

## IMPROVING SPARE PART INVENTORY SYSTEM MANAGEMENT BY USING 5S PRACTICES IN CONSUMER GOODS COMPANY

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### ABSTRACT

*The spare part inventory is an important section that must be managed and controlled in the company, primarily because this section supports the provision of spare parts for the manufacturing process. An excellent spare part inventory management system matches the records in the SAP system in the warehouse and the actual physical evidence. The problem faced by the consumer goods company was the difference between recording in the SAP system and the physical evidence for non-consumable goods. By implementing improvements to the spare part management system for receiving and picking up goods in the warehouse, data discrepancies can be eliminated on non-consumable spare parts consisting of refurbished and new spare parts. The improvement was implementing the transit area and the 5S practices in the activities conducted in the spare part warehouse. The transit area is intended for comprehensive checking between warehouse personnel and other department involved with the goods stored or picked up. Refurbished and new items are more organized, making it easier to place and pick up items.*

**Keywords:** 5S practices; spare part; inventory management system

### ABSTRAK

*Persediaan spare part merupakan bagian yang penting yang harus diatur dan dikontrol oleh perusahaan, terutama karena bagian ini mendukung penyediaan spare part untuk proses manufaktur. Sistem manajemen persediaan spare part yang baik akan dapat menghasilkan kesesuaian antara catatan pada system SAP di Gudang dengan bukti fisik aktualnya. Masalah yang dihadapi oleh perusahaan consumer goods ini adalah adanya perbedaan antara system SAP dengan bukti fisik pada barang non-consumable. Dengan mengimplementasikan perbaikan pada system manajemen spare part untuk penerimaan dan pengambilan barang di Gudang, ketidaksesuaian data dapat dihilangkan pada non-consumable spare parts yang terdiri dari barang refurbished dan new. Perbaikan yang dilakukan adalah implementasi transit area dan praktek 5S pada aktivitas yang dilakukan di Gudang spare part. Transit area dimaksudkan untuk pengecekan yang komprehensif antara personel Gudang dengan departemen lain yang terkait dengan penyimpanan atau pengambilan barang. Item refurbished dan new menjadi lebih terorganisir dan mudah ditempatkan dan diambil.*

**Kata Kunci:** praktek 5S; spare part; system manajemen persediaan

## INTRODUCTION

The manufacturing process is an essential part of the company that requires support from various parts. An important thing that supports the smooth manufacturing process is the availability of reliable spare parts, which are ready when needed. A spare part is a component that replaces

equipment or machine if the equipment or machine is disturbed. Within the company, spare parts are stored in warehouses that require monitoring. Therefore, spare part warehouse management must be able to manage and control inventory properly.

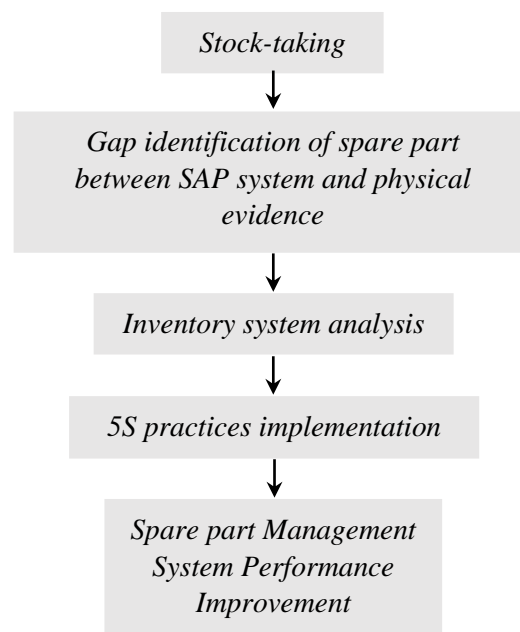
Several previous studies examined the spare part inventory management system. Riskianto et al. (2020) analyzed the management of spare part control for consumable materials in the power transmission system to handle overstock and understock. Other researchers, Gupta and Jain (2014), examined the application of 5S and kaizen principles in small companies. 5S and Kaizen bring good organizational changes, which can increase the effectiveness and efficiency of processes, improve process visibility, increase employee morale and safety, and reduce searching time, waiting time, and dangerous conditions. This research was conducted on consumer goods companies operating for decades. The grouping of spare parts in this company is divided into two major parts, namely consumable spare parts and non-consumable spare parts. Consumable spare parts are goods stored in warehouses in new condition, which come from vendors, and are consumables. An Examples of consumable spare parts are chemical, electrical, mechanical, and fuel. Meanwhile, non-consumable spare parts are spare part items that can still be reused after being repaired by the workshop. The Goods in this category have large and heavy dimensions and require a forklift to be placed and picked up. The Goods in the non-consumable spare part category are grouped into new and refurbished spare parts. Spare parts categorized as non-consumable are motors, blowers, gearboxes, and airlocks.

