INSIGHTS HIDDEN IN A SEA OF DATA

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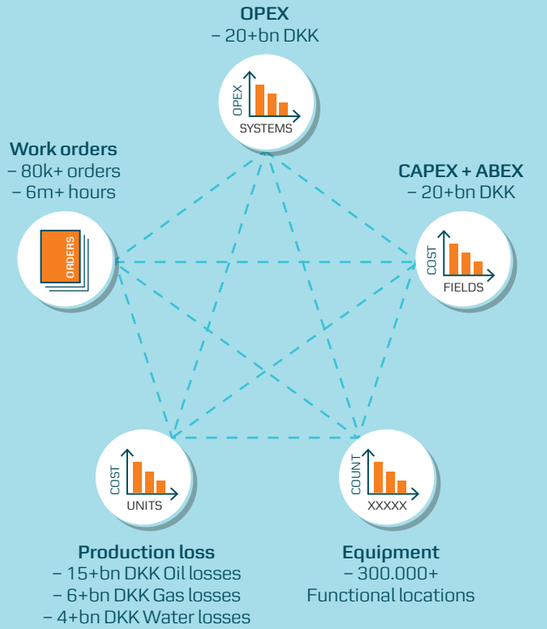
When every maintenance job is treated as unique, it's impossible to measure efficiency and evolve best practice. Now a new project is building connections between previously unconnected data to reveal dramatic potential improvements in cost and efficiency.



Current approaches to maintenance often fail to look at maintenance activities with an adequate level of detail: each item of equipment and maintenance activity is treated as unique, making it impossible to establish general best practice principles. As a result, the same maintenance activity is carried out in various ways with varying levels of efficiency and attention to safety.

The 4D maintenance project at the Danish Hydrocarbon Research and Technology Centre (DHRTC) was set up to try and tackle this problem, using a 'modularisation' approach.

LEARNING FROM MODULARISATION IN MANUFACTURING

In traditional industries such as automotive and consumer electronics, complexity costs have historically often increased faster than turnover. A key reason for this is that unique solutions, e.g. engines or tools, have been developed individually in each project, leading not only to increased costs but also lack of innovation. These industries have implemented modularisation to tackle the problem: modules, or specific solutions, can be shared and continuously improved over time, leading to higher efficiency. For example, an engine is reused across many cars and improved systematically over time. The benefit of modularisation is significant simplification, where a few components can be combined in many ways across many products.

Naturally oil and gas assets are very different from automotive, but there are also similarities. Unique ways of working have been developed across different assets, making it difficult to compare efficiency. For example, more than 60,000 valves exist across the Danish Underground Consortium (DUC). They are all different in terms of size, type of medium, position, manufacturer and so on. It is impossible to have a manual overview of all valves and to ensure that each valve is maintained cost effectively. This is where data analytics comes in.

CONSISTENT CRITERIA ACROSS DIVERSE OPERATIONS

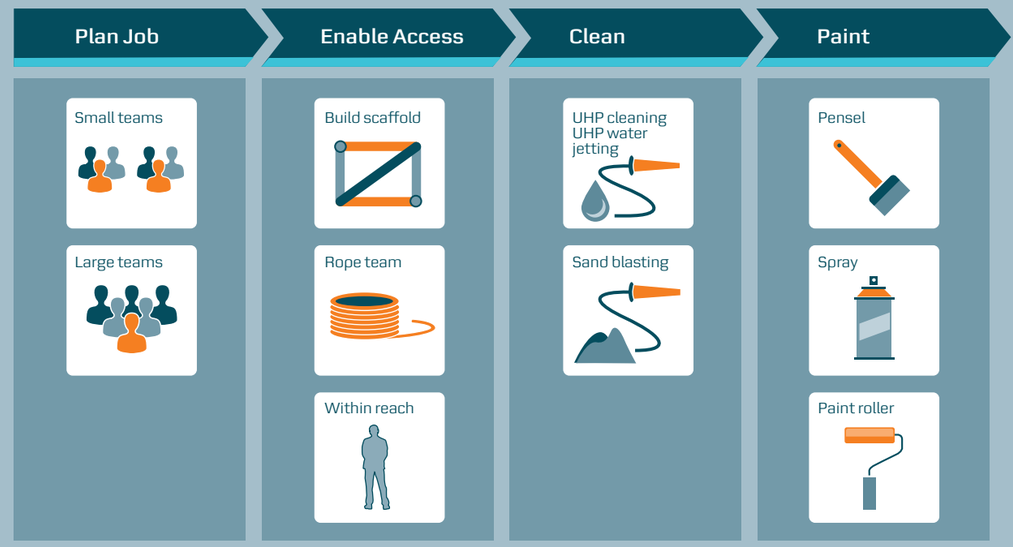
The first step in this project has been to develop a data model that allows maintenance efficiency and cost to be compared. This model shows how operation (inspection, lubrication etc.), physical (size, position, media etc.) and performance (cost and time) are related. The data exists in many different IT systems, but when they are related, a very powerful decision base can be established.

The quantities of data are impressive. So far we have included in our model 6,000,000 hours of maintenance, 80,000 work orders, 300,000 functional locations, 20 billion Danish Kroner of operational expenditure and 25 billion Danish Kroner of production loses.

WHAT A SYSTEMATIC COMPARISON REVEALS

- The data model makes it possible to systematically compare ways of working fairly – a so-called apple to apple comparison.
- This allows us to evaluate if one way of working is better than another.
- In many cases we have seen efficiency across assets differ by a factor of two – indicating a strong potential for optimisation.
- There are strong indications that the data model can support better decision making, leading to tangible cost saving on both assets and maintenance activities.

The next step will be to investigate the root causes of the variation in performance across assets, and apply modularisation in selected areas. Ultimately, our aim is to identify best practice, ensure consistency across assets, and create a factual basis for taking strategic maintenance decisions. ■



At a glance

Purpose:
Develop industrialisation approach to maintenance.

Technology:
Modular architecture

Impact:
Better operational performance and reduced downtime