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Material Inventory Control Analysis Using Safety Stock and Reorder Point Methods at PT. Hwaseung Bimaruna Indonesia

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Abstract

PT Hwaseung Bimaruna Indonesia is an automotive rubber component distribution company facing inventory control problems, as indicated by 33 materials categorized as Need Order in its Material Requirement Planning (MRP) system. This condition reflects a potential inventory shortage that may disrupt operational activities. This study aimed to identify materials with Need Order status, determine the required Safety Stock, and calculate the optimal Reorder Point (ROP) as a basis for inventory control. A quantitative approach was employed using the Safety Stock and Reorder Point methods. The research samples were selected through purposive sampling, focusing on five materials with the highest demand levels: 82130-I7000, 58737-BW200, 58738-BW200, 25415-I7000, and 26710-2M020. The data consisted of material demand records, inventory data, supplier lead time data, and company MRP data from January to May 2026. The results showed that the highest Safety Stock value was found for materials 58737-BW200 and 58738-BW200 at 1,889.29 units, while the lowest value was identified for materials 25415-I7000 and 26710-2M020 at 850.58 units. The highest Reorder Point value was obtained for materials 58737-BW200 and 58738-BW200 at 7,520.89 units, whereas the lowest value of 5,418.18 units was found for materials 25415-I7000 and 26710-2M020. The implementation of the Safety Stock and Reorder Point methods can assist the company in determining appropriate safety inventory levels and replenishment timing, thereby minimizing the risk of stockouts.

Keywords: *safety stock, reorder point, inventory control, material requirement planning, stockout*

Abstrak

PT Hwaseung Bimaruna Indonesia merupakan perusahaan distribusi komponen otomotif berbahan karet yang menghadapi permasalahan pengendalian persediaan, ditandai dengan munculnya 33 material berstatus *Need Order* pada sistem *Material Requirement Planning* (MRP). Kondisi ini menunjukkan adanya potensi kekurangan persediaan yang dapat mengganggu kelancaran operasional perusahaan. Penelitian ini bertujuan untuk mengidentifikasi material berstatus Need Order, menentukan nilai Safety Stock, serta menghitung Reorder Point (ROP) yang optimal sebagai dasar pengendalian persediaan. Penelitian menggunakan pendekatan kuantitatif dengan metode Safety Stock dan Reorder Point. Sampel penelitian dipilih menggunakan teknik purposive sampling terhadap lima material dengan tingkat kebutuhan tertinggi, yaitu 82130-I7000, 58737-BW200, 58738-BW200, 25415-I7000, dan 26710-2M020. Data yang digunakan meliputi data kebutuhan material, data persediaan, data lead time supplier, dan data MRP perusahaan periode Januari–Mei 2026. Hasil penelitian menunjukkan bahwa nilai Safety Stock tertinggi terdapat pada material 58737-BW200 dan 58738-BW200 sebesar 1.889,29 unit, sedangkan nilai terendah terdapat pada material 25415-I7000 dan 26710-2M020 sebesar 850,58 unit. Nilai Reorder Point tertinggi diperoleh pada material 58737-BW200 dan 58738-BW200 sebesar 7.520,89 unit, sedangkan nilai terendah sebesar 5.418,18 unit diperoleh pada material 25415-I7000 dan 26710-2M020. Penerapan metode Safety Stock dan Reorder Point mampu membantu perusahaan menentukan jumlah persediaan pengaman dan waktu pemesanan kembali secara lebih tepat sehingga risiko stockout dapat diminimalkan.

Kata Kunci: *stok pengaman, titik pemesanan ulang, pengendalian persediaan, perencanaan kebutuhan material, kekurangan stok*

1. Introduction

In the automotive component distribution industry, effective inventory management plays a critical role in ensuring the continuity of supply chain operations and meeting customer demand [1]. Unlike manufacturing companies that produce goods internally, trading and distribution companies depend entirely on the availability of incoming materials from suppliers [2]. Consequently, maintaining an appropriate

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inventory level becomes essential to avoid disruptions caused by material shortages or excessive stock accumulation [3]. In supply chain management, inventory control is not only concerned with monitoring physical stock in warehouses but also with forecasting demand and managing procurement lead times [4]. Effective coordination throughout the supply chain can reduce operational costs while improving responsiveness to fluctuations in customer demand [5]. The challenge becomes more significant for companies that rely on imported materials, where uncertainties in transportation, customs clearance, and supplier performance may increase the risk of stockouts and negatively affect operational performance [6].

