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Non-Conformity Handling Process and Internal Customer Satisfaction

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Wärtsilä on maailman johtavimpia merenkulun ja energiamarkkinoiden voimaratkaisujen toimittajia. Asiakasyrityksiään Wärtsilä tukee tuotteidensa koko elinkaaren ajan. Tuotteiden ympäristötehokkuutta ja taloudellisuutta parannetaan keskittymällä uusiin teknologisiin innovaatioihin ja kokonaishyötysuhteeseen. Wärtsilän vahvuutena on teknologinen johtajuus, integroitu tuote- ja huoltotarjonta, maailmanlaajuinen kattavuus ja hyvät pitkäaikaiset asiakassuhteet.

Kaupalliselle yritykselle asiakkaat ovat toiminnan elinehto ja siksi asiakassuhteiden hoitaminen on yksi tärkeimmistä ylläpidettävistä asioista. Asiakassuhteisiin vaikuttaa suuresti se kuinka hyvin yrityksen sisäinen viestintä toimii. Wärtsilän Power Plants Customer Support käsittelee projektitiimien rekisteröimiä non-conformity - asioita, eli vaatimustenvastaisuuksia, jotka projektipaikoilla on huomattu käyttöönoton tai asennuksen aikana tai jotka ovat ilmenneet kuljetusten aikana.

Tässä työssä tutkitaan sisäistä asiakastytyvääisyyttä kysymällä projektitiimeissä työskenteleviltä Wärtsilän työntekijöiltä mielipiteitä non-conformity handling - prosessista ja sen toimivuudesta. Tutkimus tehdään kyselylomakkeella ja tarkoituksena on löytää prosessin heikkoja lenkkejä. Tämänkaltaista tutkimusta ei tälle osastolle ole ennen tehty ja siksi on tärkeää selvittää, mikä prosessissa toimii ja mikä vaatii muutosta.

Avainsanat

Non-conformity handling, sisäinen asiakastytyvääisyys

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ABSTRACT

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Wärtsilä is the world's leading supplier of marine and energy power solutions. Client companies are to be provided support for the entire life cycle of Wärtsilä products. Environmental performance of products and economy are improved by focusing on new technological innovation and total efficiency.

Wärtsilä's strength lays in its technological leadership, integrated product and service offering, global coverage and a good long-term customer relationship.

Customers are essential to a commercial operation of the company so therefore taking care of relationships is one of the most important things to be maintained. Customer relationships are greatly influenced by the internal communication and systems of the company. Wärtsilä Power Plants Customer Support deals with non-conformity related issues that are mainly informed by Wärtsilä project teams. The input comes first from the site to the project teams that check which ones need action.

This work examines the internal customer satisfaction by asking Wärtsilä project teams of the opinions of non-conformity handling process and its functionality. Research is done with a questionnaire and is designed to find weak links in the process. This kind of research is unique in this department.

Keywords non-conformity handling, internal customer satisfaction

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1 INTRODUCTION

1.1 Wärtsilä Finland Oy and Quality Assurance Customer Support

This is a short presentation of Wärtsilä Finland Oy.

Wärtsilä is a Finnish company that provides complete lifecycle power solutions for the marine and energy markets. Wärtsilä concentrates to develop the technological innovation and total efficiency and aims to reach the maximum environmental and economic performance of its products. The company has approximately 18000 employees working in operations in 70 countries in 170 different locations. (Wärtsilä, Annual report 2011, 2012)

Customer support function within the Quality Assurance department is handling the registering and processing of non-conformity related issues during Wärtsilä Power Plants' project execution phase, which means the time before the warranty begins, construction time before handing over to the customer. The non-conformities can be both product and process related. The customers are mainly internal, Wärtsilä project teams and sub-functions. Project teams check the input that come from project site and report the non-conformities to Customer Support, in order to properly register and follow up the issues.

The short term goal of this function is to arrange replacement parts and services when needed. The long term goal is to improve the quality and performance of Wärtsilä. (Burman, 2013)

1.2 The non-conformity handling process

The meaning of the non-conformity process is to guarantee the quality of Wärtsilä's products and service. In the process non-conformities detected before handing over to the customer are to be registered by Wärtsilä Power Plants project teams and Customer Support. CAC (Customer Assistant Centre) is taking care of the warranty cases appearing after handing over. (Wärtsilä, Non-conformity process, internal)

1.3 Why is this study needed

This work is made for Wärtsilä Finland Power Plants Customer support Organization.

The purpose of this thesis work is to examine and estimate the performance of the Customer Support function based on gathered feedback from the internal customers. Working methods will include data analyzing and questionnaire.

The expected outcome of the thesis is to clarify the strengths and weaknesses of the Customer Support function and to uncover possible improvement opportunities of the Customer Support team and/or the process.

1.4 Methods

The research is done by an internal customer satisfaction survey to people who work on Wärtsilä's projects. It was given to the project people, who are sitting in Wärtsilä Powergate building and are dealing with non-conformities. The survey was created together with the Customer Support team to make the right questions. Instead of sending it by email it was personally given to the relevant people or left to their desk with an explaining letter and a coffee ticket. The replies were delivered back by internal mail to the quality engineers in Customer Support team. Email was not used because people get dozens of emails every day and the possibility to get results that way is low. Leaving the survey on the desk was a way to ensure that it at least was seen.

2 INTERNAL CUSTOMER SATISFACTION

2.1 Meaning

Customer satisfaction is the result of good product or service that responds to the needs of customer. It is said, that success of a company is related to the customer satisfaction. (The School of Social Work, Customer Satisfaction) (Wärtsilä, Claim Handling and Feedback Handling process, internal slide) Awareness of a bad service or bad quality of products spreads among customers and will affect the client relationships and the image of the company. Dissatisfaction factors are usually the result of a bad internal communication among the people who work in the company or process. The same applies to internal customer satisfaction. If people inside the company follow the rules and respect each other the satisfaction shows outside and company will succeed. One satisfied employee is worth more than one dissatisfied, and most likely takes care of his job.

Internal customers of Power Plants Customer Support are people who are related to the non-conformity process; Wärtsilä project teams and sub-functions. Internal communication in the process has to work because that is the only way to ensure that the customer receives the best possible products and service, and also to find and eliminate the possible non-conformities before they cause bigger problems. If communication doesn't work at all the results would be contrary. (Vilkkumaa, 2007)

2.1.1 Internal customer satisfaction

Internal customer satisfaction consists of three facts. Those are visionary leadership and internal and external information. Every single organization begins with a vision. Wärtsilä's vision is to be "the most valued business partner of all our customers". (Wärtsilä, Mission, Vision and Strategy, 2013). Leadership can simply be maintaining and clarifying the goals of the organization. Today it is more usual to have an organization which has many internal and environmental related processes and that's what Wärtsilä is like. A good organization needs the full participation of every employee. Everything in the organization, employees

and processes, is linked to each other and improperly working part of it may cause harm to any other part of the organization. (The School of Social Work)

In the non-conformity process there are many factors communicating with each other. If some part isn't working properly, it will influence to everything else. This research heads to clarify the possible problems that may occur in this process. The possibility to solve those things depends on the will and courage of these employees.

Internal information comes from the employees working inside the organization. It includes any opinions, knowledge, perceptions and supervisory assessments. Internal data concern the employees' feelings towards the organization. For example, how the organization works, does it support its employees enough in every aspect and do the employees feel their work is important and the company achieves quality. External information is gathered from customers, suppliers, competitors and regulators. This data is also important to gain regularly because it tells what the customers need and want and can also show the weak links of the organization.

A good vision and visionary leadership, internal and external data are defining the success of the organization.

(The School of Social Work; Timo Rope, Jouni Pöllänen and Weilin+Göös, 1994)

2.2 Analyzing the customer satisfaction

Customer satisfaction analyses are important. Using them it is possible to find out how the company is responding to the customers' needs. The customer always has an idea about what kind of service or product he/she wants. The company is marketing itself and based on that the customer creates an image and expectation of the company, its services and products. Although the company would be financially very successful, long-term success can only be guaranteed by keeping the customers satisfied. Customer satisfaction consists of the customers

experience and is linked to the present day. Therefore, it is to be taken care of at all times and the settlement requires ongoing measurement.

Generally it is difficult to give customer feedback. Giving internal customer feedback could be much more difficult. Colleagues know each other and negative feedback could be hard to say. (Timo Rope, 1994) Wärtsilä Customer Support knows the well-working parts of non-conformity process and now wants to know the weakly working parts too.

Information of customer satisfaction can be used to improve the quality of the activities of the company and to maintain the current level of the activities. The information can also be used as a base of management and incentive system, to find out the valuations of the customers and to implement the customer-oriented marketing. (Timo Rope etc, 1994, p. 61) The information gathered from the internal customers of Customer Support is going to be used in those two first ways.

