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Using unstructured data to reduce down time

A lot of the insights which might help to reduce equipment downtime and improve maintenance planning are hidden in unstructured data in historical records. Subrat Nanda of ABS explains how this might be utilised

By Subrat Nanda, Chief Data Scientist, ABS

In the offshore industry, we are currently sat at the tip of an iceberg in regard to unlocking the potential held inside unstructured data.

If leveraged effectively, these data driven insights can inform decisions across an enormous scope of critical business functions – from improved operations and informed planning to focused training and personnel development.

The potential to advance safety performance is also significant.

Unplanned downtime, as we know, is costly for all offshore operators. A study by Baker Hughes found that 1% of unplanned downtime (i.e. 3.65 days a year) costs offshore oil and gas organizations on average $5.037 million annually.

The industry averages a little over 27 days of downtime every 12 months, which translates into costs of about $38 million. For the worst performers, figures are upwards of $88 million.

An effective asset management strategy can start with combining data analytics with historical data and operational experience to reduce unplanned downtime and achieve higher operational availability.

This involves fusing data generated from operations and prior maintenance, covering diverse datasets from sources such as equipment design information, sensor time series data, maintenance records, inspection records, performance reports and class-survey reports.

From this, an understanding of observed failure trends and risks can be gained, which in turn provides the data-driven insights needed to underpin condition based maintenance (CBM).

Unlocking unstructured data

One of the largest obstacles to obtaining maximum value from this exercise is that the maintenance history and operator observa-
Digital.ai – keeping hackers out of mobile apps

The apps which many oil and gas companies make, to provide their staff with sensor data, can also provide a pathway for hackers. Digital.ai has some tools to keep them out of mobile apps.

Digital.ai, a company based in Burlington, Massachusetts, has services and software products to help oil and gas companies manage apps they build, to ensure that they cannot be accessed by hackers.

It has a number of oil and gas industry customers, mainly with apps providing data from sensors.

Managing security of apps is a big challenge for oil and gas companies, because once software is in operation, the software creator can have no visibility of how it is being used, or ability to control or manage it.

The apps are often developed by outside companies, and can be widely distributed, including to outside contractors. And the security risks are often not well understood, says Paul Dant, Vice President of Product Management, security with Digital.ai.

Reverse engineering

One of the biggest dangers with apps is that a hacker can open up the code and see it directly. The app code contains digital instructions for how to communicate with corporate data systems, because someone would use the app to engage with corporate systems. Once a hacker can see the code, they can build a new app which can interfere with corporate systems in a malicious way. This is known as “reverse engineering” – based on taking apart a finished product.

For example, whoever designed the Stuxnet hacking software must have had access to the code, which was running Siemens turbines, in opposition to in siloes.

Condition based maintenance

Condition-based maintenance (CBM) is a maintenance strategy that dictates decisions about what work needs to be carried out based on the actual condition of an asset. Under CBM, maintenance should only be performed when certain indicators are triggered and when it is economically optimal.

In other words, it should be done when there are signs of decreasing performance or upcoming failures. The maintenance should be performed at a time or location which makes it optimal from not only technical but also safety and economic perspectives.

The need for CBM arises in part due to the challenges of time-based maintenance practices, as well as a need to reduce uncertainty during maintenance events, and requirements to safely extend the service life of equipment to achieve maximum availability.

Condition-based maintenance is not a replacement for subject matter experts (in fact, CBM relies on their input to train and utilize their experiential knowledge to guide improvements). Rather, it is a methodology to inform maintenance strategies.

Such information is only valuable if the data fuelling CBM is of high quality – this is where data science comes in.

Quality maintenance data (and thus improved analytics over time) can inform other fundamental business operations such as human development and training.

For equipment manufacturers, it can highlight common faults on the production line, or identify equipment issues before they go on to become widespread across the deployed fleet.