

A proactive Health, Safety & Environment risk management strategy

- What are the incentives?

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Credits: 30 hec

Level: A2E

Course title: Degree Project in Business Administration

Course code: EX0536

Programme/Education: Environmental Economics and Management,
Master's Programme

Faculty: Faculty of Natural Resources and Agricultural Sciences

Place of publication: Uppsala

Year of publication: 2014

Cover picture: ABB

Name of Series: Degree project/SLU, Department of Economics

No: 839

ISSN 1401-4084

Online publication: <http://stud.epsilon.slu.se>

Key words: environment risk management, HSE, ORM, stakeholders, sustainable
business development.



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Acknowledgements

I would like to thank Cecilia Mark-Herbert for the dedicated support of this study and for the interesting conversations we have had along the way. My supervisors at ABB, Håkan Hultgren and Anette Blidberg, have been very helpful and supportive throughout the process which have helped me in the reach for a high quality study. With their open minds and dedication to the study they have given this study all the possibilities that it could get. I also thank Hans Haga and Richard Yngvesson at ABB for the interesting conversations we had and for teaching me about the operational risk management regarding working environment and environment. Without these persons, this study would not have been able to accomplish. Except these five persons I would like to thank all the persons that I have interviewed and that have contributed to the result of this study.

Summary

In a business environment where the stakeholder perspective is evolving and sustainable development is receiving increased attention, it is of importance for companies to adjust. The demand and pressure is exerted from several stakeholders who force companies to take action and live up to the expectations because if failing to do so, negative consequences will most likely be the case. The attention of this study is on ABB Power Products (ABB PP) and their environment and working environment risk management. The aim of this thesis is to identify and describe how perceived environmental risks are managed and what the incentives are to work proactively to minimize the risks. The incentives for a proactive risk management strategy are researched through both a strategic and operational perspective. The study contributes with an understanding of the complexity of the conflicting interests there is concerning environment and working environment risk management. Both the external as the internal perspective of ABB PP is presented and with more than twenty in-depth interviews and observational studies it has been possible to receive a good foundation of information which cannot be found in sustainability reports or other written data. This case study of ABB PP also includes two minor case studies of a working environment accident and an environment accident as illustrations. The labour cost and the time spent on each of these accidents has been calculated to show how much two rather regular accidents can result in. To put these costs in a perspective the, so called, cost-iceberg model has been used to illustrate the costs associated with environmental accidents and negligence.

ABB PP have expressed a *zero vision* of personal injuries and during the last decade there has been a great focus on sustainable development and the main focus has been on working environment safety. The top management are dedicated in these issues and strongly communicate the importance of it. With a strong support from the top, the health, safety and environment (HSE) organisation have received good conditions to improve both the working environment and environmental performance of the company. Though, there are several difficulties and challenges on the path to the *zero vision*. It takes time to change and adapt a whole organisation but at the end there are several earlier studies pointing at the importance of incorporating the sustainable development into the core business to receive the maximal profitability. A proactive strategy may cost more in the initial stage of investments but in the long term it will contribute to a safer working environment and a better environment with less reactive actions which have shown to be both costly and time consuming.

The main incentive for a safe working environment can be concluded as the fact that no one should risk to get injured when at ABB PP. Then this has positive consequences which will please both external and internal stakeholders through either financial result, obedience to the law and regulations, reputation or attracting professional employees, among other consequences.

Sammanfattning

I en affärsmiljö där intressentperspektivet utvecklas och hållbar utveckling tar emot ökad uppmärksamhet, är det viktigt för företag att anpassa sig. Efterfrågan och påtryckningar utövas från flera intressenter som pressar företagen att agera och leva upp till förväntningarna. De företag som inte lever upp till dessa förväntningar, kommer negativa konsekvenser troligen vara utfallet. Fokus i denna studie är på ABB Power Products Sverige (ABB PP) och dess miljö- och arbetsmiljöriskhantering. Syftet med denna mastersuppsats är att identifiera och beskriva hur upplevda miljörisker hanteras och vilka incitamenten är att arbeta proaktivt för att minimera riskerna. Incitamenten för en proaktiv strategi för riskhantering undersöks genom både ett strategiskt och operativt perspektiv. Studien bidrar med en förståelse för komplexiteten i de intressen och incitament rörande miljö- och arbetsmiljöriskhantering. Såväl det externa som det interna perspektivet utifrån ABB PP presenteras och med mer än tjugo intervjuer och observationsstudier har det varit möjligt att få en bra grund av information som inte finns i hållbarhetsrapporter eller andra skriftliga uppgifter. I denna fallstudie av ABB PP ingår även två mindre fallstudier av en arbetsmiljöolycka och en miljöolycka. De arbetskostnader och den tid som använts för var och en av dessa olyckor har beräknats för att visa hur mycket två ganska vanliga olyckor kan resultera i. För att sätta dessa kostnader i ett perspektiv så har, den så kallade, isbergsmodellen använts för att illustrera de kostnader som är förknippade med miljöolyckor och försumlighet.

ABB PP har uttryckt en nollvision för personskador och under det senaste decenniet har det varit en stor fokus på hållbar utveckling med huvudfokus på arbetsmiljösäkerhet. Den högsta ledningen är djupt engagerade i dessa frågor och kommunicerar vikten av detta arbete. Med ett starkt stöd från ledningen, har hälsa, säkerhet och miljö (HSE) organisation fått goda förutsättningar att förbättra både arbetsmiljö och miljöprestanda på företaget. Men det finns flera svårigheter och utmaningar på vägen mot nollvisionen. Det tar tid att förändra och anpassa en hel organisation, men i slutändan finns det flera tidigare studier som pekar på vikten av att införliva hållbar utveckling i kärnverksamheten för att få maximal lönsamhet. Ett proaktivt arbete kan kosta mer i det inledande skedet av investeringar, men på lång sikt kommer det att bidra till en säkrare arbetsmiljö och en bättre miljö med mindre reaktiva åtgärder som har visat sig vara både kostsamma och tidskrävande.

Det främsta skälet till en säker arbetsmiljö kan sammanfattas till att ingen ska behöva riskera att skada sig när de är på ABB PP. Detta har även positiva effekter som kommer att glädja både externa och interna intressenter genom antingen ekonomiskt resultat, laglydnad och följande av förordningar, anseende eller attrahera kvalificerade medarbetare, bland andra positiva konsekvenser.

Abbreviations

ABB PP – Asea Brown Boveri Power Products Sweden

CR – Corporate Responsibility

CSR – Corporate Social Responsibility

CSV – Creating Shared Value

HSE – Health, Safety & Environment

LESA – Local Electrical Safety Advisor

LSA – Local Safety Advisor

LSO – Local Sustainability Officer

OHS – Operational Health & Safety

ORM – Operational Risk Management

PPP – Polluter Pays Principle

SBD – Sustainable Business Development

TBL –Triple Bottom Line

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1 Introduction

In the introduction chapter of the study a background of the research area is offered to give an understanding of the current state of research. A background to the problem is presented to understand the several different stakeholder perspectives in this area of research. The problem is described through the perceived conflicting aims of business which are financial, social and environmental. The aim of the study is thereafter presented. Lastly, an outline of the study is offered to give an overlook of the coming chapters.

During the last decades companies have been blamed for the cause of economic, environmental and social problems in the world (Porter & Kramer, 2011). The public perception of companies is that they are prospering at the expense of society. UN Secretary-General Ban Ki-moon stated: “Too few grasp the need to bring the threat to the center of global security, economic and financial management. It is time to move beyond spending enormous sums addressing the damage, and to make the investments that will repay themselves many times over” (internet, un.org, 2013). Companies have been forced by stakeholders to engage in corporate social responsibility (CSR) and to look beyond the short-term profits as their only objective (Porter & Kramer, 2011). Even though companies have implemented management systems and partly included the environmental issues into business, the most common company responses have been media campaigns and public relations with the glossy CSR reports as the most prominent strategy (Regester & Larkin, 2005; Porter & Kramer, 2006). It is not in the CSR reports effects of sustainable business development actually occur; it is when included in the company’s business strategy (Porter & Kramer, 2006). How and for what reasons it is implemented into the business strategy has been a challenge for companies and has resulted in a slow adoption to these ideas and stakeholder demands. Companies that fail to fulfill the expectations of stakeholders will take a risk of losing competitiveness on the global market (Regester & Larkin, 2005). There is a competition of investment capital on the global market where companies with an organizational advantage that is hard to duplicate do have a better chance to attract capital (Hillman, 2001). A sustainable organizational advantage cannot be quickly or easily duplicated. It is developed with employees, customers, suppliers and the communities where the company is conducting its business. Today, an increasing number of company managers have made adjustments to these demands and involve sustainable work in their business in a higher degree to live up to the new expectations from stakeholders (Wolf, 2013).

1.1 Problem background

There are several views why companies exist and what purpose they have (Rainey, 2008). A short description what a company does is explained by Rainey (2008, p. 228) as “they create outcome through people and for people”. In this explanation there is room for different opinions of how this should be done optimally. Some mean that the main objective is to generate profits for shareholders and to maximize value for the company (Friedman, 1970). Others mean that companies should focus on identifying and expanding the links between societal and economic progress as well as how they influence each other (Elkington, 1999; Porter & Kramer, 2011). Elkington (1999) introduced the triple bottom line theory, consisting of environmental, economic and social bottom lines. The environment, or the health of the global ecosystem, represents the ultimate bottom line which the economy is dependent on and where the society is in turn dependent on the status and progress of the economy. Elkington (1999) and Porter and Kramer (2006) argues that the pressure on short-term financial

performance is an obstacle for sustainable business. The short-term focus is a problem for companies, as lending is needed and investment banks as well as other investors at the international capital market demand payoff on their capital, at a short-term. It has been argued for a long-term perspective on business and for the development of technology which favour both economy and environment (Porter and van der Linde, 1995; Elkington, 1999). Increased resource efficiency is an example of the positive outcome of new technology. It can please the investors short-term financial performance focus and the long-term environmental focus.

The question of what responsibilities a company do have regarding the environmental and societal challenges of today is an actively discussed subject and often boils down to ethical perspectives (Sandberg, 2011). Companies and humanity in general, affect the environment negatively and is described by Sandberg (2011, p. 231) with “inconsequentialism” which originates from the fact that an individual’s action is of insignificant importance to affect the climate change. If all individuals’ actions are put together, the sum of them will directly affect the climate and contribute to the climate change but individually each action is not the reason of climate change. Sinnott-Armstrong (2005) argues that the climate change is such a huge problem, that no individuals should be obliged to stop it or solve it. Seen from another angle, the *Sorites* paradox states; if everyone only contributed to insignificant effects on climate change it would seem like no one were responsible for the climate change to occur, because of the explanation that insignificant actions are to be neglected (Otsuka, 1991). The speeding climate change is actually real and proven to be caused by humans (IPCC-report, 2013). As Sandberg argues, “..even though I do not make climate change *perceptibly* more likely to happen if I drive my car, I make it *imperceptibly* more likely to happen and I am still responsible for this contribution” (2011, p. 233).

Over the last decades and until today companies are focused on optimizing the short-term performance and are governed to present results for the quarterly reports (Elkington, 1999; Porter & Kramer, 2011). This fact is a contradiction to what is optimally needed for a good environmental performance which should be focused on a long-term economic performance instead of the environmentally wasteful and socially detrimental behavior that short-term focus result in. An obstacle regarding long-term objectives and sustainable business is the short-term costs incurred, which do not have a framework that offers an answer if the investments are economically rational (Porter & Kramer, 2006). Perera *et al.*, (2013) observe a critical challenge in the need of metrics that can account for the external environmental cost including potential environmental risk to the business or investments that may contribute to environmental impacts to society. This absence makes these issues harder for managers to comprehend and instead they are prone to postpone the short-term costs. When the company at a later stage is judged to have violated its social or environmental obligations these costs can be far greater than the initial investment. Another critical challenge is the fact that sustainability investments compete with the rest of the company investments and do it on the traditional financial criteria which does not take into account the benefits which are difficult to measure in monetary value (Perera *et al.*, 2013). Therefore it is of importance for the firm to include the risk aspect of internal and external environment and the long-term objectives of economic performance. Otherwise the economic consequences may be of far greater extent if the unexpected occur, as for example the British Petroleum (BP) oil spill disaster in the Gulf of Mexico in 2010 or the legal preceding of ABB’s asbestos litigation in 2001-2002 (Porter and Kramer, 2006; Kallenberg, 2007; Kaplan & Mikes, 2012). Kaplan and Mikes (2012, p. 60) describe risk management as: “a firm’s ability to weather storms depends on how seriously executives take risk management when the sun is shining and no clouds are on the horizon” which covers the unpredictable with environmental issues. Kaplan and Mikes (2012)

divide risks into three categories; preventable risks, strategy risks and external risks. The preventable risks do not contribute to strategic benefits and arise from within the firm, strategic risks are taken by the firm with the intention of superior strategic returns and the external risks which are uncontrollable. These three types of risks need to be faced by different management approaches which should have the object to find cost-effective methods to reduce the probability of risk events to occur or mitigate the consequences of the events.

Employees have an interest in a company's sustainable investment, and primary the investments in the working environment, but it should be noted that there is a close connection between the working environment and environment (Wolf, 2013). Examples of the preventable risks described by Kaplan and Mikes (2012) are those caused by employees' or managers' because of inappropriate actions, unethical or incorrect behavior and risks that can be appointed to failures in the operational processes. These kinds of risks do not have any strategic benefit and for that reason should be dealt with.

1.2 Problem

Companies' today can't focus their efforts only on maximizing profits. There is an increasing expectation of companies to take responsibility concerning sustainable development (Elkington, 1999; Porter & Kramer, 2011). Sustainable development can be understood in a value creation framework that embraces three dimensions of values; financial, social and environmental (Elkington, 1999). Companies are affected by these expectations and needs to refer to environment issues, as their stakeholders are considering in environmental information (Ammenberg, 2012). These demands are coming from large groups of stakeholders and not only government policymakers, as it was in the early days of the environmental discussion (Porter & Kramer, 2006). Companies within the manufacturing industry deal with several elements of risk, both regarding working environment, such as risks of injury or health issues, but also environmental risks concerning accidents that lead to contamination or accidental emissions (Kallenberg, 2009). The working environment and the environmental risks are in many cases closely connected and therefore there is an advantage to include both when investing in the production facilities (Abrahamsson, 2000; Kallenberg, 2009). It increases the chances to attain a payoff on the working environment and environmental investments when the costs are shared (Abrahamsson, 2000). An example is chemicals, which are both a safety risk for the employees in terms of explosions, fire and hazardous gas as well as an environmental risk in terms of accidental emissions and hazardous substance in the products (Ammenberg, 2012). Manufacturing companies are facing numerous preventable risks and the health, safety and environmental (HSE) managers have a challenge in convincing financial managers, division managers and the board that investing in the working environment and environment do payoff; though the payoff sometimes requires a long-term perspective (Kallenberg, 2009).

How far the company is responsible regarding sustainable business development and working environment safety is a regulatory question. After that level of performance is reached it is an ethical question (Sandberg, 2011). Depending on the culture or society where the company is active or considering the company ethics, it can differ in the approaches to issues regarding environment and how environmental risks are perceived (Schaltegger & Synnestvedt, 2002). It may also be a difference between what is written in the ethical codes or safety regulations at the company and what is actually done in practice. One example is Tony Hayward, the former CEO at BP, whom vowed that safety was going to be his top priority (Kaplan & Mikes, 2012). Some of the rules which he instituted were to refrain from texting while driving and if

walking with coffee cups employees had to use lids. Three years after these rules were constituted one of BP's oil rigs in the Gulf of Mexico, the Deepwater Horizon, exploded. The accident became one of the worst oil disasters in history made by humans and cost BP billions of dollars (Kaplan & Mikes, 2012). Environmental and sustainable investments can be seen as an insurance which helps to minimize and prevent the most essential risks of the business.

Earlier research have identified a "green wall" between the health, safety and environment (HSE) managers and the board of the company where the root were in the failure to communicate and convince the importance of environment and how these investments can be aligned with the company's long-term financial goal (Elkington, 1999; Perera *et al.*, 2013). The financial and sustainability teams do have different priorities to reach their objectives and that make it difficult to align their strategies and find common ground. There is a need of a framework or model to ease the communication between financial managers and sustainability managers because sustainable investments can be hard to measure in only a monetary value (Porter & Kramer, 2006; Perera *et al.*, 2013).

1.3 Aim and delimitations

The aim of this study is to identify and describe how perceived environmental risks are managed at a company within the Swedish manufacturing industry. This study examines what the incentives are to work proactively to minimize the perceived environmental and working environment risks. These risks have shown to be closely connected and the work to minimize them to be intertwined. The study aims to address the questions followed below:

- How are environment and working environment risks at the company currently identified and minimized?
- What are the incentives to work proactively towards the environment and working environment risks at the company?

The study is focused on the Swizz-Swedish company, ABB, which is a global leader within the power and automation technology industry (internet1, abb.se, 2013). The case study is delimited to ABB Power Products Sweden (ABB PP) and does not include the whole organization of ABB. ABB PP is located at several localities in Sweden with its center in Ludvika. A reason of the geographical and organizational delimitation is connected to accessing data that can be conceptualized. By focusing on specific locations, the process of identifying and managing environmental and working environment risks can be undertaken with a more in depth understanding. Two minor case studies has been performed with one focusing on a working environment case and the other on a environment case, with the intention to present the extent of reactive risk management. The results from this study may inspire similar work in other parts of ABB's organization. ABB PP is chosen because it is a company that works actively with sustainable development and especially working environment safety. That makes it an interesting case study of a company which focuses on these issues (intranet1, abb.se, 2013).

The study is limited to the operational and strategic factors that affect the working environment and environmental performance of ABB PP. Therefore, theories chosen to describe and explain the case have been selected with the main idea of having both an operational and a strategic perspective on these matters. The reason for this is that a company as ABB, and the Power Products division examined, is both affected by external factors as regulation and demand as well as of the internal factors such as operational challenges.

1.4 Outline

The outline of this study is shown in *Figure 1* where each chapter from one to eight can be seen. In Chapter one an introduction to the study is given and a background of the status of the research area is explained. The problem at hand is described and the aim of the study is presented. Chapter two explains what type of research method that has been used and what type of methods has been applied to collect information as well as why the choice has fallen at the specific method. Also the ethical perspective and the trustworthiness of research are presented to give a wider understanding of certain choices. Chapter three offers a theoretical understanding of the problems and possibilities that are associated with environmental and working environment risk management. The problem is seen from both a strategically and operational perspective which is rooted in a stakeholder view. Chapter four is a presentation of the empirical background to the case which has been studied. The reader gets acquainted to the industry and the general sustainable performance of the companies within it. In chapter five, the case of ABB PP is presented and follows the same outline as the theoretical chapter to ease the understanding for the reader. The chapter is ended with two minor case studies to give an example of the extent of environmental and working environment related accidents.

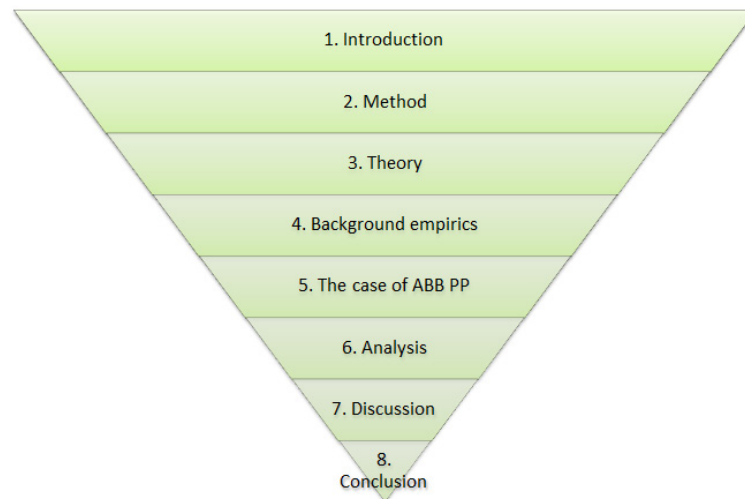


Figure 1 an illustration of the outline of the study.

