



CIL Pilot Line Implementation

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ABSTRACT

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This thesis was commissioned by SCA Hygiene Products' Nokia mill. The aim was to improve runnability and reduce downtime in packaging machines of converting line 1 of the Nokia mill by putting CIL into operation.

Theories of CIL (Cleaning, Inspection and Lubrication) and RCA (Root Cause Analysis) are explained in the theory part of this bachelor's thesis.

CIL is a basic element towards autonomous maintenance. Before CIL implementation operators and maintenance team work independently. With the use of CIL operators will have more detailed knowledge of their working place. And with that knowledge operators could maintain their working place completely in the future.

CIL implementation was successful, although there was no time to go through the whole CIL process cycle. The CIL process is not top priority at the Nokia mill, so the reparations from the defect list will take some time.

In the future there will be more CIL implementations in the converting line 1 and in the other parts of the Nokia mill. There is no doubt that CIL would not improve the profitability of the converting lines and in the whole mill.

Key words: cil, maintenance, converting, packaging, machine

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ABBREVIATIONS

CIL	Cleaning, Inspection and Lubrication
RST	Resource Team
RCA	Root Cause Analysis
DOM	Daily Operation Meeting
DDS	Daily Direction Setting

1 INTRODUCTION

This Bachelor's thesis was done *at SCA Hygiene Products' mill in Nokia*. The subject of the thesis was to do CIL pilot line implementation to the packaging machines of converting line 1. Converting line 1 produces toilet paper for consumers. The work was carried out in collaboration with the RST team of converting line 1, operators of the converting line and the maintenance team of the mill.

CIL is part of SCA's protocol worldwide and it is already in use in some of SCA's mills, for example in Prudhoe, Great Britain. In Nokia mill CIL is already in use with other RST team. This is the first time that CIL is taken in use for RST team of converting line 1. Packaging machines were chosen as the target for CIL pilot line implementation because they are causing trouble in the lines runnability.

Doing this work was very educational in every way possible. I learned a lot more about the converting line and especially about the packaging machines. But the most important thing was to work with the RST team. It was interesting to see how the mill works in other than from the converting line operator's point of view.

This work was defined to packaging machines of converting line 1 although there were CIL implementations in converting line 2 and others parts of converting line 1. Theory of CIL and RCA are included in the theory part of this thesis.

2 SCA

SCA is a global hygiene product and forest industry company. SCA's products are hygiene products, tissue, printing papers and wood products. SCA was originally founded in Sweden 1929, and the letters SCA stand for Svenska Cellulosa Aktiebolaget. Company's headquarter is located in Stockholm, Sweden. The company has approximately 44 000 employees worldwide, and its turnover was in 2013 roughly 10.7 billion euros. The company has sales in over a hundred countries, and its product range contains over 60 different brands. (SCA. 2014)

SCA has three different business areas, which are Personal Care, Tissue and Forest Products. Personal Care contains for example diapers and hygiene products for women. These products are sold in over a hundred countries, and the most well-known brands are TENA, Libresse and Libero. Tissue group includes manufacturing of tissue products. Nokia mill belongs to this group. SCA is the third biggest tissue producer in the world, and the biggest in Europe. Best known brands are Tork, Lotus and Lotus Professional. The last business area is Forest, which contains forest products, like wood and cellulose. SCA is the biggest private forest owner in Europe. It owns approximately 2.6 million hectares of forest. (SCA. 2014)

2.1 SCA Nokia mill

SCA Hygiene Products is a paper mill located in Nokia. The mill produces tissue products for consumers and institutional caterings. The Nokia mill has been known as Oy Nokia Ab, Nokia Paperi, James River Corp, Fort James and Georgia Pacific, until SCA bought Georgia Pacific's functions in Europe in 2012. Mill is still often called by the name of Nokian Paperi. SCA Nokia mill employs about 300 people. The Nokia mill has two paper machines, PM7 and PM9, which both produce tissue paper. Production capacity of the mill is with two paper machines about 74 000 tons per year. The mill has also six converting lines for different kinds of hygiene papers and deinking plant. The Nokia mill is shown in the picture 1. (SCA: Nokian tehdas. 2014)



PICTURE 1. SCA Hygiene Products Nokia mill (SCA. 2014)

SCA Hygiene Products' Nokia mill produces different kinds of hygiene papers. The most well-known brands are Lotus and Lotus Professional, which contain products like Soft Embo, Emilia and Royal. In Finland Lotus-brand is a market leader and it has also strong position in Denmark and Baltic countries. (Lotus. 2013)

2.1.1 Converting Line 1

Converting Line 1 produces toilet paper for households and consumers. Parent reels coming from the tissue paper machine are converted to toilet paper rolls. Converting line 1 consists of a reeler, stacker, and two core machines, saws, packaging machines, pallet machines and wrapping lines. The line works in five shifts which each contain three operators. The lines best known brands are Lotus Soft Embo, Lotus Royal and Pirkka. Recently the line got a new product, Zewa, which is a popular brand in Europe.

The parent reels are unwound to the embosser, where paper webs are combined and embossed. After that the paper web is perforated and rolled on a core. At this point the roll is called a log. Logs are tail glued before they move into the stacker. Tail gluing means that the first piece of toilet paper roll is glued to the roll. This way the roll remains closed until customer opens it. The point of stacker is that even if there are some problems further in the line, for example in packaging machines the reeler doesn't have to stop. This works also vice versa, if the reeler stops, the rest of the line doesn't if there are enough logs in the stacker to keep the line going on. After stacker logs are cut to the

wanted height in saws. As an example, 102 millimeters is a pretty common height for a toilet paper roll. At this point rolls are moved to the packaging machines, where they are packed into film by packaging machines. Toilet paper packages usually contain six or eight rolls, but there are some exceptions, like the 16-roll package. From here packages move to the pallet machines, where they are piled up on pallets to a formation that the processed product requires. After that the whole thing is wrapped in transparent film and then automatic transportation system carries the pallets to the loading station.

3 KÖRBER PAPERLINK A5T PACKAGING MACHINE

Packaging machine A5T is an automatic machine, which is made for wrapping toilet and kitchen towel rolls. Polythene film is used as wrapping material. The machine consists of mechanical, pneumatical and electrical parts, which are functioning together due to control processor. Packaging machine A5T has a wide range of different formats in its selection of packaging types, although, they are all for tissue papers. (Körber Paperlink A5T Operators Manual. 2006.)

