

# Semi-Submersible, Top Drive Gearbox, Gear Oil CJC® Oil Filtration

## CUSTOMER SAVINGS & BENEFITS

Installing a CJC® HDU 15/25 & a CJC® T<sup>2</sup>render Pro, the following benefits were obtained:

- Early warnings for abnormal gearbox behavior (future breakdowns to be avoided)
- Detect drilling mud in oil
- Increased uptime & component lifetime

## CUSTOMER

Drilling operator, drilling rig, semi-submersible.

## SYSTEM

**System:** Top drive gearbox  
**Oil type:** Shell Omala S4 WE 220  
**Viscosity:** ISO VG 220  
**Oil volume:** 180 L

## PROBLEMS

All sensor values were indicating such severe oil contamination level, that even the CJC® Oil Filter was not able to keep up. It turned out that the gearbox was in the process of breaking down - the CJC® Oil Filter and Monitoring Unit was installed in the final part of the breakdown. The gearbox was beyond saving, and a total breakdown occurred, with an estimated cost of more than 2 mio. USD in spare parts and lost production.

## SOLUTION

A CJC® Oil Filter HDU 15/25 with CJC® CMU Condition Monitoring Unit and a CJC® T<sup>2</sup>render Pro subscription was installed using CJC® Filter Insert BG 15/25 with a dirt holding capacity of 1 kg. The purpose of the system is to remove contamination from the gearbox oil and to detect abnormal gearbox behaviour using the T<sup>2</sup>Render PRO subscription.

## BENEFITS

With this system solution, the T<sup>2</sup>render will provide early warnings to the customer for any abnormal activity within the gearbox. If it had been installed a year prior to breakdown, the customer would have been warned in due time and necessary actions would have been taken to prevent the severity of the breakdown e.g., planned maintenance, ordering of spare parts. This will lead to reduced downtime and thus increased turnover for the customer. In addition, the CJC® Oil Filter will be able to remove contamination from the oil, such as drilling mud, water, particles, and oxidation, resulting in prolonged lifetime of the equipment.

## TEST

After a new gearbox was mounted on the top drive, the CJC® T<sup>2</sup>render PRO created a statistical model based on normal operation of the gear. This model was used to simulate whether the T<sup>2</sup>render PRO would have detected abnormal wear on the historical data during the breakdown of the gearbox.

## RESULTS

The oil and equipment conditions model- during the period with a defect gearbox - went directly into major deviation warning at the time of the first data entry. The T<sup>2</sup>render PRO models shows that alarms would have been given in case of a defect gearbox. If the CJC® solution had been installed prior to this period, the major gearbox breakdown would have been significantly reduced in severity, and thereby reduced cost for the rig operator.



The CJC® HDU 15/25 installed at the drilling derrick of the drill tower.

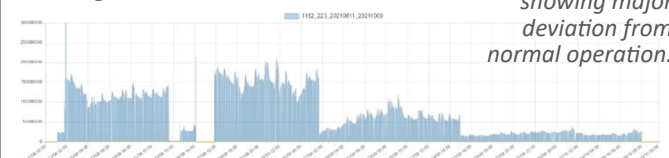


Defect Top Drive gearbox due to contaminated oil

## RESULTS

### Condition Monitoring with CJC® T<sup>2</sup>render Pro

#### DEFECT gear - Oil Conditions:



Oil conditions are showing major deviation from normal operation.

Figure 17: Simulation of oil conditions during period with defect gear

#### DEFECT gear - Equipment:



Equipment conditions are showing major deviation from normal operation.

Figure 18: Simulation of equipment conditions during period with defect gear



**CCOF8003-UK**  
 Rigs & Drill Ships  
 01.08.2023  
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