

HRO performance in small/medium oil-service organizations



What are the possibilities for HRO performance in small and medium sized oil-service companies, and have PI Intervention fulfilled the demands for a reliable and safe organization?

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Masters thesis in societal safety
University of Stavanger
2010

**MASTERS THESIS IN
SOCIETAL SAFETY**

MASTERS THESIS

SEMESTER: Spring 2010

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GUIDANCE COUNSELOR: Ole Andreas Engen

**TITLE OF MASTERS THESIS:
HRO performance in small/medium oil-service organizations.**

“What are the possibilities for HRO performance in small and medium sized oil-service companies, and have PI Intervention fulfilled the demands for a reliable and safe organization?”

KEYWORDS: HRO performance, Safety procedures, Emergency preparedness

NUMBER OF PAGES: 61 (excluding references and appendix)

STAVANGER : 13.06.2010

Preface

As two years of hard work, discussion and intelligent schoolmates comes to an end, I am proud to submit my thesis. This is a product of the input I have received from all the exciting and intelligent people I have met during these last years.

First I would express my sincere gratitude to my guidance counsellor Ole Andreas Engen. Your guidance, advice and comments have steered me in the right direction and to a product that I am proud to call mine.

My appreciation and respect also to PI Intervention, and especially Katrine Eide, who has taken me in and provided me with the necessary information to complete this thesis.

A special thanks to my friend Mirjam, who has been right beside me through this process, I could not have done this without your translations.

Finally, to my family and Roy, for always being there and putting a smile on my face. Thank you

Maren Gilje Løland

Date

Abstract

Every individual who is employed by an organization demands that he/she will be able to do the best job they can under safe conditions. Equally, employers in all organizations are seeking the optimal conditions for employees to do their job productively and safely, so that they avoid personnel injuries, high turnover, sick leave, substitutes and general poor work ethics. There are many elements involved in creating a safe environment, which is mainly the same for large and small organizations. The context for a small organization, in difference to a large organization, is relatively the same, but do small organizations have the same possibility for high reliability performance as large organizations? PI Intervention, an oil-service organization have asked me to perform this investigation, in addition to evaluate their emergency preparedness plan and response.

In this thesis the high reliability theory is used to investigate the safety culture and organizational approach to a safe work environment. PI Intervention invited me in to do this investigation and provided me access to their organization to do interviews and observations of their emergency preparedness exercise. Qualitative research methods like interviews, observations and informal conversations were used to gather empirical material, which has then been discussed in relation to high reliability organization theory, as well as emergency management.

The findings indicate that PI Intervention as an organization is preoccupied with maintaining a safe environment for their employees. There is a trusting relationship between management and front line personnel which creates an open and transparent organization, where safety is in high priority. PI Intervention is a small/medium sized organization, but there is no indication that the size of the company has a negative effect on their safety systems. There are, of course, some aspects, such as limited resources and manpower, that could influence the work that is done in safety procedures, but there was no sign that this was the case at PI

Intervention. Being a relatively small sized company has its limitations, but also its advantages. Although PI Intervention does not fulfil all of the elements that a high reliability organization requires, I see them as a high reliability organization because of their successful procedures and preventive work toward emergency preparedness.

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1. Introduction

Today there is an increasing focus on safety at workplaces. In order to prevent personnel injuries, promote their business, maintain a respectable reputation and avoid a high turnover in the company it is important for employers to be able to present a safe environment in their organization. The employees are dependable on a safe environment to be able to do their job, and to maintain a healthy attitude towards doing their job. Therefore, it is important both for employers and employees to have a safe work environment.

This thesis will be focused on High Reliability Organization (HRO) performance in small scale companies. The robustness and reliability of an organization is often seen in relation to HRO performance. As an organization it is important for PI Intervention to be prepared for any emergency situation, big or small, and be able to protect their employees and production. It is also necessary to be aware of the working environment and safety culture in the organization, as this may be an indicator of safety performance and system error rates. This thesis will research if PI Intervention is a High Reliability Organization and if being a small/medium sized company provides any restraints, difficulties or advantages.

1.1. Presentation of PI Intervention

PI Intervention is an oil service company and an independent supplier with focus on operation and maintenance of down-hole tools such as plugs, packers and straddles with associated running and pulling tools (PI Intervention). PI Intervention is a fast growing company that started with 7 employees in 1998, and have the last years expanded to over 80 employees. They now have offices and workshops in Trondheim (which is owned by their sister company BTU), Bahrain, Saudi Arabia and Azerbaijan, with their headquarters located in Stavanger. With this expansion comes more responsibility to maintain a level of safety that is satisfying both for workers,

employers and the government's standards in the country they are working in. With their headquarters located in Stavanger and approximately 60 of 80 employees are located here it is natural to use this location for my study.

The Stavanger location has pr. 05.03.2010, 63 employees and 5 consultants. The workshop division has 9 employees and one Production & Maintenance manager. In the workshop they produce the tools, like plugs, straddles, valves and packers. These are all used in the offshore processes where PI Intervention first look into different well parameters like well temperature, pressure, restrictions and other aspects that will have an impact on what type of operation is needed. They then come to a conclusion for a solution that will fit this specific oil well. The organization is also a problem solving company for their clients, as they are hired in to evaluate and implement solutions for problems that arise in the offshore sector.

PI Intervention do jobs in many countries all over the world, for instance, among other places, they have work in Holland, Denmark, Russia, England, Saudi Arabia and Azerbaijan. Their biggest client is Statoil, while other clients are Saudi Aramco, BP, Conoco Philips and PDO in Oman. Some of the work outside Norway's borders is sub-contracted to other companies in the particular country. In relation to working with all these different clients, and geographical location it is important for PI Intervention to maintain an overview of rules and regulations that apply in each country. PI Intervention is both ISO and Achilles certified (described in chapter 5) which is certifications that are joint for the entire oil industry and can offer a recognition of safety achievements, so that the clients can verify that their HSE manuals and safety regulations are all up to date.

1.2. Research question and limitations

PI Intervention has asked me to evaluate their emergency preparedness plan to see if it meets the requirements of the NORSOK standard, and that it is in compliance with what relevant theory states an emergency plan should entail. The NORSOK s-006 standard, which is used by PI Intervention, is a standard that is used in HSE evaluation of sub-contractors and suppliers in the oil industry, and describes the demands for the organizations HSE control systems. The standard is applicable for activities both on- and offshore, along with naval installation activities. It is divided

into 7 main elements that are: leadership and commitment, policy and strategic goal setting, organization/resources and documentation, evaluation and risk management, planning and procedures, implementation and follow-up and revision and review. The organizations HSE system and organization of the HSE work is then given a score from Unacceptable to Very satisfying (Norwegian technology Centre, 2000).

However, there is, every other year, an evaluation of the emergency plan done by one of PI Intervention's clients. This evaluation is done in accordance with the Norsok standard and is performed by a qualified and experienced staff member of a customer company. In May 2009 a staff member of Statoil/Hydro completed this evaluation and PI Intervention was approved with good credits. In relation to this, I feel that I do not possess the experience or competence to perform the same evaluation and trust that the Statoil/Hydro employee embodies the competence to perform this evaluation to PI Interventions satisfaction. In addition, it is very difficult to find theoretical research that clearly states what an emergency plan should entail, so I will therefore approach this task in a different manner.

The focus of this thesis will be if PI Intervention is a High Reliability Organization, with special attention to safety. The HRO theory includes, but is not limited to, safety culture, where the overall attitude towards safety in working procedures in the organization is mapped out, the relationship between management and front line personnel and the safety procedures that are in use in the workshop location. These characteristics of an organization are all elements in the organizations ability to handle surprises, its overall resilience towards incidents and accidents, and the mindfulness in the organization.

In addition, I wish to analyze the emergency response plan in PI Intervention. As this plan is a part of how the organization handles crisis and unexpected situation, it is important to examine if the emergency plan clearly states what roles and responsibilities are delegated to whom, if it contains enough information so that the personnel would be able to perform emergency handling to a satisfactory level. In addition, it is important that the plan is integrated into the company, not only placed in a folder. Therefore, I will perform interviews mapping how well the personnel know the procedures and manners in which emergency handling is done. There will also be

an emergency drill performed at their office and workshop location, where I will be observing the effectiveness of their emergency response plan.

The research question for this thesis will be:

What are the possibilities for HRO performance in small and medium sized oil-service companies, and have PI Intervention fulfilled the demands for a reliable and safe organization?

In addition, I wish to study the emergency response plan that is created by and for PI Intervention. Does the plan contain enough and the right information, so that the employees are able to perform emergency response in an effective and precise manner?

This thesis is restricted to PI Intervention office and workshop location in Stavanger. There will be no focus on other corporative locations, neither will a possible crisis situation offshore be taken into account in this thesis as PI Intervention would not have main responsibility for such an accident, the operating company on the platform would be in charge of emergency response in such a situation.

This investigation was an assignment from PI Intervention which I accepted to perform. There has been a great deal of freedom in performing this task, the employees of PI Intervention has been open and allowing me access to all the information I needed. I have also had the liberty to decide my own research design, how to perform the investigation and what to include in my thesis. Most importantly, it was my decision to use the research questions that are presented in this investigation and the conclusions are a result of my own research, discussion and analysis.

1.3. Purpose of the thesis

I chose this study because the oil industry is an interesting field, with increasing focus on health, safety and environment. A large percentage of the organizations in the oil industry are of small/medium size, which makes this thesis relevant for them as well

with regards to what you need to be aware of to create a safe environment. Generalization of this thesis is limited, as it is a case study of one specific organization, but I hope this may help other organizations to expand their knowledge about high reliability organization theory and how they can best work towards emergency management. This thesis is something that I hope will aid PI Intervention in their work towards creating a safe environment for their employees. Through this study I hope to gain a wider and perhaps more practical perspective on how emergency preparedness is planned, integrated and performed. In addition it will be useful to see how safety culture is present and integrated within a company like PI intervention, together with limitations and advantages as a result of their relatively small size company.

A research paper like this may help to increase insight into PI Interventions emergency preparedness and their ability to handle emergency and other unexpected situations in an effective and successful manner. It will also map their aspirations toward being an HRO with focus on safety and prevention of accidents in their office and workshop locations.

1.4. Structure of the thesis

Chapter 2.

In chapter two there will be a detailed description of the theoretical aspects that will be used in this thesis in order to answer the research questions that were presented in chapter one. The theoretical contributions that will be used are the HRO theory with focus on mindfulness and organizational culture, along with emergency preparedness and a model for continuous improvement of emergency preparedness work. There will also be included theoretical facts about small organizations.

Chapter 3.

Chapter three will be the method chapter. Here there will be a presentation of the method used for this thesis and an outline of qualitative case study which is used in this thesis. There will also be an introduction of the strengths and weaknesses, along with the validity and reliability discussion.

Chapter 4.

The empirical data will be presented in chapter four. This will be the findings that resulted from the interviews, observation and informal conversations. These results will be divided into paragraphs relating directly to the theoretical contributions that were presented in chapter two.

Chapter 5.

Here the main part of the thesis will be written. This is the discussion of the findings related to the theoretical contributions. The chapter will be divided into the same chapter headlines as the theoretical chapter so that it may be easy to follow and understood.

Chapter 6.

Chapter six will offer the conclusions that are drawn in relation to PI Intervention, the theory and the empirical findings. Based on the discussion there will be a set of conclusion to answer the research questions that were presented in chapter one.

2. Theory

In this chapter there will be an introduction and explanation of the theory that will be used in this thesis as background for the empirical research. Included here are the four principles of HRO, organizational HRO theory and emergency preparedness. This is also the basis for the discussion that will follow in chapter 5.

To have a well developed safety culture in an organization is a part of keeping the organization reliable. A good safety culture will help ensure low incident and accident rates, which in turn will keep production effective with a minimum of interruptions. Reliability is essential for all organizations that provide services and are reliable on income to be able to maintain production. To be reliable means trust from their clients, a good reputation and the ability to maintain production in the event of unforeseen situations. The elements for reliability are found in HRO theory which is the basis for this research.

2.1. High Reliability Organization

The High Reliability theory is developed by a group of researchers at the University of California. The theory is based on that accidents in high technological systems can be prevented, and is positive concerning control of safety. It is necessary for an organization that aims to be an HRO to always have focus on safety and reliability through decentralized control, a strong organizational culture and continuous learning (Aven, et.al. 2008).

Aven et.al. (2008) identifies four components that are necessary for a reliable and safe organisation:

1. Safety and reliability is high priority in higher levels of management.
2. Redundancy increases safety. Duplications, overlaps and backup-systems are necessary to compensate for errors.
3. Decentralized control, strong organizational culture and continuous learning. Decentralized decision-making is necessary for fast, flexible and locally adjusted reactions. A strong organizational culture will increase safety when all levels of employees are encouraged to respond in a similar and correct manner. An organization needs to focus on a culture where colleagues can consult and correct each other.
4. Organizational learning, through trial and error, testing and simulations. Learning and experience from previous accidents is effective and can teach the organization how to avoid similar accidents in the future.

The HRO theory is built on the belief that effective planning will give a safer system and a safer organization.

Mindfulness is also a central element to the HRO theory. An organization that has mindfulness is focused on the unsafe and uncomfortable, not the safe and comfortable. To be mindful is the organizations ability to see the important signals that something is wrong and that they can respond to these signals before they evolve into a disaster (Weick et al. 1999).

