Smart Manufacturing

*Prepared for NIQR, Digital quality for a disruptive future, Session IV
Chennai

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* Views expressed here are the author's own views

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2. Smart Factory
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4. Smart Office

Smart Manufacturing

Smart Factory

Smart Manufacturing

Smart People

Smart Office

Smart Factory

Data Creation

Men

Machine

Material

Method

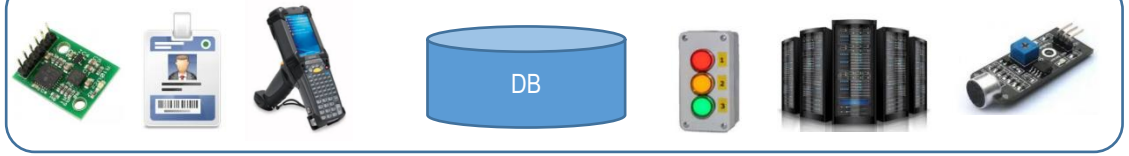
Factory Level

SMT

Line Level

Product Level

Assy



Big Data Collection in detail level

Big Data Processing for multiple purpose

Information

Visual Factory

Data based Quick Actions

Automation

Smart Actions

Connected Manufacturing

SCM Warehouse Production HR Manufacturing Logistics Sourcing Quality IT

Smart Factory

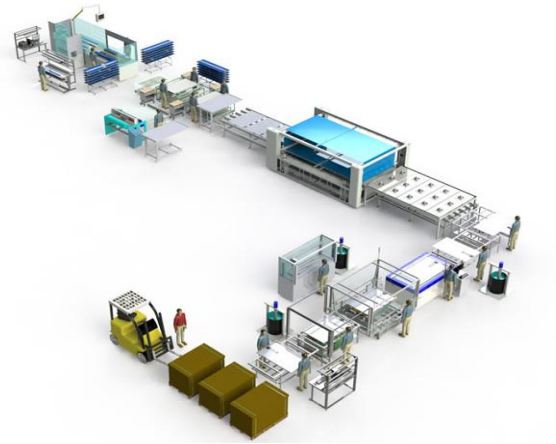
Targeted Production – Visual Factory System

1. When Line 4A has material Shortage or Machine Problem, just press a Button

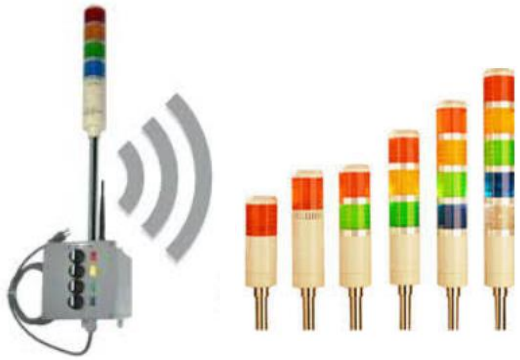
2. Automatically the system will communicate to Material or Maintenance Team. If the support team is not available it will escalate to next level

3. Control Room monitors displays the exact shop floor line layout and line status. If the line has problem it will display it visually & also current status of the problem

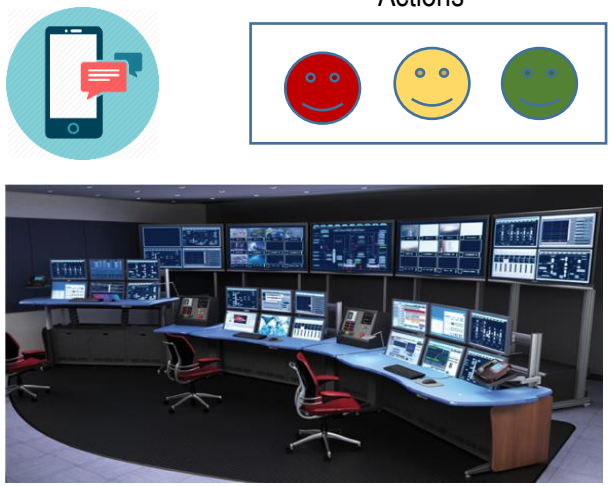
4. Monitor and Log all the statuses and problem and provide the visual dashboards to help to prevent reoccurring problems



