AN EVALUATION OF THE ROLE OF EMPLOYEE INVOLVEMENT IN
EMS IMPLEMENTATION AND ITS INFLUENCE ON
IMPLEMENTATION SUCCESS

By

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Chapter 3: Results and Discussion

3.1 Introduction ................................................................. 29
3.2 Questionnaire returns and interviews conducted ......................... 29
3.3 Results ........................................................................ 29
    3.3.1 Environmental Awareness ........................................... 30
    3.3.2 Environmental Training .............................................. 33
    3.3.3 Work activities which are harmful to the environment ........... 36
    3.3.4 Benefits of EMS implementation .................................... 40
    3.3.5 Barriers to EMS implementation ..................................... 44
    3.3.6 EMS implementation, TWI culture and future objectives ...... 48
3.4 Summary of findings ..................................................... 57

Chapter 4: Limitations of research and improvements

4.1 Introduction .................................................................. 58
4.2 Questionnaires
    4.2.1 Response options ....................................................... 58
    4.2.2 Number of questions and questionnaire returns ................. 58
4.3 Interviews
    4.3.1 Interview questions and population coverage ..................... 59
    4.3.2 Similar questions ....................................................... 59
    4.3.3 Inconsistency in asking questions ................................... 59
    4.3.4 Interview findings analysis ......................................... 59
4.4 Piloting of questionnaire and interviews ................................ 60
4.5 Job role and Group responses ......................................... 60
4.6 Limits of investigating only one company in one sector ............... 60

Chapter 5: Framework for employee involvement in EMS

5.1 Introduction ................................................................. 61
5.2 Background to recommended framework ................................ 61
5.3 Recommended framework for TWI employee involvement in EMS implementation ........................................... 63
5.4 Proposed TWI EMS implementation committee ........................ 67
5.5 Other considerations for EMS implementation at TWI ............... 68

Chapter 6: Conclusions ..................................................... 69

References ........................................................................ 71
Acknowledgements

Appendices

Appendix 1: Questionnaire and covering letters

Appendix 2: Example of interview prompt

Appendix 3: Detailed outline of framework for TWI employee involvement in EMS implementation and Justification for TWI EMS implementation committee selection
Abstract

This research focused on the role of employee involvement in EMS implementation and what influence, if any, that role had on implementation success.

An investigation of previous literature findings pertaining to the role of employee involvement in EMS implementation was required and subsequently, a new investigation was conducted at a company called TWI Ltd, in Cambridgeshire. TWI Ltd was aiming to achieve ISO 14001 accreditation and the research was undertaken in line with its planned EMS implementation. The study at TWI Ltd was conducted in order to understand if its employees could make a difference to EMS implementation, what factors influenced their participation, and subsequently, to make recommendations of how best to involve employees in the implementation process.

Firstly, a literature review was undertaken into the drivers and barriers influencing the role of employees in participation. This introduced several key themes for discussion, including the importance of employee empowerment in order to encourage participation, and lack of training as a barrier to implementation. Following the literature review, the new case study was undertaken at TWI Ltd, Cambridgeshire. Using a questionnaire and interviews, information was obtained from employees pertaining to levels of environmental awareness at the company, perceptions of EMS and receptiveness to involvement. An evaluation of these findings was then undertaken in line with the literature review results.

Results from the questionnaires and interviews included that employees thought that environmental awareness was good but could be improved, that EMS implementation was worthwhile and that employees would be willing to support EMS implementation. Cost was discovered to be the main barrier, but overall there was a positive reception to the concept of EMS implementation, and it was found that employees were an influence to implementation success. A recommended framework for how to involve TWI’s employees in EMS implementation process was created.
Chapter 1: EMS and employee involvement – the research context
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“Employees will only give their best if they fully understand the decisions that affect them, how and why these decisions arose in the first place and how their contribution will actually make a difference. Developing a sound understanding of staff role is a key component of effective EMS implementation and management”.

(Sheldon & Yoxon, 1999, p.134)

1.1 Introduction

The benefits from involving employees from all levels of a company in the implementation of an EMS remain frequently unrealised (Andrews et al., 2001). Firstly, companies are often oblivious to the possibility of involving employees other than management in the creation of EMSs, or for various reasons, take a conscious decision to involve management only (Zobel and Burman, 2004). As a result, it can be argued that the EMS creation process misses out on key observations or innovative solutions to management problems which can often be offered by employees undertaking the day-to-day operations of a business (Zobel and Burman, 2004), and this can ultimately lead to a less smooth and effective EMS implementation.

Secondly, it is sometimes considered that EMSs created by management or external consultants (or with limited employee participation) will be more ‘in tune’ with the business goals of a company and result in a more highly developed and ‘glossy’ system (Zobel and Burman, 2004). As discussed above, this is not necessarily the best way to develop an EMS. However, even if the final EMS is effective on paper, it is suggested in the literature that the final implementation may be less effective, as employees not involved in the creation process can feel isolated from, or threatened by, the EMS, resulting in resistance or incomplete adoption of required EMS procedures (Nash and Ehrenfeld, 2001). In turn, this can impede rather than support a company’s business goals.
In most instances it may be unnecessary or impractical for every employee to be directly involved in EMS creation. However, the literature claims that in order for an EMS to be effectively implemented, all employees must be informed of the system to be implemented and what impacts this will entail for them, and two-way communications should be encouraged, in order to gain their trust and commitment (Edwards, 2004; Sheldon and Yoxon, 1999).

1.2 Focus of research

For the purposes of this research the specific role of employee involvement in EMS implementation and factors which impact upon the role and the influence of the role on implementation effectiveness will be considered. Therefore, less focus will be given to other EMS components such as initial environmental review, aspects and impacts considerations, policy and manual creation, auditing and monitoring (Edwards, 2004; Whitelaw, 1997). Nevertheless, the components referred to in this research as an EMS should not be viewed as compartmentalised or static, but as a holistic, constantly evolving and improving tool.

Arguably, issues including environmental awareness and beliefs, levels of training, specific job description and levels of responsibility, relationships with management and other employees, perceptions of management systems and receptiveness to EMSs could all impact upon an employee’s role in EMS implementation and its effectiveness (Neef, 2003; Coglianese and Nash, 2001; Sheldon and Yoxon, 1999; Halme, 1997).

The concept of implementation success must be considered from the outset and a definition ascertained. Implementation success could be seen as implementation effectiveness, as ‘effective’ or ‘effectiveness’ are terms often used in tandem with discussions pertaining to best practice EMS implementation. Effectiveness can be explained by terms such as “efficient” and “having a desired effect”, and success as, “a favourable outcome” (Concise Oxford Dictionary, 1995, p.432 and p.1391). These concepts can be applied on a similar basis. Therefore, for the purpose of this research,
successful or effective EMS implementation can be seen to have been embraced by employees and to have established a tool which can lead to tangible improvements in an organisation.

1.3 Contextual background to EMS adoption

Companies and organisations are increasingly concluding that maximising profits at any cost is no longer the most beneficial way to operate their business or to maintain and improve their competitive advantage (Welford, 1998). Since the early environmental litigation days of 1960’s America, a rising number and variety of stakeholders have been demanding greater responsibility for the environment in business conduct (Schaltegger et al., 2003; Glasson et al., 1999).

Lack of awareness, or due care, of the environment and the resultant damage are increasingly altering stakeholders’ opinions of companies and can lead to loss of business (Welford, 1998). However, companies who do proactively demonstrate environmental concern, and build environmental factors into their overall business strategy, can win favour with stakeholders and attain several other benefits, such as improved image and competitiveness, support from banks and insurance companies, new and strengthened business relationships and supply chain involvement (Schaltegger et al., 2003).

Long term, costs can be reduced as more efficient energy practices are implemented, reductions are made in the use and waste of other resources and more efficient disposal and removal of waste production is established, as is discussed by Laitner (2002). Babakri et al. (2004), provide further quantitative evidence of benefits of recycling practices following from EMS implementation such as savings from recycling product materials or packaging.

Staff retention is also a key benefit and as stated by Tack (1999, p.56), “It is clear that environmental issues are a source of motivation for staff”. Whitelaw (1997), suggests that employee motive is a key factor in EMS implementation success.
Some companies complain that it can be a long time before such benefits are delivered and that in the short term there can be a substantial financial outlay in order for certain environmental improvements to be established (Hamschmidt and Dyllick, 2001). Others accept that the benefits far outweigh the costs (Babakri et al., 2004). However, in several cases the balance of costs and benefits of undertaking environmental improvements remains undetermined because companies have not recorded or analysed this information, and this can fuel the arguments of sceptics against spending on environmental improvement (Hamschmidt and Dyllick, 2001). As discussed by Babakri et al. (2004), this can also be due to difficulties in being able to determine benefits, as EMSs may not have been in place for a sufficient amount of time in order to gather full sets of data. Therefore, it is not always readily possible to make a comparison.

It has been argued that other barriers to implementing an EMS include, insufficient support, beliefs that EMS is an obstacle to competitiveness, lack of training and the opinion that EMS and its requirements are a one-off process instead of a tool for continual improvement (Zobel and Burman, 2004; de Brujin and Hofman, 2001; Biondi et al., 2000; Sheldon & Yoxon, 1999; Tack, 1999; Thomas, 1992). It is suggested that such barriers can impact upon employee motivation, which in turn reduces willingness to participate and implementation success (Halme, 1997).

1.4 Environmental Management Systems – components and standards

An EMS can be used to instigate and maintain environmental improvements and also to assist in the tracking of its costs and benefits. EMSs have been defined as representing, “an organisational change within firms and a self-motivated effort at internalising environmental externalities by adopting management practices that integrate environment and production decisions…and enable the firm to make continuous improvements in production methods and environmental performance” (Khanna and Anton, 2002, pp.409-410).
An EMS can consist of various combinations of components. Figure 1.1 illustrates one such possible combination.

![Diagram showing components of EMS implementation](image)

**Figure 1.1 Components of EMS implementation. (Adapted from Edwards, 2004, p.14.)**

Companies can receive accreditation for EMS implementation from verifying bodies as an acknowledgement of their voluntary commitment to demonstrate and maintain environmental improvements. Two such accreditations are, the EU’s Eco-Management and Auditing Scheme (EMAS) Regulations (Starkey, 1998), and the International Standards Organisation’s (ISO) ISO 14001 Standard (Starkey, 1998).
This research has not focused in detail on these standards and regulations. However, whilst Evangelinos and Halkos (2002) suggest that EMS standards have been created to encourage and assist companies apply systems and promote environmental awareness, it can be observed that there is little actual mention or active encouragement in these standards and regulations (from which companies seek guidance and accreditation) for inclusion of employees in EMS implementation, aside from ensuring that they receive adequate training in order to be able to conduct necessary EMS procedures (Edwards, 2004; Starkey, 1998).

Whilst ISO 14001 requires demonstration of continual improvement of the EMS tool, it does not specifically define thresholds for improvements in environmental performance; (it does not require, for example, that companies must demonstrate reductions in waste of x% of levels at EMS implementation within 6 months of the official implementation launch) (Starkey, 1998). As discussed by MacDonald (2004), ISO 14001 only provides principles for EMS rather than details of how to use and implement it. It also does not detail how to identify barriers to effective implementation.

This flexibility may be in part due to ISO’s desire to make the standard achievable for any form of industry or organisation. However, this leads to concerns that grand environmental statements in policies and manuals may not actually be evidenced by real environmental performance improvements, as discussed by Raines (2002). In fact, as discussed in recent literature, there are calls from various organisations for a tightening of the standards required in order to achieve accreditation, as there is a lack of consistency and effectiveness in EMS implementation (ENDS, 2004, no. 353). Therefore, it could be argued that current EMS implementation is a pointless exercise or topic for research as there are no genuine improvements.

Nevertheless, as discussed by Neef (2003) and stated by Hamschmidt and Dyllick (2001, p.53) whilst, “The ISO 14001 standard itself gives few incentives for initiating processes of fundamental change towards environmental sustainability”, it is, however, “a well-
tried starting point for the development of a continual improvement philosophy and the establishment of environmentally oriented control systems”.

1.5 Employee involvement, barriers and drivers
It can be argued that companies often have priorities or influences other than involving employees in EMS implementation and by focusing on short-term benefits produced by EMSs, such as profit, they can overlook the far reaching long-term benefits that an EMS in general, and employee involvement in particular, can bring to the company (Evangelinos and Halkos, 2002). The influence of shareholders and management in the implementation of an EMS may be considered by companies, but other levels of employee remain unmentioned or mentioned but not as an influence (Andrews et al., 2001; Petts, 2000). Some companies also continue to see the EMS tool as ‘end-of-pipeline’ rather than acknowledging the merits of full integration into business plans. These points are illustrated by recent survey studies. (Evangelinos and Halkos, 2002; Baumast, 2001; Hamschmidt and Dyllick 2001).

Nevertheless, it is maintained by many that the role of employee involvement in EMS implementation has one of the most fundamental influences on its effectiveness and success. In fact, Tack (1999, p.56) states that, “… employees are the most valuable resource for identifying problems, proposing solutions and implementing the entire system”. This is also attested by Halme (1997).