Several previous studies have investigated the application of Safety Stock and Reorder Point (ROP) methods in inventory control systems. Research conducted demonstrated that Safety Stock calculations can reduce the risk of inventory shortages by considering demand variability during procurement periods [7]. One of the researchers reported that the implementation of Reorder Point can improve procurement decision-making by determining the appropriate timing for replenishment orders [8]. Other studies have shown that the integration of inventory control techniques with Material Requirement Planning (MRP) systems contributes to better inventory visibility and procurement planning [9]. However, most previous studies focused on manufacturing environments or general inventory management systems without specifically addressing imported automotive components characterized by long procurement lead times and diverse supplier origins [10]. Furthermore, many inventory policies are still based on fixed buffer stock practices that do not adequately consider actual demand fluctuations, resulting in either excessive inventory costs or stockout risks [11].

PT Hwaseung Bimaruna Indonesia, a distributor of rubber-based automotive components under the Hwaseung Group of South Korea, currently faces inventory control challenges related to the effectiveness of its existing buffer stock policy. Based on the company's Material Requirement Planning (MRP) data from January to June 2026, 33 out of 91 managed materials were identified with a "Need Order" status, indicating a high risk of future inventory shortages. The company currently applies a uniform inventory protection policy consisting of 90 days of coverage for materials supplied from South Korea and 75 days for materials supplied from Vietnam. This policy combines delivery lead time and additional custom stock periods but does not consider the actual demand variability of individual materials. As a result, several high-demand items experience faster inventory depletion than anticipated, causing the MRP system to generate reactive procurement recommendations and increasing the likelihood of stockout occurrences.

The novelty of this study lies in the evaluation of inventory control policies for imported automotive components by integrating demand variability and supplier-specific lead times into Safety Stock and Reorder Point calculations. Unlike previous studies that primarily emphasize general inventory control applications, this research focuses on materials classified as "Need Order" within an actual industrial environment and examines inventory requirements based on dynamic demand characteristics. Five critical materials with the highest demand levels 82130-I7000, 58737-BW200, 58738-BW200, 25415-I7000, and 26710-2M020 were selected using purposive sampling techniques to represent the most critical inventory conditions. Therefore, this study aims to identify materials with a Need Order status, determine the appropriate Safety Stock level, and calculate the optimal Reorder Point for selected materials. The findings are expected to provide practical recommendations for improving inventory control policies, minimizing stockout risks, and supporting data-driven procurement decision-making in automotive component distribution companies.

2. Material and Methods

This study employed a quantitative descriptive approach to evaluate inventory control practices for imported automotive components at PT Hwaseung Bimaruna Indonesia. The research focused on materials identified with a "Need Order" status in the company's Material Requirement Planning (MRP) system during the January–May 2026 period. From a total of 33 materials categorized as Need Order, five materials were selected as research samples using purposive sampling. The selection criteria included materials with the highest demand levels during the observation period, as these materials represented the greatest risk of inventory shortages. The selected materials were 82130-I7000, 58737-BW200, 58738-BW200, 25415-I7000, and 26710-2M020.

The study utilized both primary and secondary data sources. Primary data were collected through interviews with personnel responsible for inventory and supply chain management activities to obtain information regarding inventory control policies, procurement procedures, supplier lead times, and buffer stock practices [12]. Secondary data were obtained from company documents, including Material Requirement Planning (MRP) records, inventory data, material demand records, and supplier lead-time information [13]. Data collection was conducted through direct observation of inventory management activities, semi-structured interviews, and documentation review to ensure data completeness and accuracy [14].

