



CHALMERS
UNIVERSITY OF TECHNOLOGY

Investigating project documentation in industrial organizations

How documents and checklists can be used to maximize profit and save time.

Master's thesis in Learning and Leadership

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How documents and checklists can be used to maximize profit and save time.
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ABSTRACT

The human mankind have been documenting and reading documents for centuries. It is as common if not more, as knowing how to ride a bike or how to swim. Yet many organizations do not know how to use document to maximize profit and save time.

This study was carried out at the Department of applied Information Technology, Chalmers University of Technology in corporation with Volvo GTT, since January 2013. This master thesis is based on a study to find different factors behind documentation and checklist. In order to do so a study was made at the team BF63590 at Volvo GTT, which develops rigs for verifying engines to ensure that they meet the environmental and technical requirements at Volvo GTT.

The aim of the thesis was to investigate how industrial organizations can maximize profit and save time when using documentation in projects. To accomplish the thesis aim, data was collected in form of literature study and interviews. There were 67 interviews performed with 20 different people, mainly employees working at Volvo GTT, but also academics and experts within the subject of documentation.

A document matrix was developed for the team BF63590 with an overview of the total 117 documents used in their projects. The document matrix narrowed down 117 documents to 57 documents for further use at BF63590 (see appendix 2). The thesis also concludes that there are several factors behind an effective document, these factors are the length, the communication type, deviations within an organization and the time spent on creating a document. Organizations should consider the different factors and depending on the structure and environment of an organization navigate and implement the strategy that will save the organization time and increase profits.

The significance of these findings and recommendations on further work should hopefully help BF63590 and other researchers who find the topic of documentation and checklists interesting.

DEFINITION

Checklist – *“A way of organizing that empowers people at all levels to put their best knowledge to use, communicate at crucial points, and get things done.”* (Gawande, 2010)

Communication – A process in which individuals or groups are sending or exchanging information (Jacobsen and Thorsvik, 1995).

Documentation – *“A piece of written, printed, or electronic matter that provides information or evidence or that serves as an official record.”* (Oxford Dictionary of Current English, 2006)

Formal communication – *“A type of verbal presentation or document intended to share information and which conforms to establish professional rules.”* (Business Dictionary, 2013)

Informal communication – *“A casual form of information sharing typically used in personal conversations with friends or family.”* (Business Dictionary, 2013)

Interview – *“A purposeful conversation in which one person asks prepared questions (interviewer) and another answers them (respondent).”* (Frey and Oishi, 1995)

Primary data – *“Data observed or collected directly from first-hand experience.”* (Business Dictionary, 2013)

Secondary data – *“Primary data that was collected by someone else or for a purpose other than the current one.”* (Business Dictionary, 2013)

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1. Introduction

After completing this thesis I want to express my frustration about documentation. Documentation takes time, people do not read it and it does not make a difference. So how come I am documenting this thesis. Yes I have to in order to get my degree, however I had the option to do this thesis the fast way, write what I have done during the past six months and then record it to get my degree. Or I could extend the time, put reflection and deep thought into it and with very low certainty perhaps write a brilliant thesis. I took the risk, for me it was about making a change, trying to realize something leaders and professors ignore! The topic of documentation and checklists are ancient, it has been part of our history for ages and included in society almost everywhere, in media, in sports, during education, in different careers etc. Either a person has read a document or written a document some time during their life (Chadwick, 1940). If documentation has not crossed your path yet, it will now.

Even though the topic is so familiar there are shamelessly few empirical studies behind documentation. How come professors and great business men have not made an exponential difference in documentation, the same way working in projects and building a team has increased over the past years and is mandatory for an organizations survival? There is something they know that I have not figured out yet! How come no one has written a brilliant book about documentation? How come professors and leaders ignore the topic? What makes them give up?

This thesis is not a how-to-text or written for those who want a quick fix up. This thesis will open your eyes and let you reflect and question your point of view when it comes to documentation. It is written for serious readers who have a passion for making a change, knows that change takes time and want to make a difference! My aim is that after reading this thesis you will learn from my documenting mistakes, and from mistakes done by many before me.

A short field study was made during the work of this thesis with some students at Chalmers University of Technology. The students were asked why they intended to avoid reading documentation that where relevant for them in order to perform well during their courses. The students answered the following:

- The document did not seem interesting to read.
- The document was not relevant for their studies or did not include any new information.
- They would rather ask a classmate for the same information (hopefully the classmate would have a higher interest in reading the document).

There is a dilemma with documentation that can be related to the student's answers and why others agree that documentation is boring and a waste of time. The issue could be connected to the pedagogical problem of motivating people to learn: how can we motivate people to believe that math or documentation is fun? Many people do math because they are obligated to do so in school, at the same time people are obligated to document at work. Many scientists are working on motivating student's interest in mathematics and engaging students in their learning (Sjödén,

2013). They argue that math is needed not necessarily always for the need to count, especially when there are computers that can do the job much faster than humans, but to train the brain in abstract thinking and thinking outside the box (Nolen, 2011). Similarly, meetings can be recorded or taped and the participants can escape the process of documentation. However recording is not as common as documenting and we might ask ourselves why?

At the same time the use of mathematics in school is criticized by many professors, do student need high level math when a modern life does not require it? (Welin, 2013) I believe that the critics have been one of the reasons behind the research of whether high level of math is important in schools or not. Unfortunately few have criticized documentation in the same way as mathematics. Do companies need to spend hours documenting? If yes, why not use technology to record the same information?

This thesis will stretch the importance of documentation, the human factors that have an impact on how documentation is done as well as criticizing why it is not considered to be interesting. The thesis will focus on how people can be motivated to create documentation that will be read by others instead of buried in dark, dusty rooms. In order to do so a field study has been made at Volvo GTT at the team BF63590 in Gothenburg, to find out the positive and negative effects of documentation and checklists.

1.1 The documentation at the team BF63590

Volvo GTT develops engines for trucks, buses and construction equipment. These engines are verified in a lab to ensure that they meet the environmental and technical requirements. When verifying, the engines are rigged by measuring instruments in order to gather environmental and technical data. The team BF63590 is responsible for the rigs during verification of various product development engines. BF63590 perform projects and minor construction assignments (CA) in order to ensure that the rigs have the correct equipment and instruments. To do so these projects and CA's have been performed by consulting firms where they have created checklists and other documents. In the spring of 2012, Volvo decided to hand over the responsibility for documents and processes to three Volvo employees. As of now these people have started to investigate the current documents and processes that previously have been used during verification using the 5S method in Lean Manufacturing. The five S's stand for Sort (*Seiri*), Set in order (*Seiton*), Shine (*Seiso*), Standardize (*Seiketsu*) and Sustain (*Shitsuke*) in order of execution. The 5S in lean manufacturing is a methodology for organizing, cleaning, developing and sustaining a productive environment. The 5S lean manufacturing is a system to reduce waste and optimize productivity at an organization through maintaining an organized workplace (Hirano, 1990). The thesis will focus on the first S Sort, to organize the consisting documents used in projects at BF63590, and the continuation of the 5S process will carried out by BF63590.

The project folder structure and checklist at BF63590 was designed by the project leader and consultant Jonas Blomqvist. The original folder structure consists of two folders with 72

subfolders in one folder and eight subfolders in the other folder. These folders consist of a total of 117 document templates and processes.

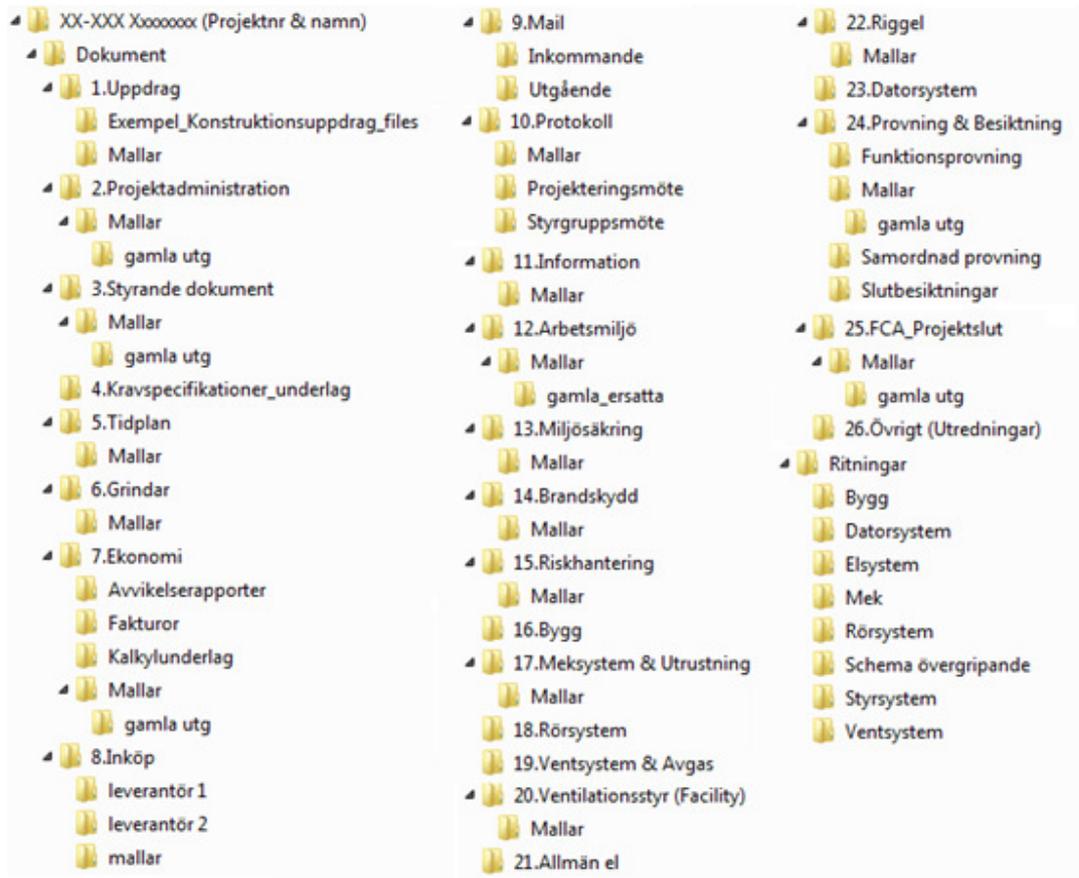


Figure 1, The project folder structure at BF63590

The checklist used for projects within BF63590 consists of six phases and of 124 activities. Out of these 124 activities, only twelve activities are mandatory and two activities are recommended. The project leader has the option to reduce or add the number of activities if she/he determines that they are not applicable for the project. The project leader is responsible to include the following information in the checklist: the finished date, the person responsible, if there are any participants and if any decisions were made for each activity. The checklist also consists of other information, for each specific activity the location of the attached documentation is stated in the project folder, considered that the activity has an attached document. On the other hand, the checklist does not state where the template can be found and for some activities there are two options for placing the documentation of an activity.

CHECK LIST FOR PROJECTS										
Requested by:	????????????									
Project number:	XX-XXX									
Project name:	????????????									
Issued by:	????????????									
Revised:										
	Included	NOT included	Finished date/sign	Responsible dept/name	Participation dept/name	Decisions document/minutes reg.no	Folder Folder where documents are located	Doc.reg M=Mandatory, R=Recommended	Template/In structure X=existing	
Assignment: (Orderer)										
assignment description							1. Uppdrag		malform	
technical specification	3						4. Kravspecifikation	M	N/A	
project organisation							2. Projektadministration		X	
GATE 1: Project description						Project description doc	3. Styrande dokument	M	X	
PRE-DESIGN:										
folder structure - project				Receiving dept.			3. Styrande dokument		X	
considerations for working environment							12. Arbetsmiljö	R	X	
open SAT document				Maintenance & Receiving dept.			25. SAT	M	X	
open Spare Parts list				Maintenance & Receiving dept.			25. SAT		X	
open Vulnerability Analysis				Maintenance & Receiving dept.			25. SAT		X	
design template with check list						Design requirements template_instructor	3. Styrande dokument		X	
economic start-up				Facility ID-resp. & Controller			7. Ekonomi		X	
cost calculation and budget							7. Ekonomi		X	
time plan							5. Tidplan		X	
address list							2. Projektadministration		X	
layout							Rättningar		N/A	
5S in the project							12. Arbetsmiljö		X	
fire protection documentation							14. Brandskydd		X	
Classification Plan							14. Brandskydd		X	
system diagrams, principle							Rättningar		N/A	
control specifications, principle							22. Siggsyrning (+Rättningar)		N/A	
mechanical principle							17. Med. & Hjälpmedel (2D/3D-mod)		N/A	

Figure 2, A cutout from the original checklist at BF63590, also see Appendix 1 for the entire checklist.

1.2 Aim

The thesis aim is to investigate the phenomena behind documents and checklists, as well as to get an overview of existing documents used in projects at BF63590. The thesis goal is divided into two sections, a specific goal for the team BF63590 at Volvo and a general goal for Chalmers and other industries similar to Volvo. The specific goal for the team BF63590 is to decide upon a process in which the documents are handled in the team BF63590. In order to achieve an overview of existing document at BF63590 the following specific questions must be answered:

- Which routines, templates and processes are requested by team BF63590 and stakeholders?
- Which routines, templates and processes exist? Are needed? Are frequently used?
- Which routines, templates and processes are missing? Need improvement?
- How should routines, templates and processes be handled in the future by the team BF63590?