Inclusion of all levels of employees in the EMS process is considered by Sheldon and Yoxon (1999, p.134), to be “paramount.” If ill-managed, it is possible that a proposed EMS could be perceived as yet another management system and a burden of additional paperwork and time, which could deter employees from involvement in and acceptance of the system (Sheldon & Yoxon, 1999). Long serving employees may resist further changes to the running of the company, and to their job description and responsibilities, if they are not appropriately informed or allowed participation in the process. This was found by Davis et al. (2003). Staff could therefore, be unreceptive to the new system and
may feel that they are being dictated to on a matter on which they already have a negative perception. This matter is discussed further in Halme (1997).

Similarly, if there is a Quality Management and Health and Safety system in place, this can in theory make implementation of an EMS simpler because a substantial amount of the necessary thinking, documentation and behaviour is already established (Oakland, 2003; Whitelaw, 1997). However, it has been found that if employees see the EMS as yet another ‘paper pushing’ exercise, they may resist it. This has been observed at a nuclear plant in Belgium, where employees were already undertaking Quality Assurance and Health and Safety procedures (Tack, 1999).

In this instance, the objection was, however, overturned by training and brainstorming sessions with employees so that they fully understood what was going to take place and this allowed them the opportunity to put forward ideas of what would and would not work (Tack, 1999). In effect, it was shown to be a ‘fine-tuning exercise’ for existing systems and an occasion to embed a more defined structure.

It can be argued that by including employees in the development and implementation of an EMS they feel part of the process and can take a pride in what is being done (Halme, 1997). They are often the best sources for understanding the processes that occur in an organisation and by gaining their trust, willingness to participate can be increased (Tack, 1999).

From several sources it can be concluded that employees require incentives, education, training and acknowledgement in order to gain their acceptance and motivation towards new EMS principles (Neef, 2003; Sheldon & Yoxon, 1999; Tack, 1999; Halme, 1997).

Empowerment of employees and the provision of a sense of ownership of the system are mentioned in much of the literature as key influences to the receptiveness of staff and their willingness to participate in the EMS (Nash and Ehrenfeld, 2001; Tack, 1999;
Halme, 1997). These influences will also enable them to undertake a critical analysis of their own daily activities (Tack, 1999).

Tack (1999), suggests that empowering employees is critical and without this the EMS will be considered an extra obligation and constraint to employees’ everyday tasks. If employees of all positions can identify with, and consent to, the changes which an EMS will entail, it can lead to a smoother integration with existing systems and possible improvements.

Therefore, it can be concluded from the above review that in spite of critics of EMS and a lack of awareness or willingness on the part of some companies, the role of employee involvement in EMS implementation is a key factor. If actively encouraged and properly managed it can play an influential part in successful EMS implementation and have far reaching benefits for the business.
1.6 Objectives and Aims

The focus of this research was introduced in section 1.2. The specific objectives and aims framing this research are detailed below:

Objectives

1. To gain a detailed understanding of the influence that the role of employee involvement has in successful EMS implementation, by conducting an evaluation of previous studies from literature in line with a new study at TWI Ltd.
2. To produce a framework for employee involvement in EMS implementation at TWI Ltd, using the results from the evaluation as guidance.

Aims

1. Undertake an evaluation of why and in what capacity the role of employee involvement is a key factor for EMS implementation success using findings from literature.
2. Evaluate what factors influence the role of employee involvement using findings from literature.
3. Evaluate current TWI Ltd employee perspectives in terms of their environmental awareness, perceptions of EMS’s and receptiveness to involvement, using questionnaires and interviews and by referring back to literature results.
4. Draw conclusions of how TWI Ltd employees might be involved in EMS implementation, barriers and drivers for their involvement, and any inputs required to enhance their role, for example, training, documented instructions or incentives.
5. From the findings of the evaluation of the literature and at TWI Ltd, create a framework for employee involvement which will best serve TWI Ltd and the success of its EMS.
1.7 Background to TWI Ltd

TWI Ltd (The Welding Institute) commenced operations in 1968 following the merger of the Institute of Welding and the British Welding Research Association, which had been in operation since 1946. It is a non-profit company and is funded by its members. It undertakes independent research and development into welding and other joining technologies for various structural engineering uses. The company has 450 employees at its Granta Park, Cambridgeshire site and also has additional sites in Middlesbrough, Yorkshire, Port Talbot and Kuala Lumpur (TWI Ltd (a), undated).

TWI Ltd’s (TWI) base at Cambridgeshire consists of the various “Technology Groups” as illustrated in Figure 1.2. TWI also offers training and examinations to industry organisations and, in addition, as also illustrated in Figure 1.2, includes, Directors, Human Resources, Quality, Health, Safety and Environment, Industrial Membership Services and Site Services (TWI Ltd (b), 2004).

Therefore, it can be seen that this is, in terms of employees, a large operation and that the range of work conducted by TWI is highly varied, from research and development into joining technologies such as welding, lasers and electrolysis, to consultancy and membership services. The technologies can be applied to large scale structures, such as oil rigs and ships to small scale applications such as for PCs or mobile phones. TWI
conducts research and provides membership for organisations from many industries, such as energy, transport and aerospace (TWI Ltd (a), undated).

TWI is looking to implement an EMS by the end of 2004 and to receive ISO 14001 accreditation during 2005. It has already produced an environmental policy, manual and register of impacts and aspects, which it anticipates may require amendments and additions.

TWI requires assistance in planning the implementation of its EMS and would like the implementation to be integrated within the existing Health and Safety procedures and documentation. This is a significant undertaking and the scope of this research will only allow for assistance in a small part of planning the EMS implementation; namely a framework for employee involvement.
Figure 1.2  TWI Ltd Company Structure
Adapted from TWI Ltd Quality Manual, January 2004
Chapter 2: Research Design and Methods
Chapter 2: Research Design and Methods

2.1 Introduction
A desk-based review of literature sources was used to identify and evaluate significant factors influencing the role of employee involvement in EMS implementation and the ultimate success of the tool. In addition to the desk based review, questionnaires and interviews were used to investigate and evaluate factors which may influence TWI’s employees, their awareness of the environment and receptiveness to an EMS. The combined results will be used to create a realistic framework for TWI employee involvement in EMS implementation.

2.2 Case study rationale
The design of this research focuses around case study evaluation. Findings from literature have already been introduced and discussed in sections 1.3 to 1.5 and in addition to this, a new case study at TWI is to be undertaken.

According to Denscombe (1998, p.158), May (2001, p.96), Taylor and Bogdan (1998, p.42), and Berdie et al. (1986, p.21), it is crucial to frame any research within a literary context in order to identify where conclusions have already been reached and also to highlight where the focus of research is required (i.e. “gaps” in knowledge). Whilst this is an important observation, the focus of this research is to firstly evaluate findings in literature pertaining to effective EMS implementation and then to examine whether they also apply in real life to TWI, or if there are other factors specific to operations at TWI which will impact upon its EMS implementation. These findings will influence the creation of a framework for employee involvement proposed to TWI.

According to Robson (2002), there has previously been some concern over the legitimacy of using case studies in research as they perhaps do not hold the same level of rigour as experiments. However, whilst some case studies (as with any research method) may have been conducted poorly, this should not detract from well executed case studies which are equally valuable in producing reliable and valid findings.
According to Yin (2003, p.1), “Case studies are the preferred strategy when “how” and “why” questions are being posed, “when the investigator has little control over events” and “when the focus is on a contemporary phenomenon with some real-life context”. Whilst the outcomes of this research may provide a degree more control than normal case studies (as a framework to guide TWI in its EMS implementation will be proposed), ultimately the findings of this new case study will not change widespread practice of EMS implementation or ISO 14001.

Nevertheless, the final observation by Yin is of particular relevance to this research as the study at TWI is based on real-life and directly gathered information. Yin (2003, p.1), also states that case studies can be “descriptive” (where a case study is used to illustrate particular developments over time), “explanatory” (where the author not only describes a situation and the conditions of the study but provides more in depth analysis) and “exploratory” (where questions are posed, tested, discussed and suggestions made for next required steps). For this research, explanatory case studies will be predominantly used, as they will provide the most relevant information for evaluation purposes.

Robson (2002, p.181), also discusses different types of case study which can be undertaken, namely, “individual” (concerning one person), a “set of individuals”, “community”, “social group”, “organisations and institutes” and “events, roles and relationships”. For this research, “organisations and institutes” studies will be evaluated as this is of most relevance to the research topic and applicable to TWI.

As the literature review content has already been introduced and discussed in some depth in Chapter 1, the remainder of this methods section will focus on the methods used to gather information at TWI and how the information was compiled.
2.3 Questionnaire Design and Methods

2.3.1 Introduction

The questionnaire was a key component of data gathering for this research project and therefore, care was needed in its preparation in order to maximise the response rate from TWI employees. Several sources of literature were referred to in order to gain an overview of which questionnaire techniques are most effective and would encourage the greatest response rate possible. The key findings from the literature are highlighted during the following questionnaire design discussion.

2.3.2 Questionnaire content and format

There are a number of question types from which to select when creating a questionnaire. Denscombe (1998, p.101), discusses “open” and “closed” questions and Fink (2003, p.15-17), discusses “concrete” and “purposeful” questions. Berdie et al. (1986, p.30), discusses “dichotomous”, “fill-in-the-blank” and “multiple choice” questions, whilst McConnell (2003, p.108), details “ranking” and “essay” questions. Questions can ask for “factual” or “opinion” based information (Denscombe, 1998, p.89). What is common to all sources reviewed is the conclusion that whichever question types are selected is ultimately dependant on what information needs to be obtained from questionnaire recipients (Fink, 2003; McConnell, 2003; Denscombe, 1998; May, 2001; Berdie et al., 1986). Therefore, it was important to first decide what was the purpose of the questionnaire and how the information would be used following compilation, in order to ensure that the questionnaire was valid and reliable, as discussed by Fink (2003).

2.3.3 Questionnaire purpose

For the purpose of this research an understanding was being sought into levels of environmental awareness and receptiveness amongst employees to the implementation of an EMS at TWI. Therefore, questions covering topics of general environmental awareness of worldwide issues and company specific criteria were posed. Strength of employee opinion regarding EMS and the environment was also
questioned. In addition, as an integral part to TWI’s business is innovation, insight was sought as to whether employees had any innovative ideas of how to improve business conduct via the EMS implementation, for example, in terms of sustainability, as discussed by MacDonald (2004).

TWI already had ISO 9001 accreditation and it is suggested that companies who have ISO 9001 are considerably prepared for achieving ISO 14001, due to it involving similar principles and documentation requirements (Oakland, 2003; Whitelaw, 1997). It is also suggested that as an EMS involves ‘regulating from the inside’ as opposed to being an imposition from external regulations, companies should be more committed to its success (Coglianese and Nash, 2001). Therefore, insight was sought as to whether TWI would show the same commitment to its EMS implementation and ISO 14001.

It was considered that this range of question topics would provide the necessary insight into employee understanding of EMS and its levels of usefulness, and their willingness to participate in EMS and follow its requirements. The questionnaire findings along with those of the interviews were used in tandem with findings of the literature review case studies to recommend a framework for employee involvement in the EMS implementation (Chapter 5).

In undertaking this research contact with TWI was mainly provided through the Quality, Health, Safety and Environment Group, who had already created an Impacts and Aspects Register. It is anticipated that they would have a significant role in the running of the EMS and in developing practices inline with ISO 14001 requirements.

2.3.4 Question format selection
As the questionnaire was used to collect information from respondents with varying degrees of knowledge regarding the environment and EMS, it was decided that two main types of question were to be adopted. Firstly, “closed” questions with a range of pre-given answers beside which respondents could tick were included. This enabled some of the questions to appear simpler to complete and, it was hoped, encourage
respondents to continue through the questionnaire (as discussed by Denscombe, 1998). Some questions were closed ‘yes/no’ response questions and whilst others offered a choice of scale or strength of response (McConnell, 2003), from which respondents could select one answer. For other questions, respondents could choose more than one answer so as not to limit their response. These are described as “multiple choice” questions (Berdie et al., 1986, p.30).

The second type of question allowed respondents the opportunity to provide additional comments or responses not included in the pre-given response selection. These questions are referred to as “essay” questions by McConnell (2003, p.108), and allowed any respondents who wished to elaborate on their answers the opportunity to do so, thus providing extra flexibility and openness.

The “don’t know” option (Fink, 2003, p.19), was offered in only one question, which queried the worthiness of an EMS. As discussed further in section 4.2.1, in hindsight it would also have been useful to include the “don’t know” option in other questions, to aid responses, and to be more in line with recommendations from literature.

2.3.5 Questionnaire mode and duration for completion

Mode of questionnaire is detailed further within the literature. Fink (2003, p.22), discusses “self-administered” questionnaires, and McConnell (2003, p.298-299), discusses “group” and “individually” administered written surveys, mailed surveys, and on-line surveys. May (2001, p.97), discusses “mailed”, “telephone” and “face to face” options. Ultimately, it was decided that internally mailed paper questionnaires would be most appropriate as, due to security and confidentiality requirements, there were limits to computer/email access for non-employees at TWI. Therefore, any questionnaires issued and returned could not be controlled directly by the researcher. Also, it was also considered that it would be easier for employees to delete an email without reading it than to discard of a hard copy document.

