

Reduction of Waste on Freight Services of QWZ Company with Lean Service Application

Reza Alauddin Albanna

Department of Management Technology-Institut Teknologi Sepuluh Nopember

Putu Dana Karningsih

Department of Industrial Engineering- Institut Teknologi Sepuluh Nopember

Abstract:-QWZ company is a freight forwarder shipping company, that serves island of Java, Bali and Nusa Tenggara which was established in 2011. QWZ company has been experiencing problems is the amount of claims of abnormality goods and lost goods and also late deliver. This may reduce level of trust and contract discontinuation. That can may reduce revenue QWZ company. Problems that occur indicate a waste. This research will use Lean Service approach concept in order to achieve effective and more efficient process by identifying and eliminating waste or non value adding activities. There are some tools use that is Service Value Stream Mapping (SVSM), Borda Count Method (BCM), Root Cause Analysis (RCA) and risk analysis. From the results of the research, there are eleven waste activities classified into 3 types of waste such as defect/abnormality, delay/waiting, and overprocessing, receives the goods abnormality and writes in the event report, the driver awaits the making of the mail by service users, preparation of driver departure to the end customer long enough and the delivery note and receipt is not complete. There are four critical waste and root cause of the problem are (1) No responsibility charged to the driver and head of operational, (2) The absence of agreement between QWZ company with customers related to the waiting time of delivery order, (3) No standardization of the time of departure to the end customer and (4) The absence of standards regarding the administration of documents causing missing documents so that can not be billed to the customer. Recommendation from root cause of the critical waste are SOP related to goods inspection conducted by driver and head of operations and SOP of departure time and document storage, agreement between QWZ company with customers who have cooperated, giving reward and punishment so that there is a sense of responsibility of driver as well as the head of operational.

Keywords:-Lean Service, Service Value Stream Mapping (Svsm), Borda Count Method (Bcm), Root Cause Analysis (Rca) Dan Analisa Resiko.

I. INTRODUCTION

QWZ company is a freight forwarder shipping company, especially the island of Java, Bali and Nusa Tenggara which

was established in 2011 where currently QWZ company has its headquarters located in Cargo Terminal 2 Juanda Surabaya and has branch offices in Bali and Lombok. 80% of PT company shipments by landline and 20% by air and sea. Customers of QWZ company are corporate customers unlike JNE, Pos Indonesia, Tiki and DHL Express services so that QWZ company does not accept retail shipments. In an effort to be able to compete with its competitors and increase profits every year then QWZ company intend to streamline every business process that occurs from the order obtained until the order is paid by the customer.

QWZ Company has been experiencing the problem of the amount of claims of abnormality goods, lost goods and also frequent late delivery of goods. It can reduce the level of trust and satisfaction of customers resulting in the shift of customers to other shipping services that can reduce revenue QWZ. The amount of late payment penalty for delivery of goods is written in one of the cooperation agreement between QWZ company and its customers which is between 40 to 60 percent of the total shipping cost, despite the fact that the current penalty delay has never been billed. Average QWZ goods delay is between 1 - 4 days. Table 1 is the claims data of abnormality goods and lost / less from 2014 until 2017.

Year	Types of Goods	Type of Damage	Amount of Damage	Nominal Claim
2014	Medicine	Abnormality	167	9,790,000.00
		Less	24	750,000.00
	Spare Part	Abnormality	15	4,250,000.00
		Furniture	Abnormality	5
Total			211	19,290,000.00
2015	Medicine	Abnormality	1073	24,605,000.00
		Less	50	2,250,000.00
	Spare Part	Abnormality	27	14,250,000.00
		Total		
2016	Medicine	Abnormality	455	30,729,000.00
		Less	240	11,550,000.00
	Susu	Abnormality	60	2,116,000.00
		P&G/Soap Product	Less	9
Total			764	44,670,000.00
2017	Medicine	Abnormality	580	48,238,000.00
		Less	52	1,580,000.00
	Total			632

Table 1 Claim Data on Abnormality Goods and Less Year 2014 up to Year 2017

With the occurrence of delays and the number of shipment items are abnormality/missing it indicates that there is an inefficient process caused by waste that occurred on freight services QWZ company. Thus companies need to reduce the occurrence of waste by looking for the cause of waste and eliminate them.

II. METHOD

In this research will be used the concept of Lean Service approach, which aims to find the root cause of waste so that it can be formulated recommendation improvement. Lean Service is a methodology used in order to achieve an effective and more efficient process by identifying and eliminating waste or non value adding activities, resulting in increased corporate productivity, lower operational costs, increased profits business and can provide satisfactory service. To achieve this, some supporting tools are used, they are :

A. Value Stream Mapping (VSM)

VSM is a visual method that describes the process in terms of the physical flow of material and create the values of the customer. This includes diagrams of information flows to manage, control or influence the flow of physical materials. The purpose of the VSM is to help identify the source of waste.