One needs to plan and train to have an expectation of what can possibly go wrong and the organization needs to be flexible and diverse in order to be considered as a mindful organization. These elements will also help build a reliable organization (Kruke & Olsen, 2005)

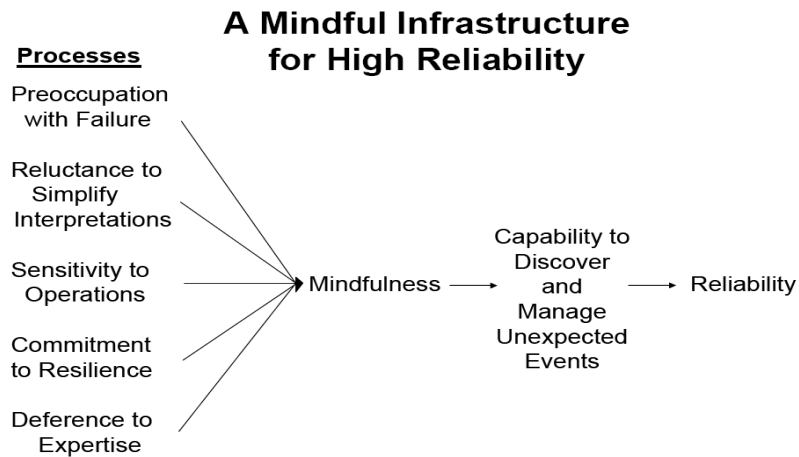


Figure 1. Mindfulness (Weick, 1999).

To explain this figure briefly one would relate the first point of *preoccupation with failure* to the awareness within the organization to look for what could go wrong and the signals that are sent when something is about to go wrong.

Reluctance to simplify interpretations entails maintaining a divergent viewpoint as a strategy to be able to handle a complex environment.

The third process of mindfulness is *Sensitivity to operations*. “Organisations strive to create and maintain an integrated big picture of the moment through ongoing attention to real-time information” (Kruke & Olsen, 2005. p 285). This may also be called situational awareness, where the organization has perception of the elements in the environment, understand their meaning and their status in the near future.

Then we have *commitment to resilience*. To be resilient means having the ability to bounce back from incidents and accidents. It is also important to always question the knowledge that you have and be able to handle surprises.

Finally is *deference to expertise* which focuses on the ability to shift authority from management to front line people with hands-on expertise. Control slack, defined as individual degrees of freedom in organizational activity, is essential to deference to expertise. Temporary networks or coalition among partners, each capable of contributing something valuable to a short term project in response to disasters may be results of deference to expertise (Kruke & Olsen, 2005). Basically it is the ability to shift easily from centralized to decentralized authority when necessary.

Weick et al. (1999) points out that there has been missing a clear specification of how mental processes interrelate to produce an effective error detection system. When the employees in a HRO focus on “failures, tendencies to simplify, current operations, capabilities for resilience and temptations to over structure the system, these concerns cover a broader range of unexpected events” (Weick et al. 1999. p. 86). Figure 1 show that these elements tied together have the capability to create awareness of details and the capacity of action, and this capability is seen as mindfulness. “Mindfulness is as much about the quality of attention as it is about the conservation of attention. It is as much about what people do with what they notice as it is about the activity of noticing itself” (Weick et al. 1999. p. 87).

2.2. Organization and culture

Up until the 1980s culture was more connected to different countries than to organizations, and there is still a difficulty of defining what an organizational culture really is. Reason (1997) presents one definition:

Shared values (what is important) and beliefs (how things work) that interact with an organization’s structure and control systems to produce behavioural norms (the way we do things around here).

It might be hard to understand what a safety culture actually is. It is a diffuse term which has many definitions. Now, however, it is more and more common in organizations around the world to concentrate on this concept when mapping the level of safety in their organization. “Few things are so sought after and yet so little understood” (Reason, 1997. p. 191).

2.2.2 Safety Culture in a HRO

There are four critical subcomponents of a safety culture; a reporting culture, a just culture, a flexible culture and a learning culture. They interact together to create an informed culture, which can be the equivalent of a safety culture, “as it applies to the limitation of organizational accidents” (Reason, 1997.p.196).

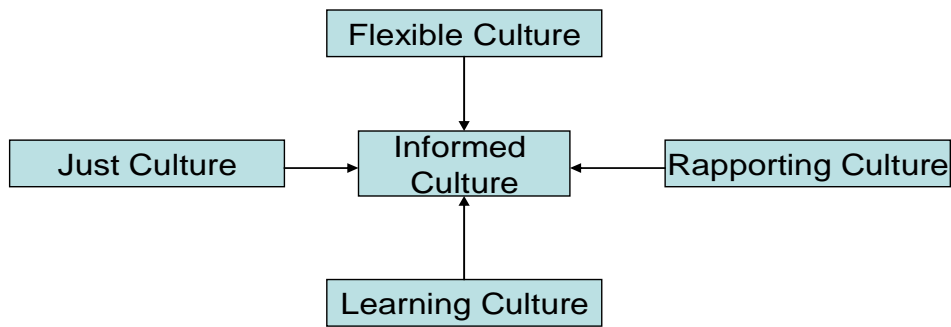


Figure 2. Elements of an informed culture (Reason, 1997).

2.2.3 Just Culture

In a just culture there will be a high level of trust and openness in the organization. One person will not be the main cause of an accident, and there will be a distinction between intended and non-intended actions. Reason, however, writes that to achieve a just culture is most likely an unattainable ideal. Justice will always be restricted by possibility.

Reason (1997) states that “a prerequisite for engineering a just culture is an agreed set of principles for drawing the line between acceptable and unacceptable actions (p.205). One also need to be aware of that an organization cannot punish all errors and unsafe acts, regardless of origins and circumstances, and it would be just as unacceptable to give everyone immunity from sanctions to actions that could or did lead to organizational accidents (Reason, 1997).

2.2.4. Flexible Culture

To have a flexible culture in an organization means that the culture is capable of adapting effectively to changing demands (Reason, 1997). This is one of the most prominent features in a HRO. To be flexible entails the skills of the personnel to shift roles in a crisis situation. If the senior manager or the technical expert become incapacitated during a crisis situation, it is important that someone on the staff is able to cover their responsibilities. A HRO is also able to shift from centralized control to a decentralized mode, where operations depend largely upon the first line supervisors (Reason, 1997).

2.2.5. Learning Culture

A learning culture is, naturally, defined by the ability to learn from what is reported in safety systems and use this information as basis for decision-making, and the ability to use proactive and reactive information so improve safety (Reason, 1997). It is important to be able to learn from the mistakes that are done, so that the number of near-accidents and actual accidents may go down.

2.2.6. Reporting Culture

To have a reporting climate in the organisation is important in the aspect of knowing what leads up to an accident. If there are no reports of accidents or near-accidents it is difficult to find what leads up to these events. In a reporting culture employees will be encouraged to report both small and large discrepancies. However, as Reason (1997) puts it, it is not always easy to persuade people to file reports on critical incidents or near-miss happenings. There are many issues connected to filing such a report. First, one might have problems revealing ones own mistakes, there are many ways to react when you have made a mistake, but it is not often the first you do is to confess. Second, one may not feel that the managerial response to these reports is worth the extra work of filing the report. What is the use when nothing comes of it anyway? Finally, there is an issue with trust. Even if people are convinced to write a detailed report and that some action will be taken on the basis of this report, they need to experience a trust relationship to the management that the right people will be given responsibility and that reprimands will not affect others than those who have been at fault (Reason, 1997).

However, Reason states that it is not merely enough to have the parts of an informed culture, you also need to be able to use them. "A culture is something that an organization is, rather than something it has" (Reason, 1997. p. 220). To approach a satisfactory *is* state, one definitely needs the components that have previously been mentioned, but it is up to the organizational chemistry to actually create an informed culture (Reason, 1997).

2.2.7. Protection and production

In an ideal organization there will be an intelligent divide between resources spent on protection and resources spent on production. Protection should correspond to the risks related to production, so that production can continue without the possibility of a

disaster approaching. On the other hand, production, of course, also needs to be prioritized because the organization is dependent on profit. This balance is illustrated by Reasons (1997) protection vs. production model shown under.

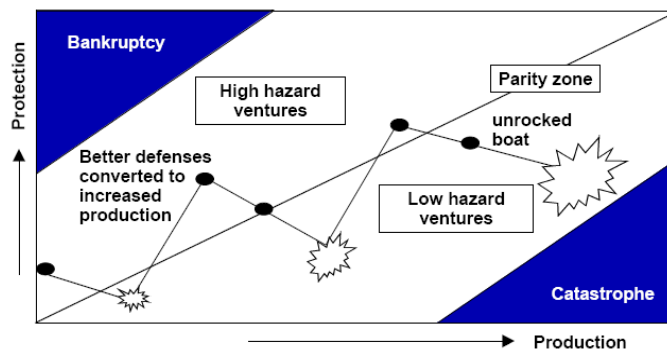


Figure 3. Protection vs Production (Reason, 1997).

To explain the model; in the top left corner is the area an organization would lie in if the protection part is over emphasised, and more resources like people, money and equipment is used on protection instead of production, and the production does not create enough profit, which results in bankruptcy. In the bottom right corner is the potential for catastrophe. In this situation the organization have under emphasized the importance of protection, and have not granted enough resources towards security, which can result in a disaster. Both these scenarios have the potential to put an end to the organization. “The level of protection should match the hazards of the productive operations = the parity zone” (Reason, 1997. p. 3).

There is also a point in figure no. 3 that is called unrocked boat. This is a phenomenon that occurs when there has not been an incident in the organization in a very long time. This may create a false safety, where employees maintain the mentality that “nothing has happened yet, its not going to happen in the future”. It is therefore likely that employees will reduce the safety levels they work by and not follow safety instructions as rigidly as they would had they just had an accident at their workplace (Reason, 1997).

2.3. Emergency preparedness – What defines a crisis?

A crisis may have as many definitions as there are people in the world. Rosenthal et.al. (2001) defines it as “periods of upheaval and collective stress, disturbing everyday patterns and threatening values and structures of a social system in

unexpected and often unconceivable ways” (p. 6). This is only one variance of the many definitions, and describes a system that is currently in upheaval and stress, which naturally would lead to a loss in production efficiency for an organization like PI Intervention. A crisis in an organization like PI Intervention can be defined as a smaller accident that obstructs production in the workshop area. This will prevent the company to be able to supply equipment out to the North Sea. However, the Directorate for Civil Protection and Emergency Planning (DSB) sees a crisis as a situation that threatens or could threaten an organizations core functions and credibility, which is a definition that is more applicable to a smaller company like PI Intervention. DSB also state that the most central aim for the work toward societal safety and emergency planning is that a break in vital societal functions and larger accidents should not lead to serious societal losses (DSB, 2007). The DSB is aimed towards a broader social organizational setting of course, but this definition can also be applied to smaller organizations and companies like PI Intervention, if one see societal structures as the structures within the organization instead.

2.3.1 What is preparedness?

So how can we define what being well prepared means? In the Norwegian public review regarding protection of the country’s critical infrastructures and societal functions, the Justice- and police department defines emergency preparedness as ”emergency preparedness is planning and preparing of actions to control unwanted incidents/accidents in the best possible way after they have happened” (Justis- og politidepartementet, 2006. p. 38). At the same time each company needs to be aware of their own responsibility for safety, and each of us has the responsibility to be prepared for a break in supply of important services and commodities (Justis- og politidepartementet, 2006). The DSB (2007) states that serious accidents or crisis situation can never be completely avoided, but that it is possible to reduce the probability for and the consequences of such serious incidents through systematic work on societal safety and emergency preparedness.

According to the DSB there are several phases included in working toward satisfactory emergency preparedness. These phases are presented in figure no. 4.

The model shows that every element is part of a circular process that will ensure the quality of emergency preparedness, and give continuous improvement through risk analysis, practice and evaluation.

Here is a short introduction to the elements:

1. *Clarification of roles and external conditions.*

It is important to clarify what type of emergency response the organization is responsible to have in their procedures and what type of formal demands, laws and procedures are concretized. It is also important to be aware of what is expected of the organization in relation to other institutions, like ambulance, fire department and police.