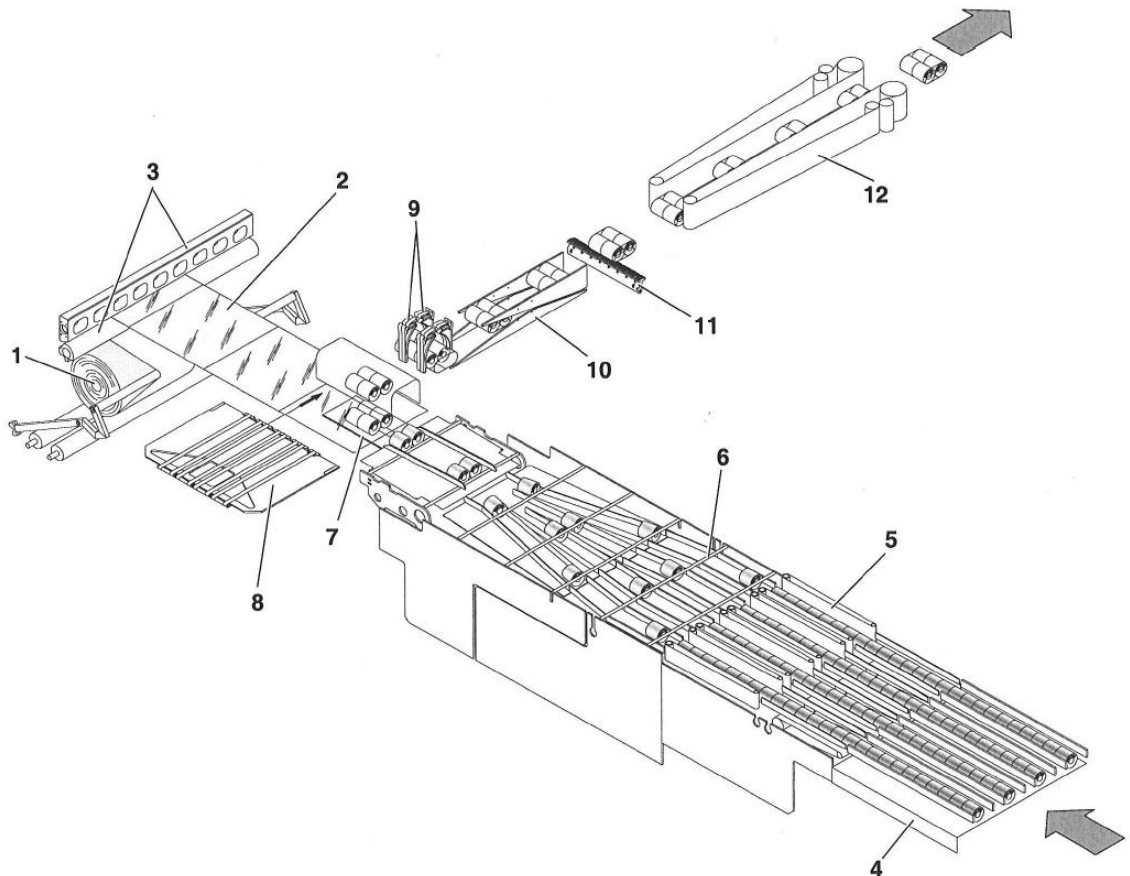
The production cycle requires observation from one operator, who visually inspects that the machine is working properly. By using the latest knowledge of mechanical and electrotechnical information guarantees the high quality of the machine. The end product satisfies even the most demanding requirements. When packages come out from the machine, they are completely ready for storing or shipping to a customer. Picture of Körber Paperlink A5T is shown in picture 2. (Körber Paperlink A5T Operators Manual. 2006.)



PICTURE 2. Körber Paperlink A5T in converting line 1

3.1 Functioning of Körber Paperlink A5T

The polythene film is unwound (1). Film is pulled by centering belts (2), and cut to the right size by blades (3). Toilet paper rolls come from conveyor to the accumulation belt (4), which transports the product to the launcher belts (5). Launcher belts separate the rolls according to the packages size, for example six or eight rolls. Then the initial feed (6) moves the rolls to the elevator (7). Elevator lifts rolls to the packaging film, and the lower folder (8) makes backside folding of the film. Drawer (9) moves the product and when it is against the bottom folder, the film wraps around the rolls forming a “tube”. Folders (10) finish the package by folding the sides. Lower sealer (11) heat seams the film crosswise, and seaming belts (12) seal the side foldings. Picture 3 shows the functioning cycle of Körber Paperlink A5T. (Körber Paperlink A5T Operators Manual. 2006.)



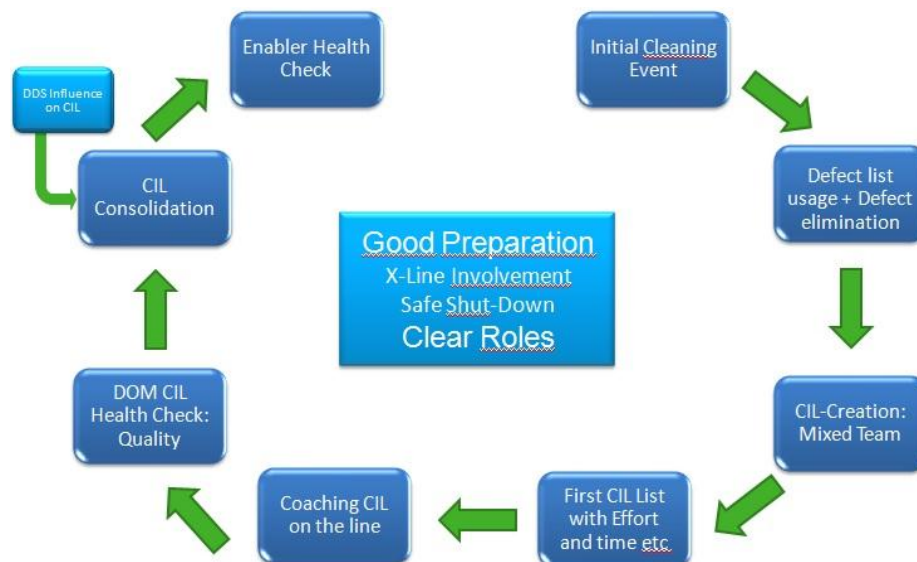
PICTURE 3. Function cycle of A5T packaging machine (Körber Paperlink A5T Operators Manual. 2006.)

4 CIL

CIL is basic element towards autonomous maintenance. Before the CIL-plan operators just operate the machines, but when something breaks, they call the maintenance team. Both, operators and the maintenance team work independently. The future targets for CIL-planning are that the operators would have more detailed knowledge of the machines and equipment of their working place. With these skills the operators could maintain the machine completely over time. By doing some smaller tasks at first and peacefully adding some more duties to the operators, this goal is accessible. Creating a routine for previous tasks before adding more makes the learning easier. (Czoske, Fassbender. 2014)

4.1 CIL: Implementation Process

Implementation process starts with good preparation and dividing the roles, so everyone knows exactly what is their task when the implementation begins. Also the planning of safe shutdown is an important part of preparations. Progress of CIL implementation process is presented in picture 4. (Czoske, Fassbender. 2014)



PICTURE 4. Progress of CIL implementation process (Czoske, K. Fassbender, J. 2014. Maintenance Program Foundation – CIL and Defect List.)

The first step of the actual CIL-process is initial cleaning event. There the machines standard condition is restored by cleaning. Restoring the standard condition implies that

all the unofficial markings are removed from the machine as well as tapes and other non-professional reparations. At this point the machine is inspected thoroughly for defects. This helps people to understand the meaning of CIL and why it is needed. The defect list is made based in defects found in initial cleaning event. If some defects are possible to eliminate right away, it should be done during the initial cleaning event. (Czoske, Fassbender. 2014)

After the initial cleaning event the CIL teams are formed and the first CIL-list is made. The CIL-list contains the specific instructions of what should be done, when and where. The list has information of how much oil, for example, should be added. New, practical tools are also provided with the CIL-list. The following step is to teach CIL to the operators of the line. RST and management are also coached. Implementation of HEALTH CHECK is done next. CIL-plan is improved based on feedback from the operators and RST team. At this point for example missing tools are brought to the line. Last step is enabler health check, where behaviors, system and the results are checked. CIL implementation process can be repeated to the same target if the RST team is not satisfied with the results. (Czoske, Fassbender. 2014)

So CIL's most important functions are to keep the working environment in standard condition and to find defects before they turn into breakdowns.