B. Process Activity Mapping

It is an approach that can be used in production floor activity. This tool can classify the steps of each activity that is operations, transportation, inspection, delay and storage and then grouped and divided to identify activity value-adding activity, and non-value-adding activity. This tool serves to facilitate view flow process and identification of waste occurrence

C. Identify Service Waste

Waste can be defined as any work activity that does not provide added value in the process of input transformation into output along the value stream

The source of waste identified by Toyota and first introduced by Taiichi Ohno (Ohno, 1988), known as Toyota's seven wastes (Toyota's Seven Waste) is often applied to the manufacturing industry. In the development of seven waste is not only applied to the manufacturing industry but also the service industry, then the following seven waste that often occurs in service-based industries, viewed from the point of view of customers (in www.sscxinternational.com):

- Delay
- Duplication
- Unnecessary Movement
- Unclear Communication
- Incorrect Inventory
- Defect

- Lost Opportunity

D. Borda Count Method (BCM)

The Borda Count Method invented by Jean Charles De Borda, is a direct technique for ranking calculations of selected alternatives (Nash, Zhang, & Strawderman, 2011). Respondents/voters fill preferential options, according to their rank from first to last. If there is *n* option, then the first rank is *n*, then the second rank is *n*-1, the third option is *n*-2 and so on. The result of that value can determine the rank of all the options, which get the highest value, is waste with the first rank. Borda Count Method can be used to determine the priority of which waste will be completed first using the questionnaire to the relevant sections. The Borda Count Method example can be seen in Table 2 below.

Waste	Responden			
	A	B	C	D
Waste 1	1	3	4	2
Waste 2	2	4	3	3
Waste 3	3	2	1	4
Waste 4	4	1	2	1

Table 2 Respondent Results Example

Then will get critical waste value from 4 waste

Waste 1 = 4 + 2 + 1 + 3 = 10
 Waste 2 = 3 + 1 + 2 + 2 = 8
 Waset 3 = 2 + 3 + 4 + 1 = 10
 Waste 4 = 1 + 4 + 3 + 4 = 12

From the results above it can conclude under waste 4 is critical waste 1, waste 3 critical waste 2, waste 1 is critical waste 3 and waste 2 is critical waste 4.

E. Root Cause Analysis (RCA)

Root Cause Analysis is a structured evaluation method to identify the root cause of the problem. In addition, the use of RCA in performance improvement analysis by Latino and Kenneth (2006) in prestige (2007) can facilitate the identification of factors affecting performance. Root cause is part of several factors (events, conditions, organizational factors) that contribute, or cause possible causes and followed by unexpected results.

There are various undesired outcome methods. Jing (2008) describes five popular methods for identifying root causes of unexpected undesired outcomes from simple to complex

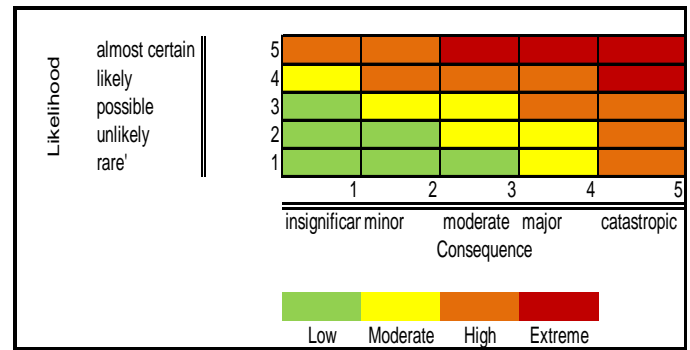
- Is/Is not comperative analysis
- 5 Why Methods
- Fishbone diagram
- Cause and Effect matrix
- Root Couse Tree

F. Risk Analysis

Risk analysis is the stage of identifying and evaluating existing controls at that time, determining the consequences and possibilities and causes of risk levels (Anityasari and Wessiani, 2011). Risks can be analyzed by appraising the probability of occurrence and consequences if they occur. When likelihood and consequences have been identified, evaluations are made and prioritize the most significant risks to be corrected first. Here are the assessment steps :

1. Assess the risk into the likelihood criterion (L) and consequence (C).
2. Calculate Risk Rating with the following formula $R = L \times C$ (2.1)

The chart of the risk analysis is shown in Figure 2 below:



(Source: Anityasari and Aranti Wessiani, 2011)

Figure 1 Mapping the Root Cause of Critical Waste

The purpose of risk analysis is to classify these risks into extreme, high, moderate and low categories. Where the highest risk will be priority to be managed first.

III. COLLECTION AND DATA PROCESSING

From the observations made at QWZ company start the process until the beginning of the final process can be described Value Stream Mapping as in Figure 4.

