

RELIABILITY MONITORING FOR OPTIMUM ASSET MANAGEMENT

Reliability and availability are key performance indicators (KPIs) for critical rotating machines in energy production. Every 1% downtime has huge economical impact so it is important to know downtime causes to take appropriate measures to reduce scheduled and unscheduled downtime.

OPENpredictor's Reliability Monitoring module provides

- Automated identification and quantification of downtime
- Downtime & operation statistics for root cause analysis
- KPIs for reliability, availability and utilisation

Such information helps operators focus and prioritize activities to problems that repeat and cause the largest amount of downtime, with maximum economic effect.

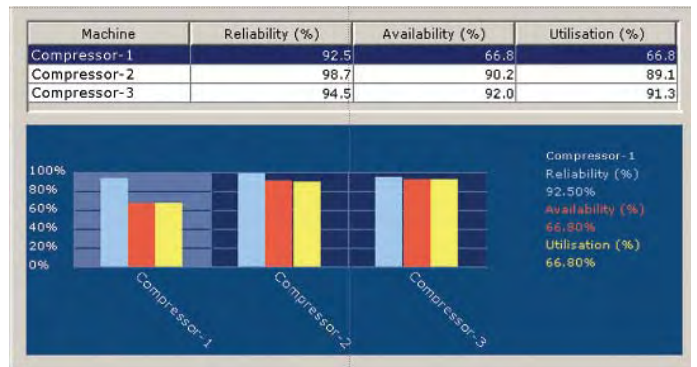
Data sources & warnings

OPENpredictor™ automatically imports data like downtime and fault codes from existing plant information systems and creates a traceable set of data for root cause analysis.

When a machine is stopped or reliability or availability drops below benchmark figure, OPENpredictor's warning system prompts the operators to provide information. A warning list gives an overview of duration, nature and downtime cause.

Root cause analysis

The user can define statistics and observation periods to verify short term problems and conclude on long term trends. With a root cause analysis it is possible to investigate how changes in maintenance can influence the downtime figures.



OPENpredictor™ provides different overviews of reliability, availability, utilisation, ↑ scheduled/unscheduled downtime, operating hours, successful/failed starts plus time causes for a root cause analysis ↓.

Surveillance	Downtime Cluster	Unscheduled Downtime	Risk Causes	Performance	Reliability	Availability	Utilisation
Cause			Cause Code			Total Downtime (hrs)	Total Downtime (%)
Unscheduled			UNK			18	3.9
Preventive Maintenance			PM			70	15.2
Corrective Maintenance			CM			3	0.6
Failed While Running			FWR			22	4.7
Failed to Start			FTS			3	0.6
Standby Mode			STBY			90	19.2
External			EXT			10	2.1



Reliability trend graph with alarm level.

TAQA MONITORS RELIABILITY TO MEET PLATFORM TARGETS



TAQA Energy, formerly BP Netherlands, use OPENpredictor™ to monitor the reliability, condition and performance of critical gas turbine compressor lines and auxiliary machinery on its mature North Sea gas compression field.

On the offshore platform three operators check operation alerts

from OPENpredictor™ and fill-in the downtime causes. Onshore the automatically generated statistics are useful tools for TAQA's Rotating Equipment Engineer, Neil MacRae, and the managers in Asset Management and Engineering for their operation and maintenance of the gas compression field.

"We use the key performance indicators and statistics on downtime causes to identify the common faults on the machines," says Neil MacRae. "We also compare with the information in our computerized

maintenance management system to ensure that we capture all faults."

"The target for the platform and the asset management team is 97% availability.

Compressor performance is crucial to the operation, so if they are not reliable our annual targets are not met. Thanks to reliability monitoring, we now have more concrete data to work with. Our asset manager uses the monthly reports with analysis and recommendations from Roving Dynamics to check how the machines

are performing. In case of downwards trends in availability we can now easily identify the cause and quickly solve the problems," Neil MacRae concludes.

TAQA gained > \$ 5 million by combining information on asset reliability, performance and condition with business objectives among other things due to a 2% increase in reliability and availability of critical production assets.

For more information see www.roving-dynamics.com/oil_gas.