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Implementation of Plan for Every Part (PFEP) to Improve Material Flow and Inventory Management

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Abstract **- This research paper aims to explore the use of the system "Plan for Every Part (PFEP)" in the company of Sai Tech Controls, so as to optimize material flow and inventory management. The study is based on lean manufacturing concepts and warehouse operation literature and targets inefficiencies of disconnected data records, inaccurate storage locations and uncoordinated replenishment strategies. To address these problems, the project took four main objectives: to create a standardised PFEP structure; to increase inventory and location visibility; to detect a master-data gap; and to introduce practical governance controls. With a focus on an applied, implementation-based research design, the study employed purposive operational sampling of a controlled working sample of 120 part records and 40 physical location audits from June 1 to August 31, 2026. Data collection methods involved direct process observation, ERP logs and physical verification, while the data analysis methods comprised completeness mapping, ABC prioritization and min-max variance evaluations. The major findings are that eleven essential fields have an average baseline completeness of 84.0% and there are governance gaps related to who owns the data and when it will be reviewed, while 87.5% of the data are physically located at the correct place. In addition, inventory policy evaluations have shown that positive differences have to be understood in their true context – not just mined out as excess inventory – based on minimum order quantities, pack sizes, and lead times. The study concludes that PFEP can serve as an essential dynamic control mechanism, linking procurement, storage, and material use, and can even be scaled to create a foundation for future digital tracking systems. To continue such progress, it is advised that executive management make PFEP a required policy, warehouse staff implement strict location audit discipline, and procurement staff work closely with suppliers to tune up the parameters of lead-time.**

Keywords **- Plan for Every Part (PFEP), material flow, inventory management, warehouse operations, master data**

I. INTRODUCTION

Operating in a dynamic and competitive market, the modern industrial automation and process control industry relies on operational efficiency, supply chain responsiveness and accurate inventory management for growth and success. The management of inventory as a collection of isolated stock records is no longer enough, as manufacturing ecosystems are increasingly digital, lean and based on Industry 4.0 paradigms. To prevent any operational delays or inconsistencies that could result from the differences between the two, companies need to make sure they have a seamless flow between procurement, storage, and the consumption of materials. This paper examines the strategic application of a Plan for Every Part (PFEP) approach to an industrial component environment to tackle these operational issues in a systematic manner.

The project is based on a firm foundation of part level information structure, connecting the various parts of the project with the parameters of their planning, procurement, storage and moving. In manufacturing and automation-component industries, material flow has often been hindered by incomplete product descriptions, storage location descriptions, unsuitable stock levels, and constantly changing product delivery times. PFEP establishes a single data architecture that connects inventory management, procurement and storage functions by mapping the most crucial attributes including dimensions, usage, suppliers transit time, pack quantities, and bin locations.

The main goal of this research is to create a standardized PFEP structure that will improve the transparency of inventory, help identify gaps in the master data, and include practical ways to ensure the accuracy of the data. The study creates a repeatable process for optimizing material flow and minimizing unnecessary cost of inventory that can be held within the system, enabling clear linkages between part information, inventory policy, storage location and operational availability.

II. THEORETICAL BACKGROUND

The theoretical basis of this study combines the concepts of lean manufacturing, warehouse operations and inventory control to develop a structured framework for PFEP. Lean thinking focuses on the value streams and smooth material flow, as operationalized in the supply chain by systematic planning tools, according to Womack and Jones [1]. PFEP acts as this structural bridge between part-level attributes (demand, lead time, pack quantities, criticality, etc.) and inventory policies and replenishment parameters [2] [3].

The material flow and storage efficiency are strongly affected by the coordinated decision making of location

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assignment, retrieval dynamics and space utilization, as described in the warehouse management literature [4] and [5]. The project integrates these frameworks and redefines PFEP as more than just an administrative master file—it is a control system that improves inventory visibility, optimizes product storage according to product characteristics, and facilitates a balanced and lean material flow.

III. METHODOLOGY

A. Research Approach and Timeframe

This study used the mixed research method that included the direct process observation, system data validation and empirical evaluation method to design a robust PFEP framework. The data collection, process observation, physical audit and mapping of master data were done systematically for a three-month period from 1st June 2026 to 31st August 2026 in the operational environment of Sai Tech Controls.

The research employed a purposive operational sampling approach involving specific warehouse settings and inventory records to evaluate. Purposive operational sampling approach was used with specific warehouse environments and historical inventory records to evaluate. The sampling frame included 120 separate part records and 40 physical location audits, which allowed for a thorough review of the accuracy of the inventory records and discipline in physical location. The data collection tools used were primary data and secondary data such as ERP reports, procurement logs, physical assessment of storage, and structured interviews with the warehouse and procurement staff..

B. Objectives of the Study

- To create a Master PFEP that will be universally applicable to all materials processed in the control industry by Sai Tech Controls.
- To make inventory information, status and physical storage locations more visible.
- Using stock, demand, lead-time, location and inventory-policy information to identify gaps in inventory and material flow.
- To suggest effective controls for the maintenance, inventory and better flow of materials for PFEP.