Value Stream Mapping PT QWZ Tahun 2017

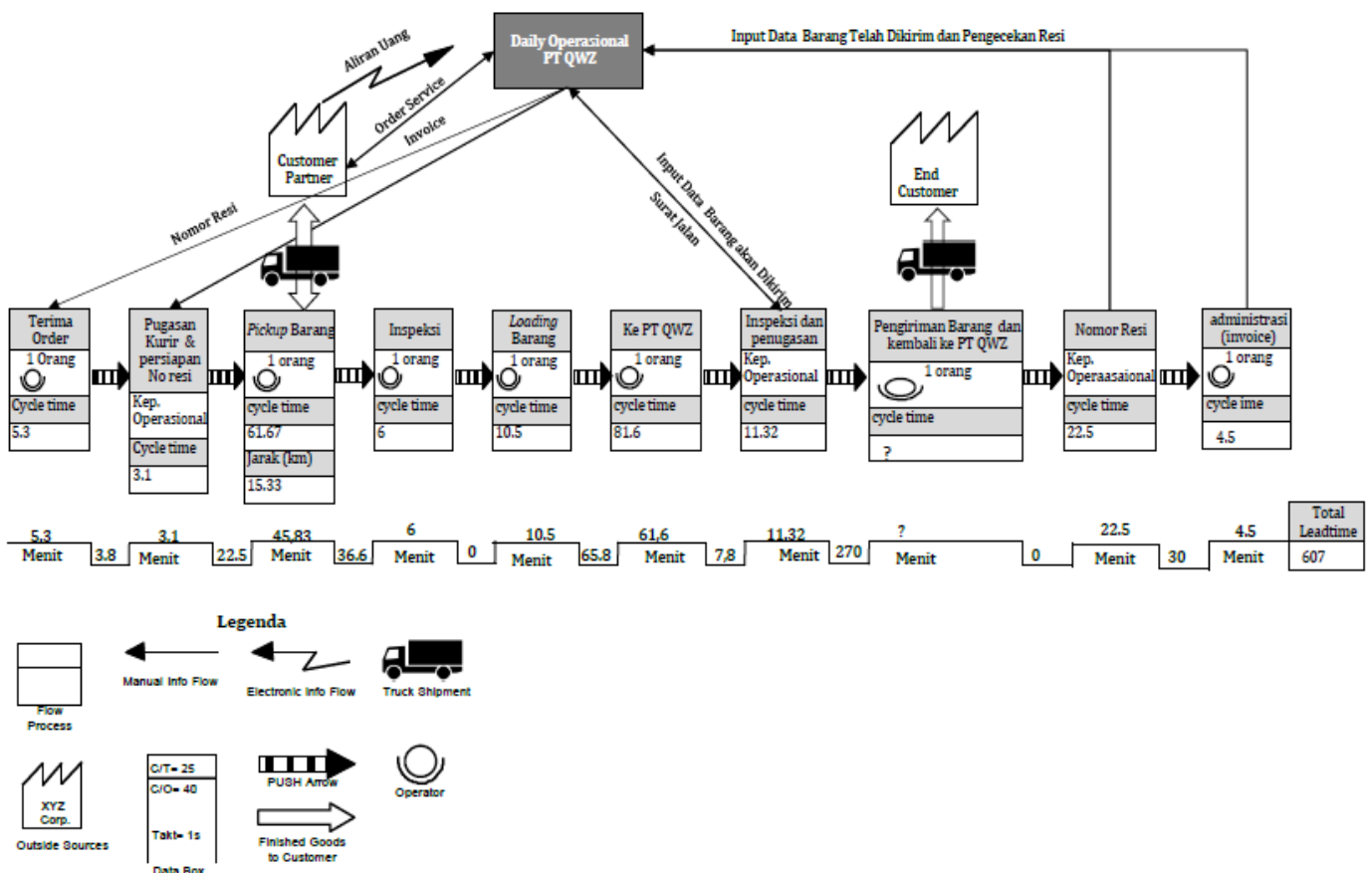


Figure 4 Value Stream Mapping Delivery Process PT QWZ

After map the process and information using ValueStrem Mapping service delivery process then it follow(Process Activity Mapping). The benefits of using PAM are to facilitate process filtering which is a VA process (Value Added), NVA (Non Value Added) and NNVA (Necessary Non Value Added). Then the output of PAM will be used in the BCM (Borda Count Method) process in determin the critical waste for NVA and NNVA.

