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Redesigning the Warranty Return Process

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Abstract

This final thesis deals with designing a warranty return process for an industrial technology company. The aim of this project was to provide Avant Tecno Oy with a working system for handling parts which will be sent back for warranty returns. The benefits of a working warranty return process would be decreased excess costs from money lost due to faulty parts being replaced directly without any returns from warranty.

The method for creating this process included assessing the needs of the company when it comes to warranty returns, interviewing people in contact with warranty returns, and designing a process which will work in the given environment. This background information provided the possibility to construct a warranty return process which: conforms with the existing related processes in the company, patches the monetary leak caused by lost warranties, and is adjustable to any future organizational or production changes.

At the time of writing the result of this project is that there is now a working warranty return process, and it is adjustable to any future needs. The cost savings are not measurable as of yet, but viewing the current functionality/usability of the warranty return process it can be assumed that improvement will be seen.

As a conclusion it can be said that a proper warranty return process simplifies product returns by a large margin, and planned properly it will lead to cost efficiency in one sector. In addition, designing a successful warranty return process is fundamentally based on familiarity of the target company in order to maximize its integration into the existing process flows. The problem that remained after the completed warranty return process was that there was no guarantee that employees would stick to the guided process.

Keywords Warranty, process design, reverse logistics, supply chain management

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1. Introduction

As a company begins to grow considerably in size the requirements for process planning grow as well. Even simple processes are now completed in such large quantities that micromanaging them is not an option; i.e. a manager cannot follow each single process through, and instead there must be a properly designed and set process guideline. These processes are then able to run according to routine and managers do not have to be concerned with them anymore on a daily basis.

As these larger company proportions are reached, properly planned processes are a key success factor in increasing efficiency and reducing costs in a company. The aim of these planned processes is to enable tasks to be completed in a fashion which is as simple as possible while still meeting the requirements of the company and other related processes and/or tasks.

Designing a successful process requires that all parts of the process are properly identified and this is followed by placing these parts along with their specific requirements into a logical process order. This logical process order then forms a streamlined and planned process which reduces the burden of the process on the company.

The above is also applicable to designing a successful warranty return process. Designing a successful warranty return process requires that the people involved in the warranty returns process are identified, and these individuals' needs in terms of information are met. In addition the warehousing involved and the factors affecting this warehousing must be identified. Finally, the warranty return process must provide the information required by suppliers in order for warranty reimbursements to be made.

The above factors combined are used to create a warranty return process which provides all the necessary information required, is high in terms of simplicity, and flows in the existing work processes.

The company for this thesis was chosen based on previous work experience in the company; having worked in the company for years provides a much clearer direction for any work to be done. Especially when designing a process such as a warranty return process, familiarity with the personnel and current activities removes many obstacles which might hinder or even cover certain key factors which affect the design process. The topic for this thesis, i.e. the target of the design work, was provided by the production manager of the company in question.

2. Supply Chain Management and Reverse Logistics

2.1 Supply Chain Management

Supply Chain Management is defined as the following:

> *Supply Chain Management is the process of planning, organizing, and controlling the flow of materials and services from suppliers to end users/customers. This integrated approach incorporates suppliers, supply management, integrated logistics, and operations.* (Bloomberg, LeMay & Hanna. 2002, 1.)

Supply Chain Management is the base of efficient and effective business when it comes to a wide variety of industries. Designing any new process requires that Supply Chain Management is harnessed properly to be able to see through a process with optimal results, and this is because Supply Chain Management clarifies the main components for a successful operation.

Logistics is encompassed by Supply Chain Management and is defined in its simplest terms as aiming to transport the correct goods to the destination according to a given timetable, while still keeping costs as low as possible without loss in quality or service to the client. (Ritvanen & Koivisto 2006, 14.)

Logistics is a large component of a business operating in the metal industry as there are thousands of parts moving back and forth in the Supply Chain. Supply Chain Management defines what mechanics must be identified in order to reach efficiency, and often the goal is lean logistics. Lean logistics refers to:

> *[Lean logistics refers to] the superior ability to design and administer systems to control movement and geographical positioning of raw materials, work-in-process, and finished inventories at the lowest total cost.* (Bowersox, Closs & Cooper 2002, 32.)

The above statement states in short what most processes in a metal industry company are geared towards, and the case of a warranty return process is no different. The sending and receiving of warranty parts, and the warehousing of these parts, are both molded to be as light on workforce and logistics costs as possible.

