

Evaluation Of Reverse Logistics In The Paint Distribution Process Using The Pareto Method And Cause-And-Effect Analysis

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Abstract. PT XYZ is a renowned company engaged in the distribution of paint products, catering to the regions of East Jakarta, North Jakarta, and Central Jakarta. PT XYZ experienced many returning paint problems from the outlets due to damage that impacted customer satisfaction and both sides' losses. Diligent researchers meticulously collected a comprehensive set of return data from January to June 2023 to ascertain the extent of paint damage and identify the underlying causes. The study aims to assess the extent of paint damage resulting from various factors to minimise future damage. This research uses qualitative research methods with quality testing tools, namely the Pareto concept, the analysis of the 5 whys, cause-and-effect analysis, and focus group discussion (FGD). The Pareto method revealed that the highest return value was 241 cans of wall paint from customers for Rp. 46,626,800. The biggest common reason for paint returns was paint packaging leakage, which accounted for 59.3%. Based on this research, the factors that can reduce paint packaging leaks are better handling practices and procedures.

Keywords : reverse logistics, product damage, quality management, quality control tools, standard operating procedure

Abstrak. PT XYZ merupakan perusahaan ternama bergerak di bidang distribusi produk cat, yang melayani wilayah Jakarta Timur, Jakarta Utara, dan Jakarta Pusat. PT XYZ mengalami masalah banyaknya pengembalian cat dari toko akibat rusak, yang berdampak pada kepuasan pelanggan dan kerugian perusahaan serta pelanggan. Para peneliti mengumpulkan serangkaian data pengembalian secara komprehensif mulai dari bulan Januari hingga Juni 2023 untuk memastikan tingkat kerusakan cat dan mengidentifikasi penyebab kerusakannya. Tujuan dari penelitian ini adalah untuk menilai tingkat kerusakan cat yang diakibatkan oleh berbagai faktor untuk meminimalkan kerusakan di masa depan. Penelitian ini menggunakan metode penelitian kualitatif dengan alat pengujian mutu, yaitu Pareto, analisis 5-whys, analisis sebab dan akibat, serta fokus kelompok diskusi (FGD). Metode Pareto yang digunakan mengungkapkan bahwa pengembalian tertinggi dari pelanggan berjumlah 241 kaleng cat tembok senilai Rp. 46.626.800. Alasan terbesar penyebab pengembalian cat adalah kebocoran kemasan cat, yang mencapai 59,3%. Berdasarkan penelitian ini, faktor yang dapat mengurangi kebocoran kemasan cat adalah praktik dan prosedur penanganan yang lebih baik.

Kata Kunci : logistik pengembalian, produk rusak, manajemen mutu, alat pengendalian mutu, standar prosedur operasi

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1. Introduction

Jakarta, the capital of Indonesia, boasts one of the highest population densities compared to other cities. This position has inevitably led to a surge in demand for comfortable and aesthetically pleasing housing options to cater to the needs of the growing population. Painting is one example of how to make a house more livable by updating its condition. In addition to serving as an aesthetic or beautiful value, numerous types of paint are currently available to meet customer needs because they come in various attractive colours. The role of a paint distributor is essential to market Indonesia thoroughly. PT XYZ is the official distributor of wall paint products in Indonesia. It is headquartered in East Java and has many distribution warehouses all around Indonesia. PT XYZ experiences returned products from the outlets through distributors and must practice the proper reverse logistics process to mitigate the loss due to return.

Reverse logistics is the process of returning the product (Christopher, 2011). Logistics management is part of the business that also manages the flow of reverse products (Simchi-Levi et al., 2014; Sutini & Wismana, 2022). The use of the internet will pretty much support reverse logistics by facilitating and tracking the replacement products (Bowersox et al. 2020). Despite our obligation to reduce distribution, to some extent, reverse logistics is useful in reducing the raw material's use as well as maintaining the environment (Krstev & Krstev, 2022).

