YRKESHÖGSKOLAN
NOVIA

Utilization of Project Scheduling Data in Management Systems

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Thesis for a Bachelor of Engineering degree

Degree Programme in Industrial Management and Engineering

Vasa 2023

EXAMENSARBETE

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Titel: Utilization of Project Scheduling Data in Management Systems

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Datum: 24 April 2023 Sidantal: 26 Bilagor:

Abstrakt

Avhandlingen har gjorts för Wärtsilä Finland Oy, Projektplanering & Kontroll. Syftet med avhandlingen var att ta reda på användningen av projektplaneringsdata i form av datum, som finns tillgängliga i olika system. Var datan är placerad, vilken data som inte kontrolleras av ett schema och vilken data som skulle kunna kontrolleras centralt genom ett schema som skulle vara huvudkällan för all datuminformation i systemen.

Teorin omfattar allmänt schemahantering och vanliga problem som uppstår med det samt hur stora företag hanterar data i sina system.

Metodologin för forskningen omfattade två steg. Först gjordes en omfattande kartläggning av de system som används i avdelningen, där datuminformation finns och intressenter som använder denna information. Sedan utforskades användningen av tidtabeller inom företaget och den effektiva användningen av denna information för att bibehålla datum i olika verktyg och databaser.

Resultaten av studien är identifiering av platsen och användningen av datuminformation i olika system. Dessutom visar resultaten vilken data som skulle kunna kontrolleras centralt genom ett huvudschema. Studien identifierade också områden där datuminformation bör förbli separat från ett centraliserat system. Vidare diskuterades utveckling samt slutsatser av studien.

Språk: Engelska
Nyckelord: Data utilization, Schedule management, Project management

BACHELOR'S THESIS

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Date 24th April 2023 Number of pages: 26 Appendices

Abstract

This thesis has been made for Wärtsilä Finland Oy, Project Planning & Control. The purpose of the thesis was to find out the use of project planning data, in the form of dates, available in different systems. The task was to find out where the data is located, what data is not controlled by a schedule and what data it would be possible to control centrally through a schedule that would be the master for all date information in the systems.

The theory covers general schedule management and common issues that arise with it as well as how large corporations manage data in their systems.

The methodology for the research involved two steps. First, an extensive mapping was conducted of the systems used in the department where date-related information exists and the stakeholders who use this information. Then, the use of schedules within the company was explored, and the effective use of this information to maintain dates in different tools and databases was investigated.

The results of the study identified the location and usage of date-related information in different systems, as well as which data could be centrally controlled through a main schedule. The study also identified areas where date-related information should remain separate from a centralized system. Furthermore, development and conclusions were discussed in the study.

Language: English
Key words: Data utilization, Schedule management, Project management

Table of Contents

Table of Figures

List of Abbreviations

PC = Project Controller

PM = Project Manager

MSP = Microsoft Project

PCC = Project Creation Controller

PD = Project Director

BC = Business Controller

PP = Project Planner

1 Introduction

The thesis background will be presented in this chapter, followed by the definition of the problem and the goal for this study. The thesis's boundaries and confidentiality are then discussed. After that, the disposition is presented to provide the reader with a better understanding of the thesis's structure.

1.1 Background

In recent years, the importance of a timetable in projects has increased significantly, as the complexity of projects has increased, and internal monitoring of projects has become more detailed overall. Date information is currently used in several different systems and tools, often without automatic linkage to each other, or central control via for example a schedule in Microsoft Project/Primavera P6. This leaves us with several sources of error, in terms of how closely these dates are maintained, who maintains them, and what information the dates are based on. The timetable is the primary tool used to guide the project work. Dates from the schedule could reasonably be used to keep information up to date in all systems used in the project work. Currently, there is a lack of clarity about what dates are in various systems, which ones are used and by whom, and how they are maintained.

1.2 Problem Area

The problem is that there is data in different systems such as CRM (sales tool), logwis (logistics tool), Clarity (project management tool) and SAP (basic tool for budgeting and cost tracking) as well as other tools that are not driven by a schedule or are not necessary data. Incorrect data is often a bigger problem than non-existent data. Date information that is not used should also not be present in tools. The risk with information in different systems is that it is unreliable and/or contradictory. It is therefore important to minimize the number of potential sources of error, to centralize the master data where possible, and to map how the information is used within the company.

Having multiple dates for the same thing can be confusing and cause duplication of work. This is especially true when the dates are stored in separate systems such as SAP, Clarity, CRM, and Logwis without any links between them.

When a company has a lot of dates in their timetable, it can be challenging to keep track of all the events and deadlines. This can lead to missed deadlines, missed opportunities, and frustration for everyone involved. On the other hand, having multiple dates for the same thing in different systems can lead to confusion and the need for double work.

For example, imagine that a company has a project with a deadline of April 30th. The project deadline is entered into the company's timetable, SAP, Clarity, CRM, and Logwis systems separately. However, if these systems are not linked, there may be inconsistencies in the dates entered, leading to confusion, and wasted time spent double-checking.

Furthermore, having different dates in different systems can make it difficult to keep track of changes and updates. For instance, if the project deadline is extended to May 15th, it will need to be updated in each of the systems separately. This can be time-consuming and increases the risk of errors.

1.3 Purpose

The aim of the thesis is to find out the use of project planning data, in the form of dates, available in different systems. Where the data is located, what data is not controlled by a schedule and what data it would be possible to centrally control through a schedule that would be the master for all date information in the systems. It is also important to identify places where date information exists that would not benefit from being centrally controlled but need to be separate. The first step will be a complete mapping of the systems used within the department, where date information exists, and the stakeholders within the company that use this information. The second step will be to examine the use of timetables within the company, and how the information in them can be used effectively to maintain dates in various tools and databases.