Several assumptions were established during the analysis process. Demand data from January to May 2026 were assumed to represent the actual consumption pattern of each material. Supplier lead times were considered constant throughout the observation period based on historical procurement records. The lead time used in the inventory calculations represented delivery lead time only, while the additional 45-day custom stock policy implemented by the company was excluded because it reflected a managerial decision rather than procurement uncertainty. Accordingly, lead times were converted into monthly units to match the demand data frequency, resulting in a lead time of 1.5 months for suppliers from South Korea and 1 month for suppliers from Vietnam. Furthermore, a service level of 95% was assumed for all inventory calculations [15].

The research procedure was conducted chronologically. First, materials with a Need Order status were identified from the company's MRP database. Second, five representative materials were selected using purposive sampling based on their demand levels [16]. Third, the average demand for each material was calculated to determine the normal inventory consumption rate. Fourth, demand variability was measured using the standard deviation formula to quantify fluctuations in material requirements. The standard deviation was calculated using Equation (1):

$$\sigma = \sqrt{\frac{\sum(D_i - \bar{D})^2}{n-1}} \quad (1)$$

where (σ) represents the standard deviation, (D_i) represents individual demand observations, ($\bar{D}$) represents average demand, and (n) represents the number of observations.

After obtaining the standard deviation values, Safety Stock was calculated using a probabilistic approach with a 95% service level. Safety Stock was used to determine the amount of additional inventory required to mitigate uncertainty during the procurement period. The calculation was performed using Equation (2):

$$SS = Z\sigma\sqrt{LT} \quad (2)$$

where (SS) denotes Safety Stock, (Z) represents the service level factor, (σ) denotes the standard deviation of demand, and (LT) represents lead time.

Subsequently, the Reorder Point (ROP) was determined to identify the inventory level at which replenishment orders should be initiated. The ROP calculation incorporated average demand, lead time, and Safety Stock, as expressed in Equation (3):

$$\mathrm{ROP} = \bar{\mathrm{D}} \times \mathrm{LT} + \mathrm{SS} \quad (3)$$

where (ROP) denotes the reorder point, ($\bar{\mathrm{D}}$) represents average demand, (LT) denotes lead time, and (SS) represents Safety Stock.

Data analysis was performed using Microsoft Excel to process inventory and demand information. Descriptive statistical analysis was applied to calculate average demand and standard deviation, while inventory control analysis was conducted through Safety Stock and Reorder Point calculations. The results obtained from each material were compared and evaluated to determine appropriate inventory protection levels and replenishment timing. The calculated Safety Stock and Reorder Point values were then used to formulate recommendations for improving inventory control policies, reducing stockout risk, and supporting data-driven procurement decisions within the company's supply chain operations.

3. Results and Discussion

Identification of Need Order Materials and Sample Selection

The initial stage of the analysis involved identifying materials categorized as Need Order based on the company's Material Requirement Planning (MRP) data for the January–June 2026 period. The MRP system is used by PT Hwaseung Bimaruna Indonesia to monitor inventory availability, material demand, procurement schedules, and future inventory projections. Through this system, management can identify materials that require replenishment before stock levels reach critical conditions.

The analysis revealed that 33 out of 91 managed materials were classified as Need Order. This status indicates that the available inventory is projected to be insufficient to satisfy future demand requirements, thereby requiring immediate procurement action. The existence of 33 materials with a Need Order status suggests that the current inventory control policy has not fully accommodated fluctuations in material demand and procurement lead times.

Although all 33 materials were identified as requiring replenishment, not all exhibited the same level of demand. Several materials showed relatively low demand volumes despite being categorized as Need Order. Consequently, the risk of stockout varied among materials. Materials with higher demand levels generally face greater inventory depletion rates and require more rigorous inventory control measures. Therefore, demand volume was used as the primary criterion for sample selection in this study.

To ensure that the analysis focused on the most critical inventory conditions, purposive sampling was employed to select representative materials from the Need Order category. Five materials with the highest cumulative demand during the January–May 2026 period were selected as research samples. The selected materials were part numbers 82130-I7000, 58737-BW200, 58738-BW200, 25415-I7000, and 26710-2M020. **Table 1** presents the total demand for each selected material.

