



SAP
Innovation
Awards 2019



SAP Innovation Awards 2019 Entry Pitch Deck

Real time OEE (Overall Equipment Effectiveness) visualization
with SAP Leonardo



THE BEST RUN



Intro Video



<https://www.youtube.com/watch?v=yms15GZ0Okk>



SAP Leonardo IoT Pilot Implementation

Hanon Systems



“Quote”

“Increased overall productivity and efficiency. It has helped us to serve our customer in more effective way.”

*Robert Oh
CIO
Hanon Systems*

Challenge

Manual intensive OEE (Overall Equipment Effectiveness) calculation with offline data was not providing visibility to the issue focusing production losses. Non-standard ways of OEE calculation and absence of prognostic capability to act when the performance was unacceptable is the major challenge at the plant.

Solution

5 machining and assembly units connected to SAP PCo, SAP MII/OEE using OPC-UA server to get the live machining data and production order data from S/4HANA used to calculate OEE and machine downtime. The baseline for SAP Leonardo set by implementing the Leonardo IoT PoC solution

Outcome

Deployment of Digital Solutions to monitor real-time performance of the production line and gain useful insights to enhance productivity

Real-time OEE visualization

Real-time Down-time reasoning

Empowering operator to take real-time decision to tweak production



Partner Information

TATA Consultancy Services System Integrator



Integration of machining and assembly centers with SAP MII / SAP OEE to enable SAP AG to configure SAP DMI and SAP Leonardo was successfully done by TCS.

TCS provided the system integration support, defining plant hierarchy, configuring downtime reason codes to provide real-time visibility of production performance and useful actionable insights.



Project / Use Case Details

Key Challenges

- Manual intensive, offline OEE solution is not scalable
- Performance management solution not integrated with Manufacturing Execution to enable input from Operator and Machines in a standard way
- Non-standard OEE configuration and manual calculation of OEE Time models (loading time, net production time, net operating time, value operating time etc.)
- Absence of prognostic capability as to when the performance is becoming unacceptable and its diagnostic

Steps Completed

- Integration of machining centers and assembly lines via OPC server to SAP PCo
- Connection between SAP PCo, SAP MII, SAP OEE
- Integration with S/4HANA
- Integration of Order creation system with SAP MII
- Configuration of SAP PCo, MII and OEE
- Creation of standard Dashboards in SAP MII/OEE
- Integration of MII with SAP DMI
- Creation of Dashboards with additional functionalities in SAP DMI

Results

- Configurable OEE Time model and reason codes to support Hanon specific Time models
- Integrated OEE POD on SAP ME to collect OEE losses and key reasons
- Quick options for operator to trigger maintenance notifications & machine status change
- Visibility of Line performance summary and preview of upcoming Planned Maintenance
- Central cloud analytics for standard OEE insights and root cause analysis
- Ability to compare similar processes / lines to bench mark and drive continuous improvements

Leveraging standard functionalities of DMI, existing source data and machine protocols available at the plant to drive productivity



Benefits and Outcomes

Business / Social

- Real-time insights on the production performance achieved
- Downtime of the machines analyzed quickly and actions taken up to address the issue
- Elimination of errors and delays by using real time machine data

IT

- Machines connected to plant network to provide real time machine and performance data
- Production order data from ERP integrated with OEE solution to get the production status and monitor gaps

Human Empowerment

- Operator and line manager empowered to take decision on the fly to manage production targets
- Reward models for operators based on performance



Deployment

Date of Deployment or POC: 27th April 2018

Number of live users: 15

SAP Technologies Used:

| | |
|--|---|
| SAP S/4HANA | ✓ |
| SAP MII (Manufacturing Integration and Intelligence) | ✓ |
| SAP OEE (Overall Equipment Effectiveness) | ✓ |
| SAP PCo (Plant Connectivity) | ✓ |
| SAP DMI (Digital Manufacturing Insights) | ✓ |
| SAP Leonardo | ✓ |

Server Processor: SAP Hana Enterprise Cloud

Linux Distribution: Not applicable



Emerging Technologies and Use Cases

The following Emerging Technologies and use-cases are part of the project and describe the contribution

| | Technology or Use Case | Yes/No | Contribution to Project |
|----|--|--------|---|
| 1. | Machine Learning / Artificial Intelligence | No | |
| 2. | IoT | Yes | Live data from machining centres collected from the PLC. |
| 3. | 3D printing | No | |
| 4. | Blockchain | No | |
| 5. | API Economy / Integrate the Intelligent Enterprise | No | |
| 6. | Cloud Native / Event Based Architectures | No | |
| 7. | Extending the digital core with SAP CP / ABAP in SAP CP | No | |
| 8. | SAP Leonardo Application (extending SAP application, using Industry Innovation Kits or result of Design Thinking workshop) | Yes | SAP MII/SAP OEE data is directly used by SAP Leonardo to provide the production insights. The overall solution was developed in design thinking workshop conducted by SAP |