

# Newsletter – August 2018

**T**ribology is the unseen partner for a real and massive impact on climate change. Reduce friction – tyre rolling resistance and air resistance coefficient – and fuel consumption decreases.

<https://www.greencarreports.com> says that 'calculating the total number of motor vehicles on the planet is an inexact science, but the number is growing rapidly. The automotive trade journal *Ward's Auto* estimated that the total crossed one billion vehicles sometime during 2010.

Navigant Research estimates in a [new forecast](#) that light-duty vehicles make up 95 percent of that total, and that the number of vehicles we drive everyday will shortly cross 1.2 billion.'

**If fuel consumption for 1.2 billion vehicles can be reduced by 0,5 litres per day through improved tribology practices, that would mean a daily saving of 600 million litres of fuel.**

At a conservative ratio of 2,5kg carbon dioxide produced for each litre of fuel burnt, that would mean reducing greenhouse gases by 1,5 million tons every day – a staggering 547.5 million tons of CO<sub>2</sub> annually!

Speed greatly increases air resistance – chart from Bridgestone Tyres:

| Effect of speed on fuel efficiency factors |        |        |
|--|--------|--------|
| Road speed                                 | 88kph  | 120kph |
| Tyre rolling resistance %                  | 33,30  | 24,00  |
| Air resistance %                           | 33,30  | 46,00  |
| Everything else %                          | 33,30  | 30,00  |
|  | 100,00 | 100,00 |
| Change in fuel economy %                   | 33,13  | 46,12  |

Saving the planet is all about reducing friction!

## ETT – Essential Tribology Terminology

### More simple definitions for three of tribology's essential terms

- ✓ **Grease** A lubricating oil thickened by adding a metallic soap or other gellant to produce a semi-solid lubricant. The thickening agent not only acts as a sponge by holding the lubricating agent in its interstices but can also enhance the performance of the grease by its synergistic interaction with the oil.
- ✓ **HTHS** High temperature / High shear rate viscosity
- ✓ **Hydrocarbons** These are substances composed of the elements hydrogen and carbon combined in various proportions, and though other compounds which contain sulphur may be present in petroleum oils, it is those first two elements which determine the character of the substance.

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## SAIT TRAINING – Smoothing the path to knowledge

### Lubrication Engineering Courses, 2018 & early 2019

LE 117: 27 - 31 August 2018, Cape Town

LE 118: 8 - 12 October 2018, Johannesburg

LE 119: 18 – 22 February 2018, Johannesburg.

|  |            |
|--|------------|
| Course Fees for SAIT Members:                                      | R14 950.00 |
| Course Fees for Non-SAIT Members:                                  | R16 675.00 |
| Course Fees for Students (Proof of Student Registration Required): | R 4 600.00 |

For a Registration Form, please go to: <http://sait.org.za/events/training/> or email [admin@sait.org.za](mailto:admin@sait.org.za)

### Further Course dates in 2019, fees to be advised:

LE 120: 6 - 10 May 2019, Johannesburg

LE 121: 27 - 31 May 2019, Durban

LE 122: 22 - 26 July, Johannesburg

LE 123: 26 - 30 August 2019, Cape Town

LE 124: 7 - 11 October, Johannesburg

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Continued / Pg 3 / STLE Exams 2018

**The SAIT will host the  
STLE: CLS, OMA, CMFS EXAMS**

On 23 November 2018

And the

**SAIT CLS OVERVIEW**

On 21-22 November 2018

**Venue: SAIT - Science Park - Johannesburg**

**COST including VAT:**

Exam R 6 095.00

Exam re-write R 3 105.00

Study course R 5 980.00

**Books**

STLE Basic Handbook of Lubrication 3rd ed R 3 021.00 + Post or Courier

AIST Lubrication Engineers Manual 4th ed R 4 047.00 + Post or Courier

For a Registration Form, please go to: <http://sait.org.za/events/training/> or email [admin@sait.org.za](mailto:admin@sait.org.za)

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**JUST ADD WATER TO CREATE ACID!**

**Oxidation and combustion processes create the oxides – SO<sub>2</sub> – NO<sub>x</sub> – CO<sub>2</sub>.**

All that is needed is a dash of H<sub>2</sub>O for any oxide to become acid and the enemy of tribological action. SO<sub>x</sub> becomes H<sub>2</sub>SO<sub>4</sub>, NO turns into HNO<sub>3</sub> while CO is changing the acid levels of the world's oceans with H<sub>2</sub>CO<sub>3</sub>.

Water contamination is prevalent. Poor housekeeping and little understanding of the consequences of allowing water into lubricant storage and machinery. This reduces Total Base Number (TBN) values and increases Total Acid Number (TAN) values. SAIT member, John Fitton comments:

Modern engine technology is reducing the amount of soot that is generated in the combustion chamber. Along with reduction in sulphur levels – this reduces the soot loading on the engine.

