TRIBOLOGY UPDATE: *ISSUE 25 - MARCH 2011*

This is the latest issue of **Tribology Update** newsletter. It has been a year since the last edition, so this is somewhat longer than usual. For further information, we can be contacted by e-mail at ***info@phoenix-tribology.com*** or by telephone on 44 1635 276064.

UNDER CONSIDERATION:

Pin on Twin Adapter TE 67/88/99/77

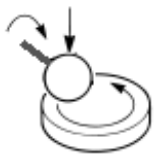
The pin-on-twin test configuration has been designed and developed by Doctors Qu, Truhan and Blau at Oak Ridge National Laboratory USA and used in conjunction with a standard TE 77 High Frequency Friction Machine. The geometry allows use of simple test specimens made from round bar stock with easy alignment of the upper cylinder on the two lower cylinders. Although only the combined friction force of the two contacts can be measured, two wear scars are generated for each test run. The test configuration has been used for evaluation of materials for heavy duty diesel fuel injectors:

"Detecting the Onset of Localized Scuffing with the Pin-on-Twin Fuel-Lubricated Test for Heavy Duty Diesel Fuel Injectors," J. Qu, J. J Truhan, P. J. Blau (2005) SAE International Journal of Engine Research, Vol. 6, No. 1, March, pp. 1-9.

"Evaluating Candidate Materials for Heavy Duty Diesel Fuel Injectors Using a 'Pin-On-Twin' Scuffing Test," J. Qu, J. J. Truhan, P. J. Blau (2005) Tribology International, Vol. 38, No. 4, pp. 381-390.

We think this test configuration could be usefully implemented as standard on both the TE 77 and on other machines with long stroke reciprocating adapters, such as the TE 67, TE 88 and TE 99 machines.

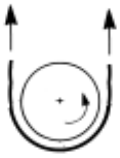
Optical Elastohydrodynamic Rig



Despite our early commercialization, in the 1980s, of an optical elastohydrodynamic film thickness measuring instrument, through the Cameron-Plint Tribology collaboration, we have not had the resources to keep up to date with development of the technique. We have now been offered the opportunity of a joint venture project with a State Key Laboratory of Tribology, Beijing, to develop a new instrument that will utilize their ultra-thin film measuring technique in conjunction with a novel instrument design from Phoenix Tribology.

Existing instruments invariably use a “ball-on-stick” type configuration, with the ball spindle mounted remotely from the disc, creating difficulties with positioning the ball relative to the disc and at the correct angle and without skew or spin. The proposed new design follows a radically different approach, allowing easy positioning of the ball and a simple and cheap method of direct measurement of the traction in the contact. Of course, it remains to be seen whether this radically new design can be made to work, but perhaps the more important point for Phoenix Tribology is that this will be our first joint venture with a university in China.

Foil Bearing



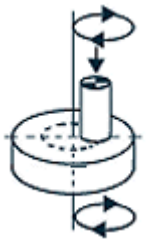
We have had numerous enquiries recently on the subject of abrasive wear in engine crankshaft bearings, whether caused by residues from manufacturing processes or abrasive particles accumulated in the lubricant during service. Professor John Williams at Cambridge alerted us to the possibilities of his “foil bearing rig”:

Mechanisms of abrasive wear in lubricated contacts Professor John Williams and A.M. Hyncica, Wear Volume 152, Issue 1, 5 January 1992, Pages 57-74

The foil bearing arrangement provides easy control of the lubricant film thickness and a ready mechanism for introducing abradant into the lubricant. A major advantage of this arrangement, other than its simplicity, is that the film thickness, or more precisely, bearing gap, a key parameter in the experiment, is not affected by wear during the experiment or, unlike all other types of journal bearing rig, minor changes in diameter of the journal sample as manufactured. By standardizing the film thickness and abrasive conditions, the rig could be used to compare abrasion resistance of different tribological pairs under both “tumbling” and “grooving” wear processes, or a combination of both.

Although this is a very simple wear generating device, we think the concept could readily be exploited as a multi-station test rig for evaluating coatings for journal bearing applications.

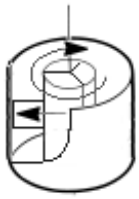
RandomPOD



We currently have two successful licence agreements in place with Dr Vesa Saikko of Aalto University, Espoo, Finland, giving rise to the TE 86 Twelve-Station Hip Joint Simulator and TE 87 Multi-Station Circular Translation Pin on Disc Machine (CTPOD). Dr Saikko has developed a new pin on disc machine with x-y motion, similar in basic structure to the CTPOD. In addition to circular translation, the machine can be programmed to perform virtually any type of x-y motion, even random motion and random load. The first “RandomPOD” study will shortly be published in the Journal of Biomechanics. We are currently in the process of securing a licence for commercial development of this new device.

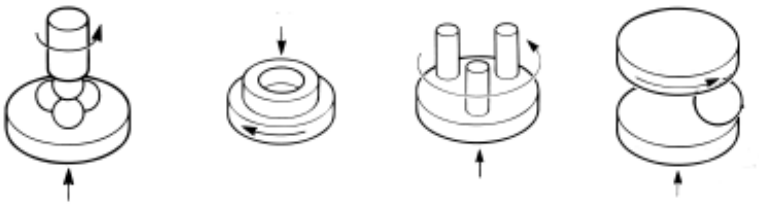
WORK IN PROGRESS:

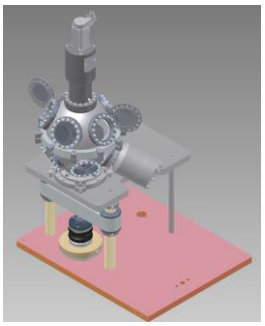
TE 47 Six Station Ring/Liner Tribometer



User trials of the new TE 47 Six Station Ring/Liner Tribometer are underway.

TE 91 Vacuum Tribometer

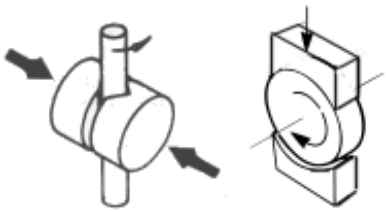


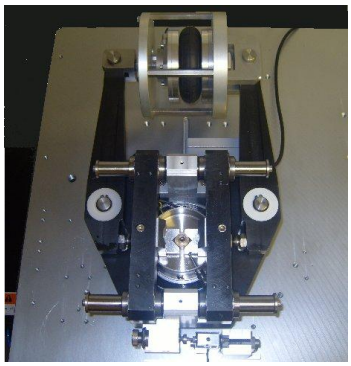


Components for the first TE 91 Vacuum Tribometer are currently being delivered.

WORK COMPLETED:

TE 67 Pin on Vee Block





Based on the TE 92 Pin on Vee Block Adapter, a new pin on vee block has been designed for use with the TE 67 Pin on Disc/Reciprocating Pin on Plate Machine.

OTHER NEWS:

The Cambridge Tribology Course 2011

The 2011 will take place, from Wednesday 14th to Friday 16th September 2011.

George Plint and David Harris
Phoenix Tribology Ltd