Planning the data acquisition system requires decisions of measuring times, what's going to be measured and who are taken to the sample and the measuring technique. These things influence to the quality of the results. (Timo Rope, 1994, p. 63)

The study can be either longitudinal or a cross-section first thing to do is to choose the right type of the study. A longitudinal study means continuing data acquisition from the same group. The purpose of this kind of study is to follow-up changes and trends in consumption or sale. A cross-section measurement is nonrecurring, which means it's done only once to find out what is currently happening. The data for that is often collected by interviews. Research method can be either qualitative or quantitative. Quantitative research clarifies how many, how often, how many and how important something is. It requires an exact sample and results are to be reported in numbers. Qualitative research is an advanced study, which helps to clarify the behavior of the customer, why and how something is happening. A research can also be a combination of these two. (Leila Lotti and Weilin+Göös, 1994, p. 42)

Customer satisfaction survey doesn't work without certain criteria, which are validity, reliability, systematically organized survey, added value production and link to the automatic action. Validity means that the survey is measuring those things as wanted. Well- organized and shaped questions are important. Reliability means how reliable the answers are and it can be influenced by sample size, the number of missed answers, bad questions and the timetable. Added value means that the results can be used to improve the internal activity. (Timo Rope, 1994, pp. 83-84)

Easiness of responding is maybe the most important thing to remember when creating a survey for customers. It should not be too long but should cover all the things that influence the satisfaction. The data can generally be collected with a letter, personal interview or a telephone interview. When planning the survey the nature of the target group needs to be taken into account. A perfect customer satisfaction survey that is explained in textbooks takes account of the estimated level of expectation, the level of experience and the importance of the characteristic activities. In practice the perfect survey is hard to complete and a survey is always more or less a compromise. (Timo Rope, 1994, pp. 88-89)

The layout of the questionnaire is also an important part of the creating process of the survey. Questions can be either open or structured questions, or both. An open question lets the answerer to answer with his own words while a structured one includes response options. Response gathered by structured questions is easier to handle and it is comparable. Also it is easier for the customer to respond when there are certain answers given. Open response is of course important and it tells more about the feelings of the customer. (Timo Rope, 1994, pp. 89-90)

A question isn't allowed to lead the answerer and it shouldn't be too long. When thinking answers for the structured questions it is important to notice, that there can't be too many choices, and there must be a possibility to answer "can't say" or "something else". (Leila Lotti, 1994, pp. 76-77)

When the questions are formed and the questionnaire is created, the working methods are decided and target group chosen, the survey is ready to begin. But

before that it is more than important to test the survey first. That is the only way to find out how it works and does it need modifying. Usually an outsider notices the possible mistakes. Testing ensures better results. (Leila Lotti, 1994, p. 101-102)

It is usually impossible to get the full response.

The customer satisfaction survey prepared for PP Customer Support was created to find the weaknesses and strengths of non-conformity process and was aimed to busy project team workers, so the survey needed to be short and simple. There was no exact time by which the informants should have returned it; they could do it whenever they had time, but as soon as possible. That was a way to show appreciation towards the informants and their work. We used both open and structured questions.

3 CASE NON-CONFORMITY PROCESS OF WÄRTSILÄ

3.1 Impact areas

The customer delivery project non-conformity process handles failures noticed during the installation and commissioning phase in customer delivery projects. The other phases are notifications with delivery or the material doesn't fit the expectations of the customer. These notifications are taken care of the factory itself or CAC for warranties. (Wärtsilä, Bright Sky project - Customer Delivery project nonconformity Training Presentation, Internal, 2012)

3.2 Cost responsibility

Ship Power, Power Plants and Services are related to sales and project activities. Marine and offshore related issues belong to Ship Power and power plants are related to Power Plants. Wärtsilä's manufacturing work consists mainly of assembly, test running and finishing of products.

Cost responsibility in this case means who is responsible for the failure in engine or auxiliary parts. It can be divided into two categories: costs detected during

installation and commissioning and costs related to the performance of the delivery project. In the first category cost responsibility belongs to Wärtsilä Ship Power and Power Plants if the non-conformity handles auxiliary equipments. For all other equipment the cost responsibility belongs to PowerTech, which serves both Ship Power and Power Plants market areas, (Wärtsilä, Annual report 2012, PowerTech) and Ship Power.

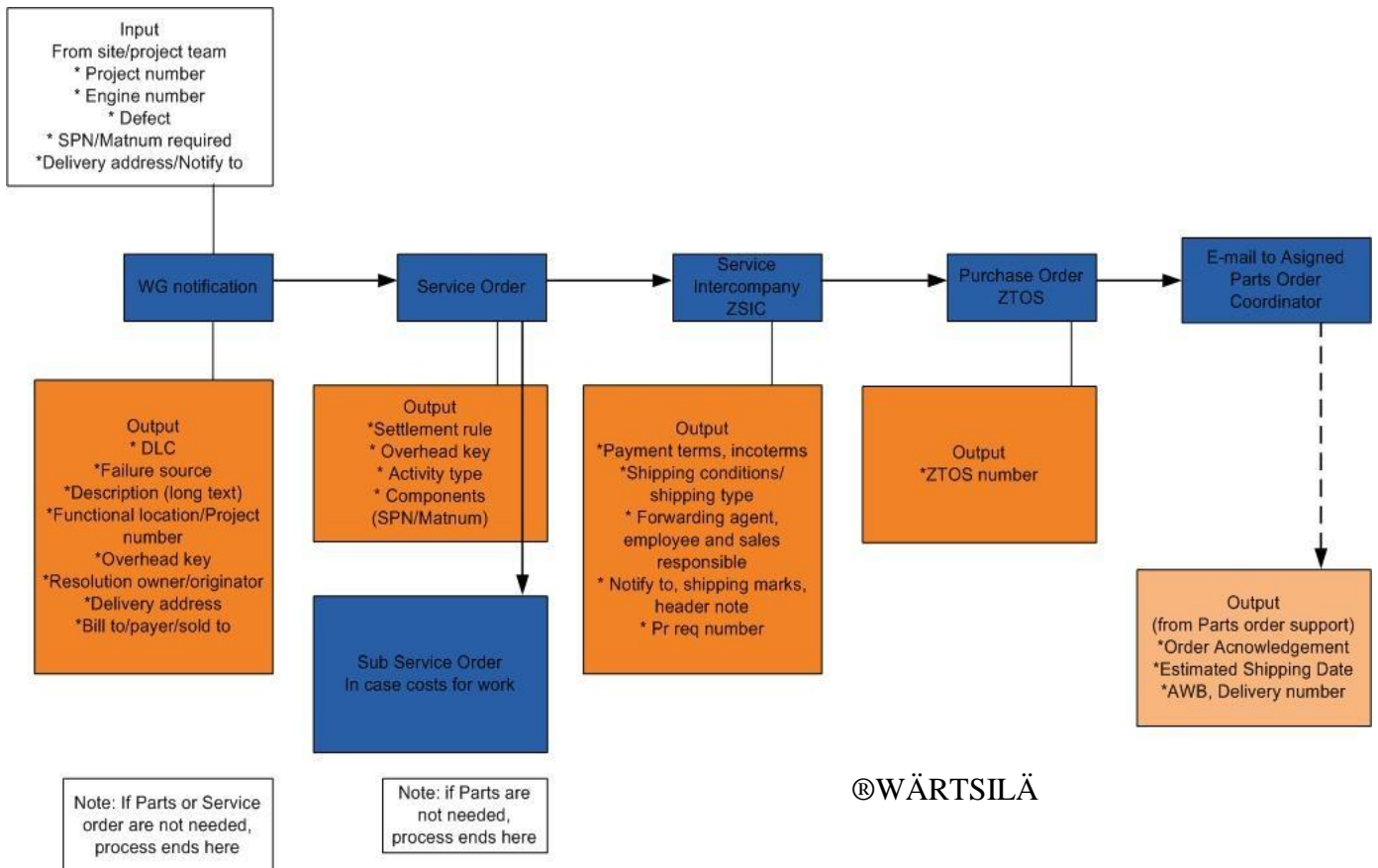
The second category handles problems in the delivery of the project like late deliveries, penalties and other delivery performance costs. In these cases the cost responsibility belongs to all divisions (Ship Power, Power Plants, Services and PowerTech). (Wärtsilä, Bright Sky project, 2012)

3.3 Roles

There are three different roles in the non-conformity process. Originator is a person who creates a new notification. He or she describes the problem and assigns the resolution owner. Originator can be anyone working on Wärtsilä's projects that have access to the SAP system.