The questionnaire consisted of an introduction with instructions and was issued on three sides of A4 paper, with a covering note from the researcher and from TWI,
encouraging employees to complete the questionnaire and return it. (Please refer to Appendix 1 for copies of the questionnaire and letters). It was also agreed that the questionnaire should be issued on coloured paper, as discussed by Denscombe (1998) and Berdie et al. (1986), so that it would stand out from other documents on employees’ desks. A pale green colour was selected as this allowed text to be easily to read.

After consideration of the literature (McConnell, 2003; Berdie et al., 1986), it was decided that the questionnaire should take no longer than 5-10 minutes for respondents to complete. This would allow for sufficient questions to be asked without over-burdening respondents. In fact, the literature suggested that 10-15 minutes should be the maximum time for questionnaire completion (McConnell, 2003). Therefore, it was considered that this additional time margin may further encourage respondents to fully complete the questionnaire. This timescale was communicated in the initial questionnaire instructions and opening letter.

2.3.6 Population size for questionnaire

Questionnaires were issued to all 450 employees at TWI, Granta Park, Cambridgeshire, in order to gauge as fully as possible levels of awareness and receptiveness to environmental considerations and EMS. It was not anticipated that a 100% return rate would be received, however, it was hoped that with the support of TWI a greater return than 20%, which is an accepted reasonable response rate (according to Denscombe, 1998), would be possible. It was agreed with TWI that 40% (180 questionnaires) would be the optimal response rate and any less than this would require additional interviews to be arranged, as discussed further below in section 2.4.9.

2.3.7 Questionnaire pilot

The secretary to the Quality Management (QM) Group completed a copy of the questionnaire in order to conduct an initial pilot test, as commonly recommended in the literature (Fink, 2003; Robson, 2002; May, 2001; Berdie et al., 1986). Feedback
included that she understood the questions and was able to respond to each one. However, it had taken her 16 minutes to complete the questionnaire. Therefore, it was decided to change the suggested completion time to 10-15 minutes, as suggested in the literature to be the maximum recommended (McConnell, 2003; Berdie et al., 1986), in order to provide a more accurate indication in the instructions of time required for completion. However, it was considered that this time frame would not deter employees, where an indication of 15-20 minutes might do so.

The questionnaire was also discussed with TWI’s Quality Officer and Health and Safety (H&S) Officer, in order to verify that they felt it appropriate for all employees, as the findings of the questionnaire also needed to meet with their expectations.

2.3.8 Questionnaire timetable
Questionnaires were issued via internal mail at TWI on 30 April 2004 and a deadline of 14 May 2004 was indicated in the instructions. Due to a bank holiday it was anticipated that employees would receive the questionnaire by 4/5 May 2004 and therefore, would have up to ten days in which to return it. On 13 May 2004 TWI’s Quality Officer issued a reminder email to Group managers to encourage more responses. The questionnaires were to be returned to the Quality Officer via internal mail.

2.4 Interview Design and Methods

2.4.1 Introduction
In addition to the questionnaire, it was decided that a number of in-depth interviews should be conducted to gain a further understanding of TWI employee environmental awareness and receptiveness to an EMS. Unlike studies where interviews are a “follow up” procedure to returned questionnaires (McConnell, 2003, p.190; Denscombe, 1998, p.112), for the purpose of this research it was considered that information obtained from interviews would be a useful addition in its own right, in
that interviews would allow employees a chance to elaborate on their opinions, beliefs and observations. In addition, questions could also be asked during interview sessions which were more appropriately answered verbally than through written questionnaires (McConnell, 2003; Berdie, et al., 1986). As the interviews were not to be used as “follow ups” they could be arranged at the same time as the questionnaires were issued.

2.4.2 Interview content and format
As with questionnaire design, literature sources were referred to in planning the interview session format and procedures. This is summarised below.

There are several types of questioning that can be used in interviews. Goodwin (2004, p.25), refer to “structured open-ended” options, where question order and wording are fixed, and the response is flexible, and “semi structured interviews”, where there are predetermined questions but the order and wording can be altered. Keats (2000, p.38), discusses “combined rating and ranking”, Houtkoop-Steenstra (2000, p.4), considers “fixed-choice” (closed) questions and May (2001, p.113), looks at “unstructured” interviews, where there is a general theme to the interview but freedom in how the discussion develops.

As concluded for questionnaire design, the purpose of the interviews and how the information obtained would be used was similarly key to the content and format of the interview, as further discussed by Keats (2000).

2.4.3 Interview purpose
As for the questionnaires, the interviews were required to canvass varying levels of TWI employee environmental awareness and receptiveness to EMS. Again, the information obtained would be used in creating a recommended framework for employee involvement in the EMS process.
However, it was considered that the interview stage would allow for more detailed data gathering to be obtained (as discussed by McConnell, 2003) from a range of employees, in that they could further expand their answers, make recommendations or highlight current and possible future problems related to, for example, company practice, procedures and attitude. Also, it was considered that it would be possible to gain further insight from their responses into what drivers and barriers might exist at different employee levels or within Groups, in terms of encouraging them to take on ownership of the EMS.

2.4.4 Question format selection

The question format adopted for all questions was open-ended and structured / semi-structured (Goodwin, 2004; Denscombe, 1998). Questions were asked in a specific order, which, as discussed by Keats (2000), provided consistency. This consistency was also present in the question content and format.

For some interviews, additional questions were asked to individuals in specific key positions, namely, Directors, HR, Health and Safety, and Quality. Question order remained the same as for the other interviews but the additional questions were asked at what was felt to be the most appropriate juncture, thus relating more to the semi-structured format (Goodwin, 2004).

It was anticipated that the open-endedness of the questions would also allow for openness in employee responses and allow for expanded explanations to those given to the closed ended questions within the questionnaire (Berdie et al., 1986).

2.4.5 Interview mode and duration for completion

As concluded from the literature, there are several methods for conducting interviews, such as “face-to-face”, “telephone” and “focus groups” (Edenborough, 2002, pp.110-111; Morton-Williams, 1993, p.183). It was decided that “face to face” individual interviews would be conducted to try to encourage, as far as possible, openness in
responses. However, telephone interviews were also required in three instances, where individuals were unable to meet the researcher in person.

Interview prompts were created for the different grades of employee to be interviewed, i.e. director, section manager, technician, administrator, and were used to control and direct the interviews. Some employees of different positions were asked the same questions, although others had specific additional questions posed, as detailed in section 2.4.4. A total of eight different prompts were used. Please refer to Appendix 2 for an example of the prompts.

The interview prompt sheets were used to record the answers of employees in note form, as suggested by Edenborough (2002, p.27), for both “face-to-face” and “telephone” interviews. These were reviewed after each interview to ensure completeness of notes, as discussed by Keats (2000).

Interviews were designed to take no more than half an hour, as any longer may deter some employees from participating. For some employees the interview may take less time if they were uncertain or had no opinion on a matter. For others it could take longer, should the employee want to take the opportunity to expand on their views.

2.4.6 Interview population selection

It was decided that a 5% sample of employees (total of 23) should be selected in the first instance. Whilst this is a relatively low proportion, the interviews were an additional method for gathering data to the questionnaire which, as discussed, was issued to all employees.

An organogram provided details of employees per Group (department) and from this an initial selection was made. In order to achieve a representative cross-section of opinions from across the organisation, employees from all levels of seniority and from the different Groups were required for interview. It was considered that within this cross-section, employees with differing levels of environmental knowledge would be selected.
In order to achieve the best cross-section, assistance was requested from TWI’s Quality Officer and H&S Officer in selecting employees for interview. Agreement was reached on the criteria needed for the selection. As discussed above, a representative cross-section of employees should be selected, and also, if possible to identify, the selection should include individuals with differing levels of environmental knowledge. This was not deemed inappropriate, as an initial selection of 23 employees was proposed to the Quality and H&S Officers, and a request was made that should they not think this a representative cross-section, they provide some alternative contacts. TWI’s Quality Officer and H&S Officer returned a list of 66 employees who, they felt, would provide a reasonable cross-section, some of whom where from the original 23 selected.

A new selection of 23 individuals from the list of 66 allowed for a reduction in the bias of choice whilst ensuring that a suitable cross-section of employees was selected in order to maximise the benefits from time spent in interviewing employees.

2.4.7 Interview pilot
A pilot interview was conducted with the QM Group Secretary in order to verify that the questions were comprehensible and the responses appropriate (as recommended by DeLamater, 1982). It was also verified that the interview could be conducted in 30 minutes. Feedback stated that the questions were understandable and the interview took just less than 30 minutes.

2.4.8 Interview timetable
Interviews were conducted on 5, 11, 12, and 27 May and 1 June, either in employees’ offices or at a designated meeting point. Interviews were arranged using Microsoft Outlook. Three telephone interviews, which were conducted on 27 May, 28 May and 10 June, were arranged by email.
2.4.9 Additional interviews

As introduced above, it was decided that if a 40% return rate was not received for the questionnaires, additional interviews would be required in excess of the initial 23, in order to supplement the information shortfall and to ensure sufficient data for the research findings.

The following scale was devised:

<table>
<thead>
<tr>
<th>Response rate to questionnaire</th>
<th>Additional interviews required</th>
</tr>
</thead>
<tbody>
<tr>
<td>40% (180 questionnaires)</td>
<td>0</td>
</tr>
<tr>
<td>35-40% (159 -179 questionnaires)</td>
<td>5</td>
</tr>
<tr>
<td>30-35% (136 – 158 questionnaires)</td>
<td>10</td>
</tr>
<tr>
<td>25-30% (114 – 135 questionnaires)</td>
<td>15</td>
</tr>
<tr>
<td>20-25% (90 – 113 questionnaires)</td>
<td>20</td>
</tr>
</tbody>
</table>

This scale was developed following questionnaire issue and receipt of initial indications of response rate. Further details of response rates and any additional interviews are detailed in Chapter 3. However, a key point of note for this methods section is that after seven days, a 20% response rate had been received, which allowed the above scale to be devised in line with the pre-determined 40% response rate requirement.

Any additional interviews would again be conducted with a cross-section of individuals. 15 additional employees were select in order of preference to maintain the cross-section from the initial round of interviews. A further five would be selected should the worst case scenario in the above scale be attained, namely a 20-25% response rate. These additional interviews would be conducted under the same conditions as the initial interviews.
2.5 Collation of results

2.5.1 Introduction
Results needed to be collated by a valid method in order to provide accessible and meaningful findings for the research. Despite the data having been collected in a qualitative format (i.e. written word), Microsoft Excel XP spreadsheets were used to record the results by way of utilising coding for responses (Berdie et al., 1986). From this coding method, quantitative analysis could be derived, such as percentages.

The following section provides details pertaining to the methods used to collate results for questionnaires and interviews.

2.5.2 Questionnaire collation
Numerical coding was used to identify questions or question sections, as suggested in the literature (Robson, 2002; May, 2001; Denscombe, 1998), except for the ‘yes’ or ‘no’ response questions where the selected answer was recorded. Coding was only added to the questionnaires following their return, as it was considered that coding may confuse or influence respondents if it was included on questionnaires from the outset (Robson, 2002).

Each question number was entered into a column of the Excel spreadsheet. Responses to each question from each respondent were then entered into the spreadsheet. No set order of employee grade or Group was established for entering questionnaire responses into the spreadsheet, except for incomplete questionnaires, for which the responses were entered at the end of the spreadsheet for easy identification.

On completion of the spreadsheet it was possible to conduct statistical analysis of percentages of each response to questions. This information was then analysed and is discussed further in Chapter 3.
2.5.3 Inclusion and exclusion of data
The decision was taken that questionnaires which contained one incomplete or blank question would be included for information collation purposes, as the remaining responses were still useful to the findings. However, questionnaires with greater than one incomplete or blank question would not be used, due to possible risks of lack of validity or consistency of response.

2.5.4 Interview collation
Notes from the interview prompts were recorded on a Microsoft XP Excel spreadsheet. These were entered in the order that interviews were conducted for ease of access to information. There was no way of using coding to allow for quantitative analysis, as for the questionnaire collation, as responses were completely open-ended with no set structure. However, it was considered that on reviewing the notes, key themes may be identified and the number of responses within those themes could be quantified (as discussed in Denscombe, 1998), in order to determine key barriers and drivers to receptiveness and awareness of employees. The analysis of the findings from the interviews is detailed in Chapter 3.

2.5.5 Inclusion and exclusion of data
All information from the interviews was included on the Excel spreadsheet for completeness. Any omissions in questioning or responses were also noted.
Chapter 3: Results and Discussion
Chapter 3: Results and Discussion

3.1 Introduction
The following chapter contains details of response rates, the key findings identified from the questionnaire and interview collation and an evaluation of those findings in tandem with considerations from literature. The main issues identified to be dealt with by TWI in involving employees in EMS implementation, and recommendations of how this can be undertaken, will be considered in Chapter 5.

3.2 Questionnaire returns and interviews conducted
A total of 165 questionnaires were returned by TWI employees (166 including the pilot study) which provided a response rate of 37%. In the first two days following issue of the questionnaire, a 10% response rate was received and after seven days the response rate rose to 20%. It is believed that some questionnaires were returned after the deadline, however, it is unclear how many, as no official record was kept of returns. Nevertheless, this does not detract from the value of the findings of the questionnaires. 165 questionnaires were ultimately used in the information collation.