Paint clumping, frozen paint, broken paint cans in the box, leaking paint packaging, inappropriate contents, and dented packaging are some reasons for damage when returning paint. Paint clumping happens when the paint in the packaging becomes thick, and it becomes hard to paint the wall. Frozen paint is the condition when the paint content turns dense and inflexible. A broken paint can in the box is when the paint packaging breaks, so the contents of the paint spill inside the box. Leaking paint packaging occurs when the lid on the paint packaging is not tight. Inappropriate contents are the conditions when the contents of the paint packaging shrink a lot. Dented packaging is when the packaging on the paint is dented and not worth selling.

The stores incur losses when receiving damaged paint as customers cancel their purchases. To initiate a return, the store must request a return document from the company, which specifies a deadline of 30 days from receiving the goods. Returns have frequently occurred due to PT XYZ's lack of reviews or improvements in addressing paint damage. The study aims to assess the extent of paint damage resulting from various factors to minimise future damage. The reverse distribution may impact to environment too due to a lot of fossil-based gasoline consumption (Agusinta *et al.*, 2022).

2. Research Methods

The research conducted in this study belongs to the domain of descriptive qualitative research, which involves utilising data relevant to the specific situation and based on the formulation of a problem. The data for this study was from January 2023 to June 2023 at PT XYZ, a paint distributor in Jakarta. The information processed encompassed various aspects such as shipping, production,

returns delivery, and product prices. The research materials utilised in this study comprised wall paint, varnish, oil paint, spray paint, and paint designed explicitly for leak-proof coatings.

Data will be collected after determining the research goal and studying the relevant references. As part of quality management, researchers use several methods to analyse the collected data, such as the seven quality tools, the 5-whys, and the Focus Group Discussion (Soliman, 2020). Liu et al. (2023) add that Industry 4.0 enhances the implementation of quality management, helping the use of quality tools. The Pareto method and the Cause-and-Effect Diagram are part of the seven quality tools to determine the causes and solutions (Kumar et al., 2020; Magar & Shinde, 2014; Muhammad, 2015; Neyestani, 2017). Figure 1 shows the overall research process.

The Pareto method organises the data in a diagram format to enhance readability. According to Magar & Shinde (2014), the Pareto method rearranges the items based on their contribution to maximise effect. This diagram will display the number of paints with the highest damage and the specific type of paint damage. By arranging the data this way, it becomes easier to identify the most significant issues.

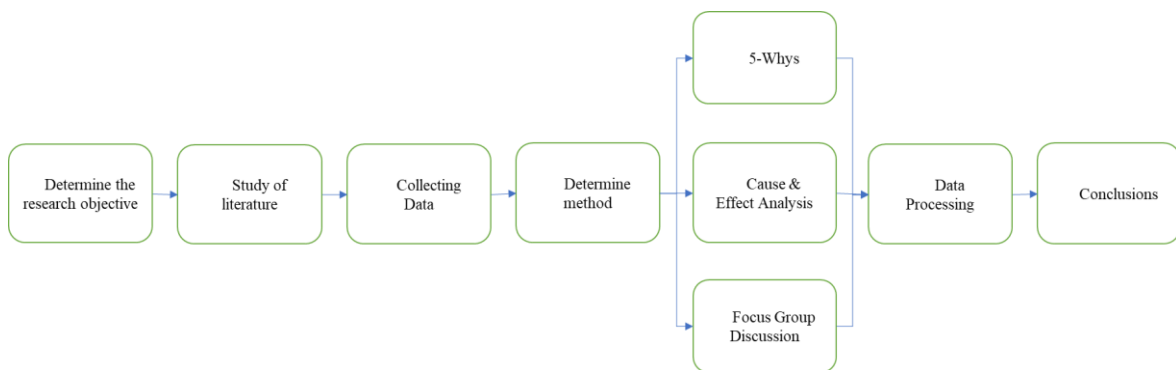


Figure 1 - Research Design

The 5 Whys method is to find the root cause. (Card, 2017). This method provides a comprehensive exploration of the underlying reasons behind paint damage. This method aims to uncover the root causes of the problem by repeatedly asking "why" five times in response to each identified cause. According to Lanida et al. (2019), we may add more "Why" if necessary. Kumar et al. (2020) call it a Why-why analysis, a tool of the quality circle.