Resolution owner is responsible for the total life cycle of notification like supervision of notification related tasks and cost collector and reporting and possible escalation of the problem. He or she also responds of closing the notification after completing all the tasks. These are usually Wärtsilä's project managers, commissioning coordinators or Customer support employees. In some cases originator and resolution owner is the one same person. The notification is sent further to the task owner who is responsible for corrective and preventive actions. He is assigned by resolution owner or by problem solver. (Wärtsilä, Bright Sky project, 2012)

3.4 The process



Picture 1: This graph explains the non-conformity process step by step.

The purpose of the non-conformity process is to improve the quality of Wärtsilä's and its vendors' products and service and ensure that products and services are accorded to the agreed scope and specifications. Picture 1 describes how the process works in practice. The non-conformity comes up on the site or has occurred during transportation. Site employees collect the needed information and inform the project team about the non-conformity. Project team assesses the input and informs further the Quality Assurance department. Engine related and auxiliary related issues and claims are separated to their own categories and there are two (or more) quality engineers taking care of them. PP Customer Support team handles the notifications and does the further actions.

Information needed for engine notification claim is:

- Project name and number
- Engine serial number
- Material Number or Spare Parts Number and material description
- Detail delivery address with postal code
- Delivery terms
- Person to notify including phone number and e-mail

For auxiliary:

- Project name and number
- Purchase order number
- Serial number of failed part
- Fault description and requested corrective actions

(Wärtsilä, Bright Sky project, 2012; Wärtsilä, Nonconformity directive; Wärtsilä, Claim Handling and Feedback Handling process, internal slide; Wärtsilä, Non-conformity process, internal)

3.5 Action

3.5.1 Problem defining and planning

The purpose of the thesis was to clarify the strengths and weaknesses of the Customer Support function and to discover possible improvement opportunities of the Customer Support team and the process. The internal customers are Wärtsilä project teams that are related to the non-conformity issues. Project teams consist of Project Managers, Chief Project Engineers and Project Engineers and also Project Controllers, Team Leaders and Trainees.

The research was planned to be carried out using a questionnaire. The hardest part was to clarify what kind of questionnaire it should be and what questions should be asked; what we wanted to be found out. Power Plants Customer Support team

has never done this kind of research before so everything had to be done from the scratch. There was internal information about non-conformity handling and related issues in Wärtsilä database and in the first hand it was necessary to read and become acquainted with what was going on in there. Also it needed a lot of reading to come to grips with how a good questionnaire should look like.

Because the purpose was to find out the weaknesses and strengths of the process, the questions had to be related to it. Many discussions for the questionnaire took place. The first version of it was made by the undersigned. It was a good start but it needed to be clarified and modified. The final survey was created together with the PP Customer Support team to make the right questions for this research. The survey also had to be simple and short enough that it would be possible to fill it quickly. The survey was both a qualitative and quantitative. It became two-page, which was ecologically printed using the both sides of one paper, and had eleven structured questions about non-conformity process with alternative answers 1 to 5. Number 1 means fully agree and number 5 completely disagree. In addition there were two questions with many possible answers and three informal open questions where the respondents were allowed to tell their response in their own words. At first, they were asked to choose their title, Project Manager, Project Engineer, Chief Project Engineer or other that includes every other title they might have. The results are reported as percentages.

The survey was tested by a few people. They made some improving suggestions and after that the research was ready to begin. Afterwards we can discuss how it would have been a good idea to test the survey by a pilot group. Then the piloting results would have shown how it works.

3.5.2 Time to start

The research was done by doing an internal customer satisfaction survey for project people sitting in the Wärtsilä Powergate building. The survey was left on their working tables with a short letter describing the meaning of the survey and asking them to send it back to by Wärtsilä internal mail. They were also given one coffee ticket in return to thank them for their answers. Email was thought to be

worse than this as an alternative because people get dozens of emails every day and they probably would have ignored this one. 78 pieces of the surveys were distributed.

At the first time only 36 copies of surveys were delivered just to check how many replies would be returned. That was in January. One week after distributing the surveys many of them were returned. In many replies the other side of the paper wasn't filled, and the survey had to be modified so that the others would recognize the other side too. An arrow with text 'TURN' was added to the down right corner of the paper. Then 14 copies more was delivered and after two weeks the rest 28 copies. Much more replies were now filled both sides.

4 RESULTS

Overall 58 of 78 surveys were sent back and the distribution between answers is shown in the charts below. Most of the replies came from Chief Project Engineers.

In Chart 2 the position of the answerer was asked. Planning the follow-up action requires knowledge about distribution between different groups in the project teams.

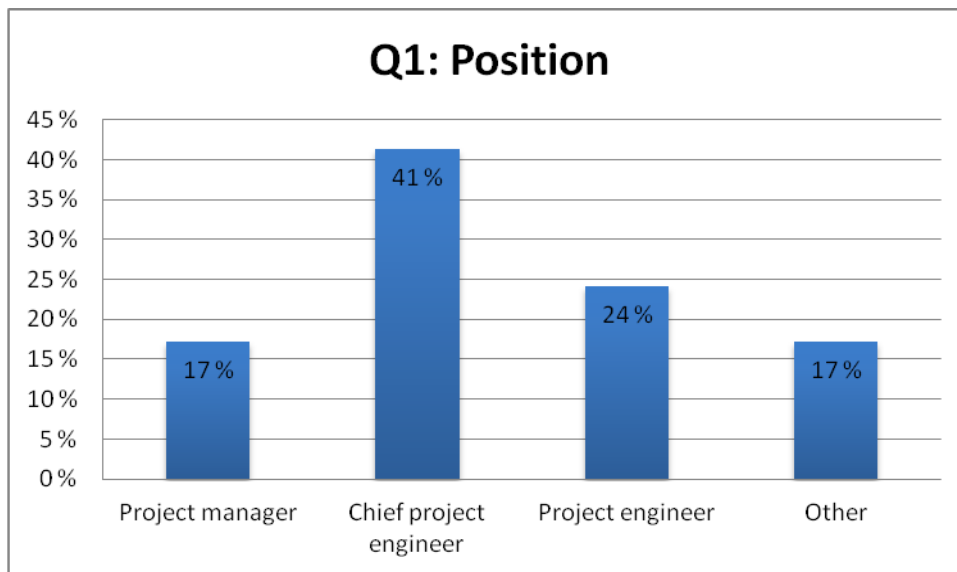


Chart 2: The position of the answerer

Question 2 was simply asking, does the answerer know what is non-conformity. As expected, everyone (100%) replied yes so it is no use to create a chart for that, but the following questions and replies might show that the meaning of the whole process isn't that clear.

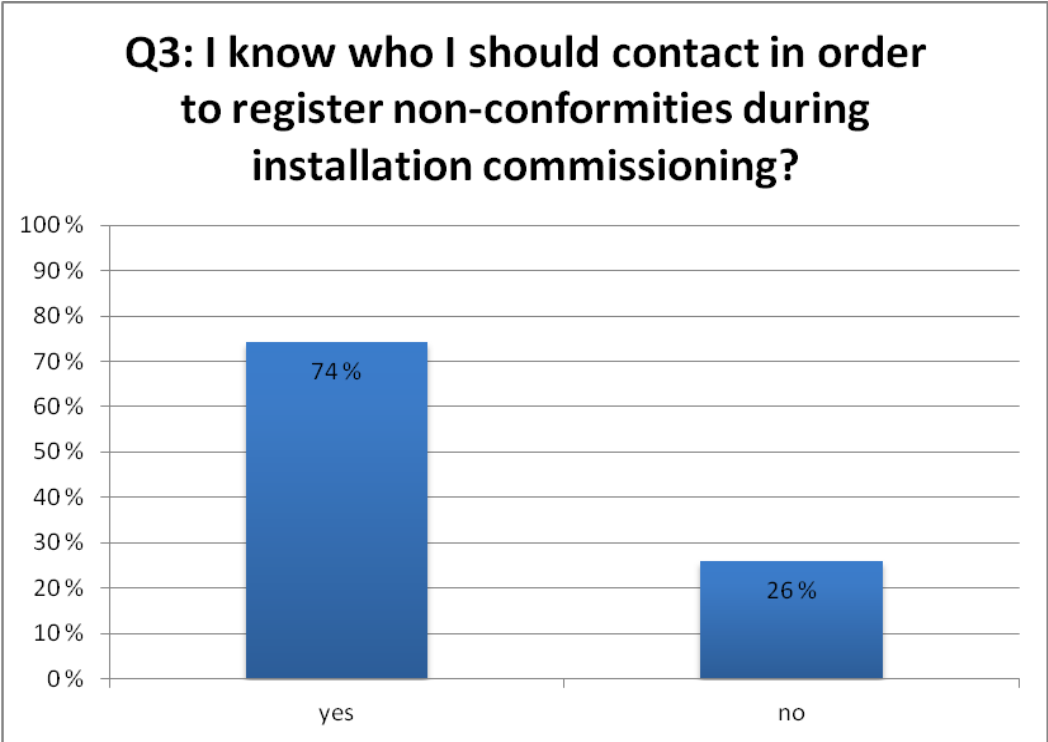


Chart 3: I know who to contact to

Out of those who answered no, 40% were Chief Project Engineers, 33% Project Engineers, 13% Project Managers and 13% were other. According to this, project teams need to be informed who to contact in non-conformity related issues.