2. *Goals and organization.*

The work towards emergency preparedness needs to establish goals of what they want to achieve and how this work is organized. It is important that a system is created to ensure the work process toward preparedness in

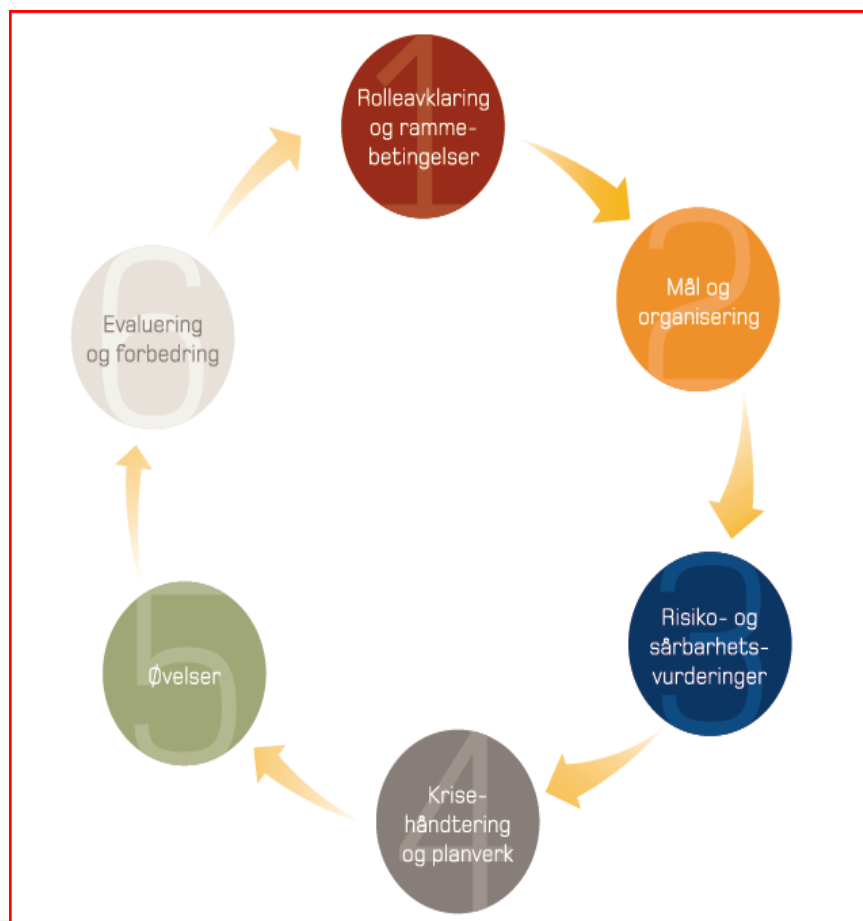


Figure 4. DSB circular model (DSB, 2007, p. 15)

one's own organization.

3. *Risk assessments.*

These assessments are supposed to clarify risk challenges within the organization. Risk is seen as a combination of possible consequences of an unwanted incident and the uncertainty that the incident will happen. A risk assessment will give an indication of dangers that unwanted incidents constitute within the organizations area of responsibility, and the ability of the organization to maintain or restore important organizational functions.

4. *Emergency management and plans.*

It is important to have plans prepared on how to manage a crisis that can quickly be taken in use, and that are updated. The plans should describe how the organization in the best possible way can handle a crisis situation that demands more extensive handling than what is needed on a daily basis.

5. *Drills*

To be able to succeed in handling a crisis situation it is important that the employees know their roles, tasks and the emergency plans, so that they can respond in the proper manner. A well completed emergency drill is a test that will show if the plans are well known and practiced. The DSB (2007) states that “an emergency preparedness plan that is not trained for is practically worthless” (p.26).

6. *Evaluation and improvement*

So that the organization have best possible use of the phases described, it is important that plans, risk analysis, drills and handling of real events are processed and evaluated. Each drill should be evaluated according to the goals that were identified before the drill, and the evaluation should result in a list of actions that can result in changes of plans or other improvement elements.

2.4. To be small in a large world

The European and Norwegian governments have a formal definition that states that a small organization has fewer than 50 employees, sales reaching 80 million Norwegian Kroner (NOK) or an accounting balance of less than 80 million NOK. A medium sized organization has between 50 and 250 employees and economical size of about 400 million NOK. Organizations exceeding these dimensions are considered large organizations (NHO, 2009).

The Confederation of Norwegian Business and Industry (NHO) operate with other numbers. They set the limit for a small company at 100 employees, and large companies have more than 100 employees. They explain this division by looking at the companies' organizational- and working capacity to uphold their commitments to the market, in addition to at the same time having an administration that makes them capable to understand their own development, to care for their own developmental tasks and the relationships to other stakeholders in the community (NHO, 2009). "Smaller organizations are not large organizations in miniature, but what defines smaller organizations is hard to generalize (NHO, 2009)"

According to the NHO, 95% of their members are smaller businesses and companies, with less than 100 employees. Small and medium sized companies are the backbone of Norwegian business and industry and these companies are important innovators and primary suppliers of workplaces in the local community (NHO, 2009).

2.5. Theory vs. practice

The primary goal of an HRO is to fulfil the four perspectives that were presented in the beginning of this chapter. The four perspectives form the basis for a safe and reliable organization together with mindfulness and the safety culture of an organization. If PI Intervention is able to have focus on these characteristics in relation to HRO theory, one can assume that respondents will give expression for a safe environment and a trusting relationship between management and front line personnel.

In this thesis, based on the theory and method, one can expect to find that PI Intervention is a company with relatively good performance in accordance with HRO

theory, but that there will be some areas of safety performance and emergency preparedness that needs to be improved. PI Intervention is a small company compared to the companies used in the organizational theory, like airline traffic and large production organizations, but the HRO theory can be applied to PI Intervention none the less and therefore can create a background for PI Intervention in regards to what their future goals with emergency preparedness and HSE quality should be.

HRO theory is, among other things, based on the relationship between the management, the front line personnel and changes in safety procedures. The aim is to link PI Intervention to HRO theory through outlining the characteristics of HRO and emergency preparedness theory, and then, through interview, observation and informal conversations, gather empirical data that investigates to what degree PI Intervention work environment coincide with the characteristics.

The challenge lies in the process of finding the theory in practice. Through interviews adapted to the theory and explanation of the HRO theory to the respondents, it will create a context for the respondents, so that they may give information that will benefit the research questions.

2.6. Chapter summary.

In this chapter the theoretical background for this research has been presented. Relevant theories that will be used in this paper have been outlined with the intent that they function as the basis for the research method and data collection. The HRO theory has been emphasized through outlining of cultural aspects and the four main principles of HRO theory. The mindfulness model has also been included because these characteristics of a mindful organization will help determine if PI Intervention is a robust organization that has insight into their own production systems. The DSB circular model of working towards emergency preparedness has been included to illustrate what is needed for a safe and reliable organization. What defines a small organization has also been outlined, where the NHO identify a small organization as a company with less than 100 employees. Finally there is an analysis design that describes what I expect to find, who to connect PI Intervention to the HRO theory and how to find theory in practice.

3. Methodology

To be able to complete a successful research study one needs to be aware of what kind of method is best to use in this particular situation. In this chapter I will introduce the research method that is used in this thesis. There will be an introduction of qualitative and quantitative methods, although qualitative methods will be the core of this research. A brief overview of what a case study is will be provided together with an explanation for the use of semi-structured interviews and observation. In addition to formal research methods like structured interviews and observation, I will also use information presented through informal conversations during my time at PI Intervention.

The aim of this chapter is to illustrate the way this study has been conducted and what aspects to research method you must be aware of to produce reliable and relevant data material. The research will be an explorative research in order to investigate HRO characteristics within PI Intervention. In a research like this you

have to go into the field in order to obtain the information you need to answer the research question. It is also important to be present, and avoid standardized surveys, in order to explain certain terms that are used in questioning, as respondents may not know what HRO theory is. It therefore also important to look for indicators of HRO theory, not only rely on the respondents information.

3.2 Qualitative method

There are two dominant types of research methods in social science; these are qualitative and quantitative methods. From the 1940s to the 1960 there was much favouritism towards quantitative methods, while in the 1970 the qualitative method was mostly used. Today, however, the two methods are seen as equal (Ellefsen, 1998). There have always been differences in opinion whether one is better than the other. Some believe that qualitative methods bring the researcher too close to the informant, while quantitative creates too much of a distance between the two (Jacobsen, 2005).

In this thesis the qualitative method will be used for collection of data. The qualitative method often emphasise closeness as an important element to be able to understand other people's perception of the world. Data is typically produced in one of two languages, either the technical language of the researcher or the layman/everyday language of the informants (Blaikie, 2000). "These languages are used to describe behaviour, social relationships, social processes and in particular the meanings people give to their own or others actions" (Blaikie, 2000. p.232.). The qualitative method makes an attempt to transgress the scientific I - them relationship between the scientist and those who are being researched. It is therefore embedded in this approach that is requires physical closeness, mutual trust and understanding between the researcher and the respondent (Holme & Solvang, 1996). However, Jacobsen uses a quite informative citation from Grønmo in his book: "qualitative and quantitative approaches, fundamentally, stands in complementary, not a competitive relation to one another. Rarely can the own of the two approaches replace the other. Most often they can mutually supplement each other" (Jacobsen, 2005. p. 41).

In this study the qualitative method has been used, by designing, performing and analyzing semi-structured interviews, in addition to informal conversations with

employees during my time spent at the location of PI Intervention. There was also an emergency exercise drill performed during the process of this thesis where I was allowed to observe and use this information in my research.

3.3 Case study

For the particular research question presented in this paper, the most appropriate way to collect the right kind of data will be through qualitative methods. The most appropriate of the qualitative methods is a case study of the organizational processes within PI Intervention.

Case study is defined in a two-part technical definition. The second part of the definition is related to what variables and sources are used, the first part however is clear on defining what a case study is; *“A case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident”* (Yin, 2009. p. 18).

According to Yin there are four different types of case studies. These are presented in figure 5.

To explain the type of case study used in this research; the holistic single case design is perhaps the one perspective that most researchers see at the typical case study. This type of study involves studying one unit, for instance a specific group or organisation. This is a type of study that can be used successfully when one wants to study something unique, like a specific government, or something that is a typical example of a phenomenon, perhaps a specific hospital. One of the conditions for using this type of study is that the phenomenon is not comparable and that it is hard to replicate the design to use in similar studies. The advantage is that there exist possibilities to go in-depth in a phenomenon. This is also the type of study that will be used in this particular research.

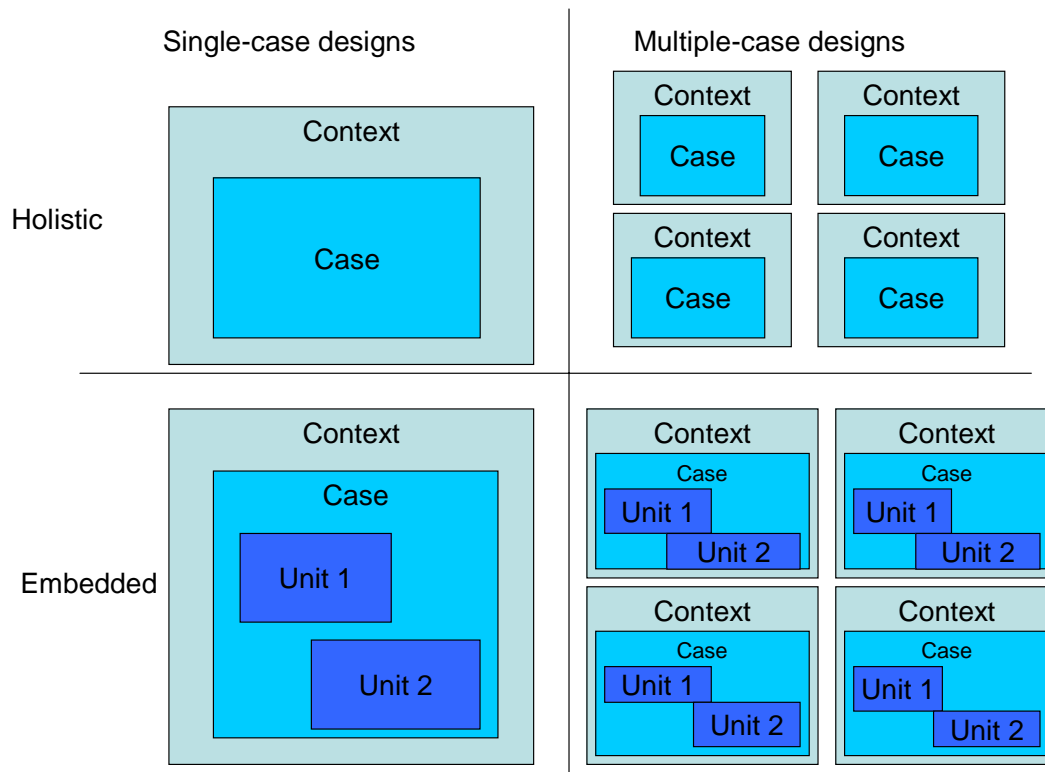


Figure 5. Basic types of designs for case studies – after Yin, 2009. p. 46.

The case will of course be PI Intervention as a unit, and the context will be their working environment at their office and workshop location in Stavanger. This type of study demands flexibility from the researcher since the researcher can not predict where the information will lead her/him. This means that the research design in such cases can be weak, something that will also weaken the reliability and the validity of the research. According to Yin (2009) it is also likely that this type of study will end in results that can not be generalized, and it is almost impossible that the results have not been influenced by the researchers' background and motives.

3.4 Interview

To best shed light on the research question presented in this paper, the interview is seen as the most appropriate qualitative method to collect data. A semi-structured interview has been chosen because "such interviews focus the conversation towards set topics that the researcher has selected beforehand" (Dalen, 2004. p. 29). The semi-structured interview allows the respondents to control the development of the interview as there are no standardised questionnaires, while the researcher still gets

the information that is essential to the research (Holme & Solvang, 1996). To be sure that each element of the research question is covered in the interview, one creates an interview-guide. This guide does not have to be followed to the letter, but one need to make sure that, during the course of the interview, all elements of the guide is covered (Holme & Solvang, 1996). The interview guides used for this research is attached as appendix no. 1 and 2. The interviews were conducted in a meeting room at the PI Intervention office space. Here the informants were informed of the anonymity in the finished thesis, and all of the respondents gave their informed permission to be tape recorded during the interview. The interviews had a semi structured guide, which helped to stay on the subject, while allowing the respondent to make comments outside the specific questions. The respondents did not have access to the interview questions on beforehand, and this may be one of the reasons they were somewhat reluctant to explore the subject outside the questions that were asked. They may not have felt prepared and it was difficult to get them to elaborate on comments they made. The QHSE manager however, did elaborate quite a bit and the researcher got a lot of information outside the set questions, which is also the meaning of a semi-structured interview.

