RENAULT NISSAN
AUTOMOTIVE INDIA PRIVATE LIMITED

RENAULT · NISSAN
JOINT VENTURE COMPANY

INTERNSHIP FINAL REPORT

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INTERNSHIP DATE: 11th September 2023- 31st October 2023

INTERNSHIP ORGANISATION: Renault Nissan Automotive India Private Limited (RNAIPL)

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ACKNOWLEDGEMENT:

I would like to express my sincere gratitude to **Renault Nissan Automotive India Private Limited (RNAIPL**), for providing me with this prestigious opportunity of doing an internship in such an esteemed organization.

I want to thank my mentor, **Mr. Arun Jaen** Sir (MSPO), **Mr. Paulraj P** Sir (Human Resource Head, Power Train) and everyone at the company, for being patient and helping me during my on-site training which has been instrumental in shaping my development. I am also thankful to Renault Nissan Automotive India Private Limited (RNAIPL) for granting me the opportunity to serve as an intern and for their collaborative spirit. With their guidance I have learned a lot.This experience has not only expanded my knowledge base but also helped me gain a profound understanding of the significance of plant. The skills and insights I have acquired through this Internship hold immense promise. These will undoubtedly make a significant contribution to enhancing my professional profile and opening doors to new and exciting opportunities in the field.

BONAFIDE CERTIFICATE:

This is to certify that this report is solely made and submitted by S.V.VISWATEJ BHARDWAJ (21BME1001), Pre Final Year, B.Tech MECHANICAL, in Vellore Institute of Technology, Chennai Campus. She has successfully completed her internship under our supervision in Renault Nissan Automotive India Private Limited from 11.09.2023 to 31.10.2023.

Date: 31.10.2023

SIGNATURE OF MENTOR

Name of the Mentor: Mr. ARUN JAEN –MSPO,
Renault Nissan Automotive India Private Limited,
Oragadam, Chennai-602 105

INDUCTION PROGRAM

Safety Briefing

- No walking while talking on the phone.
- It is mandatory to wear safety shoes inside shop floor.
- Safety helmet and goggles are to be worn for Stamping and Body Shop floors.
- Always be aware of your surroundings. Only use Walkway and not Gangway inside Shop floor.
- Taking photo inside the plant is prohibited.

INTRODUCTION

The Renault Nissan Automotive India Private Limited (RNAIPL) is a plant that is formed with 5 companies administration under it such as:

-Renault India Private Limited (RIPL)

-Nissan Motor India Private Limited (NMIPL)

-Renault Nissan Automotive India Private Limited (RNAIPL)

-Renault Nissan Technology and Business Centre India

-Renault Nissan Financial Services India Private Limited.

The Plant is a 620 Acres Plant. apart from this, there is a separate 200 acres supplier area which also belongs to RNAIPL. The plant currently runs at 33 JPH, which was 42 JPH previously. This reduction was because of factors such as semi-conductor shortage. Therefore, we can see that one car is being manufactured every 1.81 minutes.

The Renault Nissan Automotive India Private Limited is formed by a 50:50 joint venture between Renault and Nissan to manufacture passenger vehicles in India. The alliance works out of its Oragadam plant which started on 17th March 2010 in Chennai. The Renault-Nissan facility has been catering not just to the domestic demand but exporting a significant number of volumes overseas. This plant was started with an initial investment of a minimum of s 4,500 crore. The plant has a capacity of 480,000 vehicles per annum,12 million gearboxes. The company revealed that the 3.5 millionth engine to rollout was the HRAD turbo that powers the Nissan Magnite. This plant is also the first in the Indian automotive sector to locally build one lakh engines in just 14 months. The plant produced one million engines in just six years, while the rest 2.5 million power trains were built in the next x years.

At present, the Renault-Nissan Alliance produces 6 engine variants and 4 gearbox options at the facility.

