Digital : An enabler for Quality

S.N. Eisenhower
16th NIQR Global Quality Convention
10th and 11th August 2018 - Chennai

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Digital Disruptions

1

astonishing rise in **data volumes**, **computational power** and **connectivity**,

2

the emergence of **analytics** and **business-intelligence** capabilities

3

new forms of human-machine interaction such as **touch interfaces, augmented-reality systems** and **Gamification**

4

Ever growing influence of **Social Networks** as the preferred mode of communication, sharing and expressing Opinions

5

Mobile Devices becoming ubiquitous and an extension of **Self**

6

The Internet of Things creating **Dynamic, Self-organizing, Realtime-optimized** and **Value-added** connections within and across entities …

7

and improvements in **transferring digital instructions** to the physical world, such **as advanced robotics** and **3-D printing**

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Digital : Areas of Opportunity in Manufacturing

Visual Factory

Digital Plant Operations

Real-Time Monitoring

Digital Learning

Mobility Focus

Analytics, Optimization

Positioning / Tracking

Auto-Identification

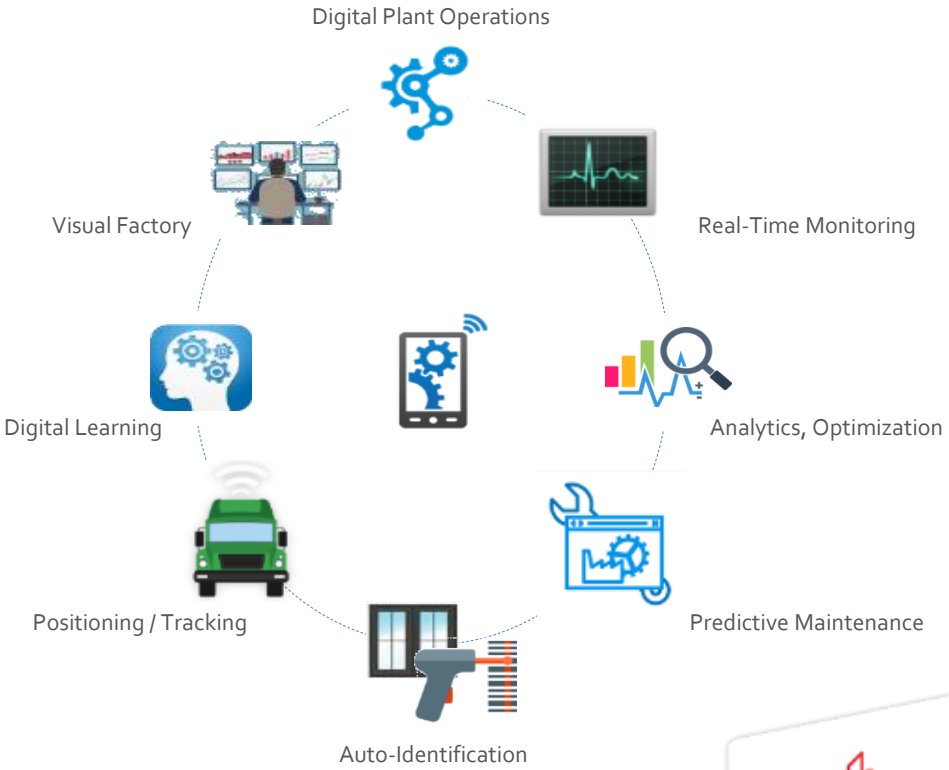
Predictive Maintenance

SG4.0
BY SAINT-GOBAIN

- Enabling **Digital Manufacturing** through
  - Integrating Sensors / Devices / Equipment / Lines
  - Acquiring Data from Industrial Control Systems
  - Enabling Automated / Rich Data Capture
  - Performing Edge Analytics / Data Visualization
  - Integrating with L3 Systems (MES/LES/ QMS…)
  - Enabling Mobility

- … to Improve
  - Quality
  - Productivity
  - Asset Utilization
  - Decision Support

