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**The Interaction Between the Implementation of an  
Occupational Health and Safety Management System  
and Safety Culture : A Case Study in the Rubber  
Industry**

DAVID BAIRD

Doctor of Philosophy

THE UNIVERSITY OF ASTON IN BIRMINGHAM

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## Abstract

A prominent theme emerging in Occupational Health and Safety (OSH) is the development of management systems. A range of interventions, according to a prescribed route detailed by one of the management systems, can be introduced into an organisation with some expectation of improved OSH performance. This thesis attempts to identify the key influencing factors that may impact upon the process of introducing interventions, (according to BS8800: 1996, Guide to Implementing Occupational Health and Safety Management Systems) into an organisation.

To help identify these influencing factors a review of possible models from the sphere of Total Quality Management (TQM) was undertaken and the most suitable TQM model selected for development and use in OSH. By anchoring the OSH model's development in the reviewed literature a range of core, medium and low level influencing factors were identified. This model was developed in conjunction with the research data generated within the case study organisation (rubber manufacturer) and applied to the organisation. The key finding was that the implementation of an OSH intervention was dependant upon three broad vectors of influence. These are the *Incentive* to introduce change within an organisation which refers to the drivers or motivators for OSH. Secondly the *Ability* within the management team to actually implement the changes refers to aspects, amongst others, such as leadership, commitment and perceptions of OSH. *Ability* is in turn itself influenced by the environment within which change is being introduced. This aspect of *Receptivity* refers to the history of the plant and characteristics of the workforce. Aspects within *Receptivity* include workforce profile and organisational policies amongst others.

It was found that the TQM model selected and developed for an OSH management system intervention did explain the core influencing factors and their impact upon OSH performance. It was found that within the organisation the results that may have been expected from implementation of BS 8800 : 1996 were not realised. The OSH model highlighted that given the organisation's starting point, a poor appreciation of the human factors of OSH, gave little reward for implementation of an OSH management system. In addition it was found that general organisational culture can effectively suffocate any attempts to generate a proactive safety culture.

Key words : Organisational Culture, Safety Culture, Total Quality Management, Influencing Factors, OSH model.

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#### **ABBREVIATIONS**

OSH	OCCUPATIONAL SAFETY AND HEALTH
TQM	TOTAL QUALITY MANAGEMENT
GPTL	GATES POWER TRANSMISSION
HSE	HEALTH AND SAFETY EXECUTIVE
HSC	HEALTH AND SAFETY COMMISSION
GEM	GATES ENRICHED MANAGEMENT
MBNQA	MALCOLM BALDRIDGE NATIONAL QUALITY AWARD
EFQM	EUROPEAN FOUNDATION QUALITY MODEL
GBLP	GATES BUSINESS LEADERSHIP PROCESS
HRM	HUMAN RESOURCE MANAGEMENT
ISO	INTERNATIONAL STANDARDS ORGANISATION
HSG	HEALTH AND SAFETY GUIDANCE
QMS	QUALITY MANAGEMENT SYSTEM
SMS	SAFETY MANAGEMENT SYSTEM

## CHAPTER 1

### OVERVIEW OF THESIS

#### 1.1 Introduction and Motivation for Research

This thesis describes the development of a Safety Management System (SMS) within a rubber manufacturing company, Gates Power Transmission Ltd (GPTL). The research was undertaken over a two year case study period between October 1998 and October 2000. The project is a case study of a series of interventions as prescribed by BS 8800 : 1996 (BSI 1996), Guide to Occupational Health and Safety Management Systems. An initial status review combined with analysis by the Health and Safety Laboratory (Bottomley 1998) revealed various gaps in the management of Occupational Health and Safety (OSH). The project tracks the organisational development of the plant as various OSH initiatives are introduced according to BS 8800 guidance. The project builds upon work done by Glasgow University, Hunter and Beaumont (1993) and on work by Kirk (1998) in the area of Total Quality Management (TQM) implementation in 1998. In particular the Kirk TQM model of change ( developed within the Gates Group) is developed in the sphere of OSH at GPTL to help explain the myriad factors impacting upon any changes – whether restricting or aiding the change process. The author was appointed Health , Safety and Environmental Advisor at GPTL in June 1998. The motivation for the research arose out a need for a greater understanding of the factors which impact upon OSH performance – more specifically what factors are central in successfully implementing changes brought about by the introduction of a safety management system.

#### 1.2 Objectives of Research

The purpose of the work is to gain a better understanding of the influencing factors on a management system intervention. To allow an ease of understanding of these influencing factors TQM research and models were examined. This is the second strand of the research i.e. to test and develop a TQM model of change within a BS 8800 framework to aid explanation of the key impacting factors on the prescribed interventions. From a practitioner level the author had witnessed various initiatives

being introduced into organisations with unpredicted, sometimes disappointingly, low effects. Cox and Flin (1998), cited in Hawkins (2001), suggest that the concept of safety culture is an all encompassing phrase given to those intangible aspects that affect risk control. It is the identification of these intangible aspects, the key influencing factors, that lies at the heart of this research.

### **1.3 Chapter Contents**

This brief section gives an outline of the various chapters almost as an introductory guide to the thesis and its content. The practical experimental work is contained in chapters five, six, seven and eight. Chapter nine looks at OSH performance with chapter ten building and developing the OSH model of change.

Chapter one contains an introduction to the thesis as well as outlining the research methods used.

Chapter two consists of the literature review. The evolution of safety theory and management systems is reviewed, along with a very selective review of change literature. The foundations of Total Quality Management (TQM) and the potential utility of various TQM models are reviewed along with the links between OSH and TQM. Finally a model is selected for development to help answer the questions posed above.

Chapter three builds upon the selected model and reviews core points from the literature to build a framework for analysis within which the research is undertaken.

Chapter four describes the company and the context within which the research is undertaken.

The next three chapters contain the practical experimental and data gathering exercises. In each case the relevant methodology has been given in advance of the experimental work. It was felt better to deal with each piece of experimental work as self contained elements rather than deal with the methodologies adopted in the overall thesis in one place.



Chapter five is where the empirical data is first presented having set the context in the previous chapters. It examines the primary qualitative interview data from 1998, drawing out the key themes for analysis.

Chapter six details the interventions into the organisation and how these manifested themselves in practice. The primary data method here is anecdotal evidence and observer notes which tracked the interventions on a daily basis.

Chapter seven is primarily an exercise similar to chapter five where qualitative interview data is presented. The same question sets and format were used to allow comparison with 1998 data. This chapter examines data from the second set of interviews held in 2000 with a view to assessing the elements of the model outlined in chapter three. As a supplement to the qualitative data in chapters five, six and seven, selective results (after authoritative guidance) from a quantitative attitude survey are presented to triangulate the data sets.

Chapter eight centres on accident rate analysis attempting to shed light onto the patterns of accident rates within GPTL and the influence of organisational culture on the first line manager.

Chapter nine examines OSH performance as the proposed output of the OSH model. These key themes from the data are loaded into the developed OSH model of change in chapter ten.

The developed model in chapter ten allows an insight into the characteristics of GPTL and aids explanation of the core influencing factors on the interventions detailed in chapter six. The core and medium influencing factors are stripped out of the model to illustrate the utility of the developed model itself and its application within the facility under research.

Chapter eleven consists of conclusions and discussions.

### 1.4 Research Methodology

This section outlines the research methodology used throughout the data gathering exercises of the thesis. In chapters five, six and seven the research methodologies are given in more detail prior to presenting and analysing the experimental data. The data sources, role and influence of the researcher in relation to the project, the question sets, the interview format and techniques and the data analysis are all detailed. The decision was made to detail the research methodologies within the actual chapter to which they are referring as it was felt this allowed for greater transparency and flow. One of the main thrusts of the research is to develop a model of OSH change and as such data generation and analysis is geared towards this aim with issues like developing data categories for analysis influenced and structured by the model.

#### 1.4.1 Construction of the Study - The Case Study Approach

This research is a single site case study over a period of two years, 1998 –2000. A primary reason for a case study within one organisation is that a greater depth of understanding could be gained by focussing on one organisation, in contrast to a larger number of sites (Gummesson 2000). The study is concerned with the implementation of a Safety Management System (SMS) and its interaction with safety culture. More specifically the research attempts to gain a picture of the influencing cultural factors on SMS implementation. As Gummesson (*ibid.*) points out a case study approach allows a holistic view of a specific series of events or a specific phenomenon. In addition Yin (1994) advocates that a single case study is appropriate where the case is relevatory or exploratory, such as this research. An exploratory case study should carefully define what is to be explored, the purpose of the exploration and the criteria by which it will have been judged to be successful (Yin, *ibid.*). What is being explored is the implementation of an SMS and its interaction with safety culture. The purpose of which is too identify the core influencing factors on SMS implementation. In his discussion of the third element Yin points to two facets. These are knowing when the empirical work is complete and also the researcher being able to answer the research questions. The data collection stopped in 2000 with the second semi-structured interview set, which

allowed answers to be reached to the research questions. This fulfils the criteria set out by Yin (ibid.)

There are, therefore, a number of advantages of a single case study approach. As stated above, it allows a holistic view of a process to be gained and by so doing allows different aspects and the links between them to be studied in greater depth, than perhaps a multi-site study would allow. In addition to this, a single case study is valuable in developing tools that practitioners can implement in their respective organisations. This is because the richness of the data allows practitioners to make up their own mind regarding the applicability of any tools or methods proposed. In essence a case study allows mechanisms of an organisation to be laid bare for scrutiny.

Case study approaches are however not without weaknesses the principal one being that of making generalisations from a single case study or small group of cases. That is, the case study is not representative of the process or phenomenon under study. Generalising from case studies is possible if there is a really good grasp of the interaction of the various parts of the system under study. As Normann, cited in Gummesson (2000) puts it:

“..the possibilities to generalise from one single case study are founded in the comprehensiveness of the measurements which makes it possible to reach a fundamental understanding of the structure, process and driving forces”

The other main criticism of the case study approach is that it lacks rigour in terms of data collection and case study design. The three points discussed above by Yin do address this. But in addition, this case study has deliberately been designed to be complementary to the previous works by Hunter and Beaumont (1993), Kirk (1998) and Bottomley (1999). As such the case study and methodology are anchored firmly in previous research.

As stated above, during the research the author was employed as full time Health Safety and Environmental Advisor at the site, starting employment in June 1998. This raises another issue in terms of the role of the researcher as a participant observer.

### 1.4.2 The Role of the Participant Observer

Nachmias and Nachmias (2000) argue that the field worker or researcher gains a deeper understanding and appreciation of the organisation by actually participating in the organisation's functioning. It allows different levels of insight to be gained than by mere observation.

Hamel, Dufour and Fortin (1993) point out that the participant observer approach has the potential of letting subjectivity creep into the data collection, in that the researcher is part of what he / she is trying to measure and as such cannot get the same objectivity as from other research methods. This is countered in the thesis in that, as stated above, the author was new to the organisation, being employed only some weeks prior to the research starting. In addition to this, the author had no experience within the rubber industry itself and as such could research the safety culture and the organisation from a relatively objective standpoint. Gummesson (2000) also points out that the participant observer approach is the prevailing research method in use to identify effectively those aspects that play a significant role in organisational culture. Access into an organisation can sometimes be a major problem for researchers, more specifically satisfactory access without going through "organisational gatekeepers." This refers to persons in the organisation that are the key contacts for research with the potential problems of the "gatekeeper." This refers to selecting such things as meeting places and personnel for interview that would put the organisation in the best possible light. It is a fundamental strength of this case study that the author had relatively unlimited access to personnel and circumstances. This obviously brings into play the danger of selective bias on the part of the researcher. This is addressed by using multiple data sources – both qualitative and quantitative - allowing rich data sources to be generated. There is no doubt that being a participant observer allowed data to be captured that would have been extremely difficult for an observer only to capture, particularly in relation to aspects such as near miss reporting as described in Chapter Six.

### 1.4.3 Data Generation and Collection

The primary data source is the qualitative semi structured interview. As Schein (1996) and Marshall and Rousseau (1997) point out qualitative techniques make organisational culture and the "softer" issues more amenable to study than

quantitative methods. To supplement and triangulate the primary data source, various other secondary sources identified by Marshall and Rousseau (ibid) were used:

- Anecdotal note taking and direct observations on a daily basis also took place which allowed the BS 8800 prescribed interventions to be accurately tracked over time.
- Documentation such as corporate communication and completed inspections were also used, again support the primary data source.
- As part of a communication strategy the Health and Safety Executive's Health and Safety Climate tool (HSE 1997) was utilised which allowed a quantitative analysis of the safety climate. Advice on results interpretation was taken from Byrom (2000) and is reflected in the explanation/introduction to the survey results.

It must be recognised that both quantitative techniques and qualitative techniques have their advantages and disadvantages. However, by using data from a multitude of sources the integrity of the primary data and hence findings are buttressed from as many angles as possible.

The qualitative data is presented in chapters five, six and seven and includes interview data, BS 8800 interventions and recall of critical events. The results of the HSE Safety Climate measure are also included as supporting information.

Developments in Safety Management theory relevant to this research include Safety Management System (SMS) development and third party certified systems and behavioural safety intervention. These developments advocate certain interventions within organisations. It is to gain an understanding of what makes certain interventions succeed and others fail within an organisation that lies at the heart of the research. The key research questions are:

1. *Does implementation of an OSH management system (BS8800) improve safety performance?*

2. *What are the key influencing factors that will impact upon an OSH management systems intervention?*
3. *Can a TQM model of analysis be used to aid identification of these key influencing factors?*
4. *What is the level of interaction between safety management system implementation / intervention and safety culture?*
5. *Can a proactive safety culture develop independent of the general organisational culture?*
6. *What influence does the organisational culture have on the first line manager's ability to aid implementation of an OSH management system?*

With these in mind, the next chapter orientates the research by reviewing the relevant literature.

## CHAPTER 2

### FOUNDATIONS AND ORIENTATION OF RESEARCH

#### 2.1 Introduction

The literature that is within OSH and related areas is vast and as such a selective literature review must be undertaken to orientate the research. The literature orientation is akin to identifying a key resource and tools to ease explanation of research findings. It also ensures that the research undertaken is anchored in previous research and is on a solid foundation in this respect. The main objectives of the research are centred on safety management systems development and the influencing factors on this development. This suggests that management systems are central and that human factors are also important. Building upon the BS 8800: 1996 initial status review conducted within the organisation and also HSE (Bottomley 1998) research the key interventions fall into the “software” area in contrast to “hardware” engineering solutions.

What is reviewed is firstly the development of OSH management systems theory and practice. This literature guides the research into aspects of organisational culture. The concept of culture itself has identifiable strands, which are examined in turn. Various TQM models are then assessed regarding their utility and a model selected for development.

#### 2.2 Occupational Health and Safety Management Theory and System Development

One of the main thrusts of the research is the implementation of a SMS, according to the prescription given in BS8800:1996. This section charts the evolution of the management of occupational health and safety drawing attention to the phases through which health and safety management has passed to reach the “present day” position. The various management systems, including BS 8800 are reviewed.

### 2.2.1 From a Reactive to a Proactive Era

The first signs of concern for safety and welfare were contained in the Factories Acts of the early 19<sup>th</sup> Century. This type of legislation was adequate enough in the context of the risks that it addressed but did little to encourage broader thinking by employers. A central problem evident then and still acting as a brake on effective legislation was the slow moving and cumbersome legal systems. The ACSNI Human Factors Study Group (HSC 1993) defines three stages or phases in history where industry has attempted to address safety. The initial stage is one that focused on the outcome. That is, if an accident or incident occurs then those considered responsible are punished.

The second stage is detailed prescription in advance of the actions that must be taken. As this second stage evolved then the prescription of the process required that the hazard be assessed internally by the organisation rather than by an external body.

The third stage is where industry is encouraged to develop a safety culture. The concentration here is on the ownership of safety by every person within the organisation. A general shift in safety philosophy is still taking place away from a compliance mentality, with its associated lack of encouragement to foster constructive attitudes, towards a position where profit-enhancing possibilities are realized. The move is one from a reactive stance to a proactive one. The diagrams below typify the core elements of these approaches:





**Figure 2.1 The Reactive Organisation**



**Figure 2.2 The Proactive Organisation**

(Cox and Cox 1996)

The traditional approach to safety management was a reactive investigation approach where the focus was on the search to find a single primary cause of the accident. The other key feature of this approach was the debate over unsafe acts or an unsafe condition. The diagram below illustrates the traditional management approach of which many of the strands still influence thinking today:



(HSC 1993 )

### **Figure 2.3 The Traditional Management Approach**

This approach, discussed by ACSNI, (HSC1993) reached its peak in the concept of accident proneness and did little to advance health and safety management. This pre-occupation with unsafe acts and unsafe conditions missed three crucial issues:

- a) The single primary accident cause method is too simplistic a model for a complex process.
- b) The rigid focus on unsafe acts and unsafe conditions obscures the contribution of the role of conditions and behaviour in prevention and the requirements for precaution plans to promote these.
- c) The climate and physical environment may have been created by the decisions of engineers and managers. This may mean that errors are potentially exacerbated creating a greater loss than there would perhaps have been.

It could be argued that the Roben's Inquiry and Report in 1972 with the Health and Safety at Work Act 1974 shortly after represents a watershed as they constitute the first real attempt to involve workplace people and encourage more action by industry itself. The origins of self-regulation were set at this time. However, ACSNI (HSC 1993) contend that the implementation of the philosophy behind Robins Inquiry was ineffective as the management style and hierarchy in the United Kingdom was not receptive enough or flexible enough to embrace this philosophy.

In the area of occupational health and safety management Cox and Cox (1996) argue that management have three primary tasks:

1. Thinking through and defining the policies and goals of the organisation.
2. Making the work productive and allowing the worker to "achieve".
3. Managing social impacts and responsibilities.

This notion of goal setting is incumbent on employers in an implicit way by virtue of the general obligation to assess and manage risks. As part of a general shift away from prescription to goal setting patterns.

Underpinning the success of this method, and indeed any other risk management strategy is open communication at all levels and between all levels, with a willingness to discuss risk issues and act upon these discussions.

As part of the general shift from reactive to more proactive methodologies the abilities of accident causation models, generally speaking, fall short in their explanatory powers. ACSNI (HSC 1993) argue that accident prevention programmes must address the following core elements :

1. Multi-causation
2. Active failures - immediate and obvious causes
3. Latent failures - underlying causes
4. Skill, Rule, Knowledge Based Errors and Violations
5. A requirement to identify hazards, control risk and instigate preventive action

A model of the accident causation process is illustrated below to which allows deeper analysis than the single chain models of Heinrich (1980) and Bird and Loftus (1976).

### 2.2.2 The Hale - Glendon model

The Hale - Glendon model encapsulates the principles of the risk assessment process. The input phase is concerned with hazard identification, the processing stage with risk assessment and the output stage is analogous to the selection of control measures. The central argument of this model is that persons at risk must have the competence, skills, motivation, responsibility and knowledge to allow risks to be assessed.



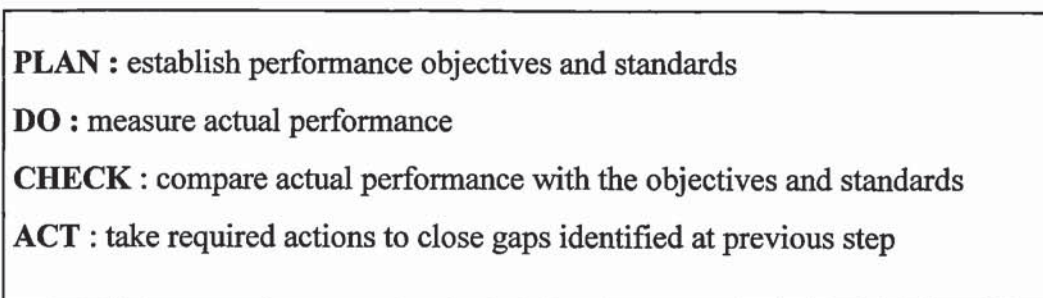
**Figure 2.4 Hale and Glendon, Behaviour in the Face of Danger Model**  
(Hale and Glendon 1997)

Health and safety management as a discipline draws upon the principles of total quality management. Reason (1995) and Buckley (1968), cited in Cox and Cox (1996) contend that employee involvement in the generation of safe operating practices is critical to ensure compliance. Current thought is on safety management systems and integrating safety into business objectives. Waring and Glendon (1997) advocate that it is becoming more and more necessary to adopt an integrated approach to managing the whole spectrum of risk. It is against the backdrop of these

developments that the Health and Safety Executive issued a Guide to Successful Health and Safety Management HS G 65 (HSE 2000, first published in 1991) and British Standards Institution developed BS8800 : 1996 (BSI 1996)

### 2.3 OSH Management Systems Development

Three primary guidelines / templates can be identified for the management of OSH. These are based on the Deming management cycle of Plan – Do – Check/ Study - Act.



(Adapted from Oakland 1995)

**Figure 2.5 The Deming Cycle**

#### 2.3.1 BS 8800 : 1996

Building upon the links between quality and safety BS 8800 (BSI 1996) gives guidelines on the integration of health and safety management into an overall management system. BS 8800 identifies two possible ways by which this process may be achieved. One is based on HS G 65 and the other is based on BS EN ISO 14001. The standard builds upon previous guidance as health and safety management as a discipline develops and evolves. The whole purpose of BS 8800 is to give guidance and recommendations on how the management of occupational health and safety may be integrated with other aspects of business performance. This is in order to:-

- a) minimise risks to employers
- b) improve business performance
- c) assist organisations to establish a responsible image within the market place

The following sections represent an overview of the two approaches suggested in BS 8800.

*2.3.1.1 Based on the HS G 65 approach*

*Initial Status Review* provides managers with a measure of the current safety performance. The review should compare existing arrangements against legislative requirements, the organisation's guidance on occupational health and safety, best practice within the organisation's employment sector and the efficiency and effectiveness of existing resources devoted to occupational health and safety management. Occupational health and safety policy is central to objective setting and making explicit senior management commitment. Again, audit and feedback from performance feed into safety policy with organising emanating from sound safety policy along with initial and periodic status review.

Following the initial and periodic status review policy should be formulated or altered to suit the findings of the review. The following summarises the key features of commitment that a safety policy should contain :

- Recognise occupational health and safety management as an integral part of business performance
- Regard legal requirements as the absolute minimum, with an emphasis on continual improvement.
- Provide adequate resources.
- Set and publish occupational health and safety objectives
- Place occupational health and safety management as a prime responsibility across all levels of management.
- Ensure policy implementation, understanding, and maintenance through out the organisation.
- Ensure employee involvement and consultation to gain commitment.
- Policy and management system review.
- Ensure adequate training and competence across the organisation to meet safety objectives.

*Organising* refers to the allocation of responsibilities through out the organisation. The most senior member of the organisation must take responsibility for ensuring that the occupational health and safety management system is properly implemented. The demonstration of senior management commitment is critical to success. Through out the organisation people need to be responsible for their own health and safety, those they manage and their own work colleagues. An awareness of responsibilities to third parties must be present as well as a general recognition that actions and inactions can effect the whole management system. Organisational arrangements should be such that the safety management system can be effectively implemented. This requires sufficient knowledge and skills to manage safety along with adequate resourcing of the health and safety function. Personnel must have the necessary authority to carry out their responsibilities. Competencies at all levels must be assured along with responsibility and accountability through out the management structure. In addition to the above open communication and information should be effective in combination with employee participation and consultation.

Up to date documentation is a key element in the implementation of the management system. Documentation should be effective and efficient and kept to a minimum to allow for compliance with legal standards.

*Planning and implementing* are key elements in the cycle. The priority here is risk assessment and control. This refers to the identification of hazards and the evaluation of risk arising from these. A risk control programme should be put in place as a result of the assessment, following a clear hierarchy of control measures. These control measures should be periodically reviewed. The effectiveness of the system should be able to be clearly seen. Besides identifying legal requirements relevant to the organisation, management arrangements should be identified and implemented to cover the following:

- a) overall plans and objectives to allow implementation of policy.
- b) operational plans to control risks identified through risk assessment and legal requirements.
- c) contingency plans for foreseeable emergencies.



- d) planning for organisational activities covered earlier under organisational arrangements.
- e) planning for measuring performance, audits and status reviews.
- f) implementing corrective actions shown to be necessary.

*Measuring performance* feeds back into all activities. An array of qualitative and quantitative measures exist. Measuring performance is a way of monitoring the extent to which policy objectives are met and includes proactive and reactive measures. Where deficiencies are found corrective action should be implemented.

*Audit* closes the loop in the management system and has a two way flow to all other activities. Audit is a deeper more critical appraisal of all elements within the system. Competence of individuals carrying out audits is central to efficient auditing. Four core questions will require to be addressed.

- a) Is the organisation's overall health and safety management system capable of achieving the required standards of performance?
- b) Is the organisation fulfilling its obligations with regards to occupational health and safety?
- c) What are the strengths and weaknesses of the occupational health and safety management system?
- d) Is the organisation doing and achieving what it claims to do?

The periodic status review should consider the overall performance of individual elements of the management system, the performance of individual elements, the findings of audits as well as take on boards internal and external factors.

#### *2.3.1.2 Based on BS EN 14001 Approach*

The first two elements of successful health and safety management based on BS EN 14001 are very similar to the HS G 65 approach. It is in the next stage of the above approach that the sequence differs. Where the HS G 65 approach has planning as the third step, for the BS EN 14001 approach planning is immediately after policy. Both audit and feedback from performance feed into planning as

previously discussed, however policy also feeds directly into planning with ramifications directly for implementation and operation. What was said for planning under the HS G 65 approach holds true for BS EN 14001 approach. In essence the two approaches are almost identical with some slight variations in ordering of elements. The approach to be chosen by an organisation will depend upon the existing systems in place. i.e. HS G 65 to BS EN14001.

What BS 8800 offers is a framework to ease the integration of occupational health and safety management into existing business functions by offering a parallel to BS EN 14001 and to an extent the ISO 9000 series. The integration of safety management into everyday business management may become more attractive for managers and practitioners alike. By making such obvious links occupational health and safety can feed off the success of existing management systems within an organisation. But, by the same argument the disadvantages of existing systems may well also transfer across. The latest development within OSH management systems is OHSAS 18001 and this will now be reviewed.

### 2.3.2 Occupational Health and Safety Assessment Series (OHSAS) 18001 : 1999

OHSAS 18001 is the latest safety management system to be developed. The system was brought about as a result of urgent customer demand (BSI 1999). It represents the distillation of various documentation pertaining to OSH management systems, including BS 8800 : 1996. It originated from the core certification bodies meeting and developing the standard to meet market demand, with little input of the kind that typified BS 8800 : 1996 and its technical committee composition. The core features are fairly similar to HS G 65 and BS 8800:



(BSI : 1999)

#### **Figure 2.6 OHSAS 18001 Systems Model**

The distinctive feature about OHSAS 18001:1999 is that it is third party certifiable, although it is not an ISO standard in the sense of the 14001 or 9001/2 standards. It is not an accredited standard by the United Kingdom Accreditation Service (UKAS). The system is founded on the management cycle of plan – do – check –

act. The standard is orientated to ISO 14001 / 9001 to allow integration if required. As the standard is taken up by industry its integrity will be tested in practice.

### 2.3.3 HS G 65 : 2000

HS G 65 consists of guidance issued by HSE on the successful management of health and safety. The Plan – Do – Check – Act cycle is in evidence as can be seen below:



(HSE 2000)

### **Figure 2.7 Successful Health and Safety Management**

The principles are advocated as being universal and applicable across all sectors as a suitable framework. The guide is in its eight edition and the 2000 edition contains revised and expanded sections on issues such as auditing and accident / incident investigation.

HS G 65 also discusses the similarities between TQM and OSH management. The point is made that quality and environment are all too often viewed as an integral

part of the business where as OSH is conversely viewed as a “ bolt on ” extra. Just as quality management underwent a shift from inspecting defects out to managing quality in – OSH has changed from a reactive to a more proactive orientation based on risk control. IOSH (1997) in their consultative document review the debate concerning the integration of Occupational Health, Environmental Protection and Quality. The argument for integration is founded on less duplication of effort, a more holistic and co-ordinated response by the organisation to risks, avoidance of compartmentalisation and an optimal design tailored to the needs of each discipline. The counter argument is that professional tensions may be generated, individuals within an organisation may perceive the whole process as yet another exercise in producing red tape and the practical difficulties may turn out to be overwhelming. The whole area and process of integration is shrouded in uncertainty and the challenges of embarking on such a route requires very careful deliberation.

The Deming cycle is reflected in the diagram on the previous page, other parallels between OSH and TQM include tools and techniques as well as a supportive culture with visible leadership. These points are also supported by Krause (1992) and Cox and Cox (1996). Reference is made to the European Foundation for Quality Management (EFQM) model as potential basis for assessment within the OSH field. What the developments in OSH and TQM for that matter demonstrate is the importance of human factors or cultural factors to provide for further continual improvement. It is to these factors that the research orientation now turns starting with the general concept of organisational culture.

## **2.4 Organisational Culture and Safety**

### **2.4.1 Introduction**

Safety culture is part of an organisation's overall culture and should be viewed as part of the overall culture (IOSH 1994, Waring 1992, ACSNI HSC 1993). The development of the concept of safety culture represents a further step in the evolution of safety management, as part of a general shift from reactive to proactive safety management with the emphasis on risk suppression before the risk is realised. This proactive approach to safety management is also required by statute, reflected in The Management of Health and Safety at Work Regulations 1999. Krause (1992) and Everly (1995) argue that the elusive pursuit of self-regulation has as its roots the notion of a proactive safety culture. The concept of safety culture itself and its assessment has its origins in organisational culture analysis, where a relatively rich body of literature exists.

### **2.4.2 Organisational Culture**

The concept of organisational culture is certainly not a new one (Clemens 1986), cited in Schein (1992). What is more recent is the in depth study and analysis of organisational culture. The study of organisational culture came to the forefront of research and practice in the late 1970's and early 1980's. It became fashionable for companies to have their cultures analysed, (Dawson 1995, Schein 1992), examples include B.P. and Hewlett Packard.

The main reasons for the sharper focus lies in the works of Peters and Waterman (1985), Deal and Kennedy (1982) and Schein (1984), cited in Buchanan et al (1997). These publications catapulted organisational culture to the forefront of management, striving for excellence. Coupled to this were the admiring glances at the rise to prominence of Japanese companies on a global scale. The point noted from the Japanese was the emphasis placed on the "softer" side of management. Buchanan et al (1997) contend that this sharper focus on organisational culture is a logical progression in the analysis of organisations. The argument presented is that organisational culture is the fifth perspective from which to analyse organisations - the preceding four being the individual, the group, the political and the structural.

Organisational culture is taken to be important as a concept because it enhances our understanding of individual behaviour and organisational effectiveness.

Techniques for assessing culture in general organisational terms are well developed in comparison to the sub set of organisational culture - safety culture.

The concept of organisational culture has not been well defined, however the following give some insight into the key elements.

Freytag (1992) differentiates between narrow and broad definitions of organisational culture. Where authors define it as essentially the “ beliefs of senior management ” (Lorsch 1985), or as “ shared tacit knowledge ” (Loius 1985), to the definition given by Cooke and Rousseau (1988)

“ organisational culture is the shared beliefs and values guiding the thinking and behavioural styles of members”

(all cited in Freytag 1992)

Waring (1992) gives a definition which he advocates as generally acceptable to organisational specialists:

“Organisational culture is a complex set of attitudes, beliefs, values, opinions, motivations, myths, symbols, quirks, language, rituals, habitual responses and ways of doing things which characterise the group of people concerned”

“ Culture is not a thing but a complex and dynamic property of human activity systems.”

(Waring 1992)

Schein (1992) contends that organisational culture contains ten overt phenomena

- Observed language, rituals, customs and traditions
- Group norms
- Espoused values
- Formal philosophy
- Rules of the game
- Climate
- Embedded skills
- Habits of thinking

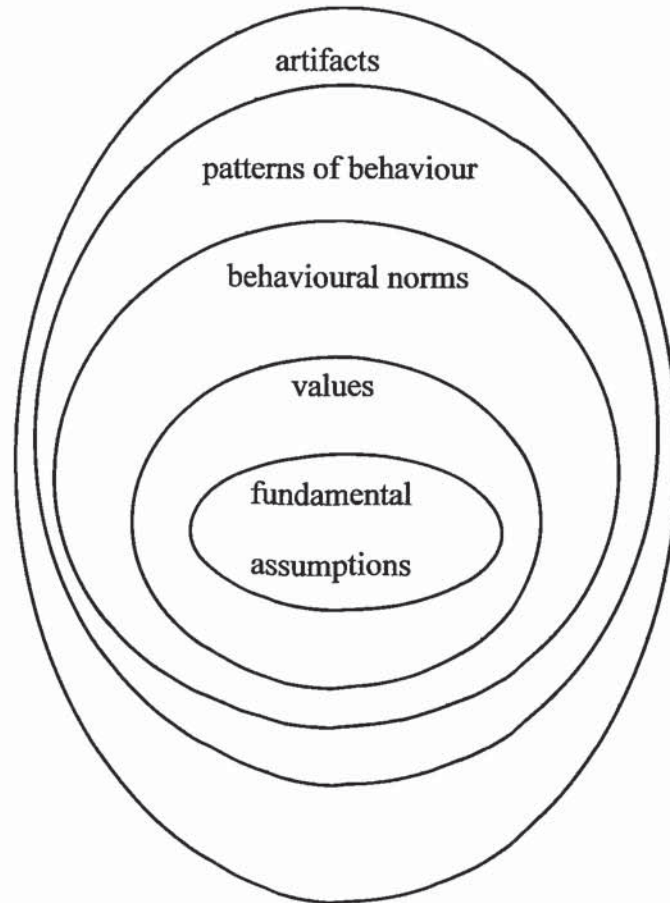
- Shared meanings
- Integrating symbols

Schein adds the use of the term culture implies a stability and depth of group norms, rituals, traditions, etc. The term culture also infers that the key elements combine to make a coherent whole. For Schein (ibid.) organisational culture is defined as:

“A pattern of shared basic assumptions that the group learned as it solved its problems of external and internal integration, it has worked well enough to be considered valid and therefore be taught to new members as a correct way to perceive, think and feel in relation to those problems”.

Of note in Schein’s definition is the absence of overt behaviour. Schein argues that the patterns of behaviour which are observable flow from the core / basic assumptions. These core assumptions represent the essence of culture. Building on broad definitions Dawson (1995) refers to culture as a “software of the mind.” The primary tenet to be drawn from Dawson’s argument is that culture is made up of various layers which reflect a set of core shared values and assumptions. This essentially represents an elaboration or variation on a theme advocated by Rousseau (1990), cited in Freytag (ibid.); and shown graphically overleaf.





(adapted from Rousseau 1990)

**Figure 2.8 Layers of Culture**

Therefore authors (e.g. Dawson 1995, Schein 1992) in the field of organisational culture identify that there are various layers to culture, which can be observed using various techniques.

At this point it is worth reviewing briefly the three main ways that corporate culture can be examined. The most common approach (Martin 1992, cited in Mullen and McMillen 1994)) is the integrationist approach which argues that corporate culture should be analysed as a cohesive whole with the various layers radiating from, but at the same time, feeding back into a set of shared basic beliefs and assumptions -

and assumptions - very much in the Schein approach. The perspective known as differentiation analyses culture from the premise that it is made up of a collection of smaller sub - cultures each with their own identity.

The last and perhaps least favoured viewpoint of analysis is one that essentially argues that there is no such thing as corporate culture as organisations are too fragmented and split to form any real cultural identity. The integrationist approach is the one that is perhaps the most prominent and is the perspective which this research will take.

In summary then organisational culture has various definitions from which central themes emerge :-

- There are core assumptions which impact somehow on related layers of an organisation's culture.
- Among these related layers there are attitudes and beliefs that via some mechanism may impact on behaviour and vice versa.
- Organisational culture is a stable cohesive concept which generates problems for culture change.
- Various layers are more tangible than others with corresponding ease in assessing them.

### 2.4.3 A Definition of Safety Culture

The concept of safety culture has emerged to a prominent position in recent years, In the wake of such disasters as the Kings Cross fire and Piper Alpha calls were made in the reports to examine the adoption of a proactive safety culture. The Cullen Report stated that:

“it is essential to create a corporate atmosphere or culture in which safety is understood to be, and is accepted as, the number one priority”

HS G 65 guidance on successful health and safety management (HSE 2000 and previous revisions), BS 8800 (BSI 1996) and CBI (1992) all make substantial reference to the development of a pro-active safety culture. Safety culture analysis forms an extension of the more general work on organisational culture. According to Waring (1992) safety culture refers to those aspects of organisational culture which affect safety.

The concept of safety culture was introduced by Zohar in the late 1970s. He found that an identifiable set of key factors were common to highly safe companies. However, the term safety culture is wider than safety climate capturing the notion of residing within an organisation (Glendon and McKenna 1995) in contrast to the more passive connotations of safety climate. Perhaps the clearest distinction can be drawn by viewing safety climate as more of a static picture of the outputs of an organization's safety culture (Byrom and Corbridge 1997). A formal definition of safety culture is given in the ACSNI Report Organising for Safety:

“ The safety culture of an organisation is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to and the style and proficiency of an organisation's health and safety management.

Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures. ”

(ACSNI HSC 1993)

The International Nuclear Safety Advisory Group (INSAG 1991) state:

“ Safety culture refers to the personal dedication and accountability of individuals engaged in an activity which has a bearing on the safety of nuclear power plants ” key elements include “ an all pervading thinking, ... prevention of complacency... a commitment to excellence and the fostering of both personal accountability and corporate self regulation on safety matters ”

Safety culture is therefore manifested by a collective commitment to safety stemming from shared accurate perceptions of risk and positive attitudes reflected in patterns of behaviour. IOSH (1994) contend that the measurement of safety culture may prove time-consuming, complex and unrewarding, a point reinforced by INSAG (1991) and recommend focusing on key indicators which taken together constitute a positive health and safety culture. IOSH identify the importance of -

- demonstrated commitment and leadership of directors and senior managers
- acceptance among managers that health and safety is a line management responsibility
- participation in health and safety decisions by personnel at all levels
- training to promote competencies in health and safety
- shared perceptions of : the nature of hazards, the magnitude of risks and the practicality of and effectiveness of preventive plans

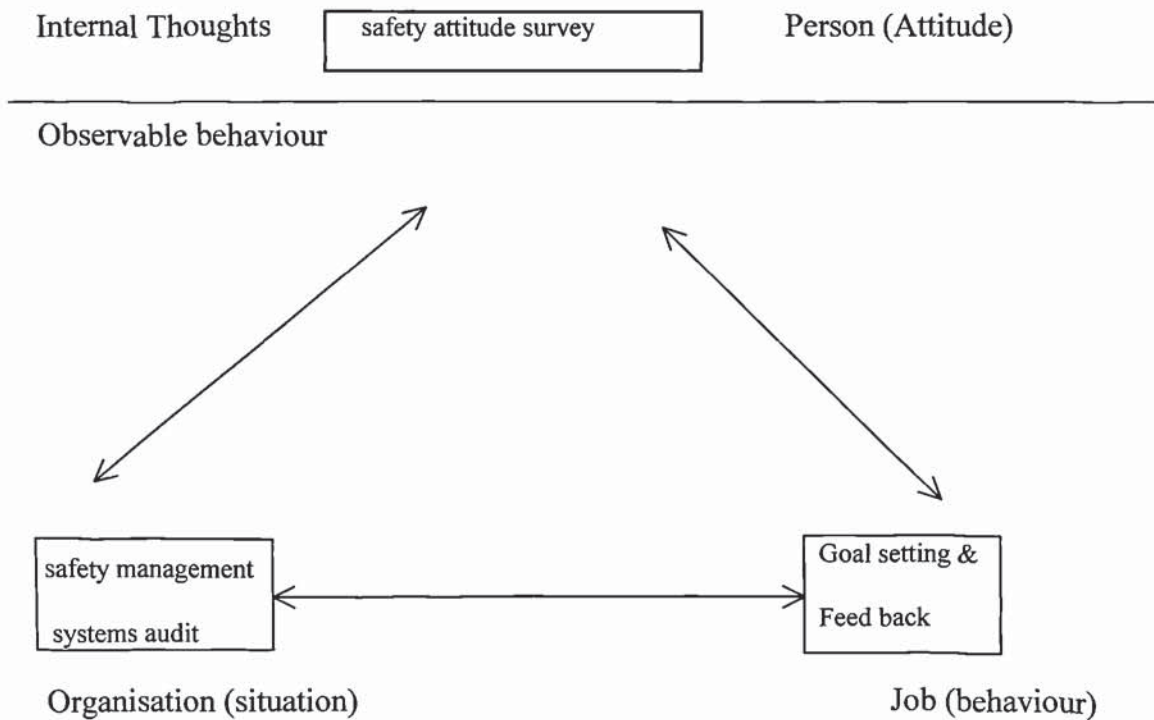
In common with definitions of organisational culture, safety culture has common themes aptly illustrated by IOSH in their policy statement. However, safety culture is a multi - faceted concept with many of its constituents seemingly intangible and perhaps as a result difficult to assess. In common with organisational culture, safety culture has various layers which emanate and in turn influence a set of shared core assumptions. The table below illustrates the case in point:

**Table 2.1 Levels of Organisational Culture**

Level	Component	Examples
Manifest	Symbolic Artifacts	safety award schemes; prominent displays of lost time accident figures; safety policy statements.
	Language	zero LTAs; safety management systems; loss prevention; we have a new safety culture.
	Stories	the day that the managing director went on a safety tour
	Rituals	continued use of canaries as mine gas detectors; safety award presentations.
Strategic	Normative Conduct	use of hard hats on construction sites; consensus or conflict in safety committees
	Strategic Beliefs	the Quality plan and the safety plan must be closely linked; safety is a matter for operational managers and the safety department.
Core	Ideologies	safety dominated by particular groups values and assumptions eg. those of engineers.
	Values	safety is a managerial responsibility; profit before safety
	Assumptions	accidents are caused by stupidity; attitudes towards safety can be changed quickly by directives and training.

(Waring 1992)

The extensive work by Cooper & Phillips (1993) has gone some way to reaching a working definition of safety culture. Building upon the social learning theory of Bandura (1997), Cooper (cited in Cameron 1997) proposes a reciprocal influence model of safety culture:



(Adapted from Cameron 1997)

**Figure 2.9 Reciprocal Model Influence of Safety Culture**

This approach essentially combines the two competing schools of thought in explaining behaviour. Behaviourists argue that observable behaviour is the main route of inquiry and analysis and that behaviour is a function of its consequences, i.e. the environment shapes behaviour. In broad terms the counter argument contends that covert thought processes eg. attitudes are the main factors to be analysed in explaining behaviour. This complementary approach advocated by social learning theory can accommodate both environmental factors and internal forces. This approach has been recognised by HSE (1989) in Human Factors in Industrial Safety, stressing the interaction of the individual, the job and the organisation. The essence of the model is that attitudes can be measured by a safety climate questionnaire. This uses a Lickert style format and will be discussed in detail later. Goal setting and feedback constitute a behavioural intervention eg. Duff

et al (1993). Safety management systems audits are well developed tools for measuring the management factor and there are a host of proprietary systems for doing just this. The model has much to complement it in that it attempts to make tangible the seemingly intangible concept of safety culture.

Safety culture has many facets which combine to form the overall concept. These are evident in the ACSNI definition of safety culture and each of these strands will now be reviewed individually in turn to build up a battery of the relevant explanatory tools for further use in the analysis of results. The literature above suggests that attitudes and behaviour, leadership, risk perception, communication and trust are central.

## **2.5 Attitudes**

### **2.5.1 Attitudes and Behaviour**

Attitudes to safety have been the focus of much research (Cox & Cox 1996, Cooper 1993). A link between attitudes and behaviour may be present. It is the change of attitudes to hazards and eliminating unsafe behaviour by changing behaviour patterns that lie at the heart of research into attitudes, i.e. attitudes and behaviour are somehow both cause and effect. It is the management of this that is one of the central concerns regarding safety culture development and measurement.

Psychologists (Dobson et al 1988) typically define an attitude as:

“a relatively permanent learned orientation or disposition for a person to respond positively or negatively towards a particular object or concept.”

( Dobson et al 1988 )

The concept of attitude is an ambiguous one, however most definitions share the point that attitudes are learned. Most definitions also encompass three main elements:

Affective: reflects an individual’s feelings towards an object.

Cognitive: equates with what an individual believes is so.

Behavioural: consists of an overt expression of attitude in behaviour.

Much of the ambiguity surrounding the concept of attitude may well lie in the complex interaction of the components that go to make it up - beliefs, values, opinions as well as overt behaviour (Dobson et al 1988). A belief is the acceptance of a proposition (Morgan and King 1971). What produces a negative or positive attitude is the value attached to the attitude, where a value may be thought of as an individual's conception of what is socially desirable. Much debate is centred on the existence of the distinction between attitude and value. Another interacting variable is that of opinion i.e. a verbal expression of an attitude. As can be seen below the models regarding the possible linkages between attitudes and behaviour illustrates that behaviour itself may well directly influence attitudes. What can be taken from all this is that attitudes are complex in their formation and that measuring such a concept may be fraught with pitfalls.

The notion that attitudes are direct predictors of behaviour is inadequate. As Thurstone points out:

“ All we can do with an attitude scale is to measure the attitude actually expressed with the full realisation that the subject may be consciously hiding his true attitude or that the social pressures of the situation have made him really believe what he expresses. ”

(Thurstone 1977)

Indeed studies in the field of occupational safety (Glendon & Hale 1984), cited in Cox & Cox 1996 found attitudes to be poor predictors of behaviour, a point reinforced by the investigation into the Clapham rail disaster where time and again safety concerns were noted, however:

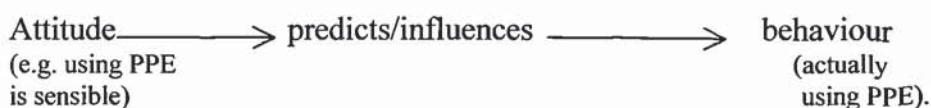
“... the remainder of the evidence demonstrated beyond doubt two things :

1. there was a total sincerity on the part of all who spoke of safety but nevertheless ;
2. there was a failure to carry out those beliefs through from thought to deed.”

(Budworth 1994).

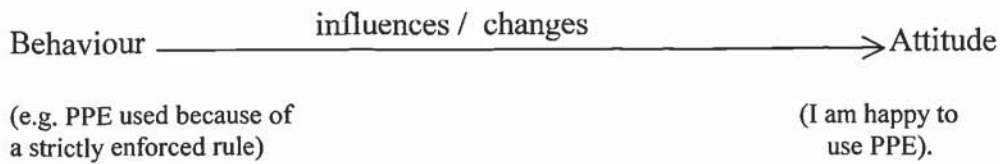
Glendon and McKenna (1995) identify four possible linkages between attitudes and behaviour. These can be summarised:-

a). Attitudes directly influence behaviour





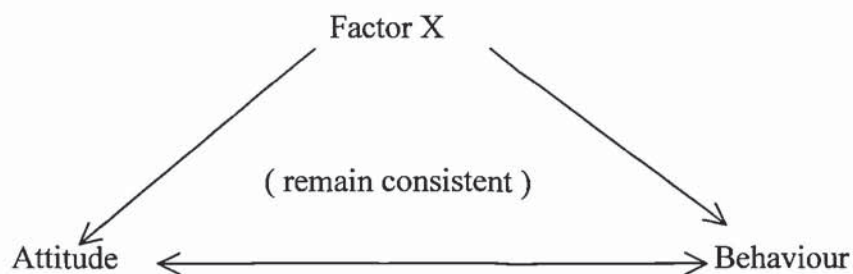
b). Behaviour forms and shapes attitudes.



c). A mutual influence model where attitudes influence behaviour and vice versa mutually influences



d). A third factor is a prime causal agent in influencing both behaviour and attitude.



A more complex theory of reasoned action (Fishbein and Ajzen 1975, cited in Glendon and McKenna) contends that there is a causal link between attitudes and behaviour but this can only be uncovered by a much deeper analysis. Essentially, if the restrictions on a person's behaviour can be quantified and identified then inconsistencies between attitudes and behaviour can be accounted. Such restrictions will include e.g. social norms, person's beliefs about the consequences of their behaviour, etc.

Therefore there are constraining or modifying influences, the problem of people responding in a way that they perceive as socially acceptable and also the issue of a response set - where an individual may have the tendency to constantly agree or disagree. There are however techniques in measuring attitudes that can combat these to some extent e.g. stressing anonymity of response, use "red herrings" to mask the real aim of the test, etc.

The theory of planned behaviour (Ajzen 1991) develops the theory of reasoned action further by suggesting that behaviour is driven by the intention to act. The intentions are shaped by among other things a perceived behavioural control element. Where this refers to the ability to control e.g. a hazard. (Cox & Cox 1996). Various other models exist to explain the relationship between attitudes and behaviour (e.g. Snyder & Kendzeirski 1982, cited in Cox et al, Becker & Rosenstock 1987, cited in Glendon & McKenna).

Before reviewing methods of measuring safety attitudes there are general points which should be taken on board. The Human Factors Study Group (ACSNI 1993) suggest that attitude formation is influenced by various factors.

Social groupings and organisations that people join dictate risk acceptability and displayed attitudes. A point reinforced by Douglas et al (1985). A relatively high level of job satisfaction may well aid the formation of positive attitudes to safety. A study cited by the Human Study Factors Group adds some support to this notion. Attitudes towards the control of risk i.e. perceived safety was studied on offshore drilling platforms and it was found that two main predictors of attitude were present in this study - specific safety measures and general organisational and social factors. The problem of the risk taking individual or adventurousness is a potential source for the generation of poor attitudes to safety, apparently driven by a desire to appear macho or fearless. Alternatively poor attitudes towards safety may be as a result of an individual seeking attention or acting the “clown” at the expense of safety. Evidence to support this is given in studies conducted by Leaven et al (1976) and Andriessen (1978), both cited in ACSNI (ibid.). Peer pressure may be the most powerful tool to correct unconstructive attitudes.

Cox & Cox (1991) illustrated that attitudes in a European workplace were a mix of evaluation, constructive attitudes and beliefs, and unconstructive attitudes and beliefs. For safety management strategy to succeed in developing positive attitudes to safety “reinforcers” should be used to reward constructive attitudes and beliefs and “extinguishers” should be used to eliminate unconstructive beliefs and attitudes.

The “locus of control” may well be another factor impacting upon general attitudes and therefore upon attitudes to safety. The distinction to be made is one between internal and external control. The latter refers to the belief that events are dictated by luck, chance and fate. Where as with the former a degree of control lies with the individual.

Reason (1990) gives a powerful analogy drawing on biological images. A distinction is made between active errors that finally trigger an accident and deeper rooted causes - pathogens which go unnoticed and build up over time to spawn a systems failure.

### 2.5.2 Attitude Measurement

The most common way to measure attitudes is by developing an attitude scale. Glendon and McKenna (1995) identify different types of attitude scale - Semantic Differential, Thurstone, visual analogue and the Lickert scale. Anastasi (1961) describes attitude scales as instruments to provide a quantitative measure of an individual’s relative position along a uni - dimensional scale.

The Thurstone method is a way to devise attitude scales whereby a large number of statements are collected which reflect particular attitudes towards a topic. These are then filtered to produce a set of forty or so statements reflecting the range extremely favourable to extremely unfavourable, on an eleven point scale. This attitude questionnaire is then piloted on subjects who indicate which items they agree or disagree with. Subjects responses can then be scored and a measure of their attitude towards a particular topic gauged.

The Semantic Differential Scale builds on previous work but takes into account factors that people call on to make a judgment. These are namely - evaluative, potency and an activity factor. The Lickert scale is the best known one and the most common one used in safety research. Various studies (e.g. Cooper and Phillips 1994, Phillips et al 1993, Budworth 1994, Cox and Cox 1991) have utilized such a scale. The essential elements in developing a Lickert scale are selecting a number of

statements which reflect favourable and unfavourable items. Usually a five or seven point scale is given across a range of strongly agree to strongly disagree.

Care must be taken in developing such a scale with adequate testing and research to ensure that inherent weaknesses are resolved, for example wording statements to ask or present the same issue in two different ways to minimise any tendency to respond in a socially favourable way, rather than gaining a true reflection of the attitude. A European example (Cox and Cox 1991) was concerned with the common architecture of attitudes across occupational group and country. Attitude measurement for the authors is a five stage process:

**Table 2.2 Attitude Measurement : A Five Stage Process**

Stage	Process
1. Initial discussion framing concerns and planning design.	Focus groups or representative discussions yielding verbatim data records. Developing pilot attitude statements and pilot questionnaire instrument
2. Pilot study / development	Pilot study distributed , reliability studies and subsequent refinement validation.
2. Questionnaire distribution and data collection	Refined questionnaire distributed to test population and confidential data collection
4. Data analysis	Data coding and analysis using computer based statistical packages (BMDP or SPSS). Factor analysis to explore underlying structure
5. Feedback	Feedback takes several forms including written, verbal and formal representations.

(Cox and Cox 1991)

The study aimed to uncover the architecture of data derived from attitude statements. It concluded that in the study there was a mix of evaluation, and constructive and unconstructive beliefs about safety. The authors suggest that strategies for improving safety culture through change should consider two approaches. The

extraction of unconstructive and negatively beliefs coupled with the reinforcement of positive calculations and constructive beliefs represents a “behaviour modification” approach.

### 2.5.3 Attitude Change

Given the complex link between attitudes and behaviour it is not surprising that the theory and practice of attitude change is uncertain. Rules of thumb however have been developed (HSC 1993).

The work of Hovis, Janis and Kelly (1959), cited by HSC(1993) suggests that the whole area of attitude change should be viewed as one of who says what to whom, via what channel and with what effect. A summary of their findings illustrates the more important aspects of attitude change.

Who : This is concerned with the source of the message. Where a source is perceived to be powerful, prestigious, credible and relevant then there is an improved chance of the message giving the desired effect. An additional important factor here is if the source is perceived to be a person “like me.”

What : A clear two sided argument holds greater sway over an audience as does the emotive content of a message.

To Whom : The message must be tailored to the audience i.e. be relevant to them.

Channel : A more personalised face to face approach carries more weight.

With What Effect : The best predictor of behaviour (purely in the context of attitude study) is the particular attitude towards a specific act; account must be taken of other impacting factors.

(Adapted from Hovis, Janis and Kelly 1959)

The theory of Cognitive Dissonance (Festinger 1957) holds that behaviour does not always align with attitudes. When this happens then an individual experiences discomfort and attempts to realign attitude and behaviour. Anchoring is also an effect that can lead to an inaccurate revision of attitudes in relation to a hazard as an individual does not shift their attitude enough to account for the new information.

#### 2.5.4 Attitude Measurement as an Indicator of Safety Culture

The measurement of attitudes as an indicator of safety culture has been used by various researchers to measure the effects of interventions on a safety management system. Phillips et al (1993) expanded on the earlier work of Zohar (1980). A fifty item safety culture measure was developed building upon the eight dimensions of safety climate identified by Zohar:

1. Importance of safety training programmes.
2. Management attitudes towards safety.
3. Effects of safe conduct on promotion.
4. Level of risk at work place.
5. Effects of required pace on safety.
6. Status of safety officer.
7. Status of safety committee.
8. Effects of safe conduct on social status.

Phillips et al developed a fifty item safety culture measure which was distributed to 524 employees in a manufacturing plant in the South West of England. It was concluded that the dimensions given by Zohar could be reduced to direct and indirect factors. The direct factor includes management attitudes and actions, level of risk and effects of work pace. These factors had high internal reliability in the study. The indirect factor is concerned with matters such as status of safety committees and status of safety officer.

Cooper and Phillips (1994) utilised a safety climate measure prior to a goal setting and feedback exercise. The findings supported the notion of direct and indirect factors and that the safety culture measure itself had high internal reliability. It was also concluded that the goal setting and feedback exercise impacted upon safety attitudes in a positive way.

This approach of measuring safety climate has also been used by Cox et al (1991) and Budworth (1994). HSE (1997) have also developed an “off the shelf package” for measuring safety climate.

It would appear that the safety climate measures correlate well with other indicators of safety performance. Overall the concept of measuring safety culture in this way is still in its infancy and from a qualitative standpoint is open to criticism.

In conclusion then attitudes are enduring but by no means fixed. They are complex in their formation and are not easily manipulated, as such measuring attitudes in this quantitative way is still being tested and validated. In summary the focus on attitudes is the means to an end which is altering behaviour. A central tenet of safety culture is management behaviour and commitment and it is to this strand that the literature orientation is now guided.

## **2.6 Leadership**

The aspect of leadership dictates demonstrated levels of commitment, behaviour and also organisational priorities. As such it is a central facet of organisational functioning, the impact of which may be fundamental on an OSH intervention. There are many definitions of leadership. A selection is given below cited in Sadler (1997) and Grint (1997):

“The process of persuasion or example by which an individual (or leadership team) induces a group to pursue objectives held by the leader or shared by the leader and his or her followers”

(John Gardson)

“An activity - an influence process - in which an individual gains that trust and commitment of others and without reliance on formal position or authority moves the group to the accomplishment of one or more tasks”.

(Walter F Ulmer).

“Leadership is the ability to get men to do what they don't like to do and like it”

(Harry S Truman).

The point to be made here is that there are as many definitions of leadership as those who have tried to define it. However, in spite of this there a number of components which can be identified. Central amongst these is that leadership is an activity or a process. It is not merely an observable trait but a transactional event between the leader and his or her followers. There is a two way transfer of influence between the parties. As such the process or activity of leadership involves power persuasion and

influence. In many cases these aspects are invested within the leader through the authority given by the organisation to the individual or position. This process involves prime actors i.e. leaders and followers and produces outcomes.

Some of these outcomes may be:

- achievement of goals.
- enhancement of group cohesion.
- cultural change within the organisation.
- gaining the commitment of individuals to achieving objectives/goals.

Bevalas (1969), cited in Sadler (ibid.) draws a distinction between the process of leadership and the intrinsic quality of leadership. This carries implications for research on leadership the main one being that leadership must be viewed and assessed within the context of decision-making, organisational culture and functioning. Allied to this distinction is that leadership exists at differing levels - in interpersonal terms e.g. first line supervision and institutional. The former refers to leadership in the sense of group working and achieving day to day tasks. The latter refers to developing and maintaining values and beliefs, defining direction, policy and strategy.

There are therefore identifiable components within the concept of leadership. These components can manifest themselves in the leadership style of an individual or team. In a similar vein to the linkage between attitudes and behaviour the linkage between managerial style and efficiency and effectiveness in the achievement of excellence in OSH performance is somewhat unclear.

Before moving on to discuss leadership style directly, it is worthwhile to dwell upon the arguments presented by Schein (1992). Accepting that safety culture is a sub-set of organisational culture then questions posed by Schein hold at least the same relevance to safety culture as to organisational culture. For example:

“How do companies with similar external environments and founders of similar origins come to have entirely different ways of operating over the years? Equally mysterious are the evolution of culture



and the degree to which culture at times seems to resist change. Why do some cultural elements survive even though they seem to serve no useful purpose, and why do they sometimes survive in the face of intense efforts by leaders and/or group members to change them?"

(Schein 1992)

Given Schein’s perspective of culture he argues that in a new organisation the founder(s) generate the cultural beginnings. Typically founders have high levels of self-confidence and determination. They have strong assumptions about the nature of the world, the role of organisations within that world and how the truth is arrived at. These traits allow founders to impose their views on others within the organisation and on any new members. Through a process of socialisation leaders can embed culture within the organisation. There are a variety of mechanisms for doing this - a difference can be noted between primary embedding mechanisms and secondary articulation and reinforcement measures.

**Table 2.3 Culture Embedding Mechanisms**

<b>Primary embedding mechanisms</b>	<b>Secondary Articulation and Reinforcement Mechanisms</b>
<p>What leaders pay attention to, measure and control on a regular basis.</p> <p>How leaders react to critical incidents and organizational crises.</p> <p>Observed criteria by which leaders will allocate scarce resources.</p> <p>Deliberate role modeling, teaching, and coaching.</p> <p>Observed criteria by which leaders allocate rewards and status.</p> <p>Observed criteria by which leaders recruit, select, promote, retire and excommunicate organizational members.</p>	<p>Organization design and structure.</p> <p>Organizational systems and procedures</p> <p>Organizational rites and rituals</p> <p>Design of physical space, facades, and buildings.</p> <p>Stories, legends and myths about people and events.</p> <p>Formal statements of organizational philosophy, values and creed.</p>

(Schein 1992)

One of the most important aspects in identifying an organisation's priorities are the issues to which the leader systematically pays attention. This point is supported by ACSNI (HSC 1993) and also implicit in Duff et al (1993). Where management visibility and demonstrable commitment to OSH are highlighted as powerful contributors to safety culture.

### 2.6.1 Leadership Style

The strategies and styles of leadership implicit in theories such as McGregor's Theory X and Theory Y, and Maslow's hierarchy of needs have moved on somewhat at least in terms of analysis (Sadler 1997).

Early studies by White & Lippitt in 1939 and 1940, (cited in Sadler) form the basis of much of the research and work on leadership today. Both were social psychologists conducting experiments into the evaluation of the effectiveness of leadership styles. The three styles of leadership identified were autocratic, democratic and laissez-faire. Different results were produced with regard to the style of leadership and quality and productivity. Under the autocratic style productivity levels were the highest. However, in the absence of the leader productivity levels dropped sharply. The quality of work was judged to be best under the democratic style of leadership. Under the Laissez-faire approach productivity actually rose. Although the design of the study may be criticised as basic or even primitive further research does tend to support the findings.

A criticism levelled at early studies in leadership is that the subject tended to be viewed in black and white terms. Tannenbaum and Schmidt (cited in Sadler 1997) argue that this degree of polarisation is not as marked. In practice a scale with autocratic and democratic as its respective end points has at least two other styles of leadership located on the continuum i.e. persuasive and consultative. The persuasive leader still makes the decisions uni-laterally but puts great effort into selling them to others and into generating enthusiasm for set goals. The consultative leader confers with group members before taking decisions. Research does indicate that leaders tend to use one style of leadership consistently over time.

Research at the Ohio State University in the 1940s pointed to two key elements of leadership behaviour - consideration and initiation of structure. This postulation was derived from questionnaire data. As ACSNI (HSC 1993) illustrate, these dimensions may be more easily understood as caring and controlling. The caring dimension refers to behaviour such as helping subordinates, being available, friendly and looking out for their welfare. The controlling dimension is essentially reference to task orientation i.e. setting targets, rule and procedures and getting subordinates to follow them. Leaders will usually follow the style of the organisation. At the present time there is a scarcity of information on the most appropriate style for management to adopt in the caring / controlling balance in the field of safety management.