RNAIPL has achieved production target of 5,00,000 lakhs vehicle in the month of October 2013 in the short span of 40 months after start of production. On 24th November 2020, Renault-Nissan India Records 1 million Car Export Milestone. The Renault-Nissan India Alliance Plant (RNAIPL) in Chennai, India, has achieved a new milestone with the rollout of the 3.5 millionth power train unit from the facility. The automaker began engine production at the Chennai plant in 2010 and the facility has produced 2.3 million engines and 1.2 million gearboxes. The company revealed that the

3.5 millionth engine to rollout was the HRAD turbo that powers the Nissan Magnite. This plant is also the first in the Indian automotive sector to locally build one lakh engines in just 14 months. The plant produced one million engines in just six years, while the rest 2.5 million power trains were built in the next six years. At present, the Renault-Nissan Alliance produces 6 engine variants and 4 gearbox options at the facility.

The Renault-Nissan Alliance plant builds a number of models including the Nissan Magnite, Kicks, Sunny, as well as the Renault Kwid, Kiger, and Triber. Nissan India exports the Magnite to 15 countries worldwide including South Africa, Nepal, Indonesia, Bhutan, Sri Lanka, Bangladesh, Brunei, Kenya, Seychelles, Uganda, Mozambique, Zambia, Mauritius, Tanzania, and Malawi.

Current models in production:

Renault: KWID, TRIBER, KIGER

Nissan: KICKS, SUNNY, MAGNITE

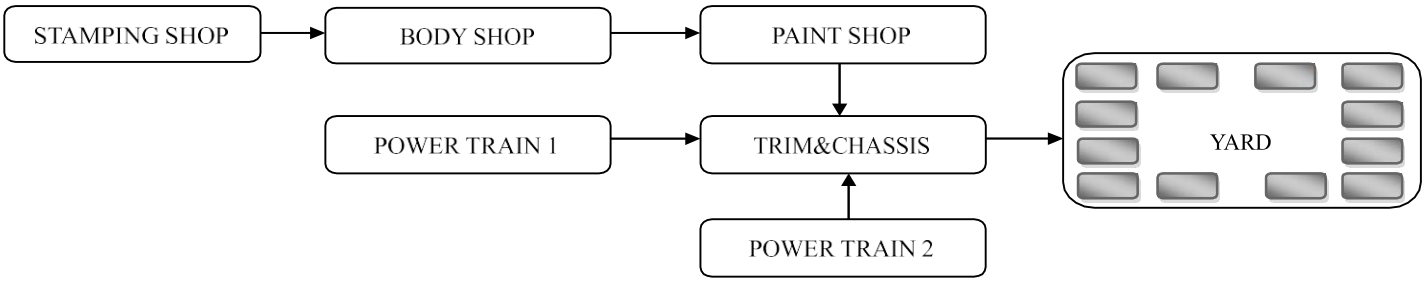


Fig. Process flow in RNAIPL

STAMPING SHOP:

Stamping involves placing flat sheet metal, in either coil or blank form, into a stamping press In the press, a tool and die surface form the metal into the desired shape. Punching, blanking bending coining embossing, and flanging are all stamping techniques used to shape the metal.

Fig. Process flow chart followed in Stamping shop

Raw Material used:

SPCC-Cold Rolled Carbon Steel Sheets and Strip (SPCC) is a Japanese industrial standard for cold rolled steel.

GA-Galvanized steel sheets (GA) have become the mainstream steel sheet for automobile applications because of their superior corrosion resistance, painting ability, and welding ability.

GI-Galvanized iron (GI) sheets are basically steel sheets which have been coated with zinc.

First Operation that takes place in stamping is Blanking.

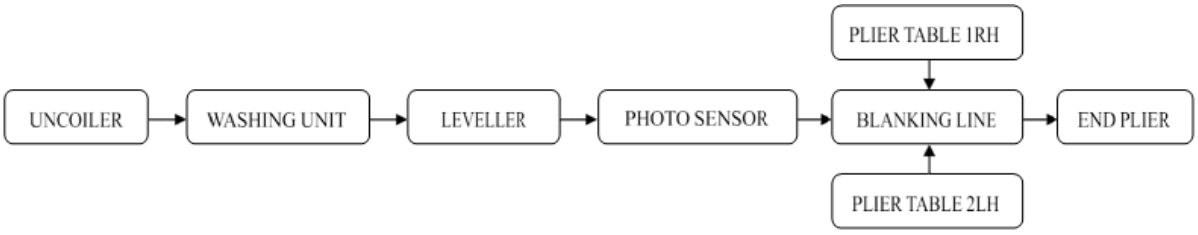


Fig. Blanking process flow

Types of Defects:

- Bump

- Dent
- Neck

Quality Checking methods used:

- Oil(Highlight Checker)
- Landfill Checker
- Oil Stone Check

Dies are classified based on their operation as follows:

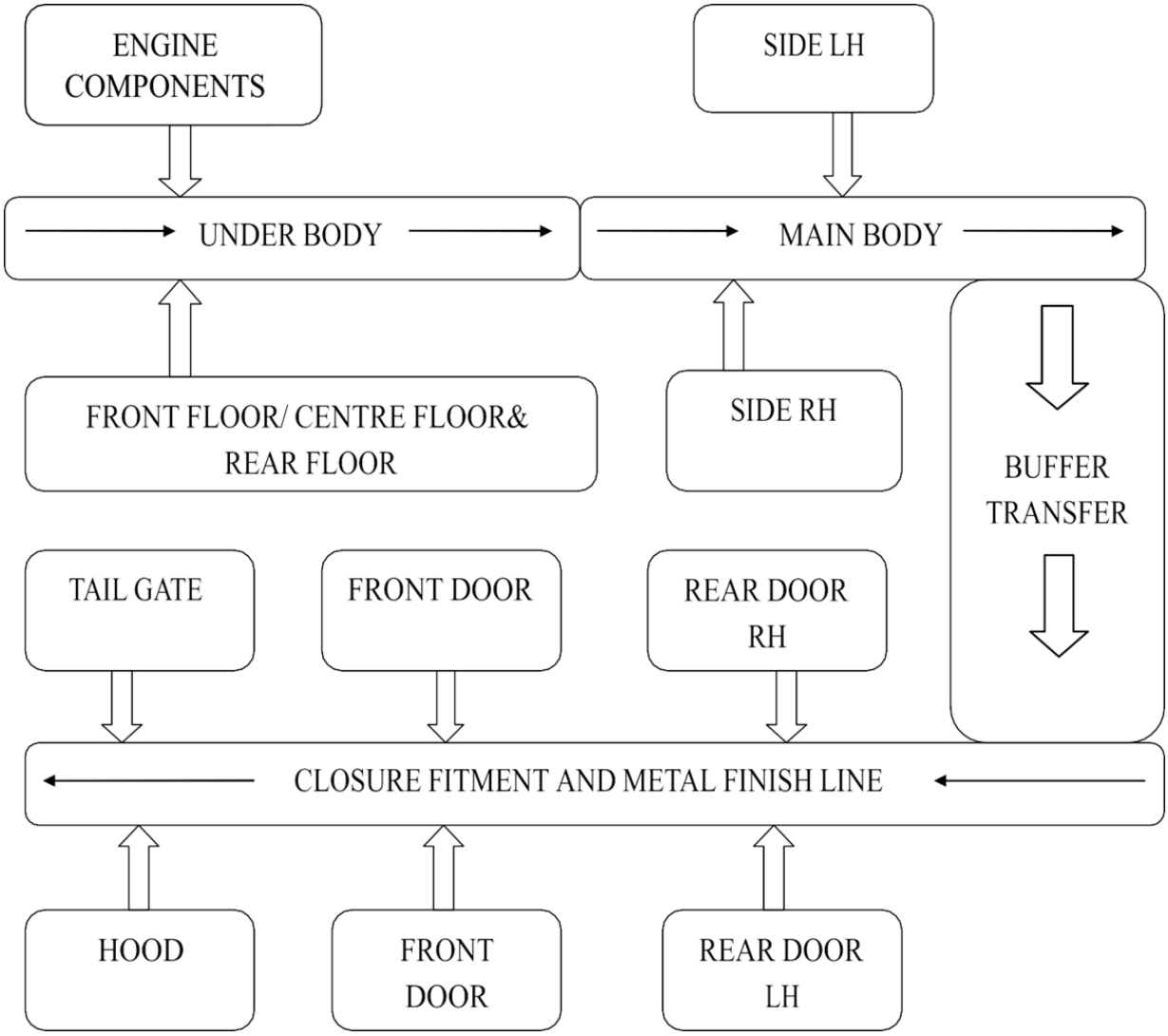
- PA Die:Blanking
- PB Die:Drawingg
- PC Die : Excess cut
- PD Die: Hemming

The output from stamping shop is feed to body shop .

