

## Lean Six Sigma to Reduce Dead Stock at PT Globalindo Intimates

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### ABSTRACT

**Keywords:** Dead Stock; Lean Six Sigma; DMAIC. PT Globalindo Intimates is a manufacturing company that produces underwear in the garment sector. In the long run, dead stock accumulation in the warehouse becomes an unused company asset, making inventory management ineffective and inefficient. This study aims to identify and analyse the factors that cause dead stock materials and provide solutions as an improvement effort in minimising dead stock in the future to increase the effectiveness and efficiency of PT Globalindo Intimates. The method used is Lean Six Sigma with the DMAIC approach model. The data collection technique is done by observation, interview, and documentation. The results of this study explain that the factors that cause dead stock materials are man, method, environment, and material factors, the causes of which include less careful human resources, lack of understanding related to material handling, less than optimal ordering practices, overstock, damaged / defective goods, poor material storage, and low demand. The improvement efforts that can be made to minimise the occurrence of dead stock in the future so that it is not sustainable include making regulations related to the management and handling of dead stock, managing the inventory management system more effectively, optimising the application of 5S practices in the warehouse, and conducting training for employees.



### Introduction

In the current industrial era, 4.0, competition in the industrial sector is very tight, where they compete to maintain their market share (Laureani & Antony, 2019). Moreover, the manufacturing industry's growth is growing and showing rapid progress, so companies must continue to improve their effectiveness and efficiency (Trilaksono & Damayanti, 2022). One of the manufacturing industries that is experiencing very rapid development is the textile and garment industry. The textile industry is increasingly competing globally because it is competitive from upstream to downstream. In addition, its products are also known for superior quality to compete in the international market (Trilaksono & Damayanti, 2022).

PT Globalindo Intimates is a manufacturing company engaged in the garment industry that produces women's underwear with export quality. PT Globalindo Intimates is a company that uses the Make Order system in its production process so that inventory becomes the most critical asset or resource that must exist to support production activities. The strategy of achieving a company's competitiveness will depend heavily on effective and efficient resource management. Inventory owned by a company plays a crucial role, where the availability of raw materials owned by the company will be interdependent on the company's operational activities (Hidayat, Pramono, & Afdulloh, 2019).

The problem faced by the company is that there is a significant accumulation of immovable stock, where this dead stock is a company asset that has no value in the long term. Dead stock is no longer an active inventory and has only been stored in warehouses for a long time (Singh & Rathi, 2019). Of course, this becomes ineffective in inventory management because of the large number of dead stocks that accumulate and do not move on the storage shelf for a long time. The changed inventory paradigm from valuable to valueless assets encourages companies to develop innovations in their business processes (Sugiono & Alimbudiono, 2020). The accumulation of dead stock in PT Globalindo Intimates' warehouse is one of the wastes that needs improvement efforts in reducing or even preventing further dead stock to improve the company's best performance in effective and efficient stock management and avoid future business disasters.

The Lean Six Sigma (LSS) method is one of the strategies used to improve business performance processes that integrate superior principles of Lean and Six Sigma. Many academic experts have recommended this strategy over the past twenty years (Komkowski, Antony, Garza-Reyes, Tortorella, & Pongboonchai-Empl, 2023). Lean is oriented toward eliminating elements that have no added value and reducing waste. Meanwhile, Six Sigma is a tool that focuses on continuous performance improvement by identifying and eliminating waste during the improvement process (Trilaksono & Damayanti, 2022). By integrating these two principles, it is hoped that this study can find the factors that cause dead stock and improvement efforts that can be made to minimise waste dead stock that occurs at PT. Globalindo Intimates.

The main contribution of this research study is to represent efforts for continuous improvement and improvement through the application of Lean Six Sigma, namely the DMAIC (Define - Measure - Analyze - Improve - Control) method, which is used to analyse the company's inventory condition and provide improvement efforts to reduce dead stock on an ongoing basis so that operational performance in the inventory movement system becomes more effective and efficient (Ramadhanti & Hardati, 2021).