Chapter six offers an analysis of the empirics found in the research. The chapter give an understanding of ABB PP's incentives and challenges regarding their environment and working environment risk management. The consequences of the two minor case studies are analyzed, both from an operational and a strategic perspective. In Chapter seven a discussion of the analysis as well as a comparison of what has been found in other studies within the area is offered. The comparison of other studies and the factors close to this subject, which has not been evolved around is discussed and how it may affect the future decisions of the company. In Chapter eight the conclusions of what has been found in the study are presented and this connects back to the aim of the study presented earlier in this chapter. After the list of references the appendices are found where organizational charts, interview information, background of regulations and reporting of companies historically and today, an environmental assessment method, the calculations for the two minor case studies and in the last appendix is suggestions of further research presented. *Appendix 9* offer suggestions on both future research within the academic field and suggestions for the case company of what to further investigate or develop.

2 Method

Chapter two offers an explanation of the method used to perform the study and the different strategies that have been used for the collection and analysis of data. An ethical perspective is presented as well as a trustworthiness view in order to better understand different choices to reach the final result of the research.

2.1 Scientific approach

It is valuable to have a scientific quality oriented attitude, which means that the study should be carried out with three words in focus; *systematical*, *skeptical* and *ethical* (Robson, 2002). It means that the study should be given a serious thought of what is researched, for what reason and how it should be managed. Of great importance is that the persons mentioned or involved in the research are safeguarded and that a code of conduct is followed (Patel & Davidson, 2011). The result of following these principles will more likely be a useful research of a better quality. In scientific research, either qualitative or quantitative research methods may be used (Esaïsson, 2007). It is valuable to have a scientific quality oriented attitude, which means that the study should be carried out with three words in focus; *systematical*, *skeptical* and *ethical* (Robson, 2002). It means that the research should be given a serious thought of what is researched, for what reason and how it should be managed. Of great importance is that the persons mentioned or involved in the research are safeguarded and that a code of conduct is followed (Patel & Davidson, 2011). The result of following these principles will more likely be a useful research of a better quality. In scientific research, either fixed or flexible methods may be used (Esaïsson, 2007). The fixed method is theory-driven, which means having a well articulated theory of the phenomena researched (Robson, 2002). This suggests that a conceptual understanding of the phenomena is needed before time and resources are invested in the research. The fixed method typically quantifies the phenomena studied. The flexible method focuses on the object chosen to study with the aim to raise and explain the most important content of the material studied. This study is based on qualitative data. It is a flexible method which allows for multiple ways of gathering and analyzing data (Robson, 2002). The quantitative data has been retrieved from the internal report system of incidents and accidents for the purpose of giving an understanding of the amount of incidents and accidents that occur including an estimation of time consumed and costs. Out of the flexible methods, a case study strategy has been chosen.

The focus of the case study strategy is to understand dynamics existing within single settings and it is appropriate to use when the research question is broadly defined and evidence have to be drawn from several sources (Eisenhardt, 1989; Yin, 2004). There can be several potential cases to study such as individuals, organizations, societal environments, specific groups or events (DePoy & Gitlin, 1999). This case study consists of two minor case studies which represent one environmental accident and one working environment accident with the intention to show realistic examples of the risk management work,

In the past, the case study method was seen as inferior to other research methods concerning knowledge generating, but since the 1980's it is treated as a respected method. The main focus of the case study is to support or draft a theory with empirics and not to generalize. The interpretation of the case study is made in relation to the context, which means that the organization studied is not solely analyzed as a single unit but by including interactions and

impacts with external actors (Backman, 2008). The data collection of a case study includes multiple sources which applies to the thesis aim, including interviews, documents and observations, which are the three objectives focused on in this study (Robson, 2002; Patel & Davidson, 2011). The process of a case study is developed step-by-step when the knowledge of the case is gained and also perceived differently along the process (Backman, 2008). One challenge of flexible research is the demand on the researcher for the reason that the researcher becomes an instrument in the study. Five general skills Robson (2002) list as important and needed by the researcher; questioning, good listening, adaptiveness and flexibility, grasp of the issue and lack of bias.

2.2 Data collection

After the decision regarding research focus, what the aim for the study is and what scientific approach is best suitable to answer the research questions, then the method for finding these answers are chosen (Robson, 2002). There are several different methods to choose between e.g.; interviews, questionnaires, observations, tests, document analysis. The selection of which methods are suitable to use should be based on what sort of information that is sought, from whom the information is sought and under what type of circumstances. It is important, when choosing what methods to use, consider the realistic time and resources that need to be allocated for each alternative.

The methods considered for this study have been interviews, questionnaires, observational methods and literature studies. After a review of what type of data that could be retrieved internally at ABB PP, the questionnaire was no longer needed. The reason for that is the quality of the already existing secondary data and statistics which give a sufficient, or possibly, even better view of reality than a questionnaire. The questionnaire was considered to be used because it is easy to organize and it gives standardized answers that are direct and easily consolidated (Rainey, 2002). On the other hand, the truthfulness of the answers is hard to measure in a questionnaire and the availability of the secondary data, gives no incentives to make a questionnaire to obtain similar data (Patel & Davidson, 2011). The methods used in this study are interviews, observational methods and literature studies.

2.2.1 Literature

When writing a thesis it is of great importance to conduct an in depth literatures study (Bryman, 2008). As Bryman (2008, p. 97) expresses it, “..to avoid having reinvented the wheel” it is important to identify what has been contributed earlier and to take advantage of that knowledge. The search and collection of literature within environmental risk management, CSR and working environment has been compiled through several data bases such as Jstor, Google scholar, Web of knowledge and Primo which has been the main search engine. The reason why Primo has served as the primary search engine is because of my greater knowledge of it. The timeframe used for the literature has been the 2000’s and forward with exceptions of some distinguished literature dated earlier which is still highly relevant within this area.. Keywords used for the search has been *environment risk management*, *work safety*, *sustainable development*, *CSR* and *stakeholder theory*. To find additional relevant articles the *snowball technique* has been used which add the opportunity to identify studies and research which have been widely used and referred to (Ridley, 2008).

It is of importance to critically examine the literature and there are four requirements that should be met; independency, authentication, freshness and concurrency (Ejvegård, 2003). These requirements have tried to be met throughout the literature study to ensure the quality

of the research. To meet the freshness and concurrency requirements sources from the last decade has been used to the highest degree possible. By using the search engines referred to earlier, which are established, recognized and frequently used by other researchers and to the highest degree try to use primary sources, reduce the risk of the study being biased (Patel & Davidson, 2011). This ensures the study's relevance, authenticity and timelessness. In cases when a primary source haven't been possible to get hold of, a secondary source has been used and to ensure it is a reliable source, only peer-reviewed sources have been used.

2.2.2 Interviews

The use of interviews can be seen as a shortcut in finding, or at least seeking, the answers to the research questions of the study (Robson, 2002). It is a flexible and adaptable method of obtaining information. Interviews are best suitable to conduct "where individual perceptions of processes within a social unit – such as a work-group, department or whole organization – are to be studied prospectively, using a series of interviews" (King, 1994, p. 16).

Interviews are conducted with several persons within the organization at ABB Power Products. The persons that have been of interest for the interviews at ABB Power Products Sweden (ABB PP) are the Health, safety and environmental (EHS) manager, Operational, health and safety (OHS) manager, Environmental manager, the working environment engineer at the PP division, the Local sustainability Officer's (LSO), the Local safety advisor's (LSA), the Local electrical safety advisor's (LESA), safety representatives, persons at the economic, communication and supply departments. In addition smaller interviews and mail conversation have been conducted to receive data from persons central in the two minor case studies. The persons interviewed have been given anonymity on demand of ABB PP, which is further explained in 2.5. The interview list is found in *Appendix 2*.

The disadvantage of interviews are that it is time consuming both for the researcher but also for the interviewees whom then, if busy, will not have time to participate (Robson, 2002). In the case of this study the advantage is that I was at the office and could then be flexible and also the time for travel was minimized. Interviews have the ability to provide rich and highly informative material but at the same time the factor of bias have to be known of and that enquire professionalism. The interviews are of semi-structured character for the reason that the interviewees are all experts within their area and they have room for more advanced answers which give increased in-depth answers from the interviewees (Patel & Davidson, 2011). The questions are structured under topic headings followed by key questions under each heading which will lead the interviewees during the interview as in the same. It is essential to take a complete record of the interview and this can be done in two possible ways. Either it is done through a recording of the interview or to take notes, and according to Robson (2002), experienced interviewers does have strong preferences for one of them. A disadvantage of recording interviews is that the respondents feel uncomfortable and may limit their expression of personal opinion (Backman, 2008). The interviews for this study have been completely recorded through the taking of notes. The semi-structured questions enable more depth to the answers and to make a truer assessment of what the interviewee surely believes. The disadvantage of this sort of semi-structured interviews is the difficulty in analyzing the answers and possibly even a loss of control of the interview (Robson, 2002). Though, it can give unanticipated answers which would have been missed if the questions would have been closed. Interviews suits well to combine with other methods and certainly with an observational method (Bryman, 2008). The interview questions are presented in *Appendix 3*.

2.2.3 Observational method

In this project direct observation also serves as a method for gathering empirical data. An advantage of the use of observations is its directness (Robson, 2002). Instead of an active stands, as in interviews, the researcher take a passive position and observe what people do and what they say. The observational method is a useful complement to interviews because of the fact that during an observation it shows what a respondent actually does in comparison to an interview which is focused on what someone say they have done or will do. The observational method will also give a possibility to see how things are done in a real life situation which otherwise is difficult to get close to. The disadvantages that have been found are the fact that the observer can affect the situation just through the presence. The observed person or group may then act differently than if the observer would not be there. This can be overcome in different ways and two extreme examples are to either make the observation without the observed knowing about the presence of the observer or that the observed are so accustomed with the presence of the observer so they act naturally.

Of these two examples, the latter is closer to the description of how the direct observations have been during this study. To perform the research from inside ABB Power Products has the advantage of being part of group meetings and risk assessment rounds which, combined with interviews, add a depth to the research. As mentioned earlier, in a qualitative study, the researcher becomes an instrument and through the observational method the knowledge of the area studied grows which give a possibility to understand the more complex parts of the problem. During the months the study has taken place several Local sustainability officer (LSO) meetings, Local safety advisor (LSA) meetings and Division meetings has been attended, observations of risk assessment rounds done and guided tours in the production performed. A disadvantage of this sort of method is that it is time consuming. It has been much time invested in the observations during this study, but on the other hand the observations gave important contribution to the study (Robson, 2002).

2.2.4 Documents

A second source for the empirics are documents, which includes annual reports, sustainability reports, internal reports and statistics over working environment and environment events. Content analysis is a common method of analyzing documents and that is used in this case study of ABB PP (Robson, 2002). It is important to have in mind that the document, which is analyzed, is made with a purpose which has to be taken into account to understand and to interpret the result of the analysis.

2.3 Trustworthiness

The critique towards the qualitative approach regarding the trustworthiness is the absence of the standard means that are used in the qualitative approach and can assure the validity and reliability of the research (Robson, 2002). A problem with a qualitative method is the incapability to replicate studies which make it more difficult to compare studies. The test for validity in the quantitative approach is that the study is replicated by another researcher who can confirm or reject the earlier study. If the study is to be replicated at ABB or any other company the position of the interviewees are given to ease the comparability. A case study cannot be generalized because the conditions may differ and therefore the possibility of comparability is weak (Robson, 2002). The two minor case studies conducted in this research is not giving a truth about the rest of the accidents at ABB PP, but it gives a perception of how the risk management is conducted and a approximate of costs.

Validity can be described as something is being accurate, correct or true (Robson, 2002). It may be difficult to judge if a study is valid or not because, for example, of the readers prejudices. Three threats identified for a valid study are *description*, *interpretation* and *theory* (Maxwell, 1992). To provide a valid *description* it is important to be accurate and complete when transforming the information from what have been heard and seen into data. It is important to take notes of good quality or audio tape during interviews and observations. The threat of *interpretation* is that of imposing a framework on what is occurring during the study instead of letting it emerge during the involvement with the setting. *Theory* has to be searched through and alternative explanations of the phenomena studied should be considered. These aspects have been highly considered during the process of the study to reach a valid result.

In the cost-benefit analysis it has been chosen to exclude the productivity effects from the calculation because when those are included in the calculation the sums are reaching such high levels that the trustworthiness of the analysis is undermined (Johanson & Johrén, 2008). The choice of using a cost-benefit analysis in the study is not an end in itself but for the reason to demonstrate the mismanagement of resources as well as a support in the argument for a sustainable business development. As Johanson and Johrén (2008) argue, it is difficult to explain the optimal management of resources but it is easier and maybe also sufficient, to prove the mismanagement.

Challenges associated with selecting an environmental assessment method are related to difficulties to estimate environmental effects in a monetary value and validating the estimates and indicators that are selected (Ammenberg, 2012). It points to the importance for companies, society as a whole and environmental politics to have a tool to make a practical evaluation possible (Ammenberg, 2004). The environmental assessment methods, which are presented in this study, are an attempt to achieve a practical solution to these problems. According to Ammenberg (2012) it is of importance that the problematic associated with this method is met with humbleness and a great deal of transparency. If these factors can be included in the work with the assessment methods the trustworthiness of the study will increase (Robson, 2002).

2.4 Ethical aspects of the study

The ethical perspective of research is important and most certainly when a case study is performed, because of the persons involved in the research topic (Bryman & Bell, 2011). In the case study of ABB PP around thirty persons have been involved through interviews and observational meetings, which give the researcher responsibility to examine the possibilities of using the material publicly. It has been asked from ABB PP to keep the sources anonymous and therefore all persons interviewed are given anonymity. Under and after the interviews the interviewees have had the possibility to exclude material which has been seen as sensitive for publication. In most cases sensitive material is either because of the topic could be harmful if being public or that it is of private characteristics (Bryman, 2004). The study has two minor case studies where sensitive figures are used to calculate the costs of the accidents. These numbers have been asked to be censored in the public version of this research and therefore the numbers in *Appendix 8* are not shown. To avoid any factual inaccuracies the empirical text has been examined by persons at ABB PP with insight regarding the subject. This is mentioned by Bryman and Bell (2011) as deception, which should be avoided to not depict something which it is not.

3 Theoretical perspective and literature review

In chapter three a theoretical perspective is presented, including a literature review of research within the area of interest. An operational and strategic perspective is given to understand both aspects of the possibilities and challenges a company do have concerning working environment and environmental risk management.

3.1 Stakeholders

The most critical components for a company's business environment are the markets and customers along with the other stakeholders (Rainey, 2008). The primary stakeholders can be defined as those who bear some type of risk because they have invested either human or financial capital in a company (Clarkson, 1995). Without these stakeholders the company will not be able to conduct business or even survive. The primary stakeholders are the shareholders, who supply the company with capital, and employees, customers, resource suppliers, community residents and environment. The governments and the communities are part of the public stakeholder group. They provide infrastructure and markets, including laws and regulations that should be obeyed. Community residents are affecting the company by providing infrastructure and are also affected by the firm through its tax revenues and the effect on environment, either the degradation of it or the protection.

Clarkson (1995, p. 107) stress that "the survival and continuing profitability of the company depends upon its ability to fulfil its economic and social purpose, which is to create and distribute wealth or value sufficient to ensure that each primary stakeholder group continues as part of the company's stakeholder system". Relationships to the company's primary stakeholder are thus important to continually manage to keep them satisfied and ensure a continual participation in the company (Hillman & Kein, 2001). An effective stakeholder management may constitute intangible and socially complex resources which can enhance a company's competitive advantage and outperform competitors in the terms of a long-term value creation. Hillman and Kein (2001) argues that by developing a longer-term relationship with the communities, customers, suppliers and employees, the company can build a value through the relationship rather than transactional interactions. Three aspects are certainly emphasized; reputation, fair dealing and moral treatment that will enhance the relationship. "CSR encourages companies to look at a wider range of stakeholder interests, which can widen understanding of the potential risks and opportunities for the company while offering wider social or environmental gains" is stated on the UK government official CSR website (internet, UK government, 2013).

Seen from another perspective, a company's responsibility is to produce demanded products and services as well as provide jobs (Friedman, 1970). According to these ideas the societal benefits are maximized when companies focus, and only focus on, maximizing the profits. Expanding on these ideas regarding sustainable development can mean that companies focusing on other factors than profit can lead to a competitive disadvantage because the cost of, for example waste disposal, as polluting competitors can neglect (Ottosson & Parment, 2013). The ideas of Friedman served as the ground for shareholder value perspective, during the 1980's and 1990's, where the financial return was central and the shareholders were the stakeholder focused on (Rappaport, 1986). The effect of this view on business led to slim companies that sold out units that were non-related to the core business or managed by out-

sourcing the units that was still needed (Ottosson & Parment, 2013). This type of stakeholder view has been criticised lately and Cannon (2012, p. 19) put it like this: “The banking crisis and environmental disasters like Deepwater Horizon can be laid at the door of executives who espoused shareholder value and embedded it in their organizations”. The growing recognition of a need of increased systematic and formal approaches to the overall company risk exposures, have come in the last decade (Kallenberg, 2009). The pressure comes from the stakeholders, such as the financial markets, shareholders, insurance companies, accounting industry and regulators, who call for companies to handle and manage their risk with more care. In *Figure 2* a stakeholder’s perspective is presented with the company in the centre and its four main stakeholder categories surrounding (Roberts, 2003).

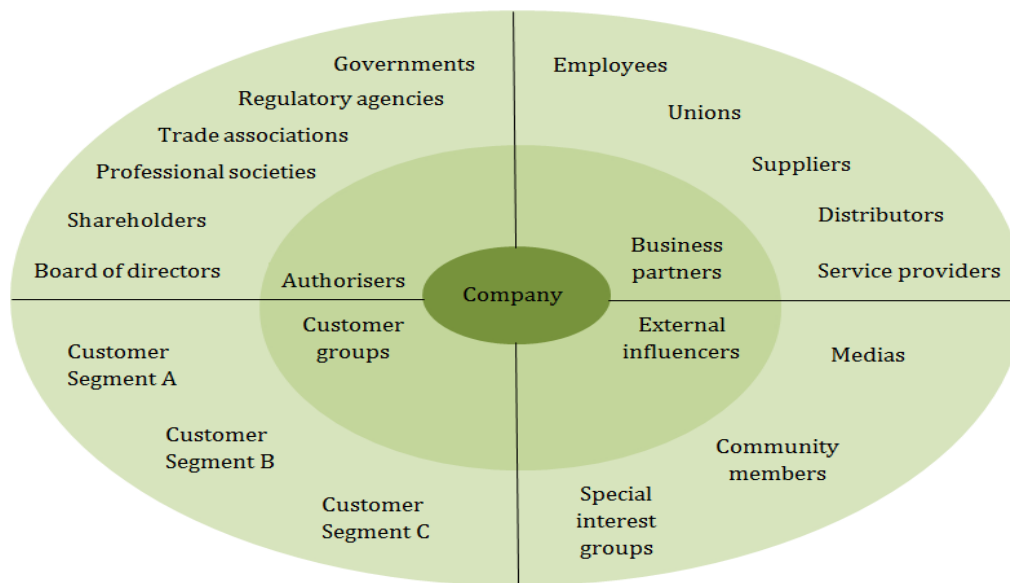


Figure 2. A stakeholder’s perspective (Roberts, 2003, 162).

Figure 2 explain the relations a company have with its stakeholders and through this model the demands, expectations and pressure from the stakeholders can be understood. It is needed to have in mind that institutional pressure differs because it is perceived differently depending on what department at the company it is aimed at (Hoffman, 2001). It should also be noted if it is community pressure which most likely is aimed at the local plant or shareholder pressure that is targeted at the corporate level. The pressure is managed according to the cultural frame of the receiving department which means that each department perceive and encounter pressure differently. For example legal departments interpret pressure through risk and liability, public affairs through reputation, environmental affairs through eco system damage and sales departments through lost revenues. There are stakeholders who have been identified as being of specific interest and those are presented in this following chapter with emphasize on the two that are of certain importance for environmental risk management, which are employees and management (Rainey, 2008; Kallenberg, 2009; Wolf, 2013). The categorization is based on *Figure 2*.

3.1.1 Authorisers

A company’s adoption of environmental practices can be allocated to the influential power of various *government agencies* (Delmas & Toffel, 2004). Through the issuing and enforcement of regulations the legislative authorities act as an enforcer of environmental practices. The relationship with the governmental agencies is of a formal character and may control the company’s activities through standards, agreements and regulations (Rainey, 2008). Government agencies play the role as both a coercive force and as a political support

(Delmas, 2002). As a coercive force, governments put regulatory pressure on companies in terms of their environmental performance. The act of political support may be reduced by the costs of information and search by providing of technical assistance. More information on regulations and reporting is explained in *Appendix 4*.

