

# CHALMERS



## Assessment of the ISO 14001 Implementation Process in Estonian Certified Construction Companies

Master's Thesis in the International Master's Programme Applied Environmental  
Measurement Techniques

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Department of Civil and Environmental Engineering  
*Water Environment Technology*  
CHALMERS UNIVERSITY OF TECHNOLOGY  
Göteborg, Sweden 2005  
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## **Abstract**

During recent years a lot of research has been done in order to investigate the purpose of ISO 14001 (Morrow et al., 2002; Rivera-Camino, 2001; Clark, 1999. etc.) and problems occurring during its implementation (Hillary, 1999; Stratchan et al., Öhman, 2004; etc.). Environmental Management Systems (EMS) like ISO 14001 are often criticised for not being the drive force of environmental benefits that it was intended to. In Estonia the ISO 14001 EMS is not widely used yet. Moreover, no studies have been made so far to evaluate the use of ISO 14001 in this country.

In 2004 the author of this thesis was given the opportunity to work with an Estonian construction company and implement ISO 14001. During this process several problems occurred which formed the basis for this thesis. This thesis is an assessment of the implementation process of ISO 14001 by using questioner. It is based on a four-months practical experience of implementing ISO 14001.

The results show that the main reasons for implementing ISO 14001 at construction companies in Estonia are 1) staying in competition 2) to improve company image and 3) to deal with environmental issues and that lack of finances for implementation is not considered as a problem.

Furthermore, it is shown that, most companies have problems implementing ISO 14001. According to this thesis, those problems are mainly related to human resources such as working habits, employee awareness and attitudes toward environmental issues. Suggestions are given to prevent these identified problems.

This thesis concludes that the general criticism toward ISO for not being the driving force for gaining environmental benefits is justified, also in Estonia.

Keywords: Environmental Management System, EMS, ISO 14001, Estonian construction industry, implementation

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## 1. Introduction

*This thesis begins with an introduction of Environmental Management Systems (EMS) and ISO 14001 in particular. A review of the construction business and its environmental problems in the Estonian construction industry is presented. A practical experience, made by the author is summarized, followed by the identification and analysis of critical issues related to ISO 14001 implementation. Based on the findings, the relationship between the internal and external barriers that influence the implementation of ISO 14001 are discussed and some preliminary conclusions and recommendations will be given.*

Environmental issues are one of the most common “hot topics” in the world today's. For example, how to decrease the waste of natural resources and pollution of air have been discussed and investigated for years and as a result many environmental regulations have been created.

Today, organisations around the world are implementing Environmental Management System (EMS) and certifying them by international standard. For environmental management, ISO 14001 is becoming the leading environmental standard. It specifies the requirements for an EMS, which provides a framework for an organisation to control and monitor their environmental impact of company activities, products and services in order to improve their environmental performance continually.

There is a lot of criticism towards ISO 14001 for not being the driving force of environmental benefits, that it is supposed to be, according to the main purpose stated in the ISO 14001 standard. (Summers, 2002; Flyxell et al, 2002; Morrow et al., 2002; Morrison et al., 2000; Clark 199 etc.). It is clear that the environmental factors are not the main motivation for companies to implement ISO 1400. Instead, the motivation is based like international trade, suppliers' preferences, public relations pressures, stakeholders' interests etc.

It seems that being certified according ISO 14001 does not always lead to the environmental performance, which was intended to When EMS was developed. When analysing these problems, the questions that need to be answered are:

- What are the main forces that motivate Estonian construction companies to implement ISO 14001?
- What kinds of environmental benefit are really gained?
- What are the main problems that occurred during implementation?
- How can companies prevent these problems?

## 2. Aims and Objectives

*This thesis aims to investigate the Environmental Management System implementation process and problems that occur during this process in the Estonian construction industry.*

According to literature research, implementation of environmental management systems does not necessarily lead to the environmental benefits that were intended when EMS was developed. In Estonia the implementation of ISO14001 is a rather new phenomena and the number of certified companies are increasing. The construction industry is a growing industry in Estonia that seems to use EMS mainly for competition advantages.

The overall aim of this thesis is to evaluate the problems of implementation and environmental benefits of ISO 14001 Environmental Management System in the Estonian construction companies. This is accomplished by:

- Understanding the goals and purpose of ISO 14001;
- Mapping the main environmental issues related to the construction industry;
- Practical experience in implementing an ISO 14001 environmental management system at a construction company;
- Evaluating the main problems of implementing ISO 14001 by questionnaires to an extended number of certified construction companies;
- Pointing out recommendations to prevent problems in the implementation process.

### 3. Background

*The background of this thesis describes the Environmental Management System (EMS) in general and ISO 14001 implementation problems; main environmental issues related to the construction industry; and Estonian construction market.*

#### 3.1. Environmental management systems

A large quantity of activities that an organisation does has some environmental impact, not only the pollution that its activities may cause, but also in the way it uses natural resources, manages its business and produces waste.

An Environmental Management System (EMS) is one of the tools an organisation can use to improve environmental performance. It consists of "a number of interrelated elements that function together to help a company manage, measure, and improve the environmental aspects of its operations" (Welford, 1996).

ISO (URL-3) defines an EMS as "the part of the overall management system that includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy."

EMS is a part of an organisation's general management and it helps to deal more easily with environmental questions as stated in environmental policy. EMS should also help an organisation to increase efficiency of using natural resources and reduce their impact to the environment. In general, this means voluntary control and preventive action over the company's products, processes, services, actions etc. that may influence the environment.

The organisation has a number of choices as it approaches the decision: it may choose to certify its EMS through an independent agent: it may choose to self-declare its adherence to ISO14001; it may pick or choose only certain elements of an ISO 14001 EMS (Bansal, 2002). Certificated systems such as EMAS and ISO 14001 are formalized, but for example systematic waste management orders can be non-formalized and may work as well.

Some organisations operate their own EMS's. These systems may exist as quality or health and safety systems and have the environmental issues incorporated into them. The in-house systems are environmentally non-certified but are often based on certified standards like ISO 14001 (Tinsley, 2002). The establishment of an environmental management system and its continuous improvements is a process towards a reduction of the company's and the products environmental impact (Jorgensen, 2000).

Although environmental management systems were developed to meet the needs of large industrial companies, they can be implemented in all kinds of organisation (Belman et al., 2002).

If every organisation starts to use its own environmental management system to meet its own particular needs, it can be seen that resulting systems may be very different between organisations. It makes it difficult to compare their results especially on an international level. In the past ten years the number of international standards in the field of environmental management has increased. The first environmental management standard BS 7750 (British Standard for EMS) was established in 1992 in United Kingdom (Belmane et al., 2002).

The International Organisation prepares most of the standards for Standardization (ISO). It was founded in 1947 in Switzerland (Welford, 1998).

These standards give a set of elements that all EMS should contain. They are frameworks, for supporting organisations in establishing structured and effective environmental activities. The most frequently used guidelines for EMS development and implementation are the international standard- ISO 14001 and the European regulation - the Eco- Management and Audit Scheme (EMAS). Standards do not obligate a particular organisation's optimum environmental performance level but describe a system to help an organisation achieve its own environmental objectives. ISO 14001 requires companies to perform continual improvement and prevent pollution as part of the normal management cycle.

Market demand is one of the dominant forces driving ISO 14001 registrations in the world. For the foreseeable future, customer demand and business competition will be the dominant reason for implementing ISO 14001. Roberts (1998) reports that improved environmental management could have several benefits: reduce company's cost; procedures are in place to ensure legislative compliance; improved public image and increased market opportunities.

### **3.1.1. ISO 14001:1996**

In the early 1990s, the International Organisation for Standardization (ISO) began to work on a series of environmental management standards.

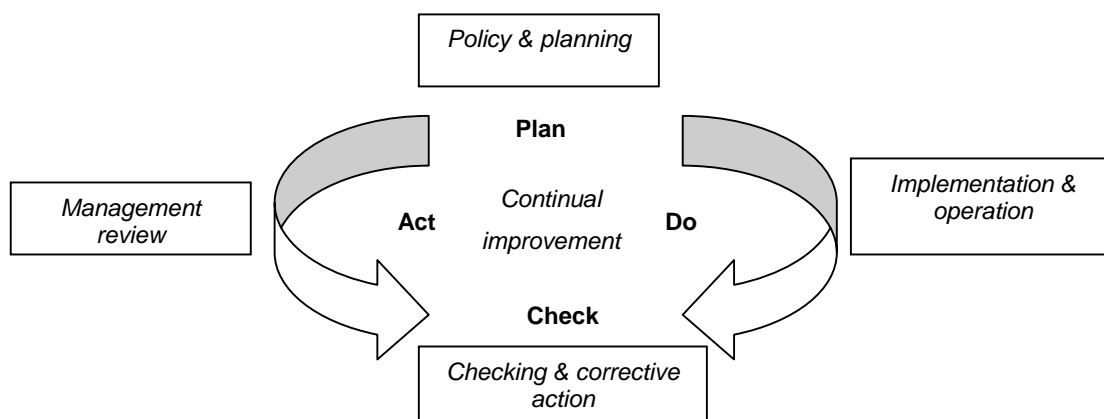
The ISO 14001 series environmental management standards were introduced on the coattails of the success of ISO 9000, which is a series of quality management system standards (Magali, 2002).

The ISO 14001 is now becoming the dominant international standard for assessing environmental management processes all over the world.

It was first published in September 1996 (Morrow, 2002) and the latest version of ISO 14001:2004 came out in November 2004 (Sistok, 2005).

The standard allows an organisation to focus on the issues most important to its business.

ISO 14001 requires an organisation to commit to the prevention of pollution and continual improvement as part of the normal management cycle (Ammenberg, 2003). According to Hillary (2001) it can be used for all types and sizes of organisations and accommodates diverse geographical, cultural and social conditions. The Environmental Management System (EMS) is a continuous cycle that follows the model "Plan, Do, Check, Act"- the Deming circle (figure 1):



**Figure 1.** "Plan, Do, Check, Act" model.

An organisation that starts to implement ISO 14001 may be a company, corporation, firm or enterprise. It can be incorporated or not, public or private and has its own function and administration.

According to this model the EMS can be divided into the four stages: plan, do, check and act

**Planning** includes identifying environmental problems, establishing goals, aims and environmental policy. An organisation should set aim to move EMS forward. When drafting a plan, different aspects should be considered:

- Technological options;
- Financial, operational and business requirements;
- Views of interested parties;
- Significant environmental aspects, environmental policy.

It starts with a small review about organisation activities to identify their environmental aspects. An organisation that implements EMS should first point out objectives and targets with the aim of obtaining environmental performance improvements. Then, environmental management programmes should be established to support the process described above. In these programmes responsibilities and time frames will be specified.

The main purpose of an EMS is to steer and control significant environmental aspects, which should be regarded as cornerstones for a company using an EMS (Edwards, 2004).

An organisation should establish an environmental policy document that gives an overview of their priorities according to the environment. The policy statement must be defined by top management, be appropriate for the nature, scale and aspects of the organisation, set a framework for objectives and targets, be documented and available to the general public (Strachan, 2003). In the planning process it is required to have procedures that make sure that applicable legal and other requirements of environmental relevance are identified and available.

