

Developing Supply Chain at Varkauden Puu Oy

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<p>Abstract</p> <p>Increasing levels of wood production, a lot of political or commercial decisions and the fading wood resources prompted to the idea of sustainable development in Varkauden Puu Oy. It was decided to solve the problem of issues and ideas of a renewable resource such as wood, because it has recovery limit.</p> <p>The thesis was aimed at finding ways of optimal solutions to this problem. Were used a lot of materials, which had already been development and done in other corporations and companies. This study includes historical part of the company, partners, wood processing in the company, logistic processes and sustainable development.</p> <p>The main subject of this thesis can be utilized not only in Varkauden Puu Oy, but also in other companies which want to progress and stay in the market. It will help to develop supply chain and increase productivity using the same resources.</p>			
<p>Keywords</p> <p>Wood product; Varkauden Puu Oy; Logistic; Innovations;</p>			

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1 INTRODUCTION

1.1 Reasons for Choosing This Topic

At the time when I was invited to work at Varkauden Puu Oy, I had no idea that it was the work that would push me to this thesis theme. The world has started to consume too much, and those who think about sustainable development do not always get the support of corporations or governments of a particular country.

The use of wood and wood materials in the world is a common thing. It should be understood that our ancestors used the tree, because it is easy to process, rather than the stone.

The percentage of the use of wood increases as well as the number of inhabitants on the planet. In developed countries, legislative facts have been adopted that oblige the timber production site to plant a new generation of wood, so as not to lose the green cover. In the developing and third world countries, wood, as well as other resources, can be treated differently and used in its entirety. It is necessary to understand that there is illegal logging. Against the background of all this, it is worth noting the attempts of some states and people in the restoration of the green world fund.

Thanks to such developments and ideas - it was suggested to use sustainable development and maximum use of the already purchased resources. In Varkauden Puu Oy there was not exact marking system that could help to use wood, make less waste in production. [1]

2 THEORY

2.1 Logistics

Logistics is generally the detailed organization and implementation of a complex operation. In a general business sense, logistics is the management of the flow of things between the point of origin and the point of consumption to meet requirements of customers or corporations. The resources managed in logistics can include physical items such as food, materials, animals, equipment, and liquids; as well as abstract items, such as time and information. The logistics of physical items usually involve the integration of information flow, material handling, production, packaging, inventory, transportation, warehousing, and often security.

It shows that any company, which wants to be in the market, should have logistics. If the company has great logistic management, they can be more efficient. Logistics management is the part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customer's requirements. The complexity of logistics can be modeled, analyzed, visualized, and optimized by dedicated simulation software. The minimization of the use of resources is a common motivation in all logistics fields. A professional working in the field of logistics management is called a logistician.[2]

2.2 History of Logistics

The concept of «logistics», previously known only to a narrow circle of specialists, is now becoming widespread. Despite the fact that it may be an earlier science, it goes from the roots deep into history.

The opinions of many researchers converge on the fact that logic originated in Ancient Greece, where in ancient Greece, where the word logistics meant «countable art». In other words, the ancient Greeks understood the logistics of performing calculations. If you believe Archimedes, the logistics were in the IV century BC in Greece. In addition, during the Roman Empire, there were special ministers who referred to the title of «logistic» or «logistics». They distributed food.

However, according to another version, this term is known from the 9th century AD, from the time of the Byzantine emperor Leo VI (866-912). In Byzantium at the court of the Emperor, there were «logistics», which were supposed to manage the received taxes and distribute them.

The creator of the first scientific works on logistics is considered the Frenchman Jomini. He was a military specialist of the beginning of the 20th century, who derived the following definition of logistics: «Logistics is the practical art of maneuvering troops.» He believed that in this respect he considered some important issues which were planning, management and supply. There is evidence that even Napoleon Bonaparte himself used the principles of logistics in his army.

