



“understanding friction, lubrication and wear”

Newsletter, July 2014

Tribology 2015

The 11th International Tribology Conference, presented by The South African Institute of Tribology, 10-12 March 2015 at the University of Pretoria Conference Centre Pretoria South Africa. For information about presentation of papers, sponsorship, exhibition and registration, contact Gill or Isabel at +27 11 804-3710 or e-mail secretary@sait.org.za or admin@sait.org.za.



SAIT Programme 2014

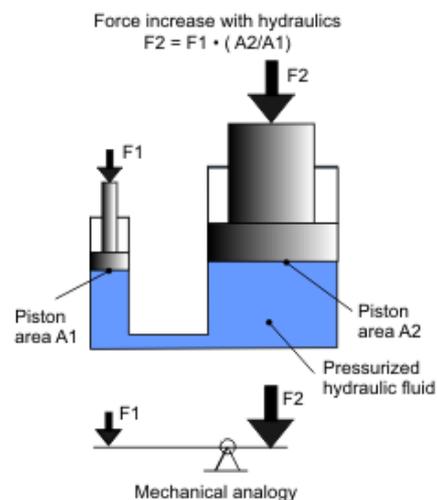
25 – 29 August 2014: 5-day Lubrication Engineering Course (91)

- Breakwater Lodge, V&A Waterfront, Cape Town. This course is registered with ECSA, SAIMM No. 00663, and is awarded five CPD credits

15 – 19 September 2014: 5-day Lubrication Engineering Course (92)

- Science Park, 1 Northway off Marlboro Drive, Kelvin, Sandton, Johannesburg. This course is registered with ECSA, SAIMM No. 00664, and is awarded five CPD credits.
Please note – this course is fully booked.

14 October 2014: Afternoon Seminar, ‘Hydraulics’ –



The SAIT will present an afternoon seminar on “Hydraulics“, at Science Park, Northway, Kelvin on 14 October 2014. We are inviting interested persons to submit papers for this event. The seminar is intended to bring together all parties interested in this important and topical subject.

With the continuing focus on cost cutting, longer asset lives and better efficiencies, many companies should be seeking high performing, high efficiency anti wear hydraulic circulating fluids.

Guidelines for Speakers:

Authors are invited to submit papers or case study material on topics that are informative and current. The following subjects are a guideline only for the day’s programme. Any other suggestions, ideas or topics that could be associated with the subject, will be welcome:

- Improved hydraulic pump operation
- OEM specifications and test requirements
- System & component design



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- Base oils & additives.
- Effective sampling techniques for oil analysis programs,
- Filtration and maintenance.
- Failure analysis.
- Ashless fluids vs Zinc based.
- Used oil recovery and recycle.

Please send a brief synopsis, and short title, of your proposed presentation or case study for approval, maximum 500 words, to the SAIT, email secretary@sait.org.za, admin@sait.org.za or fax to 086 719-2261 as soon as possible. We would like to circulate the programme early to a large target market to ensure a good attendance. Please include title, author and affiliation, and your contact details. The full paper, presentation or case study is required by **3rd September 2014**.

The seminar is not a selling platform. Product promotional material or sales orientated videos should not be included in the presentations unless modified to provide only technical aspects.

For any enquiries regarding the technical nature of the seminar please contact Shawn Pharo on mobile +27 82 856-2100, and for general enquiries phone Gill or Isabel at 011 804-3710.

20 – 24 October 2014: 5-day Lubrication Engineering Course (93) – Science Park, 1 Northway off Marlboro Drive, Kelvin, Sandton, Johannesburg. *This proposed course will presented in October, depending on demand, and will be registered with ECSA, SAIMM No. pending, and will be awarded CPD credits.*

19 & 20 November 2014: SAIT CLS Study Course – Science Park, 1 Northway, off Marlboro Drive, Kelvin, Sandton, Johannesburg. For those wishing to write the STLE CLS exam, attendance of this course is strongly advised, especially bearing in mind the imperial measurements that are used and the focus on steel industry lubrication. The course will be facilitated by a current CLS holder, and study modules can be

made available before the course dates, if needed. The STLE exam standard is high and the pass mark is 70%. Global pass rates are around 50%.

21 November 2014: STLE - CLS, OMA & CMFS exams – Science Park, 1 Northway off Marlboro Drive, Kelvin, Sandton, Johannesburg.

Course Attendance:

We ask that, should a delegate not be able to attend a course for which they have registered, they let us know as soon as possible, so that we can accommodate people from the waiting list. Delegates can phone either Gill or Isabel at 011 804-3710, or e-mail Gill at secretary@sait.org.za or Isabel at admin@sait.org.za. We will be happy to carry your registration forward to a future course at no further cost.