Table 1. Demand of Selected Sample Materials (January–May 2026)

Part Number	Total Demand
82130-I7000	17,813
58737-BW200	18,772
58738-BW200	18,772
25415-I7000	22,838
26710-2M020	22,838

As shown in **Table 1**, materials 25415-I7000 and 26710-2M020 recorded the highest cumulative demand, followed by materials 58737-BW200, 58738-BW200, and 82130-I7000. These demand levels were significantly higher than those of several other Need Order materials identified in the MRP system. The high consumption rates indicate that these materials play a crucial role in supporting company operations and are more vulnerable to inventory shortages when procurement activities are delayed.

In addition to demand considerations, supplier lead time was evaluated because it directly influences inventory replenishment decisions. The selected materials originated from two different suppliers located in South Korea and Vietnam. Materials supplied by HS R&A (South Korea) had a procurement lead time of 45 days, while materials supplied by Pantra Vina (Vietnam) had a lead time of 30 days. To ensure consistency with the monthly demand data, lead times were converted into monthly units. Therefore, the lead time values used in the analysis were 1.5 months for South Korean suppliers and 1 month for Vietnamese suppliers, as presented in **Table 2**.

Table 2. Lead Time of Selected Materials

Part Number	Supplier	Country of Origin	Lead Time (Days)	Lead Time (Months)
82130-I7000	HS R&A	South Korea	45	1.5
58737-BW200	HS R&A	South Korea	45	1.5
58738-BW200	HS R&A	South Korea	45	1.5
25415-I7000	Pantra Vina	Vietnam	30	1
26710-2M020	Pantra Vina	Vietnam	30	1

Information obtained from the Supply Chain Management (SCM) department indicated that the company currently applies a uniform buffer stock policy consisting of delivery lead time and an additional 45-day custom stock allowance. As a result, the total inventory protection period reaches 90 days for materials supplied from South Korea and 75 days for materials supplied from Vietnam. However, this policy is applied equally across all materials without considering differences in demand variability. Consequently, high-demand materials may reach critical inventory levels before the predefined protection period expires, which contributes to the occurrence of Need Order status within the MRP system. This condition highlights the necessity of implementing a more data-driven inventory control approach through Safety Stock and Reorder Point calculations.

Safety Stock Analysis

Safety Stock was calculated to determine the additional inventory required to protect the company from demand uncertainty during the procurement lead time. In this study, Safety Stock was determined using a probabilistic approach with a 95% service level (Z = 1.65). The calculation considered both demand variability and supplier lead time characteristics, allowing inventory protection levels to be adjusted according to the actual risk profile of each material. The Safety Stock formula used in this study is presented in Equation (2).

To illustrate the calculation procedure, material 82130-I7000 is presented as an example. Based on demand data from January to May 2026, the material recorded an average demand of 3,562.6 units with a standard deviation of 682.71 units. Considering a lead time of 1.5 months and a service level factor of 1.65, the resulting Safety Stock value was calculated as follows:

$$SS = 1.65 \times 682.71 \times \sqrt{1,5}$$
$$SS = 1,379.61 \approx 1,380 \text{ units}$$

The result indicates that the company should maintain at least 1,380 units of reserve inventory for material 82130-I7000 to reduce the risk of stock shortages during the replenishment period. The same calculation procedure was applied to the remaining sample materials. The resulting Safety Stock values are summarized in **Table 3**.

Table 3. Safety Stock Calculation Results

Part Number	Average Demand (Units)	Standard Deviation (Units)	Lead Time (Months)	Safety Stock (Units)
82130-I7000	3,562.6	682.71	1.5	1,379.61
58737-BW200	3,754.4	934.91	1.5	1,889.29
58738-BW200	3,754.4	934.91	1.5	1,889.29
25415-I7000	4,567.6	515.5	1	850.58
26710-2M020	4,567.6	515.5	1	850.58

Table 3 shows that materials 58737-BW200 and 58738-BW200 required the highest Safety Stock levels, amounting to 1,889.29 units each. This result was primarily influenced by the relatively high demand variability combined with a longer procurement lead time of 1.5 months from the South Korean supplier. In contrast, materials 25415-I7000 and 26710-2M020 exhibited the lowest Safety Stock requirements at 850.58 units. Although these materials had higher average demand levels, their shorter lead time of one month reduced the amount of inventory protection required.