No	Type of Waste	Code waste	Activity of Waste		
1	Defect/abnormality	D1	Delivery note and receipts are incomplete		
		D2	End customer receives the goods abnormality and writes on the news event		
		D3	Drivers complain abnormality of goods		
		2	Delay/waiting	Dy1	Driver awaiting assignment
				Dy2	Preparation of driver departure
				Dy3	Queuing for pickup
				Dy4	Driver waiting for delivery note by service users
		Dy5	Drivers wait for customers to change the goods abnormality		
		Dy6	Driver waiting to unload the goods		
		Dy7	Preparation of driver departure to end customer		
3	Over processing	Op1	Re-checking		

Table 3 Type of Waste

From Table 3 it is known that there are 11 waste/non value added activities in the process of goods shipping in QWZcompany. Eleven activity consists of 3 types or service waste category. Waste categories are defect/abnormality, delay/waiting, over processing.

After the waste categorization, followed by scoring the waste. Scoring is done based on the assessment given by the owner of QWZcompany (2 owner) by using the questionnaire tools. The value is between 1 (one) to 11 (eleven) where the value of 1 is a waste that greatly affects the value of losses experienced by the company while the waste with value 11 is the waste that the least impact on losses experienced by the company. It can be concluded that the top four critical waste generated from the BCM (Borda Count Method) scoring process are summarized in Table 4.

No	Type of Waste	Waste Code	The Activity of wastey	Ran k
1	Defect/abnormality	D2	End Customer Receives abnormality goods and write ini news event.	1
2	Delay/waiting	Dy4	Driver wait preparation of delivery note by users	2
3	Delay/waiting	Dy7	Preparation of driver departure to end customer	3
4	Defect/abnormality	D1	Delivery note and receipts are incomplete	4

Table 4 Top Four Critical Waste

After getting the top four critical wastes then the root cause of the critical waste is determined using 5 Whys.The results can be seen as seen in Table 5 below.

Code Waste	Activity of Waste	Root Cause
D2	End customer receives the goods abnormality and writes on the news event	No Responsibility Is Charged To Driver And Head Of Operations
Dy4	Driver waiting for delivery note by service users	Because there is no agreement between both parties
Dy7	Preparation of driver departure to end customer	PT QWZ Management System Which is not good
D1	Delivery note and receipts are incomplete	There is no standard document storage

Table 5 Why’s Critical Waste QWZ Company

To find out whether the waste goes into the waste category with insignificant, minor, moderate, major or catastrophic risks, risk analysis is conducted that considers likelihood and consequence.

Based on the results of interviews conducted with owners of QWZ company shows that; the absence of responsibilities imposed on the driver and the head of operations has the biggest risks, followed by the second because there is no agreement between the two parties and the poor QWZ management system and the absence of standard document administration. The results of the research can be seen in Appendix . The results of the assessment are poured in the QWZ company risk map as presented in Figure 2 codewaste D2 and Dy7 will prioritize the improvement first because it is in the extreme category.

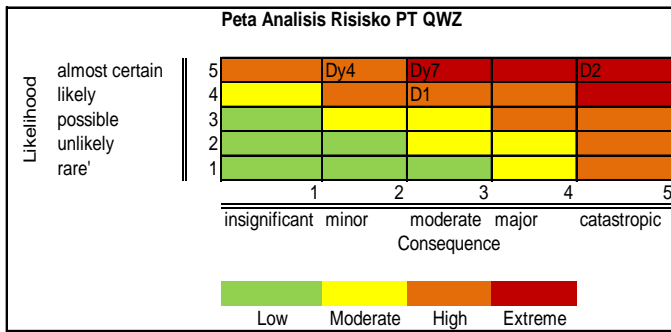


Figure 2 Risk Maps QWZ Company

IV. RECOMMENDATION FOR IMPROVEMENT

Critical waste in QWZ company consists of four waste. The recommendations for improvement on the four critical waste in QWZ company with waste code D2, Dy4, Dy7 and D1 are as follow:

A. Recommendation Code D2

Head of operations and drivers is an element of the company in charge of ensuring goods to the end of the customer with a state of non abnormality. But at this time many items found

abnormality when received by the end customer. Loss and damage of goods at the time of delivery are borne entirely by the company. Yet here it is clear the company has made a good SOP by doing two inspection processes to ensure goods to the end customer with goods condition. As illustrated in Figure 3, the initial inspection process is performed by the driver during the goods pickup process at the customer's company. The second inspection process is performed by the head of operations when the driver finishes pickup of goods at the customer's company. It can be said if there are goods abnormality that reached the end customer's hand is an error occurred between the head of the operational and driver. In the operational stage both are critical points in the process of delivery of goods with good circumstances. Both of which have the power to reject goods from customers to be sent to the end customer when the inspection process is done. Therefore the appropriate improvement recommendations implemented to this root of the problem are,

1. Preparation of SOP (Standart Operating Procedure) inspection of shipping goods for drivers and operational head. The following will be presented on the flowchart of the SOP inspection for the driver as well as the operational head.

