SAFE AND EFFICIENT POWER PLANT

ARNO MAKKONEN
NORDIC LEAD, IOT
TAMPERE 25.5.2017
DIGITAL POWER PLANT CHANGES THE WAY HOW YOU RUN YOUR BUSINESS

**DIGITAL ASSETS**
Managing the asset data efficiently and changing the way how assets are maintained

**DIGITAL WORKERS**
Keeping the worker Safe and helping him perform

**DIGITAL OPERATIONS**
Ensuring agile operations at the plant, taking into account what is happening inside and outside the company
DIGITAL ASSETS
NEW REVENUE STREAMS
New hyper-personalized and context specific user experiences are created through the connection of “Smart Products” with platform-based services utilizing the power of broad ecosystems. This change will be fast, disruptive and redefine the rules of competitiveness.

NEW PRODUCTIVITY
Connected “Smart Products” in smart spaces allow the exploitation of the potential for efficiency and flexibility in engineering & manufacturing. This change can be disruptive through the use of new technologies. Investment upgrades in “legacy” typically slows down progress.
CONNECT YOUR ASSETS

FOCUS ON THE EVOLUTION OF OPTIMUM ASSET AND OPERATIONAL PERFORMANCE

Deploying predictive analytics alone can reduce

MAINTENANCE COSTS 30%

BREAKDOWNS 70%

CONNECTED ASSET JOURNEY

1. BREAKDOWN
   Breakdown maintenance, reactive mindset

2. PLANNED
   Breakdown maintenance includes prioritization in maintenance planning

3. PREVENTIVE
   Preventative maintenance to avoid breakdowns, includes prioritization to plan maintenance activities

4. CONDITION
   Condition monitoring and preventive maintenance to increase equipment reliability

5. PREDICTIVE & PRESCRIPTIVE
   Focus on reliability & continuous equipment improvements using monitoring techniques & bad actor reports

6. COLLABORATIVE
   Focus on integration and collaboration

6. AUTONOMOUS
   Enable systems to interact and make decisions autonomously

CAPABILITY MATURITY

Woodside - Predictive analytics applied for improving the reliability of critical equipment’s
DIGITAL WILL DISRUPT THE MAINTENANCE MANAGEMENT PROCESS

THE FUTURE OF ASSET MAINTENANCE

Intelligent Asset Management

- Predictive Asset Analytics
- Integrated risk and health Models
- Machine Learning and Artificial Intelligence
- Integrated Asset Information Management
- Digital Plant Refreshment Service and 3D models

Digital Maintenance Execution

- The Digital Field Worker
- Industrial Mobility
- Digital Tracking
- Robotics
- 3D Printing

Copyright © 2017 Accenture All rights reserved.
DIGITAL WORKERS
DIGITAL FIELD WORK IN THE NEW
THREE INEVITABLE FORCES ARE TRANSFORMING FIELD SERVICES OPERATIONS

SMART PRODUCTS
The combination of “Smart Products, Services and New Experiences” creates disruptive business models.
During installation and maintenance, the products can share their usage & maintenance history and “aspirations”.

TECHNOLOGY FOR PEOPLE
Technology is still the answer but to a new question.
Today technology adapts to our needs. We augment and enhance our human skills to see more, hear more and understand more, which helps workers better achieve their goals with transparency and accuracy.