Especially brightly the logistics showed itself during the Second World War. This is because the effectiveness of military operations largely depends on the coordinated and rapid provision of all needs. Competently adjusted joint work of military production, transport-forwarding services and logistics services made us think about the use of military logistics in a peaceful economy. In the 1960s, logistics was gradually moving from military to civilian and then industrial. Interest in it is determined by the needs of economic and business development.[3]

2.3 Product Development

In business and engineering, new product development (NPD) covers the complete process of bringing a new product to market. New product development is described in the literature as the transformation of a market opportunity into a product available for sale. The product can be tangible (something physical which one can touch) or intangible (like a service, experience, or belief). A good understanding of customer needs and wants, the competitive environment and the nature of the market represent the top required factor for the success of a new product. Cost, time and quality are the main variables that drive customer needs. Companies develop continuous practices and strategies to satisfy better customer requirements and to increase their own market share by regular development of new products. There are many uncertainties and challenges which companies must face throughout the process. The use of best practices and the elimination of barriers to communication are the main concerns for the management of the NPD process. Any changing which can provide a new level of production can be called product development.[4]

2.4 Marking

It is well known that almost any product needs marking. With the increase in line productivity, as well as with the complexity of transportation and storage systems, the need for rapid and high-quality information inflow and rapid change is rapidly increasing. In fact, the correspondence between the external appearance of the product, its purpose, properties and contents did not always exist, and sometimes it was completely absent.

This circumstance, supported by the lack of a label or marking in their modern sense, made it difficult for consumers and buyers to objectively evaluate the goods and choose the necessary products. Even now, such a circumstance hampers the work of archaeologists, causing disagreement in determining the purpose of the find. Therefore, in museums you can see the inscriptions on the plates: «a vessel for water», «a vessel for salting fish». The basis for these conclusions is often the decor.

A full-fledged packaging and packaging is made by marking, which serves to identify the goods. The information contained in the marking is primary to the packaging. By the way, the first inscriptions on the vessels appeared in Egypt in the III millennium BC. E. They were pitchers with the repressed name of the reigning pharaoh. There were also signs of owners, dates of manufacture and even labels of tax collectors, but nothing was said about the contents.

Only in the middle of the II millennium BC, the information contained in the marking of wine jugs has grown to almost the volume characteristic of a modern wine label. There it was mentioned the place of grape collection for this wine, its sort, taste (sour, sweet), the age of wine and place of production. Marking facilitated the sale and transportation, because all the vessels were opaque, the same shape; without marking, to understand what was inside, you could only open the vessel and try the contents.[5]

3 VARKAUDEN PUU OY

This company is a manufacturer of planed wood products with 25 years of experience in the field. Main products are mouldings and decorative panels used by builders, interior decorators and carpenters. Customers include building trade wholesalers, factories and industrial painting shops, but also products sold directly to the customer. About half of the production goes into exports to Great Britain and Germany. The machinery of the company includes four hydro technical planing machines made by Weinig. The used raw material is wood that conforms to the Programme for the Endorsement of Forest Certification (PEFC) standard.

Varkauden Puu Oy produces about 10 million meters of wooden mouldings per annum. The production produces a lot of sawdust and wood chips. The sawdust is baled as a desiccant, and the wood chips are sold as a heating material. In addition, the process leads to off cut end pieces, which are refined at Jatkos Oy.

3.1 Production

The company produces both standardized mouldings and customized mouldings. The standards of various countries also show slight variations. To comprehend what this company is creating, we need to cite the image data as an example (Figure 1;2):



Figure 1. Type of moulding



Figure 2. Type of moulding.

The given images help to understand what type of products the company makes and for what the excellent sorting system is initially necessary. Also, it is already possible to understand where and in which details spoilage can be found.

