

How to organize working queue in forwarding department

Case: Delivery team, Metso Flow Control Oy

Sampsa Paakkinen

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Abstract <p>The thesis was assigned by the Metso Flow Control Oy. Topic of the thesis was chosen to help the company revise and develop the process of managing the working queues in the forwarding department. The goal of the study was to check how well the process follows Lean management practices and what are the key challenges and areas for development.</p> <p>The study was done as an action research as the researcher was also working as member of the team having key role implementing process improvements. The data for the thesis was collected by interviewing the team members and by making continuous observations of the daily work. In addition, the process was compared to the Lean management theory to see how well it has been implemented to the practice. Focus of the thesis was on how to develop the current process and working methods and how to eliminate unnecessary waste in the process.</p> <p>As a result, some suggestions for improvements were made. Main benefit of the study was to see how the current process works and if it is followed in daily work. Moreover, the study helped to find out what were the most important issues that need to be focused and how the process can be managed more effectively. The purpose of the study was to revise the process and help the team to find the key development areas and to focus on the right actions to make the team work more effective.</p>		
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1 Introduction

Delivering goods to the customer is an essential part of customer satisfaction and the success of any company. Especially when dealing with international trade and cross border transportation, it is important that the order lead time is as short as possible and that the shipping requests are processed always on time. There are many ways to organize the forwarding processes, but the key to success is a well planned and organized process that is easy to follow in every situation. The required lead times for the deliveries are often very tight, and there is no margin for errors to keep the customers satisfied. When looking to meet customer expectations and aiming at better results, many companies have adopted the lean management philosophy to ensure that the processes serve customer satisfaction and follow the best practices available.

Typically, in forwarding the work is done against time, schedules are very tight, and there are deadlines for tasks to be done in order to the deliveries shipped on time. The amount of daily work can vary from day to day, and it is hard to estimate all the work to be done during a working day. In this environment it is especially important to have a clear process to follow in order to organize the daily work effectively. For this purpose, Lean has been proven to be a well working concept. A well planned process can also help to smoothen this variation and help to use the available resources effectively.

1.1 Metso Flow Control Oy

Metso is a world-leading industrial company offering equipment and services for the sustainable processing and flow of natural resources in the mining, aggregates, recycling and process industries. The Metso Flow Control company produces valves and control units for flow control purposes. The company's products are used in the petrochemical and chemical, oil & gas, pulp & paper, industrial gas as well as power and other process industries. The main offices and the valves factory are in Vantaa, and they serve customers all over the world. (Metso in brief. N.d.)

The delivery team is responsible for processing shipping requests and for ensuring the dispatch of the goods from the Vantaa factory as well as other forwarding activities. The main task of the team is to book transportation and to be contact with the forwarding companies and agencies, both the company nominated and the customer contracted. The team also prepares shipping documents, does invoicing and handles claims as well as other forwarding work. The team receives hundreds of e-mails in the common inbox daily. It is extremely important that all the messages are checked and appropriate actions are taken. Hundreds of shipments leave daily, and the shipping process must work smoothly.

1.2 Backgrounds of the study

Lean management was adopted to Metso Flow Control for the first time in the office environment in 2013/2014 in Helsinki for D2D Quotation support. After successful implementation, Lean office methods have also been implemented in the other departments in the company. In the begin of the year 2016 the lean management process was adopted in the forwarding department. At that point, lean tools and methods were implemented as part of the daily process. The office environment was changed to follow 5s standards, and standardization of processes were carried out, and definitions of different roles and working cycles in the team were created.

Now, there is need to reviese how well the lean methods have been adapted in the delivery team. The aim of this study was to analyze the current working process and the way of organizing the work queue of the delivery team, and by reflecting on the lean management tools, give some ideas for improvements. The objective of this study was to make a current state analysis of the process and give proposals for the future state.

The thesis is divided in following parts: After the introduction, Chapter 2 presents the research methods, and the chosen methods are described in detail. Chapter 3 is the theory part defining and presenting the most important Lean Management tools and concepts as well as the theoretical background. In the following Chapters 4 and 5,

the current state analysis and proposals for the future state are presented. Chapter 6 contains the Conclusion and self-assessment of the study.

2 Research

2.1 Methods

In all research, there is always a phenomenon that can be researched using different research methods. The aim of a study is to increase understanding of a phenomenon and often also to affect a change for something better. There are two main methods for research: quantitative and qualitative research. The choice of a research methodology always depends on the research phenomenon and the problem. Separate from research methods, there are also several research strategies that can be used, such as case, design and action research. (Kananen 2013, 27-28.)

The main difference between quantitative and qualitative research is that quantitative research requires existing models of a phenomenon. The internal and external factors (variables) of the phenomenon must be known as quantitative research cannot be conducted without knowing what to count. Quantitative research is based on numbers opposite to qualitative research that uses words and sentences to solve a problem. The purpose of qualitative research is to understand the phenomenon of the study more in-depth. (ibid., 31-33.)

