Case Study "Drive Switch Assembly Lines Using IOT"

14th – 15th December 2018

15th ISQ Annual Conference 2018
New Delhi

Presenter :-
Puneet Kohli
Pankaj Goel
Mindarika Pvt. Ltd., Manesar plant

Uno Minda Group at a Glance

Rs. 56 B Group Turnover (FY17)

58 Plants Globally

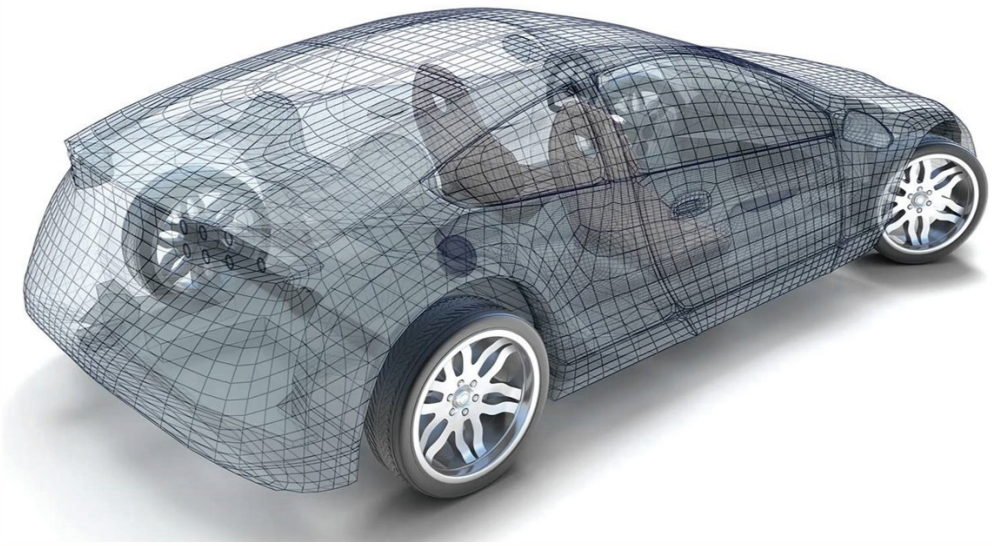
15 Joint Ventures

8 R&D Centers

180+ Product lines

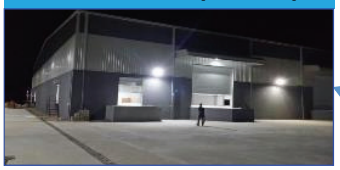
145+ Product Patents

165+ Design Registrations



Mindarika Pvt. Ltd. (MRPL) – Indo Japanese Joint Venture

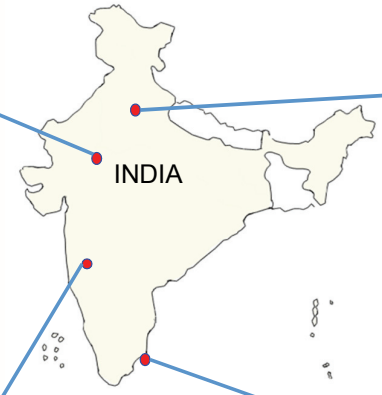
MRPL - GUJARAT (GUJARAT)



Area - 750 Sq. Mtr.
Employees - 240

MRPL - MANESAR, (GURUGRAM)

Area - 15965 Sq. Mtr.
Employees - 1025

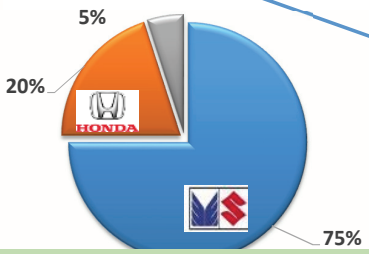


MRPL - Pune

Area - 7845 Sq. Mtr.
Employees - 574

MRPL – Chennai

Area - 750 Sq. Mtr.
Employees - 450



MRPL-M Share Of Business

Our product range

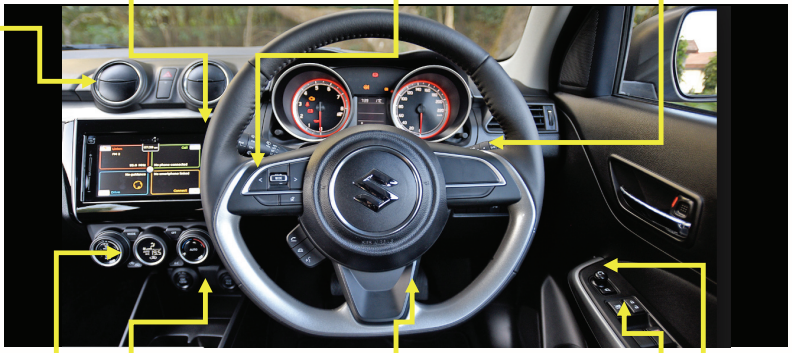
PANEL SWITCHES

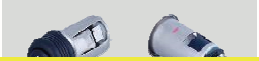
WIPER SWITCH

AUDIO SWITCH

LIGHT SWITCH

DOOR LAMP SWITCH





Our products are Complex, functional, aesthetics & safety related and operated in vehicle