The cause-and-effect diagram, also known as a fishbone diagram, visually represents various factors contributing to paint damage. This tool, named after Dr Koura Ishikawa, is also recognised as the Ishikawa Diagram (Magar & Shinde, 2014; Muhammad, 2015). This diagram presents a comprehensive overview of the factors that can lead to damage, allowing researchers to identify the critical areas of concern. Due to its shape, this diagram is called the fishbone diagram.

Lastly, the Focus Group Discussion (FGD) method is employed to determine effective strategies for reducing paint damage. This FGD involves expertise in controlling damaged paint.

These stakeholders will gather valuable insights and recommendations to mitigate paint damage effectively. FGD is a qualitative method to collect information and data from a small group of people who sit together and discuss the assigned topic (Gundumogula, 2020).

3. Results and Discussion

Table 1 presents the return goods quantity data from January - June 2023 at PT XYZ, and Table 2 shows the delivery quantity. The use of Excel here is to read the collected data easily. The information relates to damage-related returns of wall paint, coating, oil, varnish, and spray paint. The data group of paint type is to make it easier to read. The Pareto method will then process the data.

Table 1 - Quantity of return paint January – June 2023 (pcs)

Type of paints	Jan	Feb	Mar	Apr	May	Jun	Total
Wall	18	26	59	0	65	73	241
Coating	23	1	44	29	57	10	164
Oil	16	24	80	25	20	10	175
Varnish	2	0	0	6	19	14	41
Spray	0	0	1	0	12	0	13

Source: PT XYZ (by authors)

Table 2 - Quantity of paint delivery January – June 2023 (pcs)

Type of paints	Jan	Feb	Mar	Apr	May	Jun	Total
Wall	4589	3981	5663	3796	4390	8402	30821
Coating	9496	13884	20548	10232	8573	22254	84987
Oil	8218	7459	11999	7277	8402	14441	57796
Varnish	183	337	214	130	478	842	2184
Spray	234	60	144	144	295	582	1459

Source: PT XYZ (by authors)

Despite the delivery volume of wall paint not being the biggest, it contributes to the most significant quantity of returned products.

Pareto Method

The result of the Pareto method was that wall paint contributed the most returned products, followed by oil paint, coating paint, varnish paint, and spray paint, in terms of pieces, as shown in Figure 2.

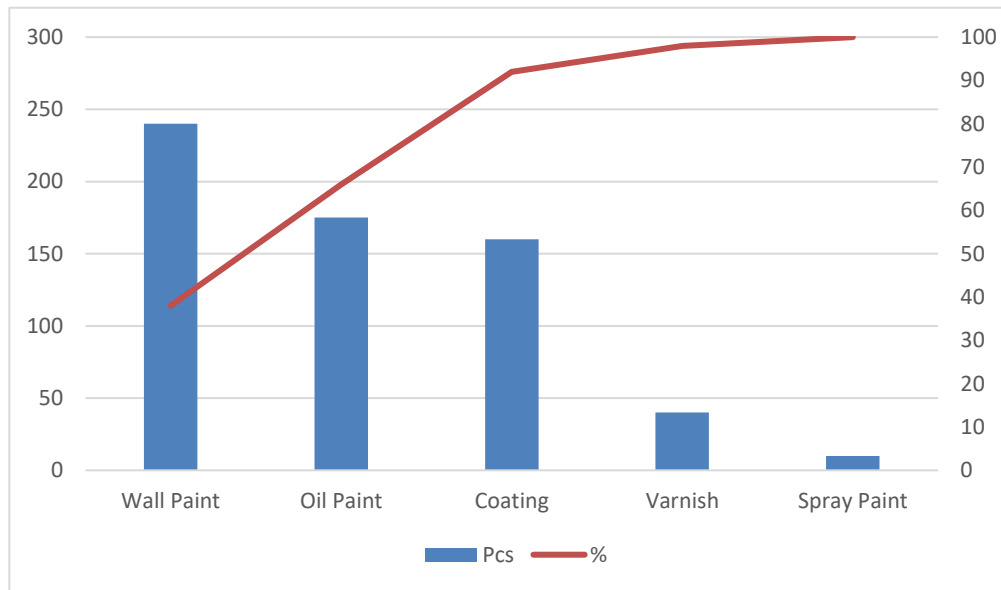


Figure 2 - Quantity of return Pareto (pcs)

Source: PT XYZ (by authors)

When converted to a value, as presented in Table 3, Pareto's most prominent contribution is wall paint, followed by coating, oil, varnish, and spray paint.