### 2.6.2 Styles of Leadership Theories

Probably the best known work in the field of leadership development is Blake and Mouton's managerial grid. The model below has two intersecting axes with the X axis concern for results and the Y axis concern for people. The grid portrays five major leadership styles:



(Northouse 1997)

**Figure 2.10 The Managerial Grid**

- a) Authority - Compliance (9,1) - This style of leadership is autocratic, demanding and purely results driven. Communication and concern for people and only means to an end.
- b) Country Club Management (1,9) - This style has concern for people as the main focus. Inter personal relationships are central along with concern, open communication, eagerness to help and no real emphasis on production.
- c) Impoverished Management (1,1) - Neither concern for task or people . Leadership style is one of merely going through the motions with minimal communication.
- d) Middle of the Road Management (5,5) - As the name suggests the concerns for people and production are intermediate. Expediency is the identifiable trait with the middle ground being secured for the sake of both task and people.

- e) Team Management (9,9) - A strong emphasis is placed on both task and inter personal relationships. The promotion of participation and team work are stressed in order to achieve goals.

Blake and Mouton (ibid.) have also identified a paternalism / maternalism style where by 9,1 and 1,9 are both used dependent upon the situation. The opportunistic leader uses any one of the five styles for the purposes of personal advancement.

There are a host of related theories on leadership style most being variations on the themes identified above. These are summarized below from Sadler (1997) and Northouse (1997).

**Table 2.4 Summary of Research on Leadership Style**

<u>Year</u>	<u>Researcher</u>	<u>Theoretical Contribution</u>
1940s	Ohio State University	Identification of 2 main dimensions of leadership style - consideration and initiation of structure.
1958	Tannenbann and Schmidt	Continuum of leadership style across spectrum ranging from autocratic to democratic

Continued overleaf.....

<u>Year</u>	<u>Researcher</u>	<u>Theoretical Contribution</u>
1950	Michigan State University	Production centred supervision Employee centred supervision
1970	J. Reddins	Reddins 3D Theory identifies “task orientation” and “relationships orientation”. Contends that no one of these styles is necessarily more effective than any other.
1961	Renis Likert	Job centred supervision gave low efficiency in studies. Two types of autocratic leader - Exploitative authoritarian restricts communication to top down. Benevolent authoritarian: allows upward flow of communication but restricts this to things he/she wants to hear.
1969	F. Feilder	Contingency Theory and least preferred co-worker test (LPC), results were the type of leadership behaviour is contingent on the favourableness of the task situation.
1988	Hersey and Blanchard	Situational Leadership. Appropriateness of the leadership style is a function of the situation.
1989	Badavacco and Ellsworth	Leaders behave and solve problems according to their own personal philosophies - political, directive and values driven.

(Derived from Sadler 1997 and Northouse 1997)

What has emerged from the theories above is that there is little in the way of definitive answers to the fundamental question – when does a particular leadership style work best?. What can be suggested is that certain task / hard leadership styles

may not yield returns where an aspect has a central human / soft side – for example improving OSH performance. The next strand of safety culture identified by ACSNI is that of risk perception, this will now be reviewed.

## 2.7 Risk Perception

Before an individual can take action in the workplace to avoid a risk a judgement in relation to the seriousness of the risk must be taken. This process is called risk perception and is a central strand in the concept of safety culture.

“One of the main characteristics of a positive safety culture is that every individual member of an organisation accepts primary responsibility to behave as safely as possible... for this to work effectively the employee must have an accurate perception of the risks involved in different aspects of the work”

(HSC 1993).

Risk perception and its analysis has its origins in psychology and as such an overlap exists between the study of risk perception, attitudes and behaviour. Perception in the field of psychology is a fairly narrow and technical discipline, perhaps too restrictive to allow an accurate insight into occupational risk perception. However, one of the identifiable trends in the area of risk perception is the widening of the whole concept of risk perception and the adoption of a more holistic approach drawing on expertise from other academic and practical disciplines (Royal Society 1993). In relation to risk perception the concept being used refers to a cognitive process i.e. how an individual or population thinks, feels and knows about a risk. (HSC 1993). The Royal Society Report (1993) defines risk perception from the perspective of the social sciences where risk perception

“involves people’s beliefs, attitudes, judgments and feelings, as well as the wider social and cultural values and dispositions that people adopt towards hazards and their benefits”

(Royal Society Report 1993).

Much of the early research on risk perception focused on the differences between expert judgement and lay judgements on what actually constituted an acceptable level of risk. Early assumptions were based upon expert judgements being quantifiable and objective, whereas, public judgements were biased and irrational.

Early research by Slovic, Fischhoff and Lichtenstein (1981) and Upton (1982) can be summarised (HSC 1993). Three different groups of people were asked to rank 30 hazardous activities which were then compared against experts. The research shows significant findings. There is a reasonable measure of agreement between the groups on some items. However items such as nuclear power show marked differences between groups. It would appear that individuals consistently across the groups were not equating risk purely with the number of fatalities. That is, other factors were involved in the process of perceiving the relative risk of an activity. This supplements research findings by Lichtenstein (1978) where participants overestimated deaths from unknown, infrequent hazards but underestimated risks from hazards with which they were familiar. It also appeared that people relied on the availability heuristic i.e. where an event will be recalled as more probable if it can be easily imagined. The existence of biases such as these is supported by the Royal Society Report (1993), which argues that it is the characteristics of hazards rather than the abstract concept of risk that people tend to evaluate. Risk perception is a human phenomenon and to reduce it to a mathematical model of risk is inappropriate. In addition to the trend identified earlier i.e. a widening of the input into the field of risk perception from other disciplines, additional trends can be identified.

### 2.7.1 Objective versus Subjective Risk

Accident data and fatality rates are hard data. Objective risk can be expressed in terms of probability of death per 100, 000 , deaths per year, per hour, etc. These figures are extrapolated from previous accident data and the use of probability statistics. Quantitative Risk Assessment and Probabilistic Risk Assessment are essentially exercises aimed at producing an objective measure of risk from a nuclear installation or chemical plant. However, the assessment and perception of risk is ultimately dependent on human judgement. The distinction between objective and subjective risk assessment is being eroded. It was found by Fishhoff and MacGregor (1982), cited in Dobson et al, that the rank ordering of lay fatality judgements is relatively consistent and that people are drawing on a whole range of qualitative judgements and biases. Some of the attributes include inequity, involuntary



exposure, benefits not highly visible, etc. Work by Slovic (1980), cited in HSC identifies core influences / factors :

Dread Factor	- inequity, uncontrollable, involuntary.
Unknown Factor	- effect delayed, not observable.
Numbers exposed	- self explanatory.

The key finding was that the higher the dread factor the more people want the risk reduced. Later work tends support this.

Therefore a related trend is that risk perception is not affected only by an individual's judgement with the accompanying biases but must be viewed in a much wider sense. Risks must be seen within the wider social, political and cultural sphere, a point supported by Douglas et al (1989) who argue that risk is essentially culturally defined.

The notion of risk communication has undergone a redefining and emerged as a key topic. A whole range of qualitative human elements impact upon risk perception and the lines between objective and subjective risk are very blurred.

In light of the difficulties in quantifying risk and the points raised above, the question of what actually constitutes an acceptable level of risk is pertinent. There are three main ways that this has been decided in the past - expert judgement, cost benefit analysis and boot strapping (use of previous risk data). There is no single definitive number to express an acceptable level of risk. Sir Frank Layfield investigating the Sizewell B Nuclear Power Plant (HSE 1990) concluded that acceptable risk does not reflect the seriousness of risk. To be more precise the term tolerable risk should be used, where tolerable risk refers to a willingness to live with a risk to secure benefits in the knowledge that it is adequately controlled. The ALARP principle is the criterion used i.e. as low as is reasonably practicable.

In summary then there are a number of debates within the area of risk perception - tolerable risk versus acceptable risk, objective versus subjective risk, the impact of biases in the processing of risk information and the multi- dimensional nature of the

concept necessitating a much wider perspective. The implications for using some sort of measure of risk perception as an indicator of shifts in safety culture is therefore fraught with problems both in terms of reliability and validity.

Studies of risk perception in the workplace are relatively sparse, however research by Hale (1971), Dunn (1972), Zimolong (1979) and Ostberg (1980), reviewed by the Human Factors Study Group (ACSNI HSC 1993), illustrate many of the principle factors already mentioned – for example - effects of bias, objective and subjective risk discrepancies, etc.

The next strand of safety culture that will be reviewed is partially a function of leadership style reviewed above, i.e. communication.

## **2.8 Communication**

If the definition of Safety Culture given by ACSNI (1993 HSC) is taken as a working definition then a core aspect is that of communication. Good communication at all levels of an organisation is a key factor manifested in organisations with superior safety records.

Miller (1995) contends that organisational communication is goal directed because organisations themselves are goal directed entities. A great deal of communication is therefore task orientated. Organisations are structured systems with patterns of behaviour generating both formal and informal hierarchies and channels for communication to flow.

### **2.8.1 Theories of Organisational Communication**

There are three main theories of organizational communication which can be identified from the literature. These are summarized below :

**Table 2.5 Communications in Classical, Human Relations and Human Resources Approaches**

	Classical Approach	Human Relations Approach	Human Resources Approach
Communication Content	Task	Task and Social	Task, Social and Innovation
Communication Direction	Vertical ( Downward )	Vertical and horizontal	All directions Team Based
Communication Channel	Usually Written	Often face to face	All channels
Communication Style	Formal	Informal	Both, but especially informal

(Miller 1995)

There are various theoretical aspects to organisational communication processes which can be traced back historically to the ideas of Fayol, Weber and Taylor. The essential ingredient in all of these theoretical approaches is that they are characterised by a vertical downward flow of communication with very little opportunity for feedback. Written communication is the norm with a division between management and the rest. Communication is sterile with titles used instead of names. One may suggest that as a central aspect of safety culture communication within the classical approach may be damaging to any OSH initiative falling into the softer human factors area.

Theoretical approaches to organisational functioning developed and evolved with the well known Hawthorne Studies and the Human Relations Approach.

Representative of this school of thought are Maslow, McGregor (theory Y) and Herzberg, (all reviewed in Miller) The essential ingredient to these perspectives is that they represent a shift away from the machine metaphor to a more enlightened approach. Humans are not cogs in a machine but workers are motivated to the achievement of higher needs e.g. social interaction, individual accomplishment, etc. Flows of communication are not restricted to vertical ones but horizontal

communication and interaction is emphasised. Channels of communication tend to be fact to face with written channels of communication de-emphasised.

The Human Resources approach extends further the human relations approach in that leadership style is emphasised. A discussion of this particular argument is given in the leadership section of the literature review. Lickert (cited in Miller ) proposes an organisational type that encompasses the philosophy of the human resources movement. He advocates four organisational forms that would be more or less effective in reaching individual and organisational goals.

The emphasis for Lickert's approach is that organisations in which team building and participation are the norm will achieve goals far more easily than those organisations emphasising control and vertical communication. Empirical research has yet to fully validate this standpoint.

Ouchi (1981), cited in Miller proposes an alternative to McGregor's Theory Y by drawing out the main differences between Japanese and American companies. His theory Z proposes a set of Japanese principles that can, and he advocates should, be adopted by Western companies. In summary the human resources approach emphasises both productivity and individual need satisfaction where upward communication is viewed as a booster to productivity. Communication flows are multi-directional with participative teams drawn from all areas across an organisation. In the human resources approach all channels of communication are utilised to their full advantage. The emphasis with regards to the style of communication is on the informal.

Various organisations therefore adopt a form and style of communication which impacts on the development and sustainability of safety culture. Communications are therefore both a prerequisite of a proactive safety culture and to some extent a function of the overall organisational culture, it would appear.

### 2.8.2 Communications Climate

The notion of communications climate is apparently not a new one. The communications climate is simply the atmosphere or conditions in which ideas, information and feelings are exchanged. There are two polar ideal types. The open supportive communications climate is characterised by the following:-

- descriptive: statements tend to be informative rather than evaluative.
- solution-orientated : there is a focus on problem solving rather than on what cannot be done.
- open and honest : criticism is constructive.
- caring: empathy and understanding.
- egalitarian: communications value all regardless of status.
- forgiving: certain mistakes are inevitable.
- feedback: viewed as essential and positive for good working relationships.

(Adapted from OU Effective Manager 1997)

As with safety culture, communications climate must be viewed within the overall sense of an organisation's culture. As far as safety is concerned, mistakes / accidents / incidents are viewed as valuable learning opportunities.

The closed communication climate on the other hand is the antithesis of the open climate, where hidden agendas, power struggles, promotion, competition for resources and approval are central elements within an organisation. Knowledge is power. Certain behaviours are likely to predominate, these include:

- judgemental : apportioning blame is emphasised, feedback is negative, and people are made to know their place in the hierarchy.
- controlling : people are expected to fall into tune with the norm.
- deceptive : messages hold a hidden meaning.
- non-caring: communication is detached and formal.
- superiority : differences in the hierarchy are made obvious.
- dogmatic : no compromise.
- hostility : a negative approach to others exists

(Adapted from OU Effective Manager, 1997).

Influence in such an environment is very difficult unless a senior management position is held. Verbal aggression is common with communication focused on relationships rather than objectives. The theoretical approach related very much to this is the classical management philosophy discussed earlier. Such a style which suppresses upward communication can be destructive in terms of OSH interventions which are primarily software based. In some organisations upward communication is hindered by an organisational culture and climate that punishes managers who communicate bad news or information to which more senior managers would not agree. Indeed the tendency to report only good news upwards is quite common (Koontz and Weirich 1994).

This logically raises the question - how can the effectiveness of communication within an organisation be assessed ? Booth (cited in Smith 1991) contends that four questions need be asked when considering communication within an organisation.

- Is there a communications problem?
- What is the problem?
- Is expenditure of time/money justified in finding a solution?
- What techniques are called for to investigate further?

The key tools identified include structured and unstructured interviews, questionnaires, group discussions, network analysis or socio-grams, communication

diaries, telephone logging/monitoring, mail tagging and review of printed matter. In essence either qualitative and / or quantitative techniques can be used.

## **2.9 Trust**

Trust as a concept has had relatively little research and investigation in comparison to leadership or attitudes. The notion of trust as being an important factor in organisational functioning has already been indicated in the ACSNI (HSC 1993) definition of safety culture. As a concept trust could be defined as follows:

“ Trust is both the specific expectation that another’s actions will be beneficial rather than detrimental and the generalised ability to take for granted, to take under trust a vast array of features of the social order ”

(Creed and Miles 1996).

What this definition illustrates is that trust is both a behaviour and a belief. The above definition is from a sociological perspective. Other definitions in varying disciplines do exist but in essence they are variations on the above theme. A point made by Schein (1992) is that managers play a central role in initiating and controlling levels of trust within an organisation. An example could be the creation of a reward systems, control systems or even job descriptions and recruits help create and sustain a certain level of vertical exchanges of trust. A core of beliefs held by management set the predisposition of trust or mistrust within an organisation. This fits in with Schein’s notion of organisational culture emanating from a central core of beliefs which can be thought of as a managerial philosophy. It has already been suggested that the managerial philosophy within an organisation will be the central driver for organisational culture development. The authors (Creed and Miles *ibid.*) contend that organisational form and trust are linked with trust deficits manifesting themselves in sympathy to the type of organisational form. Various linkages can be identified. The owner managed entrepreneur form of organisational was the dominant form of organisation in the 18<sup>th</sup> and 19<sup>th</sup> centuries. Very much a directly supervised type of management no real decision making was made anywhere else in the organisation outside the owner-manager. The vertically integrated functional form refers to the type of organisation which operates by passing down decision making to operational managers. However, any such decision making is within very tight

organisational guide lines. As a minimum, managers must believe that employees will be responsive and co-operative when treated properly.

The diversified divisionalised form of organisation is one which succeeds by clustering sets of resources around a particular product, function or area. Indeed, this clustering is one of the main strengths of this kind of organisation. In this form of organisation sectors are expected to respond to their own market and be evaluated periodically from management above. At the senior management corporate level a deficit of trust sacrifices the responsiveness and expertise of an organisation. At the lower operational levels in an organisation again as in the preceding example a minimum amount of trust is required ie. employees will be responsive and co-operative when treated properly.

A mixed matrix organisation is designed to achieve frequent and rapid lateral resource allocations. If matrices are complex then centralisation is very costly and time consuming. A high level of trust is required with a “looseness” in organisational control which will allow talent to expand and individuals contribute to overall goals and objectives.

A very high level of interdependence must exist in a network organisation to allow any successful functioning. A partner requires to have absolute confidence in the actions of upstream and downstream compatriots.

In summary there appears to be a linkage between levels of trust and organisational form. Trust deficits are manifested in various ways but if an assumption is made that GPTL is the diversified divisionalised form, then a trust deficit can perhaps be illustrated via research. At the upper levels of the organisation a failure to delegate decision making for all facets of the business combined with duplication of staffing and effort at lower levels are all signs of a trust deficit. Whether such issues can be measured objectively and quantitatively is still open to debate.



2.9.1 Can Trust Be Measured ?

Cummings & Bromiley (1996) suggest that trust can be measured quantitatively if a three dimensional model is presumed. The three dimensions are:

- the individual being trusted is behaviourally reliable
- the individual’s statements and behaviour prior to making commitments are consistent with the individual’s desires
- the individual does not take a short run advantage of unforeseen opportunities to gain at the expense of others

This generates a three by three matrix as a definitional structure of trust. The researchers here have worked on the assumption that trust is a belief and as such has three components across which the concept can be measured. This is represented below:

		Component of Belief		
		Affective State	Cognition	Intended Behaviour
Dimension of Trust	Keeps Commitments			
	Negotiates Honestly			
	Avoids Taking Excessive Advantage			

(Cummings & Bromiley 1996)

**Figure 2.11 Structure of Trust**

Working from this point the researchers followed a typical Lickert scale exercise in generating a measurement tool for trust. It would appear that on the face of it, at least, trust can be measured to some extent. But the tool described is very much in its infancy. How relevant and reliable such a measure would be when applied to say

factory workers as opposed to higher degree students, as done so during the development of the questionnaire is open to debate. At best the tool is perhaps a tentative step in the right direction. Until it has been validated in various organisations then qualitative methods may be the best method of uncovering effects from this important construct.

In summary then safety management theory has evolved from a reactive to a proactive approach which guided the orientation of the research into the software area. A central part of this evolution is the realisation that further improvements in OSH performance may rely on an appreciation of organisational culture and the identified components above. These components form both the analytical predictive tools of the research and also the building blocks of the research in terms of OSH model development. Before moving on to assess potential models – a brief review of organisational change is appropriate to illustrate that the foundations identified thus far are sound.

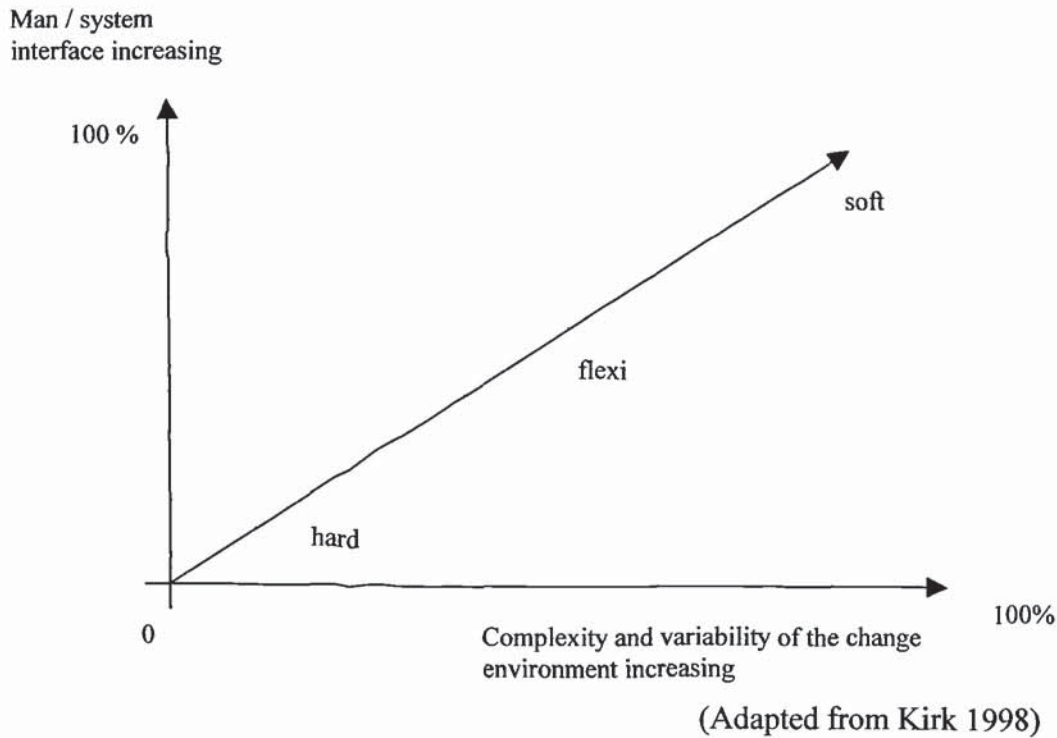
## **2.10 Organisational Change**

The literature in this area is vast. The orientation will concentrate on the aspects that are central to understanding the potential affect of influencing factors on a BS 8800 prescriptive change. The first question to pose is what type of change is being introduced into the organisation?

### **2.10.1 Types of Organisational Change**

McCalman and Paton (1992), cited in Kirk 1998 identify two polar types of change that can occur within an organization. These are hard or soft changes. Hard changes are fairly structured, mechanistic changes which involve little in the way of human / people interaction or participation. Measures of success are numerical data which are easy to track and plot. Soft change on the other hand is the reverse of hard change in

that the process involves people and relies heavily on participation and team work to succeed. Measures here tend to be more difficult to quantify and there may be a time lag between introduction of a change and the resultant effect. The figure below illustrates the spectrum of change :



**Fig 2.12 The OSH Change Spectrum**

It could be argued that a hardware management approach to a soft issue will meet with little success. The type of systems changes that will progress safety performance more and more tend to be of the soft variety, with an emphasis on human factors and safety culture (HSC 1993), HSE (2000). It will be seen in chapter four that the organisation under study has reached a plateau in terms of OSH performance and on the surface of it appears to have reaped the benefits of the engineering solutions to OSH. To break out of this it is suggested that the emphasis must move to software (human / people) aspects. As such this is in the flexi / soft area of the change spectrum on the above graph. The Bottomley (1998) research does vindicate this point.

### 2.9.2 Motivators for Change

The work of Lewin (1951), cited in Kirk 1998, argues that there exist driving forces for change and restraining forces for change. It is argued by Lewin that an equilibrium is reached whereby the driving and restraining forces are equal within the organization. To generate change it is therefore necessary to either strengthen the driving forces or weaken the restraining forces to alter the equilibrium.

Given that there are forces for change within an organization are there particular forces which have been identified which motivate for safety change? Research by Hawkins and Booth (1998) points to fundamental elements affecting the implementation of OSH management systems. A review of BS 8800 in terms of content and utility revealed that the implementation of the guide was impaired by the extent to which core management literature findings were implemented within an organisation. It is also suggested that BS 8800 and core management literature do not align. Two main approaches to implementing BS 8800 guidance were found. The first type of approach follows the guide to the letter generating OSH manuals and procedures as a “ quick fix ” solution. This approach had no real understanding as to why they were doing it. Conversely, the other type of organisation absorbs what *the guide states and then builds its own system*. The latter group tend to be internally motivated whereas the former tend to be externally motivated. In all, six main sources of motivation were identified.

1. Senior management commitment – hierarchical motivation (internal).
2. OSH system champion – self motivation (internal).
3. Business case – financial motivation (internal / external).
4. *Ethical case – moral motivation (external / internal)*.
5. HSE intervention – regulatory motivation.
6. *Safety culture – motivation from a committed workforce at all levels. (internal)*.

In addition to these factors above Wright (1998) also identified key drivers for safety as corporate credibility and legislative compliance. These are the two main factors. In essence then there are various motivating and also demotivating influences identified so far. The introduction and success of various OSH initiatives will be subject to these factors. The next section identifies various models that will aid explanation of these factors upon the interventions within the organisation.

### **2.11 Total Quality Management (TQM) Models of Analysis**

This section focuses on TQM and charts its development along with various views on its strengths and weaknesses. The links between TQM and OSH management are

also discussed. Various TQM models are highlighted and their potential utility for the research being undertaken assessed.

### 2.11.1 What is TQM ?

Quality control as an activity was historically based on the “ death certificate” approach (McMillan and Mullen 1994), whereby inspection at the final stages of a product would decide if the product was defective and therefore if it was a pass or fail. Various proponents however argued that this was an unsatisfactory method in increasingly competitive markets. A shift has occurred over the past decades whereby founders of a different style of managing quality advocated a “Total ” approach to quality. The literature (adapted from Mullen 1994) within the TQM related field is vast, therefore the key authors / advocates of a differing style of quality management are identified below along with their core contributions which lay the foundation stones for TQM.

Deming’s main contribution was to emphasis that a culture of continuous improvement is imperative to ensure business improvement, based on better quality. This in turn means higher production levels. The Deming cycle of Plan – Do – Check – Act is in evidence in ISO 9000 and 14000 standards as well as HS G 65 and BS 8800. Juran’s views coincided with the views of Deming but he placed greater emphasis on the responsibility of management for quality of output in addition to a heavy reliance on training. In further developments in the TQM field Feigenbaum clarified the costs of quality and the overriding importance of customer needs. The emphasis on the softer side of quality management and participation was further underpinned by Crosby who promoted the target of zero defects. In addition he also advocated the importance of culture change and attitudes to quality. As a progression from the Crosby but still founded in the key principles identified by Deming and Juran, Ishikawa generated what is known as Company Wide Quality Culture which synonymous with TQM. Various tools were developed including the promotion of problem solving teams, brainstorming, bottom up approach, quality circles and a much more participative style of management.

(Adapted from Strathclyde University MBA Course notes 1998)

From the above authors and the literature a set of key interlinked features can be identified as the main principles of TQM. The first aspect is that TQM has a holistic and wide ranging application of participation, team working across functions and cultural change to achieve organisational goals. This in itself relies heavily on visible commitment and leadership from management. Secondly, (Oakland 1995) there is a focus on continual improvement of processes and systems with culture gradually changing, emphasising that TQM is not a destination with an end point but a continual journey for an organisation. This is reflected in the continual improvement principles of Kaizen. During this TQM journey various proactive quality control techniques and tools such as Statistical Process Control (SPC) and flow charts are used aimed at prevention of a defect. In addition to these aspects team problem solving via brain storming techniques and participation allows solutions to be drawn together and prioritised. Linked into this facet is that of moving away from a traditional adversarial style of management to more open and co-operative ones where trust and communication are allowed to flourish. With management activity not so much based on imposition but more on team based approaches visibly supported by management, to allow cultural change in the organisation with ownership for quality permeated throughout the organisation.

A fundamental characteristic of TQM is the importance of internal and external customer relationships. The implication is that internal customer needs in particular can only be met if communication links within the organisation are adequate.

Interlinked to the above is that TQM is usually accompanied by organisational structure changes involving teams – usually a steering committee with shop floor teams linking into this via a two way flow through a TQM facilitator. In summary TQM represents an all embracing philosophy of continual improvement via participation to deliver customer needs. The obvious question is what are the links with OSH management ?

### 2.11.2 TQM Links with OSH Management

The European Centre for Total Quality Management, University of Bradford was commissioned by the Health and Safety Executive (HSE 1998) to assess the area of TQM and its relationship to OSH. Briefly the research remit was to assess :

- Why organisations did / did not link TQM and OSH.
- Assess the effectiveness and benefits of any links.
- Understand the reasons for the absence of any such links.
- Identify areas of good practice.

The argument put forward is that if OSH is to be integrated into core business management then TQM and OSH should converge as the milestones to achieving excellence should be similar. This is represented below:



(HSE 1998)

**Figure 2.13 Convergence of TQM and OSH Management**

Twenty four businesses were analysed using a questionnaire based upon the EFQM model (see below) and various conclusions reached. Links to the core principles of TQM were developed, more in some areas than in others. Typically links were most developed in areas of audit, empowerment, involvement, participation and team building. Conversely links were least developed in taking a holistic view of stakeholder needs, performance measurement and process management.

This highlighted key differences between OSH and TQM. Where as TQM tends to be customer driven OSH differs in that the main motivation is compliance. Partnering this is that the organisational approach to OSH tends to be loss prevention contrasting with TQM's continual improvement. Performance measurement in OSH is also not as well developed as in TQM, some of the tools of which are outlined above.

Barriers to implementing a TQM approach to OSH are detailed under organisational, process, people and external factors. The conclusions reached were that unless safety is viewed as critical to the business then TQM principles were not applied as rigorously. Where an organisation can achieve a mature approach to TQM then it is more likely that OSH will be integrated into the business and itself become a core function. Where this is not the case in a company then the barriers may prove insurmountable without intervention. Greater process management and measurement is required to allow OSH to catch up TQM in terms of development.

It can be seen from the above then that TQM and OSH do share many core features. What must be recognised at this point is that TQM is not without its critics. There are a number of criticisms which have been levelled at TQM. It could be argued that the concept itself is just the latest management buzz word and could be superseded by the next "fad." The softer factors may not be appreciated as a core element, more of a bolt on to the hard systems and tools elements. Webb (1995), cited in Kirk (Ibid.) identifies two main views on TQM – one where workplace democracy has increased during the implementation of TQM and a converse one where is contended that the use of TQM techniques have lead to little in the way of empowerment or participation. The result of this latter approach is potentially a very narrow view of TQM with little appreciation of the possible human factors pay back.

This completes a review of the foundations of TQM and the links with OSH to address the core research question. It is appropriate to turn to the TQM models and assess their potential ability / utility to explain the influencing factors on an OSH management system intervention.

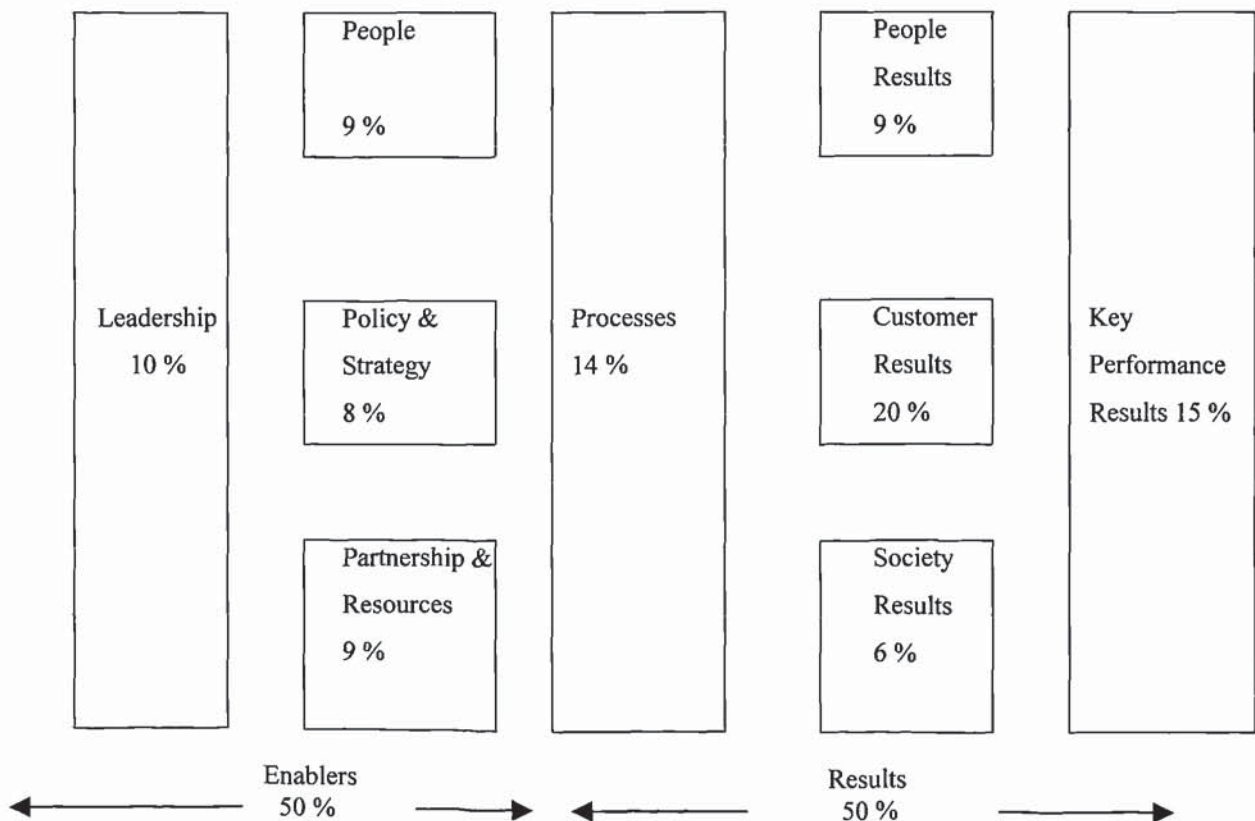


2.11.3 TQM Models

Within the literature there are a number of models used to explain and assess TQM implementation and performance. A review of their utility and applicability to the research is conducted with the aims of the research in mind i.e. what are the key influencing factors on an OSH management systems intervention.

2.11.3.1 EFQM Model

One of the principle models featured in European Quality Awards is the EFQM model below. This format is used to assess an organisation's TQM performance and a rating is arrived at using the weightings given in the model with a percentage loading factor attributed to each element. These loadings were arrived at by the founder members of the EFQM. The process of assessing has European Union funding and a membership of over 700 companies:



(Oakland 1995)

Figure 2.14 EFQM Model

The EFQM model is represented above with enablers on the left hand side of the diagram and results on the other. In OSH terms enablers are the influencing factors impacting either negatively or positively on OSH interventions. The results on the right hand side could potentially be OSH results - such things as accident statistics, HSE inspection results, audit results, days lost, civil claims, etc. As such the model does appear to have potential in terms of its explanatory powers.

### *2.11.3.2 Oakland Model*

The Oakland model of TQM encapsulates the above with emphasis on Tools, Teams, Systems, Culture, Communication, Commitment and Supplier / Customer chains.



(Oakland 1995)

**Figure 2.15 Oakland TQM Model**

What the Oakland model does is to illustrate clearly the hard and soft aspects of TQM. The hard aspects are the tools, teams and systems for TQM, whereas the commitment, communication and culture represent the soft aspects. On the face of it, it would appear that there is some utility regarding the Oakland model in terms of its applicability to OSH. For example the hard aspects such as systems could be BS 8800 instead of ISO 9000, the tools instead of SPC could be risk assessment, with teams focussing on OSH instead of QA. On the softer side commitment, communication and culture appear as relevant to OSH as to TQM.

### 2.11.3.3 MBNQA Awards

The Malcolm Baldrige National Quality Awards (MBNQAs) also examine and assess an organisation's TQM performance against a set of given criteria :

**Table 2.6 MBNQA Criteria**

Leadership	100
Information and Analysis	60
Strategic Quality Planning	90
Human Resource Utilisation	150
Quality Assurance of Products and Services	150
Quality Results	150
Customer Satisfaction	300
<b><u>Total</u></b>	<b>1000</b>

(Mullen and McMillen 1995)

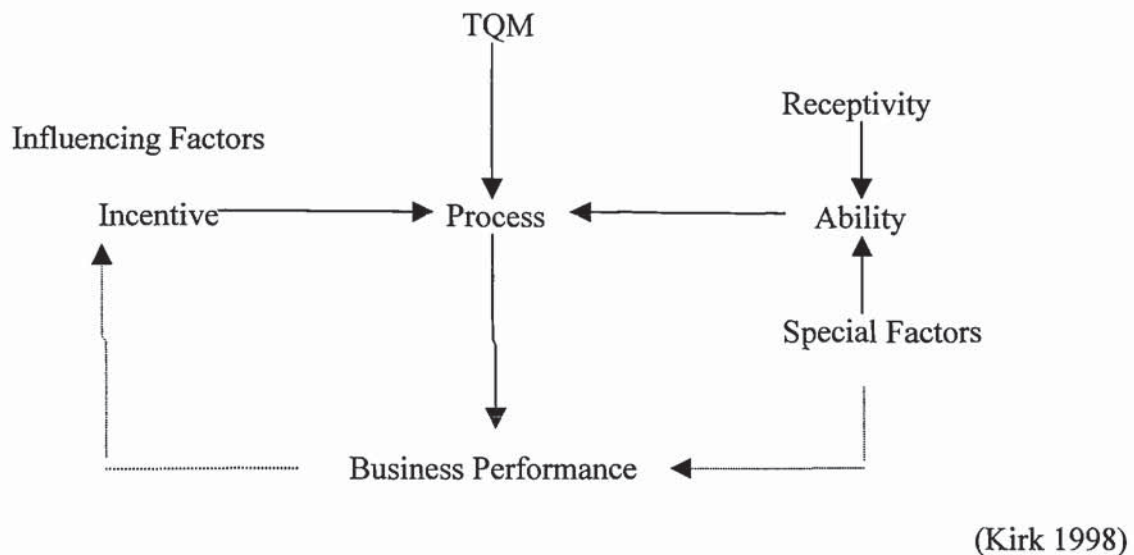
The MBNQA have come in for criticism in recent years mainly because of the sometimes poor correlation between winning the award and actual business performance. What can be seen from the above model is that (with exception of customer satisfaction) a similar loading factor of 3:1 has been used for rating award elements.

2.11.3.4 *Ishikawa*

Although not so much a model of TQM the Ishikawa cause / effect diagrams are used extensively in TQM / Quality. This type of model / diagram was reviewed but it was felt that it was too open in terms of its analytical use and is more of a brain storming cause / effect tool rather than a TQM model.

2.11.3.5 *Kirk TQM Model*

The model below was developed and used to analyse TQM implementation in the rubber industries.



**Figure 2.16 Kirk TQM Model of Change**

What the model shows is that TQM is introduced into an organisation and this in itself involves a certain process or steps. What should result from effective implementation is enhanced business performance. The TQM process itself will be directly subject to influencing factors such as incentive and ability. Ability to implement the TQM process will be in turn affected by how receptive an organisation is to change, and in turn special factors may also impact upon ability to change.

What can be seen from the models outlined above is that there are similarities (and differences) between TQM and OSH management. The whole thrust of this research is to identify the key influencing factors which may impact upon an OSH intervention, and as such the Kirk TQM model has been selected at the expense of the other potential models for development, for the following reasons :

- The EFQM model and Oakland models are broad models of TQM for assessment and implementation. As a result their focus is not directly on the influencing factors.
- The Ishikawa and MBNQA systems are rejected for the reasons given in the discussion above.
- The Kirk model identifies and focuses directly on influencing factors which may impact on an intervention / change.
- Kirk identified that the use / development of the model within his thesis in other disciplines / fields could aid the consolidation of the model itself.
- The use of the Kirk model allows a continuity of research within the Gates group, building upon work conducted by Hunter and Beaumont (1993) , Kirk (1998) and also the Health and Safety Laboratory (Bottomley 1998)

The research conducted by Kirk between 1995 and 1998 was spurred on by the earlier work by Hunter and Beaumont (1993), focusing on the key influences regarding the implementation of Total Quality Management. Six plants within the Gates Group were analysed - four in Europe and two in the USA. The hypothesis put forward by Kirk was that a company implementing a Total Quality Management programme via a recognised route would achieve enhanced business performance. A model was devised to test the hypothesis – see figure 2.16.

The model basically shows that Total Quality Management implementation will affect company business performance subject to certain influencing factors - ability and incentive. Ability is also affected by receptivity and special factors. Given the

central importance of this model to both Kirk and the author's future research a detailed explanation is necessary. It was discovered that four of the six plants fitted the model - the exceptions being Balsereny in Spain and Dumfries in Scotland.

#### Incentive

Incentive to introduce Total Quality Management comprises four elements, business performance, customer influence, bandwagon effects and senior management pressure.

##### *A) Business performance*

This can cause a company to have a strong incentive to introduce Total Quality Management when business results are poor, as a catch up act. Conversely very good levels of business performance may act as a disincentive, as there may be no perceived need to change successful methods.

##### *B) Senior Management Pressure*

This can arise from two sources - corporate and internal - a "felt need" pressure. This latter pressure in essence is one which emanates from a desire to stay ahead of the pack, to be the best in the organisation.

##### *C) Customer Influence*

In this instance customers who have already implemented a Total Quality Management programme will look to influence suppliers and transfer the Total Quality Management philosophy. This can be voluntary by a supplier or made mandatory by a customer.

##### *D) Bandwagon Effects*

Pressure to adopt an incentive in this case arises not from an evaluation of the benefits but because a number of other organisations have taken on board a programme. Institutionalised pressure causes a bandwagon effect as non-adopters do not want to be seen as out of step from adopters.

#### Receptivity

This describes the various factors which render a plant more or less receptive to change. These factors can be "hard" or "soft" and include - previous initiatives, industrial relations, climate, workforce profile, organisation structure and organisation policy.

*A) Previous Initiatives*

This factor suggests that those organisations which have had success in implementing previous initiatives are better placed to receive further change.

*B) Industrial relations Climate*

This may well effect any change from the status quo and covers such issues as management/union relations, management/operator relations and communication style.

*C) Workforce profile*

This refers to a proposition that a younger more skilled workforce will embrace change more readily than a lower skilled older workforce.

*D) Organisational Structure*

This makes reference to reporting lines, management levels and responsibilities. For example poorly defined responsibilities and a multi-teired hierarchy could make it very difficult to communicate any change.

*E) Organisational Policy*

In this instance policies which include aspects such as reward and recognition schemes, communication briefs, attitude surveys and bonus systems may help support any change process.

Ability

This refers to the ability of management and the workforce to take on board change. Three sub- areas present themselves.

*A) Human Resource Management*

Total Quality Management and change are linked with the human resources function primarily through training. Various checklists of HRM practice include visibility, training and education, appraisal schemes, teamwork and time management. It is suggested that low HRM involvement could signal low management commitment.

*B) Resources*

This simply refers to the allocation of resources to implement change. If resources in terms of funds, time and facilities are not committed then change is weakened.

*C) Management Ability*

A management team must be aware of its weaknesses and strengths. The ability to co-ordinate and implement a programme requires experience, knowledge and skills.

Four sub- areas are identified:

- Management style can range from facilitator to autocrat.
- Behaviour signals levels of commitment.
- Commitment and leadership signals ownership.
- Perceptions of where we are and where we want to be are crucial in enforcing and championing any change.

Special Factors for Kirk can be internal or external and are in essence random events which can impact on any change process.

Results at GPTL, Dumfries

It was discovered in Gates Power Transmission Limited, Dumfries, that some of the key steps in the process of implementing Total Quality Management had been missed. Despite this however the plant was still successful, i.e. the process part of the model was not completed yet business performance was still excellent. In essence the process of TQM implementation had been cherry picked at Gates Power Transmission Limited. It appears that the two main influences were management style and customer influence. Customer links are very strong indeed at Gates Power Transmission Limited. The management system was found to be less facilitative than other plants in the study. Emphases has been less on participation and team building. It would appear that these two influences allowed the ends to be achieved without the means as prescribed by leading authors in the field.

In summary, so far then the development of OSH management and its links to TQM have been reviewed. Much has been discussed of the soft factors or human factors – issues such as culture, leadership, communication have been mentioned. Before



moving on to develop a framework for analysis it is appropriate to discuss the results of recent research into the safety performance of the rubber industries.

## **2.12 Recent Research in the Rubber Industry**

### **2.12.1 Hunter and Beaumont 1993**

This section reviews previous research that has been undertaken within Gates Power Transmission Limited in previous years. The recent thesis (Kirk 1998) discussed above examined the implementation of a Total Quality Management programme. This partially built upon a study by Professors Hunter and Beaumont in 1991, published in 1993, which identified a gradient effect in attitudinal differences between various occupational groupings with Gates Power Transmission Limited.

Various questions were posed using a typical Lickert scale format to analyse the responses. It was discovered that results depended very much on where an individual was in actual production process. The data was analysed by the following groupings with twenty three personnel also subject to interview. The results are summarised below and refer to the differing managerial style and cultures between the old site and the new brownfield development, when a new purpose built belt plant was erected. The ratings are based on a scale where one is the unfavourable end of a five point scale and five is the favourable end of the five point scale. The only exception to this is question 7 on management toughness where the scale is reversed i.e. five is much tougher and one is much slacker.

**Table 2.6 Gates Survey : Analysis of Questions Showing Polarisation (Mean Scores)**

<b>Gates as an Employer</b>	<b>Supervision</b>	<b>Warehouse/ Eng.</b>	<b>Manufacturing</b>	<b>Finishing</b>
2B Provision of information relevant to the workplace.	3.3	3.8	3.0	1.8
2D Mgt keeps promises	4.0	3.4	2.6	2.1
2E Company listens responds to views.	3.3	3.4	2.6	2.0
3E My job provides an interesting experience.	3.6	4.0	2.3	2.1
<b>New Plant</b>				
1B Well informed about design of new plant and planning	3.6	3.0	3.1	2.6
6 able to influence working arrangements at new plant	3.6	3.4	2.0	1.0
7 senior management controls tougher than before.	4.3	3.4	3.8	4.2
8 job in new factory an improvement on old job.	4.3	4.4	3.0	2.4

(Beaumont and Hunter 1993)

From this snap shot survey, the following tentative conclusions could be drawn. A trust deficit manifested itself increasing proportionately as one looks down the

organisational hierarchy. Similarly with communication flows which tended to be perceived as ineffective or restricted at shop floor level with little bottom up influence. Leadership style was also perceived to be tougher and more task orientated as responses from further down in the organisation were received.

However, given the viewpoint of the researchers i.e. observation only, the numbers interviewed and the small time span spent in the organisation the results must be viewed as merely possible signposts and nothing more.

### 2.12.2 Bottomley / Health and Safety Laboratory 1998

A research report by the Health and Safety Laboratory in conjunction with the BRMA (Bottomley 1998) highlighted various aspects of direct relevance to the research being undertaken at GPTL. The background to the research lies in the historically very high accident rate in the rubber industries. This report was the second one on the subject and followed up an earlier investigation (Bottomley 1997) into accident rates in the rubber industry. This initial report validated that the accident rates were indeed very high and flagged up hot spots in terms of accident type and causation. The second report was aimed at investigating the link between safety performance and three factors - technological risk, safety management and safety culture. Safety performance was measured using accident statistics reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR) as the only source of reliable and comparable data. It is this second report that provides useful building blocks for future research.

#### *Methods*

Ten companies were selected to give a representative coverage in terms of size, turnover and accident statistics. Six were from general rubber goods and four from the new tyre sector as these sectors had the most reliable accident data. Visits were conducted ranging from two to three days according to the size of the company. During this time data was gathered by using a semi – structured interview with a cross-section of the workforce, documentation and a site tour. These data sources

were then collated and aligned to each of the three factors – technological risk, safety management system and safety culture.

### *Findings*

Generally the safety management systems were found to be poorly developed with the odd exception. The most reliable predictor of safety performance was found to be safety management systems and safety culture. With the latter having a restraining effect on the former. Given the central importance of the BRMA / HSL report it is pertinent that the three variables are explained in more detail.

### *Technological risk*

This refers to the level of risk inherent within the process itself and is built upon the research conducted in the paper industry (Bottomley and Horbury 1998).

Technological risk covers all other safety related issues not bracketed under safety management or safety culture. In the BRMA / HSL report covering the rubber industry the production process was broken into stages and four parameters looked at in each stage. These were risks from production, proximity to other hazards (e.g. fork lift), cleanliness of the process and the age of the machinery. These were subjectively scored from 1 to 10 for each parameter and then converted into a total score out of 100. For example a very clean process would carry a weighting of 1 and an extremely messy process a score of 10. The higher the overall score the higher the level of technological risk.

### *Safety Management*

Safety management was assessed for each company by using the framework given in BS 8800, more specifically the guidance advocating an ISO 14001 approach.

Documentation was obtained and data for interviews to allow assessment under the management cycle headings of policy, planning, implementation and operation, checking and corrective action and management review. Under each of these headings various management elements were examined and subjectively scored 1 to 10 with 1 being very poor and ten very good. An example under policy includes assessing the safety policy document, assessing mission / vision statements and

assessing environmental and quality policy statements. Again, as with technological risk, scores were calculated out of 100. For GPTL this gives a useful yardstick as to where the deficiencies are in the safety management system.

*Safety Culture*

The aspect of safety culture was assessed using a twenty three dimensional model of safety culture. These dimensions / key issues cover the key fundamentals of the concept of safety culture and two of these are illustrated below :

<b>Key Issue</b>	<b>Good example</b>	<b>Bad example</b>
Visibility of M.D.	Seen on shop floor regularly	Staff don't know his name or what he looks like.
Morale	High Stable or Improving No evidence to suggest this will change.	Low Changing circumstances and therefore pressure.

(Bottomley 1998)

**Figure 2.17 Example of Key Dimension Indicators**

A similar approach to the above elements of technological risk and safety management was taken in that a good example scored 10 and a poor example 1. In the instance of GPTL a rating of 47 was allocated to safety culture. In addition to many of the aspects already reviewed in the literature Bottomley (1998) also makes mention of other notable aspects which may impact on OSH performance – notably work force commitment and ownership, reward and recognition systems and general morale (The actual twenty three dimensions are reproduced in Appendix Eight and will form a fundamental part of the research development in Chapter Ten.)

Perhaps the most notable aspect was that the two aspects of safety management system and safety culture could not predict the accident rates in the rubber industries statistically as well as they could in the paper industries:

“ It is worth comparing the results of the prediction process in the two industries subjected to this technique – paper and rubber. The model developed in the former research accounted for 74 per cent of the variance in accident rates ( based on a study of 12 paper mills ). In this chapter, we have shown that, at best, it is possible to account for 59 per cent of the variation in rubber industry accidents. .... Of course, another reason could be that there is genuinely less of a link between the factors. That is, the factors contributing to safety performance in the rubber industries may be much more complex and susceptible to additional influences. ”

(Bottomley 1998)

Against this backdrop use will be made of the model proposed by Kirk 1998 to explore these potential further influences and develop an OSH model of change using the building blocks of the literature survey, the Hunter and Beaumont study, the Kirk thesis and the recent research reports reviewed above. The next chapter develops a framework for analysis within which it is proposed to answer the key research questions :

- 1. Does implementation of an OSH management system have improve safety performance ?*
- 2. Can a TQM model of analysis offer an insight into the key factors which may influence a safety management system intervention ?*
- 3. What are the key influencing factors that will impact upon an OSH management systems intervention?*
- 4. What is the level of interaction between safety management systems development and safety culture?*
- 5. Can a pro-active safety culture develop independently of the general organisational culture?*
- 6. What influence does the prevailing organisational culture have on the first line manager 's influence to aid implementation of an OSH management system?*

## CHAPTER 3

### FRAMEWORK FOR ANALYSIS

#### 3.1 Introduction

The purpose of this chapter is to review the key issues from the literature review which are relevant to our study. It is being attempted to establish if the implementation of guidance BS8800 will impact on OSH performance and how various influences affect this process of implementation and subsequent results. To help explain this process we will draw out the salient points from the literature. This process can be thought of as utilising building blocks to set up a framework within which to analyse findings. The key building blocks are identified in 3.2.

#### 3.2 Key Influencing Factors on OSH Management Systems Development

In 2.2 and 2.3 the development of OSH and OSH systems was discussed. A shift to a more proactive orientation has witnessed the development of HSE guidance HS G 65, BSI guidance BS 8800 and OHSAS 18001. In more recent years links and parallels between OSH management and quality management systems have been made more explicit.

In the review section on organisational culture (2.4) the main strands making up safety culture - communication, trust, leadership, risk perception and attitudes were identified. It was also suggested that the concept of safety culture should be viewed as a sub-set of the overall culture. The implication of this is that a wide view or holistic view should be taken of an organisation in order to understand its functioning.

Attitudes and changing them in relation to safety was discussed (2.5), the most prominent theme being the degree of uncertainty surrounding the whole field of attitudes. The utility of safety attitude measurement or safety climate measures was also discussed.

Leadership (2.6) and in particular leadership style was analysed, the main aspect highlighted being that the presence of a task orientated style at the expense of a facilitative style can restrict any initiative being introduced. Participation and empowerment can also be severely hindered - key elements of a pro-active OSH management system.

Risk perception (2.7) was reviewed and the subjective versus objective debate explored. Within this research risk misperception can be an influence on OSH implementation. For example, if operatives or managers constantly underestimate risk then a potential drive for change is perhaps nullified as the degree of receptivity may be lessened.

Linked to some extent to leadership in terms of organizational functions is that of communication (2.8). ACSNI (HSC 1993) emphasised the requirement for open channels of communication. The distinction between an open and closed communication climate is fundamental in terms of a proactive OSH management system. The latter climate it is suggested could stifle or suffocate any change initiative. The latter climate is also indicative of a McGregor Theory X type of management.

The review of trust (2.9) demonstrated that the concept itself is under-researched in relation to other concepts such as communication or leadership style. However, it was highlighted as a key operating function of a proactive safety culture. The implication as far as this study is concerned is that a trust deficit may defeat any initiative requiring a flow of trust from operative to management or vice versa.

A very selective review on the literature on change highlighted the nature of change within an organisation, making a distinction between soft and hard change. Motivators for OSH were also reviewed which highlighted the links into the Kirk (ibid.) model in the area of incentive.

Section 2.11 reviewed TQM. The foundations of TQM were identified and the links between OSH and TQM reviewed. The utility of various TQM models



and their explanatory powers within the field of OSH were assessed, before deciding on the most appropriate model to develop in the research.

Recent research on the rubber industry was reviewed, and in addition to Kirk, the work by Hunter & Beaumont was reviewed. Bottomley (1998) demonstrated that accident rates could be partially predicted by safety culture and safety management systems development. That is, the effects from the level of technological risk within a facility in the rubber industries are superseded by “organisational / human” factors as far as safety performance is concerned. The other point of note is that the explanation of predicting accident rates by using models based on safety culture and OSH management systems development is only partial and may indicate that the rubber industries have “additional influences”.

### **3.3 Building a Framework for Analysis**

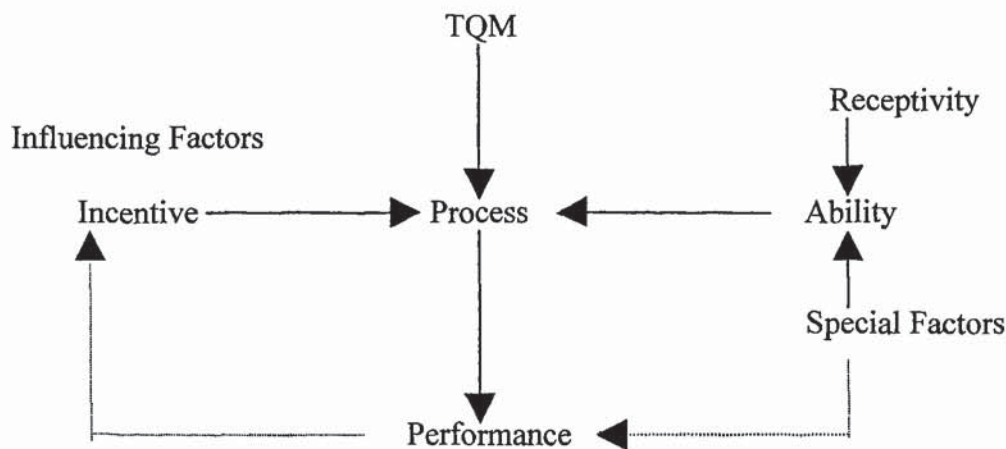
Before moving on to build up a framework the key points raised above can be summarised:

- There are links between TQM and OSH management systems
- Safety culture is a sub-set of organisational culture
- Attitudes are central to organisational culture
- Risk perception or risk misperception can have profound affects on people’s actions regarding hazards
- Leadership style can hinder or aid an initiative
- Communication is a central theme of safety culture and can aid or hinder development
- Trust deficits may severely restrict certain changes
- Rubber industries’ safety performance may be susceptible to more influences than initially perceived
- A range of OSH motivators / drivers can be identified

Taking these points on board as building blocks how might a framework be built? Use will be made of Kirk model of change for the following reasons:

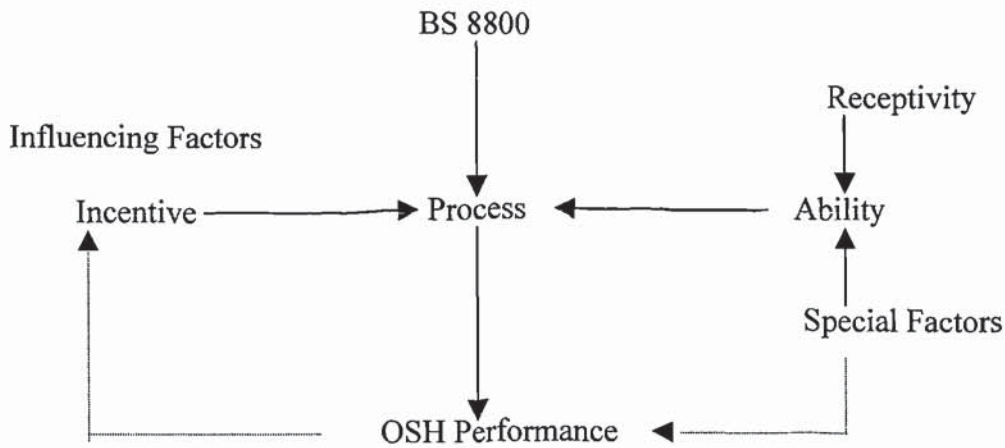
- Safety Management is relatively under - researched in comparison to Quality Management. Given the links between the two fields utilising a TQM model makes use of the parallels.
- The Kirk model appears to capture a “wide” view of an organisation and may be able to account for additional influences as noted by BRMA/HSL.
- In effect building on top of Hunter and Beaumont and Kirk allows a continuity in research at GPTL, Dumfries.
- The Kirk model is being “tested” in a different field from TQM, itself highlighted as a future research avenue by Kirk.

As such then a potential model of OSH change can be proposed at this stage within which analysis can take place. Firstly let us remind ourselves of the overall hypothesis – an organisation implementing BS 8800 will have an improvement in OSH performance. The Kirk model is placed alongside to allow for ease of reference:



**Figure 3.1 Model of TQM implementation**

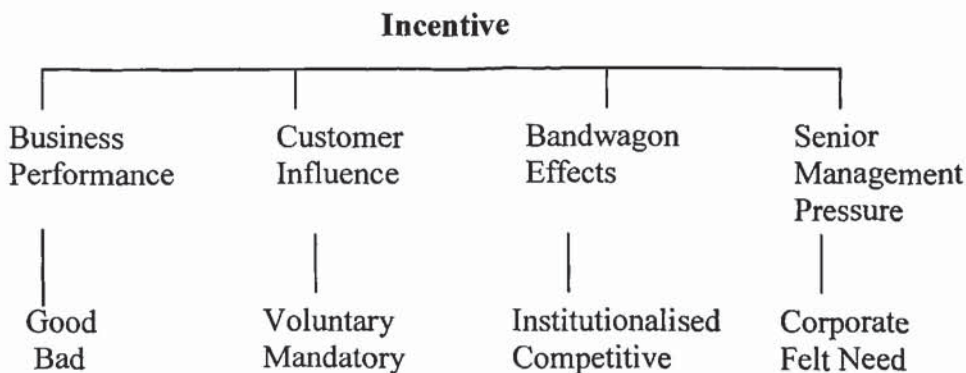
(Kirk 1998)



**Figure 3.2 Potential Model of OSH Change**

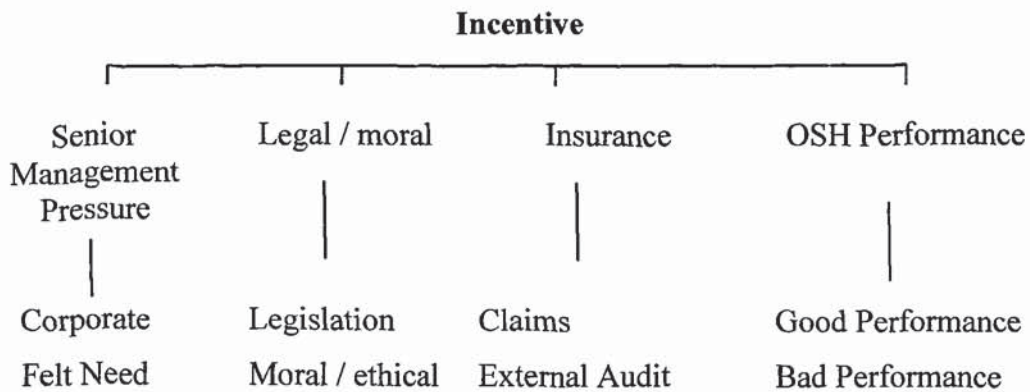
(Adapted from Kirk 1998)

A potential model of OSH incentive can also be proposed building upon the literature already explored and the key references. OSH performance replaces business performance as the link between OSH and business performance relies on being able to accurately and reliably cost incidents. This process it was concluded would take the focus away from the aim of the research which is to identify key influencing factors and the utility of TQM models to explain these. The notion of accurately costing incidents is still relatively young – “There is still a pressing need to emphasise the business case for good health and safety management” (HSE 1997). For this reason OSH performance was selected as the output from the BS 8800 process. The factors of incentive, ability and receptivity will now be discussed.



