

Quality Control Due to Damaged Returned Goods at the Changhong Warehouse

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ABSTRACT

Objective: This research aims to describe quality control related to damage in returned goods, identify quality control implementation using the PDCA (Plan-Do-Check-Act) method. **Method:** To address these issues, the company implemented strategies such as fishbone diagram analysis and the 5 Why analysis, and developed a Work Instruction (WI) as a standard operating guideline to support comprehensive quality control improvements. **Results:** The results of the study indicate that the primary causes of damage to returned goods include improper use of hand pallets and an overloaded warehouse, leading to limited and inaccessible storage space. In addition, ineffective communication also contributes to the high number of returned goods. **Novelty:** The company has obtained ISO 9001 certification, which focuses on quality management systems, as evidence of its commitment to implementing quality control standards. However, in practice, the quality control implementation at this company has not been optimal. This is evident from the high rate of damage in returned goods, which exceeds the annual target limit of 90 cartons out of the total returned items received.

INTRODUCTION

The era of globalization has brought significant opportunities that can be leveraged, yet it also presents challenges for companies in the logistics sector. Logistics encompasses the stages of planning, movement, and placement of raw materials to finished goods from producers to customers [1]. The logistics process requires a control system. Quality control is a series of structured steps aimed at maintaining and improving the quality of products or services to meet standards and satisfy customers. This concept is not only applied in manufacturing companies but also in service companies, including Third-Party Logistics (3PL) providers.

Third-Party Logistics (3PL) companies must adopt internationally recognized quality standards, such as ISO 9001:2015, which governs quality management systems. This standard, issued by the International Organization for Standardization (ISO), is globally acknowledged as a benchmark for ensuring service quality [2]. ISO 9001:2015 serves as a core reference for implementing quality standards, enhancing competitiveness, improving product and service quality, and increasing customer satisfaction. It helps companies ensure that all stakeholders, both external (customers) and internal (management and employees), receive high-quality products and services [3].

An effective and efficient company must maximize the performance of its services. These services involve inbound, outbound, and returned goods processes within warehousing operations. Warehousing plays a crucial role in logistics management. The

elements of logistics management, warehousing, and storage are interrelated. A warehouse functions as a storage facility for various types of products, accommodating both large and small storage units, during the time between production and the moment when products are required by customers or workstations within a production facility [4]. Warehouses are essential for ensuring product availability and preventing damage.

Damage refers to the condition in which a product experiences quality degradation, which may be caused by various factors, including human error. Such damage leads to financial losses for companies due to increased costs and reduced profitability. When damage occurs, companies may opt for an alternative solution such as product returns, commonly known as returned goods. Returned goods are products sent back by customers or distributors to the company for specific reasons, such as product defects, order mismatches, or dissatisfaction with quality. Efficient handling of returned goods aims to reduce operational costs, streamline the return process, and enhance customer satisfaction [5], [6], [7].

There are corrective methods that can be applied to reduce the rate of damage in returned goods. One of these methods is the PDCA cycle (Plan – Do – Check – Act). The PDCA method is a continuous cycle applied through ongoing processes [8]. Supporting tools include the Fishbone Diagram and 5 Whys analysis. According to [9], the Fishbone Diagram is used to show cause-and-effect relationships. Meanwhile, Santoso state that the 5 Whys analysis is a method used to identify root causes of problems.

Tabel 1. Data on the number of damaged returned goods from customers.

No	Year	Number of Damaged Goods	Number of Damaged Goods	Total Damaged Goods	Annual Difference	Percentage Damage (%)
1.	2022	65	20	85	5	5,88%
2.	2023	40	40	80	8	10,00%
3.	2024	22	50	72	72	100%
Total				237		116%

Source: Field Data, 2024

Based on the data, the damage rate of products from PT Kievit and PT Sarihusada was 5.88% in 2022, 10.00% in 2023, and rose sharply to 100% in 2024. The main causes of the damage include dented items, torn packaging, and water exposure. If this condition continues, it will lead to financial losses and a decline in customer trust. Therefore, damage prevention must be given proper attention through the implementation of Work Instructions (WI). Work Instruction (WI) is a document that outlines work steps that must be carried out in a detailed and systematic manner in accordance with established standards.

Company Third-Party Logistics (3PL) company that has been operating since 2003. The company offers Inventory Management and Trucking services. Currently, it serves three clients: PT Kievit Indonesia, PT Changhong Electric Indonesia, and PT Sarihusada

Generasi Mahardhika. To support smooth operations, the company not only provides service solutions but also implements systems known as Wx3, Tx3, and SAP. These systems function similarly to a Warehouse Management System (WMS) by serving as cloud-based software that enables real-time product monitoring, inventory management, stock availability tracking, summary generation, and monthly sales reporting.

However, in practice, there are still issues, including a high rate of damage due to returned goods handling, which is suboptimal and performed manually using hand pallets. Errors in this process have resulted in items becoming torn, wet, or otherwise damaged. Based on initial interviews with pickers, it was identified that the damage caused by returned goods is linked to human error. Human error refers to failures in carrying out or completing tasks that lead to negligence in adhering to operational schedules. The damage problem related to returned goods mainly occurs with vulnerable electronic products, as their packaging uses cardboard boxes.

