

PROJECT ON

Inventory Management at Colorcon Asia Private Limited

**Under the guidance of:
Goa Business School Faculty
Prof.: Guruprasad V. Mantravadi**

**Submitted by-
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April 2022

Inventory Management at Colorcon- Project



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DECLARATION

I ,Mr. Anil Tatoba Patil ,hereby declare that the following project titled **“INVENTORY MANAGEMENT AT COLORCON ASIA PVT. LTD.”** is my original authentic work and i have put in my efforts meticulously to make this project come up to the expectations and logically viable. The data collected is primary, authentic, and properly analyzed by me to the best of my ability. I also assure that the research work is completely original and has not been copied from any other resources.

Mr. Anil Tatoba Patil

Executive MBA Trimester VIII & IX

ID:EM1805

Date:

Place:

ACKNOWLEDGEMENT

This project has been accomplished by the support, blessings and guidance of My family, Executive MBA batch classmates and colleagues of Colorcon Asia pvt. Ltd. They have been silently helping me in my efforts to make my vision of obtaining this degree in Executive MBA come true.

I would also like to specially thank my project guide **Prof. Guruprasad Mantravadi** for been patiently guiding and supporting me in this endeavor.

I would also like to thank the faculty of Goa Business School and all the non-teaching staff who have been patiently guiding and supporting me in this endeavor.

I am also grateful to the Employees of Colorcon Asia Pvt. Ltd., especially Mrs. Sarita Sawant, Senior Officer Supply chain, Mrs. Aparna Khalap, Manger Supply Chain and Mr. Prakash Gadhave Site Director, without whose help it wouldn't have been possible of obtaining so much information and data about this topic. I would extend my special thanks to Dr. Rajesh Parab, MD, Colorcon Asia Pvt. Ltd. For his support in this Project.

Company Profile- Colorcon

Company Name: Colorcon Asia Private Limited

Location : Plot no:M14 to M18, Verna Industrial Estate, Verna, Goa

Brief Company history: Colorcon® provides a wide range of pharmaceutical film coatings and pharmaceutical formulation development assistance. Our fully formulated, complete film coating systems, modified release technologies, and excipients assist all pharmaceutical and nutritional supplement companies in the development of cost-effective, high quality products with superior performance and appearance.

Our core business is the design and technical support of advanced coating systems, modified release technologies and functional excipients for pharmaceutical dosage forms.

Colorcon offers film coating products, all of which can be formulated specifically for customer application and regulatory requirements. Whether the desired function for your tablet or particulate is immediate release, enteric release and/or sustained release, we have the tablet film coating technology needed to enhance, protect, or meet the desired release profile.



Turnover (FY 2018-19): >500 (in INR cr.)

Total No of Employees: 262

Our Business & Purpose

Colorcon is a world leader in the design and development of specialty excipients for solid oral dosages for the pharmaceutical and nutritional industries.

We deliver superior product quality, unparalleled technical support, extensive regulatory assistance, and reliable supply from multiple locations.

We are committed to investing in enhanced dosage forms and advanced technology solutions.

Our Purpose is to improve health and wellness through convenience, compliance and safety.

Our Vision

To be the most trusted partner across the pharmaceutical and nutritional value chain.

Our Mission

Direct our customer focus to increase speed to market, lower total cost and make a positive contribution to quality.

Leverage our scale and infrastructure to be a true global partner, delivering consistency around the world.

Use our agility and creativity to innovate and meet our customers' needs.

Our Values

Colorcon's core organization and values are the foundation for Colorcon's culture, performance management strategies, reward systems, employment programs and standards of conduct.

➤ **The Platinum Rule**

We treat others the way they want to be treated

- Be positive, connected, and be kind
- Demonstrate mutual respect, value personal and cultural differences
- Get things done through personal influence and credibility

➤ **Empowerment**

We trust our colleagues with responsibility and decision making

- Clear the path for others
- Believe in your ability to effect positive change
- Volunteer your best efforts toward important goals

➤ **Customer Focus**

We put our customers' needs at the heart of everything we do

- Understand our customer needs and how we can create value for our customers
- Go above-and-beyond for internal and external customers
- Respond in a timely manner to work requests, confirm actions promised and actions taken

➤ **Teamwork**

We embrace the value of collaboration and work together to exceed what is possible as individuals

- Energize, inspire and support each other to achieve common goals
- Share knowledge and experience and learn from others
- Place team needs before individual interests and share in success and failures

➤ **Keep Getting Better**

We create an environment for constant improvement to be the best we can

- Improve a work system, re-evaluate and focus on continuous improvement
- Acknowledge what is not working quickly and learn from mistakes
- Ensure best in class quality, safety and performance standards across the organization

➤ **Global Respect**

We are citizens of a diverse world and behave with respect for the communities in which we operate

- Value diversity and differences; seeing them as a richness
- Strive to reduce waste and protect the environment
- Commit to the principles of corporate social responsibility (CSR) for the benefit of the communities where we operate

Our Promise

Our ability to achieve our vision is built around a promise to excel. That promise is to ourselves, our stakeholders, and our commitment to the Colorcon Values.