In addition to the original 23 interviews, five extra interviews were selected per the scale chart in section 2.4.9 in order to offset the 3% questionnaire response rate deficit. During one of the interviews it was suggested that it would be very worthwhile speaking with a further employee. Whilst this exceeded the required amount for interview, it seemed prudent to follow up on this lead. A further telephone interview was arranged for 10 June 2004. Therefore, a total of 30 interviews were conducted including the pilot interview.

3.3 Results
From both the questionnaire and the interviews, key themes pertaining to EMS implementation and environmental awareness were identified following collation of the results. Therefore, rather than addressing results in the order that the questions were posed, it is more meaningful to look at results surrounding each theme. It is
recommended that the example questionnaire and interview prompts in Appendices 1 and 2 are referred to throughout as a guide to the discussion.

It should also be noted that the words used to categorise the themes established from the interviews were not necessarily the exact words used by interviewees. Nevertheless, the categories were selected to aid discussion of the results. Please refer to section 4.3.4 for further comment on this matter.

As discussed further in section 4.3.3, due to some minor inconsistencies in interview questioning there are some anomalies in the interview results. Nevertheless, the results obtained do provide useful insight into factors which may influence the role of employee involvement in EMS implementation and its success, and along with the findings of the questionnaires, can be used in forming conclusions and recommending a framework for employee involvement.

### 3.3.1 Environmental Awareness

In the questionnaire, respondents were asked about worldwide environmental factors. In 24% of returned questionnaires all 11 factors were ticked, indicating that respondents felt that all factors could cause significant harm to the environment (Figure 3.1).

<table>
<thead>
<tr>
<th>Total number of factors selected</th>
<th>Number of people making selection</th>
<th>% of responders</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>21</td>
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<td>11</td>
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<td>7</td>
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<td>8</td>
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<td>10</td>
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<tr>
<td>9</td>
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<td>8</td>
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<td>10</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>11</td>
<td>40</td>
<td>24</td>
</tr>
</tbody>
</table>

*Figure 3.1: Total number of factors selected per respondent*
The 11 factors chosen to be included were selected using literature (O’Callaghan, 1996; Kemp, 1994), and could all potentially cause significant harm.

It would appear that as the majority of respondents selected eight or more out of the 11 environmental factors listed, there is a high level of general awareness at TWI about matters affecting the global environment. Alternatively, it could be proposed that respondents were selecting the majority of factors in order to make their response “look good” (“social desirability response bias”, Robson, 2002, p.233).

![Bar chart showing % response per factor for each environmental factor]

**Factors which may cause significant harm to the Environment**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Factor</th>
<th>Reference</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (1)</td>
<td>Global Warming</td>
<td>3 (7)</td>
<td>Pollution of oceans and rivers</td>
</tr>
<tr>
<td>3 (2)</td>
<td>Ozone Layer Depletion</td>
<td>3 (8)</td>
<td>Contamination of land</td>
</tr>
<tr>
<td>3 (3)</td>
<td>Extreme Weather Events</td>
<td>3 (9)</td>
<td>Human population growth</td>
</tr>
<tr>
<td>3 (4)</td>
<td>Rain forest depletion</td>
<td>3 (10)</td>
<td>Transportation systems</td>
</tr>
<tr>
<td>3 (5)</td>
<td>Fossil fuel resource depletion</td>
<td>3 (11)</td>
<td>Waste/refuse disposal</td>
</tr>
<tr>
<td>3 (6)</td>
<td>Other natural resource depletion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 3.2: Environmental factors which TWI employees believe may cause significant harm to the environment.**

However, given the highly educated population at TWI and as the interviews proved, their general eagerness to voice their opinions, this latter consideration is more unlikely. In addition, most respondents to the questionnaire (96%) and all of the
interviewees were willing to state their job title and group department, which suggests a degree of openness and willingness to be accountable for their responses.

Exposure to issues through the media could explain the most popularly selected factors (Figure 3.2). Also, global warming and rain forest depletion are emotionally charged topics often highlighted on television or in news articles. It is possible that extreme weather events were seen as a result of causing harm to the environment rather than a cause in their own right, or were not significantly harmful on a large scale.

A subsequent question in the interviews asked what levels of environmental awareness existed amongst TWI employees. 40% of interviewees thought that awareness levels were ‘good’ which is consistent with the findings of the questionnaire (Figure 3.3). However, the majority of interviewees (47%) suggested that awareness was ‘not as good as it should be’, which links to findings discussed below under Environmental Training. This also, ties with the subsequent questionnaire finding that 23% of respondents thought environmental awareness was a barrier to EMS implementation (Figure 3.14).

![Figure 3.3: TWI employee opinion of current environmental awareness within the company](image-url)
It can be argued that awareness of environmental issues gives employees the capability to deal with making improvements in environmental performance. However, as explained by Dodge (1997, p.116), ability alone is not enough, as employees also require “willingness” in order to effect the changes in behaviour and practice required to produce effective environmental strategies. “Ability includes the employee environmental traits that represent the established ability, skill, knowledge and experience the employee has to manage the environment. Willingness comprises the commitment, confidence and motivation to complete the greening task” (Dodge, 1997, p.116). The concept of willingness is discussed further below.

3.3.2 Environmental Training

The finding that 47% of interviewees believe that environmental awareness levels could be improved is consistent with the following results.

Respondents were asked in the questionnaire whether they had undergone any environmental training in the last two years, to which 89% answered “no”. Of those who responded that they had received training it was stated to be either as part of their previous employment, or related to their specific Group role, for instance, how to handle chemicals. Six individuals had received EMS or ISO 14001 related training, although as stated above this may have been in their previous employment.

Interviews also asked for interviewees’ opinions on current training related to the environment, how sufficient it was and how often it was received. Again consistent responses were provided to those pertaining to levels of awareness. Most interviewees (57%) did not think that current environmental training was sufficient and the majority (70%) confirmed that they had not received any (Figures 3.4 and 3.5). This suggests that TWI needs to increase access and provision of environmentally related training in order to highlight that it is a matter to be taken seriously and not just a ‘nice to have’.
This also corroborates further findings from the interviews concerning what topics relating to the environment interviewees would like included in training. 30% of interviewees responded that they would like training related to the ‘requirements of the EMS/practical requirements’ and 27% noted that training related to ‘waste handling and disposal’ would be beneficial, as there was some uncertainty surrounding both matters (Figure 3.6).
Therefore, it would appear that respondents want to be proactive in addressing environmental matters, are aware that there are issues of environmental concern but need and want adequate training in order to be able to respond to requirements. This is referred by Sheldon and Yoxon (1999, p.134) as a need for “environmental management literacy”.

These findings agree with comments made by Neef (2003, p.171), that, “employees simply need to understand what is required of them”. Therefore, it can be argued employees do not just require a basis of environmental awareness in order to tackle environmental performance improvements, but in order to instigate the changes in behaviour and practice which are necessary to implement an effective EMS, require adequate training, education and communications (Sheldon & Yoxon, 1999).

It should be noted that these arguments are counterbalanced by comments made by employees involved in producing and providing training, as they commented that environmental training in relation to an EMS was only in initial stages and needed to be expanded and improved, which suggests that TWI is aware of training needs but has not yet put improvements into practice.
3.3.3 Work activities which are harmful to the environment

In the questionnaire the majority of respondents answered that they had not observed any activities which could harm the environment (Figure 3.7). Some respondents did not respond to either their “job role” or “company as a whole” response options, perhaps because they were uncertain, and as detailed in sections 2.3.4 and 4.2.1, a “don’t know” option was not provided.

![Observed harmful activities](image)

**Figure 3.7: Any activities observed which are harmful to the environment**

From the questionnaire, it can be concluded that those who responded “yes” to there being harmful activities felt that there are more issues “within the company as a whole” than in their own specific “job role”. These respondents and also those who responded “no” to harmful activities in their “job role” may have done so based on genuinely accurate observations, but alternatively, due to lack of awareness of what impacts their job activities may incur or due to an unwillingness to take responsibility for possibly harmful actions within their job, especially when considering that they conduct the job on behalf of TWI.

Also from the questionnaire, pre-selected responses pertaining to the possibly harmful activities which respondents may have observed were provided to which response option 5b(7) “raw material usage” was the predominant response (25%) (Figure 3.8).
Figure 3.8: Activities observed by employees at TWI, which could be harmful to the environment

TWI does not undertake heavy industry, as its work is predominantly research based. Therefore, it does not produce any tangible product but rather provides a service. Thus, the traditional harmful activities of air emission plumes or contaminating water sources are less occurring or non-existent and this may explain why the majority of respondents answered “no”.

Nevertheless, this does not escape the fact that some respondents have failed to realise that several other types of activities can create significant impacts – be it paper or energy usage, and that these can all have an influence on combined impacts on the environment, (as illustrated by Starkey, 1998).

This in part ties with the responses to the interview. It would appear that within the interview population there was debate over what is the definition of harmful activities,
which might account for the 50/50 split in responses. Whilst some saw waste production and energy use as harmful activities others disagreed, suggesting that such activities were part of a normal European business environment. Some respondents also noted that the main environmental issues at TWI had been identified and dealt with or were being so.

The questionnaire allowed for respondents to expand on their previous answers and provided sections where they could write further information. Respondents were asked to note any other potentially harmful activities to the environment in addition to those that were pre-given responses. 12% of respondents provided an answer and a selection is included in Figure 3.9.

"Air & land travel. Energy use within TWI. Some fume emissions from weld processing. Solvent use."

"Lights left on. Computers & other equipment left on after work. Too much waste paper generated."

"Escape of incorrectly stored general/hazardous waste - oils, solvents, batteries etc. Poor energy management - depletion of natural resources."

"Wasting electricity by … running air conditioning in winter."

"Vibration/Noise from resonance fatigue, recycling not optimised, significant air travel, travel to/from work."

**Figure 3.9: Quotations from the questionnaire pertaining to potentially harmful activities for the environment.**

Despite some respondents considering there to be no harmful activities occurring at TWI, it is worth bearing in mind that even less obvious activities can have a significant impact on both the environment and a business, such as the cumulative effects of waste. Ackroyd et al. (2003), highlights that handling waste can cost organisations up to 4% of turnover. The gathering of similar statistics relevant to TWI, might assist in convincing employees that there are issues to be dealt with for the betterment of the environment and the business, and also that the principles of
A continual improvement of environmental performance can make a difference. Similar considerations could be given to energy use and travel, which were frequently quoted in the written responses section.

Respondents to the questionnaire were also asked to note any solutions to stop or reduce impacts. 33% of respondents supplied a response and a selection is included in Figure 3.10.

“Paper recycling, separate waste bins in lab, better procedures for storage of samples/materials.”

“Adoption of correct procedures in all areas covering emissions, waste storage & disposal.”

“Improve recycling - paper, plastic, aluminium from offices. More use of IT to reduce air travel & peak car usage in rush hour (work from home occasionally).”

“Staff education.”

“Easier recycling for paper etc. Turn off car park lights at weekend - or at least 3/4 of them.”

“The system for recycling paper/cardboard does not appear to be comprehensive (a lot goes in the general waste). The use of electricity is not always economic i.e. switching off everything at night/weekends (computers, monitors, lights etc). Plastic cups are not always put in the 'becca' bins.”

Figure 3.10: Quotations of solutions to reduce or stop activities from harming the environment.

As can be seen from Figure 3.10, the need for better recycling was identified, which could explain why “raw materials usage” was the most selected harmful activity response option in the questionnaire.

Whilst waste was not the most popularly selected harmful activity from the pre-given responses in the questionnaire, several respondents noted better waste storage and disposal as a consideration (which could correspond with requests for training on this matter, as discussed above).
Therefore, it would appear that some employees at TWI do make observations related to impacts and are also willing to state those observations and possible solutions. This suggests that they may be willing to participate in EMS implementation.

### 3.3.4 Benefits of EMS implementation

![Benefits of EMS implementation](image)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Factor</th>
<th>Reference</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (1)</td>
<td>Long term cost savings</td>
<td>6 (6)</td>
<td>Staff Morale</td>
</tr>
<tr>
<td>6 (2)</td>
<td>Improved existing customer relationships</td>
<td>6 (7)</td>
<td>Public Reputation</td>
</tr>
<tr>
<td>6 (3)</td>
<td>New customer relationships</td>
<td>6 (8)</td>
<td>Ethically appropriate</td>
</tr>
<tr>
<td>6 (4)</td>
<td>Improving the environment</td>
<td>6 (9)</td>
<td>Improved communications</td>
</tr>
<tr>
<td>6 (5)</td>
<td>Legal Compliance</td>
<td>6 (10)</td>
<td>Training opportunities</td>
</tr>
</tbody>
</table>

**Figure 3.11: Benefits of implementing an EMS**

The questionnaire asked respondents to tick key motives or benefits for implementing an EMS. Again response options had been chosen using literature (Neef, 2003; Schaltegger *et al.*, 2003; Evangelinos and Halkos, 2002; Coglianese and Nash, 2001; Hamschmidt and Dyllick, 2001; Tack, 1999; Halme, 1997). In this instance, it was not important to observe that respondents ticked all options, but rather what they thought
were the key benefits and therefore, what should be highlighted to encourage effective EMS implementation at TWI.

