

MINIMIZING DEFECTIVE PRODUCTS BY IMPROVING SUPPLY CHAIN MANAGEMENT PROCESS TO INCREASE VOC REVENUE

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ABSTRACT

The aim of this research is to obtain a way to minimize the risk of defective products ever reaching the customers' hands through process improvement or creating preventive methods on every section/chains along the supply chain management in order to increase the revenue/sales of Verona Office Chair, a company that works in the field of making office chairs, with a focus on handmade productions. The research is done through a qualitative method with an external data combination, prior theory and research, and data from purposive sample, through observation, interviews and discussions, either internally or external of the company. Apart from the methods to prevent defective products, this research also summarize a new view about a more effective quality control practices and utilization of residual material after productions. The next research is encouraged to obtain a more effective implementation strategy and to obtain a more effective new methods that are suitable to changes in business situations.

Keywords: *supply chain management path, defective products, fishbone analysis, poka yoke method, improvement process method, VOC (Verona Office Chair).*

INTRODUCTION

As time goes on, consumers these days prefer quality more than consumers used to in the past. The products or services that consumers thought are of a better quality will have a better market share chances compared to products regarded to be of lower quality, which means that the company who provides the products or services will have a higher potential to get a higher revenue (Wibowo, 2014). In this industrial age with very tight competition these days, every business people who wants to win a competition in the industrial world will surely give their full attention to quality. Production process that focuses on quality will produce a quality product that fulfills the requirements and free of defective products, will avoid waste and

inefficiency which means that production cost per unit will be lower, allowing the product cost to be more competitive. This will increase the sales of those products which means leads to an increase in market share and eventually an increase in company income (Gaspersz, 2005).

The cost to fix a defective product will be lowest if it happens at the location or design phase and will increase when it reach the production phase, and will jump up drastically if it already reach the customers' hands, since there will be cost for pulling back the product, fixing it, sending it back, guarantee claim, fines, and possibly even a lawsuit, but the worst impact of this is losing the customers and lowered company reputation, as it means loss of sales and extra cost in re-acquisition of the customers, if that's even still possible (Reid and Sanders 2005).

History shows that Japan's recovery in the industry business after World War II starts with development of the a modern quality system, for example with Toyota who are supported by credible suppliers and are able to work as a team (Liker, 2004). To complete the explanation about the role of suppliers above, quoting Pujawan and Mahendrawathi (2010: 8): "...competition these days aren't only between one company and the other, but between one supply chain and the other".

As explained above, to this day VOC, as a company with a traditional style of management who focuses on handmade work in its production process, is in a situation that forces it to improve on quality if they want to be sustainable and growing.

From the internal data of the July 2014 – June 2015 period it is found that there are 6 category of defective products with a total of 405 cases (239 units of which have to be returned to be fixed), detailed as follows:

1. Component Break when used (88 units returned from 88 cases)
2. Assymetrical assembly (55 units returned from 100 cases)
3. Incomplete components (44 units returned from 44 cases)
4. Broken inside packages (30 units returned from 56 cases)
5. Assymetrical Bekleed (14 units returned from 14 cases)
6. Assembly holes doesn't Fit (8 units returned from 103 cases)

These defective product cases has a direct cost of fixing it of Rp32.000.000 where this hasn't include other costs like the cost of communication and negotiation, additional discounts, loss of time and others, even the cost of loss of sales and customers who break the relationship. As such, the focus of VOC quality improvement is to obtain a way to minimize defective products through an improvement in the supply chain path which will also be the main theme of this research

LITERATURE REVIEW

Several prior research who explained the relationship between supply chain and quality achievement are as follows:

1. Research by Ismail Sila, Maling Ebrahimpour, Christiane Birkholz (2006) with the title "*Quality in supply chains: an empirical analysis*", summarize:
 - The relationship between each chain the supply chain has to be based on the quality attribute.
 - Sharing information with each other based on a foundation of trust is one of the way to increase quality and competitive level in all parts of the supply chain

2. A research by Victor HY Lo and Alice Yeung (2006) "*Managing quality effectively in supply chain: a preliminary study*", summarize:
 - Quality commitment from the suppliers shown by the presence of **quality culture and system**.
 - Relationship with the supplier must have a **long-term orientation** since the supplier is located at the start of a *supply chain*.
3. A research by Mahour Mellat-Parast (2013) with the title "*Supply chain quality management: an inter-organizational learning perspective*", summarize: increasing satisfaction and performance of the supply chain can be achieved by practicing a concept of learning with other companies.

