The South African Institute of Tribology

*understanding friction, lubrication and wear*

# SAIT Newsletter, October 2020

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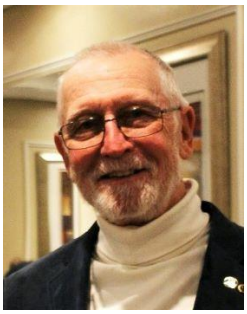

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# Tribology

## Tribology CAN be 'green'.

No, you say – one litre of used oil can pollute one million litres of water. But the word 'green' plays a role that depends on the outcome of our intentions in preserving the environment. A 3,400 word 'White Paper' by John Sander | Vice President of Research & Development at **Lubrication Engineers**, entitled **'Lubricants Can't Be Green … Can They?'**, spells out a way forward.

**John Sander, Vice President, Research & Development, Lubrication Engineers**

Sander's answer to the question, "Can lubricants be green?" is an unequivocal yes! To be 'green' requires **policy before procedure and training** – that's where Sander adds value to the debate. 'The goal of this paper' says Sander, 'is to show that an unlikely industry – lubrication – can be very green through responsibly planned purchasing, storage, use and disposal; and to challenge the limited regulatory view of green lubricants that fails to consider longer lubricant and component life, and decreased energy use.'

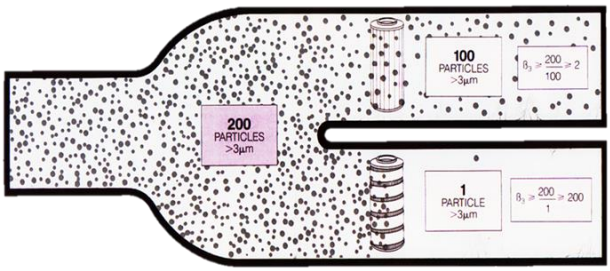
Sander points out that 'The term "green" has various synonyms: environmentally friendly, environmentally acceptable, and sustainable, just to name a few. Most of the terms used over the years have involved how something we do (or use) affects the natural environment in which we live, including air, water, soil and the natural organisms that live in them. The goal of green initiatives is to conserve resources, produce less waste, and minimize pollution. Today many organizations are embracing "sustainability" as the best way to describe these initiatives.'

**'Green' is undeniably linked into 'Climate Change' – This 'White Paper' is worth storing for strategic and operational reference purposes.**

# Filtration – it's much more than particle size

There's no doubt that particles and their size play a major role in tribology, but in filtration terms it's not only size that matters because **filter efficiency is not a 10-micron rating – we need to know the Beta ratio / efficiency%**

- **Beta ratio** is often used when expressing **filter efficiency** for a given particulate size. This, in simple terms, is the number of particles in the upstream (before **filtration**) divided by the number of particles downstream (after **filtration**).
  - **For example:** A 10-micron, Beta 100 filter will mean that for every 100, 10-micron particles that the filter sees, 1 is passed through **(99.5 %** efficient) What you really want is Beta 2000 or 99.95% efficient filter – this diagram spells out the difference



- So, what is the Beta ratio of the fuel filters in use? This is often an awkward question that leads to a more definitive answer…

# SAIT Training

## *Follow the path from data to information and into knowledge.*

### Applicable to ALL SAIT Training Courses:

***Registration closes a week before the starting date of each course; please book early to ensure your position.***

***Please note that photographs will be taken during the course and published in the SAIT Newsletter and on the SAIT Website.***

**Something New:** The SAIT intends to present, online, one-day Introduction to Lubrication Engineering and Introduction to Wear and Materials Courses.

## *"INTRODUCTION TO LUBRICATION ENGINEERING"*

## On Zoom

A one-day introductory e-learning course*, ILE 1e*, on the principles & technology of lubrication engineering held on Zoom platform.