TABLE 1. Classification of different research approaches and methods including their characteristics					
Factor	Research Approaches		Researches with Multiple Approaches Researches with Multiple Strategies		
	Qualitative Research	Quantitative Research	Case Research	Design Research	Action Research
Relationship between Theory and Practice	Induction or from practice to theory	Deduction or from theory to practice	Abduction	Abduction	Abduction or interaction between theory and practice
Purpose of Research	Understanding	Generalisation Prediction	Understanding	Change	Intervention Change
Researcher's Role	External participant	External observer	External participant	External participant	Active actor
Research Questions	Open questions Theme interview	Structured questions	Mainly open questions	Mainly open questions	Mainly open questions
Responses	Text descriptive	Numbers quantitative	Open	Open	Open

Table 1 Classification of different research approaches. (Kananen 2013)

As presented in the above table, the objectives of research vary between understanding a subject and intervention to make a change. Still, every research process is based on understanding the phenomenon. It is not possible to make a change without knowing what to change.

In a traditional research approach, the phenomenon subjected to research and the researcher must be kept apart. The researcher must not influence the subject under research in order to obtain reliable results from the authentic phenomenon. On the contrary, in design and action research the researcher has a key role in organizing the change. (ibid., 29.) The thesis was implemented using the qualitative data approach and it was action research aiming to make a change in the subject under research. The methods used are described more in detail in the following chapters.

2.1.1 Qualitative research

The aim of qualitative research is to obtain a more in-depth view on a phenomenon. The research aims to draw a picture to understand the phenomenon under research. Qualitative research follows the general research chart presented below in Figure 1. The research starts from planning and defining the research questions, which is followed by data collection, analysis and final conclusions. (Kananen 2011, 36.)

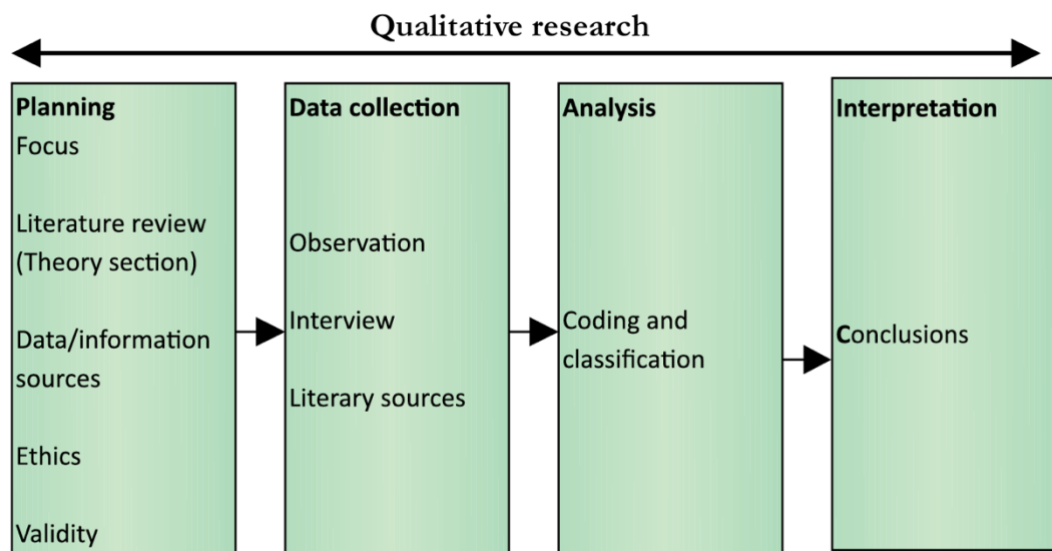


Figure 1. Qualitative research flow chart (Kananen 2011)

2.1.2 Action research

As qualitative research aims to understand a phenomenon, action research goes deeper and aims for a change. Action research is targeted at people and their possibilities to influence on and be involved in the change. Often the researcher is a part of the research object. The researcher tries to eliminate the problem and show measures of the change. The action research recommendations can be tested in practice during the research, and intervention can happen during action research. (ibid., 41)

2.2 Research objectives

Behind a thesis or a study, there is always a problem that needs to be solved. To solve the problem, it is important to know what the actual problem is and understand the reasons behind it. The aim of this study was to analyze the current situation and practices of the working process in a team. Research questions derived from the problem helped to solve the research problem.

This study was based on the following research questions raised by the assigning company to improve the working process of the delivery team:

- ***How can the working queue be organized better to eliminate waste and improve the efficiency and measurability of the process, and what parts of the process can be automated?***

- ***How to make the working queue more visible and easier to manage, and how can the amount of daily work be measured more accurately?***

2.3 Execution

The aim of the thesis was to make a current state analysis of the process and transform it in order to present proposals for a future state. The data used in the analysis was qualitative. The data for the thesis was collected by interviewing the team members and by making continuous observations on how the process worked. Each member of the team was interviewed separately. The idea was to find out how the team members felt about the process and whether it is clear and easy to follow. In addition, development ideas from the team members were collected. The current state analysis and improvement proposals were made based on the lean management theory, observations made throughout the thesis process and the interviews with the team members.

3 Lean management

3.1 Definition of Lean management

When talking about Lean management it is important to understand what it really is. Lean is a philosophy and general way of working in an organization. There are numerous definitions of what Lean is, but they all revolve around three key aspects:

1. Focusing on delivering better value to the customer
2. Doing more with less
3. Ensuring that when doing 'more with less quality', the safety or the long-term stability of the organization are not jeopardized. (Mark 2013, 23-24.)

