


Case Study: March 2019: Asset Reliability Management

**Engine Health Diagnostics Prior to Overhaul enabled ~\$900,000 in Revenue over six months & saved ~\$20,000 due to extension of overhaul by 2000 hrs**

<p><b>Industry Segment:</b></p> <ul style="list-style-type: none"> <li>Oil &amp; Gas</li> </ul> <p><b>Customer:</b></p> <ul style="list-style-type: none"> <li>Land rig operator in India</li> </ul> <p><b>Equipment:</b></p> <ul style="list-style-type: none"> <li>Caterpillar diesel engines</li> </ul> 	<p><b>ARM Solution Module:</b></p> <ul style="list-style-type: none"> <li>Engine Health Diagnostics through torsional vibration solution</li> </ul> <table border="1"> <thead> <tr> <th colspan="6">Cylinder Specific Indicators</th> </tr> <tr> <th></th> <th>Compression</th> <th>Injection Timing</th> <th>Injection Condition</th> <th>Bearing</th> <th>Misfiring</th> </tr> </thead> <tbody> <tr> <td>Overall Information</td> <td>27% </td> <td>0% </td> <td>0% </td> <td>83% </td> <td>100% </td> </tr> <tr> <td>Cylinder 1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Cylinder 3</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Cylinder 6</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>⋮</td> <td>⋮</td> <td>⋮</td> <td>⋮</td> <td>⋮</td> <td>⋮</td> </tr> <tr> <td>Cylinder X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Cylinder Specific Indicators							Compression	Injection Timing	Injection Condition	Bearing	Misfiring	Overall Information	27%	0%	0%	83%	100%	Cylinder 1						Cylinder 3						Cylinder 6						⋮	⋮	⋮	⋮	⋮	⋮	Cylinder X					
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**CHALLENGE**

- Repeated breakdowns on the 7 nos Caterpillar engines (Series 35 & 34) across the 11 land rigs.
- These breakdowns were **impacting the drilling performance**.
- A local service provider advised **Top End Overhaul on 3 nos. 3512** and some repair activities like **injector replacement, turbocharger replacement, cylinder head replacements** on the other engines.

**SOLUTION**

- Neptunus' expert **advised for Engine Health Diagnostics using torsional vibration analysis**. The objective was to ascertain the problem and recommend the **optimal servicing and spare parts to prevent the breakdowns**.
- Neptunus' team went onboard & carried out the engine health inspection through **the torsional vibration analysis tool**.
- The report data showed that **only one 3512 engine needed a Top End Overhaul & MTBO (Mean Time Between Overhauls) for the other two 3512 could be extended by 2000 hours with minor repairs. The other engines could be repaired only replacing the specific faulty components like injectors, turbo cartridges, dampers & by doing the calibration of fuel pumps.**

Neptunus' team **proposed an optimized list of spare parts** that had fewer parts than the estimate of the local service provider. The job was completed by Neptunus on time and since then, these **engines have been running without breakdown**.

**BENEFITS**

- Since MTBO was extended by 2000 hours (20% extension), life cycle cost was reduced by (1/3)\*\$50,000 per engine = \$10,000 per engine, **resulting in savings of \$20,000 for two engines**.
- The repair saved 10 days compared to the overhaul, and **breakdowns were completely eliminated**.

- The **drilling performance improved**. Rigs were able to complete wells on time and the **charterer** extended the contract of one rig by a period of 6 months. **This enabled revenue of 180 days \* \$5,000 = \$900,000.**

#### ***About Neptunus Power Plant Services***

Neptunus combines 23+ years of experience and expertise in engineering services & solutions for engines, generators and all kinds of rotating equipment. Our solutions include Engine Lifecycle Management, Asset Reliability Management and Turnkey EPC Projects. We serve customers in marine, oil & gas, industrial and data center segments from 25 countries.  
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