The findings demonstrate that Safety Stock levels are influenced not only by average demand but also by demand variability and supplier lead time. Materials supplied from South Korea generally required larger reserve inventories than those supplied from Vietnam due to the longer replenishment period. These results indicate that applying a uniform buffer stock policy across all materials may not adequately address differences in inventory risk. Therefore, a dynamic Safety Stock approach based on actual demand fluctuations and procurement lead times provides a more accurate inventory control strategy for minimizing stockout risks while avoiding excessive inventory accumulation.

The company currently applies a fixed buffer stock policy of 90 days for materials supplied from South Korea and 75 days for materials supplied from Vietnam. However, the Safety Stock results indicate that inventory requirements differ significantly among materials because each material exhibits unique demand characteristics and procurement risks. Materials 58737-BW200 and 58738-BW200 required the largest safety inventory due to their higher demand fluctuations, whereas materials 25415-I7000 and 26710-2M020 required lower reserve inventory because of their relatively stable demand patterns and shorter lead times. Therefore, the implementation of Safety Stock based on quantitative calculations can provide a more effective inventory control mechanism than the current uniform buffer stock policy. This approach enables the company to maintain adequate inventory availability while reducing the risk of stockouts and excessive inventory holding costs.

Reorder Point Analysis

After determining the Safety Stock values for each material, the next step was to calculate the Reorder Point (ROP). The purpose of the Reorder Point calculation is to identify the inventory level at which a replenishment order should be placed to prevent stock shortages during the procurement period. By implementing an appropriate ROP, the company can ensure material availability while minimizing the risk of operational disruptions caused by stockouts. In this study, the Reorder Point was calculated using the average demand, lead time, and Safety Stock values obtained from the previous analysis.

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To demonstrate the calculation procedure, material 82130-I7000 was used as an example. The material had an average demand of 3,562.6 units, a lead time of 1.5 months, and a Safety Stock value of 1,380 units. The calculation was performed as follows:

$$ROP = \overline{D} \times LT + SS$$
$$ROP = (3{,}562.6 \times 1.5) + 1{,}380$$
$$ROP = 5{,}343.9 + 1{,}380$$
$$ROP = 6{,}723.9 \approx 6{,}724 \text{ units}$$

The result indicates that a replenishment order should be placed when the inventory level of material 82130-I7000 reaches 6,724 units. This inventory threshold ensures that material requirements can still be fulfilled throughout the procurement lead time without consuming the reserved Safety Stock. The same procedure was applied to all selected materials. The results of the Reorder Point calculations are presented in **Table 4.**

Table 4. Reorder Point Calculation Results

Part Number	Lead Time (Days)	Safety Stock (Units)	Reorder Point (Units)
82130-I7000	45	1,380.00	6,724.00
58737-BW200	45	1,889.29	7,520.89
58738-BW200	45	1,889.29	7,520.89
25415-I7000	30	850.58	5,418.18
26710-2M020	30	850.58	5,418.18

Based on **Table 4**, the Reorder Point values varied among materials according to their demand characteristics, Safety Stock requirements, and supplier lead times. Materials 58737-BW200 and 58738-BW200 recorded the highest Reorder Point values, reaching 7,520.89 units. This result was influenced by their relatively high average demand, large demand variability, and longer procurement lead times from the South Korean supplier. Consequently, replenishment orders for these materials must be initiated earlier to ensure continuous material availability throughout the procurement cycle.

In contrast, materials 25415-I7000 and 26710-2M020 exhibited the lowest Reorder Point values at 5,418.18 units. Although these materials had the highest average demand among the selected samples, their shorter lead time of one month significantly reduced the amount of inventory required during the replenishment period. As a result, the company can delay replenishment orders longer than for materials sourced from South Korea while still maintaining adequate inventory availability.

The results further demonstrate that Reorder Point values are strongly influenced by both procurement lead time and Safety Stock requirements. Materials with longer lead times generally require higher reorder points because additional inventory must be available to cover demand during the waiting period. Therefore, implementing a uniform ordering policy for all materials may not provide optimal inventory control performance. Instead, reorder decisions should be tailored to the specific characteristics of each material.