ARTIFICIAL INTELLIGENCE
AI is taking on more sophisticated roles within the technology interfaces
85% of executives say they will be investing extensively in AI-related technologies over the next three years.
Average resolution and fix time of infrastructure issues by Virtual Engineers cut up to 93%

VALUE DRIVERS
- Handling time: 17% ↓
- Simpler work processes: 30% ↓
- First time right: 100% ↓
- Employee & customer satisfaction: 5-10% ↓
- Reduction in onboarding time: 50% ↑
- Cost of safety and insurance: 5-20% ↑
SMART OPERATING PROCEDURES ENABLE THE DIGITAL FIELD WORKER

STATIC PROCEDURES | PLATFORM TO CONVERT CURRENT PROCEDURE TO SMART OPERATING PROCEDURES | SMART PROCEDURES
---|---|---
Standard Operating Procedures |
Legacy Systems |
PDF Docs |
Paper Based |
Digital Content Delivery Platform |
Ingest |
Publish |
View |
Smart Operating Procedures |
Smart Glass/Watches |
Tablets / Ipad |
Laptops/Desksops
EMPLOYEE TRACKING FOR SAFETY

• Allows to know the **location of personnel operating at the plant** that wear an RFID-fitted device.

• Location is known through **triangulation using the wifi network mesh** already in place.

• An dispatch operator at a **Control Room then monitors the location** of the personal detectors and other manually and automatically triggered events:

  - Location of RFID fitted devices
  - Notification of manually and automatically triggered events

---

Copyright © 2017 Accenture All rights reserved.
EMPLOYEE TRACKING FOR SAFETY

ACCESS POINTS (APS)
Placed at 30-80 meters from each other

RFID-FITTED PERSONAL DEVICES TO BE DISTRIBUTED
Personal Gas Detectors
Personal and Asset badges

All functionalities including detection of $O_2$, CO, $NO_2$ and $CH_5$ gases
Only location and panic-button functionalities.
DIGITAL OPERATIONS
TRANSFORMING “VIDEO SURVEILLANCE” TO “OPERATION EFFICIENCY AND SAFETY”

From Video Surveillance…
Operators monitoring 20+ screens
Showing feeds from 100+ cameras
Trying to stay alert! 98% of CCTV feeds unseen

To Operations Safety and Efficiency
Safety, Security, Operations insights
INTUITIVE DASHBOARD IS KEY IN MAKING VIDEO ANALYTICS ACTIONABLE

Operator missing from his designated place

Detect intrusion in restricted/forbidden zones

Person too close to machine!
KEY USE CASES ENABLED VIA VIDEO ANALYTICS

- Unmanned Critical Zone
- Unauthorized Intrusion detection
- Dangerous Proximity Detection
- Pathway Obstruction Detection
- Oil/Water Spillage Detection
- Personal Protective Equipment Compliance
- Safety alerts
- Anomaly/Incident detection
- License plate recognition
- Footfall tracking
- People recognition
- Post-event analysis
- Object recognition
- Suspicious behaviour
- Traffic monitoring/Crowd monitoring
**Forecasting**

Forecast is extending in the future the behaviour of a time series with the consumption from the past.

- Price forecasting
- Volume forecasting
- Quantity forecasting
- ...

**Predicting**

Predictive is estimating the probability that something will happened in the future taking into consideration the past.

- Price prediction
- Market prediction
- Clients behaviour
- ...

**Optimizing**

Optimization is the selection of a best element with regard to some criterion from some set of available alternatives.

- Plan optimization
- Flow optimization
- Price optimization
- ...

Copyright © 2017 Accenture  All rights reserved.
INDUSTRIALIZED ANALYTICS BUSINESS PROCESS WORKFLOW

Input: weather data, actual consumption, prices...

Data preparation: outliers, driver data calculation

Forecast on each point (elaborate and control)

Dashboard with forecasts and drivers (e.g.: Temperatures)

Final Forecast Export

Input: actual validated consumption

Estimation on each point

KPIs MAPE, MAE, ME, SP

Tuning of models or creation / import of new ones

Backtesting to test the performances of alternative models

Performance analysis and reports on monthly KPIs by zone/model etc.

Decision Point

Advanced Analytical Models
A mixed-integer linear algorithm...

...converted into a script...

...becomes an accessible app!
CONTACT

ARDO MAKKONEN
Nordic Lead, IoT and Mobility
Accenture Digital
arto.o.makkonen@accenture.com