THE IMPORTANCE OF ORGANISATIONAL KNOWLEDGE FOR THE IMPLEMENTATION OF AN EMS

A case study of the Volvo Bus Corporation to determine how to practically implement the ISO 14001 standard.

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ABSTRACT

Many books and studies exist that guide us in how to go about and how to set the objectives and targets for an environmental management system (EMS) such as ISO 14001. However, what they do not do is state *how* to go about the actual, practical, on-site implementation or where problems and complications can arise.

Through literature studies, interviews and a case study at the Volvo Bus Corporation, it was concluded that the success of the implementation depends on how existing routines, networks and communication channels are utilised. The EMS should be integrated into these systems and not be seen as a peripheral issue. Furthermore, it depends on how well the project group is put together and how the group works together with the common organisation. These factors not only influence the level of acceptance, motivation and involvement, but have also an impact on any conflicts and complications that may arise. A thorough knowledge of the organisational features and project management is required in order to understand and manage these factors.

Key words: Environmental Management Systems, ISO 14001, integration, organisation, project management, implementation, routines, networks, communication, acceptance, motivation, group dynamics, resources.

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1. INTRODUCTION

One of the major concerns of modern life is the depletion of natural resources and, in turn, it's destruction of the natural habitat around us. The distraught caused by this fact is leading mankind to wanting to influence the way in which natural resources are managed. Mitigating the repercussions is possible through better utility management. Environmental issues will most probably become a high-priority demand from customers in the future. Today, very few people are prepared to make any real sacrifices in order to lessen the use of natural resources. When that time eventually comes, companies that have made environmental issues a high-priority will be more successful compared to their competitors.

Many books and studies exist that guide us in what to do and how to carry out the implementation of an environmental management system (EMS) such as ISO 14001. However, most of these books are written from a criteria fulfilment perspective and not from a practitioner's perspective. The literature gives check-lists, states short-term targets etc., but what it does not do is state *how* to go about the actual, practical, on-site implementation or where problems and complications can arise.

Introducing a change in an organisation is always a difficult task. Therefore, to facilitate the introduction, the EMS should be integrated into the system and not be seen as a peripheral issue. Integration is only possible if the practitioner has a thorough knowledge of the organisational features specific to the company. This includes both knowledge of the way the organisation functions with its structure, relationships, know-how, politics etc. and its steering documents which are the basis of the organisations management system.

2. OBJECTIVE

This study's objective is to attempt to explain *how* the objectives and targets of the ISO 14001 standard can be attained. This includes obtaining an understanding of the important characteristics of an EMS implementation, especially focusing on organisational aspects and work in practice.

3. METHODOLOGY AND BACKGROUND

The methodology chapter consists of an explanation of the different stages that we have gone through in order to write this report and an explanation of the project report's methodology.

In October 1997, the first plans were made. Our initial wish was to write our thesis abroad and within a company that is recognised for its environmental image and behaviour. The Volvo Bus Corporation (VBC) became our first choice because of Volvo's reputation and also because of the fact that we had a contact within the company.

At this point, our focus was the managerial side of environmental performance and especially towards EMSs. As a result, the discussion that followed concentrated on the possibility to assist in initiating the implementation of ISO 14001 at the Nova Bus plant in St. Eustasche, Quebec, Canada.

Our main contact at Volvo was, at this stage, Mr. Inge Horkeby at Volvo Headquarters. VBC did not, at this time, have an Environmental Director. During the spring of 1998, our contacts with Volvo improved whereby including the newly appointed Environmental Director, Mr. Peter Danielsson. Volvo then realised that it would not be possible to introduce such a system at the plant in St. Eustasche in the beginning of August and the plans were postponed until January 1999.

Closer contacts where established in October-November whereby our supervisor at Chalmers University of Technology, Ms. Henrikke Baumann was included. However, shortly before our planned departure for Canada, major organisational changes were made at the Nova Bus plant. This made the implementation of ISO 14001 impossible for the time being as all their resources were needed for other purposes. We have later learned that resource allocation is a major problem in environmental work.

Further discussions followed that evaluated other alternatives within VBC. Eventually, the Säffle Karosseri Plant came up as the strongest candidate. Discussions were also held in order to straighten out what we

were to do for Volvo. It was decided that we carry out the planning stage of the implementation of ISO 14001 at the Säffle Karosseri Plant.

3.1. PROBLEM FORMULATION

After the 'Säffle decision', we started working on the actual thesis. The first phase started with extensive literature reviews from January to February. These were necessary to render enough information on the issue so that it would be possible to make further investigations and so that we would be able to carry out the planning stage at the Säffle Plant. What we found was that the ISO standard only states the basic requirements that need to be fulfilled. Moreover, the guidelines and existing literature on the subject only give a practical help to carry out the implementation. They give check-lists, state short-term targets, etc., but what they do not do is state *how* to go about the actual, practical, on-site implementation and where problems and complications can arise. This is where we defined the problem and objective of this thesis. The literature, which is meant to be a help in implementation sets the objectives and targets, but does not indicate the way in which to reach them.

At this point in time, we attended a course in organisation which made us realise that knowledge of organisational features is part of the way of reaching the objectives and targets. By studying literature on the subject and from discussions with Volvo, we came to the conclusion that integrating the EMS with existing systems of an organisation is of great importance for its acceptance and for its survival. This called for further investigation into the problem in order to find a sustainable solution.

3.2. INITIAL FIELDSTUDIES

Our commitment to VBC has been to help plan the ISO 14001 certification at the Säffle Karosseri Plant. In order to learn more about the subject, we looked for a similar plant to use as a reference. The Volvo Bus Borås Plant was chosen to conduct our initial fieldwork. This plant was among the first sites to be certified within the Volvo Group. Also, within

Volvo, the certification in Borås is regarded as very fast with a desired outcome.

Our investigations consisted mainly of interviews and site visits and of a case study involving the Volvo Bus Borås Plant. These visits gave us a good picture as to possible improvements and showed us the achievements at each site. Also, to a certain extent, they have been necessary to help us understand the production stage.

The case study of the implementation at the Borås Plant was carried out in February and March and consisted of a number of site visits including five interviews. What is more, we were allowed to read their documents and manuals. We then tried to outline the different stages and processes that they had to go through to attain their certification. Eriksson & Wiedersheim-Paul explain a learning process which we have applied in this project report. Our understanding and interpretation process is illustrated in Figure 3-1.

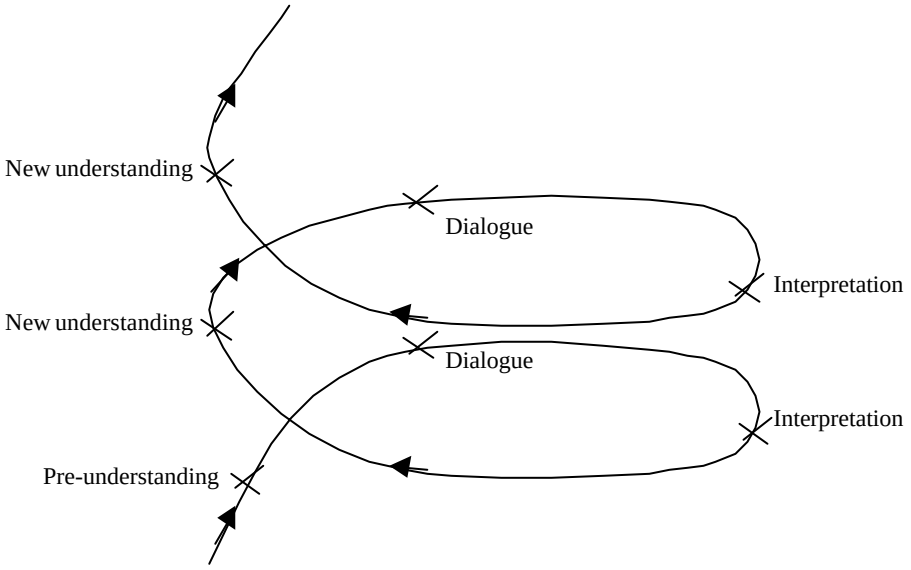

Figure 3-1: The process of gaining knowledge and understanding (Eriksson & Wiedersheim-Paul, 1997).

After each interview and site visit, we interpreted the actions of the people involved and then went back for another dialogue for further information. As more information was collected, the process had to be re-interpreted whereby our analysis subsequently changed.
Communication and dialogue is essential in this case, as the understanding of other people's actions are in focus. Technical terms, definitions and significance of factors must therefore be agreed upon in consensus. Moreover, it must be stressed that a dialogue does not necessarily only take place between physical persons, but that literature and observations also serve as counterpart (Eriksson & Wiedersheim-Paul, 1997).

In April and May, interviews were conducted with people from all interested parties of the ISO 14001 implementation process. These interested parties are management, staff, internal and external consultants as well as members of accredited certification bodies. The interested parties work and deal with the *how* problem on a daily basis, which therefore gives them the experience and knowledge to give qualified suggestions and advice. The material that was collected during this time served as the foundation of our analysis.

The gathering of primary information was conducted according to the model in Figure 3-2.

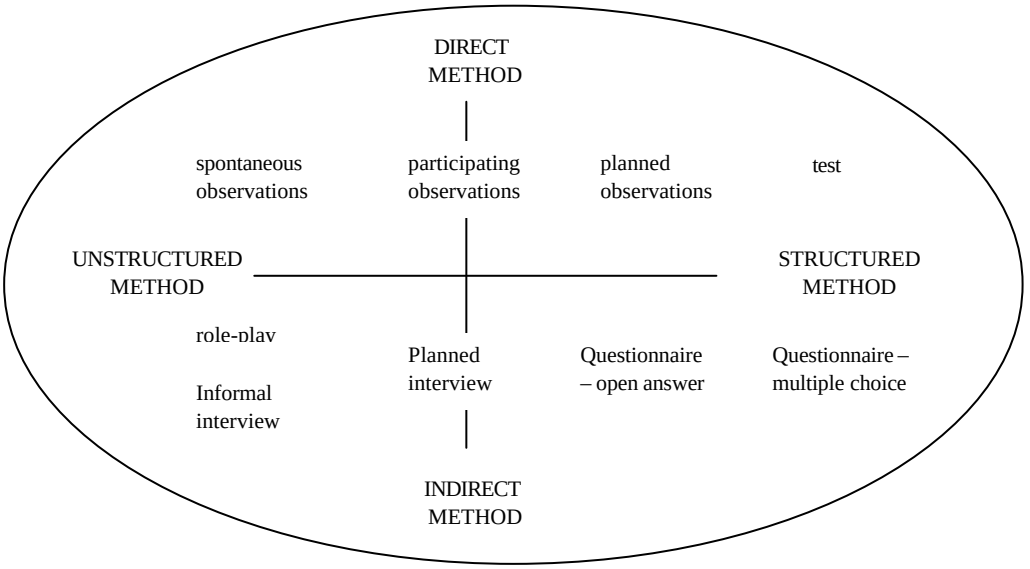

Figure 3-2: Different methods for gathering primary information (Ekholm & Fransson, 1989).

At various stages, different methods were more suitable than others. Direct information implies visual or audible registration of events that is possible at site-visits, while indirect methods concern an interpretation through other direct information, such as interviews (Ekholm & Fransson, 1989).

As stated earlier, general information on environmental implementation and experiences had to be collected at the beginning of the project. This was achieved through informal interviews with people that had previous experience within the field and through spontaneous observations made at the site-visits. All along, both direct and indirect methods have been used. As the study developed, the information gathered became more and more specific, see Figure 3-3.

The interviews were all conducted person to person with a normative time limit of one hour and fifteen minutes. Notes where taken at all of them and moreover most of them were taped in order to verify the collected data. The first interviews had a more general character compared to the interviews conducted at a later stage. This was due to the growing knowledge that demanded and enabled more detailed and specific questions.

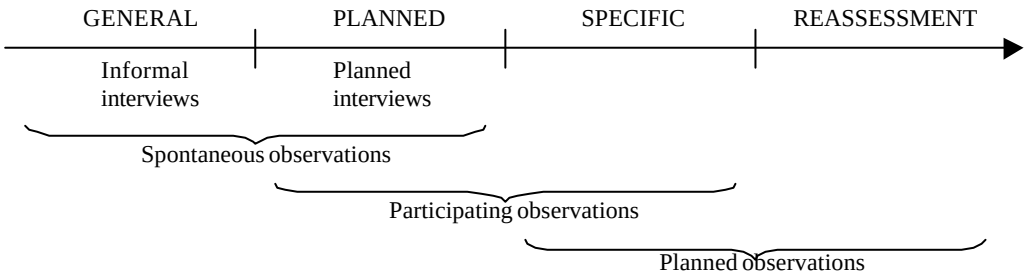

Figure 3-3: The study's time scale for the gathering of primary information.