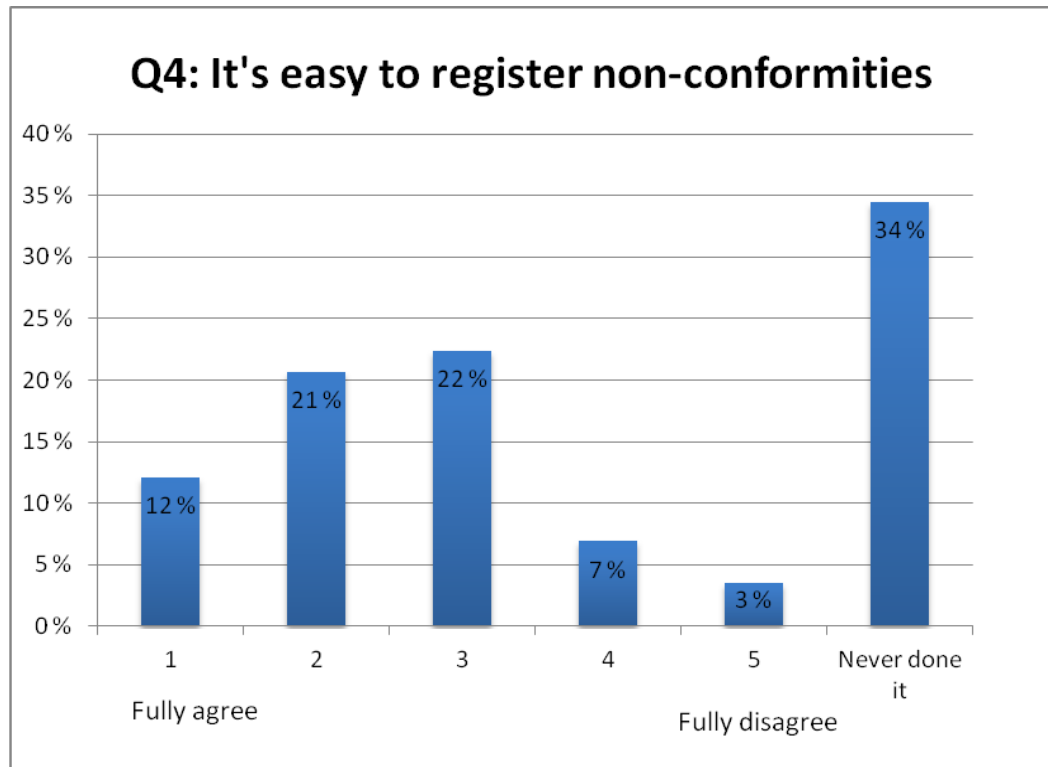


Chart 4: Is registering easy or not

In this question there was a possibility to answer “I’ve never done it”, in case the answerer had never registered non-conformities in SAP. This result is showing that even one third had never done that. Most of them were Project Managers, even 35%. Both Chief Project Engineers and Project Engineers had the same percentage 30%. Only 5% were Other. But these percentages don’t tell the whole truth because the amount of answerers in these groups weren’t the same, so the percentages of never done- answerers in each group had to be calculated. It is shown in the chart below. One had written a comment: “Technically easy, but considered as labourous when issue at hand”.

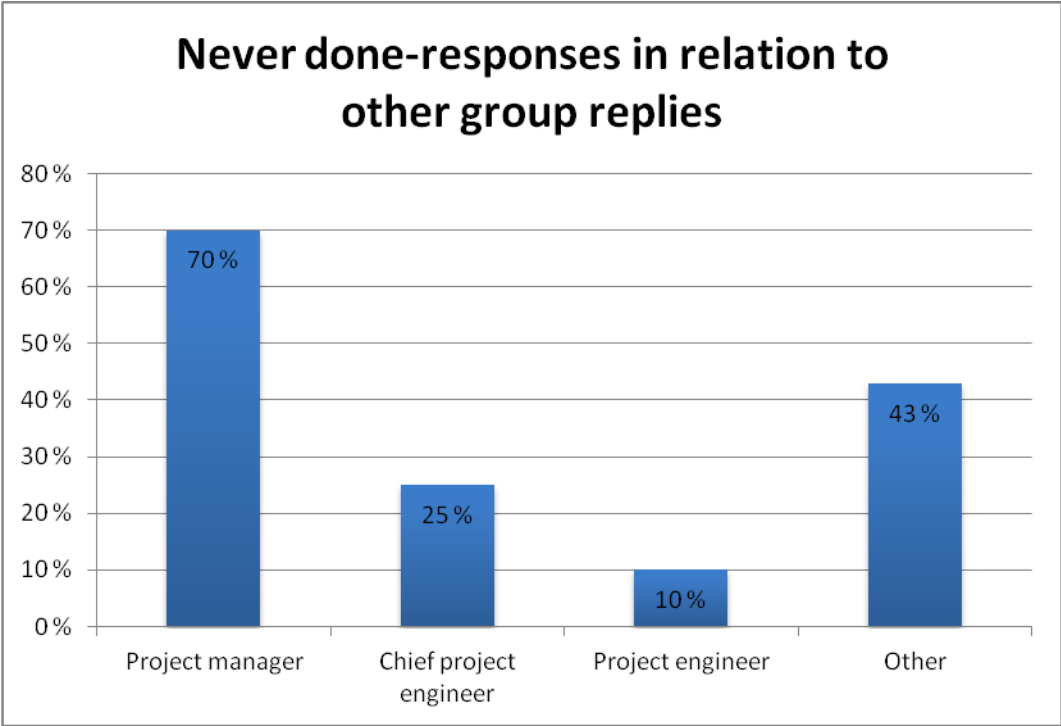


Chart 5: This chart is related to Chart 4. Here is shown how many never done- answerer there were in every group.

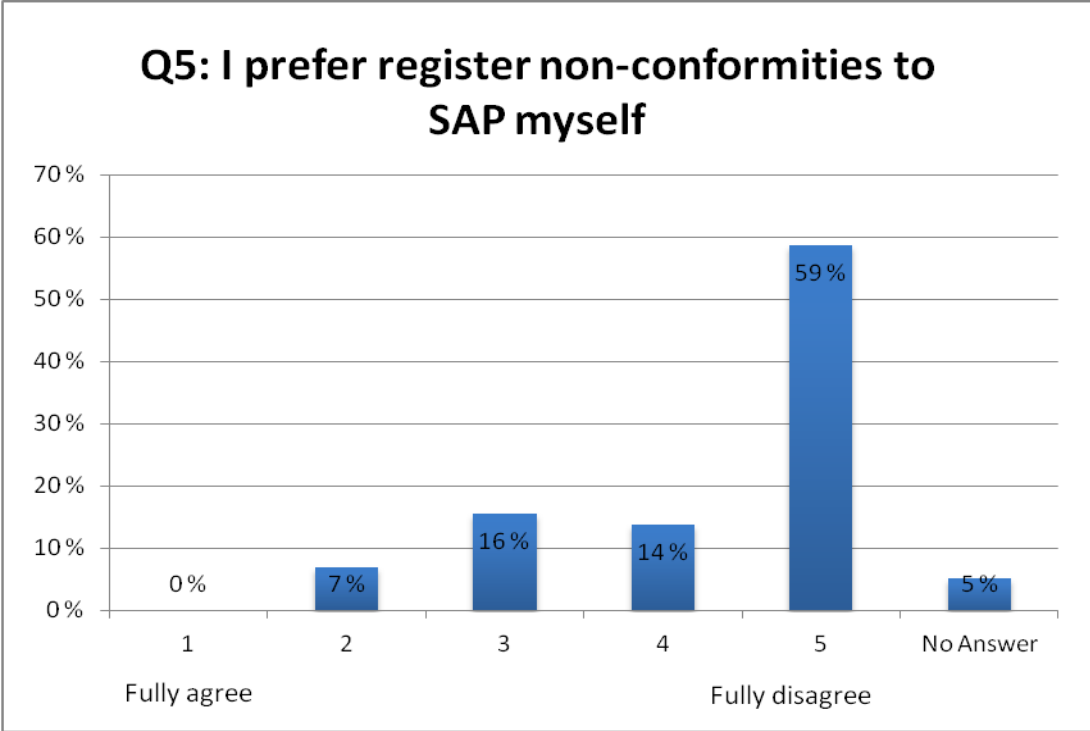


Chart 6: Most of the answerers don't want to register non-conformities themselves.