The selection of the responses “improving the environment” and “public reputation” as the key benefit options offered in the questionnaire provides an interesting perspective (Figure 3.11). In selecting these options, it would appear that there could be a higher motive to implementing an EMS at TWI than purely business profit. “Public reputation” was provided as a separate response option to “new customer relationships” in the questionnaire and its popularity as a response suggests that respondents may believe that how the community and wider public view TWI is of importance, i.e. not just purely for business relationships but a broader audience.

‘Reputation’ was also the second most popular response in the interviews and which is therefore consistent with the questionnaire findings (Figure 3.12).

![Motives/benefits of ISO 14001 accreditation](image)

**Figure 3.12: Motives/Benefits of accreditation to ISO 14001.**

Also for these factors to be chosen above “legal compliance” and “long term cost savings” would suggest that TWI employees see there to be a greater purpose to an
EMS than simply reducing chances of being fined, going by the book and long term profit of the company.

Nevertheless, the findings from the questionnaire are to some degree contradicted by the findings from the interviews, where ‘customers/the market’ was the most popular response over ‘reputation’. This is a very different primary motive to “improving the environment”, as chosen in the questionnaire and ‘protecting the environment’ was respectively only the third most popular response in the interviews.

Literature commonly suggests that customers and market are the main or prominent motives to companies for implementing an EMS as this in turn could maximise profits and new client leads (Babakri et al., 2004; Edwards, 2004; MacDonald, 2004; Schaltegger et al., 2003). Therefore, it could be argued that TWI should not be any different. Lee Peng Tan (2004), agrees with this perspective as far as “industrialised” organisations are concerned. However, she continues by suggesting that for some Malaysian/less “industrialised” organisations, “improving the environment” is a more prominent motive (Lee Peng Tan, 2004, p.6). Should the questionnaire findings be genuine it might suggest that should TWI wish to implement ISO 14001/EMS in their Kuala Lumpur office, they might face less resistance than for other organisations, as the UK company culture perhaps views business from a more environmentally aware and caring perspective.

It is possible that when faced with “improving the environment” as a pre-given response option, respondents selected this either as a genuine response or because it was the right thing to do (“social desirability response bias”, Robson, 2002, p.233). As discussed above, this latter suggestion is more unlikely.

For the interviews, responses were open-ended and unprompted and therefore employees had to create an answer from their own observations. It is therefore, quite reasonable that the majority of interviewees would suggest ‘customer/market’ as the main motive, as TWI is a competitive and non-profit making organisation, which needs to keep generating contracts and memberships.
It is also possible that the interview population of 30 is not in fact representative of the larger questionnaire response population.

Further written responses could be provided in the questionnaire pertaining to benefits of EMS implementation. 11% of respondents noted an answer and a selection of answers is included in Figure 3.13.

“Technology should improve quality of life and not cause more problems. This should be part of TWI mission.”

“Uncertainty of how exactly a substance should be disposed of properly. Someone available to ask and organise would be good.”

“To obtain projects focused on environment/recycling etc. TWI must demonstrate commitment.”

“Knowledge gained could stimulate new areas of business for TWI.”

“TWI will do what it has to do - there is no driver to do more”.

“Set an example for others to follow e.g. member companies”.

“May stimulate innovation which is a TWI corporate value.”

Figure 3.13: Comments from the questionnaire pertaining to benefits of an EMS.

On the whole, these comments do suggest a wider concern for the environment and the directions in which TWI could develop, such as environmentally friendly technologies. Therefore, the overall findings in respect to benefits from EMS implementation do highlight a potentially genuine concern for improving/protecting the environment as this category was selected in both the questionnaire and interviews. Also, in spite of the different order for response selection popularity, the same key themes were apparent from both sets of results. This highlights the main benefits which should be communicated to TWI employees in demonstrating that both the environment and business could benefit from an EMS.
3.3.5 Barriers to EMS implementation

The questionnaire asked respondents to select which would be the main barriers or disadvantages to implementing an EMS (Figure 3.14). Response options were again derived from literature (Petts, 2000; Tack, 1999; Halme, 1997; Whitelaw 1997; Thomas, 1992).

![Figure 3.14: Barriers to EMS implementation as selected by TWI employees](image)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Factor</th>
<th>Reference</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 (1)</td>
<td>Cost of implementing system</td>
<td>7 (5)</td>
<td>Communication procedures</td>
</tr>
<tr>
<td>7 (2)</td>
<td>Cost of maintaining system</td>
<td>7 (6)</td>
<td>Extra documentation</td>
</tr>
<tr>
<td>7 (3)</td>
<td>Time pressures</td>
<td>7 (7)</td>
<td>Bureaucracy</td>
</tr>
<tr>
<td>7 (4)</td>
<td>Awareness of environmental issues</td>
<td>7 (8)</td>
<td>Environmental training costs and time</td>
</tr>
</tbody>
</table>

Convincing employees that an EMS is money well spent is perhaps the biggest hurdle for TWI to address in pursuing effective EMS implementation. As introduced in the literature review, Hamschmidt and Dyllick (2001), highlight that some companies are unhappy with the financial outlay of an EMS. This is indicative of a non-profit making organisation, such as TWI. Employees are aware of the importance of securing money for new projects which might in turn yield more contracts. Therefore, in proposing to allocate money to an EMS, of which they are not fully certain of the
benefits, it is understandable why employees are sceptical of the short term cost outlay. Halme (1997), suggests that this is an understandable concern, whilst Sheldon and Yoxon (1999), agree that EMS can be seen as an obstacle to attempting to remain competitive in increasingly demanding markets.

It will be imperative to convince employees, that long term, implementing an EMS would be financially beneficial. A strategy such as that discussed by Babakri et al. (2004), which provided quantitative evidence of cost savings through an EMS would be an optimal situation to pursue, and one which TWI has already begun to address (via the financial gains of selling metal scraps). It is essential to communicate such initiatives throughout the organisation.

As discussed by Halme (1997), it is vital that all employees receive communications no matter what degree they are directly involved in the implementation, as such messages convey progress and assist in ensuring continued implementation effectiveness. This point is borne in mind in the recommendations (Chapter 5). However, it should be remembered that gathering the necessary information in order to demonstrate benefits and reduce any reservations is a long term consideration (Babakri et al., 2004). Therefore, it may take time to reduce any resistance.

Cost of EMS implementation is also a factor of business priorities, as discussed in Evangelinos and Halkos (2002). As TWI is a non-profit organisation it is fundamental that it can continue to undertake projects and attain the finances necessary to remain a viable business. Therefore, the cost and time factor is crucial, in that implementation must be worked around and integrated into existing and future project work. This is a sensitive subject and will require much interaction with employees.

It should also be highlighted that in spite of cost concerns raised in the questionnaire, a subsequent question provided a 53% “disagree” response to the statement, “Finances and time required for EMS implementation and maintenance would be better spent in other areas of companies’ business” (Figure 3.15).
Thus, whilst there were some “uncertainties” (35%), this would suggest that EMS could be feasible and support the business ventures which TWI wishes to pursue.

As highlighted in the literature (Davis, 2003; Tack, 1999), it is possible for employees to view an EMS as another form of bureaucracy, particularly amongst long serving employees. The results did not highlight this to be a major concern. Tack (1999), concludes that resistance can be dealt with by the provision of training and brainstorming which provides two-way communication opportunities and consistency of understanding. Although only potentially a minor barrier, if TWI includes these strategies in its implementation this may alleviate any such concerns.
Continuing with the theme of communications, it is interesting to note that it was amongst the least selected response options for both benefits and barriers to EMS. It would appear that TWI employees do not see communications to be of importance or to have an impact on the EMS process. Communication is a key factor in EMS effectiveness and success and needs to be two-way (Edwards, 2004; Sheldon & Yoxon, 1999). Some of the interview comments suggested that, as an organisation, TWI needs to improve its communication channels in order to ensure a better understanding of existing systems, procedures and requirements.

| “Adequate resources - staff & equipment etc.” |
| “Possible barrier - limited availability of recycling facilities which are both accessible and affordable.” |
| “People must be educated in the processes otherwise they will become a barrier.” |
| “Needs to be led from CEO and thus supported to work.” |
| “Main problem is ensuring awareness & getting people to take seriously. Need procedures which are technically correct - is it more energy efficient to turn a fluorescent light off for 10 minutes or to leave it on? Need to look after the environment - EMS implies possible unnecessary bureaucracy.” |
| “Quantifying the cost benefits to see it is worthwhile.” |
| “To be worthwhile, the management must 'buy' into the issue, rather than do the minimum to obtain another badge on our letterhead.” |
| “Lack of top management initiative/commitment and external pressures.” |
| “Staff lethargy - resistance to change. The "I've always done it like this" mentality, there is not time allowed for adaptation or education regarding environmental issues.” |

**Figure 3.16: Questionnaire quotations of barriers to EMS implementation**

Thus, whilst not a main barrier at TWI, it would be important to establish from the outset which communication channels would be most successful. This would ensure that the organisation as a whole was aware of what was occurring, and also had the
opportunity to put forward suggestions, in order to ensure effective EMS implementation.

The questionnaire also allowed for further written responses on barriers of EMS and 13% of respondents recorded further details. A selection of comments is included if Figure 3.16.

Education, awareness, management and staff attitudes were all barriers noted in the questionnaire. This highlights why it is essential that employees are made aware of what is required and encouraged to participate (Neef, 2003). Therefore, as already discussed, letting employees know what is expected of them and providing details of the benefits may encourage more positive attitudes and participation.

3.3.6 EMS implementation, TWI culture and future objectives

A key question in the questionnaire asked how worthwhile respondents felt the EMS would be. 63% of respondents thought it “worthwhile” and 25% “crucial”, which suggests a majority in favour of it (Figure 3.17).

![Figure 3.17: Questionnaire respondents’ opinion on how worthwhile is an EMS](image)
This ties to interview findings which showed a unanimous response of ‘yes’ to the question of whether interviewees would be willing to support the EMS, although 13% of interviewees also added ‘if I have to’.

Therefore, from both sets of results it would appear that TWI employees believe an EMS to be worthwhile and would therefore be willing to support it.

Interviewees were also asked how they would support the EMS. Some employees (20%) suggested that they would like to be actively involved in the implementation, and this enthusiasm is to be promoted, as suggested by Emerson et al. (1997). Others stated that they would support the EMS by ‘supporting’, ‘encouraging’ and ‘reminding’ employees to participate and meet with requirements (Figure 3.18).

This is also promising. However, TWI would need to ensure that such promises were not just idle words and that there was some means of measuring support and encouragement, such as through Key Performance Indicators (KPIs).
According to Emerson et al. (1997), giving individuals more responsibility and accountability for their action is important, and as stated by Hans-Werner (2003, p.68), “… it is not enough to ask people’s opinions. Participation without consequences is not participation.”

As highlighted by several literature sources, employees need education, communication, training, incentives, and acknowledgement in order to encourage their acceptance of and participation in an EMS (Neef, 2003; Sheldon & Yoxon, 1999; Tack, 1999; Halme, 1997). These points were considered within the interviews as interviewees were asked for suggestions of the best ways to encourage employees to embrace the EMS and participate in its implementation (Figure 3.19).

![Figure 3.19: How to encourage employees to embrace EMS implementation](image)

Appropriate ‘communication’ was by far the most popular suggestion with several interviewees suggesting that there should be a representative from each group involved in the process in order to cascade information through their group. ‘Demonstrate benefits to employees’ was also a widespread response and ties to thoughts discussed above pertaining to training requirements.
Interviewees were asked if they could suggest anyone best placed to be an environmental champion to oversee the success of the implementation (Figure 3.20). The most popularly chosen individual was the H&S officer, closely followed by the suggestion that someone not senior, a Director or the QAS group should be the champion. It should be noted that some interviewees suggested more than one option for this question. These findings suggest that some top level leadership is required but also less senior employees have a key role to play in overseeing EMS implementation. This point is addressed in the recommendations (Chapter 5).

![Environmental champion suggestion](image)

**Figure 3.20: Employee suggestions for environmental champion**

The interviews also dealt with TWI’s current Quality Management (QM) and Health and Safety (H&S) systems, how successful they were and any influence they might have on successful implementation, integration and acceptance of an EMS. The majority of interviewees believed that the current systems were ‘good’ and thought other employees would agree. Some interviewees identified that the systems had ‘improved’ over time, however, also remarked that there were still some ‘issues to be addressed’, which ties with suggestions that other employees saw H&S and QM as a ‘necessary evil’, and that there was some resistance to existing systems (Figure 3.21).
However, in terms of what was already in place, the vast majority (93%) believed that integrating an EMS should be easy. In addition, whilst some degree of convincing employees that it was a useful tool might be required, 67% thought that there would not be too much resistance in the long term to a further system being implemented (Figure 3.22).
It would appear that most employees are therefore, used to existing management systems and generally acceptance their presence. As suggested in the literature (Oakland, 2003; Whitelaw, 1997), it can be simpler to integrate an EMS when there is an existing QM system in place, in particular as ISO 14001 has many similarities to ISO 9001.

![Image of a bar chart](image)

**Figure 3.23: Interviewee involvement with other TWI sites**

Interviewees were asked whether they were involved in TWI’s other sites. Most employees (77%) have some contact, although there is a mix of direct and indirect involvement (Figure 3.23). (Indirect involvement would include for example, a metal sample sent from a regional office to be sliced at Granta Park and returned to the regional office for analysis).