Supply Chain Management also defines the basic idea of warehousing, and the lack of his basic idea is enough to cause a process in the company to fail which leads to numerous problems. Warranty returns follow the same basic routine (Coyle, Bardi, Langley 2003, 300) as any incoming item to a warehouse, especially the put-away phase show in Figure 1:

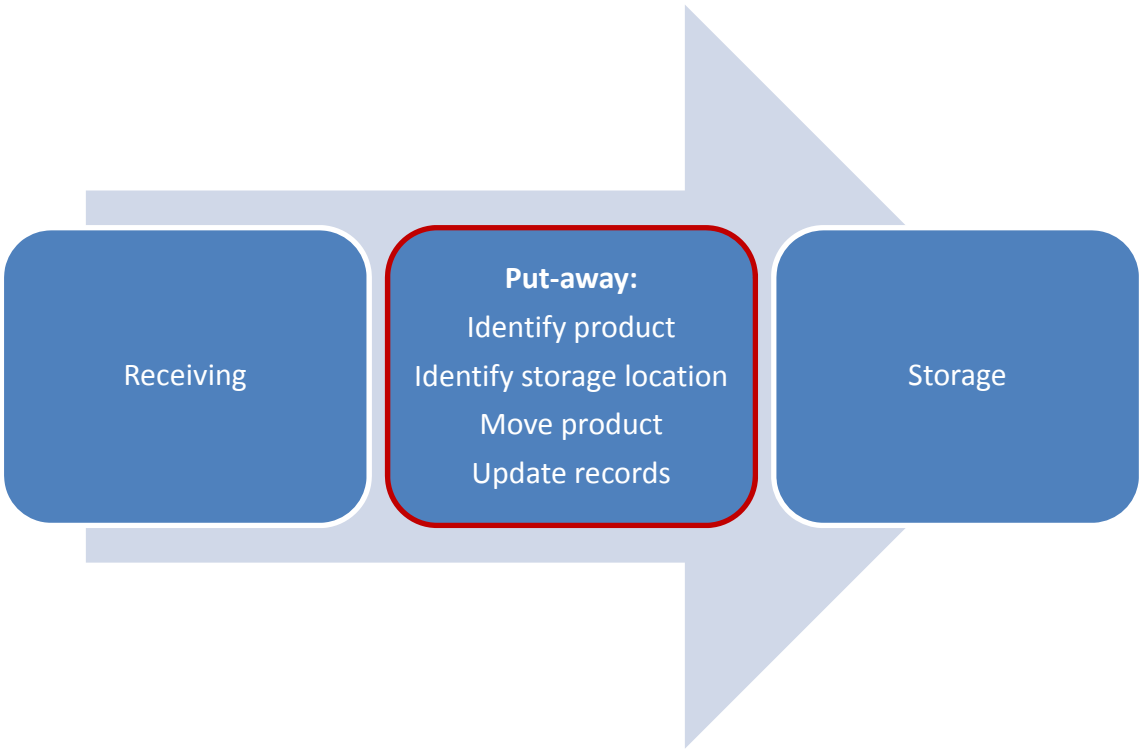

Figure 1: Basic warehousing, put-away

The very basic put-away task shown above when skipped during the receiving of an item can have unfavorable consequences. In a warranty return case the information about the item is very specific, unlike a generic part for production, and not recording the item will likely lead to information loss at a later point in time. In the warranty return process this means there will be no warranty reimbursement as the supplier will not receive all necessary information they require.

Another aid from Supply Chain Management is the concept of safety stock, i.e. stock which is held in case of surprises which also includes sending parts to existing clients because they have a faulty part. If there is no information on previous warranty returns there is also no forecast on the possible weekly/monthly/yearly quantities of parts that must be reserved for machine servicing. The concept of a safety stock in the case of a warranty return process emphasizes the importance of proper warranty return documentation. However, when there is knowledge of previous warranty return quantities it is possible to reduce safety stock and simply add these quantities to regular orders, because:

> *[It is important to take] a more proactive approach to reduce uncertainty, using the power of information to reduce uncertainty and, consequently, the need for safety stock.* (Coyle, Bardi, Langely 2003, 194)

Safety stock is always more inventory cost, and cutting safety stock leads back to the basic idea of lean logistics where costs are cut and efficiency is sought after.

Supply Chain Management provide the designing of a warranty return process tools with the basic ideas that ensure an efficient outcome; considering lean logistics, basic warehousing ideology and safety stock aid in the design process. Especially the put-away phase of warehousing where documentation of arrived warranty parts is recorded has a possibly large impact on company actions later on; having the information of defective parts collected properly can allow for supplier reselection or improvement later on:

> *Reporting this kind of information, both to management and the suppliers management, is one major source of added value contributed by the buyer. That concludes the cycle, because this information can be used in a subsequent purchasing cycle to assemble the "bidders short list" for future projects and contracts. In this way the company learns to work with suppliers with proven capabilities. When companies learn to work this way, this usually results in a reduction of the supplier base. Companies, then, will gradually concentrate their business among fewer but more capable suppliers.* (van Weele 2002, 69)

In addition to improving process efficiency and reaching the process goal, the application of the Supply Chain Management in warehousing, product documentation, and production/procurement planning can lead to either communicating with the supplier to improve their products or it can allow a company to notice that a specific part from a supplier has a too high fail rate resulting in the changing of supplier.

Supply Chain Management encompasses a large variety of techniques, one is ABC analysis.

