Shaft Failures

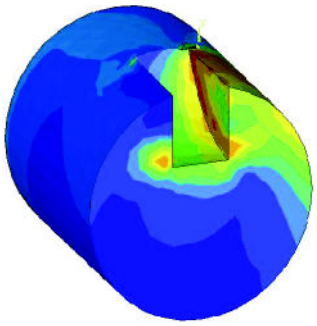
Shafts are one of the most common components in machinery. They show up everywhere from small motors, pumps and compressors to large rolls in paper mills, steel mills and power generating facilities. Properly designed and maintained they are expected to operate for years without problem. However, shafts still represent one of the most common types of machinery failures. When a failure occurs it can result in either a minor inconvenience or it can be sudden with catastrophic results and expensive business interruption.

Understanding the specific cause of a failure can help determine if it was truly sudden and unexpected or simply the result of long-term wear and tear. In some cases, poor workmanship, material defects or inadequate design can be identified to assist in subrogation efforts to recover losses. All of these failure analyses require both the knowledge of materials and metallurgical concepts as well as engineering and experience of the entire machine components and functions.

Some of the typical types of shafting failures that can be expected are:

- Keyway Fatigue
- Improper Keyway Design
- Improper Material Specification
- Inadequate Fillet Radius
- Corrosion Fatigue
- Material/Processing Defects

Altran Solutions experts have investigated and analyzed shaft failures in numerous industries with a few examples illustrated here. In many cases, the failures are related to time-dependent fatigue crack propagation. Periodic inspection and preventive maintenance can sometimes detect problems before serious damage occurs. In other cases, complex design and construction (such as in large gear box reducers) precludes any shaft inspection. Failure of shafts in these applications usually is unexpected and result in considerable and expensive collateral damage. Identifying the cause of failure in these types of accidents requires expertise and experience.



Computer Analysis of a Keyseat Showing Stress Concentrations.

Altran Solutions has complete in-house metallurgical and mechanical engineering expertise and practical experience that allows us to determine the root cause of failures. We can perform laboratory post-mortem failure analyses as well as complete on-site accident investigations, root cause analysis, and design review.

Left: Failure of an Output Shaft on an Emergency Backup Generator at a Powerplant due to Improper Hardness.

Middle: Keyway Fatigue Failure in a Large 1500 hp Gear Reduction Transmission at a Rubber Processing Plant

Right: Corrosion Fatigue Failure of a Shaft on a Dryer Roll Paper Mill.

For more information on this capability,
Please contact us at (617) 204-1000 or
via e-mail at sales@altransolutions.com