Application AREAS



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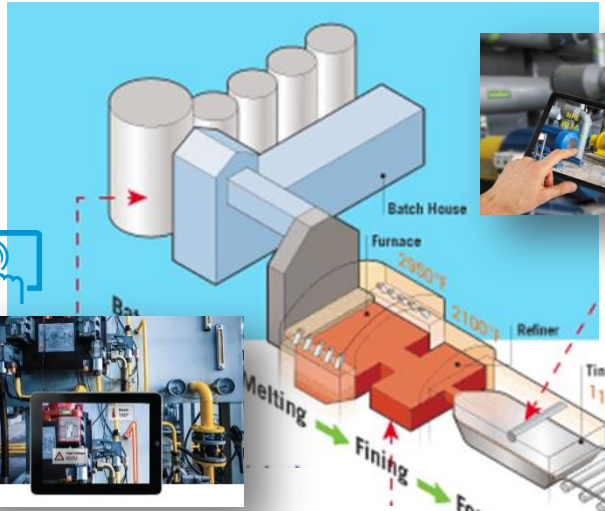
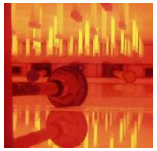
Float Glass Plants are working on Opportunities to **Digitalize Operations**

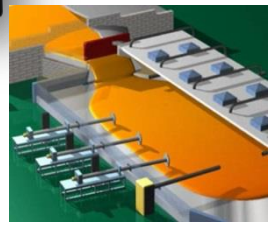
Smart Production



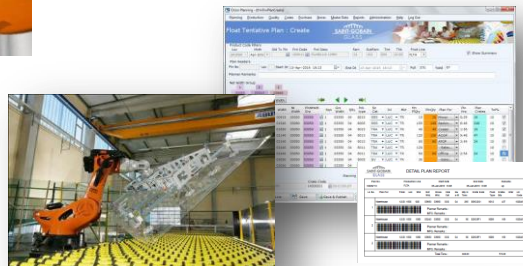
Plant Maintenance assisted by **Augmented Reality** and **e-Work Instructions & Videos**

Safe Operations enabled by **Augmented Reality** and **Visual SOPs**



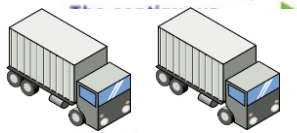


Simulative Learning of **Repetitive Tasks** like Width and Thickness Changes



Collaborative **Planning & Optimization, M2M** Interfacing and **Automated Execution**

Support to **Skill Building** by **Video Training** and **Simulation**



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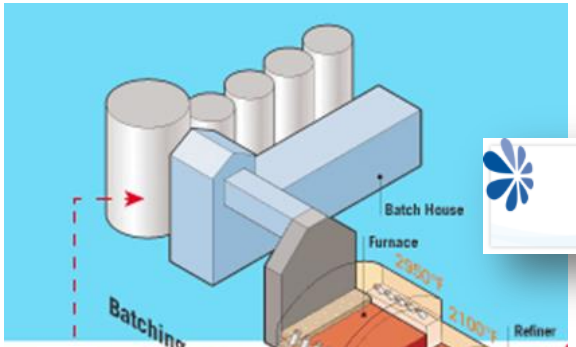
Real-Time Monitoring Systems strengthen Quality Management



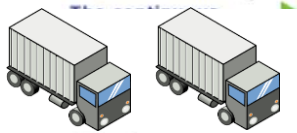
Alerts, Technical Assistance
Decision Support

Smart Monitoring

Quality Management

Yield, Losses & KPI Follow-up

Warehouse Management



The Future Workstation at **SG Sekurit** : Automotive Glass Manufacturing

Smart Quality

Reference quality, ….