ABC analysis is on option of categorizing shelving; ABC analysis involves placing inventory into three categories of importance. The basic idea is that items of category "A" have a value of 80% but quantity of 20%, items of category "B" have a value of 15% but quantity of 30%, and items of category "C" have a value of 5% but a quantity of 50%. This categorization enables inventory costs to be identified so that the overall

inventory carrying costs do not get out of hand. (Krajewksi, Ritzman & Malhotra 2007, 469)

This is illustrated below in Table 1:

Table 1 – ABC Analysis

	Category		
	A	**B**	**C**
Value	80%	15%	5%
Quantity	20%	30%	50%

Simply, ABC analysis can allow for the categorization of items by value in relation to quantity which in turn helps determine the amount of shelf space given to each item category.

2.2 Reverse Logistics

Reverse logistics refers to the flow of goods in the opposite direction in comparison to standard logistics channels, for example from the customer back to the producer. Reverse logistics creates entirely new problems in a company's product flows as often it is necessary for the returning goods to use alternative channels of transport, and this often leads to new costs and increased requirements for coordination. (Bloomberg, LeMay & Hanna 2002, 61.)

Reverse logistics is a very important part in designing the warranty return process, and this is because the logistics involved in going back up the supply chain is very costly. It is hence very important to increase efficiency in this sector.

Examining reverse logistics also forces a company to look more closely at its warranty return policies. After examination of reverse logistics costs it is necessary to make sure that clients understand the limits of warranty, otherwise they will send a part which has an expired warranty yet the company will most likely end up paying the logistics costs anyway to keep their client satisfied. As quoted below:

> *It is frequently unclear whether a defective product can be taken back and repaired on the basis of the warranty or whether the time frame of the warranty is no longer valid. In the latter case the customer must pay for the repair and other services. In practice, the resulting effort for services*

> *and material is frequently credited internally to satisfy the customer with regard to future business.* (Wolfram & Montanus 2006, 1.)

The above quote describes well what a company might resort to especially if there is a lot of after sales taking place after an initial sale to a customers. Clarifying to customers early on the limitations of warranties can reduce the need a company feels to reimburse regardless of void warranty.

Reverse logistics also sets guidelines as to what logistical carriers are used to send products back for warranty. A company may choose to use one of the carriers they always use, or in some cases it is even possible to send back items in the delivery that just arrived from the respective supplier. Although the option of using the same delivery is only possible for domestic transportation since international transportation vehicles usually go through logistics centers where they might be sent to a completely different direction; it is however possible that some cost is saved from not having to order a separate transportation for the items to get to the carrier company's logistical center.

Figure 2 below demonstrates the above possibility, where item "A" is sent back to the supplier.

Figure 2: Item "A" sent back to supplier

The above situation will save time, and money, in regards to organizing a separate delivery for item "A" to be returned to the supplier for warranty returns.

Warehousing related to the warranty return process is also part of reverse logistics, and here guidelines must be set for warehousing. The design of handling warranty return items must be efficient and take as time as possible from the employee who has some other main task in the company. The amounts of items for warranty are relatively small compared to production items, and there is no single employee responsible for warehousing these items; the warehousing is carried out by the person who first comes into contact with the warranty return item, and hence it is important that the process does not hinder their usual work.

Reverse logistics in the case of this warranty return process design will aid in setting guidelines on how warranty return items must be handled and sent so that warranty reimbursement claims can be completed efficiently. Also, reverse logistics will fortify the idea that warranty limitations must be well communicated to client since reverse logistics emphasizes the costs of the process. Reverse logistics also provides the grounds for set methods for clients when returning items to Avant Tecno Oy.

3. Warranty Return Process at Avant Tecno Oy

Avant Tecno Oy is an industrial technology company based in Ylöjärvi, Finland, which designs and produces small loaders (under 2,000kg), machines used for various construction and landscaping work. Avant Tecno Oy is the world leading manufacturer of small loaders, and they are widely recognized with various awards.

Avant Tecno Oy was founded in 1991 and since then they have produced over 25,000 small loaders and many fold that many attachments for them. All activities – marketing, product development, production, and sales – are done from Ylöjärvi; however Avant Tecno Oy has sales offices in the Germany and the UK. Currently Avant Tecno Oy employs approximately 140 people, the majority of which work in production. The company can be departmentalized into finance/accounting, procurement, sales, production management, research & development, after sales, and production. Production can be further cut down into metal works, assembly, painting, and servicing. Production management is also divided into metal works management, assembly/painting management, and general production management.

Avant Tecno Oy is a very international company, in the sense that they have sold machines to over 40 countries and 75% of their sales come from abroad. Avant Tecno Oy has numerous supplies in foreign countries, and this is one of the reasons that they require a working warranty return process. It is very important that any defective parts that Avant Tecno Oy receives from clients or notices during production are properly recorded and sent back to suppliers.