Objective

- **Review and Improve current inventory management process in colorcon Asia pvt. Ltd.**
- **Problem Statement:**
 - We have to face shortage of raw materials for manufacturing finished goods intermittently
 - Also, we get excess raw material inventory which makes difficult to accommodate in warehouse.

SCOPE-

Raw material used in manufacturing FG batches at Goa location are considered under the project scope.

Manufacturing Process Flow

RM RECEIPT

MANUFACTURING
WAREHOUSE

DISPENSING

STAGING ROOM

LOADING

SECONDARY
PACKING

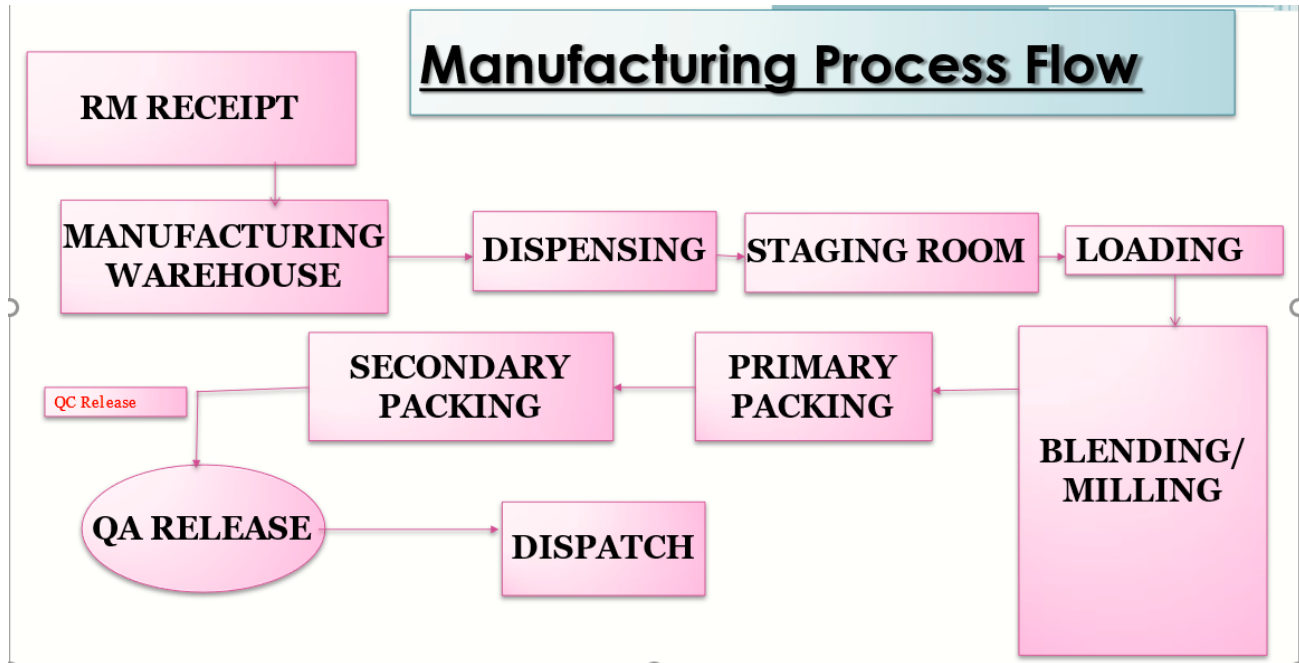
PRIMARY
PACKING

BLENDING/
MILLING

QC Release

QA RELEASE

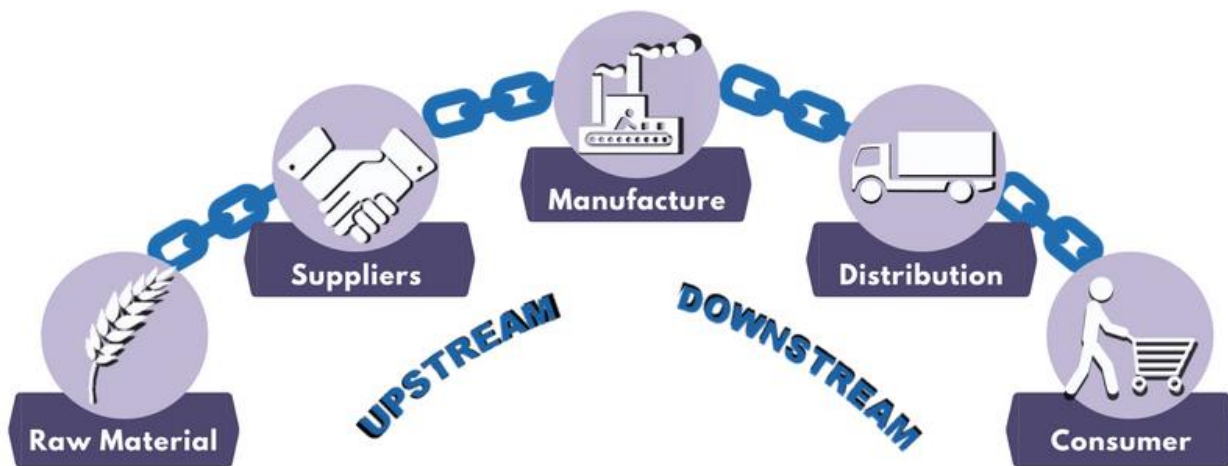
DISPATCH



Supply Chain- Colorcon

Supply chains consist of all the steps involved in getting a product from a raw material into the hands of the customer. Typically, the supply chain