All interviews where arranged to cover a few specific areas in which the interviewee was allowed to speak freely without interruption. When necessary, more detailed questions were asked to clarify remaining uncertainties. The interviewees played an active role in the discussion,

which allowed them to speak freely. Unfortunately, the tape recorders can be perceived as an obstacle.

3.3. PRELIMINARY MODEL OF THE EMS IMPLEMENTATION

This first stage, included literature reviews, interviews and site-visits and was carried out by using an inductive method based on empirical data which was all the information that we had gathered. The information gives results which are in turn analysed to give a model. This model is our analysis. In other words, information from the five senses and the ability to reason are main influences on the results of this thesis. Using this kind of a method implies that science is rational, measurable, objective, based on previous knowledge and that it is possible to explain matters in terms of cause and effect (Wallén, 1996).

3.4. PRACTICAL TESTING OF THE MODEL

The first on-site contacts with the Säffle plant were made in June with the Production Manager, Mr. Olle Björk. In July, our effort was concentrated on further reading and a compilation of collected material to form a recommendation for further progress. In mid-August, the process of testing the theories or hypotheses based on the pre-study began.

This second phase gave us the opportunity to reassess our analysis as we then gained actual, practical knowledge of *how* to reach the objectives and targets. The second phase was carried out with a new approach from the first one. The second phase involved an hypothesis of how to plan the implementation of the EMS. We then gathered information on site, analysed it and came up with a result. At the same time, we played double roles in the process in which we were active participants and passive observers and could therefore analyse the signals, actions and reactions of the people involved.

3.5. CHAPTER IN BRIEF

During the first phase, information was collected through literature reviews, interviews and site visits. These pieces of information, together, serve as the material that is analysed to form a theoretical recommendation of *how* to implement an EMS. The second phase, when the recommendation was actually tried on site at the Säffle plant, is characterised by a dialogue between us and the management and employees. This dialogue is interpreted and sheds new light on what the critical factors of success are. It must be understood that an EMS according to the ISO 14001 standard is subject to the values and interpretations of the people involved. It is not an absolute set of criterion that has to be fulfilled.

From the beginning, our commitment to VBC has been to help plan the ISO 14001 certification at the Säffle plant. Therefore, the work in this report has had two sides. From our point of view, it has been to gain the practical experience needed in order to write this thesis and for Volvo we had the consultant's role.

4. VOLVO INFORMATION

In this chapter, the Volvo Group is briefly presented to give information about what the corporation consists of and what it does. Volvo Bus Corporation and two of it's production facilities, Borås and Säffle, are also described as they constitute a major part of the thesis.

4.1. THE VOLVO GROUP

4.1.1. Corporate Presentation

Volvo is a Swedish transport vehicle company that operates on a global scale. Following the sale of Volvo Car Corporation in the beginning of 1999, the Volvo Group now focuses on transport equipment for commercial use. Volvo is one of the world's largest manufacturers of trucks, buses and construction equipment. Also, it operates in the fields of marine and industrial engines as well as aircraft engine components. Volvo both develops their own products as well as develop and co-ordinate their service operations with customised total solutions in the areas of financing, leasing, insurance and service. In addition, they develop systems for the transport of goods and people (Volvo Corporate Presentation, 1999). Volvo's business areas are well established in the world market:

- Trucks
- Buses
- Construction Equipment
- Marine and Industrial Engines
- Aero

4.1.2. Core Values and Environmental Goals

Volvo has three core values which they wish to communicate to their clients and potential clients. These are Safety, Quality and Environment. As stated earlier, this is one of the reasons why we chose to contact

Volvo. One of Volvo's objectives is that all of Volvo's companies and plants be certified according to the ISO 14001 standard by the end of the year 2000. Environmental directors and managers are found at all levels of the organisation. Volvo also has a centralised committee which deals with and researches environmental questions as a whole.

4.2. THE VOLVO BUS CORPORATION

4.2.1. Corporate Presentation

The Volvo Bus Corporation (VBC) is the second largest manufacturer of large, high-capacity buses and bus chassis in the world. The company's range of products consist mainly of diesel-powered vehicles used in city, inter-city and tourist traffic. Support services and complete systems solutions for urban traffic are also included within their operations. The company has a major industrial presence with manufacturing operations concentrated to Europe, North and South America, and East Asia.

4.2.2. Dynamic Organisation

Since our arrival to VBC, major organisational changes have taken place on all levels, throughout the entire organisation. During the past two years an expansion into North America, Mexico and China has demanded resources which have postponed the environmental efforts at VBC. Also, responsibilities have not always been clear to the personnel which has resulted in many uncertainties. Our project was not only delayed, but also to a great extent modified because of this.

4.2.3. Manufacturing Sites in Sweden

VBC has traditionally built chassis and delivered them to independent body builders. Following the acquisition of the body builder Höglunds Karosseri in 1981, VBC can offer customers a complete bus. The newly started factory in Wroclaw, Poland, is their first plant where complete buses are made. In Sweden, the Borås plant manufactures chassis, that are

delivered to Säffle Karosseri (formerly Höglunds), other Volvo-owned body builders as well as independent body builders.

4.3. THE VOLVO BUS BORÅS PLANT

4.3.1. Company Presentation

The Borås plant was inaugurated in 1977 and is today the largest chassis manufacturing unit within VBC. The employees amount to 370 of which 300 work in production and 70 work in office, sales and marketing. The assembly is divided into pre-assembly of frames, axles, engines and final assembly in four parallel docks. Wheels and batteries are fitted last together with media filling.

The Borås plant was one of the first production units to be certified according to ISO 14001 within the Volvo Group. They received the certificate in March, 1997. Each year approximately 4000 complete chassis are delivered to customers and approximately 1000 knocked-down (non-assembled) units are shipped all over the world. In order to produce a complete bus, the customer has to fit a bus body onto that chassis. This is carried out by factories such as Säffle Karosseri AB.

4.4. SÄFFLE KAROSSERI AB

4.4.1. Company Presentation

In 1981, Säffle Karosseri AB became a member of the Volvo Group and is now a subsidiary completely owned by the Volvo Bus Corporation. At present, the Säffle plant has 300 employees, 250 in the factory and 50 in office, sales and marketing. All bodies are built in aluminium since the 1950's. The primary market is the Nordic countries, however, since 1994 the company has also delivered *Completely Knocked Down* (CKD) units all over the world. They are later assembled by local body builders.

4.4.2. Production

The buses are more or less custom-fitted to the customers needs and demands. The body-building is a mixture of advanced techniques and traditional craftsmanship where many trades, such as carpenters, welders, painters, electricians, upholsterers and mechanics are represented. On an average, 300 complete buses are delivered to customers each year. In 1992, a new patent protected system to manufacture buses was introduced. System 2000 is seen as an innovative and modern way of constructing bus and coach bodies. Production is based on teamwork where the workers need a great deal of knowledge of body-building to be able to work in the flexible production-chain. (www.safflekarosseri.se).

5. LITERATURE REVIEW

The literature review had three aims: to learn about ISO, EMS and project management and organisational theory. Publications within the ISO family as well as national publications related to the ISO-standards form the basis of our literary search, as they state what needs to be fulfilled. Documents published by Volvo (manuals concerning quality, environment and safety), books and published guidelines outside the ISO-system, current reviews and scientific articles have been read to attain the necessary knowledge to understand and grasp the EMS as a whole. Again, we would like to point out that the ISO literature states the standards, objectives and targets to be fulfilled without explaining *how* these can be reached in practice. Therefore, by studying project management and organisational theory we hope to obtain a basic understanding of the way in which a project such as the implementation of an EMS can be carried out.

5.1. ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS)

The aim of management systems is to pull disparate systems into integrated and organised systems. As Welford & Gouldson (1993) put it, "An integrated system which covers the totality of operations helps management and workers to clearly see their place in the organisation and recognise the interdependence of all aspects of an organisation.". It is thought that establishing clear reporting and communications channels should untangle the potential web of structures, tasks and hierarchy into a clearly defined matrix of relationships with clear horizontal and vertical links. The result will be that functions are less likely to be lost in this web (Welford & Gouldson, 1993).

An EMS can be used as an excellent tool to avoid incidents. Investigations have concluded that many accidents and disasters could have been avoided had there been an effective system in place that could have dealt with the event. In many of these incidents, a system has been in place, but gaps allowed the event to happen anyway (Welford & Gouldson, 1993). Tjernobyl, Exxon Valdez, and the Boliden accident in Spain are all

examples where the environment was severely damaged due, in part, to the lack of a system or inadequacies in the systems in place.

An EMS can be defined as follows (Auditor General of Canada, 1995):

Environmental Management System – *that part of the overall management system which includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.*

A properly designed EMS provides the practices on how to document and communicate its environmental performance. It helps organisations ensure that major environmental liabilities and risks are identified, minimised and managed. In other words, it controls the impact of an organisation's activities, products or services on the environment. At a minimum, an EMS helps ensure that operations are carried out in compliance with environmental laws (Auditor General of Canada, 1995).

5.1.1. History

There are a number of standards that apply to EMSs. The first published standard was the British standard BS 7750, in 1992. After pressure from the business community, it was produced so that it would be compatible to the quality management standard BS 5750 (which was subsequently replaced by the ISO 9000 standard). In 1993, the European Union published their own standard, known as the Eco-Management and Audit Scheme (EMAS). At the same time work began on the international scene to create an international EMS standardisation (Starkey, 1998).

The international standard, ISO 14001, was introduced in 1996. It used BS 7750 as a starting point for discussions which explains why the contents of these two standards are very similar. There are, however, differences between EMAS and ISO 14001. For example, whereas ISO 14001 can be used by all organisations, EMAS is only open to 'EU specific companies performing industrial activities'. Moreover, a whole organisation can be certified to ISO 14001, but only sites can be registered under EMAS. Like ISO 14001, EMAS specifies the requirements for an EMS, but it also requires the publication of an environmental statement

and independent verification of compliance with the requirements of the regulation (Starkey, 1998).

The European Commission decided to adopt ISO 14001 as a European standard at the end of September 1996. Therefore, EMAS has accepted ISO 14001, and other standards that fulfil the EMAS criteria, as its base. When a European standard is issued, all equivalent national standards, including BS 7750, must be withdrawn (Starkey, 1998). This means that today the most adopted standards are ISO 14001 and EMAS. Since EMAS is more demanding, more expensive and only for European Union countries, ISO 14001 is the most widely used standard.

5.2. ISO – THE INTERNATIONAL ORGANISATION FOR STANDARDISATION

The International Organisation for Standardisation (ISO) is made up of national standard institutes from many different countries, industrialised and developing, in all regions of the world. ISO is an organisation which develops voluntary technical standards that contribute to making the development, manufacturing and supply of products and services more efficient, safe and clean. The standards are developed by experts from the majority of the industrial, technical and business sectors as well as representatives of government agencies and testing laboratories. In short, the ISO standards represent an international consensus on the "state of the art" in the technology concerned. A vast majority of ISO standards are product, material or process specific. However, ISO 14000 is known as a generic management systems standard which means that the same standards can be applied to any organisation or business, whether large or small, whatever the product or service (ISO, 1997).

5.2.1. The ISO 14000 Family

ISO 14000 is a family of standards for environmental management. At present, it includes more than 20 documents, standards, guides and technical reports. Examples of standards are environmental management systems, eco-labelling, life cycle assessment, guidelines, etc.. These are all tools to help organisations realise their environmental policy, objectives and targets.

It is important to note that ISO 14000 is not a "green" label for products, nor does ISO assess or audit EMSs. Neither do the standards specify levels of environmental performance. When an organisation is certified to an ISO 14000 standard, this means that an independent auditor has checked that the process influencing the organisation's environmental performance conforms to the relevant standard's requirements (ISO, 1997). ISO 14000 was developed with the aim of providing an overall strategic approach to an organisation's environmental policy, plans and actions. The underlying philosophy is, thus, that the requirements of an effective EMS are the same, whatever the business. Also, they are designed to be implemented whatever the organisation's current level of environmental maturity. However, as stated in 5.1, a commitment to compliance with applicable environmental legislation and regulations is required, along with a commitment to continuous improvement (ISO, 1999).

The requirements and criteria for the certification of an EMS are stated in ISO 14001. Therefore, ISO 14001 is the leading document for anyone seeking a certification within the ISO 14000 family. ISO 14004 is summarised in the appendix. This standard is designed to be compatible to the quality management standard ISO 9000. ISO 14004 is a guideline on the elements of an EMS and its implementation (ISO, 1999).

The independent auditor, from a registration body, demands objective evidence which can be audited to demonstrate that the EMS is operating effectively in conformance with the standard. Therefore, ISO 14001 can be used as a tool for both internal and external purposes. Internally, it provides assurance to management that they are in control of their processes and activities which have environmental impact. Externally, it provides assurance to interested parties, such as customers, the community and regulatory agencies of the organisation's environmental performance (ISO, 1999).