3.2 Hardware and Specification

Different kinds of ready wood products are obtained thanks to this planing and milling machine Weinig Powermat 1000. It is a basic model of this series (Figure 3)[6]:



Figure 3. Powermat 1000

It embodies all the advantages of the Vertex software and allows us to experience their technological flexibility fully. This model provides up to 11 seats for the tool, which makes it easily adaptable to a wide range of manufacturing tasks. Execution of work commands is provided in a matter of seconds through the PowerCom control unit with a touchscreen. The finishing touch in this «quality parade» is the VARIO safety system, which controls the optimal position of the protective covers and clamps, taking into account the diameter of the used tool[7]. Main technical characteristics are shown in Figure 4:

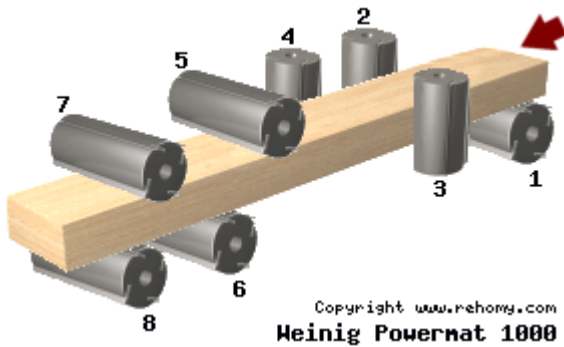
Working width	20 - 230 * mm (260; 300 mm)
Working height	8 - 160 * mm (180; 200 mm)
Diameter of spindle	40 * mm (PowerLock tool holder)
Feed speed	5-30 m / min (6 - 36 m / min)
Number of spindles	5-11, including universal spindle
Spindle rotation frequency	8000 * rpm (with PowerLock 12000 rpm)
Power of spindle drive	With the adjustment of 4000-12000 rpm
Max. Profiling depth	5.5 - 37 kW
Max. Diameter of the cutting circle	35 mm

Figure 4. Technical specifications

Different options for the given unit:

- Feed with frequency adjustment
- Heavy cast frame
- Covering Marathon Coating for machine table and stops
- Pneumatic pressure for the feed rollers
- Two clamping rolls in front of the 1st left spindle
- Drive rubberized roller 50mm wide in the output table
- VARIO safety system: the position of the protective covers and clamps is automatically matched to the diameter of the tool used
- PowerCom control system
- Two multipurpose spindles (options)
- Dividing saw unit (option) for cutting the workpieces from the bottom
- Sawing unit for cutting work pieces by thickness, right and left (option).

The principle of operation (Figure 5):



1 Bottom	15 kW
2 Right	7.5 kW
3 Left	11 kW
4 Right	11 kW
5 Top	22 kW
6 Bottom	22 kW
7 Top	22 kW
8 Bottom	18.5 kW

Figure 5. Powermat 1000 inside

The specification of this device is very diverse and suitable for creating various wood products. Initially, there is a control system in production that is not ideal. Therefore there can be different situations that can affect the business for the better, and vice versa, for the worse.[8]

3.3 End Products

It should be borne in mind that wood is also supplied to different companies for different price categories. There are three types of acceptable wood for certain customers.

1. Pared down, without bark, no knots, no more than one knot per meter is allowed, the size of the knot should not exceed five millimeters (Figure 6)



Figure 6. Type of mouldings, AMKO

2. Pared down, without bark, the presence of knots, the size of the knot should not exceed five millimeters, the number of knots is not limited, but the less, the better (Figure 7)



Figure 7. Type of mouldings, TM

3. Pared down, without bark, knots ranging in size from five to ten millimeters, perhaps the presence of a little bit of resin. Often used for the deal board (Figure 8).



Figure 8. Type of mouldings, CM

Companies from Switzerland, Germany, as well as AMKO from Finland, order the first option. Arvolista orders the large size of the metric area and the same quality. The second option is sent to England with the mark CM. The third option is also sent to England, only marked TM.

4 SUPPLIERS

Raw material must be purchased. There are several suppliers. Let us analyze two main companies that supply the company with products.

4.1 Versowood Oy

Versowood is Finland's largest private sawn timber producer and processor. As a domestic family business, it deals with wood trade with emotion, listening to the needs of the forest owner and the customer. The company originated in 1946. Since then under different names, it produces raw materials for wood processing companies.