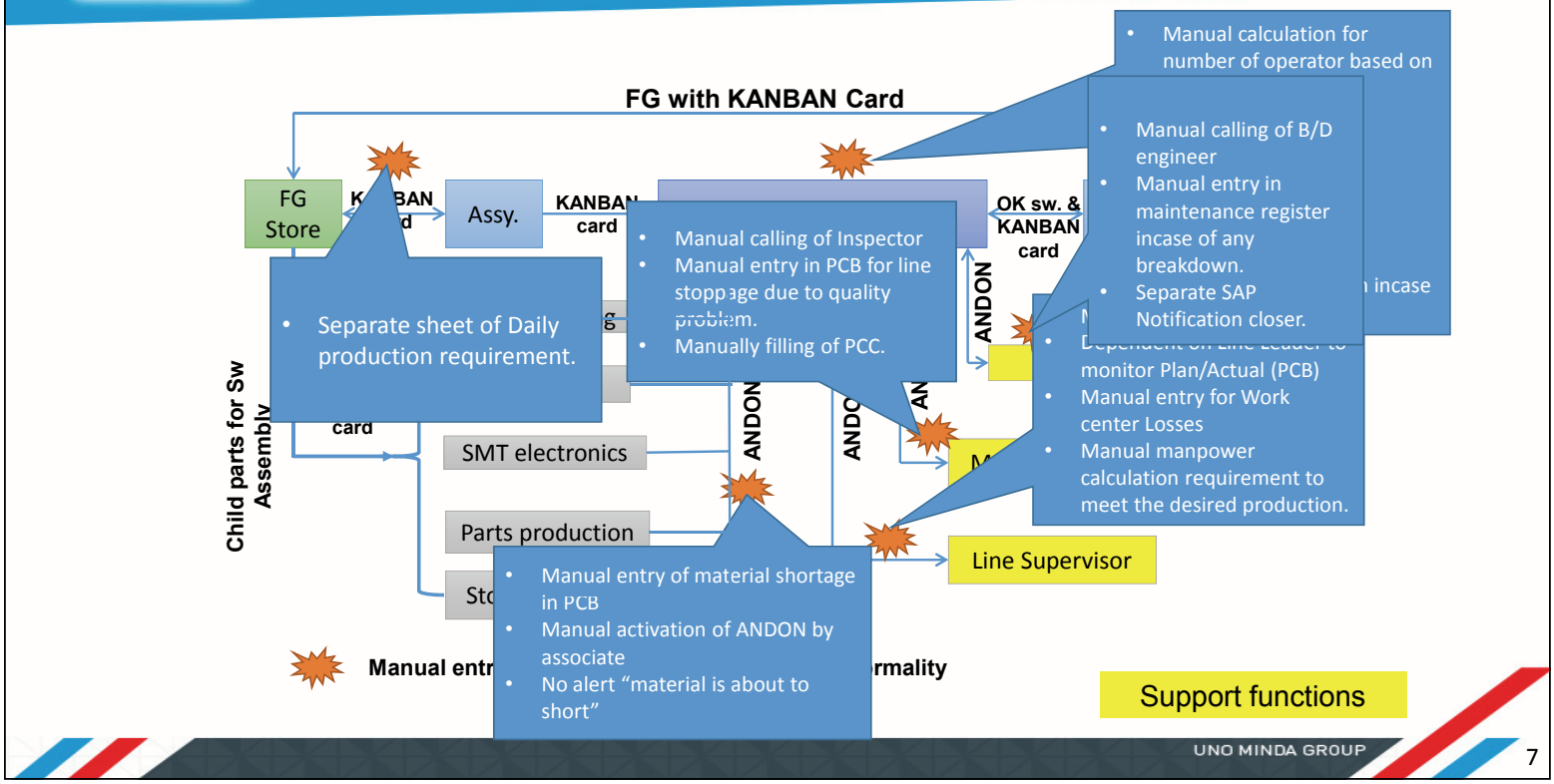
Overview - MRPL, Manesar plant switch assembly

- Total number of Assembly lines : 73
- Total Manpower : 520
- Number of Shift : 2
- Total number of products : 261
- Variety of parts for assembly : 8,500
- Daily number of switch assembly : 1,10,000
- Daily average changeover : 180
- FG Inventory norms : 3 Days
- Total Number of SPM/EOL/Fixtures : 1800