Table 3 - Value of return paint by type January – June 2023

Type of Paint	Quantity of Return (Price)
Wall Paint	46,626,800
Coating Paint	40,494,600
Oil Paint	13,475,000
Varnish Paint	3,152,900
Spray Paint	364,000

Source: PT XYZ (by authors)

Figure 3 shows that histogram chart. The wall paint generates the most significant returns regarding pieces and values. Between January and June 2023, the returned goods were 241 pieces worth IDR 46,626,800.

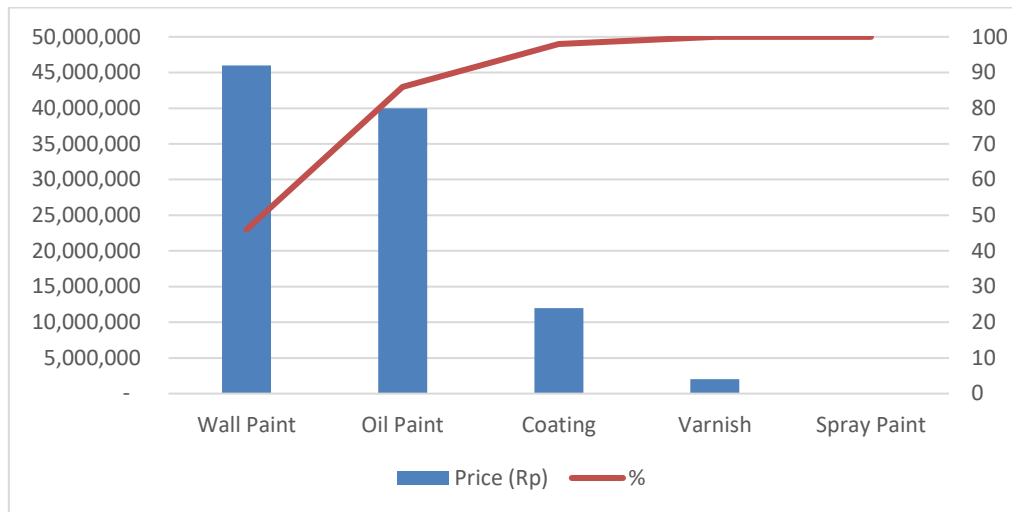


Figure 3 - The highest value of paint return Pareto (Price IDR)

Source: PT XYZ (by authors)

Table 4 presents the kind of wall paint returned per value. The 5 kg of wall paint contributes the highest loss in pieces and value.

Table 4 - Value of Wall Paint

	Size	Return	Unit Price	Total Price
Wall Paint	1 kg	18	Rp 37,900.00	Rp 682,200.00
	5 kg	195	Rp 140,600.00	Rp 27,417,000.00
	25 kg	28	Rp 661,700.00	Rp 18,527,600.00
Total		241		

Source: PT XYZ (by authors)

The Cause of Paint Return

The highest reason for returning wall paint is caused by leaking paint packaging, at 59.3%, as shown in Table 5.

Table 5 - Cause of paint return

Cause of Return	Quantity	Percentage
Paint Clumps	43	17,8%
Paint Coagulated	7	2,9%
Paint Packaging Broken	20	8,3%
Paint Packaging Leak	143	59,3%
Paint Nonconformity	28	11,6%
Paint Packing Dented	0	0,0%
Total	241	100,0%

Source: PT XYZ (by authors)

The 5-Whys Method

The 5-Whys method addresses several issues in this research and develops a solution. The proposed solution for the root cause is to prevent product damage and ensure the products remain in good condition. The 5-whys questions are raised in this research and listed as follows. The 1st Why - why was the item returned? Because the paint is damaged. The 2nd Why – why is the paint damaged? Because there is a leak in the packaging. The 3rd Why – why is there a leak in the paint packaging? Because of improper goods handling in operational. The 4th Why – why is there improper goods handling? Because the pickers do not get sufficient training. The 5th Why – why don't the pickers get sufficient training? Because they are assumed to understand the process already. Based on the result of the 5-Whys method, the possible root cause is that the Standard Operating Procedure or SOP is rarely regularly evaluated. Adequate training will follow the evaluation result.