***Registered with ECSA, SAIMM number pending, and accredited with CPD credits.***

Friction, wear, poor lubrication and failures cost the industry time and money. To overcome these problems, and to save on downtime and maintenance, it is essential for all personnel from top management right through to the lubricator on the factory floor, to be aware of how machinery and equipment can be maintained to ensure maximum efficient functioning. This introductory level course is based on selected modules of the current five day *"Lubrication Engineering"* course, which has been successfully presented over many years to personnel involved with maintenance.

***Course Objectives:*** To give participants an introduction to the practical understanding of lubrication engineering.

***Who Should Attend?*** The course gives basic knowledge which would suit plant operators, buyers, lubricators, artisans and apprentices, but with sufficient detail to warrant CPD credits with ECSA. The course will also benefit anyone involved with the operation and maintenance of industrial plant and machinery, or mining, trucking, transport and other lubricant related disciplines.

***Proposed Course Content:*** Lubrication Terminology, Source, Chemistry, Physical Characteristics, Additives, Fundamentals of Lubrication, Greases, Plain Bearings, Rolling Bearings, Gears, Hydraulics, Compressors, IC Engines, Oil Analysis & Condition Monitoring, Storage & Handling, Filtration and Synthetics.

*A certificate of attendance will be awarded to delegates who complete the course.*

***Cost:*** **SAIT Members: R2,394.00** **Non-Members: R2,508.00** **Students: R700.00 (*Written proof of full-time student registration is required.***

**AND**

**/4…**

## *"INTRODUCTION TO WEAR & MATERIALS"*

### On Zoom

**A one-day introductory course, IWM 1e, on the tribological principles of wear and materials.**

***Registered with ECSA, SAIMM number pending, and accredited with one CPD point.***

This one-day SAIT course ***"Introduction to Wear & Materials"***, presented at an introductory level, is based on selected modules from the original three day *"Understanding and Managing Wear"* course, and is concerned with the operation, maintenance and design of plant and equipment, with special relevance to the selection and specification of wear resistant materials, in the field of tribology.

***Course Objectives:*** To give participants an introduction to the different wear mechanisms and a practical understanding of the range and right selection of materials available to combat wear. A short introduction into the theory is complimented by practical examples of applications.

***Who Should Attend?*** The course is aimed at supervisors and foremen, who must be able to understand and recognise wear and related problems, but will also benefit anyone requiring an introductory understanding of the common wear processes and the materials currently used to combat wear. The course is accredited with ECSA, for one CPD point.

***Proposed Course Content:*** Wear mechanisms such as sliding wear, abrasion, erosion, fatigue-related wear, corrosive-wear and cavitation; Wear resistant materials including ceramics, rubbers, hardmetals (tungsten carbide), polymers, ferrous and non-ferrous alloys; Case studies on wear failures. A certificate of attendance will be awarded to delegates who complete the course.

*A certificate of attendance will be awarded to delegates who complete the course.*

***Cost:*** **SAIT Members: R2,394.00** **Non-Members: R2,508.00** **Students: R700.00** ***(Written proof of full-time student registration is required.)***

***Please* let us know at admin@sait.org.za if you would be interested in participating, or registering trainees to participate in these courses.**

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## *Our next full, online*

## *Lubrication Engineering Course*

## *Is scheduled to take place in February 2021 as LE 128e, dates to be advised.*

**All of our Lubrication Engineering courses, online and 'live', are registered with ECSA and are awarded 4 CPD Credits.**

### Information is applicable to all Lubrication Engineering courses held by The SAIT:

***Course Objectives:*** The course is designed to transfer a thorough understanding of tribology from a lubrication engineering perspective. Some twenty topics take participants through from basic chemistry; the theory of rubbing contact and friction in industrial applications, to the application of management principles, safety and the environment.

***Who Should Attend?*** The course is aimed at maintenance personnel but will be of benefit to anyone concerned with the operation, maintenance, condition monitoring or management of industrial plant, machinery, transport and other lubricant related disciplines. Marketing personnel can gain valuable knowledge from the course.

***Experience:*** Delegates are advised that it is essential that they should have a good understanding of lubricants and their application, specifically what viscosity is. Delegates must have at least twelve months experience in the lubricant and maintenance professions.