Multiple part handling & complex assembly process

Switch assembly process

Simplified diagram of information flow on line



Issues related to line status review

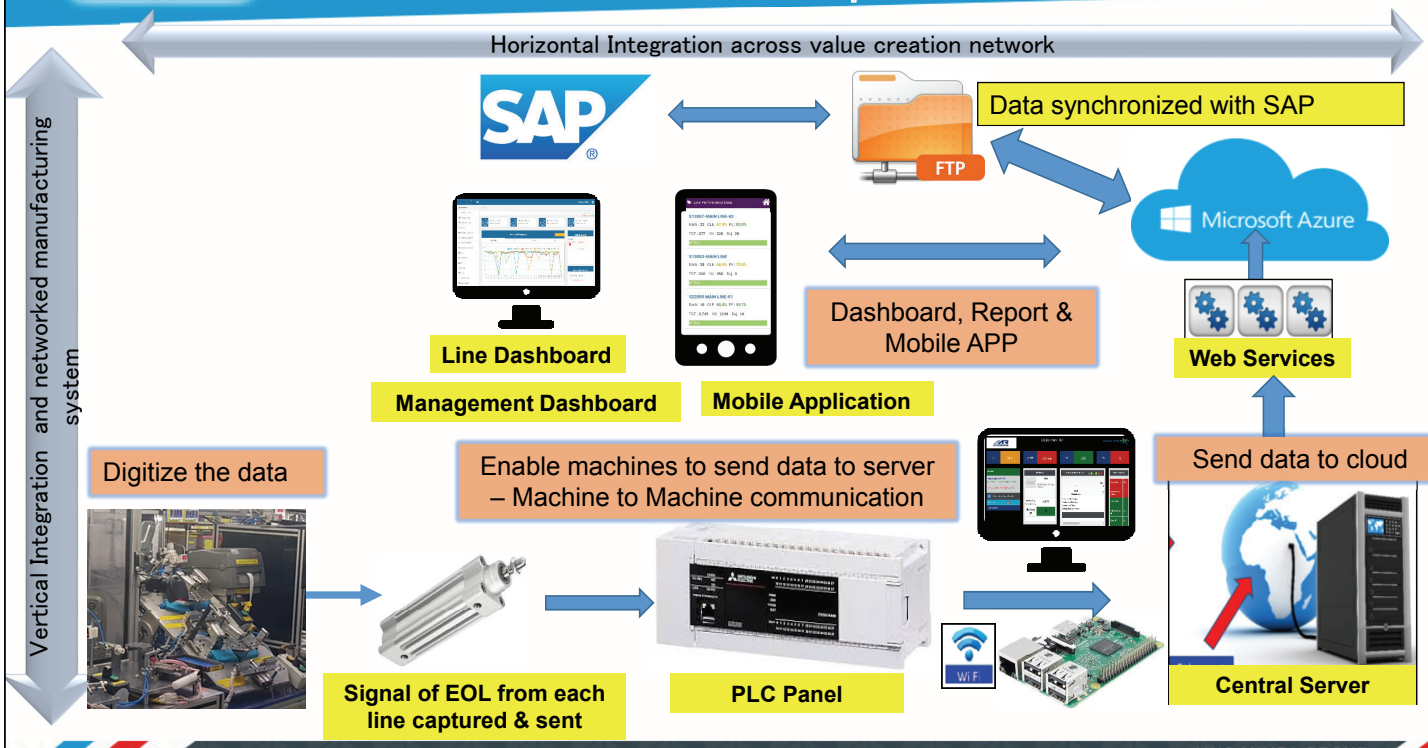
1. Manual Data collection of lines for review & production meetings
2. Quality of data not good (In-complete / wrong data)
3. Delay & gaps in communication
4. Manual data preparation for SAP
5. Time loss & overtime
6. Traceability
7. Paper records of production data
8. Physical presence is must
9. In-effective Escalation Management

Industry 4.0 has the Answer!!!

