How Shift Teams at BASF use AVEVA™ PI System™ Data to Collaborate and Boost Asset Utilization

Michael Eckardt
Andreas Eschbach
BASF – We create chemistry

- Our chemistry is used in almost all industries
- We combine economic success, social responsibility and environmental protection
- Sales 2022: €87.3 billion
- EBIT before special items 2022: €6.9 billion
- Employees (as of Dec. 31st, 2022): 111,481
- 6 Verbund sites and 239 other production sites
- Around 82,000 customers from various sectors in almost every country in the world
BASF production and Verbund sites

- Production sites
- Verbund sites / planned Verbund site
BASF’s segments

**Chemicals**
- Petrochemicals
- Intermediates

**Materials**
- Performance Materials
- Monomers

**Industrial Solutions**
- Dispersions & Pigments
- Performance Chemicals

**Surface Technologies**
- Catalysts
- Coatings

**Nutrition & Care**
- Nutrition & Health
- Care Chemicals

**Agricultural Solutions**
The biggest job on earth is getting bigger

+2 billion increase of world population by 2050

50% higher productivity in farming required in 2030

Limitations on arable land

---

1 World Bank hectares per person 1994-2016: -23%
2 FAO
BASF Agricultural Solutions

**Seeds & traits**
- Field crop seeds
- Vegetable seeds

**Crop protection**
- Herbicides
- Fungicides
- Insecticides

**Solutions beyond crop protection**
- Seed solutions
- Soil management
- Biologicals
- Pest control solutions
- Public health

**Digital farming**
- Digital farming solutions
- Sales and marketing excellence
Our business and process challenge

- Link AVEVA™ PI System data and contextualize it
- Provide a managed asset performance process
- Full VI: from sensor data to the global AE database
A real-life example on optimization

• We observed:
  ➢ Process upsets
  ➢ Reliability issues
  ➢ Shift dependent rates

• Why was it so hard to get a smooth output?

• Who has all the relevant information?
A typical situation in a 24/7 plant

8:00 am: Gosh! What happened at night?

Production Manager 8 am – 5 pm

Shift A (Night) 5:15 pm – 5:15 am
Shift B (Day) 5:15 am – 5:15 pm
Shift C (Night) 5:15 pm – 5:15 am
Shift D (Day) ...

Asset Utilization

© 2023 AVEVA Group plc and its subsidiaries. All rights reserved.
Information flow isn’t a piece of cake
Getting the whole process picture
Pain points of our optimization approach

- Managed by one person or a small team
- Sustainability issues due to short term maximization
- Difficult getting a clear picture w/o functional locations
Solution: asset utilization as a team sport

- We got an increased:
  - Process stability
  - Employee alignment

- Finally, we have:
  - Common understanding
  - Shift independent rates
  - Interface to AE database
Bridging the skill gap – Circle of knowledge

Mitigating the shortage of qualified workforce

• Know-how across different generations
• Conservating implicit knowledge
• AI-assisted knowledge-sharing
AVEVA PI System, Shiftconnector and GAP

AVEVA PI Server
- Asset framework
- PI Web API

AVEVA PI Vision application

AVEVA PI Server data archive

Shiftconnector Backend
- BasF AE Database
- SHIFTCONNECTOR®
  - Web App (.NET + MS SQL)

Shiftconnector User Frontend
- OEE / AE
- Plant Status
- Shift Handover
- Morning Meetings
- Round trips / Inspection
- SPOT principle

© 2023 AVEVA Group plc and its subsidiaries. All rights reserved.
How Shift Teams at BASF use data from AVEVA PI System to Collaborate and Boost Asset Utilization – BASF Project Demo
Welcome to AVEVA World 2023
How Shift Teams at BASF use PI Data to Collaborate and Boost Asset Utilization.
Empowering Chemical Manufacturing Teams with the PI System and Human Intelligence.

New Production Record in September
Our team achieved a new production record
With this, we can all look forward to a successful year 2023.

Shiftconnector Training Sessions
Training sessions will continue in October for our new hires
Please book a suitable time in our global training portal
Any questions? Please touch base with our on-site training team.

Vacation and Events Planner available
New Planner for 2024 out now
The new vacation and events planner for each team is available.

XLST   Vacation and Events Plan_2024.xlsx
How Shift Teams at BASF use PI Data to Collaborate and Boost Asset Utilization
Empowering Chemical Manufacturing Teams with the PI System and Human Intelligence.

New Production Record in September
Our team achieved a new production record
With this, we can all look forward to a successful year 2023.

Shiftconnector Training Sessions
Training sessions will continue in October for our new hires
Please book a suitable time in our global training portal
Any questions? Please touch base with our on-site training team.

Vacation and Events Planner available
New Planner for 2024 out now
The new vacation and events planner for each team is available.

