

VIABLE REPORT

AdientPPather Capital



Technical Report

PROJECT VIABLE

Lead Recipient:	AdientPPather Capital
Project Title:	Project Viable
Project Director:	Xolisani Nyawo
Project Initiator:	
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End date:	

~[The project was carried out in complete secrecy in order to prevent rumours and preserve the project's integrity and confidentiality. The information flow was directly for those involved in the project and its specifics.]~

Acknowledgements

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Summary

The methods used in the manufacturing and production sectors today, especially in the automobile industry, have their roots in the early stages of industrialization. It's becoming clear that these antiquated methods make it difficult to adjust to the current industrial revolution, often known as Industry 4.0. The integration of cutting-edge technology like automation, artificial intelligence, and the Internet of Things (IoT) is emphasized in this revolution.

The industry's capacity to completely take advantage of these technical breakthroughs is hampered by its reliance on conventional techniques. As a result, productivity, creativity, and competitiveness suffer. The automobile sector must modernize its working practices, embrace new technology, and promote a culture of constant development and adaptation if it is to prosper in this fast changing market.

1. Introduction

This report outlines the proposed improvement of raw material issuing process from the store to the lines through strategic line feeding. The objective is to ensure just-in-time (JIT) availability and usage of raw materials, minimize inventory use, and WIP transportation to next processing station to enhance productivity. This improvement will also help the store maintain an accurate count of stock.

Aim

Design a distribution pattern and strategy for raw materials from the store and WIP movement to next station without operator deviating from assigned task or affecting manufacturing efficiency.

Goals

Achieve high production efficiency and process integration through innovation and advanced technology use to allow better ergonomics and educative changes towards next generation of industrial revolution.

2. Summary review

The current working procedures delivers a way of working dynamics that are naturally from the early days of industry diversity. Changes in the process flow has disadvantages and advantages that must be exercised to practise our chances and innovation strategies. We intend to simulate a process flow and distribution strategies that will enable us to better improve productivity and navigate demand and supply to keep our system intact for better monitoring and control. The demand level should help us adjust floor stations supply to produce expected number of parts to ship to customer. Equivocally workers tend to adopt a behaviour that is making it difficult to understand some of the activities expected of them while the motivation is unclear from their expectations.

3. Data Collection

Tracking steps of an inner explanation that only a few understands make things difficult for affected individuals especially when the aspiration of exercising change is limited nor rejected by management. The flexibility of management to seek innovative changes is imperative in any environment especially in the automotive industry since it is increasingly growing with high competition and market expectations. Difficulties occurred due to such resistance to change which contributed to challenges in question such as:

Current Challenges

- ❖ **Inefficient Raw Material Issuing:** Raw materials are currently issued in bulk, leading to excess inventory at the stations with unbalanced need and usage.
- ❖ **WIP shortages:** Parts get held at stations with high processing capacity limiting the operations of downstream stations depending on those processing stations.
- ❖ **Inventory Management:** Excess inventory results in difficulties in tracking and managing stock levels.
- ❖ **Productivity Issues:** Stations often face delays due to the unavailability of specific materials when needed.
- ❖ **Excessive rejects:** number of scrap is uncontrollable and some parts are classified as scrap after several processing and final step such a painting.

4. Findings

The Adient plant run processes with a lot of contingencies than proper planning and execution. Such processes are adopted from the past which had little effect on the market and rivalry to innovatively adapt to the industrial revolution change. Mapping and schematically design the process flow positively lay a foundation to sub-activities and how to control them considering all factors necessary to complete assigned tasks efficiently. Using Tecnomatix (Plant simulation software) to design and test run the forecasted processes helps us to assign workers to station along with task and processing time as well as Line feeders to feed schedule and congestion rate to feed effectively in demand rate. The simulation makes WIP supply in a buffer form to show

capacity and availability of WIP required to every single station and quality route for readiness to proceed to downstream stations.