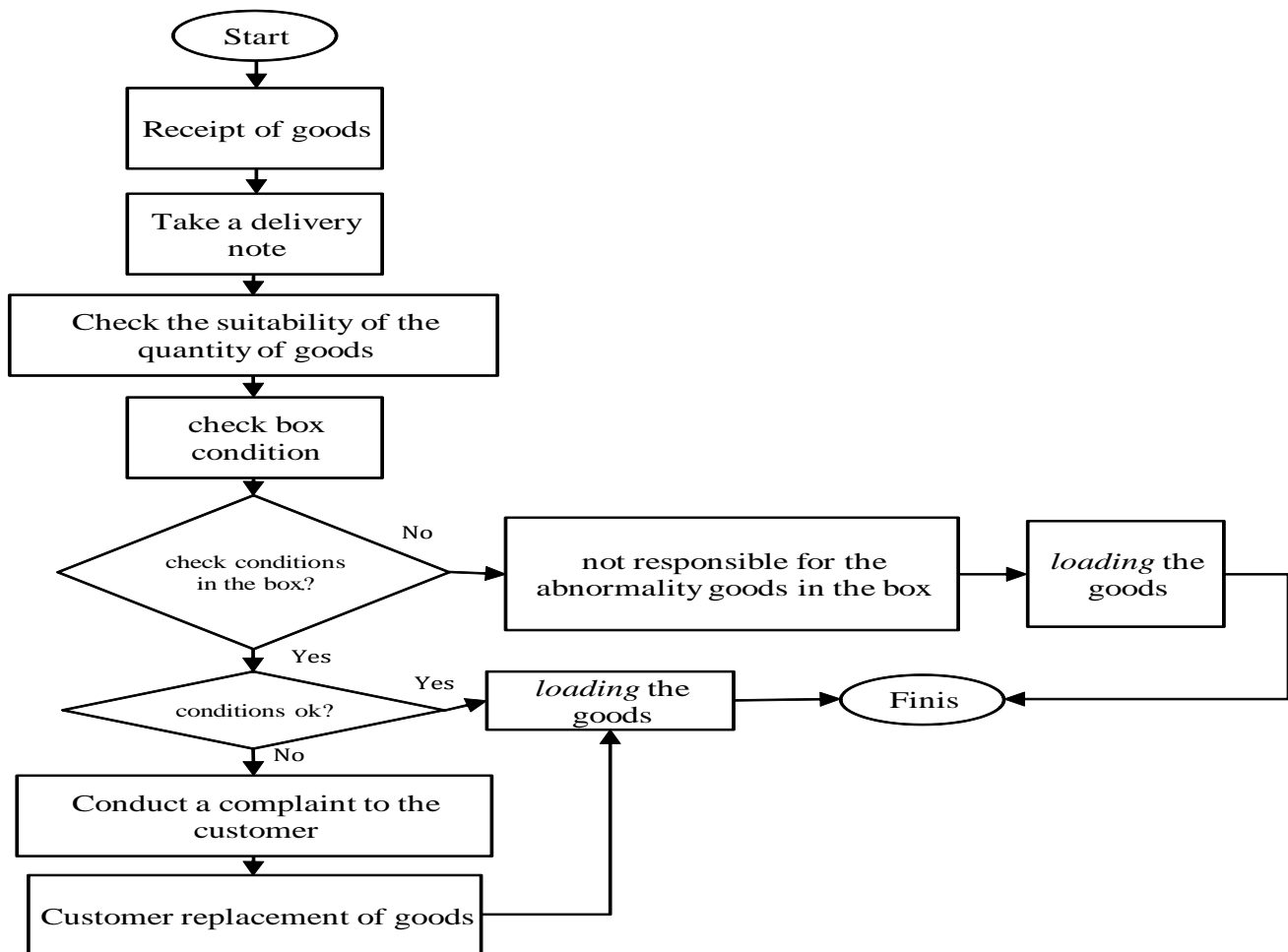


Figure 3 SOP Inspections for Drivers and Head Operations.

Overall, the in flock flowchart performed by the driver or the head of the operational same, which distinguishes is if the inspection is done at the customer's place and there is a abnormality goods then the driver to complain against the customer and request the goods are replaced, but if the inspection was done in the office of QWZ company by the head of operations and there are goods that are abnormality the head of operation is entitled to hold the driver accountable

2. Provide sanctions to the driver or head of operations for abnormality goods received by the end customer written on the contract work. If there is an abnormality of goods received by the end customer, who will get the sanction is the driver and also the head of operations by matching the delivery note at each stage. Sanctions can be a warning letter like Figure 4 below

