



# **Optimizing Delivery Quality Control with Statistical Quality Control Method at PT Pos Indonesia Ambulu Branch**

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## **Abstract**

Increased competition in the delivery service industry requires companies to continue to improve the quality of their services. This research aims to analyze the quality control of goods delivery at PT Pos Indonesia Ambulu Branch using the Statistical Quality Control method. With a qualitative approach and case study method, research was conducted through direct observation and in-depth interviews. Data was collected over the period April 2023, focusing on three types of delivery failures: incomplete address, inability to contact the customer, and long distance travel. The analysis results show that the shipping process is still within control limits with a UCL of 3.62% and an LCL of 2.88%. Through cause-and-effect diagram analysis, four main factors causing failure were identified: machine system errors, worker inaccuracy, method incompatibility with SOP, and unpredictable environmental conditions. These findings resulted in recommendations for improvement in the form of increasing machine maintenance, employee training, standardizing procedures, and anticipating environmental conditions to optimize the quality of delivery services.

**Keywords:** quality control, Statistical Quality Control, delivery services, PT Pos Indonesia

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## **1. Introduction**

Over time, the national economy continues to improve. The diversity of people's consumption drives the high demand for products and services, which is reflected in the increasing use of goods delivery services, thus encouraging each party to improve the quality of its services. Business competition now focuses not only on productivity levels and competitive prices, but also on quality aspects such as comfort, convenience, accuracy, and speed of service. The intensity of competition between companies requires management to be more careful in anticipating various changes that may occur in global economic activity.

Quality control becomes crucial to maintain product and service standards and meet market expectations. This process includes inspecting products to ensure compliance with standards and separating products that do not meet the criteria, thereby optimizing the use of material, labor, and time resources. The various existing definitions of quality are similar in essence. Heizer & Render (2015) define quality as the totality of features and characteristics of a product or service that reflect its ability to meet promised or implied needs. Quality management plays a vital role in all aspects of operations, from planning to evaluating results, and is an integral factor that connects various business functions.

Quality is a fundamental aspect for companies, not just a priority but also a key differentiator from competitors. Quality control becomes an important instrument in maintaining product or service consistency through a series of systematic activities to achieve, maintain, and improve predetermined standards. Ginting (2007) explains that quality control is a system of verifying, maintaining, and monitoring planned levels of product quality, using standardized equipment, continuous inspection, and corrective action when necessary. This system allows operations managers to identify the root of the problem and take quick action to maintain product quality. In the context of freight forwarding, which KBBI defines as the physical movement of goods from one location to another, quality control remains a vital aspect. Dewi et al. (2020) in Arimbawa & Suryawan (2022) emphasize that freight forwarding is a service that facilitates the movement of goods for consumer convenience.

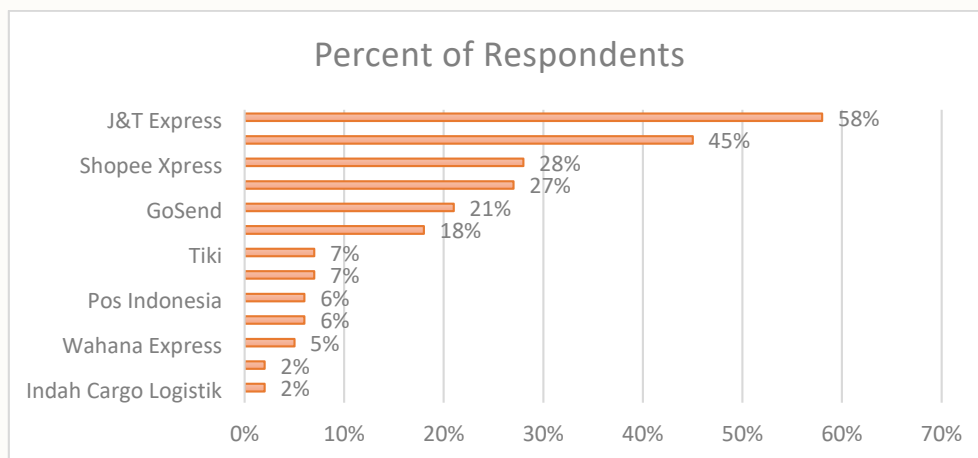


Figure 1. Expedition Services Used by Indonesian E-commerce Seller Respondents (June 2023)

*Source: Katadata.co.id 2023*

PT Pos Indonesia, which has been operating since 1945, has undergone various transformations to reach its current form. The company provides a wide range of services, from goods delivery to financial services, which is reflected in the various products it offers. Based on data from Katadata.co.id on Expedition Services Used by Indonesian E-commerce Seller Respondents in June 2023, PT Pos Indonesia is in ninth place with a 6% market share, according to a Polulix survey in the Indonesia Outlook on the Logistic Delivery Services report. The survey shows that J&T Express dominates the market with 58%, followed by JNE with 45%, Shopee Xpress with 28%, SiCepat with 27%, and Tiki with 7%.