Supply chain management illustrates a comprehensive coordination for the supply chain activity, sequentially started from the material by the supplier, Production Company and/or service provider, and Distribution Company and/or reseller that brings a quality product free of defect that meets expectations (Pujawan and Mahendrawathi, 2010; Siahaya, 2011, Render and Heizer, 2014).

A defective product is (1) a final characteristics of the product that doesn't fit the planned specification which means it doesn't meet the required function especially from the user point of view, (2) a defective product often happens very closely related due to a mistake in its building process (www.wikipedia.com, www.businessdictionary.com).

A concept to minimize defective products is to focus on its process, to prevent and do it at the very start of the process by applying the concept of '*Do It Right the First Time*' (Crosby, 1992). The Fishbone Diagram, is used as a helping tool to identify the cause and effect in a quality case (Ishikawa, 1992), which in the context of this research is used to know the relationship between each defective product category with the supply chain management path in VOC.

A defective product prevention method can be done with two analysis methods:

1. Poka-yoke method that means a mistake prevention method, which states through a simple logic as follows:
 - The cause of product defect lies on the working mistakes by the workers, and the product will not be effective if those mistakes are discovered and removed before it is processed further.
 - Defect appears due to a mistake in work, those two things have a causality effect. Therefore, it can be summarized that the work mistake will not turn into a defective product if there's a feedback and action when it's still in the process where work mistake happens. Preventing the wrong output to avoid it becoming the next inputMoreover, the tools included in the Poka-yoke are the jigs and fixtures (Shingo, 1986). This method is more focused on chains of a production process.
2. For non-production method a fixing process model with steps introduced by Tanner and De Toro in Gaspersz (2005) which are: problem definition, documentation of the existing process measuring performance, understanding the cause of the problem and idea for improvement.

From the above study, the following method of analysis can be made for this research:

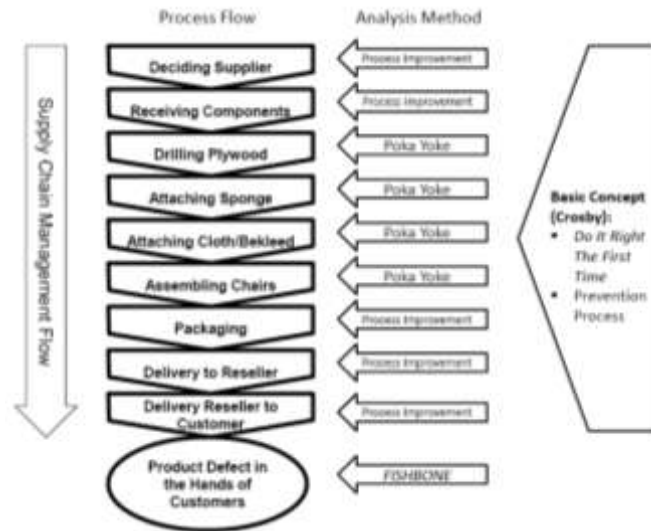


Figure 1. Research Analysis Method

RESEARCH METHODS

This research uses the qualitative research method that stresses on the observation and extensive research on the field. This qualitative method is used because the deciding variable is still unclear, and therefore there is a need for a field observation in order to obtain a clearer, more comprehensive, deeper and more credible information (Moleong, 2015). The main instrument in this research is the researcher itself, who is the founder of the company and to this day is still active in the operational business of the company. Meanwhile, the tools used are a voice recorder, a video recorder and a question answer sheet based on observation results. (Sugiyono, 2014; Moleong, 2015).

This research uses purposive sample (Sugiyono, 2014) as an informant that is taken from personnels who are directly involved in every chain of the supply chain management, the purposive sample that will be used can be divided into three categories which are: internal purposive sample from VOC side, external purposive sample from the supply side external purposive sample from the reseller side, with a minimum amount of 3 personnels including the researcher in every chain. The validity and data reliability test in the qualitative method is done through: observation extension, dilligent increase, triangulation and discussion with friends (Sugiyono, 2014).