XLSX Vacation and Events Plan_2024.xlsx
How Shift Teams at BASF use PI Data to Collaborate and Boost Asset Utilization

**Precursor Synthesis**
- **Start/End or Open:** Tue, 10-17-2023 17:23
- **Category:** Precursor Synthesis
- **Functional Location:** BE10 - KAT-Aufgabe
- **Description:** Catalyst from last delivery has hard-to-read labels.
- **Created/Modified:** Jane Doe

**Saponification**
- **Start/End or Open:** Tue, 10-17-2023 18:28
- **Category:** SAP PM Notification M18
- **Functional Location:** C512 - Reaktor Verseller
- **Description:** Lighting in area of vessel C512 insufficient.
- **Created/Modified:** Jane Doe

- **Start/End or Open:** Tue, 10-17-2023 18:25
- **Category:** Saponification
- **Functional Location:** C512 - Reaktor Verseller
- **Description:** Lighting in area of vessel C512 insufficient.
- **Created/Modified:** Jane Doe

- **Start/End or Open:** Tue, 10-17-2023 15:21
- **Category:** Saponification
- **Functional Location:** C564 - Reaktor Verseller
- **Description:** Reaction was passed due to maintenance work in this area.
- **Created/Modified:** John Doe

**Purification**
- **Start/End or Open:** Tue, 10-17-2023 21:18
- **Category:** Purification
- **Functional Location:** P441A - Pumpe von B441
- **Description:** Flow rate dropped to 6 kg/h. Action: Solution: Check in the field, motor not moving, pump stuck.
- **Created/Modified:** Jane Doe / Michael Eckardt

- **Start/End or Open:** Tue, 10-17-2023 14:20
- **Category:** Purification
- **Functional Location:** R470 - Rührwerksbemüher Winter/H2O
- **Description:** Batch 20230117. Al concentration out of specification @ D&C. => Lab analysis running...
- **Created/Modified:** Richard Miller
Standardized deployment templates

**Batch process deployment template**
- Batch cycle time tracking
- Line clearance and changeover
- Based on ISA-88 PI System event frames

**Discrete production deployment template**
- Accounting for number of pieces
- Micro stops accounting
- Based on totalizer in PI Server's AF

**Continuous process deployment template**
- Timeboxing (drumbeat)
- Flow rate vs. target
- Based on totalizer in PI Server's AF
Scaling and standardizing with PI Server's asset framework structures
Standardization with AVEVA PI System's event frames

1. Get event, e.g. unit procedure
2. Get procedural element type
3. Visualize in

© 2023 AVEVA Group plc and its subsidiaries. All rights reserved.
How Shift Teams at BASF use data from AVEVA PI System to Collaborate and Boost Asset Utilization – Multi Unit and Batch Plants
BASF increases the time at the desired production rate from 30% to > 85%

**Challenge**
- Shift dependent driving styles, process upsets and short-term maximization of the output led to less reliability and limited the time at the desired production rate
- Loss accounting into the global database was difficult due to a lack of information
- Most employees were not involved in asset effectiveness efforts

**Solution**
- Implementation of Shiftconnector™ as middleware with interfaces to AVEVA™ PI System™ for reliable process data and BASF’s global AE reporting database

**Results**
- Increase of the time at the desired production rate from approx. 30% to >85%
- Synchronized process flow across all teams: engaged employees, reduced friction, reduced upsets and sustainable output at $M_{\text{max}}$
- Hands-on data for decision-making
Michael Eckardt, PhD

Project Lead Technical Process Optimization

- BASF Agricultural Solutions
- michael.eckardt@basf.com

Andreas Eschbach

Founder & CEO

- eschbach
- andreas.eschbach@eschbach.com

Visit us at the eschbach booth #21
Questions?
Please wait for the microphone.
State your name and company.

Please remember to...
Navigate to this session in the mobile app to complete the survey.

Thank you!
Our path is digital.
This presentation may include predictions, estimates, intentions, beliefs and other statements that are or may be construed as being forward-looking. While these forward-looking statements represent our current judgment on what the future holds, they are subject to risks and uncertainties that could result in actual outcomes differing materially from those projected in these statements. No statement contained herein constitutes a commitment by AVEVA to perform any particular action or to deliver any particular product or product features. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect our opinions only as of the date of this presentation.

The Company shall not be obliged to disclose any revision to these forward-looking statements to reflect events or circumstances occurring after the date on which they are made or to reflect the occurrence of future events.
ABOUT AVEVA

AVEVA is a world leader in industrial software, providing engineering and operational solutions across multiple industries, including oil and gas, chemical, pharmaceutical, power and utilities, marine, renewables, and food and beverage. Our agnostic and open architecture helps organizations design, build, operate, maintain and optimize the complete lifecycle of complex industrial assets, from production plants and offshore platforms to manufactured consumer goods.

Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life’s essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world’s most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. The company is headquartered in Cambridge, UK.

Learn more at www.aveva.com