BODY SHOP:

The function of body shop is to assemble various parts produced in press shop using welding processes. Generally, the body shop is divided into many sub-assembly lines. Each sub-line represents a welding area covering numerous welding operations in different stations.

In Body Shop Majority of operations are carried out by robots. Various Techniques such as Spot welding, Seam welding, Mig welding, hemming (Door assembly) etc., are used for assembly of sheet metal parts. The Fit & Finish and other aspects are checked in the Metal line.



There are 3 lines in Body Shop:

- Line 1-Sunny and Kicks
- Line 2-Kiger, Magnite and Triber
- Line 3-Kwid

In-House Quality Assurance team (IHQA) take care of the quality control in Body Shop. In Body Shop, the 5 main pillars used to define quality of the output are:

1. Spot Welding
2. Sealer
3. Dimensional Accuracy
4. Fit and Finish
5. Surface Finish

After the completion of all these processes, the car is moved to Paint Shop

PAINT SHOP:

Paint Shop consists of two lines. The Chassis that is received from Body Shop undergoes the following processes:

1. Pre-Treatment line
2. Electro-Deposit line
3. ED Oven
4. Sealer Zone
5. ED Sanding Zone
6. Body Arranging Zone
7. Dust off Zone
8. Topcoat Zone

Pre-Treatment line: Degreasing, Raw water rinsing, conditioning, Phosphate treatment, De-ionized water rinsing.

Electrode Deposit line: ED bath, Ultra Filtrate, Fresh water bath and tilting.

ED-Oven: For drying of paint.

Sealer Zone: Resist leakage through car body.

ED Sanding Zone: sanding to make paint layer uniform.

Body Arranging Zone: Side line Buffer for grouping same color bodies, Main line- Scanning barcode and sent to CCR panel, Repair line- Repairs after ED sanding done here.

Dust off Zone: Dust from body is removed before topcoat.

Topcoat zone: Anti corrosion coating, primer coating, base coating, Final Clear coating.

The chassis is then transferred to Trim and Chassis Shop.

PLASTIC SHOP:

In Plastic shop, Bumpers are manufactured in house by the process of injection molding. They are manufactured by both Mechanical and Electrical Injection molding press After this process,the Bumpers are taken to Bumper paint shop where similar painting operations done followed by quality check. With the help of punching machines, holes are made in bumpers for fixing lights and various other sensors. From there these bumpers are taken to Trim & Chassis shop for assembly.

TRIM AND CHASSIS SHOP:

Different parts of the car are fully assembled into the chassis here. There are two lines here:

Line 1: Sunny and Kicks

Line 2: Kwid, Triber, Kiger, Magnite

In total, there are 9 zones for one line in Trim and Chassis. They are:

1. Trim A
2. Trim B
3. Under Floor
4. Engine-Sub Assembly
5. CUBS Line (Complete Underbody System)
6. Chassis Trim
7. Door Sub
8. Pre-Final Line
9. Tester Line

TRIM-A:

 Engine room harness fixed

- Engine mounting bracket (LH, RH)
- Backdoor finishing (lock, striker, stay latch)
- Door off (door removed from the body and sent to door sub line tocomplete the door Sub assembly)
- Headliner fixing (completion of the roof)
- Brake and clutch pedal mounting

- Seat belt fixing
- Airbag fixing

TRIM-B:

- CCB member mounting (CCB member assembly is mounted with SMM manipulator)
- IP completion (instrument panel-mounted)
- A, B, C, D and panel shelf trims are assembled Keyset installation
- Roof rail (Headliner) mounting
- Front, rear and quarter glass fixing (high strength sealant is used). Transfer from Conveyor to Hangar

Under floor:

 Completion of fuel and brake tube assembly

- ABS mounting
- Fuel tank assembly

 Rear shock absorber jig fixing

- Exhaust insulation plate Engine-Sub Assembly
- Engine Loading
- TM Fixing
- Drive Plate Fixing Injector, Starter Motor and Alternator Connection
- Purge Hose Fixing