These statistics indicate a significant decline in consumer confidence in Pos Indonesia's services, showing a large gap with its competitors. To maintain its existence in the Indonesian expedition industry, Pos Indonesia needs to take strategic steps. This research focuses on PT Pos Indonesia Ambulu Branch, which operates every day from 08.00-19.30 WIB with a shift system. In an effort to improve delivery quality, the company uses Statistical Quality Control to measure delivery failure rates.

This study specifically analyzes the expedition division of PT Pos Indonesia Ambulu Branch. The main challenges faced by this branch include the inability to meet delivery time targets due to several factors: incomplete addresses, difficulty contacting recipients, and long travel distances.

These issues have the potential to affect service quality and customer satisfaction, which could result in consumer switching to alternative delivery providers and negatively impact the company. Given the intense competition and the wide selection of delivery service providers, controlling delivery quality is a crucial aspect for PT Pos Indonesia Ambulu Branch to maintain high service standards and maintain customer loyalty.

## **2. Literature Review**

### **2.1 Operations Management**

Operations management is a concept of managing and coordinating various resources, including raw materials, human resources, machinery, equipment, and capital efficiently to produce products or services. Purnomo (2017) explained that the scope of operations management includes four main aspects: planning, production system design, production system operations, and decision making related to the production of goods or services. The main focus of operations management is to optimize resource utilization to create added value to products or services that can exceed consumer expectations.

Iswanto & Akbar (2021) outline several fundamental reasons for the importance of studying operations management. First, operations management is an essential component that must exist in every organization. Second, learning operations management provides an in-depth understanding of the process of producing goods or services. Third, this study helps to comprehensively understand the roles and responsibilities of operations managers. Fourth, understanding operations management is crucial considering that operations are activities that require significant cost allocation in an organization or company.

### **2.2 Definition of Control**

In her book, Mulyani (2020) defines control as a series of actions implemented by managers to ensure that all elements of the organization operate in accordance with predetermined plans and objectives, so it can be said that planning reflects control. The control function is not limited to supervision alone, but includes detection of activities from the planning stage to implementation. Control plays a vital role in mitigating the risk of failure to achieve goals, ensuring that every step has careful planning, and anticipating the potential impact of future risks.

Wibowo (2022) explains that control is the process of verifying that all activities are going according to plan and monitoring organizational performance to compare actual results with predetermined targets. The main purpose of control is to support management in making organizational decisions and comparing actual achievements with the initial planning that has been prepared.

### **2.3 Definition of quality**

Putri (2018) defines quality as a parameter that measures the superiority of a product in meeting consumer expectations. The concept of quality is divided into two main aspects: design quality related to product specifications, and conformance quality that measures the level of fulfillment of predetermined quality standards. More broadly, quality includes all the features and characteristics of a product or service that contribute to its ability to meet customer needs. A quality product is characterized by its conformity to established standards and its ability to perform functions optimally.

Phombre-Patil (2018) outlines several perspectives in defining quality. First, quality is viewed as the ability of components to function effectively in the intended equipment, thus defined as "fitness for purpose". Second, quality is the distinguishing characteristic of a product that is reflected in various aspects such as appearance, performance, durability, reliability, and ease of maintenance. Third, quality is defined as the level of consumer preference for a product compared to competing products that have equivalent specifications. Fourth, quality represents the general level of excellence of a product.

## 2.4. Quality Control

Phombre-Patil (2018) describes quality control as an integrated system that aligns quality development, maintenance, and quality improvement efforts between departments in the organization to achieve economical production and service while maximizing customer satisfaction. Quality control is also understood as a set of tools and skills to implement quality activities. Through this system, actual performance can be measured and compared with established standards, allowing corrective action when deviations occur.

The objectives of quality control include several aspects: increased revenue through more desirable products for customers, reduction of production costs by minimizing defective products, interchangeability in mass production, customer satisfaction through high-quality products, achievement of optimal quality at minimal cost, integration of quality effects between departments, and development of a quality mindset.

According to Ariani (2020), quality control involves four main factors: machines and their components in the delivery process, the capabilities and physical conditions of human resources, standard operating procedures, and environmental conditions.

In the context of freight forwarding, Tuahatu et al. (2022) define it as a vital operational activity in the supply chain. Martono et al. (2017) added that freight forwarding is an integrated service within an organization to facilitate the movement of goods. Susilo (2021) emphasizes that freight forwarding is a crucial component in the supply and distribution chain, while Suyono (2003) describes it as a comprehensive service that covers various modes of transportation.