3.1.2 Customer groups

Companies may imitate what they have observed that other companies have successfully done earlier (Delmas & Toffel, 2004). Companies respond to the requirements of customers and in several studies it has shown that the environmental management practices adopted by companies were motivated by customer concerns. In a study produced in USA it showed that retail consumers apply a higher pressure on companies than customers of commercial and industrial companies (Khanna & Anton, 2002). The customers expect a solution that has economic viable benefit and which has a minimum of negative impact, burden and defect (Rainey, 2008). In many cases the customers demand a disclosure of the relevant information of the product to ensure a proper and safe use, because the customer do not want to buy a product which mean an involuntarily accepted risk.

3.1.3 External influencers

Environmental management practices are also motivated by the *communities* and for the companies to improve or maintain the relations (Delmas & Toffel, 2004). One large study showed the correlation between the desire of being a good neighbour and the pursuing of an environmental certification (Raines, 2002). Another large study showed that the company's adoption of environmental management systems was positively correlated with an active community stakeholder focus (Florida & Davidson, 2001).

In today's society *media* plays a role through their channels of reaching out to the customers and consumers (Ottman, 2011). Media is increasingly turning green which give more space in the reporting to factors concerning sustainable development. Companies do not want to receive media publicity of their poor sustainable performance because it may result in bad will and harm the company image and reputation (Ottosson & Parment, 2013). The media may affect the public opinion and the companies' popularity (Pakseresht, 2010). It has been shown that industrial businesses or suppliers find a higher value by cooperation with a reputable company in the business to business context.

The *industry* acts as a strong influencer when it comes to environmental practices (Kollman & Prakash, 2002). It is important for companies to differentiate themselves and offer the customers something else than their competitors may offer (Porter & Linde, 1995). In industries with a dense market concentration, with a few large players that have high environmental demands on their suppliers, it is more likely to have a greater diffusion of environmental practices than with a fragmented market (Delmas & Toffel, 2004). There might be a first mover advantage on the market if the customers show an interest in and awareness of sustainable products which will increase the industry pressure when one of the players make a move (Porter & Linde, 1995).

3.1.4 Business partners

In increasing extent, companies has outsourced key business activities to subcontractors and *suppliers* which give the result that environmental, safety and health risks end up somewhere outside the company (Roberts, 2003; Rainey, 2008). This implies that it also raises the risk of environmental or social scandals within the supply network, which may affect the reputation

of the company. Therefore it is important for companies today to have certain tools, such as code of conducts, which may help to managing suppliers.

Employees and subcontractors have social and personal agendas which includes having a safe and hazard-free work environment, be treated in a fair and equitable manner, and to have opportunities for both personal achievements and advancements (Rainey, 2008). It is of importance that the employees and subcontractors are given appropriate training and education to perform the job in best possible way as well as to be given the possibility to contribute to the company's success and improved working condition.

The stakeholder with the closest connection to the core business is the employees and therefore they also have a unique knowledge of the company (Wolf, 2013). This unique knowledge in combination with the possibility to directly communicate their sustainability expectations within the company enable them to support in adopting corresponding organizational structures. It also assumes needs of adequate training and education for the employees to perform a good job and contribute to the success of the company (Rainey, 2008).

Employees tend to care for the sustainable performance and especially the local environment and the working environment of the company (Wolf, 2013). There is evidence showing that employees have a tendency to be satisfied to a higher degree when working at companies with a sustainable business strategy. Evidence is also showing that a satisfactory physical working environment gives the effects of a good safety performance among employees and a healthy workforce (Bjerkan, 2010). The employees' perception of risks and hazards at work will play a key role in the employees' perception of the organisational pressure to trade of safety versus expenditures. With a weak HSE climate it may have the consequence of employees' feeling the pressure of taking safety shortcuts (Pirainen, Rasanen & Kivimaki, 2003). According to Bjerkan (2010, p. 470), "work environment factors such as work pace and perceived work demands directly and strongly influence employees' accident risk".

The role of management is to achieve strategic fit it is a need to switch focus from sustainability reports to the implementation of sustainability strategies in the companies (Porter & Kramer, 2006; Wolf, 2013). A challenge for managers is to translate the sustainability strategies into appropriate organisational strategies (Wolf, 2013). There is a need for new competences and skills as well as a re-calibration of organisational objectives, for a successful sustainable management (Hart, 1995; Wolf, 2013).

Another challenge is the integration of a multiple stakeholder perspective which is of importance for managers to excel in sustainability (Wolf, 2013). It is not an easy task for company managers to integrate the different perspectives of stakeholders because they can be both homogeneous and conflicting in nature. Therefore it is a need for managers to develop capabilities to understand and integrate the stakeholders. There is of an importance to understand and not to simplify manager's decisions making process which include more than the environmental aspects (Ammenberg, 2012). It is a balance act between several areas of interest which need to be included in the decision making process.

Management and the commitment of managers are of critical importance for the occupational health and safety of the employees (Lund & Aaro, 2004; Bjerkan, 2010). If there is a lack of commitment and hazards are allowed to accumulate it, will send observational signals to the employees who may perceive it as a firm's low commitment to occupational health and safety (Bjerkan, 2010; Kallenberg, 2009). Poor communication channels and inflexible leadership

have been identified as factors of the organisational climate which contribute to negative effects regarding working environment (Bjerkan, 2010). Effects, such as higher accident rates, lower levels of work morale, increasing work stress, higher burnout and turnover rates. According to Lund and Aaro (2004, p. 316) an important challenge in the risk work is to identify cultural factors which are influencing the safety behaviour within the organisation and they further argues that it may prove to be “the most effective preventive measure”, at least in the long term.

3.2 A sustainable management business strategy

Companies can respond differently on the stakeholder pressures that they encounter (Delmas & Toffel, 2004; Ottosson, 2011). It can be environmental strategies that are adopted to comply with the regulatory requirements and to adjust to the standard practices within their industry or to go beyond regulatory requirements and with environmental strategies strive for a reduction of the company’s environmental impact. The increase of regulatory and financial instruments to support the sustainable development in companies have come so far that it induce market forces in some sectors and some countries to an extent that companies need to make a serious evaluation and consider adoption (Regester & Larkin, 2005). Companies, in a sector or country with this situation, which fail to live up to the requirements and demands from customers and society risks criticism and also an impendent detrimental impact on reputation. The company’s financial market may be damaged because of the perception of the company to be slow in response to the markets and new societal trends and demands.

Four factors which are used to explain corporate responsibility (CR) activities and motivate incorporation of it are: moral obligation, license to operate, sustainability and reputation (Porter & Kramer, 2006). The *moral obligation* suggests that firms ought to act as good citizens and take their responsibility which can be related to the argument of Sandberg (2011) who explains that even though an action is only a small part of the whole, it is still a responsibility to minimize that part. The *license to operate* focuses on the implicit and explicit permission from communities, governments and various other stakeholders for the firms to operate with a long-term perspective that secures both economic performance and sustainability (Elkington, 1999; Porter & Kramer, 2006). To strengthen the brand, the image of the company, raise the morale regarding sustainability and even raise the value of the firm’s stock are all connected with *reputation*. Company credibility is essential for a good reputation and to reach that, companies need to fulfill the interest of stakeholders and society (Pakseresht, 2010). An incentive for companies to implement a *sustainable* business strategy is that it differentiates them and builds long lasting relations with stakeholders which may lead to increased brand value.

3.2.1 Incentives for a sustainable development

Companies of today are taking different stance regarding sustainable development. The different approaches are in many cases divided into three strategic stands which are *defensive*, *reactive* and *proactive* (Ottosson & Parment, 2013). The most common argument for those with the *defensive* approach is that sustainable development negatively affects the profitability and those initiatives that are for sustainable development need to be opposed (IVA, 1995; Ottosson & Parment, 2013). The result of the defensive approach may be that resources and strategic power are allocated to oppose sustainable initiatives instead of adapting to the new world which in the long run can lead to lost market shares (Porter & Kramer, 2006; Ottosson & Parment, 2013). The *reactive* approach implies that the sustainable development demands are ignored as long as possible and may first implement a sustainable solution when the treat

of legislation or penalty is at stake (Ottosson & Parment, 2013). The sustainable development view is mostly operational and not strategic. A solution is often implemented when it is too late and an accident already have occurred as for example a working environment solution is implemented after the accident occurred even though a safety representative have pointed out deficiencies. The *proactive* approach implies that companies include the sustainable development in the core business and work with these matters at a strategic level (IVA, 1995; Porter & Kramer, 2006).

Companies compete in productivity of how well they use labour, natural resources to produce their high quality products or services, and capital (Porter & Kramer, 2002). The productivity of a company is dependent on employees who are educated, healthy, safe and motivated through opportunity. Through a safer working environment, a reduction of pollution and waste, it may lead to a usage of resources which is more productive.

3.2.2 Reputation management

The company cover activities all the way from sourcing to product disposal are concerned with many of the CSR related matters (Regester & Larkin, 2005). The importance for companies to manage CSR aspects of business and the risks associated with reputational and commercial values are affected by all the areas of business (Ottosson & Parment, 2013). Investors are concerned over companies which are not managing the CSR related risks and will apply pressure to those while rewarding the companies that succeed in their risk management. Therefore it is of importance to e.g. manage the supply chains in a satisfactory manner, environmental and human capital management likewise, because failure in doing so may most likely affect shareholder value (Porter & Kramer, 2006). The human capital of business has become more important than the physical capital and so the relationships and threats to them are critical (Regester & Larkin, 2005). In *Table 1* different aspects of CSR are shown and the impacts it have on certain factors.

Table 1. CSR impacts on a company (Regester & Larkin, 2005, 75)

Negative impacts	
Aspects of CSR	Impact on
Concern with social and economic impacts	Operating efficiency
Human rights	Innovation Operating efficiency
Positive impacts	
Aspects of CSR	Impact on
Ethics, value and principles	Risk profile Brand value and reputation
Focus on environmental process	Risk profile Access to capital Operating efficiency Shareholder value
Community action	Brand value and reputation
Workplace condition	Human and intellectual capital Operating efficiency Revenue

Observe the positive impacts the company may gain from a *focus on environmental processes* and the *workplace conditions* as well as the *ethics, value and principles* which are the most central to this study.

3.2.3 Competitive advantage

The growing demand on companies' environmental and social responsibility and performance creates incentives for individual companies' to work actively with these matters to gain a competitive advantage (Porter & Kramer, 2006; Rainey, 2008). The customers demand has also matured in these issues and the concerned customers do not only look at the brand but also the face behind the brand which influence their decision (Ottosson & Parment, 2013). There are several sectors where the companies' cannot be the perfect eco-friendly example because the core business is oil, chemicals or other harmful products (Regester & Larkin, 2005). There is a public acceptance towards these companies and the expectations from customers are that the negative environmental and social footprints are reduced.

3.3 The factors of risk

The, so called, cost iceberg in *Figure 3* can serve as a portrayal over the cost allocation associated with risks and work related to accidents (Mercurio & Roughton, 2002). At the top of the iceberg, the tip above the surface, are the medical costs and the insurance costs associated with a personal injury (Bird & Germain, 1985). The example in *Figure 3* show that every \$1 spent on an obvious incident, most likely bring additional costs from \$5 to \$50 below the surface which are allocated to material damage. Additionally, there are more hidden costs at the bottom of the iceberg that are \$1 to \$3 in relation to the \$1 at the top and these are uninsured miscellaneous costs (*ibid.*). The weakness of the model is the exclusion of the effects of how the productivity and how other employees are affected in an organisation when injuries and accidents are common (Mercurio & Roughton, 2002). Neither are the illnesses because of health hazards included even though these are assumed to have a greater financial impact on companies because it frequently involves longer absences according to the Occupational safety and health administration in the U.S.



Figure 3. The cost iceberg (Räddningsverket, 2003, 38, adapted from Bird & Germain, 1985).

Demands from government agencies, customers, and suppliers put a pressure on companies to have a functioning risk management (Kaplan & Mikes, 2012; Rainey, 2008). The development in the industry of new techniques, improved design and modern control systems, increase the safety but at the same time make risks more complex (Wennersten, 2003). The reason for larger accidents occurrence is increasingly affected by several reasons which have causation (Reason, 1990). Risks in the working environment can be placed in the category of preventable risks which are defined as (Kaplan & Mikes, 2012, p. 50) "internal risks, arising

from within the organization, that are controllable and ought to be eliminated or avoided". Those risks that are too costly to achieve a complete avoidance and which will not cause the company any severe damage should have a zone of tolerance (Kaplan & Mikes, 2012). Apart from those risks, the company should seek to eliminate the preventable risks because they do not receive any strategic benefits from taking them. Active prevention is the best way to manage these risks which can be through the monitoring of operational processes, preventive analysis of the systems that have great hazards and to guide employee's behaviors and decisions toward the company's desired norms (Wennersten, 2003; Kaplan & Mikes, 2012).

It is essential that the top management have a clear commitment that the security features are maintained. Risk management is a key to a safe and healthy environment (Rainey, 2008). Risk management is in many cases treated as a compliance issue which is solved by the drawing of numerous rules and to assure that the employees follow them (Kaplan and Mikes, 2012). Continually explained, there are no disasters that are prevented or effects diminished by rules based risk management, even though some risks which could severely damage the company is reduced.

3.3.1 Sources of risks and reasons for accidents

Three general reasons for accidents to occur are the human handling, the technical design and framework and the organizational and routine aspects. In most accidents these three are intertwined (Wennersten, 2003). To further evolve on this, three additional and more specific reasons for accidents to occur are presented. The first reason is changes in the facilities, on the equipment and the machines, which have a negative impact on the safety. Secondly is the fact that things, past the changes, are performed in a manner that does not belong to the normal. The third reason is the lack of communication and instructions.

It is essential to find the primary cause when an accident occurs and emphasised by Wennersten (2003) is the meaningless to blame the human factor. The human factor is often a result of stress, failure in the instructions resulting in that the problem need to be solved in another way, or that the indications from the management shows that it is urgent, among other factors. It has been identified that accidents are caused by a combination of factors as an interacting system of technical, cultural and social forces (Brown, Willis & Prussia, 2000).

The traditional safety research has searched for the cause of occupational accidents with the focus at the identification of individual attributes, as for example personality traits (Neal & Griffin, 2006). Depending on the delimitations on what is meant with the human factor, almost everything can be allocated to the human factor (Ericson & Mårtensson, 2003). Almost all accidents are associated with human actions, because it is humans who decide of what material to use, take the decision of how to construct machines and plan how the work should be performed. These are also called latent faults. In an organisation there may be several latent faults which separately are not critical, but in case of an unfortunate chain of events may lead to a catastrophe (Reason, 1990). According to Reason (1990) it is important to lift the responsibility from the operator at the floor, higher up in the hierarchy. The conclusions regarding a successful risk work are a functioning management system including good routines for risk assessment, a responsible management who prioritize safety ahead of production and, at last, competent employees who have the knowledge about both the risk assessment and the production (Reason, 1990; Wennersten, 2003).

The results of risk mitigation are improvements which create rewarding and lasting outcomes (Abrahamsson, 2000; Wennersten, 2003). That is one reason why it is of importance for

management to address risks and reduce liabilities. Another reason is to ensure sustainable success of the company. A prime motivator for sustainable business development (SBD) is the risk mitigation (Rainey, 2008). In the earlier days the social and environmental requirements were not thought of as anything else than regulatory requirements. Mistakes and problems of companies was a lack of perspective according to Rainey (2008, p. 138) and therefore product failure or single events could lead to catastrophic effects on companies with examples like the Exxon Valdez oil spill, BP's Deepwater Horizon catastrophe and the tire problem of Firestone/Ford Explorer (Rainey, 2008; Kaplan & Mikes, 2012). SBD can be seen as an insurance which minimize and proactively constrain the greatest risks.

3.4 Risk management strategies – A conceptual framework

In an increasing number of areas the demand of risk analysis are raised with the intention of increasing the safety parameters to avoid accidents, also known as a proactive approach (Holmgren & Thedéen, 2003). In *Figure 4* a risk management process is presented which is divided into three sections to better understand the different stages of work; *Environmental risk analysis*, *risk assessment* and *risk management*.

3.4.1 Scope definition

At the first stage the focus is on defining the aim and the delimitations, to motivate why risk management is important and what should be achieved with the process (Miljösamverkan Sverige, 2010). In most cases, companies make choices between risks and actions where the focus is on the cost efficiency and if the cost of the investment is lower than what the cost of an accident could be. The signification of a profitable and stable company is that the stakeholders' requests and demands are known and respected, at the same time as the risks associated with the company are known and are managed in a good way (Wessberg *et al.*, 2008; Miljösamverkan Sverige, 2010). It is essential that there is a discussion concerning what types or levels of risks that can be accepted within the company (Kaplan & Mikes, 2012). It may be strategic risks that the company takes with the intention of superior returns or if it is preventable risks which never give a superior return, it should be eliminated.

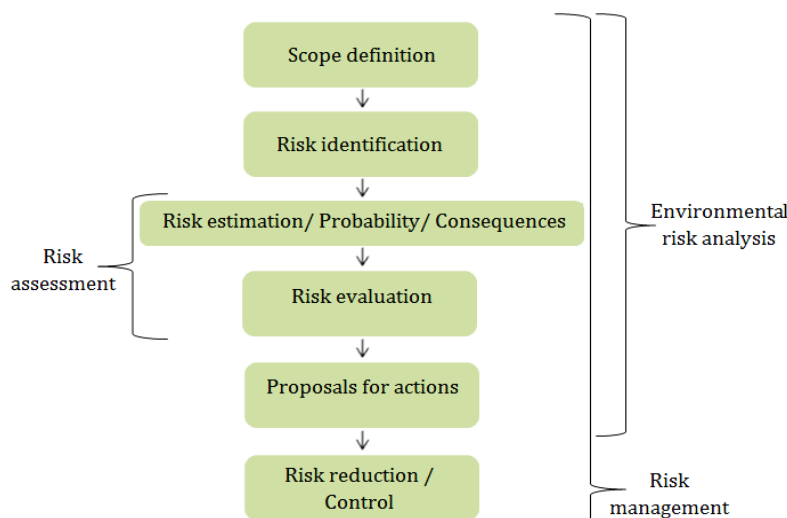


Figure 4. Risk management process (Wessberg *et al.*, 2008, 26).

The risk management process model is presented in the text, 3.4.1 to 3.4.6.

3.4.2 Risk identification

In the next step, the identification of risk aims to map the potential risks that exist within the company or division and to describe them (Kaplan & Mikes, 2012). The sources that can be used for the risk identification can be; earlier statistical reports of incidents or accidents within the company, audits, investigations of certain procedures or systems within the company, to contemplate with others in the company to see their experience of risks and also others within the industry (Wessberg *et al.*, 2008; Kaplan & Mikes, 2012). It is central to avoid the narrow thinking, instead follow chains of cause and effect as well as interweave knowledge from several different disciplines (Abrahamsson, 2000; Holmgren & Thedéen, 2003). At this stage it is of importance not to neglect risks because they seem to be of trivial character (Miljösamverkan Sverige, 2010). Risks that are not identified cannot be analyzed!

3.4.3 Risk estimation, probability and consequences

The underlying of estimation of risk is the estimate of the probability associated with risks and the consequences which can occur if there is an accident (Holmgren & Thedéen, 2003). It may be consequences of societal or ecological character which in addition can cause harm to economy or the company image (Wessberg *et al.*, 2008). When the probability and the consequence are summed up, the result is the estimation of risk which is the foundation for the risk assessment (Ammenberg, 2012). The objective of a risk analysis is to identify where and how accidents, incidents and disruptions may occur, how often this might happen as well as the consequences if it would occur (Miljösamverkan Sverige, 2010).

3.4.4 Risk evaluation

At this stage a valuation of the risks are made and a comparison of what risks should be prioritized for actions and what levels of risks are acceptable within the company (Miljösamverkan Sverige, 2010). A commonly used method for this procedure is the use of a risk matrix. It is illustrated with the level of probability on one axis and the level of consequences on the other. The identified risks which end up far out in the matrix have a high probability and a serious consequence which indicates it should be prioritized.

According to the principle of proportionality the overall risks that a company entails should not be disproportionate to the benefits, such as revenues, products, services, of the activity (Räddningsverket, 2003; Ammenberg, 2012). Conferring to the plausibility principle an activity should not pose risks that through reasonable means can be avoided or reduced. Those risks of technically and economically reasonable means which can be eliminated or reduced should always be attended regardless of risk.