**Do** refer to implementation and operation. An organisation must establish various elements necessary for the implementation and operation of the plan. To create effective EMS roles, responsibilities should be defined; documentation and good communication flows between employees should be established. In order to get ISO14001 certified, environmental training should be defined and carried out among all employees that have a significant impact on the environment in their work. Communication and documentation is a part of implementation and should be managed as well.

Procedures to identify possible accidents and emergency situations and emergency preparedness are required (Edwards, 2004).

**Checking** includes monitoring, measurements, and EMS auditing. This part of the standard should define how the performance of the EMS is checked and weaknesses strengthened.

Checking has to be carried out on a regular basis and will be needed for periodical evaluation of completing corrective and preventive action. To ensure that EMS has been successful in meeting its environmental objectives and targets, it must be audited periodically.

Audits can be divided into the three parts:

- Members of the company or environmental consultants carry out first party audits;
- Second party audits may be carried out by a closely related company, for example a supplier;
- Independent auditors make third party audits or external audits.

**Act** includes management reviews. Top management and appropriate staff must periodically review the management system once a year based on information from measurements, monitoring and audits. Where needed, the programme is renewed; new objectives and aspects are established and policy is changed etc.

These four steps of EMS should be linked together into a process in order to give improved environmental results. The concept of continual improvement is a key component of the environmental management system by completing the cycle.

Organisations prefer to implement ISO14001 mainly because ISO standards are well known and widely accepted.

### **3.1.2. EMAS**

The European Union's Eco-Management and Audit Scheme (EMAS) is a management tool for companies and other organisations to evaluate report and improve their environmental performance. The scheme has been available for participation by companies since 1995 (Council Regulation (EEC) No 1836/93 of 29 June 1993) and was originally restricted to companies in industrial sectors [URL-1].

The EMAS regulation applies to all European Union Member States and the European Economic Area Member States i.e. Norway, Iceland and Liechtenstein.

The EMAS regulation consists of a set of articles and annexes which cover both requirements on organisations as well as on European Union member states in terms of establishing competent bodies and accreditation system for EMAS. The regulation is voluntary, hence organisations can choose to participate or not.

The registered organisations have the right to use the EMAS logo after the verifier, the Competent Body, has accredited the environmental statement [URL-1].

Since 2001 EMAS has been open to all economic sectors including public and private services (Moora, 2005).

At the beginning of 2005, more than 4000 sites in more than 3000 organisations are registered as EMAS organisations. Most of them are companies from the industrial sector [URL-1]. At the beginning of 2005, there were no EMAS registered organisations in Estonia (Moora, 2005).

### 3.1.3. Comparison between EMAS and ISO 14001

The Eco- Management and Audit Scheme (EMAS) is similar to ISO 14001 in its requirements and components. ISO 14001 provides guidelines that can be implemented by almost any type of organisation all over the world. EMAS is designed to bring some changes in environmental performance in European Union organisations.

EMAS and ISO 14001 are different in a many ways. These differences are illustrated in table 1 showing in particular where EMAS goes beyond the ISO 14001 requirements.

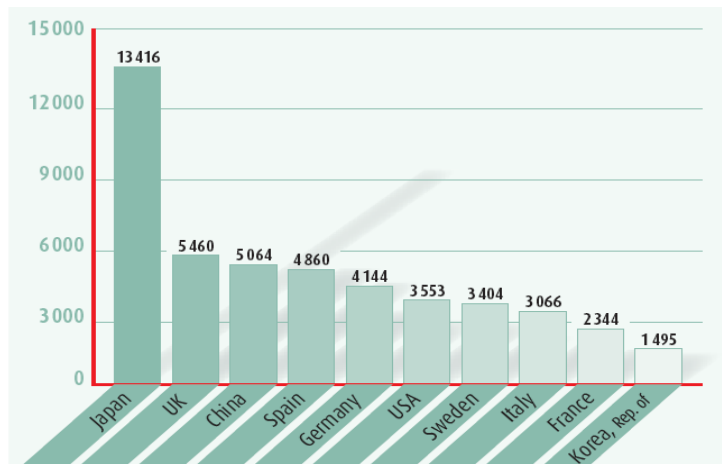
**Table 1.** Difference between ISO 14001 and EMAS [URL-1]

ISSUE	EMAS	ISO 14001
<b>Preliminary environmental review</b>	Verified initial review	No review
<b>External communication And verification</b>	Environmental policy, objectives, environmental management system and details of organisation's performance made public	Environmental policy made public
<b>Audits</b>	Frequency and methodology of audits of the environmental management system and of environmental performance	Audits of the environmental management system (frequency or methodology not specified)
<b>Contractors and suppliers</b>	Required influence over contractors and suppliers	Relevant procedures are communicated to contractors and suppliers
<b>Commitments</b>	Employee involvement, Continuous improvement of environmental performance and compliance with environmental legislation	Commitment of continual improvement of the environmental management system rather than a demonstration of continual improvement of environmental performance

### 3.1.4. ISO 14001 in different parts of the World

There were more than 74,000 organisations in December 2004 using standardized environmental management systems worldwide [URL-2]. Up to the end of December 2003, at least 66,070 certificates had been issued in 113 countries and economies.





**Figure 2.** Top ten countries for ISO 14001 certificates in 2003 [URL-7]

A significant number of companies have adopted ISO 14001 in Western Europe and Asia, which can be explained, by high population, high market share and number of different organisations. The top ten countries for ISO 14001 certificates at the end of 2003 were: Japan (13416), The United Kingdom (5460), China (5064), Spain (4860), Germany (4144), The USA (3553) Sweden (3404), Italy (3066), France (2344), Korea (1495).

As can be seen in figure 2, the most certified European countries in 2003 were Spain, Germany, Italy, The UK, France and Sweden.

It can be assumed that the number of companies that will start to adopt EMS will rise especially in Eastern Europe. One of the reasons for this is an increase in environmental awareness among these countries. Lack of knowledge has been considered one of the problems regarding the definition and application of management systems and the regulatory requirements in relation to these environmental effects (Sheldon, 1997).

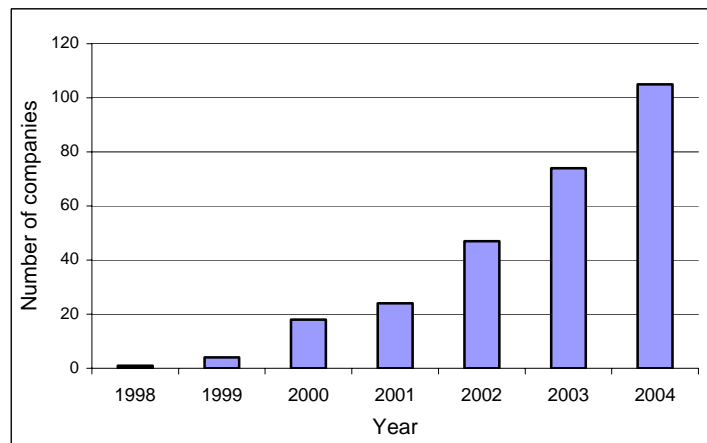
### **3.1.5. ISO 14001 in Estonia**

Estonian organisations have a choice to choose between two environmental management system tools: ISO 14001 international standard or EMAS (Eco Management and Audit Scheme). In Estonia the implementation of ISO14001 is a rather new phenomenon.

The European standard EN ISO 14001:1996 has been implemented in Estonia, as EVS-EN ISO 14001:1998 since 1998. So far the implementation of this standard has not been very successful. At first only large companies and foreign capital based companies were using standardized environmental management systems. Since 2000 the number of certified organisations has increased (see figure 3).

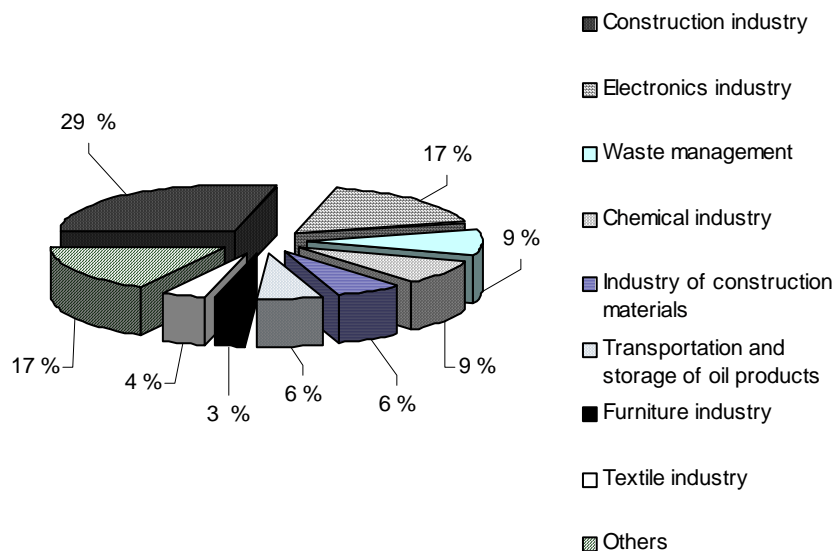
During recent years environmental and sustainability questions are becoming more and more topical. Company managers have started to think more about EMS. After joining the European Union it may be possible that many organisations start to develop and certify their EMS. The reasons for that could be market demand, governmental support and information availability.

At the beginning of 2005, 105 organisations in Estonia were already certified, which is 31 companies more than at the same time last year. This shows that the use of ISO 14001 standard is growing rapidly.



**Figure 3.** Number of ISO 14001 certified organisation 1998-2004 in Estonia

Most of these are companies from the industrial sector (figure 4). As can be seen in figure 4, the most certified business sector is the construction industry (29%).



**Figure 4.** The percentage of ISO 14001 certified companies in Estonia by field of operation [URL-6]

The reason for this could be a market demand. According to the Estonian Quality Union, most certified companies have integrated quality and environmental management systems.

### 3.1.6. Problems that influence ISO 14001 implementation

During recent years, many studies have been carried out in order to investigate the barriers for implementation. According to evaluation done by Hillary (1999), who has compiled information on the drivers and barriers from 33 different European studies-the problems that may occur can be divided into two groups: internal and external. The main internal barriers are outlined in Table 2 (Hillary, 1999).

The study (Hillary, 1999) indicated that human resources, rather than financial resources, are the main barriers for implementation and maintenance. Lack of motivation and multifunctional nature of the staff becomes more and more important during ISO 14001 implementation. Negative company culture towards the environment does not support the implementation process. Incongruous executive support is frequent important factor that interrupt the implementation of an EMS (Öhman, 2004). According Rivera-Camino (2001) the lack of capable human resources is one of the main obstacles. Another barrier that is experienced is an increase in paperwork and bureaucracy attached to the EMS (Stratchan et al., 2002).

**Table 2.** Internal barriers to EMS implementation (Hillary, 1999)

Resources	Understanding and perception	Implementation	Attitudes and company culture
Lack of management and/or staff time for implementation and maintenance; Inadequate technical knowledge and skills; Lack of training; Multifunctional staff easily distracted by other work; Lack of environmental manager and professional staff; Requirement for capital expenditure	Lack of awareness of benefits; Lack of knowledge of formalized systems; Perception of bureaucracy; Perception of high cost for implementation and maintenance.	Implementation is an interrupted and interruptible process Inability to see relevance of all stages; Internal auditor independence difficult to achieve in a small firm; Doubts about ongoing effectiveness of EMSs to deliver objectives; Difficulties with envir. aspects/effects evaluation and the determination of significance; Uncertainty about how to maintain continual improvement.	Inconsistent top management support for EMS implementation Management instability; Low management status of person spear heading EMS implementation; Resistance to change Lack of internal marketing of EMS; Negative view or experience with ISO 9000 standards rubs off on ISO 14001's acceptance.