Statistical Quality Control, according to Phombre-Patil (2018), is a quality control and problem-solving tool that includes three activities: systematic data collection, data analysis, and implementation of management actions. This technique provides a variety of benefits, including cost efficiency, effective control, optimization of raw material usage, improved inspection standards, early error detection, and increased productivity.

Ariani (2020) outlines five components of quality control analysis in SQC: data collection through check sheets, histogram generation, control chart development, cause-and-effect analysis, and calculation of control limits to evaluate service delivery.

- a. Defects can be calculated using the equation [1]

$$\bar{P} = \frac{np}{n}$$

- b. Calculation of Center Line (CL) using equation [2]

$$CL = \bar{P} = \frac{\sum np}{\sum n}$$

- c. Upper control limit (UCL) calculation using the equation [3]

$$UCL = \bar{P} + 3 \frac{\sqrt{\bar{p}(1-\bar{p})}}{n}$$

d. Calculation of the lower control limit (LCL) with the equation [4]

$$LCL = \bar{P} - 3 \frac{\sqrt{\bar{p}(1-\bar{p})}}{n}$$

Where:

$\bar{P}$  = average failure

$np$  = failed shipment

$n$  = number inspected

$CL$  = average damage

### 3. Methods

This research adopts a qualitative approach with a case study method. Sugiyono (2013) defines qualitative research as a methodology rooted in the philosophy of postpositivism, which is applied to study objects in their natural conditions, with the researcher acting as the main instrument. Hadi et al. (2021) explain that a case study is a scientific investigation that is carried out in depth and systematically on a program, event, or activity, both at the individual, group, institutional, and organizational levels to obtain a comprehensive understanding of the phenomenon.

The research location is PT Pos Indonesia Ambulu Branch which is located at Jl. Watu Ulo No.2, Krajan, Ambulu, Ambulu District, Jember Regency, East Java. The selection of informants was done through purposive sampling technique, where samples were selected based on specific criteria that had been determined.

The data analysis process followed the Miles et al. (2014) model, which consists of four stages: data collection, data condensation, data presentation and conclusion drawing. To validate the validity of the data, this study applied three types of triangulation: source triangulation, technique triangulation, and time triangulation.

### 4. Results and Discussion

The analysis of delivery quality control began with the creation of a Check Sheet using Microsoft Excel for the period April 1-30, 2023, which recorded three types of delivery failures: incomplete address, inability to contact the customer, and long distance traveled. This Check Sheet was designed to facilitate efficient data collection and analysis. Furthermore, a histogram was used to visualize the frequency of delivery failures from highest to lowest.

Analysis using Cause and Effect Diagrams identified four main factors causing delivery failures: system errors in the machine factor, data input inaccuracies in the human factor, ineffective communication with customers and non-conformance with SOPs in the method factor, and environmental conditions such as bad weather and difficult terrain in the environmental factor.

This study shows that although there are still delivery failures at PT Pos Indonesia Ambulu Branch, overall quality control can be categorized as quite good, marked by the fluctuation pattern of delivery failures that show a downward trend.

This finding correlates with the research of Tuahatu et al. (2022) who identified three failure factors: inaccuracy and indiscipline of labor, inadequate supervision and facilities, and non-optimal use of scan reader machines. Ramdhan et al. (2015) also found three similar factors: Incompetent human resources, improper material handling, and damaged goods.

Meanwhile, Sofiana & Sanggala (2021) emphasized the importance of HR training, standardization of form filling methods, and database updates.

Based on the comparison with previous studies, it can be concluded that the quality control system for shipping goods at PT Pos Indonesia Ambulu Branch has shown a fairly good performance.

## 5. Conclusion

PT Pos Indonesia Ambulu Branch has implemented a comprehensive delivery quality control system, starting from receiving goods from the head office to pre-delivery inspection. Control map analysis shows that the company's operations are still within the acceptable range, with an upper control limit (UCL) of 3.62% and a lower control limit (LCL) of 2.88%. Overall, the operational process is still well under control.

However, there are four significant factors that contribute to delivery failures: suboptimal machine maintenance leading to data input errors, worker inaccuracy in task execution, method incompatibility with SOPs, and unpredictable environmental conditions such as bad weather.

The company needs to increase its focus on quality improvement from various aspects. First, ensure regular machine maintenance. Second, improve worker accuracy through training and supervision. Third, ensure compliance with SOPs in every procedure. Fourth, anticipate environmental conditions for safe delivery. In addition, implementing a more comprehensive tracking system and improving the efficiency of delivery time also need to be a priority for service optimization.

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