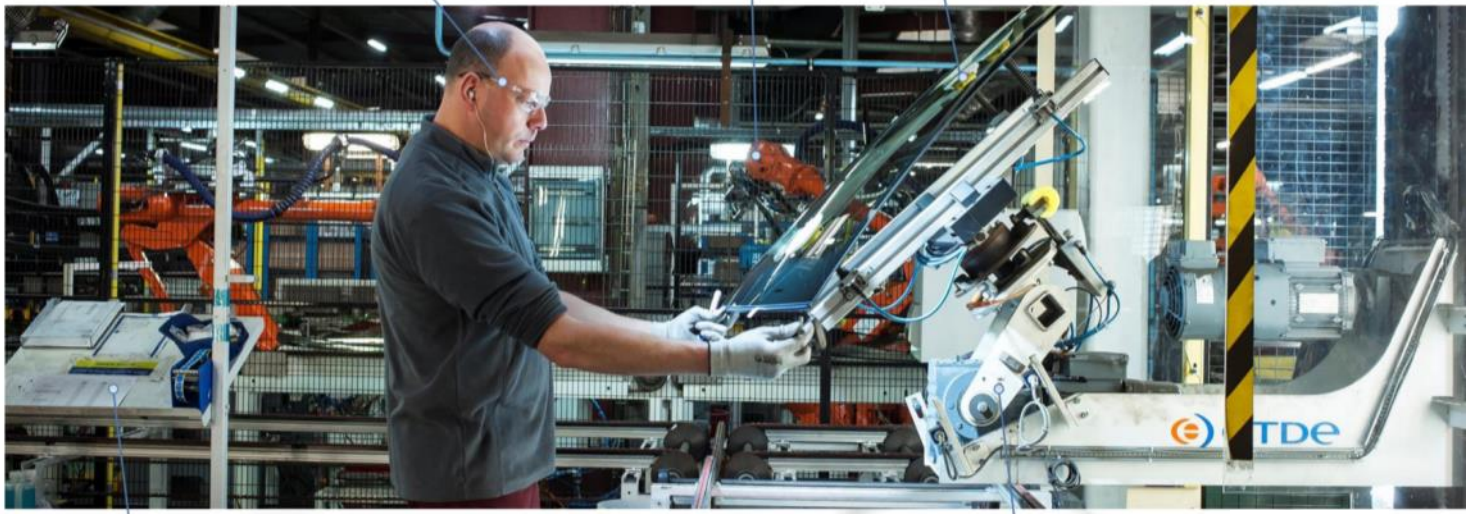
Smart glasses
Augmented reality

Auto soldering contact order,
…….

Production Planning
Machine 2 Machine

Marpos data trend analysis,
CpK trend alert

Quality KPIs
Big Data



E-Work instructions
Touchscreens

Packaging instruction changes with model change

Instant OEE
Big Data

Automatic Alerts based on Quality Thresholds

http://sggiappsqly.saint-gobain-glass.com/Marposs/View/Login.aspx

Digitalization Journey 2017 :

We started with **Mobile Applications :** Key to **People Engagement**

EQ Check

TF4/TF5

eKPS

eSMAT

ER Score

SQ Check

DigiOps

eTagger

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Digitalization Journey 2017 :
...and created scalable **Digital Platforms : Foundations** for the Future