According to Mark (2013, 23-24.): "Lean is an approach to improving organizations that focuses on the needs of customers – and considers everything that is neither delivering value to customers nor ensuring the safety and security of the organization and its staff as waste and therefore a target for elimination."

It is popularly misunderstood that lean is only suited for manufacturing. That is not true since lean concepts can be applied to every business and process, and it is suitable for improving office work as well. Moreover, lean is an approach to improve an organization on all its levels. Even though it is an approach to improve the whole organization and culture of a company, the ideology can be used in a smaller scale for improving the working methods of a team and its processes (What is lean? N.d)

Although the Lean management philosophy aims to create an efficient working environment, the main factor of success is the people and how well they can adapt the philosophy. In Lean management, the relationships between social and technical components are complex, and they determine the overall system performance in both short and long term. It is essential to understand the importance of human factors and employee participation in developing the lean practices. Well implemented Lean management can be beneficial for everybody, not only for the company and the customer but also the employees as well because it increases job satisfaction and commitment and reduces job stress. (Gaiardelli 2018)

The key idea in lean management is to eliminate waste in the entire value stream. It is not a short-term cost reduction program, but the way in which a company and its employees operate in everyday work. The main point is to standardize the work and processes by following the best practices available. There is no need to 'reinvent the wheel', but still every organization must go through changes and adapt the lean management philosophy and tool to their specific organization and environment.

3.2 Just in time

Just in time manufacturing (JIT) is a very similar idea to Lean manufacturing, and sometimes the terms are used synonymously. Just in time (JIT) means producing right items (or services) at the right time in the right quantity. Anything else is considered waste. There are a few simple rules behind the JIT philosophy: 1. Do not produce something unless the customer has ordered it. 2. Level the demand so that work may proceed smoothly through the plant. 3. Link all the processes to the customer demand through simple visual tools. 4. Maximize the flexibility of people and machinery. One of the goals in JIT as well as in Lean management is to create a continuous workflow in which all the waste is eliminated, and the work is done just in time when needed. (Pascal 2016, 92.)

This idea is as important in an office environment as it is in manufacturing. Often the key to success is to address the right kinds of issues and deliver information to exactly when and where it is needed. When there is plenty of work to be done, it is important to do the right work at the right time so that critical tasks do not wait for other tasks to be completed if those tasks can be done later.

3.3 Eliminating waste

One of the key concepts in Lean management is to maximize the value generated to the customer at every process step. All operations or activities that provide little or no value to the customer are considered waste. There are eight categories of wastes in lean management: transportation, waiting, overproduction, defects, inventory, motion, excess processing, and recently added safety. The goal is to eliminate all the

possible waste in every process. Even though these eight categories are presented individually they are all linked, and one waste can generate another. For example, over production and defects can lead to excess inventories that can lead to increase in waiting times. Also, if the development project is poorly planned when trying to eliminate one waste it can lead to an increase in other waste category. These wastes can be physical waste or unnecessary steps in the process or work that is consuming time and resources. (Kliem 2016, 21.)

When applying lean management and improving value stream there are some key waste issues to look for. These concepts apply whether improving office work or manufacturing processes. One of these wastes is defects. From Lean perspective a defect is output from process or operation that does not meet customer's expectation resulting customer dissatisfaction. Defects can occur in a product or service. Defects usually lead to extra costs and create a loss of confidence by everyone in the value stream. That is why it is maybe the most important type of waste to be eliminated.

Another waste to be eliminated is waiting time. In most of the cases this means long queue time meaning the amount of time a product or service waits to proceed forward in a value stream. Longer queue time usually means slower delivery of the product or service to the customer. Waiting time can be also cause by excessive lead time which can lead to delay delivery to the customer. Excess waiting time is extremely harmful as it often results in increase in other types of waste and customer dissatisfaction.

Also, it is important to avoid Large backlogs. These are issues, problems or improvements that need to be addressed but no action has been taken. They always result in poor performance in value stream when remaining unsolved. They affect the quality of output and result additional waste such as rework and excess processing trying to fix the problem. They can often be eliminated by looking for and addressing the root cause of the problem and not trying to "quick fix" a long-standing problem. (ibid., 23-25.)

3.4 Office lean

As mentioned most of the Lean management ideas suit for improving office work same way as manufacturing activities. In most of the cases it is just applying the philosophy in different purposes. Standardizing of analyzing data, formatting reports and emailing information to colleagues can be developed easily using the same lean tools and principles that can be used in manufacturing environment. Lean philosophy can be used effectively in office environment to: Increase the speed and accuracy of data and information flow, improve communication and productivity, facilitate documentation and sharing of standardized methods and documents. However, there is a risk that networking tools and applications can cause more confusion into the office environment by tempting employees to waste time by over-analyzing, over reporting, and over-emailing data. Therefore, Lean office concepts must be chosen carefully, and common business sense must be kept eliminating not create more waste. (Tapping 2012, chapter 1)

There are five issues that needs to be managed to get the lean office work properly.