5.2.2. ISO 14001 and ISO 14004

As stated earlier, ISO 14001 specifies the requirements and criteria that must be fulfilled to receive an ISO-certification for an EMS. This report will not include all the 52 *shalls* listed in the requirements. Examples of these are: the organisation shall establish and maintain procedures to

identify the environmental aspects of its activities and management shall provide resources essential to the implementation (SIS, 1997). Instead, ISO 14004 is summarised from SIS, 1997 in the appendix, as it states what needs to be done to fulfil the requirements (SIS stands for the Swedish Standards Institute which is also the Swedish national institute of ISO). Practical help stating issues to consider, how to deal with and approach these different steps is given in the ISO 14004 publication.

Many steps, routines and operations must be penetrated, analysed and incorporated before the certification can be acknowledged. As seen in Figure 5-1, the implementation process of an EMS according to ISO 14001 can be divided into four stages; Planning, Implementation and Operations, Checking and Corrective Action, and Management Review.

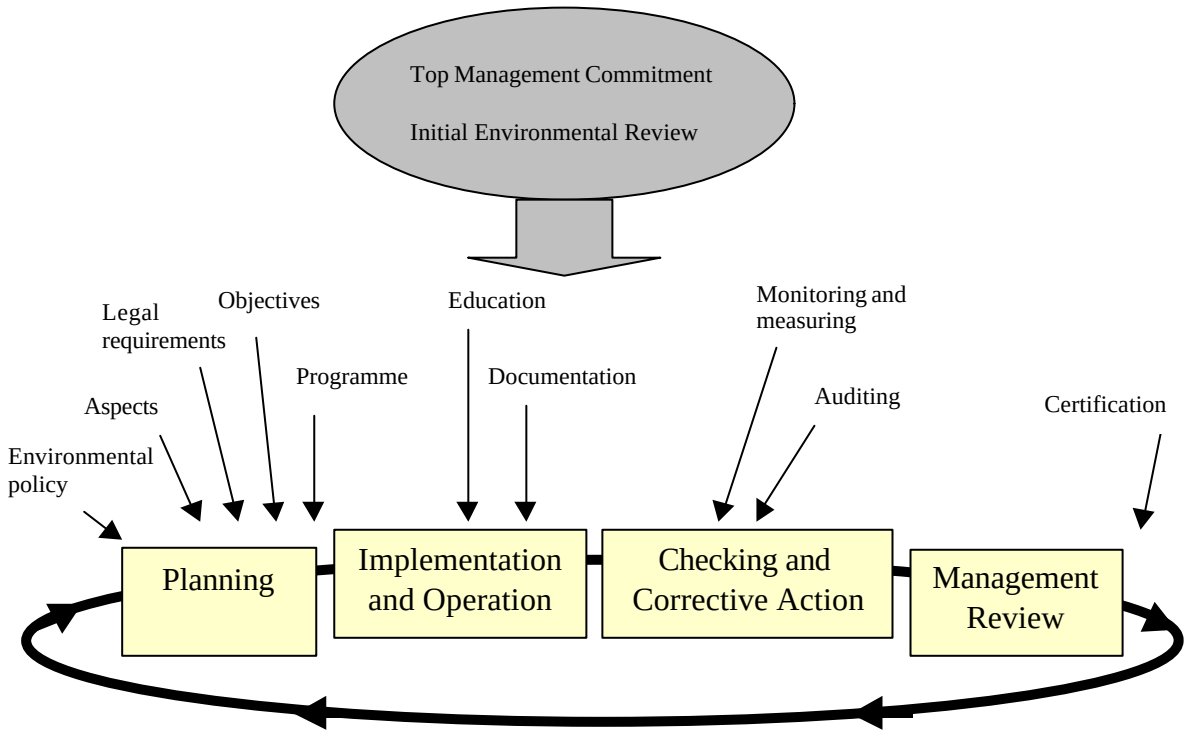

Figure 5-1: The four different stages in the implementation process of an EMS according to ISO 14001.

It is important to note that this is an ongoing process that continues even after the organisation has been accredited with the certification - the

certification is reassessed at regular intervals. Some audit annually, some every six months, depending upon the registration body in question (Persson & Elvin, 1999).

The planning stage of the EMS is the first stage of the entire implementation process. This is where the foundation for the remaining work is laid. If it is carried out in the correct manner, the implementation process is facilitated to a great extent. Before the planning stage can be initiated, commitment from the top management of the organisation must be obtained. This ongoing commitment to improve the environmental management of its activities, products or services is crucial to ensure the project's success. An initial environmental review must also be completed in order to establish the current environmental situation of the organisation (SIS, 1997). As seen in Figure 5-1, the planning elements include:

1. environmental policy
2. identification of environmental aspects and evaluation of associated environmental impacts
3. legal requirements
4. internal performance criteria
5. environmental objectives and targets
6. environmental plans and management programme

The extent to which the implementation process is described in practical terms is the 'practical help' box in ISO 14004. An example of a 'practical help' box is: Evaluation of the significance of impacts can be facilitated by considering the scale of the impact, the severity of the impact, probability of occurrence and duration of impact (SIS, 1997). This is indeed a help, but before getting to the evaluation other questions need to be answered. Questions such as who should be involved, when are they to be involved, do they have the proper knowledge, do they have the time, will resources be available, etc.

5.3. PROJECT MANAGEMENT

Project management was initially used for very large and complex research and development projects and massive construction programmes. As the techniques of project management were developed, the use of them began to spread. Private construction firms found that project organisation was helpful on smaller projects and automotive companies began using it to develop new car models. Nowadays, project management is even used to develop new shoe models, in advertising campaigns, mergers and capital acquisitions. Meredith & Mantel (1989) determine that, "In it's broadest sense, a project is a specific, finite task to be accomplished. Whether large- or small-scale or whether long- or short-run is not particularly relevant. What is relevant is that the project be seen as a unit." The following attributes characterise projects (Meredith & Mantel, 1989):

- Purpose - One-time activity, well-defined set of desired end results, co-ordination and control in terms of timing, precedence, cost and performance.

- Life Cycle - Slow beginning, a build-up of size, then peak, decline and finally terminated or phased into a parent organisation, as shown in Figure 5-2.

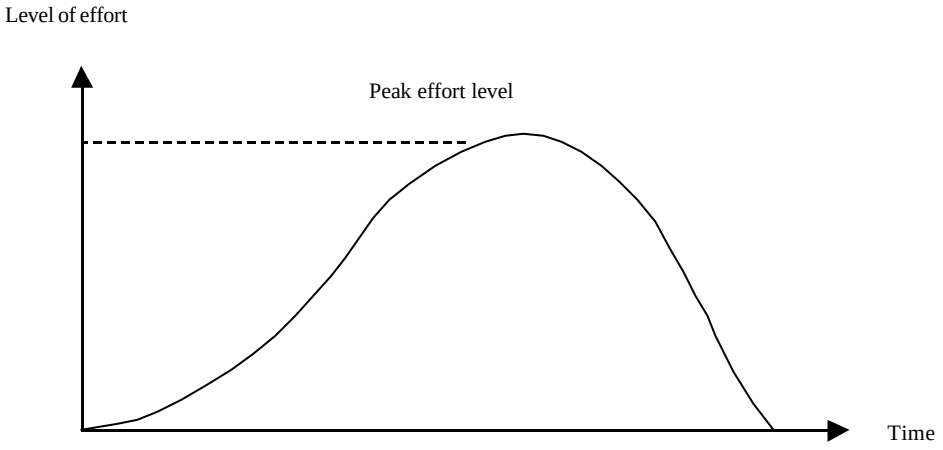

Figure 5-2: Time distribution of a project's efforts (Meredith & Mantel, 1989).

- Interdependencies - Interact with other simultaneously run projects and functional departments.

- Uniqueness - All projects are unique. They cannot, by their nature, be completely reduced to routine.

- Conflict - As stated earlier, projects compete with other functional departments for resources and personnel. Individuals are often responsible to two managers at the same time, managers with different priorities and objectives. Conflicts are therefore a part of project organisation.

5.3.1. Project Manager

Each project needs to be co-ordinated and organised by a manager, the project manager. A project manager is usually a generalist with a wide background of experience and knowledge who has to be able to oversee many functional areas, each with its own specialists. An ability to put together many different pieces to form a whole is required. The questions that need to be asked by the project manager are: What needs to be done, when does it need to be done and how do we obtain the resources to do the job (Meredith & Mantel, 1989).

The basic principles that are common to all projects are planning, organising, leading and controlling (The University of Auckland, 1999):

Planning

Documenting a plan in a logical sequence, ensures that all aspects of the project are considered and that the required resources are made available on time.

Organising

Early phase assignment of responsibilities ensures that everyone involved in the project knows the reliance being placed on them to successfully complete the project within the budget and timeframe.

Leading

The ability to guide the activities of the project team can have a significant influence on the success (or otherwise) of the project.

Controlling

The mechanisms for identifying potential problems need to be in place. This enables corrective action to be taken as early as possible which, in turn, ensures that the task, time, cost and performance targets are met.

The project manager is responsible for these actions to take place. Often, he/she does not have the power or influence to make the necessary changes and must therefore rely on middle management at the different departments. If they do not help, the project manager is forced to go to top management, which has a short-term positive effect. Unfortunately, this may lead to long-term opposition from the middle management. Also, the project manager, top management, the project group and interested parties define success and failure differently. A project is, by definition, a challenging environment full of conflicts (Meredith & Mantel, 1989).

The implementation of an EMS fulfils all the criteria for project management. It has a purpose, a life-cycle, interdependencies and conflicts. Each implementation is unique. Also, planning, organising, leading and controlling are essential for the success of the project. The definition of an EMS, see chapter 5.1, shows that it involves project management, but also that it involves organisation.

The ISO standards state some key principles for managers implementing an EMS. Among these are included: establish communication, develop commitment, encourage planning, establish a process for achieving targeted performance levels, evaluate performance, establish management processes, etc. (SIS, 1997). These are all project management principles that further demonstrate that implementing an EMS requires project management.

5.4. ORGANISATIONAL THEORY

The implementation of an EMS can be defined as a project. As stated above, projects involve many people who have different needs and interests. These people, could be members of the project group, managers, workers, interested parties, etc., and must be handled, managed and organised in a way that ensures the success of the implementation. Organisational theory has been studied in order to find out how to

structure the group, utilise human resources and understand the politics involved both within and outside the project group.

An organisation is a complicated, deceptive and ambiguous phenomenon full of surprises, which makes it difficult to understand and manage (Bolman & Deal, 1997). Our theories and conceptions lead us in what we see, what we do and what we are able to do. Therefore, if we have too narrow or simple an approach to organisational theory, it will make the management task very confusing and chaotic. Managers with a blind approach to this confusion, will find their work frustrating and full of mistakes. Moreover, managing the correct way demands well functioning theories and the capability to apply them.

The implementation, being a project, calls for a project group. Setting up the group and choosing its members is a crucial stage of the project. Therefore, group dynamics are important to bear in mind. A certain structure evolves in all groups as the group's members work together. However, the function of this structure can vary greatly. Even though most group problems are blamed on particular individuals, most of these difficulties originate from badly designed structures (Bolman & Deal, 1997). Increasing the performance of a group requires consciousness and attentiveness of the structure and the different roles of that group.

Many teams do not vary the structure of the group according to changes in the task or environment. Take, for example, a group or team that meets to study a problem and write a report on their findings. The group will go through many stages which all require different kinds of roles, patterns, relationships and dependencies. Loose and non-hierarchic structures may work perfectly during the first stages where brainstorming is carried out and objectives and targets are formulated. This is especially the case if the group is given the time to go through the initial difficulties which occur when a newly formed group is put together. However, the final stages that include writing a report usually need a more centralised and defined structure. When the members of the group are confronted with difficulties in the group's work (i.e. lack of time, conflicts, uncertainties, communication problems, insufficient performance) they will blame each other. No groups consist of perfect members and to solve these problems it is easier to restructure the group than to change the personality of all the members (Bolman & Deal, 1997).

The members of the group are individuals with different know-how, needs and interests. A sustainable philosophy for human resources and a meaningful investment in people is necessary, but not enough to create strong commitment. The work-task in itself must include independence, the possibility to influence and must be self-rewarding. Researchers within the human resource field state that traditional management forces people to depend upon their superiors. This makes it very difficult for them to be in control of their own work. Instead, they should be given contributory influence and involved as an important part of the organisation. In other words, they should be able to influence the decisions that involve their own work-task and working conditions (Bolman & Deal, 1997).

The further down a member of the project group is in an organisation, the more influence they tend to have on the actual work that needs to be carried out. Therefore, subordinate members can have a higher degree of influence on the operations than their superiors (Granér, 1991).

Hackman & Oldham (in Bolman & Deal, 1997) have identified three critical factors that should be fulfilled when defining and developing the job description or task.