**Figure 3.3 TQM Incentive**

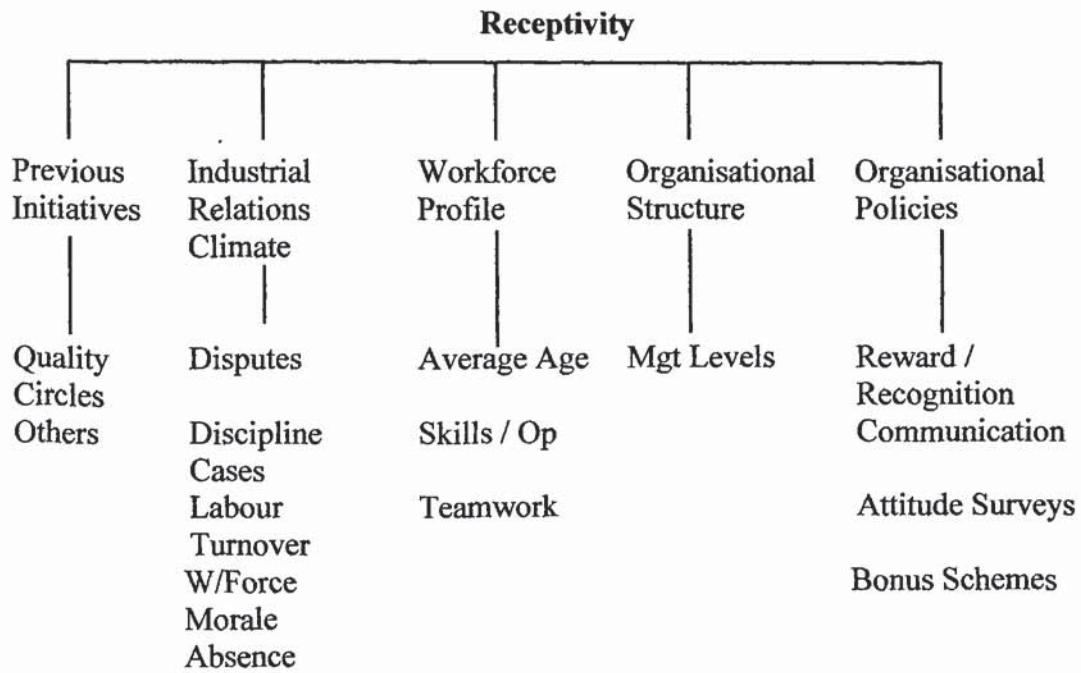
(Kirk 1998)



**Figure 3.4 Potential OSH Incentive**

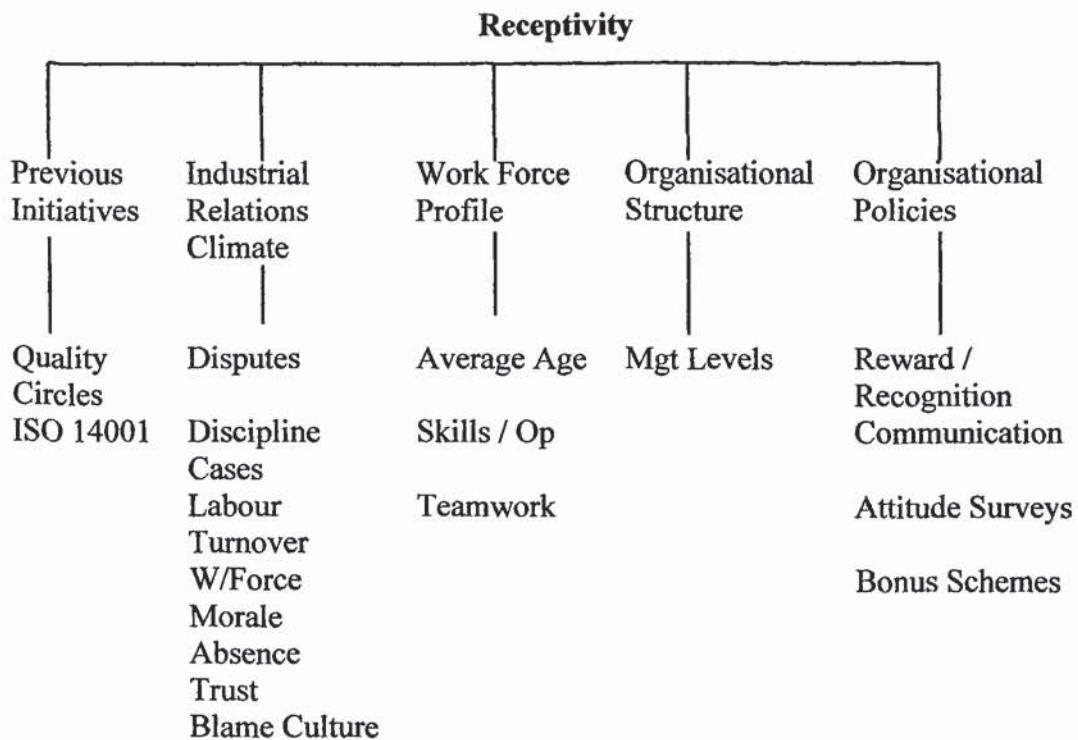
(Adapted from Kirk 1998)

Alterations were made to the factor of incentive. Little in the way of bandwagon effects is in evidence in OSH compared to say environment or quality and similarly with customer influence in relation to OSH. For these reasons legal / moral and insurer pressure were incorporated into the model (see Wright 1998, Hawkins and Booth 1998.). Also implicit in senior management pressure is the notion of an OSH champion from the top of an organisation (see Kirk). Legal / moral incentive is mentioned along with corporate pressure as core motivators for OSH (Wright 1998). The business case for OSH is implicit within incentive – OSH performance includes aspects such as lost time, down time, plant damage, etc. Insurer pressure also captures the notion of the business case for OSH, e.g. civil claims and rising premiums.



**Figure 3.5 TQM Receptivity**

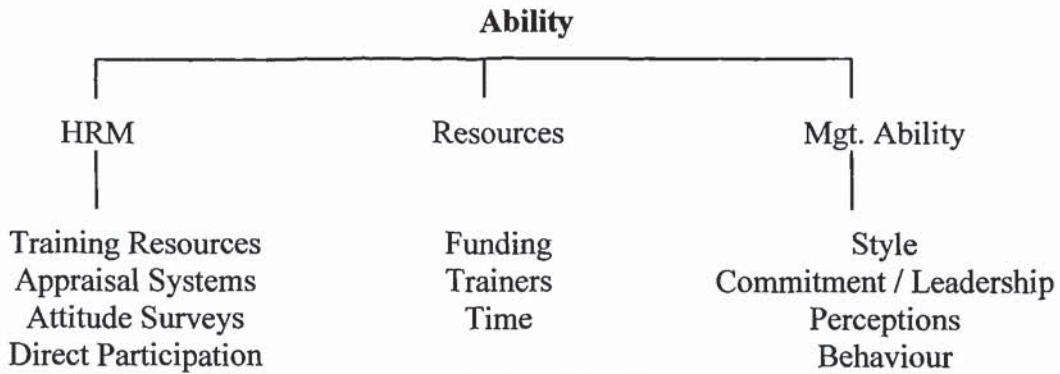
(Kirk 1998)



**Figure 3.6 Potential OSH Receptivity**

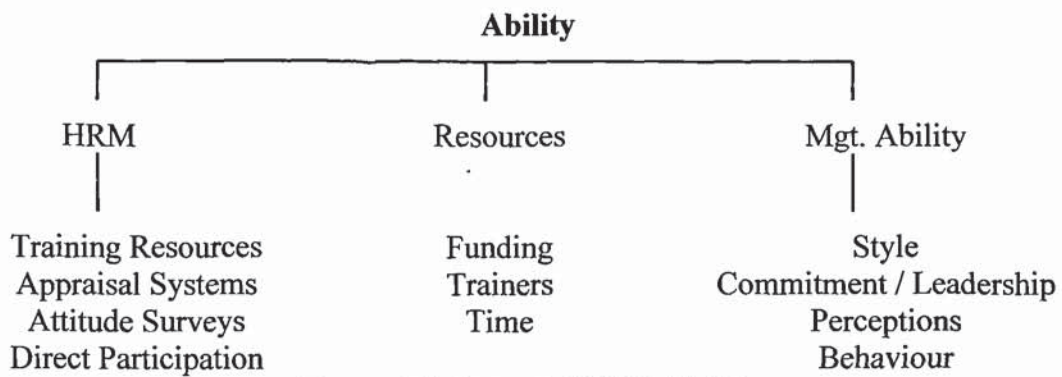
(Adapted from Kirk 1998)

The only alterations to this particular element is the addition of two sub factors. Trust and blame culture have been identified within the literature review (ACSNI HSE 1993, Bottomley 1998) as important concepts and are incorporated into receptivity under industrial relations climate.



**Figure 3.7 TQM Ability**

(Kirk 1998)



**Figure 3.8 Potential OSH Ability**

(Adapted from Kirk 1998)

No changes are proposed at this stage to this factor.

Additional special factors have yet to be identified and may or may not arise during the course of the research. However this initial framework will be used and developed as the research progresses utilising the empirical evidence to help answer the key research questions. The next chapter sets out the context within which the research will take place.

## CHAPTER 4

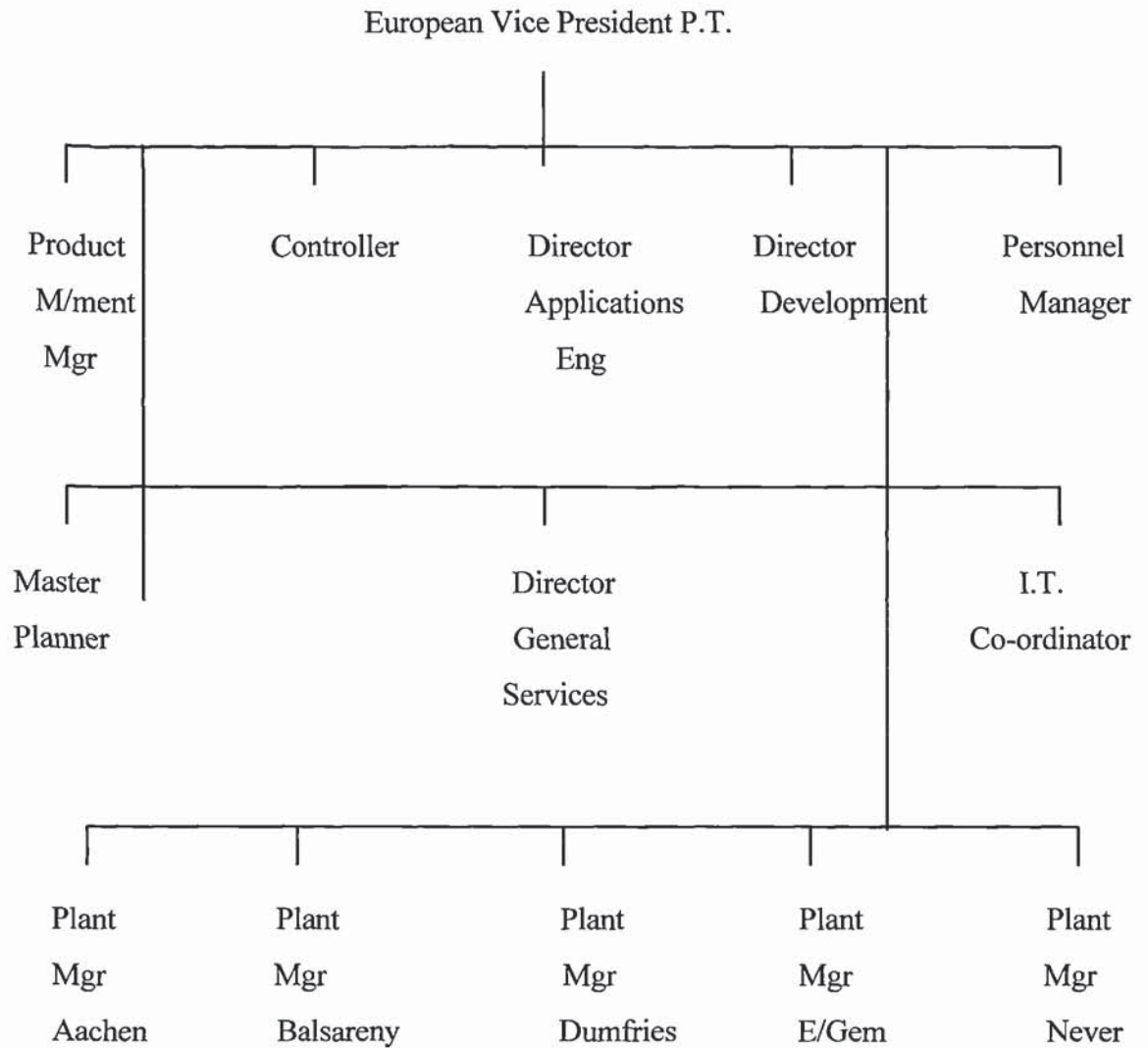
### ORGANISATIONAL OVERVIEW - COMPANY CONTEXT

#### 4.1 Introduction

This chapter outlines the history of the Gates group, including the Dumfries plant, and will describe the organisation structure and goals of the corporation. This is followed by a review of the safety initiatives and finally a brief overview of Gates parent company owners, Tomkins. In July 1996 Gates became part of Tomkins Plc, an industrial management company. Gates is now one of four subsidiaries of Tomkins.

#### 4.2 The Gates Group

The Gates Corporation was a privately owned multinational, operating in 21 countries throughout the world. It employs 26,000 people, at 70 plants with sales of 2.8 billion dollars (1999-2000). The group expanded by absorbing the Stant and Trico companies as well as Schrader – Bridgeport in 1997/98. The company was founded in 1911 by Charles Gates in Denver Colorado. In 1917 Charles's brother John developed the first vulcanised rubber V-belt to replace the round hemp rope used to drive the fan on a 1917 Cole coupe. Within a few years V-belts began to dominate the market and the expansion of the company started. Rubber hose production began in 1927 and in 1963 Gates opened its first European facility in Belgium, now European headquarters. Growth in Europe saw plants built in France, Spain and Scotland in 1988-89. The products made by the Gates group are primarily automotive components and the company is divided into North American, Asian and European Operations. The European division is headed up by a European President and Vice President, with the structure illustrated below:



**Figure 4.1 Gates European Power Transmission Organisational Structure**

Each plant is controlled by a Director of Factory operations, with his own management team, who in turn answers into European Headquarters in Belgium.



### 4.3 The Products

Power transmission belts have played an important role in the industrial development of the world for more than 200 years. Flat belts of piled-up leather and regular cotton or hemp rope running in V- grooves (sheaves) were predominant in early industrial history. These belts transmitted power from large steam engines or water wheels to various types of production machinery, usually through a series of line shafts.

Individual machines were driven from the line shaft by flat belts that could easily be shifted between a driving pulley and an idler pulley to start and stop the machine.

Power transmission by belts is best described as the transmission of power from a prime mover to one or more driven machines by means of a flexible non-metallic member. The belt operates in conjunction with a pulley or sheave mounted on each of the rotating shafts. Power is usually transmitted by frictional forces developed between the belt and the pulley or sheave. A frictional drive like those using V-belts or flat belts does not give exact driven speeds. There is a certain amount of belt creep, which makes it impossible to drive machinery such as indexing heads of machine tools or the camshaft of an internal combustion engine where synchronisation is needed. This was a segment of the power transmission market not open to belts until about 1950 when the synchronous belt was developed. ( Source : Gates Group Company Outline 2000).

The synchronous belt is an exception whereby the belt teeth make positive engagement with the teeth of the pulley. Synchronous belts are capable of transmitting power through the positive engagement of the teeth on the belt with corresponding teeth on the pulley. This creates the synchronisation between the driver and the driven shafts which is essential for some types of application. Synchronous belt drives have a distinct advantage over gears or chain drives because they can transmit reasonably high loads at a wide variety of speeds, with low noise level and without lubrication. Fig 4.2 details the component parts of a synchronous belt



**Figure 4.2 : Component parts of a Synchronous Belt** (Source : Gates Catalogue 2000)

The application scope of power transmission belts is virtually without bounds, ranging from drives which can be held in the palm of the hand to drives several feet in width, and using belts over fifty feet in length. Power transmission capabilities can vary from less than 0.1 horsepower (HP) to several thousand HP. Figure 4.2 shows an automotive applications which accounts for a large percent of the timing belt market.



**Figure 4.3 : An Automotive Application** (Source : Gates Catalogue 2000)

The PT division manufactures conventional V belts and V ribbed serpentine drive Micro V belts for the automotive original equipment and replacement markets. The division also makes heavy and light duty V belts for the industrial market, and Synchronous belts for both automotive and industrial customers. Major customers include Ford, Renault, Peugeot, BMW in the Automotive market and Black and Decker, Rank Xerox, AT&T, and Qualcast in the Industrial market. In addition the division has established a technical support team and manufacturing facility in Aachen, Germany, to develop synchronous components and accessory drives for European customers. Agriculture, construction, mining, oil field and transportation industries are some of the markets served. Vehicles of every kind, including bicycles and high horsepower industrial equipment such as mine ventilation systems and tooling machines, and light machinery including sewing machines, computers and photocopiers, employ Gates belts, (Source : Gates Catalogue 2000).

#### **4.4 The Dumfries Facility**

The Dumfries factory was operated as a multi-product site up until 1989, when due to capacity restrictions, the Power Transmission product line relocated to a new purpose built factory, approx 100 meters from the original site. The multi - product site manufactured carpet underlay, matting and wellingtons as well as power transmission belts. The relocation comprised significant new manufacturing equipment, but retained the same workforce. This move signified a major change for the PT dept. The new technology contained a substantial amount of automated equipment and significant changes to layouts and established working procedures. The move to the new facility commenced in Sept 1989 and was phased over 12 months to ensure continuity of service to the customer base. The Power Transmission facility at Dumfries is a separate plant, and its only connection with the older Dumfries plant is by belonging to the same subsidiary, i.e. Gates Rubber Co Ltd. The facility is dedicated to the manufacture of synchronous belts for Industrial and Automotive markets. The plant employs approximately 400 people and works a 24 hour operation, with 12 hour by four shift pattern. The total turnover (inclusive of internal markets) was £86.6 million pounds in 1999-2000.

#### 4.5 Tomkins

Gates was a privately owned company up until July 1996, when it merged with Tomkins plc. Gates was sold because Charles C Gates was reducing his involvement in the running of the company and the family members had interests in other areas. The merger was designed to give the Gates family members the option of selling their share in the company if they so wished. Tomkins was chosen by Gates following an announcement by Gates in March 1995 that it was looking for a merger partner which must be a publicly traded company in the auto/industrial sector and not competing directly with Gates. When the merger was announced in March 1995, Charles C Gates said that the Gates Rubber Company had grown to a point where remaining private, that is family owned, did not permit the funding of competitive growth opportunities. When Tomkins was designated as the preferred partner in December 1995 Charles C Gates stated that Tomkins brought Gates the growth opportunity as well as a very promising future for both businesses. Tomkins Chairman stated that Gates would continue to be run by Gates management and the company would grow as a fully functioning wholly owned subsidiary of Tomkins. Tomkins, an industrial management company, is based in Putney, London, but has its US headquarters in Dayton, Ohio. The group reported profits of £ 232.4 million in 1999-2000 on sales of \$7.49 billion, with over half its operating profit generated in the US. Tomkins businesses are organised in four sectors. They are in order of sales revenue:-

##### *Food Manufacturing*

Tomkins food businesses operate in five distinct and separate segments, each characterised by its own growth opportunities, e.g. groceries, cakes, convenience and ethnic foods, ingredients and catering products. At the time of writing this particular section of Tomkins Plc is about to be sold.

##### *Industrial and Automotive Engineering*

A range of niche, low-risk technology industrial products is manufactured by companies in this sector. Products include plastic and fibreglass mouldings, doors and windows, wheels and axles, rubber components and coated textiles, control instrumentation, metal pressings, precision turned parts, industrial disk brakes, clutches and flexible couplings.

*Professional, Garden and Leisure Products*

This range includes finely engineered products such as power mowers, snowblowers, bicycles, handguns, handcuffs and buckles

*Construction Components*

Services provided are conveyor and material handling systems, valves and fittings, fasteners, automobile components, spring steel, heat treatment, business forms and head-to-toe safety wear. Products manufactured include water, heating, ventilating and air conditioning valves, engineers' brassware, faucets, radiator and plumbing fittings and components for air handling and distribution.

Gates' future may appear to be secure with Tomkins, who have given Gates management the freedom to develop the company along the same lines as Charles C Gates did. As such there is a great deal of autonomy within the Tomkins group, however profit and delivering to the shareholder have taken over as the key overriding goals as Gates have been absorbed into a plc.

#### 4.6 Previous OSH Performance

Safety performance in terms of accident statistics at the Dumfries site can be traced back over the past four years.

**Table 4.1 Total Number of Recordable Incidents (require first aid, medical treatment or lost time)**

Year	Over 3 day	Major	Fatality	Other recordables	Total
1994 – 1995	2	0	0	1	3
1995 – 1996	5	0	0	6	11
1996 – 1997	4	1	0	2	7
1997 – 1998	5	0	0	2	7

The marked increase from two reportable incidents under the RIDDOR Regulations represents a sharp increase in the workforce and a change to 24 hour production. It can be seen that safety performance has very much hit a plateau. This point was noted during a recent inspection from insurers – who complemented the degree of engineering control but advised that any “further improvements would come from generating a proactive safety culture.”

#### 4.7 Health and Safety Hazards on Site

These are discussed in more detail in chapter nine of the thesis, but are outlined here to assist in overall clarity of the site processes and hazards. The key health and safety hazards can be detailed in terms of the processing of materials through the site. There are three main parts to the overall process – fabric production, main belt production and finishing. The fabric production forms a much lesser part of the overall production process. The raw materials which make up the internal face (see Figure 4.1) of the belt consist of nylon fabric which is impregnated with various rubber compounds. Solvent based chemicals are used to dissolve the rubber which is then applied onto the fabric via automated coating machines which stretch the fabric along steel rollers. The fabric is then drawn through ovens which heat the

fabric and “flash off” the solvent from the rubber based cement leaving the rubber impregnated into the fabric. Hazards in this initial part of the production process consist of chemical formulations (various solvents and isocyanates), machinery-generated crushing and entanglement hazards and also fire and explosion. To mitigate these hazards there is extensive local exhaust ventilation as well as varying levels of guarding systems. In addition there are lower explosive limit (LEL) monitors, which monitor solvent levels, ultimately linked into automatic process shut downs if levels approach the LEL. These initial processes are in a separate building from the rest of the production processes. The second main process consists of winding glass fibre cord under tension, on a lathe and pulley system onto a mould. Fabric is then applied, as a wrap to the mould, and finally a layer of rubber is added to the mould. This whole assembly is then lifted by automatic crane into a vulcaniser where the product is cured under temperature and pressure. There are machinery hazards within this part of the process including extrusion machinery, calendars, two roll mills, lathes and automated machinery. In addition to these there is a great deal of manual handling of rubber feed stock as well as various sizes of moulds too small for the overhead process cranes to lift. Rubber fume is generated as part of the curing process from the seventy two vulcanisers on site. Rubber fume is a known carcinogen and within the case study site is poorly controlled with little extraction at source. The final hazard in the main production process is that of pressure from the pressure vessels generating steam and pressure to cure the rubber. These are subject to standard engineering inspection to ensure their integrity as required by the Pressure Systems Regulations 2000. The finishing area consists of grinding machines, which grind rubber from the back of the belts to the correct specified tolerance, and also printing processes used to mark the belts to customer requirements. The key hazard in this area, in addition to the machinery hazards, is the level of solvent vapours, particularly toluene which is used to wash down printing screens and equipment.

The principal legal and other requirements most relevant to the site activities include the Health and Safety at Work etc, Act 1974 , The Management of Health and Safety at Work Regulations 1992 (amended 1999), The Provision and Use of Work Equipment Regulations 1998, the Manual Handling Operations Regulations 1992, the Supply of Machinery (Safety) Regulations 1992 and also the Control of Substances Hazardous to



Health Regulations 1998 and subsequent revisions. In addition to these EN 292 Parts 1 and 2 (BSI 1992), EN 1050 (BSI 2000) and PD 5304 : 2000 (BSI 2000) are also particularly relevant with regards to machinery safety and risk assessment.

#### **4.8 Previous Initiatives**

Internal pressure and guidance for improvement at the Dumfries facility comes from two main sources – Gates H.Q. in Belgium and Tomkins in London.

There are guidelines issued regarding both occupational safety and health (OSH) and the environment from Gates Europe Headquarters in Belgium. These are combined with periodic European Safety and Environment Workshops / Seminars. The most prominent recent one was the introduction of a Zero Incident strategy for Gates Europe. Guidance is also issued by Tomkins PLC although as yet the every day impact of this remains minimal. The site itself has recognised management systems in place being accredited to ISO 9001 and also ISO 14001.

This is the scene effectively set for the start of the practical / experimental work. Chapter one set out an overview of the thesis and the objectives of the research with chapter two orientating the research by reviewing the relevant literature. Chapter three outlined a framework for analysis for the research with chapter four detailing the organisation itself. The next four chapters consist of practical data analysis relying on a mix of research methods and data including anecdotal evidence, documentary evidence for corroboration, and daily note taking, with a quantitative measure also assessed to allow for triangulation of data. The primary data source however is the semi-structured interviews and it is the results of the 1998 interviews that are set out in chapter five.

## CHAPTER 5

### INCENTIVE AND ABILITY 1998 – MANAGEMENT GROUP

#### 5.1 Introduction

This chapter is the first part of the empirical work. As noted in the introduction the methodology used for each piece of experimental / practical work is detailed in advance of the data presentation and analysis.

Ability and Incentive are two core elements of the potential OSH model of change. This section details the results of a series of individual interviews carried out in October/November 1998 with the management team at GPTL. These were conducted to gain data that would allow for an analysis of OSH incentive and OSH ability within the plant. A total of eleven managers were interviewed. This consisted of the senior management team and the Director of Factory Operations. An additional manager heading up Research and Development, which has a centre at the Dumfries plant, was also interviewed to give an additional view on the Dumfries plant and also an insight into Gates corporate organisation. This particular manager is not part of the Dumfries management team but reports to Gates Europe H.Q. By choosing individual interviews as a format it was hoped to gain as much insight into the status of GPTL against the influencing factors outlined in the OSH model detailed in chapter three. This section allows a base line to be drawn for the change vectors of incentive and ability, prior to the OSH interventions.

#### 5.2 Interview Format and Techniques

Managers including the side director were interviewed by the author using a semi structured format (n = 11), on a one to one basis in the manager's own office. These typically lasted for 25 minutes. Operationally on the site this was the most convenient option to obtain the views of all managers, as opposed to interviewing as a group. Eleven managers provided a low enough number to allow in depth interviews that did not impinge too heavily on the author's time commitments as HSE adviser. Notes were taken during the interview and written up later into interview scripts (see appendices two and three). It was felt

that tape recording interviews would not give the same degree of openness from the manager. Advantage was also taken to interview a research manager (using the same question set) from Gates corporate HQ to give an additional view of the corporate culture.

### 5.3 Question Sets

The question sets for all interviews are included in the appendix one. The basic premise for asking certain questions was to generate data / information to test and develop the explanatory powers of the potential OSH model. Many of the core facets of the model are software type elements, more specifically, data on the following were required:

- Ability: leadership style, commitment, behaviour, perceptions of OSH.
- Incentive: key motivators for OSH – legal, corporate, OSH performance, insurer pressure.
- Receptivity: previous initiatives 14001/9001, quality initiatives, communication, teamwork/empowerment, risk perception, trust, blame culture.

Following an examination of the question sets from Bottomley et al (1998) and Kirk (1998), projects which probed into very similar areas, questions were developed. Open questions were asked where possible to minimise any bias from the interviewer. However, following testing of the managerial interview question set, with the external supervisor and Quality Manager, it was felt that three questions had to be slightly leading to minimise prompting from the interviewer and allow the interviews to flow. These questions are linked into corporate pressure for OSH and safety production relationship / trade off. This notion of prompting or asking leading questions is one aptly dealt with by Oppenheim (1996) who contends that probing prompts are often by definition leading and allow heavy bias to creep in and go unseen into the data. It was felt that to minimise any hidden creep of bias in terms of methodology slightly leading questions asked up front were preferred with little probing or follow up allowing for greater transparency in data generation. It was found that the

interviews flowed very well with a great deal of openness and frankness displayed.

#### **5.4 Role and Influence of the Researcher**

As part of the research it was recognised that the role of the researcher may have an impact upon how various initiatives were progressed within the plant. The researcher rather than being an observer is a participant observer and may effect what is being measured. This may have indeed occurred - in the area of inspection and auditing for example various options were tried and tested, an option not open to an observer only. However, countering this effect it was felt that being involved in the day to day functioning of the facility allowed a far deeper insight to be gained than a purely observer role. An observer role carried the danger of being perceived as an “outsider” with all the associated aspects of the Hawthorne effect. This is particularly true where daily anecdotal evidence is gathered. Throughout the course of the research the author was employed by Gates Power Transmission Ltd as Health, Safety & Environment Advisor.

#### **5.5 Data Presentation and Analysis**

A Strategy advocated by R.Chenail (1995) was used as a template for analysis and presentation of data. The data from the interviews was analysed using a coding system which was deliberately broad with only eleven categories which reflected the elements of the OSH model. This coding exercise reduces data into clusters around certain topics and allows for ease of interpretation, (Robson 1993), (Miles & Hubermann 1993). The typed up interview scripts were then cut up into logical bits of data. As Carney et al (1997) puts it a “scissors party” was had which ended up with a mound of data bits which fell naturally into the broad categories. A provisional list of codes / categories was used and developed, where categories can be thought of as themes or variables (Dick 2000). Not all bits of data could fit into the initial category set. Following a revision of the category set an initial set of categories was derived. Following this process codes or abbreviations for the actual data categories could then be applied. Throughout this process the author made use of the external supervisor to ensure minimisation of bias. These categories centre

around the elements detailed above under Incentive, Ability, Receptivity and Special Factors. The categories for the individual interviews are Perceptions of OSH, Hardware, Software, Felt need, Leadership, Previous change, Blame, Corporate Influence, Team Building. Empowerment & Participation, Business case for OSH, Drivers for OSH. These categories are deliberately straightforward and linked into the questions with the decision made not to subdivide codes/categories further to minimise any distortion of data through “over analysis”.

Examples of the interview data generated are given in appendices two and three to allow transparency of data reduction and analysis, as well as helping situate the data in context. Data is presented in tabular format as question, comments and actual data itself. Below each table is analysis of the data. A deliberate decision to quote extensively was made to allow transparency of data and findings with reference back to the literature in chapter two to allow analysis and insight.

### **5.6 Management Team Make up**

Generally senior managers have come up through the ranks, in some cases from the shop floor. Lengths of service within Gates are very high, typically twenty to thirty years experience within the company. With three exceptions senior management have no other professional experience outwith Gates. Exposure to serious OSH incidents tends to be variable with predictability higher exposure and experience the closer the function to the shop floor.

## 5.7 Perceptions of OSH at Gates

### Perceptions on Performance

<p><b>Question</b>  <i>How do you feel we are doing at the present time regarding safety performance?</i></p>	
<p><b>Commentary</b>                  Ten of the eleven managers interviewed felt that safety performance was satisfactory or good. No manager felt that OSH performance was bad.</p>	<p><b>Data Exemplars</b></p> <p>“our safety record is good as we have no fatalities”</p> <p>“nobody is at risk”.</p> <p>“I would say its satisfactory. ”</p> <p>“don’t think that there are any glaring gaps anywhere – we to look after safety, guards and things”</p> <p>“a highly protected site...strong on engineering considerations”.</p> <p>“a purpose built factory is akin to low risk”</p>

An emerging theme from the first question was the dominance of hardware in the area of OSH, with guarding, plant safety and engineering perceived as the absolute indicators of OSH performance.

<p><b>Question</b>  <i>How do you think we compare to manufacturing in general ?</i></p>	
<p><b>Commentary</b>                  Four of the eleven managers felt that they could not comment as they had little experience of industry outwith Gates. The remaining seven felt that on the whole Gates was superior to the rest of manufacturing.</p>	<p><b>Data Exemplars</b></p> <p>“better than others”</p> <p>“glaring obvious would be spotted”.</p> <p>“I have been to our suppliers facilities and by and large we exceed their standards, some have powders and yellow dust all over the ship”</p> <p>“better than most”</p>

There was a tendency therefore to perceive good OSH performance as the absence of very serious incidents. On purely statistical terms – perceptions of

performance and the accident rate per 100,000 employees do not match up - why should this be so? One reason could be the lack of external benchmarking even in simple rate per 100,000 figures. From a practical viewpoint if there is not perceived to be any problem in safety performance then there can be little motivation for change.

<p><b>Question</b></p> <p><i>Do you feel our position has changed in the past few years ?</i></p>	
<p><b>Commentary</b></p> <p>Seven of the eleven managers felt that progress had been made in the area of OSH. The remainder felt that the site had maintained its position as a good performer in OSH.</p> <p>Two managers made reference to visiting organisations which were apparently more proactive than the site under study.</p> <p>These aspects are captured in the quotes opposite.</p>	<p><b>Data Exemplars</b></p> <p>“more a gradual process of closing things out than big leaps”</p> <p>“steadily improved over the years, put in cranes to lift heavy moulds and stuff”</p> <p>“new technology makes sure we have a safe plant”</p> <p>“maintained a good one”</p> <p>“held our position in terms of safety, I would say”</p> <p>“I have been to other sites and seen gimmicks like a clock thing counting up hundreds of thousands of hours since a lost time injury, I don’t think we need that here”</p>

A theme which emerged from the first question is the pre-occupation with OSH as primarily an engineering issue. It could be contended that the primary focus is on technological risk, which in itself may not be sufficient to ensure improvement in OSH performance (Bottomley *ibid*). The focus on technological risk may also help explain misperceptions on performance as the age of the plant is less than twelve years old. On the rare occasion when visiting external organisations with very high profile safety initiatives these were viewed suspiciously and with “paranoia” on their part.

This pre-occupation with hardware aspects may also be the reason for an accident plateau - the law of diminishing returns holding true in that the primary benefits from hardware engineering solutions have been accrued. The delivery

and performance by the site of aspects that are measured extensively by corporate headquarters e.g. profit and turnover, is generally very good. Therefore it may be a natural reaction to believe that all plant functions are above average including OSH.

### 5.8 Positive and Negative Motivators

<p><b>Question</b></p> <p><i>What are the key things driving safety ?</i></p>	
<p><b>Commentary</b></p> <p>All managers without exception made reference to legislation as the key driver of OSH. One of the managers made reference to civil claims and insurer pressures from premiums. No mention was made of the business case for OSH acting as a driver. Two managers also made brief reference to moral and ethical aspects as a driver for OSH.</p>	<p><b>Data Exemplars</b></p> <p>“I think the legal implications being more heavy on directors and managers is very powerful”,</p> <p>“safety does not come without a cost - a cost is involved”.</p> <p>“ the law is a minefield and trying to comply with it is always playing catch up – the goal posts are moved all the time”</p> <p>“I guess society is changing as well – people maybe expect a safer workplace nowadays, more than say ten or fifteen years ago”</p>

Building on Hawkins and Booth (1998), a difference between positive and negative motivators can be argued. The latter refers to aspects perhaps involving coercion and enforcement e.g. legal compliance. The former refers to aspects which are good business e.g. customer satisfaction and efficiency increases. The tendency within the management team was to view OSH as being forced upon the plant by legislation.

Other motivators for OSH were mentioned albeit fleetingly by two managers, including changes in society attitudes, as well as moral, and ethical duties. In essence the predominance of more negative motivators may tend to indicate a relatively poor ability to absorb and implement OSH change. It can also be seen from the literature on in chapter two that the key characteristics of the reactive organisation are emerging from the data – for example fear of prosecution as a core driver.



## 5.9 Essence of Gates Culture

### 5.9.1 Gates Corporate Culture and Leadership

<p><b>Question</b>  <i>If you were to identify key elements that make GPTL tick what would they be?</i></p>	
<p><b>Commentary</b>                  All managers interviewed stated that without exception leadership was cited as the main element that makes GPTL at Dumfries function as an organisation.                  In addition to this a desire to be the best PT plant in the group was also present amongst all managers.</p>	<p><b>Data Exemplars</b></p> <p>“ people in high places tend to be more directive and they see this as part of their success. XXX is this kind of guy – action orientated and all the head guys are like this, it’s the corporate culture”</p> <p>“leadership !, and to be better than the others”</p> <p>“ I suppose growth, profits and turnover serving our core markets”</p> <p>“ driving things through from the top and getting others to follow”</p> <p>“one of the results of the style that we run things is that people crave leadership and are unwilling to act without direction, so its a circular thing”</p> <p>“plants within Europe tend to be competitive, at the present time the rest are trying to catch up with us”</p>

The organisation is very heavily results driven with accountable objectives and targets for managers. The style of leadership tends to be more directive, a 9,1 style to refer to Blake & Mouton reviewed earlier. This has been successful within the plant with high profit margins and certification to ISO 9001, QS 9000 and ISO 14001. This style of leadership tends to be the dominant style through Gates as a corporate body. It was suggested by one manager that this style has tended to generate a culture whereby people outwith the very top team crave leadership and direction. Illustrative of this is the author requesting responses to emails on issues such as inspection findings, risk assessment, proposed frequency of safety committee meetings, etc. No responses were forthcoming

from any manager if the Plant Director was on the distribution list as “it is up to him.”

### 5.9.2 Felt Need

All managers interviewed with the exception of the research and development manager gave a consistent message across the management to be the best Power Transmission plant not only in Europe but worldwide and outwith the Gates group. The plant has been doing very successful in terms of increasing turnover and profit levels. The desire to “be the best in all areas, profit, quality, everything” was very evident across the whole management team. Within Gates Europe the site was the first to achieve ISO 9000/ QS 9000 and ISO 14001 certification.

### 5.10 Previous Change

<p><b>Question</b>  <i>What has been the most effective method of driving change ?</i></p>	
<p><b>Commentary</b>                  Nine of the eleven managers advocated that the best way of historically driving change had been via the managers owning and implementing the new initiatives. No manager claimed that workforce involvement was a key to change in any way.</p>	<p><b>Data Exemplars</b></p> <p>“hard and decisive is the only thing that’s understood”, got to give people direction or it doesn’t happen”</p> <p>“by generating targets and plans that each manager would own and then be accountable to the top for delivering them”</p> <p>“it’s a technical product, so we don’t need much shop floor involvement, they cant know about chemistry stuff can they”</p> <p>“by Force !!”</p>

Continuing on the themes from above of leadership and this “felt need”; how was change wrought in the past? As mentioned previously various organisational upheavals have occurred both in terms of technological advance and management systems. This has generated an attitude within the management team that “change is the norm”. In the case of ISO 14001 this was driven very hard in a top down style. This is appears to be fairly representative of how major initiatives are driven. A small management team allows for a smooth

horizontal flow of communication aided by a compact site. It may be argued that systems such as an EMS / QMS, implemented as a result of customer pressure and to achieve certification rather than a change of philosophy, do not need the workforce involvement that an SMS may require. The accepted wisdoms reviewed within the literature, for example Cox & Cox, ACSNI, Cameron, Cooper & Phillips (ibid.) contend that human factors are central to OSH.

### 5.11 A Business Case for OSH ?

<p><b>Question</b>  <i>Do you feel that it (OSH) is a central business issue ?</i></p>	
<p><b>Commentary</b>                  No manager acknowledged that OSH was a central business issue. The main focus was on the aspects measured extensively by corporate – namely profit, production and quality. Two managers recognised that OSH had a business argument but that it was not realised in the day to day running of the site.</p>	<p><b>Data Exemplars</b></p> <p>“at least there are good goals for losses and the like. But I wouldn’t say it is on top of the list for reviews”</p> <p>“a necessary evil that’s got to be done”</p> <p>“it’s what I would call an underlying business issue.... At times it only gets lip service”</p> <p>“as far as being a topical issue – running a business does not involve safety as such. There are key business decisions to be made but that doesn’t mean safety does it?”</p> <p>“commercial business issues dominate and profit and finance is over everything”</p>

A consistent theme was the existence of first and second level business issues. Irrespective of the managerial function three core business issues emerged - productivity, finance and quality. These were cited as the three main priorities that made GPTL function as far as the Director of Factory Operations was concerned

“Production and product performance are critical. The Gates name on a belt is a quality statement”

Peripheral or second level business issues included issues such as information technology, human resource management, engineering and health, safety and environment. The Schein notion (see chapter two) of core cultural foundations permeating from a central point appears to hold true thus far, with the site

director’s priorities reflected down the heirarchy. This is as true for culture as it is for leadership. If consideration is taken of the culture embedding mechanisms reviewed in table 2.3 in chapter two then the following can be clearly seen and argued. The primary embedding mechanism is what the leader of an organisation pays attention to, measures and controls on a regular basis. These within GPTL are fundamentally hard measures of turnover, scrap levels and finance – that is, the first level business issues.

### 5.12 Corporate Influence

<p><b>Question</b>  <i>Do you feel there is a heavy corporate drive on safety ?</i></p>	
<p><b>Commentary</b>                  No manager felt that the corporate presence in OSH was strong.</p>	<p><b>Data Exemplars</b></p> <p>“I read it but I don’t feel it”</p> <p>“Balsereny (Spanish plant) getting 2.2 in severity means nothing to me”</p> <p>“ eh, no”</p> <p>“corporate drive is weak and contradictory as any internal environment or safety award carries no real clout”</p> <p>“I didn’t know there was one – maybe that says it all eh?”</p>

Corporate influence in terms of direction was perceived to be fairly weak and at times inconsistent. Illustrative of corporate influence was the 1998 corporate European HSE meeting which only two plant directors out of an invited 14 chose to attend. Monthly business reports feature as a key mechanism for communicating plant results back into European H.Q. within which OSH has a low profile. Corporate pressure was identified by Wright (ibid.) as a core motivating factor for OSH – within GPTL it is at best very weak.

**5.13 Trade Unions**

<p><b>Question</b>  <i>What about trade unions in general - do they carry much clout at GPTL?</i></p>	
<p><b>Commentary</b>                  No manager felt that trade unions had any real power or influence within the facility.                  Three managers made reference to the perceived poor quality of union representatives.</p>	<p><b>Data Exemplars</b>                  “it’s ( Dumfries ) not an area of high employment so they know their place”                  “no”                  “they are of very low calibre in terms of reps”                  “they more or less have to just take what they are offered and are not intelligent enough to argue for much more”                  “certainly not in here”                  “don’t think unions can ever carry much clout these days”</p>

There appeared to be little respect for trade unions amongst managers. A reason for this may be the calibre of the representatives, but it may merely be an indication of the managerial style being more task than people orientated. Unions are merely being a part of the minimalist approach to consultation.

<p><b>Question</b>  <i>Do you perceive trade unions / safety reps as having a role in safety ?</i></p>	
<p><b>Commentary</b>                  Only two managers perceived unions as having a positive role in OSH. Two managers also made reference to unions claiming and having a negative influence on OSH. The remainder were fairly non committal, perhaps reflecting the almost non-existent role of the unions on the site with respect to OSH.</p>	<p><b>Data Exemplars</b>                  “ I suppose so but don’t see them doing much here that could help ”                  “I have never thought of them having a role in safety but perhaps they could”                  “truth is they probably don’t care too much about safety”                  “not really – they only appear once a year for wage negotiations”                  “ the only role they have here is negative in making sure people claim against us”</p>

Trade Unions tend to be passive rather than confrontational. Any activity is centered on aiding civil claims against the company. This is one of the major arguments that trade unions have for retaining membership. Any influence here tends therefore to be negative as opposed to helping drive OSH in the workplace. Evidence reviewed by ACSNI (ibid.) demonstrates that Trade Union representatives can have a substantial positive contribution. Within GPTL this appears to be an opportunity missed at the present time.

#### 5.14 Team Building, Empowerment and Participation

<p><b>Question</b>  <i>In general what do you think of the issues of team building, participation and empowerment ?</i></p>	
<p><b>Commentary</b>                  No manager had a positive opinion on the issues of empowerment, participation and team building. Reference was made by three managers to Gates Quality Commitment which was an attempt at creating teams akin to quality circles.</p>	<p><b>Data Exemplars</b></p> <p>“it’s all fine in a small business that is not too complex but in a large facility the notion can become troublesome..... there are big knowledge gaps”</p> <p>“empowerment is a dream”</p> <p>“not workable in reality”</p> <p>“airy fairy crap”</p> <p>“I was involved in GQC (Gates Quality Commitment) and teams and participation stuff ...it’s a good philosophy but all talk”</p>

Views on these aspects can be summarised

- workable concepts but not here.
- not workable anywhere.

These aspects are recognised as fundamental to gaining improved communication and ownership through an organisation. In the areas of OSH there have been attempts to hold safety fora in the past on the site but they have not been successful. The work of Kirk (ibid.) gave evidence on previous attempts in relation to TQM.

The issue of lack of knowledge was mentioned by four of the senior managers. Additional reasons as to why the concepts are not viewed as workable include speed of business development, massive technological jumps and also a lack of willingness by personnel further down the hierarchy to be empowered and participate. Certainly the work of Kirk (ibid.) does tend to confirm this almost extreme version of demotivation and withdrawal by the workforce.

Another interesting point also manifested itself. A cleavage is evident horizontally across the organisation, with an attitude of them and us present not only in relation to shop floor and white collar staff but also white collar staff and managers. When asked who “we” referred to this was the senior management team. Initially some managers viewed team building and empowerment as fundamentals but went on further and gave responses such as “us in the management team only”. Some degree of perceived insularity or even elitism is therefore in existence.

### 5.15 Underlying Blame Culture

<p><b>Question</b>  <i>What do you think are the main causes of accidents ?</i></p>	
<p><b>Commentary</b>                  Nine of the eleven managers responded that the main cause of accidents was human error.</p>	<p><b>Data Exemplars</b>                  “nine out of ten have a human element as I can’t recall any mechanical failures”                  “you can only anticipate so much until an idiot comes along”                  “he was stupid”                  “In many cases they are created by the operator”</p>

Attitudes to accident causation built a picture of operator error as the main cause. The tendency within the management team is to foster a blame culture, which may act as a block to acknowledging the root cause of incidents. The underlying trend to blame the victim. Again may be another reason why a plateau has been reached in terms of improvement. The traditional management approach reviewed in chapter two is in evidence in responses to this question as

well as permeating throughout the organisation. In terms of advancing from this accident plateau the managerial style may not be best suited to accommodating software advances. Software throughout refers to the human issues and not software in an information technology sense.

### 5.16 Trust

<p><b>Question</b>  <i>How is trust between managers and operatives ?</i></p>	
<p><b>Commentary</b>                  No manager felt that trust levels were high and answers tended to be fairly negative.</p>	<p><b>Exemplars</b></p> <p>“not that great to be honest. We have promised much in the past and not delivered”</p> <p>“probably okay – ish”</p> <p>“not too bad but not too good either – tends to be suspicion for some reason”</p> <p>“average”</p>

Levels of trust appeared to be fairly low with no manager commenting that levels were high. As a central component of a proactive safety culture trust appears to be weak.

### Interim Summary

In summary then OSH within the plant is hardware focussed with motivation principally centred around legislation. Corporate pressure as a driver for OSH is perceived to be extremely weak. Perceptions of a business case for OSH are almost non-existent with priorities clustered around production. Previous change in the past has been successfully driven by task orientated leadership, with little in the way of embracing any notions of empowerment.

These characteristics feed into the OSH model of change under the elements of Incentive and Ability. Ability itself is influenced by receptivity – i.e. how receptive the environment and workforce is to change. To gain an insight into this the results of group interviews with shopfloor workers will now be detailed.



## RECEPTIVITY 1998 – GROUP DATA

### 5.17 Introduction

A series of semi - structured group interviews were carried out as part of a initial training programme in OSH, covering 85 percent of production and related staff (actual number 242). Details of the question set and actual interview scripts are given in the appendices. The overall objective is similar to the one in the previous section i.e. uncover the core beliefs and attitudes of shop floor employees with reference to particular elements of the OSH model of change, so allowing the identification of the driving and restraining influences on OSH developments.

### 5.18 Interview Format and Techniques

Shop floor interviews were carried out by the researcher in group interview settings of between eight and twelve participants with groupings numbering 25 in total. Programmed training courses allowed questions to be asked as part of OSH awareness training sessions. The questions were asked prior to the training course starting and typically lasted 25 minutes. One of the on-site training rooms, immediately next to production was used. Areas were closed down to allow participants to attend. In deciding the group format as a strategy the disadvantages and advantages were assessed. Disadvantages were considered and the main one was that of noting views that were not representative of the group. To counter this throughout the whole exercise consensus among the group was sought at all times to minimise obtaining a distorted picture. However, the justification and the main advantage (in addition to sheer coverage of numbers of participants) of interviewing as a cell/work area group is that a certain amount of group think will be inevitable on the shop floor in every day working directing actions as well as thoughts. This has been noted by ACSNI (1993). Interviewing them as a group, as they would be on the shop floor, allowed this aspect to be captured. Again as with management notes were taken

and written up later on in the day or between interviews when time allowed. Tape recording of interviews was considered but rejected as it was felt that this could cause participants to withhold information and be more uncomfortable with the process.

### **5.19 Questions Sets**

As with the management team questions set, an examination of the question sets from Bottomley et al (1998) and Kirk (1998) allowed group interview questions to be developed. Open questions were asked where possible to minimise any bias from the interviewer. The question set for the shop floor group interviews was developed and trialled with four groupings which saw the adoption of the Gates Business Leadership Model (GBLP) model to allow prioritisation of plant activities. The model is in the appendices and was simply shown on an overhead projector. Again questions were geared to finding data for the development of the OSH model around the elements listed of ability and incentive but in particular receptivity.

### **5.20 Data Presentation and Analysis**

An identical approach was taken to data presentation and analysis in this section as the previous one on management data.

Again, a strategy advocated by R.Chenail (ibid.) was used as a template for analysis and presentation of data. The data from the interviews was analysed using a coding system which was deliberately broad with only eleven categories, which reflected the elements of the OSH model. The typed up interview scripts were then cut up into logical bits of data with mounds of data, bits which fell naturally into the broad categories.

Following this process codes or abbreviations for the actual data categories could then be applied. Throughout this process the author made use of the external supervisor to ensure minimisation of bias. This was done coding interview scripts independently of each other and then comparing and reaching agreement on codes. These categories centre around the elements detailed

above under Incentive, Ability and Receptivity. The categories for the group interviews are Perceptions of OSH, Hardware, Software, Felt need, Leadership, Previous change, Blame, Corporate Influence, Team Building. Empowerment & Participation, Business case for OSH, Drivers for OSH. These categories are deliberately straightforward and linked into the questions.

Examples of the interview data generated is given in Appendix two and three to allow transparency of data reduction and analysis, as well as helping situate the data in context. Data is presented in tabular format as question, comments and actual data itself. Below each table is analysis of the data itself. As with the managerial data a deliberate decision to quote extensively was made to allow transparency of data and findings.

Four group interviews were categorised independently by the researcher and external supervisor to ensure consistency in applying codes and assigning a piece of data to a category. Similarly with management data, group interview data is presented in order of question, direct representative quotations and then analysis.

### 5.21 Perceptions of OSH at GPTL

<p><b>Question</b>  <i>How do you feel we are doing at the present time regarding safety performance ?</i></p>	
<p><b>Commentary</b>                  Opinion on this was fairly divided and tended to depend on the perceived problems in the participants area at that time. Seven of the 25 groups perceived OSH performance as poor while the remainder were neutral on the issue i.e. did not perceive OSH performance to be good or bad.</p>	<p><b>Data Exemplars</b></p> <p>“we definitely do not have a safe plant – look at the chemicals we are using”</p> <p>“OK I suppose”</p> <p>“still lifting a lot of heavy stuff”</p> <p>“but look at where we came from its bad in terms of crap in the air –its black”</p> <p>“not too bad”</p>

An approximate mix of Gates Rubber Company Commercial and Industrial (C & I) section ex-employees and employees recruited into the purpose built plant

exists in proportion of two thirds in favour of the former. Taking on board the arguments by Kirk (ibid.) and Hunter and Beaumont (ibid.) it could have perhaps been expected that ex-employees of C & I would compare the new plant favourably in terms of degree of automation, age of plant and cleanliness i.e. use C & I as a benchmark. The notion of brownfield site perceptions being transferred to another site is referred to by Kirk (1998). While the old C & I division was mentioned a far greater impact on how things were perceived with respect to OSH was made by the conditions in respective areas. Where there existed a hazard which was being perceived as not being dealt with by management safety performance was perceived as fairly poor. The overall impression was one of apathy on this point.

<p><b>Question</b>  <i>How do you think we compare to manufacturing in general?</i></p>	
<p><b>Commentary</b>                  Seven of the 25 groups perceived GPTL to be better than other manufacturing sites.                  14 of the 25, perceived comparative OSH performance to be worse than manufacturing in general</p>	<p><b>Data Exemplars</b></p> <p>“I used to work in construction and here safety is much better”</p> <p>“safety there was a top priority but not here”,</p> <p>“ we still have MEK and toluene so we are not improving ”,</p> <p>“if we fall off trying to put a jacket on a mould they will blame us for it. But if we say it’s unsafe we will be told to get on with it”,</p> <p>“well compared to ICI it’s a joke”.</p> <p>“same as others I suppose”</p>

Why should the dominant perception be of a comparatively poor performance? Responses were constant across areas groups revealing a poor understanding of hazards. A very common misperception existed over the use of solvents and in particular toluene. The overall impression was that it was a cancer causing agent and was illegal the world over but still in use at GPTL. The trend in the past has been to monitor toluene but not feed the results of the monitoring back to those exposed. Solvents are extensively used throughout the site, monitoring results of

which are regularly over the OES of 50 ppm with a very heavy solvent odour in various areas. Perceptions of the risks within the workplace were generally poor.

## 5.22 Reactive Position

<p><b>Question</b> <i>Do you feel that our position has changed over the past few years ?</i></p>	
<p><b>Commentary</b> No group made reference to OSH aspects degrading over the previous few years. All groups made reference to OSH performance remaining static.</p>	<p><b>Data Exemplars</b> “we are the same as always really - it only alters if there is an accident” “things haven’t really got worse or better” “see they used to tackle things a few years ago - ventilation and the like and then it just died all of a sudden” “treading water and fingers crossed” “they know where the risks are -but they remain untackled until an accident forces the hand”</p>

Existing OSH systems were perceived to be reactive, with management happy in a “comfort zone” of an acceptable number of accidents. This reactive position in the main was put down to the rush for production with other issues such as employee relations and OSH being side-lined as a result. Indeed this backs up reasons for failure to fully implement TQM identified by Kirk (1998). This is consistent with the first and second level business issues highlighted in the management data.

The data at this point does reflect the management data and also features many of the traditional management facets identified in the literature, particularly of the reactive organisation. (Cox and Cox 1996.)

Any suspected or perceived safety / production trade off does not appear to be present within the plant. The most dominant theme was the division within the organisation between operatives and management. This may be as a result of the

management style in use within the plant, that is a more task orientated style of management.

### 5.23 Influence / Power

<p><b>Question</b>  <i>Do you think you have much influence over issues in the plant in general ?</i></p>	
<p><b>Commentary</b>          No group perceived themselves as having any influence. This question was held to ridicule by just over half of groups interviewed.</p>	<p><b>Data Exemplars</b></p> <p>“the whole plant focus is on production and we are just part of production - no more”</p> <p>“the only thing that matters to us is getting our wage and getting out of here that’s how it works here”</p> <p>“no – you are joking, he’s winding us up”          (Prolonged laughter)</p> <p>“your new here – but you’ll learn”</p>

Operatives tended to view themselves as part of production and nothing else. This is consistent with the data from the management interviews. This may be a reflection of the management style which may be causing self perpetuating situation with respective parties’ behaviours and attitudes mutually reinforcing each other. This aspect of lacking influence has been identified as a key feature of a closed communications climate as reviewed in chapter two.

<p><b>Question</b> <i>What about the influence of the safety officer ?</i></p>	
<p><b>Commentary</b> No group perceived the HSE advisor as having any real influence. The presence of whom was put down to legal reasons only.</p>	<p><b>Data Exemplars</b></p> <p>“did they give you the green light to this and introduce safety inspections - you’ve done well to get this far ”</p> <p>“you aren’t going to stop a machine are you?”</p> <p>“like everyone else, no real say”</p> <p>“are you seriously going to go to senior management with a risk assessment and say this has to be stopped - I don’t think so”</p> <p>“your presence is only here because the law said so”</p>

Management can’t be influenced by either the shop floor operatives or the HSE Advisor who are both perceived as powerless. This feeling of apathy generates a situation of withdrawal (Kirk 1998) which potentially impacts on attempts to form teams and participation. Given that the OSH management systems interventions are primarily software orientated the omens for success are poor.

#### 5.24 Motivators for Safety

<p><b>Question</b> <i>What do you think are the key things driving safety ?</i></p>	
<p><b>Commentary</b> All groups made reference to the law driving safety. Four of the 25 groups also made reference to improved worker’s rights – albeit driven by legislation.</p>	<p><b>Data Exemplars</b></p> <p>“It is all about the law is it not?”</p> <p>“the main drivers were mentioned as legislation, fear of being prosecuted and people claiming”</p> <p>“definitely the law isn’t it. It’s got much tighter in the past 10 years”</p> <p>“much of it is a cover your backside issue - to stop getting sued”</p>

Shop floor operatives had a fairly negative view of reasons why OSH happened. Legislation, fear of prosecution and bad publicity were the main themes, with

little reference to effective workforce pressure. Again this is consistent with management views where negative motivators dominate in terms of motivation. These key motivators being essentially negative is consistent with a lack of internal ownership of OSH as identified by Booth & Hawkins (ibid.).

**5.25 A Question of Priorities ?**

<p><b>Question</b>  <i>Look at the model of a GPT plant (model in appendix 4) where do you think the priorities lie ?</i></p>	
<p><b>Commentary</b>                  A diagram which was used extensively in the plant showing core site functions was displayed. All groups ranked plant functions for themselves as the opposite of management.</p>	<p><b>Data Exemplars</b>                  “there is our views and theirs - theirs are different. We are the reverse of that in terms of our priorities”                   “it depends on who you are talking about, they don’t think the same as us”                   “it’s been a case of them and us”                   “managers priorities are different from ours – reverse it”                   “employee relations is off the bottom of the board”                   “the bottom two (employee relations and safety) lag way behind the others particularly employee relations”                   “employee relations is lower than the bottom of the pile”</p>

**5.25.1 Management Priorities**

The simple model was adapted from the Gates Business Leadership Process GBLP model and was used as a format for discussion of perceived priorities. Groups were asked to rank priorities for the plant. It was here that differences in terms of mind set were displayed. The main findings were – managements’ priorities were almost the complete reverse of the shop floor’s. Production and output were consistently quoted as the main priority for management, as perceived by the shopfloor, with 100 % of groups citing this as the main priority. The switch to a 12 hour shift appears to be a main factor in this



perception. Finance and costs were cited as the second main issue (76 % of groups) along with quality as the third (72 % of groups) . Ratings of these priorities were consistent across areas and shifts and the perceptions of management's priorities does fit in with the 1<sup>st</sup> and 2<sup>nd</sup> level business issue aspect already discussed.

The environment was invariably ranked fourth, a reason for this being a topical issue was ISO 14001 being "forced" upon the plant by customers.

Safety and employee relations (i.e. working conditions, wage levels, management - shop floor communication) were perceived as fifth and sixth respectively. Management's priority given to employee relations was perceived as being particularly low. The group interviews ( both in 1998 and in 2000 in chapter seven) did take place during a period of wage negotiations, however the strength and depth of feeling in this area were such as to indicate that this situation was more than a one - off perception.

A marked horizontal cleavage exists across the organisation in terms of mind set and priorities. This "software of the mind" has been suggested by Dawson (1995), as a central tenet of any organisational culture. To use Dawson speak (ibid.) the software programmes appear poles apart.

### **5.25.2 Shop Floor Priorities**

The consistent message for shopfloor employees was that in terms of priority employee relations was the foremost, followed by safety (68 % of groups). This could be as a powerful reaction to the signals from management regarding first level business issues. The ranking of safety as a high priority may also have been due to the bias effect created by the presence of the HSE adviser asking the questions. Quality of product tended to be third with environment as fourth. Extreme apathy and a "who cares" attitude were vented towards finance / costs and production levels. The table below gives a broad picture of respective priorities.

**Table 5.1 Respective Priorities – General Picture**

Management Rank		Shop Floor Rank	
High ↓ Low	Production	High ↓ Low	Employee Relations
	Finance / Costs		Safety
	Quality		Quality
	Environment		Environment
	Safety		Production
	Employee Relations		Finance / Costs

### 5.26 Communication

In general terms there are various potential routes which can act as mechanisms for communication up and down in GPTL. In terms of OSH these are: - managers, shift coordinators, safety committees, HSE officer and suggestion schemes. A discussion on communication highlighted the climate within the plant, with the various routes commented upon by the participants.

#### 5.26.1 Managers

Question	
<i>Do you think that they (management) are approachable ?</i>	
<p><b>Commentary</b> Only three of the 25 groups would approach a manager to raise any issue. These groups were not in main production but in direct support – product engineering and quality.</p>	<p><b>Data Exemplars</b></p> <p>“They look straight through you”</p> <p>“Never see them anyway”</p> <p>“Management are invisible on the shopfloor so how can they pick us up on a safety issue”,</p> <p>“No chance”</p> <p>“There’s a strict way of doing things – through our shift manager”</p> <p>“Only time we see management is for a 1<sup>st</sup>, 2<sup>nd</sup>, or 3<sup>rd</sup>”</p> <p>“Tell me how can we approach them if we don’t see them”</p>

For shop floor employees management are unapproachable with any issue. In essence a mass of people on the shopfloor have all queries channeled through one person - the shift coordinator.

So what else do the workforce see as they look up the hierarchy? Management are not visible on the shopfloor with regards to OSH. Indeed many individuals didn't know what certain managers looked like despite having worked at GPTL for more than a year or two. This particular aspect of visibility and demonstrated commitment has been pointed out as critical by ACSNI (HSC 1993) and Duff et al (1993).

When asked if management could be approached with a safety issue, 88 % of groups viewed this as a closed route. A highly consistent message across all shifts and all areas was that as a vehicle for raising safety issues senior managers were unapproachable and in most cases very aloof. The "management by wandering around" or "walk the talk" does not happen in the main. In the vast majority of cases groups laughed at the suggestion of approaching a senior manager with any issue. The division between management and shop floor appears to be a gulf which is part and parcel of GPT organisational functioning. The HSE function was deemed to be on the management side of the fence. Upward communication tends to be very sparse perhaps illustrating a more classical approach to communications.

