Pall Rental Purifier saves tunnelling company $125K/ day downtime cost and keeps rail project on track

CASE STUDY

PICSHDPIM1EN

Background

Climate change has forced many governments to reconsider their public transport policy. As railways have a key role to play in reducing overall greenhouse gas (GHG) emissions and thus help to reduce and mitigate the global temperature increase growth, there are multiple projects initiated across the world for development of new railway infrastructures or to modernize existing railway networks.

Introduction

When Railways & Engineering/Construction companies develop a new line, they identify the best path for the railway, considering all the geographic, urbanistic, and societal constraints you can imagine. However, natural obstacles or dense urban areas cannot always be avoided, and it is necessary to excavate tunnels.

Tunnelling machines are very sophisticated, expensive pieces of equipment, often running 24/7 in the harshest operating conditions. Some can operate as a self-contained underground factory, as well as digging the tunnel, also lining it with concrete wall segments and adding expansion grout as they move forward. In his context, any downtime of a tunnelling machine due to a mechanical failure represents a huge cost and potential loss of profit for the construction company.

Problem

A major construction company contacted the Pall Service team to report concerns over rust found inside a gear box on a large tunnelling machine. The root-cause was the presence of free water in the industrial gear oil.Visually, the oil was cloudy, suggesting that the oil was already close to its water saturation point. This was quickly confirmed as 98% Relative Humidity (RH) measured on-site using a Pall water sensor and the presence of free water was noted.

At the point of our visit the machine had been shut down for 4 days at a cost of $125K per day and no progress in tunnelling operations.

Rust deposits on the reservoir cover (inside the reservoir)

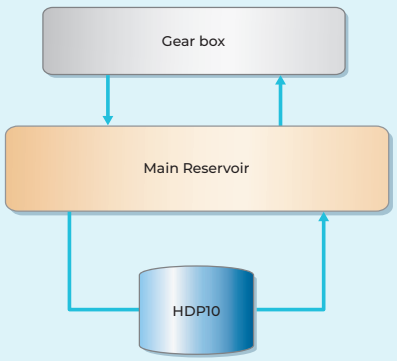
Solution

Due to the high water ingression into the gear oil resulting from the harsh operating environment of the tunnelling machine, the Pall service team recommended use of a heavy duty purifier (HDP) to quickly remove both the free and dissolved water from the gear oil, and capture any rust contaminant that had entered the recirculating fluid system.

Removing both free and dissolved water is important to extend the service life of the oil and reduce further incidence of free water forming as fluid temperature changes. The impact can mean the removal of many additional litres of water contamination from the system fluid.

The Pall team recommended to deploy an **HDP10** purifier from its rental fleet, which was agreed and delivered to site within 48 hours. The purifier was connected to the main reservoir in a “kidney” loop configuration, meaning a portion of the lubricant is diverted through a filtration system, where water and particulate contaminants are removed before the oil is reintroduced into the main lubricating system.

Pall Fluid Conditioning Purifier



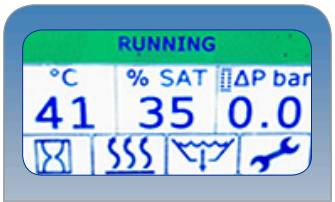
Lubrication system

- *Fluid type:* Industrial gear oil - Extreme Pressure properties
- *Fluid grade:* ISO VG 460 (460 cSt @ 40°C)
- *Fluid Capacity:* 15 m^3
- *Operating temperature:* 38 to 42°C

Pall Rental Purifier saves tunnelling company $125K/ day downtime cost and keeps rail project on track

Results

After two days of operation, the water saturation level of the oil fell from 98 to 35% RH and a marked improvement in visual condition (clear and bright).



Purifier control panel after 2 days of treatment

HDP Operation	Water Saturation at 41°C
Starting Point	>98% RH
After 48 hours	35% RH

Conclusion

The construction company was impressed by the performance of the HDP10 purifier such that the site Technical Director extended the rental of the HDP10 Oil Purifier, stating "it will remain fitted until the end of the project as it is definitely my best insurance guarantee to maximize the uptime of my machine – every single day of downtime was costing me $125K!".

The Pall HDP series purifier demonstrates its capability to operate in the harshest environments and provides a range of operational cost savings:

- Increased equipment uptime and improved machine performance,
- Reduced component replacement costs
- Reduced maintenance labour costs
- Lower oil replacement and disposal costs

Pall Purifiers remove:

- 100% of free water and entrained gases
- Up to 80% dissolved water and gasses at 100% ambient RH; >80% at lower ambient RH
- Solid contaminants

HDP10
Flow range:
37.8 L/min
(10 US gpm)
Maximum viscosity:
1,000 cSt

For more information on the available range of Oil purifiers from Pall, visit www.pall.com or contact one of our sales representatives

PALL CORPORATION

Corporate Headquarters
Port Washington, NY, USA
+1-800-717-7255 toll free (USA)
+1-516-484-5400 phone

European Headquarters
Fribourg, Switzerland
+41 (0)26 350 53 00 phone

Asia-Pacific Headquarters
Singapore
+65 6389 6500 phone

Visit us on the Web at www.pall.com/industry
Contact us at www.pall.com/contact

PICSHDPIM1EN
July 2023