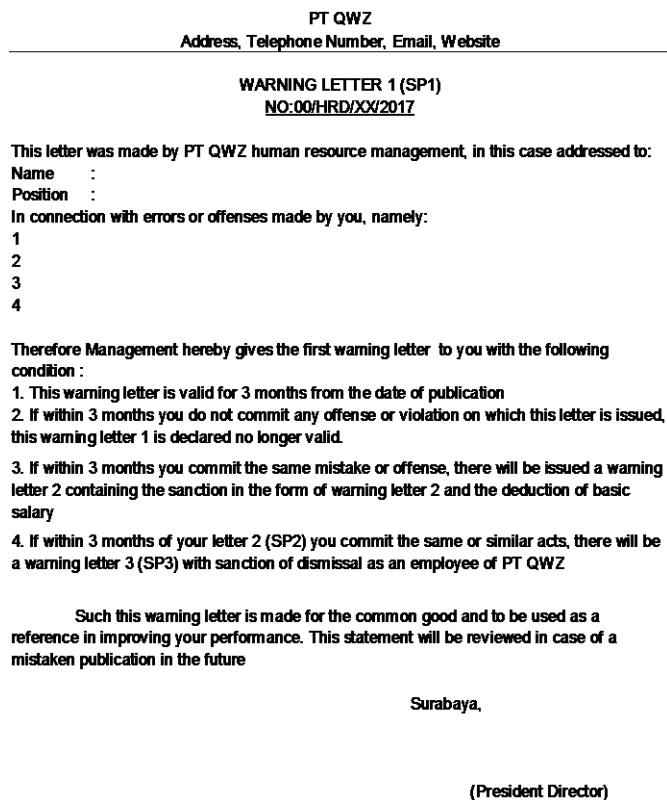


Figure 4 Warning Letter of Sanction to Driver and Head of Operations

By doing so it is expected to reduce the presence of abnormality and lost items during the shipping process, drivers and operational heads are charged with responsibility for shipped items by imposing strict sanctions on drivers and operational heads

3. Provide a percentage of commission or rewarding to the head of operations and drivers for non-abnormality items successfully delivered to the customer. The Commission may be a share of the proceeds or profits derived from the process of delivery of goods. While rewarding can be the best

employee award each month or the end of the year to the driver or chief operations. Where the award can provide benefits for additional promotions or commissions. That way, it will make drivers and operational heads improve performance and have a positive competitive spirit.

4. Make SOP inspection of goods as shown in Image 6 and make MOU or collective agreement on goods to be shipped. The MOU is important to ensure that QWZ company does not accept the burden of the abnormality of the goods that may be in fact made by the customer. By entering into such consent, if there will be any goods of abnormality received by the end customer in which the goods are mentioned in the MOU, then it is not the responsibility of QWZ company.

5. Plotting the driver to the delivery vehicle should be done, this is because now each driver does not own or is responsible to one vehicle that fix. So the damage to the vehicle is sometimes unpredictable and not charged to drivers who use the vehicle. In addition, vehicles with bad conditions can make damage to the goods when it will make delivery of goods. Therefore, with the plotting of drivers on this transport vehicle can minimize the uncontrolled damage of vehicles that will affect the damage of goods transported during the delivery takes place.

B. Recommendation for Dy4

Creating a joint contract or agreement on a mail-making policy by a service user must be made when a user has an order (an agreement has been made on the delivery of goods) to QWZ company. So the driver of QWZ company does not need to wait for the mailing when it will pickup the goods. The following will be presented about the flow process or SOP that can be done and agreed by both parties so that waste Dy4 can be reduced.

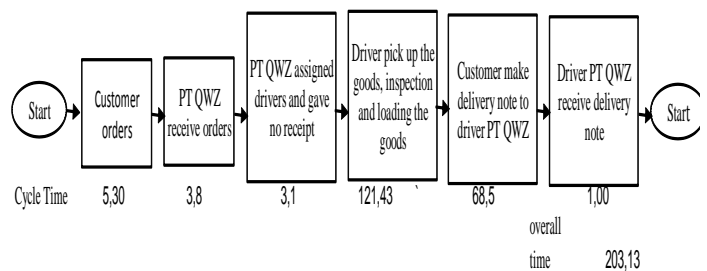


Figure 5 Flow Initial Policy Process

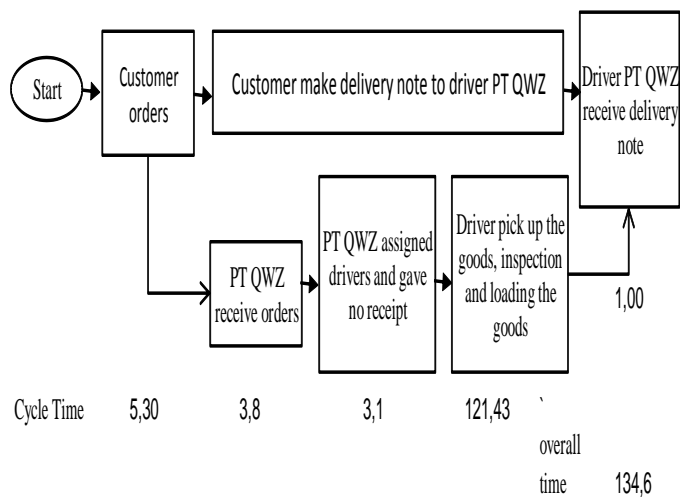


Figure 6 Flow Process After Policy Change

With this new policy the time required from reception order until the pickup process finished goods is only about 134.63 minutes. The new policy reduces the waiting time by 68.5 minutes.