## 5.26.2 Shift Coordinator

<b>Question</b> <i>Do you feel that the person above you is committed to safety ?</i>	
<b>Commentary</b> Responses to this were not so much critical of the level of commitment by the shift manager but more on his effectiveness to actually do anything about OSH aspects raised.	<b>Data Exemplars</b> “take any inspections, in the past things were flagged up and they are still there – what can they do?”  “look at jackets bursting - we have to stand on the edge of a lathe to put them back on”  “falling bags have been flagged up, nothing has been done. The coordinator is only there to supervise - he has no power to stop anything”

As a route of communication the majority of groups viewed the coordinator as approachable, but with reservations. As a point of contact for the shopfloor employees he is the main person for all issues. Perceptions of the approachability and commitment to safety varied across shift and across area with regards to the shift coordinator. Typically the shift coordinator was viewed as fairly powerless in term of influence with regard to safety:

“The supervisor is our main contact and he is production orientated. He carries the can for so much”  
“.....the problem is he is getting his backside kicked from all angles. He does not always have the time”

Additional comments also painted a picture of a function under pressure from many angles. Combined with this powerlessness is the perception of the coordinator as in a function being bombarded by many influences - production, quality, human relations, training, amongst others which put severe constraints on time. This may be as a result of the sheer workload in terms of supervisory capacity. The ratio of shop floor workers directly under their control being seventy.

<p><b>Question</b>  <i>Say you personally felt that a safety issue needed raised – how would you do it?</i></p>	
<p><b>Commentary</b>                  All groups made reference to the shift coordinator as the route for raising safety issues. However differences existed across shifts in terms of approaching the shift coordinator.</p>	<p><b>Data Exemplars</b>                  “this would have to be through our shift manager”                  “ there was a book in the office for reporting safety hazards – but you would stick out like sore thumb filling it in”</p>

Combined with the notions of the coordinator being severely pressurised for time and essentially powerless, is the varying approachability to the role. There were marked differences across the shifts and work areas. In A and B shifts in the Finishing area in particular the coordinator was perceived to be “one of them” i.e. management - “invisible and unapproachable.” The co-ordinator was perceived to be working on a different agenda from the shop floor and purely task orientated. This contrasts with shifts C and D where they are viewed as much more approachable although still fairly powerless. Power and influence is essentially concentrated only in a few senior managers. The relevance to team building in the future may be profound in terms of perceived effectiveness and commitment to the process by participants.

**5.26.3 Safety Committees**

<p><b>Question</b>  <i>What do you think of the Health and Safety Committee ?</i></p>	
<p><b>Commentary</b>                  Opinions expressed were more concerned with the actual existence of the committee, rather than its effectiveness.</p>	<p><b>Data Exemplars</b>                  “is there one?”                  “there used to be one”                  “never heard of it”</p>

The history of safety committees at GPTL is patchy indeed in terms of frequency and their very existence. Records exist showing only four meetings in six years. Small shift safety meetings did appear to happen at one time but fell

away as “managers wouldn’t listen and production rose”. In this respect many people (ex GRC employees) cast envious glances across to the “old” plant where trade unions were more active and safety committee meetings much more frequent.

By far the vast majority (92 % of groups) had never heard of any form of safety committee and only in the very odd exception were workers aware of who their union or safety representative was. In the writers short experience at the plant trade unions tend to be inactive in the area of OSH.

**5.27 Horizontal Communication**

<p><b>Question</b>  <i>Do you hear about other accidents not in your area?                  (relate most recent lost time injuries)</i></p>	
<p><b>Comments</b>                  The vast majority of groups only heard of an accident - if it was a major incident and/or caused a change of procedure in the workplace in their area. Outwith their own area no groups heard of safety incidents.</p>	<p><b>Data Exemplars</b>                  “only if it’s a big one”                  “not on a routine basis”                  “not that we know of”                  “I don’t think so”                  “through the grapevine we maybe here of it – if a procedure changes but generally not”                  “not aware of these”</p>

<p><b>Question</b>  <i>Are safety issues a part of day to day conversation with colleagues ?</i></p>	
<p><b>Commentary</b>                  Only one group gave an indication that safety issues were routinely discussed.</p>	<p><b>Data Exemplars</b>                  “not really”                  “never”                  “talk about most things but safety doesn’t really get a look in”</p>

It can be argued that most communication in GPTL is downwards. What about horizontal communication across work areas? This tended to be restrictive certainly in terms of everyday conversation - only one area in one shift C (Focus Factory) discussed safety issues. In terms of areas being aware of what goes on in OSH in other areas - awareness was poor. Virtually nobody outwith the immediate work area was aware of the previous fairly recent lost time injuries. There is also some element of vertical communication which could aid awareness but in terms of safety discussion flowing across areas it was all but non - existent. As OSH appears to be secondary on the management agenda this may be no more than OSH having a low profile in general.

**5.28 Trust**

<p><b>Question</b>  <i>How do you think trust is between management and operatives ?</i></p>	
<p><b>Commentary</b>                  Ten of the 25 groups made reference to the previous failed attempt at TQM and team building. No group felt trust was high between management and operatives.</p>	<p><b>Data Exemplars</b>                  “ well there is none – why should we?”                   “we went to Hetland Hall on a GQC training course for 3 days and it was a very good course. But at the end of the day we all knew that when we went back to work on Monday then management would walk on one side of the yellow line and we walk the other”.                   “you are joking – there a strong mutual distrust between us”                   “we all went to Hetland Hall but fell asleep.                   “I wouldn’t say low as non – existent”                   “we were promised the earth but the best memory of the whole thing was being able to fall asleep after dinner time in a T.V, room.”</p>

Previous initiatives appear to have coloured perceptions about the potential impact of any further changes in the organisation. During the course of the interviews the legacy of previous initiatives Gates Quality Commitment (GQC) surfaced with broken promises of empowerment and team building. The strength and depth of feeling was found to be consistent across all shifts and

areas. Gates Quality Commitment refers to an earlier attempt at workforce involvement and team building.

Anecdotal evidence included blood samples from operatives exposed to solvents that had been taken years ago but were “hidden away as results were so bad.” Of the three dimensions of organisational trust noted in the literature (Cummings & Bromiley 1996) there has been low behavioural reliability and a mismatch between local plant goals, and statements making commitments about issues such as team building

### 5.29 Blame Culture

<p><b>Question</b>  <i>What do you think are the main causes of accidents ?</i></p>	
<p><b>Commentary</b>                  The dominant cause cited by 19 of the 25 groups was human error or operator lapses. Mention was also made of other aspects such as long working hours. Notably enough only six groups made mention of production pressure, but only after mention of operator error.</p>	<p><b>Data Exemplars</b></p> <p>“we make mistakes but nobody tries to injure themself”</p> <p>“human mistakes”</p> <p>“operator carelessness”</p> <p>“guys taking shortcuts cause accidents”</p> <p>“the problem is that we have to work 12 hour shifts, that’s what does us in – sheer tiredness”</p>

When asked what the main causes of accidents were a pattern emerged in terms of one outstanding attributed cause –namely operator error. What was generated was a list of other possible contributory causes including inadequate machinery, training gaps, operator error and most frequently tiredness caused by twelve hour shift working. The main theme that did emerge was that no area felt under overdue production pressure and that this was not perceived as a main cause of accidents. Again as with many of the responses this was consistent with management data.



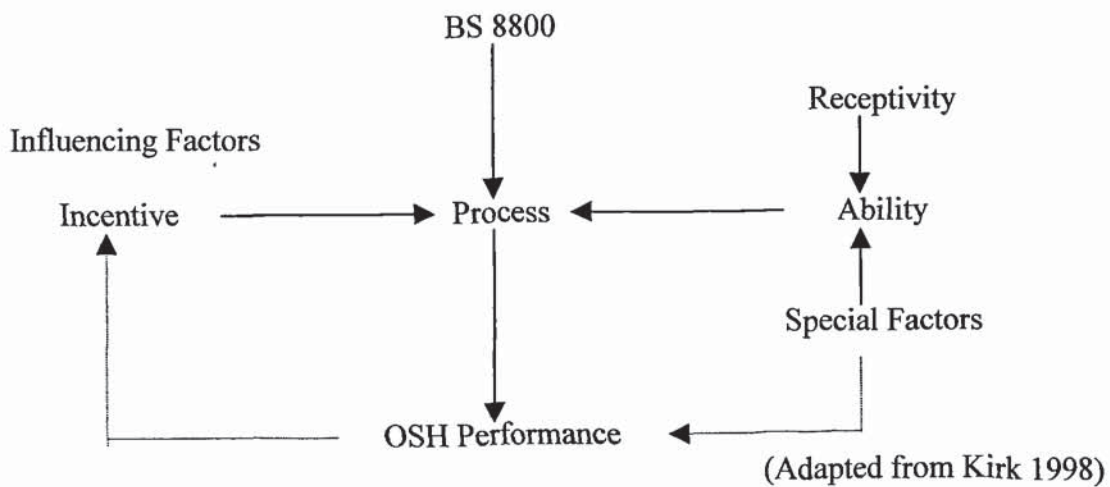
### **5.30 Interim Summary**

Looking back at the OSH model of change and in particular the aspect of receptivity then it can be briefly stated that the plant appears to be low in this area, i.e. has low receptivity in terms of the actual environment into which OSH changes are to be introduced. The next section draws the data together from both sets of interviews to allow an insight into the core influencing factors that may impact on the SMS interventions.

### 5.31 Summary of Findings for 1998 Data

#### 5.32 Introduction

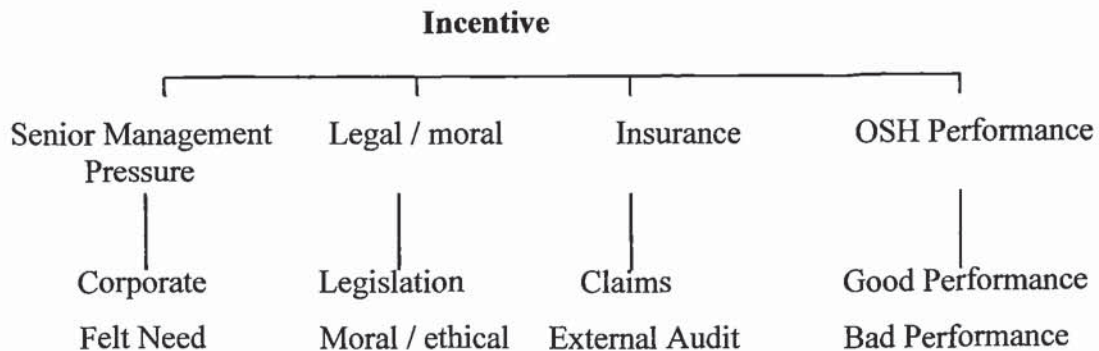
Interview data was generated for a particular reason. That reason was the identification of influencing factors within the framework set out in chapter three. That is, input into the potential OSH model of change. As such we draw the data together in a summary section to provide a base line or backdrop against which various initiatives will be introduced. Not all sub factors are amenable to the type of data produced in the interviews and this is stated at the appropriate places. However, if the literature is used as a guide then the key aspects have been captured in terms of influencing factors. What is produced here is a general overview of the proposed model of change and summary findings of the data. As a reminder of this the model is displayed again below:



**Fig. 5.1 Potential Model of OSH Change**

### 5.33 Incentive

The initial element within the model was incentive and is reproduced below for ease of reference:



**Fig 5.2 Potential OSH Incentive**

#### 5.33.1 Senior Management Pressure

Corporate pressure has been cited by Wright (1998) and Hawkins and Booth (1998) as a core driver of OSH. In the case of GPTL, Dumfries this particular driver is weak to the point that it sends a negative message in terms of where OSH lies as a business concern. Generally people will try and deliver what their immediate line manager wants (HSE 1997). What the line management wants with Gates is measured by what is given the greatest attention. All the evidence is that the focus from corporate head quarters is on production, finance and quality. This feeds its way down from European HQ to plant level and manifests itself in the form of first and second level business issues in terms of felt need. There was a definite theme emerging whereby the desire to be the best was present. How relevant this felt need drive is to OSH is difficult to say and as an impacting factor may not be so strong in the GPTL business climate.

### 5.33.2 Legal/Moral

Legal pressures as an incentive have been shown to be a core motivating factor by Wright (1998). What we have at GPTL, Dumfries is an unwillingness to tackle the major OSH issues within the rubber industry – machinery guarding, rubber fume control and manual handling. These have been the focus of the Rubber Industry Advisory Committee (RUBIAC's) push on the rubber industry to improve safety performance. Within GPTL, it has taken action from the Health and Safety Executive to force the site to tackle these issues and channel resources onto them in any meaningful way. Moral and ethical reasons for OSH were perceived to be weak.

### 5.33.3 OSH Performance

In relation to OSH performance the main aspect here is that management perceive there not to be a problem. Reasons for this may be that the site is highly profitable and a group leader in the areas that matter within the group i.e. profit, production and quality. As such accolades are usually accorded to the plant. With such an extreme focus on these aspects a business case for OSH is not perceived. Aspects such as machinery down time and lost operator time caused by accidents are missed by management. Nobody perceived the facility as having a bad OSH performance.

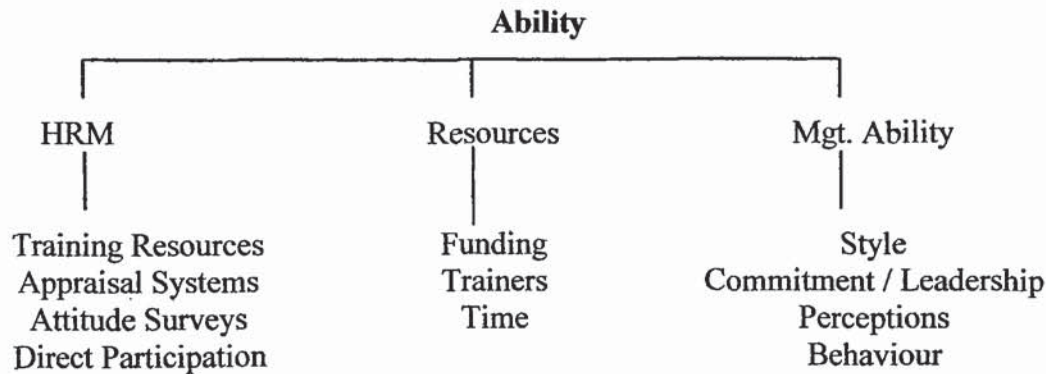
### 5.33.4 Insurer Pressure

Insurer pressure is generally perceived to be weak, perhaps reflecting the lack of OSH business case in terms of increase in insurer premium. An annual insurance survey is treated with some respect.

Civil claims as an insurer related aspect carried a little more weight in terms of operatives suing the company for damages. This appeared to be a minor thorn in management's side, more from the act of a shop floor operator being audacious enough to try and gain recompense.

### 5.34 Ability

The vector of influence in the OSH model which feeds directly into the process is that of ability. The data for ability can be drawn together as below:



**Fig. 5.3 Potential OSH Ability**

#### 5.34.1 Human Resource

This aspect has four main sub factors. The aspect of attitude survey has been covered within receptivity and will therefore be removed from this particular factor. Documentary evidence suggests that HRM direct participation in OSH is very low. Appraisal systems which should capture issues such as OSH training gaps are also non existent within the plant. Training resources from HRM are also very weak and consist of record keeping of names of attendees on courses.

#### 5.34.2 Resources

Data to input into this factor in the model cannot be based on the semi - structured interview data. Therefore to allow for some form of comparison for funding, trainers, time- i.e. what is a comparatively high level of time to train, what is a short time regarding training, hard measures will be sought from reputable sources.

### 5.34.3 Management Ability

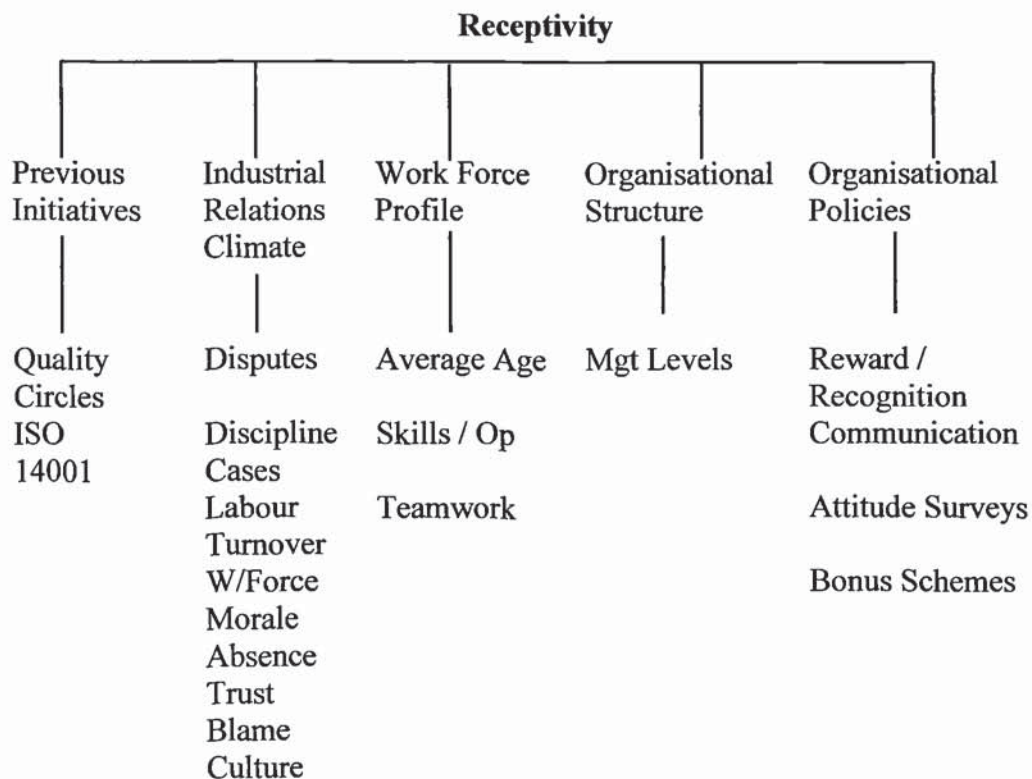
Management style within the facility can be seen from the 1998 data as highly controlling and task orientated with little room for any caring aspect to be shown. The style is almost the extreme version of the Blake and Mounton managerial grid, a position of 9,1 i.e. a high concern for production with human factors minimised.

Commitment and leadership degraded over the course of the study with fairly high profile action by the enforcement agencies apparently the only way that movement would occur on core OSH issues. In conjunction with this senior management also habitually flout safety rules on safety footwear and neck ties near exposed pulleys and lathes. Perceptions of OSH were made apparent by what drives OSH. As a business function it is peripheral and deemed a second level business issue. Behaviour and displayed attitude regarding OSH are illustrated in the next chapter.

Ability in turn is impacted upon by the environment within which the interventions are take place. This is referred to as receptivity.

### 5.35 Receptivity

This section draws the group interview data together to allow the question on receptivity to be answered – How receptive was the organisation to OSH change? As with the management interview data, not all sub-factors can be loaded with qualitative interview data. Where this is the case then national or industry sources are used to allow for objectivity.



**Fig 5.4 Potential OSH Receptivity**

#### 5.35.1 Previous Initiatives

The primary previous initiative within GPTL, Dumfries was the creation of quality circles within the programme called Gates Quality Commitment (GQC). This had left a deep grained sense of mistrust within those who had attended and this was vented at the interviews and during the training courses that were given. This has been covered by Kirk (1998.) in his research but a series of unfulfilled promises

was the net result of this very high profile programme. In terms of ISO 14001 and its implementation it perhaps should not come as much of a surprise that a task orientated, hard driven style of management was predominant.

#### 5.35.2 Industrial Relations Climate

Moral, trust and blame culture are the sub-factors within this element that are directly linked into the interview data. Morale within the workforce appeared to be fairly good, perhaps as a result of the relatively very high salary levels particularly for the geographical area. This aspect of good morale is confirmed by the Bottomley (1998). In terms of trust, this appears to be low acting as more of a hindrance on OSH development than an aid. Cummings and Bromiley (1996) identify main criteria where by levels of trust can be assessed. Firstly, individuals must be behaviourally reliable, secondly the individual's statements and behaviour prior to making commitments are consistent with the individual's desires and also the individual does not take a short run advantage of unforeseen opportunities to gain at the expense of others. In addition to these it is also evident that a trust deficit exists where decision making is highly centralised.

Blame culture was evident in both sets of interview data (management and groups).

Factors not as amenable to interview data within this research include disputes, disciplinary cases and absence levels. For these sub-factors there exists factual, directly measurable data. Sources to allow some measure and comparison against industry averages will be taken from nationally recognised systems.

#### 5.35.3 Workforce Profile

Within this element there are three sub-factors. In terms of skills per operative and age again a hard measure from nationally recognised sources will be used.

Team work in terms of any sense of empowerment does not exist within the facility. The previous GQC legacy as well as the way the OSH teams worked in practice, perhaps merely reflect the attitudes of management towards these



concepts and towards operatives in general. This generates a scepticism and withdrawal from the workforce that makes the notion of meaningful teams unworkable.

#### 5.35.4 Organisational Structure

As with absence levels this is a factor that is measurable not from qualitative data but from some form of recognised source on managerial levels. Within GPTL, Dumfries there are four levels of management from top to bottom, whether this is flat or heavily tiered will be answered to allow its potential impact to be gauged.

#### 5.35.5 Organisational Policies

Reward and recognition schemes are notable by their absence within GPTL., Dumfries. Unsurprisingly this is consistent with the management style used and opinions of the managers of workers. In terms of informal recognition of OSH aspects, this is absent where OSH is not on the agenda on a daily basis at all. In terms of communication a great many of the features of a closed communication's climate are in evidence – aspects such as being judgemental, controlling, making differences in the hierarchy obvious, dogmatic and ensuring superiority all came across in the data presented above.

Bonus schemes do not exist within Dumfries and are therefore not an influence.

In essence the potential OSH model postulated in Chapter Three allows a template for analysis prior to the OSH interventions. In particular the vectors of incentive, ability and receptivity have been discussed above, where the interview data can be loaded into the various sub-factors. Albeit this process is not complete at this stage.

It is against this back drop of influencing factors that various interventions were made in the organisation to improve OSH performance. The next chapter details these interventions and their outcomes.

## CHAPTER 6

### INTERVENTIONS

#### 6.1 Introduction

This chapter outlines the key OSH interventions as prescribed by BS 8800: 1996 and details the consequent results of these. This as an exercise in itself helps to give a rich picture of how interventions fared in terms of their output. It also supports and triangulates the data in the previous chapter in illustrating behaviour and attitudes towards OSH within the facility.

#### 6.2 Research Methodology

The research methodology employed in this instance consisted of note taking of events and collection of documentation. Note taking occurred on a daily basis with key events and contacts being noted. Notes were taken by the researcher only and were written directly into a small note pad and transferred on the same day to a large desk top diary in the researcher's office. Every three months the themes relating to the interventions, for example a contact or incident relating to inspections and auditing, were noted at the bottom of each page of field notes in the diary. This allowed an ease of tracking of interventions over the two year period as the foot of each page had the relevant intervention(s) noted. For example, a page may have forty lines of notes and within these forty lines reference could be made to inspections and assessment teams. At the foot of the page the note – inspections and assessment teams would appear.

This approach has weaknesses in that it is highly subjective and the researcher may only note those aspects that fit in with pre-conceived ideas on findings. Whilst acknowledging that these are weaknesses factual data has been incorporated where possible, an example being factual data in table 6.2 showing the respective shift uptake and use of the newly introduced near miss system and factual data on numbers attending training courses. The anecdotal data below is built around this factual data with quotations illustrating the case being made. In addition to this documentary evidence, semi-structured interviews and a quantitative attitude survey elsewhere in the thesis mutually support this anecdotal data. The main

advantage of the approach is that it adds a richness to the whole data sets and allows close monitoring of interventions, in addition to capturing daily behaviour and attitudes which may be more reliable in terms of giving a true representation of organisational functioning.

### **6.3 Interventions**

Following an initial status review and taking account of research conducted at the plant (Appendix six ) by Bottomley (1998) a series of interventions were made according to the prescription given in BS 8800 : 1996. These interventions were designed to fill the gaps between the plant's initial position and the guidance on safety management systems given in BS 8800 : 1996. The following gaps were identified :

- Communication & Participation Strategy
- Training Programme
- Introduction of inspection & auditing
- Near miss reporting system

These interventions and their effects were tracked utilising note taking and observation on site.

#### **6.3.1 Communication & Participation**

A strategy of communicating and involving the workforce was introduced in October 1998 with various formal and less formal mechanisms set up. These are illustrated below:

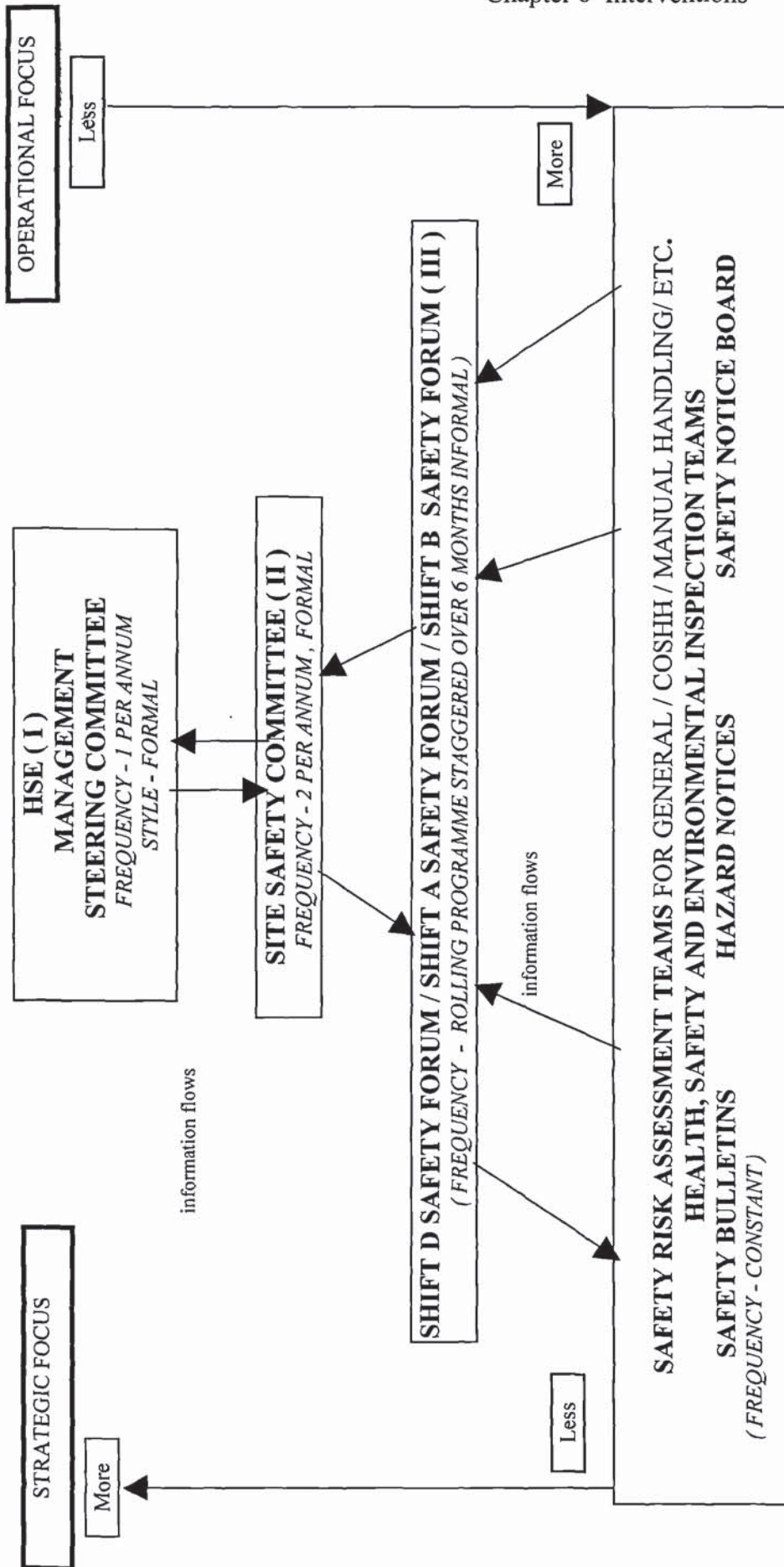


Figure 6.1 STRATEGY FOR OCCUPATIONAL HEALTH & SAFETY COMMUNICATION

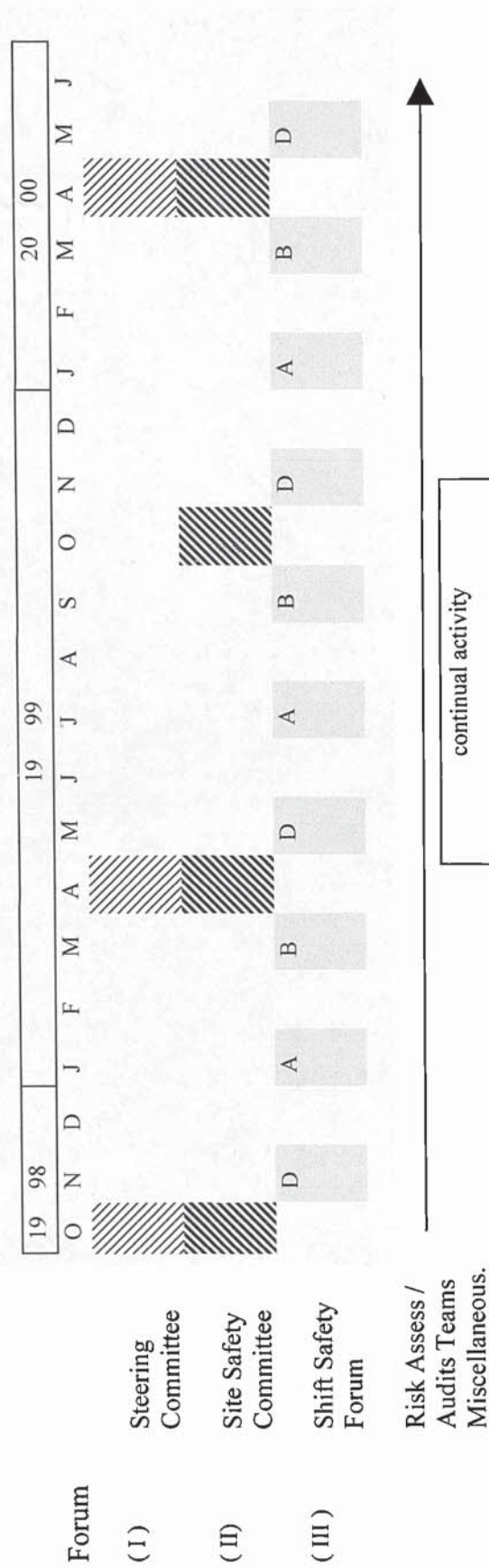


Fig 6.2 Schedule of Occupational Health and Safety Communication

### 6.3.1.1 HSE Management Steering Committee

This body met to review the plant's status against BS 8800 in October 1998 under the term Safety Management Steering Committee during which the interventions above were enthusiastically embraced. Albeit attendance at the meeting was poor. In April 1999 safety was included into the ISO 14001 management review process to fit in with the business cycle and annual business reviews. As in 1998 six of eleven managers turned up, However, although safety was discussed it was not given the same importance as ISO 14001 in terms of depth of review and objectives being set. In the area of safety the site was deemed to "be doing well and by no means unsafe." Little ownership of safety was evident in relation to environmental affairs where individual managers dwelled on targets and discussed issues of waste reduction and solvent conversion in detail. A similar pattern occurred in April 2000 where the HSE advisor covered OSH matters with very little feedback of any kind from management. The management style was obvious in terms of contentious points regarding management programmes for environment where the site director passed judgement and moved the meeting on quickly with no discussion. The April 2000 management review was cut from 4 hours down to three and then to two hours. When the meeting finally arrived it lasted just over thirty minutes.

### 6.3.1.2 Site Safety Committee

This body was set up in October 1998. The history of formal safety committees as required by statute at the facility was very patchy indeed with only evidence of two meetings in the ten year history of the plant. The latest safety committee prior to October 1998 was held three years previously. One safety representative was active within the plant and had lobbied long and hard to no avail. With this exception the trade unions and representatives showed little or no interest at all in OSH matters with the exception of pursuing claims against the company. As far as the utility of the Site Safety Committee was concerned, it provided a useful mechanism to feed back progress on risk assessment to operative representatives. Little came back from operatives and meetings tended to be fairly one sided in terms of dialogue. In one meeting the safety advisor worked his way through the agenda with not one

issue or remark brought from either management or work force. This particular twice-yearly meeting lasted less than 30 minutes. Meetings were cancelled on whim by the two production managers who were suddenly unable to attend, and in one instance just not turning up for the meeting. Not one of the five meetings held went ahead on the originally allocated date. Indeed the site director requested the engineering manager and production manager into his office one hour prior to a safety committee meeting which ultimately was cancelled and the workforce representatives sent back to the shopfloor. Issues brought up from shopfloor representatives appeared not to be treated seriously by management, for example standardising a steam isolation procedure was allowed to run across more than one year before being documented and closed out. This was in spite of a vulcaniser rupturing five years earlier and injuring a fitter.

### 6.3.1.3 Shift Safety Forums

Volunteers were requested from each of the shifts to form safety forums, bodies whose main purpose was communicating between shop floor and management and forming a pool of volunteers to be trained and conduct risk assessment, manual handling assessment and safety inspections. A mixed reception was given by shift managers as there had been shift safety meetings in the past but they had disbanded them as they were perceived as ineffective and powerless. There was extreme difficulty in getting six to eight volunteers from each shift, with shop floor operatives on A and B shifts in particular showing no enthusiasm, and animosity at being forced to “waste my time on safety.”

In relation to risk assessment two patterns quickly emerged over time. Initially C and D shifts conducted risk assessments enthusiastically bringing in operatives, however this initial enthusiasm was dampened as additional control measures were not implemented despite having been allocated a high risk rating, and the whole process became bogged down and stalled altogether less than one year later. Shift co-ordinators indicated that their teams had lost heart in the whole process.

It had been agreed that the appropriate senior managers would discuss the assessment findings with the relevant team. In reality these meetings for C shift were cancelled twice and for D shift cancelled three times before being held in late May 1999 to discuss an assessment completed in January 1999. Only one assessment was discussed for A and B shift before the idea of consensus and discussion was dropped by the safety advisor with no complaint from anyone. Perhaps more fundamentally the notion of assessment teams created from shop floor operators appeared to rest uncomfortably with management (a view shared by engineering supervisors) with repeated requests for the HSE advisor to take control as “ they are going into things in too much detail and making high risk scores where ever they want. ” Indeed one of the most illustrative episodes occurred when the author and a fitter spent three days looking at manual handling on site for fitters. This resulted in a list of priorities where a simple scoring system involving frequency, weight and risk factors was used to score an item. Over 60 was deemed high risk. The site management looked at the list of manual handling tasks and asked for a copy of all the assessments relating to it. These were promptly down rated so that the scores were low risk and as a result not a priority with no expenditure required. Examples of the tasks include one man handling a pump motor of 60 kgs. from an overhead crane down a flight of stairs travelling about forty metres overall. Another is two men lifting a 2cwt vacuum pump motor in a confined space. The Health and Safety Executive wrote to the site threatening to take enforcement action on manual handling issues shortly after this.

### 6.3.1.4 Hazard Notices

Safety notice boards were posted throughout the plant in prominent positions. These were designed to complement other arrangements and allow safety information to be disseminated to shop floor operatives on key safety issues and to give feedback on key safety issues. However, such was the level of mistrust between shop floor and managers that any issue of contention was not devolved. Despite an explicit legal requirement to do so information on aspects such as noise levels and isocyanates was instructed not to be divulged to operatives (albeit safe



working systems were in place). Information on isocyanates was withdrawn from shift co-ordinators for fear of distortion of facts. Plans to brief shop floor operatives on isocyanates were discouraged, as were issues on rubber fume following an HSE visit. On direct instruction a “ need to know ” basis was used to inform operatives on key health issues and risks.

### 6.3.1.5 Safety Climate Survey

As the plant was a member of the British Rubber Manufacturers Association (BRMA) the author was a member of the BRMA Accident Working party. The main output from the BRMA to the plant was in the area of health, safety and environment. Following on from the Bottomley research a strategy from RUBIAC had been developed, part of which was a drive on safety culture. As the Dumfries plant had first used the HSE safety climate measure a key function was feedback on potential problems to BRMA in conducting a safety survey. In early August 1999 the company committed a room to the survey and time during working hours with a very high response rate being returned. Analysis was complete at the end of August and some weeks after this (October 1999) the results were presented.

Management’s response to the results was denial and disbelief at the findings. The author reached factor number seven out of ten during presentation of results and was instructed to “go and think about it” and later told to “let it die away naturally.” Two days after the presentation the author was instructed to resign from the BRMA Accident Working Party and GPTL withdrew from the BRMA as a “waste of money.” No feedback of any kind was given to shop floor operatives

## 6.4 Training Programme

Training has been highlighted as a fundamental aspect in OSH (ACSNI 1991, 1st report) and had been cited by HSL as a key gap to be addressed within the facility. A structured training programme was developed with no Human Resource input or interest. Little value was placed on training activities in general with no personnel development or appraisal strategy implemented. This tended to be reflected in an apathetic attitude to training, an attitude which seeped down through the

organisation. Initially a training programme had been set up for the organisation as shown in table 6.1 :

**Table 6.1 Training Requirements 1998 - 2000**

<b>Organisational position</b>	<b>Course</b>	<b>No. participants</b>
Management Team	Safety for Senior Executives (IOSH)	11
Middle managers / key front line supervisors	Managing Safely (IOSH)	14
Shift co-ordinators / safety forum members	Working Safely (IOSH)	26
Shop floor operatives	Various briefings (IOSH)	288

Safety for Senior Executives had a fairly luke warm response in terms of enthusiasm, with the author in certain instances putting people's backs up. "Heard it all before" and "I suppose it did fill a legal gap" were the only comments received on it.

Managing Safely was viewed as a critical course by the HSE advisor in terms of training needs and delivery as the participants were in control of maintenance staff, contractors and introduction of new chemicals and materials onto site. The proposed participants displayed a poor understanding of risk assessment terminology and risk management. This is illustrative by comments such as:

"can we not write an instruction to maintenance staff not to fall through holes in the gantry or over the side?" (gantry 3 metres from floor level) and also by a written instruction

"we acknowledge that air supplies cannot be isolated in some areas, but we can improvise by bending the lines over and using tape"

However, despite sincere statements by the site director :

"where safety is concerned money is no object"

the Managing Safely course was cancelled three days prior to it starting as too expensive - on the same afternoon that the above assurance was given.

Working Safely was delivered to twenty six operatives across the four shifts. The course was delivered in house by the author using the training facilities on site. B, C and D shift showed enthusiasm for the course and interacted throughout, showing interest and asking questions throughout. Shift A had two drop outs who did not attend after session one and the shift co-ordinator aside, two of the three participants barely passed the course, contradictory to the other shifts where all passed very easily. No engineering or maintenance staff attended despite being listed as participants.

Safety briefings were conducted covering general awareness and near miss reporting, chemical hazards and noise. A great deal of apathy and hostility was displayed at briefings in relation to the utility of the information being given. The powerful them / us mind set tended to override any serious safety message being conveyed with intense suspicion and mistrust vented. Two co-ordinators along with the finishing area co-ordinator opted not to attend as did the maintenance manager and charge hand fitter as they “were too busy with maintenance.” Awareness of hazards, for example the carcinogenic effects of rubber fume, was extremely low among operators. The whole exercise was perceived to be of little value by management. The seriousness with which the training was taken was illustrated by the finishing co-ordinator and engineering manager who instructed toluene to be liberally used to wash floor areas in finishing on the same day that briefings gave instruction to contain solvent vapours and minimise solvent liquid surface exposure as vapour levels were at and above the OES of 50 ppm.

### **6.5 Near Miss Reporting System**

The set up of a near miss reporting system was initiated during September and October 1998. Careful studies of very successful systems in the chemical industry

(Courtaulds / Novaceta) and a visit to these sites to view the practicalities of the system were undertaken prior to its introduction. To ease the process a series of awareness training sessions were undertaken covering operatives and managers. Copies of near miss forms were placed at strategic points to allow for ease of access.

Over time the use of forms faded out with only C & D shifts filling them in.

**Table 6.2 Near Miss Uptake**

1998	Sep	Oct	Nov	Dec			
	0	5	2	2			
1999	Jan	Feb	Mar	Apr	May	June	July
	0	2	1	0	1	0	0

The type of issues that the form was used highlighted some high risk issues, for example slings failing under load, racking collapse and crane jaws opening and dropping moulds. However, perhaps more fundamentally there were near misses that went unrecorded. Examples include a severe steam pipe rupture and an overhead crane chain bag falling from an overhead crane narrowly missing an operator's head which were related to the HSE officer by the witnesses to the events.

The use of the near miss was publicised via the safety notice board with a summary of the corrective actions detailed. However, effectively by November 1999 the near miss system had stalled.

The perceived utility of the near miss form was eroded by September 1999 with forms not being processed from shift managers and lying on the production manager's desk with feedback to operators diminishing by August 1999.

Fundamental to the success of any near miss reporting are ;

- Rapid response to allow association of report and solution.
- Acknowledgement of report.
- Feed back on progress
- Supervisor commitment.
- Maintenance department commitment

(HSE 1999)

As illustrated shift co-ordinator commitment was at best variable and in certain instances non-existent. The critical aspects acknowledging, responding and feeding back to employees who had filled in forms fell down. The maintenance department did not view the forms seriously, but merely as a “ wish list ” from the shop floor.

### **6.6 HSE Inspection & Auditing**

An inspection system was introduced along similar lines to inspections / scoring systems used in goal setting and feedback exercises. That is, concentrating on unsafe behaviours and unsafe conditions and scoring to allow tracking over time. Results were fed back to operatives via notice boards in main production areas. These were viewed as an administrative chore by A and B shifts who were constantly late or missed doing them altogether. A and B shifts did not utilise participants from A and B shift safety forum, three of whom subsequently requested not to be involved.

Initially the scoring systems and scores were disputed by management but over time consistency was demonstrated to management by teams doubling up on areas inspected and getting the same results to plus or minus three percent. Very shortly managers felt overwhelmed by the volume of corrective actions being flagged up and the volume of inspections while at the same time the teams who had conducted the inspection waited for things to be done as a result of the inspection. This

reached a stalemate where no actions were being completed as a result of the inspections with managers ignoring them.

In an attempt to re-start the process, shortfalls holding scores down were summarised and the list emailed to the appropriate manager along with a copy of the inspection. The result was that nothing happened, despite repeated persuasion by the HSE officer.

In a further attempt to kick start and prioritise the corrective actions being flagged up by the inspections, it was decided to raise systems non conformances (identical to ISO 9000 / 14000 non conformances) after an item had been flagged up on three consecutive inspections. The result of this was that nothing at all happened. Non conformance logs were left with managers to be completed but no form was actually acknowledged, completed or returned, again despite requests from the HSE advisor.

Despite this it was felt that the inspections should continue to at least demonstrate to shop floor operatives that some form of monitoring was being done. Some fairly minor issues could also be corrected by shift managers. The inspection system was effectively side lined to insignificance and referred to by managers as the “co-ordinators small housekeeping inspections.” In terms of any real changes this intervention must be considered a failure. Perhaps it is illustrated best by a shift manager who photocopied an inspection from July 1999 and handed it in with his inspection from May 2000 with a small note on it – “what’s the point ?” as nothing from July 1999 had been actioned.

Overall the OSH management systems interventions did not produce results in terms of continual improvement. Overt behaviour and attitudes displayed were negative and tended to destroy what little momentum was initiated at the start of the intervention. If the potential OSH model of change and the results of the 1998 interviews are considered then perhaps this situation was predictable. That is, the

organisation had low incentive to introduce any change in the first place with any incentive being dominated by negative motivators. Ability was low in terms of communication, trust and leadership style employed in the organisation. In terms of receptivity there were also fundamental weaknesses in areas such as risk perception and ownership of OSH by the workforce. These interventions were undertaken over a period of time which poses the question did any of the parameters of incentive, ability or receptivity fundamentally alter over the course of the research? The next chapter details results of semi-structured interviews which measure a change against the base line identified in Chapter Five.

## CHAPTER 7

### MANAGEMENT GROUP ABILITY AND INCENTIVE 2000

#### 7.1 Introduction

This section details the results of a series of individual interviews carried out in October/November 2000 with the management team at GPTL. A total of eleven managers were interviewed as in 1998. There were no changes to the management team over the course of the research. Repeatability of research method was paramount to ensure that valid conclusions could be drawn from data comparison. Generally there was very little change and as such the analysis of data in chapter five is valid for the data in this chapter.

#### 7.2 Interview Format and Techniques

Managers including the site director were interviewed by the author, numbering eleven, on a one to one basis in the manager's own office. This covered the whole management team. These typically lasted for 25 minutes. The reasons for using this format are given in the 1998 data. Again notes were taken during the interview and written up later into interview scripts. To ensure reliability of results was maximised the exact same methods were applied in 2000 as in 1998. There were no changes in personnel within the management team over the course of the two years.

#### 7.3 Question Sets

The question sets for all interviews are included in appendix one. The exact same question set was used in 2000 as in 1998. The only alterations were to put in additional questions to attempt to uncover the reasons behind the intervention's results. These additional questions were tested prior to use, with prompts used for these questions to elicit the reasons why an intervention succeeded or failed.



#### 7.4 Data Presentation and Analysis

The same simple system of categories derived in 1998 was used to allow analysis of the 2000 data. These categories centre around the elements detailed above under Incentive, Ability, Receptivity and Special Factors. The categories for the individual interviews were Perceptions of OSH, Hardware, Software, Felt need, Leadership, Previous change, Blame, Corporate Influence, Team Building, Empowerment and Participation.

As with the 1998 data, examples of the interview data generated are given in appendices two and three to allow transparency of data reduction and analysis, as well as helping situate the data in context. Again data is presented in tabular format as question, comments and actual data itself. Below each table is analysis of the data itself and comparison with previous data. As with the 1998 data a deliberate decision to quote extensively was made to allow data to speak for itself.

#### 7.5 Perceptions of OSH at Gates

##### Perceptions on Performance

<p><b>Question</b>  <i>How do you feel we are doing at the present time regarding safety performance?</i></p>	
<p><b>Commentary</b>                  Ten of the eleven managers interviewed felt that safety performance was satisfactory or good. No manager felt that OSH performance was bad.</p>	<p><b>Data Exemplars</b></p> <p>“we have a safe plant”</p> <p>“a fairly new facility but we can’t legislate for stupid folk”</p> <p>“we are good at most things – safety included”</p> <p>“we don’t ask folk to break the law”</p> <p>“fairly good is my gut feel if I was pinned down on it”</p>

There was no change in this perception between 1998 and 2000 in that OSH performance was seen as satisfactory. Again the theme of hardware dominating software emerged as in 1998.

<p><b>Question</b>  <i>How do you think we compare to manufacturing in general ?</i></p>	
<p><b>Commentary</b></p> <p>Four of the eleven managers felt that they could not comment on comparative performance. The remainder perceived OSH performance to be better than manufacturing in general. No manager perceived OSH performance as worse than manufacturing in general.</p>	<p><b>Data Exemplars</b></p> <p>“compared to others we are a lot better, cleaner place”,</p> <p>“well protected compared to others”</p> <p>“better than the others – I’ve been into a few and I don’t come back thinking we are bad”</p> <p>“it’s a clean well maintained site – not like your usual rubber factory”</p> <p>“highly engineered, so compared to others we will be better”</p>

A dominant theme that emerged during 1998 data collection was the position of hardware or engineering within the managerial mind set. A pre – occupation with OSH as almost exclusively an engineering issue was as strong in 2000 as in 1998. No mention was made of softer aspects, such as communication or management behaviour in OSH. As in 1998 the body of research points to these human factors as having a central role in OSH improvement. Either an inability to appreciate their importance or an unwillingness to grasp them was evident. More specifically no mention was made at this point of two warning letters and an improvement notice from HSE. Enforcement action did not appear to have impacted upon perceptions of OSH performance.

<p><b>Question</b>  <i>Do you feel our position has changed in the past few years ?</i></p>	
<p><b>Commentary</b>              Eight of the eleven managers felt that improvements had been made in the area of OSH. The remainder felt that the site had maintained its position as a good performer in OSH. No manager felt that there was a deterioration on OSH performance.</p>	<p><b>Data Exemplars</b></p> <p>“the odd hole but by and large we have always been quite good ”</p> <p>“we are always improving”</p> <p>“I don’t know – I guess we are”</p> <p>“we have lost ground on anybody and we have introduced improvements”</p> <p>“there are guards now where there was nothing before, we have tighter site rules as well”</p>

There was very little change in perceptions over the course of the research in terms of shifts in OSH performance. The actual accident statistics show a fairly static pattern in terms of performance. A reason for this perception of improvement may well be that the core business issues identified in 1998 i.e. production, finance and quality all improved significantly between 1998 and 2000. This seemingly appears to have created a comfort factor or feel good factor amongst managers, generating an attitude whereby all things, almost by default, must have improved.

### 7.6 Positive and Negative Motivators

<p><b>Question</b>  <i>What are the key things driving safety ?</i></p>	
<p><b>Commentary</b></p> <p>All managers without exception made reference to legislation as the key driver of OSH. Four of the managers made reference to civil claims and insurer pressures from premiums. Passing reference was made to moral / ethical reasons by three managers.</p>	<p><b>Data Exemplars</b></p> <p>“the law is very heavy”,</p> <p>“we have certainly seen HSE active and pushing very hard”,</p> <p>“the law seems to be getting tighter and more difficult to comply with”</p> <p>“HSE pick on us for some reason, it’s totally uncalled for”</p> <p>“I suppose threat of jail and also folk suing us”</p> <p>“claims are getting higher profile – almost a culture of this starting here”</p> <p>“insurers and claims are certainly higher profile nowadays”</p> <p>“may be society attitudes have moved as well some hazards aren’t tolerated nowadays”</p>

The key incentive for driving OSH was dominated by criminal legislation and particular reference was made to enforcement agency activity. The overall perception was that the law was becoming more burdensome over time. There was some reference to more positive motivators for OSH – moral and ethical reasons. On the whole these aspects showed no real change. The level of Employers Liability claims increased significantly over the course of the research and this was reflected in interviewee comments. Overall the core OSH motivators remained primarily negative, unchanged from 1998. As Hawkins and Booth (1998) point out motivation can be internal or external with implications for effectiveness and implementation of OSH initiatives. Within GPTL the motivators remained negative.

As reviewed in chapter two and identified by Schein and Rousseau the fundamental assumptions of an organisation can be traced to the leader or founder of a particular organisation. Given the stability of the site and the management team the

fundamental assumptions within the organisation can be identified as delivery of first level business issues, with OSH as a supportive function.

## 7.7 Essence of Gates Culture

### 7.7.1 Gates Corporate Culture and Leadership

<p><b>Question</b>  <i>If you were to identify key elements that make GPTL tick what would they be ?</i></p>	
<p><b>Commentary</b>                  All managers interviewed stated that without exception leadership was cited as the main element that makes GPTL at Dumfries function as an organisation. In addition to this a desire to be the best PT plant in the group was also present amongst all managers.</p>	<p><b>Data Exemplars</b>                  “very senior managers are powerful figures by and large”                  “leadership – tasks are allocated and we do them”                  “Gates likes strong leaders who can make decisions without faffing about”                  “striving to be the best PT plant in the group”                  “its all about leadership and pride in the place”</p>

The key cultural feature that appears to run through Gates corporate and not only the site under study is the aspect of powerful leadership. Senior managers and line management tend to deliver what leaders desire in terms of core results. Within Gates these tend to be hard measures, whereby tasks are allocated down the chain of command with little bottom up interaction to deliver the key hard measures. No change was evident in this area. In addition to this a static position regarding felt need was also consistent between 1998 and 2000. As reviewed in the literature the leader within an organisation is fundamental to initiating levels of trust and the climate of communication within the site.

If anything over the course of the research the style of leadership remained a 9,1 style (see figure 2.10) and it could be suggested this style was vindicated as the parent group pushed for higher returns to shareholders. The upturn of this was that the reporting mechanisms on plant performance were changed to become more orientated towards hard measures of turnover, production and finance. The aspect of

felt need remained very strong within the management group, albeit geared towards delivery of first level business issues.

### 7.8 Previous Change

<p><b>Question</b>  <i>What has been the most effective method of driving change ?</i></p>	
<p><b>Commentary</b>                  Nine of the eleven managers advocated that the best way of historically driving change had been via the managers owning and implementing the new initiatives. No manager claimed that workforce involvement was a key to change in any way.</p>	<p><b>Data Exemplars</b></p> <p>“can’t pussy foot about with consultation and stuff”,</p> <p>“grab opportunities and make them happen”</p> <p>“hard and from the top”</p> <p>“engineer it in, get the technology and force it through”</p> <p>“fast and decisive”</p>

The successful method of driving change in the past has been hard from the top, consistent with the central cultural aspect of leadership identified above. Perhaps the most notable aspect here was the total absence of any reference to workforce involvement or participation. Again there was no real change between 1998 and 2000 data. The lack of appreciation of the people factor in OSH is very evident in the anecdotal data in chapter five. Lying at the root of the partial failure of software OSH initiatives may be core assumptions held by management as with the above examples. As previously stated a task orientated management style may succeed in gaining hardware returns and management systems certification. However, in OSH the evidence and literature suggests that returns on this approach will diminish over time and an emphasis on software aspects becomes central to continual improvement.

**7.9 A Business Case for OSH ?**

<p><b>Question</b>  <i>Do you feel that it ( OSH ) is a central business issue ?</i></p>	
<p><b>Commentary</b>                  No manager acknowledged that OSH was a central business issue. The same two managers from 1998 recognised that OSH had a business argument but that it was not realised in the day to day running of the site.</p>	<p><b>Data Exemplars</b></p> <p>“ eh – no”</p> <p>“it’s there but it cant be top of the pile”,</p> <p>“it’s what is called a secondary aspect where its function is to support other things”</p> <p>“it’s a new one on me – how can safety be a central business issue. It does not save money or contribute”</p> <p>“not in a high profile way – I don’t see it there”</p> <p>“it’s there more as a support to production”</p>

As in 1998 the theme of secondary business issues emerged with OSH supporting these core aspects. In addition to this a substantial minority of managers held a negative view on OSH, i.e. they perceived it as a burden on business. Also the corporate drive and signals regarding OSH detailed below served to reinforce these attitudes towards OSH as a business issue.

### 7.10 Corporate Influence

<p><b>Question</b>  <i>Do you feel there is a heavy corporate drive on safety ?</i></p>	
<p><b>Commentary</b>                  No manager felt that the corporate presence in OSH was strong.</p>	<p><b>Data Exemplar</b>                  “no”                  “virtually non existent”                  “there’s no corporate safety department left – its gone – I guess that says it all”                  “its zero and contradictory when it does come”                  “never feel it or am even aware of it”</p>

As in 1998 there was perceived to be an absence of corporate pressure for OSH. This notion was reinforced by the signals from the corporate headquarters where the central HSE department line of report within the organisation was dropped down to a less senior level. On a seven page reporting mechanism covering all business aspects OSH is covered in one line. The Corporate HSE Section was also in the process of being dismantled as a “non value added function” during 2000. In a recent visit by the Gates CEO only presentations on production, finance and quality were requested.

### 7.11 Trade Unions

<p><b>Question</b>  <i>What about trade unions in general - do they carry much clout at GPTL?</i></p>	
<p><b>Commentary</b>                  No manager felt that trade unions had any influence within the plant. Three managers made reference to the poor quality of union representatives.</p>	<p><b>Data Exemplars</b>                  “no – they usually know their place”                  “zero”                  “the actual calibre of union rep is very low now compared to what it was and the results they achieve reflect this”                  “only rear their heads once a year- aside this nothing”</p>



Trade union activity remained centred upon assisting with EL claims. The one TU representative that had been active in OSH in a positive way had left the organisation. In OSH as a positive driving force trade unions were perceived to be non-existent. This aspect showed no change in the two years of the research.

<b>Question</b> <i>Do you perceive trade unions / safety reps as having a role in safety ?</i>	
<b>Commentary</b> Factually the trade unions had very little positive contribution to OSH. Only two managers could foresee union safety representatives as a potential positive contributor.	<b>Data Exemplars</b> “need to be more intelligent to be able to contribute” “don’t need union pressure to force safety” “maybe happens in other places – here not so sure” “not really” “maybe a good idea – there’s no interest in here though because there is nothing in it”

The underlying theme present appeared to be the perceived apathy of unions to become involved in OSH. In addition to this the calibre of union representative was perceived to be low. The overarching impression given was that union pressure was not necessary to achieve satisfactory OSH performance. Research reviewed by ACSNI (HSC 1993) illustrates that TU representatives can have a substantial beneficial effect in the appropriate circumstances.

**7.12 Team Building, Empowerment and Participation**

<p><b>Question</b>  <i>In general what do you think of the issues of team building, participation and empowerment ?</i></p>	
<p><b>Commentary</b>                  No manager had a positive opinion on the issues of empowerment, participation and team building. Reference was made to the ineffectiveness of risk assessment teams by two managers.</p>	<p><b>Data Exemplars</b></p> <p>“as notions they are non starters – we are here to make money and belts”</p> <p>“the return on this kind of stuff is zero”</p> <p>“garbage – all that happens is you get impractical wish lists created”</p> <p>“you have tried it, it doesn’t work, because they don’t care”</p> <p>“just non workable here, doubt if it can be anywhere”</p> <p>“been here before its like raking over old embers – its gone”</p>

Softer aspects such as team building and participation have been shown to produce significant results in the area of OSH (Cox and Cox 1996, HSC 1993.). Within the organisation a combination of a heavy preoccupation with hardware and engineering has led to a negative view on participation and the softer aspects of organisational functioning. There was no change in data from 1998 to 2000.

**7.13 Underlying Blame Culture**

<p><b>Question</b>  <i>What do you think are the main causes of accidents ?</i></p>	
<p><b>Commentary</b>                  Nine of the eleven managers responded that the main cause of accidents was human error. The remaining two felt that they could not express an opinion on this aspect.</p>	<p><b>Data Exemplars</b></p> <p>“most of the time it’s their own fault”</p> <p>“they are at the coal face and know the dangers yet still manage to get themselves injured”</p> <p>“stupid operators”</p> <p>“thinking of recent ones – not really much in the way of mechanical failure, so I suppose it’s almost operator error by default then”</p>

As with a great many of the factors discussed above, there was no real change in the perceived causes of accidents. Perhaps this should not be surprising given the leadership style of traditional management. This style has a negative view of the worker in any case. The underlying blame culture may be a reflection of this.

The questions below are additional questions not asked in 1998 and are designed to elicit reasons for the success or failure of the OSH management system interventions.

**7.14 Trust**

<p><b>Question</b>  <i>How do you think levels of trust are on site between management and operators?                  Why? Has this changed over time?</i></p>	
<p><b>Commentary</b>                  All managers interviewed gave a negative response to the levels of trust on site.</p>	<p><b>Data Exemplars</b></p> <p>“ there is none”</p> <p>“I trust them as far as I can throw them and they are treated accordingly, its always been that way but the increase in claiming doesn` t help anybody”</p> <p>“got worse in past two years because of rumour factory working overtime”</p> <p>“shopfloor tend to view management with great suspicion and I do not really know why”</p> <p>“its probably got worse over time, particularly with 5M and the rumours and twisted stuff made out of that”</p>

The legacy of GQC which was present in 1998 was not mentioned during this course of data gathering. It was perceived that trust had deteriorated over time, with reference made to rumours over isocyanate introduction damaging the fragile trust that had existed.

**7.15 OSH initiatives.**

<p><b>Question</b>  <i>The take up of the near miss system is low – why do you think that is?</i></p>	
<p><b>Commentary</b>                  Apathy from the shop floor to be involved was cited by seven managers as the main reason for the near miss system take up being low. Four managers had not heard of the system.</p>	<p><b>Data Exemplars</b></p> <p>“I don’t know – I suppose lack of interest from shopfloor – don’t see it as worthwhile”</p> <p>“they don’t want to be seen to be a grasser perhaps, and they don’t see anything in it for them in terms of money or reward”</p> <p>“can this type of thing really work anywhere”</p> <p>“they don’t give a toss that’s why”</p> <p>“it’s maybe the wrong type of environment here as for some reason shopfloor are only interested in getting out the door at end of shift”</p>

What emerged as the main reason for failure of the near miss system perhaps reflects the dominant managerial style. No reference was made to issues such as managerial failure to feedback or respond to issues. These reasons were perhaps the core reasons for very low take up of the system.

<p><b>Question</b>  <i>What do you think of the effect of the training that has been done ?                  Why ?</i></p>	
<p><b>Commentary</b>                  The majority of managers (eight) viewed training activity as a good idea. In terms of its effect only two managers viewed what had been done as effective.</p>	<p><b>Data Exemplars</b></p> <p>“certainly raised awareness”</p> <p>“good idea but I don’t think it will really change much in terms of mind set”</p> <p>“I don’t think that they feel enriched by the experience to be honest and tend to view it very suspiciously like the company covering itself for claims by signing off, etc”</p> <p>“you are talking to brick walls most of the time”</p>

The dominant strand that runs through responses to the above question is consistent with previous answers. The aspects such as a mechanistic view of the worker apathetic to any change or stimulus dominated.

<p><b>Question</b>  <i>How effective do you think the safety committee is?</i>  <i>Why?</i></p>	
<p><b>Commentary</b>                  Eight managers viewed the safety committee as a worthwhile body. Of these eight managers, four of them felt that it was effective but had limits in terms of its potential function.</p>	<p><b>Data Exemplars</b>                  “its okay”                  “its required by law is it not?”                  “it’s a good forum to discuss issues but we don’t want to overdo these things, people are here to do a job”                  “don’t really get much from shop floor to discuss tends to be more us telling them things”</p>

The actual effectiveness of the committee appeared to be the most salient point. That is, reference was made to “overdoing it” in terms of involvement from operators. Perceptions tended to be more of the body being required by statute rather than a tool to be used for communication and actioning of OSH issues. This is certainly backed up by the evidence in the previous chapter on this subject.

<p><b>Question</b>  <i>What do you feel the effect of the assessment teams has been ?</i>  <i>Why ?</i></p>	
<p><b>Commentary</b>                  A mixed response was given from management. The majority (seven) viewed the concept of assessment teams as a good idea. Two managers had no knowledge of teams. Two managers viewed them as a bad idea. Of the seven majority, the overall theme was on the perceived output from the teams.</p>	<p><b>Data Exemplars</b>                  “folk can see things happening but what is produced is a huge wish list of things and we can’t see the wood for the trees”                  “they have tended to become disillusioned as we have not gone and fixed everything they have highlighted”                  “poor on some shifts as teams fell apart for some reason”                  “is there teams, I did not know this?”</p>

The effectiveness of teams had been severely curtailed with disillusionment amongst team members. This was acknowledged from managers. The overall view of teams

and their output appears to be coloured by the perceptions of OSH performance held by managers. This appears to have resulted in a distinct discomfort caused by the outputs from the teams. The outputs highlighted numerous controls that were required for some very significant risks in some cases.