In addition, data from informal conversations with other employees at PI Intervention during my time there will be used as empirical data. These conversations took place during breaks between interviews and observation, and touring of the facility.

3.5 Observation

"Observation is essentially for registering individual and group behaviour" (Jacobsen, 2005. p. 159). Observation is distinctly different from an interview situation. According to Jacobsen (2005) is observation suitable for when we are interested in registering what people actually do (behaviour) and not what they say they do, and to register behaviour in a context. The observation in this research was done in PI Interventions office and workshop location during an emergency response drill. The first part of the drill took place in the workshop location, where the workshop employees first were presented with the written emergency procedures that PI Intervention has generated,

together with their roles and responsibilities during the exercise. The test commenced with an imagined explosion while pressure testing, there were two persons injured. The workshop personnel were to start first aid, call for ambulance and alerting the Managing Director of the situation. The second part took place in the office location where the emergency response team was gathered by the Managing Director, the team was informed of their roles and responsibilities, followed by an active run-through of their routines.

3.6 Sample

It is not easy to determine what sample size one should have for a particular research question. One needs to determine how one should select the sample, how many should be included, where should they be selected from and so forth. Choosing a sample is a crucial element of the research. If one selects the wrong persons into the sample, this may lead to the whole research being worthless in relation to the research question (Holme & Solvang, 1996). "The goal for qualitative interviewing is to increase the informational value and create the basis for a deeper and more complete understanding for the phenomenon one is studying" (Holme & Solvang, 1996. p. 99). To be able to do this type of systematic selection you need extensive knowledge about the group one chooses the respondents from and an assertive strategy for what one wishes to achieve (Holme & Solvang, 1996). It is however important not to have too many respondents. According to Jacobsen (2005) is an upper limit of 20 respondents more than enough. Such a limit should be set because these types of data collection often takes a long time, and because the data that are collected are rich on details and information that we cannot analyse too much data in a sensible way (Jacobsen, 2005).

To achieve valid information for my research question the most natural selection would be from the employees at PI Intervention. To be able to determine the HRO possibilities for PI Intervention it was necessary to include both management and workshop employees into the sample. The workshop has 6 employees, and there was a random selection of 4 done from the list. The natural respondent from the management section was the QHSE Manager.

3.7. Confidentiality and anonymity

It is important that the researcher manages to ensure confidentiality for the respondents in the research. The fact that the research is confidential and anonymous may increase the amount of information that is provided during the research, and is in addition an important ethical point. It is important that employees in a company do not experience negative consequences from their participation in a research project. A researcher should always be aware of the affects he/she has on the environment he/she enters. It is also likely to lead to decreasing numbers of willing informants, and of honest answers if the respondents know that their employers will have access to the answers they give.

3.8. Strengths and weaknesses

There are weaknesses and strengths to every research method. By using a qualitative method, with interviews as the main source of information the researcher creates a link between him/herself and the respondents. This can create different reactions. It is likely that the respondents create their own opinion of the researcher. From this opinion they might try to live up to the expectations that they think the researcher has, rather than present the attitudes, opinions and information that they really possess. The researcher needs to be aware of this so that the information that is revealed is the respondents' real opinion. "This may be achieved by the researcher taking the role of the interested listener" (Holme & Solvang, 1996). The previously mentioned link may also create a comfortable atmosphere where respondents open up and share more of their information than if they were to answer a standardized survey.

During the interviews it came apparent that the respondents put something else in the term emergency preparedness than the researcher did. It seemed as though the majority of the responders though of fire drills and smaller incidents, and not the larger accidents the researcher laid in the term emergency. It was explained what was meant with the term emergency preparedness, but there might be some ambivalence in the information given when it comes to what exactly was the meaning behind the terms used. This is related to the internal validity of the research. "Internal validity is based on if the results are seen as accurate" (Jacobsen, 2005. p. 214). It is important that we actually measure what we want to measure, which is the basis of

the validity of a research. To have internal validity means that we have research to support the conclusions that are drawn. I believe this is the case in this thesis, as the research is based on different research methods and not interview alone, where results from observation and conversations support the results from interviews.

3.9. The role as a researcher

As a researcher it is important to know your own role when entering into an investigation. It is especially important in relation to the people you retrieve information from and the issue you are writing about. To be aware of your role as a researcher is an element in maintaining validity and reliability in your research. "A role is about the actual behaviour a person chooses based on their own status. It is not so that a status brings a certain type of behaviour in a given situation, but rather that the status creates boundaries for a space of action" (Aase & Fossaskåret, 2007 p. 62). One may have many statuses when you enter a culture or organization to partake in an investigation. You may be a researcher, but you are also a guest, an outsider and an unknown. It is therefore important to maintain a relationship to the respondents that do not trespass the status they have imprinted on you, but it is also important to manage yourself into a position where the status you are given is not a hinder in your investigation.

I was asked into PI Intervention to do an investigation for them. They hoped to use this report to improve their work towards emergency preparedness and general safety in their organization. This is defined as action research which "is a form of enquiry that enables practitioners everywhere to investigate and evaluate their work. They ask, 'what am I doing? What do I need to improve? How do I improve it?'" (McNiff & Whitehead, 2006. P. 7.)

In this research I was free to choose my own type of research, my own research questions and my own methods of obtaining information. In this manner I do not directly engage in the discussion of how to improve safety culture and emergency preparedness, rather what state the organization is in right now in relation to these topics, and then PI Intervention can take the appropriate actions which they feel are necessary, if necessary at all.

3.10. Chapter Summary

In this chapter the premises of the thesis have been set. Research strategies and methods have been outlined and an in-depth presentation of interview and observation has been included. It has been made clear that this research is based on qualitative methods, with the use of semi-structured interviews, informal conversations and observation. The reliability and validity of this thesis have been discussed, as well as the strengths and weaknesses and ethical dilemmas of confidentiality and anonymity.

4. Empirical Data

In this chapter there will be a presentation of the empirical data that was collected through interviews, informal conversations and observation. The data will be presented under different headlines, and will not be chronological according to the interview guide. There will also be a mix of information gathered during interviews and observation under the different headlines. First is a presentation of how the discrepancy reporting system in the organization works, then a run-through of the emergency preparedness, the knowledge of it and what is included in it. There will

also be a summary of what type of training is done at PI Intervention, including first aid and emergency training exercises. Finally, the safety culture in PI Intervention will be presented. This will all be further discussed in relation to theory in chapter 5.

4.1. Reporting discrepancies

There is a reporting system in place within the company. They use the Synergi program, and it is designed so that the reporter has to do a minimum of work to be able to report a discrepancy. According to the QHSE manager they receive a fair amount of discrepancy reports, especially from the offshore sector. However, they had 20 reports within HSE in 2009.

Synergi is available through internet so that you have the possibility to register discrepancies and suggestions for improvement independent of where you are in the world. This is especially an advantage for those who work offshore. Earlier they had to wait until they got onshore and then discuss this with their manager, which may lead to a loss of information because it might be a long time since the incident. As QHSE manager put it “those who are offshore can register improvement proposals instead of having to tell it to the closes manager when they came home, and they may have forgotten some of it because it is some time since it happened”.

There is also an employee that has the responsibility to follow up these reports. She spends a lot of her time reviewing the discrepancies when they are reported, looking at who should manage the report and then follow up this person to see that the right actions are taken in accordance to the discrepancy.

There are weekly meetings with the technical executive managers, “primarily with Installation & Support manager, production & maintenance manager and the technical support manager” to ensure proper follow-up. Also, when a report is filed there are automatic e-mails sent to the Managing Director, QHSE manager, and the QHSE coordinator, so that they have an overview of the reports, their status in the system, which actions are taken, and if they are satisfied with the result. If they are not satisfied they can add actions to the list, and approve them as they are completed. The Managing Director is the one to close the report when he is satisfied with the process and the result.

When it comes to discrepancy reporting in the workshop unit there are mostly technical and tool discrepancy, like tools put together wrong, shipping errors and the like. There are relatively few discrepancy reports that are written as there is a tradition for taking things internally at the workshop, which functions well according to the respondents. The fact that they are a small unit has made them into a “small family” as one of the respondents commented. This leads to an atmosphere where you can tell your colleague to put on protective eyewear without filing a discrepancy report. People listen to each other and follow the safety instructions the majority of the time.

4.2. Emergency response plan

Pi Intervention has an emergency response procedure (appendix 3) which defines the “process for handling an emergency involving any PI Intervention personnel either offshore/onshore/abroad, or in the event of a serious environmental incident” (Pi Intervention). This procedure shows a diagram over what should be done from the receiving call, to the assessment of the situation, notification of relevant personnel and gathering of the Response Team. The Senior Manager will assume the role of the Emergency Co-ordinator and manage the situation until concluded or he is relieved.

When the incident is concluded the Senior Manager has the responsibility to ensure that all information is registered in Synergi, ensure that all lessons learned are documented and passed to the QHSE responsible, and arrange a debrief with all relevant members of staff.

When this procedure was first presented to me, the roles of each individual of the Response Team was not defined and not trained for. In cooperation with the QHSE manager, we were able to define which roles were needed in a Response Team and who should have the different responsibilities. After these definitions have been set, the individuals who are a natural choice have been registered for appropriate training courses.

In addition to this procedure which is located in the QHSE Managers folder, there are folders placed strategically around the office and workshop space which contain instructions on how to proceed if there is a crisis situation. This folder contains a copy

of the company's procedures to emergency response, a chart of the emergency response team, an overview of who has participated in First Aid and CPR (cardiopulmonary resuscitation) courses, and who can manage the defibrillator. The phone numbers of everyone in the company are also included, with those of the managers highlighted and in what order they should be contacted if the previous is not reachable. There is also a phone log included so that calls that are made can be logged and registered in Synergi.

There are one folder placed in the workshop, one in the reception area and one in the HMS area located by the doorway between the workshop and the office space. It is also available online and in both Norwegian and English.

According to the QHSE manager, the procedure is well known among the management. However, the workshop employee respondents experience some lack of information about this procedure. When asked if they know about the emergency response plan, the responses are "partially", "somewhat" and "I don't know where it is, except the one for fire which is posted in the washrooms".

4.3. Training

The company arranges First Aid and defibrillator courses every second year, which is mandatory for the workshop personnel and voluntary for other employees. A comment from one of the workshop employees is that the defibrillator course should also be made mandatory.

There seems to be an overall consensus among the employees in the workshop unit that they have enough training to handle a crisis situation. They do not feel that they lack the skills that are necessary for such a situation and they all feel comfortable taking control if something should occur.

There has not been a training exercise for a more complex crisis situation than a fire, but this was scheduled in correspondence with the start of this thesis. The management hopes to test the procedure as it is now, to see weaknesses and strengths. One of the reasons for doing this is to make employees aware of their own role in an emergency situation so that they are as prepared as they can be if something should happen.

When the exercise is completed the management will add improvements where necessary. They also aim at increasing awareness among the emergency response team, and to create the right circumstances so that they can get familiar with their respective roles and practice the routine.

Most of the employees at PI Intervention have been part of many emergency response drills as most of them have been working offshore for many years. Most of the people, especially in the management section have been part of drills both offshore and onshore through certification training.

4.4. Safety culture

During the first round of interviews one of the main perspectives was to map how the workshop workers perceive the safety culture in their unit, if they know how the emergency preparedness plan works and how comfortable they would be if there should arise an emergency situation.

Throughout the interviews there was a unified agreement that they are all comfortable with the safety culture in the unit. There are safety instructions on every piece of equipment they use, which is followed by the employees.

There is no pressure to omit safety procedures to finish a job, and the safety procedures are not seen as too strict in the sense of slowing progress in the workshop.

The management also states that they are an open and transparent company. They seek out, rather than wait, if they see someone having trouble at work.

If there has been a crisis of different sorts they are good at talking about it and open about what has happened and what is going to change. QHSE manager states that it is important to have this transparency not that they are growing as a company and expanding outside the country's borders.

4.5. Emergency situation exercise

The emergency exercise was divided into two parts. The first part was an imagined explosion in the pressure testing facility located in the workshop. There were two injured employees, one with severe damage to the head and leg, and the other with

minor injuries with lacerations and shock. The participants were to commence first aid, contact the ambulance, and notify the management according to written procedures. These procedures were also run through with the workshop personnel just before the exercise started.

The second part of the drill was for the Managing Director to gather the emergency response team after he had been notified by the workshop employees of what had happened. The emergency response team was to gather in the response room and act out their responsibilities according to their role assignments and written procedures.

The exercise seemed to be a success from observations made during the situation. There were some lack of concentration and seriousness during the first part of the training exercise. The observation indicated that this may be a consequence of the unfamiliar situation the workshop employees suddenly found themselves in and perhaps felt the need to make a little fun of the situation to legitimize their actions. The differences between an actual crisis and an exercise are of course essential for emergency response performance. To invade personal space during an exercise may feel wrong to the participants and therefore they will try to apologize and make it less uncomfortable by engaging in collective humor.

The participants needed some suggestions and advice during the exercise. Some help as to how to apply a bandage to an injured arm was provided, as was a hint that someone should be calling the Managing Director. As the situation was perceived by the observer, it is likely that these actions would have been taken, regardless of suggestions, had the participants been given a few more minutes.