3.4.5 Proposals for actions

All the work in the earlier stages should give a good and informed material as a foundation for the decisions that should be made regarding the risks (Holmgren & Thedéen, 2003). The risks are identified and formulated during the process and for each and every risk there should be information such as; probability, consequences, economical aspects, technical barriers and opportunities, and finally the benefit of an activity or business is associated with (Ammenberg, 2012). If the information at hand is of good quality the priority of what risks should be managed will be better, and of course the objective should be to eliminate all risk sources so the risk don't exist at all (Miljösamverkan Sverige, 2010). If it is not possible, which often is the case, the risks should be reduced to the highest degree possible when accounting for what is reasonable regarding the other parameters.

The work with risks should be maintained continuously and it is important to keep the risk information updated (Miljösamverkan Sverige, 2010; Kaplan & Mikes, 2012). When there are changes done within the company and conditions change, it is important that also the risk

work follows the same way and is updated after the new conditions (Holmgren & Thedén, 2003). In the day to day business it is vital to have policies for communication, routines, monitoring and measurements to minimize the risks. Except technical aspects of risk it is of importance to account for the human factor and how we perceive risk (Ericson & Mårtensson, 2003).

3.4.6 Risk reduction and control

The personal injuries and costs of sick leave are a relatively small in proportion of the total costs of accidents or incidents that occur (Räddningsverket, 2003). Although an accident led to a personal injury or not it is associated with great costs for the company. There is a significant financial incentive to use risk analysis to reduce the number and extent of accidents that occur and the disruptions in the production (Wennersten, 2003; Kaplan & Mikes, 2012). The difficulty, or challenge, is to make the costs of disruptions of operations and accidents obvious to everyone because the true costs are seldom known (Räddningsverket, 2003). In *Appendix 5, 6 and 7* an environmental assessment method is presented which could be a helping tool in the decision making regarding environmental, but also working environment risks.

It is of importance that the knowledge and experience from incidents are utilized for review to be able to perform a good risk management. It should be an imperative process where monitoring, information and feedback are constantly recurring elements in both the short term and the long term as well as at several different organizational levels in the organization (Räddningsverket, 2003; Miljösamverkan Sverige, 2010). For example, data bases can be used for the analysis of incidents and accidents, which can give a hint of the possibility, causation and trends.

3.5 Conceptual framework

In *Figure 5* the conceptual framework is presented. It explains the different strategic and operational performance connected to environmental and working environment issues (IVA, 1995).

	Defensive	Reactive	Proactive
Attitude	"We will follow the laws"	"We do what we have to, and in the best way"	"Environmental issues can provide a competitive advantage"
Position	Defence	Acceptance	Conscious decisions
Perceived impact on business	Threat	Competitively neutral	Possibilities
Typical solution	"Filter on the chimney"	Change of process	Product development
Partners	Technical specialists	Business managers within the industry	Competitors, suppliers, customers, NGO's
Focus	Minimize costs	Optimize investments	Maximize economic and environmental benefits

Figure 5. Importance of a constructive attitude (adapted from IVA, 1995, p. 22).

This model can be used to understand how, what and why companies act in certain ways concerning working environment and environmental issues. Different aspects of the defensive, reactive and proactive approaches are explained and what they may result in depending on the approach.

4 Background for the empirical study

In the following chapter a description of the sustainable development and, environment and working environment risk management in the industry is presented. The general environment and work safety climate in the Swedish industry is presented to ease the understanding of the landscape of ABB Power Products Sweden (ABB PP) A brief presentation of ABB PP is given to increase the knowledge of the company studied and to get a view of the environment and working environment risk management which follows in the next chapter of this study.

4.1 The industry's approach to sustainability

The Confederation of Swedish enterprise (CSE) is an organisation which represents Swedish companies and work in their interest within several areas (internet1, Svenskt näringsliv, 2013). According to CSE the Swedish environment politics and regulations need to be competitively neutral and not harm Swedish companies' possibilities to compete globally on equal terms (internet2, Svenskt näringsliv, 2013). CSE assist companies in Swedish environmental legislation, which they claim to be the most complicated in the world. According to Förebildsföretaget's study (2013) it is emphasised that at the same time as stakeholders, both global and national, are demanding more than economic results from companies, the leaders of the companies are experiencing a political dissatisfaction and resignation in the environmental issues. An absence of political decisions is pointed at and the political focus is instead set on stricter requirements on the companies. In a comparison of consumers' confidence in politicians and company leaders' possibility to improve the society the confidence ratio was 30% versus 38%.

The environmental debate in Sweden is generally discussing the need of more and higher taxes and fees, and increased regulations (internet3, Svenskt näringsliv, 2013). CSE instead advocate a technical development performed without hinders and an environmental policy which is economically efficient where the greatest positive effect on the environment per unit invested is attained. CSE state it is entrepreneurship and growth that is the solution on the environment, and not the problem. At the same time a long term perspective is necessary regarding the environmental policies, which according to CSE, there is a lack of today. The Swedish companies are underperforming environmentally (Förebildsföretaget, 2013). The two factors that showed to be the worst was the *integration of sustainable development into the business* and the *management's action*. The conclusion was that the management of the companies was deficient and with a management which is not dedicated result in a non-included sustainable development strategy. The Swedish companies which were seen as sustainable business role models to other company managers were companies from several different sectors (Förebildsföretaget, 2013). This shows that it is possible to become a sustainable business role model independent of sector and different conditions.

The working environment safety is a prioritized area among Swedish companies and according to CSE there is a constant process to become even better, but an obstacle is the complicated Swedish working environment policies (internet4, Svenskt näringsliv, 2013). There has been a shift in the view of working environment safety and this was stated by a risk manager within a Swedish industrial company (Kallenberg, 2009, p. 100); "previously, line management working in the factories thought this to be damned uncomfortable...But now, they have realized that it is an advantage...they prioritize risks to focus on...and look at what

to act on.” The main perception among Swedish companies is that sustainable development investments do pay off or at least break even, but there is not any exact or correct measurements at hand so far-reaching conclusions should be avoided (Förebildsföretaget, 2013). One of the large obstacles is the short-term view on business with the sub optimization complicating the long-term ambitions.

4.2 The production industry – environment and risk

Companies meet pressure from several external stakeholders and the government regulations increasingly demand CSR reporting (Porter & Kramer, 2006). Companies in especially the EU and North America regions are having disclosure requirements from both their governments and stock exchanges (internet, hausercenter.org, 2013). The countries which distinguish themselves are; Norway, U.K, France, U.S.A, Canada and Australia, which means that companies within these countries have tougher requirements. In this way companies are increasingly hold accountable for their social and environmental performance which put a pressure on both the choice of supplier and the own business performance (Porter & Kramer, 2006). In the engineering industry companies have several suppliers that can be affected when demands on environmental performance are set (Tingström, 2006). Larger organizations have greater power to affect their suppliers and also can assist in their sustainable work.

All industrial production is associated with risks of different types (Kallenberg, 2009). The most common risk events in the industry is fires, accidental emissions, hazardous substance in products, and the risks that are associated with the acquisition of facilities, land or firm take-overs (Kallenberg, 2011). Industrial facilities are always in changing condition, because of redevelopment, changed routines, and wear on the parts because of mechanical abrasion and corrosion for example (Wennersten, 2003; Kallenberg, 2009). The changes done in the industrial facilities are for example efficiency reasons or reduce emission, which make the facility and the machines to differ from the original specification (Wennersten, 2003). The changes can come gradually and at the end lead to a greater accident because of the total change has not been included in the risk analysis. The unexpected deviations from the normal production conditions can cause illicit emissions, set the safety for the employees at stake or cause operational disturbance which are associated with costs for the company (Kallenberg, 2009).

In a recent study of the Swedish industry the conclusion were that the sustainable work in general among the firms studied is underperformed (Förebildsföretaget, 2013). A similar indication came from a global study which concluded that the company response on environmental issues often remained marginalized and not prioritized compared to other issues that was considered core to the firm’s strategy (Perera *et al.*, 2013). If the firms are to succeed in their work concerning sustainable business it is of importance that it is integrated in all of the parts of the firm, supported from the top management and that it is integrated in the decisions made (Rainey, 2008; Förebildsföretaget, 2013; Perera *et al.*, 2013). Though there has been a change in the sustainable work when focus shifted from the earlier reactive pollution control, or also known as end of pipe control, to the proactive sustainable work (Tingström *et al.*, 2006). The proactive work seeks to prevent the problem by looking at the source and to minimize, or hopefully eliminate the toxics in materials used in the products.

In the engineering industry there is a large resource consumption of metals as lead and mercury and heavy metals as for example zinc, copper and nickel (Kallenberg, 2009; Ammenberg, 2012). The chemical pollution adversely affect ecosystem and human health

which have been identified at regional and local levels since many decades, but now also at a global level (Carson, 1962; Rockström *et al.*, 2009). It is of highest importance that the metals are treated with a safe procedure and rather sparingly or alternatively in a cycle. It has been an increase of chemicals used, from 7 million tons in the world at 1959, to 250 million tons in 2000 (Ammenberg, 2012). On the global market there are 80.000 to 100.000 different chemicals in use and the health and safety controls are scarce which mean that the knowledge of what problems it cause or can cause are limited (Rockström *et al.*, 2009). In Sweden it is the Swedish Chemicals Agency (KEMI) that is responsible for the chemical inspections (internet, kemi.se, 2013). KEMI has been given the task from the government to work for a non-toxic environment. Chemical emissions from the industries go through the air, ground, and water which in some cases go out in nature without purification.

Characteristics of the Swedish engineering industry are the several production units, numerous suppliers and the assembly of factories (Kallenberg, 2009). The most important risks within the industry is the interruption of business because of technical risks or machine breakdown and fires, occupational risks, environmental risks and, at last, the failure of supplies delivered from subcontractors or subsidiaries (Ammenberg, 2004; Kallenberg, 2009). The mismanagement of these first-hand risks is increasing the likelihoods of second-hand risks to occur (Kallenberg, 2009). The second-hand risks are new risks which are emerging as a consequence of the occurrence of first-hand risks. In the study of Kallenberg (2009) of Swedish industry all of the respondents stressed the challenges with second-hand risks and particularly reputational risk which were perceived to likely affect several factors of business, such as consumer and investor trust, brand value and consequently profits.

4.1.1 Working environment

In an extensive literature study made by Hansson (2006) it was concluded that there are several studies which point at the fact that investments in working environment do have a great profitability potential. In the production industry it was found that a production line with a good working environment showed significantly better productivity and quality than the one with a bad working environment (Ichiowski *et al.*, 1995). A bad working environment is in many cases related to stress, such as high work demand and work pace, which have shown to “directly and strongly influence employees’ accident risk” (Bjerkan, 2010, p. 470).

Employees have shown to be a crucial stakeholder for successful risk management activates and for the process towards a safer working environment (Kallenberg, 2009). This implies that the employees are involved both in the risk management work and that they take responsibility regarding the risk issues. In several studies it has shown that a stronger safety climate within the company also means fewer reports of workplace injuries than companies with a weak safety climate (Bjerkan, 2010). An asymmetric relationship between health and safety is explained by Bjerkan (2010, p. 470); “bad safety can lead to injuries and ill-health effects for the employees, but “good” safety does not necessarily lead to “good” health amongst the employees. Furthermore “bad health” implies impaired safety status, or less ability to follow safety regulations, but good health does not necessarily imply better safety status”.

4.1.2 Sustainability

It has been several studies which have shown indication of profitable possibilities in integrating the concept of a life-cycle perspective into the companies’ Environmental management system (EMS) (Ammenberg & Sundin, 2005). The life-cycle perspective on the products could contribute to an increased knowledge and awareness of the resource and energy flows that are affecting the company, both in terms of costs and environment. For

example Siemens, a German competitor of ABB, created an environmental portfolio consisting of three categories, customers, society and Siemens, which should be benefitted by products and solutions that are provided from the portfolio (Perera *et al.*, 2013). Certain criteria's had to be met such as CO² emissions and the portfolio consist of goods with long life-cycles as for example energy saving engines, highly efficient wind turbines and components for biomass power plants. The tree criteria's are energy efficient products and solutions, renewable energy and environmental technologies. The portfolio is growing faster than the rest of Siemens business and account for 42 percent of their total revenues.

4.2 A brief introduction of ABB

ABB is a multinational company within the power and automation technology industry where they are one of the world's leading company (ABB Annual report, 2012). ABB is based in Zurich, Switzerland, and are active in around 100 countries with approximately 150000 employees (internet2, abb.com, 2013). ABB was established in 1988 when a merger between Swedish firm Asea and the Swizz firm Brown Boveri was done, which have a history in the industry that strives back 120 years. The strong focus on research and development (R&D) has been the key factor to success. ABB provide solutions for energy-efficient and secure generation, the distribution and transmission of electricity and for industries, commercial and utility operations to increase productivity (ABB Annual report, 2012). ABB is divided into five divisions, which are organised after the customers and industries that are served. The divisions are Power products, Power systems, Discrete automation and motion, Low voltage products and Process Automation.

During 2010 ABB carried out a sustainability stakeholder dialogue where 600 persons, both internal and external, gave their view on what areas was in need of an improved performance and where to increase the focus (ABB Sustainability report, 2012). Three objectives that were established after evaluating the input were; to strengthen the skills and knowledge of the employees, develop robust objectives and to improve communication. The aim for the coming years is to make ABB to a world leader within sustainability. As former CEO of ABB, Joe Hogan (ABB sustainability report 2012, p. 2) puts it: "intelligently integrating how we manage sustainability issues with day-to-day business must be at the heart of how we operate".

ABB Sweden has 8950 employees and is located at more than 30 locations with Västerås and Ludvika as the biggest employers with 4200 and 2700 employees (ABB Annual report, 2012). ABB Power Products (ABB PP) has the Swedish division in Ludvika, which is the global company's centre for transmissions where the most comprehensive and complete operation of the power transmission field is conducted (ABB i Ludvika, 2012). The units within ABB PP are differing in size and of the eight units within ABB PP four are situated outside Ludvika, which are Insulation and components in Figeholm, Composites in Piteå, Swewater in Landskrona and Swedish sales in Stockholm. More than 90 percent of the production goes on export. The goal is to deliver products with the best possible quality and safety, and with least possible negative effects on environment. ABB Sweden are quality certified by ISO 9001 since 1992, environment certified by ISO 14001 since 1998 and working environment certified by OHSAS 18001 since 2009 (Bureau Veritas, 2012). OHSAS 18001 specifies requirements for working environment management systems and provides guidance on what should be included and require continues improvement. Through that, the safety risks, controls and preventions can more easily be identified by the organization (intranet 2, abb.com, 2013).

5 ABB Power Products – results of a case study

In this chapter a presentation of the results from the empirical study will follow. To ease the readings, the structure is mirrored from the theoretical chapter. Because of the extensive interview and observational study, most of the empirics are based on these findings. Several different methods used in the environment and work environment risk management are explained to better understand the reality of these challenges and possibilities. In the end of this chapter two minor case studies are presented which show the extent of the effects an environment and working environment accident may cause.

In the early 2000's ABB went from working with indirect and direct environmental impacts to take a much wider perspective of work on sustainable development (internet 2, abb.se, 2013). The human has been the focus of the last decade, through working environment, health and safety as well as social responsibilities and human rights got a strong place on the agenda. During the last couple of years ABB has made considerable efforts to strengthen their proactive risk management concerning sustainability which includes the previously mentioned aspects (sustainability report, 2012).

ABB Power Products Sweden (ABB PP) has a Health, safety & environment (HSE) organization which works with these matters on a daily bases (pers. com., Person 10, 2013). In Appendix 1 there is an organizational scheme which show the extent of employees involved. The organization is structured with a HSE manager at the top with an Operational, health and safety (OHS) manager and an Environmental manager under (pers. com. Person 1, 2013). The OHS manager has one Local safety advisor (LSA) at each of the six units within the PP-division as well as six Local electrical safety advisors (LESA). Two units do not have LESA which are the Front end sales unit and Composites in Piteå which are smaller units. The Environmental manager has one Local sustainability officer (LSO) at each of the six units and nine Chemical administrators. The two units without Chemical administrators are Front end sales and Insulation and components in Figeholm which have none or small amounts of chemicals in their business. Some units, as for example High Voltage Components have a unit in Landskrona where a LSA and LSO report back to Ludvika. Certain units have more than one Chemical administrator because of the amount of chemicals at the unit. The working environment and the environment is in some aspects intertwined which imply that the LSO and the LSA may work close together in certain matters (pers. com, Person 2, 2013).

Formally it is the manager at the unit who has the responsibility for environment and working environment matters, and the LSA and LSO is responsible to coordinate their work at the unit, in terms of education, news, monitoring and reporting (pers. com., Person 1, 2013). There are also Safety representatives at almost all the units of ABB PP and they represent the union from where they have the task to look after the employee's interest and safety at work (pers. com. Person 3, 2013).

5.1 Stakeholders

ABB PP can be affected by its stakeholders in various ways and to various degrees as well as they can affect stakeholders such as suppliers and the surrounding community (pers. com., Person 13, 2013; pers. com., Person 10, 2013).

5.1.1 Authorisers

All ABB units are required to have knowledge about and to follow the *legislation* which each unit's operation is concerned with (pers. com., Person 10, 2013). It is both the Swedish environment- and working environment legislation which includes several ordinances such as laws and regulations as well as EU's directives and ordinances which are required to be complied to. To simplify the access of legislations, to help with the interpretation and to give update on changes there is an internal data base with all information (intranet 3, abb.com, 2013). The Corporate staff sustainability affairs (CSSA) are continually updating and give information on changes to the LSA and LSO. From the interviews and observational sessions it seems like ABB PP has a good relation with the authorities such as the Ludvika municipality, the Swedish work environment authority (Arbetsmiljöverket) and the County administrative board (Länsstyrelsen) (pers. com. Person 3, 2013; pers. com., Person 20, 2013). It is a relationship which builds on transparency and ABB PP has a professional and positive dialogue with the authorities (pers. com., Person 10, 2013). The idea of the relationship with the authorities is to act proactively and stay updated on new regulations and requirements instead of being pursued.

5.1.2 Customer groups

Some customers demand certain levels of sustainability and working environment safety performance to consider doing business with ABB PP, while other customers are not as active in these sorts of issues (pers. com., Person 7, 2013). There are especially companies from Norway, U.S.A, Canada and Great Britain who demand that ABB PP have an active work with these matters. The reasons behind the demands are differing between these companies depending on the origin because of the differences in the legal system and the company culture of the different customers. For example Norwegian customers are to a high degree from the oil industry where there is a great focus on working environment (pers. com., Person 4, 2013).

5.1.3 External influencers

ABB PP is by far the largest employer in Ludvika and many of the people who lives in the town work there or knows someone who works there which make ABB PP to an important part of the *city's* future development (pers. com., Person 4, 2013). There are 14000 inhabitants in Ludvika and there are 3000 employees including consultants at ABB PP (pers. com., Person 2, 2013). In Ludvika there is an ABB Industrial High school cooperating with ABB PP which bring company and community closer to each other (pers. com., Person 2, 2013). The production is managed in a rather non disturbing manner with almost nonexistent noise, smell or smoke which contributes to a positive image of a clean production (pers. com., Person 2, 2013). It is rather at occasions when an accidental pollution or accident occurs that the community gets affected and questions are asked regarding the environmental performance.

The communication department at ABB PP is playing a role regarding sustainable development and CSR because of both internal communication to and with the employees and external communication to stakeholders (pers. com., Person 18, 2013). *Media* do have an effect on the public's perception of the company and in a small city as Ludvika the information spread quickly (pers. com., Person, 18, 2013). It is important for ABB PP to be able to show a positive image, because it also strengthens the pride of the employees. If an accident occurs the communication department try to collect and publish the information on the internal website before it reaches out to the media and the public. Media is also a

distributor of positive publicity which is performed through the internal webpage, the open webpage and Facebook, depending on who is the objective of the information.

The power and automation technology industry is highly competitive and the Asian companies are pressing the prices heavily which put a pressure on ABB PP to increase productivity and efficiency (pers. com., Person 7, 2013). On the other hand, the Asian competitors have not come as far as ABB PP in terms of sustainable development and working environment which may be seen as a competitive advantage. According to a majority of the interviewees there is a constant search for cutting costs and increase profitability and one of the reasons mentioned was the differences in personnel costs between Sweden and low-cost countries. Any pressure from the rest of the industry for a proactive environmental risk management is not perceived by the interviewees and therefore not identified as an incentive.