Energy Management

OEE Monitoring

Condition Monitoring

Process Data Visualization

Customer Connect Platform

Warehouse Optimization

Real-Time Remote Monitoring

Logistics Tracking

On-Board - Visual Factory

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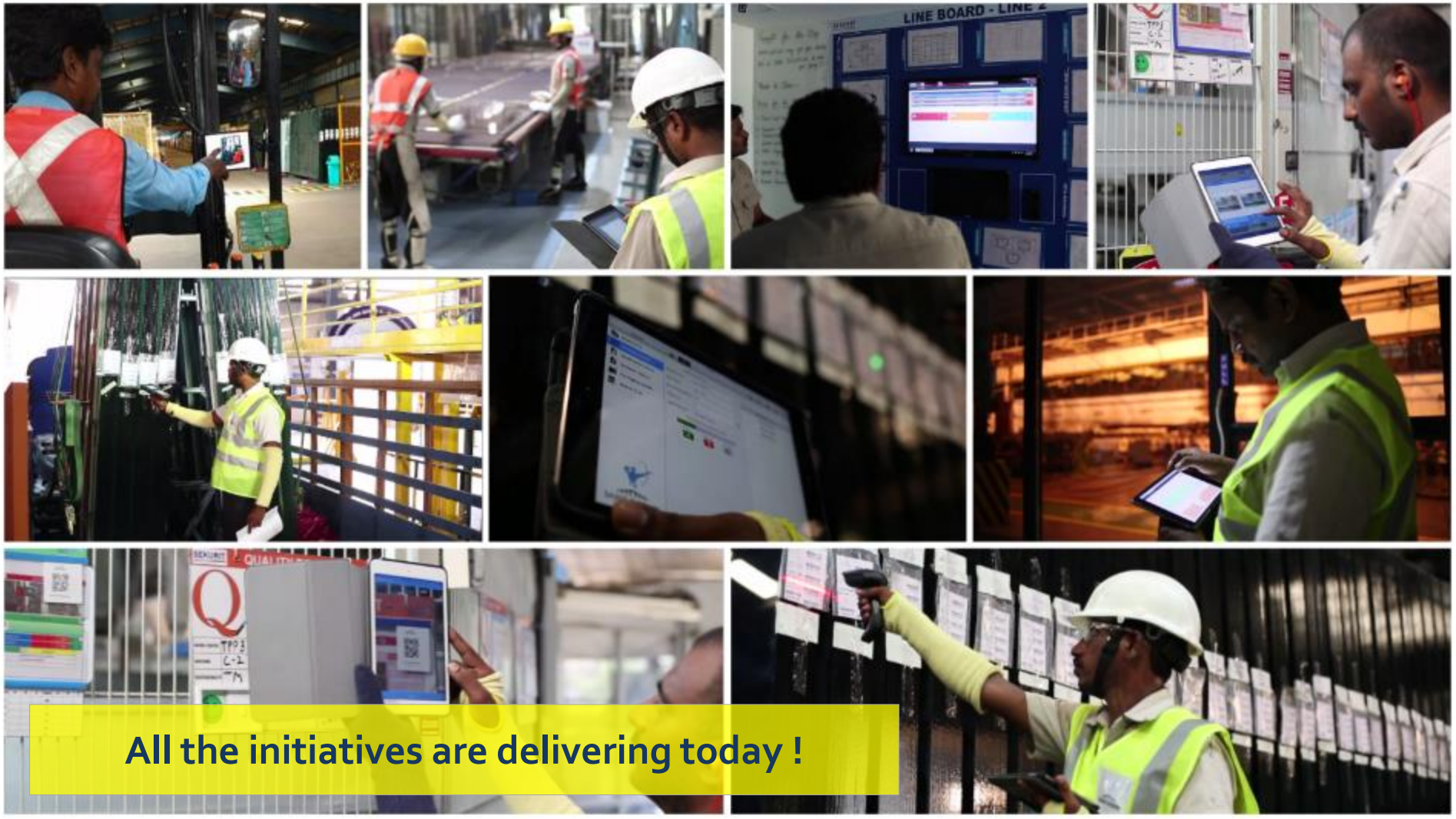
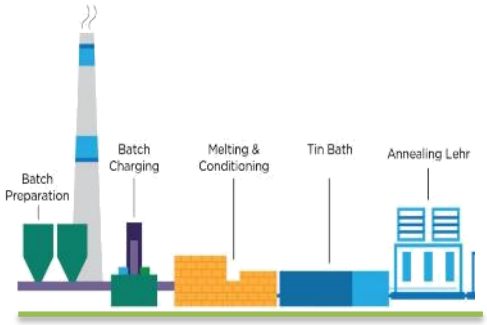
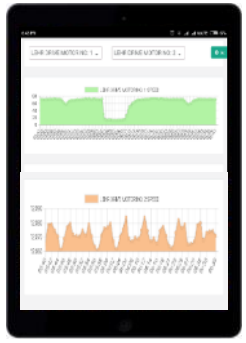


All the initiatives are delivering today !

