How Dredging Benefits from Self-Service Advanced Analytics

Presented by: Kristof De Mey, Manu De Block
Agenda

DEME Group

DEME’s PI System Story

Innovation Hackathon

TrendMiner Case

Conclusion
DEME: Dredging, Environmental & Marine Engineering

- Market Leader
- Global Solution Provider

- + 5000 people
- + 100 vessels
- + 90 Countries
- + 140 years xp
- €2.4 Billion/y
What about the ever growing population in coastal areas?

What about the rising sea level?

What about soil & water pollution?

What about the scarcity of mineral resources?

What about growing CO2 emissions?

Offering solutions for global challenges
Dredging, land reclamation, port construction, maintenance dredging
Development and construction of renewable energy projects
Decontamination of polluted soils and silts
Harvesting marine resources, deep sea mining
Versatile
High-Tech
Modern
Global Marine Construction – A Challenge

What’s underground
Decentral operations
High hour cost - act!
Floating factories
Hackathon Information and Winners

• DEME was data sponsor for the Innovation Hackathon

• 3 Cases:
  • Sensor data quality handling
  • Soil model visualisation
  • Windfarm installation planning

• Congratulations to all participants
  • And the winners are …
The PI System (hi)story @ DEME (1)

• Start = 2010
  • Historian with stack of tools
    *Yes, you can have it all*
  • A project, not a department
    *No steep learning curves*

• ‘Remote viewing’ project

Why?

- Robust
- Complete
- Industry Proven

Decentral operations
Floating factories
The PI System (hi)story @ DEME (2)

• Growing realisation: **data = value**
  • Big Data
  • Feedback
  • OEE - Overall Equipment Effectiveness
  • CBM - Condition Based Maintenance

• 2016: enter **TrendMiner**

**What’s underground**
**High hour cost - act!**
**Floating factories**
**Decentral operations**
Technical stuff for geeks

- 24 large production vessels, worldwide via satellite
- 14000 points every 1 or 2 seconds
- ‘Datapump’ pushing data to an UFL server
- Close to 100 UFL interfaces
- Microsoft Azure Cloud
- 7 servers (Incl. TrendMiner)
Some unexpected behaviour

• The hopper dredger
• Pumping a mixture
• Dynamic process
Some unexpected behaviour

- The hopper dredger
- Pumping a mixture
- Dynamic process
- Oscillations
Questions and hypotheses

• To what extent?
• Why does it begin?
• When does it stop?
• Soil type influence?
• Is it a problem?

Why TrendMiner?

Google of the industry: powerful search
Easy access, promote data usage
Self-Service Analytics philosophy
Questions and hypotheses

- To what extent?
- Why does it begin?
- When does it stop?
- Soil type influence?
- Is it a problem?

Happened in the past

Happened on other ships
Questions and hypotheses

- To what extent?
- Why does it begin?
- When does it stop?
- Soil type influence?
- Is it a problem?

After 20 minutes?

Draught is key!
Questions and hypotheses

• To what extent?
• Why does it begin?
• When does it stop?
• Soil type influence?
• Is it a problem?

Oscillations mainly occur in certain zones

10 GOOD & BAD TRIPS VS SOIL TYPE / AREA

<table>
<thead>
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<th>Area</th>
<th>Good</th>
<th>Bad</th>
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<tr>
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</table>
Questions and hypotheses

- To what extent?
- Why does it begin?
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- Is it a problem?

Yes! But deceptive due to zones and soil types.

Good

Bad
Questions and hypotheses

• To what extent?
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Questions and hypotheses

• To what extent?
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What works in soil type A does not automatically work in soil type B

→ Lessons and insights

Short-term
Long-term
Valuable lessons and Insights from Data

**Conclusion**

**Short term:**
use other setpoints

**Long term:**
Further study provided extra knowledge to better dredge in these soils
Condition Based Maintenance

• Rolling out engine logging
• One asset as CBM pilot
• From Planned Maintenance to Predictive Maintenance
• €400k/year potential savings
The Next piece of PI System

Future considerations from lessons

• Don’t try to make the Integrator for BA
• Pumps & Engines Performance Monitoring
• Deploying a test system
• Company wide data governance project
• ‘Smart Technology Platform’
• Improved logging with OPC
Creating a data culture
The PI System Guy Concludes

Strong legs to stand on

Healthy vital organs

Arms to interact
The PI System Guy Concludes

- **What’s underground**
  - ‘Data Science’ side
  - Legacy logging

- **High hour cost - act!**
  - ‘Self-Service Analytics’ side
  - Improved logging

- **Decentral operations**
  - Floating factories
DREDGING HAS A HIGH FINANCIAL RISK TO IT, AS IT IS HARD TO LIMIT UNCERTAINTY IN PRODUCTION FACTORS.

• Need to act quick with high hourly cost
• Floating factories challenge datalogging
• Decentral operations challenge knowledge sharing

ROBUST DATALOGGING WITH A COMBINATION OF SELF-SERVICE ADVANCED ANALYTICS AND CENTRAL EFFORTS.

• Central PI System in the cloud
• TrendMiner and PI Vision accessible everywhere

INSIGHTS AND KNOWLEDGE BUILD UP FOR A BETTER OPERATION AND LOWER UNCERTAINTY.

• Short term insights to act on
• Long term knowledge gain
• CBM rollout generating first savings, €400k potential for one asset type
Presenters

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Questions?

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