5 ROOT CAUSE ANALYSIS

Root cause analysis is a type of failure analysis. Instead of *what* root cause analysis asks *why*. This way of thinking fits well in finding defects in processes. Root cause analysis makes it easier to find the real cause of the problem. It is important to know what launched the problem in the first place. Example of root cause analysis is shown in figure 1. (Richard. 2011)

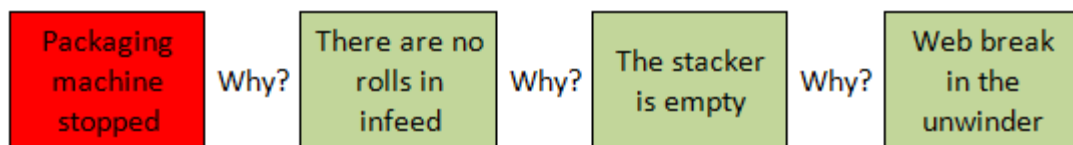


FIGURE 1. Example of a simple RCA

The 5 Whys –analysis an analysis tool which makes making of RCA easier. The 5 Whys –analysis helps the user to find the root problem quickly. As the name says, whys are asked when trying to find the cause of the problem. Usually the answer to the first why will bring another why question about the situation. And answer to the second why will bring another why and so on. This process has to be repeated until the root cause of the problem is found. Then the solution is made for the problem, and the same solution is used everywhere in the mill where it is accessible. If the 5 Whys –analysis will not give the absolute answer to problem, more advanced problem solving techniques may be needed. (Gulati. 2009)

Benefits of 5 Whys –analysis are that it helps to find the root cause of the problem quickly and it is very easy to apply for different situations. (Gulati. 2009)

6 INITIAL CLEANING EVENT

The initial cleaning event was held on 4th of March 2014. The meaning of this day was to do the initial cleaning to both of the packaging machines of the converting line 1. The packaging machines are identical. The target in the initial cleaning is to restore the machines basic condition and find defects. Every defect found from the machine is photographed, and these pictures are added to the defect list with description of the defect to help to process the upcoming actions.

Preparations for the initial cleaning event started a week before the actual event. The CIL-team had a meeting where the responsibilities for the initial cleaning were decided. Successful initial cleaning requires: Cleaning equipment, vacuum cleaner designed for industrial use, protection equipment, defect list and a camera. In this case we needed two cameras, because there were two packaging machines to be cleaned. Pictures of the machine taken before the cleaning are also very helpful when checking the results of the initial cleaning. All these things were done before the cleaning.

The CIL Initial Cleaning team consisted of 12 people. It was a mixed team, containing converting line operators, maintenance workers and RST team. Before the actual cleaning started we had a theory session about CIL and the progression of the day where the whole team participated. After that we went to the packaging machines. Group was divided so that there were six persons on both machines. Both teams selected one person as a book-keeper, who also took the photographs. By doing this the defect list remained in better order than it would have been if everyone had taken their own pictures for defect list.

After cleaning we had feedback session about the cleaning event with the team. We went through every single defect by looking the pictures which had been taken earlier that day. Responsibilities for fixing the defects were also planned during that session. Everyone was surprised how many defects we found that day, but also glad because now the defects were going to be fixed. The whole team enjoyed the initial cleaning event, even the operators of the converting line.

7 THE FIRST CIL-LIST

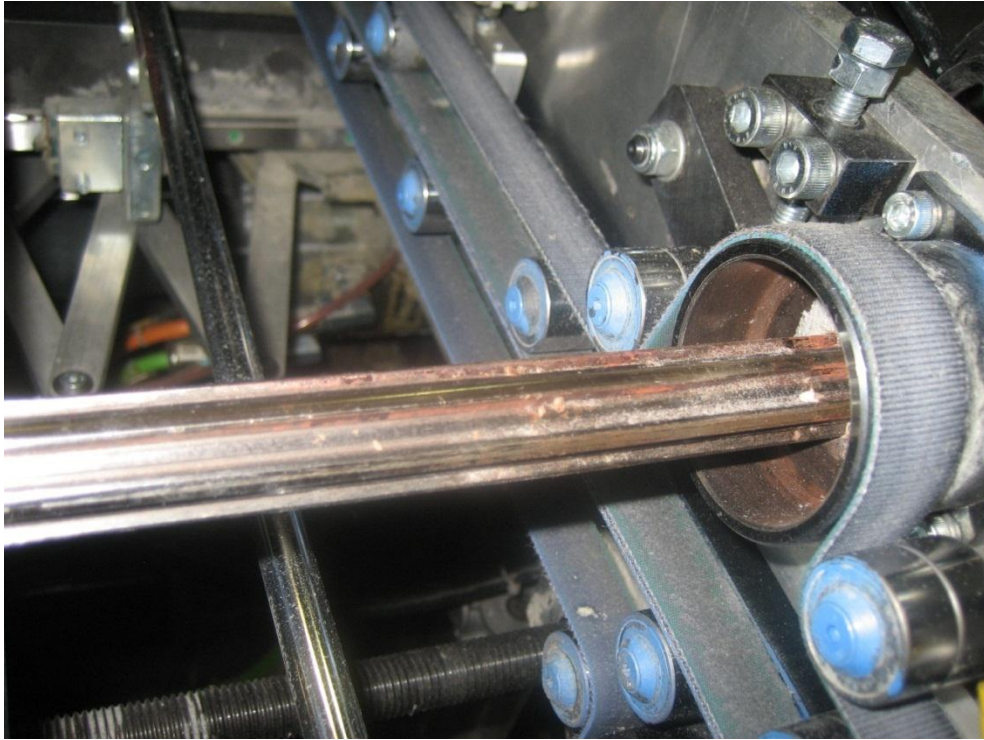
After the initial cleaning and the feedback of the event, the RST team started to plan the CIL-targets to the packaging machines. CIL-targets would be the same for both packaging machines. It was decided that first there would be maximum two or three CIL-targets, and more in the future. The CIL-list is not necessarily perfect when it is put to operation. They could be changed based on trial of the instructions, where instructions are tested by the RST team by actually performing the task. This way it is made sure that the operation pictured in the instructions is possible to perform by anyone. Operators can still suggest changes in the instructions if they are not happy about it, even after the implementation of the CIL-list.

7.1 CIL-targets

RST team chose two CIL-targets from packaging machines to begin with. Targets were axis of the centering belts and tension roll of seaming belts. When looking these targets from the CIL's point of view, axes of the centering belts is lubrication and tension roll of the seaming belts is cleaning. CIL-lists were planned from these targets, with exact information what should be done. It was decided that these CIL-tasks based on the CIL-lists should be done during weekly cleaning session.

7.1.1 CIL-list: Axes of the centering belts

Axis of the centering belts was selected as a CIL-target because it was noticed in initial cleaning event that the axes were rusty. It turned out that the axes had never been lubricated in the whole time that the packaging machines have been in the converting line, approximately six years. We discussed about this with the Nokia mills converting trainer, and decided to use CRC Dry Lube to lubricate the axes. The condition of axes on initial cleaning day is shown in picture 5. Frequency for lubrications would be one week, during the weekly cleaning events.