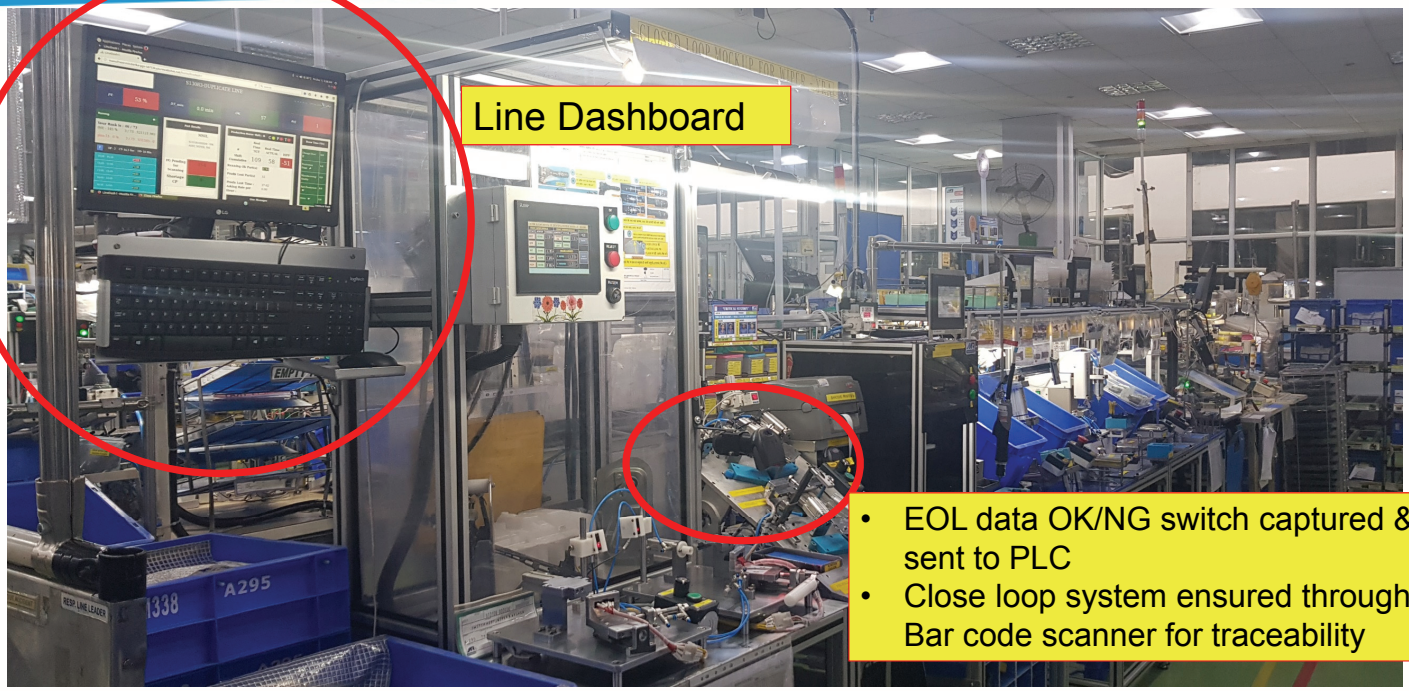
Deloitte. accenture KPMG BOSCH

- Digitization.
- Real time capturing of data.
- Use of IOT.
- Cloud storage.
- Dashboard & reports.