The answers to the above questions will be presented through a documentation table requested by the team BF63590. The thesis also focuses on how industries similar to Volvo can improve and use documents more efficiently general issues concerning documentation and checklists which will be discussed and reflected upon.

- What are the factors behind documentation and checklists?
- How can organizations similar to Volvo save time when using documents and checklists in projects?

1.3 Limitations

The master thesis will create an overview that only covers documents within the team BF63590. When working at Sort in 5S lean manufacturing the thesis will focus on investigating documents and checklists in order to find suggestions for improvements. There will not be enough time within the thesis to apply the other steps in 5S lean manufacturing in order to implement the improvements and suggestions.

2. Theoretical Framework

The purpose of the theoretical framework is to provide relevant and necessary information for the topic of this thesis. This information is then used to analyze the results from the interviews but also to serve as an inspiration for the thesis' discussion, conclusions and recommendations. The theoretical framework will begin to explain the importance of documentation, and then criticize why documentation is not performed at all times as well as captures the advantages and disadvantages of using a checklist.

2.1 The importance of documentation

In recent years documentation has been an important instrument in every project and career worldwide. Verbal communication is replaced by nonverbal communication, people text more often than call, business agreements are written agreements rather than agreed upon a handshake (Patersson, 2003). There are many reasons behind the importance of documentation which will be explained below. However many projects and businesses document poorly and people prefer to do other things rather than working with documentation (Brandl, 2011). What are the reasons behind the disinterest in documentation? Is documentation as necessary as the same amount it is used and what are the reasons supporting the growth?

2.1.1 Evidence, control and memory

“Lawyers have a saying that the three D's are very important in a contract. Namely, Document, Document, Document.” (Abdulaziz, 2007)

Documentation provides a written account of activities as they happen. It is a place to go when time has passed and memory fails us. It is also a form of written proof that something was done or said. Documentation gives the ability to have another account of a situation and helps us have something to fall back on, other than the word of one individual. Therefore documentation can be referred to information security:

“If something is important, put it in writing. It will then be very difficult for the other side to argue differently. It is hard to have a judge or jury determine that if a contract specifically spells out "red", what the parties really meant to say was "green" (Abdulaziz, 2007).

Therefore, the next time there is a confusion regarding who is supposed to do what, or what are the best practices following which a task needs to be performed, one can look at the detailed documentation and the dispute can be resolved. The documents act as a collection of the organizational knowledge regarding the processes and can be accessed by anyone at all times. There are also certain disadvantages with keeping track and following procedures at all time. Employees risk shutting of their brain and following rules instead of using logic and common sense (Gunnarsson and Svensson, 2009).

Other than proof, it is important to know what has been done in previous projects and businesses. Employees switch careers, go on holidays, get sick, get children etc. And at all times traceability is important, otherwise information and expertise will be lost. By writing down important decisions and procedures, documentation will keep employees on track. Everyone in the organization will be pointed in the same direction and employees do not need be mind-readers, there will be no mysteries, questions or confusions.

2.1.2 The learning process

Documentation does not only provide evidence when memory fails us, it can be used as a learning tool. When experiences are repeated, the brain creates strong pathways of connections based on those experiences. The brain then retains those connections and adapts to the environment it is exposed to. If an experience does not happen frequently the brain eliminates connections made from those experiences (McNelis, 2012). Kahneman describes a similar process as two different ways of thinking; system one which is fast, instinctive and emotional while system two is slower, more deliberative and more logical. As the slow system (system two) is repeated, consider a child learning the multiplication table, eventually the new information will become permanent. Then it will turn into fast way of thinking (system one) (Kahneman, 2011). The same pattern occurs when documentation is done, it is an educational process to put thoughts into writing, since the writer will reflect upon and question what to write (Säljö, 2010). While seeing information and then writing it down is beneficial, actually putting new knowledge and skills into practice can be one of the best ways to improve learning.

Documentation also acts as a training material for the user. It can help new personnel move up the learning curve faster, instead of making resources join the job and learn tacitly. The documentation can be used to give new resources classroom lessons about the tasks that need to be performed. It can also help experienced employees to learn about a process or product faster. The documentation acts as the training manual and covers the syllabus as well as provides notes to educate the resources. This can be supplemented with on the job hands on floor visits for better and faster creation of efficient resources.

This also allows the organization to take advantage of the talents of the most creative people, as well as to help the moderately talented to produce outstanding work. This is a way to ensure costumers that the organization could meet their needs and requirements regardless of who the project is as assigned to (Hackos, 1994).

2.1.3 Saving or consuming time

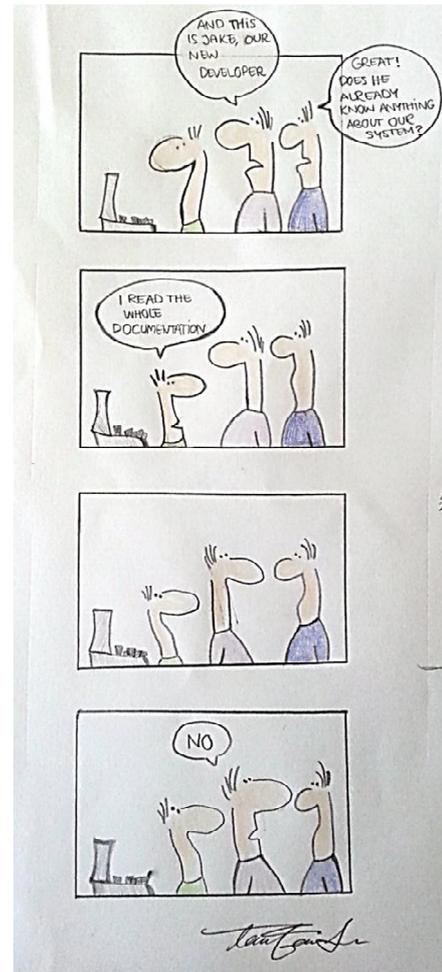
Many employees find the process of documenting and using documents as boring and a waste of time (Gawande, 2010). And believe it or not, writing words take time, and every time someone needs to update part of documentation it will take additional time, presuming that the person remembers what previously has been done. How much time, depends on what has been documented and how well it has been documented. The issue relies on that it is hard to predict how much time an employee needs to put down for documentation. It is also difficult to create a

living document: a document that is revised and up to date. Having a living document is rare in organization, since many organizations fail to have their document updated. Note that a document can be updated without any changes needed to be applied to the document. An employee can read a document and realize that everything is still valid and therefore not apply any changes to the document and the document is considered updated. Note that knowing that a document is updated and spreading the information is two different aspects. When working within a document based organization every user should be able to know when the document last was updated, with or without any changes applied.

A comparison can be made to a beam: when a consumer asks for a beam, they ask for the beam and the documentation associated with the beam. When the beam is constructed and delivered, it can be put into practice, with or without the documentation. The documentation is used as a complement for the beam and is not crucial for the function of the beam. The documentation will be crucial when the beam need maintenance or if something unpredictable happens to the beam. Until then the supplier have an extra amount of time after the delivery of the construction to finish the documentation. This illustration indicates that most documentation is not crucial at the end of a project and is not needed at the same time as a delivery. This often leads to the student syndrome; the documentation is forwarded until the last day or even forgotten after the project has been delivered. Therefore, in the short time a document may not be needed and in the short time documenting will take a lot of time and there is no guarantee that the documentation will be used, it all depends on the quality of the beam (which most sellers guarantee to be excellent).

In order for the document to consist of relevant information and be effective for the reader, the authors need to do some initial hard work. The better the document, the more effort has been put into creating and reviewing the document. Although writing a document takes time, it is important to know that in the long-term, the investment pays off a thousand times over.

“Documented procedures will make an organization dramatically more efficient. No longer will there be endless fire-killing because



you will have documented all of your processes and, in doing that, described in detail how they should be done: efficiently, quickly and cost-effectively. With every system functioning super-efficiently, your overall business will be efficient and profitable. The end-result will be great bottom-line profits.” (Carpenter, 2013)

Therefore, it is not the process of creating a document that saves time but the outcome of the document considered that the document is consistently reviewed and up to date.

2.1.4 Other signals of documentation

The human kind is egocentric, prioritizing oneself has always been part of businesses, where a promotion is more important than a product. It is a “*business of winning wars*” (Benjamin, 1998), where getting a product into production even though the product does not meet specification requirements is more important than the product safety. This outdated behavior is about to change and need to change in order to increase security and productivity. Working at a business company or producing a product is all about teamwork, every action needs to be puzzled and timed correctly in order for the result to be a success. A comparison made to team sports, where players sacrifices oneself for the team to win, where players see one another as one rather than many individuals. This way of working will not guarantee the employer a promotion, however it will create a better environment at work and increase an organization’s overall productivity. The same theory goes for a checklist or documents, a document is not an archived piece of written paper buried in a dark dusty room. Since documents are not written for the documenting purpose but for others to gain information and to use. Therefore a document needs to be criticized and reviewed by a team in order to be a useful tool. A parallel could be made to writing a code, it is more effective for the programmer to compile parts of the code rather than compiling a whole written code. In the same way it is time consuming to write part of a document, review and update the part and then continue writing. This process will reduce and in some cases prevent errors in thinking which could result in rewriting an entire document, therefore it is better with constant review during the documentation process (Wujec, 2010).

The use of team work will also promote a better working environment, where people will dare to ask the “dumb” question or admitting that they actually do not know something that is expected for them to know. Playing with open cards is essential in order for a team to trust each other and have fun, which leads to higher productivity, better quality and in the end will save time and money.

Another behavior seen in businesses is that highly ranked people and their opinions can change important decisions, not because they are necessarily right or have based their opinion on facts. But because they are ranked higher on the hierarchy scale and like to criticize or to comment on a product. There are many projects that have failed, due to influence from people

“Have the courage of arguing for your opinion, however make sure it is well founded.”
– Project Leader, ÅF

with no expertise in the matter's opinion (Benjamin, 1998). Therefore clarity and honesty are two key elements in any documentation or checklist. Being clear from the start and presenting arguments based on facts rather than opinions and being able to be brave enough to admit that mistakes can be made will save time and money. In documentation, clarity in the use of the document will create interest and an understanding to the user, as well as being open-minded will create inclusion and participation.

2.2 To document or not to document?

Documents are usually not designed with research in mind. The information recorded may not be of value or incomplete. Documents get misfiled, left on people's desks for long periods or simply just do not get fully completed at all. Even standard ways of collecting data in other places like a police station may change, so there may be information that are available for one period of time and not another. All of this will create gaps in data as well as difficulties. It is hard to motivate people into collecting data and recording it on time, since people's motivation vary over time.

It is interesting that documentation is not part of many peoples interest and takes time to complete. It is also interesting why organizations document more than ever before, almost every action is recorded, when the employees lack interest and motivation. Could it be that the people in charge of the decisions do not document themselves? Could it be that documentation is not needed as frequently as it is recorded? Could the lack of motivation depend on the amount an employee needs to document?

There are many reasons behind the misuse of documentation. One important element when dealing with humans is the human factors. There are factors such as laziness, habits, negligence, trying to decrease complexity and optimizing work in order to spend less time on an activity and be more efficient that can decrease the quality of a document. These factors have an impact on the motivation and reduces creativity, reflection time and team work. In other words things that consider to take more time and other resources and due to the human factors it is extremely hard to motivate people to document.

There are many factors behind documentation and many can debate for and against it. Whether documentation is needed as frequently as it is done in organizations or not needed at all is yet a question.

“Documentation is like eating and drinking. It's essential, but in the right quantities, at the right time and place. You don't want to get obese, and you certainly don't want to drown.

Yet some companies just can't get a healthy sense of perspective with documentation. There's no sense of “just enough”. They always seem to need more that is required, as if documentation is an end in itself.” (Christie, 2011)

2.3 The size of a document

An issue lies behind every written text, the text need to be long enough to reveal certain information, at the same time it needs to be short enough to keep the reader interested. It is also important that the text satisfies the reader's expectations. I used to believe that the size of a documentation is essential for keeping the reader interested, that short and consist documents are more interesting. However there are examples that proved my theory to be incorrect, one example is the "*Harry Potter*"-series by J.K Rowling. Each book consists of a minimum of 500 pages and I have seen anything from children to adults who cannot stop reading the books. There are also other examples such as the telephone catalogue, "*The lord of the rings*" by J.R.R Tolkien, the Bible, the IKEA-catalogue and many other texts to follow. These texts gather the reader's attention at all times and are well read. Notice that there is a big difference between the telephone catalogue and the "*Harry Potter*"-series. The telephone catalogue is an information source in comparison to the "*Harry Potter*"-series which tells the reader a story. Even though these texts are different they have managed to be well read texts.