5.1.4 Business partners

The *suppliers* are playing an important part in ABB PP's strategy to reduce their environmental impact and to improve the working environment (pers. com., Person 16, 2013). The suppliers need to fulfill certain requirements regarding quality, working environment and environment to be allowed to deliver their products. To become a supplier of ABB PP the company needs to go through a *Supplier qualification process* which includes three important steps; Firstly a *Supplier assessment*, Secondly a *Process assessment* and lastly the *First delivery assessment* (internal document 1, ABB, 2013). The first step decides if the company is a potential supplier after an on site assessment. The second step is to assess the company's process of deliver a service, component or system. The last step is to verify if the first delivery runs are complying with all requirements. ABB PP has persons with the knowledge and experience within the organization who are visiting the suppliers and performing audits (pers. com., Person 4, 2013). The audits are performed in smaller groups of two to three persons with a special knowledge within different areas, for the ability to cover all the parameters of interest. ABB PP tries to make the suppliers aware of the considerable importance of sustainability, working environment and quality in the process.

In ABB's Supplier requirements it is stated: "Our expectation is that all members of ABB's supply chain act in compliance with the ABB Supplier Code of Conduct" (internal document 1, ABB, 2013). ABB PP do not want to be associated with suppliers which can cause bad publicity and harm the reputation of the company (pers. com., Person 16, 2013).

It is the *employees* at the company who is in need of a safe working environment, to not risk any accidents while at work (pers. com., Person 3, 2013; pers. com., Person 10, 2013). All the safety investments, educations, communications and internal rules are made to make their working environment safer and reduce the risks of accidents so they are not to be injured. It is the employees within the production who at the end of all are the ones at more risk regarding the working environment. There are two different approaches that have been met during the interviews and observations. The first one is the, so called, *behavioral* approach which implies that it is the behavior of the employee that is the cause of accident and the risk management need to approach and change the behavior through educations, communication and safety clothes. The second approach is the *operational*, which focus on safety investments in machines, mechanical tools, and instructions etc. to have a safety level which allow making mistakes without getting injured. Humans are lazy by nature and try to take shortcuts in their work, which may lead to negative consequences and that is why it is of importance to secure the working environment (pers. com., Person 3, 2013).

The type of production at ABB PP is differing at the units (pers. com., Person 2, 2013). Some are more intensive concerning environment issues and others are more intensive regarding working environment issues. Overall the working environment includes several risks such as sharp edges, chemicals, noise, high voltages etc. (pers. com., Person 7, 2013). Because of the risky working environment it is even more important to work proactively with the risk management and try to build the risks away (pers. com., Person 10, 2013). The *vision zero* is set by ABB PP to work towards a production where there are no accidents.

In the work to minimize the environmental and working environment risks within the organization it is important to involve the persons that have the deepest knowledge about each part of business, and that are the operators (pers. com., Person 13, 2013; pers. com., Person 14, 2013). In all different sorts of risk assessments, consequence analysis and safety rounds the knowledge from the operators are used to be able to make an operationally functional decision.

The management of the environmental risks and the working environment risks are conducted at all levels of the organization and the top managers' are dedicated in their support in these matters (pers. com., Person 4, 2013; pers. com., Person 12, 2013). The focus on sustainable development and especially working environment is rooted in the top of the organization and multiple strategies are used to get the message of the importance of a safer working environment down through the organization. One part is the organizational structure with CSSA as the central part of the sustainable organization and then at divisional level, ABB PP, there are the HSE staffs which have the LSA and LSO at each unit. Through this organization of different manager levels the sustainable message can reach out to the units. Then there is the behavior of managers that are playing an important role (pers. com., Person 8, 2013). Managers who walk the talk get the rest of the group onboard and are more successful in these matters. The important role of managers has been expressed throughout the study and a majority of the interviewees stated the vital in a managers attitude concerning environmental risks and how it affects the organization.

Most of the LSO and LSA that were interviewed during the study expressed the support from their division manager as an important factor and that it increased confidence in their own work through the feeling of support. The managers themselves emphasized this as well, to be supportive of their LSO and LSA. The other way around, it was seen as important to also support the managers with knowledge and backing in these issues (pers. com., Person 6, 2013; pers. com., Person 4, 2013). Another factor that was coherent from the LSO and LSA was that they got time for their environmental tasks and their working environment tasks instead of given other tasks that took time from the LSO and LSA position. This was in some cases not how it actually was and it was expressed that other tasks were conflicting with the LSO or LSA task. A positive attitude combined with an inspirational communication was seen as an important factor to get the employees to embrace the safety message (pers. com., Person 6, 2013).

It has been emphasized by several interviewees that the behaviour of managers are vital in the work with working environment and environment matters. Managers that behave as a good example affect the employees in a positive way and most certainly increase the chances of the employees take these matters seriously (pers. com., Person 8, 2013; pers. com., Person 6, 2013). The other way around, at the units where managers avoid these matters, also the employees avoid them because it is not seen as an important part of their job. Therefore it is of importance that the managers take their responsibility and walk the talk. A majority of the

interviewees have mentioned the managerial factor, both in terms of challenges and possibilities. The middle managers, who mainly report on productivity and financial results, have other incentives than the line manager who have a close relation with the employees or the top manager who defined the agenda of the safety focus (pers. com., Person 8, 2013; pers. com., Person 4, 2013). A challenge is to get the message regarding sustainability and working environment down the organization because it get, according to many of the interviewees, stuck on middle managers on the way. Some persons have mentioned an insufficient introduction education for managers and that there is a lack in clarity regarding what the expectations and the responsibilities are for the manager. Managers should get a better introduction and training before becoming managers, because at the managerial position it is expected to have knowledge within a broad spectrum which can be demanding (pers. com., Person 4, 2013). A challenge for managers in general is that everything is the most important and to prioritize among these demands become difficult (pers. com., Person 7, 2013). What is most important depends on what perspective viewed from and when viewed from a single position, the importance seems obvious.

5.2 ABB PP's sustainable business strategy

The main incentive for a safe working environment is coherently, among the interviewees, said to be that no one should risk or get injured at work. A qualitative and well-structured work will in most cases lead to cost efficiency and fewer incidents (pers. com., Person 5, 2013). The risks of production stops will decrease with a proactive and qualitative work where risks are taken into consideration at the beginning of a process. A production stop can be very costly and if it occurs at a bottle neck of the production line it affects other part of the production and the costs will increase dramatically (pers. com., Person 17, 2013).

ABB PP is working towards a proactive approach where accidents do not happen and instead observations get reported before anything occurs (pers. com., Person 1, 2013). It is not necessarily the whole organization which has the same attitude towards environment and working environment risk, because in reality the units have different attitudes. The aim is to get the whole organization to work proactively and to get it to the natural way of the daily routines (pers. com., Person 7, 2013; pers. com., Person 10, 2013).

According to the vast majority of the interviewees the main incentive of a proactive risk management for the working environment at ABB is that no one of the employees should risk to get injured at work. This was expressed with clear words by the HSE Division Manager at PP (pers. com., Person10, 2013), as “stop hearting people”. After more than twenty interviews and several observational studies the attitude towards working environment matters can be summarized as widely accepted and prioritized at most levels of the organization. After the focus from the top management was set on working environment a couple of years ago it has become a lot easier for the LSA's to perform their tasks and to get people at other positions within the organization to get involved (pers. com., Person 14, 2013). Among other things, the LSA's interviewed in unison express that it has become much easier to receive capital for investments concerning working environment improvements.

ABB PP, compared to other companies within the Swedish industry, do have similar working environment accidents, with a majority of the injuries on the hands and mostly from the contact with sharp edges or being squeezed (intranet, TIA, 2013).

5.2.1 Regulation, reporting and liability

If ABB PP does not follow the environmental laws they risk losing the license to operate and that can be said as a main incentive of why these matters are of such high importance (pers. com., Person 13, 2013). Swedish laws and regulations demand a certain level of working environment and environmental performance of the organization and ABB PP need to fulfill these demands (intranet 3, abb.com, 2013). If these demands are not met or if violated in the case of an accident, fees and penalties may be the outcome (pers. com., Person 13, 2013). It is the manager who is responsible for the safety and if an accident occurs, the manager can be prosecuted if the law has been violated (pers. com., Person 10, 2013). It is the CEO of the organization that is upper most responsible for the laws to be obeyed. As said during a LSA-day for all the LSA's at ABB Sweden: "you cannot delegate responsibility, but you can delegate authority and duty", which imply that a manager cannot resign responsibility by giving it away. Instead managers need to be sure that the authority and duty passed on to the manager below in the organization has comprehended and understood properly (pers. com., Person 10, 2013).

ABB Sweden has an objective and strategy to, till 2020, all of the hazardous substances that are used in the products and in the production are phased out and only use substances which are not dangerous for the human health or the environment (intranet 4, abb.com, 2013). During 2013 all the chemicals at ABB PP have been risk assessed and that is 772 chemicals at 1558 different localities (pers. com., Person 2, 2013). It is important that the chemicals are risk assessed so they are stored in the correct way, handled properly, have the correct fire distinguisher at hand, personal protective equipment appropriate to the chemicals and to phase out the chemicals which are dangerous to humans and environment.

The use of oil in the products, and certainly in the transformers where large amounts of oil is used is seen as an environmental risk (pers. com., Person 12, 2013; pers. com., Person 2, 2013). If there is a leakage of the amounts of oil from a transformer inside the production facility there are safety procedures which take care of the oil in a safe and controlled manner. The risk of leakage into the environment is small because of the precautionary work with oil filters and oil separator that has been invested in lately. Storm water affects the oil separator and tests have been made during the fall with the aim to measure what dimension the oil separator need to have. Leakage from the oil separator may also be seen as a risk.

Sulfur hexafluoride (SF₆) is an artificial gas that has the potential of global warming that is around 22200 times bigger than carbon dioxide (internet 4, abb, 2013). ABB uses SF₆ in high voltage equipment because of its excellent insulating properties. The accidental emissions of SF₆ - in the manufacture, installation, maintenance and removal - are a bigger problem than leaks from the products. ABB's procedures for handling of gas prevents emissions and safeguard recyclability. In the production facilities there are sensitive alarm sensors which activates if there is SF₆ emissions.

5.2.2 Competitive advantage

There are some customers who ask about ABB PP's sustainable performance to ensure that they buy from a responsible company (pers. com., Person 13, 2013; pers. com., Person 7, 2013; pers. com., Person 12, 2013). There are customers with the origin in certain countries who have higher demand on this sort of information and it is Norwegian, American, Canadian and Great Britain customers who are the most characterized.

A secure working environment can give a competitive advantage because the employees may be more productive and also increased quality of the output may be an effect (pers. com.,

Person 8, 2013). A project at one of the units at ABB PP can serve as an example. The focus was on time delivery of output (pers. com., Person 3, 2013). The result from that were increased productivity, better quality and content employees. The conclusion that was drawn from this project was that a focus on one main input can contribute to the improvement of other related factors. One could see it as a spillover effect, where one positive consequence will contribute to several other positive consequences.

5.2.3 Reputation management

In the interviews with employees and managers at ABB PP, one of the most consistent observations was the negative reputational effects a bad working environment or environmental performance could have on the company. The bad will from working environment accidents or environmental pollution was seen as major risk to the company and therefore one of the incentives to work proactively with these matters. In the same way the good will from a sustainable business strategy was seen as a possible competitive advantage which could assist in selling a green concept to the customers (pers. com., Person 7, 2013). The reputational factor was also identified as an opportunity to attract new employees and especially the younger generation had been identified having a specific interest in the sustainable questions (pers. com., Person 2, 2013). Also regarding the working environment, to offer a safe and secure work place was expressed by several interviewees, as an important reputation opportunity to attract the best competence employees.

5.3 The factors of risk

ABB PP has, as mentioned before, a production and manufacturing process which is associated with several risk factors such as high voltage, sharp edges, heavy machinery and chemicals (pers. com., Person 7, 2013). Fires and explosions do occur at ABB PP which has resulted in production stops and great costs for the company (pers. com. Person 2, 2013). The costs incurred from these types of big accidents are of great extent. In case an accident or breakdown occurs at a bottleneck of the production the effect is not isolated to simply that unit, but it also affects several other units in the production line which result in even greater costs (pers. com., Person 17, 2013). Except the direct negative effects from accidents occurring such as employees injured and machines destroyed there are the secondary risks which is mostly associated with economic factors. These factors can, for example, be the risks of late delivery to customers which often is associated with fees or possibly a lost customer, unexpected costs that need to be allocated to the accident instead of invested in other projects (pers. com., Person 6, 2013; pers. com., Person 7, 2013). It might also affect other parts of business because concerned employees and managers need to allocate time to the accident.

The material ABB PP purchase from their suppliers can also be seen as a risk, because it possibly contains hazardous substances or the supplier produce the products in an ethically doubtful manner (pers. com. Person 2, 2013; pers. com., Person 16, 2013). Therefore it is of importance to also look at the environmental and working environment risks existing outside of the company (pers. com., Person 16, 2013). Another factor is if the supplier mismanages their business which most likely will affect the delivery time and may cause trouble for ABB PP.

An example of the combined effects of working environment and environment is the decrease of emissions from the blast machine and the welding process which both contribute to a better and safer working climate and a better environment (pers. com., Person 12, 2013).

5.3.1 Sources of risk

During the interviews several different aspects of risk has been expressed and explained. The most common answer in the interviews has been that most accidents occur because of several factors which have causation. It may be a machine which does not have the correct safety equipment and the employee using the machine haven't got the proper instructions of how to use the machine and accidentally make a mistake which cause the accident (pers. com., Person 3, 2013). A minority of the interviewees expressed the human factor to be the major cause of accidents and that it is of importance to reach out to the employees and change the behaviour as well as increase the use of personal safety protections. A factor which was emphasized by all of the interviewees were the importance of a well worked through proactive action when changes in the production is done to be sure that it is safe from the beginning and not risk any future accidents.

5.4 HSE risk management strategies

The environment risk management at ABB PP is, as described earlier, supported from the top of the organisation. There is a strong support from the top managers and with a certain focus on working environment and the safety for the employees. Much of the actions taken to improve safety in the working environment are also affecting the environmental risks in the production in a positive way because the two areas are in many cases interconnected (pers. com., Person 2, 2013). According to all the interviewees whom working with risk management it is both motivating and helpful to have a top management that is supportive and dedicated in these matters. The Division manager at ABB PP (intranet 5, abb.com, 2013), stated in his internal blog that: "I give all employees a full mandate to stop, both their own and others' work in progress at the slightest risk of accident". The vision is to have no serious accidents at all within ABB PP and that is expressed internally as "the worst part is not the flaws; the worst is that we accept the weaknesses and continues. Zero by choice" (intranet 6, abb.com, 2013). It means to work proactively with risk management and to learn and act on the mistakes or failures that occur. In the operational work there are several activities that are conducted to contribute to a proactive environment risk management (pers. com., Person 13, 2013). The activities include and demand that several levels of the organisation are actively contributing. These activities are presented in the following text. Except these activities, it is included in the daily work that all employees report or take action when a risk is identified (pers. com., Person 5, 2013).

At ABB a method named *4Q* is used when making improvements of the business (intranet 7, abb.com, 2013). The method is widely used within ABB, several areas such as engineering, offices, production, project management, suppliers and more. The 4Q stands for Q1 to *measure*, Q2 to *analyse*, Q3 to *improve* and Q4 to *sustain*. The process of the 4Q method starts with Q1, defining what the issue is and collects data on the current situation to be able to solve it. It is important that this first step is dealt with thoroughly because with a well-defined problem the chances of solving it will increase. At Q2 the root cause of the problem are to be found and verified. When this is done, the team can prioritize the root cause which causes the greatest impact. This provides the team with the information of where to make the improvements in the process which takes us to the next phase. At Q3 the implementation of a solution to the problem or an improvement in the process is performed. It is important that the action or actions taken are verified to have eliminated the cause and that the problem have been removed. The last step, Q4, is of high importance because if all the previous work is not sustained the efforts gained will be lost and all the effort has been unnecessary. Therefore it is

of importance that process documentation is changed, employees trained and new issues worked on.

5.4.1 Scope definition

It could be said that the scope definition of the risk is set from the top of the organisation (pers. com., Person 14, 2013). As mentioned earlier in this study the top management of ABB PP is dedicated in the sustainable business area and most certainly the safety of the working environment. There is a great focus from the top of the organisation to work proactively with the environmental and working environment risks. “*Safety always comes first*” is often said by the interviewees and there is a constant development to minimize the risks and be able to allocate more time to proactive risk management. Even though investments which can increase the safety are said to be prioritized and should be approved, there is a need to show the effects such an investment could contribute with in terms of risk reduction, efficiency and financial gains, and therefore calculations are needed (pers. com., Person 6, 2013).

5.4.2 Risk identification, and risk estimation, probability and consequences

There are several methods and different parts of the organisational structures used in the identification of risks and several of these methods and structures are also used in the estimation of risks, the analysis of the probability and what consequences it may have (pers. com., Person 14, 2013; intranet 7, abb.com, 2013). This is the Q1 stage of the process and there are several methods used to collect data and measure the area of improvement, problem or risk. The most used methods are explained in the following text.

TIA is a software report system which all the employees within ABB PP have access to (pers. com., Person 1, 2013). In *TIA*, the employees should register risk observations, incidents and accidents, regarding both working environment and environment. When registered, an errant is created and the nearest manager is assigned responsibility to take care of the errant and close it when action is taken. Through this system the top management get statistics concerning the incidents and accidents within the organisation and the units get a tool for an organized work with these matters. The managers can see patterns of incidents and accidents which may imply to make changes within certain areas which are identified as more risky (pers. com., Person 3, 2013; pers. com., Person 20, 2013). Through the statistics, the top managers can identify areas or work that are associated with a higher risk and therefore allocate more resources to reduce them.

Another procedure to identify risks are the *safety rounds*, and also fire safety rounds, which are conducted mainly by the LSA, LSO, LESA, Safety representative and managers at the units (pers. com., Person 6, 2013; pers. com., Person 20, 2013). During these rounds the main procedure is to observe and talk to the operators. This gives an understanding of both the operators’ point of view as well as the critical eyes of the person seeing it from “outside” the daily routine (pers. com., Person 14, 2013).

The *Business development-groups* (VU-groups) are consisting of employees within each business unit (intranet 8, abb.com, 2013). In these groups the idea is to have a results-oriented work in a continual process where problems and challenges are raised and solved. The continual process is started with a *dialogue* including everyone in the group and thereafter *operating* the work and *follow-up* of it which then is given a *support structure*. When the work has come this far the *cultural development* is initiated and followed by getting the *deal in focus*. The BD-groups are mainly worked with separately at each unit within the operating

areas, but the thought is to use these groups more cross-sectional within the organisation to share valuable knowledge and experience (pers. com., Person 11, 2013).

Several *audits* are made at ABB PP which is performed by different actors (pers. com., Person 3, 2013; pers. com., Person 10, 2013). It is internal audits made with different sorts of focus such as electricity safety, working environment safety, environment and quality. Internal audits are carried out continuously in accordance with established plans. Internal global audits are also performed at the different units at ABB PP with a three year interval. The external audits are made by customers, insurance companies, governmental agencies and certification bodies (pers. com., Person 2, 2013; pers. com., Person 3, 2013).

5.4.3 Risk evaluation

According to the 4Q method the risk evaluation is performed in the Q2 stage where the analysis of the risk is done. A risk matrix is used which have two axis, one showing the level of probability and the other shows the level of consequences. Risks up in the right corner of the matrix indicate both a high probability and serious consequences, which conclude that it needs to be prioritized (pers. com., Person 1, 2013; pers. com., Person 3, 2013). Risks that are close to the centre of the axis indicate low levels of probability and consequences. According to a majority of the interviewees, at the *analysis* stage it is of importance to evaluate if there is a possibility for a direct solution to the problem or if a short term correction is possible and at a later stage make a permanent solution to the problem. If none of these options are possible and the risk is perceived to be unacceptable, a stop of the activity is necessary and a permanent solution has to be made before the activity may start again.

