Logistics Automation

Material Flow and Packaging Engineering

Current Trends and Future Opportunities

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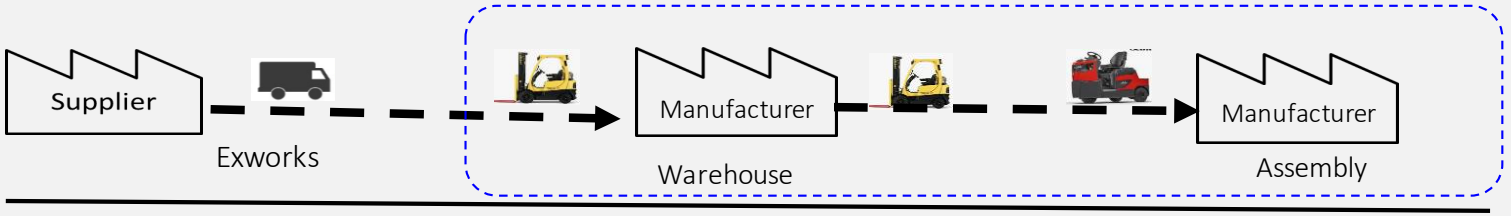
Material Flow Value Chain from Supplier to OEM

Information Flow

Material Flow



Current Process Flow and Technologies

✓ Logistics from Supplier
- ✓ Shipment as per Customer Release (MRP)
- Window Shipment
- Milk Run / Cross Docking
- Live Shipment Tracking by (GPS/ RTLS)
- Cube Utilization (thro Logistics Systems)

✓ Dock Unloading
- Truck Calling system
- Dock Window time Management
- Safe Unloading Thro Process & Systems

✓ Storage
- Automated Storage ASRS
- Narrow Aisle Equipment / Racking
- Integrated Warehouse Management System

✓ Market Place
- Integrated Pull System
- Pick To Light Enabled Kitting
- Scan to Pick Sequencing

✓ Delivery to Lineside
- Standard Delivery using Pull Systems
- IOT Enabled Devices in MH Equipment's to support on time delivery
- Manage Complexity thro Kitting & Sequencing
- Fork Free Concept feeding to line (Improved Safety)
- Connected Flow from Warehouse to POF using Integrated WMS & replenishment Systems

Current Value Chain and Systems supporting Logistics

Technology Enablers / Opportunities in Material Flow

Supplier to Customer Dock

OEM Storage & Delivery

OEM Mfg Line

Transport Management & Truck Calling system

GPS Enabled Trucks / Track & Trace

Window Schedule Management

Returnable Mgt.
System guided
RFIDs

Dynamic / Predictive Routing

Automated Storage - ASRS
Vertical Carousel
VNA Equipment

Safety Light Enabled
Fork Truck

Autonomous PMHV
RT/VNA/Pickers

Warehouse Management System
System guided operations

Pick to Light
Wireless
Paperless

Scanning
Handheld
Barcodes
RFID

Vision Picking
Goggle / AI / AR

MRT/ Call button/ SMART/ Tab
System guided replenishment triggers

Autonomous Delivery
AGVs AMR
Drones
Integrated Conveyors

Robotic Process Automation

Enablers & Components to support Connected Material & Information Flow

Enablers to Support Future Technology

Components / Enablers

Technology

- IIoT
- Cloud Computing
- Autonomous Robots
- Connected Systems

IT

- Big Data & Analytics

Manufacturing

- Simulation & Validation
- Systems Integration
- Virtual-Augmented Reality
- Smart Machines (RFID/ Wireless)