1. The task must be perceived as worthwhile and meaningful, which is more likely if it leads to a visible and important entirety.
2. Judgement and experience should be utilised in such a way that one feels responsible for the results.
3. Performance and achievement feedback is important to be able to develop and perform better.

The question is not whether an organisation is political or not, but rather what politics it has. Changes in the organisation and it's effectiveness is dependent upon the different manager's political talents. Constructive politicians are conscious about and understand the political reality. They know how to write an agenda, create supportive networks and are able to negotiate with both allies and opponents. They must evaluate which co-operational possibilities exist, the importance of long-term relationships and most importantly what their values and ethical principles are.

Vast organisational changes give rise to four important issues (Bolman & Deal, 1997):

1. Changes influence the individuals ability to feel efficient, appreciated and in control of their own situation. If people are not given support, education and involved in the process, they will obstruct all forward motion.
2. The existing roles and relationships are broken up, which causes obscurities and insecurity. It is important to change the structural pattern and adapt it to the new direction.
3. The changes give rise to conflicts between the winners and the losers of the changes. These conflicts must be discussed and the political map needs to be changed.
4. Finally, the changes can cause a loss of interest and meaning to those involved. Therefore, one needs to talk about what has been and what is going to be so that people can forget about the past and move forward. Efficient changes demand a finely tuned and integrated design which is sensitive to learning ability, adaptability, discussions and grief.

5.5. CHAPTER IN BRIEF

The literature review has shown that ISO states what must be achieved, but not how to practically fulfil these standards. However, by learning about EMS, project management and organisational theory we now know how to start shaping the *how*. An EMS is, by definition, a project and projects call for project management. In order to manage a project as smoothly as possible, organisational theory is essential.

Group dynamics, involvement, politics and organisational change all call for organisational knowledge, planning, organising, leading and controlling. For example, a vast organisational change is not wanted. In the case of implementing an EMS, it should be avoided. It could cause conflicts to arise, group involvement to decline etc. Therefore, the existing organisational features should be utilised instead. This way, many conflicts are avoided and the implementation is accepted and can be carried out with more ease.

6. INITIAL FIELD STUDIES

The initial field studies comprise both a case study of our reference site, the Borås plant, and a number of interviews. The case study included interviews with the people involved in the implementation process of ISO 14001 in Borås as well as numerous visits to the shop floor. We also interviewed environmental management consultants, auditors and people within the Volvo Group with experiences of environmental auditing.

6.1. CASE STUDY - THE VOLVO BUS BORÅS PLANT

This is a retrospective case study. The implementation took place in 1996-1997. We visited the plant a number of times in February to May 1999 to learn more about of their implementation process. Since our focus is on the practical aspects of implementation, our description of the implementation process at Borås follows the sequence of events in chronological order.

6.1.1. Time-scale

The budget for the ISO 14001 project was decided upon in the autumn of 1995 and the project was initiated in August 1996. The auditor, Lloyd's Register Quality Assurance (LRQA), approved the EMS according to ISO 14001 in March 1997, as illustrated in Figure 6-1. The entire process of implementing an EMS at the Borås plant took 8 months, which is considered a very rapid implementation.

During the process of implementation, the entire personnel was given a course in environmental science. The internal Volvo education, *Dialogue on the Environment,* was presented in which the fundamentals were described and certain groups and key persons received more specific education for their specific needs.

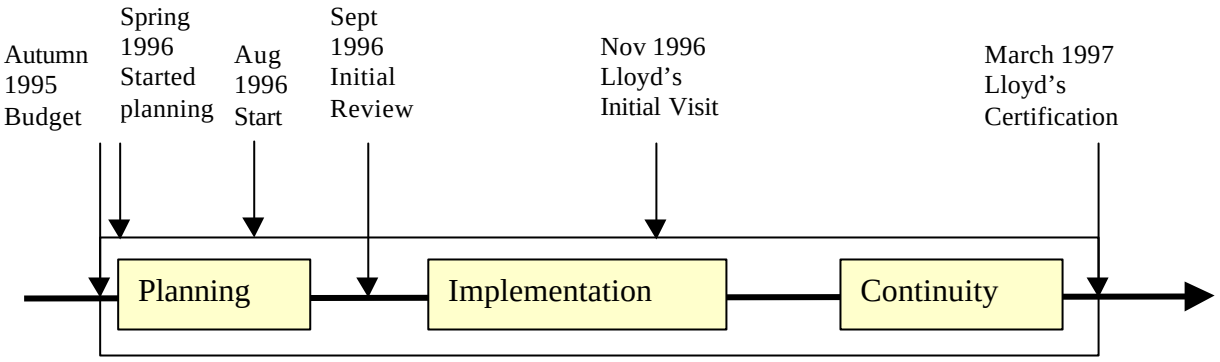

Figure 6-1: Time scale of the different processes at the Volvo Bus Borås Plant.

6.1.2. Planning

The planning stage began with senior management approval, which then resulted in factory management approval of the project. The engineering manager, Mr. Lars-Åke Nordh, was made responsible for the implementation. The first thing he did was to inquire into which parts of the organisation would directly influence the implementation. Then he asked the employees in each of these operational functions respectively if they were interested in participating in the project (Nordh, 1999). The organisation of the project with it's formal power and responsibilities is shown in Figure 6-2.

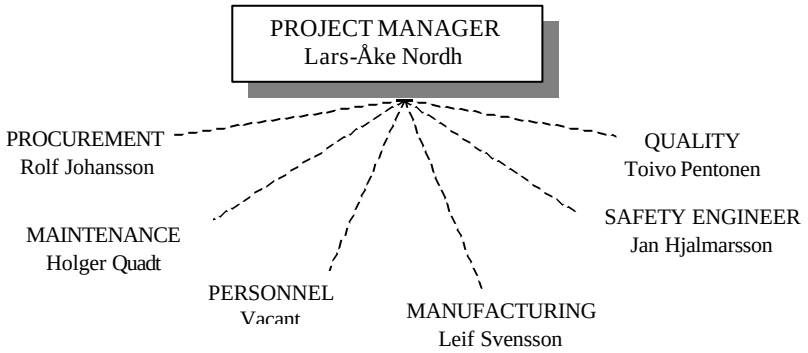

Figure 6-2: The project's formal organisation at the Volvo Bus Borås Plant.

The project group demanded different skills and experiences of the participants (Nordh, 1999). The operational functions contributed with the following knowledge and skills:

- Quality — Experiences from ISO 9000
- Safety Engineer — Environmental and safety aspects
- Maintenance — Waste management
- Procurement — Supplies and deliveries
- Personnel — Education
- Manufacturing — Technical process management

As soon as the group was intact, the goals were defined and agreed upon within the group. The first goal was to implement the EMS and the second goal was to integrate the EMS system into existing operations.

The objective of implementing an EMS was formulated by the plant management, which originally was the goal of the senior corporate management. The Borås plant did not have any past experience of implementing an EMS, but they created a vision which stated what they wanted to achieve. The planning stage involves the establishment of a strategy and the breaking down into tactical decisions.

Strategy

When the project group was formed, they established the strategy. In order to reach the strategy, the group went through three different stages; mapping the political terrain, forming contacts/relationships and finally compromising on the decisions. The project manager did this before the group was formed. Mr. Toivo Pentonen and Mr. Jan Hjalmarsson worked well together with the project manager, Mr. Lars-Åke Nordh. According to Mr. Pentonen, this meant that the negotiations could be carried out more easily.

Conflicts

The problems that arose, did so in the beginning. These were usually about prioritising different departments and resource management. The problems were restrained quickly through discussing their common goals and points which were disagreed upon. By doing this as soon as the problems arose, many future conflicts were avoided.

Power

Often in groups, a few individuals work more intensely than other members. A core group is formed who become the driving force of the group's work. In this case, the core group consisted of Mr. Nordh, Mr. Pentonen, Mr. Hjalmarsson and, to a certain extent, the maintenance manager Mr. Holger Quadt. The power within the group shifted from a formal to a more informal structure, as seen in Figure 6-3. Mr. Pentonen and Mr. Hjalmarsson took initiative in the project through the fact that they wrote all the routines and supplemented them after having conducted risk assessments, etc., which gave them the informal power of the project.

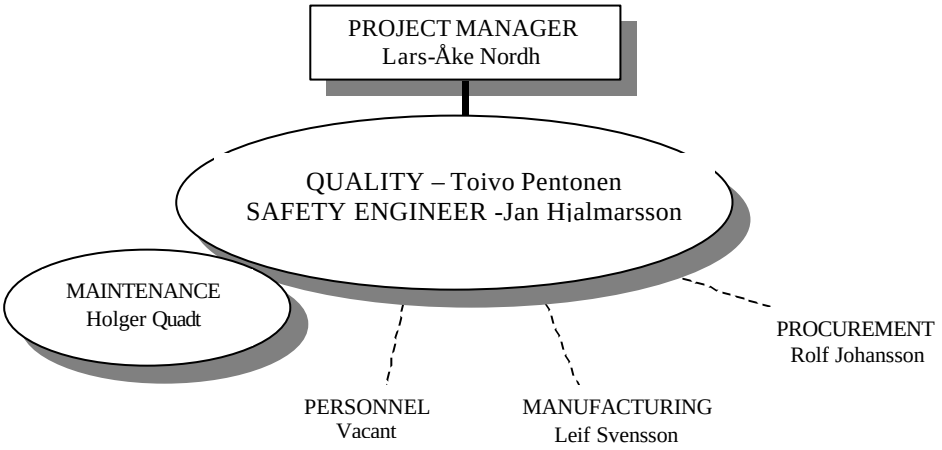

Figure 6-3: The informal power within the project group where Mr. Pentonen and Mr. Hjalmarsson can be seen as the core.

Group Dynamics

As stated earlier, Mr. Pentonen was involved in the project because of his experience and knowledge of ISO 9000. He knew how to write the routines and about the procedures of ISO. Being an expert in this field, it was a source of power for him just as Mr. Hjalmarsson had through his knowledge of environment and safety aspects.

Mr. Pentonen and Mr. Hjalmarsson had a great working relationship. This had a greater significance than the formal decision process. It contributed to the fact that the entire project progressed smoothly and quickly (Pentonen, 1999).

When taking a close look at the project group, one realises the significance of the initiative and involvement of Mr. Pentonen and Mr. Hjalmarsson. It is important for group dynamics that everyone feels that they are actually members of that group by taking responsibility and achieving their objectives and targets together. As stated in chapter 5.4, research shows that contributory influence is one of the crucial ways to boost both production and moral. Mr. Pentonen and Mr. Hjalmarsson were given much freedom when working with the objectives and routines. This gave them a sense of greater responsibility, job enrichment and more contributory influence. Therefore, they were motivated to do a good job with the end result being higher moral and an increased efficiency.

6.1.3. Implementation and Certification

The local environmental and safety authorities already had environmental demands on the plant. Therefore, routines to fulfil some of the ISO requirements were already in place, but needed to be supplemented to fulfil all ISO requirements. After the supplementation, LRQA came for an initial visit to audit the system and to give their point of view as to the progress of the project. When the management system was fully integrated and had been in operation for some time, LRQA carried out their audit and acknowledged the system for certification according to ISO 14001.

6.1.4. Integration

Mr. Pentonen's experiences from implementing both the quality and environmental management systems made him realise that these systems should be integrated. He wanted to create one management system consisting of similar systems, i.e. quality, environment and safety. Mr. Pentonen believed that management system must be seen as a natural part of the organisation and not as a peripheral system. Furthermore, he pointed out that the EMS should take advantage of the other systems in place.

6.2. INTERVIEWS WITH ENVIRONMENTAL EXPERTS

Being students, we lacked practical experience within this field. To gain an understanding, interviews with experienced environmental experts were conducted. They were environmental management consultants as well as auditors from prominent environmental business firms in Gothenburg. Furthermore, Mr. Peter Wessberg, who works with EMSs at the Business Management Systems department at the Volvo Car Corporation was interviewed. From the beginning, the aim of the interviews was more orientated towards giving answers about the process as a whole. It then evolved to be more and more specific about success factors and hidden obstacles.

6.2.1. ÅF - IPK (Kjell Berndtsson)

Mr. Kjell Berndtsson is an environmental management consultant at Ångpanneföreningen - a technical consultation firm. As Mr. Berndtsson explained the ISO 14001 standard for us, he also gave recommendations as to how the implementation could be carried out.

The order in which the planning stage can be implemented was presented by Mr. Berndtsson, as seen in Figure 6-4. Using this order can facilitate the entire process. Mr. Berndtsson stated that:

- Structure is a key word for an EMS. Mr. Berndtsson explained that structural thinking is the concept of the ideas behind ISO and that they are a component of the greater operational plans.
- Flowcharts should be used as often as possible, not only because they illustrate the work that needs to be done, but also because they support the structural thinking which, as stated earlier, is the basis for the ISO standard.
- It is important that the environmental manager works together with the plant management during the formulation of the environmental policy. This way, the policy will have greater impact on the operations of the plant.