1.4 Confidentiality

This thesis will include confidential information that cannot be shared outside of Wärtsilä. No real names will be shown, and all enclosures will be classified and not included in the official version.

1.5 Disposition

The first chapter introduces the background, problem area, and purpose of the thesis. Afterwards there will be a chapter about Wärtsilä in brief which is general information about the company and a section about the systems used within the project planning & control department. In the third chapter the theoretical part will be discussed. Information about project management, schedule management and common issues that arise with it as well as data management in large corporations. The fourth chapter will cover the empirical study part. The fifth chapter will cover the results of the empirical study part. Furthermore, there will be a discussion part at the end with a development part and a conclusion part.

2 Wärtsilä in brief

Wärtsilä was first established in 1834 and operated then as a sawmill and iron works company. The mayor turning point in Wärtsiläs history happened in 1938 when the diesel engine era began. Wärtsilä signs a licence agreement with Freidrich Krupp Germania Werft AG in Germany and the first diesel engine comes to Turku in November 1942. In June 1959, the first Wärtsilä diesel engine which they designed themselves was started for the first time and that's when the birth of the first Wärtsilä diesel engines happened. (Wärtsilä, The History of Wärtsilä, 2023)

Wärtsilä has developed their business immensely since 1834 and with a team of 17 500 professionals in more than 240 locations in 79 countries they have become a global leader in innovative technologies and lifecycle solutions for the marine and energy markets. (Wärtsilä, This is Wärtsilä, 2023)

2.1 Energy Business

Wärtsilä energy is one of Wärtsiläs segments. Wärtsilä is a leader in the transition towards a 100% renewable energy future, with a mission to help its customers achieve a more sustainable future. Their solutions cover various areas of renewable energy, from balancing power plants to energy storage and hybrid solutions, all designed to increase efficiency and reduce carbon emissions. With a track record of delivering 76 GW of power plant capacity and over 110 energy storage systems to 180 countries around the world, they have proven expertise in helping customers meet their decarbonization goals. (Wärtsilä, Wärtsilä business in brief, 2023)

Wärtsilä Energy's lifecycle services also aim to promote reliability and guarantee operational performance. Overall, Wärtsilä is dedicated to creating a future powered by clean, renewable energy, and helping its customers to achieve this vision.

2.2 Marine Business

The Marine business is another of Wärtsilä's major business areas and remains the biggest of them. They offer a wide range of engines, propulsion systems, hybrid technology and integrated powertrain systems. (Wärtsilä, This is Wärtsilä, 2023)

2.3 Wärtsilä systems used for scheduling data

In this following chapter I will examine the many applications utilized by Wärtsilä, including SAP, CRM, Logwis, Clarity, and Microsoft Project.

Each of these software programs serves a particular function and is essential to the timely supply of goods and services as well as the management of many areas of Wärtsilä's operations, such as controlling project timelines and keeping track of customer contacts. In this text, we'll look at each software solution individually and give a quick description of its main features.

2.3.1 SAP

SAP is a basic tool used for budgeting and cost tracking. SAP stands for Systems, Applications, and Products in Data Processing. It is a software company that provides enterprise resource planning (ERP) software to manage business operations and customer relations. SAP was founded in 1972 in Germany and has since grown to become one of the largest software companies in the world. (Wikipedia, n.d.)

SAP's ERP software is designed to help companies manage their financials, logistics, human resources, and other business processes in a centralized system. The software provides real-time data analytics and reporting to help businesses make informed decisions and improve efficiency.

2.3.2 CRM

CRM is a sales tool. The CRM system at Wärtsilä is made to combine customer information from a variety of sources, such as customer interactions, orders, invoicing, and service requests. The CRM system at Wärtsilä also has capabilities that sales and marketing teams may use to track customer interactions and design niche marketing campaigns. Although marketing teams may use the CRM system to manage campaigns, segment customers, and tailor marketing communications, sales teams can use it to handle leads, track sales activity, and monitor customer accounts.

2.3.3 Logwis

Logwis is a logistics software platform used by Wärtsilä. You may view all order information in logwis, including order numbers, shipping status, contents of shipments, destination of shipments, anticipated shipping date, incoterms, and more. A variety of features and tools are available with Logwis to enhance logistics planning, execution, and tracking. Tools for handling transport orders, shipments, inventory levels, and customs clearance and documentation are all included. The technology also offers real-time shipment tracking, allowing Wärtsilä to keep track of the progress of its shipments and guarantee prompt delivery to its clients.

2.3.4 Clarity

Clarity is a project management tool. With the aid of the project management application Clarity, businesses can better plan, monitor, and control their projects. It is a cloud-based system that offers a centralized platform for collaboration and communication between project managers, team members, and stakeholders throughout the project lifecycle.

Many features and tools are available in Clarity to assist with project planning, scheduling, budgeting, resource management, and reporting. Project managers can use it to develop and manage project plans, monitor project development, and deal with project risks and concerns. To assist in managing project funds and budgets, the program also offers time tracking, cost management, and invoicing features.

2.3.5 Microsoft Project

Microsoft Project is a powerful scheduling tool that enables project managers to develop and manage project schedules with ease. The software is designed to help users create project plans, assign resources, and track progress throughout the project lifecycle. Microsoft Project offers a range of features that make it an ideal tool for scheduling projects of any size or complexity. (Microsoft, n.d.)