5.4.4 Proposals for actions, risk reduction and control

At this stage of the risk management it is the two later steps of the 4Q process that are essential, which are to *improve* and *sustain*. As explained earlier in 5.5, it is at this stage the proposals for actions are made and the reduction of risk or improvements of the process is performed. It is the manager that has the responsibility to monitoring and follow-up the actions to see if the actions have had effect and are incorporated into the natural process (pers. com., Person 4, 2013). According to several of the LSO's and LSA's interviewed, the importance of a manager with a driving force is an essential factor in this process. At ABB PP the risk management is approached with a model called *ERIC PD* which explains how to prioritize the actions for risk minimization (pers. com., Person 1, 2013). *ERIC PD* is an approach that is adopted by all countries that have signed the ILO Convention. When the risk reducing or risk elimination is complete it is important that also the information and processes are updated to suit the conditions for the employees (pers. com., Person 3, 2013).

The so called *ERIC PD*, stands for *eliminate, reduce, isolate, control, personal protection equipment* and *discipline* (internal document, ABB, 2013). The idea is to go to the bottom of the risk, identify the source and minimize the risk as far as possible. This should be done with a focus to, at the first place, *eliminate* the existing risk. It has to be done with consideration to economic and technical aspects because it may be hinders in each of them, or both. If there is no possibility of eliminating the risk, the following actions is to *reduce* the risk to the minimum level. This is done through substitution of for example substance, article, method etc. The next procedure is to *isolate* risk through, for example, total or partial enclosure, guarding and to segregate. The *control* stage is aimed at three levels which are engineering design, job design and amounts of exposure. Engineering design can be local exhaust and dilution ventilation, job design is focused at training, supervision and monitoring, and the amounts of exposure can be to control workplace exposure limits like noise, vibration etc. The

final option for protection is considered to be *personal protection equipment* which is a physical barrier to harm and protects the employee from injury in case of an accident. The last action is to affect the *discipline* among employees through the setting of rules to be followed or to provide information through signs or posters.

5.5 Two accidents – Oil pollution and an *Lost time injury*

Two minor cases have been studied. The first is a working environment case and the type of accident that was chosen occurs several times each year at ABB PP (pers. com., Person 1, 2013). It was an employee who cut himself during work. The second is an environmental case where oil leaked out from the oil separator and into the nearby water which happen more seldom but the workload can symbolize a standard environmental accident (pers. com., Person 2, 2013). The cost of employees is presented with the average prime production cost of clerks as well as workers (pers. com. Person 17, 2013).

5.5.1 Working environment case

This case is examining how many persons within the organization that got involved in a working environment accident and how much time each person involved had to assign to work concerning the situation. In the end it is calculated with a suitable formula and an approximate cost can be obtained. The case is an accident where one employee cut himself so badly that ligaments in a finger were injured and the person had to stay on a sick leave for approximately three weeks. In total there were 14 persons who got involved in the case. The complete list of title of employees involved and the some of the calculations can be seen in *Appendix 8*.

The first step was to take care of the employee who got injured and to ensure that he got the suitable treatment. When it was sure that the person was fine the other employees at the unit had to be informed about the accident and also to restructure the work for the rest of the shift. No production time was lost because of this initial action (pers. com. Person 22, 2013). After these initial actions had been done, the administrative work begins. That includes reports, insurances, investigations, information to concerned managers and possible changes in the working environment. The total amount of hours that was spent on this accident was approximately 100 hours which resulted in a prime production cost of between 90000 - 110000 SEK.

The system requires that certain persons within the organisation are informed about the accident when it becomes a, so called, *Lost time injury* (LTI). In *Appendix 8* it is possible to see the persons involved with the employee injured at the top and the person highest in the hierarchy at the bottom. When serious injuries occur information is posted on the intranet (pers. com., Person 18, 2013). This is both of informative reasons, but also for educational reasons because employees hopefully get the notion that an accident really can happen.

5.5.2 Environment case

In the environment case an accidental emission of oil into the lake Väsman, at Lyviken, was examined. It occurred because of heavy rainfall and that the oil separator, which handles the storm water from the ABB area, did not handle the pressure from the amount of water (Ludvika Nya Tidning, 2013). The oil that leaked out was later analysed to, highly possible, be old oil pollutions from the ground and the storm water system. As in the working environment case several employees got involved in the work concerning the accident. The total amount of employees involved in the case ended at 15 persons. The complete list of title

of employees involved and the some of the calculations can be seen in *Appendix 8*. Most of the people involved were in the emergent action of the operation when the oil was to be narrowed in and the cause of the pollution to be found and to limit the effects. All of the interviewees who contributed in the emergent operation signalise an effective and well organised work. ABB PP has a response team that will be at spot within 30 minutes any time of the day, all year around (pers. com., Person 19, 2013). The response team limited the effects of the oil pollution through the placing of booms in the bay. The area of the oil pollution has a long history of pollution and is heavily polluted from a former firm conducting impregnation of wood in the area (pers. com., Person 2, 2013). After the emergency service had tried to soak up the oil, but failed, the decision was taken to let the oil decompose and evaporate. Except the working hours that ABB PP had to spend on this accidental pollution, also the Ludvika municipality and the emergency services had to spend several hours and as stated in the local newspaper by a person from the municipality; “when an incident with oil pollution like this occurs there are big resources that need to be allocated” (Ludvika Nya Tidning, 2013, p. 5).

In the second stage of the case are the administrative works where reports, investigations, information to persons of interest and proposals for actions have to be conducted. The total time spent on this operation was approximately 60 hours and the final prime production cost was 55000 - 75000 SEK.

5.5.3 Accidental factors of ABB PP which is not included in these cases

Worth noting in the both cases which was studied is that the production was not disturbed in a direct way. If the production get effected it will be even higher costs, and most certainly if the disturbance is at a bottleneck of the production which would result in a direct effect on the invoicing and the financial result (pers. com. Person 17, 2013). There have been accidents and unsafe conditions identified at ABB PP during the year which has led to production stops and the estimated costs incurred are significantly higher than these two cases (pers. com., Person 3, 2013). There are also several additional factors that have not been included in these calculations, but should at least be known as for example the effect of bad publicity, disturbance of work among other employees who have not been directly influenced and productivity loss.

6 Analysis

This chapter presents the analysis of the empirical and theoretical framework with the intension of answering the research questions presented in chapter one. The analysis has a mirrored structure of the theoretical and empirical chapters with the intention to ease the reasoning in the text. The starting point is the wide stakeholder perspective and work through the strategic aspects of environment and working environment risk management to end in the operational aspects.

6.1 Stakeholders

The stakeholders have shown to play an important role in the environmental and working environment risk management at ABB Power Products Sweden (ABB PP), with emphasis on the internal stakeholders; managers and employees, and the external stakeholder; government agencies.

6.1.1 Authorisers

A producer and manufacturer as ABB PP are associated with both environmental risks and risk moments for the employees (pers. com., Person 4, 2013; pers. com., Person 3, 2013). This requires a constant update on *legal requirements* and to have a professional and transparent communication with governmental officers, which ABB PP have been identified to be committed to. According to Delmas (2002) the governmental agencies act as a coercive force and that gives ABB PP a strong incentive for a, at least, adequate environmental performance and safe working environment conditions. The government agencies are also used as a support which supplies information on new legal requirements and new technologies which are an advantage of the approach ABB PP have with the *authorities* (Delmas, 2002; pers. com., Person 3, 2013; pers. com., Person 20, 2013). It can be said that the legal requirements are at least one of the, if not the one, main incentive for ABB PP's sustainable performance which can be seen as a reactive strategy. If the legal requirements are not followed the license to operate can be withdrawn, which definitely is not an option for any company.

6.1.2 Customer groups

Customers valuing the environmental performance and safety of the working environment include these factors when choosing supplier (Rainey, 2008). In the interviews it has been regularly mentioned that especially Norwegian customers care for the safety in the working environment and also British, Canadian, U.S and Swedish customers request information on ABB PP's sustainable and working environment performance. This is in accordance with what Rainey (2008) mention as customers do not want to buy a product which is an involuntarily accepted risk. With government customers, the environmental performance can be a vital factor in public procurement because it is valued to a greater extent (pers. com. Person 2, 2013). If ABB PP fails to live up to the expectations of their customers, there is a great risk of losing business to competitors such as Siemens with their outspoken sustainable strategy. Therefore it is important in the future that ABB PP communicate their sustainable performance actively to increase the sustainable brand of ABB.

6.1.3 External influencers

The pressure from *community* is expressed to be, a potential, vital part in the incentives of companies sustainable performance (Porter & Kramer, 2006), but it has also been identified

that retail consumers exert a greater pressure on companies than customers of industrial companies (Khanna & Anton, 2002). The production is operated in a rather clean manner without disturbing noise, smell or smoke (pers. com., Person 2, 2013). The surrounding community is dependent on ABB PP for the survival and a future development of the community, and with so many of the inhabitants working at ABB PP it becomes a close connection between company and community (pers. com., Person 10, 2013; pers. com., Person 18, 2013). It is also stressed by Delmas and Toffel (2004), the importance to improve or maintain the relations with the community. In this way both the ABB PP and the surrounding community can take advantage of each other as for example through the ABB Industrial High school. It is a win-win solution for ABB PP and the community to cooperate because both will gain from it.

Media is playing an important role when it comes to reputation and as shown in previous studies companies prefer to cooperate with reputable companies (Pakseresht, 2010). ABB PP attempt to show a positive image and use different media channels depend on the objective of the information (pers. com., Person 18, 2013). A good media strategy could help build a reputation and attract customers. In the case of accidents the media can be a harmful stakeholder because the spread of the information to the public and possible customers. Media can possibly affect the company's good will or bad will depending on how they perform and there is a risk in bad publicity. With a good sustainable performance of the company, it would also mean that the company have less to worry about the publicity from the media which also incurs costs.

Because of the *industrial pressure* on ABB PP's cost structure from competitors based in the low-cost countries, it sets demands to improve the efficiency and productivity (pers. com. Person 16, 2013). To be competitive on the world market ABB PP have to deliver products at a competitive price and it is difficult to compete on the wage level costs. On the other hand ABB PP can compete with a proactive environmental and working environment risk management because it will keep the accident and incident costs down (Porter & Linde, 1995). This is a strategy that is hard to copy for competitors and will be a competitive advantage. Competitors as, for example, Siemens is pushing the sustainable development forward and this implies that also ABB should possibly be part of this development.

6.1.4 Business partners

ABB PP is well aware of the risks with *supply chains and suppliers* who may not fulfil the requirements and demands set on them (pers. com., Person 16, 2013). They have code of conducts for their suppliers which they are obligated to follow. Therefore audits are done from local, national and global level, to be sure of the suppliers' environmental and working environment performance as well as assure quality. These three are the areas focused at on the audits. It is important for companies to have a supplier strategy to assure quality products delivered, take responsibility of the ethical values such as environment and health and safety of the employees at the supplier company (Roberts, 2003; Rainey, 2008). The proactive approach to affect suppliers is an effective strategy to assure quality products delivered on time and without environmental scandals which possibly result in less costs for the company. Therefore it is important for ABB PP to also focus on the supply chain regarding working environment and environment issues.

Employees are important in several different aspects regarding environment and working environment performance, because it is the employees that has the closest connection to the core of the company and therefore a unique knowledge, and at the same time they are the

users of the working environment (Rainey, 2008; Wolf, 2013). Employees have therefore a unique position to support in defining and adopting corresponding organizational structures regarding sustainability. All the safety investments, educations, communications and internal rules at ABB PP are at the end for the safety of employees and to minimize the risk of injuries (pers. com, Person 3, 2013; pers. com., Person 10, 2013). The approach to environment risk management and working environment risk management are different in terms of the employees' involvement. It seems easier for the employees' to comprehend the vital in a safe working environment than the seriousness of, for example, SF6 gas emissions that harm the environment. The activities of working environment safety are closer to the employees concerned and the environmental aspects are dealt with at a higher level in the organization.

Bjerkan (2010) states that the work pace and perceived work demand are factors which strongly affect employees' accident risk. According to several interviewees there is a pressure to be efficient and deliver results, at the same time as the safety is communicated to be a first hand priority. If the HSE climate is weak the consequences may be a perceived pressure on the employees' to take safety shortcuts (Piirainen, Rasanen & Kivimäki, 2003). Therefore it is important that the HSE climate reach all the way down through the organisation and avoid get stuck on the way to the employees concerned. When this is not completed it probably weakens the safety climate which directly affects the behaviour of the employees and that indicates the importance of a true commitment from the manager level.

At ABB PP, two different approaches have been identified during the study, which are the *behavioral* and the *operational* approach. The *behavioral* approach sees accidents as a fault in the behavior of employees and a cultural factor. While the *operational* approach focus the attention on the safety of the machines, tools and processes used by the employee. A "good" safety climate has shown to lead to fewer accidents (Bjerkan, 2010). Though there is a need to get to a point where the safety climate can be stated as "good", and there can or need to be several different activities to affect a whole organization. Some of these will be discussed later in the analysis. It seems like there is a need of going through the operational approach and invests in operational safety before reaching the behavioral approach which has a greater focus on affecting the employee and the mindset concerning safety.

It was expressed by Porter and Kramer (2006), that it is essential of moving away from a sustainability reporting focus to instead implement sustainability strategies and Wolf (2013) expand on that when pointing at the importance to translate that into appropriate organizational strategies. ABB have most certainly moved their focus, over the last decade, from sustainability reports to sustainable strategies and the top management is dedicated in these matters (pers. com. Person 14, 2013). The challenges lay in the actual implementation of these strategies and stressed by Ammenberg (2012), that the *managers'* decision making process should be understood and not simplified because it include more than only the environmental aspects. It has been emphasized by both interviewees at ABB PP and by Ammenberg (2012) that the managers have a balance act between several areas of interest, which all are seen as the most important factor, and have to be taken in consideration in the decision making process. At certain managerial positions it mainly reports on financial performance and productivity which do not give incentives, or at least not increase the incentives, for investments in environment or working environment safety.

It is central to have managers that are committed in these matters because a lack of it possibly lead to a situation where hazards are allowed to accumulate (Kallenberg, 2009; Bjerkan, 2010). This may send observational signals to the employees which perceive it as a low

commitment of occupational health and safety from the organization. At ABB PP it has been mentioned that the units with committed managers also to a higher degree have employees who perceive these matters as serious and a need to improve performance (pers. com., Person 8, 2013). On the other hand, at the units where the managers avoid these matters and show a low commitment, also the employees avoid it because it is not seen, or understood, as an important part of their job. It has been shown in earlier research that factors of the organisational climate such as inflexible leadership and poor communication channels contribute to negative effects of working environment safety (Bjerkan, 2010). A challenge which has been identified during a majority of the interviews at ABB PP is to get the sustainable message down the organisation to the employees concerned. According to many of the interviewees the sustainable message gets stuck on the middle managers. An explanation found is a lack in clarity regarding what the expectations and the responsibilities are at the managerial position which demands knowledge within a broad spectrum (pers. com. Person 4, 2013). Therefore a suggestion was to offer managers a better introduction and training.

It seems to be of vital importance to include all levels of the organization in the environment and working environment discussion because every position at the company has different roles and therefore view situations from different perspectives. As understood from interviews and observations there is not everyone who sympathize with the environment and working environment focus of ABB PP. This implies a need of an even more persistent work to reach out.

6.2 A sustainable management business strategy

Companies compete in productivity of how efficient they use capital, labour and natural resources to produce their high quality products or services (Porter & Kramer, 2002). The productivity is dependent on, among other factors, employees who are educated, feel safe, healthy and are motivated through opportunity. The sustainable business strategy should be to use the resources in ways that is more productive. ABB PP has made considerable progress over the last decade in terms of sustainability (pers. com., Person 3, 2013). In terms of labour and employees ABB PP does have a *zero vision* approach (pers. com., Person 10, 2013). The aim is to eliminate all personal injuries and this is clearly stated by the top management. Over the last couple of years there has been an extensive focus on working environment safety which has given the LSA's increased opportunities to influence and perform their tasks. It has also given the effect that capital for working environment investments is now easier to receive if it can be shown that risks are reduced or, even better, that it will induce a pay-back (pers. com., Person 7, 2013). So except the good cause of caring for the employees the effect for the company may most likely be increased productivity, which is equivalent to increased profits.

6.2.1 Incentives for a sustainable development

ABB PP may be seen as both a reactive and proactive company, depending on the area studied. There is a great dedication to working environment safety and also to decrease the environment footprint, but to actually implement it in the operational work takes time and effort (pers. com., Person 8, 2013). When studying the top management of the company it really matches the proactive attitude but when interviewing the employees and managers closer to the production another perspective is seen. The proactive approach is communicated by the LSO's, LSA's, LESA's and HSE-staff but it is still a reactive attitude among others in the organisation which has not been convinced of either the importance, necessity or gain a proactive approach may contribute with.

The main incentive at ABB PP for a safe working environment is said to be that no employee or subcontractor should risk to get injured at work. This has also other effects on, for example, quality, productivity, machine safety, labour costs, and resource efficiency (Porter & Kramer, 2002; Porter & Kramer, 2006; Ottoson & Parment, 2013). So, except the moral ABB PP show through their *zero vision* approach, they also have several factors that can affect the financial result. Either it will be with a positive outcome or a negative outcome, depending on how the environmental or working environment risks are managed at the end.

6.2.2 Regulation, reporting and liability

The main incentive for ABB PP to have a sufficient environmental performance is the fact that, they risk losing the license to operate if the demanded levels are not fulfilled (pers. com., Person 4, 2013). The Swedish laws and regulations demand certain levels of environmental and working environment performance and safety, which need to be fulfilled or otherwise fees and penalties are condemned. The regulations are being more complex which demand more of the companies in terms of registering, reporting and transparency (Regester & Larkin, 2005). It is the manager that is responsible for the laws and regulations to be followed and if these are violated it is the manager who risks prosecution (Regester & Larkin, 2005; pers. com., Person 10, 2013). Therefore it is extremely important that the managers have the information needed and are aware of laws and regulations, and have the knowledge about these requirements (pers. com., Person 10, 2013). Though, as mentioned earlier it has been emphasized during interviews and observations that there may be a lack of this knowledge at some managerial positions. The importance of understanding the managerial position which have several different objectives should be noted and the increased complexity mentioned by both the Confederation of Swedish enterprise (CSE) (2013) and Regester and Larkin (2005).

6.2.3 Competitive advantage

It has been identified that customers to companies within industries such as chemicals, oil, and other harmful products do not expect as much from these companies as from companies in other more environmentally friendly industries (Regester & Larkin, 2005). In the case of ABB PP, which includes oil, chemicals and other harmful substances in their products, they do have certain customers that care about more than just price and quality (pers. com., Person 7, 2013; pers. com., Person 4, 2013). Especially their customers from Norway, Great Britain, U.S.A and Canada tend to require information on the environmental performance and working environment safety. Through the active work of ABB PP with these matters it may reward them with a competitive advantage which is hard to copy for competitors. The investments in working environment and environment will possibly result in less costs and increased profits due to, for example less accidents and a more efficient use of resources.

6.2.4 Reputation management

The economic effects, an accident of this type, have on brand value or the effects on productivity are extremely hard to calculate (Ammenberg, 2012). There is research which point in the direction of that a company's sustainable performance also affect the brand value of the company (Pakseresht, 2010; Ammenberg, 2012). It is also research that has found indications that in a safe working environment, employees are more productive (Bjerkan, 2012) and that it is an increasing number of people that value companies with a sustainable approach when choosing employer (Porter & Kramer, 2012). Out of this reasons it would seem motivated for ABB PP to continue the investments in environment and working environment because of the increased possibilities given through reputation. It could be seen in terms of economic value and the attractiveness as an employer and a business partner.

6.3 The factors of risk

ABB PP operates a production which is associated with several risk moments such as high voltage, hazardous chemicals and gases, sharp edges etc. (pers. com., Person 7, 2013). This means an importance of a professional risk management concerning these, to avoid accidents from occurring.