<p><b>Question</b>  <i>There has been more involvement from operators in inspections, audits and the like – do you think that this has had any impact ?</i>  <i>Why?</i></p>	
<p><b>Commentary</b>                  Responses to this question closely linked into the question above on teams, the dominant issue here being the actual concept itself. Most managers felt uncomfortable with the aspect of increased involvement.</p>	<p><b>Data Exemplars</b></p> <p>“again it just generated wish lists”</p> <p>“I don’t see it as having actually altered anything at the sharp end do you ?”</p> <p>“not at the coal face in terms of changing anything”</p> <p>“all we get is a huge list of rubbish from them, they are not skilled enough to do the things”</p> <p>“troublesome – see it as a way to dig at us”</p> <p>“some good ideas but many loose cannons”</p>

The actual concept of involvement from operators was viewed as troublesome in that it presented an opportunity which allowed operators to be critical of the system and processes, albeit from an OSH perspective.

**Summary**

The above data and analysis reflects the incentive and ability of the organisation to firstly desire change and secondly, be able to implement this change. Over the course of the two years there were no major changes in incentive or ability. Before examining the elements of the model in more detail the aspect of receptivity will be assessed from the second pass of group interviews.



## RECEPTIVITY 2000 SHOP FLOOR GROUP DATA

### 7.16 Introduction

As with the 1998 group data - a series of semi structured group interviews were carried out again as part of an OSH awareness training session. This covered approximately 85 percent of production and related staff. Details of the question set and an actual interview script are given in appendices one and two. The overall objective is to track any changes in the elements of the model, in particular receptivity. This is to identify any relationship between receptivity and OSH performance over the two years and also to assess the utility of the OSH model and its explanatory powers. Additional questions were also asked to attempt to uncover the reasons behind the success or failure of *BS8800:1996 interventions*. To eliminate repetition analysis tends to be brief where there are no changes in the interview data from 1998 to 2000.

### 7.17 Interview Format and Techniques

An identical approach to the first data gathering exercise was taken. Shop floor interviews were carried out in group interview settings of between eight and twelve participants with groupings numbering 25 in total. An awareness / training course allowed questions to be asked as part of OSH awareness training sessions. The questions were asked prior to the training course starting and typically lasted 25 minutes. The training course itself lasted approximately two hours. The same on-site training room as in 1998 immediately next to production was used. Again areas were closed down to allow participants to attend. The disadvantages and advantages of this approach have already been outlined. Similarly with the 1998 data, notes were taken and written up later on in the day or between interviews when time allowed. Tape recording of interviews was considered but rejected as it was felt that this could cause participants to withhold information and be more comfortable with the process.

### 7.18 Questions Sets

The exact same question set which was used in 1998 was used in 2000. Additional questions were formulated to cover the interventions over the two year period. These additional questions were tested with two groupings prior to actual use.

### 7.19 Data Presentation and Analysis

An identical approach was taken to data presentation and analysis in this section as the previous one on management data.

Again, a strategy advocated by R. Chenail (ibid.) was used as a template for analysis and presentation of data. The data from the interviews was analysed using the same coding system as in 1998.

Examples of the interview data generated are given in appendix three along with the categorise/codes applied to each script, to allow transparency of data reduction and analysis, as well as helping situate the data in context. Data is presented in tabular format as question, comments and actual data itself. Below each table is analysis of the data itself. As with the managerial data a deliberate decision to quote extensively was made to allow transparency of data and findings.

### 7.20 Perceptions of OSH at GPTL

<p><b>Question</b>  <i>How do you feel we are doing regarding safety performance at the present time?</i></p>	
<p><b>Commentary</b>                  Opinion on this was divided, with seven of the twenty five groups perceiving present OSH performance as fairly poor. As with the first data gathering exercise the remaining groups perceived OSH performance as static and displayed a high level of indifference.</p>	<p><b>Data Exemplars</b></p> <p>“same as always”</p> <p>“some things are still there – 40 kilo rolls of gum”</p> <p>“nothing has really changed – can still burst our backs easy”</p> <p>“lip service – that’s all that it gets”</p> <p>“must be poor compared to some bits – not many places have near deaths”</p> <p>“there are still some glaring things”</p>

There was a slight degradation in perceived OSH performance in relation to the 1998 data. Reasons for this may include the near fatality in June 2000 as well as high profile enforcement agency presence over the two year period. This is in contrast to management views that OSH performance improved.

<p><b>Question</b>  <i>How do you think we compare to manufacturing in general ?</i></p>	
<p><b>Comments</b>                  Five of the twenty five groups perceived GPTL be better than other manufacturing sites. The vast majority nineteen of the Twenty five, perceived comparative OSH performance to be worse than manufacturing in general.</p>	<p><b>Data Exemplars</b></p> <p>“not too great is it ?”</p> <p>“we still struggle to get the basics right in here – we nearly killed someone not that long ago”</p> <p>“it only gets attention when the factory inspector calls”</p> <p>“fairly ordinary I would suggest”</p> <p>“same as everywhere else – at least we have a safety person, some bits don’t”</p>

Consistent with the first question there was a perceived slight deterioration in comparative OSH performance. Reasons for these perceptions may be the reasons given above, but perhaps also a lack of delivery from the OSH interventions over the two year period. Risk or hazard perception still remained poor on hazards such as toluene and rubber fume which was perceived to be very low risk. Perceptions on isocyanates tended to grossly overstate the actual risks involved.

**7.21 Reactive Position**

<p><b>Question</b>  <i>Do you feel that our position has changed over the past few years ?</i></p>	
<p><b>Commentary</b>                  Eight groups made reference to OSH aspects degrading over the previous few years. The remaining groups made reference to OSH performance remaining static. No group perceived any improvements.</p>	<p><b>Data Exemplars</b></p> <p>“in some ways a lot worse – look at stuff we are using now”</p> <p>“you only need to look at the poison they bringing in now and people walking around with masks and all sorts”</p> <p>“definitely worse as boy was nearly in a pine box”</p> <p>“not really”</p> <p>“too much secrecy now as they are trying to cover up dangers”</p> <p>“they know things are there but sweep them under the carpet until HSE sort out”</p>

Again it would appear that critical events on site heavily colour shop floor perceptions on OSH performance. Perhaps significantly the 2000 group data showed perceived deterioration in OSH performance. Consistent with the 1998 data there still remained a large number of operatives who perceived OSH systems as reactive and static.

**7.22 Influence / power**

<p><b>Question</b>  <i>Do you think you have much influence over issues in the plant in general ?</i></p>	
<p><b>Commentary</b>                  No group felt that they had any Influence over issues within the plant.</p>	<p><b>Data Exemplars</b></p> <p>“you have surely learned by now that nobody has, including you”</p> <p>“you are joking actually asking that are you not?”</p> <p>“all power is in one place – at the top – but who really cares anyway”                  (laughter all round)</p> <p>“listen we are here for the crust and nothing else”</p> <p>“we are just part of the big machine”</p>

Perceptions on the aspect of influence were consistent across all areas and shifts and showed no change from 1998. The aspect of withdrawal and apathy highlighted by Kirk, Hunter and Beaumont was evident. The comments were indicative of a mechanistic style of management with the connotations for communication and managerial style that this entails.

<p><b>Question</b> <i>What about the influence of the safety officer?</i></p>	
<p><b>Commentary</b> No group gave any indication that the HSE Advisor carried any real influence.</p>	<p><b>Data Exemplars</b></p> <p>“you don’t need us to answer that one”</p> <p>“you are part of the system to protect them from the law. It’s that that makes anything happen”</p> <p>“same as us – we are all in the same boat”</p> <p>“not quite zero – but not far off it”</p> <p>“can change the odd thing but like us you can’t rock the boat too much”</p>

No influence outwith very senior management can be exerted was the dominant perception in 1998 and remained unchanged in 2000.

### 7.23 Motivators for Safety

<p><b>Question</b> <i>What do you think are the key things driving safety ?</i></p>	
<p><b>Commentary</b> All groups made reference to the law driving safety. Four of the twenty five groups also made reference to improved worker’s rights – albeit driven by legislation.</p>	<p><b>Data Exemplars</b></p> <p>“Factory Inspector has forced changes in here – extraction, etc”</p> <p>“HSE have pulled them up about a few issues”</p> <p>“the law of course”</p> <p>“it’s taken HSE to push them on extraction and handling gum – these have been here years but it’s only when prosecution threatens that it’s done”</p> <p>“threat of jail”</p> <p>“the law nothing else”</p>

A small minority of interviewee groups in 1998 made reference to improved workers rights. On the second set of group interviews all groups without exception made reference to criminal legislation as the sole driver. The main reason for this presumably was the fairly recent high profile of HSE. Again negative motivators dominated – consistent with the managerial data set and previous 1998 group data.

## 7.24 Priorities

<p><b>Question</b>  <i>Look at the model of a GPT plant (model in appendix 4) where do you think the priorities lie?</i></p>	
<p><b>Commentary</b>          The same diagram as in 1998, used extensively in the plant showing core site functions was displayed. All groups ranked plant functions for themselves as the opposite of management.</p>	<p><b>Data Exemplars</b></p> <p>“we have ours they have theirs”</p> <p>“there is a mark , a dividing line, the yellow lines on the floor are it”</p> <p>“certainly different from management – I tell you that”</p> <p>“people here are nothing and so is employee relations”</p> <p>“don’t hear a great deal about anything other than production and sometimes quality”</p> <p>“there is no relations in employee relations – we are told zero”</p>

### 7.24.1 Management Priorities

The simple model in appendix four was displayed to allow ranking of plant functions and perceived priorities. As with the 1998 data the overriding theme was the degree of division within the plant in terms of priorities. The key management priority was perceived to be production and output by all groups. Similarly finance was cited by 22 of the 25 groups as second only to production. Quality was perceived as third by 18 of the 25 groups. The aspects of employee relations and safety were predominantly ranked fifth and sixth. These results show no real change from 1998.

### 7.24.2 Shop Floor Priorities

Perceived shop floor priorities were cited as the reverse of management’s. This showed no change from 1998. Similarly this may indicate a deep division within the organisation rather than a shopfloor preoccupation with OSH.

7.25 Communication

<p><b>Question</b>  <i>Do you think that they (management) are approachable?</i></p>	
<p><b>Commentary</b>                  No group interviewed in the main production areas viewed management as approachable.</p>	<p><b>Data Exemplars</b></p> <p>“never see them”</p> <p>“no chance”</p> <p>“management look at you as if you are something they have stepped on”</p> <p>“there is one route and we must go through this”</p> <p>“we would never approach them with anything”</p>

As with the 1998 series of interviews managerial visibility remained unchanged, along with the level of approachability. Responses in this particular area are consistent with earlier data and show no change in terms of this avenue as a route of communication.

<p><b>Question</b>  <i>Do you feel that the person above you is committed to safety?</i></p>	
<p><b>Commentary</b>                  Responses here tended to focus on the lack of effectiveness of line management to actually do anything about OSH aspects as much as the level of commitment to OSH. Sixteen groups made reference to a lack of commitment with fourteen of these making reference to lack of influence of line management. The remainder demonstrated a marked indifference to the aspect.</p>	<p><b>Data Exemplars</b></p> <p>“I got soaked in toluene and I’m still waiting for ladders so what’s the point?”</p> <p>“ look at the lists of stuff they used to get during inspections and tell me how many are fixed”</p> <p>“its not really talked about much”</p> <p>“they tend to be too busy – not a case of not being committed”</p> <p>“they can’t actually do much because they get judged on production figures and nothing else”</p> <p>“never really mention it much”</p>

The main themes emerging here were consistent with the 1998 data and centred on the powerless position of line management as well as a perceived lack of



commitment. The impression was that OSH was almost not on the agenda during plant functioning.

### 7.26 Trust

<p><b>Question</b>  <i>How do you think trust is between management and operatives ?</i></p>	
<p><b>Commentary</b>                  No group felt that trust existed between management and shopfloor operatives. This appeared to be severely eroded over the two years, with 14 groups making reference to recent events within the site.</p>	<p><b>Data Exemplars</b></p> <p>“they kept things to themselves about poison and the like, how can we trust them”</p> <p>“ there is none”</p> <p>“there is a very low level of trust and it will always be that way because of their attitudes”</p> <p>“wouldn’t show a bird’s nest”</p> <p>“ they don’t tell us anything – you just see folk working with masks on and you are told it is safe”.</p> <p>“absolute zero and I am sure it will be the same for them”</p>

The legacy of failed TQM attempts was not mentioned and appeared to have been overtaken by recent events in the plant. Aspects of OSH hazards such as noise and isocyanates were not communicated as effectively as they could have been, causing rumours and misperceptions, the result of which appears to be a legacy of almost total mistrust. Trust showed a large negative movement over the course of the research.

<p><b>Question</b>  <i>Do you hear about other accidents ?                  (show recent accidents)</i></p>	
<p><b>Commentary</b>                  The vast majority of groups only heard of an accident - if it was a major incident and/or caused a change procedure in the workplace in their area. Outwith their own area no groups heard of safety incidents.</p>	<p><b>Data Exemplars</b></p> <p>“not unless it’s a major deal”</p> <p>“never heard of any of these”</p> <p>“Hear about bits being cordoned off – but in terms of run of mill accidents – no”</p> <p>“Even in our own area were sometimes not told”</p> <p>“Only if it involves a change to working practice”</p>

<p><b>Question</b>  <i>Are safety issues a part of day to day conversation with colleagues ?</i></p>	
<p><b>Comments</b>                  Only one group gave an indication that safety issues were routinely discussed.</p>	<p><b>Data Exemplars</b></p> <p>“rarely discussed”</p> <p>“no”</p> <p>“only when there is a bad one (accident)”</p> <p>“is the odd time and we will raise it with you when you walk past”</p> <p>“if we are asked to work with masks and that on then we will discuss this – but beside this no”</p>

As with the 1998 data horizontal communication of OSH aspects appears to be poor. It could be argued that as OSH appears not to be on the line management or senior management agenda then it is not an integral part of corporate culture. As such discussion of OSH in general, including shopfloor, is very sparse.

<p><b>Question</b>  <i>What do you think of the Health and Safety Committee ?</i></p>	
<p><b>Commentary</b>                  Fourteen of the twenty five groups had no knowledge of the Health and Safety Committee. The remaining eleven that had heard of it expressed doubts as to its contribution.</p>	<p><b>Data Exemplars</b></p> <p>“it doesn’t meet enough to do anything”</p> <p>“ineffective – but better than nothing”</p> <p>“never used it”</p> <p>“is there one here?”</p> <p>“is something but there is no real commitment to it or it doesn’t have any impact that we see?”</p> <p>“I’m on it – it gets cancelled at the drop of a hat”</p>

As outlined in the analysis of the 1998 data, employee participation via a safety committee system was at best very weak and sporadic. Managerial actions and perceptions of its importance appear to be confirmed at the lower levels in the organisation.

<p><b>Question</b>  <i>Say you personally felt that a safety issue needed raising – how would you do it ?</i></p>	
<p><b>Commentary</b>                  All groups cited the shift co-ordinator as the only communication route.</p>	<p><b>Data Exemplars</b></p> <p>“through our co-ordinator”</p> <p>“never felt the need to - nothing would happen anyway”</p> <p>“used to raise them to co-ordinator but he gets pressured from other places and can’t get things done”</p> <p>“channels are quite strict and they go ballistic if you step over the line”</p> <p>“team leader or coordinator – is no other way”</p>

The communication channels for shopfloor operatives consist of one avenue – the shift co-ordinator. However, this function is perceived to be under pressure from many sources of which OSH is but one. As line managers this group will on the

whole deliver what is designated as important from the top of the organisation – 1<sup>st</sup> level business issues.

### 7.27 Blame Culture

<p><b>Question</b> <i>What do you think are the main causes of accidents?</i></p>	
<p><b>Commentary</b> The dominant cause cited by 19 of the 25 groups was human error or operator lapses. Mention was also made of other aspects such as long working hours. Notably enough only six groups made mention of production pressure, but only after mention of operator error.</p>	<p><b>Data Exemplars</b></p> <p>“short cuts – that’s the cause”</p> <p>“guys being daft”</p> <p>“stupidity – most have been here for years and know what to look out for”</p> <p>“long hours – especially third night of night shift”</p> <p>“short cuts are taken but it’s not for the man’s own good, it’s to help the process”</p>

The fairly strong culture of blame evident in 1998 in both shopfloor and managerial data remained unchanged over the two years.

### 7.28 Additional Questions

<p><b>Question</b> <i>The take up of the near miss system is low – why do you think that is ?</i></p>	
<p><b>Commentary</b> 20 of the 25 groups showed very strong apathy towards the near miss system. Three groups made reference to being blamed for hazard reporting, the vast majority saw no point in filling near miss forms in as they would not be taken seriously.</p>	<p><b>Data Exemplars</b></p> <p>“we did fill some in but nothing happened”</p> <p>“I don’t want the finger pointed at me”</p> <p>“ too much hassle, that’s not our job anyway, it’s down to the co-ordinators”</p> <p>“never seen it again – so why fill them in ?”</p> <p>“never really work in here because communications are so bad towards us”</p> <p>“see what happened when we filled in the survey thing – it disappeared because they did not like it – so what’s the point?”</p>

The withdrawal effect and general feeling of powerlessness from shop floor operatives which appears part of the fabric of the organisation may be the result of the hardware pre-occupation.

### 7.29 Training

<p><b>Question</b>  <i>What do you think of the effect of the training that has been done ?                  Why ?</i></p>	
<p><b>Commentary</b>                  The vast majority of groups, 19 of 25, viewed training as worthwhile. However, the effectiveness and motives behind it were the subject of scepticism by most of the groups, 18 of the 25.</p>	<p><b>Data Exemplars</b></p> <p>“it’s not being done for the right reasons – when your told its to stop you claiming how can we get enthusiastic about it”</p> <p>“lets us know what is going on but there is no real commitment for it is there”</p> <p>“to cover backsides only so we can get disciplined”</p> <p>“no real effect as things are still the same as they have always been”</p> <p>“it’s good ideas but”</p>

The data here is consistent with findings earlier in terms of perceived management commitment to training. The was evidenced by the attitudes of participants and management to the IOSH “Working Safely” courses and appears to reflect relatively poor ownership of OSH by the workforce and management.

**7.30 Participation**

<p><b>Question</b>  <i>What do you feel the effect of the assessment teams has been ?                  Why ?</i></p>	
<p><b>Commentary</b>                  Only five of the 25 groups intimated that there had been a positive effect from the assessment teams. The primary reason given was a lack of action by management on findings.</p>	<p><b>Data Exemplars</b></p> <p>“did not know there was any”</p> <p>“they fell away rapid did they not?”</p> <p>“I was on them and we got nowhere – what’s actually changed?”</p> <p>“treated with contempt by them”</p> <p>“some things were brought up in our area but they were not addressed”</p> <p>“you will not really change anything”</p>

The perceived value of teams lies with their ability to effect any change in OSH. It would appear that the concept itself was not accorded enough weight by management in terms of findings to hold any perceived value by shopfloor operators. Again, extreme scepticism for the reasons behind teams was evident.

<p><b>Question</b>  <i>There has been more involvement from operators in inspections, audits and the like – do you think that this has had any impact ?                  Why?</i></p>	
<p><b>Commentary</b>                  No group viewed involvement in these areas as having had any impact.</p>	<p><b>Data Exemplars</b></p> <p>“I don’t see anything”</p> <p>“people have got disillusioned with inspections that’s why they are not getting done”</p> <p>“been here before and had false promises – why bother, they don’t”</p> <p>“its all still the same”</p> <p>“the only time they react is if the factory inspector boots them”</p> <p>“there is no telling them”</p>

An air of disillusionment was the dominant theme in terms of participation and involvement. There was reference to the GQC legacy and also the powerlessness of shopfloor to actually act as an agent of change. These views are consistent with events that occurred in relation to these interventions. This notion of withdrawal was identified by Hunter and Beaumont (1993) as well as Kirk (1998). OSH interventions into the organisation would appear to have been profoundly affected by the organisational culture. But, in parallel to this the interventions themselves have reinforced the dominant culture already present within the organisation.

### 7.31 Self Perpetuating Culture

From the above group data combined with the data from the management team interviews a self perpetuating culture can be proposed. If we take on board the notions of Schein (1995) and Dawson (1995) regarding origins of organisational culture and mind set then we can put forward the notion of a self perpetuating culture. That is, signals come from the core of the culture which impact through out various levels of the organisation and manifest themselves in various ways: The principle argument is that there are signals from management which go through the organisation and produce a reaction or reflection which filters its way back to management, which reinforces the original perception and self perpetuates this equilibrium. Examples of this are given below:

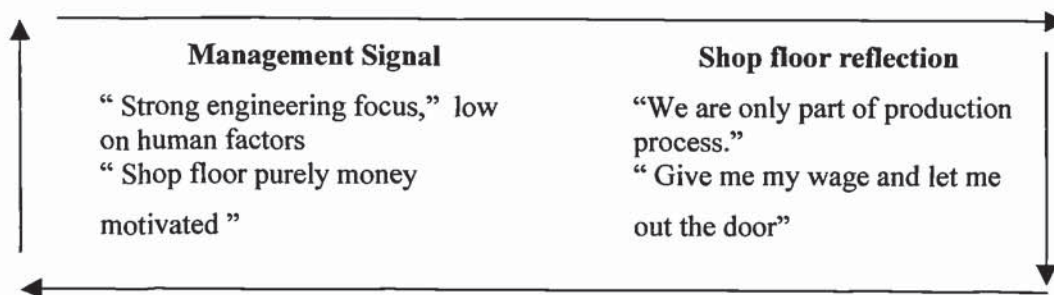
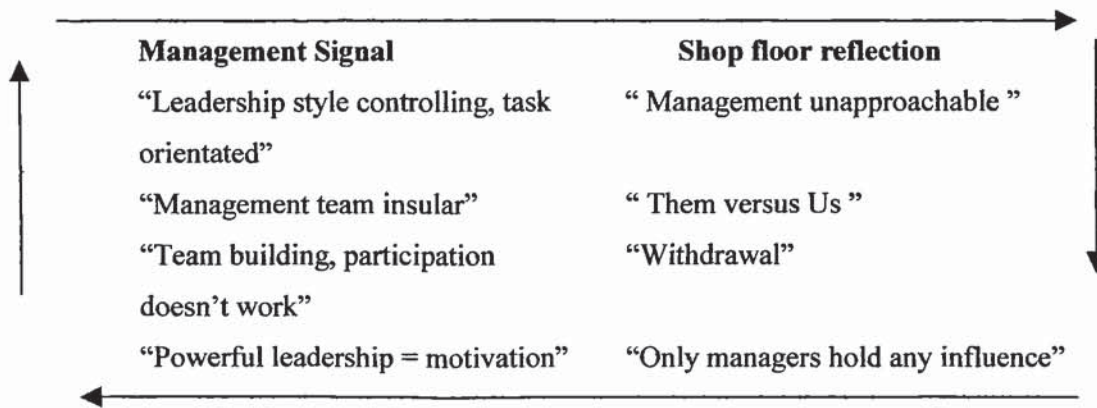


Figure 7.1 Facet - Hardware Focus



**Figure 7.2 Facet – Leadership Style**

The next section draws the data together for all interview data sets, acting almost as a focal point for the previous three chapters.

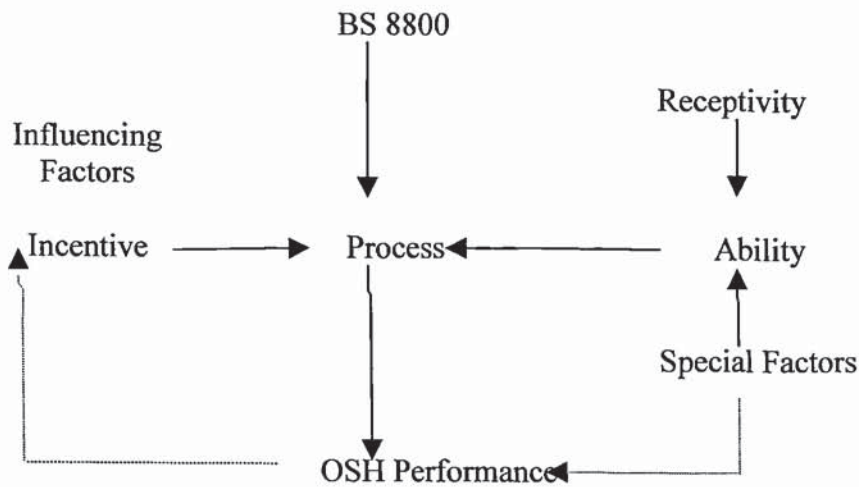


**7.32 Summary of Findings**

**7.33 Introduction**

This section draws together the data for both the 1998 and 2000 interview surveys. This is in order to track any changes in incentive, ability and receptivity across the two years of the study to gain a general picture at this stage. It serves as a prelude to the point in the thesis where the model of change starts to undergo development in light of the data and the literature. This section is a prelude to this process.

As a reminder of this the model is displayed again below :

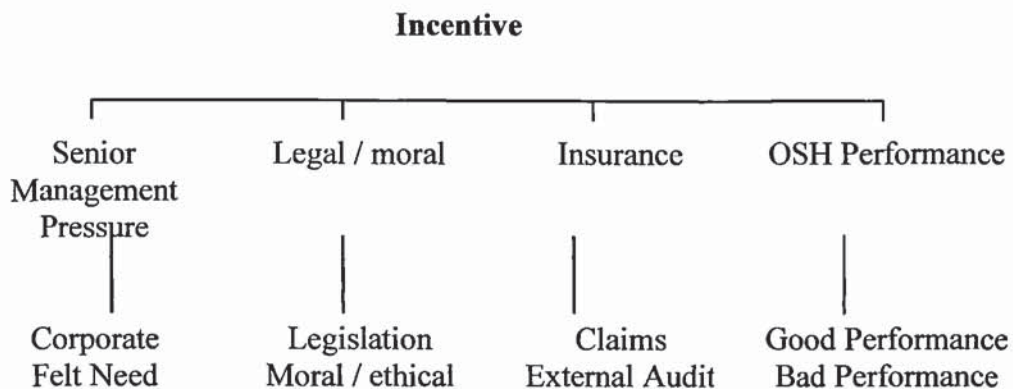


**Fig. 3.2 Potential Model of OSH Change**

(From Chapter Three, page ninety eight)

**7.34 Incentive**

The initial element within the model was incentive and is reproduced below for ease of reference.



**Fig 3.4 Potential OSH Incentive**

(From Chapter Three, page ninety nine)

### Senior Management Pressure

Corporate pressure has been cited by Wright (1998) and Hawkins and Booth (1998) as a core driver of OSH. Within the site under study this sub- factor is weak to the extent that the messages sent out by corporate about OSH are potentially destructive in terms of continual improvement. In terms of demotivation for change this sub- factor did not improve over the course of the study. The aspect of felt need remained very strong over the two years. How powerful this is in the area of OSH though is debatable as the organisation exhibits many of the reactive characteristics identified by Cox and Cox – fear of prosecution, driven by accident litigation and external agencies.

### Legal / Moral

Legal pressures as an incentive for OSH has been shown to be a core motivating factor by Wright (1998). Within the facility key changes in relation to the core rubber industry hazards have all been the subject of enforcement agency action. This perception of OSH being driven by the law was pervasive throughout both data passes. As with the first set of interviews moral and ethical aspects received little attention.

### OSH Performance

Aspects such as machinery down time and lost operator time caused by accidents are missed by management in terms of a business case for OSH. Similarly with the 1998 interview data nobody perceived the facility as having a bad OSH performance. ACSNI (HSC 1993) argue that accurate perceptions of risk are fundamental for an improved safety culture. The misperceptions on risk appear to be fundamental amongst management.

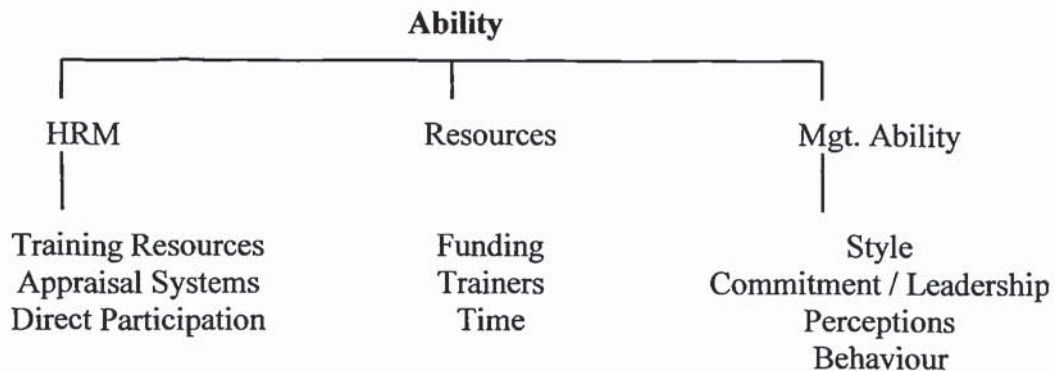
### Insurer Pressure

Insurer pressure was generally perceived to be weak in 1998, perhaps reflecting the lack of OSH business case in terms of increase in insurer premium. This did not change during the course of the research. Civil claims as an insurer related aspect carried a little more weight in terms of increased profile over the study.

Incentive then over the course of the study remained primarily dominated by negative motivators. The principle one being legislation.

### 7.35 Ability

Ability in the diagram feeds directly into the process. The data for ability can be drawn together as below :



**Fig. 3.8 Potential OSH Ability**

*(From Chapter Three, page one hundred and one)*

#### Human Resource

This aspect has three main sub-factors. Documentary evidence suggests that HRM direct participation in OSH is very low. Appraisal systems which should capture issues such as OSH training gaps are also non-existent within the plant. Training resources from HRM are also very weak and consist of record keeping of names of attendees on courses. This remained unchanged from 1998.

#### Resources

Data to input into this factor in the model cannot be based on the semi-structured interview data. Therefore to allow for some form of comparison for funding, trainers, time – i.e. what is a comparatively high level of time to train, what is a short time regarding training, hard measures will be sought from reputable sources in chapter ten which develops the model.

### Management Ability

Management style within the facility can be seen from the 1998 data as highly controlling and task orientated with little room for any caring aspect to be shown.

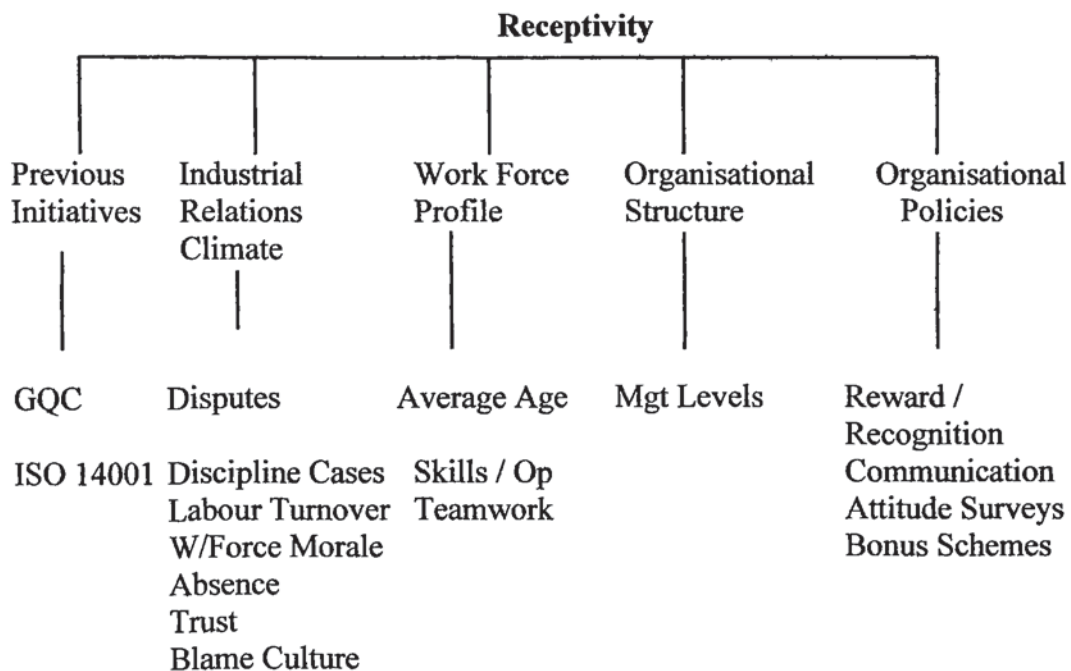
This showed no change over time.

Commitment and leadership degraded over the course of the study with fairly high profile action by the enforcement agencies apparently the only way that movement would occur on core OSH issues. As Schein points out in the literature leaders can impose a world view on an organisation. This appears to be the case within the site. A mechanistic view of the employee with minimal consultation contrasts with the literature where by Krause (1993), Everly (1993), IOSH (1994) and Cox and Cox (1996) contend that employee participation is central to improvement in OSH. Perception of OSH and its culture can be illustrated if the model by Waring (1991) is taken into account. The core ideology of the site in terms of OSH is that it is an engineering function and is dominated by engineers. The strategic belief complementing this is that danger can be engineered out and is indeed engineered out. How this is manifested is in the language i.e. a heavily protected site which in turn aids the view that injury can only then be the injured person's fault as the machinery and processes are to all intents and purposes safe.

Ability appeared to be weak in a few core areas to actually allow the organisation to implement change. This was the case in 1998 and remained so in 2000. Ability in turn is impacted upon by the environment within which the interventions take place. This is referred to as receptivity.

### **7.36 Receptivity**

This section draws the group interview data together from both passes to allow an general assessment of receptivity and any major changes in the element to be made:



**Fig 3.6 Potential OSH Receptivity**

(From Chapter Three, page one hundred)

#### Previous Initiatives

The level of distrust appeared to increase over time to the extent that the organisation's failure to deliver on GQC was overtaken with the introduction of isocyanates onto site. Communication and education on this subject was restricted, resulting in extreme misperceptions of risk, which ultimately influenced future briefing / training sessions.

#### Industrial Relations Climate

Morale, trust and blame culture are the sub-factors within this element that are directly linked into the interview data. Morale within the workforce appeared to stay fairly steady, perhaps as a result of the relatively very high salary levels particularly for the geographical area. In terms of trust this appears to be low, acting as more of a brake on OSH development than an aid. This concept was severely eroded over the course of the study with closed communications lines exacerbating rumours over the introduction of isocyanates and sensitisation. Blame culture was evident in both sets of interview data (management and groups) in 1998 and remained in 2000.

Disputes, disciplinary cases and absences are hard, directly measurable data. Sources to allow some measure and comparison will be taken from nationally recognised systems.

#### Workforce Profile

Within this element there are three sub-factors. As will be seen the sub-factor of age will be assessed in detail in the next chapter. In terms of skills per operative, again a hard measure from nationally recognised sources will be used.

Team work in terms of any sense of empowerment does not occur within the facility. As can be seen from the data in chapters five and seven this generated a scepticism and withdrawal from the workforce that made the notion of meaningful teams unworkable. The whole notion of employee involvement in OSH is within an organisational culture that goes against these concepts. On hindsight this aspect of team working may have always been very difficult.

#### Organisational Structure

There was no change in the number of management levels from 1998 to 2000. As with absence levels this is a factor that is not measurable from qualitative data. Within GPTL, Dumfries there remained four levels of management from top to bottom. Whether this is flat or heavily tiered will be answered to allow its potential impact to be gauged.

#### Organisational Policies

Reward and recognition schemes do not exist within GPTL, Dumfries. This perhaps reflects the managerial style of the plant.

The closed communications climate identified in 1998 remained with many of the facets of the classic style of communication in evidence. These include a high task orientation with a predominantly vertical downward direction. Bonus schemes do not exist within Dumfries and are therefore not an influence.

Receptivity appears to have moved in a negative sense in terms of restricting any proposed change and particular the aspect of trust. What is represented above are fairly general comments on the elements of the model. The core question arising from the model is that amongst the plethora of sub factors surely there are some

that are critical to success? The next chapter looks at the aspect of general organisational culture and varying OSH performance across the four shifts. The model is then refined and developed to attempt a more detailed analysis of the core influencing factors. However before doing so further triangulation of data sets must be considered.

### 7.37 Data Triangulation

#### 7.38 Introduction

The research is primarily a qualitative exercise with sources supporting each other i.e. note taking, anecdotal, documentary and interview evidence. In addition, the findings are consistent with previous research, i.e. Hunter & Beaumont (1993), Kirk (1998) and Bottomley (1998).

The above data are from an essentially qualitative exercise and it could be contended that a degree of subjectivity has been applied. To counter this contention the quantitative data presented below gives details on relative strengths and weaknesses of the organisation. The quantitative data consists of extracts from the HSE Safety Climate Survey. The questionnaire and guidance are given in appendix five. Advice was taken on the data interpretation and it can be seen that aspects such as risk perception, workforce ownership of OSH, supervisor attention to OSH, blame culture and communication all point in the same direction.

The typical aspect of management having a higher opinion of OSH performance in comparison to the workforce, is also apparent.

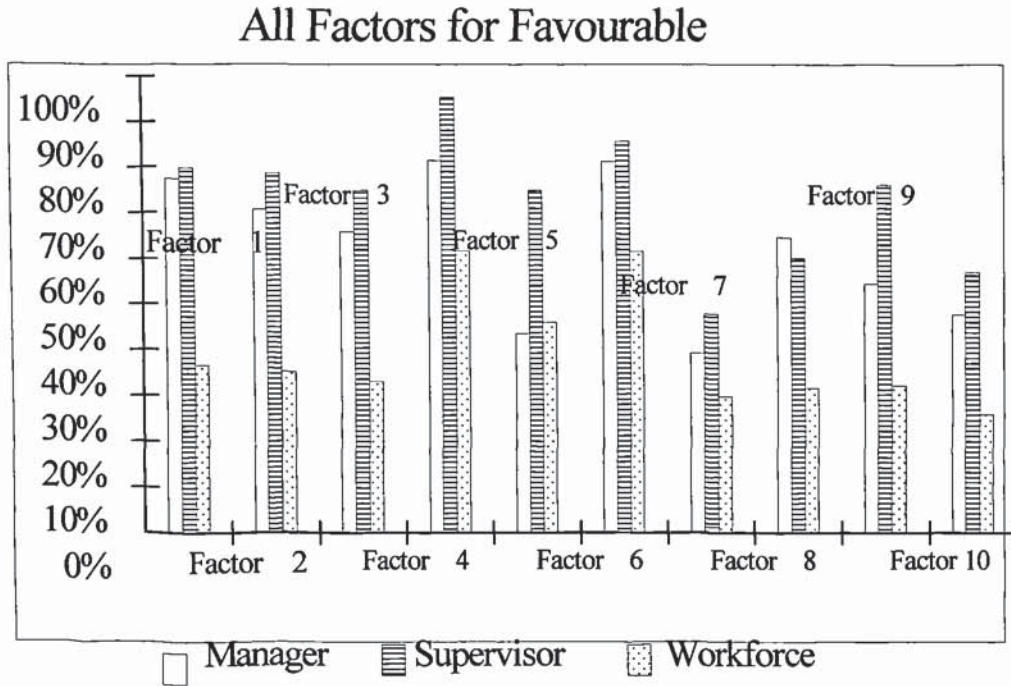
#### 7.39 Health and Safety Climate Measure

A safety climate survey was utilised as part of the communications strategy. The detail and methodology of the safety climate measure is given in chapter six.

The actual survey itself is the HSE Safety Climate Measure (HSE 1997). This provides a useful quantitative source of data to support and triangulate the qualitative data. The actual questionnaire used is in appendix five. Advice on its interpretation and its interrelationship with the qualitative data was taken from one of the individuals instrumental in its development ( Byrom 2000). The advice given was to look at the factors for strengths and weaknesses and how these factors are made up in general terms, rather than attempt any advanced statistical analysis. On the strength of this advice data is presented which looks at factors overall, workforce data, composition of factors. Although this is supportive data, its role is secondary and selectivity of questions to be presented was unavoidable. Some bias in selection of questions may have been present. This was countered by following the advice of Byrom to select those questions that are skewing the responses for a factor.

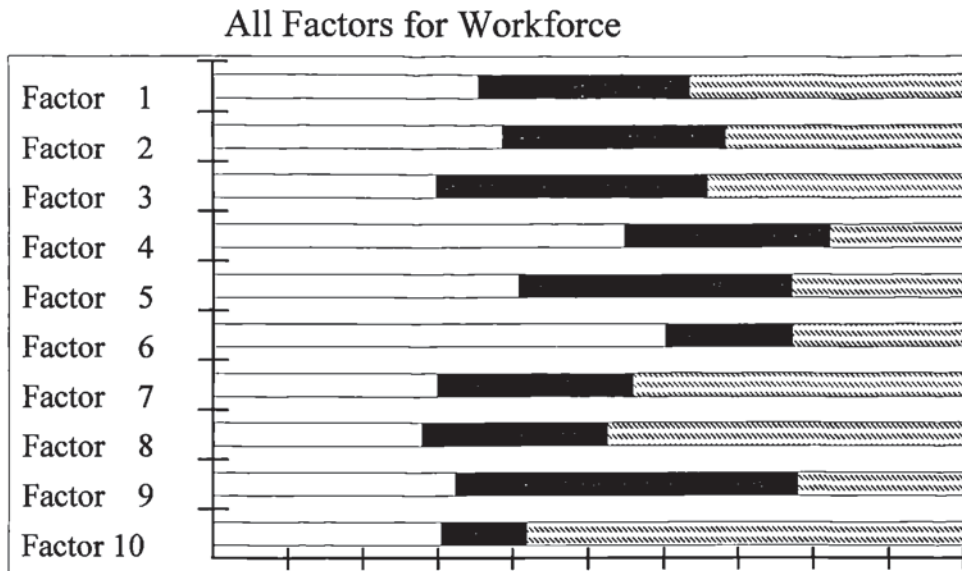


Factors overall for managers, supervisors and workforce show a typical pattern (Byrom 2000) where managers perceive safety climate factors to be better than the workforce.



**Figure 7.3 Favourable for Managers, Supervisors & Workforce**

Factors for the workforce are also represented below to illustrate strengths and weaknesses. This shows relative strengths in Factors 4 and 6 – competence and personal role. Relative weaknesses exist in Factors 1, 2, 3, 7, 8 and 10. These are organisational commitment and communication, line management commitment, supervisor’s role, workmate’s influence, risk taking behaviour and some contributory influences, obstacles to safe behaviour and reporting of accidents and near misses. In the graph below no colour is favourable, black neutral and hatched unfavourable.



**Figure 7.4 Factors for Workforce**

The next step in interpreting the safety climate factors is to examine how the scores on each of the factors are made up, i.e. what statements are loading the factors? What is represented below is the statement(s) from each factor that contributes most to its loading. While a subjective exercise in terms of selecting statements, it has been attempted to present as balanced a picture as possible by looking at first the relative strengths and then the relative weaknesses. It can be seen that broadly the data points in the same direction as the qualitative interview data.

**Relative Strengths**

**Factor 4 Personal Role**

The statements below show perhaps a willingness to receive briefings and information on OSH concerns by the workforce, as well as an apparent willingness by individuals to adhere to OSH rules and procedures. This is also a relative strength in combination with clarity of responsibilities and procedures

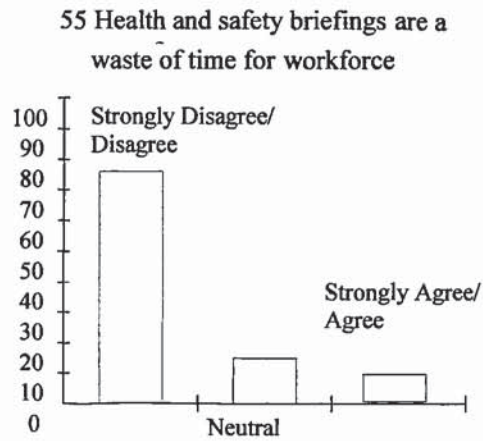


Figure 7.5 Question Number 35

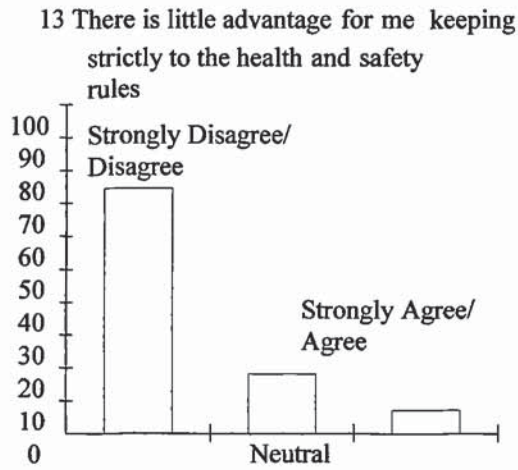
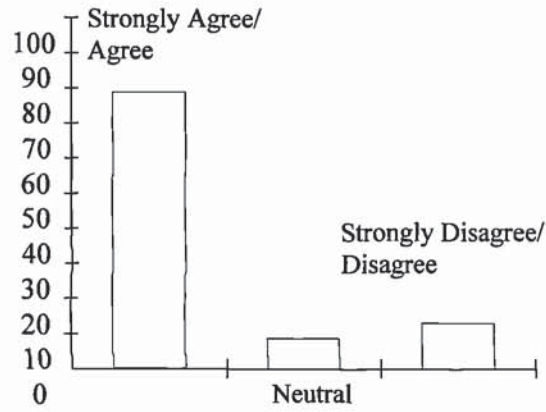


Figure 7.6 Question Number 13

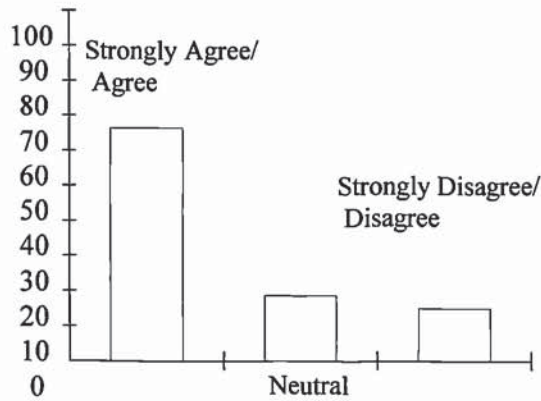
Factor 6 Competence

29 I am clear about what my responsibilities are for health and safety



**Figure 7.7 Question Number 29**

64 I fully understand the health and safety procedures/instructions/rules associated with my job



**Figure 7.8 Question Number 64**

15 I fully understand the health and safety risks associated with my job

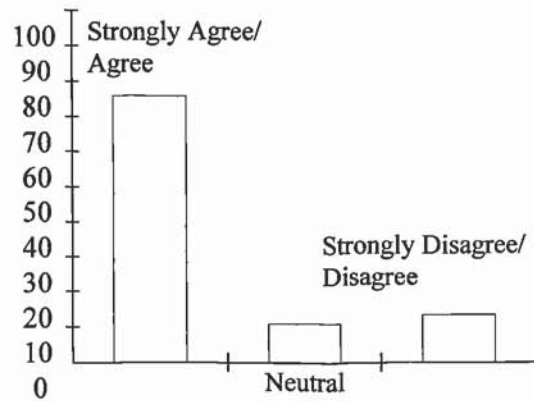


Figure 7.9 Question Number 15

**Relative Weaknesses**

Factor 1 Organisational Commitment and Communication

16 Productivity is usually seen as more important than health and safety.

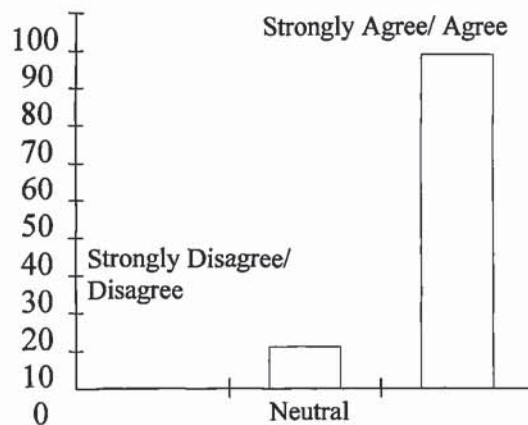
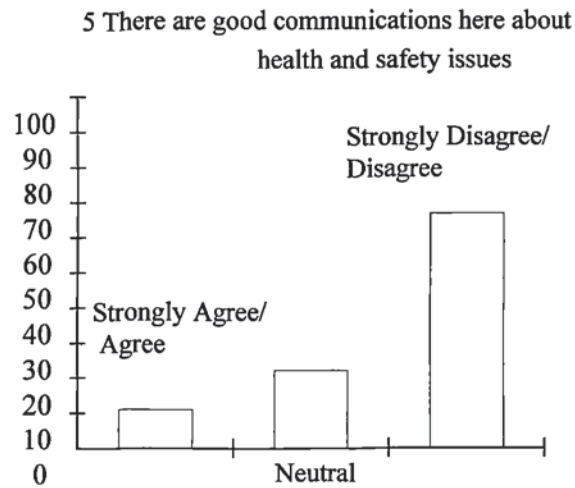
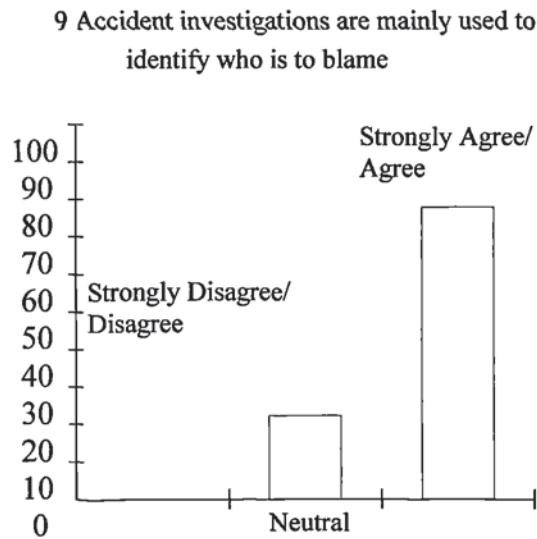


Figure 7.10 Question Number 16



**Figure 7.11 Question Number 5**

These findings align with the qualitative data presented in 5.25, 7.25 and 5.26, 7.26 where productivity is cited as the key plant priority and communications are deemed to be poor respectively.



**Figure 7.12 Question Number 9**

This data aligns with the qualitative data presented at 5.15, 5.29, 7.13 and 7.28 in terms of a blame culture being present within the plant.

Factor 2 Line Management Commitment

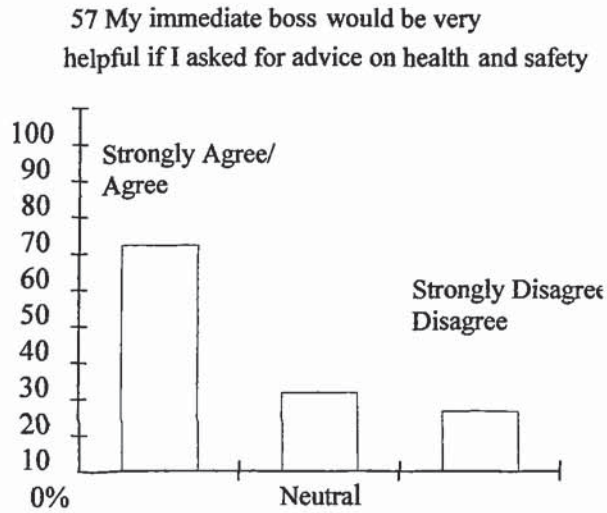


Figure 7.13 Question Number 57

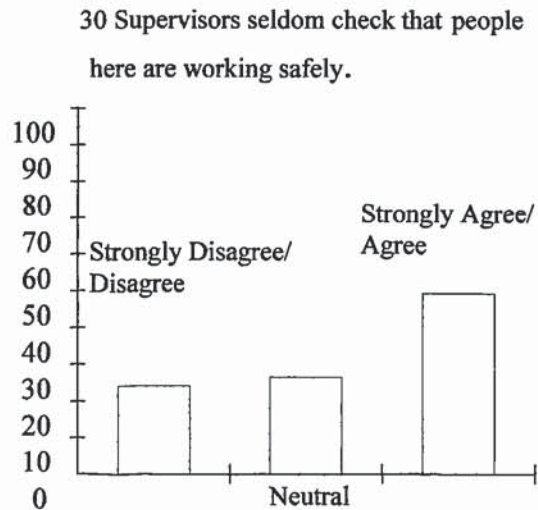


Figure 7.14 Question Number 30

What these two statements demonstrate is that their immediate line manager would be helpful if they asked for help. However, OSH does not appear to be on the actual daily agenda of the plant and its functioning. This does link into the data presented at 5.25, 5.26, 5.27 and also into the general plant characteristics where OSH is deemed a second level issue at 5.11 and 7.9. Perhaps predictably this is consistent with the statement in Factor 3.

Factor 3 Supervisors Role

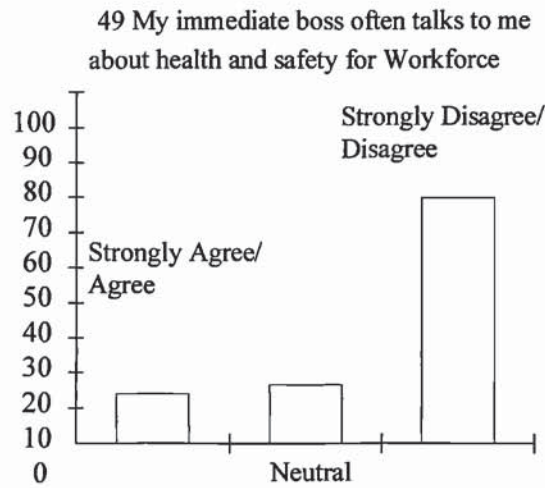
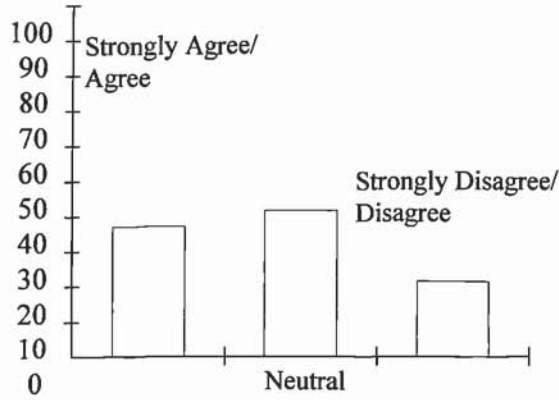


Figure 7.15 Question Number 49



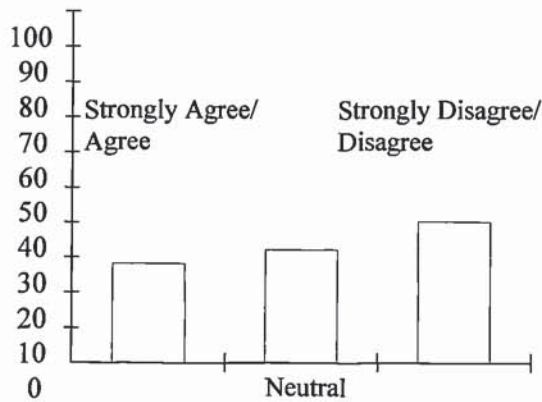
Factors 5 Workmates Influence

69 All the people who work in my team are fully committed to health and safety



**Figure 7.16 Question Number 69**

68 My workmates would react strongly against people who break health and safety



**Figure 7.17 Question Number 68**

The above is countered by the factual data from the statement below, in that in terms of reacting to OSH breaches there is reluctance.

Factor 7 Risk Taking Behaviour and some Contributory Influences.

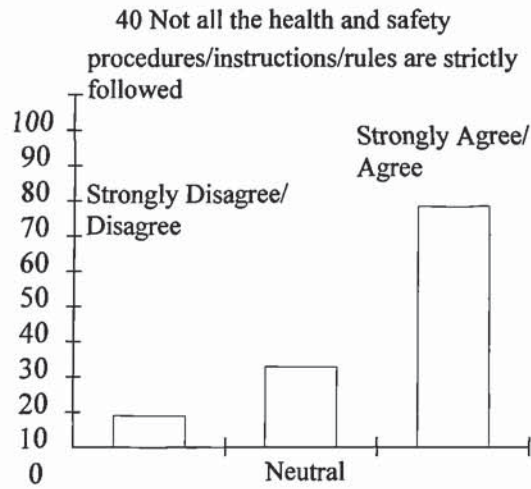


Figure 7.18 Question Number 40

56 Some people here have a poor understanding of the risks associated with their job

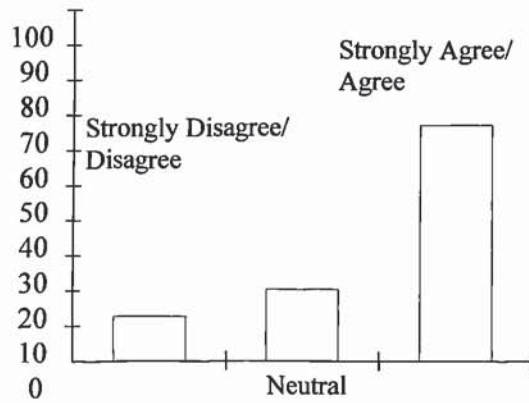
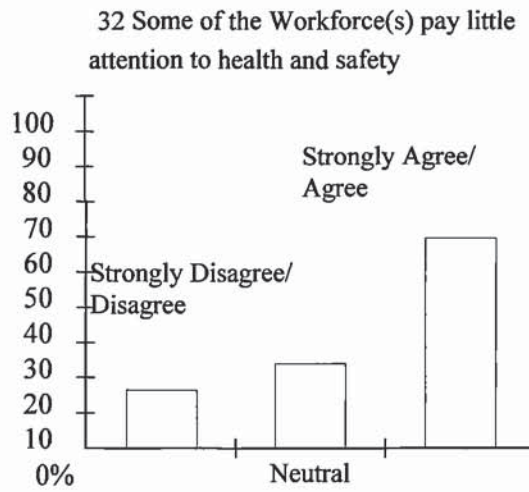


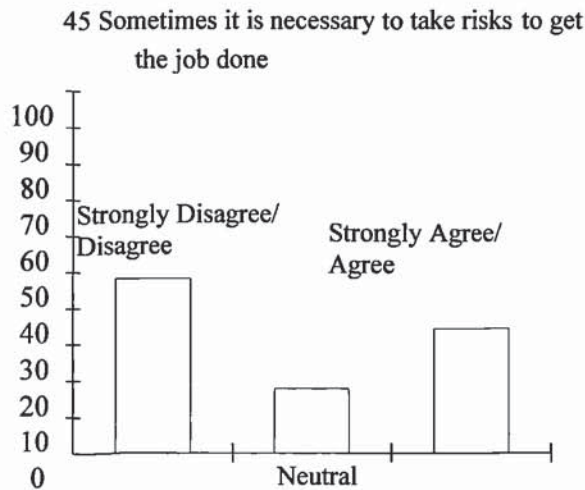
Figure 7.19 Question Number 56



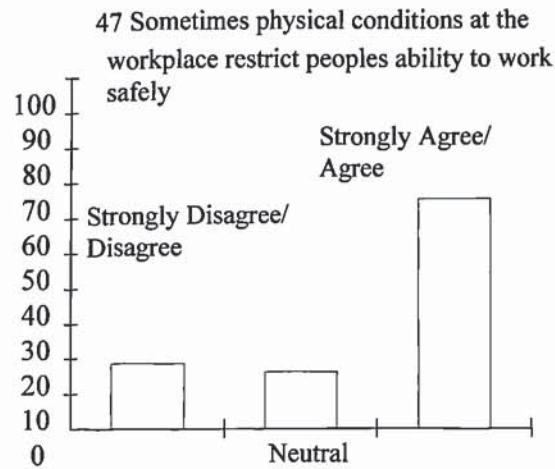
**Figure 7.20 Question Number 35**

Data here and in factor 8 below tends to back up the findings of the qualitative interview data at 5.21, 7.15 and 7.29-7.31 in particular the aspects of workforce ownership of OSH and risk perception.

**Factor 8 Some Obstacles to Safe Behaviour**



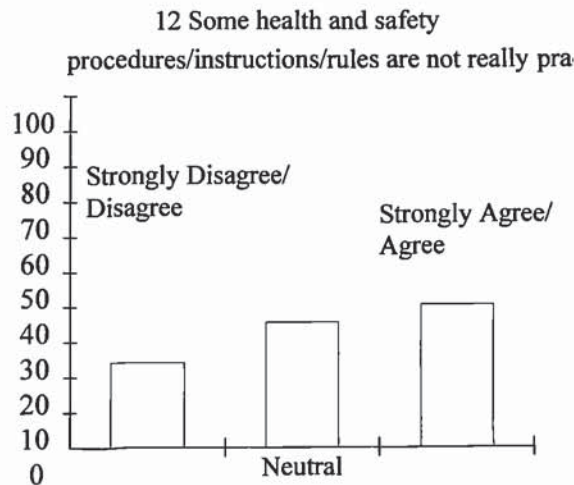
**Figure 7.21 Question Number 45**



**Figure 7.22 Question Number 47**

**Factor 9 Permit To Work**

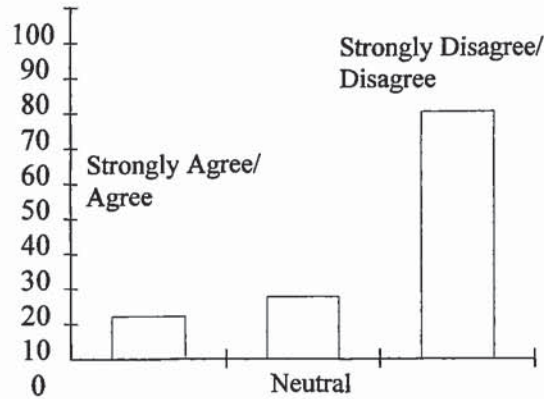
This factor applies to only a fairly small percentage at GPTL and data cannot therefore be classed as representative or meaningful in the context of the workforce in general.



**Figure 7.23 Question Number 12**

Factor 10 Reporting of Accidents and Near Misses

11 Near misses are always reported



**Figure 7.24 Question Number 11**

The aspect of non-reporting of near misses may reflect poor ownership of OSH at shop floor level and also a perception of the whole exercise being futile in terms of effect. This aligns with qualitative interview data at 5.23, 5.14, 7.12 and 7.23.