The participants did however manage to commence first aid and successfully stabilize the injured workers, call for an ambulance, secured the area and met and updated the paramedics as they arrived (hypothetically). Finally they were also able to contact and inform the Managing Director of the situation. This shows that the training that has been provided for the employees in PI Intervention regarding first aid has been successful and adequate in relation to handling injured colleagues in a crisis situation.

The PI Intervention report following the exercise shows a detailed time line, (appendix 4) but no analysis of the event. I was asked to comment on the timeline and see if I remembered anything different. I added a few comments on actions taken by the participants and the fact that I thought they should add an analysis part where strengths, weaknesses and changes in procedures that the exercise led to were discussed. After these suggestions were mentioned PI Intervention decided to add an analysis to the report.

4.6. Being small

When the QHSE manager was asked if she thought it was an advantage or disadvantage for them to be a small organization, she answered that they, in reality is not that small of as an organization any more. “The reason I say that we are a little big is that we have spread out in the world. That makes it a little bit more challenging, because we cannot just think about this location, but if something happens in Baqu we have to know who to contact and so on”. Being a relatively small organization in relation to HRO theory, it seems as though there are definitely some advantages. PI Intervention is a transparent organization, with short communication lines, and close ties between management and front line personnel. The fact that they are growing as a company will present more challenges in adaptation, learning new regulations for foreign countries and creating a safety network for those employees who work abroad.

4.7. Chapter Summary

In this chapter the empirical data have been presented. It is based on the interviews, observation and informal conversations that were done at PI Interventions office and workshop space in Stavanger. There is an outline of how the discrepancy report system is set up, how they use it, and who follows it through. There is also a description of the emergency response plan that is created for PI Intervention, along with information of how the safety culture is within the organization.

There is also an outline of the emergency exercise that was done at PI Intervention, along with an evaluation of it.

5. Discussion

It is now time to present the discussion of the empirical data in relation to the theory presented in chapter 2. The discussion will progress in roughly the same succession as the theory was presented, with exception of the four principles of HRO theory which were presented at the beginning of chapter 2 and will now be discussed at the end of chapter 5. It will in this chapter be discussed if the empirical data show that PI Intervention is organized and operates in accordance with HRO theory. There will

also be a discussion about whether PI Interventions emergency preparedness can be linked to DSBs' phases of satisfactory emergency preparedness.

5.1. To be mindful and reliable

The model of mindfulness was presented in the theory chapter, and this model consists of five characteristics or processes an organization have to fulfil in order to be regarded as a reliable and mindful organization.

In relation to *preoccupation with failure*, which is the first characteristic in the model, one might say that PI Intervention try to fulfil this characteristic by close monitoring of the discrepancy reports that are filed. There are weekly meetings where discrepancies are discussed and analysed, and through this work they are able to identify what is most likely to go wrong in a work situation, and can therefore be aware of the signals that are sent when something is about to go wrong. This type of preventive work will also benefit them in the long run, with little production time lost in relation to breaches of safety procedures.

These meetings also ensure that there are several employees involved when looking at the system of the workshop, and how it works. In this situation they maintain a divergent viewpoint when several people are involved in the analysis and assessment of the workplace, and therefore they do have a *reluctance to simplify interpretations* in order to maintain safety levels. The fact that discrepancy reports also are forwarded to at least 3 people every time, facilitates this diversity. The fact that all these people come from different sections of the company is definitely not a drawback either when it comes to maintaining a diverse viewpoint.

Process number three in the mindfulness model is *sensitivity to operations*, or situation awareness, this process is maintained in PI Intervention as there is a close connection between the workshop and the office personnel. There is a mutual understanding of the elements in the workshop processes and the reason for them being there. There is close attention to what types of tools are used, what is built, why it is there and what it is used for. This might be a positive consequence of the fact that PI Intervention is a small/medium sized company with close ties and transparency between personnel and between different sections of the organization.

When it comes to having *commitment to resilience* there are a few bumps in the road. The fact that PI Intervention did not have an emergency preparedness drill in ten years, that they did not have the roles of the emergency response team in place and no training for these roles as such, it is hard to firmly claim that PI Intervention can complete this particular process.

In addition, there is no alternative workshop area if there should happen something to the workshop that would make it unfit to work in, although they have an extra storage space which could work temporarily and amputated comparative to the original space. PI Intervention is also very dependant on the air traffic in terms of getting their equipment delivered to the oil rigs, this is not particularly a part of this thesis, but it is a point to make in regards to resilience and ability to carry on production.

However, as mentioned before, they do have a good work environment, with cooperation and good work ethics, so although there is no formal and written procedures, one might draw the conclusion that they would be able to handle an unexpected situation through cooperation and innovation.

Based on formal procedures there is no reason however, to state that PI Intervention have the process of commitment to resilience incorporated into their processes.

Finally there is the process of *deference to expertise*. This characteristic, one can certainly claim that PI Intervention is able to fulfil. From information gathered at the workshop and office location during interviews and observation one is able to claim that authority can easily be shifted from management to front line people. There is of course a normal hierarchy through the organization, but management have trust in the front line people as to take over control when the situation calls for it. From interviews one can also draw the conclusion that front line personnel are comfortable in taking on authoritative roles as a situation progress. In PI Intervention there is an easy shift from centralized to decentralized authority, which may be contributed to the close ties between managers and front line personnel.

In conclusion of the mindfulness and reliability process one can then state that PI Intervention certainly fulfils many of the demands for being a mindful organization. Although there is some lack in resilience, it seems as though PI Intervention is looking for what could go wrong by careful discussion about discrepancies and an open work environment in the workshop.

5.2. Safety Culture

As outlined in the theory chapter there are four subcomponents to a safety culture, or an informed culture as it can be described as. These subcomponents will now be discussed in relation to the data collected.

5.2.1. The power of righteousness

A just culture is a culture where there is openness and trust among the personnel. Through observation at PI Intervention it seems in its place claim that PI is such an organization. During my observation there was an incident offshore where a person was responsible for setting the wrong tool. There was no specific blame placed, as the person responsible showed great concern for the error that was made and immediately started to fix the situation. The management had a desire to redeem the situation and carry on production and there were no reprimand methods set in motion. Although the offshore sector of PI Intervention is not a part of this thesis I see this as a relevant example of the fairness that was displayed between PI Intervention management and front line personnel. Should an error like this occur repeatedly and the same person would be responsible each time however, there is reason to believe that management would take action, based on conversation with management employees¹. One of the consequences of being a relatively small organization is that if one person is often involved in errors that occur, it is more likely to be noticed than if it were a larger organization. The discrepancy reports are also stored in Synergi, which identifies who has been involved.

However, one cannot be sure if every employee would get the same treatment as there are no observations to compare the incident to. The policy of PI Intervention in such a situation described above is to file a report in Synergi. It is then decided who should handle the case, what actions to take and it is up to the assigned supervisor which consequences the situation should have. It is written in the quality assurance manual that Synergi should be used if there are any discrepancies from protocol or procedures.

Even if PI Intervention has these procedures for handling errors one cannot be sure that these are always followed to the letter. As a small/medium sized company you

¹ Informal conversation 18.03.2010 at PI Intervention office location.

have relatively daily interaction with your managers. This interaction may lead to personal relationships between colleagues. These personal emotions and relationships between the management and the front line personnel vary from person to person and may be the cause of subjective judgment. There is a chance this will affect judgment in both ways. A manager might know the employee in a good way, and realize that this was an honest mistake and can therefore act according to this knowledge, or they may know him/her in a not so good way and act accordingly.

A large sized company may have the advantage of having an own section dedicated to overseeing errors and how these are both done and solved. With this department as an own section there is a relatively small chance that personal relationships will influence judgment in relation to possible reprimands and handling of personnel.

5.2.2. Flexible like rubber bands

From the interviews of the workshop employees there seem to be no hesitation to taking charge in a crisis situation. All respondents said they would be comfortable in taking control of a situation where it is required. If the management is ready to let them take charge is, however, a different question. From the informal conversations during my visits to PI Intervention, there seem to be enough trust between the employees on the different hierarchical levels of the organization, so that managers would probably accept the temporary change of authority when necessary.

There is of course also the possibility of exchange of authority between different managers. As the QHSE manager pointed out during the interviews, all of the managers have background experience from front line operations from previous employment. This experience transgresses the responsibility lines they now have as managers of different sections, and there is therefore the possibility of one manager being able to take over another manager's area of responsibility if necessary.

The fact that PI Intervention is a small/medium sized company may aid to the ability to shift from centralized to decentralized control, and sideways shift in managerial responsibility. This advantage may arise from the fact that as a small/medium sized company they have transparency and short communication lines through the company. Therefore front line personnel have the opportunity to observe and learn from managers when interacting with them on a daily basis, and experiencing first

hand how they operate within their areas of responsibility. The drawback of this situation is of course the possibility of group thinking, difficulty changing set habits and lack of diversity in problem solving.

A larger company, again, may not have these personal relationships that form the basis of learning and observing. It is perhaps typical for a large company to have different sections doing different tasks, and this creates difficulty to transgress areas of responsibility and learn different aspects of an organizational procedure. However, a company of this size may have more resources for training and courses. So there are both advantages and limitations to companies of all sizes.

5.2.3. Learning from mistakes and reporting what you know

PI Intervention has a good discrepancy reporting system in place. This system gives notice to the relevant people when a discrepancy is registered, the management is clearly involved and concerned with regards to what has happened, what is being done with it and what have we learned. The program is set up so that people that register discrepancies can also include suggestions of improvement when they register what has gone wrong. When a discrepancy is reported and actions are made in relation to this discrepancy, the QHSE manager and the Managing Director can access the discrepancy and evaluate if they are satisfied with the actions taken, change them and edit them until they are satisfied with how the discrepancy is handled and close the case. The organization also has a yearly run-through of all discrepancies that are reported, which is a requirement of the ISO certification of the organization. They can then compare the preceding years, define where most of the discrepancies are reported (workshop, offshore, etc) and act accordingly. This may lead to increased focus on some areas where the rate of discrepancies reported is high. It is important in this process to not lose focus on the rest of the organization, so that the rate of discrepancies do not go up in other sections.

This process of reporting discrepancies, follow-up and actions taken seems like a good process, with efficient programs and notification of relevant personnel. The question is of course if the program is used to an accepted extent throughout the organization. During interviews one of the respondents stated that even though he knew where to register a discrepancy, he never used the program to file reports about minor issues or near-accidents. "We do not write a paper because someone

does not wear protection-goggles". It is natural to raise the question about hidden statistics. How many discrepancies are not reported? Should every discrepancy be reported? It is difficult to know what exactly merits a discrepancy report, and what is best handled on the floor in the situation. It might be easy just to tell someone to put on their protective goggles, but when this happens more frequently it is important to get this documented so that management can be proactive and hopefully prevent any accidents relating to use of protective goggles. It can also be difficult to admit your own mistakes, let alone report them to management. From the transparent and close working environment in PI Intervention I do not see this as a problem. If something is to happen, it would be easy to logically figure out who is responsible, and it is always worse if someone finds out you did something wrong, than if you tell them yourself.

It might be in PI Interventions interest to do a survey, mapping the rates of hidden statistics and, if needed, how to change procedures so that hidden statistics will decrease. This is of course based on trust between the management and the front line personnel. The person that report an incident needs to experience that they are taken seriously; that the rapport is followed through and that reprimands will not target anyone but those who are at fault.

However, with the statistics that are reported, PI Intervention have frequent meetings on what has happened, what has been done and what have we learned. These are important steps in achieving a learning culture in the organization.

When the organization organized an emergency exercise I was told they were generating a report after the exercise was finished. When the report was finished it only consisted of a timeline, no analysis of the exercise, no indication if any procedures were to be changes and no strengths or weaknesses that were discovered during the exercise. This may be an indication of poor learning abilities in the organization.

5.3. Protection and production

As PI Intervention has been in operation for 12 years it seems as though they have a balance between protection and production that is working for their company. The interview respondents affirmed this theory when asked if they ever had to delay production to be able to fulfill safety requirements. The question that was asked was: have you ever experienced that safety instructions are too restricted for you to do

your job properly? They informed me that they felt this had never been an issue. They respect the safety instructions as they are and that the workshop employees are comfortable with the level of safety they presently have at the workshop. When asked if they had ever felt time pressure to finish a job even if they felt that the safety conditions have not been optimal, the respondents answered that they had never been asked to do this, neither had it ever been necessary.

The fact that they have not yet had a proper emergency preparedness exercise may be a symptom of the unrocked boat phenomena. The fact that they have not had a serious accident at the workshop may have created a false sense of security where they expect the rate of accidents to remain at zero. This is, according to the protection vs. production model, a characteristic that may lead them down the road to catastrophe. As this false sense of security is allowed to maintain in the mentality of the workers, there may be a decrease in level of safety, which may lead to a serious incident. It is important for the management to be aware of this type of mentality and take preventative measures to maintain safety levels on top.

5.4. Emergency preparedness

As mentioned in chapter 3, there may have been some ambivalence as to what exactly was the meaning behind the terms of emergency preparedness and emergency exercise. It may be hard for the respondents to picture a crisis as a larger and more serious accident because they have yet to experience one at PI interventions facilities. Neither has there been an emergency drill during their time at PI Intervention, except fire drills, which may create the impression that the only serious incident they need to be aware of is a fire. The terms that were used were explained during the interviews, but I take caution that some misunderstanding took place, but as explained in chapter 3, the results from the interviews were supported by observation and conversation.