One of the key features of Microsoft Project is the ability to create project timelines. Project timelines provide a visual representation of the project schedule, showing the start and end dates for each task, as well as the dependencies between tasks. Project managers can

use timelines to identify critical path activities, and to ensure that project deadlines are met. (Keup, 2022)

Microsoft Project also offers tools for tracking progress and managing budgets. Project managers can use the software to track actual progress against planned progress, and to make adjustments as needed. The software also provides tools for managing project costs, including the ability to track actual costs against planned costs, and to generate reports on project spending. But its main use in Wärtsilä is scheduling. (Keup, 2022)

3 Project management theory

In this chapter I will go through project management focusing on schedule management common issues that arise with it and data management in large corporations. A project's scope, cost, quality, and risk must all be successfully managed for effective project management to take place. The success of every project, however, depends on two areas: data management and schedule management.

First, I will go through schedule management and common issues that arise with it. Next is data management in large corporations. By understanding the common pitfalls and best practices associated with schedule management and data management, organizations can improve their project outcomes and overall performance.

3.1 Schedule management and common issues that arise

Project Schedule Management includes the processes required to manage the timely completion of the project. The Project Schedule Management processes are:

- Plan Schedule Management which is the process of establishing the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule.

- Define Activities which is the process of identifying and documenting the specific actions to be performed to produce the project deliverables.

- Sequence Activities which is the process of identifying and documenting relationships among the project activities.

- Estimate Activity Duration which is the process of estimating the number of work periods needed to complete individual activities with the estimated resources.

- Develop Schedule which is the process of analysing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model for project execution and monitoring and controlling.

- Control Schedule which is the process of monitoring the status of the project to update the project schedule and manage changes to the schedule baseline

(A Guide to the PROJECT MANAGEMENT BODY OF KNOWLEDGE, 2017)

Scheduling is one of the most important tasks of a project manager and it can be one of the most complex tasks as well. Many issues can arise during the scheduling process, and it is important for a project manager to be aware of these issues so that they can be addressed appropriately. These include the following issues: Setting priorities: One of the most important tasks of a project manager is to ensure that the projects that are being managed get enough resources to meet their deadlines. In some cases, it may be necessary to make sacrifices to ensure that one project gets the resources it needs. This can be a delicate process as managers must balance the needs of different projects so that no one project is compromised. An effective project manager should be able to understand the needs of all the projects that are being managed and work to make sure that all of them receive the resources they need to meet their deadlines. (Kerzner, 2009)

Workload prediction: Another important task of a project manager is to be able to anticipate how much work will be required for each task. This is vital as it allows managers to be prepared for the workload ahead and ensure that they have enough resources to handle the workload that is expected to be completed during the project. This can be difficult to do accurately if there are several projects being managed at the same time. However, it is a skill that can be developed and improved over time as managers gain more experience and become more proficient at predicting the workload of various projects. (Kerzner, 2009)

Time management: A project manager must be able to manage the time available to complete a project in an effective manner. This is a key factor in ensuring that all tasks are completed within the planned timeframe and that the project is delivered on time and within budget. To ensure that this is achieved, the project manager needs to manage the available time and workload of each individual task and make sure that they do not get out of hand and cause delays in the completion of the project. (Kerzner, 2009)

One common scheduling method is the Critical Path Method (CPM), which involves identifying the sequence of tasks that are critical to completing a project and determining their expected duration and the earliest start time for each task. This method helps project managers to prioritize tasks and allocate resources accordingly, so that the critical path

tasks are completed on time and do not cause delays to the overall project timeline. (Project Scheduling: How-To, Techniques & Best Practices, n.d.)

Another scheduling method is the Program Evaluation and Review Technique (PERT), which considers the uncertainty of task duration and uses statistical analysis to estimate project completion time and identify the tasks that have the greatest impact on the project timeline. (Project Scheduling: How-To, Techniques & Best Practices, n.d.)

Effective communication is another essential skill that project managers must possess to ensure that all stakeholders are informed of the project's progress, any changes or updates, and potential risks that may affect the project's timeline, scope, or budget. (Project Scheduling: How-To, Techniques & Best Practices, n.d.)

Now over to the more important aspect for my thesis that is the challenges that arise in schedule management when tracking dates in different systems as well as how to handle these issues. The most common issues are:

Inconsistent Dates: One of the common problems that can arise is the inconsistency of dates in different systems. For example, the dates in SAP may not match the dates in Clarity or MSP. This can lead to confusion and errors in scheduling. To address the issue of inconsistent dates in different systems, it is important to establish a clear protocol for how dates will be tracked and synchronized across different systems. This may involve setting up regular updates between different teams or departments to ensure that everyone is aware of any changes to the schedule. Additionally, investing in software that can integrate different systems and automatically synchronize dates can help reduce the risk of errors. (A Guide to the PROJECT MANAGEMENT BODY OF KNOWLEDGE, 2017)

Duplicate Entries: Another issue that can arise is duplicate entries in different systems. For example, if a task is entered in both the SAP and MSP, it can lead to confusion and errors in scheduling. To avoid duplicate entries in different systems, it is important to establish clear guidelines for how tasks will be entered and tracked. This may involve designating a specific system as the "master" system for tracking tasks and ensuring that all team members are aware of which system to use. Additionally, regular reviews and audits of different systems can help identify and address duplicate entries. (Kerzner, 2009)

Lack of Integration: Sometimes different systems may not integrate with each other, which can create problems in tracking dates. For example, if the project management software does not integrate with the email system, it may be difficult to track important dates or deadlines that are communicated via email. When different systems do not integrate with each other, it can create problems in tracking important dates or deadlines. To address this, it's important to invest in tools or software that can integrate different systems and ensure that data is synchronized across all systems. Regular communication and updates between team members can also help ensure that everyone is aware of important dates or deadlines, even if they are communicated via email or other non-integrated systems. (A Guide to the PROJECT MANAGEMENT BODY OF KNOWLEDGE, 2017)