At the time of the stock-taking of goods in the consumable spare part category, there were no problems in synchronizing the database between the records on the company's SAP system and the physical evidence. However, problems occurred in goods included in the non-consumable spare part category; namely, there was always a difference between the recording in the SAP system and the physical evidence.

The recording discrepancy results in inappropriate planning for purchasing spare parts because the data was unclear; it could interfere with the supply of goods to manufacturers and increase inventory costs. Therefore, this study aimed to analyze the problems in the spare part warehouse and implement 5S practices to overcome those problems.

## METHODS

The research is a case study on a spare part warehouse in a consumer goods company in Indonesia. The research framework is presented in Figure 1.



**Figure 1** Research framework

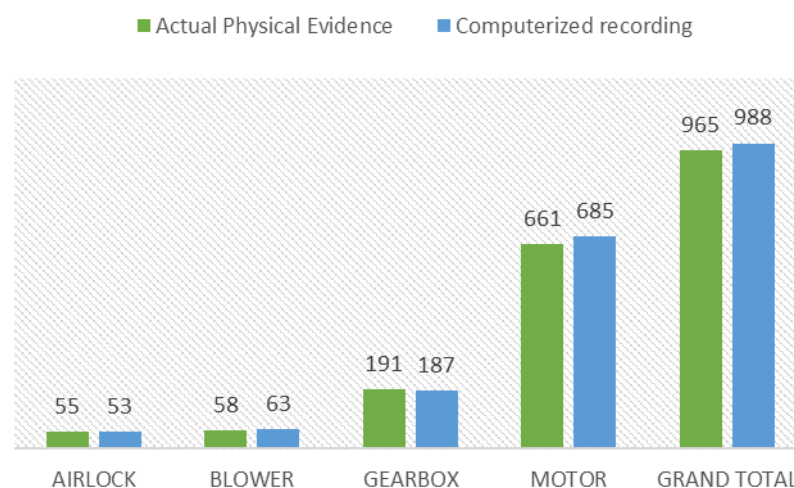
Stock-taking at this company is carried out at the end of every month. The difference between the recording and the actual physical evidence was identified. The spare part inventory system was then analyzed and implemented by 5S practices. The difference between recording and inventory measured the performance of the spare part management system after 5S implementation.