Another thing these texts have in common is that they are written by experts, professional authors or people who are an expert in documenting. Documentation now days occur by most people in organizations. Many do not have the talent, education or the knowledge on how to create interesting and relevant texts. Engineers' are schooled into solving problems, doctors in finding the problem, lawyers to come up with evidence and economists to predict the future. Even though documentation is part of many organizations activities and projects, there are few students that are being thought on how to document during their studies in school.

I do believe that there are many textbooks, manuals, articles and other documents which could have conveyed the same message through a shorter text. However the size does not always matter when it comes to keeping the user interested in a document.

2.4 Why use Checklists?

Checklists are an effective way to get things accomplished, but they can also create problems. Lists might help one person feel more organized, while others will feel overwhelmed and frustrated. Some people enjoy the tangible aspects of creating a list, while others ignore the list once it is created and focus on other issues instead.

2.4.1 Where are checklists used?

Checklists where introduced in the airplane industry after Boeing flight B-17 Model 299 crashed due to "pilot error" on October 30th in 1935, when the airplanes had become too complex to handle. The pilot's new routine was to read and check every item on the list before takeoff and landing. After that the checklist was introduced, the pilots went on to fly the Model 299 a total of 18 million miles without one accident (Crawford, 2012).

Checklists have also reached the medical industry and as late as in 2001 the first medical checklist was applied. In 1960's if someone had a heart attack, doctors would have little idea of

how to treat it. They would give the patient morphine for the pain and put the patient on strict bed rest for weeks. Then everyone involved would pray and cross their fingers. In contrast to 1960's, today doctors have at least a dozen of different ways to reduce the likelihood of having a heart attack. If the patient has a heart attack, doctors have effective therapies that will save the patient's life and also limit the damage to the heart (Gawande, 2010).

Other than the industries mentioned above there are also other types of checklists. Grocery checklist, restaurants cleaning checklist, safety checklists, project checklists etc. used both privately and in different organizations.

2.4.2 When are checklists helpful?

The use of checklists has increased over the past few years as the efficiency of getting things done has increased, and we might wonder why?

Things are more complicated and more complex now compared to the 1950's, there are more procedures for curing a person and planes are too complex to handle. The interesting thing is that in the early twentieth century a doctor only needed a high school diploma to practice medicine. Now, every doctors need to have a college degree, a medical degree and an additional training in an individual field of practice, this results in a minimum of 10 years study (Gawande, 2010). This change of education over the past years exists in other fields as well, such as engineering, economics, construction etc. Even though the human kind is more educated and better trained than before, the preparation is not enough and we fail. One reason, why we fail at what we set out to do is necessary fallibility, which means that some things that we want to do but are simply beyond our capacity (Gawande, 2010).

So what can we do when expertise is not enough? How can we solve problems when even the super specialists fail? Professor's has begun to see an answer, but is has come from an unexpected source – one that has nothing to do with any of the fields mentioned above at all.

With more technology, more pressure exceeds on the human being, we have a higher responsibility for the actions we take and the human memory isn't enough. This indicates that we need a different strategy for overcoming failure, one that builds on experience and takes advantage of the knowledge people have but somehow also makes up for our inevitable human inadequacies. And there is such a strategy- though it will seem almost ridiculous in its simplicity, maybe even crazy to those of us who have spent years carefully developing ever more advanced skills and technologies. It is a checklist (Gawande, 2010).

*“There are skyscrapers we do not yet know how to build, snowstorms we cannot predict, heart attacks we still haven't learned how to stop”
– Atul Gawande*

2.4.3 Are checklists the reason behind growth?

Checklists are a great tool when memory fails the human kind, but is it effective in every situation? Are checklists the reason behind growth and change when complexity increases, or are

there other reasons behind the increased use of checklists? Are all checklists useful? What disadvantages can a checklist bring to employees and organizations?

There are many reasons that will explain why checklists are useful or not useful in that matter. For example, imagine going to the grocery store, many people would bring a checklist along since it is hard to remember every item one needs to buy. One could on the other hand try to memorize all the items, this method requires more time and thinking than creating a grocery checklist. By looking at a grocery checklist the conclusion made is that a simple checklist is time consuming and allows the brain to focus on more important matter. However there is a factor behind grocery checklists that are not as common elsewhere. When creating a grocery checklist, the creator and the user are often the same person and the checklist is optimized for the user. Therefore the user of the grocery checklist does know who the writer is and trust their opinion.

In many organizations the checklist creators tend not to be the checklist users and the checklists are applied for numerous of users. It is difficult for the checklist creator to create individual checklists or to optimize the checklist for all users, and therefore has to create a checklist that will satisfy the organization and hopefully the majority of the users. This way many checklist users optimize the given checklist themselves and important activities/checks may remain undone.

It is a good feeling to be able to check off an activity from a checklist, many employees will try to accelerate the process, during this process important steps may be overlooked. An example is given from the airplane industry where the take-off checklists are checked twice before take-off. Studies have shown that after numerous checks, the users are too familiar with the checklists and ticks of the activity before checking or sometimes even without checking the activity (Travado, 2012). This could create safety issues and unwanted consequences further on during a flight.

There are also sign-off checklists where users can tick of activities without actually doing them, where it is hard to trace if the activity was completed. I witnessed a lecturer at Chalmers University of Technology skip an activity in a sign-off checklist since it was more effective for him to send off a paper without checking a step. In many cases it is easy for the checklist user to skip certain steps in a sign-off checklist in order to optimize the checklist for their own use. In most cases the skipped activity will not harm the organization in the short run, but can leave scars in the long run.

2.5 Formal vs. Informal communication

In industries and businesses formal communication is more common than informal communication. Many organizations defend formal communication and authority over informal communication, team building and productivity. Informal communication contributes to more productivity and social relationships between the employees within an organization (Jacobsen & Thorsvik, 1991). There are also leaderships based on informal communication that have contributed to more effective and productive organizations (Abrashoff, 2002).

The main reason formal communication is preferred in organizations is that it contributes to legitimacy of individuals, while informal communication contributes to effectiveness of a team or an organization in the long run. Unfortunately there are few employees that stay at the same job their entire career and statistics have shown that more than every tenth employee changes workplace per year (Andersson, 2010). These employees would want to improve their knowledge and legitimacy during the years they are working at a firm and probably will not be interested in the organizations long term goals.

If formal communication comes from management's direction, it may be due to a lack of trust for employees. A manager may not believe that employees are able to perform as well without routines and templates or that the organization may not have enough resources to invest in failures. These failures are an educational process and improve the efficiency in the long-term (Abrashoff, 2002).

Another aspect worth mentioning is that organizations cut down breaks and social activities in order for the employees to have more time for work. Studies have shown that it is during the breaks and social activities when the employees get most of the work done, they get to know one another through informal communications and barriers are broken (Pink, 2010).

Informal communication leads to more pictures and “smiley faces” in documents compared to formal communication where the picture is rather described than attached. In cases where pictures are important, there is no use of replacing the picture with a long text. The risk with pictures and smiley-faces is that it will reduce legitimacy for the author of the document but increases effectiveness for the reader.

I believe that both informal and formal communication is necessary in organizations, since an excess of either would lead to inefficiency. It is easier to inform employees through formal communication, since it is more legitimate and the employees will understand the significance of the assignment, while informal communication signals that the managers are down to earth and care about the employees (Brevell, 2013).

3. Methodology

The thesis work was part of the Sort of the 5S method in lean manufacturing, which was divided into three different stages, firstly a literature study to find more about the process of documentation at BF63590 as well as finding empirical studies on the subject of documentation and checklist. Furthermore the next stage consisted of interviews, where employees at BF63590, stakeholders, and experts within the subject of documentation and checklist were interviewed. The third stage consisted of observation, experiments and analysis, where the data collected was reviewed, tested and reflected upon in order to find different suggestions for improvement.

3.1 Data collection

The data collected has been in form of both primary and secondary data. The primary data consists of mainly interviews and the secondary of literature studies. The main purpose for collecting data through interviews is to create an understanding of how the team BF63590 and stakeholders would like to work with checklists and document templates in the future. The data collected through literature study will be used as a base to explain reasons and factors that have an impact on human behaviors and processes in industrial organizations.

3.1.1 Literature study

One of the main sources of data collection has been through literature studies, in order to find out what previous researchers has observed from documents and checklists and their impact in organizations. Remarkably few studies have been made within this subject and even fewer based on empirical studies, most commonly in the medicine and airplane industries. On the other hand there are few who have not read or written a text during their life. My prediction is that documenting is as common as riding a bike or knowing how to swim. Documentation has not crossed every person's path on this planet, however the majority of humans can relate to the subject.

Atul Gawande's book "*The checklist manifesto*" has been a key element for the thesis and the book is based on the avoidable failures that continue in industries as in the health care, government, the law, the financial industry etc. Gawande states that the reason behind the failures are the volume of knowledge that continue to increase, even though the training process is longer and more advanced technologies are used. This exceeds the human ability to always be consistent, correct and safe. He argues that the checklist is a solution to many of these problems and by using this simple method human errors can be reduced.

Daniel Kahneman's book "*Thinking fast and slow*" has also been a successful contribution to this thesis. Kahneman explains two different systems that drive the way humans think, the book offers practical and enlightening insights into how choices are made in both our business and our personal lives. Other than the mentioned books many articles from scholarly publications and articles being peer-reviewed has been read and reviewed, in order to give a full perspective on the issue of documentation and checklists.

3.1.2 Interviews

The main source of the data collected has been performed through interviews, mainly from people working at Volvo, but also academics and experts within the subject. The main reason to interview people was to gather as much knowledge about the processes and thoughts behind the existing documents at BF63590. Interviews are a useful tool which can lead to further research using other methodologies such as observation and experiments (Jensen and Jankowski, 1991). Interviews can have one of two basic structures. They can be either structured (closed interview style) or unstructured (open interview style). Open-ended or unstructured interviews are defined by Nichols (1991) as:

"An informal interview, not structured by a standard list of questions. Fieldworkers are free to deal with the topics of interest in any order and to phrase their questions as they think best."

The interviews performed during this thesis have been in form of open-ended interviews. This type of structure uses a broad range of questions asking the people being interviewed in any order according to how the interview develops (Breakwell, Hammond and Fife-Schaw, 1995). Open-ended questions allow the interviewer, if they wish, to probe deeper into the initial responses of the respondent to gain a more detailed answer to the question (Wimmer and Dominick, 1997). The richness of the data is therefore entirely dependent on the interviewer. They themselves, must judge how much or how little they should probe or say themselves.

There are both advantages and disadvantages of having open-ended interviews. It may throw a completely different light on an issue that the interviewer had previously never considered (Wimmer and Dominick, 1997). Freedom for the respondent to answer how they wish to is important in giving them a feeling of control in the interview situation. This version also has its disadvantages, namely in terms of the amount of time needed to collect and analyze the responses (Wimmer and Dominick, 1997). Due to the varied nature of the responses, it is necessary to use the content analysis technique to analyze it. This is what takes the time. Open questions used in this unstructured interview approach can cause confusion either because of the lack of understanding of the question by the informant or by the lack of understanding of the respondent's answer by the interviewer (Wimmer and Dominick, 1997).

There have been a variety of people present during these interviews, mainly people working within BF63590 but also stakeholders interested in BF63590's documentation and checklists, as well as experts and academics within the subject. There have been 67 interviews performed with 20 different people during a period of nine weeks. The table below states the name and the title or department of the people who have been interviewed, the number of interviews and the total duration of the interviews.

Title/Department	Number of interviews	Duration of Interviews (hour)
Project leader	1	1
Project lead electrical	6	5,5
Service and Calibration	2	2
Project leader	5	6
Expert Documentation and checklist	4	9
Design Engineer	1	1
Manager BF63590	7	6,5
Project lead coordinator	37	37,5
Rig owner	1	1
Rig owner	1	1
Rig owner	1	1
Manager BF63580	2	2
Project leader	1	1
	1	1
Maintainance	1	1
Project leader	1	1
Project leader	1	1
Project leader	1	1
Project lead mechanical	10	10
Supervisor, Chalmers University of Technology	21	26
Total number of interviews and total duration:	105	115,5

Table 1, Overview of interviews

4. Project documentation at industrial organizations

Organizations work in different ways to deliver products, many organizations deliver projects as a process. When working in projects there are a number of important documents used for spreading information and planning a project in order to follow the initial scope. The project documentation will differ depending on the project, however there are certain documents that are more common than others. (Maylor, 1996) This chapter will present the project documentation used in the team BF63590 at Volvo and how the process will be handled in the future. It will also present a possible solution to how organizations similar to Volvo can save time when using documents and checklists in projects.

4.1 Project Documentation at BF63590

When starting this thesis the team BF63590 made it clear that they wanted a process that was simple and logic. The aim was to look over the existing 117 documents and to decide after interviews with employees and stakeholders, which documents to use and develop for future use. In order to do so a matrix has been developed, to get an overview of the existing documents at BF63590. The matrix includes the 117 documents divided into three categories: remove, move or update. Each document has been reviewed through interviews and placed in the most suitable category. The decisions recorded during the interviews were based on how often the document was used, if there were any duplicates, if similar document could be rewritten into a document, if the information in the document was still valid etc. An example would be the document named *“Material- och färgprogram_U.pdf”* that had a duplicate located in another folder, or the document *“Arbetsmiljöplan_projektet.doc”* which needed to be updated with new valid information. These decisions are listed in the matrix’s comment section (see figure 3 and Appendix 2). There is also other information stated in the matrix: a link to each document, information about when the document was previously updated, the type and size of the document, in which file the document is located and a link to open the document (also see figure 3).