Remote Monitoring for Float Lines / SMQF





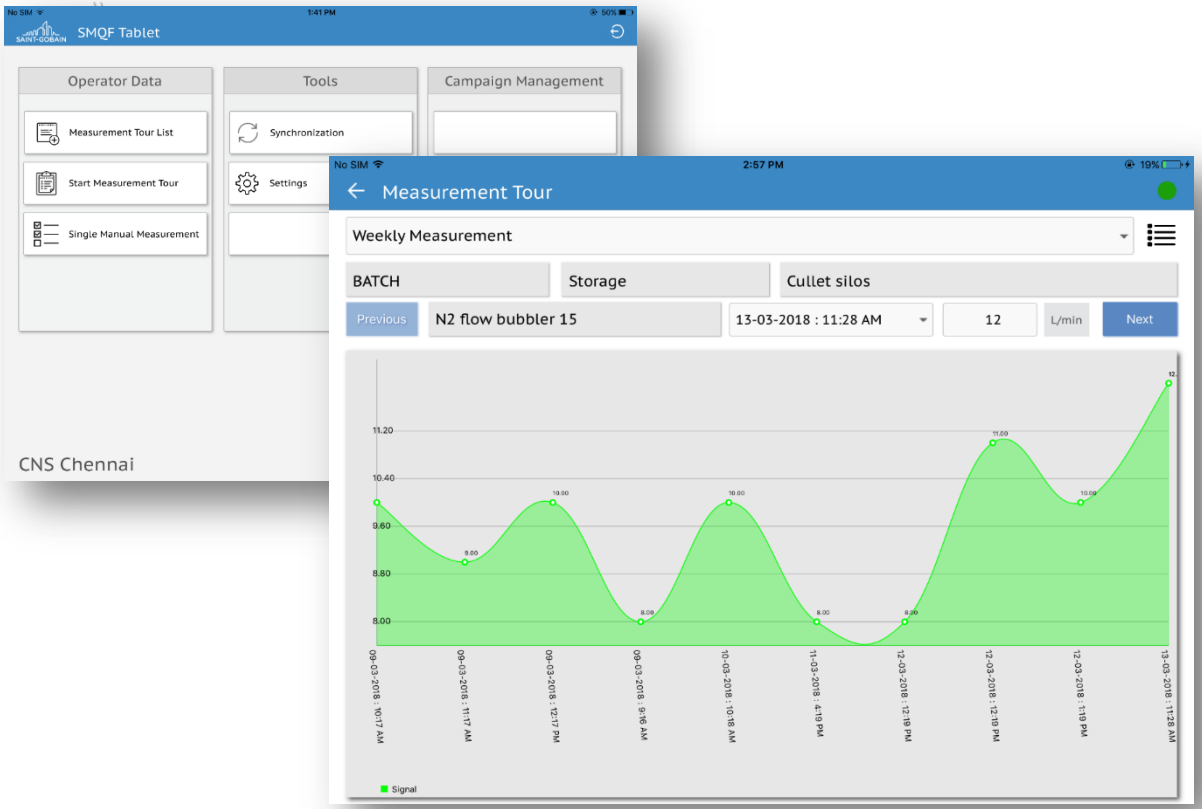
Key Points

- ~1100 sensors connected across a typical Float Line
- Sensor values recorded in DCS in Real-Time
- Data transferred from DCS to SMQF (Process Historian) via OPC
- Critical parameter values moved from historian to DMZ and published to users via a responsive Web Application
- Preset SMS Alerts sent by Web Application to mapped users

Maturity Metrics

Launched	May-17
Users	26
Sessions	23 / Day
Indicator(s)	14329 Alerts

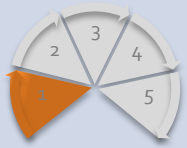
<Operator Data> Entry for Float Lines / SMQF Tablet



Key Points

- ~ 300 Parameters are to be entered manually by Operators
- Parameters are Grouped under various <<Tours>>
- Typically the Values are noted down and then entered in SMQF @ Control Rooms
- Present Data entry System has many improvement opportunities in terms of Validations / Warnings etc.,
- The new Tablet Application will enable data Capture in the Field