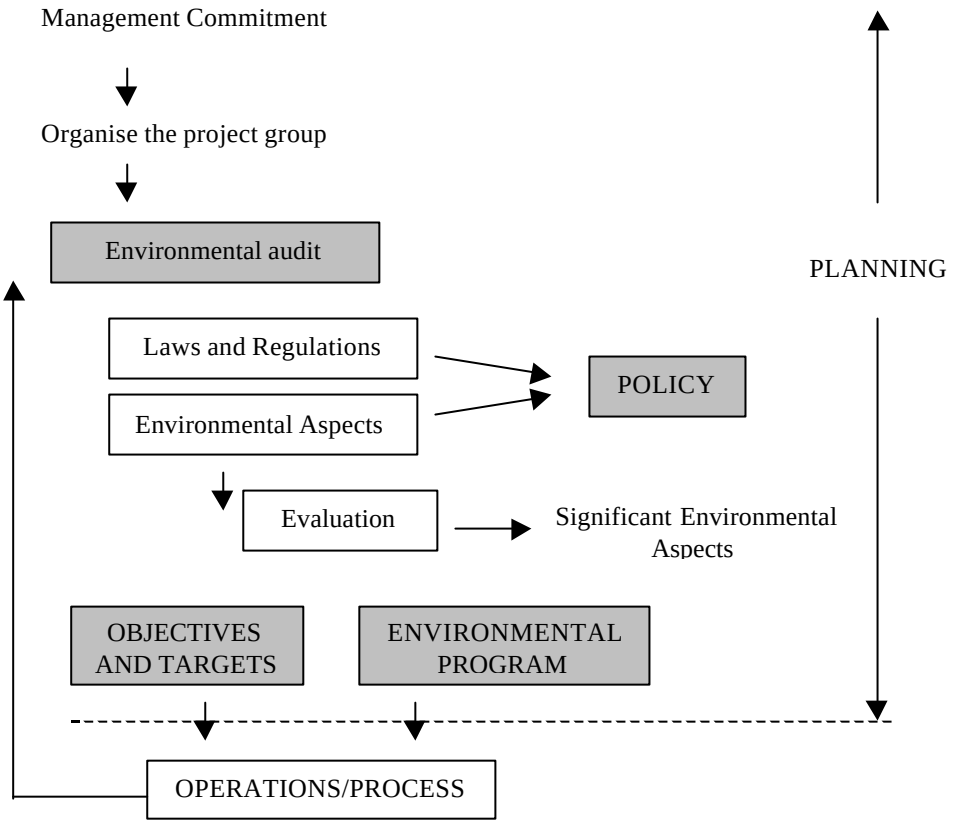

Figure 6-4: A recommendation of the order in which the planning stage can be implemented (Berndtsson, 1999).

6.2.2. Arthur D. Little (Åsa Furnander)

Ms. Åsa Furnander, environmental management consultant at Arthur D. Little, an international consultant agency, specialising in managerial and strategic questions especially emphasised the following issues.

Resource Allocation

A recommendation was that the matter of how many resources will be needed should be resolved at an early stage. Ms. Furnander said that, depending upon the size of the project, usually 10 people who work 40 % solely with the implementation for 8 months are needed. If the

management is reluctant to supply with the necessary resources , it is not a good idea to proceed with the project. If the project proceeds anyway, it will be a very time-consuming process which will, most probably, end up not being certified after all.

Knowledge about the Organisation

Ms. Furnander explained that it is important, as early as possible, to set up routines for what, when and how information needs to be communicated about the environment and the implementation within the organisation. A smooth and quick way of getting the work underway is to find someone who works within the organisation who is interested, wants to help, influence and push through the project. When conducting interviews and talking to people, it is a good idea to have this person along to make acceptance easier. This person should not be among the management because much time needs to be put aside to deal with the work of the project and also a closer relation with the majority of people within the organisation can be established.

The Process

At the time of writing the environmental policy, the question that needs to be asked is “Why are we doing this?”. Also, one must see if there is a corporate policy or if there are any demands from interested parties. According to ISO 14001, the policy must include a statement of continuous improvement, of the identification and improvement of the relevant environmental aspects and it has to comply with laws and regulations.

Ms. Furnander pointed out that it is a good idea to exchange ideas about the policy with the personnel, then to go further up in the organisation and finally to the top management. The personnel knows what can be done and what is possible to implement and not. This way, they are also more involved and motivated before, during and after the implementation.

It is important to remember that the auditors will see if the policy is relevant and if it is coherent with the objectives and targets.

First of all, all the significant environmental aspects must be found. But what is significant? It is those aspects that are important to the organisation and which they are able to influence according to Ms. Furnander. Also, laws, regulations, policy, and the aspect’s operational

and strategic value for the organisation must be considered. Consideration must also be taken to how easy or how difficult it is to improve upon the aspect, see Figure 6-5. If it is very complicated to improve upon the aspects, it might not be a good idea to have these as objectives. For example a small company that delivers the seats to a car manufacturer does not need to look into trying to repair the ozone hole. This is extremely complicated and not so significant for the company itself.

The moderately significant aspects which are not so complex are easily improved and should therefore be taken care of immediately. These should not be a part of the objectives and targets.

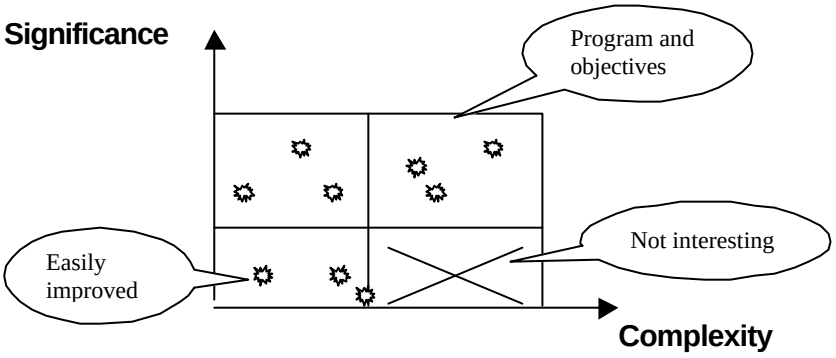

Figure 6-5: The figure shows how to map environmental aspects in order to give them the right priority (Furnander, 1999).

Educating the personnel should not be started until after the environmental policy and objectives and targets have been written. The policy and objectives are written during the planning stage. This is also where the rest of the implementation is planned, which includes timetable, resources and also when the education should be carried out. Also, the implementation of the EMS takes time to be communicated to the employees. Education should not be rushed into an organisation.

The quality and environmental management systems should be integrated as much as possible, especially due to the documentation. Also, if an operations system is to be implemented later on it is very important, for

the ease of that work, that the quality and environmental systems are integrated.
The process of implementing an EMS should be carried out by a project group with a project manager and personnel from the procurement, production, maintenance and quality departments.

6.2.3. Tellus Miljömanagement AB (Hans Heiwall)

Mr. Heiwall is an environmental management consultant at Tellus Miljömanagement AB. Tellus is a small consultant firm which deals with the environmental affairs of other organisations. Among their work is the implementation of EMS according to ISO 14001.

According to Mr. Heiwall, the most important step in the planning stage is the environmental audit. It must be carried out thoroughly, properly and methodically. Therefore, resources will be utilised and need to be approved by the management. The sufficient resources need to be given to a project group, which must communicate all the information to the entire personnel. This illustrates the importance of the management's commitment for the project's realisation. To get management commitment, sound arguments are often needed. According to Mr. Heiwall one of the most effective arguments is money – saving the environment saves money. Another argument is that environmental consciousness is often demanded by customers, sometimes even a certification according to ISO 14001 is demanded.

The ISO 9000 standard gives the organisation such benefits as a reduced need of resources and money as well as a smoother operations, but according to Mr. Heiwall, ISO 14001 leads to more benefits because it is something which all employees are affected by and care about both at work and at home. Since everyone thinks about the effects on the environment and on oneself, everyone wants to contribute to its improvement. As opposed to the quality management system, the environmental management system is, therefore, not done by routine.

The objective of the audit is to map out the present situation in relation to the environment. This forms the basis from which all the environmental aspects are defined. A good way to start is to look at the regulations and permits of the plant, since they include a lot of information that must be

submitted to the authorities. A common mistake, according to Mr. Heiwall, when carrying out the audit is that it is often done solely by the environmental manager. This can lead to narrow-minded work, but more importantly it does not spread the information or the commitment and involvement to the rest of the personnel. Key persons need to be interviewed and included in the project group since they have the information and the knowledge of the operations (for example those within procurement, production, quality, etc.). The importance of the audit is that the identification and defining of the environmental aspects establishes the information needed to set up the objectives and targets. These, in turn, form the foundation for the environmental policy.

6.2.4. Det Norske Veritas (Helen Persson and Per Elvin)

Ms. Helen Persson and Mr. Per Elvin work as environmental auditors at Det Norske Veritas (DNV), an international registration body, comparable to LRQA.

According to Ms. Persson and Mr. Elvin, the role of the auditor is to represent all interested parties, see if the system is effective and functional and trying to see the system as a whole by collecting details. They begin with the organisation's operations and compare it with the ISO-standard and a system of their own. The usual time-span of the certification process is illustrated in Figure 6-6.

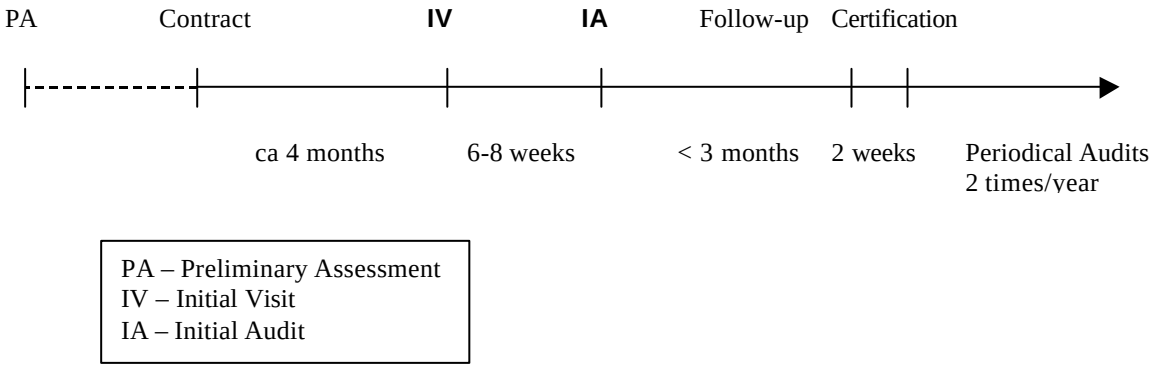

Figure 6-6: The usual time-span of the certification process (Persson & Elvin, 1999)

A preliminary assessment can be carried out by DNV, but is not compulsory. The auditors go through the entire organisation and it's operations and comment on all deficiencies.

When the contract has been signed, the organisation is given the necessary time to take care of and supplement it's deficiencies and to carry out the changes needed in the operations. After that, DNV examines their environmental management manual. The initial site-visit is carried out in order to give the auditors a general picture of the organisation's operations and also to discuss ideas and changes that need to be made to the manual. It is important to remember that the auditors are not allowed to specifically state what needs to be altered or changed. What happens is that the customer must suggest the alterations and then this is discussed with the auditors. All this is done before the actual certification process. The organisation is then again given time to supplement the EMS and to suggest corrective action. The suggestions for corrective action are approved at the initial audit. The organisation then carries out the corrective action and verifies that it has been done. When all the actions have been corrected the auditors follow it up and certify the organisation according to ISO 14001.

The audit carried out according to the agreed program is based on random inspection. All deviations are then presented by DNV in writing, and inspected and approved by the customer. A summary report is then produced. If the customer is approved, they receive the certificate which is valid for three years, but periodical audits must be carried out twice per year (according to DNV policy). When the validation period is up, a renewal can be achieved through an enlarged, more extensive periodical audit. The periodical audit is carried out according to a plan which includes a few obligatory items:

- Management Review – the management must know the EMS, what is going on and reassess the system.
- Objectives and Management Program – the objectives must be fulfilled and the program followed, otherwise they need to be changed.
- Internal Audit – a number of internal audits must have been carried out.
- Corrective Action – The organisation must have started to change or alter a few of the items in order to improve upon the environmental performance and fulfil its set targets.

- Continuous Improvement – an organisation must go through all the points stated above in order to attain continuous improvement.

The question, "What influences a realistic timetable and in what way does it influence it?" was asked during the interview. Ms. Persson and Mr. Elvin answered that it depends upon a few different aspects:

- The size of the organisation is of course very influential. A larger organisation takes longer time.
- Are there any existing routines? Either they are in writing or in the heads of people, they greatly facilitate the implementation.
- Depending upon the resources that are given to the project, the work can be carried out quicker and better.
- Changes in the world around us also influences the timetable, for example if a large order has been received, the implementation is often put aside.
- Finally, customer demands also determine the timetable. The car industry demands, for example, that all suppliers have a QS (Quality System) before the end of 2000.