Manual Data Entry Errors: Finally, manual data entry errors can also cause issues in tracking dates. For example, if a team member accidentally enters the wrong date for a task, it can throw off the entire schedule. To reduce the risk of manual data entry errors, it's important to establish clear protocols for how data will be entered and verified. This may involve requiring multiple team members to verify data before it is entered into the system, or using software that can automatically validate data to ensure accuracy. Additionally, regular reviews and audits of data can help identify and address any errors or inconsistencies. (Kerzner, 2009)

To overcome these issues, it is important to establish clear protocols for how dates will be tracked and synchronized across different systems. It may also be helpful to invest in tools that integrate different systems or automate data entry to reduce the risk of errors. Additionally, regular communication and updates between team members can help ensure that everyone is on the same page when it comes to scheduling and deadlines.

In summary, handling inconsistent dates, duplicate entries, lack of integration, and manual data entry errors in schedule management requires a combination of clear protocols, regular communication and updates, and investment in tools or software that can help automate and streamline the process. By addressing these issues proactively and collaboratively, project managers can reduce the risk of errors and ensure that the project stays on track.

3.2 Data management in large corporations

Effective data management is essential for large corporations to maintain a competitive edge in today's fast-paced business environment. In addition to enabling informed decision-making, it also helps in improving operational efficiency and reducing costs. However, managing large volumes of data can be a complex and daunting task that requires expertise in various areas such as data storage, security, analysis, and compliance with data privacy regulations.

This is where the role of a dedicated team of data professionals comes into play who possess the necessary skills and knowledge to handle data management challenges effectively. These professionals are responsible for ensuring that the organization's data is accurate, up-to-date, and easily accessible to authorized users while also being protected from unauthorized access or breaches.

There are several reasons why large corporations cannot just track everything in one system. One of the primary reasons is that different systems are designed to handle specific types of data or functions. For example, an enterprise resource planning (ERP) system may be used to manage financial data, while a customer relationship management (CRM) system may be used to manage customer data. Similarly, a supply chain management system may be used to manage inventory data, while a human resources management system may be used to manage employee data. (W.H. H. Inmon, 2019)

Large organizations may have outdated systems that are challenging to combine with more modern ones, which is another reason why they use several systems. For instance, a business might need to keep separate systems for payroll and financial data because an outdated payroll system cannot be connected with a modern ERP system. (W.H. H. Inmon, 2019)

Large organizations may have many business units or divisions that use various systems based on their unique needs and requirements in addition to the reasons mentioned above. A business might, for instance, have a manufacturing division that uses a certain manufacturing execution system (MES), and a sales division that uses a CRM system. (W.H. H. Inmon, 2019)

To manage data across different systems, large corporations typically use data integration tools and techniques to ensure that data is accurate, consistent, and up to date. Data integration involves the process of combining data from different sources into a unified view, which can be used to provide insights and inform decision-making. Data integration tools may include extract, transform, and load (ETL) tools, data warehousing tools, and data virtualization tools. (W.H. H. Inmon, 2019)

4 Empirical study

I started by gathering data from every system listed in the previous chapter. The data gathered includes dates that are used frequently and those which are not that frequently used as well as data that isn't updated regularly. The result of all the data gathered and a comparison will be presented in the results chapter and be more detailed.

4.1 Data in clarity

In clarity I found various dates which you can see from the figure attached below. The figure indicates what the dates are, who updates them, and the source where the dates are taken from. In clarity the most used dates are usually always up to date but there are hidden dates which are not used that frequently which could be substituted or just left out. In the attached figure you can see which dates are frequently updated, have a guide by which they are updated by and assigned to a certain roll those are marked in green. The dates that are covered in red are dates that don't have a guide, aren't frequently updated or just are unnecessary data. The data that is updated by x indicates that there isn't any role assigned to who is updating that data if anyone is even inserting that data. I searched for the dates in clarity by going through the whole system and seeing which dates exist, and by having meetings with my colleagues who are more familiar with the system. All these dates lack integration. This creates problems when tracking dates, it requires good communication between the persons responsible for these different dates. Then also there could be manual data entry errors. Everything is entered manually by someone and there isn't anyone checking if it right the first time. To reduce the risk of manual data entry errors, it is important that there is a clear guide on how to do things and as you can see there isn't a clear protocol for every data. Also, there is inconsistency in these dates, some of them which had the same data in SAP were completely different from the dates in Clarity. This can lead to confusion and errors in scheduling.

Who maintains what fields in CA PPM (for customer projects)		Entered by / Updated by
Z	General	PM, PCC, PD
X	CD Specifics	PM, PC, PCC, BC
	Procurement chain	PC, BC
	Addresses	Any Project team member
	Evaluation & Prioritization	PM, PD
	CD internal status report	PM
	CD Project management plan	PM
	Links	PM, PC
	Lessons learned	Any Project team member
	Customer invoices	PC, BC
	Shipment values	PC
	Project master data	PCC
	Response strategy	PM
	Staff	PM, Line managers
	Detail	PM, Line managers
	Gantt	PM, PC
	Risks	Any Project team member, PD
	Issues	Any Project team member, PD
	Change report	PM, Any project team member
	Role capacity	x
	Participants	x
	Participant group	x
	Requsitions	x
	Task list	x
	Import scope of supply from SAP	x
	Resource utilization	x
	Assignments	x