File	Document	Date	Type	Size	Stakeholders	Remove	Move	Update	Comments
1. Uppdrag	Exempel_Konstruktionsuppdrag.html	2010-03-04 6:11	HTML file	15 KB					Remove /R and R (Info received from the 80 group)
Exempel	WebResource(1).axd	2010-01-13 10:29	AXD file	22 KB					Remove /R
	WebRes	2010-01-13 10:29	AXD file	21 KB					Remove /R
Mallar	Riskhan	2010-10-08 1:00	Microsoft Word 9...	176 KB	PL				
2. Projektadministration	Adressli	2008-10-11 11:11	Microsoft Word 9...	27 KB	BO, PL			X	SEMPPL.pdf and replace with 1 document
	ista.xls	2008-11-11 11:11	Microsoft Excel 97...	151 KB	BO, PL			X	
	entation Volvo Gtbg YIT 2011-1...	2011-11-16 1:27	Microsoft PowerP...	86 KB	BO, PL			X	Update, change name to "deltagarlista", /R and duplicate, exists in file no.14 /R
	r_5.doc	2011-05-02 2:04	Microsoft Word 9...	27 KB	PL	X			Make 1 document with 4 tabs (including Farmer
	r_20.doc	2011-05-20 1:35	Microsoft Word 9...	36 KB				X	
	Fiskregister_31.doc	2010-02-16 3:22	Microsoft Word 9...	44 KB				X	
	Project organisation template.ppt	2010-06-03 11:07	Microsoft PowerP...	384 KB	BO, PL			X	Update and keep the english version, /R and /I
	Projectorganisation.ppt	2011-11-07 1:49	Microsoft PowerP...	652 KB	BO, PL	X			Remove the swedish version and update the english version, /R and /I
	Paäms	2010-04-08 11:11	Microsoft Excel 97...	22 KB	PL	X			See Fiskregister_5.doc, Fiskregister_20.doc and Fiskregister_31.doc for more info.
	Resurs	2010-04-08 11:11	Microsoft Word 9...	42 KB	PL	X			Include "Resurslikning_Avvisning.doc" in "Grindokument.ppt" /R and /I
	YIT or	2010-04-08 11:11	Microsoft Word 9...	51 KB	PL	X			Duplicate, exists in file no.14 /R
gamla utg	Projektorganisation_111213.ppt	2009-12-17 2:16	Microsoft PowerP...	436 KB		X			
3. Styrande dokument	Arvisningar för elinstallationer 20091030...	2011-01-13 4:38	Adobe Acrobat D...	42 KB	PL		X		Stand
Mallar	Arvisningar för IFE: Fastighetsövervaknin...	2011-01-13 4:41	Adobe Acrobat D...	406 KB	PL		X		Stand
	Arkivinstruktion 91650.pdf	2009-04-22 8:11	PDF file	31 KB	PL		X		"Mak"
	Checklist_project.xls	2013-01-28 11:11	Microsoft Excel 97...	15 KB	BO, PL			X	Update
	Checklista_eigenkontroll.doc	2013-01-21 10:11	Microsoft Word 9...	38 KB	BO, PL	X			Remove /R and /I
	Checklista_projektet.xls	2013-01-21 3:11	Microsoft Excel 97...	08 KB	BO, PL	X			Remove the swedish version and update the english version, /R and /I
	Design requirements template_instructio...	2010-09-13 1:25	Microsoft Word 9...	47 KB	PL			X	Update and keep the english version, /R and /I
	Dokumentationsstruktur projekt EXEMPE...	2008-10-31 2:20	Adobe Acrobat D...	42 KB	PL	X			See "Dokumentationsstruktur projekt.doc" for more info.
	Dokumentationsstruktur projekt.doc	2008-05-28 3:56	Microsoft Word 9...	67 KB	PL			X	Update with a better description.
	oGDP Inv process.ppt	2010-08-12 1:45	Microsoft PowerP...	302 KB	PL	X			Old Version /I
	Konstruktionsmall checklista.xls	2011-12-07 8:57	Microsoft Excel 97...	31 KB	PL	X			Remove the swedish version and update the english version, /R and /I

Figure 3, The structure of the project documentation matrix

After completing the interviews the data gathered was analyzed and reviewed, in order to clarify which document changes that were wishful changes and which changes that were essential for further work with projects at BF63590. In order to do so continuous reviews with supervisors and managers carried out until a decision was made. The original 117 documents were narrowed down to 57 documents. Out of the remaining 57 documents, 31 documents were moved from the project file structure into other databases. The documents that were removed contained duplicates, old versions and old standards. The decision was made to keep and update the remaining 26 documents in the project folder structure, and to add documents considered to be missing.

In order to get an overview, part of the document matrix is presented in figure 4. The complete document matrix is located in appendix 2, including all the information stated above about the documents at BF63590.

File	Document	Date	Type	Size	Stakeholders	Remove	Move	Update	Comments
1. Uppdrag	Exempel_Konstruktionsuppdrag.htm	2010-03-04 4:12	Chrome HTML Do...	15 KB		X			Remove /K and R (Info received from the SO group)
Exempel_konstrukti	WebResource(1).axd	2010-01-13 10:29	AXD File	22 KB		X			Remove /N
	WebResource.axd	2010-01-13 10:29	AXD File	21 KB		X			Remove /N
Mallar	Riskhantering_projekt_mall.doc	2010-10-08 1:10	Microsoft Word 9...	176 KB	PL	X			Duplicate, exists in file no 3 /N
2. Projektadministrat	Adresslista_EXEMPEL.pdf	2008-10-20 10:58	Adobe Acrobat D...	27 KE	BO, PL			X	Remove "Adresslista.doc" and "Adresslista_EXEMPEL.pdf" and replace with 1 document
Mallar	Adresslista.doc	2008-11-21 11:02	Microsoft Word 9...	151 KE	BO, PL				
	Aktivitetslista.xls	2008-11-21 3:06	Microsoft Excel 97...	86 KE	BO, PL			X	Update, change name to "deltagarlista" /R and J
	Brandpresentation Volvo Gtbg YTT 2011-1...	2011-11-16 1:27	Microsoft PowerP...	1 153 KE	PL	X			Duplicate, exists in file no 14 /N
	Fikregister_5.doc	2011-05-02 2:04	Microsoft Word 9...	27 KE	PL				Make 1 document with 4 tabs (including Färmvagg.xls as 1 tab) and move to template /K, J and N
	Fikregister_20.doc	2011-05-20 1:35	Microsoft Word 9...	36 KE	PL			X	
	Fikregister_31.doc	2010-02-16 3:22	Microsoft Word 9...	44 KE	PL				
	Project organisation template.ppt	2010-06-03 11:07	Microsoft PowerP...	384 KE	BO, PL			X	Update and keep the english version. /R and J
	Projektorganisation.ppt	2011-11-07 1:40	Microsoft PowerP...	652 KE	BO, PL	X			Remove the swedish version and update the english version. /R and J
	Färmvagg.xls	2010-11-04 1:07	Microsoft Excel 97...	22 KE	PL	X			See fikregister_5.doc, fikregister_20.doc and fikregister_31.doc for more info.
	Resursökning_Anvisning.doc	2008-11-27 3:16	Microsoft Word 9...	42 KE	PL	X			Include "Resursökning_Anvisning.doc" in "Grindokument.ppt" /M and J
	YTT organisation Brand Göteborg_Lundb...	2011-11-16 1:27	Microsoft Word 9...	51 KE	PL	X			Duplicate, exists in file no 14 /N
gamla utg	Projektorganisation_111213.ppt	2009-12-17 2:16	Microsoft PowerP...	436 KB		X			Old version /N
3. Styrande dokument	Anvisningar för elinstallationer 20091030...	2011-01-13 4:38	Adobe Acrobat D...	42 KB	PL	X	X		Standard, move to template /R
Mallar	Anvisningar för IFX fastighetsövervaknin...	2011-01-13 4:38	Adobe Acrobat D...	495 KB	PL	X	X		Standard, move to template /R
	Arktivinstruktion 91650.pdf	2009-04-22 8:59	Adobe Acrobat D...	31 KB	PL		X		"Mek"-instructions, update and move to template. instructions for "ei" is under development /R
	Check list project.xls	2013-01-28 1:58	Microsoft Excel 97...	45 KB	BO, PL			X	Update and keep the english version. /R and J
	Checklista egenkontroll.doc	2013-01-21 10:40	Microsoft Word 9...	28 KB	BO, PL	X			Remove the swedish version and update the english version. /R and J
	Checklista_projekt.xls	2013-01-21 3:23	Microsoft Excel 97...	68 KB	BO, PL	X			Remove the swedish version and update the english version. /R and J
	Design requirements template_instructio...	2010-09-13 1:35	Microsoft Word 9...	47 KB	PL			X	Update and keep the english version. /R and J
	Dokumentationsstruktur projekt EXEMPE...	2008-10-31 2:20	Adobe Acrobat D...	42 KB	PL	X			See "Dokumentationsstruktur projekt.doc" for more info.
	Dokumentationsstruktur projekt.doc	2009-05-28 3:55	Microsoft Word 9...	67 KB	PL			X	Update with a better description.
	eGDP Inv process.ppt	2010-08-12 1:45	Microsoft PowerP...	302 KE	PL	X			Old Version /J
	Konstruktionsmall checklista.xls	2011-11-07 8:57	Microsoft Excel 97...	31 KE	PL	X			Remove the swedish version and update the english version. /R and J
	Konstruktionsmall_instruktion.doc	2011-11-17 11:27	Microsoft Word 9...	49 KE	PL	X			Remove the swedish version and update the english version. /R and J
	Kravspecifikation styr- och övervaknings...	2010-01-13 4:39	Adobe Acrobat D...	164 KE	PL, S&C	X	X		Standard, move to template /R
	mappstruktur.bmp	2010-01-14 2:54	Bitmap image	3 841 KE		X			See "Dokumentationsstruktur projekt.doc" for more info.
	Projekt description.doc	2010-06-18 7:52	Microsoft Word 9...	85 KE	PL			X	Additional information, same information should be included in "konceptstudie och förstudie" /J
	Projektbeskrivning.doc	2009-10-16 12:12	Microsoft Word 9...	107 KE	PL	X			Remove the swedish version and update the english version. /R and J
	PL	X			Remove the swedish version and update the english version. /R and J

Figure 4, A cut out from the project documentation matrix at BF63590, see appendix 2 for the complete document.

4.2 Project document

There are many documents that are essential for a projects success. Two of the most important documents used within a project are a checklist and a time plan (Maylor, 1996). The checklist is responsible for activities to be completed and nothing to be forgotten, while the time plan is responsible for the activities to finish on time in order for the project to follow the critical path and the scope. There are also another document which significance is important for project leaders, the work breakdown structure (WBS), every project leader need to break down all activities to a certain level of interest in order to be able to create a timeline and a checklist valid for the project.

During this thesis it has become clear that there are many different documents that could be defined as checklists, three of these documents are a WBS, a checklist and a time plan. These three documents consist of a certain amount of similar activities. The WBS usually consists of more activities than the checklist and the time plan, and is not presented for others than the project leaders themselves. While the time plan and the checklist consists of fewer activities and is presented during gate decisions to managers and stakeholders.

Using these three documents an organization can develop and implement a project document that will combine a WBS, a timeline and a checklist. The project document would have the structure of a time plan, where activities follow a hierarchy structure based on a WBS, and having the option to check each activity as when using a checklist.

Using one document instead of three documents has both advantages and disadvantages. One document will reduce the burden and time of having three documents and as it allows the user to

write down the activities once, check them and follow the critical path all in one document. Note that including three documents into a document could result in an overflow of information, and a long document instead of having three short documents. There is also the issue of revealing unnecessary information to higher level management and the stakeholders of a project. It all depends on the question: will creating one document out of three similar documents save time, and for whom?

5. Reflections on the use of checklists and documents within organizations

As documenting this thesis, many thoughts have come to my mind. One main thought is that the topic of documentation is not a well-researched topic. There are very few empirical studies behind the topic of checklists and documentation, and even fewer that have been documented academically. When it comes to expertise within the category of checklists and documentation it could be divided into two categories: industry experts and academic experts. I have had the benefit of interviewing an industrial expert, his skills in making checklists and effective documents are incredible but when it came to explaining theories and methods it was harder. I realized that he might not have read any theories about checklists and documentation, and when I turned to the library for information I understood why, it was extremely difficult to find any academic work on the topic of checklists and documentation.

I argue that one main reason to document information is for it to be read or used. If the document consists of neither then we might wonder why it was written in the first place. Many employees document and I believe that they document for the wrong reasons, and without any motivation. Documentation should not be written for dusty old rooms, done during time pressure nor be based on opinions. Many employees know that documentation is important, they know that filling in checklists are important, they also know that it is a necessary action in order for their work to be completed, however it is rarely done or done incomplete (Travado, 2012).