6.3.1 The cost-iceberg

The cost-iceberg explained in the theoretical chapter does not show any exact numbers or any given truth but it points at costs relative to other costs and gives an understanding of where to allocate the resources (Bird & Germain, 1985). As mentioned earlier in the analysis, ABB PP has an objective called *vision zero* that aims for no personal injuries. The personal injury is symbolized by the top of the cost-iceberg and the administrative and replacement costs are the bottom of the cost-iceberg. These bottom costs symbolize one to three times the cost of the personal injury at the top. When studying the middle of the cost-iceberg, which represents material costs, the really big financial costs are seen. These can be up to 50 times higher than the personal injury cost. The costs of a machine break-down may result in consequences such as production stops, which is associated with several different costs and lost incomes as well as repairing or service costs, among some (pers. com., Person 17, 2013). Even though ABB PP is insured there is still the deductible cost which preferably is avoided and even though the insurance company cover most costs there are still the working hours at the top and bottom of the cost-iceberg that will affect the company. It should also be noted that it is the direct costs that are shown in the cost-iceberg and the actual time that could have been spent on proactive work is then lost for the emergent situation. This is something which probably slows down the positive change within the organisation, and in the long run will result in even more costs because the proactive work has to stand back for new emergent situations.

6.3.2 Sources of risk

Risks are in many ways complex and several different factors, which isolated is not any major risk, but together may result in a factor of risk (Wennersten, 2003). It has been concluded that a successful risk work should include a responsible management who prioritize safety ahead of production, a functioning management system with good routines for risk assessment, and at last competent employees who have the knowledge about both the risk assessment and the production (Reason, 1990; Wennersten, 2003). During the observational studies and the interviews it has been emphasised an importance of the dedication in safety matters of the managers. As mentioned in 6.1.4 a difference had been found between units where the managers were dedicated to these matters and the units it had a lower priority. The risk management system with its routines has been built up over the last couple of years at ABB PP, but there are still improvements needed such as the quality of risk assessments which have been mentioned by several interviewees. The employees' role in the risk management system is seen as very important at ABB PP, because they are the ones with the best knowledge when it comes to the operational factors. Parallel to this fact it has been mentioned by some of the interviewees that the human factor is the main cause of accidents and the safety attitudes are the problem. This indicates that the investments in the employees are of high importance because they are the ones with the possibility of vital contribution in the risk assessments and at the same time they are seen as the cause of accidents.

The human factor has been said to be a result of other primary causes, which are important to identify if the risks are to be reduced (Wennersten, 2003). Several researchers have found it meaningless to blame the human factor as a cause of accidents because it is a result of other

factors (Reason, 1990; Brown, Willis & Prussia, 2000; Ericson & Mårtensson, 2003; Wennersten, 2003). The human factor can be caused by factors as stress, insufficient instructions, and indications of urgency from the management, trying to solve a problem in a different way than the standard operation, among others (Wennersten, 2003). Therefore it is of importance to aim at the primary cause of the risk, as in the tool ABB PP use called *ERIC PD*. This is in line with the findings of Reason (1990) who emphasize the importance of lifting the responsibility from the operator at the floor, up in the hierarchy of the organisation. The *ERIC PD* method involves the whole risk management organisation and the main objective is to eliminate the risk.

6.4 HSE risk management strategies

At ABB PP the HSE risk management strategies have been identified within a broad spectrum. It is conducted from the top of the organisation to the bottom and within several different channels. In the following part of 6.4 the three stages of *environmental risk analysis*, *risk assessment* and *risk management* (from Figure 5) will be analysed out of ABB PP's perspective.

6.4.1 Scope definition

ABB PP has a dedicated top management regarding the sustainable business area and most certainly the working environment safety is prioritized. It is stated by most of the interviewees that "*safety always comes first*" and within reasonable limits of costs risks will be minimized. As most companies, ABB PP balance the risk reduction and the cost of it against the possible positive effects of the investment, either in terms of profit or in terms of risk reduction (Miljösamverkan Sverige, 2010; pers. com., Person 7, 2013). The common message from the interviewees working with risk management aspects is the will to allocate more time to proactive risk management. It is shown to be of importance to divide the risks between expert groups and through the organisational structure of LSA, LSO and LESA the delimitation of risks are made (Kallenberg, 2009).

6.4.2 Risk identification, and risk estimation, probability and consequences

There are several different methods used to identify and estimate the risks at ABB PP. The relatively new software report system, TIA, is a useful tool in this work because it include several of those aspects which Kaplan and Mikes (2012) mention as useful sources. TIA map the potential risks, make statistical reports of incidents and accidents, comparability with the rest of the industry's statistics as well as an opener for contemplation with other units which have shown to have similar risks (Kaplan & Mikes, 2012; pers. com., Person 1, 2013). Except TIA, ABB PP also has the safety rounds, internal and external audits and the Business development-groups which are used in the work of identifying and estimating the risks. These methods give several different perspectives of risks, the external and internal view as well as the operators view and the persons seeing it from outside the daily routine (pers. com. Person 14, 2013). In this way it is possible to avoid the narrow thinking which is fatal in risk management, and it also gives the possibility to interweave knowledge from several different disciplines (Holmgren & Thedéen, 2003; pers. com. Person 3, 2013).

6.4.3 Risk evaluation

The evaluation of the risks identified and estimated, is performed in general among companies and at ABB PP with a risk matrix (Miljösamverkan Sverige, 2010; pers. com., Person 1, 2013). The indications and comparability the matrix deliver is of good use when prioritizing among the risks. At this stage a valuation of what level of risk it really is and from

that the result will either be to try a direct permanent solution or a preliminary solution and if none of this are possible because the risk is too high or it is practically impossible the production need to be stopped, to get a permanent solution in place. As the plausibility principle, ABB PP has the attitude towards environment and most certainly working environment risk that these should be reduced if it is possible within reasonable limits (Ammenberg, 2012; pers. com., Person 7, 2013).

6.4.5 Proposals for actions, risk reduction and control

This stage of the risk management is dependent on how the earlier stage has been performed and with good quality information at hand, the chances of eliminating the risk increase (Miljösmverkan Sverige, 2010). The manager is playing a vital part in this process, according to a majority of the interviewees, and with a driven manager the result of the process will be better. ABB PP uses the method *ERIC PD* to explain in what order the risk minimizing actions ought to be performed (pers. com., Person 1, 2013). When action is taken, primary risks eliminated or reduced, and conditions are changed it is important to be aware of what these changes may affect within the production or even the company (Miljösmverkan Sverige, 2010; Kaplan & Mikes, 2012). Secondary risks may occur from the actions to minimize the primary risk, because of the changed conditions. There is a need of keeping the risk information updated so new risks don't occur without knowing it. When changes in the production environment at ABB PP are performed, new information and processes are to be updated to suit the new conditions (pers. com., Person 3, 2013). *ERIC PD* works as a tool to eliminate or at least keep the risks under control and if used correctly the incident and accident rate could decrease within ABB PP.

6.5 Two accidents – Oil pollution and an *Lost time injury*

The two case studies performed concerning the oil pollution and the person who got injured during work includes several aspects of both operational and strategic risk management, which have been analyzed earlier in this chapter. The operational risk management is concerning the direct impact of the failure in dealing with the risks and the strategic risk management is at the level of the perception of the company and its environmental and working environment performance (Bjerkan, 2010). The costs incurred of the two accidents are in itself not any large numbers for a company as ABB PP, but when this type of accidents occur several times every year it do sum up to great numbers and time-loss. Looking at the cost iceberg or the accident pyramid it is evident that these accidents that affect employees, which cause unnecessary costs for ABB PP, is just a small part of the whole (Bird & Germain, 1985; Räddningsverket, 2003). In a production and manufacturing company as ABB PP where there are heavy and advanced machinery the accidental costs concerning machine breakdowns are expensive (pers. com. Person 17, 2013). Both in terms of the *zero vision* objective and the economic costs, it is a failure when accidents occur and several negative consequences follow. When an accident happens it is easy to draw the conclusion of why there is of importance to work proactively with sustainable development, but it is not as easy to persuade sceptics of the importance before it occurs. That is why it is central to be able to show the consequences that may arise and to be able to build a case to show the possible positive effects of a sustainable investment.

The amount of hours that have been spent on the emergent work of the two accidents should have been used to produce value to the company. It should be noted that the persons who in some way get involved in these two cases are persons at rather high positions within the organisation and also the ones who could have initiated proactive solutions.

Viewed from a stakeholder perspective, it could be noted that effects on the perception of the company may be affected negatively (Rainey, 2008). It may not affect the company directly but if these types of accidents occur frequently it may have negative effect on the stakeholders who perceive these issues as important (Porter & Kramer, 2006). ABB PP has customers with a strict view of working environment performance, such as the Norwegian and Great Britain customers in particular, who may reconsider their business partner if their demands are not met (pers. com., Person 4, 2013; pers. com Person 6, 2013). A lost customer can be stated as a true loss of income and is nothing less than a failure in meeting the demands.

When these two accidents and the costs of them are put into the whole perspective of the amounts of accidents which occurred every year at ABB PP the costs sums up to great amounts. Even though every accident don't result in the costs as these examples, there are some accidents or incidents that incur even higher costs and others are quick fixes which scarcely are noticed. It is important to know that environment investments such as energy efficiency, recycling and change of hazardous products has not been investigated in this study, but it has been mentioned by several interviewees that it is this type of investments which are easier to show payoff potentials on.

At the end of the year the result of all costs will be of a significant value and also other negative effects will be the result. The safety climate at the company will be affected and a safety climate with the attitude of accepting accidents has also shown to affect the accident frequency negatively (Bjerkan, 2010). So with an improved safety climate and the employees' perception of it to be good, will also lead to improved safety behaviour and fewer accidents. This would mean that there could be a extra positive effect of a proactive approach towards health, safety and environment risk management because a safer work environment also incurs a better safety climate which lead to improved safety behaviour and less accidents. In economic terms, fewer accidents mean less costs and that is an incentive for all within the company to reach for.

7 Discussion

This chapter offers a discussion over the findings in this study, compared to what has been found in earlier research. Other perspectives, which have not been presented in this study so far, are discussed and evolved on. The incentives for a proactive approach which was found in the previous chapter is further discussed and compared with earlier studies for a broader understanding of the complex relationship between financial, social and environment aspects.

7.1 A proactive HSE strategy

A proactive business strategy which incorporates sustainable development into the core business has, in the research literature, found to be a successful way for companies to take social and environmental responsibility while being profitable (Porter & Kramer, 2006; Rainey, 2008; Ammenberg, 2012; Perera *et al.*, 2013). The switch from the old shareholder perspective to the stakeholder perspective of business has forced companies to change and develop new strategies which involve health, safety, environment and social responsibilities. This shift can be viewed in *Appendix 4's Table 2*. The challenge for companies has been to transform from the past business strategies to this new strategies where several different stakeholders, with several different interests, have to be involved. It has become a conflict of interests. While the short-term result driven demands come from the shareholders, managers and board of directors, there are also the increasing government regulations, customer demands, media and NGO pressure which require a long-term perspective. This has also been identified within ABB PP, a conflict of interest between financial results and sustainable performance, because all functions within the company do not have the same incentives. For obvious reasons, functions within a company do have different objectives and these can at some points conflict with each other, or at least be of different opinions of what is to be prioritized (pers. com., Person 7, 2013). An obstacle for sustainable development to be incorporated is that it can be so vague and when a manager are to take a decision there is no framework to balance the short-term cost and the long-term objectives (Porter & Kramer, 2006). Managers who lack the knowledge or understanding of sustainable development would possibly postpone this cost, which may lead to consequences that result in far greater costs.

The mismanagement of environment and working environment risks may result in great costs and time loss for employees' who could have produced value for the company (Bjerkman, 2010). These risks can be categorized as preventable risks which should be eliminated or avoided (Kaplan & Mikes, 2012). It can be seen as a domino effect when a LSO or LSA need to use their work hours on emergent situations instead of creating proactive solutions, because then the proactive solution haven't been and the next day there is a new emergent situation which need to be dealt with. This could mean, and also what has been identified at ABB PP, is that the HSE-organisation will need time to be incorporated because the start up is much about emergent situations and actions which need to be made.

A perspective is described in this sentence: "The danger from embedding risk managers within the line organization is that they "go native" – becoming deal makers rather than deal questioners" (Kaplan & Mikes, 2012). This could be a danger within ABB PP if the LSA, LSO and LESA at the business units aligning themselves with the inner circle of the leadership team. Then it could lead to that the "what if" questions may stop or not be as challenging as supposed to. On the other hand, the whole sustainable development vision is to be incorporated in to the core business so there may be a fine line in-between.

The discussion over the statement “*safety always comes first*” is central because when looking at it closely, one can see other perspectives such as financial and ethical which are affecting (Besnard & Hollnagel, 2012). Safety will most likely be as high as affordable from these two perspectives. From these perspectives there is conflict of interests which in this study has shown indications to exist. The managers who report on financial results and productivity do not have the same incentive as either the LSO or LSA or the managers close to the employees’ in the production. There is always a need of tradeoffs and at ABB PP a risk matrix is used which point out the risks or factors of working environment or environment improvements that need to be made or may be invested in. That is a way of differentiate between actual risks and possibilities. A similar method is shown in *Appendix 5, 6 and 7* which show the decrease in risk or environmental effect per invested unit of capital. This could be a helping tool in the tradeoffs between competing investments.

7.2 Measurement of HSE management

It has been mentioned in the interviews that it often is easier to present a payback on environment than working environment investments (pers. com., Person 2, 2013; pers. com., Person 7, 2013). For example energy efficiency, recycling, more efficient use of material which may lead to less waste and cost savings for both the disposal and material cost. Though, it has been perceived that the main focus is on the working environment safety which could get the result of missed opportunities concerning environmental investments.

A study of a working environment project at Swedish Steel in Luleå showed that it may be of importance to classify working environment problems as production problems because it became a natural view of production investments instead of environment costs (Abrahamsson, 2000, p. 7). One conclusion of that study was; “the most efficient way of optimizing the production and thus the competitiveness of a company is to foster cooperation between man and machine and production technology and work organisation”. As seen at ABB PP the production engineer is central in the processes to find solutions and therefore could also be a key to improved work environment safety together with production improvements. This could, and was shown in the earlier study, give both positive effects for the working environment and the production efficiency.

The main incentive of a safer working environment is seen, throughout the organisation, to be the safety of employees and that no one should risk or get injured at work. To justify investments for a safer working environment it has shown to be needed arguments of how this can affect the future production or increase efficiency, which more or less mean that the financial parameters is necessary to allocate capital. The positive effects from a safer working environment and decreased risks of environmental accidents can be used as incentives to work proactively. The study have shown that ABB PP have several incentives to work proactively with these matters and to incorporate the environmental and working environment safety in the core business even more than what is done today. This is in line with Porter and Kramer (2006) refers to as make the sustainability team a part of the core business because in that way it will result in a maximized profit.

8 Conclusions

The last chapter of this study present the conclusion of the findings and intend to address the research questions stated in chapter one.

ABB Power Products Sweden (ABB PP) has a HSE-organisation which possesses a strong mandate from the top management to minimize environment and working environment risks and to work proactively with these matters. This has resulted in an increasing number of managers and employees also understand the importance and relevance of a proactive approach. There are several tools and methods used to identify and minimize the risks within the company, such as safety rounds, reporting in TIA, the Business development groups (VU-groups), audits, risk assessments, consequence analysis and 4Q. This shows that ABB PP has several channels to go through in the work to eliminate or at least minimize the risks. The challenge seems to be to get everyone involved and a hinder has shown to be middle managers who are measured on financial and productivity results and therefore have other incentives, or even conflicting objectives. Another role at ABB PP which has been identified as central in the precautionary work with environment and working environment risks is the production engineer. An investment in them to increase the sustainable mindset could result in positive effects because their role is central when it comes to solutions for improvements in the production. This could increase the safety culture because of the solutions that are used in the production is adapted to environment and working environment safety which is an indicator for the rest of the employees.

Shortcomings in existing management systems or methods to calculate future environment or working environment investments have been identified. This is something that would help the HSE-staff in their work for improvements. There are several incentives for a proactive HSE-strategy that has been identified at ABB PP, but possibly the most prominent is the financial factor. In *Appendix 5, 6 and 7* an example is given of how such a method could be used. It has been shown throughout the study that there are financial incentives to invest in sustainable projects because it pays back in the long-term through direct cost savings, profits, productivity, brand value or competitive advantages. It has been emphasized by several interviewees that environmental investments are often easier to get a pay-off on than the working environment investments because of difficulties in calculating the value of a safer work environment. As seen in the minor case studies the costs of accidents can be rather high even with minor situations, which is a given incentive for a sustainable business.

The effects of working environment and environment issues stretch beyond the operational factors inside the organisation to the stakeholders outside. As presented in the analysis, accidents at ABB PP may affect costs of reactive operational actions, brand value, customers' choice of supplier, fines for law violations and decreased attraction on the labour market etc. A proactive work may cost more in the initial stage of investments but in the long run it will contribute to a safer working environment and a better environment with less reactive actions which have shown to be both costly and time consuming, as well as in the working environment case even negatively affecting the safety climate.

The main incentive for a safe working environment can be concluded as the fact that no one should risk to get injured when at ABB PP. Then this has positive consequences as mentioned above which will please both external and internal stakeholders through either financial result, obedience to the law and regulations, reputation or attracting professional employees, among other consequences.

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Person 2

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Person 3

HSE staff, ABB Power Products Sweden

Personal meeting, 2013-10-16

Person 4

LSA, LSO & Chemical Administrator, ABB Power Products Sweden

Personal meeting, 2013-10-20

Person 5

LSA, LSO & Chemical administrator, ABB Power Products Sweden

Personal meeting, 2013-10-22

Person 6

LSA, ABB Power Products Sweden

Personal meeting, 2013-10-22

Person 7

Manager, ABB Power Products Sweden

Personal meeting, 2013-10-22

Person 8

LESA, ABB Power Products Sweden

Personal meeting, 2013-10-23

Person 9

LESA, ABB Power Products Sweden

Personal meeting, 2013-10-24

Person 10

HSE staff, ABB Power Products Sweden

Personal meeting, 2013-10-24

Person 11

Controller, ABB Power Products Sweden

Personal meeting, 2013-10-28

Person 12

LSO, ABB Power Products Sweden

Personal meeting, 2013-10-31

Person 13

Manager, ABB Power Products Sweden

Personal meeting, 2013-11-06

Person 14

LSA, ABB Power Products Sweden

Personal meeting, 2013-11-06

Person 15

Safety Representative, ABB Power Products Sweden

Personal meeting, 2013-11-08

Person 16

Supply Chain department, ABB Power Products Sweden

Personal meeting, 2013-11-11

Person 17

Financial, ABB Power Products Sweden

Personal meeting, 2013-11-12

Person 18
Communications, ABB Power Products Sweden
Personal meeting, 2013-11-13

Person 19
Security, ABB Power Products Sweden
Personal meeting, 2013-11-15

Person 20
LSA & LSO, ABB Power Products Sweden
Telephone interview, 2013-11-19

Person 21
Production Manager, ABB Power Products Sweden
Mail interview, 2013-11-05

Person 22
Production Manager, ABB Power Products Sweden
Mail interview, 2013-11-05

Person 23
Communication, ABB Power Products Sweden
Mail interview, 2013-11-06

Person 24
Technical Property, ABB Real Estate
Mail interview, 2013-11-11

Person 25
Technical property, ABB Real Estate
Mail interview, 2013-11-13

Person 26
Communication, ABB Sweden
Mail interview, 2013-11-13

Person 27
Environmental specialist, ABB Sweden
Mail interview, 2013-11-13

Appendix 1: Organizational charts

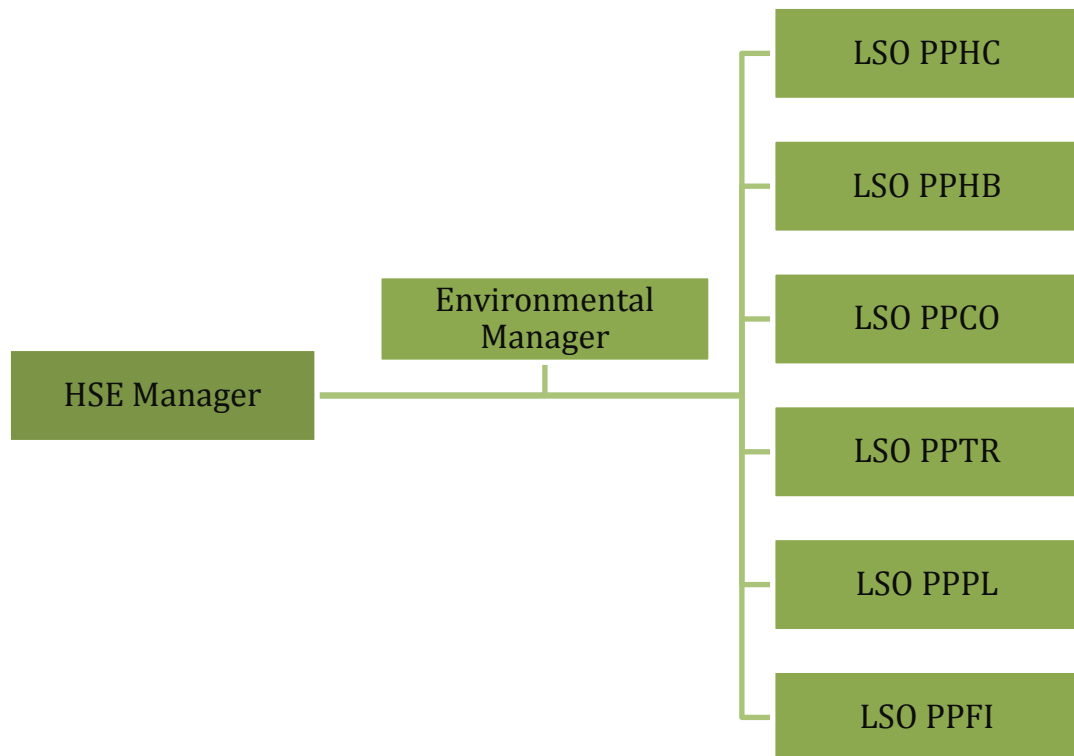


Figure 3 The LSO network at ABB PP.