The DSB model that was explained in chapter two depicts several elements that will ensure the quality of emergency preparedness and give continuous improvement through risk analysis, practice and evaluation.

5.4.1. Clarification of roles and external conditions

PI Intervention is part of the oil-industry and is a supplier of both tools and manpower to the oilrigs in the North Sea. In relation to this they have several rules and regulations to abide by in order to maintain their services in the petroleum industry. There are too many regulations to go through them all as they are not directly relevant for this thesis, however I will mention some organizations and standards that are relevant for PI Interventions body of rules.

The Norwegian Petroleum Directorate has several regulations that apply to resource management in the petroleum industry, the Norwegian Oil Industry Association (OLF) has several guidelines in the areas of competence employment, environment, HSE & operations, integrated operations and industrial policy (OLF, 2010), and there are of course other rules and regulations to follow according to whom you are working for etc. Most of these rules and requirements are related to off-shore production, but a portion of them are related to the entire organizational structure.

There are some certifications and standards that are more directly related to production and management on-shore. These are necessary to complete to be able to run their business in an effective and productive manner.

First there is the ISO certification. PI Intervention has been certified with the NS-EN ISO 9001:2008 certificate which is valid for design development, sales, rental, operation and refurbishment of oilfield intervention and completion tools and accessories activities (Pi Intervention, certificate). The ISO 9001 certificate shows that your quality control system is certified by the standard for good quality control and is found to coincide with it. The certification is done by an independent third party, and this shows your customers that they can rely on that you have introduced the necessary internal routines to be able to meet your obligations. The standard is process oriented and is focused on current updates and customer satisfaction. It is also adapted to all organizational processes that affect quality. The most important elements of the standard is; quality control systems, the responsibilities of the management, resource management, production sales, measurements, analysis and improvement (Det Norske Veritas, 2010).

PI Intervention is also qualified through the Achilles JQS database. Achilles is a well renowned company that does reviews of supplier organizations through a series of

evaluations in different subject areas. Since PI Intervention has been approved in all of these areas, and has fulfilled the requirements that are expected from a supplier company, they are included in the Achilles database so that procurement professionals can identify them as a supplier based on qualifications that are defined by Achilles (Achilles, 2010).

Then there is, of course, the NORSOK standard. As mentioned earlier, this standard is “developed by the Norwegian petroleum industry to ensure adequate safety, value adding and cost effectiveness for existing and future petroleum industry developments” (Norwegian technology centre, 2000. p. 2.). It is a standard that should participate in forming the contractors overall system for health, safety and environment (HSE) management.

These certifications and standards are relevant for PI Interventions management organization. They all help in identifying PI Intervention as an organized, informed and safe supplier. The goal of the emergency preparedness plan in PI Intervention is to create a safe work environment for their employees. It is therefore necessary that they follow the rules and regulations that are set by supervisory organs, so PI Intervention can be approved to do what they do. PI Intervention is therefore also very aware of what type of regulations they have to follow, and their emergency preparedness should therefore be organized in accordance with these. The entire HSE manual is written in close agreement with the NORSOK standard, and ISO certification is achieved, it is therefore safe to say that PI Intervention have fulfilled the requirements for the regulations they are set under. These regulation are necessary and available for every type of company regardless of their size and location, therefore there are no limitation for a small/medium sized company in regards to outline what rules apply to them in particular.

5.4.2. Goals and organization

Pi Interventions emergency preparedness work is based on the NORSOK standard s-006². Section 5.4. in this standard is called emergency preparedness and asks the questions of how the contractor provides required notification in case of an emergency, what systems they have established to provide immediate and long-term care for employees and next-of-kin in case of an emergency. As the HSE manual is

² Formal conversation 10.01.2010 at PI Intervention office space

based on this standard, PI Intervention has used this section to clarify the goals they have set for emergency preparedness in relation to the NORSOK standard questions. It states here that PI Intervention shall be capable of proper notification and be able to establish and maintain contact with next-of-kin, media, unions and authorities in co-operation with the relevant company, unless otherwise agreed. PI Intervention does now have a system that ensures that updated and relevant personnel data for all employees and sub-contractors are easily accessible in case of an emergency. The HSE manual also states that they will have a documented plan for organizing and providing immediate and long-term care for employees and relatives in the event of a hazardous condition or an accident. Since the organization was approved by the NORSOK standard audit may 2009, I believe that they have been able to fulfil these goals that have been identified in the HSE manual. However, as this is all the information I have been presented with on the topic of defining what goals they have with their emergency preparedness work, there is in my opinion not enough emphasis on the emergency situation itself. It is important to have goals and planning toward the situation itself, and not just the aftermath.

Before the emergency preparedness exercise that was performed at PI the QHSE manager stated that their goal with this type of drill was to “train on the procedure as it is, to see weaknesses and strengths with the procedure”, “to make the individual conscious about their role in an emergency situation so that they are prepared in the best possible way if something should happen, and to “test the procedure as it is now and make improvements, and also to create awareness among the emergency preparedness team so that we get to practice the roles”.

The fact that the exercise took place increased the participants’ awareness of their roles in the situation, to increase their knowledge about how their role is executed, what relation you have to others in different roles and of course insight to what an emergency situation can entail.

However, as will be further discussed in chapter 5.4.6. Evaluation and improvement, there has to this date been no further evaluation of the exercise, the performance of the participants or the procedure itself. If there is no evaluation of the procedure, it will be difficult to identify strengths and weaknesses, which will impede the process of

making improvements to the procedure. Therefore the organization of the work toward emergency preparedness needs to be improved.

It is here showed that PI Intervention has, to some extent, produced a definition of what goals the organization has towards emergency preparedness. It does seem to lack some substance in the preparing of personnel and procedures during an actual emergency situation and somewhat focused on the aftermath and taking care of employees. Not that this is entirely a bad thing, employees need to be taken care of, I simply ask for a more extensive and broad goal setting when it comes to emergency preparedness. The fact that PI Intervention is a relatively small organization should not be a hinder in the process of goal setting, they merely need to adjust the goals to the size and resources of their organization. From the information I have gathered I would say that PI Intervention has created a good starting point for their further goal setting and work towards emergency preparedness.

5.4.3. Risk Assessment

There has been done only one risk assessments connected to the workshop at PI Intervention. This assessment created the background for the worst case scenario for the emergency exercise where two persons were injured during a blow-out in the pressure testing grave. As PI Intervention is a relatively small organization with a small workshop area there is a limited risk when working in the workshop. There has of course been some unofficial risk assessment when safety instruction for the operating equipment has been made, but there has only been the one official risk assessment. This may be enough considering the size of the workshop, and the possibilities of severe accidents. According to the emergency preparedness plan there will also be the same response to a pressure grave blow-out as there would be to a pipe falling from the crane. First aid would be started and the management would be alerted. An incident like that would not put a stop in production for a time longer than it takes to get the injured to the hospital and a debriefing. It may therefore be unnecessary with such risk assessments. It is not possible to create an assessment for each pipe that could fall on the floor or if someone should hit a colleague in the face with the high-pressure hose.

5.4.4. Emergency management and plans.

PI Intervention had already an emergency response plan in writing when this investigation first started. The part of the plan involving first aid response, calling for ambulance and alerting the management was placed in folders at strategic locations around the workshop and office space. This is an effective solution as long as the employees are aware of where they are, and what they entail. However, the information from interview respondents may imply that they are not particularly aware of the folders. When asked if they knew about the emergency response plan, they answered “partially” and “only the one for fire”.

The emergency response plan itself is a work in progress as admitted by the management³. There was, at the start of this investigation, no written role assignment and no particular responsibilities for the members of the emergency response team. It was orally suggested who should have what role, but there were no decisions or written procedures. These flaws have been addressed while the thesis was written and there is today a role assignment and a division of responsibility in the emergency response team which was rehearsed during the emergency exercise.

It would be beneficial for PI Intervention to make their emergency plans more known among the staff, so that efficiency and knowledge about the situation will be increased.

5.4.5. Drills

Previously we have learned that PI Intervention has had no other emergency drills except fire drills. This creates a gap in training and learning procedures, which should have been filled a long time ago. As the DSB states, there is no use in having an emergency preparedness plan if you do not practice and train for it. As exercise is set as an individual element/phase in the DSB emergency preparedness model, it is clearly seen as one of the more important elements in emergency planning.

I am sure that the employees of PI Intervention are well functioning people that would be able to work through a crisis. The point of training is to make this work more efficient and smooth, so that the crisis do not evolve into something more serious than what it already is. As there were no set roles for the emergency response team when I first learned the emergency response plan for PI Intervention, it is likely that

³ Informal conversation at PI intervention office space

extra time would pass for the team to agree on their roles and what responsibility each position entails. There was, however, good cooperation between the members of the emergency response team during the emergency drill, so the roles were assigned on the spot, which shows the ability to adapt quickly. There was one incident where a discussion broke out on the basis of the Synergi paperwork regarding next-of-kin contact, which could have been avoided had the paperwork been sorted out beforehand. This incident may have been very time consuming if there had been a real emergency. The exercise was however quite completed in a satisfactory manner. A well completed emergency drill is a test that will show if the plans are well known and practiced, which the participants got to experience, and the exercise was, all in all, satisfactorily executed.

5.4.6. Evaluation and improvement

It is important to always evaluate plans, drills and handling of real events, so that you are able to pinpoint strengths and weaknesses, what needs to be improved and what works as it is. As the DSB state, each drill should be evaluated according to the goals that were identified before the drill, and the evaluation should result in some improvements or changes in plans. This type of evaluation is currently missing from the exercise that was performed at PI Intervention. I have asked the management for such an evaluation, but it is yet to be confirmed that they will perform one. This is of course seen as a lack of responsibility when it comes to evaluation and improvement. You cannot expect to get better at something if you do not evaluate what you have done. It is essential to complete an evaluation, so that not only management, but also front line personnel, sees the use of such an exercise and that their work during an emergency drill results in something tangible. If something went wrong during the exercise it is also important to identify why it went wrong, and communicate to the employees what they should do instead, should a similar situation arise.

There can be much use in an evaluation like this. There should also preferably be a short debriefing to the participants on how the exercise went, what is now being done and open up for questions and comments from the participants. This will help increase the trust between front line personnel and management as the management show interest in how the front line personnel perceived the exercise and what they have to offer when it comes to improvements. A closing evaluation will increase the

necessity and use of the previous phases, as it will bring together the result of previous work and give better perspective when the cycle of the model is started again. The model is not a one-time cycle which is completed after one round. It is essential for good emergency preparedness that the phases be repeated so that there is continuous improvement and change as the organization itself changes.

5.5. Small companies

The HRO principles that have been discussed previously in this thesis have been taken from theoretical texts that mainly focus on very large organizations, like the air traffic industry. However, smaller organizations are also in need of securing their profits and employees at the same level as the larger ones. Therefore the HRO principles should be applicable to the smaller organizations as they are for the larger ones, only in a remote and downsized manner. One needs to take into account the size of the company of course when you look at learning, the ability to be flexible and robust and of course the safety culture that exists in the organization. A small organization does not have the same resources that a large organization would have to ensure that safety precautions, instructions and reporting were done in the right manner. For a Health Safety and Environment (HSE) department of 20 people it is easier to keep track of such things than a two person group.

However, PI Intervention is a small/medium sized company, which can be one of the best advantages. From my time at the organization I can say that PI Intervention is an open organization where the focus is on getting the job done and not on the bureaucracy. There is a relatively short chain of command which can help speed up the production process because there is a small chance of information being lost or distorted, and there is a minimum of paperwork between the different divisions in the organization. It is easy for the employees to get a good overview of the systems and procedures of the organization, and managers have time to train and assist both new and old employees so that incidents are minimized and there is trust established between front line personnel and managers. The fact that they are a small organization should also be an advantage in the work towards emergency management, change in attitudes and procedures.

As mentioned before, the respondents expressed that they have a “family bond” between themselves in the workshop⁴. This is a positive thing when relating to training and assistance, but it can also be a negative thing when an employee have to file a discrepancy report which involves one or more of your colleagues and you have to go back to work with them afterwards. This can easily lead to disgruntlement and a negative atmosphere and it is important for the management to take these reports seriously and live up to the trust that are being shown them by the reporter. It is also important for the management to be aware of the practise of taking care of safety regulation breaches then and there, as this may lead to less unreported incidents, which can create a latent error that may lead to serious consequences later in production.

5.6. A high reliability organization

The four components that is necessary for a reliable and safe organization was presented in chapter two. These components are presented by Aven et.al. (2008) and if fulfilled will create a strong organizational backbone to build a reliable organization.

1. Safety and reliability is high priority in higher levels of management.

PI Intervention is perceived as an organization that takes precautions and safety regulations seriously in all levels of management. The Managing Director, QHSE manager and appropriate section manager are all informed of and involved in discrepancy reports that are reported, there are weekly meetings concerning these reports and the Managing Director himself is in charge of closing each report when he is satisfied with the actions taken and the results of these actions.

It is, through observation and conversation at PI Intervention, clear that higher levels of management along with the rest of the employees are concerned with safety. It is however important to be aware of the unrocked boat phenomena within the company and have continuous focus on safety and safety performance. Being a small company in this relation may be of great advantage. Being small means that management have a close relationship to the front line personnel in the workshop, and can therefore more easily monitor safety performance.

⁴ Informal conversation at PI Intervention office space 18.03.2010.