4.2 Stora Enso Oyj

Stora Enso Oyj was founded in 1998 by merging a Swedish extractive and timber company Stora and a Finnish timber company Enso-Gutzeit Oy. Stora was the oldest corporation (limited liability company) on Earth: back in 1347 this firm, then called Stora Kopparberg, was granted the privilege of King of Sweden Magnus Eriksson. The very earliest document evidencing the existence of this company dates back to the year 1288. Stora Enso also has production capacity in Russia, which is an indicator of the global brand of products.[9]

5 LOGISTICS AT THE MOMENT

Representation and determination of the correct point of departure and production is an important thing in any company. The principle of logistics which is used in this enterprise will be explained later in the production process. The company receives an order for a certain type of product. Depending on the customer, the required raw materials are purchased. Vendors have the right to assign their offers to every order. For an enterprise to make a profit, the best option is chosen, whose criterion is the cost of raw materials, a method of delivery, time of delivery, and the amount of possible spoilage. When choosing an unknown supplier, the percentage of risks increases, because the new supplier offers the lowest prices, but the threat of risks is also present. After a certain tender, the company that provides raw materials for the order is selected. Raw materials are packaged in bags and shipped to the company's location. When the order is delivered, it is verified and initial evaluation of the raw material is made. If raw materials are not of high quality, the company that provided raw materials returns the money, and also pays the risks. If the raw material is suitable for production, it is allowed to cut and billets. The finished product is packaged and sent to the warehouse. Then the product is sent from the warehouse. Often the finished product is sent immediately from the machine and after the process of packaging to the firm that made the order.

The process of rejecting spoilage, as well as critical spoilage is similar to the process of finished products. It is sent to the warehouse, marking in two types: bad for this order or even for processing for the needs of the enterprise. Subsequently, from the processing, pallets and wood are obtained, which is required for the company's internal turnover. Spoilage is used to make a finished product for another company. It is worth noting that spoilage is rarely used and it happens that people forget about it until better times.

6 SUSTAINABLE DEVELOPMENT

Sustainable consumption and production are about promoting resource and energy efficiency, sustainable infrastructure, and providing access to basic services, green and decent jobs and a better quality of life for all. Its implementation helps to achieve overall development plans, reduce future economic, environmental and social costs, strengthen economic competitiveness and reduce poverty.

Sustainable consumption and production aim at “doing more and better with less,” increasing net welfare gains from economic activities by reducing resource use, degradation and pollution along the whole lifecycle, while increasing quality of life. It involves different stakeholders, including business, consumers, policy makers, researchers, scientists, retailers, media, and development cooperation agencies, among others.

It also requires a systemic approach and cooperation among actors operating in the supply chain, from producer to final consumer. It involves engaging consumers through awareness-raising and education on sustainable consumption and lifestyles, providing consumers with adequate information through standards and labels and engaging in sustainable public procurement, among others.

One of the world's beliefs is that sustainable development can reduce costs, spoilage in production and use available resources many times for different purposes. Like our production, any other production is willing to be at the forefront of preserving our planet. So for the sake of various aspects, development and change are required. However, the question remains: what is wrong with the company and what is it striving for? Let us consider the process of manufacturing a finished product by the company.[10]

7 PRODUCTION PROCESS

One of the companies makes an order for a certain capacity of products that they need. While the order is processed and confirmed, the company receives an order for the right amount of wood, taking into account possible spoilage, both at the receipt of raw materials (Figure 9) and during manufacture.



Figure 9. Raw materials

By this time, the order has been finally formed, and the production of the goods required by the customer begins. Boards are cut to the required length, stored in one large pack and transported to the Weinig Powermat 1000 planing and milling machine. The machine operator, guided by the exact order and a permissible version of wood, starts using a chopped tree, shaping it.

So appears deferred raw material, which is not suitable for this order. It lies in a separate pile, in order not to interfere with further production (Figure 10).



Figure 10. Low quality

The ready order is collected to the pallets (Figure 11). After that it is packed and sent to the customer. The cycle of work is finished.