Figure 1 data from Clarity

	Dates
Risks	Impact date & Target Resolution Date, Impact date, Last updated by, resolved date
Shipment values	Foreceasted Shipment Date & Actual Shipment Date, Forecasted delivery date according to incoterms, actual delivery date according to incoterms, Created date, Planned shipment date
General	Start date & Finish Date
CD Project Management Plan	
Customer Invoices	paymeny security latest date, payment security expiry date, payment security opening date, payment status updated on, planned invoicing date
Customer Invoices	Due date, Estimated date of receipt, Payment date, Last updated date, actual invoicing date, created date, last updated date
Response Strategy	Impact date & Strategy Target date & Strategy forecasted date. Created date & Last updated date
Team -> Staff	Start date & Finish Date, actual start date, finish date, created date, investment finish date, lsat updated date
Task list (process milestones)	Start date & Finish Date, actual start date, finish date, created date,
Actual hour reporting activites	
Audit Trail	Dates
Assignments	start, finish, created date, last updated date,
Issues	Target Resolution date, Impact date, Last updated date, Last updated by, Issue Closed date, Created date, resolved date
CD status report	Report date, Status report update, Created by, Last updated date, last updated by
Change Requests	Approved date, Assessment date, Closure date, Created date, Expected closure date, Last updated by, last updated date, Review date, Target approve date
Lessons Learned	Assessement date, Created date, Date closed, date of release, Evaluated date,
Project plan	Created date, last updated date, last updated by
Adresses	Created date, last updated date, last updated by
Links	Created date, last updated date, last updated by

Figure 2 data from Clarity

4.2 Data in SAP

In SAP there are various dates that you can see from the figure attached below. Those dates are not automatically updated or controlled by any master data. The dates are manually updated usually by the project controller, the project team, or the project creation controller. Some of these dates such as Forecasted handing over date are just predictions of the project team and not an actual handing over date. In the attached figure you can see which dates are frequently updated, have a guide by which they are updated by and assigned to a certain roll those are marked in green. The dates that are covered in red are dates that don't have a guide, aren't frequently updated or just are unnecessary data. The dates that have been found here are taken from the project builder in SAP. I went through all the different tabs in the project builder and found all sorts of dates, in the figure attached below you can see some of them and where to find them. An experienced SAP

user won't have a problem finding them through the info that is provided in that figure. The problem here is then the same as in clarity. There could be manual data entry errors. Everything is entered manually by someone and there isn't anyone checking if it right the first time. To reduce the risk of manual data entry errors, it is important that there is a clear guide on how to do things and as you can see there isn't a clear protocol for every data. There were dates which didn't have anything entered either, this probably means that it is unnecessary data and should be removed.

Project main data maintain Powerpoint		Entered by / Updated by
Z	P/21037. Under basic data: Start date	PCC / PC
	P/21037. Under basic data: Finish date	PCC / PC until handing over date and AWM after handing over
	P/21037.M. Under dates: BscStart	Inserted once
	P/21037.M. Under dates: BscFinish	Inserted once in the beginning of the project. Update if contractually amended.
	P/21037.M. Under dates: FcstStrt	Updated by PC once per month until actual start date.
	P/21037.M. Under dates: FcstFin	Updated by PC once per month until actual handing over date
	P/21037.M. Under dates: ActStart	Inserted once when actual project start date has taken place, and when Wärtsilä is contractually obliged to work on a project (e.g., PNTP or NTP)
	P/21037.M. Under Cust enhancement: Actual Handing over date	PC
	P/21037.W. Warranty under dates: BscStart	PC until handing over date then AWM
	P/21037.W. Warranty under dates: BscFin	PC until handing over date then AWM
	P/21037.W. Warranty under dates: FcstStrt	PC until handing over date then AWM
	P/21037.W. Warranty under dates: FcstFin	PC until handing over date then AWM
	Project Creation Date	Project creation controller
	Project End Date	Project creation controller
	Effective date of contract	Project team
	Contractual Handing Over Date	Project team
	Forecasted Handing Over Date	Project Controller
	Start Of Warranty	Project Controller
	End Of Warranty	Project Controller
	Actual handing over date	PC
X		
	P/21037.M. Under administration: Created on	
	P/21037.M. Under user fields: NN Date	
	P/21037.MP - 3.Under dates: Ear. Start	
	P/21037.MP - 3. Under dates: Last	
	P/21037.MP - 3. Under dates: Act	
	P/21037.MP - 3. Under dates: Fcst conf.	
	P/21037.MP - 3. Under dates: Discpatch.	
	P/21037.MP - 4. Under basic data: Fixed date	
	P/21037.MP - 4. Under basic data: Actual date	
	P/21037.MP - 4. Under basic data: Scheduled date	
	P/21037.M1P -3. Under scheduling: Start date - Basic	
	P/21037.M1P -3. Under scheduling: Start date - Scheduled	
	P/21037.M1P -3. Under scheduling: Start date - Actual	
	P/21037.M1P -3. Under scheduling: End date - Basic	
	P/21037.M1P -3. Under scheduling: End date - Scheduled	
	P/21037.M1P -3. Under scheduling: End date - Actual	
	P/21037.M1PPM1 - 2. Under Purch.data: Reqmt date.	
	P/21037.M1PPM1 - 2. Under PO, under delivery schedule: Delivery date.	
	P/21037.M1PPM1 - 2. Under PO, under delivery schedule: Stat. Del. Date.	
	P21037.M1PPM1 - 2. Under PO, under Purchase order history: Posting date.	
	P21037.M1PPM1 - 2. Under PO, under Confirmations: Created on.	

