WHAT DOES YOUR SHAFT COUPLING REALLY COST YOUR BUSINESS?

Understanding Shaft Alignment Savings with TCAE™ Shaft Couplings

Importance of Shaft Couplings in Powertrain Reliability

Engineers recognise that the reliability of a pump, geartrain, or any powertrain component hinges on the quality of the shaft coupling. Unfortunately, many OEM or older machines are supplied or use basic motor shaft couplings unless specified otherwise, leading to failures or **burdensome maintenance schedules** to maintain critical alignment. The time and expense required for precise shaft alignment on rotating machines significantly impact plant productivity due to downtime, which in turn costs money.

Limitations of Modern Alignment Methods

Modern laser alignment technology has simplified the alignment process, but solely relying on digital readouts can be erroneous. Shaft alignment requirements can be divided into two categories:

1. **Static Shaft Alignment**: Alignment when the machine is stationary.

2. **Dynamic Shaft Alignment**: Alignment when the machine is rotating.

Most alignment methods focus on static alignment, aiming for coaxial alignment between drive and driven shafts. This alignment must be achieved with high precision, considering the type of coupling involved. Even slight misalignment induces side loading on the shafts, leading to component wear, increased power consumption, and eventual failure.

The Need for Dynamic Alignment

Dynamic alignment considers factors such as:

- Initial torque energisation in DOL configurations
- Torque fluctuations during loading or unloading of pumps
- Torque changes when rolling mill gearboxes handle product
- Thermal expansion from connected pipework
- Vibration from pump impeller imbalance due to wear

Additional issues like loose mounting bolts, flexible supports, and corroded foundations (soft foot) further complicate alignment. Static alignment cannot resolve soft foot issues, as connected machinery will flex to adapt to loaded conditions. Ideally, dynamic limits should be low enough for coupling tolerance to accommodate resulting flexure, but exceeding these tolerances increases wear, power consumption, and failure risk.

Advantages of using the Thompson TCAE™ Shaft Couplings

The Thompson TCAE™ range addresses these dynamic conditions by eliminating the need for precision alignment. The TCAE™ series, features a unique double-hinged mechanism that minimises radial load on connected shafts. Unlike elastomeric couplings, which generate side loads when misaligned, TCAE™ couplings self-adjust to handle dynamic forces such as shock loads, thermal expansion, vibration, and soft foot without imposing damaging side loads.

Benefits of TCAE™ Couplings

Constant Velocity Transmission: The TCAE™ mechanism ensures constant velocity torque transmission across various shaft angles, reducing vibrations from rigidly mounted machines.

Wide Range of Movement: Capable of radial movement up to 5 degrees and axial movement up to ±15 mm for the smallest size, allowing for easy installation with minimal downtime.

Remote and Inaccessible Applications: Ideal for remote water feed pumps in mine sites or pumps/gearboxes in hazardous areas, where routine coupling alignment would be challenging. The "set and forget" nature of TCAE™ couplings frees maintenance resources for more critical tasks.

By employing TCAE™ shaft couplings, engineers can significantly enhance the reliability of powertrain systems, reduce maintenance costs, and minimise downtime, ensuring efficient and continuous plant operation.

Next month we will explain the energy efficiency of using the TCAE coupling.

THOMPSON COUPLINGS (THE SMART CHOICE).