Maturity Metrics



Launched	Feb-17
Users	NA
Sessions	NA
Indicator(s)	NA

eTagging for Shop-Floor Anomalies – Safety / Quality / Equipment

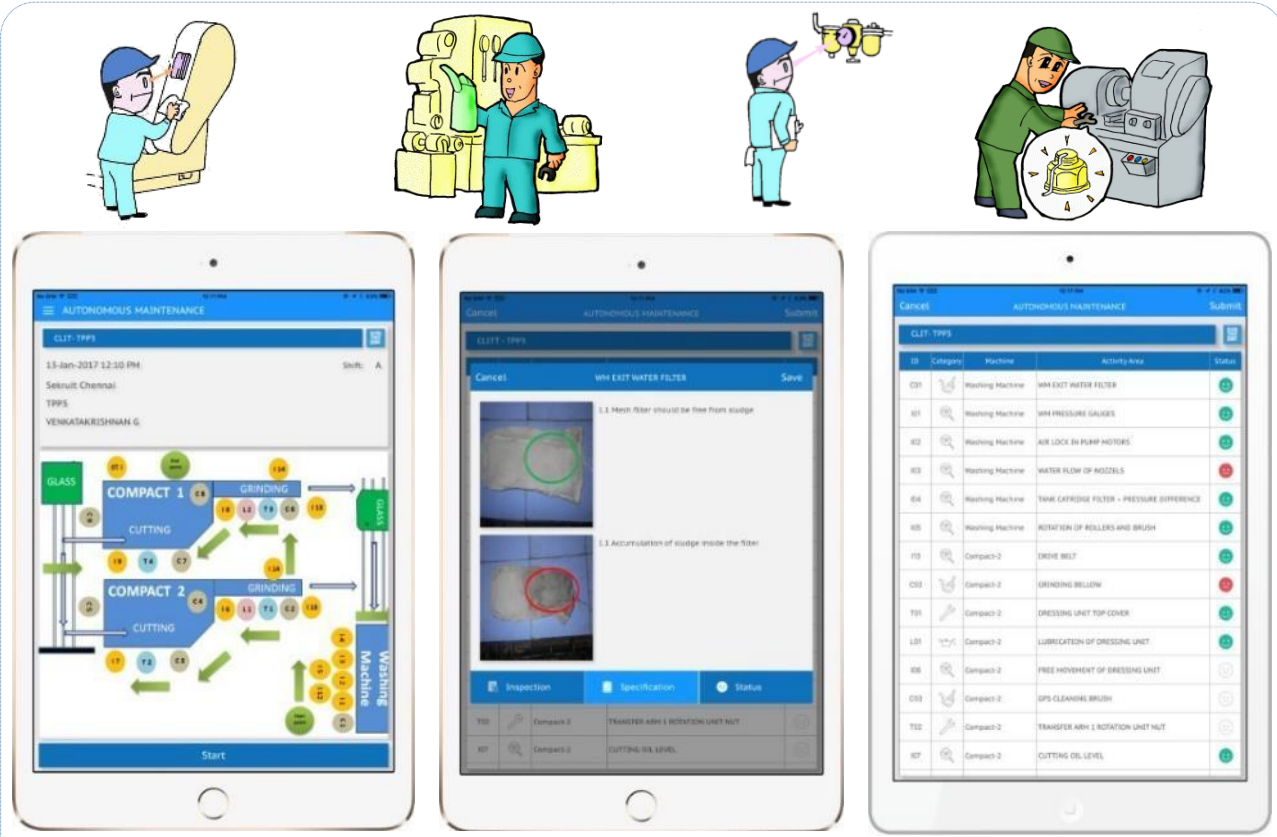
Key Points

- E-Tags are created through Authorized Smart Phones
- Anomalies (Vibrations / Leaks) are recorded, along with Photographs
- Notifications sent to Shift Leader / TM - Maintenance
- Tag Resolutions are captured for Analysis
- Integrated with Impetus, EHS System.

Maturity Metrics

Launched	Feb-17
Users	491
Sessions	NA
Indicator(s)	23 Tags / Day

Autonomous Maintenance Check App – Improves Quality and Reliability



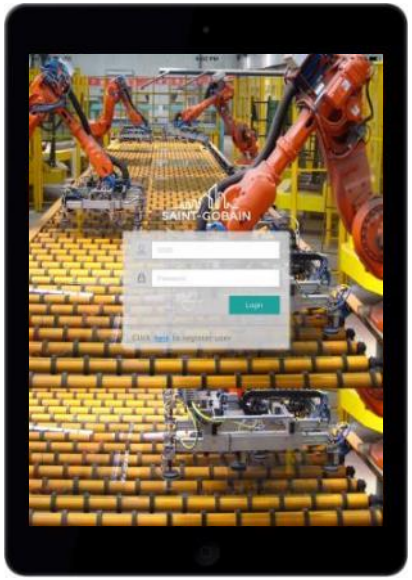
Key Points

- Visual Layout of the Work Center - Walk-through Path and CLIT Points
- Operator Scans encrypted Labels at the CLIT points
- Visual Aids and Standard Operating Procedures for Operator Assistance
- Operator completes Checklist; Anomalies sent to Shift Leader for Resolution
- CLIT maintenance activity schedule is displayed in the machine board/Line board