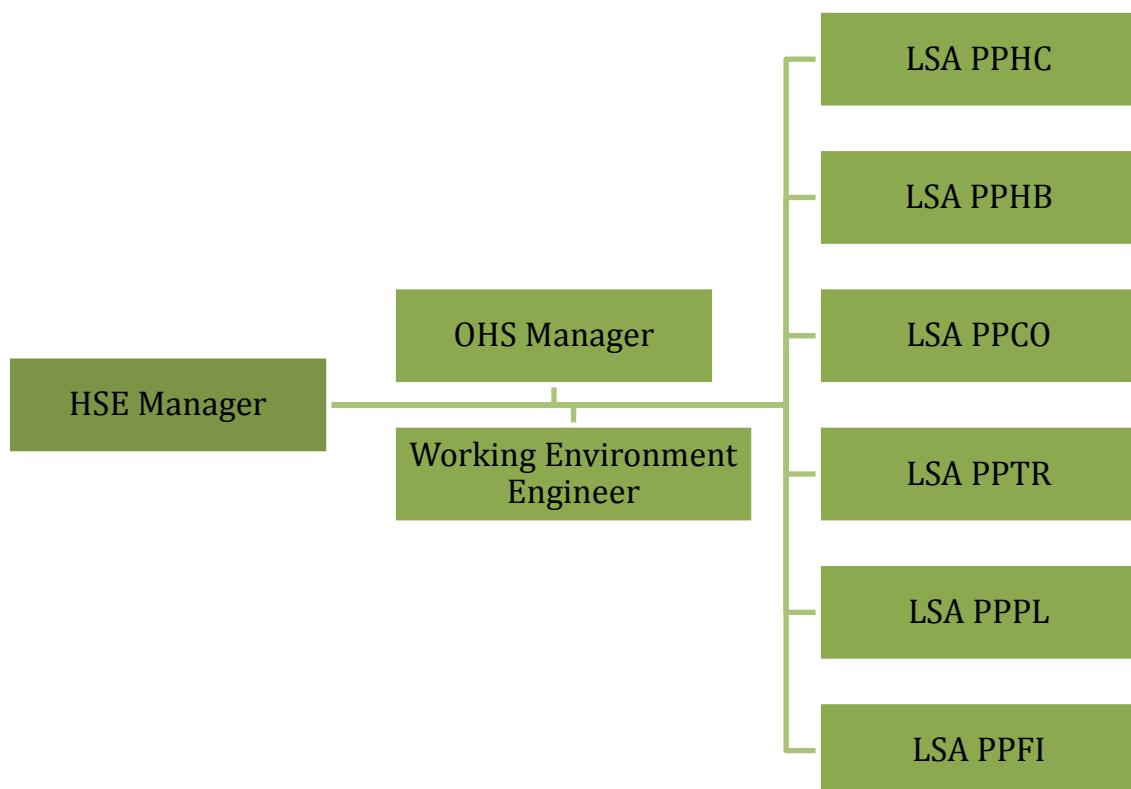


Figure 4 The LSA network at ABB PP.

Appendix 2: Interviewees

Interviewee	Position	Interview date	Interview tool	Validation request	Validation received
Person 1	OHS-manager	14/10-13	Semi structured	2/12-13	2/12-13
Person 2	Environmental manager	15/10-13	Semi structured	2/12-13	2/12-13
Person 3	Work environment engineer & LESA	16/10-13	Semi structured	2/12-13	3/12-13
Person 4	LSA & LSO	21/10-13	Semi structured	2/12-13	2/12-13
Person 5	LSA & LSO	22/10-13	Semi structured	2/12-13	3/12-13
Person 6	LSA	22/10-13	Semi structured	2/12-13	2/12-13
Person 7	Head of Transformers	22/10-13	Semi structured	2/12-13	2/12-13
Person 8	LESA	23/10-13	Semi structured	2/12-13	2/12-13
Person 9	LESA	24/10-13	Semi structured	2/12-13	2/12-13
Person 10	HSE-manager	24/10-13	Semi structured	2/12-13	3/12-13
Person 11	Functioning controller	28/10-13	Semi structured	2/12-13	3/12-13
Person 12	LSO	31/10-13	Semi structured	2/12-13	2/12-13
Person 13	Head of High voltage breakers	6/11-13	Semi structured	2/12-13	2/12-13
Person 14	LSA	6/11-13	Semi structured	2/12-13	3/12-13
Person 15	Head of safety representatives	8/11-13	Semi structured	2/12-13	2/12-13
Person 16	Supply chain manager	11/11-13	Semi structured	2/12-13	3/12-13
Person 17	CFO LBU Transformers	12/11-13	Structured	2/12-13	3/12-13
Person 18	Internal communication	13/11-13	Semi structured	2/12-13	2/12-13
Person 19	HR Security	15/11-13	Structured	2/12-13	2/12-13
Person 20	LSA & LSO	19/11-13	Semi structured	2/12-13	3/12-13
Person 21	Production Manager	5/11-13	Email	5/11-13	5/11-13
Person 22	Production manager	13/11-13	Email	13/11-13	13/11-13
Person 23	Communication manager	13/11-13	Email	13/11-13	13/11-13
Person 24	Technical property manager	18/11-13	Email	18/11-13	18/11-13
Person 25	Country CFO real estate	22/11-13	Email	22/11-13	22/11-13
Person 26	HSE country manager	26/11-13	Email	26/11-13	26/11-13
Person 27	Senior vice president corp. communication	28/11-13	Email	28/11-13	28/11-13

Appendix 3: Interview questions

1. What incentives do you recognize for environmental risk management?
2. What is done today to move the incentives regarding sustainable work downward in the organization?
3. What attitudes can you see within the organization regarding the risk management work concerning working environment? Where is the toughest challenge?
4. What are the economic aspects regarding working environment? How are the budget/costs determined regarding working environment? What are the supports for managers to calculate on environmental investments?
5. What procedures are there to detect working environment risks within the production? Who does the risk assessment?
6. Do the employees get involved in the risk assessment and management, and in that case, in what way?
7. Do the stakeholders in some way get involved in the risk management concerning working environment? What are their possibilities to affect?
8. Do you have an example of how an optimal process concerning the risk management of a working environment situation?

Appendix 4: Regulation, reporting and liability

The reporting of standards has added a pressure on the companies to have a greater transparency, a commitment to corporate governance that is much wider and to integrate the risk management controls (Regester & Larkin, 2005). Regulation, reporting and liability are moving the initiative away from the organizations in terms of determining how extensive the environmental and social goals can be achieved. In other words, it does not only impact the bottom-line of business. It affects all parts of business. The shift that has been in systems and the effects of several factors can be viewed in *Table 2*.

Table 2A more inclusive frameworks for reporting (Regester & Larkin, 2005, p. 74)

Old system	New system
Shareholder focus	Stakeholder focus
Paper based	Internet based
Standardized information	Customized information
Company-controlled information on performance and prospects	Information available from a variety of sources
Periodic reporting	Continuous reporting
Distribution of information	Dialogue
Financial statements	Brother range of performance measures (not just financial)
Past performance	Greater emphasis on future prospects
Historical cost	Substantial value-based information
Audit of accounts	Assurance of underlying system
Nationally oriented	Globally oriented
Essentially static system	Continuously changing model
Preparer-led regulations	Satisfying marketing demands

Both the polluter pays principle and the precautionary principle served as a ground for the development of the current EU legislation (Nihlgård & Bramryd, 2003). The polluter pays principle implies that the one responsible for a negative environmental effect is also the one who is responsible to address and fix the negative impact. This is the regulatory way of countering companies pollution and it also have the effect that incentives are created to act proactively to avoid the risk of additional costs or fees. It is also the precautionary principle that implies that the actor should take precautionary actions when there are risks or known problems which can harm the environment or negatively affect human health (Nihlgård & Bramryd, 2003; Rainey, 2008). The focus is on risk mitigation and to act and resolve problems before it come to the point that you are forced to act (Rainey, 2008). The precautionary principle indicates that the company or organisation need to be aware of and take precautionary action towards negative effects the business may have on the environment and on the health of individuals (Nihlgård & Bramryd, 2003). This implies that the company or organisation needs to have a good risk management.

The focus on the companies has shifted and an increasing emphasis on transparency and the access of information is expected by the stakeholders, which can be seen in the writing of regulations where this is taken into consideration (Regester & Larkin, 2005). Regulations are also becoming more complex and the penalties if violating it are getting tougher.

Appendix 5: Environmental assessment method

It is rather difficult and complex to determine a value of sustainable efforts or proactive risk management actions (Rainey, 2008). Even to formulate the environmental issue is difficult and complex. There is a difficulty in the determination of boundaries of the environmental problem because there is a cause-effect situation in most environmental situations (Ammenber, 2004). It includes both working environment and environment. The cause-effect situation refers to a situation that leads to another which leads to another and so on. This makes it hard to determine a value on the environmental impact. A second difficulty, or challenge, is the fact that it is hard to know all the possible environmental impacts or the possible long-term consequences from a situation (Nihlgård & Bramryd, 2003). This makes it hard to put a true value on the environmental impact and even if we have all possible information to know the environmental impact, there is no common unit to compare environmental impact. Ammenberg (2012) imply that the difficulties of a valuation method and working process should not be seen as discouraging, instead the work with a valuation method should be met with humbleness and it is of essential importance that it is made with transparency. There are several different methods used to determine environmental impact (Ammenber, 2004). The focus here is on an extensive method of valuation in *Figure 10*.

Assessment area:	Grade:
I: Environmental effect; the aspect rise to significant negative environmental impact. It can be widely seen as contributing to a major environmental problem, or significantly to several environmental problems	5
II: Long-term; the identified problems are expected to cause long-term adverse effects. This implies that future generations will likely be adversely affected.	5
III: Resource use; the environmental aspect implies that substantial resource bases will be affected so that the ability of future generations to use resources significantly reduces.	5
IV: Governance; authorities appear to perceive the environmental aspect as important, based on legislation and other types of policy instruments and measures targeted at areas of relevance.	4
V: Other stakeholders; other stakeholders than authorities believe that the environmental aspect is important. This can apply to customers / consumers, banks, insurance, media, etc.	4
Total (I-V):	23
VI: Comparative magnitude; the environmental aspect occurs widely in the business, in comparison with the extent of other environmental aspects and taking into account the impact associated with the various aspects.	4
Product = Sum (I-V) * Quantity (VI):	92

Figure 5 An environmental assessment method (Ammenber, 2012, p. 339).

When the first step, the valuation method, has been done and the determination of which environmental aspects is critical it is time to involve the business aspects of the issues (Ammenber, 2012). There are five areas of focus regarding the commercial assessment. It is the *costs and revenues*, *request and demands from stakeholders*, *regulations and laws*, *potential improvements* and last, *level of knowledge*. These factors are presented in Appendix 6 and 7, with an emphasis on *cost and revenues*. Regarding the *request and demands from stakeholders* this is presented in Chapter 3.2 and therefore not presented again in this text.

Appendix 6: Cost-Benefit Analysis

The aim of a company is to make profit and that is done through products or services that customers are willing to buy for a higher price than the cost of producing them (Friedman, 1970). Therefore it is of importance to include economic parameters in the environmental issues. Ammenberg's (2012) opinion and experience is that many companies have a very vague knowledge regarding how the sustainable business is affecting the economic performance of the company. There are several methods that can be used for this purpose and one is Cost-benefit analysis (CBA) which Rainey (2008, p. 101) simply explained as "the value derived from investing in a product, program or activity was measured against the cost of obtaining the benefits". CBA demands that all advantages and disadvantages can be reduced to numbers and a result showing a monetary value (Ackerman & Heinzerling, 2002). CBA combine the information on a person's willingness to pay with the aggregated approach (Persson, 2006). The generalization of the willingness to pay allows it to be used in different purposes (Persson, 2006; Holland, 1997). The generalization is one of the grounds of the extensive critique against the CBA. The first step in a CBA is to calculate the costs and that is relatively straight forward in theory (Ackerman & Heinzerling, 2002; Rainey, 2008). Far more problematic is to put a monetary value on the benefits of the environmental investment because of the difficulties to translate the environmental benefit into a monetary value. There is not a natural monetary value on a healthy environment and therefore CBA requires that these are created and estimated. *Figure 11* show a diagram which assists to symbolize the effects in terms of monetary cost and reduced environmental impact.

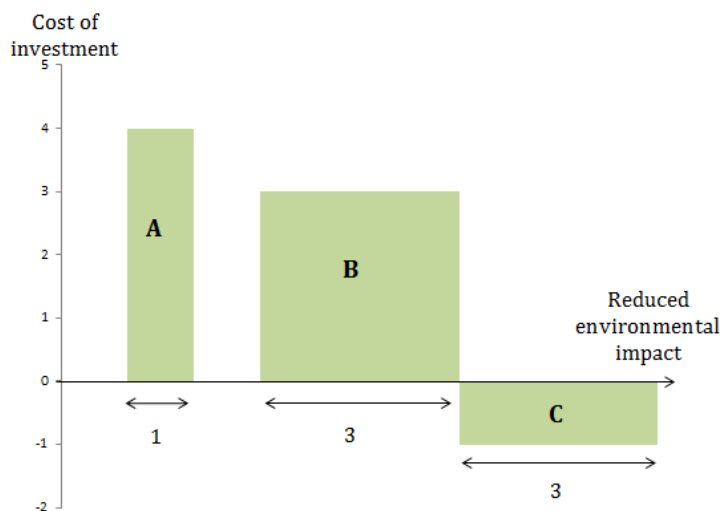


Figure 6 A diagram over environmental effects and costs of investment (Ammenberg, 2012, p. 341)

Combining the economic parameters with the environmental parameters is done through a comparative study between the costs and revenues when the company do take action or if they do not (Bebbington *et al.*, 2006). It is made through an environmental cost-benefit analysis which is presented in the two-dimensional diagram in *Figure 11*. The diagram shows the reduced environmental impact on the x-axis and the cost or revenue from the action on the y-axis. The capital should be allocated to option C in the diagram because it is profitable and reduce the environmental impact to the same degree as option B. Option A show, in comparison, a minor reduced environmental impact but for a high cost and should not be invested in. An investment in option C, described above, has the greatest environmental payoff per financial unit invested.

Appendix 7: Additional factors

Legislations

It is of highest importance to investigate what the legislation is, and if the company fulfil the requirements of the law (Nihlgård & Bramryd, 2003). In the case the company identifies an environmental aspect that can be accused of an environmental crime, it should be given the highest of priority in the list of precautions (Miljösamverkan Sverige, 2010). The environmental aspect should either be given the highest score or be marked as prioritized. If there is an environmental legislation should be seen as an indication that it is of higher importance. On the other hand there are several large environmental contributors which are not in the area of legislation, but may have even greater negative effect on the environment. For example there are legislations against the noise level at the work place but there are no legislation against the type or amount of energy used (Nihlgård & Bramryd, 2003).

Level of knowledge

The level of knowledge concerning environmental aspects and what the future possibilities may be, are vital parts in the work for improvements and can affect if the improvements are possible or suitable (Ammenberg, 2012). Before it is possible to make improvements it is of importance that investigations and inventory are made, because it will be a directive if the environmental improvements are possible to do and what levels of goal the company should aim for.

Improvements

The potential of improvements of a sustainable business should be looked at and considered if it is possible to make changes and to what degree it is possible (Ammenberg, 2012). It can be improvements concerning any area of the business, such as organisational and technical attributes.

Appendix 8: The oil pollution and LTI

Table 3 The time spent and salary cost of the *LTI* is presented

Working environment case							
	<i>Employees involved</i>	<i>Time spent</i>	<i>Internal hourly rate clerk</i>	<i>Internal hourly rate worker</i>	<i>Overtime cost</i>	<i>Salary</i>	<i>Total salary</i>
Employee injured	1	80		x	150%	x	x
Production Mng. Operations	1	10	X		150%	x	x
Production Mng. Assembly	1	3	X		150%	x	x
LSA	1	4,75	X		150%	x	x
Safety representative	1	1		x	150%	x	x
Head of Safety representatives	1	0,5	X		150%	x	x
Safety engineer PP	1	0,2	X		150%	x	x
HSE Division Mng. PP	1	0,75	X		150%	x	x
OHS Division Mng. PP	1	0,25	X		150%	x	x
Division Mng. PP	1	0,5	X		150%	x	x
BU Sust. Mng. Group Vice President	1	0,25	X		150%	x	x
HSE Country Manager	1	0,25	X		150%	x	x
Internal Communications PP	1	0,5	X		150%	x	x
Communication Mng. PP & PS	1	1	X		150%	x	x
TOTAL	14	102,95					90.000 – 110.000

Table 4 The time spent and the salary of the oil pollution is presented

Environment case							
	<i>Employees involved</i>	<i>Time spent</i>	<i>Internal hourly rate clerk</i>	<i>Internal hourly rate worker</i>	<i>Overtime cost</i>	<i>Salary</i>	<i>Total salary</i>
Environmental Mng.	1	10	X		150%	x	x
Group leader SBT	1	2,5		x	150%	x	x
Employees task force	4	1,75		x	150%	x	x
Technical property	1	16	x		150%	x	x
Communication Mng. PP & PS	1	3	x		150%	x	x
Division Mng. PP	1	0,5	x		150%	x	x
Security Mng.	1	8	x		150%	x	x
Technical property Mng.	1	8	x		150%	x	x
Director of nformation	1	3,5	x		150%	x	x
HSE Country Mng.	1	0,6	x		150%	x	x
Environmental specialist	1	0,25	x		150%	x	x
TOTAL	14	54,1					55.000 – 75.000

Appendix 9: Suggestions on further research

In this appendix suggestions on further research within the academic field and suggestions for the case company are presented. The academic suggestions are presented first, followed by the ones for the case company. Due to the extent and detailed description of these suggestions they are put in an appendix. It could therefore better assist in the choice of future research within this area.

For those with interest in this area of research there are a wide range of future research that may be conducted to increase the knowledge for health, safety and environment risk management. It would be of interest to research how companies should organize their sustainability organization to reach an optimal result of their work, because the field is still relatively young and it would therefore be of both academic and businesses value. This could be accomplished through a comparative study between different companies and their organizational structure regarding sustainability.

A research of the incentives that managers have to make sustainable investments would be interesting because both from the academic research and this study, it has shown to be a hinder that the performance of manager's is measured on productivity and economic results. This does not make the incentives any stronger for sustainable investments, and probably it even weakens those incentives. Possibly a study on the incentives given to managers from the shareholders, the board or from top management could be of interest.

Primary for the case company it may be of interest to make a research on financial models that could be used to increase the understanding within the companies. It has shown to be important for the persons working with sustainable development, to be able to build strong cases to get the investments and it is expected that this is presented in economic terms in many cases. Therefore a financial model over sustainable investments could be a vital tool for the ability to convince managers of these investments.

It would also be of interest to do a research on what role within a company that could be central for the implementation of the sustainable development into the core business, which Porter and Kramer (2006) point at as of vital importance. In the case of ABB the production engineers was seen as possibly holding that role and it could be interesting to further investigate that or looking at it within another company.