5.1 Checklist

The reason behind why I did a research on the topic of documentation and checklists is because it is an under reasoned area. With my contribution, the knowledge of what experts and the most talented already know and do has been documented. When working with checklists there are three essential paradoxes: the length of a checklist, the communication type of a checklist and the time spent on creating a checklist.

5.1.1 The length of a checklist

The length of a checklist depends on the number of activities that should be included and not forgotten in a project. Note that some activities could be included in a project but not in a checklist due to different reasons, such as the ability to forget to complete the activity or the activity is assumed to be common sense. Also note that there might be activities included in a checklist that maybe should not be included in a project. It is a project leader's responsibility to create a checklist suitable for their project, however most organizations provide a template checklist based on previous projects and experiences. It is the paradox of the length of the template checklist that will be discussed below.

The template checklist could consist of many activities. The checklist would contain of mandatory and recommended activities that are essential in every project as well as activities that are easily forgotten. However the template checklist would also contain activities that have been used during a previous project. Given that all projects are not similar, this method gives the project leader the option of going through the list and removing activities not needed for

different projects. The project leader does not need to be creative to come up with new activities, since many activities already are listed and will use the system one way of thinking, which is fast and instinctive (Kahneman, 2011). However long checklists tend to very detailed (Travado, 2012) and can convey the message of unnecessary activities listed in the checklist. This might lead to users not reading the entire checklist and create a low probability for project leaders to add more activities to the list.

A short template checklist with few activities would consist of the most essential activities that are needed in every project in the organization. In order to complete the checklist, a project leader would have to come up with additional activities. This method will challenge the project leader's cognitive ideas and use the system two way of thinking, which is slower, more deliberate and logical (Kahneman, 2011). Having a short template checklist would not scare the eye in comparison with seeing a long checklist and will highlight the significance of each activity listed. However, short checklists usually contain general information which includes that project leaders need to contain certain qualities such as creativity and experience, in order to be able to expand and optimize a short checklist. The short checklist will also be more time consuming to finish since being creative takes more time than going through a list and crossing out activities that are unwanted.

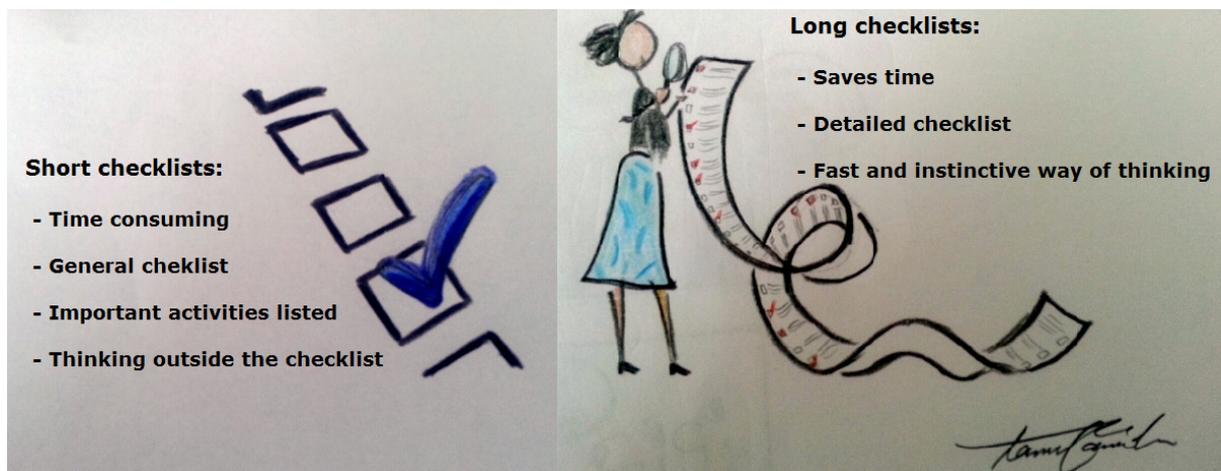


Figure 5, The difference between the short checklists and the long checklists

5.1.2 The communication type of a checklist

When creating a checklist the author could either use a formal or an informal language. As mentioned before there are certain advantages and disadvantages with both types of communication. By using formal communication the organization maintain the authority of managers, the legitimacy of employees and the communication is clear and consistent. Since formal communication states clear relationships between upper level management and lower level management and if there were ever any uncertainties within an organization there is an

authoritarian tone to dominate the confusion. This type of communication can also contribute to lack of initiative, lack of cordiality, inflexibility and fear. When established rules are strictly observed, more emphasis are given to the formalities rather than the human side, therefore there are no aims into developing cordial relationships between the sender and receiver and creative ideas can be ignored. There is also the risk of fear to represent information in front of the upper level management and superiors, which could lead to loss of important information.

Informal communication on the other hand contributes to improving social relationships and broken barriers between employees and managers. Information flows quickly and employees can freely exchange their opinions and ask any questions without hesitation, since a cordial communication environment is created to increase the efficiency and productivity within an organization. On the other hand, informal communication can lead to lack of secrecy and mislead information. With informal communication it is more difficult to keep authority and control since there are no restrictions or rules, which can lead to classified information leaking out and creating damage to an organization. There is also the risk of incomplete or mislead interpretation of any information which could create confusion or even conflicts between employees (Project Lead Coordinator, Volvo GTT).



Figure 6, Informal vs. formal communication

Both communication types take time, although it is said that informal communication is efficient and increases productivity, discussions, opinions and rumors will take time. There is also the risk of employees getting off topic and talking about things other than work. When using formal communication, information is transferred through downward and upward communication, the process is time consuming and important information may be lost throughout the process.

Excess of any one of these communication types will lead to inefficiency. Organizations need to ensure people talk and coordinate and accept responsibility, as well as having the power to manage uncertainties and unpredictable actions the best they know how. They also need to consider each communication type and gather the most suitable element from each communication type that will apply to their organization.

5.1.3 The time spent on creating a checklist or document.

When creating documents and checklists most authors think about different factors in the process of creation and how it may be viewed and used when completed. Many authors need to consider which audience they want to attract and how the document should be interpreted by the readers and others. Therefore one of the factors an author must consider is how much time the reader should spend on reading and understanding a document.

The paradox states that the more time the author spends on the process of creating a document, the less time is needed to be spent by the reader in order to read and understand the document and vice versa. An organization should realize that spending time will lead to money being spent. They should therefore consider if they want a fully developed and reviewed document that requires more time in the process of creation than when read and understood by readers, or a document that is created rapidly but require time in order to be read and interpret the message the author wants to convey (Lecturer, Chalmers University of Technology).



5.2 Factors behind documentation and checklists

During my thesis I have been able to study different types of documentation and studying what impact different factors have on effective documentation. This discussion will be searching for reasons of how organizations can make a better use of their documentation and discussing three factors that not only affect the documentation but also the productivity of an organization. These are effectiveness, the issue of saving time and deviations within organizations.

5.2.1 Effectiveness

Through experience of working within different organizations I have noticed that the word effective is commonly used. However an organizations definition of effective may vary from another organizations definition. When referring to the word effective in this thesis I will talk about organizational effectiveness; how an organization can save time and resources in the long run and subjective effectiveness that will be beneficial for an individual in the short run.

I argue that there is differences in being effective in the long run and in the short run, let me introduce an example to illustrate my point. A mailman who does not deliver the commercial flyer to the old lady that is the only person who lives up the hill would be considered effective, since he can wait another day to see if the old lady would receive more mail to be delivered to and deliver these at the same time instead of going up the hill twice. At the same time it is unknown if the lady knows about the commercial flyer and is waiting for its delivery, there might have been an offer on the flyer that she will miss out if the mailman delivers the flyer the next day. This story illustrates the different perspectives of effectiveness. What are the benefits and disadvantages for the mailman and the organization that delivers mail? Will the mailman's effectiveness also be the organizations effectiveness? The mailman is subjective effective and

saves time in the short run, however the old lady could send in a complaint to the organization for receiving her mail late and this could lead to ineffectiveness for the organization in the long run, since they would have an unsatisfied customer that they need to compensate for. Correcting the mailman's effectiveness could cost the organization more than the time it would have taken the mailman to deliver the commercial flyer. However there is a chance that the lady will not send in a complaint and was not expecting a mail delivered on that day which would lead to organizational and subjective effectiveness for the mailman and the organization.

There is a risk with being subjective effective and it may harm an organization in the long run. There are plenty more stories to tell about people being subjective effective and how it has hurt an organization in the long run. It is easy to put aside documentation, planning and similar activities for later since it is hard to motivate employees that putting extra hours on risk analysis may save a project in the long run. There are unfortunately no other facts than experience when it comes to subjective and organizational effectiveness and therefore hard to motivate employees to focus on the organizational effectiveness.

When working with documentation it is essential to put the extra time to make the document easy for the user to read and use. In order to create an organizationally effective document, the document needs to be used, reviewed and updated frequently. An organization can have a person or hopefully a team responsible for spending short amount of time regularly to review the document, instead of updating the document when it is out of date. Creating an organization with an environment where the employees focus on improvement and organizational effectiveness. With these arguments I state that by considering the organizational effectiveness instead of subjective effectiveness the organization will take lower risks and be more effective in the long run.

5.2.2 Documentation saves time

Throughout this thesis there have been arguments for and against documentation and whether it saves or wastes time. As the thesis focuses on long term goals and organizational effectiveness, the perspective of saving time will be through the long term goals of an organization.

During the process of completing this thesis and through previous experiences with work and school I have noticed that documentation is often put aside for later, or in many cases never completed, it piles up and the person in charge of documenting will have a load of work and lack the time to complete the work. An example would be writing an essay the night before the hand in. The risk of receiving a pass is low and in many cases it takes time for the student to receive the results, which leads to loss of information during that time. When the student then has to rewrite the essay it would consider additional time than if it was written on time. However, many organizations do not offer their employees the initial time to complete a document.

After an interview with a project leader at Volvo, he stated that "*It is hard to motivate the hours one puts into documentation*". Even the project leader believed that putting down some extra

hours into finishing a plan or a strategy would benefit him in the long run, but there were not enough time for that. Ironically there is not enough time within the project to finish something that will save time in the future, but there is time to correct the mistake in the future. The interesting part is that there is not enough time in the future either for correcting risks, but many project leaders and employees skips different steps anyways. A lecturer told me how he had signed a paper without checking if the action was completed since it saved him time to send of the paper as soon as possible, would that sign-off save the school time as well?

There are solutions for organizations to take into preventing employees to skip steps. An example would be to make documentation part of the work, putting aside short amount of time when the memory is fresh instead of completing the documentation in the end when memory often fails the human kind. This method reduces the work load of documenting and errors in thinking. If a person have misinterpreted a task it is easier to notice the errors in thinking if the document is updated regularly than written at the end. An example would be programmers writing a code, writing short codes and compiling them to find out errors results in better quality and is more time consuming than finishing the entire code and then checking for errors. Another study called "*The Marshmallow Challenge*" was made with different teams of employees around the world to see which group could build the tallest standing structure with spaghetti, and placing a marshmallow on top. The study showed that the teams that where the most successful, where the ones that took short steps at a time and checked if the "so far" built structure could carry the marshmallow (Wujec, 2010).

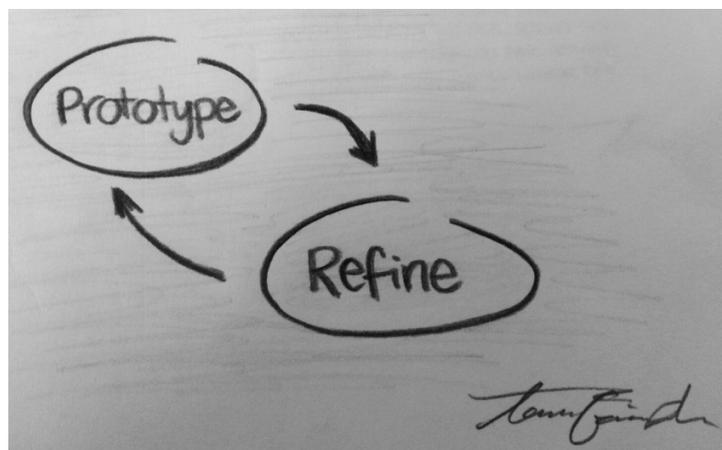


Figure 6, The process of refining a prototype several times before delivery.

After completing this thesis I do not have a solution for this issue, however I know that motivated people and employees document gladly and read documentation as well. There is unfortunately the issue of how to motivate people to document effectively. There are different examples in society where the human kind is motivated to document and read different documentations and they do it on their free time, such examples are the Wikipedia, Facebook, Twitter, people writing blogs etc. What these have in common that organizations lack is still

unknown. Could it be the use of language, the responses given, the fact that they do not have to document or simply because they are motivated?