1. Understanding the importance of the culture and behavior. For a long-term success, the employee's commitment and understanding of their role in the continuous improvement is a must.
2. Understanding the business case for lean. Employees need to understand that current way of doing business may not be the most efficient and continuous evaluation and change is needed.
3. The areas of waste. Lean tools and concepts help employees identify and eliminate all type of waste. It is critical that employees have fundamental knowledge and understanding of waste.
4. Applying power of information technology. The Lean tools and concepts apply to all forms of information management, whether paper or digital. Employees must understand how to use today's technology to eliminate waste and to increase work efficiency.
5. Management commitment. Lean implementation must be driven from top down and manager in all level must make 100% commitment to make the change. (Tapping, 2012 Chapter 2)

One of the key concepts in Lean offices is 5s. The idea is to ensure that work areas are systematically kept clean and organized. The five steps in 5s are: Sort, Set-In-Order, Shine, Standardize and Shine. It is simple concept, easy to do and gets

everyone involved and provides a good foundation for Lean office. When implemented correctly it also helps to in elimination of waste, allows smoother work flow, provides a systematic process for improvement and can help to reduce employee stress (Tapping, 2012 Chapter 5).

In lean office it is important to create visual communication system which ensures that work standards are in place so that the work is completed on schedule, without errors. Visual aids notify appropriate people to take correct actions and allows immediate problem notification and correction. There are various tools that can be used for visual control such as storyboards, signboards, process maps, check lists, indicators, lights, email alerts, flags, color coding, markings, labels, and signs used for identifying conditions etc. The most important is that the visualization is simple, standardize and easy to understand, in that way it can be very effective to improve office productivity (Tapping, 2012 Chapter 12).

Part of a Lean office is to balance work by volume and variety and simplify it through leveling. The purpose of leveling is to ensure that the work is evenly distributed among workers by volume and variety. The aim is to minimize the amount of work waiting in queue and ensure that every customer's demand is met each and every time. The key is to divide the work in smaller tasks to make it easier to handle big amount of work. The idea is to use categorization and segmentation of the work. It makes it much easier to take right actions for different kind of tasks and makes it much easier to allocate the resources effectively. This will automatically reduce the variation in the lead time inside the process and share the workload more even for the workers (Tapping, 2012 Chapter 9).

Work rotation is another important thing in Lean office. Well planned work rotation will keep the employees motivated and also helps them to keep their skills updated. Having cross-trained and multi skilled workforce helps to use the resources most effectively and adjust the work load in peak seasons. It also creates a good base for continuous improvements. This will also help for training new employees as they don't need to learn the full range of tasks done in the office at once but can start from certain part and develop skills need to move to the next one.

3.5 PDCA

The key in success in Lean management is continuous development. In Lean management there is a scientific approach made for implementing change and take appropriate actions. This method is called PDCA cycle and it has four stages, Plan, Do, Check and Act as presented in the figure 2. The idea of PDCA cycle is part of Lean philosophy made to ensure continuous development.

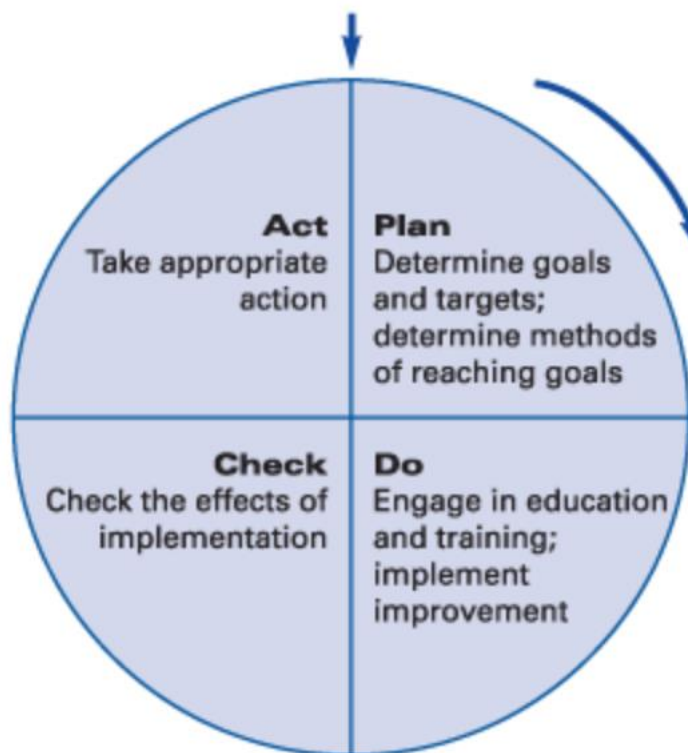


Figure 2 PDCA cycle (Adapted from Lean.org)

Biggest strength of PDCA is its simplicity. Plan is a part to determine the problem and building a road map to resolve it. Second step is "Do" executing the plan. Next step is check and measure the performance and determine the progress. Last step left is to analyze the findings and make improvements. This cycle then continues until the perfection is reached. (Kliem 2016, 123.)

It is important that everyone adapt this philosophy and idea and continuously evaluate own work and seek actively for possible areas for improvement. In time to time it is good to stop for a while to reflect how well the process works and if the target and goals are met. If needed new the cycle must start from the beginning to determine methods of reaching the new goals.

3.6 Measuring the process

In all the development projects it is important to know what it is that going to be improved. The key is to have right measurement and indicator that provide the information of what is done well and what needs to be improved. What you measure you can control. It is important to get reliable data out to follow the success of the processes and to be able to make improvements on them.