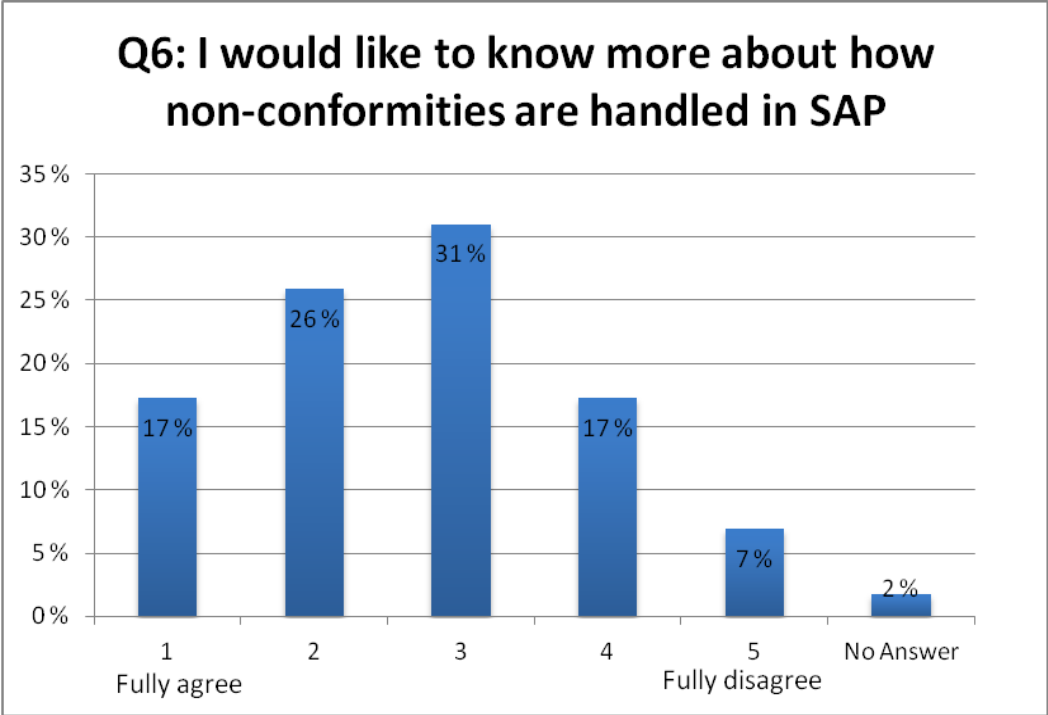


Chart 7: More information about non-conformity related issues is needed.

Project teams seem to have interest to know more about non-conformity handling. Dubiety about the process among the project teams could be a reason to the unwillingness of registering non-conformities.

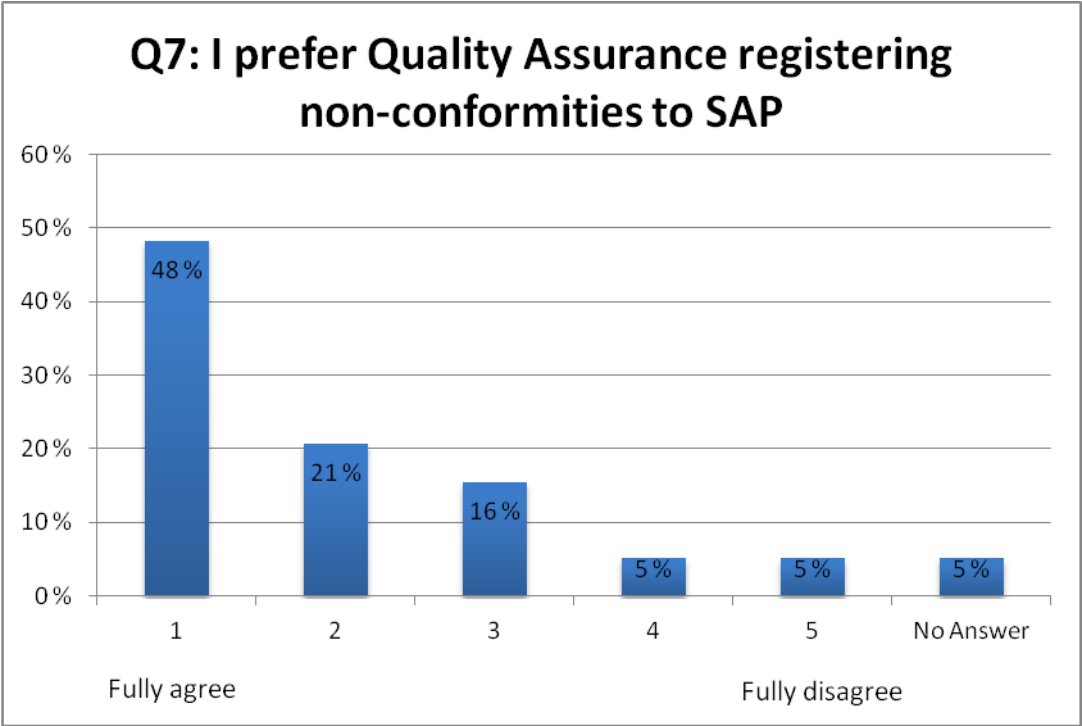


Chart 8: QA is preferred to handle the registering of non-conformities

This question was ensuring that the question 5 was understood. The result is the same. According to Chart 6 and Chart 8 almost every answerer prefers PP Customer Support to take care of registering non-conformities.

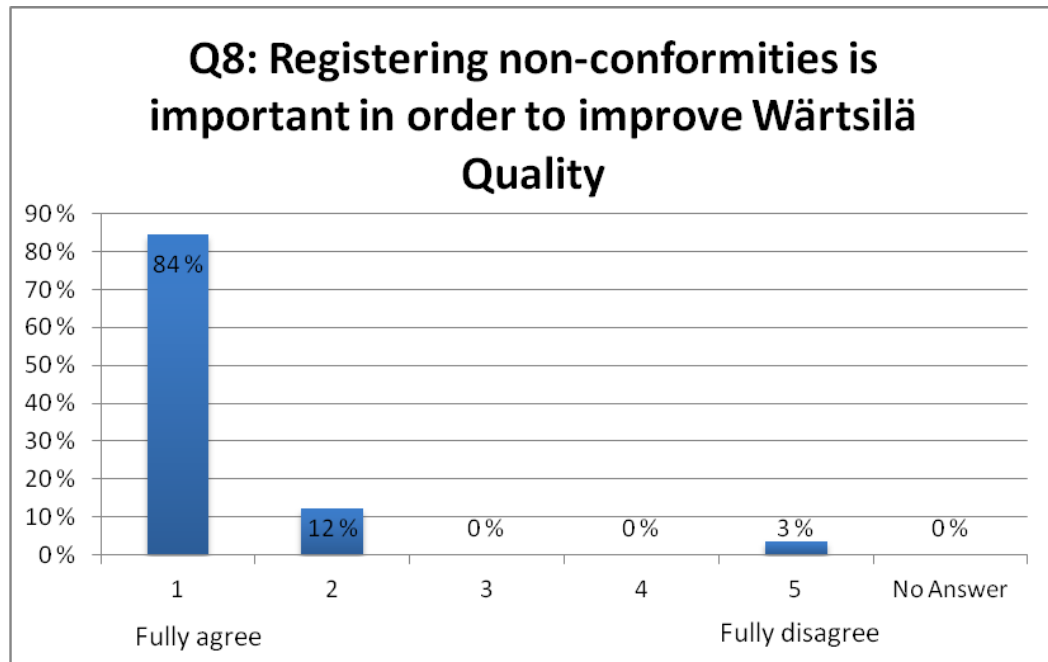


Chart 9: Chart shows how many knows the importance of the process.

Almost everyone is complete about the fact that the non-conformity registering is an important detail in order to improve Wärtsilä Quality. Those few who totally disagreed were Chief Project Engineers, and that is a little odd because they in particular should know the importance.

This result shows how well the importance of the process is known among project teams and now it would seem that the procedure is well-known.

Registering is a way to take a responsibility of quality of Wärtsilä products and service. Registering non-conformities helps to notice the failures keep them under control. It is not unusual to skip that. The reasons for that can vary but it may cause some troubles in the system.