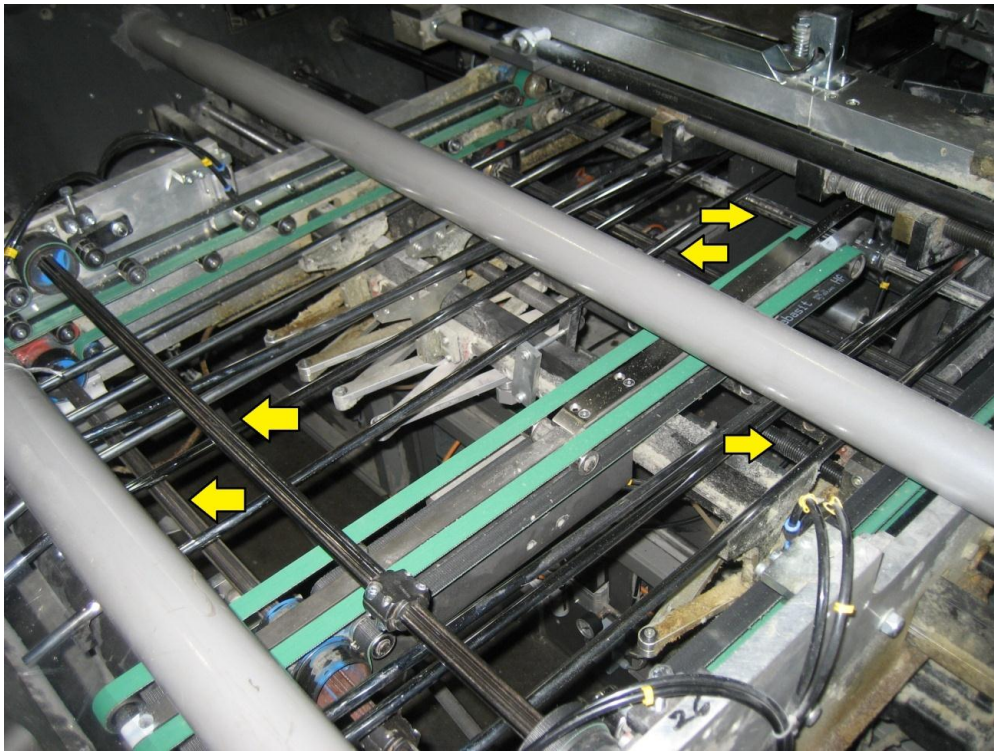


PICTURE 5. Axis of centering belts on initial cleaning day

Next step was to make CIL-list about this action. First step was to think what equipment is needed to successfully perform this task. Of course, personal protection equipments are needed, as always in the production areas. Another thing required is CRC Dry Lube for lubing the axes, as mentioned earlier. These things are written to the CIL-list, so everyone is able to know what is needed for this task.

Before the actual performing, it is mandatory to think how this task could go wrong. In this case, it is important to point the lube straight to the axes, so it doesn't spill to the centering belts or anywhere else into the machine. Another thing is not to use too much lube, since the converting line is very dusty environment. Using too much lube would leave the axes wet and they would collect dust and make the axes dirty, and that would harm the process.

When these things are checked, the actual lubing can be performed. Simply lube all the axes from the machine. Axes are pointed out by yellow arrows in the picture 6. After lubing check also the condition of the centering belts, that they are in good shape, and there are no fractures of other defects.



PICTURE 6. All axes of centering belts

When we performed this task for the first time with the converting line operators, we noticed that it would be easier to spread the lube to the axes with a sponge. By spraying CRC Dry Lube to the sponge and then doing the lubing makes it more improbable that the lube gets in unwanted places. Using the sponge helps the performing because the centering line area is quite narrow, and it is hard to fit the lube can in every place needed.

HOLDERS for the CRC Dry Lube cans were also ordered after the implementation of this CIL-task. Holders are installed inside the packaging machine close to the axes. This way the Dry Lube is always in the same place, and time doesn't get wasted in finding Dry Lube cans around the converting line.

7.1.2 CIL-list: Tension rolls of the seaming belts

Second CIL-target was the tension rolls of the seaming belts. The rolls that are in the process now are VRS-HYDRIL 11+-3PJ. It was noticed during the initial cleaning event that the rolls are in awful condition. The problem is that the seaming belts are in high temperatures, over 200°C, and during the process the film from the toilet paper roll

packages melts on the surface of the roll. There are no instructions yet how the rolls should be cleaned.

Tension roll is shown in picture 7. Brown material on the rolls surface is the melted film. Holes, which show as white marks on the roll, are traces left from knife some other sharp object. Someone has been trying to remove the melted film with a knife, which is definitely not a good way of cleaning the rolls. As seen from the picture 7, it harms the surface of the roll.



PICTURE 7. Tension roll of the seaming belts

I interviewed the maintenance team of the mill, workers on the warehouse and even an external maintenance team that worked on the converting line during shutdown week. No one seemed to have a clear idea about the cleaning of the rolls. The rolls are resistant to chemicals, so they won't help in the cleaning. Best suggestions for cleaning the rolls were to sand or peel the melted film off the rolls. These are not very good ways for this particular action, because the rolls are in a narrow place, and it takes a long time to take the rolls out of the machine. Point of CIL-task is that it is easy to perform during normal work or cleaning events. Removing the rolls for every time for cleaning is not that kind of action.

Supplier of the rolls, Vaahto roll service, was contacted. I told development engineer of Vaahto roll service about this cleaning problem. She also suggested peeling as the best way for cleaning the rolls, but we had to dismiss the idea because that is not possible in our process. We had to think some alternative ways for solving the cleaning problem. Vaahto started testing other roll materials that the film used in the process wouldn't stick. When the test results were ready, Vaahto suggested rubber filled nitrile rolls. In their tests film didn't stick on to the rolls at all. Only problem was that the rolls heat resistance is only 140-150°C, when in the process it is over 200°C. Next proposition was rolls coated with fluororubber. Film didn't stick on these rolls either, and its heat resistance abilities would suit in our process. Only problem was this time that Vaahto can't get this rolls as hard as our rolls are now. The hardness on rolls is 95 Shore A, and fluororubber rolls are possible to get in hardness 90 Shore A. I discussed about this with RST and maintenance teams, and they said that the difference in hardness doesn't affect the process.

We also contacted Teknikum, which is a roll supplier too, considering this same subject with the tension rolls of the packaging machines. To our surprise they suggested different kind of rolls that Vaahto had suggested to us, and they wouldn't recommend the use of fluororubber at all in this kind of process. Teknikum's engineer asked that could he come to visit the Nokia mill and see the packaging machines in action. We are now planning on the details of this visit.

Tension roll of the seaming belts didn't make as a CIL-list because the cleaning is hard to put into action with the knowledge we have now. RST team is working on solution for the cleaning problem. Whether it is a new cleaning method or different roll material, the problem will be fixed.

8 ROOT CAUSE ANALYSES

Some defects found on initial cleaning event required further investigations to be solved. These targets couldn't be made as CIL-lists because the solution for them is still unknown.

8.1 Lubrication problem in packaging machine 1

In the packaging machine 1 lubrication doesn't work properly, and there is oil in places where it shouldn't be. It was noticed on the belts of the back folder. Oil in unwanted places causes impurities because dust sticks to it. This is shown in picture 8.



PICTURE 8. Belt of the back folder

The cause of this oil leak is still unknown and to find the root cause of the problem RCA is needed. RST team is currently working on this problem so we don't know the answers yet.

8.2 Ionizer of packaging machine 1

The function of the ionizer is to charge handle cord, so it sticks to the packaging film until they are seamed together by the seaming belts. Ionizer is the red box in the picture 9.