According to Jürgenson (2004) the main critical issues for implementation of ISO 14001 in Estonia are:

- Following ISO 14001 procedures;
- Understanding legal and other requirements;
- Internal and external communication;
- Identification of environmental aspects and setting aims and targets;
- Training.

In practice, no environmental aspects are controlled. Aspects are identified but companies often do not follow the procedures. Frequently, important aspects are not identified or a list of significant aspects is uncompleted. Legal and other requirements are not predetermined and the structure of ISO 14001 is often too complicated. Moreover, no clear connection could be seen between monitoring and environmental performance. External barriers found by Hillary (1999) are outlined in Table 3.

**Table 3. External barriers to EMS implementation (Hillary, 1999)**

<b>Certifiers/verifiers</b>	<b>Economics</b>	<b>Institutional weaknesses</b>	<b>Support and guidance</b>
High cost of certification/verification which disproportionately penalizes small firms; Lack of experienced verifiers; Duplication of effort between verifiers/certifiers and internal auditors; Verifiers exceeding their role e.g. influencing audit cycle length; Distortion in the verifier market.	High cost of certification/verification which disproportionately; Changing economic climate alters the priority given to an EMS ; Insufficient drivers and benefits; Uncertainty about the value of an EMS in the market place.	Lack of promotion of EMSs and accessible financial support; Lack of clear or strict legislative framework Absence of a central source of information on environmental legislation.	Inadequate institutional quality to assist SMEs; Inconsistent approach of consultants to EMS implementation; External assistance, e.g. consultants needed to interpret ISO 14001 and required for environmental review and EMS implementation; Lack of sector specific implementation tools, examples; Lack of explanation of concepts and more guidance needed on environmental aspects and significance evaluation Poor quality information and conflicting guidance given.

It has been stated that companies need a lot of guidance e.g. from consultants. However, it has often been reported that good consultants might be hard to find. Another barrier is the lack of sector specific material adjusted to different types and sizes of firms, especially very small companies (Hillary, 1999).

According to the study made by Dalhammer (2002) ISO 14001 has been indicated to be too difficult to understand. It is perceived as bureaucratic and does not fit especially into the more small companies. The standard of the certifiers/verifiers varies, as well as within the certification bodies (Hillary, 1999). This factor might also form a barrier to ISO 14001 implementation.

The implementation and certification are costly both in terms of money and other resources, especially working hours.

### **3.2. The construction industry in Estonia**

The construction industry in Estonia has successfully grown during the last 10 years. It is an important branch of the Estonian economy since construction contributes 6.7% to the total GDP. This ranks construction in the fifth position as an economic activity. Construction works conducted in Estonia at current prices are amounted to EUR 1.5 billion and construction activities to foreign countries to EUR 0.58 billion in 2003 [URL-4].

In 2003 the Estonian construction market grew 16%. The turnover of construction companies was EUR 1.65 billion in 2003, which is 13.6% higher than in 2002 [URL-4].

The construction of residential buildings has showed the fastest growth. Thanks to European Union support programs the construction of communication lines (electricity, sewerage and waste treatment plants, roads and streets) has grown.

New residential buildings are mainly built in Tallinn and in its closest neighbourhood but also in Tartu and Pärnu.

The construction industry employs about 42,900 people. Approximately 88% are directly engaged in construction work. People employed in the building sector comprise 7.3% of the economically active population. In 2003 average monthly gross wage in construction was EUR 420, which is slightly lower than the average in Estonia [URL-4].

#### ***3.2.1. Environmental problems in the construction industry***

Intensive construction activities during recent years has caused extensive soil contamination, large quantities of abandoned waste and unreasonable use of energy and natural resources, especially in northern part of Estonia. These can be considered as the main environmental problems that occur in this industry.

Construction, demolition, refurbishment and material supply processes are responsible for a significant amount of wastes. The major components are soils (often mixed with other materials), concrete, masonry, brickwork, wood, stone, metal, glass, plasterboard, bituminous materials such as road pavings and architectural features.

Among the different regions in Estonia, Tallinn and the surrounding rural municipalities generate the biggest amount of construction and demolition waste. In 1998, 330 000 tons of construction waste was generated in the whole country, with 86% or 283 000 tons originating from Tallinn. According to other data there was more than 600 000 tons of construction waste generated in Tallinn in 1998. Other evaluations have concluded this last amount to be even bigger. According to waste statistic, 11.6 million tons of waste was generated in 2000.

9.9 million of these amounts were generated in the oil shale industry. The total amount of waste contained 5.97 million tons of hazardous waste, of which 99.7% was hazardous waste from oil shale combustion and pyrolysis [URL-5].

Construction waste may contain hazardous waste, such as asbestos, solvents, impregnated timber, packaging containing chemicals, etc. Some construction waste is deposited illegally, dumped in wasteland, forest, or in the nearest place at hand. This is major problem in building industry.

Construction waste can be used primarily as filling material. In landfills it is necessary for the construction of temporary roads. Part of the waste was delivered for free to other enterprises (as filling material) and to private persons. Concrete and rock material waste (bricks, panels, etc.) -is a needed material in landfills for building temporary roads and intermediate layers. Construction timber waste can be used for similar purposes as waste from timber industry. Waste generation can be prevented and reduced in construction and demolition works by reasonable organisational work. It is necessary to increase the use of reusable materials, reduce wasting of materials (e.g. unnecessary damage) during all stages of work, reduce the use of dangerous substances, increase the use of recoverable packaging, separate and collect hazardous waste generated in all stages of the construction work. To ensure separate handling of hazardous waste it should be delivered to a company licensed to handle these byproducts (Rootsma, 2005).

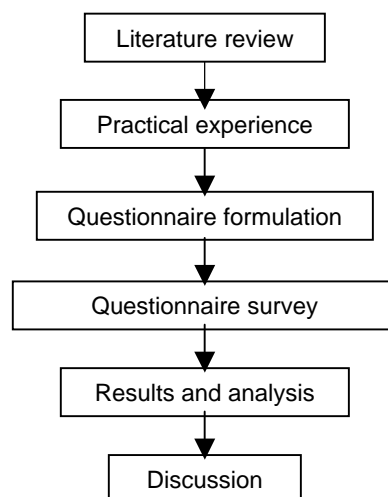
Smaller problems that also occur in building industry are dust, smell, cutting trees and noise that can be reduced using the proper technique and by implementing the right know-how.

## 4. Project Procedure

This thesis was selected in order to study the implementation of ISO 14001 and problems that influence this process. It is based on a literature review, practical experience and a questionnaire survey.

Important information and knowledge for this thesis was gathered from the practical experience of implementing environmental management system in a construction company Level Ltd. During this period several internal and external obstacles occurred which formed the base for this thesis.

Also materials that obtained from ISO 14001 certified construction companies by using questionnaires (Appendix 2) are going to be presented and discussed.



**Figure 5.** Project procedures

### 4.1. Limitations

The main limitation in this current thesis was the availability of accurate information. Especially when it came to evaluation of the environmental performance in ISO 14001 certified construction companies. The information posted from the companies was often not sufficient. 4 companies out of 35 admitted that ISO14001 was developed and implemented mainly for getting the certificate and no environmental benefits could be seen.

As for the literature data of this thesis, the sources that have been published for some time were mixed with books and papers that have been issued recently. This approach would be the optimal one to use, due to respected popular research papers, and would enable us to build a proper scientific base for this thesis. Further, it has been necessarily combined with

fresh sources of information concerning contemporary issues that need to be updated relatively often. All this was done to minimise the subjectivity of the obtained thesis results.

Another limitation in the evaluation was the possibility that those answering the questionnaires might not be always objective. The respondents may be inclined to give a picture of him or her or of the situation being exceedingly idealistic. By nature, humans are trying to suppress their failures, mistakes and other negative experiences. Furthermore, a respondent may forget an important item or alternatively, try to suppress some, negative experiences. The picture of the situation might therefore not coincide with reality. On the other hand, all the respondents have shown a genuine interest in being interviewed on the subject and willingly shared their viewpoints.



## **5. Practical experience**

In Estonia the implementation of ISO14001 is a rather new phenomenon and the number of certified companies is increasing. The construction industry is a leading industry in Estonia that implements EMS for competition advantages. The organisation selected for this thesis was an Estonian construction company called "Level Ltd".

Level Ltd. is located in West of Estonia in the island of Saaremaa. It was established in 1997 as an independent company. Today it has 8 years of experience in the construction business, road construction and manufacturing construction materials. Level Ltd. has developed from a small enterprise into an important construction company in the West-Estonian market. Net turnover of the 2003 has constantly been over 30 million EEK. Level Ltd. employs more than 70 people.

### **5.1. Implementation of ISO 14001 at Level Ltd. in Estonia**

#### ***5.1.1 Purpose, Scope***

In June 2004, Level Ltd. started to implement its Environmental Management System (EMS) together with Quality Management System (ISO 9001) under the guidance of the consulting company AAA1.M.I. This project was partly subsidized by Estonian Enterprise.

The responsibility for planning, developing, and implementing the project was assigned to a core implementation team where the environmental aspect was mainly conducted by the author of this thesis. General guidance for the EMS was taken from the International Organisation for Standardization (ISO) 14001:1996 Standard, Environmental Management Systems—Specifications with Guidance for Use.

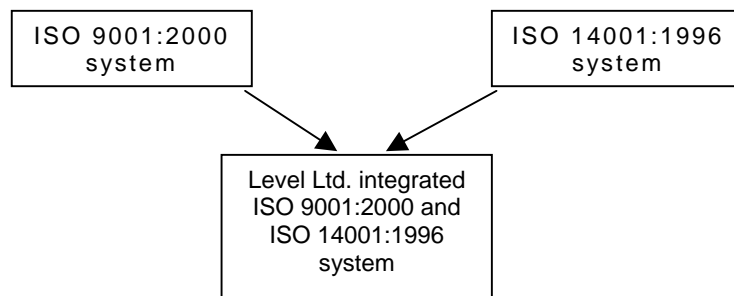
As mentioned above the system that was implemented, was an integration of environmental and quality management systems. There are several similarities between ISO 9001 and ISO 14001 standards.

All management systems, whether focused on quality, safety, or the environment, have certain core elements (Randmer, 2001).

In the case of ISO 9001 and ISO 14001, there are similar requirements for all of these core elements. Those are:

- Policy;
- Defined organisation and responsibilities;

- Defined and documented standard practices;
- Control of critical operations;
- Document control;
- Training;
- Records system;
- Internal audits;
- Corrective action system;
- Management review for continual improvement.



**Figure 6.** System integration

In an EMS, the most critical elements are those found in the planning section of ISO 14001:1996. They are environmental aspects, legal and other requirements, objectives and targets, and the environmental management program. The table of content of the Management System Manual can be seen in appendix 1

### **5.1.2. Initial Review**

It is important that top management and all personnel are 100 percent involved in the implementation process.