***Case Studies:*** Delegates are invited to bring their case studies, their problems and their questions to the course for discussion.

***Course Content:*** Lubrication Terminology, Fundamentals of lubrication, Production and characteristics of lubricant base oils, Properties of base oils, Additives, Specifications, Grease, Lubrication Devices, Synthetic Lubricants, Internal Combustion Engine Lubrication, Auto Drive Line Lubricants, Plain Bearings, Rolling Bearings, Gears, Hydraulics, Compressors, Transformer Oils, Metal working, Filtration, Condition monitoring & Used Oil Analysis, Seals, Coolants, assessment of failed components, Lubrication Surveys, Storage and Handling of Lubricants and Environment.

***Examination:*** An on-line examination will complete the course, with a certificate for successful candidates.

***Costs:*** ***SAIT Members: R11,385.00*** ***Non-Members: R12,765.00*** ***Students: R3,510.00*** ***(proof of registration as a full-time student is required)***

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## *"LUBRICATION ENGINEERING 127e"*

### 5-16 October 2020

This course is currently being presented, online, over two weeks, mornings only.

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## *'Live' Lubrication Engineering Training:*

**Face-to-face 'live' training will resume when Lockdown Regulations permit, subject to confirmation, dates not yet set:**

***Costs:*** ***SAIT Members: R17,135.00*** ***Non-Members: R19,090.00*** ***Students: R5 267.00*** ***(proof of registration as a full-time student is required)***

**For full details about SAIT Training, go to** SAIT Training

## The STLE's CLS, OMA and CMFS Examinations Hosted by The SAIT

stle
Society of Tribologists and Lubrication Engineers

**NB: These Examinations have been postponed as no registrations being received by the closing date.**

**They will not take place in November 2020.**

The South African Institute of Tribology will host the STLE's CLS, OMA I and OMA II and CMFS examinations **at a date to be advised.**

***Please contact us at admin@sait.org.za if you are interested in participating in these exams earlier in the new year. Please note that before writing, you will need time for a large amount of preparatory self-study and reading.***

The venue will be Science Park, Kelvin.

- **Certified Lubrication Specialist** (CLS): Although not compulsory, it is highly recommended that you first attend the SAIT five-day 'Lubrication Engineering' course. A distinction of 75% is a good indication of success in the CLS exam, where the standard is high and the pass mark is 70%. The recommended books for the CLS exam are the STLE Alberta Section '*Basic Handbook of Lubrication*' Third Edition, and/or the AIST '*The Lubrication Engineers Manual'* Fourth Edition.
- **Oil Monitoring Analyst** (OMA I and OMA II)
- **Certified Metalworking Fluids Specialist** (CMFS)

***A significant amount of study is required for these exams, so it is advisable that candidates make an early start.*** Recommended reading for all modules is on the STLE website under *"Professional Development".*

For further information, costs and to register, please contact Gill, Isabel or Berice at the SAIT offices:

Tel. (+27) (0)11 804 3710 or email secretary@sait.org.za or admin@sait.org.za.

# SAIT Events

### Technical Meetings - SURVEY:

The SAIT is planning to resume it's monthly early-evening Technical Meetings, both 'live' and as webinars.

***Your opinion matters:*** ***Would you prefer Tuesday, or Wednesday, evenings at 18:00? Please send your preference to admin@sait.org.za.***

*We will keep you informed of all updates and changes to our schedule.*

# International Events

**For a full list** of upcoming international events please visit Tribonet Conferences where links take you to each event in full detail. For news on the Plenary Speakers and important dates, please read on.

Every Wednesday, a new **Recorded Webinar** is available, free, to all **STLE Members**. The STLE also provides links to TLT articles related to the webinar topic. *For more information, please go to:*

stle
Society of Tribologists and Lubrication Engineers

*https://www.stle.org/WebinarWednesdays?utm_source=Real%20Magnet&utm_medium=email&utm_campaign=156033357*

For full information about the **7th World Tribology Congress,** to be held in Lyon, France, from September 5 to 10, 2021, please visit WTC2021.