Applications



Automation



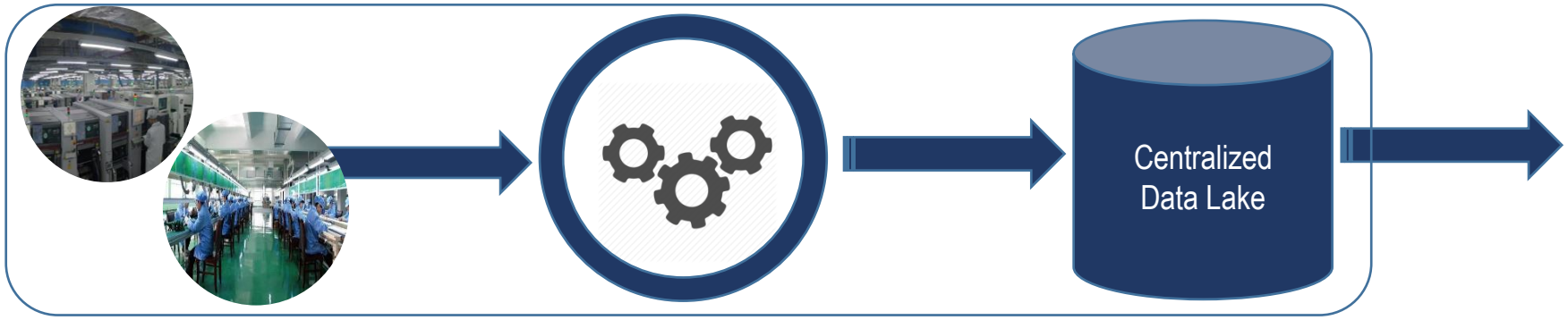
Actions

Analytics

Live Line Status	Quick Communication	Automated Triggers	Monitor & Log	Faster Turn around	Analysis

Targeted Production – Big Data & Data Analytics

- Big Data Collection from different sources
- Data extraction -> Factory Level, Level VI / Level X level, Product Level, Line Level
- Information availability from Management to Line Levels
- Enhanced Data Analytical Capabilities
- Mobility - Dashboards & Reports available in different devices



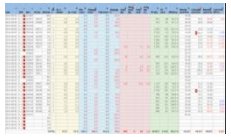
Big Data :
- ✓ Extract / Collect data from various sources
- ✓ Process the data
- ✓ Clean the data
- ✓ Apply Business Rules
- ✓ Feed data to Data Store

Data Lake :
- ✓ Centralized Data Store which holds detailed level data
- ✓ Supply data to various analytics & action purposes

Monitors

Dashboard

Reports



Mobility

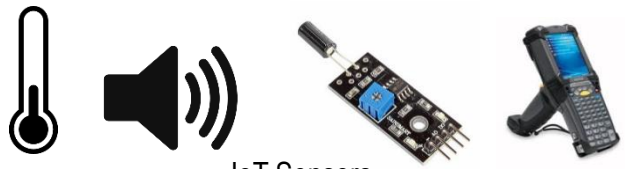
Data Analytics:
- ✓ Dashboards – quick snapshot on production
- ✓ Reports – detailed information
- ✓ Monitors – Line to monitor their daily operation
- ✓ Mobility – Available in different devices

Smart Factory

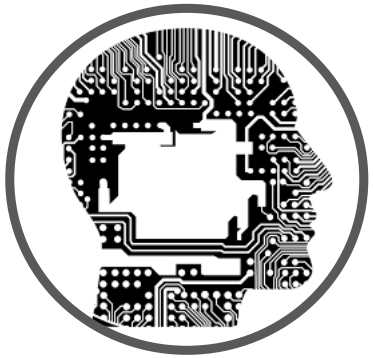
Connected Manufacturing

- Data Capture from
  - SMT Data from machines
  - IoT Sensors data for temperature, noise & vibration
  - SUSE data
  - FUSE Data
- Connected Devices and Sensors