Tabel 2. Data on the number of damaged returned goods from customers.

No.	Year	Number of Damaged Electric Products	Number of Damaged CMEI Products	Total Damaged Products Electric and CMEI	Annual Difference	Persentase Damage (%)
1.	2022	152	214	366	43	11,75%
2.	2023	161	248	409	30	7,33%
3.	2024	164	275	439	439	100%
Total				1214		119%

Source: Field Data, 2024

Based on the data above, the number of damages caused by returned goods has been increasing from 2022 to 2024. In 2022, the damage rate of returned products caused by the company was 30%, which increased to 34% in 2023, and rose again to 36% in 2024. This increase in returned goods damage is largely due to the material handling process, which is still performed manually using hand pallets. The manual process carries a high risk of damage, especially for electronic products that are fragile and vulnerable to impact.

The programs implemented by the company have succeeded in reducing the number of damaged returned products; however, further improvements are still needed to completely eliminate damage to returned goods. The continued presence of damaged products each month indicates that the company's efforts have not been optimal and that further quality control analysis is necessary. This involves identifying the root causes and finding appropriate corrective solutions to be implemented within the company.

Based on this, the researcher is interested in conducting a study entitled Quality Control Due to Damage of Returned Goods at the Warehouse. This study aims to:

1. Describe the quality control measures implemented.

2. Identify the appropriate quality control methods to be applied using the PDCA (Plan-Do-Check-Act) method.
3. Identify the factors hindering quality control at.

RESEARCH METHOD

According to Bogdan and Biklen [10], qualitative methods are conducted in natural conditions where the researcher acts as the key instrument. Data collection techniques are carried out through triangulation, with data that is more qualitative in nature. Data analysis is inductive and aims to understand meanings, comprehend uniqueness, construct phenomena, and discover hypotheses. According to Dukeshire and Jeniver [10], qualitative research is research that involves data that is not numerical; this research is used to obtain information regarding issues and problems that need to be resolved. The sources of data used in this study are primary and secondary data. This research employs purposive sampling techniques. [10] defines purposive sampling as a technique for selecting data source samples based on certain considerations. The informants selected for this research are Operational PIC Changhong, Quality Assurance PIC, Picker, and Data Entry.

[10] states that research instruments are tools used to measure observed natural and social phenomena. In qualitative research, these instruments are necessary means for gathering information. In qualitative studies, researchers collect data through direct observation and interviews with informants. In this final project, the research instrument applied is the researcher themselves, acting as the individual who collects the data. Additionally, the researcher requires supporting tools for data collection, such as a recording device using a mobile phone, as well as office supplies (stationery) like pens and notebooks used during the interview process.

Data collection techniques are methods used to gather data and obtain accurate information that is investigated and studied. According to [10], data collection can be conducted in various settings, sources, and ways. Data collection techniques in research are a crucial stage that must be carried out with an appropriate strategy. The purpose is to obtain data analysis that involves systematically organizing the data collected from observations, interviews, and documentation. According to Miles and Huberman [10], [11], data analysis techniques consist of four stages as follows: Data Collection, Data Reduction, Data Display, and Conclusion Drawing.

RESULTS AND DISCUSSION

Results

In this study, the focus is on Quality Control Due to Damage in Returned Goods Warehouse. This research explains the theory of quality control in relation to damage from returned goods, as outlined by Montgomery, which includes Process Capability, Applicable Specifications, Acceptable Level of Nonconformity, and Cost of Quality. In addition, the researcher also discusses the PDCA method and the factors that hinder quality control related to damage in returned goods.

1. Quality Control Due to Damage in Returned Goods

a. Process Capability

The product-related activities in the Changhong warehouse begin with receiving emails from the head office containing information about schedules, product quantities, and product types. This information is then processed through the company's internal system to generate documents such as Delivery Orders (DO), Getpass, and Purchase Orders. The next step is to wait for the arrival of the container, followed by a physical inspection of the products and the container itself, and concluded with the preparation of a report and a summary document [12], [13], [14], [15].

b. Applicable Specifications

It can be concluded that the company has implemented a Work Instruction (WI) in accordance with the requirements provided by the customer (Changhong), as outlined in the document Work Instruction WI-ISO-YHC-IND-SM-CH-001 *concerning the Changhong Return Process*. The WI states that a damage check must be conducted on returned products, and documentation must accurately reflect the actual conditions in the field.

c. Acceptable Level of Nonconformity

It can be concluded that the company's efforts to handle nonconformities acceptable to the customer are carried out through direct communication, one of which is in the form of damage verification activities. This process is documented in the Work Instruction (WI) with code WI-ISO-YCH-IND-SM-QA-030 regarding Corrective and Preventive Actions, and WI-ISO-YCH-IND-CH-006 concerning Handling Damage. According to the WI, the maximum allowable damage is 90 cartons. If damage occurs, the affected products must be stored separately in the return goods area.

d. Cost of Quality

An overloaded warehouse slows down the picking process, and warehouse operations are slightly hampered due to the limited movement space for handpallets, which are obstructed by customer products and suboptimal equipment usage. The overloaded condition increases the working hours of equipment, which occasionally leads to handpallet malfunctions. This issue is outlined in WI-ISO-YCH-IND-SM-GE-005, which states the maximum number of products that can be stored according to the warehouse's capacity. However, in cases of overload, the Work Instruction (WI) cannot be fully implemented.