IV. DATA ANALYSIS AND DISCUSSION

A. Standardized PFEP Structure

Table I evaluates field completeness of the proposed PFEP structure across the working sample of 120 part records.

TABLE I PFEP FIELD COMPLETENESS

PFEP Field	Completed	Completeness (%)
Part no.	120 / 120	100.0%
Description	115 / 120	95.8%
Supplier	112 / 120	93.3%
Lead time	94 / 120	78.3%
Consumption	103 / 120	85.8%
Current stock	120 / 120	100.0%
Location	107 / 120	89.2%
Rack/bin	89 / 120	74.2%
Status	108 / 120	90.0%
Last review	75 / 120	62.5%
Owner	66 / 120	55.0%

Analysis shows an overall average field completeness of 84.0% for eleven parameters. Ownership (55.0%) and current stock (62.5%) are found to be fully compliant while rack/bin details (74.2%) are found to have deficiencies. This disintegration highlights the importance to have a single PFEP database that has owners and cycles for its review, so that the data is not made obsolete..

B. Visibility and Storage Locations

Table II summarizes the results of the risk-based physical verification sample evaluating storage location visibility.

TABLE II PHYSICAL LOCATION VERIFICATION

Verification Result	Checks	Share (%)
Location matched	35	87.5%
Mismatch / update required	5	12.5%

Out of 40 location checks 35 location checks were confirmed (87.5%) and 5 location checks were not confirmed (12.5%). This mismatch exposes gaps that lead to longer search times and to artificial scarcity. Standardized Area-Rack-Shelf-Bin coding combined with continuous physical validation greatly improves the visibility and ease of retrieval.

C. Inventory Gaps and Policy Status

Table III categorizes the inventory policy status by comparing current stock against operational thresholds.

TABLE III INVENTORY POLICY STATUS

Inventory Status	Records	Share (%)
Within policy	86	71.7%
Above policy – review	21	17.5%
Below minimum	13	10.8%

71.7% of the records were aligned with the operational thresholds, 17.5% exceeded the upper thresholds, and 10.8% were below the lower thresholds. Items that exceed the policy limits should not be assumed to be "excess" without investigation since many variances are due to minimum order quantity (MOQ), pack sizes, and/or project requirements.

D. Practical Controls and Governance

Table IV outlines the integrated PFEP control dashboard designed to monitor performance metrics.

TABLE IV PFEP CONTROL DASHBOARD

KPI	Baseline Result	Frequency
PFEP completeness	84.0%	Monthly
Location accuracy	87.5%	Weekly / Monthly
Record accuracy	92.5%	Monthly
Above-policy review	17.5% of sample	Monthly
Below-minimum review	10.8% of sample	Monthly

The key takeaway is that KPIs are no longer just a fire extinguisher but now become a management tool, and flagged anomalies are acted upon in a systematic way before any disposition is made..

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V. FINDINGS AND CONCLUSIONS

A. Findings:

The study has concluded that the effective integration of the PFEP Master data is possible by standardizing the data. Overall, 84.0% of the deliveries were complete, 87.5% of deliveries were served at the physical location, and inventory policy review indicated there were positive variances, which need to be assessed in the context of MOQ and lead times..

B. Conclusions:

The research proves that running a PFEP process changes the disjointed records into a master data, which is a single view of the same data that is used for doing business. PFEP is a dynamic control mechanism that improves inventory visibility, helps with exception management, and provides the basis for digital tracking.

VI. SUGGESTIONS AND STAKEHOLDER IMPLICATIONS

A. Suggestions:

PFEP should be made mandatory policy and be tied to KPIs through management. To work with the supplier in terms of Lead Time and MOQs. Warehouse staff need to maintain location audit disciplines, and the planning teams will share the fluctuations in demand..

B. Stakeholder Implications:

Executive management can see their working-capital; procurement can streamline replenishment processes; warehouse staff can minimise search errors; and planning staff can keep manufacturing processes running.

VII. FUTURE SCOPE

Expansion of this framework could cover enterprise-wide SKU catalog, deployment of barcode/QR tracking, enterprise machine learning demand forecasting, and multi-year financial impacts.

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REFERENCES

[1] J. P. Womack and D. T. Jones, Lean Thinking: Banish Waste and Create Wealth in Your Corporation, 2nd ed. New York, NY, USA: Free Press, 2003.

[2] E. A. Silver, D. F. Pyke, and R. Peterson, Inventory Management and Production Planning and Scheduling, 3rd ed. New York, NY, USA: Wiley, 1998.

[3] S. Chopra and P. Meindl, Supply Chain Management: Strategy, Planning, and Operation, 7th ed. Harlow, U.K.: Pearson, 2019.

[4] J. Gu, M. Goetschalckx, and L. F. McGinnis, “Research on warehouse operation: A comprehensive review,” Eur. J. Oper. Res., vol. 177, no. 1, pp. 1–21, 2007.

[5] J. Rojas Reyes, E. Solano-Charris, and J. Montoya-Torres, “The storage location assignment problem: A literature review,” Int. J. Ind. Eng. Comput., vol. 10, no. 2, pp. 199–224, 2019.

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