Architecture of IoT implementation

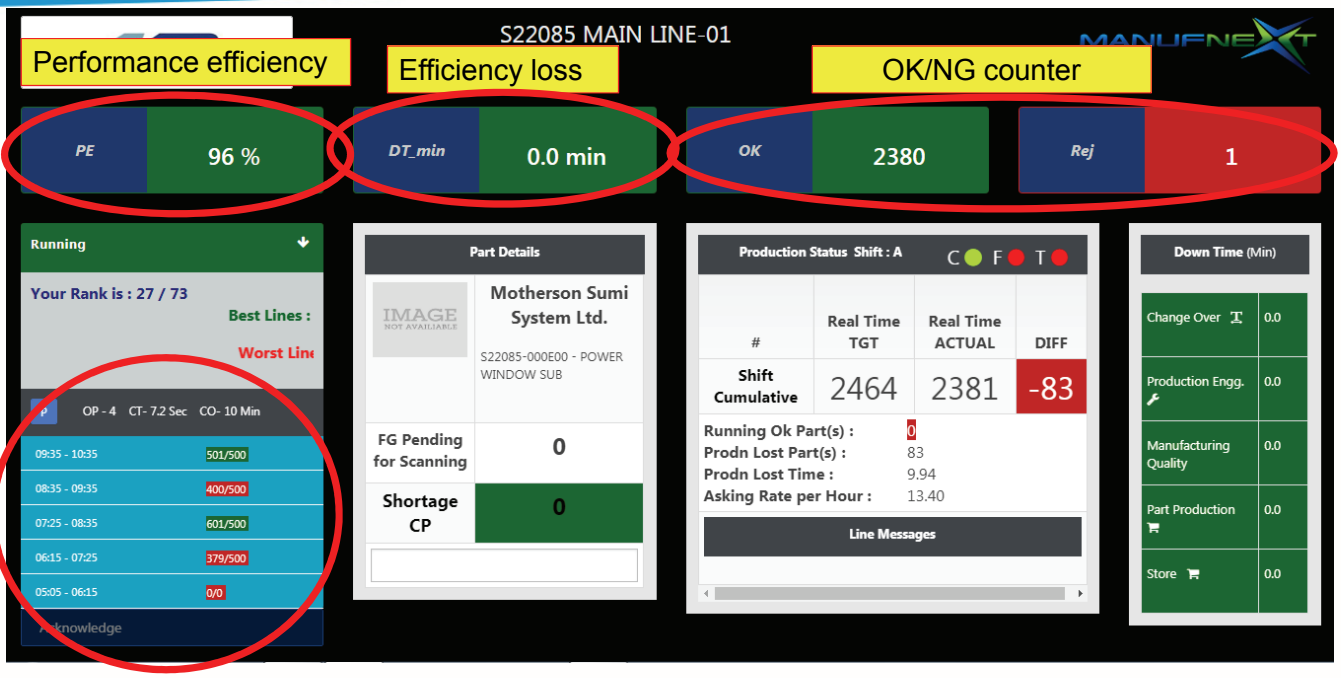


IoT implemented on line



- EOL data OK/NG switch captured & sent to PLC
- Close loop system ensured through Bar code scanner for traceability