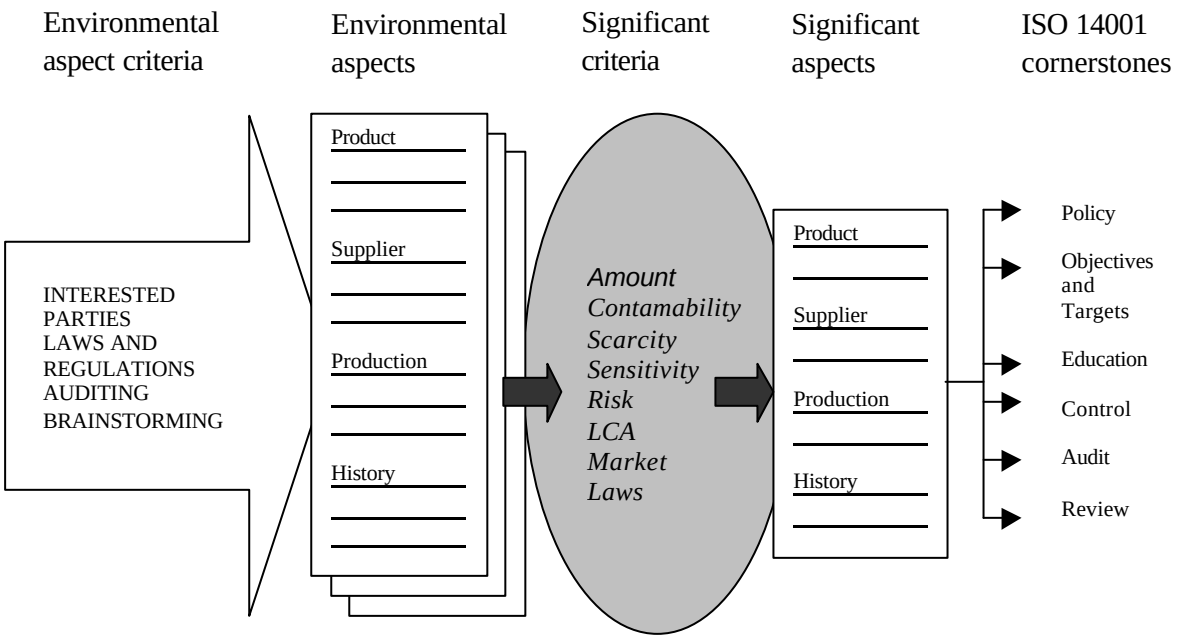

Figure 6-7: What needs to be taken into account when identifying the significant environmental aspects (Persson & Elvin, 1999).

The advice given was that the build-up or the planning stage of the implementation is extremely important. The foundation is laid if an extensive and thorough environmental audit is carried out. Figure 6-7 shows in which way DNV finds the significant environmental aspects.

Other advice that Ms. Persson and Mr. Elvin gave was that the similarities between ISO 9000 and ISO 14001 are stated in the ISO-standard. We were informed that Mr. Peter Wessberg at the Volvo Car Corporation wrote an internal report about the problems of implementing ISO 14001 into organisations.

6.2.5. Volvo Car Corporation (Peter Wessberg)

Mr. Peter Wessberg works at the department for Business Management Systems at the Volvo Car Corporation. The interview with Mr. Wessberg was conducted to understand the problems that may arise when implementing ISO 14001 and to get advice on how to proceed with the implementation.

One common problem is communication, or rather the lack of communication according to Mr Wessberg. When people do not know what is going on or they have not been informed about changes their involvement and motivation is curbed. Another problem is the lack of management commitment and its willingness to provide the needed resources. This can severely halt the entire process or, in fact, make impossible the implementation of an EMS (Wessberg, 1999).

Other problems which often occur, but are not as severe, are the knowledge and competence of the project group, the updating of laws and regulations and the routines for monitoring and evaluating. The knowledge and competence of the project group is necessary in order to carry out the project and its parts. Actually, this is a prerequisite for the start-up of the project. Documenting the applicable laws and regulations of the organisation is usually not a problem, but updating them is. If the laws and regulations are not up-to-date, the organisation does not know if they are following them.

The routines for monitoring and evaluating are usually not followed during the implementation period. According to Mr. Wessberg, this is

probably due to the fact that these routines are new and it takes time for the people involved to use them in the first place and then to use them in the correct manner.

Mr. Wessberg made suggestions as to how to utilise the education, how to set up the structure of the organisation and what communication channels to utilise. When educating the personnel it is a good idea to utilise each part of the education to write the routines. For example, when going through the emissions to air, ask the employees to exemplify by writing a routine for this specific part of their operations.

Setting up the structure of the organisation of the project group and where it is in relation to the existing organisation can be quite a difficult task. Mr. Wessberg suggested, as seen in Figure 6-8 that the project manager have a position which is not next to, but beside the different department managers. This way he/she answers to the top management and it does not create any conflicts with the department managers. Furthermore, the project manager can put pressure on the department managers if things are not being carried out and it can be done without them feeling threatened. For the project group, Mr. Wessberg suggests an organisation with a project manager and people from different departments who answer to him/her. The represented departments could be procurement, production, quality, maintenance, personnel etc.

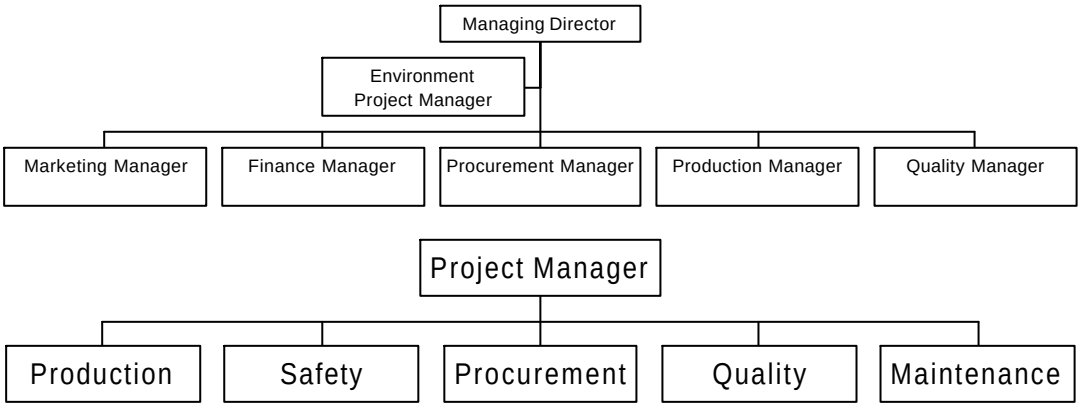

Figure 6-8: The organisational structure of the top management and the project group (Wessberg, 1999).

When environmental information needs to be communicated within an organisation, it is always best, according to Mr. Wessberg, to use the existing communication channels. These could be, for example, corporate newspapers, leaflets, meetings, networks (such as unions), internal television and symbols. These channels were created and shaped by the corporate culture and therefore one should use them and not try to create new ones. Furthermore, utilising the existing channels facilitates the integration of the EMS since it makes people feel as if it is not something new but something that has been with them for a while.

6.3. COMMON FEATURES

6.3.1. Project Management

Those who were interviewed argued for the process to be done in a form that is separate from the functional organisation. We learned that an EMS should be implemented in a way that ensures that it does not become a peripheral system separated from the on-going operations. If a functional unit were in charge of the project, they may work the system to ensure their own existence by complicating the system for its intended users. Also, the implementation of the EMS requires resources from already existing functional departments and thereby competes with them. Forming a project group makes it possible to reach a much larger part of the existing organisation. With this in mind, a functional unit should not run the project, it should be carried out according to project management.

Members of the Project Group

Ms. Furnander stressed that the best way to get results is to find someone that is respected by most people. It is a good idea to have him/her in the project group to, amongst other things, act as a door opener to the rest of the organisation. If he/she shows you parts of the existing networks, they will be useful to penetrate to get a better understanding of the organisation. Furthermore, it is important to create a project group with widespread connections and competence within various fields so that a holistic approach to an EMS can be accomplished.

The Project Group in Relation to the Functional Departments

A project, however, evokes conflicts that need to be resolved at an early stage. This can be done by clearly stating what the purpose of taking resources from other departments is and what it will lead to.

Mr. Wessberg explained the importance of defining the project groups relation to the functional departments as necessary to avoid conflicts. He also stated that the formation and structure of the group was important.

Required Resources

As Ms. Furnander stated, depending upon the size of the project, usually 10 people who work 40 % solely with the implementation for 8 months are needed. Considering that the members of a project group most often must carry ordinary duties not related to the project at the same time, it is easily realised that resource allocation is central for the function of a project group.

6.3.2. Organisational Knowledge

Existing Networks

Mr. Wessberg pointed out that it is important to use existing networks. It is always difficult to make people change their accustomed practices or habits. This is also a focal point in organisational theory. Everyone has a need to be familiar with the surrounding environment. If a new system is to be introduced, not only routines are of importance. Identifying informal networks is crucial for its success. It is better to go with the flow than against it. Being new, it is easy to unknowingly break or disturb existing networks. This could lead to problems in the progress without an apparent reason. If, on the other hand, these networks are identified they can be very useful.

Communication Channels

To be able to spread and be given information, functional communication channels must be established, as Mr. Wessberg explained. The existing communication channels are the easiest to use as they are in place and thereby familiar to the personnel. In some cases, new and more direct channels may be needed for a single purpose or routine. New channels that involve a lot of people are difficult to establish as they take time and

because people must be convinced of their significance. Therefore, it is much more efficient to use existing communication channels.

Existing Routines and Previous Studies

Mr. Pentonen argues for the positive effects of connecting all the disparate systems to each other to form one management system. He explains how he has been trying to integrate the existing business management systems to form a single, simple system that would be a natural part of the organisation and not be seen as a peripheral system. He has been aiming for the systems to form an entity.

Ms. Furnander explained that quality management systems (QMS) and EMSs should be integrated as much as possible, especially to lessen the burden of documentation and reviews. If the organisation is, at a later stage, prepared to implement a total operations management system, the previous integration of the QMS and EMS will substantially facilitate that process.

Mr. Wessberg stressed that, for the purpose of an EMS, it is better to utilise accustomed practices rather than creating new ones. If needed, it is clearly better to slightly modify the existing routines or to add where necessary. Unless the EMS is not regarded as simple to use and that it adds value, it will most certainly fail to comply to the underlying purpose of an EMS.

Mr. Heiwall pointed out that an initial audit must be carried out by people with the right skills and knowledge. Ms. Furnander explained that previous audits or related investigations probably exist. In many cases they could serve as a base for further studies. Therefore, asking for previous studies carried out by experts in any related issue can be worthwhile.

6.4. CHAPTER IN BRIEF

The retrospective case study of the Borås implementation gave us the first hints of how organisations work and how they respond to changes. The previous studies of organisational theory proved successful in order to

describe and analyse the implementation process in terms of strategy, conflicts, power and especially group dynamics.

The initial field studies clearly show that implementing an EMS should be executed in the form of a project and that it is important to form a project group with the right set of skills. It is also important that the project group make sure that they understand how the organisation that they work within functions. This is especially important if the Project Manager is a consultant brought in for the single purpose of creating an EMS.

7. PRELIMINARY MODEL OF THE EMS IMPLEMENTATION

A preliminary model of how we thought the planning stage should be carried out was formed before going to Säffle. It was based on the literature review and the field studies. Two main issues served as a base; Project Management and Organisational Knowledge. A short review of their general importance for the success of any project follows. After that, the model itself is described.

7.1. ORGANISATIONAL KNOWLEDGE

Learning about the organisation in question is the first task of the project manager. This means understanding the organisational structure, knowing who is in charge of what and which people are able to work with each other. Also, of equal importance is understanding and finding the existing networks, communication channels and routines. Of course, if the project manager is already a part of that organisation, this work is greatly facilitated. Even so, it is important for him/her to map the political terrain. When changes are about to happen, the resistance may be hard to overcome unless the responsible manager understands the organisation and knows where resistance might occur. Especially important is to find out who is in favour of the project. By using them to inform the others, slightly disapproving individuals may become convinced of its benefits.

7.2. PROJECT MANAGEMENT

Production facilities often lack environmental knowledge, therefore it is important to collect information or to bring in external help in the form of a consultant. The consultant, or preferably the internal environmental manager, must learn how the organisation works before forming a project group. The structure of the project group is crucial. It should consist of people with the needed skills, knowledge and influence, which can be difficult to find within certain companies. The members must be motivated and able to achieve as they will have to perform their normal duties at the same time. To pick the right persons is difficult, but will save

time and lead to a better end result. Influential and respected people with the correct know-how are ideal as group members and as sources of information in creating the project group.

