TRENDS IN ASSET MANAGEMENT 2025

Break-out 1 | Onderhoudsmanagement, betrouwbaarheid en Al door een duurzaamheidsbril door Han van Gerwen en Ronald Teijken van IBM

Bilfinger

Next Generation AI, Reliability, Sustainability and Asset Lifecycle Management

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Sund≈Bælt Sund≈Bælt

Storebælt Bridge

Industry Challenges:



Risk of failure: Structures operating beyond their designed life, huge backlog of needed repairs



Maintenance costs rising: Manual inspections, increasing volume of maintenance tasks



Improve sustainability: Extend the expected life time of structures



Compliance with rules and regulations



IBM Maximo / © 2023 IBM Corporation

CONCRETE INSPECTION ON STOREBÆLT LARGESCALE CONSTRUCTIONS

• General inspection of concrete structures on the East Bridge is challenging on the following constructions:



Pylons

Anchor blocks

- Piers
- Steel/Main cable/Catenary
 hanger

WHAT WE DID BEFORE









- Manual inspections
 - From the floor/ground
 - Lifts/platforms
 - Access facilities
 - Rope

- Registrations
 - Paper
 - Digital

- Challenges
 - Traffic
 - High costs
 - The weather
 - Hard to document

STRUCTURAL HEALTH MONITORING



Existing sensors (incl. 2019 expansion)

- A Hanger vibrations (accelerometers)
- B GPS
- c Sensors on tuned mass dampers (TMD)

New monitorering proposal

- J Axle loads (A1)
- K Intelligent cameras on traffic (A2)
- L Inclination of pillars and pylons (A3)

- D Weather stations
- **E** Displacement sensors at bearings
- **F** Sensors on hydraulic buffers
- M Accelerometers (A4)
- Acoustic emission sensors (A5)
- Corrosions sensors (A6)

- G Strain gauges on orthotrope bridge deck
- н Digital image correlation (DIC) sensors monitoring hangers

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- Dehumidification of main cables
- P Light influx sensor, rain sensor (A7)
- **Q** Power consumption (A8)
- Temperature of structural parts (A9)

AI is used to automate drone flight patterns and capture images of the entire bridge. Civil engineers provide continuous feedback to the models, making AI Automation faster and more accurate, bridge after bridge.





Analyze images for anomalies



Promote anomalies

Sund≈Bælt



"We wanted to move into the green field of digitization and go from repair and maintenance to asset management"

> Bjarne Jørgensen Executive Director of Asset Management Sund & Baelt Holding A/S

The Client

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- Sund & Bælt was established in 1991 as a public limited company for the construction of the Great Belt Fixed Link, an 11-mile bridge, tunnel, and railway combination, the largest construction project in Danish history
- The company is headquartered in Copenhagen, Denmark and develops and operates a range of bridges, tunnels and roads

The Challenge

- Running disparate EAM processes across rail, construction, mechanical and electrical operations
- More than 300,000 square meters of concrete needing full inspection every six years
- Wanted to move to digitization and go from repair and maintenance to asset management
- Slow and manual process for conducting regular maintenance inspections an inspection could take a month, and the process had to be repeated frequently for bridges near oceans or in other corrosive environments

The Solution

- Sund & Bælt formed a collaboration with IBM on Maximo for Civil Infrastructure
- Standardized Maximo usage across 3 key operations
- Solution is used to monitor and manage the infrastructure

The Benefits

- ** **
- Better handle on work orders, contractors and purchase orders that led to 2% Y/Y operational expense reduction
- Gained capabilities to streamline inspections and clarify predictive maintenance strategies
- Reduce time and costs while improving quality by automating more of its inspection work
- + Increase in productivity of 15% 25% over 5-10 years
- Reduced the time from when they see an incident to when they can repair it by more than 30%

Sustainability: Turning ambition into action

Supporting companies achieve their sustainability goals by infusing data with AI into daily operations enabled by expertise to deliver profit and purpose.



Sustainability strategy, data and reporting

Sund≈Bælt Sund≈Bælt

Sund & Bælt is responsible for the entire value chain in investing in sustainable, reliable and robust infrastructure of high quality, and it is these elements that together make up the company's core business. In addition, the size of the company's projects means that Sund & Bælt has a special responsibility to help raise the level in the construction industry in a more sustainable direction.



Autostrade per l'Italia Group



Reliability Strategies Makes It Easy

A dedicated RCM/FMEA app with included content library integrated with asset Management. Together, it becomes a gamechanger.





Adds RCM capabilities to MAS

- Enabled by a content library
- Unprecedented in the Industry
- Closes gap identified by Industry Analyst



- 800 + Equipment Types
- 58,000+ Failure Modes
- 50,000+ PM Tasks with
- step-by-step instructions



Example of a Completed RCM Study You Can Use and "Apply"

Pump - Horizontal – Multi Stage - Double Suction - Axially Split Case – Mechanical Seal – Radial Bearing – Oil Lube



20 Failure Modes

124 Failure Mechanisms

- Degraded Lubricant
- Gear Drive Oil Pump Failure
- Misalignment

Operating Context

Select Operating Context:

- Duty Cycle
- Criticality
- Service Conditions

Tailor based on context:

- Utilities / Power generation
- Oil & gas
- Manufacturing
- Commercial Real Estate
- Mining
- Hydro
- Wastewater

Reliability Strategies

Baseline

PMs and CBM' with intervals by operating context

Job Plans

- Tasks
 - Step-by-Step Guides

$+AI \rightarrow AI+$

Reinventing how work gets done across business domains and industries



IBM Sustainability Software / © 2024 IBM Corporation

Artificial Intelligence (AI)

Human intelligence exhibited by machines

AI refers to the ability of computer systems to attempt to mimic the problemsolving and decision-making capabilities of the human mind – including all aspects of learning, reasoning, perceiving, and problem solving.



1950's

Machine Learning (ML)

Systems that learn from historical data

ML-based systems are trained on historical data to uncover patterns. Users provide inputs to the ML system, which then applies these inputs to the discovered patterns and generates corresponding outputs.



1980's

Deep Learning (DL)

ML technique that mimics human brain function

2010's

DL is a subset of ML, using multiple layers of neural networks, which are interconnected nodes, which work together to process information. DL is well suited to complex applications, like image and speech recognition.

Foundation Model (FM)

Generative AI systems

2020's



AI model built using a specific kind of neural network architecture, called a transformer, which is designed to generate sequences of related data elements (for example, like a sentence).

Demo

Click here to watch video!

Welcome	to FMEA Builder with Generative AI.
Use FMEA Model.	Provide documents. Zero shot. Hybrid.
USE FMEA Model.	Provide documents. Zero shot. Hybrid.

Foundation models are bringing an inflection point in AI...

...but how enterprises adopt and execute will define whether they unlock value at scale Where are you in the journey?



+AT

Thank you



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