In Lean theory, excess inventory can be considered the most common form of waste. If resources cannot be used effectively, they are considered a waste. According to (Tampubolon and Purba, 2021), Lean is a concept that is applied to reduce waste and eliminate processes or activities that do not provide added value. Another goal is to improve the efficiency and effectiveness of the company's operations. When implemented correctly, implementing lean can majorly impact businesses, including increased efficiency, reduced time cycles, lower costs, and increased competitiveness. The main

focus of lean is to eliminate waste, that is, elements that provide no value; also explains that Lean is an ongoing effort to eliminate waste, increase product value-added, and provide customer value through radical continuous improvement to achieve Six Sigma performance standards.

## **Research Methods**

The research method used in this study is qualitative, which is analysed descriptively. The data collection process used in this study is as follows:

### **Interview Techniques**

The interview is a data/information collection technique involving communication, where there is a dialogue between two parties, namely the interviewer who asks questions and the interviewee who responds. The purpose of conducting interviews is to obtain information that cannot be observed or obtained through other methods.

### **Observation Techniques**

Observation is observing and recording a phenomenon or event under study. Through observation, we can understand the behaviours that arise in certain social situations. The author applied a direct observation approach in this study as his research methodology. The author makes direct observations by supervising all activities and interactions within the company environment (Heryadi & Sutopo, 2018).

### **Documentation Techniques**

Documentation is a data source used to complement research, such as written sources, films, photographs, drawings, and monumental works, all of which provide relevant information in the research process. The documentation techniques carried out in this study aim to obtain information and data that will be used to support phenomena relevant to this research.

## **Results and Discussion**

### **Tahap Define**

The problem that the author encountered in the warehouse of PT Globalindo Intimates is the accumulation of immovable stock or "dead stock." Dead stock in PT Globalindo Intimates' warehouse is no longer used but remains in the storage room long. The dead stock reported from the company's database has found as many as 102 items with a total quantity of 25,235,229 divided into two groups: dead stock comes from material items, and dead stock comes from accessories items (Sugumaran & Sukumaran, 2019).

### **Tahap Measure**

This stage is the collection of data that is analysed to measure, know, and evaluate the conditions in the company. After analysis, dead stock in PT Globalindo Intimates' warehouse is separated into two items: dead stock of material items and accessories items. Table 1 shows that most of the dead stock came from material items, which accounted for as many as 80 items or 78.43% of the total dead stock. The total quantity value of material items reached 19,567,229, or 77.54% of the total quantity value of dead stock.

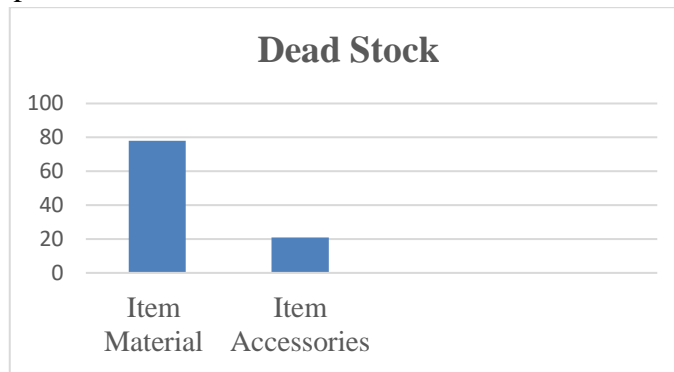
In contrast, dead stock derived from accessories items only contained 22 items or 21.57%, with a total quantity value of 5,668 or 22.46% of the total dead stock.