This then completes the primary data gathering and experimental section of the thesis. The next chapter looks at the varying OSH performances of the four shifts within the facility.

## CHAPTER 8

### ACCIDENT RATE ANALYSIS

#### 8.1 Introduction

During the course of the research a pattern began to emerge of a higher than expected accident rate on one particular shift. The purpose of this section is to suggest answers to a fundamental question – why should it be that employers in the same facility, doing the same tasks on the same shift patterns with similar geographical backgrounds have different accident rates? Recent research into the rubber industry has utilised a three dimensional model to attempt to explain the variances regarding safety performance within the sector. The three dimensions used were safety management systems, safety culture and technological risk. In terms of this recent research into the rubber industry (Bottomley *ibid.*) it was found that the three-dimensional model used could not predict accident rates as reliably as in the paper industry. One reason suggested was that the rubber industry may have some other factor(s) impacting upon accident rate when used as a measure of safety performance. This study effectively controls the variables of technological risk and safety management systems as the study is contained within one facility. By suggesting answers to the above question further light may be shed on the determinants of safety performance.

#### 8.2 Accident Rate Patterns

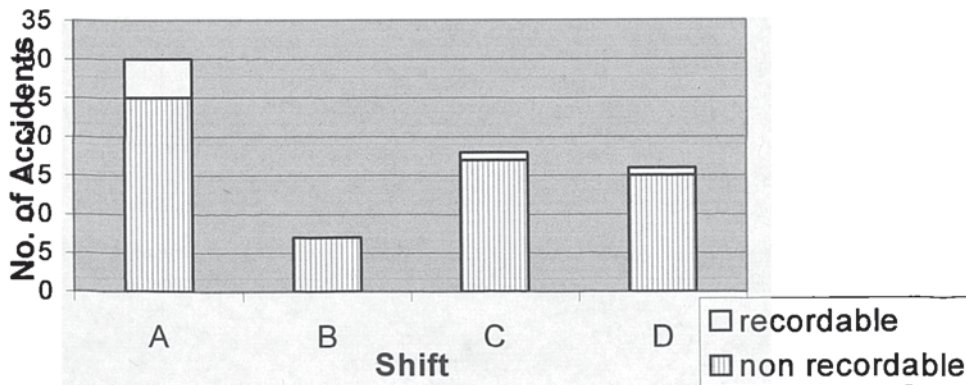
The accident statistics were analysed across the four shifts to allow comparison. The statistics could only be valid in terms of comparison for the previous three years up to 1999, as incident reporting arrangements were altered in 1996. The accident statistics are presented below (tables 8.1 and 8.2) and demonstrate a consistent pattern across the four shifts over time. Recordable accidents are accidents which are reportable under RIDDOR or require professional medical treatment other than first aid i.e. site nurse or hospital. Applying a chi square distribution test on the accident rates demonstrates that differences in rates are due to something other than chance.

**Table 8.1 Accident Rates for 1999, 1998 and 1997**

E = expected rate  
1998 - 99

Shift	A	B	C	D	totals
non recordable	25	7	17	15	64
recordable	5		1	1	7
	30 ( E 17.75 )	7 ( E 17.02 )	18 ( E 17.75 )	16 ( E 18.48 )	71
	$x^2 = 8.454 + 5.898 + 0.003 + 0.332 = 14.68$				

**Accidents per shift 1998 -99**



**Table 8.2 Accident Rates 1996-99**

Shift	A	B	C	D	totals
non recordable	70	22	58	51	201
recordable	14	1	10	5	30
	84	23	68	56	231

**8.3 Search for Confounding Factors**

The pattern across the shifts is very consistent and a realisation that there may be some confounding factor skewing the accident records/results was considered. These factors include under reporting on shift B. This was considered a possible cause for the very low rate on this shift and a tendency to report every minor incident was considered for shift A being relatively high. The mechanism for

filling in accident forms is via the first aid treatment room where the B1510 book and accident forms are located. Both of these are filled in by the shift manager and the first aider at the time of an injury. Examination of the accident book showed that all accidents in the B1510 book were transferred across for shift B and vice versa for shift A in that no accidents appeared on the form that were not in the B1510 book. Informal questioning of the managers and shift first aiders also gave consistency in following procedure in terms of reporting mechanism. There are no differences regarding loadings on each of the shifts in terms of gender. In addition the geographical origin of the operatives is constant i.e. locally recruited, which may not be surprising as manufacturing industry within the predominantly rural area is limited. The other crucial aspect is that injuries that cause hospitalisation and lost time cannot be “hidden” particularly given the physical layout of the plant and the 12 hour shift demands. The gross overall accident rate/pattern is consistent with the number of recordable injuries per shift. In addition to these factors the overall plant figures generally follow the 1:10, major: minor injury ratios given by Bird (1976). Furthermore, given the nature of the Trade Union representation within the plant, the chance of not recording an injury and thereby obviation of any claim is very slight across all shifts.

A potential reason was postulated for the differences between shift accident rates. That is, the key role of the shift manager in terms of managerial style, commitment, behaviour and communication.

Each of these will be analysed in turn in an attempt to explain the differences between shifts. The actual interview questions are in italics with responses below these. As there are only four shift managers it was felt that the data could be produced verbatim. This allows transparency of data for this particular chapter as well as aiding transparency of the research process throughout.

#### **8.4 The Role of Shift Manager**

The four shift managers were interviewed using a semi- structured interview format. The question set was derived at from the questions used in chapters five and seven with additional questions added after some piloting. The interviews were held on a one to one basis in the author’s office during normal working hours and



lasted approximately 30 minutes. Responses are reproduced in alphabetical order of A,B,C and D shift. In addition to this use is made of other measures which are useful in triangulating data, proxy measures for things such as commitment. These additional measures are derived from observations and note taking on site and also from hard data already within the company. The proxy measures are – take up of HSE inspection system, progress with shift risk assessment teams, training regimes on shifts, availability of operatives for manual handling training, utilisation of near miss procedure, production levels on shifts and down time levels on shifts. A co-ordinator is a shift manager.

### *Background of Shift Managers*

“Management trainee Post House Forte, buyer, 20 years service at GRC - lab. Tester, QA lab supervisor QA engineer, product engineer, lead assessor for QA, corporate auditor, shift coordinator for PT for just over four years.”

“33 years at GRC, all functions and products. In P.T. for 16 years as a supervisor.”

“Served my time and came in here at 20 years old. Following footwear - pots - QA dept. as a supervisor and then a shift coordinator.”

“ I started in the golf ball section in 1977 on the shop floor, moved to footwear in 1981 and became a chargehand. I then had a job offer PT. Became a chargehand and then a coordinator for the last 10 years.”

All shift managers had vast experience of at least 16 years ranging through various product lines and supervisory years of experience. Shift B co-ordinator had the greatest level of years of experience at supervisor level on shop floor (20 years), with shift A manager the least number of years of shop floor supervisor experience (4 years), C and D had similar supervisory experience levels (approx. 10 years). The shop floor supervisory experience levels can be directly correlated to accident rates.

### *How would you describe your role?*

“Shift manager basically responsible for running the place. Issues like quality, targets, safety the whole thing.

In charge of the shift - obviously to ensure everybody is working safely. Production in the cells and quality at the end of the day are the most crucial things as these make efficiency and pay the wages. You have 50 - 70 people below you each with a different personality - some you have to treat different to others. Production and targets is what managers want and we ensure it's done safely.

## Chapter 8 - Accident Rate Analysis

Running the shift ensuring targets are met and the units working. Take to do with work loads, absence safety make sure no short cuts are taken.

Role of the coordinator is to supervise the daily running of production, get the figures, targets and ensure a quality product. We also ensure this is done safely and training adhered to.”

Shift managers viewed their role as shift manager with emphasis on production, targets and customer care. However, a wide holistic approach to shift management was present e.g. managing certain individuals, safety, planning, scheduling generated a role pre-dominated by “fire fighting.” This is perhaps not surprising and is consistent with the hardware issues and measures that tend to dominate plant activity.

*How do you feel we are doing at the present time regarding safety performance?*

“Safety performance is not where it could be or should be. Prior to you showing accident figures about a year ago I would have said we were good.”

“Okay, quite good, much improved since say ten years ago. Twenty five years ago safety was never spoken. We aren’t there yet but we are getting there.”

“Good (no hesitation) compared to where we were.” (across road)

“Very good apart from this morning obviously” ( minor incident ).

*Do you feel that our position has changed in the past few years?*

“Better over the past few years - the ongoing increase in awareness at shop floor level. As lab supervisor I became aware of the law and the HSW Act with criminal liability. In the past and perhaps now the training wasn’t always up to scratch - showing bad habits, etc. I tell new starts that they will go home the way they come in - in one piece!”

“Well compared to across the road...we are much improved because of legislation management now have to take it all on board. Driven by the law.”

“Definitely it’s more and more in people’s minds they don’t do silly corner cutting any more. The guys come forward with safety things. The targets aren’t too high to cause safety to suffer.”

“We’ve got systems in place because of legalities - they’re needed now.”

C and D shift managers unhesitatingly stated safety performance was good. The manager on shift B was more reserved with shift A manager the most cautious of the four. All stated there had been a marked improvement over the past few years, making reference to conditions in the “old plant” and the need to comply with

legislation, perhaps reflecting the hardware/engineering focus taken by the plant in general. The views are consistent with the management team views cited earlier in chapters five and seven.

*What do you think are the priorities for the company?*

“In here - profit probably. We are also very big on image across the whole shooting match. Although this has tended to breed an approach of doing the right things for the wrong reasons - just to get a badge or stamp - not really meaning it.”

“Making money and profit at the end of the day. It’s the Tomkins way and others and it’s the bottom line with XXX, (plant director) Tomkins obsession with the profit must cascade down. If a company doesn’t produce it’s cut out of the business and sold.”

“Making it’s goals - things are customer driven and quality. It’s got to be customer driven with the focus on quality and quantity.”

“The priorities for the company are health and safety of the workforce obviously. But the biggest is the customer and customer service. Targets and profits are big as well but the customer is all.”

Again the first level business issues tend to dominate the thought processes of the front line managers, with the aspects of production, profit and quality obvious.

*Do you feel safety is a central business issue?*

“I would say its more of a support function, but it is on the up in terms of certification, ISO 14001 and such. The way quality was ten years ago.”

“Not really – should it be ? – I don’t know.”

“ It’s there but not a central thing. Our biggest pressures are to hit production targets and produce good gear”

“Well he comes down in the morning to see the production figures – he’s not really bothered if anybody is injured, unless it’s really bad.”

*What do managers pay attention to most?*

“No real dealings with the managers’ team. For XXX and XXX it’s cost -effectiveness and profit equals more browning points. For production manager he has to report production, scrap and profit levels up the tree.”

“Customer satisfaction which covers targets and that. JIT - the OE companies are the big profit customers that we require to listen to and we must deliver.”

“Manufacturing performance although XXX is a people person. Image right for customers. But we aren’t often picked up on safety issues - except by XXX ”

“Downtime and targets. That’s what’s in the office next door, first thing, that’s what they (managers) always head for. ( targets from night shift ) We should be 95% of our targets and XXX at half past eight that’s the way it’s driven.”

*What are the biggest pressures you feel?*

“Responsible for the smooth running of the place - the whole lot comes into it. Man, method, machine, etc.

“We are fire fighting all the time with break downs and chasing your tail. Chasing schedules compounds to maximise production and minimise down time. That’s what’s on the daily charts.”

“Manning levels on the unit, call offs are my biggest headache although trained operatives are okay but they aren’t as slick as the cell ops. My mind is set up to get output levels by juggling the manning about. We take from the smaller money cells to get the bigger cash cells.”

“Keeping the whole place going and ensuring product gets out the door”

Company priorities were cited as “profit and targets” consistently across the shifts.

In terms of pressure for managers the largest amongst a competing number was customer care, which incorporates targets and down time. One reason for these priorities may be the perceived Tomkins Plc approach of buying and selling companies according to profit levels.

*What do you feel are the key things driving safety?*

“Internally it’s driven from the middle and not the top. Tends to happen for the wrong reasons legal.”

“Well when we moved we got hit by legislation. It’s government and legislation - can’t think of anything else.”

“Individuals like yourself. But mainly legal issues - doesn’t really come from management as such.”

“Legislation drives it. We are more open but communication on safety could improve.”

The law was cited by all four managers as the sole driver for safety. Perhaps unsurprisingly, this reflects workforce and management views as well.

*What about trade unions in general?*

“Not as much as used to - they have got a place. I’ve been lucky on my shift and have level headed stewards unlike the others.”

“Well trade unions are only as strong as the work force. Here there not clued up for their job. They don’t get facts right and end up getting shot down.”

“They are without doubt the worst union reps I have ever seen. I would hate to be in the union and have them representing me. There are too many with a chip on their shoulder against the company. They are much weaker than they used to be but that’s because of who is in them.”

“Trade unions have no power at all. The four shop stewards are very poor all round but particularly on communication and person skills.”

With the exception of shift A, all managers were scathing on the competence of the union representatives. Shift A recognised that he had landed lucky with fairly competent Trade Union representatives. In terms of power the unions were viewed as powerless, maybe due to lack of competence from the representatives.

*If any changes were to be introduced what do you think would be the major obstacles?*

“People don’t like the changes but all have gone through having said that. The key is to avoid confrontation and let change ease in, letting them know what is going on does help, although we have some improvement to go in this area.”

“Some don’t like change and have an aversion to it. The lot from the old plant with 15 - 20 years experience have chips on their shoulder and are just anti-management, a them vs us. Self centred. The new starts in this environment have a new culture. A lot of the younger ones are tradesmen and that - switched on. Here and across the road is day and night changing their attitude is very difficult, it does spill into the younger ones and affects them”

“Proving it works via briefing and explanation usually means it will happen if we talk first it’s easier. Biggest obstacle is getting our message across - they never ask opinions on layouts etc. The shop floor have done the jobs for years they know what will work. Instead we have shop floor asking “Why have you done this”.

“The operators have changed and there are few groans now. They know they are making a good living and the customer pays the wages. Very few obstacles to change. Ten years ago there would have been great fighting for any change at all. The old hands you see - the recruitment policy and age limit means people appreciate their job and cooperate.”

The fact that major changes in process technology and work methods had taken place were recognised, but in terms of obstacles managers made reference to the old culture from the other plant. It would appear then that the brownfield culture transfer referred to by Kirk, Hunter, and Beaumont (ibid) may indeed be the case. Poor communication was also cited by two managers along with a lack of shop floor involvement in general as potential obstacles.

*What do you think is the main cause of accidents?*

“Familiarity and a lack of care. Perhaps fatigue from 12 hour night shift. Lack of concentration. I don’t think things can be 100% safe - can they?”

“Carelessness. To be honest most are cuts they admit themselves they are stupid. Lack of concentration.”

“Carelessness is the main cause - operator error - they are all trained.”

“The main cause is human error trying a short cut. You see certain individuals flap on a day to day basis. These tend to be the older guys - they’re no spring chickens in their mind and try and short cut to keep up or exceed the younger, generates a flapping nature becomes part of their make-up then, you see.”

Carelessness was quoted as the primary cause of accidents by all shift managers, with fleeting mention of other issues such as tiredness from 12 hour shifts patterns and complacency. Perhaps this reflects the underlying blame culture and is consistent with views given by managers and shop floor operatives.

*How would you describe your working relationship with the shop floor?*

“Reasonable-ish. I try and give respect and freedom and hope I get respect back. There are certain ones I have to chase but that’s a historical thing and tends to be those who have been here a while. They are tied down more to the machine and can’t wander off to have a fag. The whole philosophy across the way was the British Leyland one - well I turned up I don’t need to work do I?”

“Reasonably good - couldn’t work with everyone the same way and I don’t expect to be everybody’s friend but I would say it’s above average. For management – non existent.”

“Fairly well with them. I have the odd moment but that’s because of the mix of people.”

“Respect for them and them for me. I have a very good working relationship with them. The odd time they have had words but very rare. Tell them what I need and they do it.”

Both A and B shift managers described their working relationship after careful deliberation as “reasonable”, C and D managers described their working relationship as good.

*What do you think of levels of trust are in the organisation?*

“Between shopfloor and me a lot I would say as I don’t lie to them. But take all things it’s on a sliding scale. For management – well there is none now is there ?”

“Between me and shopfloor is low. Some I trust others I don’t. Management and operatives a big no.”

“Trust is very good they know they can approach me about anything and to be fair they do this. They don’t trust management and it’s because of a lack of communication a them versus us. You will never get that divide away. The MD doesn’t mix with shopfloor and he didn’t come up through the ranks he was time and study. So that’s always been there - this friction with shopfloor and managers.”

“Good at shopfloor with me. Management and shopfloor perhaps no, as certain individuals are always going to be anti-management. But the majority are quite happy. In “C” shift things are different as they have a sheep syndrome - they tend to be quiet natured and are easily led.”

Both C and D shift managers felt that levels of trust between themselves and the shopfloor were good. Shift A manager felt that trust levels were variable but good

with Shift B manager feeling levels to be low. Trust between shopfloor and management was deemed by all managers to be non-existent.

*Do shop floor guys approach you with safety issues?*

“Yes but it tends only to happen during an audit or briefing which is disappointing. Often think they could have said things earlier.”

“Now and then but perhaps not as often as they could. Some operators will phone the filters others will not.”

“Yes more so since you put out the hazard/near miss forms. In other cases they will wait until an assessment or an accident and they you find out. The mentality of a lot of individuals is just looking to the next break unless it really affects them, the majority wouldn’t say though.”

“Yes (no hesitation) Take Delta this morning for example.”

*Do you pick individuals up on safety issues?*

Yes, at times in the past they have been warned but not often. Don’t need to keep on top of them.

Yes, but it’s very rare indeed.

Yes, now and then as it there’s a short cut they’ll take it.

Yes - safety glasses, shoes, etc.

Perhaps predictably all managers stated that they pick operatives up on issues of safety. However in relation to approachability from shopfloor operatives on safety only in shift D was the manager approached, on the other three shifts this only occurred during inspections.

*Do you think there is much value in the near miss form?*

“Folk don’t use it because of complacency. It’s just another bit of paper.”

“Haven’t seen a near miss form in action. Perhaps they don’t recognise it as such or they just get a fitter to fix it.”

“Very rarely get a near miss form filled in. Usually they will approach a fitter as they know how it’s happened and how to cure it. The other thing is it’s just a form - another one to get ignored and forgotten as a paperwork exercise. For many the mentality is I am in to do a job I get switched on and do it and nothing else. You must tackle these guys differently from the others. The old hands tend to just be anti-management, there are many boys who have been here for twenty years plus. You have to think what they are thinking and keep them apart from the younger crew in case they contaminate them. There is the odd very good old hand though.”

“A lot of people are taking it on board I would say half fill one in and the other half I have to prompt. Much more could be filled in but I would rather they said to me much earlier.”

Only shift D consistently filled these forms in and the manager felt that it had value. When asked why these were not used on other shifts reference was made to a “switched off mentality”, of the withdrawal type identified by Hunter and Beaumont (ibid). Also at this point comments were again made regarding the poor mind set or culture from older hands almost infecting the new starts.

*What do you think of the monthly inspections?*

“We have good reliable folk and it’s working. But I can see it getting really disheartening as I see nothing for Twin Power, QA or Delta being done. Even something small would help or it’s just a paperwork exercise.”

“They’re being done but to be honest who looks at it. It’s viewed now as more paperwork hitting the desk - you tend to get de-motivated repeating the same things that need fixed.”

“They’re good enough as it keeps a dept. on it’s toes. Reporting things again and again 3 - 4 months later is depressing. Perhaps there is a lack of resources but there’s a lack of action.”

“They do good and guys approach me when I am doing them. It means there is some activity every week on every shift for safety. All get a copy but there is a lack of respect for them from certain quarters - to go back four months later and find the same fault it frustrating.”

Shift D shift manager felt that these were a worthwhile and valuable exercise, but were showing disillusionment with the system of inspection. This was because of a perceived lack of movement on corrective actions.

*What about the risk assessment forms?*

“This is a good exercise rather than the safety officer forcing it on them. It creates good involvement and trust. Far better asking the man on the shop floor the problem. Although some findings can be unpopular for example in finishing.”

“It’s a good idea but we have only had a couple. It’s difficult with some to get them to do anything that’s not their job.”

“Yes it has real potential but the general feeling it’s only a paper exercise - all the guys - on shift, the assessors believe that. It’s probably due to communication and not feeding back results. They need to be seen to work or the guys will lose heart ”

“It’s a good idea but I don’t know how seriously it can be taken if management don’t back it. May be brick walls coming up?”

*Why do you think the accident rates are like this? (show statistics)*

“Could be age imbalances. B was my shift and is loaded with young people under 35s, who want to keep their job.”

“I don’t know but I am glad we are the best. The attitudes of a lot of the younger ones is better. Jobs around this area paying the sort of money these guys get are rarer than hens’ teeth. When the younger guys get one they want to keep it and it shows in their attitude I suppose”



“Shift B was a new shift put together with a great deal of new blood in it, that’s probably why. As far as A is concerned nobody will touch it on the ACLAS and targets versus production , maybe this is why safety is poor – I don’t know”

“They are probably under-reporting. Or else (after much thought) B shift had good trainers and a lot of the older hands weren’t present in the same numbers as A, C and D - we probably have a mix with B having more younger people.”

After some thought the four managers all concluded that the differing rates were because of different age profiles and how long operatives had worked in the plant. It was also pointed out that when conversion to a four shift pattern occurred the shift with the lowest accident rate was filled by new recruits i.e. under age 35 years.

*What do you think of discipline in Safety matters ?*

“I think we should come down much harder. We have started a file noting them. Tends to be a case of there’s a band aid and there’s sympathy as well even when it’s blatantly his fault.”

“Not a nice route as it means you have failed to reach this. But at the end of it, it is an option.”

“Never seen the need to do it. Some of the older guys get file noted every 3 months and time themselves when these run out. It’s only held for 3 months you see.”

“I suppose it’s got a place but I have never needed to use it and thinking back I can never recall the need to use it.”

Before drawing the above information together and in addition to the interview data, the following proxy measures are used to help buttress and support the above.

## **8.5 Proxy Measures**

### **8.5.1 HSE Inspections**

A schedule of monthly inspections was formulated during October 1998 and inspection teams set up in each of the four shifts. These were led by the shift manager and one or two operatives. The level of ownership into the procedure varied across shift. Shifts C and D after eight months into the inspection programme had completed all inspections on time. The level of detail and follow up of corrective actions was also higher than on A and B. Typically C and D shift would append a page or so of corrective actions and assign responsibility noting what they had closed out during the inspection, this was then copied to the relevant manager. A and B after eight months tended to be late completing the inspections,

these were not detailed in content and totally missed one each. These inspections were not copied to managers,. During this period the author had to cajole these shifts into doing inspections, combating comments of “time consuming” and “too much to be covered in each shift”.

### 8.5.2 Skill Levels

During the course of an accident investigation which happened on shift A. The possibility of moving a certain operative to an alternative work cell had been suggested. However, the managers in A and B shift had taken the conscious decision not to multi- skill operatives as a matter of course. In contrast on C and D levels of multi- skilling were much higher allowing more flexibility in terms of operator movement. This may be an indirect indicator of a lack of willingness to invest time in the people element by the shift manager.

### 8.5.3 Commitment to Risk Assessment

In a similar vein to HSE inspections, risk assessment teams were set up in each of the four shifts. An assessment schedule had been set and comparison made against this with each shift as at June 1999. At the point of interview each shift should have assessed three areas.

Progress illustrated below.

Shift A –One cell partially complete, no others started.

Shift B – One area partially complete, no others started.

Shift C –Three complete.

Shift D –Three complete.

### 8.5.4 Safety Forums

Safety forums which were essentially set up as safety circles were established in each shift. These consisted of five operatives and the shift manager to ensure an even coverage and representation of all work areas. Shifts C and D had little difficulty in recruiting operatives to sit on these. In contrast A and B shift had great difficulties, with A shift in particular being very apathetic and reluctant during any meetings or assessments. Comments like “waste of time nothing will change” and “I haven’t really time for safety stuff like this “ were accompanied by looking into the air and taking two steps backward, disengaging themselves from assessment

activities in production areas. In addition shifts A and B could not get operatives to volunteer to be manual handling trainers to allow cascade training to occur. Manual handling on these shifts was completed by trainers from C and D. This measure may be a proxy for communication levels between operators and the shift manager and / or workforce commitment to safety.

### 8.5.5 Downtime and Production Levels

Downtime is less on shifts A and B than on C and D with corresponding higher levels of production in shift A than on B,C and D. Actual levels are confidential but they follow the pattern stated. This may illustrate a pre-occupation with production i.e. task orientation rather than people orientation.

### 8.5.6 Near Miss System

Differences in the take up of the near miss system differed markedly across the shifts. In the first eight months after the system was introduced the take up was as follows:

Shift A – zero

Shift B – one filled in following suggestion from production manager

Shift C – three filled in and corrective action completed

Shift D – eight filled in and corrective actions completed.

This may reflect either better communications and/or more manager commitment on C and D shift.

The proxy measures can be taken on board and by utilising the interview data above shift differences can be illustrated. The high rank i.e. one is given to the best example and the lowest rank i.e. four is given to the worst example, relative to each other. One would expect that the highest ranked shift co-ordinator would have the best OSH performance and vice versa.

**Table 8.3 Shift Manager and Key Parameter Relative Rank**

<i>Shift</i>	A	B	C	D
<i>Parameter</i>				
Commitment & Behaviour	3=	3=	2	1
Communication	3=	3=	2	1
People Orientation	3	4	2	1
Task Orientation	3	2	1=	1=
OSH Perceptions	No Difference			
Experience Levels	4	1	2=	2=
Company Priorities	No Difference			
OSH Drivers	No Difference			
Trade Unions	No Difference			
Obstacles to Change	No Difference			
Accident Causation	No Difference			
Working Relationship	3=	3=	2	1
Trust	3	4	2	1
Approachability	2=	2=	2=	1
Skilling Levels	3=	3=	1=	1=
Sum Rank	27	25	16	10
Accident Rate 1999	30	7	18	16

In an organisation with an hour glass profile in terms of hierarchy one would expect the shift manager to have a key role in influencing OSH performance. Although there is some degree of correlation in the above table it appears that certainly in shift B manager characteristics are not a good predictor of accident rates. In addition to this the shift managers were changed in the Summer of 1997 with no real effect either way on accident rate. That is A changed to B and vice versa and C changed to D and vice versa – the actual personnel below them remaining the same.

This points to the other potential reasons being contributory factors and certainly the implication from the shift managers is that “older culture” and / or service years may also be an influencing factor.

In summary then the variances in OSH performance between shifts could not be readily explained by the variance in the core characteristics of first line management. What was alluded to in the qualitative data in chapters five and seven appears to hold true in that shift managers have little influence. An OSH initiative appears to be heavily influenced and directed by the overall culture within the organisation. Delivery of first level business issues appears to dominate all aspects of first line management and plant functioning. The data above would suggest that first line management’s effect on OSH is fairly minimal in terms of determining OSH performance.

## CHAPTER 9

### OSH MODEL OUTPUT - SAFETY PERFORMANCE 1998 – 2000

#### 9.1 Introduction

The purpose of this chapter is to look at the output of the potential OSH model of change. The model outlined in chapter three predicts that for a particular process, in this instance BS 8800, a resultant output will occur subject to influencing factors, the output in this instance being improved OSH performance. Did the process produce a change in OSH performance? To answer this reliable measures of OSH performance were required. Accident rates were used as a primary measure, however, other measures will be used, as a reliance solely on accident statistics may be misleading due to their sometimes random nature. A combination of measures is therefore detailed – namely close out of risk assessment, accident statistics, manual handling progress, progress on rubber fume, progress on machinery guarding, Personal Protective Equipment (PPE) usage, housekeeping, adherence to rules and fire precautions. Aspects such as PPE use were easily tracked by walk through style inspections and note taking in a similar vein to chapter six.

#### 9.2 Risk Assessment Close Out

The graph below is taken from the risk assessment programme used on site and essentially gives a risk profile for the site. A programme of risk assessment was ongoing throughout the research as required by the Management of Health and Safety at Work Regulations 1992 and subsequent revisions in 1999 (HSC 1999). A simple risk evaluation calculation was used to make assessment straight forward for shop floor operatives to participate. Risk here is simply a case of probability and severity combined on a sliding scale of zero to ten, with ten as high. The risks itemised below are a combination of general risk assessments and manual handling risk assessments. For both of these a scale where zero – thirty is low, thirty to fifty

nine is medium and sixty plus is high was adopted. On the graph below the risk profile from 1998-2000 during the period of the research can be seen. The aim is to move the columns left and reduce the actual numbers themselves in the medium

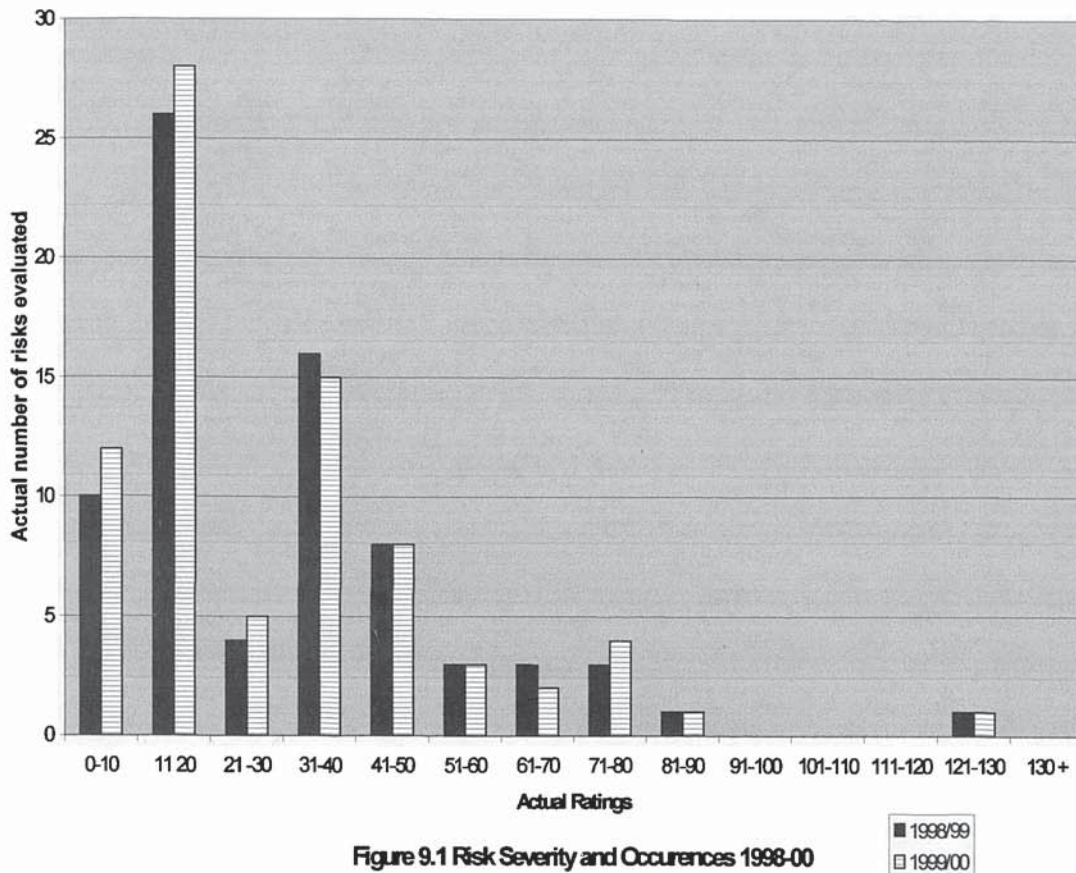


Figure 9.1 Risk Severity and Occurrences 1998-00

and high categories. In terms of close out and movement risk profile remained fairly static. That is there was little movement in overall risk reduction as can be seen below :

### 9.3 Accident / Incident Rate

Accident statistics are presented below for the site. This incorporates the two years of the study as well as the previous year to allow comparison. The U.S. OSHA (Occupational Safety & Health Administration) definition of a recordable incident is used, whereby if an incident causes lost time or medical treatment other than first aid then it is recordable. What can be seen is a fairly static picture with the

## Chapter 9 OSH Model Output - Safety Performance

exception of the numbers of days lost in year 1999-2000 where these have increased substantially. This is primarily due to two incidents in year 1999-2000 - one a manual handling injury and the other the near fatality.



Table 9.1 Accident Statistics 1997-1998

Month	Hrs. Work. Record.	1997-98					Accum. Hrs	
		Record. Acc.	Acc. Rate	YTD	Days Lost	Sev. Rate		Minor Acc
Oct	62829	1	3.3	3.2	6	19.4	7	62829
Nov	60528	Nil	Nil	1.6	Nil	Nil	6	123357
Dec	55998	Nil	Nil	1.1	Nil	Nil	3	179355
Jan	55500	3	10.8	3.4	11	39.63	5	234855
Feb	56686	1	3.5	3.4	54	141.12	8	291541
Mar	58000	Nil	Nil	2.8	Nil	Nil	7	349541
Apr	51317	Nil	Nil	2.5	Nil	Nil	2	400858
May	60298	1	3.3	2.6	0	0	9	461156
Jun	54192	1	3.7	2.7	0	0	5	515348
Jul	44850	0	0	2.5	0	0	7	560198
Aug	40178	0	0	2.3	0	0	2	600376
Sep	64198	0	0	2.1	0	0	5	664574
Totals		7		2.1	71		66	

Accident Rate is No. of Accidents x 200, 000, divided by hours worked.  
 Severity Rate is Days lost x 200,000, divided by hours worked.

Table 9.2 Accident Statistics 1998-1999

Month	Hrs. Work.	Record. Acc.	Acc. Rate	1998-99			Days Lost	Sev. Rate	Minor Acc	Accum. Hrs
				YTD	YTD	YTD				
Oct	61729	1	3.2	3.2	10	32.4	7	61729		
Nov	58880	Nil	Nil	1.6	Nil	Nil	6	120609		
Dec	54528	1	3.7	2.2	8	29.3	2	175137		
Jan	53990	Nil	Nil	1.7	Nil	Nil	4	229127		
Feb	60956	Nil	Nil	1.4	Nil	Nil	8	290083		
Mar	54136	1	Nil	1.7	Nil	Nil	7	344219		
Apr	55666	1	3.6	2	4	14.4	5	399885		
May	60234	1	3.3	2.2	2	6.6	6	460119		
Jun	56500	Nil	Nil	1.9	Nil	Nil	9	516619		
Jul	44854	Nil	Nil	1.8	Nil	Nil	4	561473		
Aug	40642	Nil	Nil	1.7	Nil	Nil	5	602115		
Sep	60752	2	6.6	2.1	19	62.54	8	662867		
Totals		7		2.1	43		64			

Table 9.3 Accident Statistics 1999-2000

Month	Hrs. Work.	Record.	Acc.	Acc. Rate	1999-00			Days Lost	Sev. Rate	Minor Acc	Accum. Hrs
					YTD	YTD	YTD				
Oct	63489	1	3.2	3.2	3	9.5	1	61729			
Nov	60928	1	3.3	3.9	30	98.4	6	102941			
Dec	55988	0	0	2.2	0	0	5	158929			
Jan	60000	0	0	1.7	0	0	2	218929			
Feb	56686	0	0	1.3	0	0	3	275615			
Mar	58123	1	0	1.7	11	37.9	3	333615			
Apr	55278	2	7.79	2.4	4	14.5	1	384932			
May	60712	1	3.3	2.5	44	145	7	445166			
Jun	55000	2	3.6	3	42	152	3	500166			
Jul	44800	0	0	2.1	0	0	6	544966			
Aug	40786	1	3.6	2.9	5	24.5	4	585752			
Sept.	61758	1	3.2	3	14	45.3	7	647510			
Totals		<b>9</b>		<b>3</b>	<b>149</b>		<b>48</b>				

On the whole the nature of the accidents did not differ to any real extent over the two years of the study as well as the year previous to the study. The composition of the incidents tended to be primarily manual handling in combination with two or three cases of broken fingers per year.

The manual handling incidents tended to arise from relatively very heavy lifts as opposed to cumulative strain from repetitive light lifting. The broken fingers arose from machinery accidents involving in running nips and unguarded pulleys.

### **9.4 Fire Precautions**

In October 1998 key areas were identified for risk control and in particular with regards to solvents. Historically, the adjacent sister plant had a fire in one of their stacks as well as a major fire in a storage hangar. There had also been two lesser fires at GPTL in the grinding areas where belts are finished. A core risk control was to ensure effective segregation of materials with flammable liquids, in particular where coating operations were carried out. This area held two 25,000 litre underground storage tanks as well as up to 40 x 200 litre drums of solvent. The solvents were mostly methylethyl ketone (MEK) , toluene and isopropanol.

The core risk controls included : separation distances from the building , segregation into intrinsically safe zones with explosion proof motors and electrical installations, non- storage of solvent drums on top of bulk solvent tanks and minimising solvents at the main processing area. All of these controls were dictated by company insurers. In addition to these there was also a constant monitoring system on the coater ovens which tracked the the Lower Explosive Limit and shut down at 45% LEL. In October 1998 up to thirty empty and half empty flammable solvent drums were stored on top of the bulk solvent tanks. Despite repeated requests this situation remained unchanged. Solvent storage in 1998 was poor in terms of segregation of flammable and non- flammable zones and again this did not change. In the words of a team leader “we all know they shouldn’t be there but this is where we are told to store them. I don’t want to be here if this place does go up”. The LEL monitoring system was always run at just

below automatic shut down. Implementation of controls showed no change over the course of the study.

### **9.5 Machinery guarding**

In October 1998 there was a great deal of exposed machinery covering most of the hazards identified in the guidance contained in BS EN 292 : 1991 Part1 and Part 2 (BSI 1991). In essence the standard of machinery guarding was not compliant with either of these standards nor with the Provision and Use of Work Equipment Regulations 1998. In the rubber industry in-running nips between steel rollers and between rollers, pulleys and materials are common hazards. In 1998 there was a total of eleven partially unguarded building lathes. These are used for winding cord onto individual moulds and are guarded by light curtains or pressure pads in other European plants. It took eighteen months of persuasion, an improvement notice and a near fatality caused by entanglement for a light curtain to be wired in at a lathe for trial. At the time of write up (October 2000) it has yet to be actually commissioned, four months after wiring in.

No other lathes were scheduled to be guarded. Of the twelve sets of exposed pulleys none had been guarded after two years, despite the guard merely being metal box section frame and steel mesh with interlock access.

Additional guarding was installed on an extruder, two calendars and a two roll mill after the author condemned them following an enforcement authority visit.

### **9.6 Rubber Fume**

Rubber fume has long been recognised as a carcinogenic substance within the rubber industry (HSE 1994). Fume has been assigned a Maximum Exposure Limit (MEL) of 0.6 mg /m<sup>3</sup>. Levels of fume within the plant in 1998 were in the order of one half to two thirds of the MEL with the occasional result over 0.6mg/m<sup>3</sup>. The crucial aspect was that the facility was not compliant with the Control of Substances Hazardous to Health Regulations (COSHH) as there was no control of

any kind on fume. The result of this was a permanent blue haze over the main production area. A warning letter from HSE in December 1999 saw some investment to improve general ventilation but with no LEV at source. Rubber fume monitoring results remained unchanged from 1998 - 2000.

### **9.7 Manual handling**

The rubber industry has historically been a heavy and dirty industry. A programme of manual handling assessments were undertaken in October – December 1998 the result of which was a list of high priority/risk activities. Handling reels of rubber up to 60 kilogrammes was undertaken along with manually moving car engine blocks and sheet metal. As a result of this an overhead crane was purchased which eliminated moving engines and sheet metal. (This is Research & Development section which reports directly into Belgium). It was only after an HSE inspector asked how a 39 kilo roll of rubber was put onto a pin above head height that action was taken. This action was only taken in this area and this practice still takes place daily in other areas as at October 2000. Perhaps more fundamentally an operator lifting a metal plate from a vulcaniser tore ligaments in his lower back. The weight was 13 kilo and had to be lifted straight legged at full extension with a straight arm lift. The operative was absent for 6 months and when he returned was put back to the same job doing the exact same task unaltered since his absence.

### **9.8 Usage of PPE**

PPE on site consists mainly of protection against chemical hazards. These can be summarised:

- Safety glasses to guard against toluene splashes.
- Chemical suits, half mask respirators gloves and visors to guard against vapours and splashes from coating mixtures.
- Gloves to prevent skin damage from solvents when screen washing.

## Chapter 9 OSH Model Output - Safety Performance

In addition to these – yellow lined walkways in production areas equates to mandatory safety footwear. Wrist bands are also worn to guard against burns when accessing vulcanisers. There were also two hearing protection zones with noise levels of a constant 104dB(A).

In 1998 the rate of wearing safety glasses was approximately 60%. On a simple walk through survey this had increased to 70% in 1999 and 95% in 2000.

PPE wearing for chemical coating purposes had been at 95% in 1998 and remained at 95% in 2000. Similarly with nitrate gloves it was difficult to find a non - wearer in 1998 and this remained so in 2000.

Safety footwear amongst shopfloor workers was typically 100% in 1998 and remained so in 2000.

Hearing protection zones gave 100% use in 1998 and 2000, however these areas gave 104d B(A) and not wearing PPE would be painful on the ear.

Arm and wrist band wearing was typically 50 – 60 % of all possible in 1998 and stayed at this rate over the two years.

The only real change came in wearing of safety glasses which was due to disciplinary action against certain individuals.

### **9.9 Housekeeping**

In the area of housekeeping this has partially been covered in fire precautions. Other aspects including silicone on floor areas, waste containment, material storage protruding into walkways and across fire exits showed no real improvement over the two years. This aspect was picked up each time by insurance inspectors

“housekeeping compared to other Gates plants is standard but compared to plants outside your group I cannot give it a good category – it hasn’t really improved”.

### **9.10 Rules**

Safety rules at GPTL, Dumfries with regards to safety are not as numerous or onerous as in other industries, say the chemical industry. However, key ones can be identified:

- With toluene vapours at or above the OES of 50ppm control was mainly to eliminate fugitive sources from containers. Closing of toluene containers remained poor across the two years with typically 50% of containers open and a constant heavy odour in the finishing section.
- Rules were devised for working at height. Generally these were followed in 1998 with the notable exception of balancing on a crane track six inches wide and fourteen feet from the floor. In October 2000 fitters still tried to balance on this instead of using a “cherry picker” as the agreed access. This happened in full view of an Engineering Manager on one occasion without any recourse.
- A no neck ties rule was introduced in 1998, where by neck ties were removed due to the entanglement hazards from exposed lathes and pulleys. This was introduced in October 1998 and at first proved difficult to enforce but over time became accepted. With exception of the site director and certain senior managers who repeatedly ignored it.

These above measures have tracked the OSH performance of the facility over the course of the research and the conclusion to be reached is that OSH performance improvement was not delivered. Within the plant it would appear that the organisational culture and the poorly developed safety culture contribute heavily to OSH performance.

### **9.11 Safety Culture and its Role in Incidents**

The role that safety culture played in incidents was fundamental. Thorough analyses were undertaken of incidents during the period of research showing the major effect that safety culture had in propagating incidents. Two are detailed below for illustration.



## Chapter 9 OSH Model Output - Safety Performance

Within the research period there were a number of incidents and accidents that occurred which are illustrative of the culture not only within the plant but also within the Gates group.

The first accident that is detailed happened in the initial part of the production process where fabric is impregnated with rubber cements. This process involves coating nylon fabric with rubber that has been dissolved in solvents and passing this through ovens, approximately thirty five metres long, where the solvent is “flashed off”, leaving the rubber impregnated into the fabric. The fabric is mechanically pulled through the ovens from the exit side of the ovens by a system of mechanical wind ups, very similar to those used in the paper industry. A powered central spindle winds on fabric into a roll weighing approximately five hundred kilogrammes. When the fabric roll reaches its desired weight the whole wind up mechanism rotates and the empty spindle rotates one hundred and eighty degrees to take the place of the previous spindle and continues winding up fabric from the roll. In essence, there is a wind up mechanism which pulls fabric through the ovens, with the wind up mechanism rotating periodically to ensure a continual winding up process. There are two such coating lines side by side.

The Gates group have a very similar piece of coating plant in one of its Japanese plants. In August 1999 in Japan, an operator entered the area where the wind up mechanism was housed and it rotated. (The cause was only related to the Dumfries site HSE advisor at a much later date). This rotation caused the operator to strike the concrete floor sustaining head and neck injuries from which he died. The Health, Safety and Environment Advisor in Dumfries first knew of the incident when an e-mail was forwarded from the Dumfries Plant Director two weeks after the event. This e-mail was from the Chief Executive Officer of the Power Transmission Division and consisted of a lengthy discussion on how Far East Operations were being compromised as the Japanese coating plant had been closed by enforcement officers. The whole focus of the e-mail was on production

## Chapter 9 OSH Model Output - Safety Performance

problems with a casual mention in two lines that the employee could be dead but he was not sure.

The Plant Director from Dumfries was instructed to go to Japan and gauge how much of the Japanese plant output the Dumfries facility could soak up. This visit to Japan was three weeks after the fatality. A camcorder was used to film the whole process and in particular the coating operations which had started to come on line by the time of the Plant Director's visit to Japan. The Plant Director then returned to Dumfries and showed the video of the process to select managers. At this time the HSE advisor and maintenance manager repeatedly tried to get sight of the video and find the cause of the fatality. Three weeks after the Plant Directors return all senior managers and support staff (for example product engineering, quality, industrial engineering) had all been shown this video to help aid production methods. The three people responsible for upgrading the coating process line were the HSE advisor, maintenance manager and also the design engineer. This team finally got sight of the video and the plant director briefly mentioned that the operator had been killed in the wind up unit end. The wind up unit in the video consisted of approximately one second of a half hour video. After much searching and analysis it was concluded that access into the actual wind up area itself must have been the cause of the fatality.

Additional safeguards were designed in the form of fixed guarding and pressure pads to eliminate the risks caused by accessing this area. Two days later, before these could be machined and fitted, an operator became entangled on the wind up unit in Dumfries and was nearly hung by his neck. The operator was extremely fortunate as his shirt had become wound up in the fabric as he accessed the wind up area. His shirt became wrapped up until it went around his neck and lifted him approximately 60 centimetres or so from the floor suspended by his neck. The Shift manager happened to be walking that way and heard a scream and cut him off, by which time the operator was unconscious. If the operator had remained suspended in a very short time he would have died via strangulation. The shift manager

had not been scheduled to be in that part of the plant, and the operator was unsighted from everybody else.

The HSE advisor and engineering manager were called to the plant and on arrival the other identical coating line not involved in the incident was still operating. The production manager had also arrived and an informal meeting culminated in the production manager having to call in the Plant Director as “all other European plants production will be affected therefore he must be told.” The Plant Director came into the plant and showed great concern with the operator having “been on drugs to have done something as daft”. Following brief discussion between the two – both production manager and plant director left the site. The required fixed fencing was delivered to the site and a local engineering company called in to fix the guarding in place which prohibited access to the wind up area. The pressure pad was also fitted later on in the week after the accident.

On the Monday morning after the accident on the previous Saturday, nothing happened at any meeting to actually acknowledge that an operator was nearly killed. Nothing was said by any manager until the HSE advisor raised it with the Human Resources Manager, who stated “it couldn’t have happened to a nicer person – I don’t like him anyway.” And this was representative of the attitude by management to the whole accident. When the operator finally left hospital, he had large psychological problems coping with the episode. The HSE advisor visited his house, and witnessed a very distressed person. No contact of any kind had been made by the company to him, his wife or family. It was only when the HSE advisor advised that the resultant civil claim might be reduced if remedial action was taken regarding counselling that third party contact was made, grudgingly via an occupational health provider. The employee returned to work some six months later in what was a very high profile incident for all staff on the shop floor in terms of possible consequences and also management approach and attitude.

The second incident consists of a manual handling injury to a member of shopfloor staff. The process centres around the loading of a vulcaniser with a mould and related assembly. The vulcaniser was a fairly small one located in a small jobbing unit which was highly labour intensive, with very little automation. The actual activity consists of loading a cylindrical mould (approximately one metre in height by thirty centimetres in diameter) via overhead crane into a pressure vessel approximately thirty percent larger than the mould. To ensure a good seal and pressure a metal disc is lifted into the pressure vessel by hand and placed on top of the mould. The disc design obviates any use of the overhead crane. An operator sustained torn ligaments in his lifting back the disc into the pressure vessel and had to be taken to hospital as he could not walk.

A risk assessment had been previously carried out on the activity and it concluded that the risk was indeed high. The actual weight of the disc was fourteen kilogrammes but because of the design of the production area and the temperature of the vessel walls, the manual lift was at full extension with legs perfectly straight. A risk scoring system was used on the site to allow for prioritisation of activities and this activity was ranked high. The assessments were reviewed again and the Plant Director personally scored out the risk factor weightings which gave an overall high score and replaced them with lower scoring ones. The logic being that “low score equals low risk, equals nothing needs done.”

No follow up action was taken to improve the activity and no follow up was taken to attempt to bring the operator back to work. A very hefty civil claim was lodged for the industrial injury and the insurers pressed the company time and again to bring the operator back to work. The operator came back to work eventually and was put straight back onto the same activity that had caused his injury in the first place. Despite protestations by the HSE advisor that the operator be put on light duties to begin with, no ground was conceded by management. Perhaps predictably the operator severely aggravated the injury and at the time of write up

## Chapter 9 OSH Model Output - Safety Performance

has yet to return to work. The company are doing very little if anything to get rehabilitation and await his civil claim for damages.

What these two cases show are typical reactions to incidents within the plant. They help reinforce the data presented in the previous chapters and emphasise the key cultural characteristics within the plant. It could be contended, particularly in the first case that the culture of the Gates group and the Dumfries facility were major obstacles to improvements in safety and contributed heavily to the near fatality. A pre-occupation with production and scant regard for operator safety and human welfare are evident in both cases.

The next chapter develops the OSH model in light of the previous chapters to answer the question – why ?

## CHAPTER 10

### DEVELOPMENT OF POTENTIAL OSH MODEL OF CHANGE

#### 10.1 Introduction

At this stage of the research the question began to emerge – of the plethora of factors surely not all are equal, some must be more important than others? To answer this it is necessary to go back into the literature review and identify core factors.

This chapter identifies the core and medium level influencing factors, i.e. those that appear to be key influences. It also rates the factors to give a combined weighting and rating. By so doing the OSH model is developed and an organisational profile obtained for each of the model elements. Each of the elements in the model is taken in turn and the methodology applied. The purpose of which is to gain a better explanation of the results of implementation of the OSH management system.

#### 10.2 Development of Model Factors

##### 10.2.1 Identifying Core and Medium Influencing Factors

Core factors are simply the most prominent in the literature review and include the aspects of risk perception, communication, leadership / commitment, trust, management style, corporate pressure, legislative pressure. Perhaps unsurprisingly, these issues are core strands in ACSNIs (1993) definition of safety culture in addition to being constant themes running through O'Loughlins (1998), Bottomley (1998) as well as literature review in totality.

Medium level factors are those which are mentioned in the literature review other than the core factors identified above. Low level factors are those which remain in the model after the allocation of core and medium factors.

### 10.2.2 Rating of Factors

Each element is scored on a continuum of motivating with a positive aspect and demotivating with a negative aspect. A decision to have a positive / negative aspect was made to capture the notion of a factor potentially acting against or suffocating any momentum. The issue of how to rate or score factors was addressed by adopting an approach following the most recent research in the rubber industry (Bottomley 1998). Bottomley used a twenty three item safety culture measure (see appendix eight). This can be adopted and expanded to suit the proposed model of change and allow shifts in incentive, receptivity and ability to be tracked.

### 10.2.3 Weighting of Factors

As stated above, within the literature certain elements can be deemed core elements, i.e. fundamental to change / implementation. Others can be deemed medium level elements with others deemed lower level. A weighting of three, two and one has been applied respectively with core influences having a three weighting.

In analysing the data some methodology of weighting the elements was sought to try and highlight the main influences which may impact upon any Safety Management Systems introduction. Certain core elements naturally emerge as a result of the literature review from recent work by Bottomley (1998), ACSNI (1993), Hawkins and Booth (1998), Kirk (1998) and Wright (1998). Factors are given a weighting of three, two or one dependant upon how central they are to the argument. This loading of three to one can be justified as it appears as a common type of weighting and is used in Bottomley and various TQM assessment models (see Chapter Three). These core factors with a factor three loading are :

#### Core Factors ( x3 weighting )

Incentive - Corporate Pressure and Criminal Legislation.

Receptivity - Risk Perception, Communication, Trust

Ability – Management Style, Commitment, Behaviour

Special Factors - None

Medium Level Factors ( x2 weighting )

Incentive - Civil Claims

Receptivity - Morale, Team work, Reward / Recognition, Attitude surveys.

Special Factors – Blame Culture

Ability - None

**10.3 Input of Data into Factors**

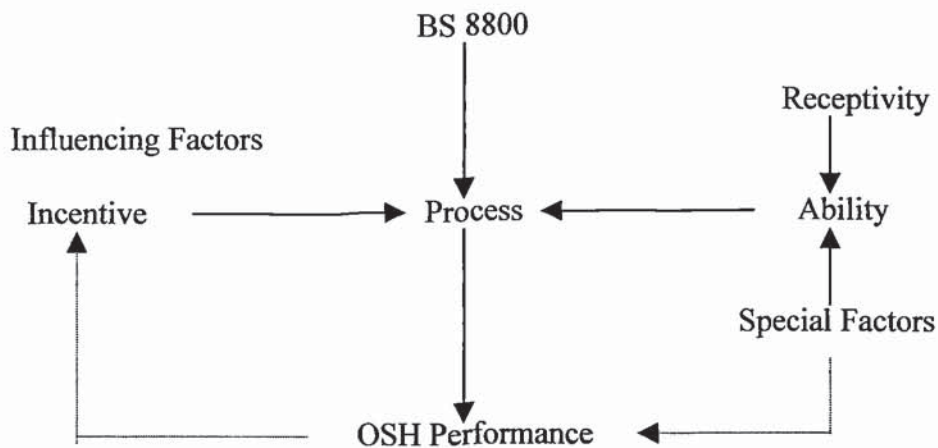
What has been developed is a model with apparently greater illustrative and explanatory powers, by fact of the development above. A decision can be made on the appropriate rating for each factor based principally on the empirical findings from the interview data sets, but also taking cognisance of the anecdotal and quantitative data sets in chapter six and appendix 4 respectively. On reaching a decision on the justification is detailed at the appropriate point below. A similar exercise was undertaken in Bottomley’s research report. For example all managers in 1998 and 2000 expressed a felt need present within the plant. That is all managers expressed the desire to be best in class. This carried a maximum rating of three and with a weighting of one, an overall score of three is gained. If a third of managers had expressed this felt need then a rating of one would have applied. This logic is applied to all factors for rating them.

**Table 10.1 Factor Development Methodology**

<b>Steps</b>	<b>Principal Basis / Anchor</b>
Identify core & medium influencing factors	Literature
Rating of Factors	Bottomley safety culture ratings
Weighting of Factors	Loadings from EFQM, TQM models
Rating of Factor x Weighting of Factor = Score for Factor	



Before moving on to look at each element in the model in turn and the various factors that make up the elements, the overall model is presented below as a reminder:



**Figure 3.2 Potential Model of OSH Change**

(from Chapter Three, page ninety eight)

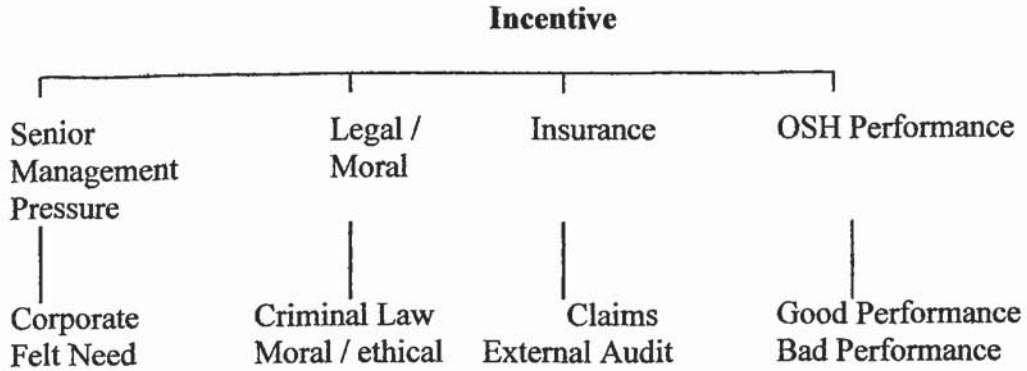
To re-iterate it can be seen that the model has the elements of incentive, ability, receptivity and special factors. These are presented below, with the developed methodology from above applied to the factors in each element. Each element and consequent data are presented as follows:

1. Reproduce element and factors and sub-factors
2. Detail key indicators from which ratings are obtained
3. Detail sources of key indicator dimensions
4. Rate each factor, deriving rating principally from interview data sets
5. Apply weightings and arrive at scoring for factors
6. Present this data in graph form.

#### **10.4 Incentive**

Incentive as an element of the model refers to the actual incentive for introducing an OSH change within an organisation. These motivators for OSH have been

identified as senior management pressure, legal / moral reasons, insurer pressure and OSH performance.



**Figure 3.4 Potential OSH Incentive**

(from Chapter Three, page ninety nine)

Each of the factors are made up of sub - factors as can be seen from the diagram above. A rating can be applied to each of these sub-factors according to the dimensions detailed below. These tables give both the dimensions and the sources of the dimensions. The general characteristics of GPTL are given in italics.

**Table 10.2 Incentive Ratings Dimensions**

Factor & sub factor key indicators ( GPTL characteristics in italics )

ELEMENT – INCENTIVE                      +3   ←————→   -3

Factor	Sub - factors	<i>Motivating</i>	<i>De Motivating</i>
<b>Senior mgt. pressure</b>	Corporate	Strong “ added value ” corporate presence. H & S accountability to corporate body. Perceived strong constructive influence at plant level Corporate and local OSH systems high convergence.	<i>No corporate presence. No added value perceived. No H &amp; S accountability to corporate body. Perceived weak destructive influence at plant level. Corporate and local OSH systems high divergence.</i>
	Felt need	<i>Strong desire to be best in class. Strong achiever e.g. ISO 9001, 14001, QS 9000. M.D. regularly speaks of being the leader. Awards prominently displayed.</i>	Happy to stay in pack. Low achievements in plant. No awards or certification present. Low drive from M.D.
Insurance	Claims	Claims perceived to be unfair. Accident to claims ratio perceived by management to be high. <i>M.D. talks regularly about need to eliminate claims. Claims culture perceived to be in place.</i>	Very few claims in relation to number of accidents. Perceived to be fair. No claims culture perceived to be present.
	Audit	Regular audits and high visibility. Pressure applied by reports taken seriously by management	<i>Low visibility.</i> Low number of reports which are not taken seriously by plant management.
OSH performance	Good	Performance owned by managers. Realisation of the business case for OSH and loss control as integral part of business.	<i>“System is not broken” because we have a low accident rate – don't need to fix it.</i> Little realisation of the business case for OSH and loss control as integral part of the business.
	Bad	Desire to be comparable to other plants. Realisation of OSH business case and loss control as integral part of business.	Safety performance is the safety officers job, no ownership by line management. Little realisation of OSH business case and loss control as integral part of business

## Chapter 10 Development of Potential OSH Model of Change

ELEMENT – INCENTIVE

+3  -3

Factor	Sub - factors	Motivating	De Motivating
<b>Legal / Moral</b>	Criminal	<i>High levels of awareness and knowledge of OSH legislation within management. M. D. regularly speaks of threat from legislation. Good relationship with local HSE inspector.</i>	No awareness of OSH legislation. Very low profile issue within plant. Poor uncooperative relationship with local HSE inspector.
	Moral / Ethical	Perceived strong ethical and moral reasons for OSH. Regularly mentioned by senior managers. Humanistic side shown by company regularly – e.g. concern after accident by department manager.	<i>Little mention of moral or ethical reasons for OSH. Little shown in humanistic side of company – eg no contact after accidents by dept. managers.</i>

**Table 10.3 Source of Incentive Dimension Indicators**

<b>Senior mgt. pressure</b>	Corporate	Kirk, Wright, Hawkins & Booth
	Felt need	Kirk, Hawkins and Booth
<b>Insurance</b>	Claims	Wright, Authors experience within GPTL
	Audit	Authors experience within GPTL
<b>OSH performance</b>	Good	Kirk
	Bad	Kirk
<b>Legal / Moral</b>	Criminal Legislation	Hawkins and Booth, Wright
	Moral / Ethical	Hawkins and Booth ( 1998 ) Wright ( 1998 )

In rating incentive the views of management obtained from the interviews conducted are considered, as this level is responsible for the direction or strategy within GPTL, Dumfries. At this stage we have the characteristics of GPTL in broad

terms. The factors can now be rated and scores derived from the interview data sets, which are in turn supported by the anecdotal and quantitative data in chapter six and chapter seven respectively. The data that is referred to below is contained primarily in the interview data, linkages between data sets and presentation are given in table on page.

#### *Senior management pressure*

Most managers ( nine in 1998, ten in 2000) felt that corporate influence was at best very weak, with a number (three in 1998 and five in 2000) concluding that it could be contradictory or even obstructive in terms of local development, for example lack of clarity in how guidance is to be implemented if at all. This combined with

the signals given out from corporate H.Q. on the importance of OSH gave a rating of minus two in both 1998 and 2000.

All managers in 1998 and 2000 felt that striving to be ahead of the pack in all fronts, i.e. a “felt need” was a dominant feature of GPTL, Dumfries. This accords a rating of three.

#### *Legislation*

All managers in 1998 and 2000, cited legislation and fear of prosecution as a key motivating factor giving a weighting of three. There was some scant mention of ethical and moral duty for OSH on both passes, giving a rating of minus one, unchanged from 1998 to 2000.

#### *Insurance pressure*

One manager on both data passes felt that insurer pressure arising from civil claims reflected in premium levels was a key factor in motivating change. No manager in 1998 or 2000 mentioned external audit as a motivating factor. Ratings of one and zero are accorded respectively.

#### *OSH performance*

Ten of the eleven managers felt that OSH performance was good and no fundamental gaps were evident. This was unchanged from 1998 to 2000. No manager felt that OSH performance was bad, either in 1998 or 2000. This gives a rating of zero.




This allows an overall rating x weighting exercise to be carried out. This is represented below for each factor and sub factor, with an overall score obtained in italics.

