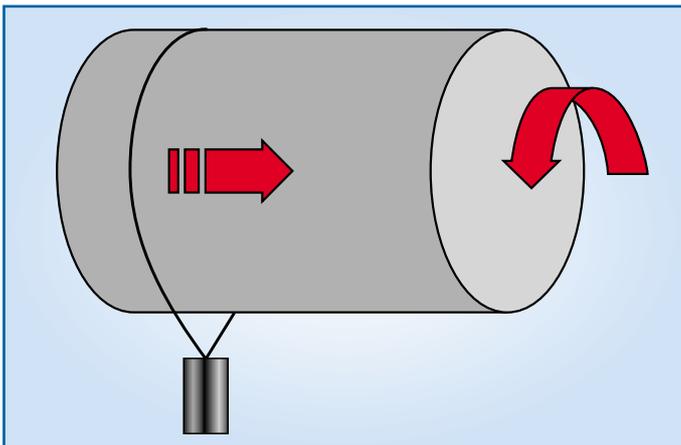# Advanced analysis of Twist (or lead) for shaft sealing applications

Twist Analysis provides a superior technique for the assessment of shaft Twist (or Lead) than the traditional methods. Twist Analysis software works with appropriate roundness or surface finish instruments from Taylor Hobson.

A new method for quantifying lay

Twist analysis is a new method of quantifying the lay on a ground shaft. It is important in the detection of lay that is likely to give rise to seal leakage or premature failure. This has many applications in industries such as automotive, domestic appliances (such as washing machines) and the food processing industry – in fact almost anywhere rotating shafts are used.
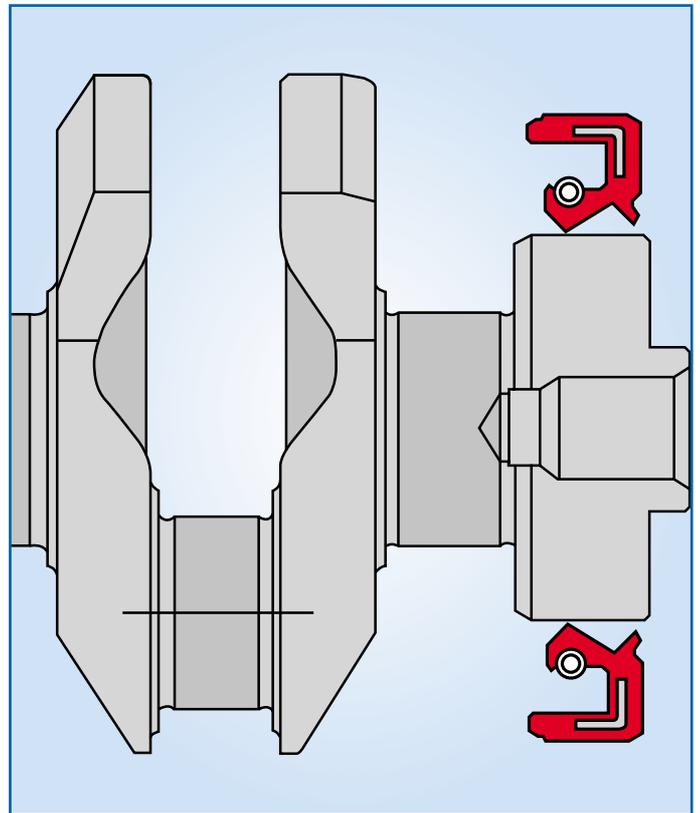
The software uses a 3D-measurement technique. With this technique, an areal map of the surface is generated from successive axial measurements taken by a suitable Talysurf or Talyrond instrument. The surface is then analyzed by means of special filtering and Fourier techniques. Important parameters including the wavelength, depth and angle of the lay can be calculated.

The performance and life-time of an oil seal can be greatly affected by the lay on the shaft surface.

Traditional method of measuring Twist by hanging a weighted string over the shaft and monitoring its movement as the shaft is rotated
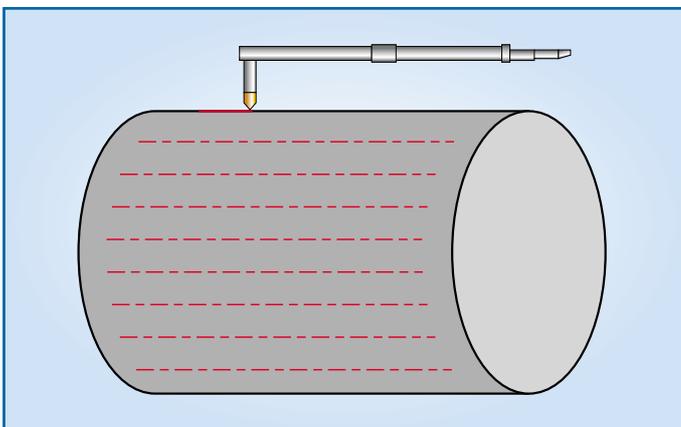
The new method involves analyzing an areal map of the surface

Twist measurement on a crankshaft using a Talyrond with a diamond tipped stylus arm mounted in the Talymin 5 gauge