Comparing the current company policy with the calculated results reveals that the existing inventory control approach relies primarily on a fixed buffer stock period of 90 days for South Korean suppliers and 75 days for Vietnamese suppliers. While this policy provides a general level of inventory protection, it does not explicitly account for differences in demand variability among materials. The calculated Reorder Point values provide a more precise and data-driven basis for replenishment decisions because they incorporate actual demand patterns, demand fluctuations, and procurement lead times. Consequently, the implementation of material-specific Reorder Point values can improve inventory control effectiveness, reduce the risk of stockouts, and support more efficient procurement planning.

Overall, the combined application of Safety Stock and Reorder Point calculations provides a more dynamic inventory control strategy than the company's existing uniform buffer stock policy. By integrating demand variability and supplier lead times into replenishment decisions, the company can maintain inventory availability at appropriate levels while reducing unnecessary inventory accumulation and improving supply chain responsiveness.

Discussion

The results of the Safety Stock analysis revealed that inventory protection requirements varied significantly among the selected materials. This finding confirms that inventory control parameters cannot be standardized across all materials because each item exhibits different demand characteristics and procurement risks. Materials 58737-BW200 and 58738-BW200 required the highest Safety Stock values, reaching 1,889.29 units. The large safety inventory requirement was mainly influenced by high demand variability and a relatively long procurement lead time of 45 days from the South Korean supplier. In contrast, materials 25415-I7000 and 26710-2M020 required only 850.58 units of Safety Stock due to their lower demand variability and shorter lead time of 30 days.

These findings indicate that demand variability and procurement lead time are the primary factors influencing Safety Stock requirements. The results are consistent with inventory management theory, which states that higher demand uncertainty and longer replenishment periods increase the amount of reserve inventory needed to maintain service levels and prevent stockouts. Therefore, the implementation of material-specific Safety Stock values provides a more reliable inventory control mechanism than the company's current uniform buffer stock policy.

A comparison between the calculated Safety Stock values and the company's conventional inventory policy revealed a substantial discrepancy. The company currently applies a fixed custom stock policy equivalent to 45 days of inventory coverage for all imported materials. Based on average daily demand, this policy results in inventory reserves ranging from 5,344 to 6,851 units per material. However, the quantitative Safety Stock calculations produced values ranging from only 851 to 1,889 units. This difference indicates that the existing policy potentially creates excessive inventory holdings while not necessarily eliminating the occurrence of Need Order status within the MRP system.

Table 5. Comparison of Conventional Buffer Stock and Calculated Safety Stock

Material	Average Daily Demand	Conventional Buffer Stock (45 Days)	Calculated Safety Stock	Difference	Interpretation
82130-I7000	118.75	5,344	1,380	-3,964	Potential overstock
58737-BW200	125.15	5,632	1,889	-3,743	Potential overstock
58738-BW200	125.15	5,632	1,889	-3,743	Potential overstock
25415-I7000	152.25	6,851	851	-6,000	Potential overstock
26710-2M020	152.25	6,851	851	-6,000	Potential overstock

The comparison suggests that the company has been maintaining inventory reserves approximately four to eight times higher than the scientifically calculated requirements. Nevertheless, Need Order conditions still occurred because the custom stock was treated as active inventory that continued to be consumed during daily operations. Furthermore, the existing system lacked a standardized Reorder Point parameter that could trigger replenishment activities before inventory levels became critical. Consequently, excessive inventory alone was insufficient to prevent future shortages.

The Reorder Point analysis further supports this conclusion. The calculated ROP values ranged from 5,418.18 units to 7,520.89 units depending on material characteristics. Materials 58737-BW200 and 58738-BW200 exhibited the highest reorder points because they combined relatively high demand levels, significant demand variability, and longer procurement lead times. These materials require earlier replenishment decisions to ensure uninterrupted availability throughout the procurement cycle. Conversely, materials 25415-I7000 and 26710-2M020 recorded lower reorder points due to shorter lead times, despite having high average demand levels.