For further details of all the above, please contact Gill or Isabel at 011 804-3710 or e-mail either secretary@sait.org.za or admin@sait.org.za

Time and Tribology

By Isabel Bradley, SAIT Assistant Secretary

Time is variously defined as a ‘commodity’, a ‘dimension’, ‘part of the fundamental structure of the universe’, a ‘concept’ or a ‘sequence’. The more one examines the definitions and discussions of time and its properties, the more confusing the subject becomes.

Whatever definition we care to use, there is no doubt that time affects everyone. Friction, a tribological reaction, is always a function of time. Time is unavoidably an essential part of everyone’s life from the minute they’re born until their ‘time is up’. Man has always felt the need to measure and quantify time in an attempt to control it.



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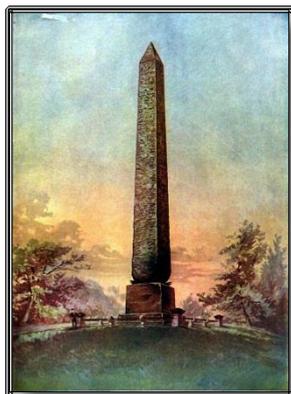
The rising and setting of the sun, the changing of seasons, the length of time it took for a person to grow into a functioning adult, were all ways of measuring time. No doubt early man watched the shade of a tall tree creeping across the ground, passing various landmarks, as the sun rose and fell, enabling him



to divide each day into periods of work, hunting, gathering, eating, playing, and sleeping.

The Position of Shadows on the ground became a way for man to tell the time.

The Egyptians erected obelisks to the sun god, Ra, which acted as a type of clock in the way the tree did, giving people a clear idea of the time of day by the position of its shadow. Many of these obelisks were moved from Egypt: Cleopatra’s Needles, one in London and one in New York, were moved from Egypt to their current locations, where they are tourist attractions.



Cleopatra’s Needle in Central Park, New York

Neither has any connection to Cleopatra; they existed a thousand years before she was born. There is a third obelisk, also referred to as Cleopatra’s Needle, in Paris, which came from a different site in Egypt and bears no relationship to the others.



Hieroglyphic of a sundial

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Later, circular sundials – flattened areas with a large, protruding beam called a gnomon, were made. They had markings on them denoting the passing hours as the shadow of the gnomon moved with the changing angle of the sun. A sundial had to be aligned to True North to give accurate readings. This positioning is critical to the sundial’s accuracy: a sundial designed in North America will not give accurate readings in the southern hemisphere. A Macedonian sundial on the side of a building in Bitola, was clearly not aligned to true north, as the readings of time on it were always way off course by at least an hour at any given time of a sunny day.



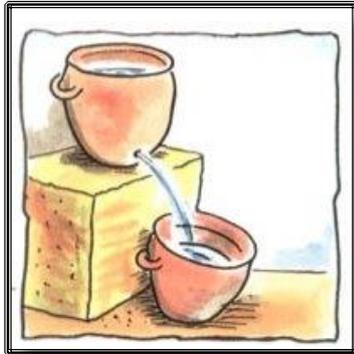
The Sundial in Bitola

Though well-designed sundials are accurate tools for telling time during sunny days, they were useless at night, or on cloudy days. Egyptian Priests needed to perform certain religious ceremonies at pre-ordained times of both day and night, so they invented the water clock around 1400 BC.

A Clay Water Clock



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A Clay Water Clock

A water clock consisted of a tall jar with a small hole in the bottom that dripped water at a consistent rate into a basin below it. The water level in the lower bowl gradually rose to lines marked to denote the passing hours. Later, water clocks worked similarly to water mills, turning a wheel which in turn caused a bell to ring or the hands on a clock face to move at regular intervals.

A lovely chain-driven clock



From about 1200 AD, chain-driven clocks were made without faces. The chain, with heavy weights on it, was hand wound. As the weights pulled on the chain, it unwound, with a bell ringing to signal the hours. After a further 200 years, springs were used in place of chains; and it took another 100 years for the first faces to appear on clocks, in the early 1500s.

The word clock comes from the Celtic words *clagan* and *clocca*, meaning bell, also Latin *glockio*, French *cloche*, and German *glocke*, as most early clocks marked the passing of time by ringing a bell.

Other devices used to measure time were ‘clock’ candles and hour glasses containing fine sand.