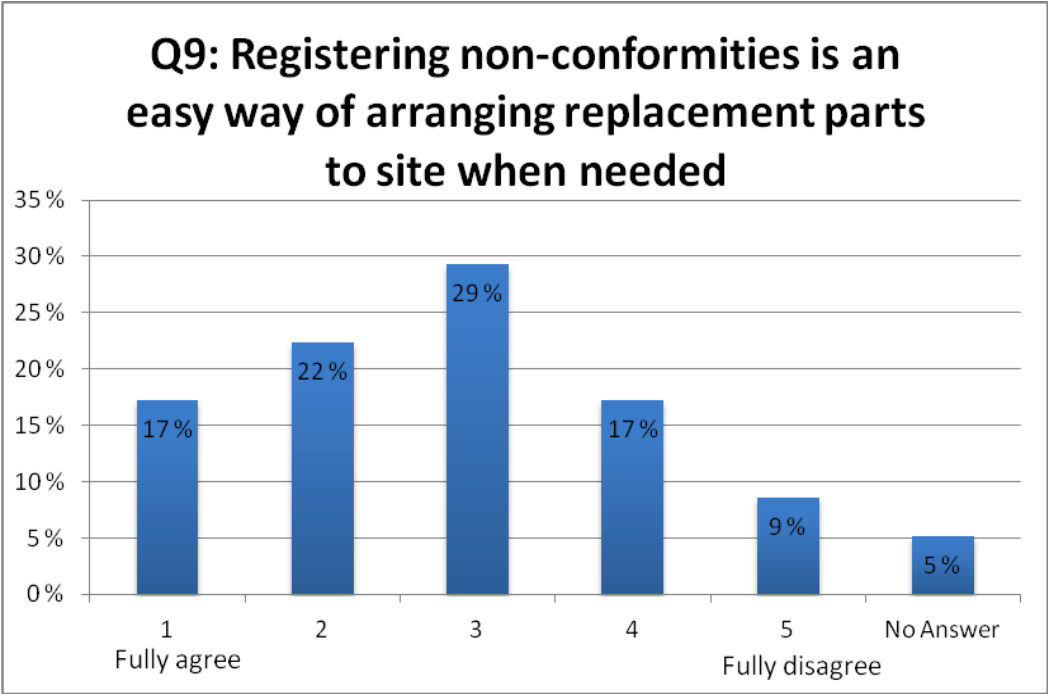


Chart 10: Is registering an easy way to solve the problem

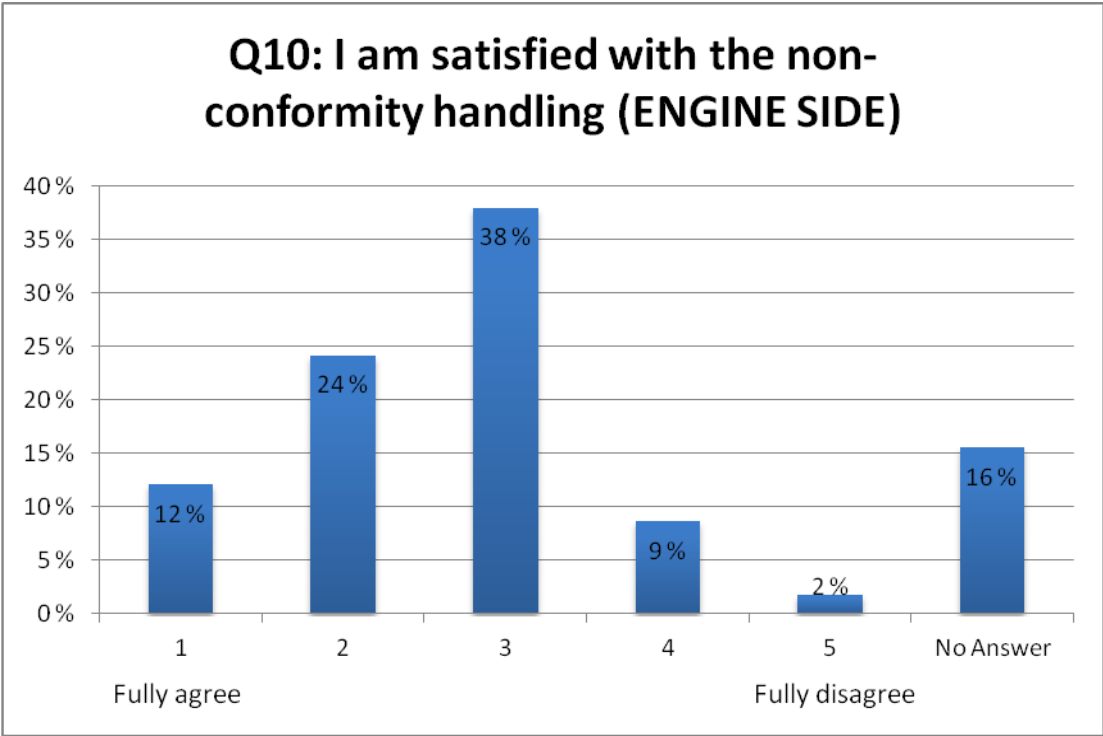


Chart 11: Satisfaction with the engine claim handling

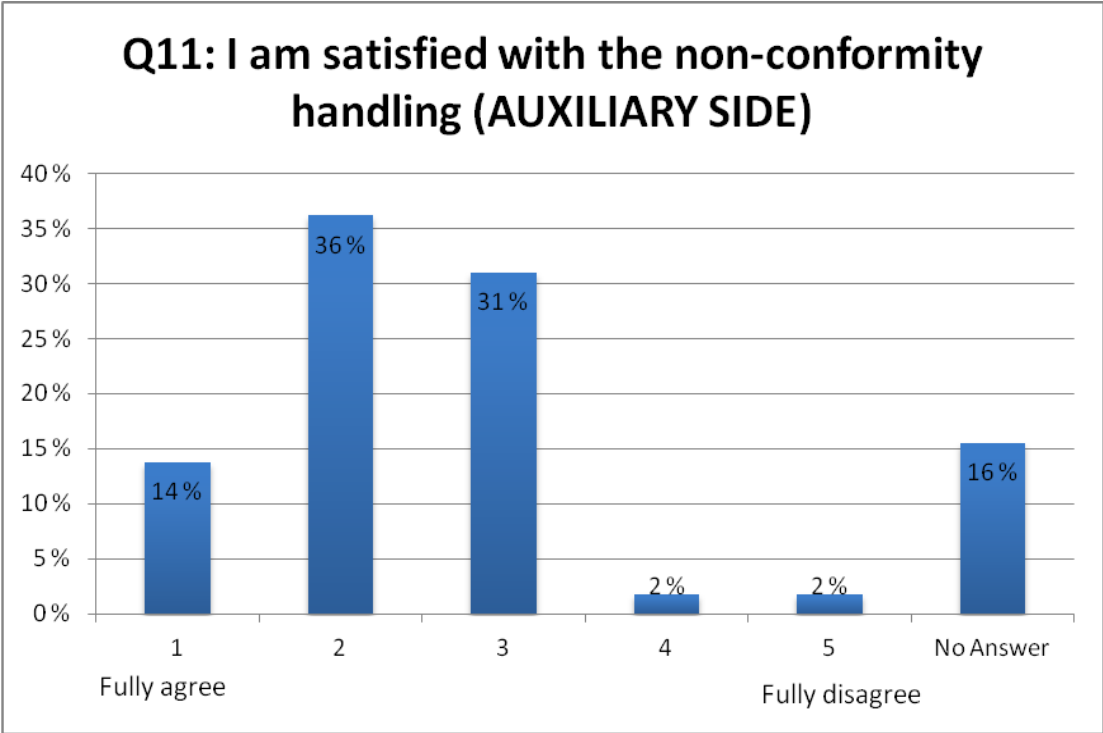


Chart 12: Satisfaction with auxliary claim handling

Question 10 and question 11 were concerned about how satisfied project teams are with the way PP Customer Support handles non-conformities in engine and auxiliary side.

In these two questions were many empty answers, maybe because these questions were on the other side of the paper and if the answerer was busy he maybe didn't remembered to turn it. The other reason could be that they did not want to criticize. Anyhow, most of them gave a nice return. One comment was written too: "Reason for lower score on 10 mainly due to service side. Sometimes it takes very long time to get replacement parts". Criticism focused on the process itself, not people.