The right measurements are important as they give clear picture of weather you are traveling in the right direction. However even the best measurements do not tell you what you need to do to improve these results. The main characters of good indicator are: they are non-financial, measured frequently, clearly indicate what action is required by staff, have significant impact and they encourage appropriate action. As described earlier measuring the progress is part of the PDCA development cycle and should be part of the process to allow continuous development of the processes (Parmenter 2010, 2-6).

3.7 Value stream mapping (VSM)

VSM is a Lean management technique that is used to map out, understand and redesign information, people and product flows. It helps to get group of people understand why processes are not as effective as they could be and to work together to improve them. A VSM event typically aims to achieve three things:

1. To understand how current processes work (current state analysis)
2. To create an improved plan of how the process works (future state)
3. To develop the implementation plan that will take you from the current state to the future state (Mark 2013, 86.)

Even though value stream mapping is ideal tool for improving large processes to cover one or more organizations the same principles can be used for smaller process improvements. The key advantage of VSM is visualizing the process that makes it easier to fully understand the process in detail and makes it possible for improvements. But of course, the smaller the scale is more it reduces the cost/benefit of doing VSM. For smaller processes some tools from current state mapping are the most useful.

To fully understand the process, it is not enough to just map the most often occurring activities, but all the different variation and scenarios must be considered. In reality there are very few processes that involves repetitive task without any variation. Even though this variation must be considered it needs to be understood that there is a tendency for people to believe that odd occasions play bigger part of the workload than they do in reality. (ibid., 86-87.)

Traditional way of doing value stream mapping uses standardized symbols. The most commonly used symbols are presented in the figure.

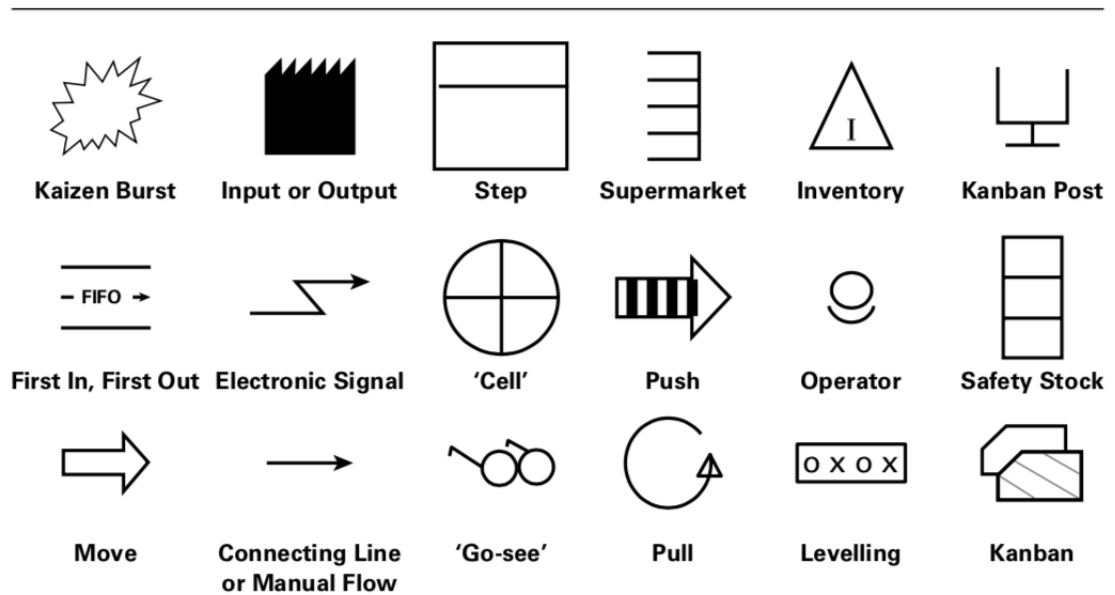


Figure 3 Common VSM symbols (Mark 2013)

There are several advantages of using standardized symbols such as it is easy and way to get quickly an overall picture of the process. Still some people can find using symbols stressful and prefer to use verbal explanations which is in some cases a good solution as well. Even though some symbols will always be needed.

In addition to the symbology used in value stream mapping it is a must to understand some key terminology:

Takt time; A key measure used to assess activity. It determines the pace of a process in terms of how frequently the work is asked to be done. Takt time can be used to figure out how many people are needed to do the work. *Cycle time*; is the average time that it takes and average item to complete a step or number of steps. It is directly related to the output rate and defines the average time between successful items to be completed. *Lead time*; the total time including all the delays, set up times and waiting, from the start to the end for individual item (Mark 2013, 92-94.).

Value stream mapping helps to gather information from which to define the current state of the process and provides opportunities to identify where to make improvements and to determine the future state and ideal value stream. Value stream map, as described above is just one of the many ways to analyze process flows. Other methods that can be used are for example standard process flowchart,

SIPOC flowcharting, interrelationship diagrams, data flow diagrams and so on. (Kliem 2016, 61-64.)

In lean management tool box there are tools for different purposes from general management to specific manufacturing improvement tools as well as tools for office lean. Different lean management tools can be used to help achieving the goals when introducing and developing lean practices. Next chapters will focus to describe the process under the study and point out stages to be improved for future.