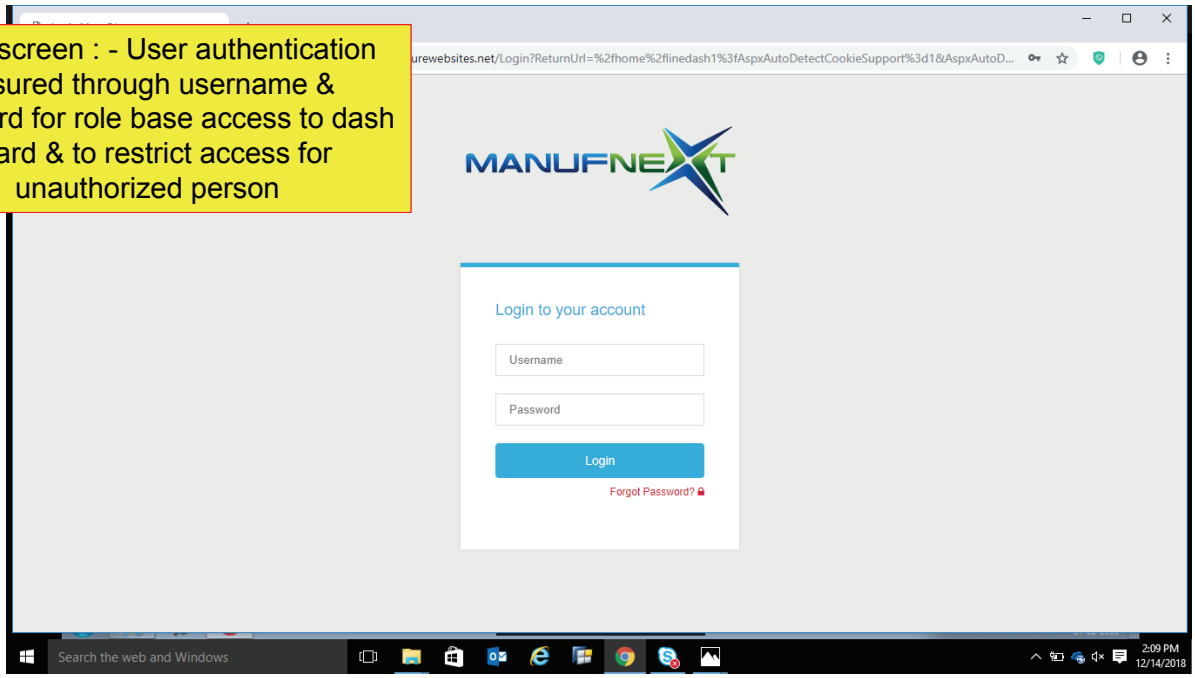
Line Dashboard – Real Time data



Hourly production monitoring

Real time monitoring through WEB

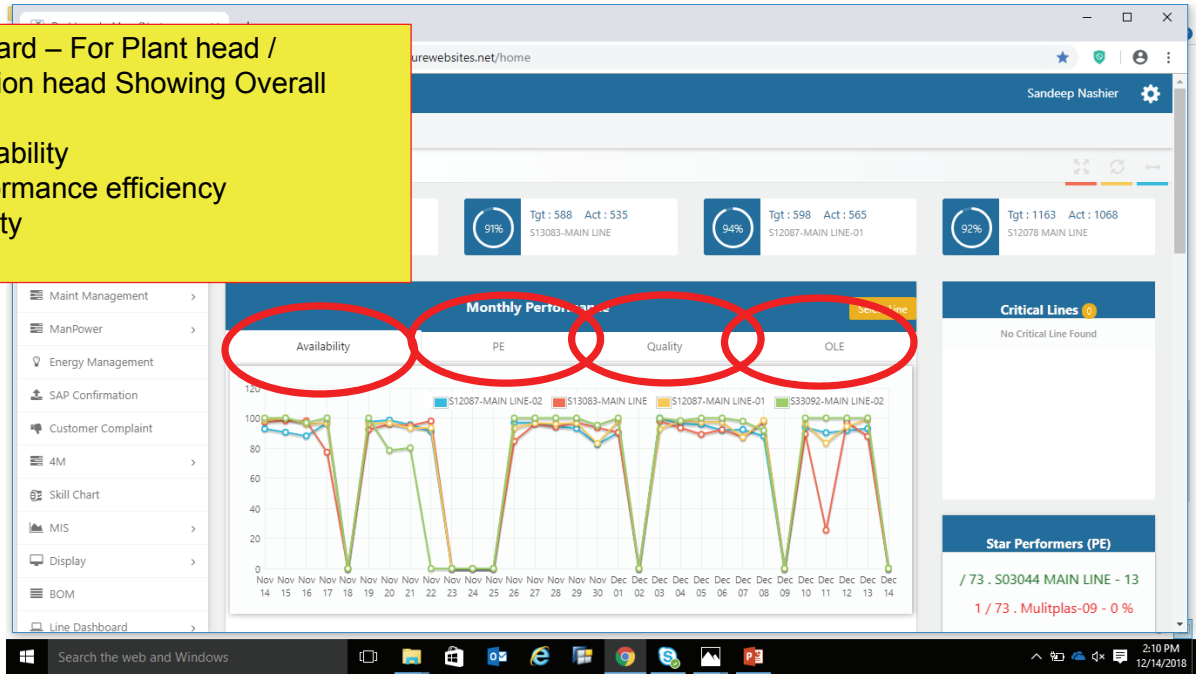
Login screen : - User authentication ensured through username & password for role base access to dash board & to restrict access for unauthorized person



Real time monitoring through WEB

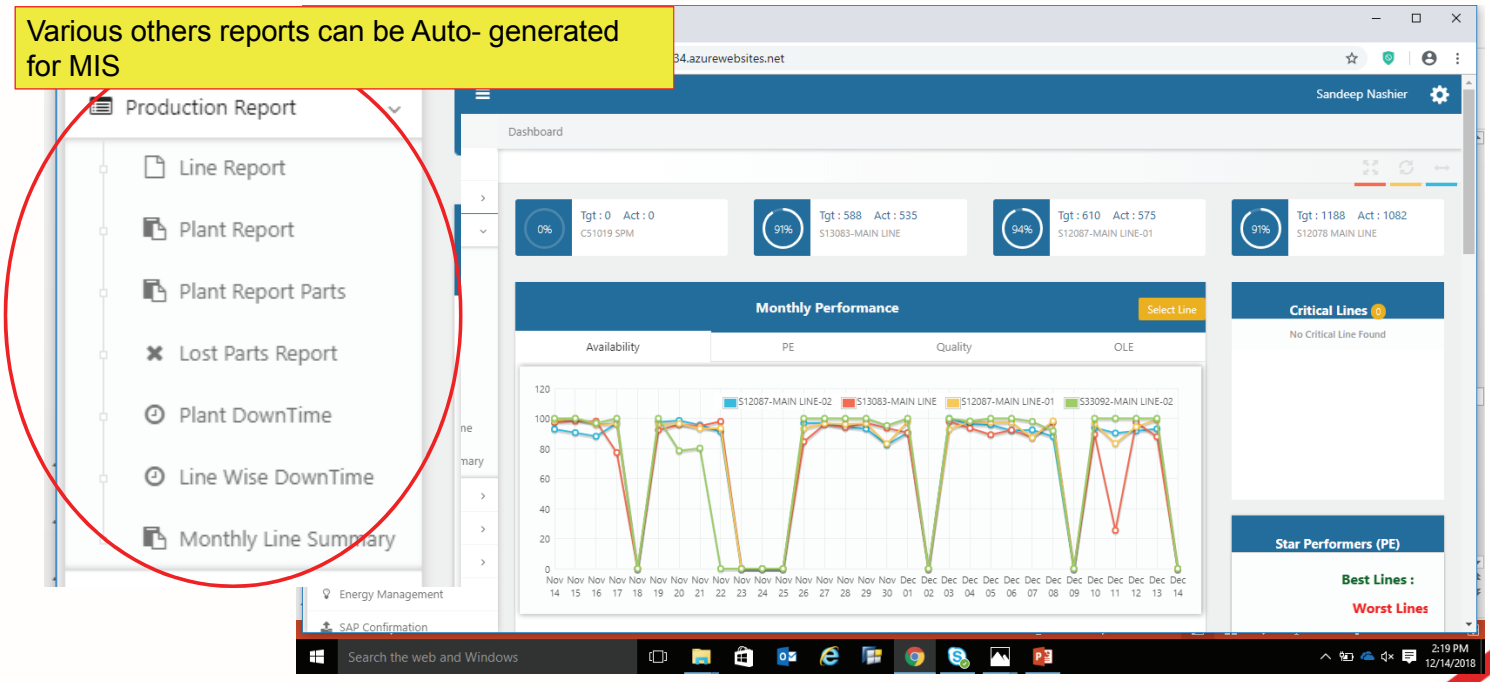
Dashboard – For Plant head / Production head Showing Overall status