SMT Machine Data

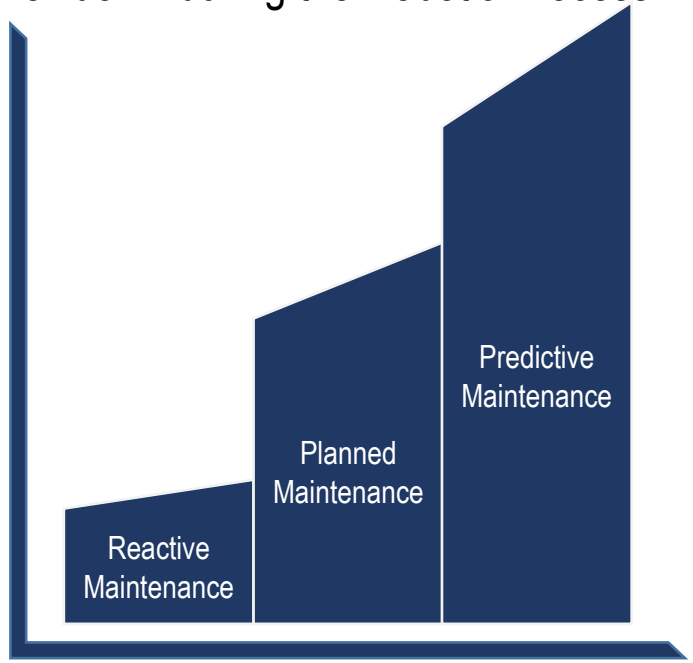


IoT Sensors



Machine Learning Algorithms

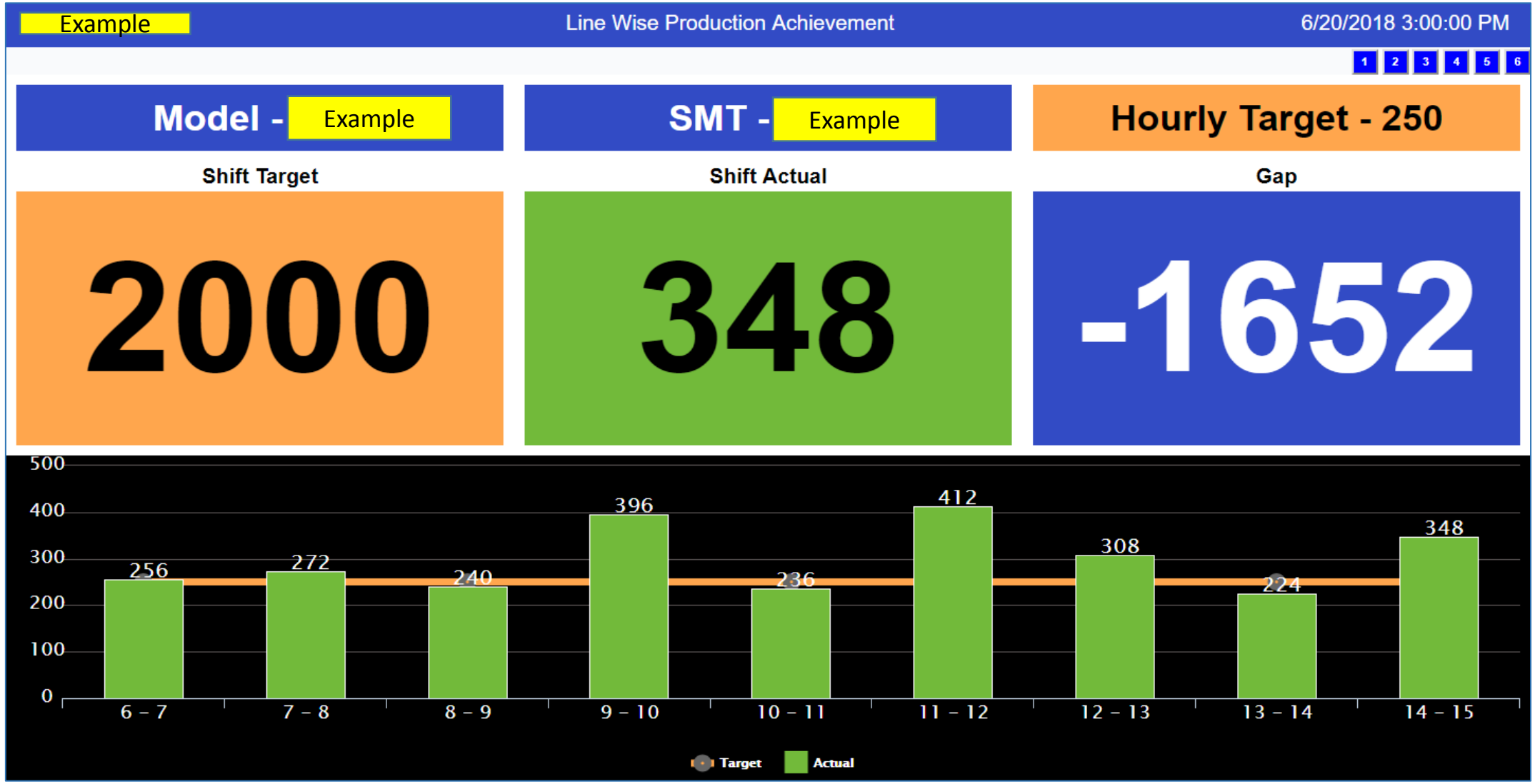
- Machine Learning Algorithms for building “Failure Model” to alert while threshold parameters are crossed
- Effectively Maintain assets
- Reduce Asset Maintenance Cost & Risk
- Preventive Maintenance Alerts
- Drop Management System to utilize high-cost materials while it fell down during the Robotic Process