4 Current state analysis

This part of the thesis describes the process of handling of incoming shipping requests and how the work is organized in working queues in the delivery team in Metso Flow Control Oy. The current process is compared to the lean theory and assessed and the main challenges of managing the current process are discussed. In addition, the research interview is presented, and the results analyzed in this part of the thesis.

4.1 Description of the current process

The goal in Lean management is to ensure that all the processes create value for the customer, eliminate waste and all unnecessary activities that do not create additional value. The true value created in the forwarding department comes from a fast response and cycle time of the process. The faster a shipping request can be processed, the faster the customer will receive the goods and the more satisfied they will be. Value adding phases are the actual processing of the shipping requests and the part of checking that the shipping request information and paper work are correct to avoid any further problems. The best way to improve the process is to reduce the waiting time that may occur in handling the requests. The current process of organizing the shipping requests to working queues is described in the following process map in Figure 4.

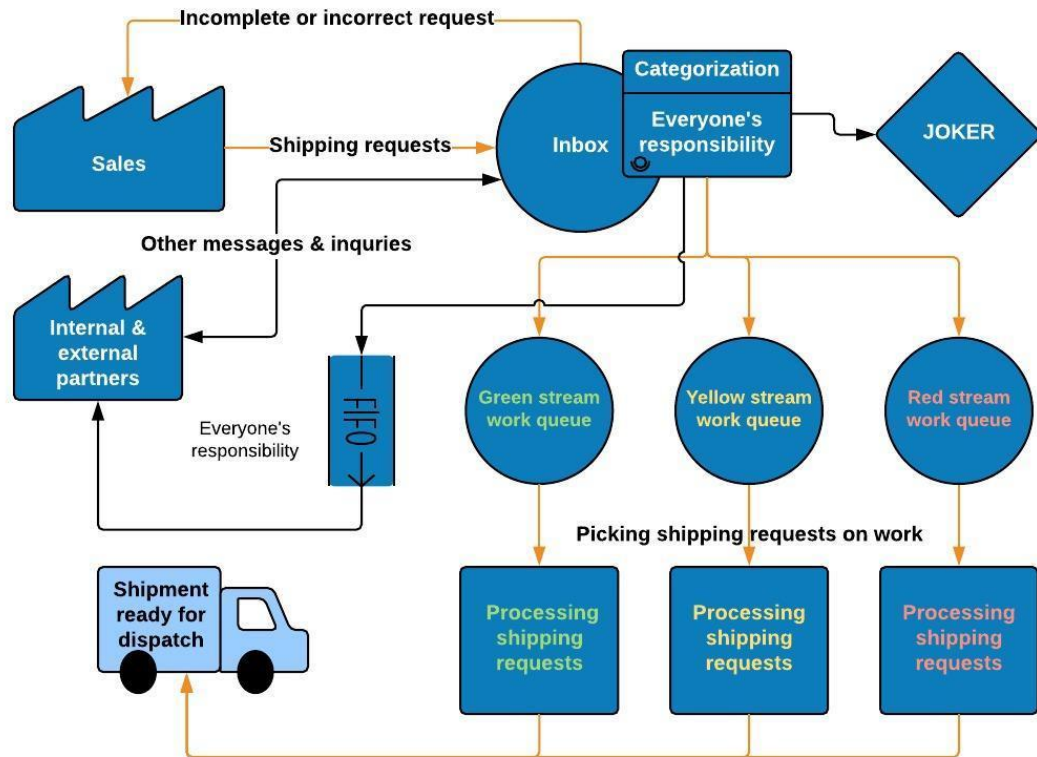


Figure 4 Process map

All the shipping requests from the sales department are sent through the company's electronic order handling system. From there they come automatically to the team's email inbox. The work queues are managed in separate folders in Outlook. In order to be able to manage the amount of incoming shipping request, they must be divided into smaller patches that are easier to handle. For this purpose, a categorization system has been created. The shipping requests and permissions are divided into five different streams according to the type of the task, time it takes to process the inquiry and the difficulty of the task. The five streams are the Green stream, Yellow stream and the Red stream, Fifo queue and Joker's tasks.

All the shipments that are easy and quick to process will be categorized in the green stream work queue. These are, for example, all the shipments that do not need a shipping permission, and shipments with a Metso nominated forwarder that do not need any special export documents to be made. The number of shipments in this stream is high, but they can be processed very fast. These shipments should not need any extra investigation or additional work to get them shipped.

The yellow stream includes shipments that are easy to process but take more time. These are, for example, shipments for which a certificate of origin, an EUR1 document or other export documents are needed as well as the shipments that have a customer contract carrier and are not Metso nominated. Also, some shipments that have Metso nominated carrier but need more work or paperwork are categorized to yellow stream. Processing these shipping requests takes more time and effort than those in the green stream.

The red stream includes the most challenging shipment requests, and more experience and knowledge from the employees are needed to proceed with these requests. These are, for example, L/C and CAD shipments. There are not so many shipments in this stream, but they are more challenging and take much more time to process. Furthermore, all shipments that need more investigation to proceed accordingly land in the red stream.