- Availability
- Performance efficiency
- Quality
- OLE

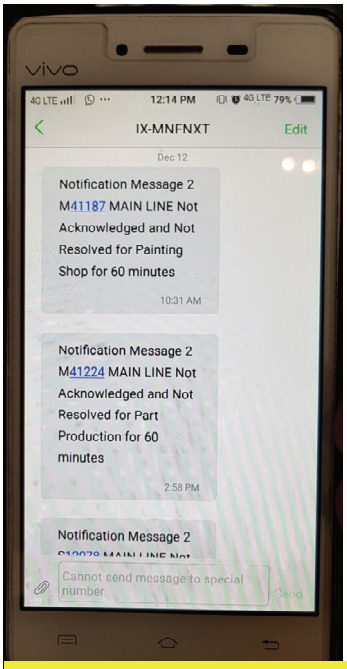


Real time monitoring through WEB

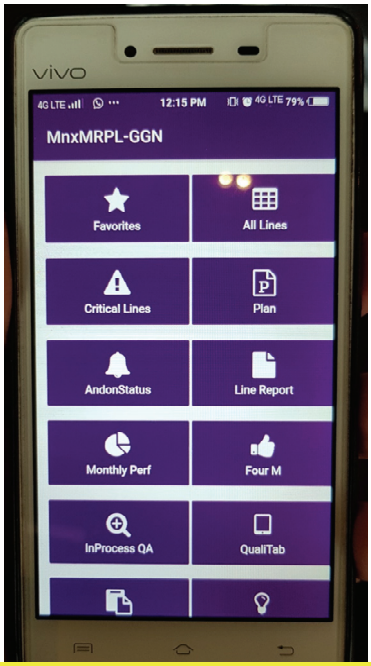
Various others reports can be Auto- generated for MIS



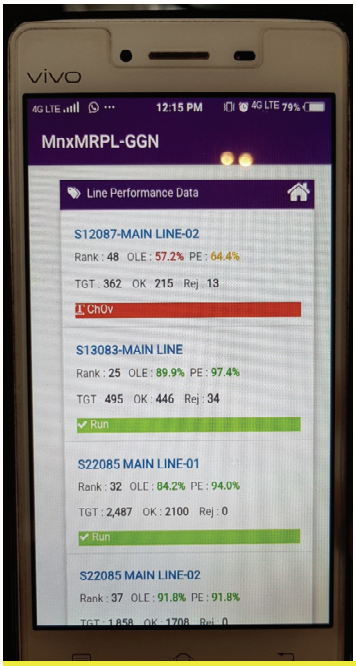
Real time prod./ Quality reports on mobile



SMS alert of any stoppage as per escalation matrix



Mobile APP interface for reports (anytime, anywhere real time)

