



*"understanding friction, lubrication and wear"*

## ***SAIT News, September 2014***

### ***"TRIBOLOGY 2015"***

Please visit our SAIT Tribology 2015 Conference Website <http://www.sait.org.za/Tribology-2015/tribology-2015.htm>.

This conference promises to be full of fascinating papers and equally fascinating presenters and delegates. Registration will open at the end of October – watch this space for updates, information and teasers.



### ***Report-back on Lubrication Engineering Courses***

#### **Lubrication Engineering 91 – Cape Town, 25 to 29 August 2014**

This course was held at the Breakwater Conference Centre, V & A Waterfront, Cape Town, from 25 to 29 August 2014.

Of the 12 delegates who registered, 11 attended the course, coming from South Africa, Ethiopia and Angola. They were enthusiastic and diligent. Hearty congratulations to Gareth Floweday, Roxsanne Gordon, Mosiuoa Clement Mohapi and Bradly Hargreaves, who all achieved distinctions, and to all the delegates – everyone passed the exams.



**Delegates of Lubrication Engineering 91 with Lecturer Patrick Swan and SAIT Secretary Gill Fuller**

#### **Lubrication Engineering 92 – Johannesburg, 15 to 19 September 2014**

Nineteen of the 20 who registered attended this course in Johannesburg during September. The course ran smoothly, despite one morning when there was a power cut and the generator had to be run for about an hour. Congratulations to everyone, there were 14 passes and 5 distinctions. The distinctions





*“understanding friction, lubrication and wear”*

# ***SAIT News, September 2014***

were earned by Rolf Agema, Angus Duxbury, Cedric Campher, Derick Pretorius and Dries Fourie – well done!



**Delegates of Lubrication Engineering 92 with Lecturer John Fitton, SAIT Secretary Gill Fuller and SAIT Assistant Secretary Isabel Bradley**

## ***Hydraulics Seminar***

**Tuesday Afternoon  
14 October 2014  
Science Park, 1 Northway, Kelvin**

### **PROGRAMME**

12:30-13:00	Registration & Finger Lunch	
13:00-13:35	Welcome & Introduction	Shawn Pharo, SAIT Chairman, Umongo Petroleum
13:35-14:10	“Basics of Hydraulics”	David Beard, Intertek Testing Services
14:10-14:45	“Principles of Filtration”	Philip Craig, BMG
14:45-15:00	Tea	
15:00-15:35	“Efficiency in Hydraulics”	Patrick Swan Aswan Consulting
15:35-16:10	“Overview Industrial Lubricants Market	John Fitton, CPS Chemicals
16:10	Closure	Shawn Pharo, Chairman

## ***Wheels Within Wheels***

### **A Tribological Tale of Observation Wheels**

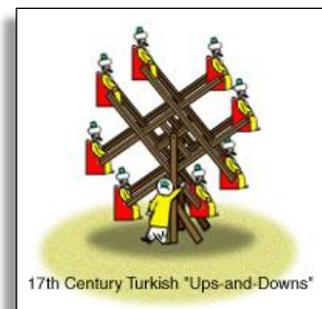
***By Isabel Bradley, SAIT Assistant Secretary***



***The Cape Wheel (photo by Galina Fuller)***

Each year in August, the SAIT’s Cape Town Lubrication Engineering Course is held at the Breakwater Lodge, Portsworld Road in the V&A Waterfront, where delegates enjoy wonderful views of Table Mountain and all the attractions of the famous Waterfront Precinct. Among these attractions is the Cape Wheel, a giant observation wheel which affords those who ride it magnificent views of the mountain, the city and the ocean.

Observation wheels have been known as sources of amusement since 1620, when an English traveller, Peter Mundy, reported seeing one on a visit to a street fair in Turkey. On his return to England, he described it as a ‘pleasure wheel with swing seats’. Smaller wheels were known as ‘ups-and-downs’ in England from about 1728. These were hand turned.





“understanding friction, lubrication and wear”

## SAIT News, September 2014



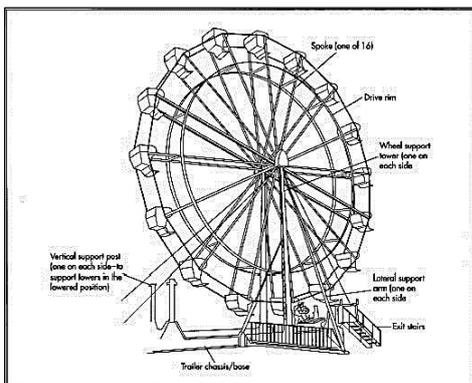
### Iron Age Water Wheels at Hama, Syria

Since the invention of the water wheel between the 3<sup>rd</sup> and 1<sup>st</sup> centuries BC, adventurous children have undoubtedly been ‘riding’ these big wheels, at great risk to their safety, enjoying the thrill of riding high.