Figure 3 data from SAP

4.3 Data in Logwis

The data that was found in Logwis can be found underneath. The Logwis data is basic dates about logistics as you can imagine because like stated in the previous chapter about Logwis, it is a logistics software. These dates are fundamental to ensuring that shipments are delivered on time and that inventory levels are maintained at optimal levels. Like in the previous chapter the dates that are marked in green are frequently updated and the ones in red are not. As you can see there are only green dates that is because everything that is updated in Logwis is directly linked to SAP. When I went through the data in Logwis every

section had a date if it is the right date, I'm not sure. Logwis is updated through SAP, and this is a good thing because it eliminates double work, but it is not controlled by a timetable and that is the case with every system. The timetable is the main tool used to guide the project work.

Under Shipments	Under Cases	Under Orders
Planned shipment date	Cases status: Planning	Delivery date
ETS	Cases status: Packing	
ATS	Cases status: Ready for pickup	
ETA	Cases status: Picked up	
ATA	Cases history: Date	
ETA at site		

Figure 4 data from Logwis

4.4 Data in CRM

I did a search in our customer relationship management (CRM) system, I have gathered a set of dates that are essential to our operations. However, I have discovered that most of these dates can also be found in our other systems. As a result, there were not a lot of dates that were unique to the CRM system.

Nevertheless, it is still important to have these dates documented in several systems to ensure that everyone has access to the information they need to make informed decisions. By maintaining consistency between our systems, we can reduce the risk of errors and ensure that our operations run smoothly.

Since I didn't have access and other project controllers don't have the access. This search was done with a colleague that had access to it. The ones that do have access to CRM are usually people that work in the sales department. That was the case with the colleague that helped me finding these dates.

The problem with CRM is also the same as in the previous ones All these dates lack integration. Then also there could be manual data entry errors. Everything is entered manually by someone and there isn't anyone checking if it right the first time.

Under Project delivery system information	Under opportunities
G0 Date	Close date
G1 Date	Effective date
G1A Date	Delivery date
G1B Date	Commercial operational date
G2 Date, Had date	
G3 Date, Had date	
G4 Date, Had date	

Figure 5 data from CRM

4.5 Data in Microsoft Project

I used our template for scheduling to gather the data. The data I found in the Microsoft Project can be seen in the figures down below, that is just a few of them. Microsoft project is used within the company to schedule manage projects. It contains a lot of dates for example shipments. These dates are usually managed by the project planner which is the one who maintains the data to successfully keep the project on track of completion. MSP is used within the company as the main tool for guiding a project with its timetables. These dates are of great importance because these dates show how far we are into the project, what the next step is and when it's going to be finished.

None	**0**	**[Project - Configuration - Project Type - Country]**	**0%**	**1 day?**	**Mon 25/03/19**	**Mon 25/03/19**
Standard	**MS**	**MILESTONES of POWER PLANT**	**0%**	**0 days**	**Mon 25/03/19**	**Mon 25/03/19**
Standard	**1.01**	**Contractual Milestones of POWER PLANT**	**0%**	**0 days**	**Mon 25/03/19**	**Mon 25/03/19**
Standard	1.011	Signing of CONTRACT	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.1.2	Effective Date of CONTRACT	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.014	Mechanical Completion of POWER PLANT	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.015	The Substantial Completion of POWER PLANT	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.016	Handing Over of POWER PLANT	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.1.6	Other contractually significant dates	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	**1.02**	**Payment Milestones of POWER PLANT**	**0%**	**0 days**	**Mon 25/03/19**	**Mon 25/03/19**
Standard	1.021	As per contract	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	**1.03**	**Customer Obligation Milestones of POWER PLANT**	**0%**	**0 days**	**Mon 25/03/19**	**Mon 25/03/19**
Standard	1.3.1	As per contract	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.031	Opening of LETTER OF CREDIT (LC)	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.3.3	Availability of CONSTRUCTION PERMIT	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.3.4	Availability of DOWN PAYMENT	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.3.5	Availability of NOTICE TO PROCEED	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.3.6	Availability of SITE ACCESS	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.3.7	Provision of GRID CONNECTION	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.3.8	Provision of SUFFICIENT AND STABLE LOAD FOR TESTING	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	1.3.9	Provision of ALL FUELS, CHECMICALS LUBE OIL, LUBRICANTS and CON	0%	0 days	Mon 25/03/19	Mon 25/03/19
Standard	**1.04**	**Contractor Obligation Milestones of POWER PLANT**	**0%**	**0 days**	**Mon 25/03/19**	**Mon 25/03/19**
Standard	1.041	As per contract	0%	0 days	Mon 25/03/19	Mon 25/03/19

Figure 6 scheduling template MSP

None	**5.1**	**Shipment 01 - [Content]**	**0%**	**1 day?**	**Mon 25/03/19**	**Mon 25/03/19**
Standard	5.1.1	Shipment 01 - Collection and Export Clearance	0%	1 day?	Mon 25/03/19	Mon 25/03/19
7 Day Workweek	5.1.2	Shipment 01 - Seafreight	0%	1 day?	Mon 25/03/19	Mon 25/03/19
Standard	5.1.3	Shipment 01 - Customs Clearance	0%	1 day?	Mon 25/03/19	Mon 25/03/19
7 Day Workweek	5.1.4	Shipment 01 - Inland Transportation	0%	1 day?	Mon 25/03/19	Mon 25/03/19
None	**5.2**	**Shipment 02 - [Content]**	**0%**	**1 day?**	**Mon 25/03/19**	**Mon 25/03/19**
Standard	5.2.1	Shipment 02 - Collection and Export Clearance	0%	1 day?	Mon 25/03/19	Mon 25/03/19
7 Day Workweek	5.2.2	Shipment 02 - Seafreight	0%	1 day?	Mon 25/03/19	Mon 25/03/19
Standard	5.2.3	Shipment 02 - Customs Clearance	0%	1 day?	Mon 25/03/19	Mon 25/03/19
7 Day Workweek	5.2.4	Shipment 02 - Inland Transportation	0%	1 day?	Mon 25/03/19	Mon 25/03/19
None	**5.3**	**Shipment XX - Break Bulk - [Content]**	**0%**	**1 day?**	**Mon 25/03/19**	**Mon 25/03/19**
Standard	5.3.1	Shipment XX - Booking Confirmation	0%	1 day?	Mon 25/03/19	Mon 25/03/19
Standard	5.3.2	Shipment XX - Collection and Export Clearance	0%	1 day?	Mon 25/03/19	Mon 25/03/19
7 Day Workweek	5.3.3	Shipment XX - Seafreight	0%	1 day?	Mon 25/03/19	Mon 25/03/19
Standard	5.3.4	Shipment XX - Customs Clearance	0%	1 day?	Mon 25/03/19	Mon 25/03/19
7 Day Workweek	5.3.5	Shipment XX - Inland Transportation	0%	1 day?	Mon 25/03/19	Mon 25/03/19