- The TBN (ability to neutralise acids) has also been improved over the years – hence it is more stable.
- The concern these days is with the total acid number (TAN).
- The TBN starts high and drops over time (is used up), while the TAN starts low and builds up from combustion (Sulphur and NO<sub>x</sub>).
- When the TBN and TAN cross, there is no longer the ability to neutralise acids and corrosion occurs.
- Hence TAN needs to be monitored as well!

## INTERNATIONAL EVENTS

### **4–7 September 2018 - 45th Leeds-Lyon Symposium on Tribology:**

**Smart Tribology Systems**, at Leeds Trinity University, Leeds, UK

*Please take the time to explore the symposium website Leeds-Lyon 2018*

<https://engineering.leeds.ac.uk/leeds-lyon-conference>

**17-20 September, 2018 – Malaysia: ASIATRIB 2018:** the mega event in the series of International Tribology Conferences under the auspices of the Asian Tribology Council (ATC), the apex body of national tribology society of Asia Pacific countries. See the prospectus at:

[http://asiatrib2018.mytribos.org/PDF/ASIATRIB2018\\_prospectus.pdf](http://asiatrib2018.mytribos.org/PDF/ASIATRIB2018_prospectus.pdf)

### **28-31 October 2018 – Chicago, Illinois, USA – 2018 STLE Tribology Frontiers Conference (Co-sponsored by ASME Tribology Division):**

Join tribology researchers from more than 25 countries in North and south America, Asia and Europe for the 2018 STLE Tribology Frontiers Conference (TFC) to be held October 28-31 October 2018, at the historic Drake Hotel in downtown Chicago. Co-sponsored by the Tribology Division of the American Society of Mechanical Engineers (ASME). The TFC's focus is the role tribology plays as the interface of physics, chemistry, materials science and mechanical engineering. The conference will feature three keynote speakers who will present talks on areas at the forefront of tribological science, and include technical sessions featuring submitted presentations from leading tribology researchers and institutions from around the world. Go to <https://www.stle.org/TribologyFrontiers> for further information.

### **2 April 2019 – UNITI Mineral Oil Technology Congress – Stuttgart, Germany:**

[www.umtf.de](http://www.umtf.de)

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## DID YOU KNOW?

### **'A tribological tip-trip'**

For most situations, chemical wear first-generation lubricants perform adequately; for adverse conditions, such as extreme temperatures, the use of premium lubricants really pays off.

A hydro utility study on energy reduction through lubrication engineering studied the use of synthetics in air compressors. The compressed air unit in the study was a 150-hp screw-type compressor that was recently rebuilt and utilized a standard 32 weight lube oil. A compressed air audit company gave the conveyor a clean bill of health. The power was monitored under varied load conditions and its power consumption noted. Because compressors run extremely hot, synthetic lubricants allow the press to run cooler, they also "de-sludge" or clean the compressor and allow it to run more efficiently, thereby reducing power consumption. Synthetics also allow for extended changeout intervals. The standard lubricant was replaced with a 32-weight fatty acid ester-type synthetic (2<sup>nd</sup> generation) lubricant. An energy reduction of 7.3% was gained by changing the lubricant, and the changeover also resulted in a cooler running compressor. (Lube tips – Noria.com)

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**Continued / Pg 5 / Foam vs Air Entrainment**

## Response to: 'Foam vs Air Entrainment'

The SAIT definition of foaming in the July 2018 Newsletter created interest and a detailed response from SAIT member, Peter Vavruch who points out that "Air can exist in oil in three different states: dissolved, entrained, and foam. Air dissolved in oil exists as individual molecules which are similar to CO<sub>2</sub> dissolved in soda water. This type of air is invisible and impractical to detect."

Vavruch adds – "While "foam" is often used loosely to describe any air bubbles in the oil or at the surface of the oil, this simplification can lead to dangerous maintenance practices namely adding anti-foam additive into the oil when it should not be done."

Join the debate! This 527-word response is worth the read and obtainable in electronic format on the SAIT Website at:

[http://79.170.40.230/sait.org.za/rw\\_common/plugins/stacks/armadillo/media/SAITNEWSLETTER156AUG2018PETRVAVRUCHRESPONSE.pdf](http://79.170.40.230/sait.org.za/rw_common/plugins/stacks/armadillo/media/SAITNEWSLETTER156AUG2018PETRVAVRUCHRESPONSE.pdf)

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## PARTING SHOT

To ensure that a machine operates effectively and efficiently, it is critically important that it is lubricated with the correct volume, at the correct time and with the correct quality. Effectively implementing this strategy will reduce wear rates and increase the life of the machine, reducing the total cost of ownership. Part of this strategy would be to ensure that the correct specification is being used for the specific machine operating conditions. Often by using a higher specification product than required will result in reduced total cost of ownership and with certain products a reduction in energy consumption. Care must however be taken that the product used meets or exceeds the required specification and has been formulated as such – confirm this!

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