

Case Study

Independent expert failure analysis: corrosion in a construction project

Sulzer Innotec**The Problem**

An international construction company experienced severe delays in the execution of a tunnelling project and was threatened with punitive action by the contracting authority. The construction company claimed that the delays were a consequence of the unusually aggressive ground water which caused corrosive damage to critical components of the tunnelling machines (TM), frequently resulting in stoppages in the tunnelling operation. This explanation was not accepted by the contracting authority, which claimed to have supplied all necessary information when the contract was awarded.

Our Remit

Sulzer Innotec was given the task of conducting an independent survey in order to elucidate if conditions at the site could indeed be responsible for the frequent and premature breakdown of the TM and other auxiliary equipment, and whether this would have been foreseeable from the information provided.

The Solution

- Analysis of information provided, e.g., documentation from the call to tender, water analyses, incident reports from the tunnelling sites etc.
- Analyses and studies on-site: the tunnelling work was still in progress. Failure analysis on damaged components at our laboratories in Winterthur and analysis of the ground water with a focus on corrosive elements.
- Laboratory based corrosion trials to verify the aggressivity of the water.

Customer Benefit

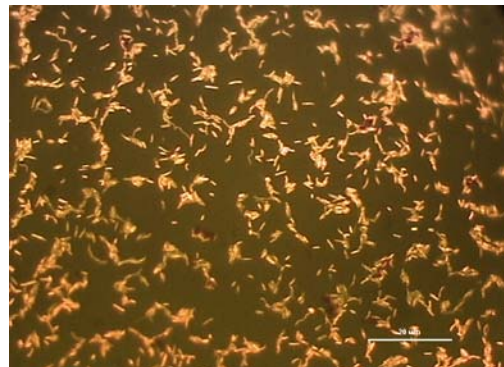
It is in the customer's interest to prove that he is not responsible for the serious delays in the project. If the independent survey is able to show this, he can not be subjected to punitive or reparative fines.

Results

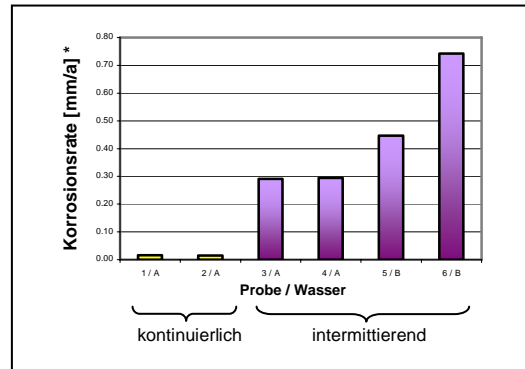
The on-site studies and laboratory based trials and analysis clearly showed that the main cause of damage of many components, such as pumps, electric motors, conveyor rolls, etc., was atmospheric corrosion after contact with water containing an unusually high concentration of chloride ions. The water analyses confirmed that the conditions were considerably more aggressive than could have been expected from the information provided by the contractor. Furthermore, microbiological activity was found to be contributing to the corrosion damage mechanism..



Corrosive damage in a roll bearing



High microbiological contamination in ground water



Corrosion tests show the water to be highly aggressive in intermittent wetting conditions