Figure 11. End product

8 SORTING AND MARKING OF DEFERRED RAW MATERIALS

After the machine worker has set aside the unsuitable wood, it is packed and sent for storage. There are a lot of such packages in production, and no one knows exactly what kind of wood lies there and why it did not fit. This is the main message of the thesis, to create a convenient marking for such packages, so that you can use them in the future without searching for packages. Initially, considering and offering the ideal option, which does not take into account the cost of implementation, it gives a minimum of losses, both monetary and raw materials. There are three main reasons for deferred raw materials:

1. A lot of barks
2. A lot of knots
3. A lot of knots and barks.

8.1 Ideal Marking and Sorting System

Depending on the order, there is a gradation in the quality of the products. For simplicity of notation, we take the first grade, the second grade, the third grade. The first grade is the best-finished wood in production. The second grade is the average wood regarding the number of knots. The third grade is the lowest layer.

For the first and second grade, there are three baskets that we will use in the marking system. For the lowest grade, such three baskets are useless, given the fact that if timber is bad for this grade, then it is spoilage. For the first grade, but with a lot of barks - a basket with a good board, which is suitable for further rasping for smaller orders (Figure 12).



Figure 12. Bark

For the first grade, but with a lot of knots - a basket with the board of good quality. However, for the first grade, it has a too large number of knots of a large size (Figure 13).



Figure 13. Knots

The first grade - a mix - is a basket with a quality board that will go on for further stripping to smaller orders. It has a lot of knots and cannot be used for the first-class production (Figure 14).



Figure 14. Mix

For the second grade, but with a lot of bark - the same approach. It is suitable for smaller orders of the second or third grade. For the second grade, but with a lot of knots, the wood is only for orders of the third grade. For the second grade, (mix), the wood is only for orders of the third grade of a small size in view of planing.

Figure 15 could help to admit which grades can be used in which production. It should be admitted, that third grade is used by companies only as a pallet.

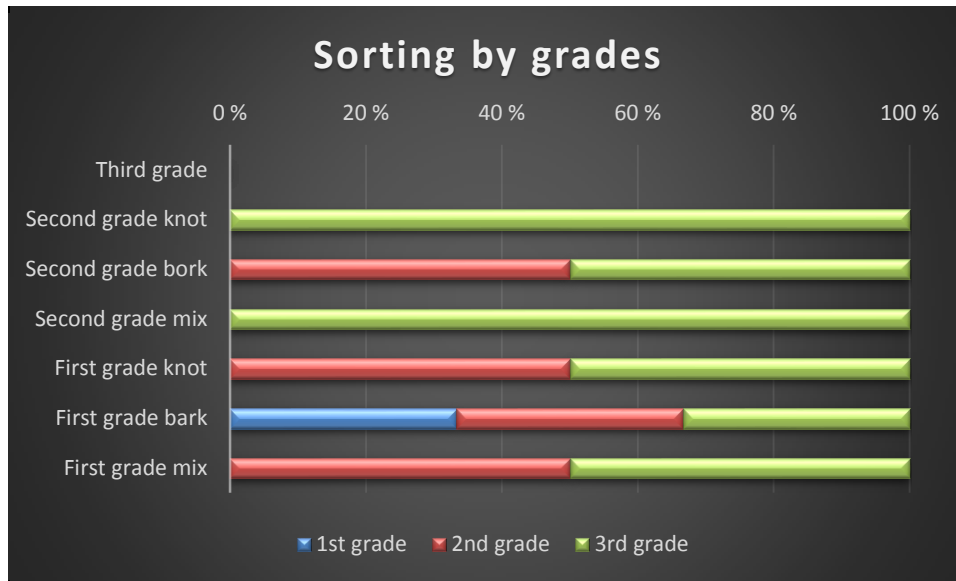


Figure 15. Excel table of sorting by grades

However, it should be kept in mind that the boards are already sawed to the right size; therefore the length of the board should be taken into consideration in the marking process. So it is not reasonable to use three-meter boards for an order of a one-meter board, if we take into account sustainable development around the world and the use of raw materials.

Therefore, the example of marking can be considered as: «First grade, a lot of bark, two meters.» But the fact that workers can be people from different countries has to be considered and they do not always understand refinements. It is necessary to get over to conventional notation.