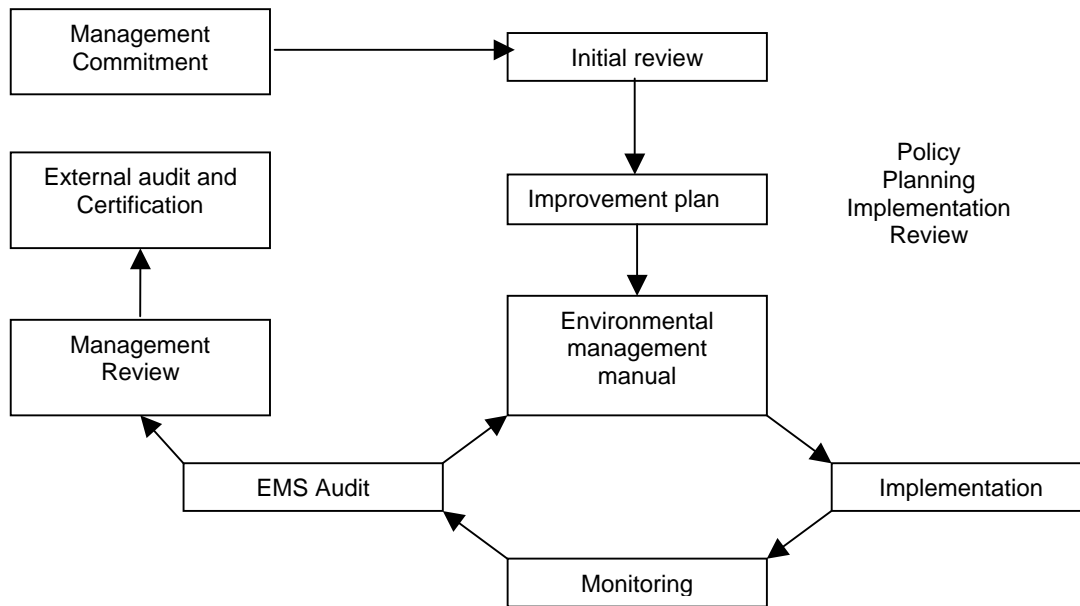
If the top management levels of an organisation are not committed to environmental concerns, employees at lower levels are usually powerless to effect changes (Ball, 2002).

At the beginning of this thesis initial review was prepared for assessing the information that is relevant for an EMS.

Important steps in the initial review analysis were:

- Identification of the legislative and regulatory requirements;
- Identification of the environmental aspects;
- Evaluation performance;
- Existing management practice;
- Existing environmental protection;

- Identification of existing procedures, documents.



**Figure 7.** EMS implementation steps in Level Ltd

### **5.1.3. Environmental Policy**

The environmental policy of Level Ltd., which sets out the company's environmental targets and principals, was approved by the Management board-in June 2004.

Environmental policy is a formal and documented set of principals and intentions with respect to the environment. Essentially, the environmental policy is the guiding document for corporate environmental improvement and adherence to it is the fundamental integrity and success of the entire EMS (Roberts, 1998).

The environmental policy is a driving force of Level Ltd. EMS. The policy statement has a significant impact on the company's image. This policy is available on the Internet (<http://www.level.ee/kvaliteet1.htm>).

### **5.1.4. EMS Planning Process**

Clause 4.3 of the ISO 14001 standard has four elements that define the planning process for an EMS (Randmer, 2001).

The process must include each of the following:

- The identification of environmental aspects of the organisations activities, products, and services;
- An understanding of legal and other requirements;
- Establishment of objectives and targets;
- The establishment of one or more environmental programs that meets the goals of the environmental policy.

### **5.1.5. Environmental Aspects**

The process of identifying and assessing environmental aspects and their impact is an important cornerstone of an effective EMS. Representatives of a variety of departments and at diverse levels were included to produce the most accurate description of aspects. This step allowed Level Ltd. to understand how its activities impact the environment. The aspects are based on initial review (pre-audit).

The aspects may be direct (use of natural resources, use of electricity etc.) or indirect (policymaking, suppliers, environmental aspects etc.).

Impacts are the actual or potential changes to the environment resulting from any of the environmental aspects. It was important to identify impacts on air, water, land, ecological resources and human resources.

During this thesis a simple set of criteria was developed to walk them through the steps in identifying their significant environmental aspects. The table below shows one possible set of criteria and how to rank them:

- Commitment to the legislation (A): yes=1; No= 0;
- Importance to the interest groups (B): yes=1; No= 0;
- Magnitude of the aspect (C): small=0; large= 1;
- Duration and frequency of an aspect (D): small 0, large 1;
- Significance on an impact (E): minimal=1, small=2, intermediate=3, large=4, very large =5;

Significance of the impact was calculated:  $(A+B+C+D)*E$

In the table 2, the aspects are ranked based on six criteria that were considered most important. A quality manager is responsible for recording and upgrading the aspects once a year. The aspects with total scores of 50 % or greater from the highest score were deemed significant.

The results of the rankings were considered when setting objectives and targets to reduce, improve, or eliminate the identified impacts. The table 4 below shows one possible set of criteria and how Level Ltd. ranked them.

Aspects were based on the company's environmental policy and consisted of its business, financial, and operational policies. In an integrated business system, the environmental objectives and targets are fitting within the overall business goals. This means that they do not describe a separate stand-alone system. These significant aspects and impacts are the focal point of programs and procedures that will enable Level Ltd. to better manage and reduce its overall environmental impact.

**Table 4.** Criteria to determine significance environmental aspects in Level Ltd.

Aspect	Impact	Commitment to the legislation (A)	External parties (B)	Magnitude of the aspect (C)	duration and frequency of an aspect (D)	significance on an impact (E)	Significance (A+B+C+D)*E
Road construction	Noise	Yes	yes	Small	Small	Small	
		1	1	0	0	2	4

#### **5.1.6. Legal and Other Requirements**

In this phase an understanding of legal and other requirements was necessary. In the review, all legislative requirements were identified.

All the requirements are gathered to the Management System Manual and are also available on the Internet. It was important to identify other self-imposed requirements that Level Ltd follows. These may include items such as management system performance criteria, client-supplied requirements, insurance company requirements, lending institution requirements and other such internal and external requirements not demanded by law. A Quality manager is responsible for conducting analysis of legal and other environmental requirements applicable to Level Ltd.

#### **5.1.7. Objectives and Targets**

After significant environmental aspects were identified, Level Ltd used them as the basis for setting its objectives and targets by selecting a manageable number of objectives. Based on the evaluation of the significant impacts and identification of requirements, Level Ltd. has set

specific environmental objectives and targets. Objectives are consistent with the environmental policy.

### 5.1.8. Environmental Management Program

After establishing its environmental objectives and targets, a program for achieving these objectives and targets was developed. An evaluation and modification of environmental objectives and targets is carried out annually in an update of the environmental aspects.

In table 5 can be seen one objective of Level Ltd

**Table 5.** Section from Level Ltd. Environmental program

Objective	Procedure	Responsible Staff	Deadline	Budget, Human resources	Previous action (monitoring, protocols, etc.)
Increase construction waste reuse for 20 % for year 2006	1) Market research for BAT	Managing Director, Quality manager, Manager of the Mechanical Department	January 2005	-	Evaluation of the competing offers
	2) Purchase of Equipment	Manager, Manager of the Mechanical Department	March 2005	4-6,0. milj. EEK	Sales contract
	3) Installation of the equipment	Manager of the Mechanical Department	April 2005	100 000 EEK	Certificate
	4) Testing of the equipment and training staff	Manager of the Mechanical Department	April-May 2005	150 000 EEK	Training certificates
	5) monitoring of the reusable wastes	Quality manager	May-December 2005	10 000 EEK	Production reports, Weight notes.

### 5.1.9. Structure and Responsibilities

Together with ISO 9001 a structures and responsibilities were established (responsibility matrix was conducted). All employees of Level Ltd had to understand clearly their environmental roles and responsibilities, as well as understand the importance of the environmental targets and objectives. Specific roles and responsibilities for tasks and functions were presented in the relevant environmental management plans as well as EMS Procedures. Training was given concerning responsibilities and activities that may affect the environment.

### 5.1.10. Training, Awareness and Competence

As mentioned above training is a part of the successful EMS implementation. Also communication and environmental awareness are very important elements in this process. The goal for Level Ltd is to have all employees trained at a necessary level depending on their job function.

The Executive manager is the responsible person for training in this company. During the EMS implementation process, all employees in Level Ltd were explained the importance of the EMS, their responsibilities for EMS operations, aims and objectives of the company, environmental policy, emergency preparedness etc. Training registry can be seen in figure 8.

Name: .....			
Department: .....			
Course	Time	Document	Other information

**Figure 8.** Level Ltd. Training registries

### 5.1.11. Communication

EMS includes communication about internal and external environmental information directed to the management, and the communication from management to others depending on their intentions regarding environmental impacts.

Communication includes both procedures and responsible staff for internal reporting as well as external reporting about the environmental activities of the organisation. Level Ltd has a successful internal communication system that includes new employee orientation, regularly scheduled department, team and other informational meetings and reviews, such as inter-departmental environmental committee meetings, trainings etc. All internal and external information will be documented. The implementation team relays EMS related information to the Management Board. Through suitable communication, many problems can be resolved. When giving explanations of what employees should do regarding environmental concerns, reasons of why those activities are important should be included. Communication should be clear enough to leave no space for misunderstanding.

#### **5.1.12. Document Control and Operational Control**

The EMS manual describes what the EMS consists of, where other related documents are located, and where records of performance can be found.

EMS documentation has the following formal components: environmental regulations, permits, plans and policy. The EMS Manual includes an overview of the EMS program and describes how the EMS is being operated. It includes procedures that are applicable across Level Ltd. business organisations and functions; environmental program-specific EMS procedures; accounts and measures of environmental performance and environmental reports, forms, and records.

Documental control includes: documents required by ISO 14001, and by the environmental management system of Level Ltd. and management system records. All documents that have been changed should be maintained at least 3 years. The quality manager and executive board have the right to change EMS documents

#### **5.1.13. Monitoring and Measurement**

Level Ltd. established and maintained documented procedures to monitor and measure, on a regular basis, the key characteristics of its operations and activities that can have a significant impact on the environment. All monitoring equipment has its calibration procedure and measured results are recorded as scheduled in the procedures. Measurement and monitoring is performed to see if targets and objectives have been reached. The metrics are updated and reviewed monthly and will be held in the same environmental conditions after every calibration.

#### **5.1.14 Emergency Preparedness and Response**

Level Ltd established and maintained procedures to identify the potential accidents and emergency situations, and for preventing and minimizing the environmental impact associated with them. The emergency situations include chemical and waste spills, process equipment breakdown, fires, mishandling of chemicals, failure of pollution control etc. Level Ltd. prepared emergency plans for the cases mentioned. In December 2004 fire emergency training was organized to all employees of Level Ltd.

#### **5.1.15. Non-conformance, Corrective and Preventive Action**

Corrective actions may change EMS policy or procedure; preventative actions may include items such as planning, ongoing monitoring and maintenance, and training. The corrective and preventive action process is a key ingredient to its continual improvement. It is important to change Level Ltd. documentation when non-conformities make it necessary.



### **5.1.16. EMS Audit**

Level Ltd. EMS includes a routine systems audit twice a year. This audit determines compliance with the ISO 14001 EMS.

The internal auditor (Quality Manager or Executive Manager) should include following tasks:

- Perform audits to determine EMS conformance;
- Determine if appropriate procedures, processes, and plans are in place at Level Ltd. to meet the established objectives and targets and the overall goals of the EMS;
- Interview people performing the tasks covered by each EMS procedure to ensure that the tasks performed are as described is in the EMS procedures.
- Visit facilities and observe work practices;
- Report audit findings in a standard format;
- Note nonconformities in the audit reports.