begins with the vendors or suppliers. These are the businesses that provide raw materials. Next in the supply chain is manufacturing. This is the process of converting the raw materials into products that are ready to sell. The final step is distribution which can involve multiple different intermediaries. Some of these middlemen could be wholesalers, retailers, distributors, and even the internet.

For Colorcon Supply chain network consist of below streams



Upstream:

For colorcon supply chain starts with RM which are imported from other countries like UK, Korea, China, USA, via both sea & air shipment It comes to Nava Shiva port at Mumbai & then by road reaches to Goa Verna Plant, now also started at Goa port.

The lead time varies from 6 days to 60 days to reach material at manufacturing site.

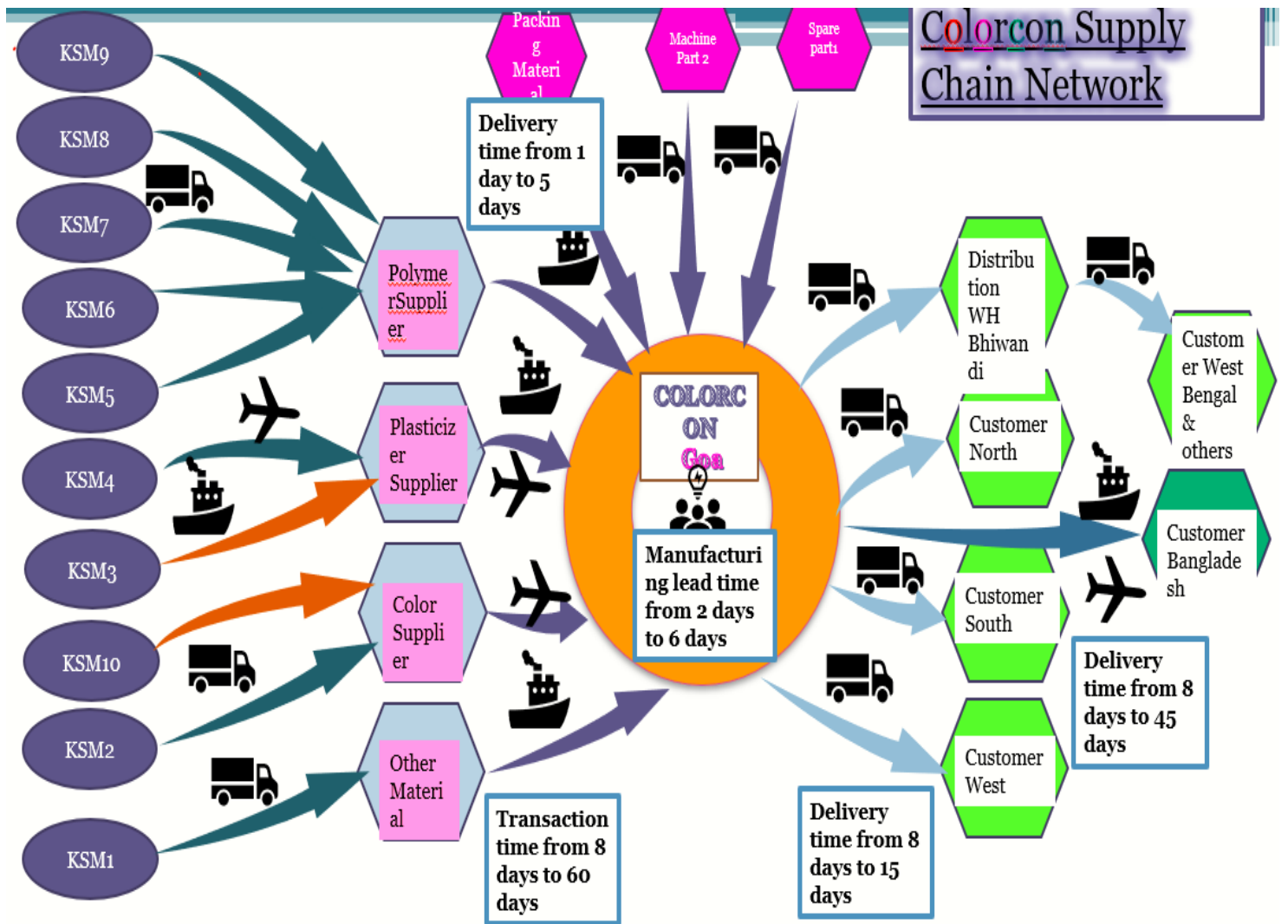
Manufacturing site:

Once RM is received it is processed to make finished product as coating material as per customer requirement

The lead time is 6 days from day of order booking.

Downstream:

Once material is ready it is being supplied to customer via road for India & for outside India in south Asia by sea or air shipments.



List of Raw material used in FG

- There are different raw materials used in finished good manufacturing.
- There are more than 2000 FG formulas where different raw materials are being used
- The main ingredient in each formula are around 5-6
- In total around 280 raw materials are used to manufacture different FG codes
- Maximum RM (Around 90%) are imported from other countries like UK, Korea, China, USA, via both sea & air shipment.
- The list of all raw materials used are attached here

[Raw Material List with supplier name](#)

Data Collection

- As the number of raw materials used are high, it was huge task of collecting all data from different sources
- Below data collected for analysis
 - Sales data for last 10 years & forecast for next 10 years.
 - Data for last five years RM consumptions and FG sales collected.
 - Current monthly usage data with order pattern
 - Each raw material Price data
 - Lead time of each Raw material
 - Safety stock for each raw material
 - Warehouse space availability in terms of pallets space
 - Different reasons for shortage
 - Reasons for excess material in warehouse
 - Current process of RM planning & order pattern
 - Current inventory levels
 - Forecasting method & accuracy
- Different department personnel involved in collecting data

- Refer different excel sheets for actual data.

Sales History of FG for last ten years

| Sales history for last 10 years | |
|--|------------|
| Year | Qty |
| 2011 | 1,193,492 |
| 2012 | 1,288,397 |
| 2013 | 1,476,142 |
| 2014 | 1,763,513 |
| 2015 | 1,816,324 |
| 2016 | 2,027,295 |
| 2017 | 2,113,753 |
| 2018 | 2,340,195 |
| 2019 | 2,398,312 |
| 2020 | 2,806,473 |
| 2021 | 2,530,500 |