PICTURE 9. Ionizer of packaging machine 1

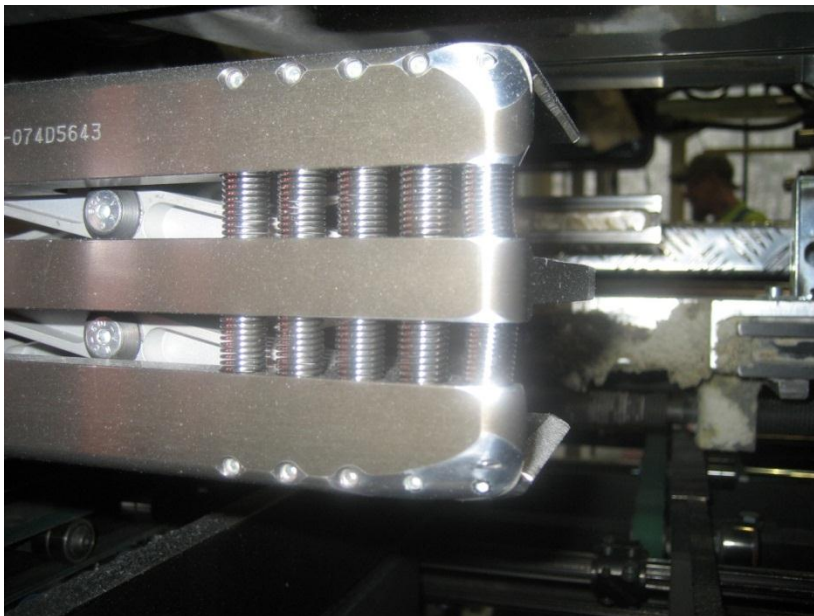
The problem here is that without the black tape, as seen in picture 9, the ionizer grounds to the support of the ionizer. That causes electric arc between ionizer and the support.

The theory of CIL says that no tapes are allowed in the machines, so this tape has to be removed. But it can't be done until the solution for the grounding and electric arc problem is found. Using the root cause analysis is a good way of doing that. One thought was that maybe the ionizer is in too high volume. We don't know the answers yet as the RST team is still working on this problem.

9 CONCLUSIONS

This CIL implementation was a success although it didn't went the whole cycle as seen in picture 3. The CIL-process is not top priority in the Nokia mill, so the reparations from the defect list take some time.

Another thing slowing down the elimination of the defect list is that some parts of the machine are very time-consuming to replace and the line needs a shutdown in order to replace these parts. It is also important to shop around with the suppliers of these parts to get them for best price. Moving folders are one example of this kind of part of the packaging machine. Moving folder is shown in the picture 10. It is clearly visible that the folder is very battered.



PICTURE 10. Worn-out moving folder

The most surprising thing in the whole CIL-process was the reaction of the converting line operators. In the CIL theory session in the initial cleaning day they were disbelieving to the fact that using of CIL would improve the runnability of the line. The operators thought that CIL is just another insignificant protocol coming from the headquarters of the company which will be forgotten soon. But when the actual cleaning session started, the operators were the most eager ones to find defects. Yes, they have the best knowledge about packaging machines of the cleaning team and they may have known

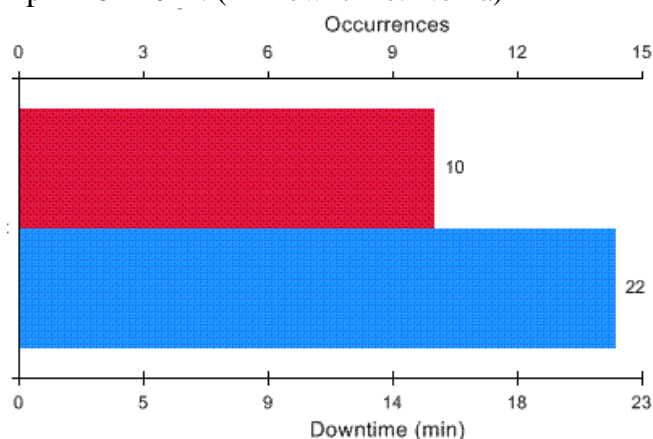
some defects even before the cleaning event, but the difference in attitudes between the theory session and cleaning event was amazing.

The informing the converting line operators about progress of repairing faults from the defect list could have been more efficient. The operators had a very little information about repairing of the defects after the initial cleaning event. RST manager had decided that there will be a meeting when most of the faults are repaired. The operators should have more information of the progress of reparations based on the defect list.

Showing how this CIL process affected the line is almost impossible. There are so many variables in the converting line and packaging machines are just one part of them. Even if the packaging machine would work without any faults all the time, the converting line wouldn't necessarily make a single toilet paper roll. It affects so much to the lines outcome if there are some troubles in the reeler or in the line after the packaging machines, for example in the pallet machines. An example of problems in the reeler could be that if the paper from the paper machines is not good and it has holes, for example. It cause web breaks in the reeler and that causes downtime to the converting line, although the packaging machines would work perfectly.

Another thing which makes following the CIL's efficiency harder for packaging machines is that these machines have old fault tracking program. It doesn't specify the faults that occur in the packaging machines. There was discussion with the supplier of the fault program about renewing the system, but it would have been too expensive so it was not done. In table 1 faults (occurrences) and downtime is shown from one shift. These values were measured on April 28th.

TABLE 1. Occurrences and downtime in packaging machine 2 from 6am to 2pm on April 28th 2014. (PI Downtime: Nokia)



On 30th April 2014, almost two months after the initial cleaning event, over half of the defects of the packaging machines are fixed. Exact numbers are shown in table 2.

TABLE 2. Fixed defects of packaging machines of converting line 1 on April 30th 2014

Packaging machine	Fixed defects	Total amount of defects
Packaging machine 1	33	42
Packaging machine 2	22	44

The reason for that there are more defects fixed from packaging machine 1 is that packaging machine two has more defects which require shutdown and shopping around with suppliers. Packaging machine 1 has a few of this kind of defects. According to the schedule right now all the defects will be fixed by May 27th of 2014.

There will be more CIL implementations in the converting line 1 and in the other parts of the Nokia mill. CIL would undoubtedly improve the profitability of the lines and the whole mill.

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APPENDICES

Appendix 1. Defect list of packaging machine 1



Defect List Initial Cleaning

Laite:	A5T/ 1 / Sisääsyöttökuljetin + Heittimet	Sivu:	1
---------------	--	--------------	---

Pvm	Vika	Valokuva numero	Toimenpide	Kuka Löysi	Kuka Korjasi	Korjaus pvm
4.3	Valvonta kenno irti (WB905) kiristys mutteri puuttuu	1,2		Kalevi	Laurila	4.3
4.3	Valvonta kennojen lukitusmutterit löysällä	3		Kalevi	Kalevi	4.3
4.3	Valvonta kennojen kiinnitysrunko löysällä	4		Kalevi	Esa	4.3
4.3	Kuljettimen kaiteen säädön lukitus puuttuu	5		Kalevi		4.3
4.3	Kuljettimen kaiteen säädön lukituksen vastaosa puuttuu	6		Kalevi		4.3
4.3	Pystyrulla anturin lukitusmutterit löysällä	7		Kalevi		4.3
4.3	Pystyrullien valvonnan säätökahva löysällä	8		Kalevi		4.3
4.3	Pystyrullan kuitauspainikkeen johtoliitos löysällä	9	000090994420	Kalevi		23.3
4.3	Johtokourunkansi irti, koska siihen on törmätty	10		Kalevi		4.3
4.3	Johdot näkyv (WU1612)	17	000090994399	Kalevi	OK	
4.3	Heittimien valvontakennon lukitusmutteri halki	18	000090994398	Kalevi	OK	
4.3	Kuljetinmatto ajaa sivuun ja hankaa kuljettimen runkoon	21, 22	Esa	Kalevi	OK	
4.3	Liittimet löysällä (U900 ja U910)	23, 24	OK	Kalevi		4.3.
4.3	Heittimiä edeltävien hihnojen kireydet	28	Esa	Kalevi	OK	
4.3	Johdot lattialla hankaloittaa puhdistusta	33	000090994421	Kalevi		23.3
4.3	Heittimien leveydensäätöketju löysällä	35	Esa	Kalevi		