Interviewees were also asked which departments they worked most closely with at Granta Park and whether they were involved in record keeping/reviewing respectively. Most respondents (90%) stated that they worked with a variety of other departments, with many identifying that they worked with all departments. Also, the majority (80%) said they were involved in some form of record keeping (Figure 3.24).
Therefore, any new communication requirements under the EMS should, in theory, be simple to adapt to (in particular as TWI already has ISO 9001 accreditation) and EMS best practice could be quite simply spread using existing work/communication channels.

Figure 3.24: Interviewees involved in record keeping/reviewing

Figure 3.25: Interviewee opinion on TWI development in next 10 years
Interviewees were asked how they foresaw TWI developing in the next 10 years (Figure 3.25). The results suggest that TWI is looking to expand its current practices, as outlined in its Vision Statement (TWI Ltd (c), 2004). This was recognised by the majority of employees who indicated that regional and overseas locations would develop in the next 10 years. Trade knowledge and technical advances, including for renewables were also highlighted as business directions in which TWI would be engaging.

Most interviewees either thought that ‘yes’ (40%) TWI would look to further enhance its environmental performance following ISO 14001 or that is was a ‘possibility’ (30%). Many interviewees felt that ISO 14001 was a factor in TWI’s success but not of paramount importance, although a high proportion did think that is was paramount (Figure 3.26). 73% of interviewees also felt that TWI should promote ISO 14001 to its members and clients (Figure 3.27). This suggests an overall value in achieving accreditation, and that it could be integrated into part of the ‘TWI brand’.

Figure 3.26: Interviewee opinion on if ISO 14001 is paramount to TWI
It is worth highlighting that TWI’s business involves the development and provision of innovative technologies and, as suggested by O’Laoire (1997, p.119), “The new paradigm of international competitiveness is a dynamic one based on innovation”. Some interviewees acknowledged that the requirement of an EMS and other management systems can hamper the degree to which innovation can be conducted, due to, for example, safety or pollution prevention requirements. Therefore, it could be argued that this might lead to resistance in the implementation of an EMS.

However, as also highlighted by O’Laoire, (1997, p.119), the most competitive companies are those, “with the capacity to improve and innovate continually”. This point links to comments made by interviewees that TWI should look to incorporate environmental considerations into new technologies and that there was a business opportunity in doing so.

Finally, this future challenge, which includes the vital element of employee involvement can possibly be summed up by Jones and Welford (1997, p.128), in the statement that, “Participation is at the heart of sustainable development and this means that the empowerment of workers and … democratic arrangements within industry are fundamental requirements of any change process.”
3.4 Summary of findings

In summary, it would appear that TWI employees are in favour of an EMS and have an awareness of the environment. Whilst there appears to be a degree of uncertainty surrounding the costs of EMS implementation and maintenance, it would appear that there are possible methods to overcome this, such as effective communication and information provision. Integration into existing management systems should not be met with too much resistance and existing relationships with other sites and Granta Park departments plus current involvement in record keeping should assist in the holistic integration of an EMS.

Sound communication channels will be essential and clarification of specific requirements will also be required. Customers and the market, along with public reputation and improving the environment, seem to be the main motives and benefits to attaining ISO 14001 accreditation and fit in with TWI’s long term business strategies.

TWI’s employees have provided many useful observations and suggestions through the questionnaires and interviews, and it would appear that they would be willing to support EMS implementation and could have a valuable role in the process. Therefore, there is every indication that, if the process is properly managed, employees could make a real difference to the success of EMS implementation at TWI.

Emerson et al. (1997, p.168), suggests that the “human” and “cultural” elements of a company are often overlooked by environmental management tools. Indeed, Thomas (1992, p.155), considers that, “Corporate goals cannot be achieved by people alone, or by systems and physical resources alone, but only through the effective integration of both”. It is hoped that this research has addressed considerations of these elements, as it has been concluded that employees have an overriding influence on the ultimate effectiveness and success of EMS implementation.
Chapter 4: Limitations of research and improvements
4.1 Introduction
Having undertaken the fieldwork at TWI, it was identified that some factors may have influenced or limited the results of the questionnaires and interviews. On reflection, improvements could have been implemented in some instances, in order to maximise useful data. This is detailed in the following discussion.

4.2 Questionnaires

4.2.1 Response options
The “don’t know” option should have been provided in more instances and in particular for question 5, as this had the most non-responses. Omission of the “don’t know” option presumed that respondents would be able to respond to each question posed (Robson, 2002, p.243). Given the incomplete or blank questions which were returned, it would appear that this option should have been provided more frequently to allow for all levels of knowledge.

4.2.2 Number of questions and questionnaire returns
A limited number of questions were asked and limited number of responses were received. Whilst a contingency plan was formed so that extra interviews would be conducted in order to make up for response shortfalls, 63% of employees did not respond. Therefore, it remains uncertain what the majority of employees at TWI believe. Nevertheless, 37% is still a higher response rate than considered reasonable in the literature (Denscombe, 1998), and as further discussed in Chapter 3, the responses received did allow for some valid and consistent conclusions to be reached.
4.3 Interviews

4.3.1 Interview questions and population coverage
Interviews only provided a snapshot of opinions within TWI. An initial 5% sample selection was deemed reasonable, given that questionnaires were issued to 100% of the employees. However, given time constraints, interviews covered a limited number of questions which were asked to only a sample of employees. Therefore, useful information may have been overlooked and employees who may have had equally valuable insight, or who wished to be involved, may still remain unidentified. However, interviews did focus on what was considered to be the most appropriate range of questions in order to obtain the best understanding of the company under the time permitted.

4.3.2 Similar questions
Within the interviews there were some questions which provided similar answers. Querying the motives and then the benefits of ISO 14001 accreditation provided an overlap in responses. Similarly, two questions pertaining to training provision and receipt provided parallel responses.

4.3.3 Inconsistency in asking questions
For the first few interviews questions were not asked in a consistent manner. Two questions were omitted in some interviews, namely, if ISO 14001 was paramount to TWI’s future success and if respondents undertook record keeping/reviewing. Therefore, there were some inconsistencies in the results. However, whilst there was not a complete set of responses to these questions, the remaining responses provide sufficient and valuable findings.

4.3.4 Interview findings analysis
In ascertaining key themes from the interview response notes, judgement was used to categorise comments made by interviewees. This was a very subject method and therefore, may not have fully captured what interviewees were stating. Nevertheless, categorisation of responses was required in order to gain some conclusions from the interview results.
4.4 Piloting of questionnaire and interviews
On reflection, further piloting may have been valuable, in particular for the questionnaire. Whilst the quality management secretary was able to answer all questions, it is apparent that not all employees could. Further piloting would perhaps have highlighted issues such as the lack of the “don’t know” option.

4.5 Job role and Group responses
Knowledge of job role or Group did not add any new angle to analysing questionnaire or interview responses. Their inclusion may have lessened questionnaire returns from people deterred by these questions. However, for those who included this information, it suggested an openness and willingness to be accountable for their responses. Also, on reflection, this information might have been of use should the other questionnaire or interview responses have proven to be ambiguous.

4.6 Limits of investigating only one company in one sector
Field research was restricted to TWI and therefore there will be a natural bias in results when compared to the findings in the literature. TWI has a high percentage of graduates and scientists who may have a greater awareness of environmental issues, given the industry in which they work, and issues to which they may have been exposed. Therefore, results may be skewed in terms of higher levels of knowledge and awareness compared other industries or organisations.
Chapter 5: Framework for employee involvement in EMS
Chapter 5: Framework for employee involvement in EMS

5.1 Introduction
It would appear from the previous Discussion section that the following could be the main focus points for TWI to undertake in involving employees in implementing their EMS, in order to maximise implementation success.

1. Enhancement of current environmental training. Include topics pertaining to EMS requirements and other practical issues, such as waste disposal and handling (section 3.3.2).
2. Effective two-way communication channels to be established (section 3.3.5).
3. Regular provision of information updates to employees pertaining to the practical requirements of an EMS (section 3.3.2).
4. Involvement of staff from different groups and seniority in the implementation process (section 3.3.6).
5. Inclusion of individual environmental performance as part of KPIs, appraisals and business objectives (section 3.3.6).
6. Information to be provided to employees pertaining to the costs and benefits of an EMS (section 3.3.5).

5.2 Background to recommended framework
The following chapter presents a proposed framework for TWI employee involvement in its EMS implementation and incorporates the above points, along with other considerations from literature, the questionnaires and interviews detailed in the previous chapters.

The framework is divided into stages and each stage specifies recommended actions to be undertaken, a brief explanation of why those actions are proposed. In addition, a proposed TWI EMS implementation committee is identified. Reference should be made to Appendix 3 which provides a more detailed description of the framework stages. A justification for the selection of specific individuals for the committee can also be found in Appendix 3.
It should be noted that as previously identified, the focus of this research has been the role of employee involvement in EMS implementation. Therefore, a detailed account of how to undertake the entire EMS process in order to obtain ISO 14001 will not be provided. Instead, the following chapter suggests how best to include employees in the process, to encourage their involvement and to provide them with ownership, in order to promote participation in and commitment to the EMS and therefore, an effective implementation.

It should also be observed that the proposed timetable includes a three month trial period before the system ‘goes live’ and an audit is requested. Therefore, the framework proposes an LRQA audit in April/May 2005, as opposed to early 2005 as initially suggested by TWI.

In the committee flow chart ‘EC’ signifies individuals who could be environmental champions. Environmental champions would be individuals who would oversee the implementation via their role on the EMS implementation committee, but also within their technology groups, by encouraging colleagues to participate and assisting with any technical or operational EMS queries.

The inclusion of more than one champion has been suggested for two reasons. Firstly, it provides recognition of commitment to EMS implementation to more than one employee and therefore may help to expand the feeling of commitment and ownership. Secondly, in sharing the responsibility for overseeing EMS implementation it prevents the onus being on one employee to ensure success and also shares the work load required, so that it does not seem too onerous a commitment in addition to employees’ other tasks.
5.3 Recommended framework for TWI employee involvement in EMS implementation

**Stage 1 - Early September 2004**
CEO to address all employees and introduce EMS implementation, costs and benefits, training and participation opportunities. *Initial communication establishes top level commitment and encouragement is offered to employees to participate and take ownership of process (Sheldon & Yoxon, 1999; Jones and Welford, 1997).*

**Stage 2 - Early September 2004**
First meeting of EMS implementation committee. Confirm members, discuss timetable, baseline conditions (e.g. quantities of waste), impacts and aspects, legislative requirements, training requirements. Agree action points to be undertaken, such as, clarification of baseline conditions or legislative matters, development of training programme etc. *Involves range of employees from beginning, so trust and two-way communications develop and there is an opportunity for employees to contribute (Edwards, 2004).*

**Stage 3 - September 2004**
Committee members to undertake action points from first meeting. Sub-committees can be created to spread work load and for increased participation. *Establishes further ownership, participation and commitment (Zobel & Burman, 2004).*
Stage 4 - Early October 2004
Second committee meeting to discuss progress, such as agreed baseline conditions, impacts and aspects, legislative requirements and training programme. Discuss existing environmental policy, objectives and targets, requirements of an environmental programme along with existing processes, operations, systems and business objectives. Allocate responsibility for revision/production of environmental programme sections and provision of training, and agree on required progress before next meeting.

_Develops communication channels, establishes responsibility and will hopefully enhance commitment (Edwards, 2004; Sheldon & Yoxon, 1999)._ 

Stage 5 - October 2004
Commence training/brain storming (e.g. requirements of EMS, waste handling) and request feedback to be communicated at next committee meeting. Introduce environmental champions, commence creation/amendment of documentation required for EMS.

_Encourages two-way communications and acknowledges suggestions made by employees, therefore enhancing commitment (Sheldon & Yoxon, 1999)._ 

Stage 6 - Early November 2004
Third committee meeting to discuss feedback from training sessions, feedback on progress of environmental programme, any emerging problems which might delay progress. Discuss how employee participation in EMS implementation can be included in KPIs (environmental performance KPIs) and also allocate responsibility for production of one page summary to issue to employees detailing progress in October and particular issues identified.

_Advancement of two-way communication channels and commitment required from employees (Edwards, 2004; Sheldon & Yoxon, 1999)._
Stage 7 - November 2004
CEO/ H&S officer attend team meetings in order to encourage employee participation. Field questions and concerns from employees, to be discussed at next committee meeting. Introduce environmental policy to employees. Advertise via emails and posters to encourage employees to participate. Complete revision/production of environmental programme of objectives and targets and continue training programme. Develop environmental performance KPIs.

*Encourages and supports employees to participate in EMS and reminds them of importance/benefits of commitment. Hopefully also develops further responsibility, awareness and willingness.* (Tack, 1999; Dodge, 1997).

Stage 8 - Early December 2004
Further committee meeting to discuss feedback from November activities. Agree content of environmental programme, verify environmental performance KPIs and identify any obstacles to EMS implementation timetable. Delegate production of summary of progress during November to issue to employees.

*Further integration of employee ideas and practice of two-way communications* (Sheldon & Yoxon, 1999).

Stage 9 - December 2004
Continue training programme, introduce environmental programme and environmental performance KPIs to employees. Ensure employees understand their responsibilities and all requirements are in place for EMS. Environmental champions continue to attend team meetings. Any remaining resistance should be identified during this time and resolved.