7.3. THE MODEL

Upon our arrival to Säffle our aim was to propose for the implementation to be carried out as a project and that we wanted to make sure that we would be able to understand how the organisation actually functions.

The first step was to find all previous studies or reports concerning the plant. These studies were interesting as they would probably teach us more about the facility as such. This step also included a general description of the plant by the production manager as well as by someone well respected amongst the workers. This would most probably give us two different perspectives on the operations.

The second step was to learn about all functional departments and their role in the organisation. The ISO 9001 manuals describe the organisation and responsibilities of each manager so they were regarded as a high priority to study. It would be important to learn more about the functional departments in order to be able to release the correct resources at a later stage as well.

Knowing this, the third step would be to create a project group with motivated and skilled members from the different departments. They would later use their respective network to involve the entire organisation in the implementation. The third step would also include the establishment of working communication channels in both directions in order to spread information as well as receive information and especially good advice.

7.4. CHAPTER IN BRIEF

The preliminary model of the EMS implementation involves two main issues, organisational knowledge and project management. It is divided into three steps to make sure that no issues are pushed through too fast.

They include learning about the organisation, establishing a project group and building networks and communication channels in order to be recognised as a part of that organisation. These issues will assist in achieving the tasks involved in the creation of an EMS.

8. PRACTICAL TESTING OF THE MODEL

The Säffle period can be divided into three separate steps. We wanted to start the first step by getting to know the organisation and then to find all previous reports and studies. Thereby, the second step had begun and we could learn about the functional departments and their roles through the existing routines. Establishing the project group was carried out during the third step. Finding and using the existing networks and communication channels were also a part of the third step.

8.1. UNDERSTANDING THE ORGANISATION

Prior to the first site-visit, we feared that our reception would be poor, but they welcomed us and explained their situation and how they saw that we could help. The picture that we had formed before arrival was that the Säffle management was quite reluctant to implement an EMS. Mr. Danielsson, the Environmental Director at VBC, had explained that the implementation of their ISO 9001 system had been very lengthy. This, put together with the delay of the environmental project as a whole, led us to believe that Säffle was not at all interested and that our arrival would not be appreciated. However, we were very wrong. Our first impression was that it seemed to be a relaxed working environment and the discussion that followed revealed that they had actually given a lot of thought to environmental issues. The top management explained and showed their commitment to the implementation of an EMS. The Quality Manager, Mr. Ove Bryggman, who had previously been responsible for the ISO 9001 certification had given a great deal of thought to the environmental system and argued for it to be as brief and simple as possible. At this meeting, it was decided that the certification process should be run as a project with a project group.

During the first couple of weeks we tried to understand how the organisation works, who to ask for different matters and who made things happen. The plant was thoroughly shown and explained to us a number of times by both the production manager, Mr. Björk, and the maintenance manager, Mr. Augustsson. How the production is carried out and how a bus body is built was explained and gave us a clear picture of the flows

and processes involved. Mr. Augustsson showed us the blueprints of the plant and its sewage system. Also, he introduced us to the factory floor team managers, which gave us the freedom to move around the plant. This was a great asset for us since Mr. Augustsson is highly respected whereby we were accepted quickly. Our plan to find key persons that could introduce us to the informal organisation worked.

8.2. IDENTIFYING THE EXISTING ROUTINES

One of our primary objectives upon arrival to Säffle was to use existing systems and behaviours as much as possible to comply with the ISO 14001 standard. The ISO 9001 manuals and the internal control system are two examples which should serve as a base when setting up the EMS to ensure integration. Many of the routines that ISO 14001 demands already exist or are easily modified in these existing manuals to suit the needs of the EMS. Understanding these was a way of understanding the corporate culture and the way in which the organisation works.

The initial environmental review that was carried out by Mr. Inge Horkeby (Environmental Auditor of the Volvo Group), was an enormous help and served as a base for finding the different environmental aspects

Information on where laws and regulations, other than the permits, could be found, compiled and reviewed was also retrieved during this stage.

8.3. ESTABLISHING THE PROJECT GROUP

The fact that Mr. Augustsson was the maintenance manager, that he had been at the factory for more than 30 years and knew its history and that he was highly respected made him ideal to have in the project group. He later proved to be our best source of information as well.

Mr. Augustsson introduced us to another member of the project group, Mr. Börje Danielsson. Since he is in charge of the goods and stock, he knows what, where from and where to all goods come and go and where they are stored. He works very closely with procurement and with Mr.

Augustsson which made him an asset for the group and facilitated group dynamics.

We also met the safety engineer since Mr. Pentonen (from Borås) told us that the safety engineer is a good resource during the planning stage as he/she has a thorough knowledge of the plant and many of its environmental aspects. We tried to include him in the project group in Säffle, but unfortunately he did not have the time at this stage, but will be included in the future.

At a later stage, the health and safety representative, Mr. Christer Stolpen, joined the group with his knowledge and interest in the health and safety aspects of the implementation (i.e. hazardous chemicals etc.). Also, as an employee representative, he has close contact with the employees and a great deal of trust and influence.

Discussions were held with Mr. Börje Danielsson and Mr. Augustsson on how to organise the mapping of the environmental aspects and who would be responsible for what. The members of the group had different skills and knowledge of the plant. This gave us the ability to systematically go through the plant and pin-point all the environmental aspects. First, the group discussed and decided which issues of the plant that were considered environmental aspects. Then the work was split up and specific parts were delegated to those most suitable to perform them and later the group again met to go through these and evaluate which were significant.

Included in the work of the environmental aspects, the various permits of the plant were penetrated. These were a part of the significance evaluation, but also necessary to know in order to fulfil the legal requirements.

In order to be able to gather and spread information, the formal and informal communication channels were mapped. A questionnaire was sent out to all managers from the top management to the factory floor team managers. They were asked to write down all contacts between staff members and what the contacts were about. By doing this, we understood the structure of the organisation and when, where and how formal and informal meetings were held. This also gave us a picture of what relation people have to each other and who they are responsible to. Mapping the

communication channels by sending out a questionnaire was a good tool in getting to know the organisation.

8.4. PLANNING THE IMPLEMENTATION

It was after the third step in Säffle that the actual planning of the implementation took place. We wrote a draft for the environmental policy which was checked and later approved by the top management and the project group. The Volvo Group has a corporate environmental policy which all companies and sites must adhere to, but according to the ISO 14001 standard, there must be a site specific policy as well.

The environmental aspects were, as stated earlier, evaluated whereby the significant aspects were identified. The environmental objectives and targets were set up by using the significant environmental aspects. Again, a draft was written by us and later checked and approved by the top management and project group. The policy was then reviewed to ensure that the objectives and targets were in parity with the policy.

Environmental plans and a management programme where written in order to know how to fulfil the objectives and targets. Routines, responsibilities, timetable and what resources will be needed are all included in the management programme.

8.5. CHAPTER IN BRIEF

Our first step in Säffle included many on site presentations and descriptions of the plant. Also, we were introduced to much of the personnel which gave a general picture of how the organisation works, who to ask for different matters and who made things happen. During the second step, the gathered previous reports and manuals were studied to identify the existing routines. Thirdly, the project group was established and we could begin planning the implementation. The policy, significant aspects, legal requirements, objectives and targets and management programme are issues that need to be carried out during the planning stage.

9. EVALUATION OF THE MODEL

Upon our arrival to Säffle we had formed many prejudices about likely events. Many proved to be erroneous. This shows the importance of being able to adapt to circumstances different from those that were anticipated. The preliminary model was a result of the initial field studies and the literature review, none of which were based on the actual conditions in Säffle.

9.1. ORGANISATIONAL KNOWLEDGE

The previous paragraph clearly states the importance of understanding the organisational behaviour before being able to create new settings. The first step included finding all previously written reports and/or manuals concerning the facility as well as understanding how the production was run and what the facility looked like. In fact, we did not so much as try to read any report before we had gained a better understanding of the production through informal interviews and guided tours. It proved to be very difficult to understand the manuals and reports without having seen and been explained to very clearly about all the steps in the production process.

Our aim from the beginning was to include people from all functional departments in order to provide for an incorporation of the whole organisation. Therefore, the first step also consisted of us trying to figure out who favoured the implementation as such. It was quite clear who was in favour and who was not. We later focused on those who favoured the project and tried to figure out in which way they could contribute to the implementation. Our contacts with Mr. Augustsson proved to be very fruitful. He came to be our door opener.

The written reports, manuals, routines etc. contributed not only to our view of the facility, but also to our understanding of the managers' view of the facility and its processes. This made it possible to discuss alterations on a common basis with the management.

Furthermore, the initial audit executed by Mr. Horkeby proved to be of great aid. Not only did it show the present weaknesses and strengths of the environmental performance of the facility, but it also allowed us to introduce the subject in a familiar way to the staff. They all knew of Mr. Horkeby from

earlier visits and he held a high degree of respect for his knowledge and credibility.

9.2. PROJECT MANAGEMENT

The ambition in the preliminary model was to include members from all functional departments in a project group responsible for the implementation. The idea of performing the implementation in such a way proved to be difficult. Very early it was decided that the implementation should be run in the form of a project, however, at this stage it had not been decided who exactly would be participating.

We were appointed project leaders and it was our responsibility to form a group where all needed skills would be represented as well as all functional departments. Soon it was evident that it was not necessary to include all departments and that it was difficult to find willing members with the right set of skills. We wanted to include not senior managers but people who would have the time to help, yet still have the respect or power to actually make things happen. Mr. Augustsson became the first member of the group due to his interest in environmental issues and his thorough knowledge of the facility. He also helped us contact other potential group members.

9.3. CHAPTER IN BRIEF

It is important to set forth with the knowledge that all prejudices may fall short. The actual site will provide conditions different from textbooks and earlier experience. However, most of the ideas in the preliminary model proved to be successful though they needed to be arranged in another order or slightly modified to better suit the circumstances. The written documents were especially efficient in providing a common base for further discussions with the managers.

10. CONCLUSION

How to introduce EMSs has been seen from the project group's perspective and in view of the fact that the group wants to keep it user-friendly. As stated earlier, we believe that the project group not only deals with instructions and routines, but also with people's attitudes. Therefore, they must also understand their own role within the organisation.

We have differentiated between the common organisation (in terms of top management and employees) and the project group (which is temporary with most of its members coming from these two groups). Figure 10-1 shows the project group's position in relation to the common organisation (in grey) and what means it will have to use to become a part of it.

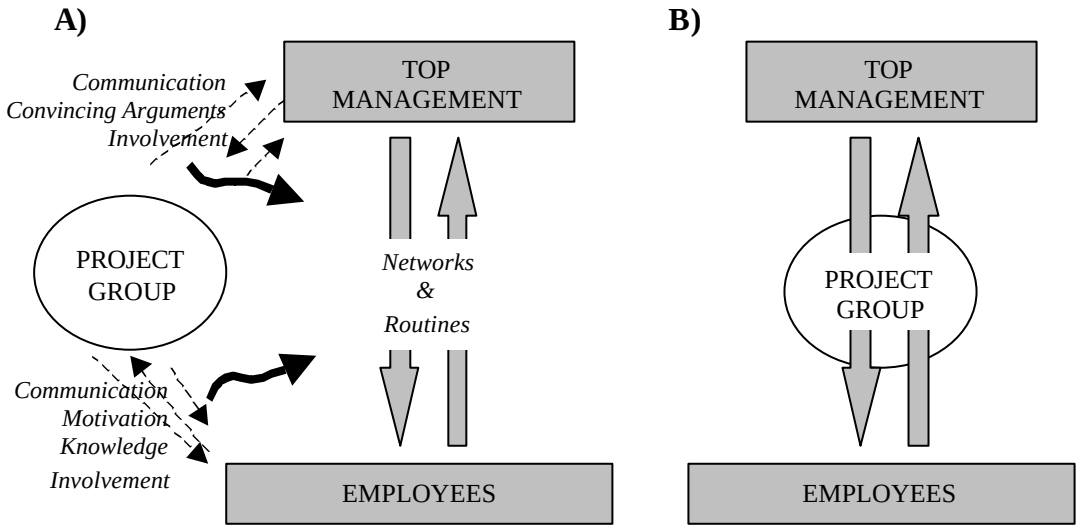

Figure 10-1: Through communication, convincing arguments and motivation the project group can establish a position within the existing operations of the common organisation (from A to B).

One has to keep in mind, that projects can vary in terms of importance in the eyes of the management. If it is not crucial for the survival of the company, it will not be given all available resources. EMSs are far from being crucial. They add to the company's external and internal goodwill,

but are usually not what the company depends on for its survival. The project group will, therefore, find itself in a peripheral position in relation to the ordinary organisation, as seen in A) in Figure 10-1. Not because it is not a part of it, but because its dignity does not give it a central position. It is our belief that the greatest factor of success is how well the project group succeeds in incorporating their work in the existing organisation.