5.2.3 Deviations within an organization

Every organization has built a structure, it could be a project based structure, matrix structure, a function based structure etc. Depending on which structure an organization has there will be certain rules and policies to follow. There might also be certain aspects where the employees are not controlled by rules and policies, where they can express themselves and work freely, by using their knowledge, common sense and opinion (Jacobsen & Thorsvik, 1995). Regardless of which structure an organization has and the balance between rules and freedom, the risk of deviations occurring during work are high. Examples of deviations could be rumors, actions taken without higher level approval, work that has been hidden under the rug or simple forgotten. These deviations are rarely informed to the higher level management. Note that some deviations could actually save an organization, where employees have no other choice than to make last minute decisions without the supervision of higher level management.



An organization can have controls and checks in order to prevent deviations in checklists and elsewhere. A manager can inform and remind employees about previous deviations in order to possibly lowering the risk of reoccurrence. However, when dealing with humans it is hard to prevent deviations and regardless of how many controls and policies, there will be rules broken and deviations occurring. Organizations cannot write down every deviation occurred in the past and every deviations that might happen in the future. The risk with deviations are that they might not have an impact in the short run, but in the long run it can damage the organization if employees break rules and ignore important activities (Project Manager, ÅF).

My argument states that it all comes down to communication costs, deviations should be allowed as long as higher level management is informed. There should be an environment based on trust within an organization, a project manager argued during the interviews that organizations should create an environment where employees are brave enough to ask the “dumb” questions and admitting mistakes. Managers hiring employees with several years of academic background should also have faith in employees making the right choices. Some deviations might not benefit the organization, but if brought forward by the managers and employees and discussed they may be learnt from and prevented in the future.

5.3 The learning aspect

It is well-known that one of human's most important tools for building knowledge is through documentation of various kinds (Goody, 1986). By writing and documenting, humans can compensate for the limited memory abilities that have been provided for them by nature. Documenting societies create a public memory. This public memory, unlike the memory of the human kind has no absolute limits. These stored up information has reached unimaginable and for the individual, completely incredible results (Säljö, 2005). To organize and make use of information is now a very big business in society (e.g. book publishing, web editing, knowledge transfer etc.). However texts and other documentation are not only central for preserving information and experiences, but also to spread them in society. The knowledge we have today is very largely achieved through what we read and how we use texts in various ways. Many of the things spoken about in everyday life and in the workplace have at any stage been through texts, some examples are a newspaper, an instruction from a manual or a catalog (Karlsson, 2006).

With the above statements it is interesting to reflect upon how humans think and learn. I have previously described Kahneman's theory of different ways of thinking. How we think quickly and with little effort in system 1 while we think slowly and with much more effort in system 2. This means that we often prefer to do work that requires system 1 thinking, we use the system 2 if necessary, but prefer to do it with well-defined problems. A major drawback with the system 1 way of thinking is that our thoughts are unconscious. This concludes that in order to know how we are doing things in system 1 we have to connect the system 2 way of thinking, which takes effort and is exhausting.

By using system 2 way of thinking, learning is applied and in the long run it will lead to system 1 way of thinking. So being assigned to investigate how industrial organizations can maximize profit and save time when using documentation, I was curious why Volvo did not perform the assignment themselves. It would have been a great opportunity for the employees to reflect upon (system 2) the work they do and educate themselves in the topic of documentation; a topic performed daily and considered well-known but in fact unknown to many.

One explanation could be the efficiency and time spent on an activity. People who have worked several years may no longer follow processes, they use their memory of how they have been working for the past years (system 1), from when they once learned about the processes. But do they check if the processes are still up to date? Using old routines are faster and more comfortable than learning new routines and applying them (system 2). And once the time and effort has been put into a new knowledge, repeating that step will occur faster and with more confidence (system 1).

“First time, it took 12 hours to replace the water pump, the second time 90 minutes.”

– Lecturer, Chalmers University of Technology

Although it is easier to use system 1, it is interesting to find out if a person's thirst for knowledge and education stops when starting to work or completing school or university, or if people continue to educate themselves? Many people would probably point out that there is not enough time for education when working full time, while occupied with other activities and taking care of children.

Now when I look back, I realize what I have gained knowledge through my meetings with my supervisor, who has challenged and questioned my way of thinking. I also realize that I would not have accomplished the same learning without the meetings. This means that if for some reason I only would have focused on delivering what Volvo had asked for, I probably would not have been exposed to the same provocative questions about what "checklists and documentation"

"There is never time for learning, just executing."

- Maintenance, Volvo GTT

"I rarely have the time to reflect upon my work during working hours."

- Project lead coordinator,
Volvo GTT

are (system 2). I perhaps never would have known that there is something I do not know or taken the time to find out (or been given that time by my employer) that digging deeper into what checklists and documentation are could be useful for a company.

This is my learning, and perhaps there are more people at Volvo who share these thoughts. If true, then this could be a possible explanation for why transferring knowledge is considered to function poorly in businesses, and especially between projects. They have learned new things through the knowledge transfer but the thinking process is still in system 1, and the effort to transfer them to system 2 is time consuming and can be experienced as unpleasant. I do not know if this is scientifically "true". But I know that I now have an idea of it in system 2 and if you have followed my reasoning, you probably have it to.

6. Conclusion

After completing this thesis I still do not have the answer to many questions regarding documentation and checklists. It has taken me six months to investigate the factors behind documents and checklists and I do not know how organizations should work with documents and checklists to maximize their profit. When I started this thesis I did not realize that this topic would be difficult, how hard can documentation be? People document regularly and there are many intelligent human beings around the world, someone before me must have done a research on the topic, and I could not possible have been the first person.

During my eight years of experience with different projects and organizations, I have only met one person who knows how to document to maximize not only the organizations profit but every employee's profit as well. However this person also had difficulties explaining any theories behind why his way of working with documents is beneficial. I still believe that others have done a research on the topic of documentation, however when I have searched for theories in different libraries it was extremely difficult to find any research. Maybe no one has found any results or theories about documentation? Or found results that they did not want to present? There are many questions on why the issue has not been solved yet. Could it be the lack of interest for documents? If organizations continue to maximize profits, why would they not want to improve their documentation?

Unfortunately I do not have an answer to any of these questions. However I know one thing when it comes to new methods and documentation: by being an experience user of a technology or method the user understand how to use a method. Many different factors have been introduced during this thesis. When implementing a factor an experienced user understands that by going too far into one direction (i.e. creating a short checklist) will lead to certain risks, and by going to far into the other end (i.e. creating a long checklist) there will be other risks. A qualified user's job is to always try to navigate between the two ends in order to find the right balance for a project, a team or an organization.

7. Recommendation for further work

After completing this thesis there are some recommendations for further work within the topic of documentation and checklists, but also recommendations other than the topic of this thesis that has been raised during interviews and observations concerning the team BF63590 at Volvo.

7.1 Recommendations for BF63590

- The team BF63590 and its stakeholders need to implement a process for the parameter lists used in their projects. A routine would not be enough in this case, BF63590 need to implement someone responsible for the change.
- Recommended changes listed in the documentation matrix should be implemented and further work with the 5S lean manufacturing should be carried out to manage a change in the process of documentation.

7.2 Recommendations for further work with checklists and documentations

- A study should be carried out to test and adapt different factors mentioned in the thesis and apply these in different organization. It is interesting to find out if some factors work better than others, and if some factors work better with certain types of organizations.

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All pictures included in this master thesis are either purchased by www.shutterstock.com or drawn by the artist Tania Gordani.

APPENDIX 1: The original checklist at BF63590

CHECKLISTA PROJEKT 91661

Uppdragsgivare:
Projektnummer:
Projektamn:
Uppgjord av:
Uppdaterad:

	Ingår	Ingår inte	Klart dat/ sign	Lev. 91650	Prel. Lev. Conc. study	Ansvarig grupp/namn	Medverkan grupp/namn	Beslut dokument/protokoll regnr	Mapp I den mapp dokument placeras	Doc.reg O=Obligatoriskt, R=Rekommenderat	Mall/Anvisn X=finns
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UPPDRAG: (Beställare) CONCEPT STUDY

uppdragsbeskrivning inkl. PAR (TSU)				X					1. Uppdrag		mailform
kravspecifikation				X					4. Kravspecifikation	O	N/A
arbetsmiljöbehandling				X			Mottag avg.		12. Arbetsmiljö	R	X

PROJEKTSTART:

projektorganisation					X				2. Projektadministration		X
projektbeskrivning									3. Styrande dokument	O	X

PRE-DESIGN:

mappstruktur - projektet									3. Styrande dokument		X
projektrisker									3. Styrande dokument		X
upprätta FCA-dokument									25. FCA	O	X
upprättande av reservdelslista					X		Underhåll & Mottag avg.		25. FCA		X
upprättande av sårbarhetsanalys							Underhåll & Mottag avg.		25. FCA		X
konstruktionsmall för status & verifiering							Tech.Ref.Group		25. FCA		X
konstruktionsmall med checklista									3. Styrande dokument		X
kostnadskalkyl/budget					X		T7-ansv. & Controller		7. Ekonomi		X
ekonomisk uppstart av projekt									7. Ekonomi		X
tidplan					X				5. Tidplan		X
adresslista									2. Projektadministration		X
layout					X				Ritningar		N/A
Arbetsmiljöplan prel.									12. Arbetsmiljö		X
brandskyddsdocumentation					X				14. Brandskydd		X
klassningsplan					X				14. Brandskydd		X
systemschemor, princip					X				Ritningar		N/A
reglerspecifikation, princip					X				22. Riggel (+Ritningar)		N/A
meksystem, princip					X				17. Meksystem & Utrustning (+Ritningar)		N/A
allmän el, princip					X				21. Allmän el (+Ritningar)		N/A
ventsystem, princip					X				19. Ventsystem & Avgas (+Ritningar)		N/A
rörsystem, princip					X				18. Rörsystem (+Ritningar)		N/A
ventilationsstyr, princip					X				20. Ventilationsstyr - Facility (+Ritningar)		N/A
riggel, princip					X				22. Riggel (+Ritningar)		N/A
datorsystem, princip					X		91650 Tech PC		23. Datorsystem (+Ritningar)		N/A
bygg, princip					X				16. Bygg (+Ritningar)		N/A
systembeskrivning, princip					X				Ritningar		N/A
anskaffningsplan, id. lång lev.					X				5. Tidplan		X
parameterlista, princip					X				22. Riggel (+Ritningar)		X
resurssäkring					X				2. Projektadministration		X
peril riskanalys - generell					X				15. Riskhantering	O	X
miljökonsekvensutredning					X				13. Miljösäkring	R	X
uppföljning kostnad									7. Ekonomi		X
uppföljning tid									5. Tidplan		X
aktivitetslista									2. Projektadministration		X
BUILDING FREEZE GATE									6. Grindar	O	X

DESIGN:

demonteringshandlingar									Ritningar		N/A
systemschemor									Ritningar		N/A
utrustningspec/mtrl-listor									Ritningar		N/A
reglerspecifikation									22. Riggel (+Ritningar)		N/A
specifikation utrustning lång lev.tid									5. Tidplan		X
EQUIPMENT LONG DELIVERY FREEZE GATE									6. Grindar	O	X
riskanlys - generell									15. Riskhantering	O	X
riskanlys - per system									15. Riskhantering	O	X
uppdatera miljökonsekvensutredning									13. Miljösäkring		X
förfrågn.handl - meksystem									Ritningar		N/A
förfrågn.handl - allmän el									Ritningar		N/A
förfrågn.handl - ventsystem									Ritningar		N/A
förfrågn.handl - ventilationsstyr									Ritningar		N/A
förfrågn.handl - riggel									Ritningar		N/A
förfrågn.handl - datorsystem									23. Datorsystem (+Ritningar)		N/A
förfrågn.handl - bygg									Ritningar		N/A
systembeskrivning									Ritningar		N/A
anskaffningsplan									5. Tidplan		X
fastställa reglerspecifikation									22. Riggel (+Ritningar)		N/A
fastställa parameterlista									22. Riggel (+Ritningar)		X
fastställa reservdelslista									25. FCA		X
fastställa program för status & verifiering									25. FCA		X
uppdatera sårbarhetsanalysen									25. FCA		X
uppdatera projektrisker									3. Styrande dokument		X
uppföljning kostnad									7. Ekonomi		X
uppföljning tid									5. Tidplan		X
uppdatera aktivitetslista									2. Projektadministration		X
INDUSTRIALISATION GATE/DECISION									6. Grindar	O	X

ANSKAFFNING:

uppdatera adresslistan									2. Projektadministration		X
förfrågningar									8. Inköp		mall via NAP
anbud									8. Inköp		N/A
utvärdering av anbud									8. Inköp		mall via NAP
upphandling									8. Inköp		mall via NAP
beställningar									8. Inköp		X
5S i projekt (Arbetsmiljöplan)									12. Arbetsmiljö		X
arbetsmiljöplan projekt									12. Arbetsmiljö		X
uppdatera reservdelslista									25. FCA		X
uppdatera sårbarhetsanalysen									25. FCA		X
uppföljning kostnad									7. Ekonomi		X
uppföljning tid									5. Tidplan		X
uppdatera aktivitetslista									2. Projektadministration		X