2. Redundancy increases safety. Duplications, overlaps and backup-systems are necessary to compensate for errors.

PI intervention have no extra workshop area to work in, so if there should be an accident in the current area that left the workshop incapable of further production, there would be a down-period in production and shipping. It is both difficult and expensive for an organization to maintain an extra workshop area just in case of emergency. Should the pressure testing facility be involved in an accident, which was the scenario for the emergency exercise drill, it may be difficult to replace it on short notice. PI Intervention does, however, have an extra large storage space that has potential to become a temporary workshop area. It may, of course, be difficult to perform the same level of efficient production there, but one cannot expect an organization to have an entire extra workshop standing by in case of emergency. It is also not necessary for PI Intervention, compared to the size of their production to have multiple workshop areas. This may be a negative aspect to being a small/medium sized company, that they do not have a secondary production workshop to fall back on, which may be the case for larger production companies that have several production sites. A positive aspect of being a small/medium sized company is, however, that the workshop personnel have the possibility to learn and observe managers, which may make it easier to take over the managers' workload, should they be incapacitated. This is also an element of redundancy that is included in the emergency preparedness plan; there are several backups for every person on the emergency response team, which ensures that there is always someone to take on a certain role, and also creates a pool of resources to add to the initial team in a crisis that requires more personnel.

3. Decentralized control, strong organizational culture and continuous learning. From the empirical information gathered through interviews and informal conversations with the employees of PI Intervention there seems to be a strong organizational culture. The organization is transparent, with good cooperation transcending division lines. This is most likely a result of being a small/medium sized company. As the office space and workshop space is relatively small it is easy to establish a connection between all the employees regardless if they are front line

personnel or management. According to Reason (1997) an organizational culture is based on shared values and beliefs that interact with an organization's structure and control systems to produce behavioural norms. Some of these shared values and beliefs are expressed through safety systems that are established in the workshop area. The safety precautions that are written for the equipment used in the workshop set the tone when it comes to being a safety organization. The workshop personnel get the incentives from the management of how the management wants the safety environment to be in their organization and so the organizational culture is creating a behavioural norm with safety in focus.

There also seems to be no problem with decentralized control in PI Intervention. Workshop personnel informed me, during formal interviews, that they are not afraid of taking charge if something were to happen in the workshop and they were forced to take control. It is also indicated from the managerial perspective through informal conversations that they expect the workshop personnel to be able to take on the responsibility when necessary. As the workshop personnel have first hand experience with the equipment and procedures of the workshop production it is far more productive to let one of them take charge if something should happen, than if a manager from a different section should take control with less experience and knowledge about the production line.

As mentioned before, there has not been produced an analysis of the emergency exercise that was performed during this study. This analysis should be part of a continuous learning cycle, which is one of the most important characteristics of a robust and mindful organization. Without learning there will be no improvement. As this was the very first emergency exercise PI intervention has had, besides fire drills, there should definitely be an evaluation. This not only for the management for learning purposes, but also for the personnel that participated so that they may learn from what they did wrong and also from what they did right. This also relates to the fourth component that Aven et.al. (2008) identifies as necessary for a reliable and safe organization.

4. Organizational learning through trial and error, testing and simulations.

There has been a definite lack of training when it comes to the emergency response plan that PI Intervention has in their official procedures. The company has been in

production for 12 years, and this year the first emergency response exercise was completed. A key question to ask is; would the exercise have been carried out if this investigation had not been done?

I believe that this all goes back to the concept of the unrocked boat that is presented in the protection vs. production model in chapter 2. The fact that PI Intervention has had no accidents in their workshop area may have created a false sense of security and therefore there has seemingly not been any need for emergency exercises.

5.7. Chapter summary

There has in this chapter been a discussion of the empirical findings and the theoretical contributions. In short, PI Intervention fulfil most of the HRO and emergency preparedness characteristics, but have some work to do in regards to emergency preparedness drills, evaluation and learning from this and setting goals for their emergency preparedness work. This according to what HRO theory and emergency preparedness theory pinpoints as important elements of a safe and reliable organization.

6. Summary

In this chapter there will be some conclusions drawn from the discussion presented in the previous chapter. First there is a diagram over the different characteristics that was presented in the discussion, and an overview of how well PI Intervention fulfil the characteristics of the high reliability theory, along with the other theories that were presented in chapter two and five.

Characteristic	To what degree is the characteristic fulfilled by PI
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Intervention?	
Potential for improvement	Satisfactory
Mindfulness	X
Just culture	X
Flexible culture	X
Learning culture	X
Reporting culture	X
Protection vs. Production	X
Clarification of roles and external conditions	X
Goals and organization	X
Risk assessment	
Emergency management and plans	X
Drills	X
Evaluation and improvement	X
Safety and reliability is high priority	X
Redundancy	X
Decentralisation, culture and learning	X
Organizational learning through trial and error	X

Figure 6. overview of fulfilment of theoretical characteristics of HRO theory.

This figure makes it a little easier to summarize the results of the empirical data and discussion of this thesis. The “potential for improvement” box is meant as a level where there might be actions in place for this particular characteristic, but that there can be potential for improvement so PI Intervention will be able to fulfil this characteristic to a satisfactory level.

When it comes to mindfulness in PI Intervention as an organization, it is clear, based on the discussion in last chapter that they do fulfil many of the characteristics that define what mindfulness is. Although there were some lack in commitment to resilience, because there have been no emergency preparedness drills and a lack of

alternative workshop space, there was an overall mindfulness in the organization where they were occupied with looking for what could go wrong and as a good overview of what goes on in their workshop area. So it would be applicable to draw the conclusion that PI Intervention fulfil the qualities of a mindful organization so an acceptable extent.

The organizational culture in PI Intervention is seen as satisfactory in all levels except for the learning culture. This is mainly due to the lack of evaluation following the emergency preparedness exercise. This was one of the more important aspects to the exercise according to both HRO theory and the DSB model, and is therefore an element that has potential for improvement.

However, the rest of the cultural aspects that was included in this thesis are seen as applicable for PI Intervention and the conclusion of a good organizational culture that is based on trust and the relationship between the management and the front line personnel is present in PI Intervention.

In regards to protection vs. production in PI Intervention, it is confirmed by the respondents that they have a culture that have a healthy balance on the focus on safety and production. There has not been an incident where one has to take presence over the other, so according to the figure presented on page 14 PI Intervention is currently in parity zone. What they do need to be aware of though, is the unrocked boat phenomenon. Even though they have not had a serious accident in their history, it is important to maintain focus on safety and not fall into a false sense of security.

The DSB models 6 phases for emergency preparedness work is also discussed in chapter five. The clarification of external roles and regulations is very well described in PI Interventions HSE manual and safety certification through ISO and Achilles. The definition of goals and organization of emergency preparedness, however, is not as well defined. There is some lack in definition of goals towards emergency preparedness procedures. As mentioned in chapter five, there is reason to draw the conclusion that PI Intervention has created a good starting point for their goal setting and needs to continue this work.

Although there has only been one risk assessment done in the workshop at PI Intervention, it can be said that this may be enough. As the pressure-testing facility is the only possibility for a serious accident that would lead to a stop in production it is appropriate that this risk assessment is done. Incidents may happen in the workshop facility which may lead to personnel injuries and a short stop in production, this will not be as serious, in production terms, as a blow-out and therefore may not require a risk assessment. The conclusion that is drawn is therefore that the level of risk assessments has potential for improvement, but one need to perform an evaluation of the necessity of further assessments.

The emergency management and plans seem to be in good condition at PI Intervention. The plans are easily accessible, they entail the necessary information that is needed to handle an emergency situation. The only thing that was missing, according to emergency preparedness theory, was the role assignments in the emergency response team. This issue was however addressed during this investigation, it has now been added to the emergency response plan and training for the different roles has been planned.

The fact that there had never been an emergency preparedness drill at PI Intervention when this investigation first started is a negative feature when related to emergency preparedness theory. You need an emergency preparedness plan and it is essential for your emergency handling that you practice it. This is a vital part of the emergency preparedness theory, and it is pure logic that you need to practice such a plan in order to have smooth and effective emergency handling. This was not done before this investigation started, but was performed during this time. It is now important for PI Intervention to continue their evaluation and learning curve from this, and continue with exercises and training. This is also important for the 6th phase in DSB model of evaluation and improvement.

PI Intervention does, all in all, have a relatively decent standing point in relation to the DSB model. There are, however, some areas where there are potential for improvement, which should be addressed.

Regarding the four components that are seen as a necessity for a reliable and safe organization, PI Intervention fulfils these in relation to the topics that are presented in this thesis. Safety and reliability is of high priority in higher levels of management at PI Intervention, as is demonstrated by the participation of the Managing Director and

several managers in discrepancy report analysis, actions and solutions, as well as general safety development at the workshop.

Redundancy for the workshop is an extra storage space that could be used as a workshop temporarily in a situation where the original workshop area would be closed in the event of an accident. One cannot expect a company to have an entire extra workshop to fall back on just in case of an accident, when extra space is not needed in everyday production. As a small/medium sized organization their production does not require a larger area, which may be the case in a larger production company. PI Intervention therefore has their backup space in form of a storage space area that could be temporarily used as a workshop.

They also have redundancy and backup systems in their emergency response plan, where all managers in central roles have additional personnel in their group that can take their place if needed.

It was found that the company has a good organizational culture for decentralization of responsibility when necessary, which is confirmed both by management and front line personnel during interviews. Being a relatively small group working together at the workshop gives the employees the opportunity to learn from each other and from their managers. This provides an excellent source of interdisciplinary training, which together with the organizational transparency prepares workshop personnel for a shift to decentralized authority when needed. This may not be the case in larger organizations where cooperation and informal training opportunities may be more limited.

Organizational learning through trial and error is one element that needs improvement. The number of emergency preparedness drills that takes place at PI Intervention is relatively low. It is important to complete emergency drills and exercises on a regular basis, in order to practice the roles and responsibilities of the different emergency team members. I believe 10 years is a long time to go between each emergency drill that is not a fire drill. In the future it will also be important to update emergency plans and phone lists as employees leave and others join the organization.

There should also have been an evaluation after the emergency drill that was performed in April. This is an important aspect of continuous learning and

improvement, if you do not learn from drills and training, you cannot improve. As there have not been any previous accidents at PI Intervention it is even more important to perform exercises so that the emergency preparedness procedures can be continually improved and changed as the circumstances and context of the workshop changes.

7. Final Conclusion

One of the research questions presented in chapter one was about the emergency response plan; if it contains enough and the right information so that the employees are able to perform emergency response in an effective and precise manner. The emergency preparedness plan proved effective when the exercise took place. The plan contains a list of numbers of the managers, and in which order one should call

them in case of emergency, there is also a list over who has gone through CPR training and heart defibrillator courses so that the most experienced individual on the scene can be contacted. In addition, there is a detailed plan over what actions the emergency response team coordination should take when informed about the situation. There is now also an overview of the respective roles each team member should take on while in session. The information in the emergency response folders that are strategically placed around office and workshop areas covers the basic demands for a smooth transgression from starting CPR, to contact with police/ambulance/fire brigade, and informing the Managing Director so that he can gather the emergency response team. This ensures an effective emergency response, which may help to minimize personal injuries as well as down time in production lines. I believe that PI Intervention has been successful in the development of their emergency response plan.

The fact that PI Intervention is a small organization has not had any apparent effect on their ability to optimise their HRO performance. They have managed to balance the protection and production side of their organization, and have avoided serious accidents through preventative work. The fact that they are a small organization has created a transparent organization with close ties between management and front line personnel. This is one of the traits that allowed easy communication and trust within the organization. So, to answer the main research question presented in chapter one:

What are the possibilities for HRO performance in small and medium sized oil-service companies, and have PI Intervention fulfilled the demands for a reliable and safe organization?

PI Intervention, as a small organization, has had few problems when achieving the status as a reliable and safe organization. This is shown through the empirical data and discussion of their HRO performance, their safety culture and attention to emergency preparedness work. This status is further illustrated by their relatively low rate of incidents and the absence of serious accidents. It is important for PI Intervention to maintain their continuous focus on safety and emergency preparedness within their organization in order to maintain a reliable production and secure a good relationship to their clients, and a good reputation to attract new ones.

PI Intervention aspire to be an HRO, they are successful in many areas, but not all. I see PI Intervention as an HRO even though they do not fulfil all the elements in HRO theory.

The conclusion that PI Intervention is an HRO verifies the additional conclusion that the possibilities for HRO performance in small and medium sized oil-service companies are relatively good. This is illustrated by PI Interventions ability of HRO performance as a small company. Mindfulness and good safety culture are elements that can be included in any size company as long as both higher managerial levels and front line personnel are involved and open minded. A small/medium sized company has a good possibility to be transparent with an open information flow which increases trust between management and front line personnel, which in turn may aid in any change processes regarding safety and emergency preparedness. There is also a short chain of command, which gives the front line personnel daily interaction with managers in different division. This opens up the possibility for informal and interdisciplinary learning which will benefit the organization in the long run with regards to situations that requires decentralization of authority, or simply a temporary substitute.

My role as a researcher has brought me these findings which, through my own discussion, have lead me to these conclusions. PI Intervention welcomed me to choose the research questions I found interesting, which methods I would use, and who I wanted to interview. Through this process I have come to these conclusions. I hope that PI Intervention find these results useful and something to help them in assessing their emergency preparedness procedures, along with the safety development in their own organization.