During the past few years Avant Tecno Oy has been growing rapidly, and this has the company facing challenges in designing new process and redesigning old processes in order to increase efficiency and cut down costs that have resulted from the growth. This growth stage in the company’s life also leads to the creation of this thesis work.

This final thesis is an account of designing a warranty return process for Avant Tecno Oy. They have a very significant number of parts every year that need to be returned for

warranty, and without a system for warranty return the parts may never be reimbursed; this is of course a very large cost for Avant Tecno Oy.

3.1 Initial situation at Avant Tecno Oy

The initial situation at Avant Tecno Oy in regards to their warranty return process was poor. There were a large number of missing parts in the process that left gaps in information flow and generally hindered the process to a degree that caused actual halts in the flow of the warranty parts back to the supplier. There was no guideline for clients who send their broken parts for warranty returns; so a client would sent parts back as they see fit with whatever information they happened to attach to the part. The lack of information that accompanied the item presented the largest problem; a lot of extra work time would be spent calling the client to ask what machine it originated from and what symptoms the machine had shown when the part failed.

There was no actual process for handling warranty returns, and after a part would arrive from a client the part would be left without handling until someone decided it was time to document them and send them forward. This of course leads to a situation where there are possibly hundreds of returned parts lying around with no idea as to where some of their originated from, and no idea as to their defect or the symptoms shown by the machine before the failure. The problem here is that the process of handling the items later becomes very complicated, and it takes a lot time since the item must be examined for its defect in addition to finding out where it came from. This unknown origin and/or defect in turn lead to the item not having grounds for receiving warranty reimbursement.

There already existed rules and terms as to warranty times, and there were already warranty claim documents. The missing part here were the documents which are filled to document and archive each item on arrival, and such a document is the key to ensuring that parts can be submitted for reimbursement; it is also beneficial for Avant Tecno Oy to have some archive of all warranty return parts with all necessary information.

Avant Tecno Oy also lacked a specified section of the warehouse reserved for warranty return parts. This resulted in warranty return parts being placed wherever there was convenient space at the time, and this eventually led to warranty return parts being forgotten wherever they were from which they might simply end up in metal trash. Also, no central location for the parts means that warehouse space is not optimized; a

pallet of warranty return parts in a random location of the warehouse will leads to parts being meant to be there not having that space available and this in turn leads to those parts being fragmented elsewhere as well.

Finally there were no guides as to when parts should be sent to suppliers for warranty reimbursements. Parts would be sent when someone happened to bring up the issue, there was no actual system implemented here.

Warehousing is one of the important aspects related to reverse logistics in the case of Avant Tecno Oy's warranty return process, as said in the following quote:

> *Warehousing plays a key role in performing reverse logistics. Most of the physical work related to product recall, reclamation, and disposal of overstock and damaged inventory is performed at warehouses.* (Bowersox, Closs, & Cooper 2002, 387.)

The above quote describes very well the problems caused by lack of a set warranty return process at Avant Tecno Oy; without set guidelines items for warranty return would pile up and then the work required for organizing them and sending them forward would take a lot of working hours. A working warranty return process would result in items being warehoused immediately on arrival, and doing so takes very little time and items are easily tracked and archived when the origin is still in close memory.

Also, another problem as was mentioned on page 7 was loyalty to customers when products keep making profit even after they are sold, and this is due to the attachments that can be sold for them. Hence, Avant Tecno Oy will very often be quite lenient in their warranty return policies. If customers are told about warranty limitations well in advance however, then the shock of not being able to file a warranty claim will have less impact on the client and ultimately further business with Avant Tecno Oy.

The problem at Avant Tecno Oy was an unclear warranty return process. There were no specific instructions for clients sending items for warranty, i.e. what information to attach to items being sent back.

There was also no specified action taken on arrival of returned part, which leads to a gradual increase of defective parts until the task became very heavy and time-consuming. There was also no documentation to be filled for archiving part details which leads to loss of part information; lack of part information also makes it difficult to follow warranty history.

Avant Tecno Oy didn’t have specified points in time when to send forward parts for warranty reimbursement, and there was no set system for sending parts forward to suppliers.

There was also lacked a specified location in the warehouse for warranty parts, so parts were placed wherever convenient at the time. This of course leads to the fragmentation of sections of the warehouse meant for other parts in addition to making the locating of warranty return parts more difficult.

The situation required filling in holes all around the existing parts, and patching the below points would allow for the creation of a working warranty return process:

- Guideline for clients regarding warranty returns
- Creation of guideline for handling incoming returned part
- Form to be filled in regards to the incoming part
- Warehouse section for warranty return items
- Guides about sending items forward to suppliers for warranty reimbursement

3.2 The design process

The first stage in designing the warranty return process involved interviewing all the people who were either connected to the process or had some knowledge about how it should work.

The initial questions were basic but they would provide strong anchor points from which to begin process design.

