

Castrol Optigear 1100 Eliminates Failures of Well Drilling Gearboxes

OIL AND GAS (USA)

WELL DRILLING GEARBOXES

Castrol Optigear® 1100 gear oil

SAVINGS: \$27,720



THE SITUATION

A well drilling contractor in Florida uses 3 rigs for large diameter (greater than 6") wells. Bearings and shafts in the cutting head gearbox were replaced due to wear after drilling only three (3) large wells. Drilling more than 3 wells can lead to a completely failed gearbox, so the customer did not attempt it. The normal operating temperature of the gearbox was over 160°F.

Castrol's distributor was contacted to determine if an improvement could be made in the gearbox reliability.

BEFORE

- Commodity type 80W-90 gear oil used
- High cost of maintenance repairs = \$9,240 per rig after 9 large wells
 - Parts cost (bearings and seals): \$2,580 x 3 repairs = \$7,740
 - Labor cost: 2 people x 5 hrs. x \$50 per hour = \$500 x 3 repairs = \$1,500
- **Total cost for 3 rigs (after 9 large wells each) = \$27,720**

AFTER

- Castrol Optigear 1100/320 in use
- **No gearbox failures after 9 large wells**
- Parts cost (bearings and seals) = \$0
- Labor cost = \$0
- **Total cost for 3 rigs (after 9 large wells each) = \$0**

THE SOLUTION

- Castrol was challenged to prevent failures, reduce total maintenance cost, and increase uptime.
- After investigation of the problem root cause, the following was concluded:
 - Viscosity of the previous oil was not sufficient for speed/load of the gearboxes, causing expedited wear & high temp.
 - Working temp was well above the acceptable range for the commodity 80W-90 oil, leading to oxidation and degradation.
- Another contributing factor to the oil breakdown was the environment, which was subject to constant water contamination by rain and condensation.

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RECOMMENDATIONS

The previous gear oil was not capable of protecting the gearbox due to the insufficient viscosity, low water tolerance, and inadequate temp range. The presence of the water and high temperature nearly triples the speed of oxidation, leading to a useful oil life of only a few months with the 80W-90.

Castrol Optigear 1100/320 high performance gear oil was recommended to increase the life of the gearboxes. This oil is formulated with a unique patented blend of oil soluble additives which provide very low friction, excellent anti-wear & EP properties, and surface protection capable to extend gear life and significantly reduce temperature.

In addition, Optigear 1100 has a high water tolerance, large temp range, and excellent oxidation resistance. These properties have combined to eliminate failures of the gearboxes.

CONCLUSION

The result after conversion to Castrol Optigear 1100 gear oil was \$27,720 savings calculated for 3 rigs after each drilled 9 large wells.

Actual savings from elimination of gearbox failures is much greater considering reduced oil usage and increased uptime.

“The Well Drilling Company owner called a month after conversion to Castrol Optigear 1100 gear oil to thank (us) greatly. He said the operating temperature of the gearboxes was cut in half, and they have drilled 7 wells* greater than 8" in diameter without a single gearbox failure!”

*** Note:** At the time of case study publishing, the contractor had completed 9 large wells (8" diameter) with no gearbox failures and continued to drill with no problems.



OTHER POTENTIAL APPLICATIONS

- Optigear 1100 high performance gear oil is the right lubricant for heavily loaded and shock loaded gearboxes, working in the most difficult conditions even with significant amounts of water present.
- It can be used in all mining, steel, cement, drilling, and similar gear applications.
- Benefits include: reduced downtime, increased gear & bearing life, less labor time, reduced oil consumption, and lower waste oil.