### **5.2.17 Management Review**

A management review is a principal element for EMS improvement, along with preventive and corrective action. The management reviews highlight the possible need for changes to the policy, objectives, and other elements of the EMS. After Level Ltd. had developed and implemented an EMS, a quality manager contacted an accredited ISO 14001 registrar in order to begin the certification process. A Certification Body is an independent, third party audit organisation accredited or approved to conduct ISO 14001 certification by a national accreditation body. Firstly, a critical appraisal was made for the Management System Manual and its supporting records. Secondly, an on-site assessment was conducted to determine Level Ltd's adherence to the procedures their progress in achieving their objectives and the extent of environmental awareness. In the end of December 2004 Level Ltd. became ISO 14001-1996 certified by BVQI.

## **5.2 Identified critical issues of ISO 14001 implementation**

*This chapter describes the main critical issues during ISO 14001- implementation experience in Level Ltd, which provides a necessary base for fulfilment of the sated aims*

### **5.2.1. The lack of commitment and motivation**

As described in chapter 3.1.6 problems might occur inside the company when applying for the ISO 14001 certification. During this thesis not everyone in Level Ltd's top management supported the EMS implementation (this does not give a good example for employees). If executives are not conscious about organisations priorities it is not possible to achieve

environmental benefits. The EMS implementation was possible only because the Director and Quality Manager of Level Ltd. fully supported it. They wanted to develop company's environmental policy and implement ISO 14001.

It was complicated to keep up the enthusiasm of the people involved. Some employees did not have any motivation to be a part of the implementation process by admitting that their part from the company's policy is minor.

Some Level Ltd. employees had still old working attitudes. For example common belief was that if one does not save energy no big loss can be seen in the companies economy or if one does not follow the environmental objectives and targets nothing significant will occur. Employees did not want to take responsibilities for their action. The staff had little understanding of the environmental issues, issues of compliance and the role of planning documents.

Another way of thinking that different standards, certificates, systems etc. are mainly important for the bureaucratic system is also far-spread. Estonia has gone through dramatic changes since the disintegration of the Soviet Union. The old bureaucratic system had to be replaced as the country was heading for the western model of market economy but employees are still settled in old habits. Employees often mentioned that all these new processes are important because of certificate.

### ***5.2.2. ISO 14001 complexity***

The identification of the environmental impacts, determination of significant aspects and targets was one of the critical issues. Level Ltd. has several activities and they all may have some kind of environmental aspect, which makes identification rather complicated. Some aspects could have not been seen at the beginning and occurred later during the process. Identification of aspects and setting aims and targets is one of the most important aims of ISO 14001. There was a lack of explanation of concepts and more guidance needed on environmental aspects and significance evaluation but also in terms of monitoring environmental performance.

There were a lot of regulations and requirements in ISO 14001 and Level Ltd. had some difficulties to comply with all of them, for example nonconformities. In level Ltd. there were few employees who were not able to understand the requirements and necessity of ISO 14001 even after trainings. Because of lack of user-friendliness, employees thought that it was impossible for them to use the standard before other employees do it.

The language used in ISO 14001 standard was considered to be overly complicated and hence it made it very difficult for employees to understand what was actually required.

### **5.2.3. Time consumption and costs**

Implementation will cost resources such as time, human resources and money (Bansal, 2002).

Using standards like ISO14001 are in many ways something completely new and unfamiliar – it is a new way of doing things and getting used to a new terminology. ISO 14001 implementation in Level Ltd. was rather expensive because of the high cost of consultants and certification. In the company, it was important to understand that the implementation is time consuming and both the learning and decision-making processes take time. At the beginning of this thesis it was explained that ISO 14001 implementation needs commitment from all employees specially those who were responsible for implementing the processes to save resources as time and money.

### **5.3.4. Market demand**

Certification seemed to be a sort of “award”- it was the most important reason why Level Ltd. aimed to implement ISO 14001. Market pressure, not the environment, was actually the dominant force driving to ISO 14001 certificates. Many of the ISO 14001 certified companies and governmental institutions are asking suppliers if they are certified to the standard. A large number of companies in Estonia require environmental performance of their subcontractors with the respect to the ISO 14001 in the business. To maintain their customer base and continue to compete in the market Level Ltd. started to implement ISO 14001.

### **5.3.5. Communication**

In Estonian construction business contractors most commonly do not maintain projects by themselves and dealing with subcontractors is necessary. Communication problems occurred in areas that Level Ltd. stands for (environmental policy, significant aspects etc.). Not all subcontractors have implemented ISO 14001 and their working habits do not support environmental protection and sustainability. The Estonian construction market is full of small companies that will not adopt EMS in the immediate future. For contractors it is a serious problem if subcontractors will not follow the environmental performance criteria.

Also internal communication between different levels in the company was often complex. Older employees were afraid of fulfilling nonconformities because it seemed to be complaining for them. It was complicated to explain to them the importance of their information for executives. It is essential that all employees be informed about environmental policy, aims and targets. In Level Ltd. waste shorting (separating paper, plastic, and hazardous wastes) was well known among employees except cleaners who mixed all the wastes back together.

## 6. Questionnaire formulation

In order to evaluate the implementation process of ISO 14001 in Estonia, a questionnaire survey has been carried out (Appendix 2). The questions were prepared in a way that they would cover the most important areas, based on the practical experience..

The questionnaire consisted of 13 different questions (a mixture of open-ended and multiple-choice questions, where all respondents had a possibility to choose more than one answer). For alternative questions only one answer could be chosen, for open-ended questions further explanation was recommended.

The questions produced for this thesis can be divided into four major categories:

- Background information about the certain company (name of the company, number of employees, time for implementation etc.);
- The major forces that motivate companies to adopt ISO 14001;
- Problems regarding Implementation process;
- ISO 14001 improvement and environmental performance.

### 6.1. The major forces that motivate companies to adopt ISO 14001

*What are the main reasons that motivate companies to implement Environmental Management System?*

During practical experience the author of this thesis noticed that Level Ltd. was implementing ISO 14001 mainly because of the market demand. According to the literature review and other countries experience environment is not the main reason for being ISO 14001 certified. It was interesting to investigate whether other Estonian ISO 14001 certified construction companies had the same reasons.

*Have you gained anything from implementing EMS? What?*

Different consultants, certifiers etc. declare that EMS and ISO 14001 certification provide different substantial benefits including significant cost reduction, enhanced corporate image, improved access to permits and authorizations, etc. It was interesting to investigate whether participants gained any benefits after implementing ISO 14001 or not and to assess what those benefits were.

## **6.2. Problems regarding Implementation process**

*Were there any barriers during ISO 14001 implementation? Which ones?*

The author of this thesis faced several critical issues during practical experience. As described in section 3.1.6, different problems might occur during implementation. Since ISO 14001 implementation seemed to be a complicated process it was important to investigate whether participants had met barriers and which were the most common. Were these problems similar to those that other countries experience?

*Did the company use any supportive help during implementation of an EMS?*

There are several consultancy companies that provide their assistance for ISO 14001 implementation. In Estonia it is also possible to apply for partial (50 %) financial support from Estonian Enterprise for consultancy or certification. This question helps to evaluate what kind of supportive help is needed for EMS implementation and do Estonian construction companies use any external help at all?

*Who is responsible for EMS?*

According to Hillary (2003) a lack of good specialists and their time contribution for implementation and maintenance is considered an important barrier during implementation process. Multifunctional employees might easily be distracted by other responsibilities. That is why responsibility for EMS should be divided between managers. It is a common occurrence that companies have hired a quality manager who is responsible for the ISO 14001 implementation process. What about Estonian construction industry?

*How does EMS internal communication take place?*

According to the literature and practical experience, communication might have a significant effect on EMS implementation. The current question was examined to evaluate what were the main types of communication that companies use for EMS.

*What types of training have been arranged to improve environmental awareness of employees and how often?*

This question was formulated since training has an important role for successful EMS implementation. Jürgenson (2004) has reported that training can be considered as one of the

problems during ISO 14001 implementation in Estonia. It has a significant influence to working habits and towards employees' attitude. It was interesting to evaluate how often companies provide trainings to their employees to improve environmental awareness and do they have yearly training?

### **6.3. ISO 14001 improvement and environmental performance**

*What are the main environmental objectives in company's environmental program?*

Waste management is one of the most important environmental questions in Estonian construction industry. For the author of this thesis it was interesting to investigate which were the main objectives of environmental programs in ISO 14001 certified construction companies and did they include waste management as well. Moreover, where those objectives measurable?

*How does environmental monitoring take place?*

According to the literature review companies have problems with environmental monitoring (Hillary, 1999; Dalhammer 2002). This question was prepared to evaluate how companies solved this problem and whether they are able to measure environmental benefits.

*Have environmental objectives and targets been fulfilled, and if not, what could be the obstructive factors?*

This question builds on the previous in order to investigate whether the environmental objectives and targets were fulfilled. Non-performance of the objectives and targets refers to the possible obstacles during implementation process, which were interesting to study.

*What kind of guidance is needed for further improvement of EMS?*

One aim of this thesis was to point out some recommendations to prevent problems in the implementation process. To provide beneficial recommendations, companies' needs were important to investigate

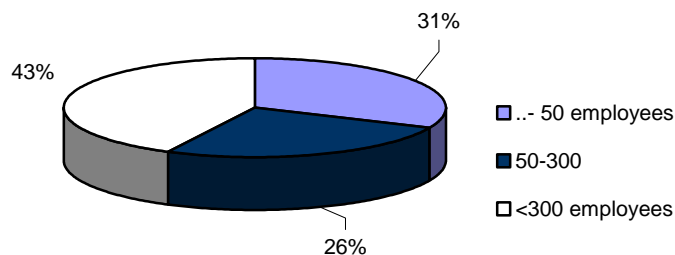
## 7. Questionnaire Survey

The principal criterion chosen for selecting companies for the case study in this thesis was that the organisation had implemented ISO 14001 and had been certified. They were identified from the current list of Estonian Quality Union where certified companies have been gathered (October, 2004). In December 2004, 105 companies were certified total. From this selection only 35 were related to the construction business [URL-6]. Data collection for this thesis was carried out during 2004, which means that the results and analyses are based on the situation in Estonia in this particular year.

Telephone interviews were carried out with quality managers or contact persons from selected companies for agreement for completing the questionnaires. 35 were related to the construction business but 4 of them did not agree to fill out the questionnaires from the beginning.

In October 2004, 31 questionnaires were distributed to the companies. The primary data used in this thesis consists of questionnaire responses from quality managers of selected companies. Finally 63,3 percentage of responses were obtained. There were 4 companies that were not interested in completing questionnaire because competitiveness was the only reason they had implemented ISO 14001. One of them (according to their executive manager) admitted that the company is buying in the EMS as a service.

68 percent of the contacted certified construction companies had integrated ISO 9001 and ISO 14001. 32 percent of the questionnaire respondents were integrated ISO 9001, ISO14001 and OHSAS 18001 (Occupational Safety Assessment Series).



**Figure 9.** Number of employees in participating construction companies

Most of the companies were located in Tallinn and Harju County. 32 percent of these companies had less than 50 employees, 43 percent had 50-300 employees and 26 percent had over 300 employees (figure 9).