1. How warranties are currently handled?

What kind of documentation was currently used with returned parts and what information is required to properly archive warranty return information. In addition what information is required to receive reimbursement from the supplier? These answers would determine how the form to document warranty parts should be structured.

Warehousing, how much space can be allocated for warranty return parts? Answering this question sets limitations of the possible sections of the warehouse that could be reserved for warranty return parts.

Sending, what carriers are can be used and how the sending process should be completed? The carriers that can be used, or types of carriers, determine the content and structure of the guidelines for handling warranty parts.

The above questions would answer the needs of the process design, and then production managers and service/after sales manager could be interviewed to find the answers. They also had ideas on how they would envision the warranty return process.

The managers suggested that guides were to be placed in the warehouse for the employees to read on the spot as to how they should handle a warranty part that arrived.

- How to fill the warranty return form
- Where to take the warranty part

Guides to be created for clients so that there is no need to ask Avant Tecno Oy what to do with an item.

- How to proceed with warranty claims as a client

The managers also had ideas in regards to the warehousing / logistics of the actual shelving of the arrived warranty return parts.

- Parts should have a specified section in the warehouse with clearly labeled shelving
- Which items should have shelf space, and to what degree
  - The managers' had a general idea of what quantities of item categories usually arrive for warranty returns

Based on the above information received from personnel the next stage of the process design could be started.

The second stage was to lay down a map of the process as it should be, and this was based on the type of company Avant Tecno Oy is and what the personnel input was in stage 1.

Laying out the process allows the creation of the necessary functions to have a working warranty return process. The layout is determined by the inputs and outputs that are included in the entire process. The layout can be seen in figure 3 below:

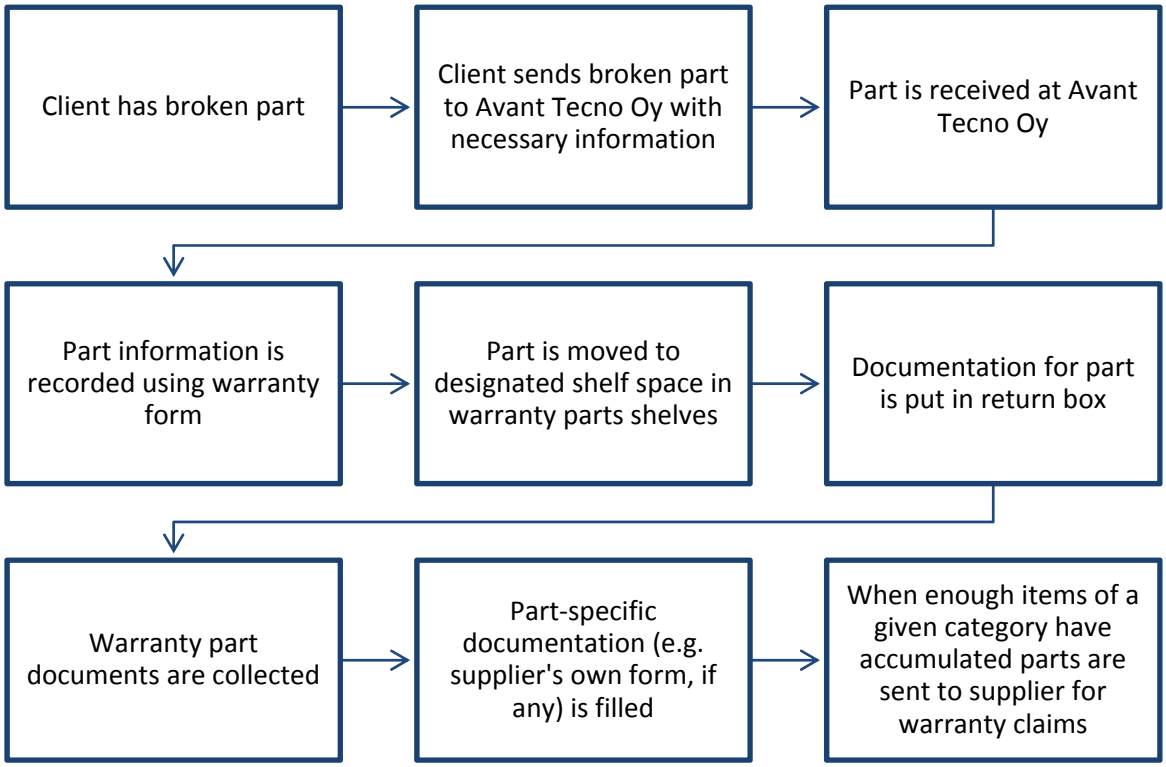

Figure 3: Process layout

Based on the above process layout while using the personnel input the missing functions can then be created.