**Table 1**  
**Description of Dead Stock Results per Item Group**

Stock	Total Item	Total Nilai Qty	Per cent by Item	The per cent by Nilai Qty
Material	80	19.567,229	78,43%	77,54%
Accecories	22	5.668	21,57%	22,46%
<b>Total</b>	<b>102</b>	<b>25.235,229</b>	<b>100%</b>	<b>100%</b>

Source: Processed Products, 2024

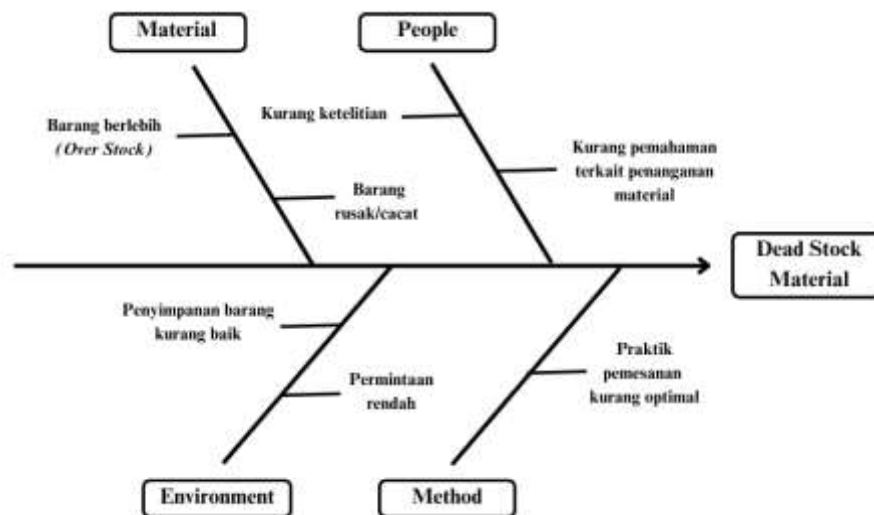
Companies can focus more on the main aspects with the highest level of problems through the Pareto chart. Thus, solutions can be developed to address critical factors that significantly impact the problem, aiming to reduce or eliminate it. Referring to Table 1 above, the data that has been analysed shows that as much as 78.43% of dead stock comes from the material item group, while 21.57% comes from the accessories item group. Therefore, dead stock derived from material items is valued higher, so it will be the main focus to identify the causes of material and dead stock and find solutions to reduce or even eliminate these problems in the future.



**Figure 1**  
**Diagram Pareto Dead Stock**

**Analyse Stage**

This stage uses a fishbone diagram to analyse the factors that cause the continuous buildup of dead stock material in the warehouse of PT Globalindo Intimates. Diagram fishbone is an analytical tool that provides a systematic view of cause and effect caused or contributed rather than an effect. The fishbone diagram analysis below grouped the discussion results related to the factors causing deadstock material.



**Figure 2**  
**Diagram Fishbone Dead Stock Material**

**Man Factor:** The Man factor is one factor that has a vital and influential role in organisational performance because it is an actor in this matter. Lack of accuracy or unfocus on the part of the operator/admin is fatal because it results in errors in inputting data, so often incompatibility occurs between actual data and data in the system. Another factor that causes this problem is the lack of understanding and knowledge of employees when handling materials. As a result, sometimes, there is a tendency for employees to be negligent in placing materials that do not match where they should be. This condition can raise concerns about the possibility of material loss that causes a stock of goods challenging to find and end in obsolescence.

**Method Factor:** The practice of suboptimal ordering methods is one of the potential causes of dead stock at PT Globalindo Intimates. The ordering method applied by the supplier is to provide a minimum order limit with a specified limit, so this is one of the things that causes many unused goods to eventually expire and become dead stock goods because the inventory condition has an amount greater than the amount of demand needed. So, this is considered less optimal and effective in ordering materials.

**Environmental Factors:** Environmental factors are essential for storing and managing material stocks. Poor storage of goods is one of the causes of damage to goods before use. As a result, inventory items damaged before use or production will eventually fall into the category of deadstock goods. In addition, fluctuating customer demand is also one of the things that cannot be controlled. PT Globalindo Intimates is a manufacturing company whose production strategy is make-to-order, meaning it will produce goods when customers demand them. In this case, when the company experiences low demand or no longer accepts orders from customers, the stock in the warehouse will not be used to shorten the life of the quality of the material.