There are some negative aspects to being a small/medium sized organization, but I believe there are just as many positive ones. The “family ties” that the employees of PI Intervention have aided them in their everyday work, their training and professional development. It is likely to make change processes much easier, and opens up for close discussion of any changes that are implemented.

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Appendix

1. Interview guide – warehouse
2. Interview guide – management
3. PI Intervention emergency response plan
4. PI Interventions report from emergency preparedness exercise

Interview guide – warehouse

Tid i selskapet

Tid med relevant arbeidserfaring

1. Har dere faste prosedyrer og rutiner i forhold til sikkert arbeid på verkstedet?
2. Følges disse regelmessig?
3. Hvis disse ikke blir fulgt, meldes det om avvik eller er det allment akseptert?
4. Kjenner du til en beredskapsplan for krisesituasjoner i deres bedrift? (NEI, spm 5)
5. Hvordan er den kommunisert ut til dere som verkstedsarbeidere?
6. Er du fornøyd med denne planen?
7. Kjenner du til hele planen eller bare den delen du er del av?
8. Hvis noe skulle skje på verkstedet og nærmeste leder ikke er tilgjengelig, føler du at du kan ta kontroll over situasjonen selv?
9. Er det klare regler for når en slik plan slås i kraft?
10. Er den sentralt styrt, kan du som verkstedsarbeider sette i gang "alarmklokkene"?
11. Blir den alltid fulgt, eller velger dere andre løsninger?
12. Har du en spesifikk rolle i forhold til denne planen?
 - b. Føler du deg komfortabel i denne rollen?
13. Hvilken opplæring har du fått i relasjon til denne rollen?
 - a. Hvis, er denne opplæringen adekvat?
 11. Hvis ikke, hvilken type opplæring kunne du tenke deg?
 12. Har dere gjennomført tester/trening utenom brannøvelser?
 - a. Hvilke erfaringer dro dere fra testingen?
 - b. Hvis ikke, hvilke type sikkerhets tester kunne du tenke deg?
13. Oppleve du at dere har et sikkert arbeidsmiljø?
14. Har du opplevd at du noen gang har følt et tidspress til å gjennomføre en jobb selv om du følte at forholdene ikke er bra nok?
15. eller omvendt, har du opplevd at sikkerhetsinstruksjonene er for snevre til at du kan gjøre gjør jobben skikkelig?

Har du noe å legge til i forhold til beredskap i bedriften?

Interview guide – management

Kan du beskrive hvordan dagens avvikssystem fungerer i din bedrift?

- a. Hvordan bør det være?
- b. Hvor mange avvik ble rapportert forrige år?
- c. Har du noen ide ang mørketall?
- d. Hva er prosedyren når noen melder et avvik?

Finnes det nedskrevne prosedyrer/klare rutiner på oppgaver relatert til effektiv drift?

- e. I hvor stor grad følges disse bokstavelig?

Hvorfor er det ikke implementert en beredskapsplan for krisesituasjoner tidligere?

Hvorfor bestemte dere for å gjøre noe med det nå?

Hva innebærer beredskap pr i dag for deres bedrift?

Hvordan er deres beredskap kommunisert ut i bedriften?

Hvilke mål har du for beredskapsnivået i bedriften?

Hvordan vil den nye planen bli kommunisert ut til ansatte?

Hva forventer du å få ut av øvelsen som kommer om ikke lenge?

Hva forventer du å få ut av prosessen som helhet?

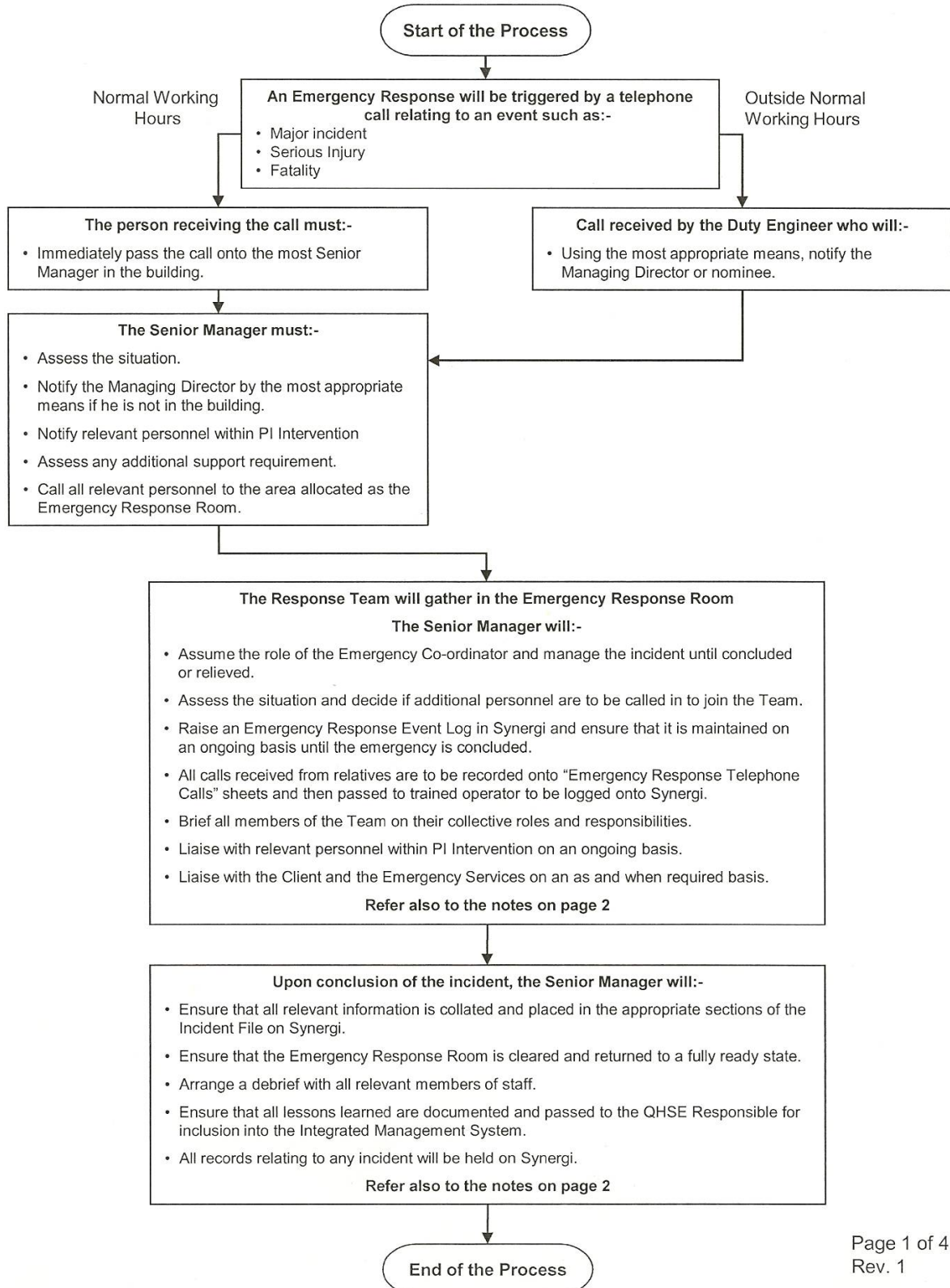
Hvis det skulle skje en ulykke i trykkgraven, hvor fort kunne dere få i gang produksjon igjen?

Fordel/ulempe at dere er en liten bedrift?

EMERGENCY RESPONSE



This procedure defines the process for handling an emergency involving any PI Intervention personnel either offshore/on site or abroad, or in the event of a serious environmental incident.



EMERGENCY RESPONSE

1.0 Responsibilities:

- 1.1 The Managing Director or nominee has overall responsibility in an emergency situation.
- 1.2 The Managing Director will ensure that all relevant personnel have been trained on the requirements of this procedure.
- 1.3 All information is updated as and when changes occur by HSE Responsible. As a minimum this will contain the following: Names, addresses, telephone numbers and next of kin details of all Staff, a copy of this procedure and associated forms, and details of where the current location is recorded for staff working away from the base.
- 1.4 Anyone on call will, for the duration of the rota, have access to the Emergency Response information.
- 1.5 The QHSE Responsible will ensure that all lessons learned are addressed in the Integrated Management System.
- 1.6 All members of the Management Team are responsible for ensuring that the requirements of this procedure are complied with.

2.0 Additional notes

- 2.1 All relevant information relating to the Management of an Emergency is available on the PI Intervention network and Emergency Response File held outside the Emergency Response Room and on the network. A further hard copy of the File is also held by the Duty Engineer on rota.
- 2.2 All subsequent calls, including any other form of communication relating to the emergency, must be routed through the Emergency Co-ordinator and recorded on Synergi.
- 2.3 All calls received from Relatives are to be taken by trained personnel and logged into Synergi.
- 2.4 The Emergency Co-ordinator will, where practicable, be relieved from duty by another Manager trained in the emergency response process after a maximum period of 12 hours.
- 2.5 Any statement to the media will only be released by the Managing Director of PI Intervention.
- 2.6 The Police are solely responsible for notifying relatives of any fatality or serious injury.
- 2.7 Any subsequent communication with relatives or any injured personnel will only be as specified by the Managing Director.

If anyone is unsure about any of the activities referenced in this procedure they must seek advice from the Managing Director or the QHSE Responsible.

SEQUENCE LOG – Synergi 601 – Emergency Response Training

Date	Time	Description
15.04.2010	09.00	<p>PART 1 – Incident at PI Warehouse</p> <p>An explosion was heard coming from the right hand, far corner of the workshop. Morten E, Tormod J, Kenneth J and Trond H ran towards the blast. On arrival at the site of the explosion, they found two work colleagues who were injured, and quickly ascertained that there was no impending danger.</p> <p>Person 1) Kenneth R: Laid on floor, drifting in and out of consciousness, broken right leg with tibia protruding, heavy blood loss, back of head injury, Multiple lacerations, dust/debris in eyes and shock.</p> <p>Person 2) Tor R: Stood, bleeding from left forearm with foreign object protruding, multiple lacerations and shock.</p>
	09.03	Morten commenced first aid by first removing his belt and using it to apply a tourniquet to the top of KR's right leg, whilst Trond assisted.
	09.03	Kenneth J commenced first aid on TR by first using his belt as a tourniquet to stem the flow of blood from TR's left arm.
	09.03	Tormod phoned for ambulance and gave relevant details, including PI address, what happened, how many casualties, possible injuries.
	09.08	Tormod got the first aid kit gave a bandage to KJ and then took the first aid and eye wash kits to Morten. Tormod then assisted Morten with giving first aid to KR.
	09.08	After prompting, Kenneth J applied bandage around the foreign object protruding from TR's arm, kept his arm lifted and gave continuous reassurance.
	09.09	Morten bandaged KR's head wound, applied eye bath and gave continuous reassurance, assisted by Tormod. KR had neck stabilised and was covered with clothes to keep warm.
	09.10	After prompting, Trond phoned Tor Olav (MD) to inform about the incident and stated that nothing had been moved pending investigation. He then proceeded towards the car park to wait for the ambulance. Trond collected and wore yellow vest which is sited next to the fire exit to car park.
	09.10	Injured stabilised. Constant reassurance given whilst waiting for ambulance
	09.15	Ambulance turned up and was directed to the

		workshop by Trond, who gave details to the paramedics.
	09.17	Trond secured and closed all access areas to the warehouse.
	09.20	Debriefing by First Aid Trainer, Eirik Jensen who gave feedback to all personnel involved in the staged incident, including an opportunity for questions and answers.
	09.28	Training Part 1: Finished.
		PART 2: Emergency Response Team (ERT)
15.04.2010	10.12	After assessing the situation Tor Olav phoned the relevant Emergency Response Team members to meet in the Emergency Response Room (PI Conference room): Katrine (10.12), Sigve (10.13), Eirik J (10.16), Morten Ø (10.19), Trond H (10.20)
	10.15	Katrine called Beverley and Marianne L to assist in the Emergency Response Team.
	10.20	All personnel of the 'ERT' were gathered in the conference room. Tor Olav informed about status of the incident: Kenneth R and Tor R are on their way to the hospital for treatment.
	10.25	Sigve called the Next of Kin for Kenneth R and Tor R according to Next of Kin list. Kenneth's wife was offered transport to the Hospital but she said she would take herself there. Sigve recorded statements and actions on the Emergency Response Telephone call sheets. Reported back to the 'ERT' and passed the sheets to Marianne to be updated in Synergi.
	10.30	Tor Olav called the police and informed about the incident.
	10.30	Sigve phoned Jon Tore, and asked him to go to the hospital and meet the next of kin.
	10.30	Eirik J gathered together all the personnel involved in the incident to check their psychological status and see if they needed any help.
	10.40	Tor Olav asked Morten Ø to check with Sales team if any customers were waiting for equipment.
	10.45	Jon Tore informed Sigve that he had arrived at the hospital. Kenneth's wife was already there and they were preparing to operate.
	10.50	Hallvard came back and informed about status of outstanding jobs. Hallvard was asked by Tor Olav to call the relevant customers.
	11.00	Tor Olav informed the rest of PI personnel in the building about the incident and current status.

	11.00	Marianne L logged all sequence and actions in Synergi.
	11.10	Tor Olav debriefed the 'ERT'.
		Training Part 2. Finished.
		Analysis report to be added, showing strengths, weaknesses and changes to any procedures or documents.