FINDINGS

From the fishbone analysis on the case of defective products that got returned the most, which is when compononets are broken when used (88 units returned) the cause can be observed as shown on figure 2 below:

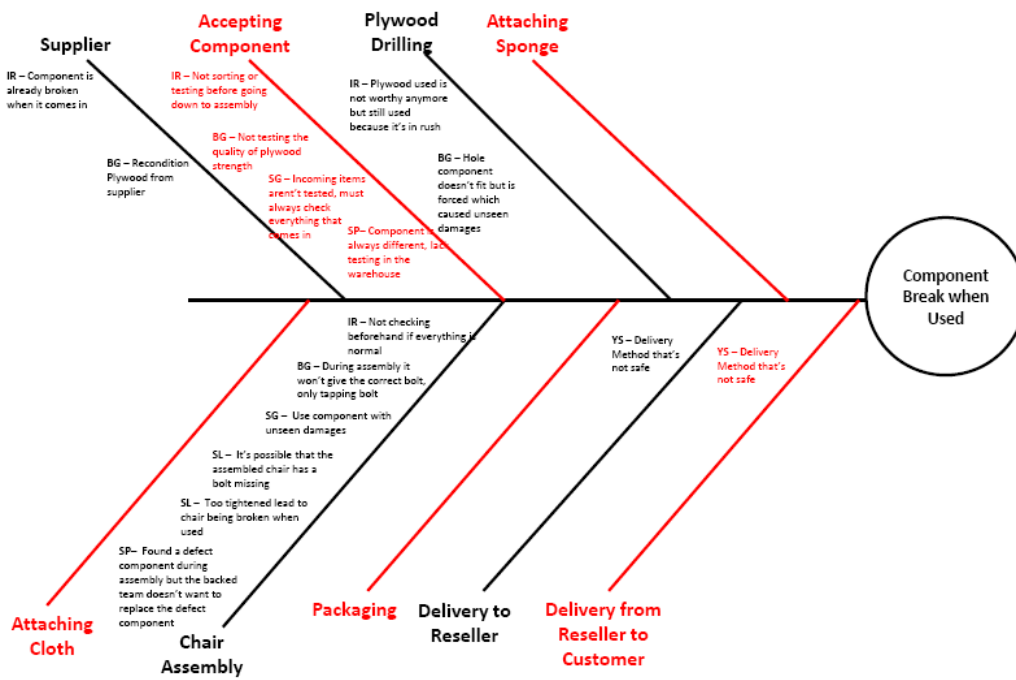


Figure 2. Diagram Fishbone of Defective Products that Broke Down when Used

Overall it can be observed that there's a correlation between defective products with supply chain management path as shown on figure 3, which shows:

1. Every category with a risk of defective product happening, a prediction done consequently from the first chain to know which chain cause the defect if there's a work mistake in that particular chain.
2. At every chain in the supply chain management path, if there's a work mistake, there's a risk to cause any type of product defect.
3. Point 1 and 2 above will be very helpful in determining the priority and work plan strategy if this research result is going to be applied.