C. Recommendations for For Dy7

Improvement Recommendations Applied to this Problem are

1. SOP delivery of goods to end customer

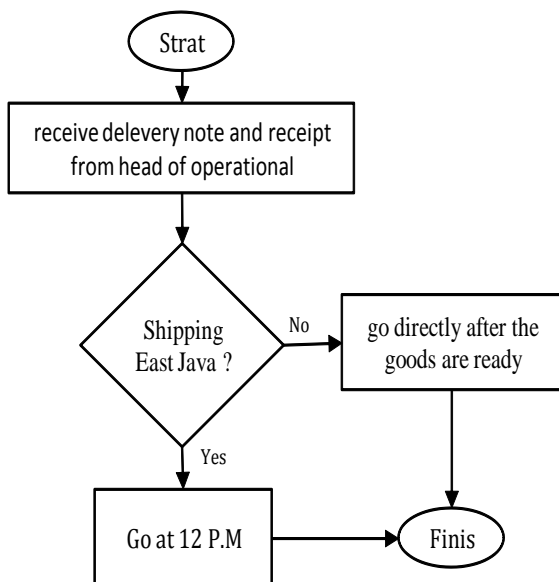


Figure 7 SOP Delivery of Goods for Drivers

SOP is more ordered scheduling departure of goods by the delivery of the driver. In order not all drivers get used to wait night time even with different destinations. It is expected that such scheduling in addition to reducing waste waiting on

drivers also makes vehicle availability and driver delivery more

2. Giving sanction of late delivery

D. Recommendation for D1

A suitable improvement recommendation for this problem is.

1. Preparation of SOPs concerning the storage of travel documents, receipts and minutes

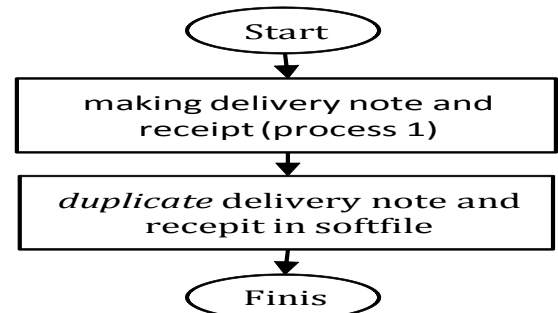


Figure 8 SOP Process Document Storage Process 1

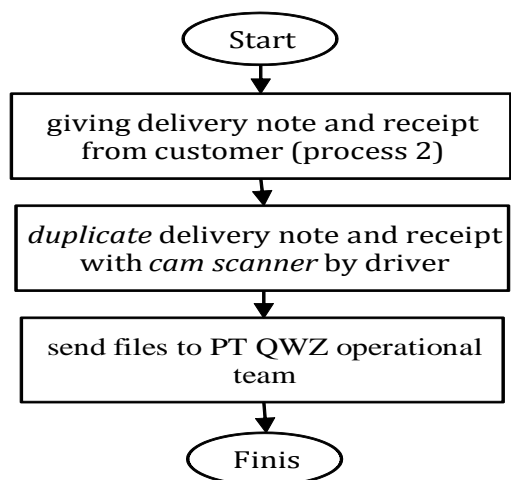


Figure 9 SOP Process Document Storage Process2

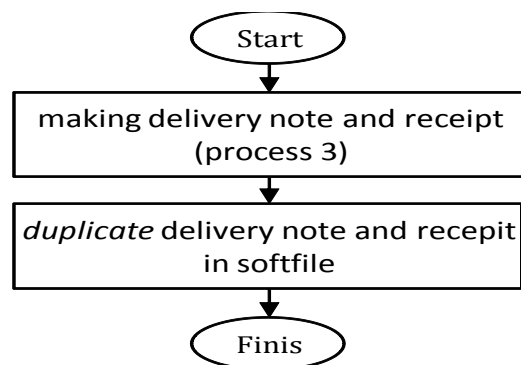


Figure 10 SOP Process Document Storage Process3

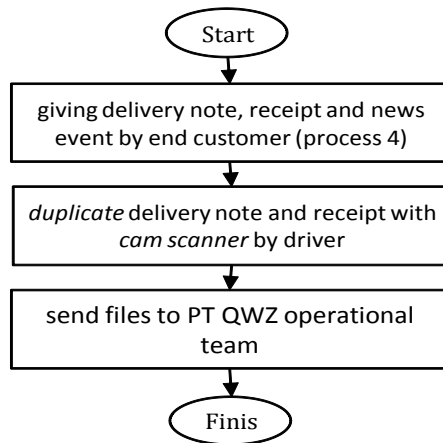


Figure 11 SOP Process Document Storage Process4

The entire SOP requires electronic documentation to make it easier to trace important letters needed to perform invoices. In addition, the process of storing electronic documents will not be abnormality or lost as document storage manually. It can be said that the mail files serve as data backups that will prevent or minimize the company to not receive service fees due to the missing letters.