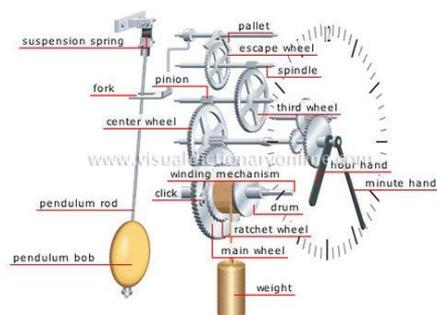
A clock candle



An hour glass

In about 1650, the Dutch astronomer and scientist Christiaan Huygens, built a clock using a pendulum. A pendulum, is defined as ‘a swinging lever, weighted at the lower end, for regulating the speed of a clock mechanism’.

The ‘period’ of a pendulum, that is, the time it takes to swing back and forth once, depends on the length of the pendulum. Therefore a pendulum can be adjusted so that it swings back and forth regularly, 60 times in a minute, thus measuring seconds.



How Pendulum Clocks Work



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According to Wikipedia,

‘All mechanical pendulum clocks have these five parts:

- *‘A power source; either a weight on a cord or chain that turns a pulley or sprocket, or a mainspring*
- *‘A gear train (wheel train) that steps up the speed of the power so that the pendulum can use it*
- *‘An escapement that gives the pendulum precisely timed impulses to keep it swinging, and which releases the gear train wheels to move forward a fixed amount at each swing. This is the source of the "ticking" sound of an operating pendulum clock.*
- *‘The pendulum, a weight on a rod*
- *‘An indicator or dial that records how often the escapement has rotated and therefore how much time has passed, usually a traditional clock face with rotating hands.’*

By combining springs, weights and gears with a pendulum, reliable, accurate clocks were built, becoming prized items. They were practical, and could also be highly decorative.

Clocks come in a huge variety of shapes and sizes, from the grandfather clock to cuckoo clocks, talking clocks, clocks that provide puppet displays on the hour and the half hour, astronomical clocks such as the beautiful one in Prague, and braille clocks – the list is as endless as man’s imagination.

Over many centuries, developing technology has improved the accuracy and reliability of our time-measuring devices. Added to the range of clocks today are electric clocks, which either use electricity as their power source, or electrical current as the oscillator. Quartz crystal clocks are remarkably accurate, with quartz used as oscillators. Atomic clocks are the most precise clocks available and use the length of time and the frequency of the change between positive and negative energy levels as their time base.

No matter how accurate our time-pieces become, control of time itself will always escape us.



The Astronomical Clock in Old Town Prague, Dating from 1410.

References:

<http://www.whoguides.com/who-invented-the-clock>

<http://www.ebay.com/gds/What-Are-the-Different-Types-of-Clocks-/1000000177636301/g.html>

<http://electronics.howstuffworks.com/gadgets/clocks-watches/clock5.htm>

First Pendulum clock - <http://www.saburchill.com/HOS/astronomy/016.html> - Christiaan Huygens, 1629 – 1695

http://www.kdwebdesigns.com/portfolio_samples/SavingTime/howclockswork.html

<http://blog.onlineclock.net/how-different-clocks-work/>

http://commons.wikimedia.org/wiki/File:3AAmericana_1920_Cleopatra's_Needle_NYC.jpg - Americana 1920 Cleopatra's Needle NYC

<http://dictionary.reference.com/browse/pendulum>



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International Tribology Events:

LUBMAT 2014, 25 – 27 July 2014: a conference and exhibition on Lubrication, Maintenance and Tribotechnology in the Hilton Manchester Deansgate Hotel, UK. For further information go to <http://www.lubmat2014.org/>.

7th International Colloquium: Micro-Tribology 2014, September 7-11, 2014 , Osieck-Warsaw. For further information, please contact : Zygmunt Rymuza [<mailto:z.rymuza@mchtr.pw.edu.pl>]

X Anniversary International conference "Lubricants Russia 2014" - €1195*, 12-13 November 2014

and International conference "Greases Russia 2014" - €450*, 14 November 2014. For more information please see:

<http://www.infineuminsight.com/trends/technology-trends/trends-2014-coming-soon>

<http://www.rpi-conferences.com/conference/?cnf=139>

http://www.rpi-conferences.com/conference/?cnf=139&pg=delegat_about

Second International Brazilian Conference on Tribology - TriBoBr-2014, 3 – 5 November 2014. For more information go to the website:

<http://www.abmbrasil.com.br/seminarios/tribologia/2014/general-information.asp>

The 10th International Colloquium “Fuels” Conventional and Future Energy for Automobiles will take place from 20 to 22 January 2015 in Stuttgart / Ostfildern. Current information and online submission of papers at www.tae.de/fuels

Malaysian International Tribology Conference 2015 (MITC2015), Penang, 16-17 November 2015. For full information, go to: <http://mitc2015.mytribos.org/>