**Material Factors:** Overstock is one of the causes of potential dead stock materials in PT Globalindo Intimates' warehouse. This overstock usually occurs when the

procurement party orders material needs with a large amount exceeding demand, so the potential for leftover goods that are no longer used is vast and ends in obsolescence. In this case, it can be said that the prolonged overstock at PT Globalindo Intimates is one of the factors causing the accumulation of dead stock material. In addition, damage to goods experienced after the checking process by Quality Control, such as goods suddenly defective, torn, or decreased quality in terms of colour, is one of the causes of dead stock. Of course, with the damage to the material, the goods cannot be reused because the company emphasises high quality, so damaged or defective goods will no longer be used and ultimately fall into the category of dead stock goods.

### **Tahap Improve**

This stage identifies improvement efforts as recommendations for problem-solving to improve company performance and be more effective and efficient in reducing or even preventing dead stock problems in the long term from recurring in the future. The improvement efforts that the company can develop to reduce and even prevent dead stock problems from recurring are as follows:

#### **1. Making Regulations for the Management and Handling of Dead Stock**

PT Globalindo Intimates can make regulations and conduct socialisation related to the management and handling of dead stock material so that it does not continue to accumulate to fill the storage shelves. An alternative mechanism for managing dead stock accumulated in PT Globalindo Intimates' warehouse can be anticipated by continuing to sell the deadstock so that dead stock goods in the warehouse do not accumulate to fill the warehouse storage area and not harm the company. Carrying out a dead stock sales strategy is one of the most effective steps because it directly impacts and can significantly reduce the accumulated dead stock.

#### **2. Set Up an Inventory Management System**

Companies need to implement an inventory management system to achieve effectiveness and efficiency. Purchasing planning and material control should be done as well as possible. In addition, the use of the FIFO system in PT Globalindo Intimates' warehouse can be emphasised more in the inventory management system. This FIFO method applies the First In, First Out system, where the first goods to come are the first items to be issued. The application of a more organised FIFO method can be increased by adding facilities such as FIFO support racks that can facilitate storing goods in a structured manner. This is expected to minimise all possible problems and make the company's business processes run more smoothly.

#### **3. Optimizing 5S Implementation in the Warehouse**

According to (Hafidz and Soediantono, 2022), 5S is an effective lean manufacturing tool to help companies reduce waste and increase profits. 5S practices become an efficient basis for various improvement efforts aimed at eliminating waste and improving organisational performance on an ongoing basis. Optimising the implementation of 5S that already exists in PT Globalindo Intimates' warehouses consistently and sustainably will improve employee productivity and company performance.

#### **4. Conducting Training for Employees**

Training (training) for employees aims to improve the mastery of various skills and mastery techniques in the implementation of specific work tasks. Holding training and routine activities in the form of mentoring can help update employee insights and skills, which are very important in improving the performance and productivity of the workforce itself. In addition, supervisors can also provide feedback to their employees so that employee performance can run more optimally.

### **Control Stage**

This stage is designed to ensure that the proposed repair solution can be maintained. This stage is essential to oversee the process to ensure that the changes implemented can reduce dead stock in the long term and prevent it from happening again. In addition, improved employee performance can ensure the successful implementation of changes. Thus, there are proposals in the form of improvement efforts that have been recommended; it is hoped that the company's management will be able to control and supervise the improvement efforts that have been implemented.

### **Conclusion**

Based on the results of the analysis and discussion, it can be concluded that the condition of dead stock in PT Globalindo Intimates' warehouse reached a total quantity of 25,235,229, with a total of 102 items, consisting of 80 material items and 22 accessories items. Pareto's analysis shows that dead stock material items are valued more than accessories, so they are prioritised. Factors that cause dead stock include inadequate human resources, lack of understanding related to material handling, suboptimal ordering practices, overstock, damaged/defective goods, poor material storage, and low demand. To overcome this problem, it is necessary to make improvement efforts such as making regulations related to dead stock management, increasing the effectiveness of inventory management systems, implementing 5S practices in warehouses, and training employees.

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