

# Abnormal noise from a winch gearbox

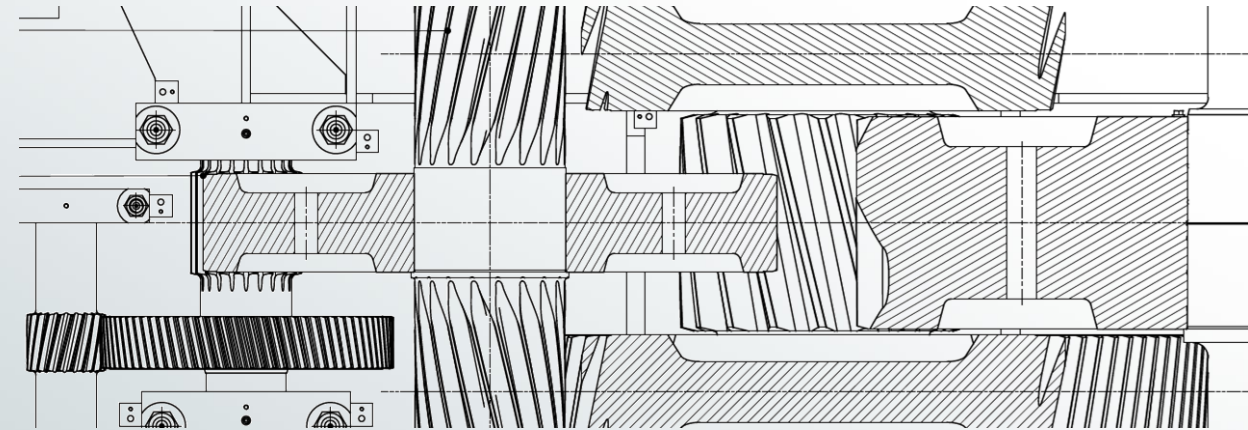
Diagnosed through a vibration measurement and visual inspection

## Customers challenge

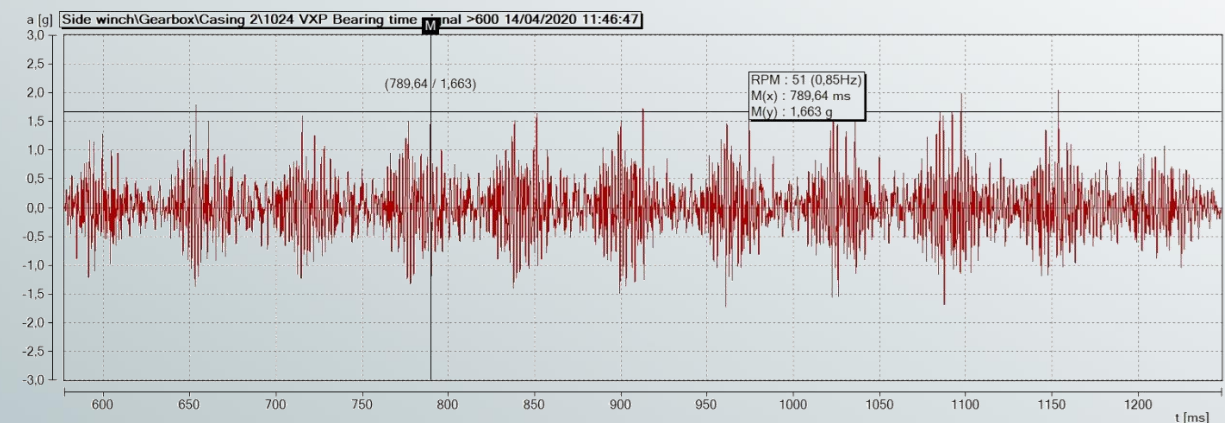
An urgent request was made to the MDS department to diagnose an abnormal repetitive impacting sound on a large winch gearbox. Shortly after the installation on board the cutter suction dredger, the commissioning was suspended which caused delays in the new-build project. The gearbox supplier was already invited but had not been able to find the cause yet through a visual inspection. Interestingly, such sound was not observed during the Factory Acceptance Test.

## Our approach

Due to its large size with many gears and 5 shafts, a visual inspection turned out not so easy. Therefore, the MDS engineer started with a vibration measurement by means of a portable spectrum analyzer. Because the overall vibration levels appeared very low, advanced time waveform analysis was used. This can be very effective for diagnosing gearbox faults as opposed to frequency spectrum analysis alone. The number of the detected impacts indicated an issue with the 3<sup>rd</sup> gear stage, and further narrowed down, the amplitude modulation particularly pointed towards the pinion shaft.



General arrangement of the gear internals.



Time waveform showing the distinctive impacts related to the abnormal sound.

# Case – Abnormal noise from a winch gearbox

## Root cause

During the subsequent inspection, this focal point derived from the vibration analysis in combination with a practiced eye, quickly resulted in finding the root cause. Although hard to see through the inspection hatches, it was observed that one of the lubrication oil spray pipes was touching the teeth of the suspected pinion shaft. The reason for such a rather rare symptom not being detected in the factory is that due its enormous size and a weight of 103t, the gearbox had to be transported into parts. As such, the issue with a misaligned oil spray pipe was deemed to be introduced during the reassembly.

## Results & key takeaways



Root cause resolved: All stakeholders and most importantly the client were relieved and reassured to continue the commissioning after fixing the issue. Because after all, the issue appeared not as detrimental as the sound suggested.



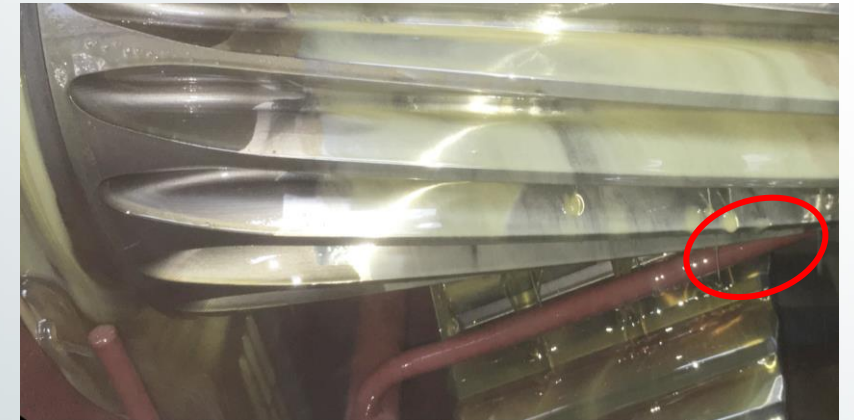
Swift diagnosis: After taking the measurement, the data was thoroughly analysed in the office and the visual inspection was done on the second day.



Specialized expertise: The combination of machinery knowledge in combination with advanced vibration analysis skills led to an effective diagnosis.



Onsite insight: Experiencing such an abnormality on board, including the possibility to take action by means of a visual inspection is key for fault finding.



*Visual inspection revealed the oil spray pipe in touch with the pinion teeth.*