Defect List Initial Cleaning

Laite:	A5T / 1/ Kapulakuljettimet	Sivu:	2
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Pvm	Vika	Valokuva numero	Toimenpide	Kuka Löysi	Kuka Korjasi	Korjaus pvm
4.3	Mitta-asteikot puuttuu kaiteiden säädöstä	13	Esa	Juha	OK	
4.3	Rullienvalvonta anturien liittimet löysällä	15	OK	Juha		4.3
4.3	Rullienvalvonta anturien säätö lukitukset hankala kiristää	16	Juha	Juha	OK	
4.3	Kapulajaon mitta-asteikko irti ja toinen puuttuu	19	Esa	Juha		
4.3	Alkuvedon kapulakuljettimen käyttö--> ruostetta	27	000090994743	Juha	OK	
4.3	Alkuvedon kapulakuljettimen hihnapyörästä puuttuu kaulus	27	000090994743	Juha	OK	
4.3	Johdot lattialla hankaloittaa puhdistusta	34	000090994397	Kalevi		



Defect List Initial Cleaning

Laite:	A5T / 1 / Elevaattori, Taitto ja Saumaus	Sivu:	3
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Pvm	Vika	Valokuva numero	Toimenpide	Kuka Löysi	Kuka Korjasi	Korjaus pvm
4.3	Runsaasti voiteluainetta	11	Niku/juurisyy	VM	?	
4.3	Saumaushihnojen kiristysteloilla muovia	25, 26	Juurisyy (CIL)	VM	OK	
4.3	Molempien säädettävien loppuviikanten lukitus ei pidä	29, 30	Niku/Juha	VM	??	
4.3	Pohjasaumaajalla irtonainen maadoitusjohto	31	OK	VM		23.3
4.3	Oikeanpuoleisen viikaimen kiinnitys löysällä	32	OK	VM	Esa	4.3
4.3	Öljyvuoto saumausmoottorissa	37	000090994840	VM	OK	
4.3	Oikeanpuoleisen saumauselementin johto näkyvissä	38	000090994393	VM	OK	
4.3	Päätytaintajien runkoliitos väljä	39	Niku/Osat	VM		
4.3	Päätytaintajien säädön lukitus rikki	40	OK	VM	Esa	4.3.
4.3	Elevaattorien kiinnitys väljä	41	Niku/Osat	VM		
4.3	Päätytaintajien johdot näkyvissä moottorilla	42	000090994395	VM		23.3
4.3	Elementtien liikenivelissä väljyyttä molemmillapuolilla	47	000090994842	VM		



Defect List Initial Cleaning

Laite:	A5T / 1 / Kalvonkuljetus ja Leikkuu	Sivu:	4
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Pvm	Vika	Valokuva numero	Toimenpide	Kuka Löysi	Kuka Korjasi	Korjaus pvm
4.3	Runsaasti öljypölyä	12	OK	Ville		4.3.
4.3	Kahvalaitessa teippiviritys	14	Teippi pois	Ville	??	
4.3	Teippiteline rikki	20	Toni	Ville		
4.3	Kalvon stopparin sylinterissä teippiviritys	36	OK	Ville		4.3.
4.3	Kalvonkuljettimien booriakseli kuiva	43	CIL	VM	OK	
4.3	Öljyvuoto vasemman kalvokuljettimen alapuolella	44, 45	Juurisyy	VM	??	
4.3	Johdot lattialla hankaloittaa puhdistusta	46	000090994396	VM		23.3

Appendix 2. Defect list of packaging machine 2

Defect List Initial Cleaning

Laite:	A5T/ 2 / Sisääsyöttökuljetin + Heittimet	Sivu:	1
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Pvm	Vika	Kuva numero	PTM numero	Kuka Löysi	Kuka Korjasi	Korjaus pvm
4.3.	Ylimääräisiä osia koneen alla	17		Teppo	OK	
4.3.	Kaapelikotelo teipattu	18	90994737.	Teppo	OK	
4.3.	Viallinen "heittimien" leveysäättö	19	90994739.	Teppo		
4.3.	Valokennot löysällä	47	?	Kalevi		

Defect List Initial Cleaning

Laite:	A5T / 2/ Kapulakuljettimet	Sivu:	2
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Pvm	Vika	Kuva numero	PTM numero	Kuka Löysi	Kuka Korjasi	Korjaus pvm
4.3.	Johtonippu irti kiinnikkeestä-hammaspyörien välissä	14		Toni	Toni	4.3.
4.3.	Rikkinäinen mitta-asteikko	15	Juha	Toni		
4.3.	Irronnut ja rikkinäinen johtokisko	16		Toni		
4.3.	Kapulakuljettimien välimitta-asteikot puuttuu - Tehdäänkö meistillä?	37	Esa	Sami		
4.3.	Voiteluletku liian pitkä ja melkein poikki	50	Juha	Teppo		

Defect List Initial Cleaning

Laite:	A5T / 2/ Elevaattori, Taitto ja Saumaus	Sivu:	3
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Pvm	Vika	Kuva numero	PTM numero	Kuka Löysi	Kuka Korjasi	Korjaus pvm
4.3.	Haravakuljettimen vas.puolen ketjun johteen runkopalkki poikki	1-2	90994845	Sami		
4.3.	Liikkuvat päätytattajat kuluneet ja teipattu	3-4	Juha/Niku	Sami		
4.3.	Klappia liikkuvissa päätytattajissa	5	Juha/Niku	Sami		
4.3.	Kiinteät päätytattajat kuluneet	6	Juha/Niku	Sami		
4.3.	Elevaattoripesän ylemmät ohjaimet kuluneet	7	90994741	Sami		
4.3.	Takalastan remmit vaihtokunnossa	8	90994844	Sami	OK	
4.3.	Elevaattorilevyt 15mm klappi	9	Juha/Niku	Sami		
4.3.	Haravakuljettimen ketjun voitelun tarkastus - vaikutti kuivalta/ruosteiselta	20	Niku	Sami		
4.3.	Haravakuljettimen yläohjaimien sivusiirron pikalukitukset puuttuu 3/4	21	Esa	Sami	OK	
4.3.	Saumaushihnojen oik. puoleisen hihnatelan laakerivika/klappia	22	Juha v14	Sami	OK	
4.3.	Saumaushihnojen käytävien telojen pinta vahvassa "vahassa" - puhdistusongelma	23	Niku (CIL?)	Sami	OK	
4.3.	Pohjasaumaajan maadoitusjohto irti	24	90994391	Sami		23.3.
4.3.	Johtolenkkejä pitkin koneen alusia - voiko lyhentää tai niputtaa	25	90994394	Sami		
4.3.	Saumaushihnojen oik. puoleisen hihnatelan laakerivika/klappia	26	Juha v14	Sami	OK	
4.3.	Kaapelikoteloiden kansia irrallaan	27-28	OK	Sami	Sami	4.3.
4.3.	Suojapleksi teipillä kiinni	29-30	Tutkitaan	Sami		
4.3.	Haravakuljettimen käyttöremmit kuluneet - löysällä	31	Juha	Sami	OK	
4.3.	Kalvoviikain vas.puolen hitsattu jo pariin kertaa - ei alkuperäiskuntoinen	32	Juha/Niku	Sami		
4.3.	Vas.puolen viimeinen kalvoviikain löysällä	33	OK	Sami	Sami	4.3.
4.3.	Haravien syvyyssäädön "matolaatikon" vedonestot ei toimi	36	90994846	Jyrki		
4.3.	Puhalluksien paineiden säädön lukitus auki	38	OK	Jyrki	Jyrki	4.3.
4.3.	Kalvonpuhalluksien ylemmät ohjaimet kuluneet	41-42	Juha/Niku	Sami		
4.3.	Paineen jakotukki irti	43	90994841	Jyrki		
4.3.	Paineen pääsulkuventtiilille tarvitaan ohjetarra mistä löytyy	44	Juha	Jyrki		
4.3.	Lämmityselementtien jouset kuoleentuneet tai liian heikot.	45	90994843	Sami	OK	