*Two-way communications are important in order to gauge any remaining resistance. KPIs promote responsibility and are also an incentive. A strong sense of ownership and responsibility should be developed.* (Edwards, 2004; section 3.3.5).
Stage 10 - Early January 2005
Final committee meeting before commencing EMS test period/ applying for LRQA audit. Feedback on progress in December and any employee comments/resistance. Verify that all requirements for EMS are in place and that there is consistency with requirements of ISO 14001. Create one page progress summary for issue to employees.

*A strong sense of employee empowerment and ownership and ongoing commitment should have developed by this stage (Halme, 1997).*

Stage 11 - January to March 2005
Undertake EMS test period and remedial action. Document all problems identified with EMS and action taken to remedy it. Apply to LRQA for audit towards end of test period.

*Committee members and all other employees have the opportunity to participate in process and will hopefully be willing due to sense of commitment (Justin Galliford, 2004; Halme, 1997).*

Stage 12 - Undergo LRQA audit process
Well-founded employee participation in EMS process will have lead to a successful EMS (Edwards, 2004; Sheldon & Yoxon, 1999).
5.4 Proposed TWI EMS implementation committee

CEO
Committee Chairman/EC

---

H, S & E officer
QAS
Chief Environmental Champion

---

Materials Controller
Site Services
EC

---

Section Manager
Manufacturing Services
EC

Laboratory Manager
Metallurgy/Electron
EC

Administrator
QAS
EC

Technician
? Group
EC

Team Leader
? Group
EC

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Group Manager
Group and European

Group Manager
Technology Transfer

Operations Manager
Regions & Facilities

HR Manager
Human Resources

Advisory Role
5.5 Other considerations for EMS implementation at TWI

- It is advisable to test an EMS for up to three months prior to applying for an LRQA audit in order to ensure that the system is functioning properly (Galliford, 2004). Any problems should be identified, resolved, and documented, in order to provide evidence to LRQA of improvements and a more efficient system.

- It is considered that it can take three to four months to fully implement an EMS (Galliford, 2004). As TWI is already a large way towards implementation, time required could be considerably reduced.

- Following implementation, meetings are not required to take place on a monthly basis. Bi-monthly or quarterly meetings may be sufficient, as greater frequency may cause resistance, due to time commitments (Oakland, 2003).

- The individuals proposed for the implementation committee were selected based on interview findings. There may be other individuals equally or more suited to the task not identified during the research.

- The EMS implementation committee should not consist of too many representatives (Sheldon & Yoxon, 1999). However, should other employees wish to be involved, sub-committees could be formed and lead by environmental champions. The sub-committees could assist in ensuring that the actions required from the environmental programme and other requirements of implementation were conducted.

Therefore, it can be seen that it is possible to include a number of employees in the EMS implementation process and as concluded in previous chapters it is beneficial to do so in order to encourage implementation success. The above framework and committee are only provided as a recommendation. It will be at TWI's discretion whether this is adopted or adapted for its EMS implementation process.
Chapter 6: Conclusions
Chapter 6: Conclusions

The objectives of this research required that a “detailed understanding of the influence that the role of employee involvement has in successful EMS implementation”, be established from literature and at TWI (section 1.6). These findings were subsequently to be used to recommend a framework for employee involvement in EMS implementation at TWI. This research was undertaken in line with the Aims introduced in Chapter 1.

An evaluation into the role of employee involvement in EMS implementation and its influence on implementation success was undertaken, by firstly conducting literature review of previous studies. Factors which influenced employees, and were drivers or barriers to their participation were identified. Key messages included that employees needed adequate training and communication in order to provide a sense of ownership and empowerment, and in turn, to encourage participation (Sheldon & Yoxon, 1999; Tack, 1999). Conversely, lack of support and training were found to be barriers to employee involvement and thus hampered participation in implementation (Ackroyd et al., 2003; Evangelinos & Halkos, 2002; Thomas, 1992).

A new case study was subsequently undertaken at TWI and involved the use of questionnaires and interviews to establish employee environmental awareness, perceptions of EMS and receptiveness to involvement in implementation. These findings were then evaluated in line with the previous literature review findings. Results from TWI indicated that employees had a good level of awareness which, it was suggested, could be improved further via the provision of more adequate training (sections 3.3.1 and 3.3.2). Whilst there were uncertainties about EMS costs, employees believed that motives including improving the environment, customers and reputation were reasons for implementing an EMS (in line with ISO 14001 accreditation) (sections 3.3.4 and 3.3.5).

Employees stated that an EMS was therefore worthwhile and that they would be willing to support its implementation (section 3.3.6). Existing systems and work channels should assist EMS implementation and its possible future extension to other
sites, in line with TWI’s business development plans (section 3.3.6). Many of the findings at TWI corresponded to those found in literature and it was concluded that employees had a significant role to play in EMS implementation success.

Finally, a framework was proposed, incorporating the findings gathered from the research and recommending actions which could be undertaken in order to encourage employee participation and successful EMS implementation at TWI (section 5.3).

It can be concluded that TWI has the human and systematic means to put an EMS in position and possibly has a stimulating challenge ahead of how to integrate environmental considerations within its technological advancements.
References
References


Galliford, J., 28 January 2004, *EMS implementation*, Lecture at School of Environmental Sciences, University of East Anglia.


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Appendices
Appendix 1: Questionnaire and covering letters
ENVIRONMENTAL QUESTIONNAIRE

You will be aware that TWI is working towards accreditation to ISO 14001 in 2005. As part of this programme, we have been given the opportunity to work with Vikki Lawson, a MSc student from University of East Anglia (UEA).

Vikki is trying to assess staff awareness of environmental issues and would be grateful if you could complete the attached questionnaire and return it to Gill Taylor, QAS by Friday 14 May. All responses will be completely confidential and used only to obtain a general view of knowledge across TWI.

Vikki is also hoping to interview a few members of staff – if you are selected, we would be grateful if you could find time to meet with her.

Thank you for your co-operation.

Gill Taylor/Ian Few
Dear Sir/Madam,

Questionnaire on Environmental Impacts

My name is Vikki Lawson and I am a student at University of East Anglia. I am currently undertaking a masters degree in Environmental Impact Assessment, Auditing and Management and as part of this, am writing a dissertation which involves the study of TWI Ltd, its environmental impacts and the possibility of implementing an Environmental Management System (EMS).

As part of this study I would like to understand what you consider to be the environmental impacts and possible solutions arising from TWI’s operations. Therefore, I would be grateful if you could find the time to complete the attached questionnaire, which should take no more than between 5 and 10 minutes. Your ideas on these issues are very important and could contribute greatly to the implementation of any EMS, as well as being a crucial element of the study.

The information you provide will be kept completely confidential I have discussed the attached questionnaire with Gill Taylor (Quality Officer) and Ian Few (Chief Safety Officer) who have given their full support for it to be issued.

I would be grateful if you could complete the questionnaire by 14 May 2004 and return it to Gill Taylor, QA via the internal mail.

Many thanks in advance for your time and consideration.

Yours faithfully

Vikki Lawson
Environmental Questionnaire

The following questionnaire will ask you about matters related to your job and the environment. Because of their familiarity with a company's operations and surroundings, it is widely recognised that a company's employees are one of the most valuable sources for identifying its environmental impacts and providing possible solutions for improvement.

The results from this questionnaire will be one of the sources of information used to aid in the implementation of an Environmental Management System (EMS) at TWI. It would be greatly appreciated if you could find the time to answer the following questions. It should take no longer than 10-15 minutes. The results will be gathered and compiled by Vikki Lawson of the University of East Anglia, and your identity and answers will remain strictly confidential.

Thank you in advance for your time and consideration.

1. What is your job title and department?
   (e.g. Accounts Manager, Finance Division
   Laser Technician, Laser & Sheet Processes Group)

2. Please describe briefly the main responsibilities that you undertake:
   (e.g. machine maintenance, supplies control, customer relations, membership fees)

3. Which of the following factors do you think could cause significant harm to the environment?
   (please tick beside your answers – you can choose more than one response)
   - Global Warming ( )
   - Ozone Layer depletion ( )
   - Extreme weather events (e.g. hurricanes, flooding) ( )
   - Rain forest depletion (e.g. Amazon) ( )
   - Fossil fuel resource depletion (e.g. gas, petroleum) ( )
   - Other natural resource depletion (e.g. fish, iron ore) ( )
   - Pollution of oceans and rivers ( )
   - Contamination of land ( )
   - Human population growth ( )
   - Transportation systems ( )
   - Waste/refuse disposal ( )

4. Have you undergone any environmental training in the last two years?
   (please tick beside your answer)
   - Yes ( )
   - No ( )

4a. If Yes, please provide details, as far as possible (name of training, topics covered – e.g. waste minimisation, energy saving strategies).
5a. Have you observed any activities which you think could harm the environment:
(please tick beside your answers)

within your job role?  Yes (  )     No  (  )
within the company as a whole?  Yes (  )     No  (  )

If you have answered Yes to either of the above, please continue to questions 5b, 5c and 5d. If you have answered No, please go to question 6.

5b. If you have answered Yes in question 5a, please tick which of the following you have observed, which you believe may harm the environment: (please tick beside your answers – you can choose more than one response)

Emissions to air (e.g. gases, ash, dust)  (  ) Waste disposal  (  )
Emissions to water (e.g. solvents, cleaning fluids)  (  ) Raw material usage  (  )
Emissions to soil (e.g. oil, chemicals)  (  ) Damage to wildlife  (  )
Noise emissions (e.g. machinery, trucks)  (  ) Transportation  (  )
Waste storage (e.g. used oil in drums)  (  )

5c. If you have observed any other potentially harmful impacts to the environment not mentioned above please note them below:

5d. If you can think of any solutions which may reduce or stop these harmful impacts please note them briefly below (e.g. recycling options for waste products, secure storage tanks for oil):

6. TWI Ltd already has Quality Management and Health & Safety systems in place which are recognised to aid company efficiency and operational control. Which of the following options do you think would be the key motives or benefits to implementing an Environmental Management System at TWI?
(please tick beside your answers – you can choose more than one response)

Long term cost savings  (  )  Staff morale  (  )
Improved existing customer relationships  (  )  Public Reputation  (  )
New customer relationships  (  )  Ethically appropriate  (  )
Improving the environment  (  )  Improved communications  (  )
Legal compliance  (  )  Training opportunities  (  )

6a. If you can think of any other benefits not mentioned above or have any relevant comments, please note them below:
7. Which of the following options do you think would be the main barriers or disadvantages to implementing an Environmental Management System at TWI? (please tick beside your answers - you can choose more than one response)

- Costs of implementing system
- Costs of maintaining system
- Time pressures
- Awareness of environmental issues
- Communication procedures
- Extra documentation
- Bureaucracy
- Environmental training costs and time

7a. If you can think of any other disadvantages not mentioned above or have any relevant comments, please note them below:

8. How worthwhile do you think it would be to implement an Environmental Management System at TWI? (please tick beside your answer)

- Crucial (i.e. must have)
- Worthwhile
- Not very worthwhile
- Not at all worthwhile (i.e. worthless)
- Don’t know

9. Finally, please read the following statements and circle the answer which most closely matches your response to each. Please circle one response only per statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Response Options</th>
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<tbody>
<tr>
<td>a. Caring for the environment is important both at home and in the workplace.</td>
<td>Strongly Agree Agree Uncertain Disagree Strongly Disagree</td>
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<tr>
<td>b. Environmental considerations are not as important as maintaining the profitability of companies.</td>
<td>Strongly Agree Agree Uncertain Disagree Strongly Disagree</td>
</tr>
<tr>
<td>c. An EMS will identify and reduce environmental impacts in the workplace.</td>
<td>Strongly Agree Agree Uncertain Disagree Strongly Disagree</td>
</tr>
<tr>
<td>d. An EMS will impose more bureaucracy on companies without improving environmental performance.</td>
<td>Strongly Agree Agree Uncertain Disagree Strongly Disagree</td>
</tr>
<tr>
<td>e. Increased environmental awareness has resulted in an increase in unnecessary regulation affecting both companies and individuals.</td>
<td>Strongly Agree Agree Uncertain Disagree Strongly Disagree</td>
</tr>
<tr>
<td>f. Finances and time required for EMS implementation and maintenance would be better spent in other areas of companies’ business.</td>
<td>Strongly Agree Agree Uncertain Disagree Strongly Disagree</td>
</tr>
<tr>
<td>g. An EMS will result in a range of benefits besides environmental improvements for companies and individuals.</td>
<td>Strongly Agree Agree Uncertain Disagree Strongly Disagree</td>
</tr>
<tr>
<td>h. Companies which implement an EMS are sending a message to suppliers and the public that they actively want to address environmental performance improvement.</td>
<td>Strongly Agree Agree Uncertain Disagree Strongly Disagree</td>
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</table>

Thank you for your time. Your responses are much appreciated. Please place your completed questionnaire into the envelope provided and return it to Gill Taylor. If you are interested in finding out more about the EMS and/or would like to help in its creation, please contact Gill Taylor.
Appendix 2: Example of interview prompt
APPENDIX 2: Example of interview prompt

Technician

1. TWI is looking to be accredited to ISO 14001. What do you think to be the main motives for this?

2. What will be the main benefits of achieving accreditation?

3. It is widely recognised that the requirements of ISO 14001 have many similarities to ISO9000 series, which TWI already has. It is possible to implement an EMS in line with existing QM systems. How do you view the success of TWI’s current Quality Management and H&S provisions.