All the shipping requests and other tasks come to the email inbox from which they will be first categorized by the type of task. They will be categorized into one of the three shipping request streams, the FiFo queue or Joker's work based on the actions required. At this point the shipping request should be checked, and if any information needed is incorrect or missing, the request should be sent back to the sales for correction before taking it into the working queue. After the message is categorized to the correct queue, it will eventually be picked up for work and processed accordingly. Each working queue can have tasks addressed for different days depending on the lead times promised for different shipments.

At the moment there are two employees working in each stream being responsible for the shipping requests in the stream. Additionally, one employee works as a "Joker". The Joker can work flexibly and support the stream that has most work. The Joker is also responsible for processing some task addressed to the delivery team, such as invoicing, credit invoicing and other related tasks. The messages that are not related to shipping requests, shipments under work or tasks addressed to the Joker but that need action to be taken will be put into the FiFo line, from which everyone will pick up tasks to work on.

In order to balance the workload inside the team, it is important to know how much work is addressed in each stream. Every morning, the amount of daily work for each stream is calculated. The calculation is based on the number of shipping requests in a stream and the defined time categories for each shipping request. This helps to plan the use of resources and to see if one stream has a higher workload and needs help from the other streams.

4.2 Research interview

To collect data for the study an interview was held to gather comments and to get a clear picture about what all the team members think about the current process of managing the working queue. In addition, development ideas from the team members were collected for further analysis.

The main themes discussed in the interviews where:

- Is the process clear and easy to follow?
- Is categorizing criteria's clear?
- Does the process make it possible to work effectively in every situation?
- Do we process the work in right order and at the right time?

Generally, all the members of the team feel like that the current way of divide the shipping request to three different working queues is better system than what it used to be. Currently the roles in the team are felt to be clearer and the workload distributes more equally. Also, it seems to be easier to communicate and share the tasks inside the team. Still, there is need to simplify the process and some issues that need to be developed further.

There was some difference in the answers for the questions if the process is easy to follow and understand. Particularly the more experience workers who have been working in the same departments for years seems to have some problems to adopt to the new way of working. Younger workers seem to feel the process easier to follow. More than that there was a little difference in the answers and same issues and themes were raised up in almost every interview.

All the participants of the interview mentioned that calculating the working load is too time-consuming task and does not create any value for the team. Many comments were that it is hard to estimate the actual time that it takes to process a shipping request. Also, some of the daily tasks that are not in the working queues are not calculated to in the daily workload. Other issues that many raised up where the difficulty of managing the working queues in outlook email. It is time consuming to check the messages in many different folders and to keep the working queue organized when there are multiple messages for the same task. Also, it is important that already processed and work will be removed from the work queue.

An issue that was raised up in almost all interviews was that is the system of having FiFo line is a well working concept. Most of the team members were concerned that when the workload gets high these tasks may not be the first ones to get processed and if these tasks will be left in queue to wait for processing for too long time. The problem is that these tasks are not addressed to anyone, but everyone should pick up these on work. Also, it doesn't work as it should first in first out principle, but people tend to take the prefer ones from the queue and the harder tasks that need more investigation and time are left last to process.

Another critical issue raised up in the interviews were the importance that the email subject is in correct form as the categorization is done mostly by checking the topic of the message. If the link to the electronic order handling system in the shipping request is not opened the message might be categorized in wrong stream and it will generate additional work. The task needs to be recategorized and moved to the correct folder. In worse case it may take time to notice the mistake which may cause delay of the shipping the goods. This is why it is important that the process is followed in every step and the tasks will be checked to make sure they are categorized in right work queue.

4.3 Challenges of managing the process

The whole process of managing the working queue seems to be working fine in a normal situation. The problem is that the number of incoming messages and shipping request variate day to day. During the peak season it comes much more challenging

to manage the process due to the increasing number of messages in the inbox. When the number of messages increases it takes more time to categorize the messages and calculate the daily working load. Not only the number of tasks to be handled rises but also the time needed to manage the working queues. Also, possible delay of processing and answering the requests usually generate more work as incoming inquiries and reminders. That is why it is important that there will not be any done work left in the queue and to ensure that only one message per a shipping requests is in the work queue.

It is also very important to follow the process in every situation, especially when the workload gets higher. Only that way it is possible to work effectively no matter how much work there is in the queue. The number of incoming messages and reminders can be reduced by answering the messages in first place even if the task cannot be done right away. Simply letting the sender know that the message has been noticed will give the team more time to react.

The most critical part of the process is that the categorization is done correctly, and the request will be found in the right folder so that the right persons can be address the issues accordingly. When the number of messages rises it comes more challenging to spot from the mass the critical and urgent messages that needs to action right away. It is important that the prioritized requests are marked clearly so that they can be processed separate from the normal queue. Trying to reduce the number of messages can help to make it easier to manage the working queues and process the request in right order.

4.4 Lean process assessment

It can clearly be seen that the work in Delivery team is planned to follow the Lean management philosophy. The office is organized following 5s principles. Even though it is not part of the thesis investigation to assess the whole shipping process it is important that all the working methods are following Lean philosophy. It seems that there is true intension to develop the process continuously to follow the Lean management practices. The main challenge still being not to have enough time to

really analyze the results and stop and reflect back what is done well and where are the main challenges faced.