INSTALLATION:

uppdatera adresslistan									2. Projektadministration		X
uppdatera parameterlista									22. Riggel (+Ritningar)		X
genomföra program av status innan ombyggn.									25. FCA		X
tillverkningshandlingar - meksystem									Ritningar		N/A
tillverkningshandlingar - allmän el									Ritningar		N/A
tillverkningshandlingar - ventsystem									Ritningar		N/A
tillverkningshandlingar - rörsystem									Ritningar		N/A
tillverkningshandlingar - ventilationsstyr									Ritningar		N/A
tillverkningshandlingar - riggel									Ritningar		N/A
tillverkningshandlingar - datorsystem									Ritningar		N/A
tillverkningshandlingar - bygg									Ritningar		N/A
systembeskrivning per system/funktion									17. Meksystem & Utrustning		X
kontraktsgenombgång									8. Inköp		mall via NAP
5S i projekt uppdatera									12. Arbetsmiljö		X
uppdatera arbetsmiljöplan projekt									12. Arbetsmiljö		X
skyddsronder projekt									12. Arbetsmiljö		X
brandskyddsinformation									14. Brandskydd		X
genombgång Volvos Allmänna Bestämmelser									12. Arbetsmiljö		X
besiktning - meksystem									24. Prövning & Besiktning		N/A
besiktning - allmän el									24. Prövning & Besiktning		N/A
besiktning - ventsystem									24. Prövning & Besiktning		N/A
besiktning - rörsystem									24. Prövning & Besiktning		N/A
besiktning - ventilationsstyr									24. Prövning & Besiktning		N/A
besiktning - riggel									24. Prövning & Besiktning		N/A
besiktning - datorsystem									24. Prövning & Besiktning		N/A
besiktning - bygg									24. Prövning & Besiktning		N/A
funktionskontroll									24. Prövning & Besiktning		X
injusteringar									24. Prövning & Besiktning		N/A

Uppdragsgivare:
Projektnummer:
Projektnamn:
Uppgjord av:
Uppdaterad:

CHECKLISTA PROJEKT 91661

	Ingår	Ingår inte	Klart dat/ sign	Lev. 91650	Prel. Lev. Conc. study	Ansvarig grupp/namn	Medverkan grupp/namn	Beslut	Mapp	Doc.reg	Mall/Anvisn
								dokument/protokoll reopr	I den mapp dokument placeras	O=Obligatoriskt, R=Rekommenderat	X=finns
samordnad provning "nitsug"									24. Provning & Beskrivning		N/A
upprätta relationshandlingar									25. FCA		X
uppdatera reservdelslista									Ritningar		N/A
uppdatera sårbarhetsanalysen									25. FCA		X
uppföljning kostnad									25. FCA		X
uppföljning tid									7. Ekonomi		X
uppdatera aktivitetslista									5. Tidplan		X
LAUNCH GATE/DECISION									2. Projektadministration		X
									6. Grindar	O	X
DOKUMENTATION:											
dokumentstruktur - slutprodukt									3. Styrande dokument		X
färdigställa systembeskrivningar									17. Meksystem & Utrustning		X
utbildning/info - meksystem									25. FCA		N/A
utbildning/info - allmän el									25. FCA		N/A
utbildning/info - ventsystem									25. FCA		N/A
utbildning/info - rörsystem									25. FCA		N/A
utbildning/info - ventilationsstyr									25. FCA		N/A
utbildning/info - riggel									25. FCA		N/A
utbildning/info - datorsystem									25. FCA		N/A
utbildning/info - bygg									25. FCA		N/A
arkivering av handlingar									Ritningar		N/A
färdigställa reservdelslista									25. FCA		X
färdigställa sårbarhetsanalysen									25. FCA		X
uppföljning kostnad									7. Ekonomi		X
uppföljning tid									5. Tidplan		X
stänga aktivitetslista									2. Projektadministration		X
FCA:											
kalibrering									25. FCA		N/A
provdrift "avlusning"									25. FCA		X
genomförande av verifiering									25. FCA		X
PRE PRODUCTION GATE											
ekonomisk arkivering av projekt							17-ansv. & Controller		25. FCA		N/A
upprättande av vitbok									25. FCA		X
slutdokument kost & tid & NAP									25. FCA		X
överlämnande enligt FCA									25. FCA	O	X
arkivering av projektet								<i>Enligt Arkivstrukturen 91650</i>	Projektarkiv		3.Styrande dok
END GATE									6. Grindar	O	X

APPENDIX 2: The project document matrix

File	Document	Date	Type	Size	Stakeholders	Remove	Move	Update	Comments	
1. Uppdrag Exempel_Konstrukt	Exempel Konstruktionsuppdrag.htm	2010-03-04 4:12	Chrome HTML Do...	15 KB		X			Remove /K and R (Info recieved from the 80 group)	
	WebResource(1).axd	2010-01-13 10:29	AXD File	22 KB		X			Remove /N	
	WebResource.axd	2010-01-13 10:29	AXD File	21 KB		X			Remove /N	
Mallar	Riskhantering_projekt_mall.doc	2010-10-08 1:10	Microsoft Word 9...	176 KB	PL				Duplicate, exists in file no.3 /N	
2. Projektadministrat... Mallar	Adresslista EXEMPEL.pdf	2008-10-20 10:58	Adobe Acrobat D...	27 KB					Remove "Adresslista.doc" and "Adresslista EXEMPEL.pdf" and replace with 1 document	
	Adresslista.doc	2008-11-21 11:02	Microsoft Word 9...	151 KB	80, PL			X		
	Aktivtetslista.xls	2008-11-21 3:06	Microsoft Excel 97...	86 KB	80, PL					
	Brandpresentation Volvo Gtbg YIT 2011-1...	2011-11-16 1:27	Microsoft PowerP...	1 153 KB	PL		X		Update, change name to "deltagarlista", /R and J	
	Flikregister_5.doc	2011-05-02 2:04	Microsoft Word 9...	27 KB		X			Duplicate, exists in file no.14 /N	
	Flikregister_20.doc	2011-05-20 1:35	Microsoft Word 9...	36 KB				X	Make 1 document with 4 tabs (including Pärmygg.xls as 1 tab) and move to teamplace /K, J and N	
	Flikregister_31.doc	2010-02-16 3:22	Microsoft Word 9...	44 KB				X		
	Project organisation template.ppt	2010-06-03 11:07	Microsoft PowerP...	384 KB	80, PL			X	Update and keep the english version. /R and J	
	Projektorganisation.ppt	2011-11-07 1:40	Microsoft PowerP...	652 KB	80, PL	X			Remove the Swedish version and update the english version. /R and J	
	Pärmygg.xls	2010-11-04 1:07	Microsoft Excel 97...	22 KB	PL	X			See flikregister_5.doc, flikregister_20.doc and flikregister_31.doc for more info.	
	Resursräkning_Anvisning.doc	2008-11-27 3:16	Microsoft Word 9...	42 KB	PL	X			Include "Resursräkning_Anvisning.doc" in "Grinddokument.ppt" /M and J	
	YIT organisation Brand Göteborg_Lundb...	2011-11-16 1:27	Microsoft Word 9...	51 KB	PL	X			Duplicate, exists in file no.14 /N	
	gamla utg	Projektorganisation_111213.ppt	2009-12-17 2:16	Microsoft PowerP...	436 KB		X			Old version /N
	3. Styrande dokument Mallar	Anvisningar för einstationer 20091030...	2011-01-13 4:38	Adobe Acrobat D...	42 KB	PL		X		Standard, move to teamplace /R
Anvisningar för IFX fastighetsövervakni...		2011-01-13 4:38	Adobe Acrobat D...	496 KB	PL		X		Standard, move to teamplace /R	
Arkivinstruktion 91650.pdf		2009-04-22 8:59	Adobe Acrobat D...	31 KB	PL		X		"Mek"-instructions, update and move to teamplace. Instructions for "et" is under development /R	
Check_list_project.xls		2013-01-28 1:58	Microsoft Excel 97...	45 KB	80, PL			X	Update and keep the english version. /R and J	
Checklista egenkontroll.doc		2013-01-21 10:40	Microsoft Word 9...	28 KB	80, PL	X			Remove the Swedish version and update the english version. R and J	
Checklista projektet.xls		2013-01-21 3:23	Microsoft Excel 97...	68 KB	80, PL	X			Remove the Swedish version and update the english version. R and J	
Design requirements template_instructio...		2010-09-13 1:35	Microsoft Word 9...	47 KB	PL			X	Update and keep the english version. /R and J	
Dokumentationsstruktur projekt EXEMPE...		2008-10-31 2:20	Adobe Acrobat D...	42 KB	PL	X			See "Dokumentationsstruktur projekt.doc" for more info.	
Dokumentationsstruktur proiekt.doc		2009-05-28 3:56	Microsoft Word 9...	62 KB	PL			X	Update with a better description.	
eGDP Inv process.ppt		2010-08-12 1:45	Microsoft PowerP...	392 KB	PL	X			Old Version /J	
Konstruktionsmall checklista.xls		2011-12-07 8:57	Microsoft Excel 97...	31 KB	PL	X			Remove the Swedish version and update the english version. /R and J	
Konstruktionsmall_instruktion.doc		2011-11-17 11:27	Microsoft Word 9...	49 KB	PL	X			Remove the Swedish version and update the english version. /R and J	
Kravspecifikation styr- och övervaknings...		2011-01-13 4:39	Adobe Acrobat D...	164 KB	PL, S&C	X	X		Standard, move to teamplace /R	
mappstruktur.bmp		2010-01-14 2:54	Bitmap image	3 841 KB		X			See "Dokumentationsstruktur projekt.doc" for more info.	
Project description.doc		2010-06-18 7:52	Microsoft Word 9...	85 KB	PL			X	Additional information, same information should be included in "konceptstudie och förstudie" /J	
Projektbeskrivning.doc		2009-10-16 12:12	Microsoft Word 9...	107 KB	PL	X			Remove the Swedish version and update the english version. /R and J	
Projektbeskrivning_Exempel.pdf		2010-01-26 1:42	Adobe Acrobat D...	62 KB	PL	X			Remove the Swedish version and update the english version. /R and J	
Riskhantering_projektet_alternativ.doc		2010-03-26 8:29	Microsoft Word 9...	182 KB	PL	X			Remove WSP template /J	
Strategiplan och Critical path.doc		2008-12-02 10:56	Microsoft Word 9...	49 KB	PL	X			Remove /M	
gamla utg		Checklista_projektet_111209.xls	2011-10-24 2:17	Microsoft Excel 97...	59 KB		X			Old Version /N
Konstruktionsmall checklista_111213.xls	2008-11-21 11:36	Microsoft Excel 97...	19 KB		X				Old Version /N	
Konstruktionsmall_instruktion.doc	2011-05-24 7:54	Microsoft Word 9...	45 KB		X				Old Version /N	
Konstruktionsmall instruktion 101124.doc	2010-11-24 12:29	Microsoft Word 9...	44 KB		X				Old Version /N	
4. Kravspecifikation	Matriral- och färgsammanst.pdf	2009-10-07 10:56	Adobe Acrobat D...	218 KB			X		Move to teamplace /J	
5. Tidplan Mallar	Tidplan alternativ.xls	2010-03-04 4:40	Microsoft Excel 97...	38 KB	80, S, PL				Remove excel documents, make a MS project-template /J and move to teamplace /R	
	Tidplan alternativ_2.xls	2010-11-03 1:14	Microsoft Excel 97...	54 KB	80, S		X			
	Tidplan.xls	2009-11-26 6:45	Microsoft Excel 97...	96 KB	80, S, PL					
6. Grindar Mallar	Grinddokument.ppt	2010-03-08 3:45	Microsoft PowerP...	396 KB	RO, S&C, PL			X	Update template and include "Resursräkning_Anvisning.doc". /M	
	Grinddokument_Exempel.ppt	2010-02-02 3:14	Microsoft PowerP...	659 KB	RO, S&C, PL		X		Move to teamplace	
7. Ekonomi Avvikelse rapporter Fakturer Kalkylerlag Mallar	Avvikelse rapport_Exempel.doc	2010-02-16 11:13	Microsoft Word 9...	122 KB	PL		X		Change name to "Ändring och tillägg (ÄTA)" and remove WSP template /J	
	Avvikelse rapport_mall.doc	2010-03-08 3:50	Microsoft Word 9...	120 KB	PL		X			
	Ekonomisk uppstart av projekt.doc	2011-10-05 7:45	Microsoft Word 9...	91 KB	PL		X		Update document and move to teamplace, parts of the document already exists in teamplace /R	
	Projekttuppfölj_EXEMPEL.pdf	2010-05-04 3:00	Adobe Acrobat D...	20 KB	PL			X	Update /R	
	Redovisning kostnader projekt EXEMPEL...	2008-10-20 11:52	Adobe Acrobat D...	13 KB	80, PL			X	Update /J and R	
	Redovisning kostnader projekt.xls	2010-10-19 11:25	Microsoft Excel 97...	38 KB	80			X		
	Skrötninglista.doc	2011-10-17 10:55	Microsoft Word 9...	51 KB	80			X	Update /N	
	Ekonomisk uppstart av projekt.doc	2010-05-04 9:39	Microsoft Word 9...	86 KB	80, PL	X			Old version /N	
	gamla utg									
	8. Inköp leverantör 1 leverantör 2 mallar	Anskaffningsplan.doc	2010-03-11 12:09	Microsoft Word 9...	76 KB	PL	X			Remove /R and J
EBD best. rutiner.ppt	2010-01-21 5:20	Microsoft PowerP...	372 KB	PL	X			Already exists in teamplace /R		
OKFörh AB04-06.doc	2010-12-08 2:27	Microsoft Word 9...	88 KB	PL	X			Remove /R and J		
9. Mail Inkommande Utgående										
10. Protokoll Mallar	Projekteringsmöte_Exempel.doc	2010-03-08 3:52	Microsoft Word 9...	79 KB	M, PL			X	Update with template and make one document out of "Projekteringsmöte_Exempel.doc" and "Projekteringsmöte_mall.doc"	
	Projekteringsmöte_mall.doc	2010-03-08 3:55	Microsoft Word 9...	76 KB	PL			X		
	Styrgruppsmöte_Exempel.doc	2010-02-05 12:38	Microsoft Word 9...	80 KB	M, PL			X	Update with template	
Projekteringsmöte Styrgruppsmöte										
11. Information Mallar	Information MP01_EXEMPEL.rtf	2009-05-14 10:52	Rich Text Format	1 604 KB		X			Remove. "Styrgrupp" and "referensgrupp" are obligated to inform stakeholders /J	
12. Arbetsmiljö Mallar	100-0002 Svarta-lista.pdf	2011-05-20 9:53	Adobe Acrobat D...	387 KB	PL		X		Standard, move to teamplace /R	
	100-0003 Grå-lista.pdf	2011-05-20 9:42	Adobe Acrobat D...	396 KB	PL		X		Standard, move to teamplace /R	
	100-0004 Vita-lista.pdf	2011-05-20 9:52	Adobe Acrobat D...	497 KB	PL		X		Standard, move to teamplace /R	
	Environmental standards.pdf	2011-05-20 9:45	Adobe Acrobat D...	87 KB	PL		X		Standard, move to teamplace /R	
	SS EXEMPEL.pdf	2008-10-20 11:15	Adobe Acrobat D...	16 KB	S, PL				Information sign, change name and move to teamplace /J and R	
	SS i projekt.doc	2008-03-05 3:33	Microsoft Word 9...	47 KB	S, PL		X			
	SS i XXXXXXXX.doc	2008-08-11 4:33	Microsoft Word 9...	37 KB	S, PL					
	Arbetsmiljöplan_Exempel.pdf	2010-05-28 9:05	Adobe Acrobat D...	20 KB	80, S, PL		X		Move to teamplace, change into an instruction or remove document.	
	Arbetsmiljöplan proiektet.doc	2010-05-28 12:09	Microsoft Word 9...	70 KB	80, S, PL			X	Update	
	BAS aktiviteter 2.doc	2010-11-12 1:29	Microsoft Word 9...	114 KB	S, PL			X	Update /R	
	faktorer_forandringsarb.doc	2010-06-18 11:44	Microsoft Word 9...	38 KB	PL	X			Update /N and move to teamplace /J	
	MBL_AM-hantering.doc	2008-12-01 3:56	Microsoft Word 9...	44 KB	80, PL		X		Include activity in the check list /N	
	medbestammande_forandringsarb.doc	2011-04-12 10:49	Microsoft Word 9...	45 KB	PL	X			Remove /R and J	
	Områdesbestämmelser 2009-08-28[1].pdf	2013-01-15 11:49	Adobe Acrobat D...	46 KB	PL		X		Move to teamplace /R	
	Skyddsronnd projekt EXEMPEL.pdf	2008-12-01 3:41	Adobe Acrobat D...	18 KB	PL				Replace with one document	
	Skyddsronnd projekt.doc	2011-05-03 3:05	Microsoft Word 9...	44 KB	PL			X		
	Volvos Allmänna Bestämmelser.pdf	2008-03-06 10:54	Adobe Acrobat D...	55 KB	PL		X			
gamla ersatta	Arbetsmiljöplan projekt EXEMPEL.pdf	2008-03-18 11:40	Adobe Acrobat D...	309 KB		X			Old version /N	
Arbetsmiljöplan projekt.doc	2008-12-01 3:29	Microsoft Word 9...	74 KB		X				Old version /N	
13. Miljöskydd Mallar	Miljökonsekvensutredning.doc	2010-05-04 9:50	Microsoft Word 9...	78 KB	PL			X	Old version, update with new version from Jenny G /N	
14. Brandskydd Mallar	Bestämmelser för brandskydd vid byggar...	2011-05-20 9:06	Adobe Acrobat D...	260 KB	PL		X		Move to teamplace /K and J	
	Brandpresentation Volvo Gtbg YIT 2010-1...	2011-01-28 12:24	Microsoft PowerP...	1 151 KB	PL		X			
	Brandskyddsdokumentation.doc	2010-05-04 9:59	Microsoft Word 9...	45 KB	PL					
	guideline_site_security.pdf	2010-09-22 8:54	Adobe Acrobat D...	334 KB	PL		X		Safety information, add a link of the document in "mallar/rutiner" /X and M	