 Engine Lifting

CUBS Line:

- Jig setting for Engine mounting
- Brake caliper subassembly, Knuckle subassembly
- Front and rear axle Subassembly
- Strut Sub assembly
- Brake drum Sub assembly

- Radiator assembly • Exhaust pipe Assembly

CHASSIS TRIM:

- Spare Tire fixing
- AC blower, PKB assembly, Fuel Tank Cover
- Head lamp, Air filter, Side finisher for center console
- Rear and Front Bumper Fixing.
- Cladding Fixing • Fixing all 4 tires

DOOR SUB:

- Door Latch Sub Assembly
- Side lock lever mechanism
- Remote key control module fixed
- Glass Fixed
- Runner and Side mirror mounting
- Pull Handle Fixing
- Door trim Fixing

PREFINAL LINE:

- First aid kit, User manual Added to car
- AC gas, Brake oil, water tank filling and coolant filling Seat and Steering wheel mounting.
- Door Fixing from door sub assembly
- Key Pairing- MDA machine
- VEP static check

Here, VOA (Vehicle Quality Assurance) is given as follows:

1. Electrical parts (Wipers, Windows, Display units, Lights and indicators) are checked.
2. Proper fixation of parts for the smooth functioning of doors and fuel tank cover.
3. Gaps of each door are checked.
4. A basic inspection of the paint job.

5. Side, Front and Rear doors' lock latch are checked for proper locking.
6. Keys are checked.
7. Lights are adjusted to check proper gapping
8. Brake, power steering and coolant oil levels are checked.
9. Chassis number is matched with that in the job paper.
10. VEP (Vehicle Electronic Process) is checked using VEP machine. It shows electronic units of the vehicle are OK or NG(not good).
11. If OK, the vehicle is passed onto the Tester line for further inspection.
12. If NG, the vehicle is taken off the line for further checking.

After this, the car goes through a bunch of checking processes as follows:

- Customer Satisfaction-1
- Customer Satisfaction-2
- Repair Line Shower Line
- Dynamic Test
- Short Test Track
- Long Test Track
- Kanken (Final detailed inspection to find out the most minuscule of damage before shipping)
- Yard

POWERTRAIN:

Power train is divided into 3 main shops namely:

1. Casting Shop
2. Machining Shop
3. Assembly Shop

Casting Shop: The cylinder head and cylinder blocks are manufactured in casting process. Casting is done by 2 processes namely,

- High Pressure Die Casting
- Low Pressure Die Casting

After Casting is done, it is followed by,

- Quality checking for Cracks
- Visual Inspection
- Air Leakage Checking

Machining Shop: The following processes take place in this shop,

- Crankshaft machining
- Cylinder block machining
- Cylinder head machining
- Gear box machining

These parts are then transferred to Assembly Shop.

Assembly Shop: There are 3 lines in Assembly Shop, namely

- IXX Gearbox Assembly Line
- Engine Line 1
- Engine Line 2

LEAN MANUFACTURING

Lean manufacturing, a management philosophy primarily focused on eliminating waste within a manufacturing system. It takes into account many kinds of waste, including the waste of excessive human motion, and aims to integrate each step of production into a holistic, efficient process that reduces cost and improves overall revenue. Under the lean manufacturing system, seven wastes are identified:

Overproduction:

The most serious of the wastes, overproduction can cause all other types of wastes and results in Excess inventory. Stocking too much of a product that goes unused has obvious costs: storage, wasted materials, and excessive capital tied up in useless inventory. More raw materials than necessary are consumed; the product may spoil or become obsolete, which requires that it be tossed.

Inventory:

Inventory waste refers to the waste produced by unprocessed inventory. This includes the waste of storage, the waste of capital tied up in unprocessed inventory, the waste of transporting theinventory, the containers used to hold inventory, the lighting of the storage space, etc. Moreover ,having excess inventory can hide the original wastes of producing said inventory.