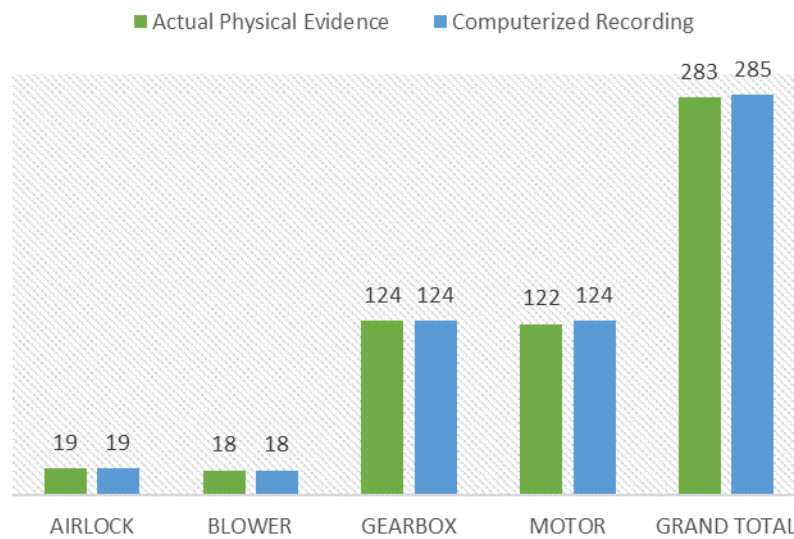
## RESULTS AND DISCUSSION

Stock taking is an activity that is carried out routinely for various inventory items, including spare parts. The performance of the spare part inventory management system can be seen from the accurate recording of spare parts with physical evidence so that ordering goods can be done with more precision and better service can be provided to other departments of the company.

Analysis of the spare article inventory system in this company showed that the difference occurred in non-consumable items that consist of large and heavy items in the form of motors, blowers, gearboxes, and airlocks. Two important activities are carried out in the spare part warehouse, receiving and picking up activities. On receipt of new items, no serious problem occurred because the goods come directly from the supplier and are placed by warehouse personnel in the right place. The problem occurred in receiving refurbished items and picking up new and refurbished items from the warehouse, which caused nonconformity data between the actual and SAP system.

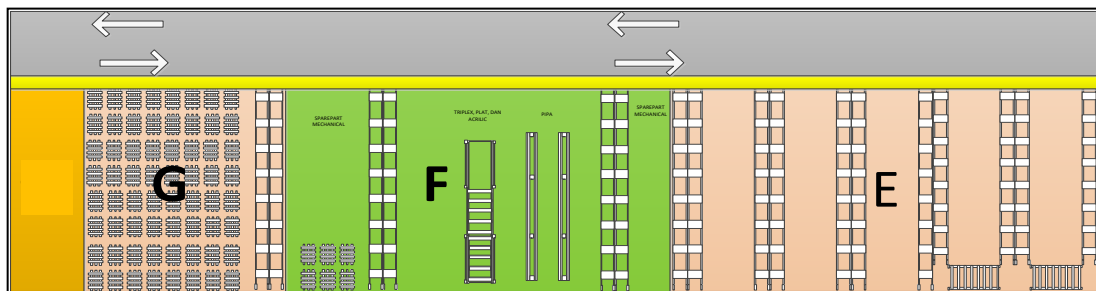
Figures 2 and 3 show the difference between actual physical evidence of inventory and computer records on the company's SAP on non-consumable spare parts (refurbished and new items) in February 2022. The gap between the recording and the identified physical evidence occurred in refurbished items, with a total of 23 items more in the recording than the actual. The difference of airlock and gearbox items was more in the recorded items than the actual items. Meanwhile, for blowers and motors, there were more actual items than those recorded in the system.

**Figure 2** Total inventory of refurbished spare parts in February 2022 (pcs)



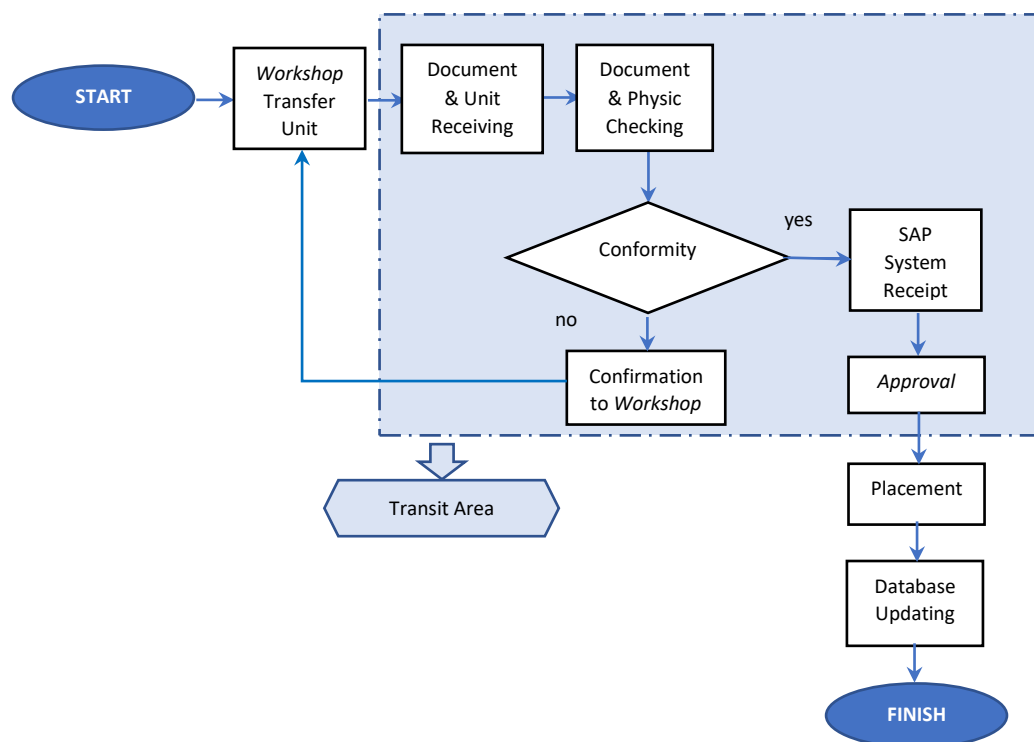
**Figure 3** Total inventory of new spare parts in February 2022 (pcs)