Maturity Metrics

Launched	Apr-17
Users	213
Sessions	NA
Indicator(s)	19 Audits / Day

Safety & Quality Point Audit in each Shift – improves Quality and Reliability



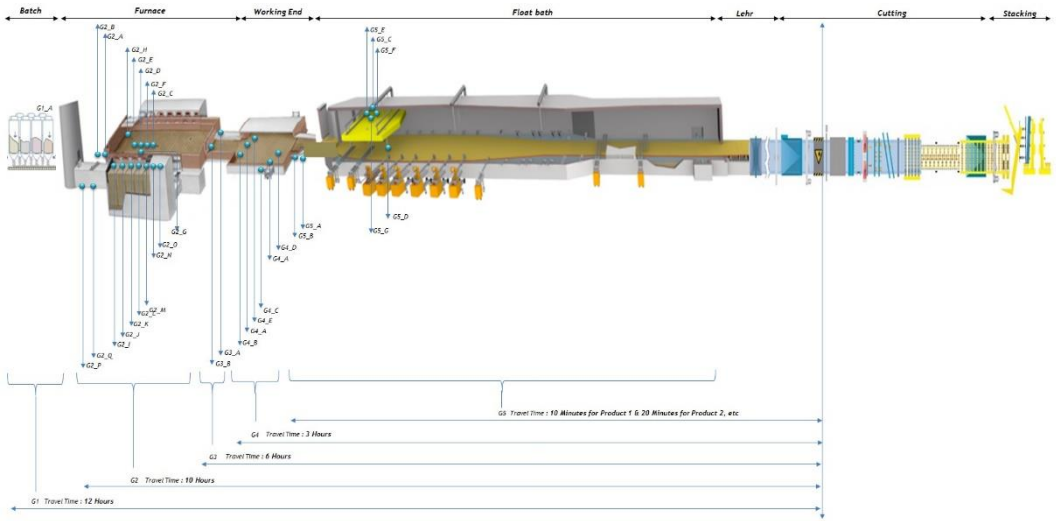
Key Points

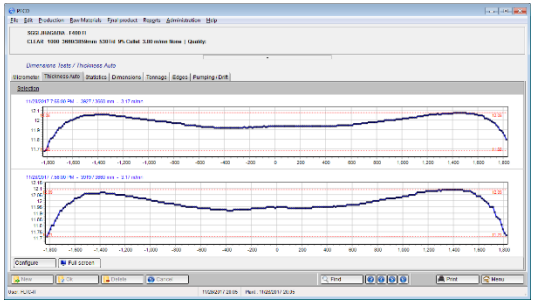
- Operator Scans the encrypted QR code label fixed at his Work Center
- Safety Information, PPE requirement and Audit Checklist are shown
- Operator goes through the Check List and confirms Equipment Status
- Anomaly Observations are sent to Shift Leader for Resolution
- Online Status of S-Point/Q-Point Check is displayed in ThinKiosk WCM Dashboard

Maturity Metrics

Launched	Apr-17
Users	144
Sessions	NA
Indicator(s)	21 Audits / Day

Data Analytics to improve Product Quality – Thickness Profile





212 Process Variables with 600,000 Measurement Records / Day

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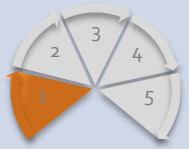
INDIAN INSTITUTE OF TECHNOLOGY MADRAS

Glass + SGRI + IIT Madras

Key Points

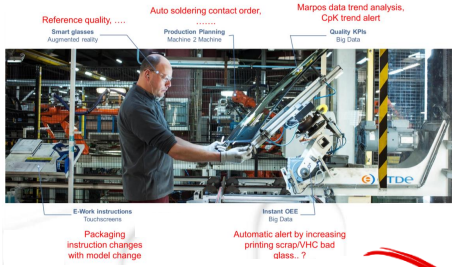
- Consistent Thickness Profile in Thick Glass Ribbon is a critical requirement
- Correlating Process Parameters to actual profile achieved and identify the ones that has direct correlation and impact
- Objective is to achieve optimal and consistent profile by controlling the identified process parameters