- The first grade will be denoted by the letter «1»
- The second grade will be denoted by the letter «2»
- The third grade will be denoted by the letter «3»
- A lot of bark will be denoted by the letter «B»
- Many knots will be denoted by the letter «K»
- Mix will be designated «BK»
- The meter will be indicated by a number, if two meters - then two, if three meters twenty centimeters, then 3.2.

Total we get that the deferred tree of the first grade with an abundance of bark cut into 2 meters will be marked as «1B2». Also, the thickness and width should not be forgotten, so in appearance with ISO standards all marking will be like «1B30x150x2», where 30 – 30 millimeters of thickness and 150 – 150 millimeters of width.

9 SPOILAGE

The sorting does not take into account the fact that raw materials, like finished products, can have unsaleable material. So, let's consider the possibilities of product spoilage, depending on the order and on the company that provided the raw materials.

VersoWood makes deliveries of raw materials based on its production principles. It is challenging to influence this company directly, but it is possible to do it indirectly. The main probability of spoilage depends on which side of the package with wood is the sawing. Under the condition that packages of the wood with 400 pieces are 6 meters long. Wood sawing begins at the right size and here is the first opportunity for spoilage. An example of sawing a tree trunk is in Figure 16:



Figure 16. Wood cut

The boards coming from the wide part of the trunk have fewer knots than in the place where the tree begins to taper. This is why the raw materials of each board are divided into three types:

- The first type is the type with least number of knots or their absence. This type can be found at the beginning of the tree

- The second type is the type that has knots and cannot be used in deliveries for companies of the first grade
- The third type is the type that has even more, knots and is not suitable for second-class orders.

9.1 Considering the Percentage of Raw Material Spoilage of the Company Versowood

However, raw materials cannot be selected and the percentage of rejects from which no timber can be produced for the company AMKO, companies in Switzerland and Germany, that is, wood products of the first grade, has about 30-40%. That is, 60-70% of the total raw materials can be used.

We should keep in mind that if the product is of a large length, then the possibility of spoilage rate tends to grow up to 95%, and of a small length, vice versa to the minimum. The raw materials used for Arvolista have a 10-15% spoilage rate. It is worth considering that the company leaves raw materials to its own resources. Raw materials that go to the second grade, or else CM, have a 20-40 percent of spoilage. Raw materials for TM, or for third grade, have a spoilage rate of 0-40%.

9.2 Considering the Percentage of Spoilage of Raw Materials of the Company Stora Enso

Initially, the company Stora Enso has a lower percentage of spoilage. Namely, any of the items presented above is reduced from 10 to 15 percent.

Wood for the company AMKO, companies in Switzerland and Germany, that is, wood products of the first grade, has about 25-33%. It should be understood that if the product is of a large length, then the spoilage rate tends to rise to 95%, and of a small length, vice versa to the minimum. Raw materials that go to the second grade, or else CM, have a spoilage percentage of 17-33. Raw materials for TM, or for third grade, have a spoilage rate of 0-33%. It would be reasonable to order from one supplier, but because of price factor company orders from another one too.

9.3 Spoilage with Re-Use of Raw Materials

It is worth considering that rarely people make ready products for companies of the first grade from raw materials of the first grade. Usually, such raw materials are given to the second grade or to the third. Spoilage at that rate is about 5-50% regardless of the company providing raw materials.

9.4 Spoilage of End Products

For all companies, except companies that order third-class products, the percentage of spoilage is 10-20%. For the third grade, the percentage of spoilage is 5-20%. However, each of the defective elements can be used again. This is demonstrated by a further example: The company produced corners for ceilings with a metric area of 2.4 meters, but due to a possible spoilage, 15% of the production was set aside. Further actions with them: cutting into smaller parts, for example from 15 defective corners of 2.4 meters in length, can be obtained 20-24 corners of 1 meter in size.