**Table 10.4 Summary of Incentive Ratings and Weightings**

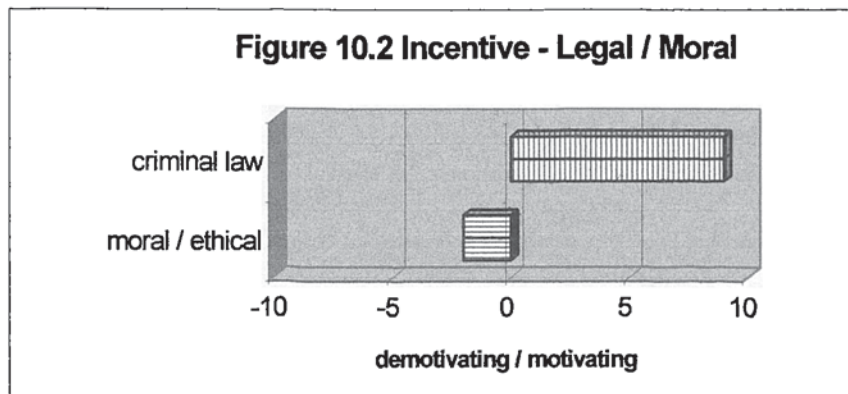
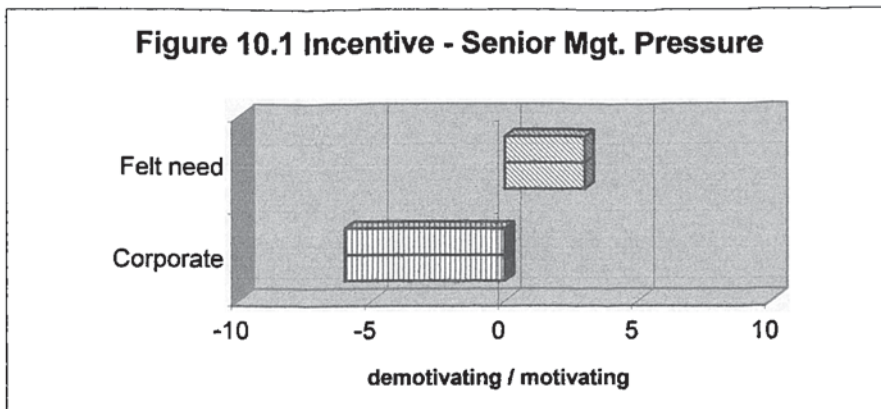
Element	Factor	Subfactor	Weighting	Rating	<i>Score</i>
Incentive	Senior Management Pressure	Corporate Pressure	3	-2, no change from 1998 - 2000	<b>-6</b>
		Felt Need	1	3, no change from 1998 - 2000	<b>3</b>
	Legal	Criminal Law	3	3, no change from 1998 - 2000	<b>9</b>
		Moral / Ethical	2	-1, no change from 1998 - 2000	<b>-2</b>
	Insurance	Claims	2	1, no change from 1998 - 2000	<b>2</b>
		External Audit	1	0, no change from 1998 - 2000	<b>0</b>
	OSH Performance	Good Perform.	1	-2, no change from 1998 - 2000	<b>-2</b>
		Bad Perform.	1	0, no change from 1998 - 2000	<b>0</b>

## Chapter 10 Development of Potential OSH Model of Change

The data can be illustrated below in graph format

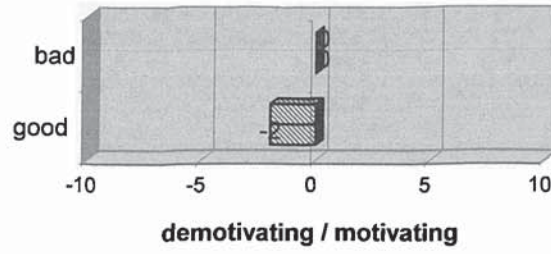
Core =  Medium Level =  Lower Level = 

Top bar on graph represent year 2000 position, bottom bars 1998 position

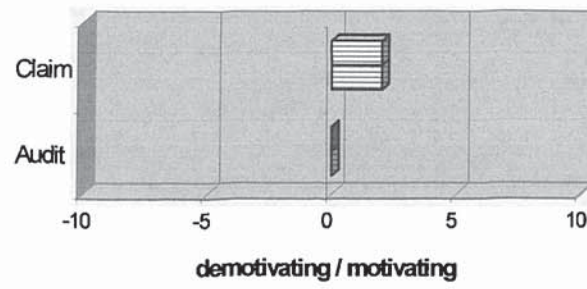




**Figure 10.3 Incentive - OSH Performance**



**Figure 10.4 Incentive - Insurer / Civil law pressure**

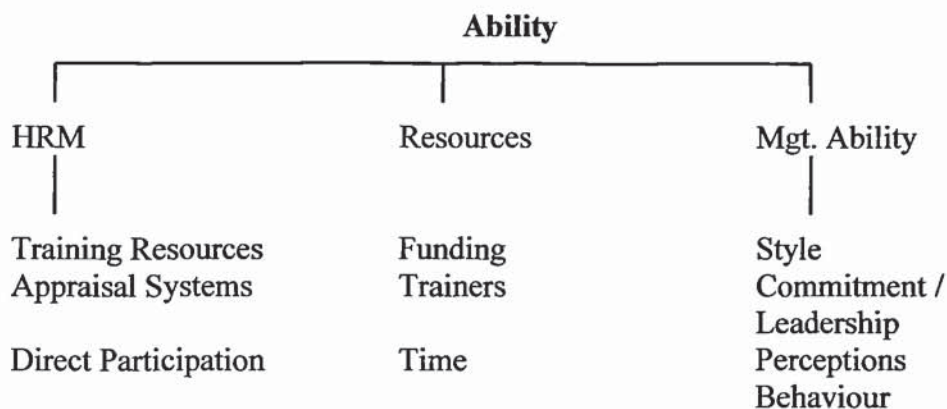


What can be seen from the above is that the organisation has a fairly stable record over the two years of the research. This much may have been expected in that culture tends to be stable over time. What can be drawn out is that the organisation is driven by the negative aspect of legislation and that corporate pressure is weak to the extent that demotivating signals are given out from the corporate body in terms of OSH importance.

Having the incentive to introduce a change into a system is only one element of the model. The ability must also exist to actually implement the change.

#### 10.4 Ability

Primarily the premise of management ability refers to management ability to actually implement a change and comprises many central software / cultural factors. This element is developed below:



**Figure 3.8 Potential OSH Ability**

(From Chapter Three, page one hundred and one)

As with all elements in the model, the factors which make up the individual elements of incentive, receptivity and ability have dimensions along which they can



## Chapter 10 Development of Potential OSH Model of Change

ELEMENT - ABILITY

+3 ←—————→ -3

Factor	Sub - factors	<i>Motivating</i>	<i>De Motivating</i>
	Perceptions	Strong OSH business case perceived by managers. Beyond legal compliance is the norm. Little in way of glaring legal breaches.	<i>No real business case perceived. Purely driven by avoidance of prosecution. Obvious legal breaches evident on site.</i>
	Commitment and Leadership	High visibility on shop floor. Safe behaviour commended. Managers adhere to safety rules e.g. safety footwear. Unsafe behaviour challenged.	Low visibility. Safe behaviour never praised. <i>Managers do not observe safety rules. Blind eye turned to unsafe working practices.</i>
	Behaviour	Management lead by example, observing safety rules and procedures. Walk the talk.	<i>Managers openly flout safety rules. Do not pick people up for OSH issues</i>

**Table 10.6 Source of Key Dimensions Indicators - Ability**

<b>Management ability</b>	Style	Blake and Mouton
	Perceptions	Hawkins and Booth
	Commitment / leadership	Bottomely, ACSNI
	Behaviour	Bottomley, ACSNI, Duff et al
<b>HRM</b>	Training	Kirk
	Resources	UK Benchmarking Index 1998
	Direct Participation	Kirk
	Appraisal Systems	Kirk
<b>Resources</b>	Funding	Kirk
	Trainers	Kirk
	Time	Kirk

In general terms the perceptions of OSH appear to be demotivating with poor profiles on leadership and commitment, and behaviour. HRM involvement appears also to be low. These factors can now be rated taking into account empirical data. This is done below with a summary table at 10.7 drawing the data together prior to presentation in form of graphs.

### Management Ability

#### *Style*

The first factor making up management ability is that of leadership style.

This can be directly related to the Blake and Mouton grid in the literature review.

The positioning of the dominant style, i.e. task orientation, tends to be validated by Kirk 1998. All the interview data and anecdotal evidence backs up a rating of minus three given for both 1998 and 2000.

#### *Commitment / Leadership*

The aspect of commitment/leadership is defined by Bottomley (1998) and a rating which reflects this is given in that report. As indicated in the literature review ACSNI (HSC 1993) and Duff et al (1993) give great importance to these two facets

in relations to OSH. Taking on board the summary points at the end of the respective data analysis sections ( see chapter five 5.31 to 5.35 at and chapter seven at 7.32 to 7.36) then a subjective judgment can be made that these two sub factors combine to slightly inhibit OSH development. A weighting of minus one was given in 1998 however, this shifted to minus three in 2000, with some very highly visible actions which put OSH into perspective within the site as discussed in chapter six ( see 6.3.1.3 and 6.3.1.5).

### *Perceptions*

Perceptions of safety are predominantly as a hardware engineering issue with only two of the managers referring to the softer side of OSH systems on both passes. For this reason a rating of minus two was given in 1998 and 2000.

### *Behaviour*

Behaviour as an indicator of managerial attitudes to OSH is alluded to in chapter six. Observed behaviour became more and more negative as the research progressed with an allocation of zero in 1998 moving to a minus two in 2000.

### Human Resource Management

#### *Direct Participation*

There is low visibility in terms of HR involvement in OSH and appraisal systems lack an OSH element. OSH training programmes are not co-ordinated or needs analysis conducted. A rating of three must therefore be given to this sub-factor, both in 1998 and 2000.

### *Resources*

In terms of facilities a training room exists with good training aids and a training budget. Training days per employee and expenditure are average as identified in UK benchmarking index. In essence this is neither demotivating or motivating for any OSH change. A rating of zero is therefore allocated.

*Appraisal Systems*

Within GPTL, Dumfries not only is there no OSH within the appraisal systems, no actual appraisals ever get conducted! Any issues such as an appraisal system picking up OSH training gaps or procedural concerns cannot work if no appraisals occur. A rating of minus three must be allocated here on both passes.

*Time*

In terms of time devoted to training an average is given above. In terms of time devoted to OSH aspects within the general running of the plant, then OSH input into for example monthly senior management meetings tends to be sporadic and not a routine request, more a case of crisis management. For this reason a zero rating is given, which was unchanged between 1998 and 2000.

*Trainers*

There are trainers on some shifts for aspects such as manual handling and fork lift driving instructors and these do deliver the odd training session after repeated reminding. These are however, missing on other shifts. As such a rating of plus one is allocated, constant over the two years.

*Funding*

Resources allocated in terms of funding tend to be sparse on some occasions with courses at times appearing very difficult to be persuasive in terms of a training need. Some courses are funded, but a pattern of limiting funds to certain areas of the business e.g. IT is evident. For this reason a weighting of minus one is given. This was steady over the course of the research.

**Table 10.7 Summary of Ability Ratings and Weightings**

Element	Factor	Subfactor	Weighting	Rating	Score
Ability	Mgt. Ability	Style	3	-3, no change from 1998 - 2000	<b>-9</b>
		Commit. / Leadership	3	0 in 1998, changed to -3 in 2000	<b>0 1998 -9 2000</b>
		Percep.	2	-2, no change from 1998 - 2000	<b>-4</b>
		Behaviour	3	0 in 1998 shifted to -2 in 2000	<b>0 1998 -6 2000</b>
	HRM	Training Resources	1	0, no change from 1998 - 2000	<b>0</b>
		Appraisal Systems	1	-3, no change from 1998 - 2000	<b>-3</b>
		Direct particip.	1	-3, no change from 1998 - 2000	<b>-3</b>

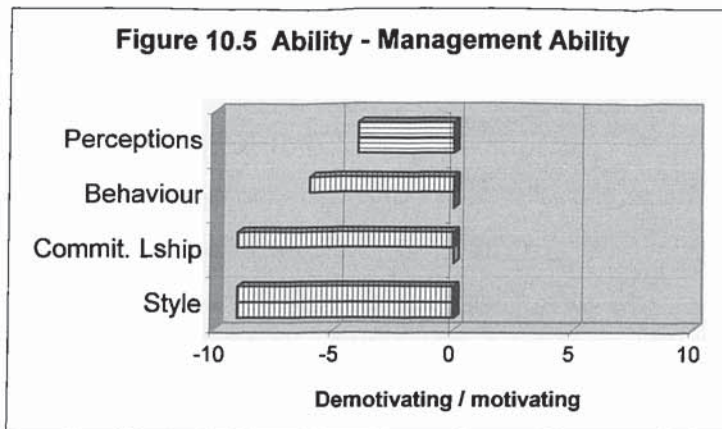


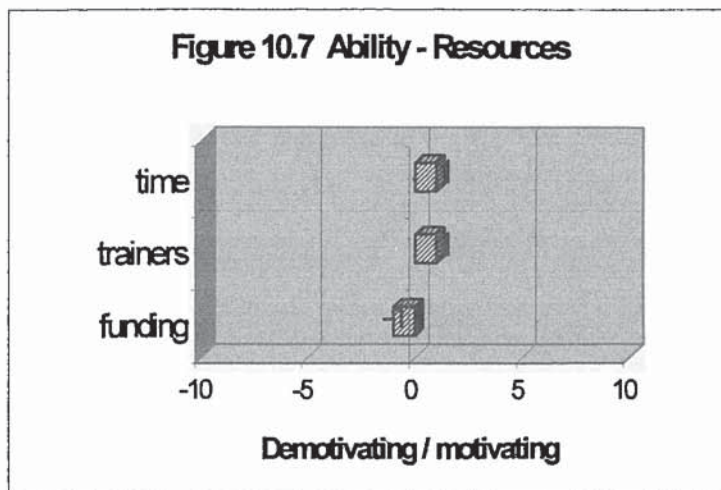
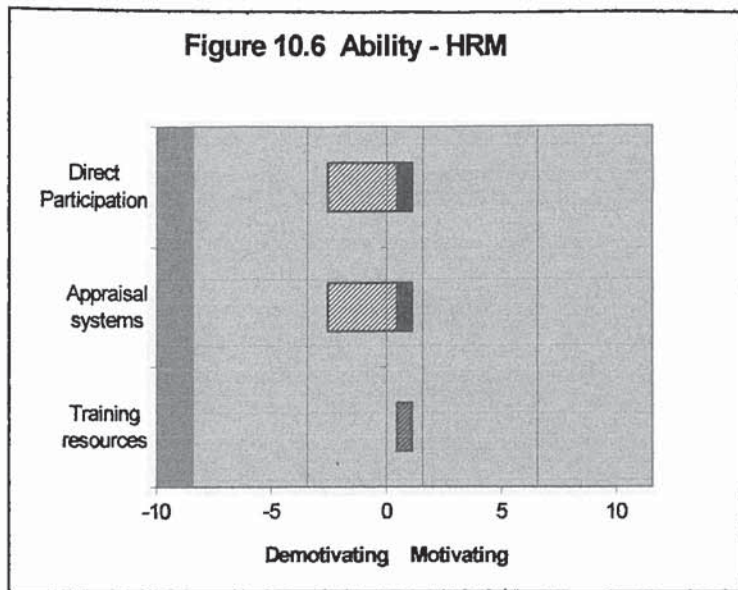
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Element	Factor	Subfactor	Weighting	Rating	Score
	Resources	Funding	1	-1, no change from 1998 - 2000	<b>-1</b>
		Trainers	1	1, no change from 1998 - 2000	<b>1</b>
		Time	1	1, no change from 1998 - 2000	<b>1</b>

Core = ||||| Medium Level = |||| Lower Level = |||||

Top bar on graph represent year 2000 position, bottom bars 1998 position

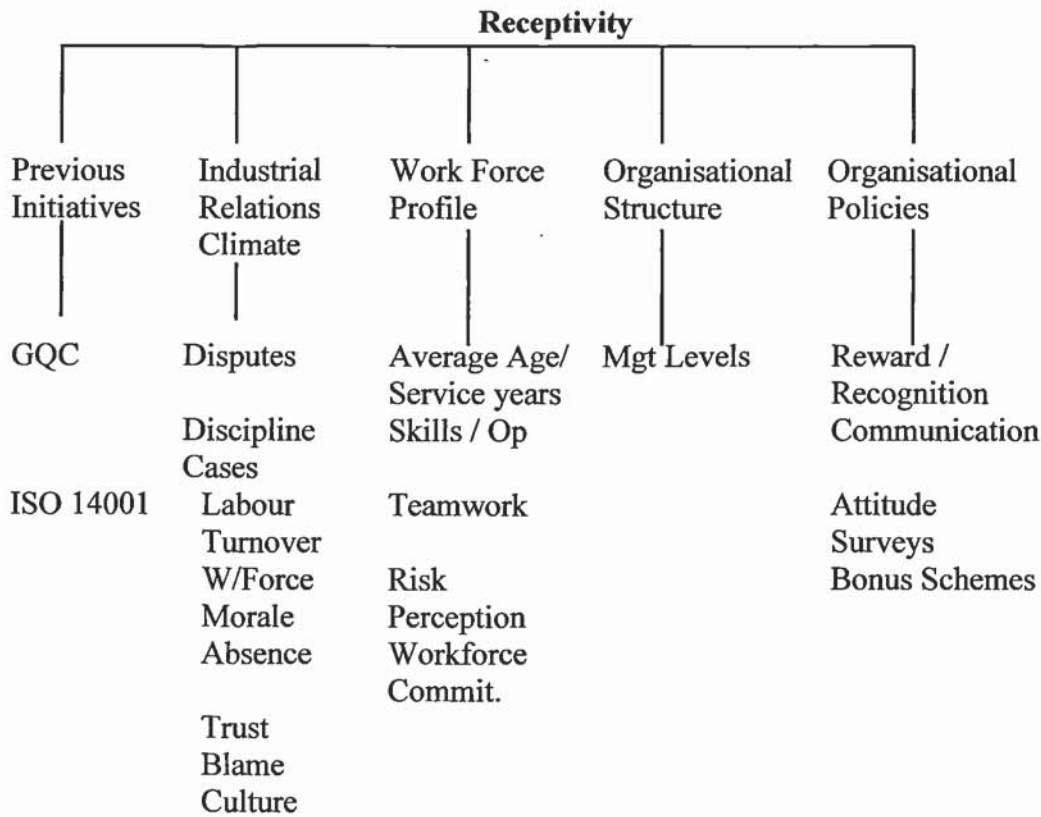




It can be seen that ability in terms of core factors is very weak in the sense that the core characteristics are stifling any OSH initiative. These demotivating, fundamental factors include commitment / leadership, behaviour and style. Ability itself is also influenced by receptivity and it is to this element that we now turn.

**10.6 Receptivity**

Receptivity taken at any point in time gives a snapshot of how receptive the organisation will be or is to change or intervention. The primary reliance on gauging receptivity is contained within the workforce. As a reminder the element of receptivity is detailed below:



**Figure 3.6 Potential OSH Receptivity**

(from Chapter Three, page one hundred)

The sub-factors of risk perception, communication and trust have been identified as core factors. In addition to this it is suggested that age / service years as a sub-factor may also be a core influence, as discussed in chapter eight. Morale, team work,

reward / recognition, attitude surveys are medium level influencing factors. Table 10.8 gives the dimensions across which receptivity can be rated, with table 10.9 giving the actual sources of the dimension indicators.

**Table 10.8 Receptivity Ratings Dimensions**

Factor and Sub factor key indicators

( GATES CHARATERSITICS IN ITALICS )

ELEMENT - RECEPTIVITY

		+3	←—————→	-3
Factor	Sub - factors	<i>Motivating</i>		<i>De Motivating</i>
<b>Previous Initiatives</b>	GQC	Previous success. Promises delivered and objectives achieved.		<i>Previous failures. Objectives not achieved and promises not delivered. Legacy of mistrust left.</i>
	ISO Systems	<i>Successful in past. Recognised management systems certification achieved. Ownership of system by management. Systems viewed as value added to business and opportunities for improvement.</i>		Failure in implementing systems or great difficulties experienced. No management ownership of system. Certified systems viewed as threats and obstructions to business.
<b>Industrial Relations Climate</b>	Industrial disputes/ Disciplinary cases	<i>Low number of disciplinary disputes. Supportive trade unions. Judicious use of discipline regarding OSH breaches.</i>		High number of disciplinary disputes. Adversarial trade unions. Disciplinary system perceived to be harsh and used routinely for breaches of OSH.
	Absence	Well below average.		<i>Well above average.</i>
	Trade Unions	Trade unions heavily involved in a positive way. Management perceive trade unions as useful.		<i>Trade unions not involved ( or only where compulsory ). Trade unions seen as a problem by management.</i>
	Labour turnover	<i>Well below average labour turnover.</i>		Well above average labour turnover.
	Blame Culture	Blame is fairly allocated ( e.g. where clear violation of a safety rule. )		<i>Staff automatically blamed following an incident and automatically disciplined.</i>
	Trust	Mutual trust and respect for each other. Between staff, supervisors, management, production and maintenance staff		<i>Lack of trust between groups. Suspicion of others motives.</i>

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ELEMENT - RECEPTIVITY

		+3 ←	→ -3
Factor	Sub - factors	<i>Motivating</i>	<i>Demotivating</i>
<b>Work Force Profile</b>	Morale	<i>High. Stable. No evidence to suggest that this will change.</i>	<i>Low. Changing circumstances equals pressure.</i>
	Skills Versatility	<i>Increasing skills and versatility base. Decision by company to foster this approach.</i>	<i>Decreasing skills base. Decision by company not to foster this approach.</i>
	Age / service years	<i>Policy to recruit younger operatives. Younger operatives perceived to be more receptive to change. Average age relatively low i.e. below forty. Lower service years</i>	<i>Average age of work force relatively high. Older operatives perceived as resistant to change. Higher service years.</i>
	Team Work	<i>Regular teams formed for tasks outwith normal operatives duties. Task driven and end point solutions found. Perceived high value of teams by management.</i>	<i>Low levels of team working. Low perceived value. Perceived low value in teams by management.</i>
	Risk Perception	<i>“Accurate” Perceptions of risks faced within plant. Sound knowledge of fundamental hazards.</i>	<i>Misperceptions of risk within plant. Poor knowledge of hazards within plant.</i>
	Work force Commitment	<i>Operatives wear PPE, observe safety rules, report near misses.</i>	<i>Operators regularly flout safety rules, do not wear PPE, do not report near misses.</i>
<b>Organisational Structure</b>	Flat	<i>Structure has no bottlenecks in terms of organisational responsibility. Communication and responsibilities flow easily.</i>	<i>Structure such that there are bottlenecks in terms of organisational responsibility. E.g. fire fighting and too busy for OSH. Communication and responsibility hindered.</i>

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+3 ←————→ -3

Factor	Sub - factors	<i>Motivating</i>	<i>Demotivating</i>
<b>Organisational Policies</b>	Reward / Recognition	Reward / recognition scheme in place for OSH. Informal recognition for safe working practice e.g. commended by shift supervisor.	<i>No formal or informal reward / recognition schemes in place.</i>
	Communications Climate	Open. Smooth two way vertical and horizontal flows.	<i>Closed. Restricted two way vertical and horizontal flows</i>
	Attitude Surveys	<i>Surveys conducted at regular intervals.</i> Feedback given to employees and action points fulfilled.	No surveys conducted. Surveys conducted but destructive in terms of reasons for completing survey. Feedback absent, no actions fulfilled.
	Bonus Schemes	<i>Low bonus ratio in pay.</i> <i>Bonus schemes do not encourage short cuts to be taken.</i>	High bonus ratio in pay. Bonus schemes do encourage short cuts to be taken.

**Table 10.9 Source of Receptivity Dimension Indicators**

Previous Initiatives	GQC	Kirk ( 1998 )
	ISO Systems	Kirk ( 1998 )
Industrial Relations Climate	Industrial disputes/ Disciplinary cases	Kirk ( 1998 )
	Absence	IDS report 660
	Trade Unions	Kirk Bottomley
	Labour turnover	IDS report 753
	Trust	Bottomley, Cummings & Bromiley
	Blame culture	Bottomley, ACSNI
	Morale	Bottomley
Organisational Structure	Flat	UK Benchmarking Index
Organisational Policies	Reward / Recognition	Bottomley, ACSNI
	Attitude Surveys	Kirk
	Bonus Schemes	Bottomley ( 1998 )
Work Force Profile	Skills Versatility	Kirk ( 1998 )
	Age	Kirk ( 1998 )
	Team Work	Bottomley ( 1998 )
Communication	Climate	Miller, Gibb

What we have so far is GPTL core characteristics identified in very general terms above. The site appears to have demotivating / restricting influences in respect of communication, trust and risk perception along with an age / service years effect. The sub-factors can now be rated according to the above criteria.

### *Previous initiatives*

These are two fold within GPTL, namely a quality initiative Gates Quality Commitment (GQC) and ISO 14001. Twenty seven percent of managers viewed GQC as a having failed to deliver promises, with eighty six percent of groups on the shopfloor citing GQC as having failed to deliver promises with a deep ingrained legacy of suspicion of change. For this reason a rating of minus three was given to previous initiatives.

ISO systems were cited by one hundred percent of managers as having being well implemented, with particular reference to ISO 14001. No shopfloor employees mentioned these systems as being beneficial, detrimental or otherwise and were fairly indifferent to them. For this reason a zero weighting was given, implying that the effect from previous ISO certifications was neither demotivating or motivating for change.

### *Industrial disputes / Disciplinary cases*

In this area a reliable anchor for the dimension was extremely difficult to find. However what can be done is to look at the evidence from the interviews and the site and allow for a subjective judgment. There have been no industrial disputes in terms of industrial action and trade unions tend to be supportive rather than confrontational. In the area of OSH discipline is used only in very rare cases, with managers struggling to recall any such instances. The implication from this is that this sub factor is neither de-motivating or motivating for change



*Absence*

The following table allows the position of GPTL to be gauged against industry standards. Industry standards tend to be very stable over time and the data below is valid for 1998 and 2000.

**Table 10.10 Absence Rates by Sector 1998 -99**

Public / Voluntary	4.87 %
Services	3.98 %
Utilities	3.0 %
Manufacturing	2.95 %
Financial	2.62 %
<b>Average</b>	<b>3.48</b>

Source : ( IDS Study 660 )

Frequency of absence is high in relative terms at GPTL, fluctuating between 3.76 and 4.65 over the period May - December 1998 and 4.8 – 4.9 during the latter half of 2000. For this reason a weighting of minus three was given to absence levels for 1998 and 2000.

*Labour Turnover*

Labour Turnover for various industrial sectors is highlighted below allowing a direct comparison with industry. These figures below tend to be stable over time and can be considered valid for 1998 and 2000 data comparison.

**Table 10.11 Labour Turnover for Various Industrial Sectors 1998 -99**

Hotels and Leisure	34.56	Utilities	14.75
Publishing	33.86	Retailing	14.57
Food and Drink	28.57	Financial Services	14.09
Consumer Products	27.09	Electronics	13.64
General Manufacturing	22.03	Paper and Packaging	13.63
Professional Services	22.03	Transport and Distribution	13.53
Pharmaceuticals	19.84	NHS Trusts	12.25
Construction	19.39	Oil / Mining	12.03
Media / Broadcasting	19.26	Local Government	11.91
Other Public Sector	18.12	Chemicals	10.52
Central Government	17.65	Other Industries	8.53

( Source : IDS Report 753 )

Looking at the labour turn over figures above and given an industry labour turnover average of 18.65 and a range of 26.03 labour turnover at GPTL is very low (7.8 % in 1998 and 7.5% in 2000).

This implies a stable workforce and is given a rating of three, for 1998 and 2000.

#### *Morale*

Morale at the time of the data gathering was deemed by the writer and Bottomley (1998) to be good and no change was detected throughout the course of the research. A weighting of plus two is given for morale for 1998 and 2000.

#### *Trust*

Trust in 1998 was not all that strong according to interview data and according to indirect data about attitudes to the near miss form and its take up. However, as can be seen from the interview data and the anecdotal evidence, trust was destroyed

over the two years of the course. When asked about trust in 2000, 92 % of groups said that none existed. A rating of minus 1 in 1998 drifted to minus 3 in 2000.

#### *Blame Culture*

This remained steady over the course of the research. Although it was mentioned by most groups that operator error was a factor, many other issues were also mentioned. For this reason a slightly destructive culture of blame exists and this went unchanged over the two years, with a rating of minus 1 allocated.

#### *Organisational Structure*

Again a fairly subjective approach must be taken, but within the boundary designated by the UK Benchmarking Index which states that the four tier structure at GPTL is medium to flat in terms of the number of levels. The argument put forward by Kirk contends that a flat hierarchy will be more sympathetic to change. However, the data would suggest that as the shift coordinator is “ harried from all angles ,” then a controlling style of leadership dominates. For these reasons a rating of minus 1 is given, which remained constant over the two years.

#### **Organisational Policies**

In this area there are four sub-factors - reward and recognition, attitude surveys, bonus schemes and communication.

#### *Reward and recognition*

The dimensions of this particular factor are lifted from Bottomley (1998). The evidence is that no such systems are functioning at GPTL and the ratings by Bottomley backs up the score of minus three given for this. This went unchanged over the two years.

#### *Attitude Surveys*

Attitude surveys were conducted in 1997 however feedback to participants tends to be rather slow. The anecdotal evidence in chapter seven shows the policy towards

attitude surveys changed and this meant that a rating of plus two in 1998 became minus three in 2000.

#### *Bonus Schemes*

Bonus schemes do not constitute a high proportion of pay levels and certainly do not encourage short cuts which may increase risk, again reflected in the rating given by Bottomley (1998). No managers or shop floor employees mentioned that the pay system encouraged short cut taking or was a primary cause of accidents. A rating of plus two in 1998 remained constant in 2000.

#### *Communication*

Many of the characteristics of a closed communications climate are in evidence, again highlighted in the rating given by Bottomley (1998). This deteriorated in the area of OSH as a deliberate policy decision, reflected in a rating of minus two in 1998 moving to minus three in 2000.

#### *Work force Profile*

##### *Age*

There is no easy way to weight this sub-factor. What can be done though is to look at the hard evidence and allow for a subjective judgement.

The average age of the workforce is thirty nine years old, having been as high as forty seven, eight years ago. Applying the Kirk logic that a younger work force should be more adaptable to change then this must be deemed a positive factor for receptivity. This is reflected in chapter eight and a rating of plus one is given which remained steady over time

##### *Skills / Versatility*

A policy decision is to increase the versatility and skills base of the workforce, indeed much work had already been done by the site in this area. The main drive of which was to allow multi-tasking by operators and placement in differing areas of

the production process. This must be deemed a positive factor. A rating of plus one is allocated here on both passes.

*Team Work*

Team work activity tends to be non-existent in OSH and is not deemed a priority at GPTL. A demotivating effect for change is therefore in evidence. Over the course of the research the rating of minus three did not change.

*Workforce Commitment*

A rating of minus two was given both times as workforce ownership was fairly poor and showed no real improvement, indicated by the OSH performance measures in chapter nine. This remained at minus two for the duration of the research.

Overall scores for each sub-factor are also presented in the table, with results illustrated graphically, after the rating and weighting data table.

**Table 10.12 Summary of Receptivity Ratings & Weightings**

Element	Factor	Subfactor	Weighting	Rating	Score
Receptivity	Previous Initiative	GQC	1	-3, no change from 1998-2000	<b>-3</b>
		ISO 14001	1	0, no change from 1998-2000	<b>0</b>
	Industrial Relations Climate	Disputes	1	0, no change from 1998-2000	<b>0</b>
		Discipline Cases	1	1, no change from 1998-2000	<b>1</b>
		Labour Turnover	1	3, no change from 1998-2000	<b>3</b>
		W/force morale	1	2, no change from 1998-2000	<b>2</b>
		Trust	-1	-1, in 1998 shifted to -3 in 2000	<b>-3 1998 -9 2000</b>
		Blame Culture	2	-1, no change from 1998-2000	<b>-2</b>
	Work Force Profile	Average age/ Service Years	2	1, no change from 1998-2000	<b>2</b>
		Skills / Op	1	2, no change from 1998-2000	<b>2</b>

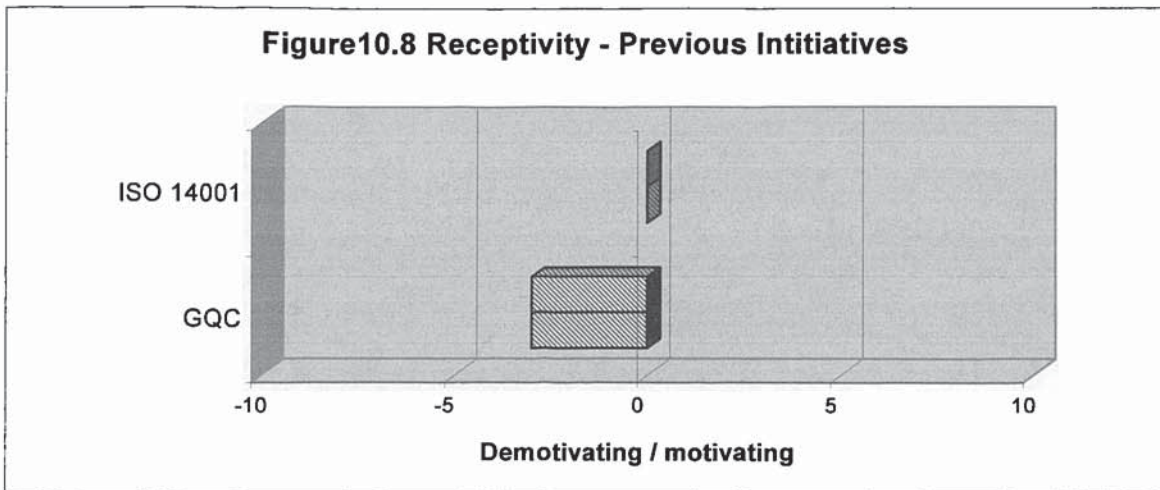
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Element	Factor	Subfactor	Weighting	Rating	Score
		Team work	2	-3, no change from 1998 -2000	<b>-6</b>
		Risk Perception	3	-2, no change from 1998 -2000	<b>-6</b>
		Workforce Commit.	2	-3, no change from 1998 -2000	<b>-6</b>
	Organ. policies	Reward / recognition	2	-2, no change from 1998 -2000	<b>-6</b>
		Communic.	3	-2 in 1998 shifted to -3 in 2000	<b>-6 1998 -9 2000</b>
		Attitude Surveys	2	2 in 1998 shifted to -3 in 2000	<b>4 1998 -6 2000</b>
		Bonus Schemes	1	2, no change from 1998 -2000	<b>2</b>
	Organis. Structure	Mgt. Levels	1	-1, no change from 1998 -2000	<b>-1</b>

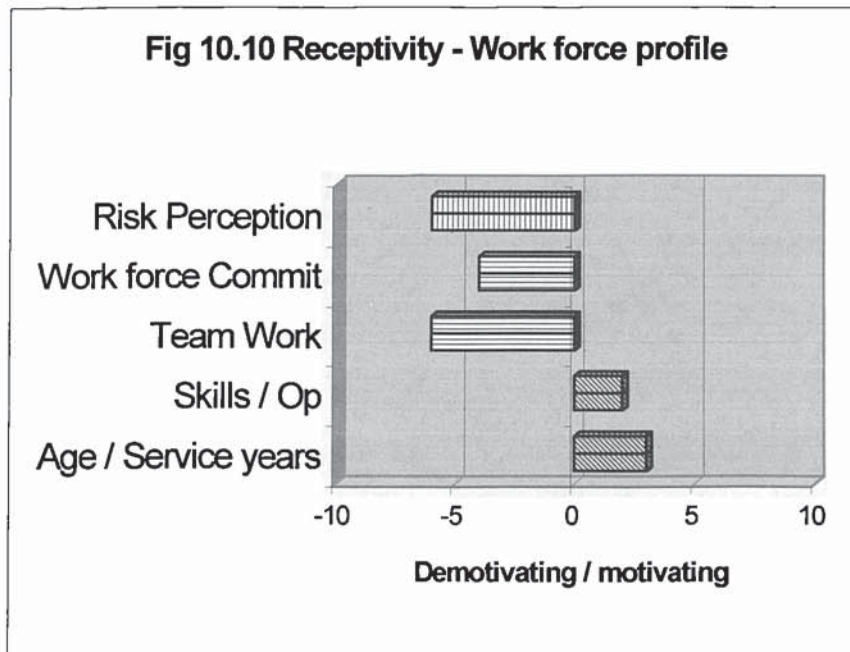
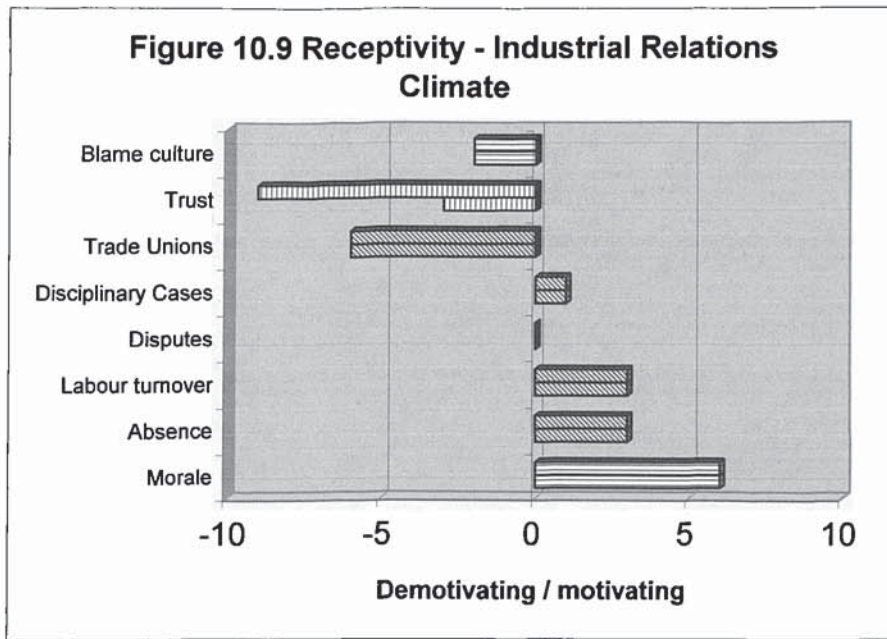
Communication, attitude survey and trust degraded over the course of the research to strongly impede or inhibit any real gains to be reaped from introducing a safety management system. As with the other elements of the model the factors are presented below in graph format:

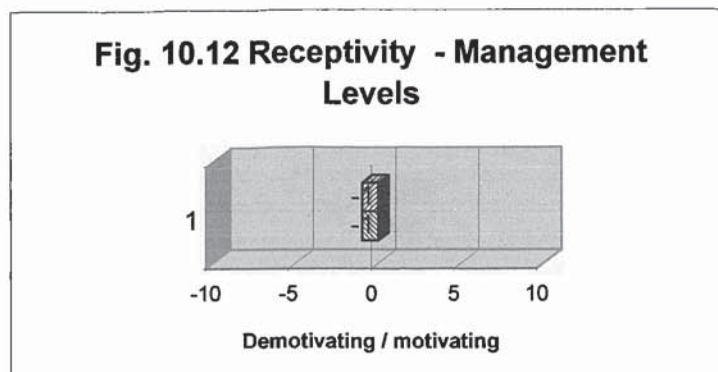
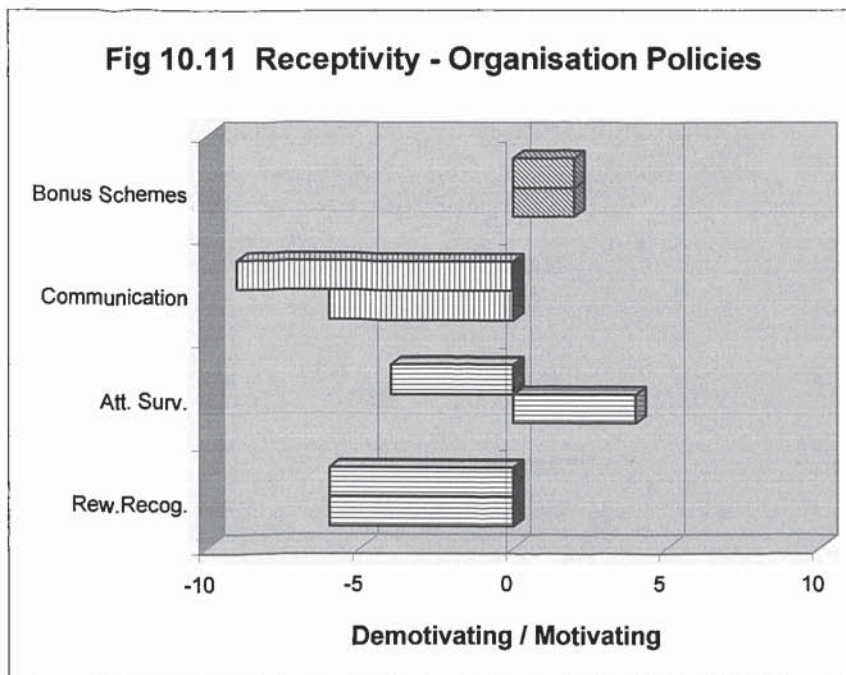
Core = ||||| Medium Level = |||| Lower Level = \\\

Top bar on graph represent year 2000 position, bottom bars 1998 position









Similarly with the previous factors the performance of GPTL against the core influencing factors is poor in that the ratings and weightings are all demotivating. The overall picture is very clear if the core and medium influencing factors are taken out of their positions within the elements of the model and presented on one figure.

**10.7 Summary of Results**

The tables below draw out the core and medium influencing factors identified in the model:

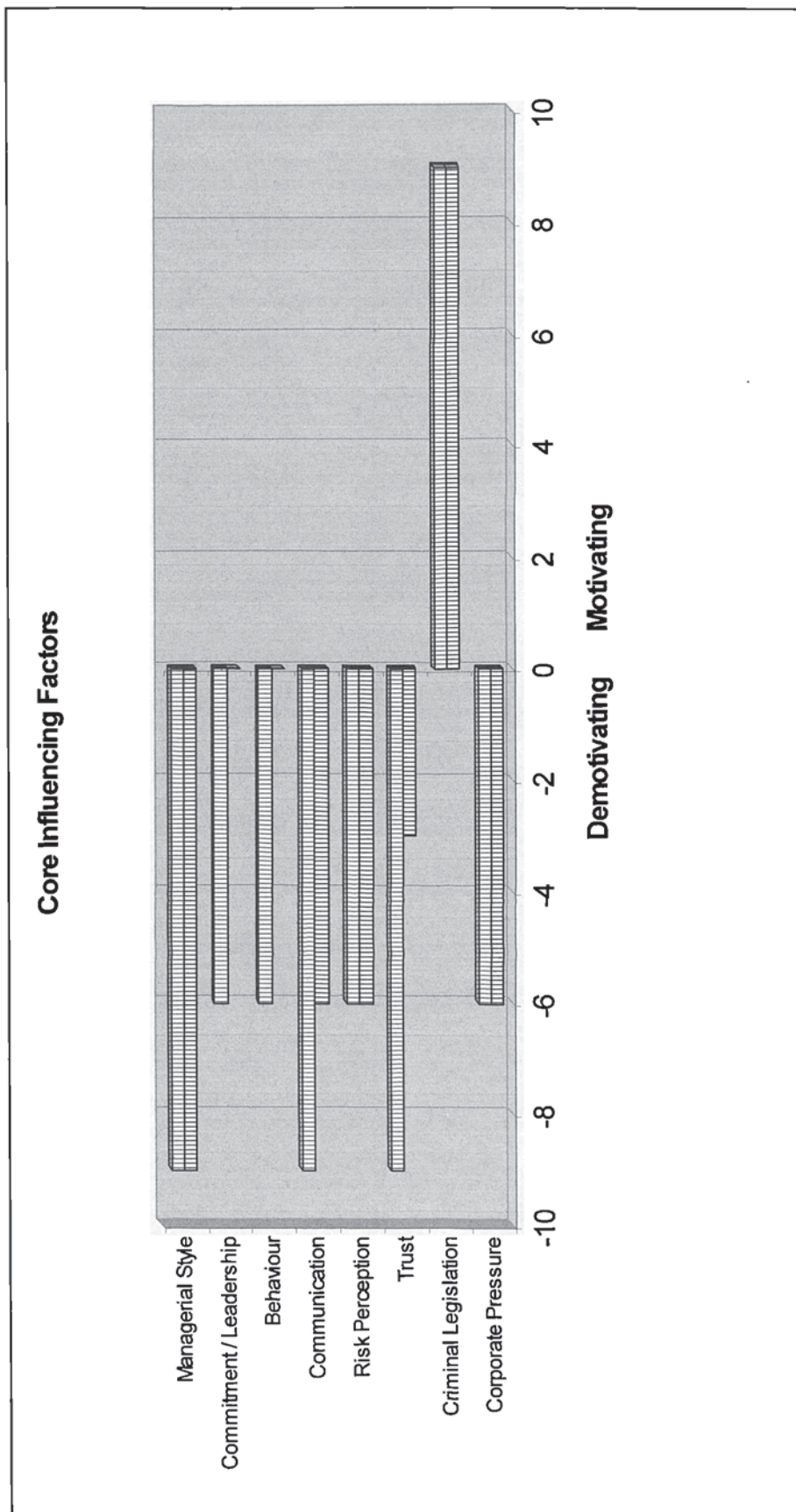


Figure 10.13 Core Influencing Factors

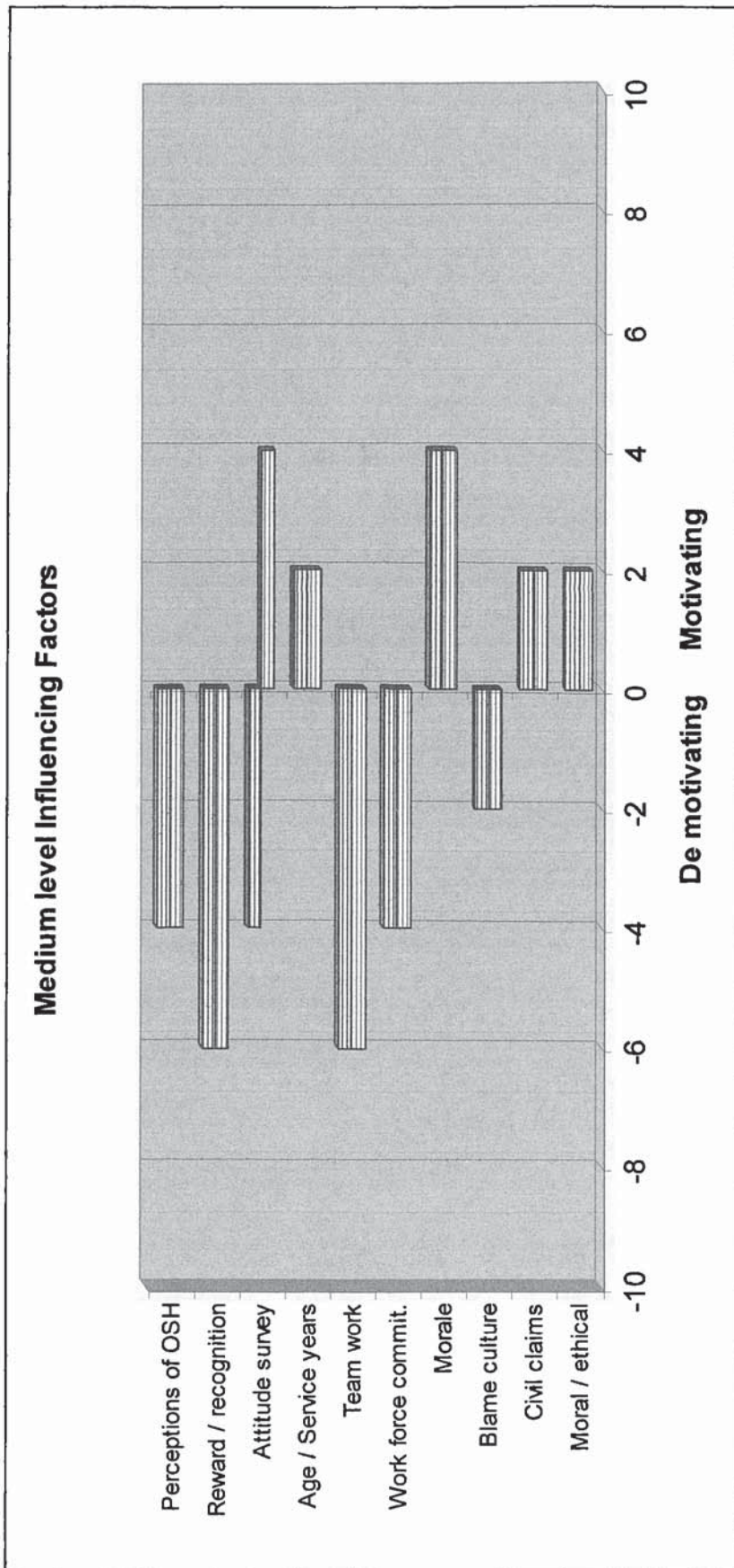


Figure 10.14 Medium Influencing Factors

The organisation under research can be characterised by using the model outlined above. What is very evident is that against the core factors GPTL rates in a fashion which has restricted both the implementation and the possible benefits of introducing Safety Management System founded on BS 8800. The primary motivation for GPTL is legislative driven – with core features including very poor communications and a purely task orientated management style. Shop floor operators have poor perceptions of the risks that they face, with low levels of trust and a perceived obstructive corporate influence. The model has been developed on the core literature and has demonstrated where the facility is lacking in terms of core and medium influencing factors. These form the key influencing factors for a successful OSH change within this context and almost all of them have been rated as demotivating. It can be seen that against the core influencing factors the vast majority tend to be in the demotivating zone, that is restricting development of OSH performance and safety culture. In relation to the medium influencing factors there is some motivating force from moral / ethical reasons for OSH as well as civil claims. Morale appears to be satisfactory. Countering these however, is a poorly conducted attitude survey, destructive influences towards attempts at team work, poor perceptions of OSH, lack of reward / recognition and poor workforce commitment to OSH. The next chapter draws out the conclusions and discusses the results of the research and its implications.

## CHAPTER 11

### CONCLUSIONS AND DISCUSSIONS

#### 11.1 Introduction

This chapter re-examines the research questions to fundamentally ask if the research questions were answered.

The point being made is that the model has its foundations and development including rating and weighting of factors anchored in the literature. The conclusions are stated below the research objectives with a discussion on the issues that the conclusions actually raise. The core influencing factors are discussed, along with the implications and limitations of the research.

#### 11.2 Research Objectives

The aim of the research is to attempt to identify the influencing factors on a management systems intervention – in this case BS 8800:1996. By analysing the links between OSH and TQM various models were proposed to allow the research questions to be answered:

1. Does implementation of an OSH management system improve safety performance?
2. What are the key influencing factors that will impact upon an OSH management systems intervention?
3. Can a TQM model of analysis be used to aid identification of these key influencing factors?
4. What is the level of interaction between safety management system implementation / intervention and safety culture?
5. Can a proactive safety culture develop independent of the general organisational culture?
6. What influence does the organisational culture have on the first line manager's ability to aid implementation of an OSH management system?

In order to link the findings into the key questions the findings can be outlined:

1. In the case study organisation the implementation of BS 8800:1996 did not improve safety performance.
2. The key influencing factors appear to be software factors and include broadly – corporate pressure, legislative pressure, managerial style, commitment and leadership, communication, risk perception, trust and behaviour.
3. A TQM model of analysis can be used in the area of OSH with very little change to the principles of the model itself.
4. A high degree of mutual two way interaction exists between safety management systems development and safety culture, with the two concepts mutually interdependent on each other to some extent.
5. On the strength of the evidence in the case study organisation a proactive safety culture cannot develop independent of a general culture. The general organisational culture apparently dictates the safety culture.
6. The general organisational culture apparently dictates the degree of effectiveness demonstrated by first line management and their ability and willingness to implement an OSH management system.

### **11.3 Key Findings**

#### **11.3.1 OSH Management Systems Impact on OSH Performance**

One of the overriding objectives of the research was to test the hypothesis that an organisation implementing an OSH management system will have improved safety performance. BS 8800:1996 was introduced into the site over a period of 6 months, with a longitudinal study period of two years. The effect overall on measures of OSH performance was minimal. Multiple OSH performance key indicators were selected to ensure that as accurate a picture as possible was obtained in relation to performance. These are discussed in chapter nine. This developed OSH management system based on BS 8800:1996, was later used outwith the period of research in December 2000 to achieve OHSAS 18001 certification. The system was robust enough that no non- conformities were raised during the process of certification. This raises points for discussion on the impact of OSH management



systems on OSH performance and also the potential impact of third party certification of OSH management systems.

### 11.3.2 Key influencing Factors & the OSH Model

A myriad of factors were identified using a TQM model of change. By grounding the development of the TQM model selected, within the literature, a potential model of OSH change was proposed. Within this framework for analysis, detailed in chapter three – the following was postulated. An organisation will implement a change, in this instance an OSH management system, the success of which will be dependant on three broad vectors of influence.

- A. The incentive for the organisation to implement change i.e. what are the motivators / drivers for the change ?
- B. The ability to implement the change will be dependant on the ability of management to actually transfer the change into practice.
- C. The ability of management to implement any change will be influenced by the environment within which the change is taking place.

Within these broad vectors of influence a whole plethora of factors exist. The OSH model of change was developed to identify firstly the core influencing factors. The process of which was rooted in the central literature. Secondly a rating and weighting was applied to these factors using the previous logic applied within the TQM academic world. This process helped identify those particular influences that carried the most weight and had the major impact.

#### ***Key Influencing Factors***

By using a primarily qualitative approach buttressed by additional data sources the key characteristics of the organisation against the OSH model were uncovered.

What it shows is that the organisation under research performed poorly against the core factors that influence change. This performance against the core factors correlated with an unimproved safety performance.

- Incentive - Legal Pressure and Corporate Pressure

The organisation is heavily driven by the threat from legislation and indeed this fits in with two letters threatening prosecution for manual handling and rubber fume as well as a fairly substantial improvement note on machinery guarding. This was a consistent theme from all sources of data from all levels of the organisational hierarchy.

Corporate pressure was inconsistent when it existed and acted as a brake on change by dint of the fact of where OSH was placed within the corporate organisation's functioning. Indeed the evidence suggests that within Gates corporate OSH performance is deteriorating in some cases dramatically with no central corporate department. It would appear that OSH is not on the corporate agenda and the position of OSH as a business aspect is very weak, cascading a destructive message down to site level management.

- Ability – Managerial Style, Commitment & Leadership, Communication, Behaviour

Managerial style within the plant was highly task orientated with very little people orientation. This style tends to be the one that predominates within the Gates Group and whilst it may arguably have reaped rewards in terms of profit and growth the result is an impoverished approach to any human factors. A dictatorial style of management sends out signals rather like ripples on the surface of a body of water. These ripples from the top impact on the core factors discussed below as the organisational “way of doing things” is set. This is a fairly predictable scenario if one takes on board the arguments set out by Schein (1992) and Freytag (1990). Commitment and leadership in the field of OSH degraded over the two years of the research with some very deliberate highly visible decisions and non-decisions made from the top of the organisation. These are highlighted as critical by ACSNI (HSC and Duff et al 1993) Linked into this aspect is behaviour, which degraded over time, with site rules flouted and strategic approaches to issues such as communication, training and the HSE safety climate measure severely undermining OSH impetus.

Communication deteriorated over the course of the research. Very little importance was placed on formal channels / systems set up with the safety forum and teams visibly being squeezed out in terms of organisational communication and influence.

Direct instruction was given not to relate information regarding hazardous aspects such as isocyanates and noise were indicative of an increasingly closed communications climate. The facility is therefore typified by being driven by legislation, but in conjunction with this there are demotivating and destructive influences from communication, managerial style, behaviour and leadership and commitment.

- Receptivity – Risk Perception, Trust

Risk perception remained poor over the course of the study. The training that was delivered was viewed with extreme suspicion and mistrust to the extent that its effectiveness in delivering a serious message was damaged. As a result the perceptions of the risks that individuals faced within the plant was inaccurate. Trust as a concept is dictated by and large by management (Cummings and Bromiley 1996, Schein 1992), i.e. this group sets the trust agenda. Little trust existed at the start of the research and this was effectively destroyed during the course of the research. The anecdotal evidence in chapter six showed how events realigned the trust agenda. Core OSH tools such as near miss reporting and training were severely eroded by these two factors, to the extent that the organisation was characterised by poor receptivity, that is, the actual work environment has low receptivity to OSH change or initiative.

Although not deemed as core influencing factors, the medium level factors still show the same pattern as the core influencing factors in terms of demotivation and towards change from the status quo. The only facet that shows any significant motivating effect is morale within the plant. Moral and ethical reasons do provide some drive as does the effect from civil claims. Perhaps the biggest swing around of the research was on the aspect of attitude surveys.

In summary then the question of influencing factors has been answered within the context of the research. What is painted of the organisation may appear to be a bleak picture, however the results should be taken into context. The plant is relatively strong on engineering and hardware aspects which have seen a comparatively steady, average accident rate. It is the advancement from this performance plateau that requires a grasp of the human factors side of change. It is this appreciation of the softer influencing factors discussed above, that is missing at

the site under research which leads to the obvious conclusions that OSH performance will remain unchanged if the pre-occupation with engineering out OSH problems continues.

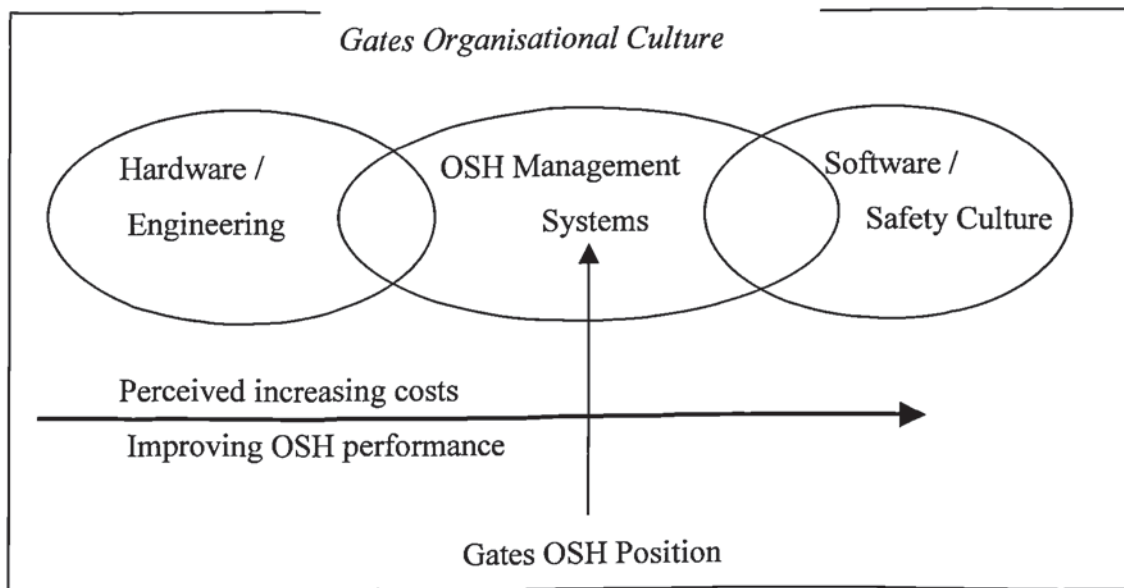
### 11.3.3 A TQM model of analysis

In terms of the utility of TQM models to explain an OSH intervention then the Kirk model appears to hold the most promise. It allowed a holistic view of the organisation to be undertaken as well as highlighting key influencing factors. Alternative models were outlined in chapter two in the literature review, however, the focus of the Kirk model allowed arguably a greater insight into the organisation than say a developed EFQM developed model. The Kirk model is geared towards the study of change, rather than an assessment based model. The fact that little change was made to the model framework illustrates the commonalities between TQM and OSH and also similarities in the core literature underpinning both the TQM model and the OSH model.

Although based on a single site case study, the evidence does suggest that it is these factors, that an organisation with a similar starting point to GPTL, Dumfries must be aware of and take into account. Either as part of the changes being introduced into the system, or prior to implementing any OSH change.

### 11.3.4 Safety Management Systems and Safety Culture.

Looking at the research orientation in chapter two it can be seen that OSH has passed through three main phases. These are hardware/engineering, through management systems, and finally on safety culture development. These are the three variables identified by Bottomley (1998) and can be presented below:



**Figure 11.1 OSH Interfaces**

The evidence in the research suggests that an organisation can have an OSH management system in place, the capabilities of which are dependent on this interface between OSH management systems and safety culture. Leadership and commitment manifests themselves at site level by members of the organisation striving to deliver what is requested by their respective manager. Within Gates this is the delivery of first level business issues. Software aspects such as communication, trust, behaviour are peripheral within the organisation, to the extent that the existing safety culture is severely limiting the OSH management system in its potential to deliver improvement. The managerial pre-occupation with hardware impacts on training, OSH communications, near miss / hazards reporting, value placed on team work and the value of risk assessment process. The result of this is that OSH management systems were restricted by the safety culture within the organisation. All of the variables above – engineering, OSH management systems and safety culture all exist within the general organisational culture.