The process flow could be still improved so that the time in queue would be reduced and work would be done more following the Just-in-Time ideology. Even though the daily tasks are marked in the work queues it is still possible that the work is not done in the right order. Typically, more time-consuming tasks are left for the queue as the easier tasks tend to be handled first, especially when there are a lot of requests waiting in the queue.

Also, visual controls could be used more effectively. Email alerts and flags for problem notification and correction could be utilized more. Standardizing the working methods is done fine but there is still a need to check that everyone follows the instructions. The categorization criteria must be easy enough that everyone knows how to do the categorization. This is important as it can help to eliminate waste of excess processing and waiting time in the work queues.

One of the areas that need most improving is how the performance is measured. The standard measures are still missing, and the measuring process relies too much on manual work. The data to analyze the work load and teams' performance should be driven automatically from the systems. Now calculating the daily work load takes a lot of time and effort and creates little value in the process.

It should be kept all the time on mind that the main idea of Lean management is to create value to the customer. All the time-consuming and non-value-added tasks should be eliminated to maximize the use of resources available. After all the process is working mostly fine, and it should not be changed too dramatically. Even if it takes time to get the process work perfectly the changes must be made continuously following the idea of continuous development.

5 Future state

The best way to really improve the quality of the process would be to make changes of the software where the work queue is handled. This is important for the future but to investigate these solutions is out of the research scope of this thesis. Outlook

is clearly not the best tool to manage the working queues. There surely better options available, but what would be the best software for the company for this purpose also depends on the other systems that are in use in the company.

Ideally sales could insert a shipping request in the system which will be also used to manage the work queues. The request could be set automatically in different work queues based on the type of the order. The system should be integrated so that it would be possible to automate the work and make the communication between sales and forwarding easier. That would also make the process more visible and decrease the amount of work done if everyone who needs the information could check the status of the shipments easily.

When integrating new systems, it should be kept in mind that the amount of manual work must decrease. Ideally in the future some of the task now done manually could be automated. This would release more resources for the actual work and decrease the possibility for mistakes and improve the delivery times. Now categorization and moving messages from different folders is taking too much time. Also, the workload calculations done manually should be automated.

5.1 Suggestions for process improvements

Based on the observations, interviews and analysis there are some suggestions for adjusting the current working methods and the process. It is important to focus to keep the work queues “clean” so that the true amount of work can be seen easily. Psychologically it is easier to manage shorter queue. Also, the day categories must be used accordingly so that the tasks planned for the current day can be seen. Using clear markings for which day the work is assigned makes it easier to manage the queue and keep track of the task than needs to be done during the day. Also, it is important to ensure that the time is not wasted by double working on the tasks so if a task is taken on work it should be marked and moved away from the queue so that nobody else will check the same task.

Minimizing the need for moving the messages from a folder to another can boost the working efficiency. Unnecessary moving of the messages is pure waste and should be eliminated. It is time consuming to be checking messages from different folders.

Number of incoming messages affects a lot to the amount of daily work. It is very important to try to affect and reduce the number of messages as much as possible. This can be done simply by always answering all the messages as soon as possible letting the sender know their message has been received. In addition, automated responses could be used to reduce the amount of the messages coming in to the inbox. That would decrease the need of time for categorizing, releasing resources for actual processing of the request and make managing the process easier.

To improve the working efficiency, it is important to develop the process and working methods continuously and everyone should be involved in the development of the team's work. Morning meetings are good place to rise up any issues, share some tasks such as updating process instructions and set up possible time for development meetings if needed. In addition, the daily meetings can help communication inside the team to share the work load, avoid people working on the same task and ensure that the resources are used wisely.

6 Conclusion

After looking more in details how the work is done in the team it is shows that the Lean management have been adopted in the team quite well. The process is working fine in normal situations, but some problems arise when the workload gets higher. Of course, as presented in the thesis there are some areas that need to be developed further. The continuous development should be part of the culture in future as well to ensure the work is done in best possible way.

The key to develop the process and make it more efficient would be automate it as much as possible and get new system to manage the work queues. The main challenge is communication between sales and the forwarding department which would be easier if having integrated it systems for shipping management.

There is no need to rush with the changes. The way of organizing the working queues have been use relatively short time and it must be still followed how it will work in peak season to see if some problems occur. All the problems and issues should be checked continuous actions for corrections must be made. It is important to try to

find the root cause for any problem and deal with it. Otherwise no real change will happen. It is extremely important that all the team members follow the process in every situation. The team need to focus on the issues presented in this thesis and together focus on developing the process so that the work will be done most effectively every day in all situations. Any change must be done step by step so the effect to the deliveries can be minimized.

6.1 Reflection on the project

The schedule to make the thesis was tight and I had limited time to use for the thesis as I was also working in daily tasks in the team. Anyway, I was able to pull it through and follow the planned schedule quite well. Maybe if I would have had more time, I could have included more theory and go a bit deeper in some topics. Also, to make more thorough process analysis would have required more time.

The topic was interesting and very educative. Making this thesis have helped me to understand better the process and why some things in the company are done in a certain way. The whole process has been very good in learning perspective and I have learned a lot about the Lean management during this project. I believe this will help me in my current job position to do my work more effectively. Also, this will be good for the further career as well.

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Appendices