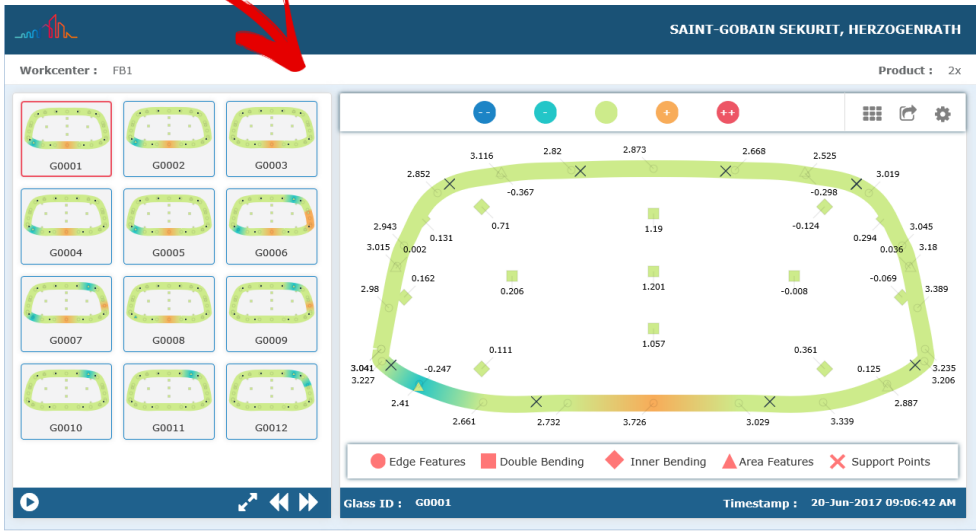
Maturity Metrics



Launched	NA
Users	NA
Sessions	NA
Indicator(s)	NA

On-line Quality Measurement & Data Visualization – enables Quick Reaction





HTTP

Key Points

- Streaming data from on-line Marposs Measurement System is captured and presented
- Visual representation of defects with multiple options to set limits and filters
- Allow operators to quickly recognize defect patterns and make process adjustments

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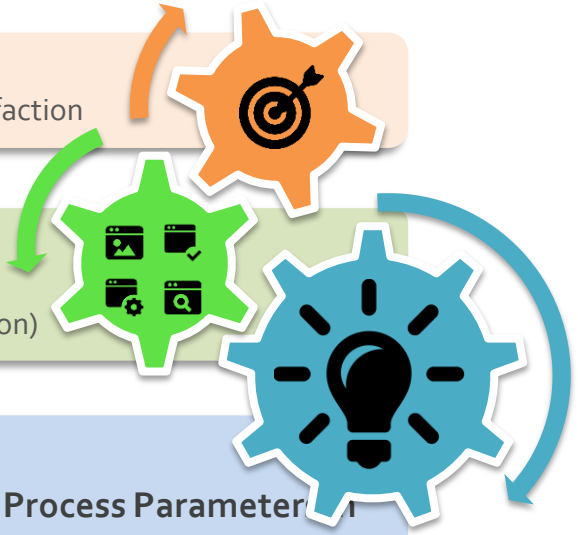
Quality & Process Control – Opportunities for the Future

Objective

- Zero-defect system through Process Control,
  Minimum Quality Cost / improved Customer Satisfaction



Current Initiatives

- Real-Time Process Parameters Monitoring / Alerts
- Real-Time Product Quality Data Visualization
- Open SCADA for legacy Lines & Equipment (Ignition)

Next Big Opportunities

- **Remote Monitoring capability for Critical Process Parameter[illegible] automated lines : coverage of all BUs by mid 2019**
- **Smart Measuring Devices + SPC + Self-Adjusting Process : 1 demonstrator project by mid 2019**
- **Mobile Application for Process / Inspection Check Sheets**
- **Enabling all BUs to work with open SCADA by mid 2019**

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Digital is the Key **Enabler** for Quality & Reliability

Smart Automation

Smart Data

Empowered Employee

IT:MES,WMS,TMS ,Infra and Cyber Security

People

Customer


FUTURENOW 2.0