5. Model design

Model design steps using Tecnomatix Plant Simulation for material flow:

- 5.1. **Determine the objectives:** objective of the simulation is to lower lead time, and improve material flow.
- 5.2. **Establish the scope:** taking into account the quantity of stations and processing durations.
- 5.3. **Layout Creation:** Plan the plant's layout, taking into account the store receiving and issuing, welding, sub welding, assembly welding, painting, and dispatch. Make sure everything is arranged logically to cut down on travel time.
- 5.4. **Model Stations and Processes:** In the simulation, identify each station and give it a processing time limit. When buffers are required to manage fluctuations in processing times, include them.
- 5.5. **Put in Place a Line Feeding system:** Create a Just-In-Time (JIT) line feeding system to guarantee that materials are delivered to each station on schedule. Utilize pull-based mechanisms to activate content.
- 5.6. **Set Up the Material Flow:** Simulate the movement of supplies from the store to every station. Make sure the materials go through the following steps in order: welding, sub-welding, assembly welding, quality control, painting, assembly and ship to customer in time.
- 5.7. **Establish Control Logic:** Use control logic to oversee material flow and guarantee station synchronization. To keep an eye on and manage the process, use sensors and triggers.
- 5.8. **Execute Simulations and Examine Outcomes:** Run the simulation to watch the movement of materials and spot any inefficiencies or bottlenecks. Examine the findings to help you make data-driven decisions that will maximize the process.
- 5.9. **Repeat and Enhance:** Based on the outcomes of the simulation, make the required modifications. Repeat the procedure to cut lead times and increase efficiency over time.

6. Data Analysis

7. Budget

The most important resource in project management is budgeting and cost to company. Acquiring expertise in various fields plays a pivotal role in being a step ahead towards industry problems. In reality almost everything requires monetary resources. Below is a budget estimate for Project Viable.

Project title			Project Viable		Implementation date	
Project director Xolisani Nyawo	Implementation Department		Engineering			
	Total budget				Actual cost	Expected cost
Initial Date	Labour cost	Material cost	Travel cost	Change cost		
Project Planning	R0	R0	R0	R0	R0	R0
Research	R0	R0	R0	R0	R0	R0
Project Design	R0	R0	R0	R0	R0	R0
Develop model	R0		R0	R0		
Project execution						
Monitoring and control						
Closing						
Total cost						

8. Recommendations

The proposed improvement involves implementing a JIT system for raw material issuing at the line feeding station. This system will ensure that materials are delivered in a pattern aligned with the production schedule, minimizing excess inventory and improving productivity.

Just-In-Time (JIT) Availability:

- ❖ **Patterned Delivery:** Raw materials will be delivered to the line feeding station in a pattern that matches the production schedule. This ensures that materials are available exactly when needed, reducing wait times and preventing overstocking.
- ❖ **Real-Time Monitoring:** Implementing real-time monitoring systems to track material usage and stock levels. This will allow for timely replenishment and prevent stockouts.

Minimizing Inventory Use

- ❖ **Lean Inventory:** By adopting a JIT approach, the amount of raw material inventory at each station will be minimized. This reduces the carrying costs associated with excess inventory and frees up storage space.
- ❖ **Efficient Use of Space:** With less inventory on hand, the workspace will be more organized, leading to a safer and more efficient working environment.

Improving Productivity:

- **Focus on Work Schedule:** Each station will receive materials based on its specific work schedule. This allows workers to focus on their tasks without interruptions caused by material shortages or excesses.
- **Streamlined Operations:** The JIT system will streamline operations by ensuring that materials flow smoothly through the production process, reducing downtime and increasing overall efficiency.

Accurate Stock Counting:

- ❖ **Automated Tracking:** Implementing automated tracking systems, such as barcode scanners or RFID tags, to keep an accurate count of stock levels. This reduces human error and ensures that the store always has an up-to-date inventory count.

- ❖ **Regular Audits:** Conducting regular audits to verify stock levels and address any discrepancies promptly.

Benefits

- ❖ **Reduced Inventory Costs:** Lower inventory levels mean reduced carrying costs and less capital tied up in stock.
- ❖ **Increased Productivity:** With materials available when needed, production can proceed without delays, leading to higher output.
- ❖ **Improved Accuracy:** Automated tracking and regular audits ensure accurate stock counts, reducing the risk of stockouts or overstocking.
- ❖ **Enhanced Efficiency:** A more organized and efficient workspace contributes to a safer and more productive working environment.

9. Conclusion

Implementing a JIT system for raw material issuing at the line feeding station will address current challenges related to inventory management and productivity. By ensuring that materials are available when needed and minimizing excess inventory, this improvement will lead to significant cost savings and operational efficiencies.