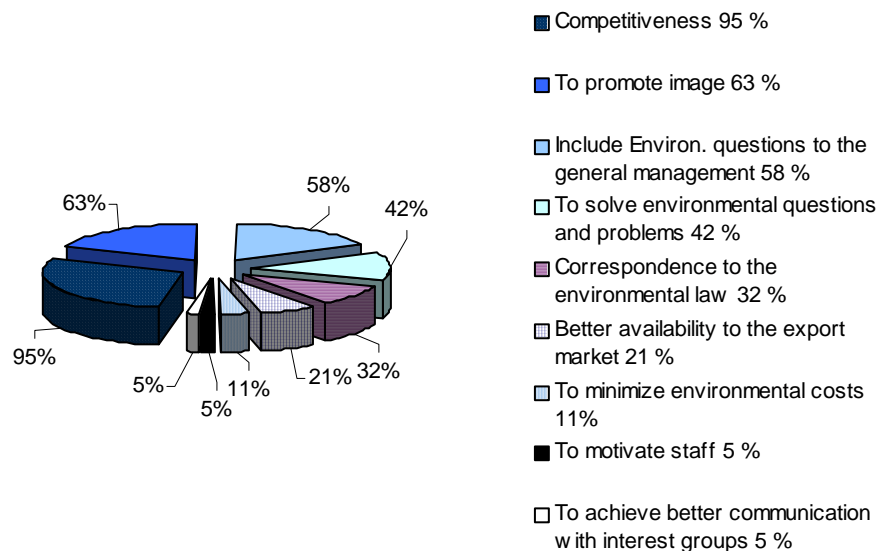
## 8. Results and Analysis

*In this chapter assessment of the ISO 14001 implementation process in Estonian certified construction companies from the conducted questionnaires will be presented. In the following part the stated aims of this thesis will be fulfilled through the analysis of the questionnaire.*

### 8.1. The major forces that motivate companies to adopt ISO 14001

*What were the main reasons that motivate companies to implement EMS?*

All quality/environmental managers were asked for the main reasons in starting EMS implementation in their construction company. Figure 10 shows the distribution of the answers. All participants could choose more than one provided answers.



**Figure 10.** Reasons for implementing EMS

As can be seen from the figure 10 an absolute majority (95 %) of the respondents declared that the competitiveness is one reason for implementing EMS. Moreover, one of the respondents named competitiveness as only reason. This means that market demand is one of the driving forces for ISO 14001 certification in Estonian construction market. Many companies implemented ISO 14001 in order to maintain their customers' base and continue to compete in the economy.

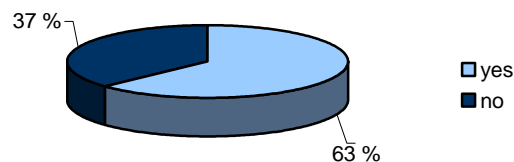
Results also indicate that the reasons likely to minimize environmental costs, achieve better availability to the export market, correspondence to the environmental law do not have that big importance for implementing EMS. Only 5 percent of participants mentioned

communication with interest groups (consumers, employees, the local population, authorities, non-governmental organisations etc.) as one of the reasons for implementing ISO 14001.

It is clear that EMS, in general, has improved many important business relations. Being certified to ISO 14001 helps to build customer confidence because it symbolises conformity and consistency. At the same time, it provides more market opportunities.

These kinds of responses were expected during questionnaire formulation, since there is criticism towards ISO 14001 for not being the driving force of environmental benefit as it intended to.

*Have you gained from implementing EMS?*



**Figure 11.** *Distribution of answers regarding EMS benefit*

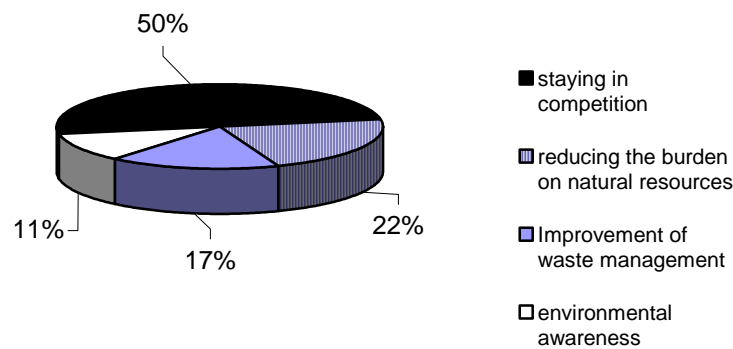
Later, the respondents were asked whether the EMS implementation gave any benefits to their company. All the participating companies could choose between two answers- positive and negative answer (figure 11). According to the results only about half participating companies (63%) had received some benefits.

These respondents, who answered positively (12 companies), were asked to be more detail.

Half of them believe that their ISO 14001 has resulted in positive commercial effects regarding staying in competition and receiving contracts more easily. Respondents got some added market value.

Other important benefits during the implementation process were considered to be reducing the burden on natural resources (22 %) and improving waste management (17 %).

Furthermore, 11 percent described progression in environmental awareness as one of the benefits.



**Figure 12.** Distribution of benefits regarding EMS

Only 4 respondents had improved their waste management, although it is one of the main problems for construction companies in Estonia. It can be concluded, that EMS did not give any significant benefits for the environment. It seems that the main benefits from an EMS were to satisfy existing customers as well as gaining new ones. A marketing advantage follows mainly by demonstrating ISO 14001 certificates. Moreover, when a company did not receive any economic gains, the EMS was thought to improve their image.

This question confirms that ISO 14001 has rather little significant impact on environmental benefits.

## 8.2. Problems regarding ISO 14001 implementation process

*Did the company use any supportive help during implementation of an Environmental Management System?*

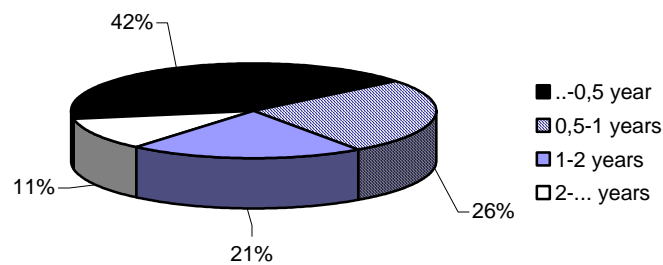
All the questionnaire respondents could choose more than one answer from multiple-choice questions.

The majority of the respondents (79 %) used external consultants. This high percentage might refer to the fact that companies are not motivated to implement ISO 14001 on their own and need external knowledge.

Most respondents were large-sized or medium-sized (Majandusministeerium, 2002) organisations which gives a reason to conclude that small-sized companies need more financial support. The cost in terms of consulting and certification are high and might appear as an obstacle for small-sized companies. A relevant finding is the low number (3) of companies that used financial support. It can be concluded that medium to large companies need external consultants to help them implement ISO 14001 more than financial support.

*How long did the implementation process last before being certified?*

All the participating construction companies could choose one of alternatives from 4 different answers. The answers of this question are outlined in Figure 13.



**Figure 13.** *Distribution of answers to questions regarding time consuming*

42 percent from the respondents declared that their construction company were ISO 14001 certified after half a year. According to the results two companies (employees over 300) stated 2 years, which is a comparatively long time. Four companies declared 1-2 years and five companies 0.5-1 years. It is almost certain that the time consumption of 0,5-2 years is dependent on a company's size.

It seems that the time is not a remarkable barrier for the participating companies as it was supposed during the questionnaire formulation.

*Where there any barriers during ISO 14001 implementation? Which ones?*

Later, the respondents were asked whether barriers occur during the EMS implementation. All the respondents could choose between positive and negative answer. 26 percent of the managers did not meet any significant barrier so far. More than half of the certified construction companies (74%) had met some problems. When asked to be more detailed, the respondents identified more than one problem. The results are presented in Table 6.

Two participating companies mentioned that they face all the problems that are illustrated in table 6.

The leading obstacles were internal, mainly related to the human resources and the company's culture.

Almost every respondent believed that the working attitude was one of the main barriers during the implementation process. Some companies' managers declared that EMS is mainly adopted for wrong reasons- to be certified. It was surprising was that none of the respondents considered lack of financial resources as an obstacle during ISO 14001 implementation.

**Table 6. Barriers to implementing EMS in Estonian construction companies**

<b>Barriers</b>	<b>Number of responses</b>
Slight participation of the employees	8
Attitude and companies culture	14
Lack of knowledge of ISO 14001	8
Importance of the certificate not environment	5
Internal and external communication	4
Paperwork and bureaucracy	3

The lack of knowledge about ISO 14001 was also mentioned as an obstacle but this is understandable since ISO 14001 is rather new phenomena in Estonia. However, this problem is expected to decrease since more literature about ISO 14001 implementation is being provided in Estonian. An interesting fact is that none of the respondents considered time consumption as a barrier.

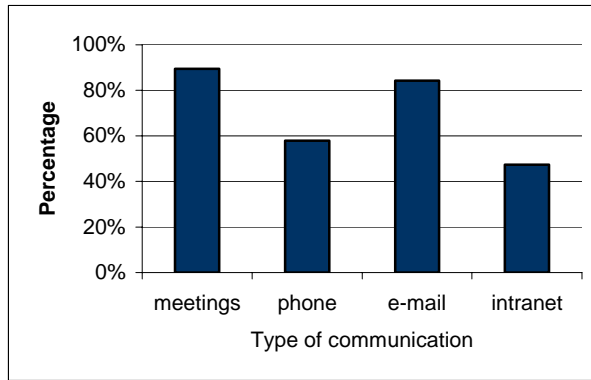
Other problems mentioned were related to waste management and the identification of significant aspects. One respondent believed that customers are not willing to pay more for environmental friendly construction.

*How does internal EMS communication take place?*

One of the most important elements in EMS implementation is internal and external communication. All the respondents were asked how internal communication concerning ISO 14001 takes place?

The participating companies could choose more than one answer from multiple-choice question. The results are presented in figure 14.

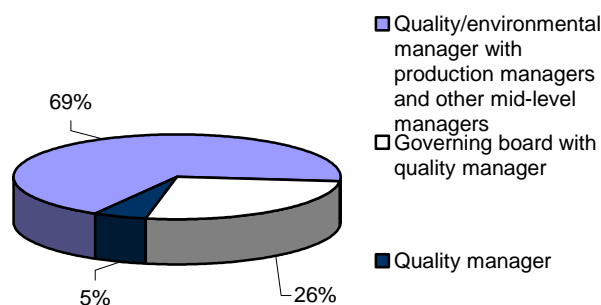
The results indicate that the majority of construction companies use meetings for internal communication, but e-mail, phone and intranet are also widely used. When using these methods paper utilization is decreasing.



**Figure 14.** Distribution of answers regarding internal communication ways.

#### Who is responsible for EMS ?

74 percent of managers declared that this responsibility belongs mainly to quality/environmental manager, production managers and other mid-level managers. Also the top management (26%) was pointed out among participating construction companies as being responsible for EMS in their companies. One respondent stated that only the quality manager is responsible for EMS and no support from other executives could be seen.