There were the following missing functions in the process which had to be created, show in figure 4 below:

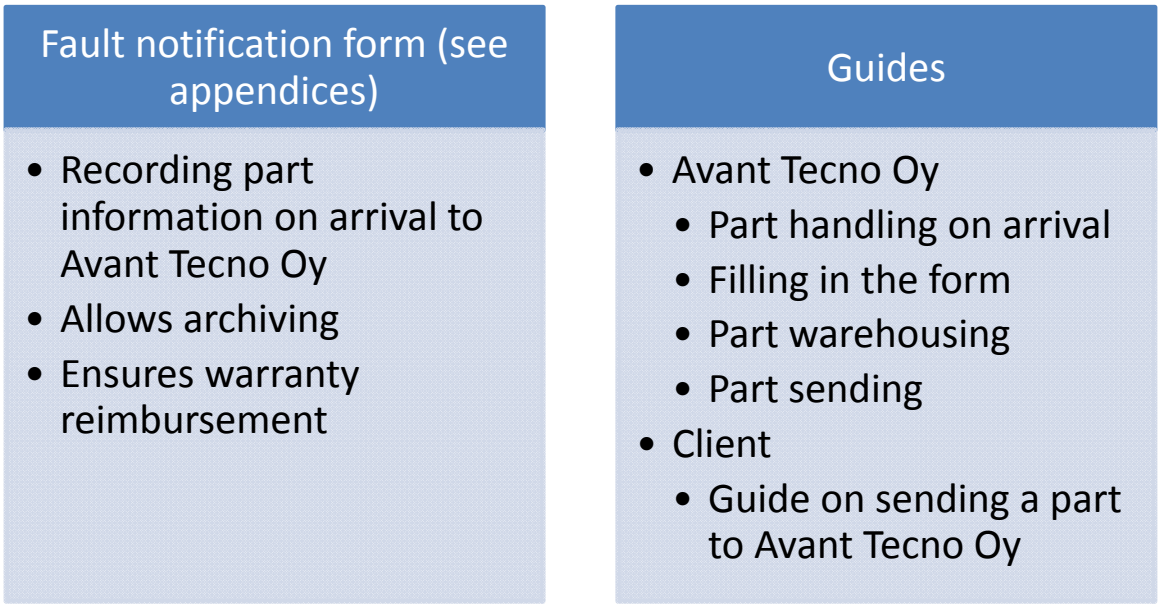

Figure 4: Parts of the warranty return process to be created

The creation of the form used for warranty part returns had to be done first, this is because the guides would be based on the information required by the form. The form in turn is dependent on what the personnel said a warranty item's information should include.

The personnel provided information as to what the information the items require:

- Date
- Machine type
- Machine serial number
- Who found the fault
- Who sent the part
- Is the part from the assembly line
- The category of the part
    - with a description of the exact part type
- Avant product number (different from part serial number set by manufacturer)
- Part fault description

The above information was enough to allow for warranty claims, and if all this information was recorded whenever an item arrived for warranty there would be no problems when filing for the claim from the supplier.

With the completion of the form the guides could then be written. These guides would be the warranty return process explained for each of the responsible individuals.

The first guide was for clients who are sending the items to Avant Tecno Oy, and it included:

- What information to attach to the item
    - Origin
    - Machine ID
    - Problem, if known
- How to send the item

In other words, the guide simply stated that the part should be packaged properly, where it should be sent, and what information was required to be sent with it as listed above.

The second guide is a general guide for Avant Tecno Oy in regards to the warranty return process, i.e. how it should be handled from beginning to end. The part should be dissembled if required because the manufacturer doesn't want all the nuts and bolts that Avant has attached to it. The part should be taken to the return location in the warehouse, and here the fault notification form should be filled in with all required information. The part should then be shelved properly in a designated pallet, and finally the form should be returned to a form return box.

The third and final guide handled the filling of the form, and it stated the filling of the form step by step with all possible exceptions and what information is required and in what circumstance.

The above guides combined ensure that a part sent for warranty claims is handled properly from beginning to end.

In addition to creating the form and guides, it had to be taken into account that these same guides and forms would be used in other countries as well. Hence it was decided that they would also need to exist in English and German; the guides were separately created but the form had all languages merged as can be seen in the appendices. So all the above were translated accordingly with help from individuals at Avant Tecno Oy with exceptional skills in these languages, although only help for the German language version was required.

The warranty return location had to be created; there existed none before this project. The warranty location had some points that had to be considered:

- The shelving had to be designed according to common parts sent for warranty returns; i.e. more space for more commonly broken parts
- There had to be clear instructions at the warranty return location
- It had to be accessible by both forklifts and by employees lifting the items into proper positions
- It had to be sized according to needs

Based on the above criteria the warranty return location was chosen, and the first step was to decide which items would receive shelf space. There were actually not that many item categories that are usually sent for warranty claims; this is because some items will never break or if they do they have no warranty anymore, and some items were so low in value that their sending would be more work and costs than their worth. Also, some item categories would have many shelf spaces, because in their category exist many different models.

In the case of Avant Tecno Oy an ABC analysis is a workable technique to categorize shelving. ABC analysis as defined on page 6 onwards gives an idea of how items should be categorized in a warehouse. Items have different values in relation to their quantity.