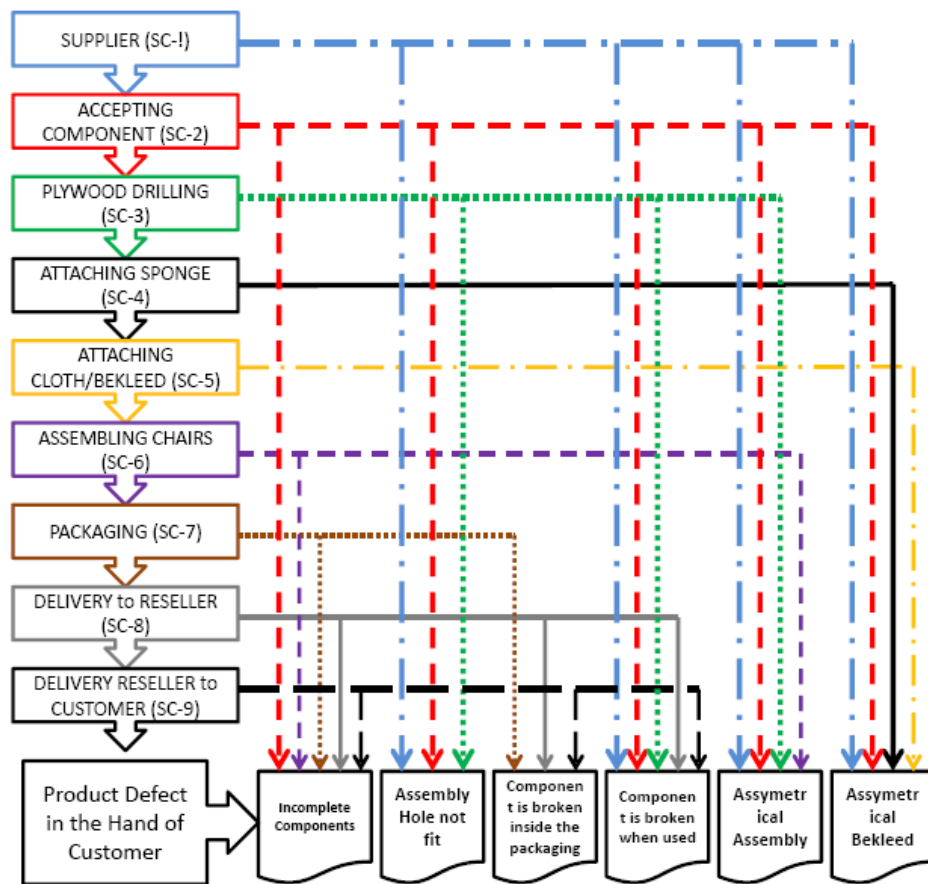


Figure 3. Correlation Map between Defective Products and Supply Chain Management Path

In this research a defective product preventive method for VOC is made:

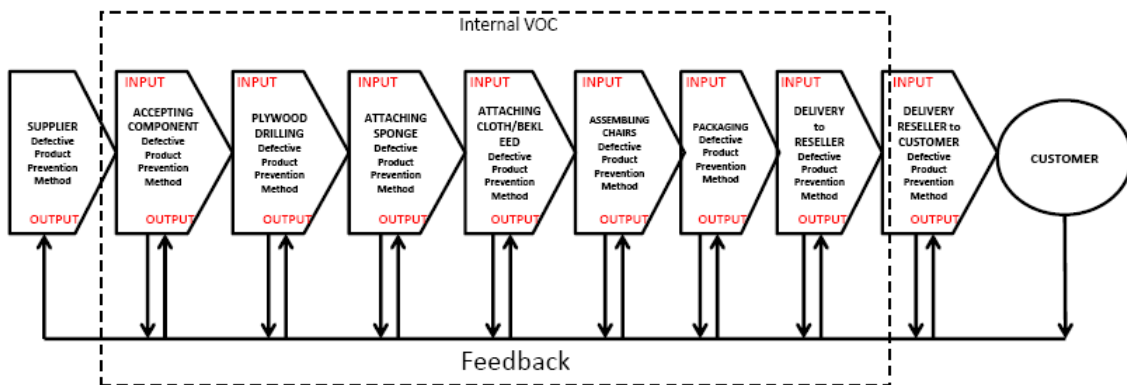


Figure 4. Defective Product Prevention System in VOC

CONCLUSION AND SUGGESTION

Conclusion

From the research that uses VOC as the case study object, the following conclusions related to defective products prevention can be taken:

1. The use of *supply chain management* path as the point of departure for the analysis is a very correct choice, since it can be seen clearly from the beginning that in every production process with a risk of creating a defective product, continued with a consequent chain until the product is received by the buyer. The output of a process in a particular chain can be an input for the process in the next chain
2. Defective products can be avoided by using the work mistake prevention method so that it will not rely solely on fixing the defective product, and in this case the use of mal/jig/fixture in addition of the Poka-yoke method makes for a very promising solution.
3. *Quality Control/QC* should be done in every chain of the *supply chain management* not only so that it would make it easier for the final QC product at the end of the production line, but it will also reduce the fixing cost if there's a defective product since it's already been treated when the first wrong output happened.

Suggestions:

1. In order to make the result of this research, the defective product prevention method, to be applied optimally, it is suggested that further research about the implementation strategy is done considering the variety of knowledge level, work experience and skills that each involved workers have.
2. There need to be further research on how the strategy to implement the defective product prevention method is done so that it can face the change in product specification, which are predicted to be very fluctuative, especially when considering the need for VOC to continue growing and be able to sustain itself, which means that there's a need to respond on the rapidly changing competition level and consumer expectation.
3. In order to respond to those two things above, the next research must be able to provide more insight about the new methods that is suitable to the more modern age.

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