2. Quality Control Due to Damage of Returned Goods Using the PDCA (Plan-Do-Check-Act) Method

Quality control is important to reduce product damage or other potential losses that the company may bear. Based on the interviews conducted, audits are carried out every three months by a team appointed by PT Changhong, and the company follows the regulations set by the customer, PT Changhong.

A. Plan

This stage involves planning corrective actions for quality control carried out by the company. The main focus is to improve quality control due to the high number of

damages caused by returned goods that are not optimally managed. This stage is carried out through several steps, namely:

a) Data Collection Stage

At this stage, several data need to be collected, including data on the number of damaged returned goods and types of damaged returned products.

a. Damage caused

The damage caused refers to product damage resulting from handling performed by the company.

- Broken Outer Bag: damage that occurs due to torn product packaging that penetrates the inner layer of the packaging but does not reach the product inside, so the product inside the package remains undamaged.
- Broken Inner Bag: damage that occurs due to torn product packaging that penetrates the product's packaging layer, causing the product to come out of the package.
- Dirty: product damage caused by packaging that is so dirty it cannot be cleaned with vacuuming.
- Wet: product damage caused by packaging that is wet.

Based on interviews and the data obtained, the damage data for returned goods caused can be seen in the table below.

Table 3. Data for returned goods.

No	Tahun	Damage Electric	Damage CMEI	Total Damage Electric and CMEI	Amount of damage to returned goods				Total damage barang retur	Presentase damage barang retur
					Broken Outter Bag	Broken Inner Bag	Dirty	Wet		
1	2022	152	214	366	100	-	-	-	100	0,27
2	2023	161	248	409	120	-	-	-	120	0,29
3	2024	164	275	439	130	-	-	-	130	0,30
Total				1214	350	-	-	-	350	0,29

The table above shows the number of damaged returned goods for Electric and CMEI products from handled. The type of damage called Broken Outer Bag was 0.27 in 2022, 0.29 in 2023, and 0.30 in 2024. This damage was caused by manual handpallet usage, which resulted in torn packaging.

B. DO

a) Man

There are several areas that need improvement, namely:

- Increasing employee awareness and concern
- Using time to remind employees regularly
- Conducting periodic training and ensuring everyone participates

b) Machine

Machine has one area that needs improvement, which is ensuring the handpallet functions properly because there is a possibility that the handpallet may be damaged and not operate as intended.

c) Method

Method has several areas requiring improvement and evaluation, including reinforcing the procedures that apply to all activities, adhering to the company's established Work Instruction (WI) standards, and designing the Work Instructions (WI) properly.

d) Money

Money has one aspect that needs review, which is whether the salary given to pickers is appropriate for the workload they handle. This review is necessary because there is a possibility that insufficient salary may result in suboptimal work performance.

e) Material

Material has one aspect that needs review, which is whether the product packaging is too thin, making it prone to tearing.

C. Check

This stage involves checking the implementation carried out in the previous stage. It can be conducted for one month after the improvements are applied to observe the results.

D. Action

This stage involves continuous review and monitoring of the team. The purpose is to ensure that the issues do not recur and can be resolved effectively.

There are two types of actions:

- a) Corrective Action: If the results do not meet the target, pickers who make frequent mistakes should receive additional training to better understand the procedures.
- b) Standardization Action: If the improvement results are satisfactory, efforts should continue to raise awareness and maintain employees' (especially pickers') care and attention towards their work.

CONCLUSION

Fundamental Finding : The quality control shows a high number of damaged goods due to returned items, which are handled manually using handpallets. This is evident from the company's yearly data consistently exceeding the maximum set target of 90 cartons. These nonconformities can be observed from several aspects, including process capability, applicable specifications, acceptable level of nonconformity, and quality cost. **Implication :** This situation indicates a systemic weakness in the existing quality control processes, emphasizing the urgent need for an integrated approach to minimize damage and ensure compliance with target performance levels. Addressing these issues is critical not only for operational efficiency but also for maintaining customer satisfaction and reducing losses associated with returns. **Limitation :** However, the current analysis focuses primarily on operational indicators and damage outcomes

without capturing the full range of contributing factors such as employee training levels, ergonomic factors in manual handling, or detailed equipment wear data. This narrows the understanding of root causes beyond what can be addressed through surface-level process changes. **Future Research :** Future research could explore a broader diagnostic framework incorporating employee feedback, time-motion studies, and predictive maintenance models to assess how various human and technical factors interact to influence return damage rates. Additionally, testing the implementation of automated handling technologies alongside PDCA in a comparative design may offer new insights into sustainable quality improvements.

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