**Figure 15.** Distribution of answers to the questions regarding EMS responsibilities.

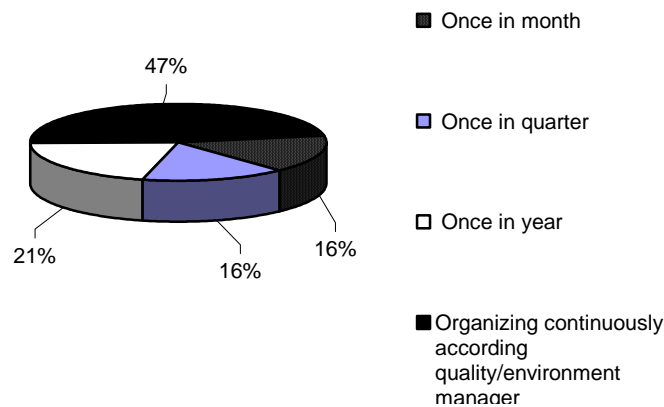
Management commitment during ISO 14001 implementation is essential. As can be seen from figure 15, almost 70 percent of the companies have included mid-level management in EMS implementation. This is positive since executives can give a good example for employees by providing significant information

#### What types of training have been arranged to improve environmental awareness of employees and how often?

All participating companies could choose suitable answers from the multiple-choice questionnaire. The respondents were asked what kind of occasions the companies have

arranged during ISO14001 implementation to improve environmental awareness of the employees. Training was chosen by 89 percent of the respondents. 11 percent from the companies used info-meetings and different flyers.

Later on, the respondents were asked how often these occasions were arranged. All the respondents could choose between 4 different answers (figure 16).



**Figure 16.** Distribution of answers regarding training frequency

As mentioned above training is a part of the successful EMS implementation. It was given by 21 percent of the companies at least once a year. Almost half of the respondents declared that training was organized continuously according to the quality/environment manager. 16 percent of the questionnaire respondents have trainings at least once in a month.

Training plays an important part in employee environmental awareness. However, responding companies seem to still have problems with environmental performance because of human resources. It is possible that training sessions are not effective or interesting for employees. The respondents declared that there were problems in EMS implementation mainly because of lack of knowledge of ISO 14001 and low participation of the employees in training sessions.

### 8.3. Environmental performance

*What are the main environmental objectives in their environmental program?*

In an open-ended question, respondents were asked to identify their environmental program objectives. 3 participating companies did not answer to this question. The results are summarized in Table 7.

As can be seen from Table 7, most of the objectives are not measurable. Raising the environmental awareness of employees was mentioned six times. Only a few (4) identified an improvement in external communication (informing subcontractors about company environmental policy) as an environmental objective.

This indicates that reduced natural resource usage and consuming environmental friendly materials were declared as the main objective. For the participating companies waste management and recycling was also important, which was stated by 10 of the participating companies. As waste management is considered to be one of the main environmental problems in the construction industry, it is essential to put it as an objective in an environmental program.

**Table 7.** *Distribution of answers to questions regarding environmental objectives.*

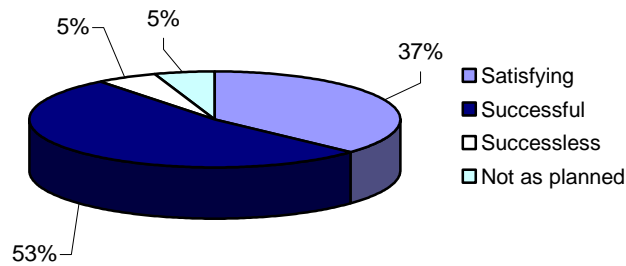
<b>Activities</b>	<b>Number of responses</b>
Waste management and recycling	10
Raising environmental awareness of employees	6
Reduced natural resource usage and consuming environmental friendly materials	13
Improve work environment	3
Inform subcontractors about companies environmental policy	4
New technology	3
Avoiding contamination	5
Observe legislation	3

*Have environmental objectives and targets been fulfilled, and if not, what could be obstructive factors?*

Respondents could choose one of 4 different answers:

- Satisfying;
- Successful
- Success less;
- Not as planned.





**Figure 17.** Distribution of answers to questions regarding environmental objectives and targets accomplishment

Figure 17 shows the distribution of the answers. As can be seen from the figure, only half of the respondents declared that their companies fulfilled successfully environmental objectives and targets and there is a possibility that environmental objectives that were chosen were too overestimated. 37 percent of the managers claimed that accomplishment of the objectives and targets were satisfying.

Approximately 5 percent stated that the early stages of EMS implementation have not led to environmental performance. These respondents were asked to be more detailed and three main areas as obstructive factors were highlighted:

- Old working habits;
- Waste of resources;
- Low participation of employees.

The results indicate that companies mentioned objectives which performance is difficult to measure. As can be seen, slight participation of the employees and old working habits were significant problems. Even for companies that have training and effective internal communication.

*How does environmental monitoring take place?*

All respondents were asked how their environmental monitoring is carried out. All the companies could explain in an open-ended answer. More than 75 percent of the participating construction companies control the performance of the environmental objectives in their environmental program and top management is responsible for this. Interestingly, only 25 % of the participating companies explained monitoring a consumption of electricity, amount of wastes, water, fuel etc as a part of environmental monitoring.

*What kind of additional information is needed for further improvement of EMS?*

Continual improvement is an important aspect of EMS and respondents were asked about their need for further information for supporting it. All respondents could choose more than one answer from the multiple-choice question. The results are presented in Table 8.

**Table 8.** Topics, which are significant in terms of further EMS improvement

Topic	Number of responses
Other companies knowledge in terms of Environmental planning and results	16
New trends in EMS implementation	9
Environmental legislation	7
Effective trainings	6
Knowledge about sustainable production practices	4
Hands on information on how to compose environmental report	3
Guidance to on how maintain an EMS after certification	3
Knowledge about effective internal and external communication	2

According to the results 84 percent of the participating companies considered other company's knowledge and experience in terms of environmental planning and results essential. New trends in EMS implementation and better availability of environmental legislation are topics that could support companies through implementation. As can be seen from Table 9, there is a need for supportive know-how for implementing ISO14001 standard. It can be one reason why almost 80 percent of the participating companies used external consultants for implementing ISO 14001.

## 9. Discussion

One of the aims of this thesis was to understand the main obstacles that influence the implementation of ISO 14001 in Estonian construction business.

It was pointed out in section 3.1.6. and according to the results from the case study, several problems may occur during ISO 14001 implementation. The factors that influence the implementation of ISO 14001 and the environmental performance of Estonian construction companies could be divided into two groups: internal and external.

The main internal obstacles were related to human resources, mentality of the organisation and ISO14001 complexity.

However, none of the respondents considered lack of financial resources as a problem during ISO 14001 implementation. This is despite the fact that many of them use consultancy as an external service, which can be expensive. The questioned companies mainly belonged to the group of large or medium-sized organisations (Majandusministeerium, 2002) and for the small firms this issue could be more important.

According to Hillary (1999) another important internal limiting factor of ISO 14001 is implementation time. Interestingly none of the Estonian construction companies that were questioned declared this factor as a significant barrier. 42 percent required less than six month before being certified. For two companies with over 300 employees this time period was more than two years to complete the same procedure. The results from the questionnaire show that smaller companies use less time than large-sized ones, which is no surprise.

Additional internal influences are the organisational culture and employee's attitudes towards the environmental performance and continual improvement of environmental management. In the opinion of companies' managers, environmental awareness and working habits of employees are detrimental to the EMS process. Even after training takes place, many employees do not see the benefits of changing their old work habits. This can be seen as a lack of proper communication. Every organisation mentioned communication between different employees as a barrier, although many different forms of communication such as info meetings, emails etc were used to present EMS.

ISO 14001 implementation often means new procedures and bureaucracy which needs to be communicated effectively to all parts of the business organisation. According to the results from the questionnaire, complexity of ISO 14001 could be considered as a barrier. This complexity is often difficult to convey, resulting in misunderstanding of the procedures. At the

beginning of the implementation, not all EMS responsible persons manage this process easily.

As mentioned before the difficulties that influence ISO 14001 implementation could be divided into two: and the second part of these difficulties is external.

The main external barriers, which occurred, were lack of sector specific implementation information and examples, inadequate institutional quality to assist companies and pressure from external interest groups.

According to the opinions of the various companies' managers, it is very important to use information from other companies experiences in ISO 14001 implementation. Various governmental agencies and consultants should consider sharing their experiences. Results show that for 84 percent of the respondents, the experiences of other companies EMS implementation is useful for their own EMS improvement. Organisations learn from their colleagues how to effectively implement EMS to minimize environmental effects and maximize environmental performance. It should be mentioned that very few guidelines can be found in Estonian language about EMS implementation and ISO 14001 (first guideline were published in 2003), which shows that there is a lack of knowledge in these standards. In Estonia, a Quality Association has been founded to provide assistance and training for companies.

Another obstacle that influences EMS implementation are external interest groups. The pressure to comply with these standards, exerted on suppliers of large businesses, is one of the reasons companies begin to implement ISO 14001. Three certified Estonian construction firms declared that without ISO 14001 certification, it would be difficult to acquire public works and other projects. According to the questionnaire results, almost all respondents claimed competitiveness and promotion of self image through certification to be an important reason for implementing EMS, because an ISO 14001 certificate would fulfil more contractors' requirements. However, one respondent declared that not all customers are willing to pay more for environmentally friendly product. This does not necessarily increase the project budget, but increases the likelihood of acquiring the project.

A strong customer base is important, but also are reliable subcontractors. In the Estonian construction industry, contractors usually do not maintain projects without the use of external sources and dealing with subcontractors becomes necessary. Communicating, effectively with subcontractors, what a company stands for (environmental policy and significant environmental aspects) and how they manage important procedures is instrumental to the completion of the project.

After evaluating both internal and external factors, it can be concluded that internal obstacles are more significant. Overcoming these problems to become certified does not always lead to better environmental performance. It is obvious that achieving environmental performance is not always the leading reason for seeking certification. Different authors (Morrow et al., 2002; Rivera-Camino, 2001; Clark, 1999. etc) have shown that market demand is one of the main reasons that compel companies to implement ISO 14001. The main reasons for implementing ISO 14001 in Estonia are staying in competition, to improve company image and to deal with environmental issues.

These issues lead to the objectives that companies set in their environmental plan. These overlapped with the environmental questions that were described in section 3.4. Respondents named reduced natural resource usage and consumption, consuming environmental friendly materials, waste management and recycling and raising environmental awareness of employees and subcontractors etc. as some of these objectives.

Not all companies were able to fulfil aims and targets initially set. Approximately 50 percent of respondents claimed that their environmental plan has been successfully targeted. Monitoring consumption of electricity, amounts of waste, water, fuel and production of waste was mentioned as ways to indicate if established aims were met, although, only 25 percent of companies tracked this information. This indicates that actual environmental performance improvement is not the main focus for adopting the ISO 14001.

## 10. Recommendations for ISO 14001 implementations

There are many factors that may influence the ISO 14001 implementation. Based on the findings in this questionnaire and practical experience the following recommendations were composed for companies who are considering the ISO 14001 implementation.

