TORSIONAL VIBRATION

What is Torsional Vibration? - Whilst most design engineers are familiar with the stress and vibration problems caused by torsional oscillation, it is not always appreciated how severe the effects can be on modern power transmission systems and machines.

All engineering components have a natural frequency at which they will vibrate, dependant upon their physical properties - materials, structure, density, size, shape etc.

In practice many of these potential harmonic vibrations are eliminated by the proximity of other components having different frequencies, or by the absence of sufficient energy to establish initial vibration in very heavy items.

Unfortunately many power transmission drive trains do not benefit from this inherent advantage - components are often manufactured from similar materials, have relatively low weights, and the basic difficulty may be compounded by static or dynamic balance requirements.

Similarly, all internal combustion engines, particularly diesel units and indeed many drive trains where reciprocating linear movement is converted to rotary motion, create torsional vibration with varying degrees of severity in the driving / driven shafts.

The potential for breakdown occurs when the natural harmonic frequency of the drive train coincides with the torsional vibration frequency of the power unit at normal operating speeds.

Excessive vibration and noise for no tangible reason are usually the only warnings, followed by "inexplicable" - and invariably expensive catastrophic failure.

Not at all surprising when you consider that these oscillating forces can have a value of well over ten times the output torque of the power unit and are both positive and negative in value.

The torsional stiffness of the LEU HDHD flexible element ensures that the critical natural vibration frequency of the drive train occurs - below normal operating speeds.

Repaircraft PLC

The Common, Cranleigh, Surrey, GU6 8LU, United Kingdom
Tel: + 44 (0) 1483 273536 Fax: + 44 (0) 1483 278078
Web: www.scorpiontank.co.uk E-mail: hq@repaircraft.co.uk