Packaging - Integration With Supply Chain

Packaging Types


Returnable


Expendable

Pick Tool Assessment

Material Flow

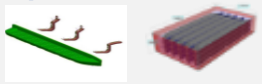
Ergo Assessment

In plant Logistics

Design For Logistics

Current

Proposed



Unpacking

DPA / DFL

LOGISTICS

RFID

3R'S

Market

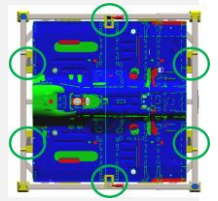
Flow

Labelling & Traceability

Environment

Supply Chain

Reuse/Hard-points



Vendor

Mfg Site

Cloud – Data Center

Consolidation Site

Reduce CO2

Styrofoam

Bamboo Pulp

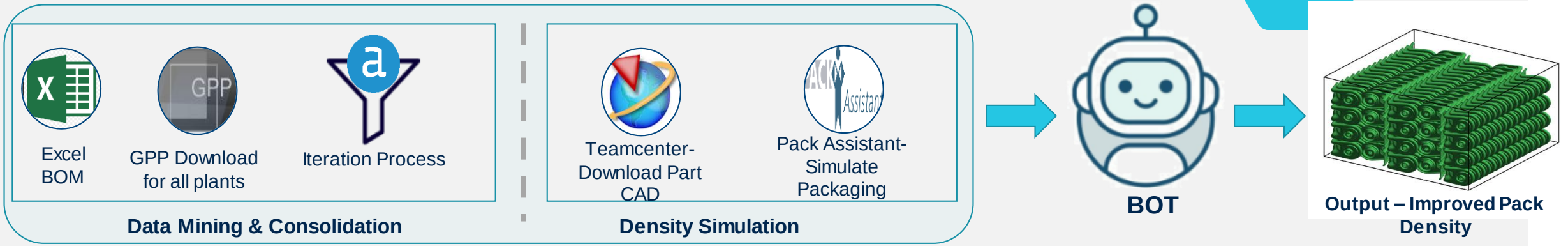
Recycle

Optimized Packaging Design Increase The Cash Flow, Improves Supply Chain Efficiency & ROI

Robotic Process Automation in Packaging

Purpose of Automation to avoid the repetitive tasks, helps to Reduce the cost nearly 30% and Improve internal processes.

Pack Density Simulation



Packaging Approval

Technology Enablers – Packaging

Now
(0 → 12 Months)

Robotic Process Automation

Additive Manufacturing aka 3D Printing

3D Scanning for CAD Modelling

Big Data used for Pack Density Improvement and cubic estimation

Data Analytics for Packaging Data Accuracy & Availability

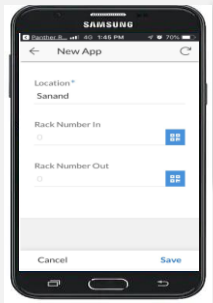
RFID Scanning for Track & Trace

Near
(12 → 24 Months)

Augmented Reality for Rack Validation using 3D Models

Virtual CLL Alignment using Chalk

Virtual Ergo Assessment

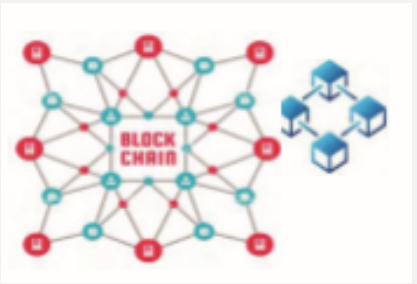


Mobile App with OCR Bar code Reading

Chat Bot For Supplier Queries

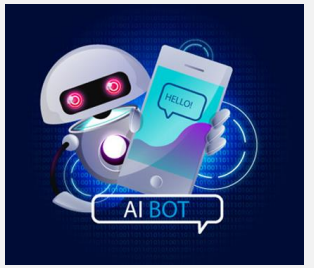
Far
(> 24 Months)

Digital Twin for Asset Management



Block Chain

AI / ML for Rack Reuse Decision



Summary / Insights Required.

- How do you see the new technologies associated with material flow and packaging engineering (MFPE) impacting the automotive Industry?
- Indicate the key drivers of logistics automation in the context of MFPE?
- Importance of the error free packaging labelling in logistics.
- Highlight the benefits and obstructions of logistics automation associated with MFPE in the current pandemic situation (COVID-19).
- Does your firm use (or) plans for any other low-cost technology solution for the logistics automation?
- Describe the MFPE considerations towards electric and autonomous vehicles (EV/AV) in your firm(s).
- Explain the various measures been taken to control the landfill for the expandable packaging in your firm(s)?