4. So in terms of what already exists, do you think that this would be an easy integration?

5. How do you think TWI staff in general view current QM and H&S?
6. Do you think there would be any resistance to yet another system?

7. What level of environmental awareness do you think currently exists amongst staff at TWI?

8. Do you think current induction and periodic update training sufficiently addresses environmental issues?

9. In creating a framework for staff involvement in an EMS, I am looking in further detail at current levels of environmental awareness, who might be willing to participate in the creation of the EMS and views that staff have on the proposed system, what would be most effective etc.

i. What do you think would be the best way to encourage staff to embrace the EMS – be it participating in its creation, implementation and monitoring/continual improvement or just abiding by any new company procedures that are put in place to serve the EMS?

10. It is widely accepted that in order for an EMS to be efficient that an environmental champion (s) should be appointed. Who do you think would be best placed for this role? Or would you need to bring in someone else to deal with it?
11. Briefly, what are the main roles/tasks that you undertake?

12. How long have you worked at TWI?

13. Are you involved at any of TWI’s other sites?

14. Which other departments are Granta Park do you work most closely with?

15. Are you involved in keeping/reviewing records?

16. How often do you receive training related to the environment?
17. What topics of environmental training/examination do you undertake? Are there any other topics that you think should be included?

18. Are you aware of any significant environmental impacts in the roles you specifically perform or in those of your colleagues?

19. Would you be willing to support the EMS and how?

20. How do you foresee TWI developing in the next 10 years – what do you think are the main business aims and targets?

21. Do you think TWI would look to further enhance its environmental performance provisions following ISO14001 accreditation?
22. Do you see ISO14001 accreditation as being of paramount importance to the future success of TWI? And why?

23. Do you think TWI should promote ISO14001 to its members/clients?
Appendix 3: Detailed outline of framework for TWI employee involvement in EMS implementation

and

Justification for TWI EMS implementation committee selection
### Appendix 3: Detailed outline of framework for TWI employee involvement in EMS implementation

<table>
<thead>
<tr>
<th>Framework stage no.</th>
<th>Actions</th>
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<tbody>
<tr>
<td><strong>1</strong></td>
<td><strong>Early September 2004 – In a communication to all employees, CEO to introduce:</strong> &lt;br&gt; - Intention to implement an EMS for ISO 14001 accreditation and renewed impetus to work to a deadline of first half of 2005. &lt;br&gt; - Brief outline of what is an EMS and the possible benefits and costs including those already identified (e.g. scrap metal sales) (Babakri <em>et al.</em>, 2004). &lt;br&gt; - Employees will be receiving more detailed information, education and training about what EMS entails, will have the opportunity to participate in and put forward suggestions for implementation (Chapter 3 section 3.3.2; Halme, 1997). &lt;br&gt; - EMS is to be integrated into existing company processes and systems and will form part of KPIs. (Chapter 3, section 3.3.6; Whitelaw, 1997). &lt;br&gt; - EMS implementation committee including environmental champions will be established to oversee implementation and anyone interested in involvement should speak to H&amp; S Officer.</td>
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<td><strong>2</strong></td>
<td><strong>Early September 2004 - First meeting of EMS implementation committee.</strong> &lt;br&gt; - Confirm members of committee and commitment requirement. &lt;br&gt; - Clarify proposed timetable for implementation. &lt;br&gt; - Discuss currently identified aspects and impacts, baseline conditions (e.g. quantities and sources of waste, electricity usage per week). (Zobel and Burman, 2004) and legislative requirements. &lt;br&gt; - Discuss what topics of environmental training are to be provided to employees and in what format (e.g. within existing team meetings, brainstorming sessions) (Sheldon and Yoxon, 1999). Seek advice from external sources, should there be uncertainty of how best to conduct aspects of the training or create training content (It is essential that employee involvement is rooted from correct and meaningful training). &lt;br&gt; - Set action points for next meeting, such as clarification of any changes which may have occurred to the baseline since last measured, verification of legislative requirements, creating material for training topics and training schedule etc).</td>
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| 3                  | **September 2004 – Undertake initial action points required from first committee meeting.**  
  - Create training programme suitable for all employees. Again refer to external sources, should clarification be required on training content or methods.  
  - Verify baseline information and legislative requirements.  
  - Ensure any progress or new findings are fed to other committee members at it may impact on their action points. |
| 4                  | **Early October 2004 – 2nd committee meeting.**  
  - Confirm current impacts and aspects and baseline conditions (Zobel & Burman, 2004).  
  - Confirm legislative and regulatory requirements.  
  - Discuss existing environmental policy, programme and environmental management manual, and any revisions that may be necessary.  
  - Discuss what objectives and targets are needed for environmental programme and ensure consistency with policy.  
  - Discuss how objectives and targets are going to be undertaken, i.e. worked into existing operations.  
  - Discuss emergency preparedness and how this is to be included in the programme.  
  - Discuss environmental programme in line with requirements of H&S and Quality Management systems, business objectives and legislation.  
  - Sub-divide revision/production of environmental programme elements fairly amongst committee, and in considering all points discussed above, agree on progress needed before next meeting, for instance, confirmation of actions required in order to meet targets, or confirmation that a proposal for used oil handling strategy meets with H&S requirements.  
  - Delegate implementation of any policy and environmental management manual alterations.  
  - Confirm training to be undertaken (e.g. waste handling, recycling, function and requirements of EMS) (Chapter 3 section 3.3.2, Sheldon and Yoxon, 1999) and sub-divide responsibility for provision.  
  - Delegate an individual to be in charge of documentation control to ensure version updates are managed. |
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| **5**              | **October 2004 – training/brain storming and environmental programme creation commencement**  
  - Via team meetings or other Group/Grade arrangements commence training/brain storming on EMS requirements for implementation and other suggestions, such as waste management (Chapter 3, section 3.3.2). Also, discuss benefits (e.g. reputation) and barriers (e.g. costs) of EMS, in order to aid understanding of its uses.  
  - Feedback any suggestions made during training at next committee meeting to encourage two-way communications.  
  - Introduce who are environmental champions and highlight if employees have any concerns pertaining to the EMS they can approach them.  
  - Commence revision/production of documentation for environmental programme. |
| **6**              | **Early November 2004 – third committee meeting.**  
  - Feedback suggestions from training and brain storming sessions.  
  - Feedback on progress of environmental programme revision/production.  
  - Identify potential issues/barriers which might hold up timetable as identified from feedback.  
  - Review amended policy and environmental management manual.  
  - Discuss how employee EMS participation can be included in KPIs and appraisals as a form of recognition (and incentive).  
  - Agree progress and action points required for next meeting  
  - Allocate production of one page summary to issue to employees regarding progress in first month of undertaking preparation for EMS implementation in order to keep all employees in touch with developments (Neef, 2003). |
| **7**              | **November 2004 – continue with training, brain storming sessions and environmental programme.**  
  - Chief environmental champion and CEO to attend team meetings to raise profile of EMS and encourage |
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<td>participation and ownership. (i.e. lead by example, Sheldon &amp; Yoxon, 1999). Perhaps also invite guest speaker from an organisation which already has ISO 14001. Field questions and comments to be feedback at next committee meeting.</td>
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<td>• Depending on progress in October, discuss in training groups the requirements of environmental programme objectives, what strategies will and will not work in meeting those requirements.</td>
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<td>• Introduce the environmental policy and environmental management manual to employees and ask for feedback.</td>
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<td>• Ensure all employees are aware of emergency requirements of EMS.</td>
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<td>• Advertise via email and posters to encourage employees to participate.</td>
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<td>• Complete revision/production of environmental programme documentation in line with other business requirements (e.g. H&amp;S).</td>
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<td>• Develop process for including EMS participation in KPIs and produce documentation to support it.</td>
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<td>8</td>
<td><strong>Early December 2004 – 4th committee meeting</strong></td>
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<td></td>
<td>• Feedback from November training and team meeting sessions.</td>
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<td>• Agree environmental programme.</td>
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<td>• Verify environmental performance KPI’s.</td>
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<td></td>
<td>• Identify main barriers/issues to achieving accreditation and refocus efforts to tackle problems.</td>
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<td>• Check that timetable requirements are still attainable.</td>
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<td>• Reallocate tasks if necessary to meet commitments.</td>
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<td>• Delegate production of a one page summary of progress, key issues identified by employees during training sessions etc, to be issued to all employees to continue two-way communications.</td>
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<td>9</td>
<td><strong>December 2004 – continue training and completion of action points.</strong></td>
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<td>• Continue training and brain storming sessions and gathering feedback.</td>
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<td></td>
<td>• Introduce environmental programme to employees and also how EMS requirements will be built into employee KPIs and why (to encourage responsibility and ownership, incentive for career development) (Chapter 3 sections 3.3.2; 3.3.6; Tack, 1999).</td>
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<td>• Ensure employees understand company wide requirements and their specific responsibilities to EMS for KPIs, through team meetings, training sessions.</td>
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|                     | • Ensure all requirements are in place for EMS implementation and that there is consistency with requirements of ISO 14001.  
|                     | • Environmental champions should continue to attend team meetings in order to establish two-way communications. |
| 10                  | **Early January 2005 – final committee meeting before commencing EMS testing period/applying to LRQA for audit**  
|                     | • Feedback on progress during December.  
|                     | • Feedback on any resistance remaining and ensure being resolved.  
|                     | • Verify that all requirements for EMS are in place and consistent to ISO 14001.  
|                     | • Allocated production of one page summary of progress. |
| 11                  | **January – March 2005 – undertake test of EMS effectiveness**  
|                     | • Verify that system is functioning effectively. Identify any issues, where issues are occurring and undertake training or other remedial action, such as provision of more paper recycling bins.  
|                     | • Keep records of all issues identified, how dealt with and outcome as this is valuable evidence for accreditation audit.  
|                     | • Towards end of test period apply for LRQA audit. |
| 12                  | **April/May 2005 – undergo LRQA audit process**  
|                     | • Initial meeting/communication  
|                     | • Audit  
|                     | • Follow ups |
### Justification for TWI EMS implementation committee selection

<table>
<thead>
<tr>
<th>Committee member</th>
<th>Justification</th>
</tr>
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<tbody>
<tr>
<td><strong>CEO</strong></td>
<td>Implementation must be lead by example from the top. Needs sufficient weight behind decisions in order for employees to take it seriously.</td>
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<tr>
<td>Directors</td>
<td></td>
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<tr>
<td><strong>H&amp;S Officer</strong></td>
<td>Appropriate to give position of chief EC, as H&amp;S officer will have predominant input into undertaking implementation. Also H&amp;S officer has worked at TWI for several years so knows TWI and employees, and has influence.</td>
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<tr>
<td>QAS Group</td>
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<td><strong>Materials Controller</strong></td>
<td>Some ISO 14001/monitoring experience from previous job. Important to involve STS in all discussions as they are vital to success of implementation. Only issue is can Materials Controller fulfill this role in addition to other existing responsibilities.</td>
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<tr>
<td>STS Group</td>
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<tr>
<td><strong>Section Manager</strong></td>
<td>Knowledge of sustainable development issues and business opportunities from environment. Provides management weight, helps get messages across to encourage employees.</td>
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<tr>
<td>Manufacturing services group</td>
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<tr>
<td><strong>Laboratory manager –</strong></td>
<td>Key influence over technicians and supervisors due to existing relationships. Therefore, crucial role for dissemination of information and two-way communications.</td>
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<tr>
<td>Metallurgy/ Electron Beam</td>
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<tr>
<td><strong>Administrator</strong></td>
<td>Has worked at TWI for many years and has useful insight into practical matters. Could provide two-way communications with other administrators.</td>
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<tr>
<td>QAS Group</td>
<td></td>
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<tr>
<td><strong>Technician –</strong></td>
<td>It is important to have a representative technician as they have a good deal of influence over procedures being properly implemented, for example, waste segregation.</td>
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<tr>
<td>? Group</td>
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<tr>
<td><strong>Team leader</strong></td>
<td>Important midway level between technicians and supervisors/managers to help get messages across and promote two-way communications.</td>
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<tr>
<td>? Group</td>
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<tr>
<td><strong>Advisory/consultative role</strong></td>
<td>These individuals appear to have a sound grasp on TWI’s business directions and objectives and into the practical matters of what will or will not work. Therefore, they could provide guidance to the committee on how best to proceed with strategies of EMS.</td>
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<tr>
<td><strong>Group Manager</strong></td>
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<td>Group &amp; European Services</td>
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<td><strong>Group Manager</strong></td>
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<tr>
<td>Technology Transfer</td>
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<tr>
<td>Committee member</td>
<td>Justification</td>
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<tr>
<td>Operations Manager</td>
<td>It is important to have an HR representative present, as integration into KPIs will require discussion at committee meetings and also needs to meet other HR expectations. Some alterations to existing processes may be required and the HR representative could help advise on how best to do this.</td>
</tr>
<tr>
<td>Regions &amp; Facilities</td>
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<td>HR representative Human Resources</td>
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