Motion:

Wasteful motion is all of the motion, whether by a person or machine that could be minimized excess motion is used to add value that could have been added by less, than that Margin of motion is wasted. Motion could refer to anything from a worker bending over to pick something up the factory floor to additional wear and tear on machines, resulting in capital depreciation that must be replaced.

Defects:

Defects refer to a product deviating from the standards of its design or fram the customer's expectation. Defective products must be replaced, they require paperwork

and human b process it; they might potentially lose customers; the resources put into the defective product a wasted because the product is not used. Moreover, a defective product implies satte at other levels that may have led to the defect to begin with making a more efficient production system reduces defects and increases the resources needed to address them in the first place.

Over-processing:

Over-processing refers to any component of the process of manufacture that is unnecessary. Painting an area that will never be seen or adding features that will not be used are examples of over processing. Essentially, it refers to adding more value than the customer requires. Time, energy, and emissions are wasted when they are used to produce something that is unnecessary in a product simplification and efficiency reduce these wastes and benefit the company.

Waiting:

Waiting refers to wasted time because of slowed or halted production in one step of the production chain while a previous step is completed. To take the classic example, the production line, if one task along the chain takes longer than another, than any time the employee in charge of the next task spends waiting is wasted. The task that takes more time must be made more efficient, other employees must be hired to help, or the workflow must be better coordinated or scheduled in order to make up for this wasted time. Additionally, material can be spoiled, and components could be damaged because of an inefficient workflow.

Transport:

Transport is moving materials from one position to another. The transport itself adds no value to the product, so minimizing these costs is essential. This means having one plant closer to another in the production chain, or minimizing the costs of transportation using more efficient methods. Resources and time are used in handling material, employing staff to operate transportation,training, implement safety precautions, and using extra space. Transport can also cause the waste of waiting, as one part of the production chain must wait for material to arrive.

LEAN MANUFACTURING PRINCIPLES FOLLOWED AT RNAIPL:

KAIZEN:

Kaizen, meaning continuous improvements, is a Japanese word made by the combination of two words-"Kai' meaning change, and Zen' meaning Good (for the better). Therefore, Kaizen can be defined as "change for better".

Main objective of Kaizen is continuous improvement in the product and process quality by eliminating waste from the process or services by identifying values and involving everyone.

1. Saves time
2. Reduces Cost of Production
3. Improve the Product delivery. Reduces Production lead time.
4. Eliminate Waste
5. Lower rejection/defects and cost

5S METHOD:

Eliminate the waste that originates from a poorly organized workplace. 55 is an improvement process to the first basic tool and foundation stone of Lean Manufacturing It is a systematic approach towards Organization improvement. 5S is formed with the first letter of Japanese words-Seiri (sort) , Seiton (order) , Seiso (shine) , Seiketsu (standardize) , and Shitsuke (sustain).

GEMBA WALK:

Achieving operational efficiency begins where the actual task happens, not from a conference room. A Gemba Walk-derived from the term Gemba or gembutsu, which means "the real place" is usually performed by managers to learn or review precisely how a specific process works and gain insights from workers about its improvement. Gemba Walk Checklists guide the observers in asking relevant questions to determine the root cause of problems and the next steps.

5W1H:

The 5W1H is a questioning approach and a problem-solving method that aims to view ideas from various perspectives. The elements included in the 5W1H method allows for a comprehensive analysis of the presented situation and enables you to spot opportunities for improvement Answering the 5Ws and 1H questions, and being as detailed as possible, helps identify potential solutions that could be implemented and observed for their effectiveness.

QC TOOLS:

The quality tools are effective graphical and statistical instruments for addressing quality issues and enhancing processes. These tools are straightforward, making them accessible for quality problem-solving and process improvement without requiring complex analytical skills. The most commonly used quality control (QC) tool are:

CHECKSHEET:

The check sheet is employed to collect, record, and analyze data. It serves as a fundamental tool in the data collection process, providing the basis for subsequent actions. Data collected can include numerical values, observations, opinions, and other relevant information.

