

TECHNICAL UPDATE # 006

What's so special about shaft alignment anyway?

For over 50 years now our manufacturing industries have followed world's best practices in equipment maintenance strategies from and rightly so. These programs invariably have followed some form of continuous improvement philosophy (with various acronyms and terms) all to improve machine reliability and plant uptime.

In my early days it was TPM whereby regular work order routines were religiously printed off on a regular basis to perform planned maintenance on all equipment (over time) whether it needed it or not. This progressed to condition based monitoring to actively monitor the health of equipment and step in at the last minute to repair/overhaul or replace before failure occurs. While this process is still in use statistical probability techniques have been introduced for risk based maintenance to eke out resources based on risk vs return.

While these programs are valuable to companies they often only address the existing plant equipment and, as a machine designer, rarely do they complete the circle to integrate new equipment being introduced. I have often seen new plant being installed with the same inherent problems being experienced by existing plants but as long as the new plant has a condition maintenance routine in place it's covered! Sometimes we seem to be blindly following existing paradigms without challenging why or is there a better way.

Take something as simple as motor to pump shaft alignment. We are conditioned now to accept how precious accurate shaft alignment is only because IT IS BASED ON THE TYPE OF COUPLING USED. Our maintenance orders and routines are full of regular Laser Alignment procedures to ensure the utmost precision is taken to ensure long reliable life. While this is no unfair reflection on the importance of Laser Alignment the real culprit is the lack of development in modern couplings that often require this sort of accurate alignment to be integrated.

In a previous article we discussed the different types of shaft alignment – Static and Dynamic. Whilst all forms of couplings may be accurately aligned with their respective connected shafts in a Static condition (Laser or other means) things can drastically change when dynamics take over. These dynamic effects will undermine the initial static setup if they are severe enough to extend beyond the tolerance range of the coupling.

The TCAE coupling was developed by Thompson Couplings to suit the growing need of maintenance technicians to counter the demands of certain dynamic situations and stop the premature failure of existing couplings and their connected devices. This TCAE coupling, that has real alignment Eliminating capabilities, does exactly what it must, by automatically accommodating to the dynamic effects of shaft misalignment. It has a full range of freedom from radial to axial compensation with limits far in excess of standard couplings and beyond what industry actually require.

Having an angular alignment freedom of +/- 5 degrees with little resistance it exceeds limits for most connected applications. The internal double hinge arrangement of the coupling also permits all manners of misalignment including axial, parallel and combination offset in all planes.

This unique feature allows the TCAE coupling to be simply installed to suit the existing situation of both motor and driven device with no need for precision alignment. As is often the case when a pump is overhauled and brought back into service standard procedure involves laser aligning the coupling first.

This adds extra time and cost to the situation to which the dynamic effects may afterwards negate the precision alignment in the first place.

By comparison the TCAE coupling is a set and forget option that engineers and maintenance personnel are using more and more to improve downtime and equipment reliability.

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