The project group is responsible for the implementation as a whole though its work will be highly influenced by the management and employees. The project group has to convince the top management several times with sound arguments concerning various issues. Furthermore, they must stress the importance of assistance in the communication throughout the company. For the implementation to be successful, all parts of the organisation must work together. The project group has a great responsibility in involving the common organisation in its work. It is important that they be a part of the common organisation in terms of its existing networks and routines. By means of communication and involvement they will work their way from a peripheral position to a more central position, or at least partially into the flow between top management and employees.

The top management must communicate a general will to achieve to the staff and other employees. In any organisation it is the management's task to give directions and set standards, especially when dealing with environmental issues that are based on values. The project group must keep the top management well informed and aware of the need of resources. It is important, as in all operations, to clearly define the scope.

The employees know the operations best. They work with them every day and are the ones that are most likely to be able to modify them if necessary. When it comes to major changes, however, the managers are responsible. During the environmental education it is important to involve the employees and ask them to come up with suggestions and to write routines that they can work according to. If an outsider would write the routines, it is likely that they will not be followed as they are probably not written out of a user perspective.

One of the cornerstones of any organisational change is simplicity. If previously known routines can be adapted in order to fulfil new demands, this should be done. The roles and positions of the project group and the

common organisation must be clearly defined so that its work does not interfere with that of the organisation and cause confusion and distress. The new routines must be plain and simple to avoid misunderstandings or a feeling of too high a complexity. If it is too complex, people will not want to comply to new orders.

The project group must communicate with the common organisation in a manner that enables them to become a part of the existing networks. They must utilise existing routines as extensively as possible and add new ones only when necessary. They have to motivate and educate the employees so that they will become an active part in the process. Figure 10-1 shows possible ways and means of reaching this position within an existing organisation. If that position as an intermediate between top management and employees can not be maintained, the implementation will be difficult and will not become a part of the operations.

The implementation of an EMS should not be seen as a criteria-fulfilment procedure. The success of the implementation of an EMS according to ISO 14001 depends on how well it is taken from a peripheral system and integrated into the existing systems, as seen in B) in Figure 10-1.

Through literature studies, interviews, the case study and experiences it has been realised that the success of the implementation depends on how the project group is set up and how existing routines, networks and communication channels are utilised. The EMS should be integrated into these systems and not be seen as a peripheral issue. Also, it depends on how well the project group is put together and how the group works together with the common organisation. These factors not only influence the level of acceptance, motivation and involvement, but also if conflicts and complications arise. In order to understand and manage these factors, thorough knowledge of the organisational features and project management is necessary.

11. RECOMMENDATIONS FOR FUTURE STUDIES

This thesis has been a study of *how* one can go about the initial stages of the implementation process. However, it ends just after the planning stage. Therefore, knowledge and information needs to be collected from the subsequent stages of the ISO 14001 implementation. After that, a recapitulation of the project as a whole should be conducted to see if the conclusions and results from this study are correct.

An environmental consultant will most likely be needed for the appropriate environmental expertise, but how much of the work should he/she carry out? Within which areas should he/she be employed and which areas should be carried out by the employing organisation? We recommend a closer look at the role of the environmental consultant.

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13. APPENDIX

Summary of "SIS (Swedish Standards Institution), 1997, SS-ISO 14004, Environmental Management Systems – General Guidelines on Principles, Systems and Supporting Techniques."

Planning

The planning stage of the EMS is probably the most important stage of the entire implementation process. This is where the foundation for the remaining work is laid. If it is carried out in the correct manner, with a lot of thought, the implementation process is facilitated greatly. The planning elements include:

1. environmental policy
2. identification of environmental aspects and evaluation of associated environmental impacts
3. legal requirements
4. internal performance criteria
5. environmental objectives and targets
6. environmental plans and management programme

1. An environmental policy must be established to get an overall sense of direction. It is a statement which sets the goal as to the organisation's level of environmental responsibility and performance, against which all subsequent actions will be judged. The responsibility for setting and implementing the policy normally rests with the top management. An environmental policy should consider (SIS, 1997):
    - the mission, vision, core values and beliefs of the organisation;
    - communication with and requirements of interested parties;
    - continual improvement;
    - prevention of pollution;
    - guiding principles;
    - co-ordination with other organisational policies;
    - specific local or regional conditions;
    - compliance with relevant environmental regulations, laws and other criteria to which the organisation subscribes.

2. Knowledge about the organisation's environmental aspects and significant environmental impacts form the basis for its policy, objectives and targets. Identifying the environmental aspects is an ongoing process which determines the past, present and potential impact (positive or negative) of the organisation's activities. The process also includes the identification of the potential regulatory, legal and business exposure affecting the organisation (SIS,1997).

3. Procedures need to be established and maintained to identify, have access to and understand all legal and other requirements to which the organisation subscribes. This means that the organisation must know what requirements are directly attributable to the environmental aspects of its activities (SIS, 1997).

4. The organisation should develop and implement internal priorities and criteria where external standards do not meet its needs or are non-existent. Internal performance criteria, together with external standards, assist the organisation in developing its own objectives (SIS, 1997).

5. Objectives need to be established to meet the environmental policy. These objectives are the overall goals for environmental performance stated in the policy. Relevant findings from the environmental review, identified aspects and associated impacts should be taken into account when establishing the objectives. Environmental **targets** can then be set to reach these objectives within a specified time-frame. These targets should be measurable and specific (SIS, 1997).

6. To be certified according to ISO 14001 an organisation is required to develop an environmental management programme which describes all of its environmental objectives and targets and how each will be achieved. This program must include a specific plan that details the actions required to meet each objective and target; states who is responsible for meeting each objective and provides a time scale for when each target will be attained. All objectives must be included, but are allowed to be prioritised within the programme. ISO 14001 does not mandate requirements or proclaim standards. Therefore, the EMS can be developed based upon the business decisions that make sense for the organisation. The firm can develop a system that reflects its

specific needs, concerns and the knowledge that it has gained from past experiences (i.e. the ISO 9000 quality management program or other environmental programs) (Schiffman et al., 1997).

Implementation

To effectively implement environmental management and achieve the organisations environmental policy, objectives and targets, necessary capabilities and support mechanisms must be developed. Capabilities and support mechanisms constantly evolve in response to the changing requirements of interested parties, a dynamic business environment and the process of continual improvement. Therefore, the organisation should focus and align its people, systems, strategy, resources and structure. To ensure capability, the organisation should work through the following (SIS, 1997):

1. Resources – human, physical and financial
2. EMS alignment and integration
3. Accountability and responsibility
4. Environmental awareness and motivation
5. Knowledge, skills and training

The step that need to be taken to obtain a support mechanism are (SIS, 1997):

1. Communication and reporting
2. Operational control
3. EMS documentation
4. Emergency preparedness and response

<u>Ensuring capability (SIS, 1997)</u>

1. The necessary and appropriate resources need to be defined and made available. In allocating resources, the organisation can develop procedures to measure the benefits as well as the costs of environmental related activities, for example cost of pollution control, wastes and disposal.

2. To effectively manage environmental concerns, the EMS elements should be revised or designed so that they are effectively aligned and

integrated with existing management system elements. The elements that can benefit from integration include:

- Organisational policies
- Resource allocation
- Operational controls and documentation
- Information and support systems
- Training and development
- Organisation and accountability structure
- Reward and appraisal systems
- Measuring and monitoring systems
- Communication and reporting

3. Responsibility for the overall effectiveness of the EMS should be assigned a person or function with sufficient authority, competence and resources. The different operational managers should clearly define the responsibilities of relevant personnel. They should also be responsible and accountable for the effective implementation and environmental performance. All employees at all levels should be accountable for the environmental performance (within the scope of their responsibility).

4. Building awareness and motivation is a key role that top management has in the implementation process. They need to explain the organisation's environmental values and communicate its commitment to the environmental policy. Commitment from the individual employer and employee transforms an environmental management system from paperwork to an effective process. Therefore, all members of the organisation should understand and be encouraged to accept the importance of achieving the objectives and targets for which they are responsible and/or accountable. Also, they should, in turn, encourage the other members to respond in a similar manner. Motivation can be enhanced when employees are recognised for achieving environmental objectives and targets and encouraged to make suggestions that can lead to improved environmental performance.

5. To achieve environmental objectives, specific knowledge and skills are necessary and must, therefore, be identified. Thereafter, appropriate training relevant to the objectives and targets should be

provided to the entire staff, including knowledge of the impact their activities can have on the environment if performed incorrectly. Since everything that happens on site is the organisation's responsibility, ensuring that contractors have the sufficient knowledge to perform their work in an "environmentally responsible manner" lies on that organisation. Education and training ensures that the entire personnel has the appropriate knowledge of regulatory requirements, internal standards and the organisation's policy and objectives.

Obtaining a support mechanism (SIS, 1997)

1. Communication includes establishing processes to report internally and externally on the environmental activities of the organisation. This shows commitment, raises awareness and serves to inform internal and external interested parties. Providing appropriate information serves to motivate employees and encourage public understanding and acceptance of the organisation's efforts to improve its environmental situation and performance.

2. Implementing the EMS is accomplished through establishing and maintaining the operational procedures and controls. This ensures that the organisation's policy, objectives and targets can be met.

3. Operational processes and procedures should be documented and updated as necessary. The various types of documents that establish and specify operational procedure and control should be clearly defined. The existence of EMS documentation supports the personnel awareness of what is required to achieve the objectives and enables the evaluation of the system and environmental performance. The environmental documentation should be integrated into existing documentation where elements of the EMS are integrated with the organisation's overall management system. Maintaining a summary of the documentation can serve as a reference to the implementation and maintenance of the EMS.

4. Emergency plans and procedures should be established to ensure preparedness and response to unexpected or accidental incidents. Potential emergency situations and how to deal with environmental incidents should be defined and maintained. This includes

consideration of accidental emissions and discharges and the specific environmental and ecosystem effects from these releases.

Measurement and Evaluation

Principle 4 states that an organisation should measure, monitor and evaluate its environmental performance. These are key activities of an EMS which ensure that the organisation is performing in accordance to the environmental management programme. Therefore, a system should be in place for measuring and monitoring actual performance against the organisation's objectives and targets. The results should be analysed and used to determine areas of success and to identify activities that require corrective action and improvement. This means identifying environmental performance indicators, which should be objective, verifiable and reproducible. Also, they should be relevant to the organisation's activities, consistent with the environmental policy, practical, cost-effective and technologically feasible. All findings, conclusions and recommendations from the measuring and monitoring should be documented and the necessary corrective and preventive actions identified. Implementation of these actions and follow-up of their effectiveness should be ensured by management. Documentation and records are evidence of the ongoing operation of the EMS. The effective management of these is essential to the successful implementation of the EMS. Audits should be conducted on a periodical basis to determine whether the EMS conforms to planned arrangements and has been properly implemented and maintained. The person(s) conducting the audit should be in a position to do so objectively and impartially and should be properly trained (SIS, 1997).

Review and Improvement

The organisation should review and continually improve its EMS, with the objective of improving its overall environmental performance. At appropriate intervals, the management should conduct a review of the EMS to ensure its suitability and effectiveness. It should be broad enough in scope to address the environmental dimensions of all its activities, including the impact on financial performance and competitive position. The concept of continual improvement is embodied in the EMS through the continuous evaluation of the environmental performance (SIS,1997).

BENEFITS OF ISO 14001

The benefits of implementing ISO 14001 cover many areas, including:

- improved environmental performance,
- reduced operating, waste management, distribution costs,
- savings in consumption of energy and materials,
- increased access to markets,
- regulatory relief,
- improved corporate image among regulators, customers and the public,
- fewer accidents and
- employee involvement and education.

The underlying premise of ISO 14001 is continuous improvement of environmental performance through self-regulation and market-driven pressure. An EMS provides businesses with order and consistency. Therefore, they are able to address environmental concerns through the allocation of resources, assignment of responsibilities and ongoing evaluation of practices, procedures and processes (Schiffman et al., 1997). Organisations can systematically examine all their procedures and activities and evaluate alternatives for their potential impact on the environment. This way, organisations can find hidden costs that were never associated with an environmental issue, causing opportunities for cost savings as well as positive environmental impacts. Therefore, a strong environmental management system makes good business sense. An integrated approach to an EMS can more than pay for itself through reduced operating costs. An example being decreased wastewater discharge requirement treatment, or reductions in raw material usage as a result of reduced solid-waste disposal. Companies have, thus, begun to recognise the need to go beyond mere compliance to effectively manage environmental risks and simultaneously improve their financial performance. Implementation enables a company to plan for environmental issues – to get out of the reactive mode and into the proactive mode (Schiffman et al., 1997). To know why a non-compliance incident occurred and be able to prevent its recurrence is much more important, than it is to simply correct the problem at hand. These management systems deliver information that managers can use to make

more accurate decisions, control costs and reduce time spent on various tasks. Resources are, therefore, better managed, allocated and focused.