Another point brought about by ABC analysis is that it is not favorable to have large quantities of item category “A” lying around in the warehouse as their value is very high and in return their values will diminish faster. However, in this case the diminishing of value is not important since the items handled in this project are going back for warranty returns and hence their purchase value will be reimbursed and devaluation does not take place.

In Avant Tecno Oy’s case ABC analysis wasn’t as strongly used in relation to the value of items, one reason being that category C items are so worthless in Avant Tecno Oy’s case that their sending back for warranty reimbursements is seen as too costly in relation to the work done to organize and send them. However, even without using the valuation of items using ABC analysis it can still be used to derive another idea.

If we have items categorized somewhat according to their value, then we can also derive a point at which at certain item category reach a certain total value. In other words, the ABC analysis in this case provides points at which it makes sense to send items forth

for warranty claims, and less the idea of exactly how much space to give different types of items.

If all item categories were given the same amount of shelf space, the total value of each item category in the warranty returns shelves are unharmonious. It makes more sense to allocate more space for items with less value since it is relatively less costly to send a larger batch of these items. Vice versa, it is acceptable to provide items with the highest value the least space since less of them are required for sending them forward for warranty returns to get the same cost/reimbursement ratio in comparison to less valuable items.

Hence it can be concluded that this ABC categorization will ultimately give concrete points in time based on total item category value as to when to send a batch of items forward for warranty reimbursement.

The shelving was designed so that there would be enough space for item categories to allow for a reasonable amount – in regards to sending the items – of items to accumulate before sending.

Finally, the shelves had to be low enough so that parts can be lifted into all spaces by a person, but also so that forklifts can take away full pallets.

The entire shelves were designed to be as small as possible, because Avant Tecno Oy has limited space so the warranty part return location was sized to have just enough space to allow for reasonable – again in regards to sending parts – part accumulation. The idea is after all that the warranty items never linger in Avant Tecno Oy for too long, the whole point of this process is to have items sent for warranty returns as soon as possible while making it cost-efficient.

The location would have to allow for the placing of a form filling area, and it would also have to have enough space for instructions placed on the wall. A lot of the areas in the warehouses have no available wall space, because of course they have been used for shelves; hence it took some time to find a place where there is wall space that can’t be used for shelves but has wall space next to it for the warranty return shelves.

Also, conforming to the shelving part above the surroundings must allow for the maneuvering of a forklift. Avant Tecno Oy is based in a warehouse/factory which is mostly quite old and a lot of the areas are not designed for modern warehousing, so there exist many places where ceiling are very low and there are pillars etc.

Finally, after all the first four stages it was time to check that the process worked as whole and it was flexible since warranty returns are often very different cases from one to the other.

The process was now laid out as in figure 5 below:

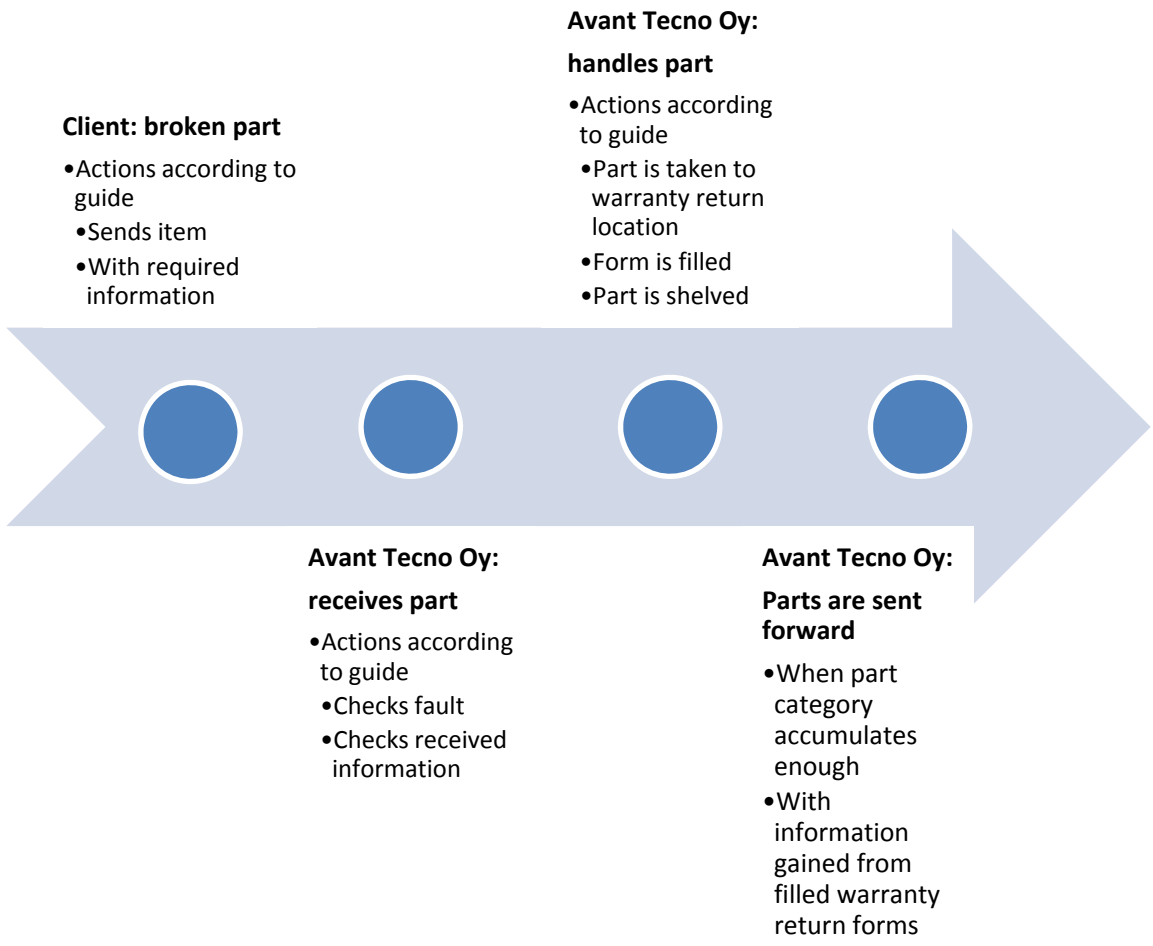

Figure 5: Final process layout

The above process fills all requirements for the warranty return process; it ensures that items are sent properly by the client, items are received and handled properly at Avant Tecno Oy, items have all the required information to receive warranty reimbursement, and items have some indicators as to when parts should be sent forward.

4. Conclusions

As a conclusion it can be said that the design of a warranty return process is largely dependent on how well the groundwork is laid out, how well the management is interviewed about their views and how well current company processes and daily tasks are evaluated. If the foundation is built well and all aspects are considered it is a simple process to create the warranty return process.

Keeping in mind simple supply chain management and reverse logistics theories simplify this process further. Personnel input, investigation of current company processes, and simple theories together create a frame inside which it is easy to fit a new process. This new process will flow with the current processes inside the company and will lead to the designed process to fulfill its' goal while remaining efficient and ultimately cutting costs.

The gains from the warranty return process are immediately noticeable, as is the case with Avant Tecno Oy. The result was that the new warranty return process works along with the overall workflow of Avant Tecno Oy; items arrived in proper form, and items that arrived were documented and shelved properly.

Although at the time of writing this thesis the cost savings acquired from receiving reimbursements for all defective parts are not available for study, the implementation of the process in itself showed that the warranty return process can be a very light burden on other existing work processes. If warranty return parts are handled immediately according to a set guideline with proper documentation, then the warranty reimbursement will take place and the process itself will not add that much cost to operations when compared to a situation where there is no uniform process.

After the completed design and implementation process there are however concerns, and the main concern is in regards to continuing the use of the newly designed process. It is often the case that a new process such as this is not accepted well among the employees who are to complete these tasks alongside their other work; to them it is something extra and there lay the problem in the first place. No one wants to complete the task of filing a warranty return part in the first place and they pile up, so really the new system if followed through each time a part arrives then parts do not accumulate and no-one ends up with the tasks of unwrapping all those warranty returns later.

Here may lay the solution for Avant Tecno Oy to have this process followed through in the future as well: inform employees of the importance of a good warranty return process and they might see that if the process is kept running then the warranty return items will not become a great burden again as was the case before this redesign.

After a successfully designed process it is important to inform all employees of its purpose as it can strengthen their knowledge of the importance of carefully designed process. This understanding can then lead to the possibility of creating new processes that will further cut down on costs by creating more efficient work flows.

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Appendices

1. Fault Notification Form

VIKAILMOITUS / FAULT NOTIFICATION / DEFEKTANMELDUNG

Pvm / Date / Datum: _____

Konetyyppi / Loader Type / Modell: _____

Sarjanumero / Serial number /Fabrik-Nr: _____

Havaitsija / Fault found by /Anmelder: _____

Lähettäjä / Sender / Absender : _____

Linjalta / From Assembly Line / Aus Produktionslinie ☐

Vikakohde / Defective Component / Defektes Teil:

Moottori / Engine / Motor ☐ _____

Ajomoottori / Hydr. Engine / Hydr.motor ☐ _____

Pumppu / Hydr. pump / Hydr.pumpe ☐ _____

Venttiili / Valve / Steuergerät ☐ _____

Letku, liitin / Hoses / Schlauch, Einschrauber ☐ _____

Muu, mikä / Other / Andere ☐ _____

Avant-tuotenumero / Avant product number / Avant Produkt-Nr: _____

Osan sarjanumero / Part serial number / Artikel Fabrik-Nr: _____

Vian kuvaus, lisätietoja / Fault description, additional information / Fehlerbeschreibung, zusätzliche Information: _____

_____

_____