Defect List Initial Cleaning

Laite:	A5T / 2 / Kalvonkuljetus ja Leikkuu	Sivu:	4
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Pvm	Vika	Kuva numero	Toimenpide	Kuka Löysi	Kuka Korjasi	Korjaus pvm
4.3.	Päätytaintajien hihnät ja ympäristö rasvassa/öljyssä - Hihnoissa murtumia	10		Vesa	OK (rasvaa)	
4.3.	Kalvonkuljetin hihnojen akselin lukitusrengas irti - onko tarve	11	Juha	Vesa	OK	
4.3.	Pussillinen "vara-osia"	12	OK	Vesa		4.3.
4.3.	Puuttuva kalvonkuljetusremmi	13	90994736	Vesa	OK	
4.3.	Oven lukon takunen korjattu hitsaamalla - terävät reunat	34	Esa	Vesa		
4.3.	Ionisaattori teipattu "kuntoon"	35		Vesa	OK	
4.3.	Kalvon paikan merkinnät pois - mennään asteikon mukaan	39		Vesa		
4.3.	Teippirullateline hajalla - tukevampi tarvitaan	40	Toni	Vesa		
4.3.	Kalvonkuljetushihnojen akseli kuiva - "ruosteessa"	46	Niku? CIL	Vesa	OK	
4.3.	Kalvon aukirullausmoottorin sähkönsyötön liitin rikki	48-49	90994392.	Vesa		23.3.

Appendix 3. CIL-list: Axes of the centering belts


Cleaning Inspection Lubrication CIL Cleaning Inspection Lubrication



Name of Instruction: CIL AXES OF THE CENTERING BELTS UNIT: CONVERTING LINE: L1 INSTRUCTIONS ID: 1822

Revision 2 Valid from: 14.4.2014 Valid until: Responsible: TOIVONEN Ville

Author/Last edited: Process Specialist RST Consumer

<p>Location: Axes of the centering belts on both packaging machines</p>	<p>Description: Lubing of axes of the centering belts</p>	<p>Equipment: CRC Dry Lube, personal protection equipment</p>	<p>Frequency: Weekly cleaning event</p>
			
<p>Before starting make sure that Dry Lube or oily dust doesn't spill on the belts.</p> <p>Performing:</p> <ol style="list-style-type: none"> 1. Clean the axes from dust by using compressed air 2. Lube all axes of the centering belts from both packaging machines with CRC Dry Lube 3. Check the condition of the belts, that there are no fractures or other defects <p>The tasks purpose is to improve reliability of the centering belts.</p>			

Appendix 4. Updated defect list of packaging machine 1

Linja	Pvm	Laiteyksikkö	Vikalöydös	Kuva	Mitä sovittu	Kuka hoitaa	Tilanne nyt	Koska valmis
L1	4.3.	Pak1	Valvonta kenno irti (WB905) kiristys mutteri puuttuu	1, 2			OK	4.3.
L1	4.3.	Pak1	Valvonta kennojen lukitusmutterit löysällä	3			OK	4.3.
L1	4.3.	Pak1	Valvonta kennojen kiinnitysrunko löysällä	4			OK	4.3.
L1	4.3.	Pak1	Kuljettimen kaiteen säädön lukitus puuttuu	5			OK	4.3.
L1	4.3.	Pak1	Kuljettimen kaiteen säädön lukituksen vastaosa puuttuu	6			OK	4.3.
L1	4.3.	Pak1	Pystyrulla anturin lukitusmutterit löysällä	7			OK	4.3.
L1	4.3.	Pak1	Pystyrullien valvonnan säätökahva löysällä	8			OK	4.3.
L1	4.3.	Pak1	Pystyrullan kuittauspainikkeen johtoliitos löysällä	9		Esa	OK	23.3.
L1	4.3.	Pak1	Johtokourunkansi irti, koska siihen on törmätty	10			OK	4.3.
L1	4.3.	Pak1	Runsaasti voiteluainetta	11	Juurisyys	Niku/Esa	??	16.5.
L1	4.3.	Pak1	Runsaasti öljypölyä	12			OK	4.3.
L1	4.3.	Pak1	Mitta-asteikot puuttuu kaiteiden säädöstä	13		Esa	OK	
L1	4.3.	Pak1	Kahvalaitessa teippiviritys	14	Teipit pois + P	Juurisyys/Toni	??	16.5.
L1	4.3.	Pak1	Rullienvalvonta anturien liittimet löysällä	15			OK	4.3.
L1	4.3.	Pak1	Rullienvalvonta anturien säätö lukitukset hankala kir	16		Juha	OK	
L1	4.3.	Pak1	Johdot näkyv (WU1612)	17			OK	
L1	4.3.	Pak1	Heittimien valvontakennon lukitusmutteri halki	18			OK	
L1	4.3.	Pak1	Kapulaajan mitta-asteikko irti ja toinen puuttuu	19	Uusitaan mitta	Juha	??	16.5.
L1	4.3.	Pak1	Teippiteline rikki	20	Uusitaan + PTM	Toni	??	16.5.
L1	4.3.	Pak1	Kuljetinmatto ajaa sivuun ja hankaa kuljettimen runk	21, 22		Esa	OK	
L1	4.3.	Pak1	Liittimet löysällä (U900 ja U910)	23, 24			OK	4.3.
L1	4.3.	Pak1	Saumaushihnojen kiristysteloilla muovia	25, 26		Ville/Juha	OK	
L1	4.3.	Pak1	Alkuviedon kapulakujettimen käyttö--> ruostetta	27			OK	
L1	4.3.	Pak1	Alkuviedon kapulakujettimen hihnapyörästä puuttuu k	27			OK	
L1	4.3.	Pak1	Heittämiä edeltävien hihnojen kireydet	28		Esa	OK	
L1	4.3.	Pak1	Molempien säädettävien loppuviikanten lukitus ei p	29, 30	Tarjouspyyntö	Juha	??	16.5.
L1	4.3.	Pak1	Pohjasaumaajalla irtomainen maadoitusjohto	31		Esa	OK	23.3.
L1	4.3.	Pak1	Oikeanpuoleisen viikaimen kiinnitys löysällä	32			OK	4.3.
L1	4.3.	Pak1	Johdot lattialla hankaloittaa puhdistusta	33		Esa	OK	23.3.
L1	4.3.	Pak1	Johdot lattialla hankaloittaa puhdistusta	34	Johdot nippuu	Esa	??	25.4.
L1	4.3.	Pak1	Heittimien leveydensäätöketju löysällä	35	Uusitaan	Esa	OK	25.4.
L1	4.3.	Pak1	Kalvon stopparin sylinterissä teippiviritys	36			OK	4.3.
L1	4.3.	Pak1	Öljyvuoto saumaussmoottorissa	37			OK	
L1	4.3.	Pak1	Oikeanpuoleisen saumauselementin johto näkyvässä	38			OK	
L1	4.3.	Pak1	Päättytaintajien runkoliitos väljä	39	Tarjouspyyntö	Juha	??	16.5.
L1	4.3.	Pak1	Päättytaintajien säädön lukitus rikki	40			OK	4.3.
L1	4.3.	Pak1	Elevaattorien kiinnitys väljä	41	Tarjouspyyntö	Juha	??	16.5.
L1	4.3.	Pak1	Päättytaintajien johdot näkyvässä moottorilla	42			OK	23.3.
L1	4.3.	Pak1	Kalvonkuljettimien booriakseli kuiva	43		Niklas	OK	
L1	4.3.	Pak1	Öljyvuoto vasemman kalvokuljettimen alapuolella	44, 45	Liittyy kuvaan	Niklas	??	16.5.
L1	4.3.	Pak1	Johdot lattialla hankaloittaa puhdistusta	46			OK	4.3.
L1	4.3.	Pak1	Elementtien liikenivelissä väljyyttä molemmillapuol	47			OK	