Taylor Hobson
PRECISION

Twist analysis process

1. The measured surface is filtered to remove long wavelength components

2. The surface is then analyzed to detect the dominant wavelengths in the axial direction

3. A special "Zero-Bandpass" filter is then applied to suppress wavelengths other than the dominant wavelength

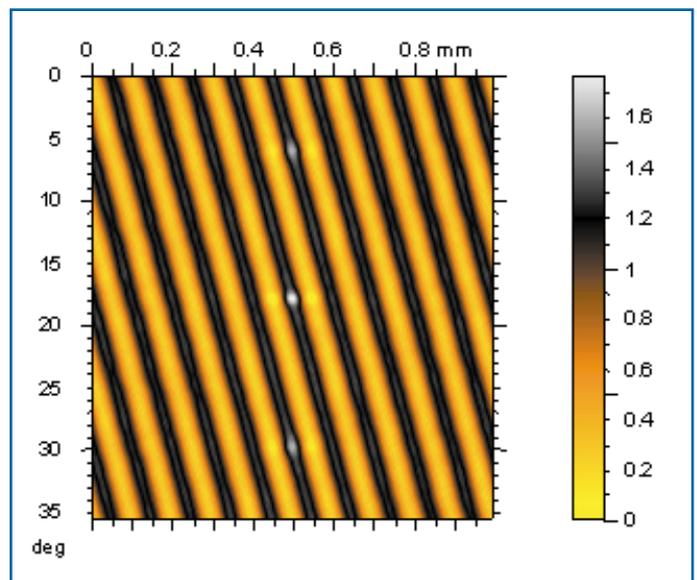4. The results are then calculated from the Fourier transform of the data

```
Test Sample 05

Wavelength     =     0.100 mm
Depth          =     1.565 µm
Gradient       =     3.000 mm
Cross section  =    78.000 µm²
Starts / rev   =    30   left
Angle          =     0º 41'
Diameter       =    80 mm
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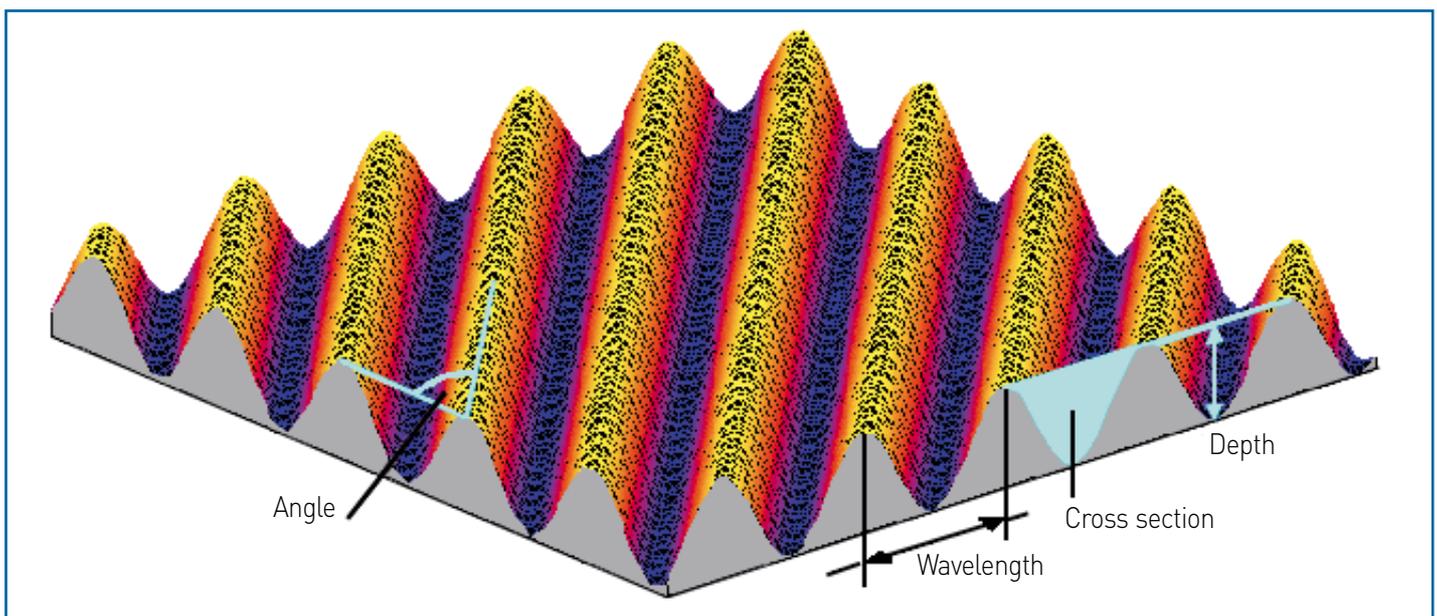
Twist results calculated from the measured surface
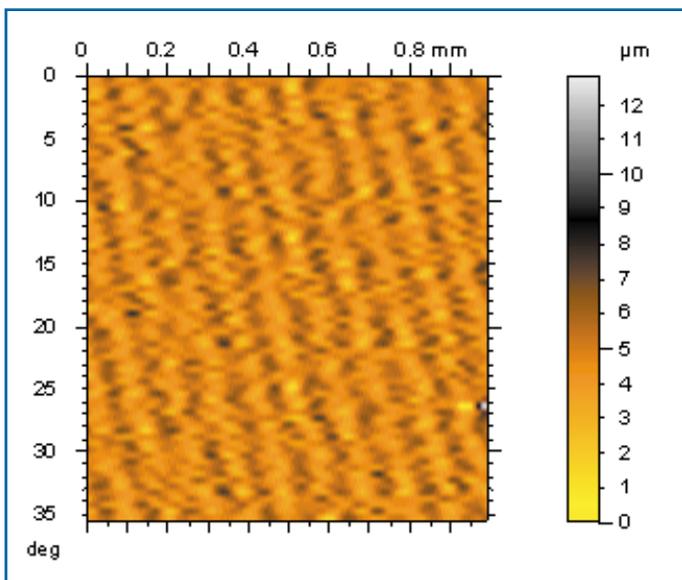
Example of a Zero-Bandpass filtered surface

Talymap's auto-correlation function can be used to create a clearer display of the twist pattern on the surface

Twist parameter definitions

Specifications are subject to change without notice.

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