Volvo Construction Equipment

Towards an Integrated Manufacturing Solution
Volvo Group Organization

Group Trucks

Group Trucks Sales

Group Trucks Operations

Group Trucks Technology

Business Areas

Construction Equipment

Buses

Volvo Penta

Governmental Sales

Volvo Financial Services

Volvo Construction Equipment – SDU PRD Solution Architect Group
- Develops, manufactures and markets equipment for construction and related industries under three brands: Volvo, SDLG and Terex Trucks
- Broad range of products and services
- Range of solutions in financing and used equipment
- Part of the Volvo Group
Volvo CE – Core Products

Product Mix based on volume, configuration and engineering complexity.
Volvo CE - Manufacturing Execution System scope

**Material Supply**
- Kitting
- Line Feeding
- Material shortage notification
- Kanban /Replenishment
- Pick to light

**Operational Execution**
- Production order reporting
- Defect Handling
- Work Instruction
- Label printing

**Operational Support**
- Plant Maintenance
- Quality / Inspection
- Truck Management
- Tools management

**Operational Preparation**
- Assembly Line Control
- Order Sequencing
- Shop Floor Print

**Operational Dashboard**
- ANDON Boards
- WIP monitoring
- Line status
- Kitting Monitoring
- Digital Info Display
Volvo CE MES Vision - Integrated Manufacturing Solution

- **Smart Plant Operations**
  - **Real Time**
    - Alarm from machining center, Deviation from work center
  - **Connected**
    - Both way communication from production equipment to ERP
  - **Synchronous**
    - Actual shop floor status in ERP
  - **Visual**
    - Andon board, Material supply board, Quality board, Maintenance board
  - **Paperless**
    - E-Card, Andon, RFID
  - **Historical process analysis**
    - Torque values per machine, Machining center operating condition
  - **Common source data for all dashboard**
  - No paper work for production status and execution
  - Automated collection of manufacturing process / equipment data with retention
  - Pick to Light, RFID, Energy consumption monitoring
  - Productivity, Quality, Energy Consumption, work safety
  - Common Platform for future plant vision
## IT Solution – Why we choose MII

<table>
<thead>
<tr>
<th>Criteria</th>
<th>SAP MII</th>
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<tbody>
<tr>
<td>ERP Integration</td>
<td>Low integration complexity (BAPI/RFC calls, no broker)</td>
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<td>Application Redundancy</td>
<td>No duplication of ERP data in MII</td>
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<tr>
<td>Machine Integration</td>
<td>Plant Connectivity with MII</td>
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<td>Process historian</td>
<td>Process historian with event data</td>
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<tr>
<td>Plant Dashboard</td>
<td>Real Time Features; Andon Integration</td>
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<tr>
<td>User Experience</td>
<td>Compatible to all browser and mobile devices</td>
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<td>Upgrade</td>
<td>Experienced low downtime for upgrade</td>
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<td>Future Vision</td>
<td>Clear Strategy from SAP on MII</td>
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CE-MII - Architecture

SAP ERP

- PP
- MM
- QM
- WM
- PM

RFC / BAPI

Monitoring UI
Maintenance UI
Execution UI
MII @ HANA

Process Historian

Notification

WAN

PCo + OPC (Plant A)
PCo + OPC (Plant B)
PCo + OPC (Plant N)

Andon
Barcode scanner
Torque Device
Paint System
Welding Robot
Machining Center
P2L
CE-MII – A new approach adopted…

Project Management → Scrum Methodology

Use cases → All core plants

Common UI → User experience study in Plants

Partnership → Close collaboration with SAP MII department of SAP Labs

Commitment → Strong support from HQ and complete acceptance from regional management

- Requirement gathering (Q4-2013)
- Proof of Concept (Q1-2014)
- Road Show demo (Q2-2014)
- CE-MII Program Setup (Q3-2014)
- Pilot development (Q4-2014)
CE-MII – The Global MES

- Automation in order reporting at work station
- Improved order preparation due to visible order queuing
- Real time data for production monitoring and execution
- Quick component serial number recording
- Andon Integration
- Internal Line feeding in line with Assembly sequence
- Part Painting monitoring
- Improved Defect Handling and Inspection recording
- Online Work Instructions and Product drawings
2015: A year of speed

- Roll out to major Plants
- Process & Sub-Process wise roll-out
- Build the strong base of MES, validate the core development and improve the usability
- Easy and smooth Go-Live
CE-MII – the tangible change

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CE-MII – 2016-17... exciting days ahead

- Major Roll out in the core Plants – Changwon (Korea) & Braas (Sweden)
- Quick Roll out in smaller Plants – Bellay (France) & Hameln (Germany)
- Scanner Integration
- Internal supply and Kitting process in MII
- Tact Pulse based Order Reporting
- Conveyor Integration with MII
- Process Historian
- MII based Real Time Global Dashboard
Summary...

- High Solution Stability
- Connected ERP
- Increased MES Usability
- Proactive involvement from Shop Floor Team
- Ripple effect on Supply Chain Optimization