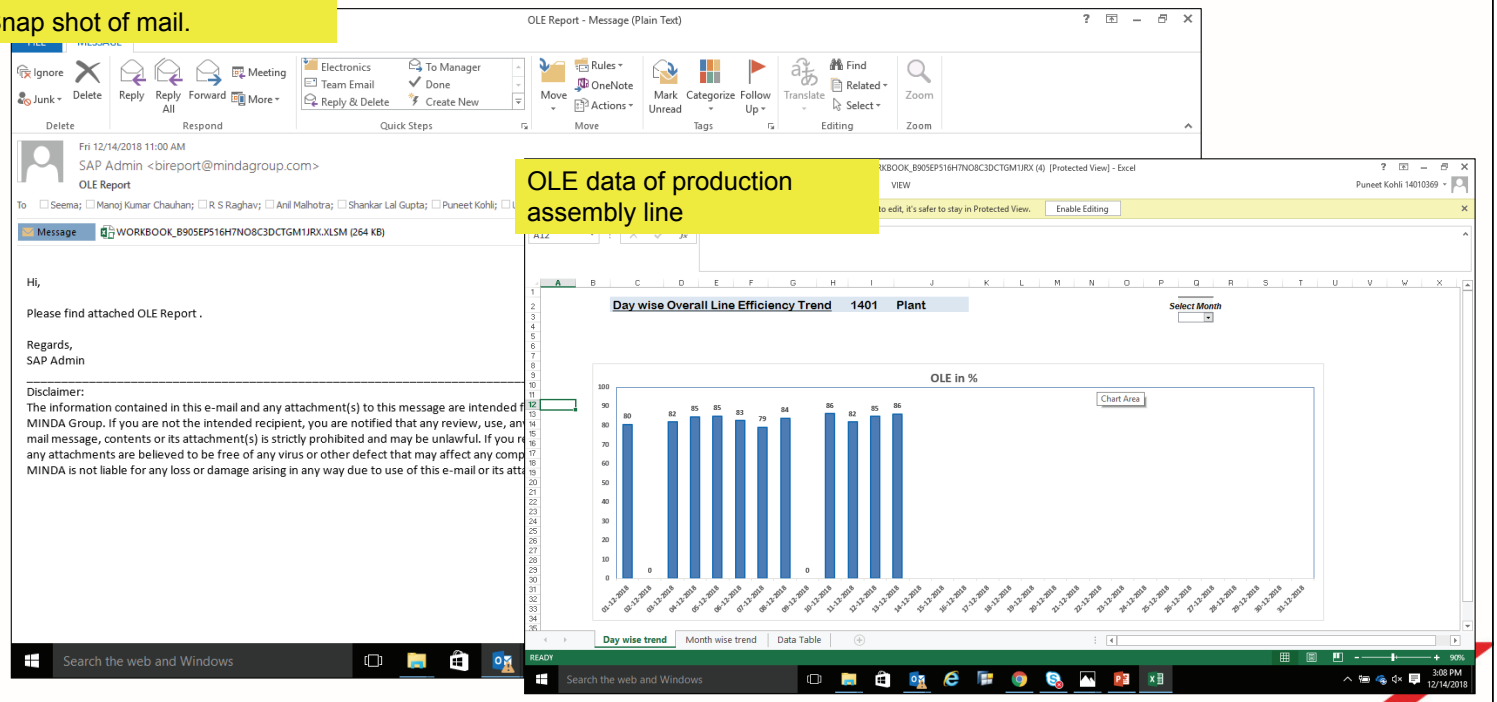


Line wise production & quality status

Auto generated mail from SAP

Snap shot of mail.

OLE data of production assembly line



Benefits from the project

1. OLE increased from 70 % to 87%
   - Efficiency losses reduced by 55%.
2. Instant, Real time production data which can not manipulated also reduced paper work
3. Strong database storage for future use for quality, productivity & warranty issues
4. Better & effective escalation management result into reduced efficiency loss
5. Better communication & status enables focus on repeated Quality issues that leads to reduce rejections up to 50%.

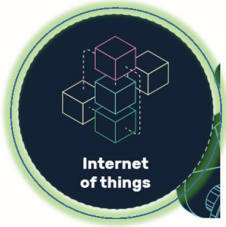
Project Snap shot

- Implemented on All switch assembly & sub assembly lines - **Total 73 lines.**
- Total period for implementation **11 months (from Nov'17 - Sep'18) in IV phases.**
- Total investment **26 lacs with ROI within 2 years**.
- Team of **6 CFT members** lead by manufacturing head (Production, IT, Production Engineering, Quality, PPC & store).
- Data on Cloud and can be accessed through **WEB & Mobile APP and integrated with SAP**
- Provided separate Login user name & password based on function **along with top management**
  - Assembly Line
  - Assembly head
  - Quality In-charge
  - Maintenance head
  - Child part & sub-assembly production in-charge
  - Store & Purchase
  - PPC

Major challenges faced during implementation

- Defining the architecture of IoT system as Variety of systems where used on assembly line (Micro-controller based, PLC based, PC based)
- Accuracy of Data & validation for IoT database both Input variables like Product list, cycle time, employee data, Integration with SAP & output reports.
- Debugging during production trials - Handling production stops.
- Think of standardize method, which is easily scalable & horizontally deployed.
- Selection of Suitable Implementation partner that fits to our need & systems.
- Adaption of the IoT system - Top management focus is required on daily basis
- Break the mindset of the user including department heads.
- Avoid bypassing the system – Shortcuts
- Training at all levels (Associate to senior management)

Elements of Industry 4.0 used.



Internet of things

Cloud computing

System integration

"If you think that the internet has changed your life, think again. The IoT is about to change it all over again!"

— Brendan O'Brien, Chief Architect & Co-Founder, Aria Systems

Thank You!!!!