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RTSSM - Rexnord Technical Services
Mechanical & Material Engineering Services

Technically Speaking

"I haven't failed, I've found 10,000 ways that don't work"

- Thomas Alva Edison

-Failure Analysis-

Do you need to stop warranty costs from eating into your profits?

Is there a particular component that is constantly shutting down your production line?

Can you make your product perform better to increase market share?

Do you need to check to see if a product is being made to your specifications?

If the answer to any of these questions is yes, you may need to consider a failure analysis.

Analyzing failures is a critical process in determining the root cause of a problem. It is a complicated discipline that draws upon experience, observation, inspection, and testing. It is important for the failure analyst to keep an open mind through the investigation and use their experience to ask the right questions. It is also important for the client requesting the analysis to provide relevant historical facts about the failed component. This information may include the life of the component versus typical life, duty cycle changes in manufacturing processes or materials, or observations from the field, etc.

RTS has experience in analyzing a variety of components and materials including, but certainly not limited to chain, shafts, bearings, gears, agricultural knives and couplings.

The analysis typically consists of some or all of the following:

- A gathering of historical information about the failed component, visual observations and photographic documentation of the fractures
- Microscopic analysis, hardness checks, microstructural

examination

- Chemical analysis
- Examination by scanning electron microscope with energy dispersive spectroscopy (SEM-EDS)

Historical information is needed to help guide the investigation. It can help the analyst start to consider whether failure may be related to changes in the manufacturing process, operating conditions, etc. Visual observations with the naked eye and with low power magnification up to 50x can provide clues about the failure origin and operating conditions. Visual observations provide clues whether the part is corroded, abraded, deformed, etc. Hardness and dimensional checks along with chemical analysis compared to print specifications can help determine whether the part was made correctly. An SEM can help the failure analyst examine important features of the fracture surface at high magnifications (up to 2000x or more) which may pinpoint a failure origin. An EDS can help the failure analyst determine the chemical makeup of loose debris or residues left in corrosion pits or inclusions that may have contributed to the failure, etc.

When all the testing is complete and all the relevant data is collected, the experience and judgment of the failure analyst is used to determine the most likely cause of failure. With the root cause of failure determined, solutions to prevent future failures can be formulated.

RTS is well equipped to perform the inspection and testing needed to obtain the most likely cause of failure. This includes digital photography, optical stereo microscopes, hardness and microhardness testers, metallurgical preparation equipment, an optical emissions spectrometer, and access to SEM-EDS.



Hardness Testers



Binocular Microscope



Inverted Stage Metallograph



Microhardness Tester

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