Figure 7 scheduling template MSP

5 Results

This chapter will present the result of the thesis. What data is not controlled by a schedule and what data it would be possible to centrally control through a schedule that would be the master for all date information in the systems.

Based on my review of the template for scheduling in Microsoft Project, I noticed that several of the dates align with those already established in different systems. One example, I found that the Handing Over date is reflected in both Clarity and SAP, as well as in the Microsoft Project schedule.

Furthermore, I noticed that each milestone included in the project plan is also present in the systems. You can refer to the figures that were attached in the previous chapters for a more detailed comparison.

The data is there but it's not controlled by a schedule, it's manually updated by someone. I would say all data would be possible to centrally control through a schedule that would be master for all date information in the systems by just connecting them in which I will talk more about in the following chapter.

The most concerning issue is that no data is controlled by a schedule. Data that is not controlled by a schedule can cause errors in a variety of ways. When data is not managed properly, it can lead to incorrect or incomplete information being stored, which can result in inaccurate analysis and decision-making. In addition, uncontrolled data can be difficult to locate, which can cause delays and inefficiencies in business operations.

One of the main reasons why uncontrolled data causes errors is that it can be entered into a system at any time, without any validation or verification. This means that the data may be incomplete, contain errors, or be entered multiple times. For example, if a company allows employees to enter data into a system whenever they want, the data may not be consistent across all employees, leading to inconsistencies in reporting and analysis.

Another way that uncontrolled data can cause errors is through duplication. When data is not managed properly, it can be duplicated multiple times, leading to discrepancies and confusion. For example, if someone enters a date into Clarity and into SAP, they must make sure to get the exact same date in as well when updating they must do it separately and

this can cause human error. It would be much easier to have one all the dates linked to each system.

Furthermore, uncontrolled data can be difficult to locate and retrieve, which can cause delays and inefficiencies in business operations. If data is not stored in a centralized location or is not properly indexed, it can take a long time to find the information needed for analysis or decision-making. This can result in missed opportunities or incorrect decisions based on incomplete or outdated data.

The results of gathering all the data were that all the systems do have some different data in them, but a lot of them have the same. For example, there is effective date in both CRM and SAP but there are many different ones as well.

After reviewing all the different templates and gathering the data that was available. There is clearly data which is not updated by anyone (referring to the figures) so that indicates that it is unnecessary, in some of the templates it stated who is responsible for updating some data which I found was still missing someone must've forgot, this would easily be managed by creating a link between the systems and using one single system for all data.

5.1 Data

In this chapter I will present all the dates that I have found in the previously mentioned systems, in which systems there are dates that are the same as in another system, which of these could be centrally controlled through a centralized data base and which one's could not be that at the moment. I will also mention where these dates can be found so it will be easier to improve and link them.

At first, I will present which dates from SAP you can find in the other systems, then Logwis then CRM and at last Clarity. This will make a clear view of which systems have what data that can be linked to each other.

In SAP you can find all the data that I have mentioned previously in the project builder. There is start & finish date in both SAP as in Clarity. In Clarity it is listed under General, in SAP however it is under basic data. In SAP you can find effective date of contract which can also be found in CRM. SAP also has actual handing over date which can be found in CRM too. The dates that I have found were just taken from the project builder, so it does not

seem like there were a lot of them which could be linked to the other systems. This means that a lot of the dates that are in SAP are just used by staff that use that particular system. So, they could include these dates at least in some timetable that is then linked to the other systems. All the other dates that are just in SAP could be left there. I'm quite surprised that there aren't any more dates that are the same as in the other systems.

So, in logwis you could see in the previous chapter what I have found. As I stated there logwis is already linked with SAP so all of the data you can find in SAP as well. The same data that you can find in logwis however you can find in Clarity too under shipments values, not all of them but nearly all. This means since it's already linked with SAP it would be possible to connect it to clarity as well or just to gather all the data in one place for example in a timetable in MSP.

Now in CRM I found G0 – G4 date. These are not found in Logwis but there is a project charter in Clarity where it's possible to find these dates. Close date, effective date, delivery date and commercial operational date can be found in SAP.

Clarity has a lot of dates. Most of the dates in clarity are just found in clarity but a lot of them are in the other systems too. The dates that are the same and in which systems these dates are mentioned already in the other parts.

The primary tool that is used to guide the project is the timetable which is usually in MSP. The problem here is that not every date is in MSP, some of them are. In MSP you can find effective date of contract which is already in Clarity, SAP, and CRM. Handing over date is in MSP that you can find in Clarity, SAP, and CRM too. All of the payment milestones can be found in MSP and in Clarity. All the shipments you can find in MSP which are in SAP and Logwis as well.