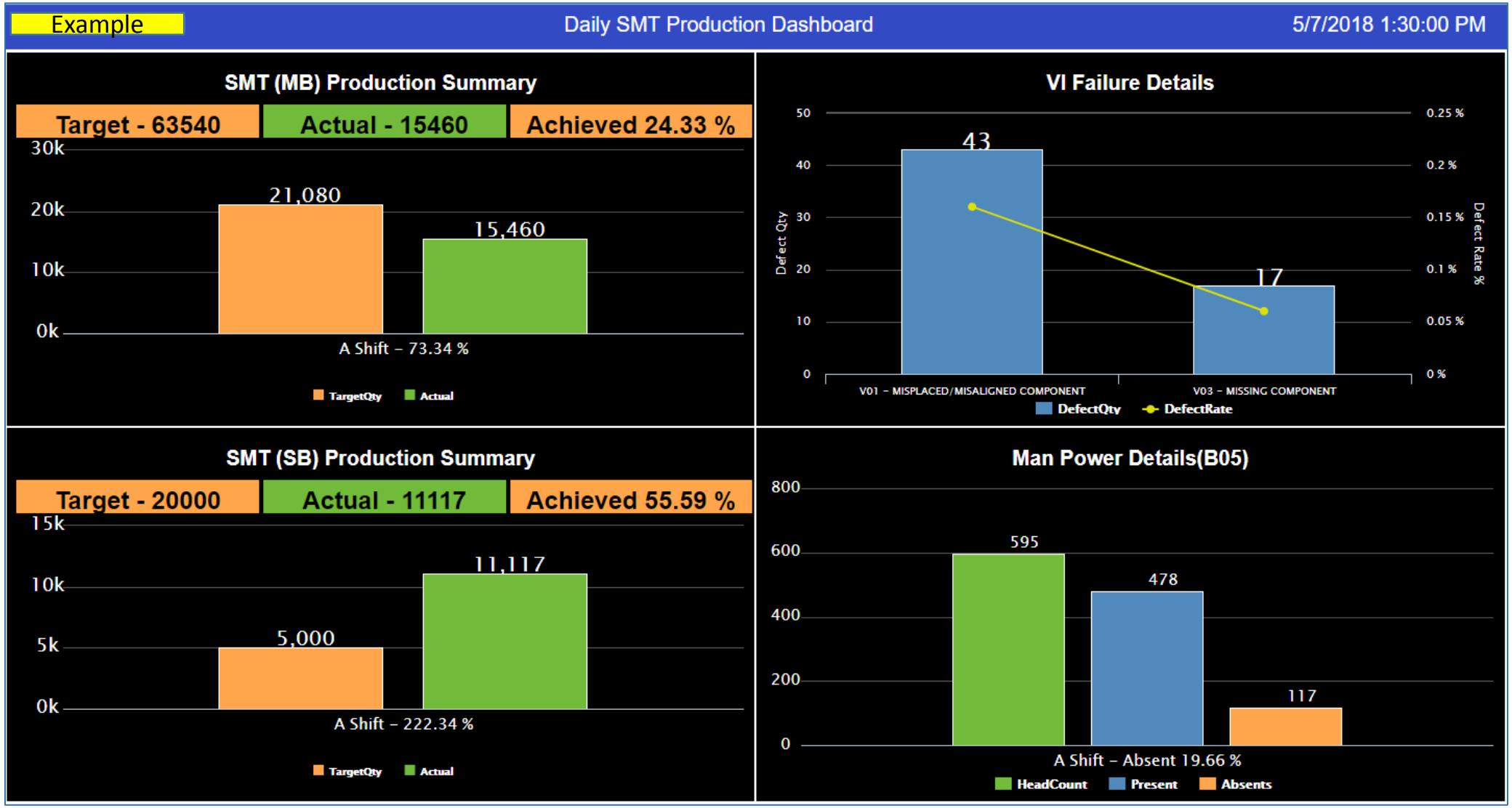
Effective Equipment Management

Smart Factory

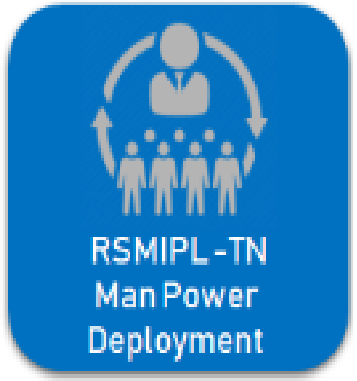
Sample Dashboard

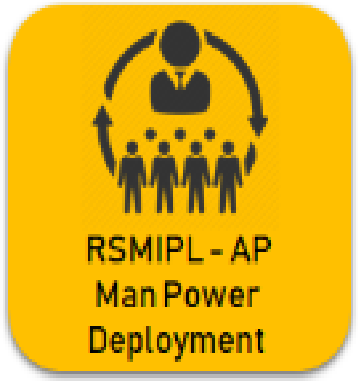


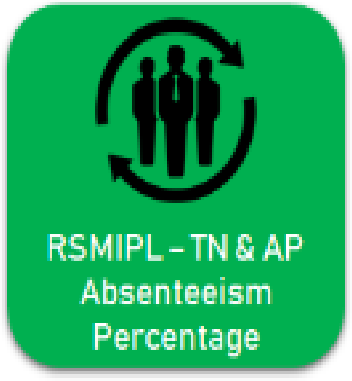
Smart Factory
Sample Dashboard