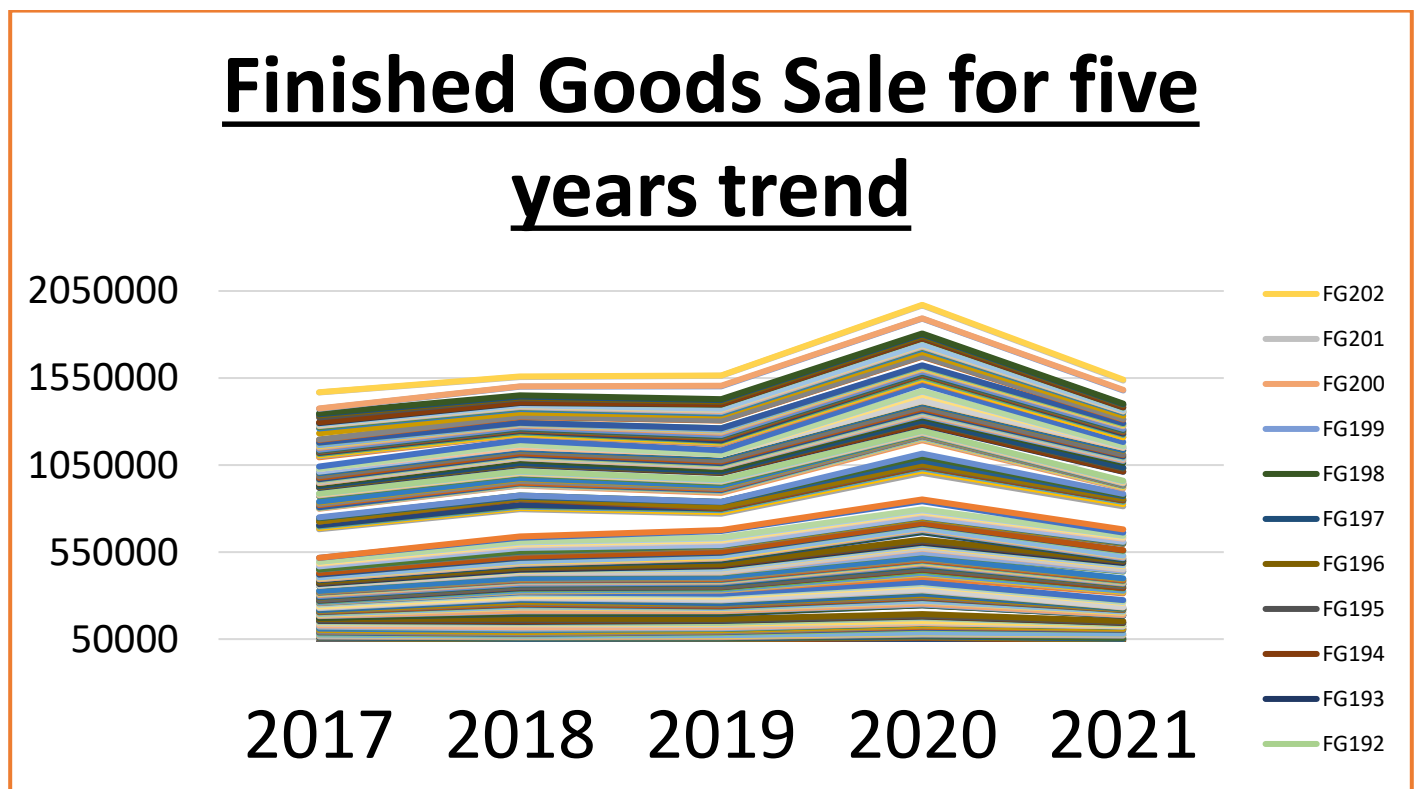
Sales Forecast for next ten years

| Forecast for next 10 years | |
|-----------------------------------|------------|
| Year | Qty |
| 2022 | 2,682,330 |
| 2023 | 2,843,270 |
| 2024 | 3,013,866 |
| 2025 | 3,194,698 |
| 2026 | 3,386,380 |
| 2027 | 3,589,563 |
| 2028 | 3,804,936 |
| 2029 | 4,033,233 |
| 2030 | 4,275,227 |
| 2031 | 4,531,740 |
| 2032 | 4,803,645 |

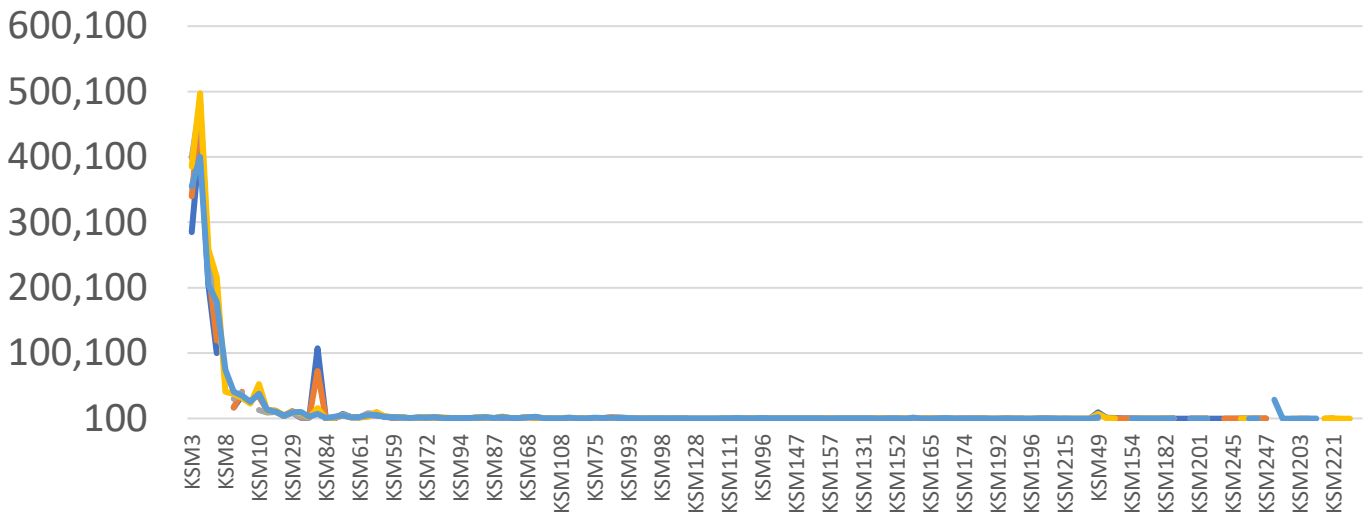
The list of Raw material used and their monthly consumption – Separate excel sheet attached