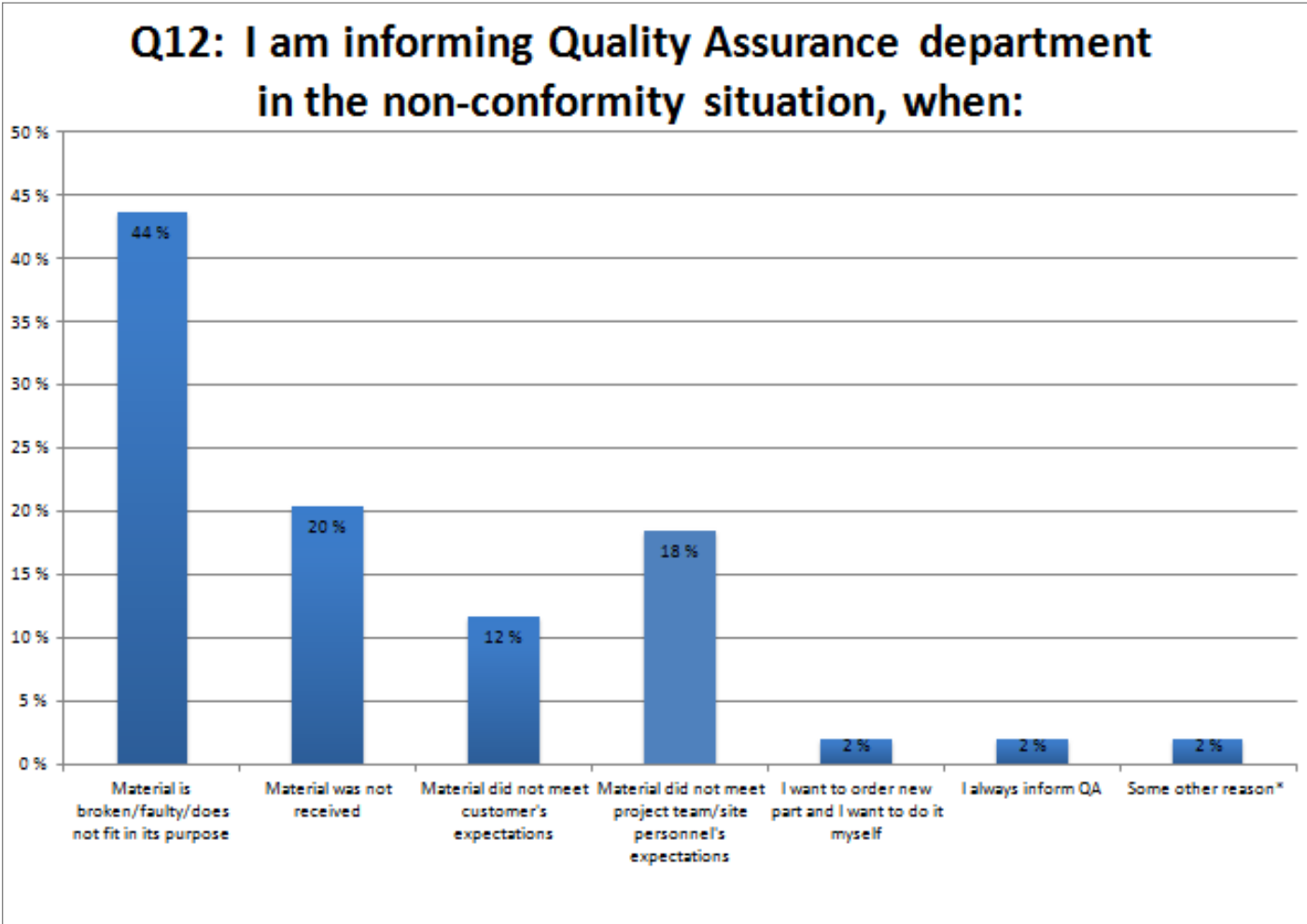


Chart 13: Project teams are registering non-conformities mostly when the material is broken or faulty.

Some other reasons were:

- I'm always informing Quality Assurance when needed and at all times.
- I mostly work with drawings and not with purchase so this is not a big issue in my daily work. Same reason in the question 13.
- I'm instructing project management teams to do so.

Maybe this question wasn't in a right form or the answerer should have been allowed to choose only one reason. However, everyone should have answer "I always inform Quality Assurance".

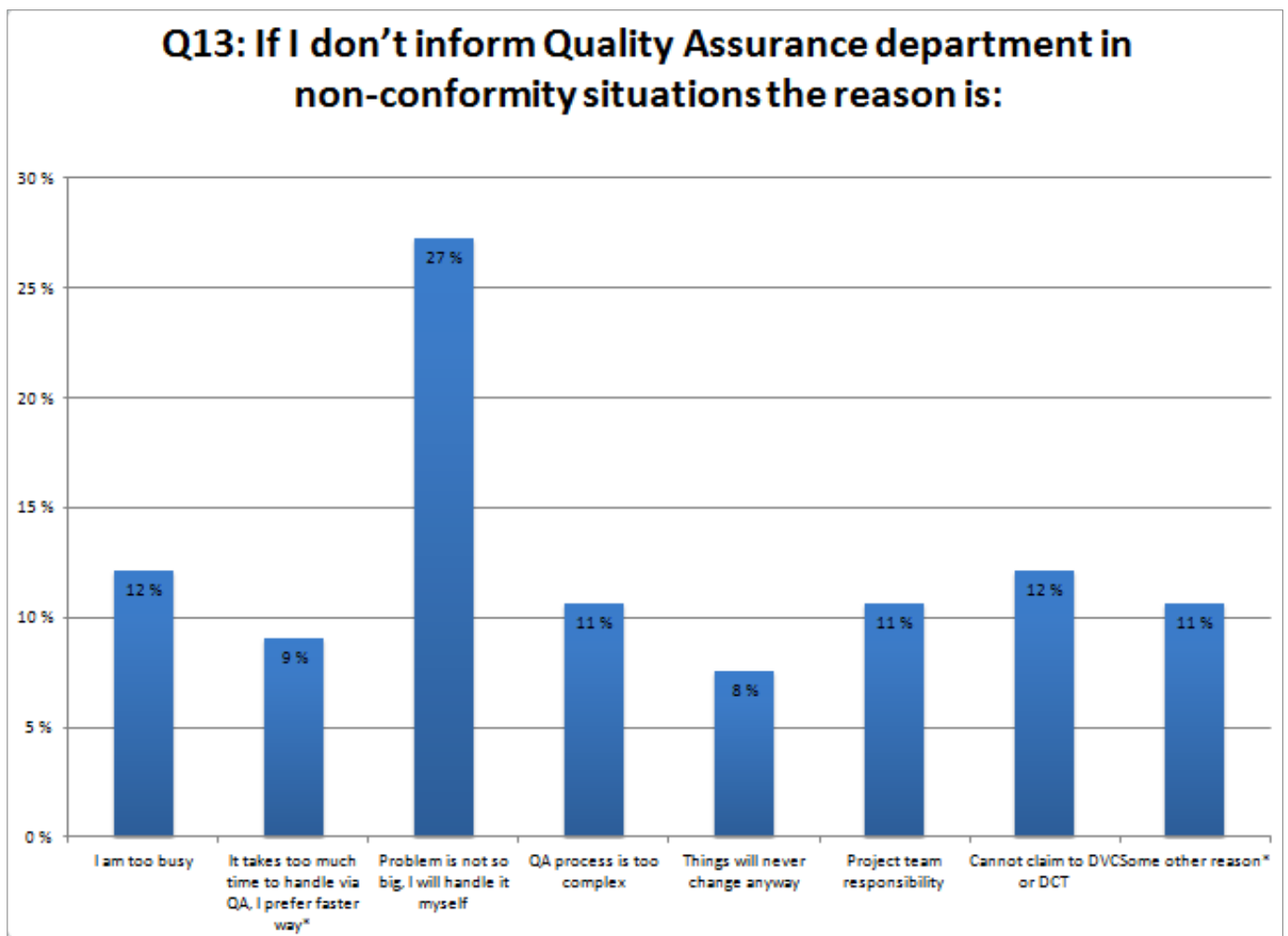


Chart 14: Situations, when the non-conformities are not registered.

Suggested faster ways in question 13:

- Part might be needed at site ASAP (as soon as possible)
- I mostly work with drawings and not purchase so this is not a big issue in my daily work. Same as above on all the rest of the questions.
- Order parts myself and send directly to site

Other reasons why they don't inform Quality Assurance in non-conformity related situations are:

- I do it always when having for doing it
- So far I don't know the procedure
- Design mistake in process outside of the main eq
- I order the parts myself
- Ask supplier if they can send the parts directly
- It is not included in my daily job
- Too little information of non-conformities and what to do when faults come up
- Some parts are easier handled directly with the supplier without any paperwork
- Quality Assurance is only replying the parts but never find a way to solve reason for failure.

The free form questions had also some replies. 30 of 58 ergo 52 % of answerers had written their response and it is shown below.

What would you like Quality Assurance to do more of/less of?

- No change needed.
- Rather than waiting to get information, proactively search customer/project teams about quality problems.
- Give lessons when and how to make the non-conformity.
- Guidance for planning PROJECT QUALITY, also helping to find quality related docs. Being leader in big quality issues (kind of project managers).
- When Quality Assurance is doing claim, it should keep the project team informed of the outcome.
- Coach and train project and site teams. Inform progress of non-conformities, any actions and if yes, what is what are the most issues regarding non-conformity progress. →lessons learned
- Fix root cause.
- Be involved more in project inspections
- So far ok.
- Some more knowledge about different engine types.
- Less fire fighting.
- The problem is sometimes that we need spare parts very urgently during commissioning. Then it might take too much time to go through Quality Assurance.
- For engine related claims if Quality Assurance also book required service personnel along with material, this will be good help.
- I'd like to get better info about good/bad product or supplier or component quality before or at project start, so I avoid problems later on. (For example: engine weak points, strength, black listed suppliers...)
- Keep on easy to read database/list with progress of the non-conformities.
- Discuss more on how is best way to send the parts, maybe better project team to handle sometimes as there might be a predefined process, not as normally done to clear the parts (transport, customs)

What would you like Quality Assurance to do better?