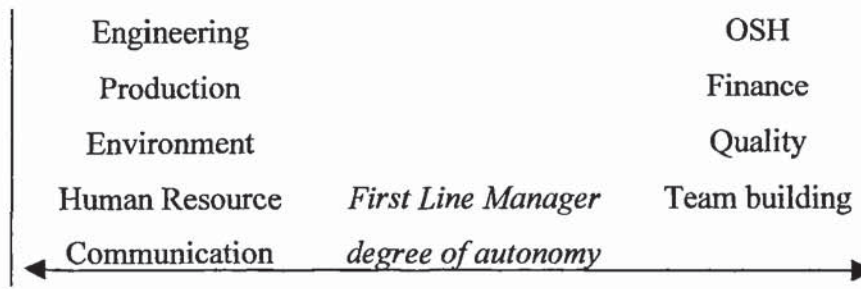
#### 11.3.5 Safety Culture and General Organisational Culture

What is alluded to above is that safety culture is a sub- set of general organisational culture to the extent that the core facets of general culture dictate the core facets of

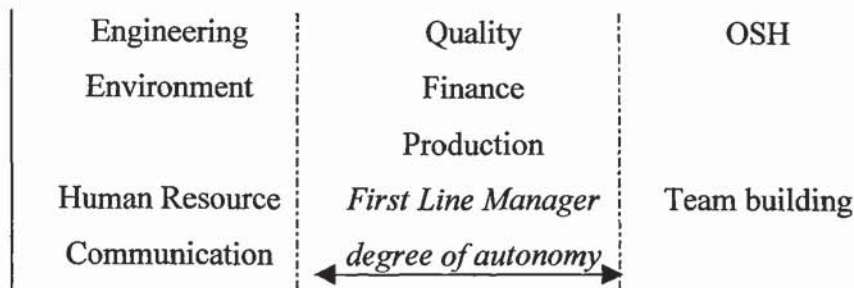
safety culture within an organisation. This much is more or less known and is covered in the literature in chapter two (Schein 1992, Rousseau 2000, HSC 1993). Where this research adds further weight is in the fact that it demonstrates that safety culture can not be developed in isolation from general organisational culture. It has been demonstrated that a safety practitioner cannot develop a proactive culture of safety where the general organisational culture is in effect pointing in the opposite direction. An example is training whereby participants in training sessions were extremely sceptical and mistrusting of any serious OSH message. It becomes very difficult to develop an atmosphere of trust in OSH when at the same time the cultural signals elsewhere in the organisation send out messages of a trust deficit.

### 11.3.6 General Organisational Culture and the Effectiveness of First Line Management

The role of first line management, has been reviewed as central in terms of OSH performance and introducing an initiative. What this case study has shown is that general organisational culture dictated the degree of enthusiasm demonstrated by first line management, and their ability and willingness to implement an OSH management system. The first level business issues were identified as production, finance and quality. Secondary issues include aspects such as OSH. Figure 2.9 shows the cultural facets of an organisation with the core or essence of culture shown as lying with the founders / leader. Within the facility the leader pays attention to these first level business issues because at a corporate level this is what is required to be delivered. This philosophy cascades into all plants and plant directors. The result of this is that autonomy within this type of environment is not encouraged or exercised as influence is perceived as negligible in any case. Virtually all personnel are geared towards delivery of first level business issues. The effect of this is a cultural sidelining OSH issues. This can be summarised in the figures below. Figure 11.2 shows the “ideal type” of a first line manager’s role in terms of influence, control and priorities derived from the literature overall in chapter two. Here the first line managers boundaries of influence are fairly broad with some degree of autonomy and latitude to decide resource allocation with regard to particular aspects. In figure 11.3 what is shown are the actual boundaries of the first line manager’s influence within the facility under research.



**Figure 11.2 Ideal Type First Line Manager's Influence**



**Figure 11.3 Actual First Line Manager's Influence**

The above findings naturally lead onto discussion. The principal point to be made here is that the above research was a single site study. As discussed in chapter one it can be difficult to generalise from a single site. For this reason we must look at evidence from related studies, from single and multi site research, which will help highlight common themes.

## 11.4 Other Case Study Evidence

### 11.4.1 Electricity Generating Company – Single Site Study

O'Loughlin (1998) studied safety culture in an electricity generating company in the UK. In terms of case study design, a mix of qualitative and quantitative methods was used during the research, to assess the impact of organisational change on safety culture. A quantitative attitude survey was combined with semi-structured interviews and observation. Parallels to O'Loughlin's research and this single site study are evident, both in methodology, but also in the following areas. O'Loughlin found that safety culture in the electricity company was dominated by engineering values with little appreciation for the human aspects of the concept. This tended to have a limiting effect on the advancement of the safety management systems in

place and under development within the organisation. In addition the main characteristics of the safety culture in place were underpinned by certain values and beliefs, i.e. consistent with a mechanistic world view. These values and beliefs were very stable over time and very resistant to change even during major organisational upheaval. In addition to this, the attitudes and behaviour of operatives was almost totally resistant to change. This is due to the existing safety standards having been developed over the years and in essence became accepted by the workforce, the result being that their attitudes were “trapped” consistent with these safety standards. This has very strong parallels to the perpetuating safety culture proposed within this thesis (see Figures 7.1 and 7.2). In order to break out of this stable culture and kick start an enhanced safety culture, O’Loughlin suggests that the following should be agreed upon, via wide consultation:

- Agree broad principles of Health Safety strategy / approach.
- Set up a balanced and representative team to consider implications and to develop strategy.
- Identify priorities, time scales and resources.
- Establish safety and risk awareness workshops.
- Establish implementation teams with terms of reference, responsibilities and budgets.
- Periodic reviews of progress.
- Amend or adjust programmes.

O’Loughlin (1998)

It can be seen that the above relies heavily on team work and consultation. This was tried to some extent in GPTL, with the formation of safety committees and safety forum. However, the culture at GPTL proved too restrictive for these bodies to function properly. To help explain further and to support the single site nature of this research it is pertinent to look at the work of Kirk (1998) again.

#### **11.4.2 Rubber Industry – Multi Site Study**

Kirk (1998), as already outlined in chapter three, conducted a multi-site study within the Gates group. The broad findings have already been outlined, however there are particular points that are relevant and consistent with both the work of



O'Loughlin (1998) above, and with this thesis. One of Kirk's (1998) main findings was that GPTL, Dumfries had cherry picked the TQM implementation process. A heavy reliance on an authoritative managerial style to deliver technological and engineering solutions combined with a strong focus on customer requirements delivered enhanced business results. Of the six plants in the study only two had actually achieved full implementation of TQM according to the prescribed route. The process failed in the European plants due in large part to the lack of "guiding coalitions." These can be thought of as participative steering groups which oversee the process and allow buy in from all sectors within an organisation. The result of these missing steering groups was a lack of leadership, and drive resulting in disjointed programmes. Kirk refers to this as a low incentive for change. In the context of this research this is central as *without incentive for change the status quo will remain*. Kirk (1998), O'Loughlin (1998) and this thesis suggest that *irrespective of ability to implement change or receptivity within the site for change, without adequate incentive nothing will alter in terms of organisational functioning*. The other two key common threads running through the pieces of research are the central role of participation and that of motivation. It is on the subject of motivation that we now turn to a single site case study in the catering industry.

#### **11.4.3 Catering Industry – Single Site Study**

Hawkins (2001) conducted primarily qualitative research in the catering industry looking at the implementation process of a Safety Management System (OHSAS 18001, BSI 1999). One of the main parts of Hawkins' work was the motivation for SMS implementation within an organisation. Citing the work of Wright (1998) Hawkins points out the central role that motivation plays in initially making the decision to implement an SMS, and also in facilitating the actual implementation process itself. It was found that a key motivator in successfully implementing an SMS within the case study site was the desire to be "ahead of the pack." This is directly linked to the aspect of felt need within the OSH model of change developed in this thesis. In contrast to GPTL the catering company had management with a sound appreciation of the health and safety risks within the business and also of the appropriate background. This appropriate background refers to a background aiding the ability to lead in OSH and appreciate the central roles of communication and team building.

This particular catering site achieved certification to OHSAS 18001 (BSI 1999). It is interesting to point out that this was the second time that the catering company had attempted to gain certification.

The initial attempt, at a different site within the group had failed, partly due to a failure to appreciate the difficulties of integrating the SMS into a QMS, and partly due to resistance from staff, apparently from a lack of involvement in the SMS process. The failed attempt was at a site which had ISO 9002 certification which was later deemed as too “narrow” in scope to cater for the human aspect of an SMS or for the actual scope of the SMS itself.

The successful site relied heavily on team work and communications to achieve a smooth implementation process and certification to OHSAS 18001. There are two interesting points to note from Hawkins’ work. These are the primary role that incentive / motivation plays in the implementation of an SMS which is consistent with this thesis, but also the fundamental role that the softer aspects were deemed to have played, in the catering site achieving a certified SMS. These softer aspects played no such role on GPTL implementing an SMS. The SMS at GPTL also received certification a few months after the site research was completed. This perhaps points to the need for more extensive research in these areas to allow conclusions to be made with greater confidence. Alternatively, the catering site may have had a much “fuller” SMS than GPTL, with incorporation of human factors. The GPTL SMS is geared towards compliance with a standard, with no real intent or willingness to take on board the “spirit” of the standard.

What these studies above demonstrate are common themes. These are the importance of incentive to the implementation of an SMS and also the central role of human factors. The research within the thesis has implications which are highlighted below for future follow up research and as propositions for further investigation, consistent with the exploratory nature of a single site case study.

What is detailed below are the implications of the research, the future of OSH management systems, motivation for OSH and finally limitations of the research and further suggestions for research.

## 11.5 Implications of the Research

### 11.5.1 Pre - Intervention Template

1. One implication from the research is that implementation of an OSH management system may not necessarily equate to an improvement in OSH performance. If the influencing factors affecting change are not taken into account then the expected benefits that may be reaped may not appear. Prior to implementation of an OSH intervention it may be appropriate for an organisation to assess its status against the core factors identified and ask the question do we really want to go down the route of change, given our status against the core factors. In a sense this is being done in industry by use of safety climate measures and attitude surveys. The implication from the research is that even before investing time and money in an initiative such as an attitude survey, some degree of soul searching by the organisation against the template described above may be in order. In essence an organisation can utilise the key factors dimensions and test the water prior to implementation

2. What is the ability of the organisation to introduce and manage the change? Aspects such as communication, leadership and commitment, behaviour and managerial style should be addressed within the context of the overall organisational culture. If the dominant managerial approach remains in the traditional management era then again ability to absorb and drive the change may be impaired.

3. The final question to ask within a facility is how receptive is the plant to change, how accommodating will the facility be to intervention? The management may have the ability to introduce change but it may be impacted upon by the receptivity of a plant's workforce. Central aspects such as the status of trust and risk perception should be taken on board at an early stage. Alongside these and amongst other aspects the legacy from previous successful or unsuccessful changes should be accounted.

In essence a template using the above core and medium level factors can be proposed. A template against which the organisation could be assessed and the

angle of approach to an intervention altered in sympathy with the findings. For example long term strategies driven by corporate senior management and integrated into more general human resource aspects such as communications programmes may yield benefits.

#### 11.5.2 Safety Culture versus General Organisational Culture

The second main implication for the OSH practitioner is whether can many of the softer, safety culture / climate factors above succeed within a general organisational culture that is not sympathetic to issues such as open communication and empowerment? That is, can the safety practitioner swim against an organisational culture and hope to succeed and develop a proactive safety culture typical of ACSNI's definition? By being aware of the core factors much effort and stress may be avoided at practitioner level and OSH strategy and goals realigned to suit.

#### 11.5.3 Lessons in Other Disciplines

Thirdly, there may be lessons to be passed into other academic spheres where similar approaches to change have been tried. There is also the fact that the framework model proposed by Kirk has now been adapted (albeit to a fairly minor extent) and used in the field of OSH. Looking at the key elements of the model, incentive, ability and receptivity, the model could be applied in other areas, in particular change which involves people. A general framework model of change which can account for the core influences on an organisation introducing an initiative involving people can be applied into areas such as environmental management and HR issues.

### **11.6 Discussion on OSH Management Systems**

The research raises a number of issues in relation to OSH management systems. OSH management systems are in a state of flux with three parallel standards – HSG 65, BS8800 and OHSAS 18001. As yet there is little agreement on whether there should be an accredited ISO standard for OSH. If the literature from BSI is a guide then customer demand for OHSAS 18001 is rising in a fashion similar to ISO 14001.

What the research has shown that it is possible to build an OSH management system which has scant regard for human factors and to also achieve a certified system that has minimal regard for aspects such as communication or participation. The result of this is that false expectations of what an OSH management system is capable of delivering may be present and in the appropriate circumstances the system may have no real effect. The whole concept of OSH management systems appears to be so heavily tied into human factors so that to deliver real improvement in one equates to improvement in the other, with the reverse also true.

When we look at other disciplines such as quality it can be seen that disillusionment followed the take up of QMSs and the ISO 9000 series. That is, the systems did not deliver the expected results. The concept of TQM as discussed in chapter two was taken on board to help develop ownership and achieve the potential rewards. If the lessons from ISO 14001 are taken on board it could be argued that certifiable systems, whether environment or quality do not automatically equate to improved performance. Indeed there have been some very high profile cases involving major pollution incidents and prosecution where sites have achieved ISO 14001 certification (ENDS Reports Numbers 309, 311). It could be suggested that OSH management systems will not automatically equate to improved OSH performance, perhaps even less so than ISO 14001 as environmental aspects tend to be hardware dominated. That is environmental risk for a facility tends to be clustered around specific emission points to the environment with a heavier reliance on technology than on the softer / human aspects.

### **11.6.1 Motivation for OSH**

This section takes a look at the issue of motivation, particularly in light of the case study evidence. Where there are primary and secondary business issues and OSH lies firmly in the latter camp – how might motivation be increased? There are three main avenues explored. These are financial motivation for OSH, integration of OSH with quality and / or environment and thirdly the aspect of six sigma and its relevance to OSH will be examined.

### **11.6.2 Financial Motivation**

In terms of OSH increasing its profile within the case study site there may be scope for expressing OSH performance in financial terms. Where costings of incidents and accidents can be calculated, then this may increase motivation for OSH improvement and enhance incentive and ability in terms of the OSH model of change. An HSE study which started in the late 1980's and most recently published in 1997 (HSE 1997) found that for every £1 of accident cost covered by insurance there was between £8 and £36 of uninsured cost. The ability to accurately cost accidents is a complex matter as there may for example be beneficial cash flows arising from the activity that actually caused the accident, i.e. the accident causing activities may have caused some financial benefit in the short / medium term (Shimell 2001). Whatever the pitfalls in measuring the costs of accidents accurately there could be benefit in converting the lost man days and incidents into down time on production.

The illustrative example of the contributory effect of the company safety culture in chapter nine detailed a near fatality. This incident closed down two coating lines impacting heavily on other European plants' production. A cost could be calculated for this down time, similarly with the operator cover required and the excess on the injured party's civil claim. A recent study (HSE 2001) gave the average incident costs within a rubber goods factory as £530.74 for an over one-day absence incident. This was not inclusive of clean up costs, disposal of waste, replacement labour, reworking product or consultancy fees, therefore costs may well be higher. In addition it was proposed by Tomkins Plc, the parent group, to adversely load the employers liability insurance premiums by fifteen percent for plants with a poor OSH performance. All of these figures – insurance premiums, lost time days, production down time and, shift cover for injured workers can have a monetary value attached. This may help raise the profile of OSH in the eyes of the management and allow it to progress closer to becoming a first level business issue.

### **11.6.3 Integration of SMS with QMS**

The key point here in terms of motivation is that SMS may reap some of the benefits of a positive culture / attitude to quality management by integrating the two systems. In terms of the case study site this would effectively give OSH an opportunity to perhaps become a first level business issue. This point of OSH

feeding from a more positive quality culture / attitude is recognised by IOSH (1998) when they detail the advantages of integrating management systems. However, the opposite may also be true in that the poorly developed safety culture within the site may weaken the stronger position of quality management if integration were to occur. IOSH (1998) highlight that there may well be savings in terms of cost effectiveness as well as a combined momentum from OSH and quality management that could help overcome any obstacles that arise in pursuing continual improvement. BSI (1994, 1996, 1999) recognise that there are similarities between the management standards for quality, environment and health and safety. However, it may well be the case that the apparent similarities may prove difficult to overcome in practice for the reasons given by IOSH (ibid.), for example professional tension between quality and safety. In addition, safety standards are not internationally recognised ISO standards in the same way as the ISO 9000 series. It may be too early in the development of integrated systems to say that quality and safety should be integrated on the case study site. But, it may be prudent to align them as much as possible to have the option of integration, if this is deemed to be an effective strategy for the future. By alignment, this refers to management systems that are parallel but specific to each discipline (quality or health and safety), with common features in terms of content and structure. Full integration refers to the existence of one top level “central” standard with optional parts covering specific topics as required.

#### **11.6.4 The Development of Six Sigma**

Six Sigma refers to a quality management programme that is designed to achieve very high levels of quality control over a product. Essentially it emerged in the late 1980’s in Motorola and refers to a product defect rate using a sigma measurement scale. This sigma scale ranges from two to six and defines how much of a product’s or process’s normal distribution is contained within a specification. The crux is that the higher the sigma value then the more of the process or product is contained within the specification.

A standard bell distribution curve is used and actual data from product / service specification is used to calculate the mean and this is transposed onto the curve on the graph. Sigma levels are marked upon the bell curve showing up to six standard deviations from this calculated mean. This is presented below. Product

or actual service data is over layed onto this diagram and a sigma level read from it.



**Figure 11.4 Six Sigma Process Defined**

(Source : Motorola 1999)



Organisations adopting such an approach strive to reach six sigma which equates to 3.4 defects per million. Which means almost 99.99999 % of their product lies within the area under the curve illustrated above. The table below illustrates the defect values at varying sigma levels.

**Table 11.1 Six Sigma Process Capability versus Errors per Million Opportunities**

Sigma Process Capability	Defects per Million Opportunities
6	3.4
5	233
4	6,210
3	66,807
2	308,537

O'Rourke (2000)

The approach involves six steps and can be utilised for all parts of an organisation. For instance, in applying the principles in OSH, the defects can be an employee recordable injury or illness with the opportunity for error in a unit (a unit in this instance being an employee) being the number of man days worked per year. The same approach can be taken to lost days due to illness or accident. This will allow a calculation to reach a sigma level. The most important aspect is the philosophy driving six sigma. The causes are identified that create defects, in the case of OSH these are injuries or lost time days. Multi-disciplinary teams are trained and set up to tackle these causes as specific projects and highly visible performance charts are devised. Injuries and lost man days can be expressed in terms of a percentage cost of total manufacturing costs and the OSH practitioner uses the same terminology as production and quality. Within the case study site six sigma is being implemented and this may be an opportunity for OSH to redefine itself in terms which are more amenable to the culture within which the study took place. By showing safety in six sigma terms it will have an increased probability of constantly being on the management agenda.

The motivators discussed above constitute potential sources of enhancing OSH profile within the site and increasing levels of incentive with respect to OSH.

### **11.7 Limitations of the Research and Suggestions for Future Research**

This section takes a reflective view on the research and asks the question – did the research actually work and what were its limitations and flaws. The primary limitation is that the study was a single site project and this has been discussed and referred to above, when comparing with other studies. Additionally, Kirk (1998) makes the point that many of the factors in the TQM model are software based, subjective and difficult to quantify. A qualitative approach was used to generate the primary data and develop the model. However, to counter this the study was anchored in the previous works of Hunter and Beaumont (1993), Wright (1998) and Bottomley (1998), in addition to using the HSE safety climate measure as a quantitative measure. The point is, that the results of all these studies point in the same direction as this research and have results consistent with this research. Any criticism that could have been levelled at the measure used to assess OSH performance was offset by utilising a host of secondary OSH performance measures to triangulate the primary measure of accident / incident statistics.

The selection of factors as either core, medium or low level influences could be criticised as unscientific and subjective. However, the justification for allocating factors a rating was done through the literature to allow transparency of the whole process. Weightings were selected by using a tried and tested loading illustrated in the EFQM.

The limitation of the research is essentially that the study was carried out in only one plant within one organisation and as such it is difficult to generalise with a very high degree of confidence on the utility of the model within other settings. The counter argument to this is that this is the very strength of the research. A participant observer, on a single site, can offer a uniqueness in terms of the internal workings of an organisation which in effect can lay the organisation bare, allowing a greater insight and greater confidence in results and data.

The primary suggestions for possible future research are to further consolidate the model developed, by conducting a multi-site study. In addition, the areas of incentive, ability and receptivity can be further studied in depth as single vectors of

change themselves. This latter aspect has already been alluded to by Hawkins (2001).

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16 Say you personally needed to raise a safety issue – how would you do it ?

**Trade Unions**

17 What about unions in general - do you think they carry much clout at GPTL ?

**Trust / Blame Culture**

18 What do you think is the main cause of accidents ?

**Additional Questions**

19. How do you think levels of trust are on site between management and operators ?

*Has this changed over time ? Why ?*

20. The take up of the near miss system is low – why do you think that is ?

21. What do you think of the effect of the training that has been done ?

*Why ?*

22. What do you feel the effect of the assessment teams has been ?

*Why ?*

23. There has been more involvement from operators in inspections, audits and the like – do you think that this has had any impact ?

*Why?*



**Management Interview**

Interviewee

Time

Date 2000

( look up data from 1998 for A-E and attach at end script, if manager has not changed )

- A. As an introduction could you give me a short history of your background and experience ?
- B. Have you ever been involved directly or indirectly with any serious injury or incident ?
- C. Does this affect your thinking regarding health and safety issues ?
- D. What degree of contact do you have with Robert Denholm ?
- E. Are there any safety / risk management issues that you have discussed with him ?

As you know I am studying at University and would appreciate it if you could answer the following questions as openly as possible. Obviously answers are confidential.

**Perception**

- 1 How do you feel we are doing at the present time regarding safety performance?
- 2 Do you feel that our position has changed in the past few years ?
- 3 How do you think we compare to manufacturing in general ?
- 4 Do you feel that safety can be restrictive on plant activities ?
- 5 What do you feel are the key things driving safety ?
- 6 Do you feel that it is a central business issue ?

**Communication**

7. Do you feel that there is a heavy corporate drive on safety ?
8. How are communications between managers ?

**Managerial Style**

9. What has been the most effective method of driving change ( eg. ISO 9000, 14000. ) in the plant ?
10. In a general context what do you think of the issues of empowerment and participation?

**Trade Unions**

11. What about unions in general - do you think they carry much clout at GPTL ?
12. Generally speaking do you perceive Trade Unions, safety reps as having a role in safety?

**Trust / Blame Culture**

13. What do you think is the main cause of accidents ?
14. If you were to identify key elements that made GPTL tick what would they be ?
- 15 How do you think levels of trust are on site between management and operators ?  
*Has this changed over time ? Why ?*

## Appendix 1 – Interview Questions

16 The take up of the near miss system is low – why do you think that is ?

17 What do you think of the effect of the training that has been done ?

*Why ?*

18 How effective do you think the safety committee is ?

*Why ?*

19 What do you feel the effect of the assessment teams has been ?

*Why ?*

20 There has been more involvement from operators in inspections, audits and the like – do you think that this has had any impact ?

*Why?*

**Interviewee: HR Manager                      Time 1:40 pm**

**Date 19<sup>th</sup> November 1998**

A. I joined Gates 16 years ago from ICI. I started in compensations then joined personnel in a generalist role for 14 years. I spent 10 years at Gates Rubber and the last 6 at PT.

B. Well there was obviously T. Munro getting trapped in the spreader. T. Miller etc. There used to be episodes in footwear regularly with solvents I think. I deal or would deal with relatives, admin, etc.

C. A massive one sticks in my mind in Gates Rubber when fumes from solvent caused people to drop like flies. First aiders and ambulances were all over the place. The problem was that fumes were blowing back out the portacabin where people were trying to recover. There was a few ambulances that day.

D. Too much eh? It's daily and constant.

E. Not as such in isolation. For example things like first aid requirements I wouldn't go to him. But if there is anything that needs a decision then I go to him.

1. Probably in my eyes I would say yes we have a safe. What we have here is not what you realise when you think manufacturing. If employees weren't so stupid it would be even better. I can compare it with Gates Rubber and other companies. My own exposure to incidents. The only really bad one here is the T. Munro one, on the whole we are not bad at all.
2. I feel things are much better than in the past few years we have under gone steady improvement. It's an environment we should be happy to work in.
3. The very nature of the other plants is old and the first impression is that we are better as we are more modern. I have been to others - BNFL, the cheese company, ICI and in some of these there is near paranoia. They have also been going longer and that's why there perhaps doing it better.
4. I am aware of what goes on in manufacturing and safety is a necessary evil that's got to be done. It's perhaps not all negative as putting a guard on a machine can help.
5. (Immediate response) Legislation is one of them. PR is another. There is also corporate company wide. Pressures and attitudes. Awareness is being raised among us and the employees. Our willingness to absorb safety has increased as well as attitudes to safety have changed because of legislation making it more public.

6. It's a key issue as there are business objectives devoted to safety and this makes it so. In a day to day working it has to be - the very nature of things means it can't be avoided.

But having said that at a local level I can't say I think safety every day because I don't. As far as being a topical issue running a business doesn't really involve safety as such. There are key business decisions to be made but that doesn't mean safety does it?

7. Oh yes, corporate have a very strong focus on safety we have objectives in relation to statistics. Locally we do feel it because there are corporate objectives which Robert has to cascade down to departments. Although I'm sure you can answer this better than me. ( Mgr. uncertain over this aspect )

8. On the whole we are a fairly small team, small enough for communications to be good. There aren't any great barriers across the way, I mean we don't depend on letters or telephone calls., Some communicate better than others and some don't think it through. There are ample opportunities for example the Monday morning meetings, there is no excuse for not communicating.

In spite of this things like labour and over-manning it's only when things are miles down the line that a manager finally comes up with information. Another great one is booking training courses and not telling me - it's not a case of obvious obstacles, sometimes it just doesn't happen.

9. By force!! We have tried to be nice and gone down all this participation route for example at finishing end, but at the end of the day when change is needed, then they must be driven hard. It tends to be the production and myself that drive things.

10. Airy fairy crap!! Theory sounds great but there are question marks all over it. It doesn't happen here - the shop floor are incapable of being empowered. It would be anarchy - some of the petty things that are raised are incredible. Empowerment and trade unions cannot go together in this environment. Look at the attitudes towards temps being paid off? - get rid of them!, who cares. People are not competent or open minded enough on the shop floor., We inherited a brownfield group who are old and totally against any change of any kind. They will never pull together as we have a transferred culture from the old company. I'll not see it here in my life time.

11. We have two unions GMB and AEEU the closed shop went out years ago but there is still virtually a 100% membership. When it comes to employees relations -change then this is the main form for practices and policies. But safety should go through them although ISO 14001 didn't go through any unions. On the whole employee relations aren't bad we have only had one grievance in the past 3 years. With terms and conditions they have, there is no reason for poor industrial relations.

12. No, not Trade Union reps as they have other agendas. But yes for other types of safety reps. The shop floor should trust these people rather than go to their supervisor or co-ordinator.

13. Human error and negligence is one of the keys but at the same time we shouldn't allow people to make errors. 9 out of 10 have human element impact I can't recall any mechanical failures for years now and even then these are few and few between. I am conscious of the fact that we shouldn't put them at risk but the Co. can only anticipate so much - until an idiot comes along. I know we were at fault with T. Munro ( arm mangled in between rollers ) but he was stupid to do what he did.

14. Leadership and leadership commitment are central I could be cynical and say wages and job security, but we need leadership or things will not be driven - it's nice to be participative but at the end of the day business decisions must be made and actioned.

Within the management group there is a desire for Gates to be the best plant in the world. Further down it's a case of joe and jenny are interested in nobody else but joe and jenny.

No doubt when you spoke to Mike (U.S. gaffer) he would be more in favour of participation and that. But he is not as effective as when someone gets a good bawling out. One guy put a stupid suggestion forward, he should've have been taken to the side and got a f\*\*\*\*\* rolicking to sort him out.



**Interviewee: Product Engineering Manager. Time 1:15 pm**

**Date 18<sup>th</sup> November 1998**

A. July '73 joined from school, assistant accounting ICMA certificate 73 - 75. - college OH grade ONC rubber tech - R & D testing - '78 various functions within P.T. division, - lab tester and technician Prod. Eng. - HNC - Prod. Eng. Manager.

B. nothing at all

C. N/A

D. Almost daily basis. Very close contact. From 7:30 in morning to 9 at night if need be.

E. No its all production related stuff and engineering, no formal or informal safety stuff.

1. I would say overall my opinion is that our safety record is good having no fatalities due to operation and purpose built factory is akin to low risk. Perhaps still a lack of awareness of unsafe acts still present at a shop floor level.
2. In last 2-3 years people are more aware and safer place because of this increase in awareness.
3. Having viewed Belgium as our |European HQ we are certainly as good as the rest and better than most. Balsereny and Aachen are a bit too fragmented to compare but generally we are good V belts in Aachen and Balsereny looks more risky as it is very labour intensive, etc.
4. Very difficult to say. Can't really comment on that one, don't want to.  
( laughter at this )
5. Key things pushing it along – well in my opinion - industrial management having a greater awareness of individuals right for a safe environment. Mostly legislation and but perhaps a moral and ethical duty is being realised. It's not all just about making money, you know.
6. Power Transmission plants in the past, well their attitude was very much - suppose I've got to have safety – and I need a certificate to prove it. Whether we believed it or not it doesn't matter the bit of paper was the thing. Greater awareness that it is required as part of business and claims in past, but not a core aspect of the business though.  
But take things like claims - I thought that when a claim arose it was passed up the tree I didn't realise insurers haggled over claims and lawyers got involved and stuff.

7. As if it is being top driven I would say no, a big no !! i.e. Belgian doesn't matter to us here - it's more a local thing whether this good or bad don't know. I get no formal or informal information from the centre and locally but I got a H & S file in the past from your predecessor but I put it in a cupboard, its still here though a bit dusty. The problem is any system has got to be live and not a meaningless folder exercise to cover butts..

8. Excellent !! Take the cord splicer to save cord. A Risk Assessment was undertaken with all involved in this, all the managers. Safety was a concern here although I had no actual personal involvement in it myself. New projects are very open e.g. commodity group meeting between management team - very open. 2,3,4 mgrs sit in on projects, Breakdown - team approach and delegation breaks down via communication some instances of breakdown where I delegate the meeting to some body else, there can be feedback problems, communication flows are free generally.

9. Top driven for QS ISO 9000 much clout for getting there and publicised in spectrum and envirofocus. ( previous now stopped Gates corporate newspaper ) Driven by a felt need to beat others, within Gates Power Division. Driven hard from the top down at plant level, very hard.. EMS was driven dictator style, ISO 14001 ? make no mistake on that. We were all given targets and told to be committed or else.

10. Pxxx!! ( very strong feelings ) Not workable in reality. (Very strong feelings!) Involved in G.Q.C. crap – its not worked. It is a good philosophy but all talk. Boils down to doing a job - total empowerment is a dream. 25 teams would be very good but we need belts out the door, that's why we are here.

11. They tried to get a staff union in the old Uniroyal days but it was bombed out. Management at the time didn't recognise it. The problem is

David that the HQ of Gates in Denver is not union orientated. Probably do not carry much weight – they work here 24 hrs 7 days a week and if they rejected the pay offer what could they do ? You know and I know - not much.

12. I am not sure – would it not distract them even more from their work ?

13. I couldn't say, ( pause ) but perhaps in ranking them in some form of order ? -  
operator error is the main one and equipment malfunctions is another. Silly xxxx as well sometimes.

14. Committed individuals, a hell of a lot who believe in the company.  
A lot of job satisfaction.  
Strong leadership and team of managers.  
Many want GPTL to be best in world basically.

**Group Interview No 7**

**11 operatives in total    Date: 4/11/00    Time: 9:30 AM**

Group were fairly receptive and feedback was good, overall attitude was favourable, after a slow start.

Participants were late as shift coordinator had forgotten about H & S training. Comments received included -

First we get to know about this is 5 minutes ago We get told of \*\*\* all in here until the last minute.

What is this anyway, some sort of safety meeting ( fairly negative attitude at start by some )

1.        General impressions were fairly positive in terms of working environment. There's the odd thing but nothing major.. ( Consensus on this particular issue was high ).
  
2.        General feeling was of being as safe as a few years ago. See they used to tackle things a few years ago ventilation and the like and then it just died all of a sudden - no interest. Overall feeling was that treading water safety improvement wise in past few years.
  
3.        Well compared to across the road we are doing great - but that's because of the age of the plant nothing else. All had worked across at old plant and viewed new plant as vast improvement. ( consensus ).
  
4.        That depends on who you are talking to – if its us then yes we can see how safety could restrict output but would be willing to follow safe procedures. If its them then they will never say it will effect production but expect or look the other way if something dodgy is going on.

### Appendix 3 Interview data for groups November 2000

5. Definitely the law isn't it. It's got much tighter in the past 10 years. Much of it is a cover your backside issue - to stop (\*\*\*\*) getting sued. Even our shift coordinator knows that we can sue them now and they run scared at times.

All negative drivers regarding OH & S

6. Focus at GPTL was:

1. Production/output
2. Finance/costs
3. Quality
4. HS & E//employee relations

A big gap exists between 3 and 4

On being asked why employee relations was low this was met with laughter  
You have been here long enough to know the score now, We are probably the reverse of that list

7. This raised laughter from most people. The supervisor is our main contact and he is production orientated. He carries the can for so much.

8. The H & S committee doesn't exist. Never had one have wet? No we had one but it was only a puppet - totally ineffective because management will not address issues. Not really because we cannot effect it. We don't raise much because nothing will actually get done – you'll see.

9. Laughter all around. No chance, very closed case.

10. We would raise safety via the shift coordinator. We would get a rollicking for not raising things through the right channels. There's a hierarchy that we must adhere to. Consensus on issues here very much a case of group think. All work together therefore not perhaps not surprising.

It's very much a resigned attitude ( for safety issues ) If it's got to be done it's got to be done.

We are just here to carve out a living and that's it. ( apathy at their own situation ).

Don't get me wrong our shift coordinator is a great bloke. It's above him - you never see them and they're not interested. We wouldn't approach any of them with a safety problem - perhaps with the exception of \*\*\*\*\*.

Take the heavy nuts on the moulds at Delta cell. I was just ignored as far as this is concerned, nobody says why. You know we could do our backs in trying to unlock them with the wenchers? We suggested to them that an air gun would be best - an engineer said he would rig one up on Saturday - he never appeared. Knocked on the head from above.

11. We could never approach management  
(Consensus on this point). Only contact via shift coordinator. At the end of the day they just turn a blind eye. Don't really bother with things like safety. "Safety is just a bolt on - sometimes.

12. Again there is a set of channels for these things and they must be followed. Whether you can change anything I don't know. Doubt it. P45 time if he rocks boat too much.

13. Mushroom syndrome I am afraid. We get told very little. Used to be briefing meetings but they took too long.

Appendix 3 Interview data for groups November 2000

14. You get the picture now David, you promised all sorts of safety stuff and it got nowhere, Its not your fault, it's the way it is. You are staff so what chance do we have.

15. It is talked about if we hear of an accident in our area, but it is generally a while later before it feeds through the grape vine, down to us. We are here for one thing and one thing only – money, this is all very well but we are not going to get anything different. We have been here before.

16. Covered already.

17. We have discussed that one have we not. The unions in here are non existent.

18. 1. Carelessness Own fault most of the time isn't it?  
2. Tiredness (particularly night shift and lighting)  
3. Production pressure  
4. Job rotation "All over the ship at times".  
5. Unsafe equipment.  
6. Lack of training ( 3-4 months in 3-4 days training now).

19. Too much a them and us , Too much secrecy over the past year or two, particularly with the 5M products and stuff that hey brought in under cover. They were very distant anyway and the way we were treated did nothing.

20. Never really work in here because communications are so bad towards us I filled one in once and it disappeared never seen it again and never had the courtesy to get it back. They know where things are wrong anyway, so why repeat it to them,. Stir it up too much and you will be a trouble maker. Too much hassle,



### Appendix 3 Interview data for groups November 2000

that's not our job anyway, its down to the coordinators. As we have said before we cant change anything so why should we try.

21. Its not being done for the right reasons – when your told its to stop you claiming how can we get enthusiastic about it. Sure we now know things like rubber fume can do you in and also the controls on the vulcanisers to stop them exploding. But in terms of effect difficult to say. ( Nodding in agreement ). Its done little for me.

22. Well I was on one the teams for my area and we did get some things fixed, but not as many as we had highlighted. I felt that the assessments themselves were perhaps taken as a paperwork exercise. We did raise things as they were going round but at the end of it at the sharp end we don't see any great changes.

23 It has some impact but it's like the assessment teams. If you point out things that are always there then they get ignored. Too often issues that have been brought up are swept away, until somebody gets injured. Inspections now are only a cosmetic, housekeeping exercise.

**Group Interview No. 17**

**Finishing area 12 operatives**

**Time: 9:00 am 'A' Shift**

**Date 16<sup>th</sup> November 2000**

1. Well , it's much stricter across the road now that they do not use toluene. You only have to look at the air conditioning thing to see the state of it, it's black. Consensus was on fairly poor.

They don't do 12 hour shifts across the road. I would like to know if there is some link to the number of accidents.

2. We still have MEK and Toluene so we are not really improving we are more or less the same. No real changes anywhere – if anything there more product going out the door, so it must be more hectic – eh?

3. I don't think there are many in here that have worked anywhere else, so its hard to say. I worked in construction with a local builder and I say its quite good. We get safety shoes and things provided here.

4. Listen management forced us here. We only take it as 2 hours off work, like all the other things, 2 hours off nothing else.. We went on a manual handling course where we're shown how to lift a pox of paper. We were told that the next day or so somebody would come round and tell us what we were doing right or wrong. We are still waiting. They are more interested in getting us to sign a sheet stating we had been on it. All to cover backsides.

5. The law is the main thing isn't it? Ambulance drivers that's the key thing pushing safety here - accidents actually happening. Adverse publicity because of getting done. There's also the fact that they will be an employee down and therefore less production. They're forced to do all this not because they want to.

6.

Managers

Ops.

1. Produ/Output

1. E. Relations - we want good conditions and to go out the way we came in.

2. Finance Cost

2. Safety/Environ

3. Quality

3. Quality

4. Safety

4. Prod/Output - F. Costs

5. Environment

6. E. Relations is the bottom of the pile I can tell you that much

7. Never used it. ( Nobody had used it. )

8. Vague looks regarding H & S committee I take it's another 2 hours off work then, eh, for those on a committee. Had all this before, nothing changes.

9. Never heard of unions being involved have you - why should they be?

General shaking of heads

10. The shift co-ordinator sometimes goes round with a clip board now and then.

We wouldn't raise it because nothing would get done. I raised the step ladders going missing and I got soaked in toluene as a result about a year ago. I run through the factory with my clothes off - I am still waiting for ladders - so what's the point?

11. laughter by all at idea of approaching manager for any safety issue.

This boy has worked here for three years and still does not know what the plant manager looks like. Managers never pick you up. Never see them anyway.

The only time you will see management is for a 1<sup>st</sup> 2<sup>nd</sup> or 3<sup>rd</sup>. Some people have been here for years and have never seen Robert Denholm.

12. Yes we could raise it with you but what impact are you going to actually have ?

Not that much eh ?

13. No, ( general head shaking all around ). We only find out about it when we get told we are being de-manned or moved.

14. Nope !! ( consensus ). You have about as much clout as we have !

15. Not unless somebody gets injured in front of your face. Of course when we near killed that boy then of course we discuss it.

16. Shift Coordinator – he's our only real contact.

17. They have the odd presence when they get our pay rise. But even there they can't do well. They can't talk at that level and are easily fooled.

18. Tiredness is the main thing with the 12 hour shifts. Say this to management and they don't want to know - they say you get 20 grand and should be as productive at the end as you are at the start. Production pressure because of storage problems with stock piling up. Human error is also a big cause. The only time we are given any directions for housekeeping is when visitors are coming. Machinery is never maintained unless it breaks down.

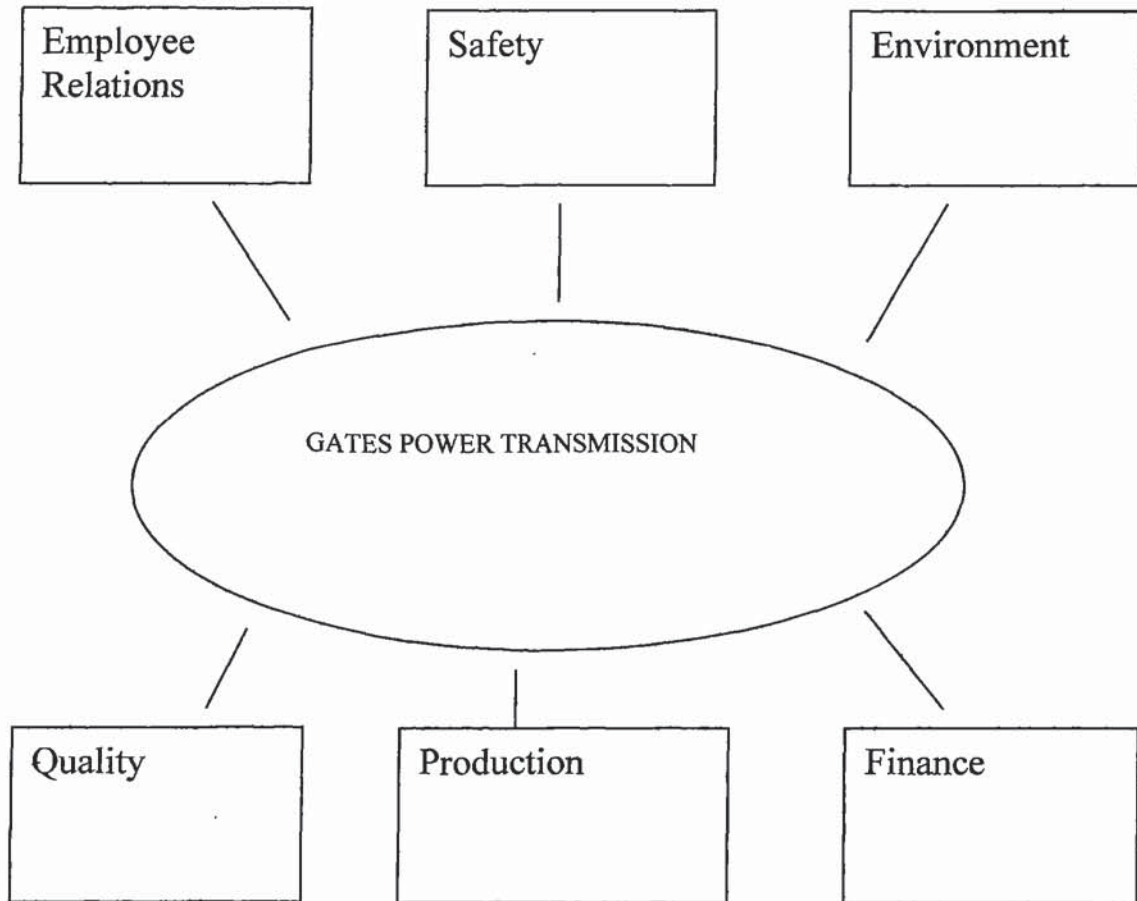
19. Do you blame us for not trusting them. You see folk walking around with bloody masks on and suites up like spacemen and never hear if its okay for us. Do we trust them ?? ( degenerated into high levels of cursing and swearing ) Moved it on to next question.

20. Extremely sceptical regarding the near miss form. Could you not have sealing edges on them so they can't read them? Healthy discussion revolved on finger pointing individuals who had highlighted issues. I have never actually seen one being used ever, so what's the question about. See what happened when we filled in the survey thing – it disappeared because they did not like it – so what's the point?

21. To cover backsides only so we can get disciplined. Look at manual handling things and those sloped barrow things, we got briefed on it and then if we didn't follow it we got pulled up.

22. I was on them and we got no where – what's actually changed - nothing. I could take you to the cell and the only thing that changed is when he hurt himself. That's right we identified that a bag could be dropped from the crane and nothing was done until it fell of and hit me on the neck. That was a year later ( bag weighs 60 kgs ) You wonder why we get pxxxxx oxx with the process?

23. Sure we see the co-ordinator walking around with a clip board going through the motions. We did get involved in inspections to begin with but the boat got rocked too much and they were cut right back. Just paperwork again.



**Appendix 5 Health and Safety Climate Survey**  
**STATEMENT DETAILS**

**Health and Safety Climate Measure**  
**Statement Details**

**FACTOR DESCRIPTIONS AND ASSOCIATED STATEMENTS**

The numbers at the side of each statement refer to the sequential order of the statements and are not important, other for reference. The negatively worded statements are in italics.

**FACTOR 1: Organisational commitment and communication**

The perceived level of organisational commitment to health and safety is a major influence on health and safety performance in practice. The series of statements in this factor seek people's opinion of this commitment as evidenced, for example, by their views on senior management's interest in health and safety, the provision of resources for health and safety, and the relative status of health and safety. Some issues associated with communication and involvement are also considered.

- 43      The company really cares about the health and safety of the people who work here
- 24      Senior management take health and safety seriously
- 54      Sufficient resources are available for health and safety here
- 16      Productivity is usually seen as more important than health and safety
- 20      Management only bother to look at health and safety after there has been an accident
- 9        Accident investigations are mainly used to identify who is to blame
- 51      Management place a low priority on health and safety training
- 39      Management would expect me to break health and safety procedures/instructions/rules to get the job done
- 11      Management sometimes turn a blind eye to health and safety procedures/instructions/rules being broken
- 5        There are good communications here about health and safety issues

**Appendix 5 Health and Safety Climate Survey**  
**STATEMENT DETAILS**

- 58 The company shows interest in my views on health and safety
- 18 Management always act quickly over health and safety concerns
- 19 I am always informed of the outcome of meetings which address health and safety
- 14 I feel involved when health and safety procedures/instructions/rules are developed or reviewed
- 31 The company encourages suggestions on how to improve health and safety
- 10 Suggestions to improve health and safety are seldom acted upon
- 46 The Health and Safety Committee makes an important contribution to health and safety here

**FACTOR 2: Line management commitment**

An important indicator of an organisations commitment to health and safety is how people regard the importance their immediate boss places on health and safety. Most people attempt to deliver what they think is important to their immediate boss. The statements in this factor explore peoples' views of the extent to which their immediate boss promotes health and safety and reacts to health and safety issues which may be raised.

- 49 My immediate boss often talks to me about health and safety
- 57 My immediate boss would be very helpful if I asked for advice on health and safety matters
- 62 My immediate boss is receptive to ideas on how to improve health and safety
- 66 I don't think my immediate boss does enough to ensure health and safety

**FACTOR 3: Supervisor's Role**

Supervisors have an important part to play in promoting safe behaviour. This series of statements seeks peoples' views on the contribution and effectiveness of their supervisors.

- 65 Supervisors devote sufficient effort to health and safety here



**Appendix 5 Health and Safety Climate Survey**  
**STATEMENT DETAILS**

3 Supervisors are good at detecting unsafe behaviour

8 Supervisors here are not very effective at ensuring health and safety

30 Supervisors seldom check that people here are working safely

**FACTOR 4: Personal Role**

Sustained success in ensuring health and safety at work demands that everyone recognises the importance of health and safety and actively supports the health and safety effort. The statements in this factor explore issues around the individual's view of their own contribution and relative importance of health and safety.

33 There is nothing I can do to further improve health and safety here

13 There is little advantage for me keeping strictly to the health and safety procedures/instructions/rules

1 Some health and safety procedures/instructions/rules do not need to be followed to get the job done safely

50 There are too many health and safety procedures/instructions/rules given the real risks associated with the jobs for which I am responsible

63 I sometimes turn a blind eye to some less important health and safety procedures/instructions/rules

55 Health and safety briefings are a waste of my time

**FACTOR 5: Workmates' Influence**

A strong influence on the way individuals behave at work is their immediate workmates or peer group. This factor seeks people's views on the importance which their workmates give to health and safety. The statements in this section were only asked of supervisors and workforce.

69 All the people who work in my team are fully committed to health and safety

71 I trust my Workmates with my health and safety

70 It is important for me to work safely if I am to keep the respect of the others in my team

## **Appendix 5 Health and Safety Climate Survey**

### **STATEMENT DETAILS**

68 My Workmates would react strongly against people who break health and safety procedures/instructions/rules

These statements, in factor 5, were not asked of managers.

#### **FACTOR 6: Competence**

People need to have a sufficient understanding of their responsibilities, the risks associated with their work and the instructions, rules and procedures in place if they are to work safely. The statements in this section explore people's views of their own health and safety training and level of understanding which they think they have achieved.

29 I am clear about what my responsibilities are for health and safety

64 I fully understand the health and safety procedures/instructions/rules associated with my job

15 I fully understand the health and safety risks associated with the work for which I am responsible

38 The training I had covered all the health and safety risks associated with the work for which I am responsible

44 Sometimes I am uncertain what to do to ensure the health and safety in the work for which I am responsible

#### **FACTOR 7: Risk Taking Behaviour and Some Contributory Influence**

Previous sections of the questionnaire explore some organisational issues and some factors which contribute to the general health and safety environment in which people work and therefore to the way they behave with respect to health and safety. The statements in this factor explore some issues on the extent to which people consider others to take risks or behave unsafely at work and why such practices may take place.

Some readers of this factor might feel that the statements naturally fall into two categories: other people's risk taking behaviour and some contributory influences. The statements have been reported in this way, however this partition is not based on statistical findings.

##### **Risk Taking Behaviour**

48 I can trust most people who I work with to work safely

23 People here always work safely even when they are not being supervised

## **Appendix 5 Health and Safety Climate Survey STATEMENT DETAILS**

- 34 People here always wear their health and safety protective equipment when they are supposed to
- 2 People who work here often take risks when they are at work
- 59 People who work here sometimes take risks at work which I would not take myself
- 40 Not all the health and safety procedures/instructions/rules are strictly followed here
- 32 Some of the workforce pay little attention to health and safety Some Contributory Influences
- 67 Supervisors sometimes turns a blind eye to people who are not working to the health and safety procedures/instructions/rules
- 53 People here are sometimes pressured to work unsafely by their colleagues
- 40 Action is seldom taken against people who break health and safety procedures/instructions/rules
- 37 People who cause accidents here are not held sufficiently accountable for their actions
- 60 People who work here are not recognised for working safely
- 21 People here do not remember much of the health and safety training which applies to their job
- 56 Some people here have a poor understanding of the risks associated with their work
- 28 People here think health and safety isn't their problem -it's up to management and others

### **FACTOR 8: Some Obstacles to Safe Behaviour**

One of the main controls employed by organisations to ensure health and safety is instructions, rules and procedures. This section explores people's views of the relevance and practicality of the health and safety rules and procedures as well as people's ability and willingness to comply with them. The results may provide some pointers as to why rules and procedures are/are not always complied with.

**Appendix 5 Health and Safety Climate Survey**  
**STATEMENT DETAILS**

- 12 Some health and safety procedures/instructions/rules are not really practical
- 25 Some health and safety procedures/instructions/rules do not reflect how the job is now done
- 26 Some health and safety procedures/instructions/rules are difficult to follow
- 41 People can always get the equipment which is needed to work to the health and safety procedures/instructions/rules
- 42 There are always enough people available to get the job done according to the health and safety procedures/instructions/rules
- 36 Some health and safety procedures/instructions/rules are only there to protect management's back
- 47 Sometimes physical conditions at the workplace restrict people's ability to work safely
- 7 Some jobs here are difficult to do safely
- 45 Sometimes it is necessary to take risks to get the job done

**FACTOR 9: Permit to Work**

Another commonly used means of ensuring a safe method of working is a permit to work system. The statements in this section examine people's views of the relevance and ease of use of the permit system.

- 22 The permit to work system is always strictly applied and followed
- 27 The permit to work system is "over the top" given the real risks of some of the jobs it is used for
- 61 The permit to work system causes unnecessary delays in getting the job done

**FACTOR 10: Reporting of Accidents and Near Misses**

A reliable accident and near miss reporting system is vital if accurate reactive measurement data are to be collected and used to inform the organisation's improvement process. The statements in this section seek people's views of the reliability of the accident and near miss reporting systems.

- 6 Accidents which happen here are always reported

**Appendix 5 Health and Safety Climate Survey**  
**STATEMENT DETAILS**

1 Near misses are always reported

General Job Satisfaction

4 My job is boring and repetitive

52 I am worried about my job security

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**Letter regarding strengths and weaknesses at Gates Power  
Transmission Ltd.**



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2 November 1998

**Re: Research into Health & Safety in the Rubber Industry**

Dear David

First of all, many thanks once again for volunteering to participate in the above research and for all your help in arranging the logistics of the visit both prior to, and during, our time on site. As promised, I am sending you a brief summary of our general findings. A copy of the full report will be sent upon completion of the visits. This is expected to be available in January or February 1999.

The main feedback takes the form of a series of bullet-points listing our perceptions of the organisation's strengths, weaknesses and opportunities with reference to the issues of safety management and safety culture. These are intended to be considered as purely descriptive and no weights are given to the categories, nor to any of the items listed under them. Hence a large number of listed weaknesses does not necessarily imply that the organisation's health and safety function as a whole is 'weak'; similarly a large number of strengths should not necessarily be viewed as being indicative of a 'strong' health and safety function. Furthermore, the items are not prioritised and hence no significance should be attached to the order in which items are listed under each section.

**Strengths:**

- Visible leadership on safety issues from the Factory Director
- Good financial resources dedicated to health and safety
- Good company policies on health and safety and the environment
- Staff morale was generally very good
- Production targets were reasonable
- A well paid workforce



**Weaknesses:**

- Many safety management systems are not in place, including an active safety committee, training, and health and safety related mission and vision statements.
- There was some evidence that the workforce were not aware of the hazards they faced.
- Poor communication of health and safety related information from management to the workforce and vice versa.
- Poor compliance to wearing PPE in some areas.
- No internal auditing for H&S issues

**Opportunities:**

- Opportunity to develop and implement a health and safety strategy
- Opportunity for improved reporting of near misses
- Opportunity to identify training needs and to improve training practices
- Potential to improve health and safety communication

I hope you find these pointers helpful.

If you have any queries on any of the items raised in this letter, please do not hesitate to contact me.

Yours sincerely



Jane Carthey  
Risk Assessment Section  
Tel: 0114 289 2542  
Fax: 0114 289 2444  
e-mail: jane.carthey@hsl.gov.uk

## Appendix 8 HSL Safety Culture Dimensions

### Bottomley (1998) Safety Culture Dimensions Indicators

<b>Key Issue</b>	<b>Good Example</b>	<b>Bad Example</b>
1 Commitment to safety by MD	<ul style="list-style-type: none"> <li>• Very committed</li> <li>• Talks about safety</li> <li>• A wareness of company initiatives</li> <li>• Care &amp; concern for workforce</li> <li>• Safety walkabouts</li> <li>• Commitment known and communicated</li> <li>• Resources to safety</li> <li>• Resources to training</li> </ul>	<ul style="list-style-type: none"> <li>• No commitment</li> <li>• Too busy to spend time on shop floor/or only time is because of production being down, or an accident</li> <li>• Unaware of any initiatives</li> <li>• No resources to safety</li> <li>• No resources to training</li> </ul>
2 Commitment to safety throughout management chain	<ul style="list-style-type: none"> <li>• Very committed</li> <li>• Talks about safety</li> <li>• A wareness of company initiatives</li> <li>• Care &amp; concern for workforce</li> <li>• Safety walkabouts</li> <li>• Commitment known and Communicated</li> <li>• Resources to safety</li> <li>• Resources to training</li> </ul>	<ul style="list-style-type: none"> <li>• No commitment</li> <li>• Too busy to spend time on shop floor/or only time is Because of production being down, or an accident</li> <li>• Unaware of any initiatives</li> <li>• No resources to safety</li> <li>• No resources to training</li> </ul>
3 Commitment to safety by supervisors	<ul style="list-style-type: none"> <li>• Safety part of conversation of all</li> <li>• General interest in safety</li> <li>• Aware of procedures and safety systems</li> <li>• Proactively try to improve safety systems</li> </ul>	<ul style="list-style-type: none"> <li>• Dismissive of safety</li> <li>• Safety viewed as an unnecessary burden of operations</li> <li>• Procedures are unnecessary paperwork e.g. accidents not reported because of the paperwork</li> </ul>
4 Commitment to safety by workforce	<ul style="list-style-type: none"> <li>• Safety part of conversation of all</li> <li>• General interest in safety</li> <li>• Aware of procedures and safety systems</li> <li>• Proactively try to improve safety systems</li> </ul>	<ul style="list-style-type: none"> <li>• Dismissive of safety</li> <li>• Safety viewed as an unnecessary burden of operations</li> <li>• Procedures are unnecessary paperwork e.g. accidents not reported because of the paperwork</li> </ul>
5 Visibility of Managing Director	<ul style="list-style-type: none"> <li>• Seen on shop floor regularly</li> </ul>	<ul style="list-style-type: none"> <li>• Staff don't know his name or what he looks like</li> </ul>
6 Visibility of management	<ul style="list-style-type: none"> <li>• See Line Management regularly</li> <li>• Involved in the investigation of accidents</li> <li>• Commend safe behaviours</li> <li>• Can see line management without presence of supervisor</li> <li>• Open door policy</li> </ul>	<ul style="list-style-type: none"> <li>• Only see line management when disciplinary action is involved</li> </ul>

## Appendix 8 HSE Safety Climate Measure

Key Issue	Good Example	Bad example
7 Production/Safety trade-off	<ul style="list-style-type: none"> <li>• Safety a priority</li> <li>• Anybody can switch the machine off if they think its unsafe</li> <li>• Methods in place to minimise the conflict</li> </ul>	<ul style="list-style-type: none"> <li>• Production is a priority</li> <li>• Bonus systems emphasising production</li> <li>• Workforce do not have the authority to stop the machine</li> </ul>
8 Claims	<ul style="list-style-type: none"> <li>• Management convinced that accident causation is not linked to insurance claims</li> </ul>	<ul style="list-style-type: none"> <li>• Management convinced that accident causation is linked to insurance claims</li> </ul>
9 Organisational Learning	<ul style="list-style-type: none"> <li>• Accident &amp; Incident Investigations chased up</li> <li>• Underlying causes sought</li> <li>• Follow-up and remedial action taken to avoid repetition</li> <li>• Obtain feedback on safety initiatives</li> </ul>	<ul style="list-style-type: none"> <li>• Blame victim or person directly implicated</li> <li>• Punitive actions taken</li> </ul>
10 Stability of business	<ul style="list-style-type: none"> <li>• Business on fine footing</li> <li>• Market expanding</li> <li>• Jobs secure</li> </ul>	<ul style="list-style-type: none"> <li>• Business in trouble</li> <li>• Redundancies</li> <li>• No job security</li> </ul>
11 Stress (objective stressors with potential for subjective stress response)	<ul style="list-style-type: none"> <li>• Production pressures manageable</li> <li>• Reasonable deadlines</li> <li>• Job is secure</li> <li>• Workforce can switch machine off</li> <li>• Job stable</li> </ul>	<ul style="list-style-type: none"> <li>• Unrealistic production targets</li> <li>• Job in jeopardy and uncertainty about the future</li> <li>• Ability to switch off machine rests with higher management</li> </ul>
12 Blame	<ul style="list-style-type: none"> <li>• Blame is fairly allocated (e.g. where clear violation of a safety rule)</li> </ul>	<ul style="list-style-type: none"> <li>• Staff automatically blamed following an incident and automatically disciplined</li> </ul>
13 Allocation & acceptance of responsibilities	<ul style="list-style-type: none"> <li>• Safety is everyone's responsibility</li> <li>• Clear about who to see to resolve safety issues</li> <li>• Safety advisor there in a support role and this is understood by workforce</li> </ul>	<ul style="list-style-type: none"> <li>• Safety issues are passed up the organisational hierarchy</li> <li>• Safety adviser is viewed as 'Mr Safety'</li> </ul>
14 Workforce involvement in safety-management process	<ul style="list-style-type: none"> <li>• Cascade system –from top management meetings through to staff meetings with mechanisms for information to go up and down the line</li> <li>• Staff consulted when changes that concern them are being made</li> <li>• Teams exist for changing work systems</li> <li>• Staff involved in risk assessment process</li> </ul>	<ul style="list-style-type: none"> <li>• Individuals coerced into safety committees</li> <li>• No consultation</li> <li>• No feedback</li> </ul>

## Appendix 8 HSE Safety Climate Measure

<b>Key Issue</b>	<b>Good Example</b>	<b>Bad Example</b>
15 Communication	<ul style="list-style-type: none"> <li>• Satisfied with pathways for communication</li> <li>• Safety adviser has access to board member</li> <li>• Feedback on initiatives provided</li> </ul>	<ul style="list-style-type: none"> <li>• Not satisfied with communication pathways</li> <li>• No access to board member</li> <li>• No feedback</li> </ul>
16 Mutual Trust	<ul style="list-style-type: none"> <li>• Mutual trust and respect for each other</li> <li>• This is between staff, supervisors and management, as well as between production and maintenance staff</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of trust between groups</li> <li>• Suspicion of others motives</li> </ul>
17 Morale	<ul style="list-style-type: none"> <li>• High</li> <li>• Stable or Improving</li> <li>• No evidence to suggest this will change</li> </ul>	<ul style="list-style-type: none"> <li>• Low</li> <li>• Changing circumstance and therefore pressure</li> </ul>
18 Perceived quality of supervisors	<ul style="list-style-type: none"> <li>• Trust in supervisor from both parties</li> <li>• Supervisor encourages safe actions, compliance with procedures</li> <li>• Democratic</li> </ul>	<ul style="list-style-type: none"> <li>• Supervisor's focus is on production</li> <li>• Pressure from management in terms of achieving this</li> <li>• Autocratic</li> <li>• In untenable position due to management &amp; workforce demands</li> </ul>
19 Standards of housekeeping	<ul style="list-style-type: none"> <li>• Mess dealt with efficiently</li> <li>• Trip hazards etc. minimised</li> <li>• General tidiness of work areas</li> </ul>	<ul style="list-style-type: none"> <li>• Messy environment</li> <li>• General untidiness</li> </ul>
20 Compliance with PPE	<ul style="list-style-type: none"> <li>• Good use of ear protection/gloves/hard hats/goggles/footwear/other protective clothing</li> </ul>	<ul style="list-style-type: none"> <li>• Poor use of ear protection/gloves/hard hats/goggles/footwear/other protective clothing</li> </ul>
21 Risk Perception	<ul style="list-style-type: none"> <li>• Workforce have good understanding of risks inherent in their jobs</li> </ul>	<ul style="list-style-type: none"> <li>• Workforce have poor understanding of risks inherent in their jobs</li> </ul>
22 Perception of Trade Unions	<ul style="list-style-type: none"> <li>• TUs heavily involved in positive way</li> <li>• Management perceive TUs as useful</li> </ul>	<ul style="list-style-type: none"> <li>• TUs not involved (or only I where compulsory)</li> <li>• TUs seen as problem by management</li> </ul>
23 Safe Behaviour commended	<ul style="list-style-type: none"> <li>• Workforce, management &amp; supervisors state that get commended and rewarded for safe behaviour</li> </ul>	<ul style="list-style-type: none"> <li>• No evidence of commendation for safe behaviour</li> </ul>