Data Analysis

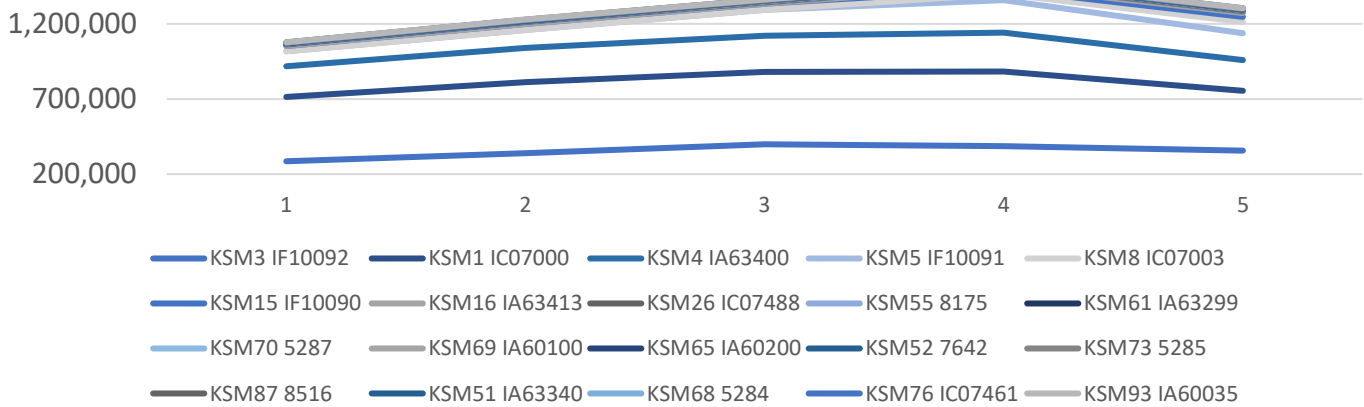
- Based on data collected analysis done for below
 - ABC analysis
 - Safety stock requirement
 - Total pallet space requirement
 - Forecasting pattern & accuracy deviation reasons
 - Top ten FG sale data analyzed
 - RM material used in top ten FG are separated & analyzed
 - Consumption pattern for last five years analyzed
- Refer excel sheets for details analysis