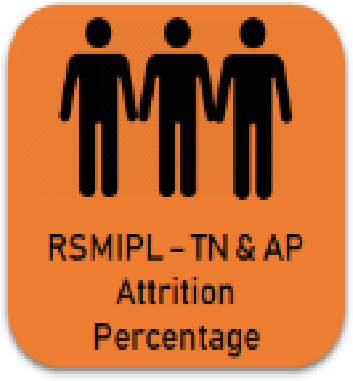


Smart People



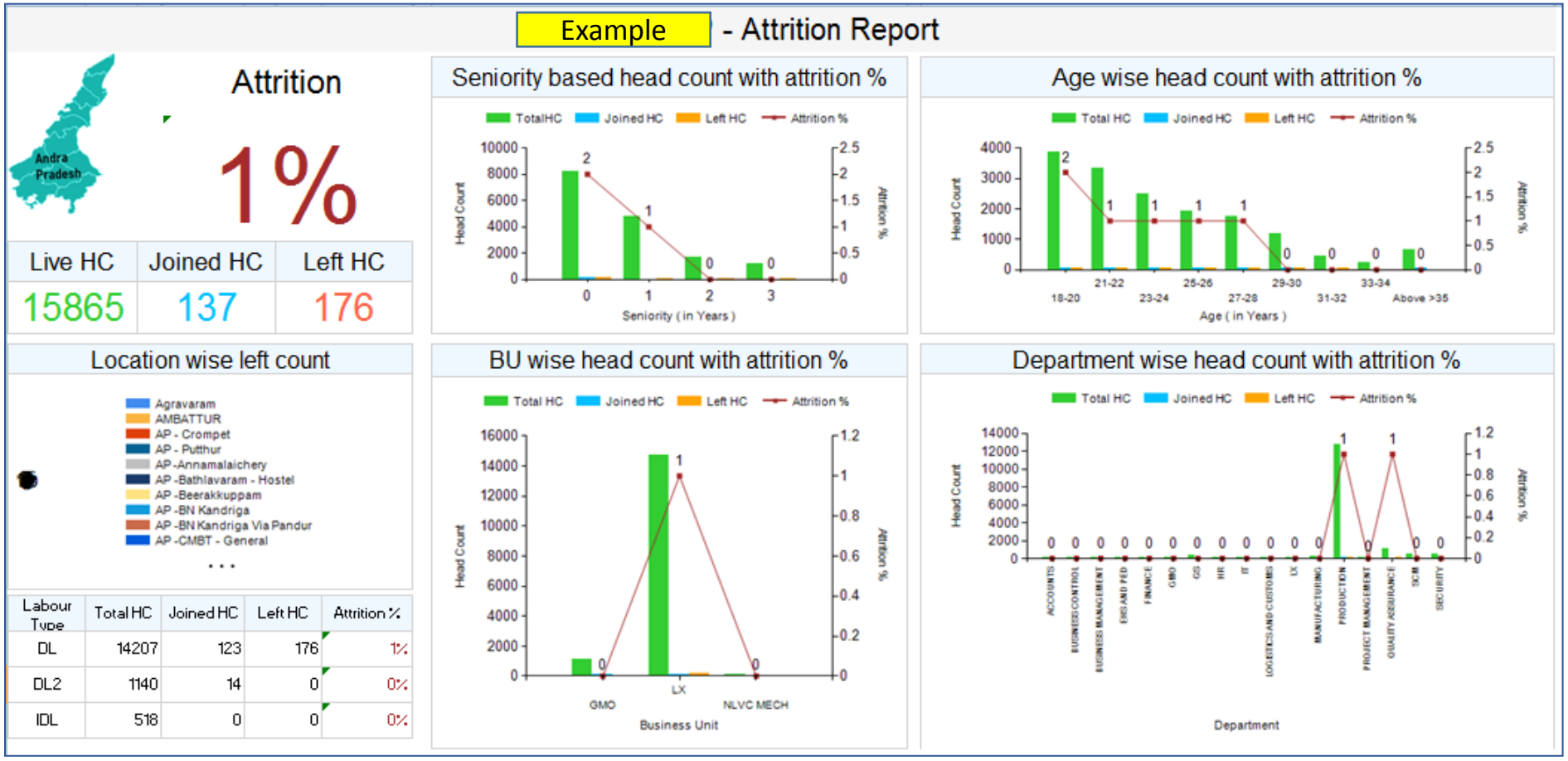






Smart People

Sample HR Dashboard



Labour Type	Total HC	Joined HC	Left HC	Attrition %
DL	14207	123	176	1%
DL2	1140	14	0	0%
IDL	518	0	0	0%

Smart Office

- Paperless office
- Enhanced Workflow applications
- Mobility – Easy accessibility of applications
- ESS – Employee Self Service System
- Leave Management
- Pay Slip
- MSS – Manager Self Service System : All forms & approval flow will be converted to online