[Objective of Data Collection]

Name of operator: **Sheet Number:**

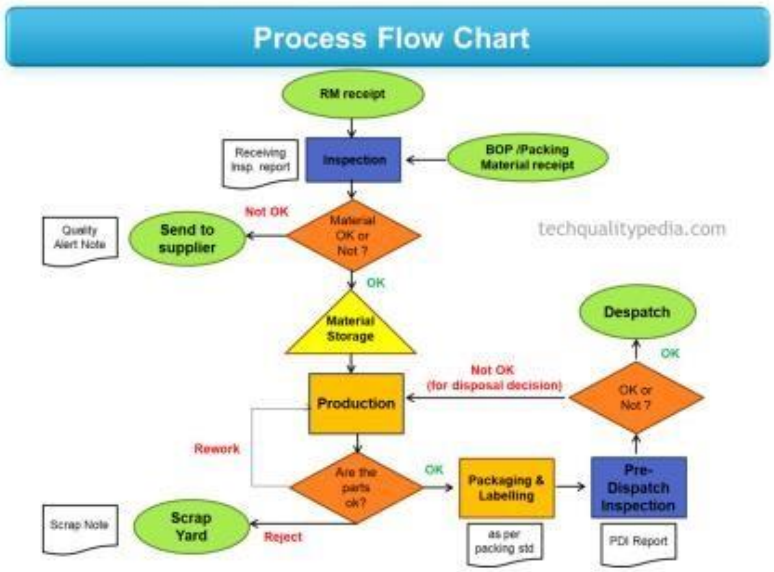
Date:

Place:

Reason	Frequency							
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Total
[Issue 1]	X		X		X			3
[Issue 2]		X						1
[Issue 3]				X		X		2
[Issue 4]		X	X					2
[Issue 5]	X			X	X			3
[Issue 6]			X					1
[Issue 7]	X				X		X	3
[Issue 8]		X		X		X		3
[Issue 9]	X	X				X		3
[Issue 10]			X		X		X	3
Total	4	4	4	3	4	3	2	

PROCESS FLOWCHART:

A process flowchart is a visual representation of the steps or stages in a process. It provides a clear and structured overview of the process, aiding in understanding the flow of operations and potential areas for improvement



MY WORK AS AN INTERN:

During my internship at Renault Nissan, I had the privilege of working closely with a mentor who was a part of the Manufacturing and Strategy Planning Office (MSPO). My role primarily revolved around assisting in various aspects of this dynamic department. Over the course of three days, I was entrusted with the task of manipulating employee data within a specialized software, both removing outdated entries and adding new ones. This hands-on experience allowed me to gain a deeper understanding of the company's workforce management systems.

Throughout this journey, I expanded my skill set significantly. I delved into Excel and PowerPoint, acquiring essential knowledge that I hadn't possessed before. These newfound skills would prove invaluable in various tasks and projects during my internship. One noteworthy achievement was collaborating with a fellow intern to create a compelling PowerPoint presentation for my mentor's proposal. This experience taught us not only how a company operates but also how it orchestrates and executes events of significance. As we researched and crafted our presentation, we gained insights into the meticulous planning and coordination required for corporate events, which proved to be an enriching learning experience.

We took part in an event conducted by the RNAIPL where both MAGNITE and KIGER were compared with a competitor car Maruti Suzuki's BREEZA for comparing the manufacturing cost, Weight of the product, Materials used for all 3 cars. Through this event I was able to learn a lot of new things about the car products and how to reduce the cost of the product.

The exposure to the company's manufacturing facilities was a highlight of my internship. The plant tour not only deepened my appreciation for the precision and expertise that go into automobile production but also allowed me to witness the seamless integration of various departments and functions.

My mentor's patient guidance provided me with valuable insights into the company's infrastructure and hierarchy. Learning the basics of Excel and PowerPoint was instrumental in enhancing my ability to contribute meaningfully to various projects. The collaborative effort with my fellow intern on the proposal presentation not only strengthened our teamwork but also gave us a glimpse into how a company manages its initiatives and events.

CONCLUSION

My internship at Renault Nissan was a comprehensive learning experience that exposed me to the multifaceted aspects of a global automotive giant. From data manipulation and plant tours to contributing to corporate communication efforts, I gained invaluable skills and insights that will undoubtedly shape my future. This opportunity not only broadened my horizons but also instilled in me a profound appreciation for the intricate balance of strategy, planning, and execution that drives a successful company like Renault Nissan.