Raw Material Consumption for last five years Trend



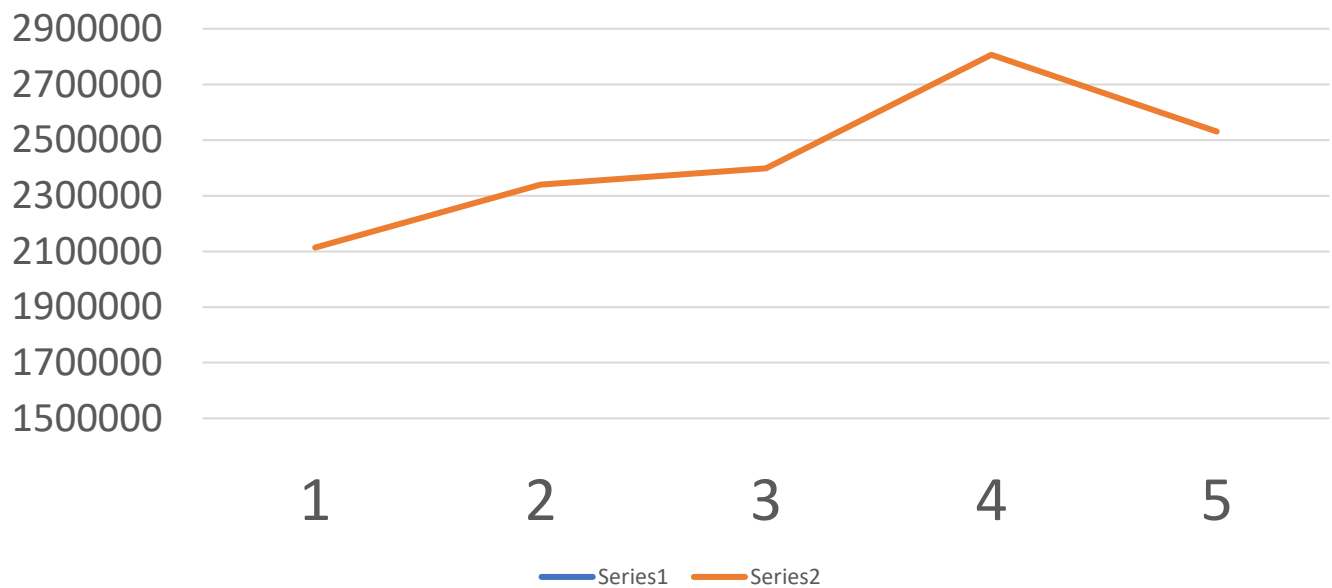
RM consumption trend for top 10 FG



Sales History of FG for last five years

| <u>Year</u> | <u>Qty (Kg)</u> |
|-------------|------------------|
| <u>2017</u> | <u>2,113,753</u> |
| <u>2018</u> | <u>2,340,195</u> |
| <u>2019</u> | <u>2,398,312</u> |
| <u>2020</u> | <u>2,806,473</u> |
| <u>2021</u> | <u>2,530,500</u> |