The findings demonstrate that the recurring Need Order status identified in the company's MRP system is not solely caused by insufficient inventory levels. Rather, the primary issue lies in the absence of a standardized and data-driven replenishment trigger. Under the current system, procurement decisions rely heavily on fixed inventory coverage periods rather than actual demand behavior and supplier performance. As a result, inventory depletion may occur faster than anticipated, particularly for high-demand materials.

From a managerial perspective, the company should replace its uniform inventory policy with a material-specific inventory control system. The calculated Safety Stock and Reorder Point values should be integrated into the MRP database as official inventory control parameters. Such integration would enable automatic replenishment alerts based on actual inventory conditions rather than subjective judgment or fixed coverage periods. This approach would support more accurate procurement planning, reduce inventory holding costs, minimize stockout risks, and improve overall supply chain performance. Based on the findings, the proposed inventory control policy for the selected materials is summarized in **Table 6**.

Table 6. Proposed Inventory Control Policy

Part Number	Supplier	Country	Lead Time (Days)	Safety Stock (Units)	Reorder Point (Units)	Recommended Action
82130-I7000	HS R&A	South Korea	45	1,380	6,724	Place a replenishment order when inventory reaches 6,724 units.
58737-BW200	HS R&A	South Korea	45	1,889	7,520.89	Maintain Safety Stock of 1,889 units and reorder at the specified threshold.
58738-BW200	HS R&A	South Korea	45	1,889	7,520.89	Coordinate replenishment with material 58737-BW200 due to identical supplier and inventory characteristics.
25415-I7000	Pantra Vina	Vietnam	30	850.58	5,418.18	Conduct regular inventory monitoring and reorder when inventory reaches the ROP value.
26710-2M020	Pantra Vina	Vietnam	30	850.58	5,418.18	Implement replenishment immediately once inventory reaches the reorder point threshold.

Overall, the integration of Safety Stock and Reorder Point calculations provides a more effective inventory control strategy than the existing conventional buffer stock policy. By considering demand variability and supplier lead times, the proposed approach enables PT Hwaseung Bimaruna Indonesia to maintain material availability more efficiently while reducing both stockout risks and unnecessary inventory accumulation.

4. Conclusion

This study evaluated inventory control practices at PT Hwaseung Bimaruna Indonesia by applying the Safety Stock and Reorder Point (ROP) methods to materials identified with a Need Order status in the company's Material Requirement Planning (MRP) system. The results showed that 33 out of 91 managed materials were categorized as Need Order, indicating a potential risk of inventory shortages. Using purposive sampling, five critical materials with the highest demand levels were selected for analysis, namely 82130-I7000, 58737-BW200, 58738-BW200, 25415-I7000, and 26710-2M020. The Safety Stock calculations revealed that materials 58737-BW200 and 58738-BW200 required the highest inventory protection level at 1,889.29 units, while materials 25415-I7000 and 26710-2M020 required the lowest Safety Stock at 850.58 units. Similarly, the highest Reorder Point value was obtained for materials 58737-BW200 and 58738-BW200 at 7,520.89 units, whereas the lowest Reorder Point value was found for materials 25415-I7000 and 26710-2M020 at 5,418.18 units.

The findings demonstrate that inventory control parameters are significantly influenced by demand variability and supplier lead time. Therefore, applying a uniform inventory policy to all materials may not effectively address differences in inventory risk. The comparison between the company’s conventional buffer stock policy and the calculated Safety Stock values further indicated that the existing policy tends to maintain excessive inventory levels without providing an effective mechanism for determining replenishment timing. Consequently, the integration of Safety Stock and Reorder Point parameters into the company’s MRP system can provide a more accurate and data-driven inventory control strategy, helping to reduce stockout risk while improving inventory efficiency.

From a practical perspective, the proposed Safety Stock and Reorder Point values can serve as operational guidelines for procurement planning and inventory monitoring within the company. Future studies are recommended to expand the number of analyzed materials and incorporate forecasting techniques or other inventory management models, such as Economic Order Quantity (EOQ) or continuous review systems, to further improve inventory optimization and supply chain performance..

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