2.Firm sanctions against any important missing letters

In addition to electronic documentation, if required, it can be subject to sanctions to drivers or operational heads who remove documents or securities. The sanctions imposed may be in the form of sanctions in Figure 4.

CONCLUSION

- The result of mapping the process or activity of goods delivery service in QWZ company by using SVSM (service value steam mapping) is obtained lead time of whole process pengiriman goods without taking into account to end customer for 607 minute or about 10,12 hour. While the results of mapping using PAM tools (Process Activity Mapping) resulted in the activities of non value added and non value added on the delivery of goods QWZ with a total of 41%. It can be said that waste in QWZ's freight service business process is still high
- There are 11 waste activities that belong to 3 types of waste such as waste defect / abnormality, waste delay / waiting, and waste over processing.
- There are four critical waste they are end customer receives goods abnormality and write on the news event, the driver waits for the making of mail by the service user, preparation of the departure of the driver long enough and the mail and the receipt is not complete.
- Root cause are no responsibility charged to the driver and the operational head for waste code D2, as there is no agreement between the two parties for waste code Dy4, QWZ's poor management system for waste code Dy7, and

the absence of standards regarding document administration for waste code D1.

- The fourth waste is then prioritized for improvement by using risk analysis tools. The result is waste that is included into extreme risk with waste code D2, Dy7 and high risk with code D1 and Dy4 must be done immediately.

REFERENCES

- [1]. Anityasari, M dan Wessiani, NA. 2011. Analisa Kelayakan Usaha Dilengkapi dengan Kajian Manajemen Risiko. Surabaya: Guna Wijaya.
- [2]. Bitner, M. J. dan Zeithaml, V.A. 2003. Service Marketing. Tata McGraw Hill, New Delhi.
- [3]. Gaspersz, Vincent. 2011. Lean Six Sigma for Manufacturing and Service Industries. Jakarta: PT. Gramedia Pustaka Utama.
- [4]. Jing GG.2008. Digging for the root Cause. ASQ Six Sigma Forum Magazine 7(3):19 -24.
- [5]. King, Peter L. 2009. Lean for the Proces Industries : Dealing with Complexity. New York: CRC Press, Taylor & Francis Group.
- [6]. Kotler, Philip. 2012. Prinsip-Prinsip Pemasaran. Edisi 13. Jilid 1. Jakarta : Erlangga
- [7]. Mark, A. Nash, and R. Poling Sheila. 2008. Mapping the Total Value Stream. New York: Productivity Press.
- [8]. Nash, Kylie, Hand Zhang, and Lesley Strawderman. 2011. Empirical Assessment of Decision Making Behavior in Multi-Criteria Scenarios. Industrial Engineering Research Conference. Mississippi.
- [9]. Ohno, Taiichi, 1988. TOYOTA PRODUCTION SYSTEM: Beyond Large-Scale Production, Portland.
- [10]. Ramadhani M, Fariza A, Bausik DK. 2007 Sistem Pendukung Keputusan Identifikasi Penyebab Susut Distribusi.
- [11]. Ronald G.Askin and Jeffrey B.Godberg. 2001. Design and Analysis of Lean Production System
- [12]. Wibawa, K.A., 2007, "Aplikasi Lean Thinking Pada Instalasi Rawat Inap Rumah Sakit Semen Gresik, Magister Manajemen Teknologi ITS, Surabaya.
- [13]. Wignjosoebroto, Sritomo. 2009. Tata Letak Pabrik dan Pemindahan Bahan. Guna Widya. Surabaya.

Attachment 1 Priority of Waste with Risk Analysis.

No	Type of Waste	Code Waste	Waste Activity	Root Cause	Likelihood Score	Consequence Score	Risk Rating
1	Defect/Abnormality	D2	End Customer Accepting Abnormality Items And Writing On Minutes	No Responsibility Is Charged To Driver And Head Of Operations	5	5	25
2	Delay/Waiting	Dy4	Driver Waiting for Delivery Note By Service Users	Because there is no agreement between both parties	5	2	10
3	Delay/Waiting	Dy7	Preparation Departure Driver to end customer	PT QWZ Management System Which is not good	5	3	15
4	Defect/Abnormality	D1	Delivery Note and Receipts Incomplete	Absence of Standard Regarding Document Administration	4	3	12