

Tribology Project 2010



Patrick Swan

The objective of this project is to determine the cost and energy saving potential of tribology to South Africa.

Since tribology is about the understanding and control of friction, and friction consumes energy and generates wear, this objective can be seen as to determine the extra cost of energy lost due to friction, and the cost of wear that could otherwise be reduced or eliminated, since wear consumes machinery.

Because tribology is universal it covers all of industry, both government and private sector, and all forms of mechanisation. The objectives of this study will be to establish both the costs and potential savings by industry type and by application, considering the following cost areas:

- Energy, consumption and savings potential
- Environment
- Maintenance
- Replacement costs
- Breakdowns
- Potential to increase component life
- Potential to increase equipment and machinery utilisation from greater mechanical efficiency.

The outcome of this study will then be to benchmark the country and highlight areas of concern where greater effort is required, for example in certain industries or applications, in general education, specific education, or research and development.

Our initial priority was to obtain as much information as possible from international sources to guide the process and ensure that we didn't end up re-inventing someone else's wheel. While we gained a lot of information, particularly by attending the annual STLE conference and World Tribology Congress 2009, we were also able to advertise our project at these events. An unexpected outcome was that we have now become a founder member of a much larger project to assess tribology globally.

Locally, our first priority was to gain as much general information from industry as possible through a web based questionnaire. Although the questionnaire went out to several thousand tribologists and engineers, and was opened by over a thousand, the meaningful data received did not adequately cover industry in general.

Our second, and most time consuming priority was

to implement a series of interviews across industry. These visits have been divided into component suppliers and industry.

Major findings thus far have been surprising:

- Typical bearing life today is about one third of what it was about 20 years ago; this applies to both rolling element and plain bearings.
- Gearbox life over the same period has reduced by up to 80%.
- Lubricators are often seen as a misfit in the organisation.
- There is a major loss of skills throughout industry, from plant lubricator level and engineers to senior management and the Bureau of Standards; examples of this are:
 - o The level of knowledge with reference to a request for quotation is insufficient, with the result that the incorrect equipment can be procured.
 - o Root cause failure analysis is not applied, or is simply not performed, and no corrective action is implemented.
 - o Minimum lubricant specifications established by the SABS and requested by industry are in some cases obsolete or inappropriate for the country's needs.
- Shortened equipment life is attributed to lack of basic maintenance skills; equipment alignment and lubricant cleanliness are seen as the dominant causes.

- CEOs and CFOs are short term cost driven, and do not see the benefits of sound tribology

- Procurement is short term cost driven; failures have been recorded where insufficient knowledge of lubricants has resulted in the use of sub-standard components resulting in expensive failures.

Training and tertiary education standards

At a tertiary level education in the engineering discipline is sound, but this education typically does not include tribology or lubrication. At lower levels reduced apprentice and artisan training appears to have omitted tribology and lubrication entirely.

We look forward to completing this project and re-establishing tribology in its rightful place in industry. As always, if any reader has any information or experience relevant to this project, or would like to contribute any information for the project, please get in touch with Gillian Fuller, SAIT Secretary, Tel: (011) 802-5145/6/7/8, Fax: (011) 804-4972, Email: secretary@sait.org.za, Website: www.sait.org.za

Patrick Swan

Project Manager, SAIT

Component suppliers surveyed have been suppliers of plain and rolling element bearings, gearboxes, hydraulic design and components and heavy transport equipment. Industries surveyed are metal beneficiation, chemicals, pulp, transport and local government. These surveys are of course on-going so that all major sectors of industry and component suppliers will be surveyed.