There were only two differences in goods in new spare parts, more recorded than actual. The difference that occurred in the refurbished and new spare parts were due to several factors. One of the contributing factors was the collection or placement of non-consumable items involving personnel outside the warehouse due to the large dimensions of the four items, so a forklift was needed to place or remove them from the warehouse. Personnel outside the warehouse who carried out this activity were the maintenance department that ordered goods and the workshop department that placed the refurbished items. The warehouse department received a document before the goods were stored or taken from the warehouse. Then they gave direction to the location of the placement, which was carried out by personnel outside the warehouse who were often not accompanied by warehouse personnel because of their mutual trust in each other. Another contributing factor was the lack of discipline in the placement or collection of non-consumable spare parts. Personnel outside the warehouse often pick up spare parts at easy-to-reach locations, which sometimes do not match the specifications listed in the letter. For example, new spare parts should be taken, but because the position was challenging to reach, spare parts that were easy to carry were taken. Likewise, the storage of refurbished items on shelves was placed in a space that was not its intended location. Incidents like this frequently happen because of the company's high turnover of non-consumable items. Figure 4 is the initial layout of the spare parts warehouse. Another factor was that refurbished items were brought by another department to the warehouse simultaneously as other items, causing the goods not to be carried or the goods to be carried in excess if it refers to the documents submitted to the warehouse. Besides, because of mutual trust, sometimes they only submit documents, but in reality, the goods were not immediately picked up because of other urgent activities.



**Figure 4** Part of spare part warehouse layout (initial)

In Figure 4, area G is the new spare part area; area F is the general and mechanical spare part area; area E is the refurbished spare part area. Due to the problems that occurred, the spare part inventory management system related to non-consumables was improved by rearranging the system for receiving and retrieving goods by implementing a transit area. The flow of the improvement process in the receiving process is shown in Figure 5. In the initial system, the workshop department that will place the refurbished items after submitting the documents is directed to store the items themselves on the shelves. In the improved system, the submitted documents are checked together with the warehouse personnel. If appropriate, the SAP system acceptance, approval, placement, and updating of the database can be continue. Meanwhile, if there is a discrepancy, a confirmation will be resubmitted to the workshop.