Cause & Effect Analysis

The cause and effect analysis is usually presented in the form of a fishbone diagram. There are five known trigger factors for paint product returns. The Man factors are lack of labour, long workdays, and exhaustion cause careless handling. There are also inconsistencies resulting from a lack of discipline, an inadequate analysis, poorly functioning production processes, and insufficient training. The Measurement factors result in inadequate storage area and lack of storage space, too high of stacking products, lack of conveyance for delivery, and overloaded cargo on the delivery conveyance. The Machine factor shows fewer amenities as a result of cost-cutting measures. The Method factors are due to mistakes in stocktaking, stock discrepancies in the system, and a lack of supervision. Lack of supervision is due to no reference procedures or evaluation, leading to a lack of repeated checks, accountability, and no reward or punishment. Eventually, this results in errors in the mutation of goods. The last factor is the Material, which is most likely to show improper packaging to protect the product. Based on the above findings, the researchers conclude that the circumstances in PT XYZ's warehouse are caused by a lack of guidelines or standards for operational tasks, making it impossible to measure every task.

Focus Group Discussion

Based on the result analysis of the Pareto method, the 5-Whys, and the cause-and-effect diagram, improper handling is the primary cause of the return problem at PT XYZ. The next step in solving this issue was to conduct a Focus Group Discussion to get solid insight from the practices at PT XYZ. Three sources from PT XYZ directly involved in product delivery discuss the issue. They agree on three factors that have the most significant influence on warehouse improvement.

Firstly, properly handling the goods will lessen their impact since the paint is deep. Many pickers place items carelessly when handling them. They will not slam the paint product if the goods handling procedure is correct. They must comply with the proper lifting and handling of goods procedures to avoid damage. Secondly, the warehouse can double-check that the goods sent are in good condition and fit for delivery. They can identify if there is damage, which will automatically

lessen the impact of returns. This procedure is one of the main ways that repeated checks help reduce the amount of returned goods. Thirdly, implementing SOPs is necessary because, in the presence of clear guidelines, people can handle products in compliance with applicable procedures, enhancing their behaviours and lowering the likelihood of product defects in the final product. SOP also serves as an efficient communication channel for all those involved in operational tasks. According to Freeman et al. (2021) an SOP is a written document that performs a repetitive activity.

The current work process does not have the updated SOP. The updated SOP must be in place since the workflow constantly changes. The SOP consists of three categories, namely Return Input SOP (Figure 5), Return Document SOP (Figure 6), and Repair SOP (Figure 7). The return process begins with the customer reporting damaged goods to the salesperson, who then visits the customer to inspect the condition of the goods. Sales will use the device to enter the returned goods data if the merchandise is suitable. A notification requesting return approval will appear on the device manager. The head administrator can print the return document once the manager has approved it. Figure 5 will indicate this process.

The next SOP is a return document, as shown in Figure 6. Having received the return document for the goods, the warehouse administrator will arrange the route for the driver. The driver will pick up the returned items along with the return paperwork. The returned goods will be double-checked against the return documents when they get to the warehouse. The warehouse division will return the customer's money if the return is inappropriate. If necessary, the head of administration will handle the return processing after the warehouse department documents the return procedure. The warehouse will receive the administrative head's input results so they can verify the return documents and return document receipts. In the event of an error, the head of administration will receive notification from the warehouse department for revision. The execution of the return input SOP and document SOP are right after the return point occurs.

The SOP of repair serves as assessment material to lower the percentage of returned goods. The items will be ready for loading by the warehouse department and delivery by the assistant. The checker will examine the items the assistant has prepared and move the items to the damaged warehouse if any are not fit for delivery. Following shipment inspection, the checker will give the warehouse administrator the data to print the delivery order and place the goods on the loading dock. During loading, checkers and drivers thoroughly check the goods to ensure their condition. If any items are damaged, the warehouse operator should cancel the delivery order and move those items to the damaged warehouse. Only undamaged items will be shipped directly to the customer. This process ensures that any damaged items are not sent to the customer and helps maintain the quality and integrity of the shipped products.