	Klassningsplan.doc	2010-05-04 10:04	Microsoft Word 9...	46 KB	80, PL			X		Routine, develop a template and move to teampplace /K and J
	YIT organisation Brand Göteborg_Lundb...	2011-01-28 12:24	Microsoft Word 9...	52 KB	PL			X		Include in document "Deltagarista" /K and J
15. Riskhantering										
Mallar	AFS2001_01.pdf	2009-11-17 1:25	Adobe Acrobat D...	95 KB	PL			X		Standard, move to teampplace /R
	AFS2008_03.pdf	2012-08-28 1:16	Adobe Acrobat D...	719 KB	PL			X		Standard, move to teampplace /R
	Riskanalys_EXEMPEL.pdf	2008-08-11 4:50	Adobe Acrobat D...	19 KB	RO, 80, PL		X			Remove all documents and replace with 1 risk analysis template. Update
	Riskanalys_091130.xls	2010-06-22 11:04	Microsoft Excel 97...	904 KB	RO, 80, PL		X			"Riskanalys_100623_Maria_ES.xls" or check with Per Jansson och Jonas Ahnberg so see if they have a relevant template /J
	Riskanalys_100623_Maria_ES.xls	2010-06-23 5:57	Microsoft Excel 97...	77 KB	RO, 80, PL			X		
	Riskanalys_Maskinkonstruktion_Exempel...	2010-02-04 9:23	Microsoft Excel 97...	906 KB	RO, 80, PL		X			
16. Bygg	VPT-rutin ditt arbmilionsvar.pdf	2011-04-12 10:11	Adobe Acrobat D...	88 KB	PL			X		Standard, move to teampplace /R
17.Meksystem and Utrustning	Matrial- och färgprogram_U.pdf	2005-06-03 4:07	Adobe Acrobat D...	3 625 KB	PL			X		Duplicate, exists in file no.4 /N
Mallar	Komponentspecifikation_EJ FÄRDIG.xls	2008-11-04 10:52	Microsoft Excel 97...	34 KB				X		Include in FDM /K and M Include in T7/ R update template /M
	Systembeskrivning_PDL_mall.doc	2011-07-06 11:54	Microsoft Word 9...	98 KB	PL			X		Old decisions state that instructions should be provided by the operation and not by the project. /J
18.Rörssystem	-									
19.Ventssystem and	-									
20.Ventilationsstyr	-									
21.Allmän el	-									
22.Rigge										
Mallar	Parameterlista_EXEMPEL.pdf	2008-11-27 11:09	Adobe Acrobat D...	69 KB	S&C, 80, PL			X		Information exists in Comtest/R and J Decide upon a general routine for the parameter list /K and N
	Parameterlista.xls	2008-11-27 11:10	Microsoft Excel 97...	42 KB						
	SystemparametarLT_Exempel.pdf	2010-01-19 9:08	Adobe Acrobat D...	9 KB						
	SystemparametarLT_rigge_Exempel.xls	2010-02-02 3:47	Microsoft Excel 97...	22 KB						
23. Datorsystem	-									
24. Proving and Besiktning										
Funktionsproving	-									
Samordnad provinin	-									
Slutbesiktningar	-									
Mallar	Funktionskontroll.doc	2011-12-13 4:18	Microsoft Word 9...	103 KB	PL			X		First control on the rigge, update
gamla utg	Funktionskontroll DRAFT.doc	2008-11-21 2:40	Microsoft Word 9...	178 KB			X			Old version /N
25.FCA_Projektslut										
Mallar	FCA specifikation.doc	2011-12-13 4:23	Microsoft Word 9...	180 KB	RO, S, PL		X			Remove the swedish version and update the english version. /R and J
	Program för status och verifiering.doc	2011-12-13 3:46	Microsoft Word 9...	31 KB	80, PL			X		Make a plan for Status and Verifiering
	Program för status och verifiering_EXEM...	2011-07-06 12:32	Microsoft Word 9...	37 KB	80, PL		X			Keep routine and example in the same document /M
	Program för status och verifiering_instru...	2011-12-09 5:25	Microsoft Word 9...	70 KB	80, PL		X			Routine, update and move to teampplace /J and K
	reservdelar beslut från LGM w914.rtf	2010-10-21 9:56	Rich Text Format	367 KB	M, 80, PL					Routines/decisions should be moved to teampplace /K The project is responsible for the part list /J
	reservdelar projekt.ppt	2010-10-21 10:02	Microsoft PowerP...	149 KB	M, 80, PL			X		Update decision and move to teampplace
	Reservdelslista projekt XX-XXX.xls	2013-01-21 3:29	Microsoft Excel 97...	27 KB	S&C, M, 80, PL			X		Move template to teampplace
	SAT specifikation_ENG.doc	2010-10-27 8:37	Microsoft Word 9...	178 KB	RO, 80, PL			X		Update and keep the english version. /R and J
	Slutdokument kost & tid.doc	2010-05-04 10:31	Microsoft Word 9...	43 KB	80, PL		X			Information should be in the white book /J
	Vitbok.doc	2008-10-17 4:38	Microsoft Word 9...	102 KB	80, PL			X		Gather all white books /K Update document /N
gamla utg	Program för status- och verifieringsköri...	2010-11-15 8:11	Microsoft Word 9...	83 KB			X			Old version /N
	SAT specifikation_EXEMPEL.pdf	2008-08-08 4:44	Adobe Acrobat D...	35 KB			X			Old version /N
	SAT specifikation_111213.doc	2010-10-08 11:17	Microsoft Word 9...	175 KB			X			Old version /N
	Schema status verifiering.xls	2011-11-04 10:27	Microsoft Excel 97...	36 KB			X			Old version /N
26.Övrigt (Utrednin	-									

Abbreviations:

J	Joakim Dahlgren
K	Kamilla Sommarsjö
M	Mariella Ekstedt
N	Nakisa Gordani
R	Robert Andersson
80	The 80 group
S&C	Service & Calibration
RO	Rig owner
M	Maintenance
S	Security
PL	Project leader
	Standard

General questions:

How will the document examples be handled in the future?

Suggestions: Remove document examples
Include document examples in the document template
Document examples will continue to exist as a seperate document

Missing documents?

All kravspecifikation
Funktionsspecifikation
Instruktioner & rutiner
Manualer/specar från leverantör
Utbildning generell, beslut
Volvo GTT Miljöprogram
Miljökonsekvensutredning

80 gruppen, skall användas som referens i 90 gruppens standard (mek/el).
Jenny har en uppdatering

APPENDIX 3: Quotes from interviews

There have been many interesting answers and comments during the interviews performed throughout this thesis. Below are a handful pick of quotes and comments about documentation and processes in organizations:

“Have the courage of arguing for your opinion, however make sure it is well founded.”

– Project Manager, ÅF

“It is hard to motivate the hours one puts into documentation.”

– Project Leader, Volvo GTT

“There is a difference between proving that something is good, and it actually being good.”

– Lecturer, Chalmers University of Technology

“Too many activities has been swept under the carpet, we are suffering now for what has been done then.”

– Maintenance, Volvo GTT

“When people are angry, they usually have not put much thought behind their arguments.”

– Lecturer, Chalmers University of Technology

“We are experts at developing processes for how we should work, and then we are excellent at completely ignoring the processes.”

– Rig Owner, Volvo GTT

“When asking which information they need, I always receive the answer: Everything!”

– Manager BF63580, Volvo GTT

“Documentation is expensive, the project FB70 paid 3 consultants 600 000 SEK for a short amount of time to develop instructions.”

– Employee BF63580, Volvo GTT

“Top-down based organizations inhibits the creativity of the employees”

– Project Leader, ÅF

“If you use document templates and checklists, then you are probably following the process. But following the process does not result in the use of document templates and checklists.”

– Project leader, Volvo GTT

“There is never time for learning, just executing.”

– Maintenance, Volvo GTT

“Participants struggle to give the impression that they know, when they may not know.”

– Lecturer, Chalmers University of Technology

“I rarely have the time and opportunity to reflect upon my work.”

– Project lead coordinator BF63590, Volvo GTT

“Dare to admit your mistake(s), instead of blaming others.”

– Project leader, ÅF

“The first time, it took 12 hours to replace the water pump, the second time 90 minutes.”

– Lecturer, Chalmers University of Technology