

Delivering smart and predictive maintenance strategies at Gunvor



Gunvor Petroleum Rotterdam is a refinery in the port of Rotterdam, The Netherlands.

Howden and Gunvor Petroleum Rotterdam (GPR) have been working together for decades, and there is a large Howden installed base at the site in Rotterdam with reciprocating compressors, cooling fans and turbo compressors in operation.

The reciprocating compressors play an important role in the refinery process, operating 24/7. However, Gunvor required more insight on the maintenance and performance indicators of these compressors.

Solution:

Howden Uptime

Application:

Refinery

Region:

EMENA

The challenge

The reciprocating compressors were identified as critical in the overall process at the refinery, but lacked any means to track past and current performance in terms of asset condition and performance.

Gunvor wanted to explore options that enabled predictive and prescriptive maintenance and performance management. Because the compressors do not run in exact intervals, it can be a surprise for the maintenance team when a compressor is switched on after a long standstill.

It could be the case that during the compressor standstill, deposits in liners or solids between the valve seats have formed. This negatively impacts the performance of the compressor - and therefore the process - which would normally not immediately be noticed.

GPR made it clear to Howden that they needed an easily approachable and proactive sparring partner, who could give performance and maintenance related advice based on reliable compressor data to support the Gunvor maintenance team.

The solution

Howden recommended Howden Uptime to GPR, as it provides a deep insight into the compressor process conditions. This, combined with Howden expert advice, will support condition-based decision making. The installation process was very simple and non-intrusive.

Howden worked very closely with Gunvor during the installation to ensure it was quick and had minimal impact on operations. The sensors and communication modules were installed without any modifications to the existing plant infrastructure.

No interference with plant DCS or any other site systems were needed, the only requirement was a power supply, which made the installation process very smooth for the customer.

With the current operational Howden Uptime system, GPR is able to make decisions based on data and expert advice. Together with their own compressor experience, it enables them to move away from reactive and time-based maintenance to a predictive maintenance strategy.

Since having Howden Uptime installed, GPR has generated savings between €200,000 - €275,000.

Preventing failure

If there is an operational change to the equipment, the Howden Uptime system will send an alert to the user, which allows them to see the change coming.

This enables them to make the necessary changes to the conditions of operation before it causes a failure, which would result in downtime and extensive repairs to the equipment.

Optimising maintenance processes

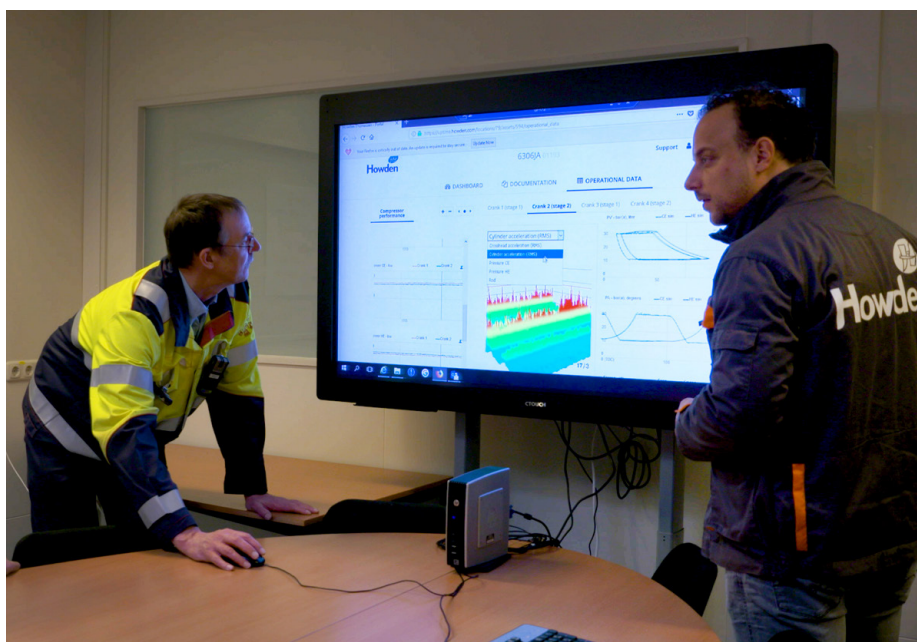
Howden Uptime gives Gunvor the peace of mind they need to be able to manage the maintenance on the equipment. In some cases, operational plant requirements may lead to a request to postpone the maintenance on the rotating equipment.

Prior to the Howden Uptime installation, they were not able to do this confidently as it could have affected the performance and availability of these assets. Using Howden Uptime, they have full visibility of the equipment performance, which supports fact-based decision making on maintenance strategies and reduces the potential risk in plant operations.

Digital Twin technology

On a cycle-by-cycle basis, the Digital Twin technology provides a real-time model representation of the compressor performance.

It identifies wear or developing failures and advises on efficiency improvements and maintenance actions. In case of performance deviations, the Digital Twin is able to accurately model effects of different failure modes and match the results of these scenarios in order to find the root cause.



Howden Uptime captured events:

1 A changing discharge pressure was detected in compressor A. Howden technical service team then advised GPR to carry out an inspection on compressor A. During this inspection, solid particles were detected in the valves, causing the discharge pressure to fluctuate.

A week later, a shutdown for compressor B was planned, with a lead time of 4-5 weeks. The availability of compressor A was essential to maintain the plant's production. If the revision had not been completed the week before, it would have created a serious risk of compressor A needing an unplanned stop while B was already shutdown during the scheduled stop.

2 GPR had experience with a "whistling" noise from the inlet filters in the first and second stage of both compressors due to contamination. Differential pressure gauges over the filters were not available, so compressors were switched and filters were replaced based on experience. Howden Uptime provides more information about cylinder pressures and piston rod loads, which allows GPR to rely on the insight from the solution to support decision making, avoiding the unnecessary changing of filters.

3 Recent operating conditions have required a serious reduction in the capacity of the compressors. The data from Howden Uptime showed that if the capacity was reduced any further it would lead to an inadequate rod reversal, which will damage the crosshead bearing. Therefore Howden advised GPR not to implement any further capacity reduction. Dave Gaal, Section Head Mechanical & Rotating at Gunvor Petroleum Rotterdam B.V., said: "The expert support we receive as a customer for increasing or decreasing capacity gives us the comfort of preventing damage to the equipment and avoiding an unplanned shutdown."

4 In the past, when a machine displayed signs of problems, the maintenance department had no choice but to replace all valves or other parts until the problem was resolved.

Howden Uptime detects which parts need to be replaced through advanced machine learning algorithms. This avoids any extra parts being replaced unnecessarily, saving time and costs.

5 GPR has repeatedly been able to postpone periodic scheduled maintenance because of Howden Uptime. Howden Uptime provided the insight, and thus a tool, to make these decisions and maintain peace of mind and trust. In these situations, maintenance was postponed because other work on the compressor line-up was delayed, meaning spare equipment availability was critical to production.



During a period of three years that Howden Uptime has been running, GPR has generated savings between €200,000 - €275,000. More importantly, if Howden Uptime was not installed these savings would be actual cost and even higher when a major machine breakdown would have occurred.

For GPR, it is very important that we can give substantiated and responsible advice on how to operate and maintain our compressors. GPR will keep using Howden Uptime to improve the time-based maintenance, and move to a predictive maintenance strategy.

For further information get in touch with our team today:

uptime@howden.com | www.howden.cloud/uptime