FG sales Trend for last five years

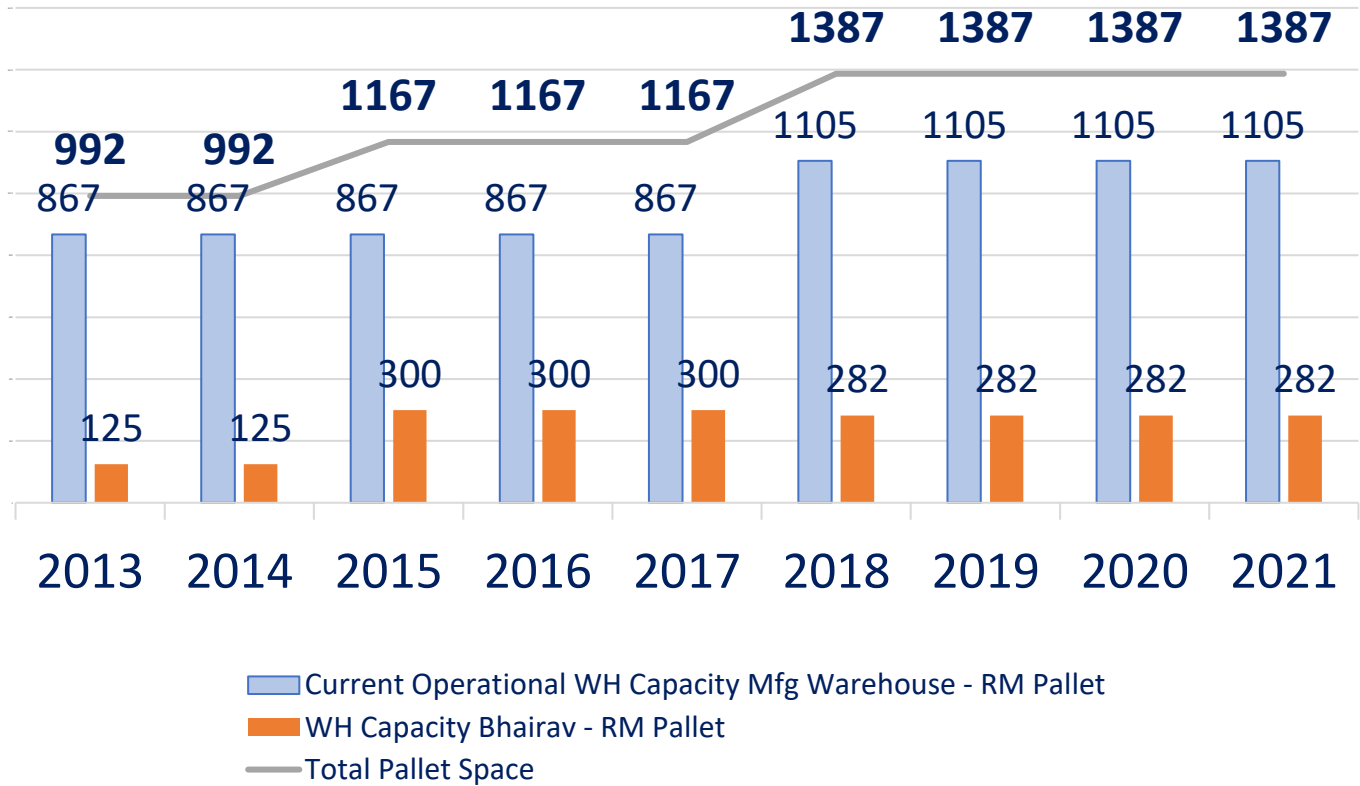


Data Analysis

- Based on graph trend analysis
 - Raw material consumption pattern is consistent
 - There is no deviation or sudden change in consumption pattern
 - Raw material consumption varies as per the sales quantity varies
 - Raw material consumption resembles the FG sales pattern even if any new products are introduced.
 - Consumption pattern doesn't follow forecasted values
- Safety stock and inventory holding
 - Current safety stock are based on
 - a) Lead time- longer lead time more safety stock
 - b) Consumption rate- Higher consumption more stock
 - c) Service level to customer – 95%
 - At present one month safety stock is kept in inventory
 - As per requirement 2 to 2.5 months extra inventory should be kept above safety stock
 - Total 1+2.5 + 3.5 inventory should be kept.
 - But the pallet space requirement to hold this much inventory is very high around 3000 pallets
 - Arranging 3000 pallets capacity is very high cost & difficult to arrange
 - After brainstorming & reviewing the history it was decided to hold 2.5 months inventory in stock including safety stock.
 - The pallet space required to this inventory is 1740 pallets
 - Available capacity analysis for last five years done which is shown in next slides

ANALYSIS

Operational Pallet Capacity for RM



Available Pallet Capacity for RM

| Warehouse | No of Pallets |
|--|---------------|
| WH Capacity –Ex. Rented Warehouse | 282 |
| WH Capacity -Manufacturing Warehouse | 1138 |
| Total Available Warehouse capacity for RM | 1420 |
| Top Pallets cannot use due to beam detector & Duct issue | 33 |

Findings

- Based on data analysis done below are some findings for the problems faced in inventory management
 - ❖ Reasons for Shortage of Raw Material
 - Un forecasted Demand for FG
 - RM required for new product
 - Vessel delay
 - Unavailability of vessels
 - Delay at customs
 - Delay in quality testing from external laboratory
 - ❖ Reasons for Excess Raw Material in warehouse
 - Reduction in FG demand
 - Less accuracy in forecast
 - Orders are placed based on forecast in advance
 - No space for keeping the material

Solution / Recommendations

- Based on finding and data analysis below are some recommendations to improve the process of inventory management
 - Work with sales team for forecast accuracy
 - Orders can be placed based on consumption history irrespective of order forecast & can validate periodically the accuracy against forecast
 - Review forecast & inventory periodically(Increase frequency)
 - Fix the qty in inventory to 2.5 months including safety stock
 - Increase pallet space for inventory holding.
 - Alternative local sourcing of RM wherever possible without compromising the quality specifications

- Alternate way of transportation
- Increase inhouse capability for RM testing for all tests

Implementation

- Below recommendations are in process of implementation
 - Fix the qty in inventory to 2.5 months including safety stock
 - ✓ Implemented
 - Review forecast & inventory periodically(Increase frequency)
 - ✓ Implemented
 - Increase pallet space for inventory holding-
 - ✓ In process, new external warehouse with increased pallet capacity identified agreement done & now material shifting in process.
 - Orders can be placed based on consumption history irrespective of order forecast & can validate periodically the accuracy against forecast
 - ✓ Recommendation send global team for evaluation & their comments
 - Alternative local sourcing of RM wherever possible without compromising the quality specifications
 - ✓ Process started & Local raw material review board formed which discusses about new RM suppliers to be developed & the further process in getting on list.
 - Increase inhouse capability for RM testing for all tests
 - ✓ Completed for few raw material & remaining are in process
 - Alternate way of transportation- This is based on situation decisions are being taken