- Before starting the implementation process, companies should assess their exact needs- what are the main reasons for adopting ISO 14001. Wrong reasons might not lead to environmental performance. It is important to understand whether or not ISO 14001 helps companies to improve environmental performance and save nature.
- Companies should evaluate differences between their current EMS and the system specified by ISO 14001. This kind of audit / general review is useful in planning process that might be done by independent consultant or company specialists. This also gives relevant overview from management habits, work procedures etc.
- During development stages before deciding whether ISO 14001 adoption is essential, consulting with personnel is useful. Middle management have good ideas and involving people who create and apply procedures, supports ISO 14001 implementation.
- Top management should fully support the ISO 14001 implementation. Executives should be involved in the whole process and give good example for employees.
- Through meetings and training, it is necessary to create interest among employees. Personnel should understand the importance of the EMS to follow exact procedures and companies environmental policy. It is necessary not to underestimate the importance of training and internal and external communication. Some employees should be more educated in terms of environment so they can act as trainers inside the company for other employees. It maybe clever to encourage employees by giving bonus salary or give positive verbal feedback etc.
- Using existing data and infrastructure is also clever way to save energy during implementation stages. All organisations have specific procedures and paperwork that could/should be directly relate to an EMS.
- Duplication of management systems must be avoided. ISO 14001 has been drafted to be compatible with ISO 9001 series. By integrating them, managers can clarify work methods and avoid confusing employees with conflicting systems (Boiral, 1998).

- Listening to relevant stakeholders (suppliers, customers, shareholders, government, consumers, and society or family members. etc.) - that might have previous experience with ISO 14001 implementation or ideas that are directly related to the company is important and might be very useful. Ability and readiness to listen is of major importance.
- Using an experienced and reliable consultant, who can act as an effective sparring partner during the entire project.

These recommendations are absolutely not final and during the time these may change and improve. As all working processes in a company following different rules, laws and standards, so does the EMS. Maybe some of these recommendations are not following rules and laws, but these are essential to discuss and pick up the good thoughts.

## Conclusion

This thesis investigated the problems that may occur during EMS implementation in the Estonian construction industry and points out recommendations for EMS implementation. Also indicated are the main reasons that compel companies to implement ISO 14001.

There have been a lot of speculations on the drivers of companies adopting ISO 14001. The results show that the main reasons for implementing ISO 14001 at construction companies in Estonia are staying in competition, to improve company image and to deal with environmental issues.

Furthermore, criticism towards ISO 14001 for not being the driving force for gaining environmental benefits is justified. Only about 50 percent of the companies fulfilled their environmental objectives and targets, although all participating firms were certified. The main benefits, in the view of the respondents, were staying in competition (50 %), reducing the burden of natural resources (22 %) and improvement of waste management (17 %).

Since half of the companies did not meet their environmental goals, obstacles presented themselves, which reduced the chances for success. According to the results more than 70 percent of the participants had seen obstacles when implementing ISO 14001. These consisted of internal and external factors, of which the internal issues were dominant. Working habits, employee awareness and attitude towards environmental issues are key examples of these internal problems.

To combat internal obstacles, construction companies appear to need guidance and support. Support from governmental agencies and consultants to help improve training and overall knowledge of the ISO 14001 standard can be an effective way of overcoming these issues. This help can lead to more effective communication between all employees, which can change their attitudes and awareness.

As pointed out, an ISO 14001 certificate does not guarantee improved environmental performance in the Estonian construction market. Construction firms use this certificate as a superficial means of showing the appearance of improved environmental performance to gain market value. Simplifying ISO 14001 processes and increasing the knowledge of how environmental consideration can increase the economic performance of the construction industry, could persuade companies to be more serious about their environmental impacts.



## References

- Ammenberg. J., 2003, *Do standardised Environmental Management Systems Lead to Reduce Environmental Impacts?*, Linköping University
- Annandale. D., Morrison-Saunders. A., Bouma. G., 2002, *The impact of voluntary environmental protection instruments on company environmental performance*, Business Strategy and the Environment 13, 1-12
- Bansal. B., Bogner. C. W., 2002, *Deciding on ISO 14001: Economics, Institutions, and Context*, Long range Planning 35, 269-290
- Barrow, C.J., 2000, *Environmental management*, Routledge, London.
- Belmane. I., Dalhammer. C., Moora. H., 2002, *Keskkonnajuhtimissüsteemi käsiraamat*, KFS AB, Lund.
- Boiral , O., Sala, J-M., 1998, *Environmental management: Should Industry Adopt ISO 14001?*, Business Horizons, 01-02
- Buchholz. A. R., 1998, *Principles of environmental management*, Prentice Hall, New Jersey.
- Burke, G., Singh, B., Theodore, L., 2000, *Handbook of environmental management and technology*, A John Wiley & Sons, Inc. Publication, USA.
- Clark. D., 1999, *What drives companies to seek ISO 14000 certification?* Pollution Engineering International Summer,14–15.
- Dalhammer. C., 2002, *Implementation and certification of Environmental Management Systems in Small Enterprises*, Lund University, Sweden
- Edwards. A.J.,2004, *ISO 14001 Environmental certification step by step*, UK.
- Flyxell. G.E., and Szeto., 2002, *The influence of motivations for seeking ISO certification on EMS effectiveness: An empirical study of certified facilities in Hong Kong*. Journal of Environmental Management 65:223–238
- Hillary. R., 1999, *Evaluation of Study Reports on the Barriers, Opportunities and Drivers for Small and Medium Sized Enterprises in the Adoption of Environmental Management Systems*. London
- Hillary. R., 2001, *Environmental management handbook: challenges for business*, Earthscan Publication LTD, London.
- Hillary. R., 2003, *Environmental management systems and the smaller enterprise*, Journal of Cleaner Production 12 (2004) 561-569
- Hillary. R., 2000, *Small and Medium Sized Enterprises and Environmental Management Systems: Experience from Europe*, Network for Environmental Management and Auditing (NEMA), London
- Jorgensen. T.H., 2000, *Environmental Management Systems and Organisational Change*, Eco-Management and Auditing 7, 60-66.
- Jürgenson. R., 2004, *Praktilised probleemid keskkonnajuhtimissüsteemide rakendamisel, Keskkonnajuhtimise seminar*, BVQI, Tallinn.

Majandusministeerium, 2002, *Eesti väike- ja keskmise suurusega ettevõtete arendamisele suunatud riiklik poliitika 2002-2006*, Ettevõtlik Eesti, Tallinn

Moora. H., 2005, *Euroopa Keskkonnajuhtimise ja – auditeerimise süsteemi (EMAS) juurutamine väikeettevõttes*, Eesti Keskkonnajuhtimise Assotsatsioon, Teabeleht 4

Morrison, J., Cushing, K., Day, Z., Speir J., 2000. *Managing a better environment: opportunities and obstacles for ISO 14001 in public policy and commerce*. Pacific Institute for Studies in Development, Environment, and Security. Oakland, California.

Morrow. D., Roddinelli, D., 2002, *Adopting environmental management systems: Motivations and results of ISO 14001 and EMAS certification*. European Management Journal 20: 159-171

Randmer. A., 2000, *Rahvusvaheliste standardite vastavad keskkonnajuhtimissüsteemid*, Arenguprogrammide Keskus, Tallinn.

Rivera-Camino. J., 2001, *What motivates European firms to adopt Environmental Management System*. Eco-Management and Auditing, 8, 134–143

Roberts , H., Robinson. G., 1998, *ISO 14001 EMS Implementation Handbook*, Butford technical publishing, Bodenham, Hereford.

Sheldon. C., 1997, *ISO14001 and Beyond*, Greenleaf.

Sistok. A., 2005, *Üleminek Keskkonnajuhtimissüsteemi standardile ISO 14001: 2004*, Eesti Keskkonnajuhtimise Assotsatsioon, Teabeleht 4

Strachan. P.A., Sinclair. I., Lal. D., 2002, *Managing ISO 14001 implementation in the United Kingdom continental shelf*. Corp. Soc. Responsib. Environ. 10, 50-63.

Summers Rainers. S., 2002, *Implementing ISO 14001—An International Survey Assessing the Benefits of Certification*, Corporate Environmental Strategy, Vol. 9, No. 4

Tinsley.S., 2001, *EMS models for business strategy*. Business Strategy and the Environment. 11, 376-390

Velasco. C, B., Zarca. E., 2000, *Environmental management in the industrial enterprises of the south of Spain*, Environmental Monitoring and Assessment 62: 169-174

Öhman. C., 2004, *Implementing EMS- Practical issues/Problems*, AF, Stockholm

Welford. R., 1998, *Corporate Environmental Management 1*, Earthscan Publication Ltd, London

Wenblad. A., 2001, *Sustainability in the Construction Business- A case study*, Corporate Environmental Strategy, Vol. 8, No 2

#### **Internet references**

[URL-1], [http://europa.eu.int/comm/environment/emas/about/summary\\_en.htm](http://europa.eu.int/comm/environment/emas/about/summary_en.htm), accessed December 2004

[URL-2], <http://www.ecology.or.jp/isoworld/english/analy14k.htm>, accessed December 2004

[URL-3], <http://www.iso.org/iso/en/iso9000-14000/iso14000/iso14000index.html>, accessed January 2005

[URL-4], <http://www.investinestonia.com/>, accessed in January 2005

[URL-5], <http://www.envir.ee/jaatmed/jaatmed.html>, accessed in January 2005

[URL-6], <http://www.eaq.ee> , accessed in January 2005

[URL-7], <http://www.iso.org/iso/en/iso9000-14000/pdf/survey2003.pdf>, accessed  
accessed in February 2005

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**Appendix 2 Questionnaire for certified EMS (ISO14001) construction companies**

Name of the company:

Field of operation:

Responsible person for EMS:

Number of employee:

Questioning will be filled by:

1. *What are the main reasons that motivate companies to implement Environmental Management System?*

- Management of distribution chain
- Competitiveness
- Better availability to the export market
- To promote image
- To minimize environmental costs (fees etc.)
- To solve environmental questions and problems
- Correspondence to the environmental law
- To achieve better communication with interest groups
- To motivate staff
- Include Environmental questions to the general management
- Other reasons:

2. *How long took implementation process before being certified?*

- ..-0,5 years
- 0,5-1 years
- 1-2 years
- 2-... years

3. *Did the company use any supportive help during implementation of an EMS?*

- Financial support
- Consultancy
- Something else (please explain):
- No, we did not use any help

4. *Did You integrate EMS with other management systems?*

- Yes, QMS and EMS
- Yes EMS and OHSAS
- Yes EMS, QMS and OHSAS
- Only EMS

5. *What are the main environmental objectives in company's environmental program?*



6. *Who is responsible for EMS?*

- Governing board
- Quality manager
- Quality/environmental manager with production managers
- others (please explain)

7. *Have environmental objectives and targets been fulfilled, and if not, what could be the obstructive factors?*

8. *How does environmental monitoring take place?*

9. *Were there any barriers during ISO 14001 implementation process? Which ones??*

- No disruptions
- Disruptions are (please explain):

10. *Have you gained from implementing EMS? What?*

11. *How does internal EMS communication take place?*

- Meetings
- Phone
- E-mail
- Intranet

12. *What types of training have been arranged to improve environmental awareness of employees and how often?*

- Trainings
- Info-meetings
- Flyers

How often?

- Once in a month
- Once in a quarter
- Once in a year
- Organizing continuously according quality manager

13. *What kind of guidance is needed for further improvement of EMS?*

- Environmental legislation
- New trends in EMS implementation

- Knowledge about sustainable production practices
- Other companies knowledge in terms of Environmental planning and results
- Guidance to on how maintain an EMS after certification
- Effective trainings
- Hands on information on how to compose environmental report
- Knowledge about effective internal and external communication
- Other (please explain)

Thank You for answering!