For further information on Speakers, Events and Important Dates for WTC2021, please read on.

Visit the Speakers Page

**The Congress Program:** A very rich and intense program which includes:
> Young Tribologists Events: 3-Minute Thesis Contest, Career Fair, Evening
> Sponsor Lectures, 40 Invited Talks, 17 blocks of Standard Sessions
> Poster Sessions, Exhibition
> Social Program: Welcome drink, Live show and party, Conference Gala Dinner

Visit the Program Overview Page

**Any contribution is welcome until 15 October 2020** through the submission platform and will be reviewed by the scientific committee. Acceptance will be notified by e-mail **by end of January 2021**. Selected papers will have the opportunity to be published in the peer-review journals partners of the conference, which are referenced on the conference website.

**Important Dates:**

**Abstract Submission:**
Opening: **30 March 2020**
Closing: **15 October 2020**

**Early-Bird Registration:**
Opening: **15 September 2020**
Closing: **15 April 2021**

# Contamination Corner

**Contamination destroys the promise of lower operating costs that can be achieved with longer drain intervals.**

Extended oil drain intervals are a competitive 'Holy Grail' of modern truck manufacturers – industry standard engine oil changes are moving up from 20,000km intervals up to 30,000km and even over 40,000km.

But extending drain intervals is far more than a policy-decision paper-exercise. This involves adherence to very specific lubricants and lube performance standards. There is an assumption in the background that operating practices observe the highest levels of hygiene. Just wiping an engine oil dipstick with a

dirty rag left on a workshop floor is enough to defeat the potential offered in a part-synthetic, multi-grade, high-quality lubricant.

Practical tribology relies on MBWA – Management by Walking Around. All the efforts of engineers and expensive certification can be lost in simple careless practices on the ground.

## Did You Know?

It's a worthwhile, informative discipline to overlay failure and condition monitoring data on seasonal timelines. This is all part of root cause analysis. Tribology provides the evidential bread-crumb trail, but it is up to human intervention to overlay the time factor **– the when that leads into the why and finally the cost**

An interesting case study covering axle differential failure revealed that 71% of differential failures occurred during the wet season while 29% occurred during the dry season. In all these failures, broken planetary gear carriers/spiders were discovered upon inspection. All failures were linked to wet weather challenges and/or post wet weather impact of abrasive wear.

Please visit https://www.wearcheck.co.za/shared/TB69.pdf

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## From the President's Desk –
### Patrick G. Swan

Shortly …

*For full information about the **7th World Tribology Congress,** to be held in Lyon, France, from September 5 to 10, 2021, please visit WTC2021.*

## Parting Shot!
### It all starts with a COVID-19 Tribology Policy!

The saga surrounding Boeing 737 MAX has not ended and national 737 MAX fleets are still grounded. According to press reports **387** of these aircraft have been delivered to customers as of March 2019 and approximately **400** produced and stored as of Dec. 2019. Add this to other national airline fleets stored in remote deserts around the globe and one begins to realise the size of the challenge posed by a start-up when COVID-19 permits international travel.

All the high-tech lubricants used in modern machinery were intended for use whatever the measuring benchmark may be – hours, kilometres or total cumulative fuel consumption. Extended storage implies a strict and expensive start-up operating procedure. **Would you be prepared to board an aircraft that has not undergone a certified**

**check-up according to recognised world standards?** That's one important role of tribology under COVID-19, the acronym for Corona Virus Disease - 2019.

## We Want to Hear from YOU


1. Please let us know what topics are of interest to you: submit interesting paragraphs or articles that we can share with the SAIT community, by sending them to admin@sait.org.za, for forwarding to The Editor. This will assist in disseminating information to all involved in Tribology.
2. Please let us know what would interest you for technical sessions or webinars
3. Please let us know of interesting presenters from whom you would like to hear.

We look forward to hearing from you!

## Social Media

**Please Like the South African Institute of Tribology – SAIT – on Facebook and regularly check our Website for updates.**

+27 (0)11 804 3710