All these dates that represent the same thing could be linked with each other. This will be discussed more in the following chapter.

6 Discussion

The purpose of this thesis was to find different data located in different systems, and to see which data could be centrally controlled through a timetable. As there has not been made a case like this before it is beneficial for the department to see where it is all located.

While it is beneficial to have consistency in dates and milestones across different systems, relying on multiple systems can also create the risk of human error. For example, if a team member forgets to update one of the systems with the latest information, it could lead to inconsistencies and confusion within the team.

Additionally, having multiple systems can create a time-consuming process of checking and double-checking each system to ensure that all information is up-to-date and accurate. This can take away valuable time and resources from the actual work of the project.

Also, using multiple systems can create challenges when it comes to data integration and reporting. If each system contains different information, it may be difficult to get a comprehensive view of the project's status and progress.

To mitigate these risks, it may be helpful for the team to choose a single system for tracking project timelines and milestones. This would ensure that all team members are working from the same source of information and could help to streamline the process of updating and reporting progress.

Using a single system can also help to reduce the potential for conflicts or delays due to inconsistencies in dates or milestones. When all project-related information is stored in one place, it becomes easier to identify potential conflicts and take action to address them proactively.

Using a single system for project management can help to save time and resources by reducing the need for duplicate data entry or redundant work. When all information is stored in one place, it becomes easier to manage and maintain, reducing the amount of time and effort required to update and track project progress.

Finally, a single system can help to improve communication and collaboration among team members. By having all project-related information in one place, team members can easily

share updates, collaborate on tasks, and communicate about any issues or challenges that arise.

While this may seem like an easy fix it is not. In the previous chapter I showed which dates are the same in the different systems used. There were a couple of them but not all, so it still requires having different systems for different dates. It would be possible to link these at least but for those dates that are just used in just one system I don't see the need to put them in to another system and then link them. There is a possibility to include all dates into one large data collection.

Then of course other problems would show up. These problems would be to assign who is going to link these dates, where are they going to be, should they just remove all the unnecessary dates, who is going to update these dates and so on. My suggestion would be to have them in the timetable and link them from the timetable to the other systems.

The dates that are just stored in one system are then only used by users who have access to that system so those don't need to be centrally controlled. It could be argued to just leave everything as it is but then at least it would require a better guide for everything. In the past figures those marked in red have some dates in them but there isn't a guide on who is using this data and who is updating it or inserting it from the beginning.

6.1 Development

Further development would be to eliminate the previously mentioned unnecessary data because the unnecessary data causes confusion and extra work. Data information that is not used should not exist. But incorrect data is still often a bigger problem than non-existent data. So, the best development there is, is to link all the different systems together so when one updates in SAP for example it automatically is updated in the other systems. This does not eliminate entirely the risk for human error, but it most certainly takes away all the duplication of work. The problem here is though that there isn't one system in place that has all the different dates, so it wouldn't work to centrally control it from one of the systems previously mentioned if they don't add all the dates.

From previous figures it is seen that the PC and the PM usually update the dates which have been found in the different systems. Another problem is that not everyone has access to

all systems because it costs money and sometimes it's not necessary to always have the access. So, since the PC and the PM already update a lot in clarity/SAP and they have access to Microsoft Project, the PP could then when making the schedule for the project insert all these different dates and the PC could then access it to update these dates within MSP if they link all the dates from MSP to all the systems.

The important dates that are mentioned previously should all be gathered in one place for example in Microsoft Project and then link them to all the systems. The timetable is the main tool to guide the project work so nearly every date should be included there.

There should also be more focus and develop the guides that are made for these systems. Another area of development could be to explore the use of machine learning and artificial intelligence to analyze the data in the centralized master schedule. To develop even further, Wärtsilä could implement a system that automatically updates the centralized master schedule with data from each system. This would eliminate the need for manual data entry and ensure that the most up-to-date information is available to all stakeholders. Additionally, Wärtsilä could implement a system of data validation and verification to ensure that data entered the system is complete, accurate, and consistent. Another development could be to develop training programs for employees to ensure that they understand the importance of data management and how to use the centralized master schedule effectively. This would help to ensure that all stakeholders are aligned, and that the system is used to its full potential. These are just recommendations, but these options would be good to take into consideration.

6.2 Conclusion

So, in conclusion I managed to find where all the data is located, which systems have what data, where there is same data, by whom it is used.

Based on the results, I can say that there is improvement to be made by using one timetable and create a link to the different systems through that timetable. That would increase the effectiveness and eliminate the need for double work.

I have presented the result of the thesis by identifying the data that is not controlled by a schedule and data that can be centrally controlled through a schedule that would be the

master for all date information in the systems. The review of the template for scheduling in Microsoft Project showed that several of the dates align with those already established in different systems. However, the data is not controlled by a schedule and is manually updated by someone, which can lead to errors, duplication, and inefficiencies.

I also presented all the dates found in SAP, Logwis, CRM, and Clarity, and identified which dates could be centrally controlled through a centralized database and which ones could not. The results showed that while there are some dates that are the same in multiple systems, there are also many dates that are only used by staff in a particular system. Therefore, it would be possible to connect some of the dates through a schedule that would be the master for all date information in the systems, while others could be left in their respective systems.

Overall, the thesis highlights the importance of centralizing data through a schedule to minimize errors, duplication, and inefficiencies in business operations. By connecting the different systems through a centralized database, organizations can ensure that all data is up-to-date, consistent, and easily accessible, leading to more accurate analysis and decision-making.

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