- Challenge in point II is amount of sub suppliers, which make it more complex and time consuming, however the work in WFI-P is done with high quality.
- Some more people might be needed to handle claims. Works good now but projects are increasing in size and numbers.
- Tracking info for parts send, inform if parts are not in stock and follow that up.
- It has been couple of years since I've contacted Quality Assurance last time, but at that time handling time was relatively long. Hope that will/has improved.
- Better info about the handling process, what they can do, when to contact them, etc.
- Proactive, find systematic errors easier.
- Shipment of goods needs to be planned and handled in a better way.
- Get more involved and visible with better results.
- Hands on training to chief project engineers and side personnel.
- You could have pool of quality engineers (like we have for project controllers) who would work with project teams as part of the team.
- Discover and fix root cause.
- So far ok.
- Know more about the engines in order to take some of the investigation load. And better planning of the transportation.
- Follow up of open claims till issue is resolved. This is required.
- CPE: For me I need training to handle non-conformities. Handle time schedule if project Quality Assurance requested.

What do you like most about Quality Assurance?

- Company willingness to improve Quality on long term basis.
- Their can-do attitude.
- Fast response
- It is fast response to request for parts
- They have experience and are SAP experts.
- Good response in the few cases I've been in contact with Quality Assurance.
- It is easy to make claims since Quality Assurance helps to put them into the system.
- Good people to work with.
- Their passion for issues
- Feedback from Quality Assurance about non-conformity situations.
- People.
- They take issues that come to their knowledge seriously.
- Nice persons working there.
- To have experts to be involved in difficult quality cases. To have additional persons to be involved in inspections.
- So far it has been very efficient and easy work with Quality Assurance. I have some experience in marine side and there it was much more complicated.
- The auxiliary side is working well.
- They know who to contact and how to handle the bureaucracy, so it will be right handled.
- Prompt response to the claims. Special thanks for quality engineers.
- Quality Assurance helps me with the non-conformities.
- Easy to contact and things proceed well.
- There are competence inspection managers for my project.

5 SUMMARY AND SUGGESTIONS

This work needed a lot of thinking, discussions and experiments, but the goal is reached. The study unveiled the weaknesses and strengths of the non-conformity process, and also a few ways to improve the process were identified and described.

5.1 Error factors

No matter how well the research is done, there will always be something that may cause mistakes or errors.

People are thinking creatures and everyone thinks in their own way. In this kind of research every answerer considers the content of the survey in their own individual way. Their answers are influenced by their feelings, and often the answerer doesn't know the scientific value of the survey. (Leila Lotti, 1994, pp. 102-103)

In this survey some questions had no answer and that may cause an error. Because the survey was printed on both sides of one paper and at first there was no sign to show that the survey continues, people may not have noticed it. After adding the arrow to the right corner much more surveys were filled in fully. Many of the answerers also had never registered non-conformities before, so they don't know the procedure and couldn't answer.

One thing that really matters is that those who never had done registering were 34% of the whole target group. And some of the rest had done it just a few times. It is hard to say how the process works if you never work with it. One had written that he had never registered non-conformities so he based his answers to what was heard from colleagues. That kind of answers might be more than one.

Haste is always a big uncertainty factor. Wärtsilä project teams which were the target group of this survey may have been busy during the time this study was done and they may have filled the survey quickly without thinking about it too much. Perhaps they were not so interested in it or they didn't find the importance

of it or couldn't find the effectiveness to their work. Maybe they were suspicious that their response would affect anything.

Layout issues are of course an eternal problem. Finding the right way to match up the right questions for the target group isn't easy. If some questions didn't match with the situation of the answerer, he/she may not understand it or find the suitable answer. Also many persons in the project teams have never registered non-conformities themselves, so the questionnaire wasn't perhaps in a right form for them. Or they aren't right people to answer these questions.

These are only speculations but these things need to be considered if Power Plants Customer Support would do this study again to analyze the satisfaction of its customers, that is recommendable.

5.2 Internal customer and PP Customer Support relationship analysis

Communication between Power Plants Customer Support and project teams isn't sufficient right now, but it has already been increased. Improving it the weaknesses of the non-conformity process would decrease. Communication is a skill that can always be improved.

The customers are satisfied if their experiences of the company or organization are good and they feel that their needs and feelings are noticed. Shortly it means that their expectations are exceeded. The internal customers are satisfied when they feel their work has a matter and they know what they are supposed to do. In this case, project teams might think that registering non-conformities is insurmountable hard or they have found better and faster ways to handle the problems, as this research just has shown. The importance of registering non-conformities was well-known, but still in some cases it is not done, even if it should. One aspect is that the importance of registering is known and done when there is enough time but in a hurry it is forgotten and many shortcuts are taken, parts are ordered directly from the supplier etc. Commonly it is thought that the process takes too much time and some problems can be solved faster and without extra work.

Quality of the customer satisfaction is a term that brings a sense of satisfaction from those experiences that one has formed. To improve the quality of its service, Quality Assurance and PP Customer Support need to renew this kind of research frequently. As said before, that is the only way to ensure that the development is going to the right direction. (Timo Rope, Jouni Pöllänen ja Weilin+Göös, 1994)

According to this research it can be seen that the non-conformity process is working well, but there is room for improvement. The communication between the internal customers and Quality Assurance could be increased. By doing that many mistakes and shortcuts in registering non-conformities would be avoided and the right way of working is ensured. Some kind of orientation of how the non-conformities are to be registered and why and also what is the purpose of it is needed, and that is what came up from the response. Moreover, it would be good if things were explained, like what to do in different situations, for example explain what kind of non-conformities should be registered. However, 69 percent of the target group prefers the Quality Assurance/PP Customer Support to register non-conformities for them. Anyhow they all should know that PP Customer Support would do it for them if they just ask. Perhaps focusing the all registering of non-conformities to PP Customer Support would be a reasonable solution. Then the project teams need to be informed only how to act when non-conformities come up from sites, what kind of those need to be registered and then informed to Quality Assurance that will do it and following steps. According to the response Wärtsilä projects will be increasing in size and numbers and more people will be needed to handle non-conformities. That will be necessary also if all the registering is focused on PP Customer Support. Two engineers aren't enough. Next step could also be that this research could be continued. Based on this study, PP Customer Support could improve the non-conformity process together with project teams, so it would satisfy both of them.

Gathering information about internal customer satisfaction is important to do continuously and there are many ways to do that. This kind of bigger research might be good to do again after a certain time, even a year. Giving feedback should be made as simple as possible. Meeting the internal customers is one

alternative but would also be good to create a feedback box. For example creating a short survey with a few simple questions and leaving it to everyone that are included in target group. The replies could be left to a feedback box that is left on the office and emptied after certain times. Again using email wouldn't be such a good idea because of the amount of emails people get every day. Project teams asked more communication, discussions and information about non-conformity issues.

The working atmosphere in Wärtsilä is encouraging and caring. Wärtsilä wants to listen and take care of its people and it is seen as personal development discussions and good social interaction. People are friendly to each other. The blames that came up during this study focused mainly on the process itself, not the engineers who work at Power Plants Customer Support. Some said the process is too slow and includes too much paper work. The Customer Support engineers were told to be nice and professional in their work. Fast response and help with non-conformity issues have made a good impression. The biggest issue seems to be the time. The non-conformity process doesn't work so fast and easily than project teams wish, but that is not Quality Assurances decision.

(Timo Rope, 1994)

5.3 Final conclusions

Internal customer satisfaction is important for the non-conformity handling process. Currently the process is working quite well but could be improved that there wouldn't be any shortcuts without telling that to the Customer Support. For now, it is very rare that non-conformity has been filed even if it doesn't need following action, replacement part or service. Quality Assurance needs to be in contact to its internal customers and also share more information about non-conformities. Project teams wanted some introduction about non-conformity handling. They want to know what happens to the non-conformities they register if anything ever happens. They also suggested that more engineers involved to the handling process would help and expedite it. Continuously done customer

satisfaction analyzes maintain the knowledge about satisfaction and help to find out if there is something to be improved.

This work has been really interesting. Special thanks go to Power Plants Customer Support team, which has been very helpful with this work. Thanks to the teachers and to the personnel of Wärtsilä who took part in the research. Thanks go also to my family and the Power Plants Auxiliary Technology team, which have been very supporting from the beginning to the end.

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7 APPENDICES

Internal Customer Satisfaction survey