Appendix 5. Updated defect list of packaging machine 2

L1	4.3.	Pak2	Haravakuljettimen vas.puolen ketjun johteen runkot	1,2	Tarjouspyyntö	Juha	??	16.5.
L1	4.3.	Pak2	Liikkuvat päätytaittajat kuluneet ja teipattu	3,4	Tarjouspyyntö	Juha	??	16.5.
L1	4.3.	Pak2	Klappia liikkuvissa päätytaittajissa	5	Tarjouspyyntö	Juha	??	16.5.
L1	4.3.	Pak2	Kiinteät päätytaittajat kuluneet	6	Tarjouspyyntö	Juha	??	16.5.
L1	4.3.	Pak2	Elevaattoripesän ylemmät ohjaimet kuluneet	7	Tarjouspyyntö	Juha	??	16.5.
L1	4.3.	Pak2	Takalastan remmit vaihtokunnossa	8			OK	
L1	4.3.	Pak2	Elevaattori levyt 15mm klappi	9	Tarjouspyyntö	Juha	??	16.5.
L1	4.3.	Pak2	Päätytaittajien hinnat ja ympäristö rasvassa/öljyssä -	10		??	OK (rasvaa)	
L1	4.3.	Pak2	Kalvonkuljetin hihnojen akselin lukitusrengas irti - o	11		Juha	OK	
L1	4.3.	Pak2	Pussillinen "vara-osia"	12			OK	4.3.
L1	4.3.	Pak2	Puuttuva kalvonkuljetusremmi	13			OK	
L1	4.3.	Pak2	Johtonippu irti kiinnikkeestä-hammaspyörien välissä	14			OK	4.3.
L1	4.3.	Pak2	Rikkiäinen mitta-asteikko	15	Varmistus	Ville	OK	25.4.
L1	4.3.	Pak2	Irronnut ja rikkinäinen johtokisko	16	Uusitaan	Juha	??	16.5.
L1	4.3.	Pak2	Ylimääräisiä osia koneen alla	17			OK	
L1	4.3.	Pak2	Kaapelikotelo teipattu	18			OK	
L1	4.3.	Pak2	Viallinen "heittimien" leveysääto	19	90994739	?	??	??
L1	4.3.	Pak2	Haravakuljettimen ketjun voitelun tarkastus - vaikut	20	Liittyy kuvaan	Niku/Juha/E	??	16.5.
L1	4.3.	Pak2	Haravakuljettimen yläohjaimien sivusiirron pikalukit	21		Esa	OK	
L1	4.3.	Pak2	Saumaushihnojen oik. puoleisen hihnatelan laakeriv	22		Juha v14	OK	
L1	4.3.	Pak2	Saumaushihnojen käyttävien telojen pinta vahvassa	23		Ville/Juha	OK	
L1	4.3.	Pak2	Pohjasaumaajan maadoitusjohto irti	24		Esa	OK	23.3.
L1	4.3.	Pak2	Johtolenkkejä pitkin koneen alusia - voiko lyhentää t	25		Sähköri	OK	
L1	4.3.	Pak2	Saumaushihnojen oik. puoleisen hihnatelan laakeriv	26		Juha v14	OK	
L1	4.3.	Pak2	Kaapelikoteloiden kansia irrallaan	27, 28			OK	4.3.
L1	4.3.	Pak2	Suojapleksi teipillä kiinni	29, 30	Pleksi pois	Esa	OK	16.5.
L1	4.3.	Pak2	Haravakuljettimen käyttöremmit kuluneet - löysällä	31		Juha	OK	
L1	4.3.	Pak2	Kalvoviikain vas.puolen hitsattu jo pariin kertaa - ei a	32	Tarjouspyyntö	Juha	??	16.5.
L1	4.3.	Pak2	Vas.puolen viimeinen kalvoviikain löysällä	33			OK	4.3.
L1	4.3.	Pak2	Oven lukon takunen korjattu hitsaamalla - terävät re	34	Huoltoseisokk	Esa	??	27.5.
L1	4.3.	Pak2	Ionisaattori teipattu "kuntoon"	35			OK	
L1	4.3.	Pak2	Haravien syvyysäädön "matolaatikon" vedonestot e	36	90994846	?	??	??
L1	4.3.	Pak2	Kapulakuljettimien välimita-asteikot puuttuu - Tehd	37	Uusitaan mitta	Juha	??	16.5.
L1	4.3.	Pak2	Puhalluksien paineiden säädön lukitus auki	38			OK	4.3.
L1	4.3.	Pak2	Kalvon paikan merkinnät pois - mennään asteikon m	39	Puhdistetaan	Esa	??	16.5.
L1	4.3.	Pak2	Teippirullateline hajalla - tukevampi tarvitaan	40	Uusitaan + työ	Toni	??	16.5.
L1	4.3.	Pak2	Kalvonpuhalluksien ylemmät ohjaimet kuluneet	41, 42	Tarjouspyyntö	Juha	??	16.5.
L1	4.3.	Pak2	Paineen jakotukki irti	43	Varmistus	Ville	OK	25.4.
L1	4.3.	Pak2	Paineen pääsulkuventtiilille tarvitaan ohjetarra mistä	44	Tarroja keksit	Juha	??	16.5.
L1	4.3.	Pak2	Lämmityselementtien jouset kuoleentuneet tai liian	45			OK	
L1	4.3.	Pak2	Kalvonkuljetushihnojen akseli kuiva - "ruosteessa"	46		Niklas	OK	
L1	4.3.	Pak2	Valokennot löysällä	47	Varmistus	Ville	OK	25.4.
L1	4.3.	Pak2	Kalvon aukirullausmoottorin sähkönsyötön liitin rikk	48, 49		Esa	OK	23.3.
L1	4.3.	Pak2	Voiteluletku liian pitkä ja melkein poikki	50	Lyhennys	Esa	??	27.5.