10 POSSIBILITY OF IMPLEMENTATION IN THE COMPANY

10.1 Feasibility

It should be kept in mind that the company does not always take risks that initially require costs. However, using the principle of non-waste production, as well as sustainable development, it is possible to improve the efficiency of work.

10.2 Effectiveness of Execution

The probability that one system will be replaced by another one immediately is extremely small. It should be understood that any reform or change is divided into several stages. The existing system is distributed only by product types:

- First grade in Figure 17



Figure 17. 1st grade

- Second grade in Figure 18



Figure 18. 2nd grade

- Third grade in Figure 19.



Figure 19. 3rd grade

There is no division of the number of knots and bark. Moreover, there is mainly a progressive production. There is a division due to the length of the deferred raw materials.

10.3 The First Stage of the Changes

At this stage it is proposed to change and replace one common basket by four:

- A lot of barks
- Many knots
- Mix
- Spoilage.

It is worthwhile to understand that the orders go sequentially, because each of the unsuitable raw materials, the basket is marked with a variety depending on the original production. We immediately have three sorted baskets with raw materials, which can be used in the future. And also there is a separate basket with spoilage.

The question arises if there are several consecutive orders of the first grade, and then a third grade immediately appears. What to do with it? Here the logistics of the enterprise arise. It takes the three shifted out baskets to the warehouse, where it is stored on demand till called for. And at this moment the machine is filling the baskets of the third grade on principle:

- A lot of barks
- Many knots
- Mix.

10.4 The Second Stage of the Changes

In the second stage of the changes, it is proposed to create seven baskets that meet the marking requirements for all parameters and repository with a clear hierarchy of wood by grade, quality, options for spoilage and length.

It must be kept in mind that these changes are too global and are unlikely to be produced by the company in a short period. This change requires the reorganization of the warehouse, as well as the training of staff. However, with the introduction of the second stage of the changes, costs can be cut by half, and the cost of raw materials can fall.

10.5 Change in Logistics

An ideal system can be a pipelining assembly when the conveyor is configured on the principle of transportation of luggage at the airport. This principle uses marking of each piece of raw material and determines in which grade, for what reason and to what extent it can be completed for further use. In simple language, a ribbon appears on the machine for which spoilage with markings is sent, the computer reads the information that contains this marking and sends the needed line to a certain point in the warehouse where the same defective raw materials are stored.

This can be analyzed by using an example. There are three orders that are made simultaneously. The first order is sent to the CM order, or to the third grade, and has a length of 2.4 meters. The second order is sent to Switzerland, it is of first grade, and has a length of 3 meters. The third order is sent to TM marking, which is of second grade and has a length of 1 meter. For each of the orders, spoilage is possible, so that the planer simply marks the defective raw materials so that they can be immediately sent to the spoilage conveyor. Sorting goes this way:

- First grade, but a lot of bark length of 3 meters is sent to the warehouse in box A1
- First grade, but a lot of knots are 3 meters long in is sent box A2
- First grade, but a lot of knots and bark length of 3 meters goes to box A3
- Third grade, long 2.4 meters and a lot of bark is sent to box C
- The second grade, 1 meter long and a lot of bark is sent to box B2.

Designations are conditional, because they will be replaced by marking on the wood. It is worth considering that in each box there is an additional separation along the length of the raw material.

11 RESULTS

In general, it can be concluded that when carrying out changes and understanding that some of the raw materials were initially discarded and nowhere further used, it is possible to increase the efficiency of purchases of one or another kind of raw materials up to several times.

Taking into account the percentage of spoilage and the number of raw materials / blanks put aside, the average savings on purchases for second and third grades is about 30-40 percent. Initially, this approach will increase the cost of production, but will reduce the cost of procurement. It should be understood that if the quality of the suppliers material increases or there will appear a new one of better quality, the percentage of rejects in the blanks as well as in the finished products will decrease, but the percentage of savings will be reduced by sorting the raw materials / blanks.

It must not be forgotten that such a confluence of circumstances may occur immediately or may appear in a few years. It is not known whether partners will use sustainable development and improve product quality, and whether new suppliers appear that offer more democratic prices or better quality products.

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