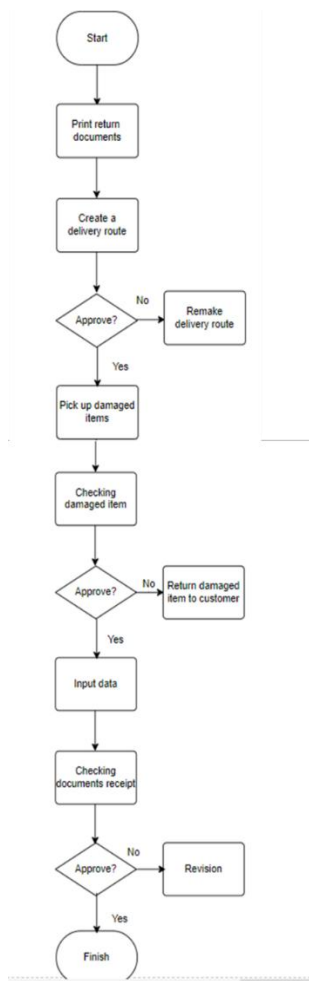


Figure 5 – Return Input SOP

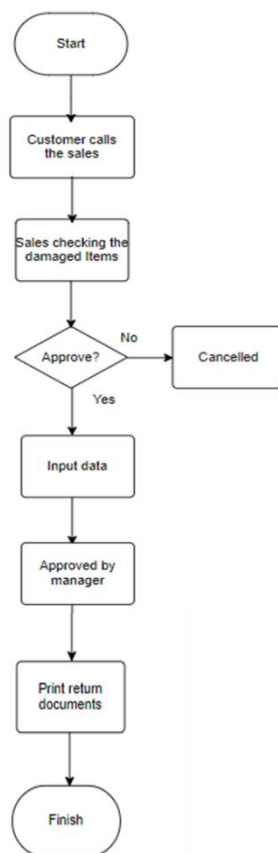


Figure 6 – Return Document SOP

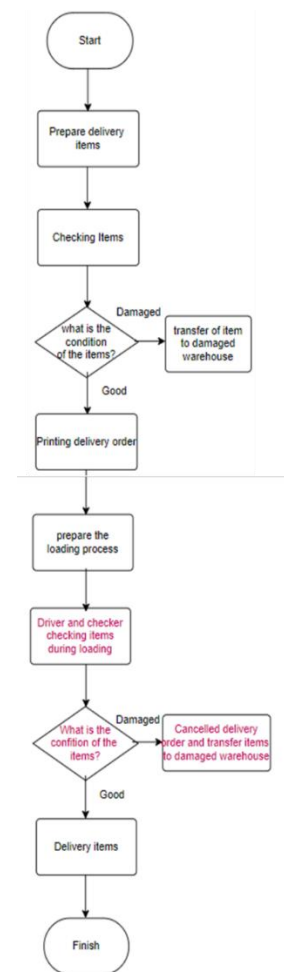


Figure 7 – Repair SOP

Source: PT XYZ (by authors)

4. Conclusion

The wall paint generates the most significant returns regarding pieces and values. There were 241 paint returns on wall paint within 6 months, from January to June 2023, with a nominal loss of IDR 46,626,800. The paint packaging leaks account for most returns, or 59.3%, of paint orders. After performing quality analysis and FGD, it became clear that the handling and procedural issues associated with sending paint products are activities that are still not operating at their best. Evaluating the problem's primary causes is the research's key takeaway. The analysis of returning paint from the distributors may become a novelty, as no research has done this before.

The warehouse department does not frequently analyse the root cause of errors every time the shop returns an item. Besides routine inspections in every receiving process, they should conduct weekly analyses to control the return of goods. The economic benefit is achieved when the warehouse can control and manage the reverse logistics (Bowersox et al. 2020). On top of the

proposed SOP, the Research and Development Department, Quality Assurance Department, and Production Department must develop and agree on the right SOP to prevent damage to production, as well as improve packaging development (Casper & Sundin, 2018).

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