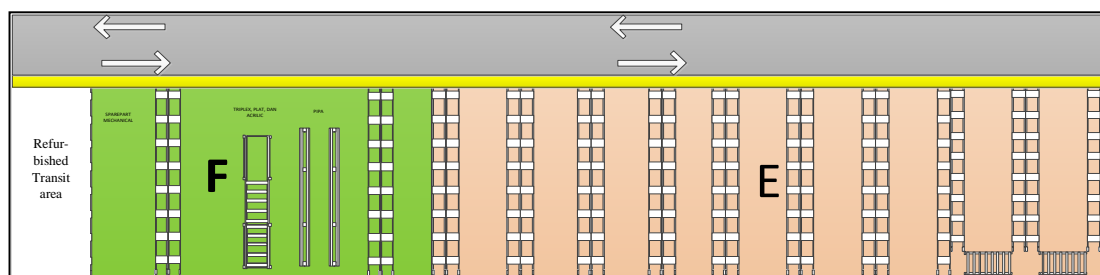


**Figure 5** Flow process improvement of spare part receiving

5S practices are implemented in the spare part warehouse of this consumer goods company. Based on the previous research, Singh et al. (2014), mentioned 5S is a systematic organizational technique that uses five Japanese words, namely Seiri (Concise), Seiton (Neat), Seiso (Clean), Seiketsu (Treat), Shitsuke (Diligent), which help organize the workplace to be more efficient and effective, reduce non-value-added activities. 5S is an effective tool to improve company performance regardless of the size of the company or the type of company, whether manufacturing or service. Randhawa and Ahuja (2017) mentioned that 5S had been proven to contribute to organizational growth in the long term. 5S brings organizations including increasing employee involvement, communication, teamwork, production, quality, workflow, security, maintenance, inventory management, et cetera. Shaikh et al. (2015) stated that 5S is the basis of lean manufacturing techniques for cleaning, sorting, organizing, and improving work areas. The application of 5S in the previous research in Ulstein Verft US warehouse department in Gergova's research (2010) stated that 5S resulted in improvements in visibility, material flow, work organization, and process standardization. Shinde and Shende (2014) mentioned that 5S is the foundation of the lean concept and aims to create a clean and orderly environment, namely, an environment where there is a place for everything and everything is in its place. Al Amin et al. (2019) examined the implementation of 5S at

a jute mill in Bangladesh, which aims to reduce waste to improve the productivity and efficiency of the mill.

The implementation of 5S practices in the spare part warehouse consists of Seiri, which is getting rid of items that are not in their place and returning them to their proper places so that the searching time for items is faster. In this case, the improvement made was the placement of refurbished items on the shelves in the same area with new spare parts. Seiton implementation is providing an arrangement of spare parts neatly in the places according to their classification so that the placement and retrieval of spare parts become easier. Improvement made was activated a refurbished transit area for refurbished goods. In this transit area, documents, condition of goods, quantity, and serial number are checked. Transfer of goods in SAP system from workshop to spare part store warehouse was synchronized with the documents and physical items. Checks were carried out comprehensively between warehouse personnel and workshop departments who will store goods in the warehouse. New and refurbished items were stored in the same area (E area). Seiso implementation is maintaining the cleanliness of the warehouse. Goods' placement and the environment are kept safe for the worker. Seiketsu's implementation is to standardize the work system in the spare part warehouse area. Sheiketsu is disciplining personnel to carry out activities related to storing, recording receipts, and retrieving spare parts according to established standards. The process of receiving refurbished items was placed by the warehouse personnel; while picking up non-consumable items, the department orders will take the items assisted by the warehouse personnel. Personnel discipline through better monitoring is carried out so that personnel always comply with established procedures when carrying out their work. Figure 6 shows the layout of spare parts warehouses after 5S implementation.



**Figure 6** Part of spare part warehouse layout after 5S implementation

In Figure 6, part of the layout improvement is made in area E, designated as a storage area for new and refurbished goods. Placement into one location is intended to facilitate the faster searching time and placement of spare parts. This kind of placement becomes neater and more comfortable, speeds up the time in picking up and placing items, and reduces errors in picking up items.

The spare part inventory management system is improved with 5S practices synchronized data on non-consumable items. After improvement, the performance of conformity data on non-consumable items (refurbished and new spare parts) was achieved. The actual physics of spare part met up with the computer records on the SAP system. It is necessary to maintain the improved system performance by keeping the commitment from top management to workers.

## CONCLUSIONS

The implementation of 5S in a consumer goods company's spare part warehouse results in accurate recording on the SAP system with actual physical evidence of spare parts. The spare part management system that is improved with the 5S rules improved working conditions more orderly, and the data discrepancy of spare parts can be eliminated on non-consumable items, especially for refurbished spare parts.

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