In most parts of the world Ferris wheels, of varying magnitudes, are enormously popular tourist attractions. The sizes of early wheels ranged from a diameter of 6.1 metres to a large metal wheel with a 10.7 metre diameter

in Indiana in the 1880s. George Washington Gale Ferris, a bridge builder and civil engineer, built a 76.2m wheel in 1893 for the Colombian Exposition during the Chicago World Fair.



‘Designed like a bicycle wheel, with a stiff steel outer rim hung from the centre axle by steel spokes under tension, the wheel could carry as many as 1,440 passengers at a time in 36 enclosed cars. The centre axle was 84 cm in diameter and 13.9 m in length. It weighed 42.2 metric tons and was the largest steel forging ever produced at the time. The giant wheel opened on June 21, 1893, and drew more than 1.4 million paying customers during the 19 weeks it was in operation. The overwhelming success of Ferris’ design ensured that his name would be forever linked with such wheels.’ Read more at:

<http://www.madehow.com/Volume-6/Ferris-Wheel.html#ixzz3EJN9w1sK>.

Inventor and civil engineer William E Sullivan, who rode the Ferris wheel at the Colombian Exhibition many times, developed a smaller wheel for use by fun fair operators. It could be dismantled to fit on a trailer that could legally be driven on all highways throughout the United States of America, and could be easily re-erected at the next site.

The famous London Eye was erected in 1999. At 135 m tall, with a diameter of 120 m, it was the world’s tallest Ferris wheel. It has since been eclipsed by the Singapore Flyer, built in 2008 at 165 m and the 167.6 m High Roller in Las Vegas in 2014.

The wonderful Cape Wheel has 30 fully enclosed air conditioned cabins that take visitors 30 metres above the ground. It does 4 revolutions during a 12 to 15 minute ride. It was designed and developed by Ronald Bussink and is a Wheel of Excellence.

‘The Wheel of Excellence is the global market leader and most recognized brand for giant observation wheels throughout the world.’

Read more about the Cape Wheel at <http://www.capewheel.co.za/home.php?page=1>





*"understanding friction, lubrication and wear"*

## ***SAIT News, September 2014***



**The Wonderful Cape Wheel at Night**

The London Eye is a steel A frame structure that leans toward the Thames at 65°, with cable backstays. The cables are anchored at the top of the frame, and buried in a 33 m deep concrete foundation.



**The London Eye at Night**

The wheel resembles a bicycle wheel, with a spindle and hub with 64 connecting spokes. There are an additional 16 rotation cables attached to the hub to ensure even timing between the turning of the rim and that of the hub. The spindle is supported by a cantilever on one side of the frame. The London Eye rotates around the hub much as a bicycle wheel does, but powered by hydraulic motors driven by electric pumps.

*'Standard truck tires along the rim of the wheel act as friction rollers. Hydraulic motors turn the*

*tires, and the rotation of the tires turns the wheel. A computer controls the hydraulic motor speed for each tire.'*

<http://adventure.howstuffworks.com/london-eye1.htm>

Ferris wheels are designed to operate safely. The following information is a direct quote from [http://web.bryant.edu/~ehu/h364proj/sprg\\_98/lynch/how.htm](http://web.bryant.edu/~ehu/h364proj/sprg_98/lynch/how.htm):



**The Intricate Structure of The Cape Wheel  
(photo by Galina Fuller)**

*'This requires calculations to ensure the horizontal and vertical forces of the fully loaded wheel can be supported when the wheel is in operation. It also requires the design of safety interlocks to prevent the wheel from revolving during loading and unloading operations, and to prevent the operator from inadvertently operating the wheel in an unsafe manner.'*

Modern Ferris wheels are manufactured mostly from steel, with aluminium used for the seats and drive rims; polyurethane foam is used for the cushions; there are nylon bushings, phenolic plastic in the electrical components (Bakelite is a phenolic resin); support cables may have plastic protective coatings; copper electrical rings carry power from the hubs to the lights along the spokes, while the brushes that carry power to the rings are of carbon.



*“understanding friction, lubrication and wear”*

## **SAIT News, September 2014**

A regular maintenance schedule is imperative to keep any ‘big wheel’ turning safely and to ensure enjoyable rides for everyone. Vibration testing and grease analysis provide early warning of potential problems, while regular lubrication and checking of bearings, pulleys, bushes and all moving parts should be performed by well-trained tribologists and lubrication specialists.



**A Maintenance Worker on the Cape Wheel  
(photo by Galina Fuller)**

In the case of the Cape Wheel, their maintenance staff could well be drawn from members of the SAIT who have attended our Lubrication Engineering Courses, passed our exams and written the STLE’s Certified Lubrication Specialist Exams such as those we will be hosting on 21 November 2014.

### **References:**

<http://www.capewheel.co.za/home.php?page=1>  
See Ferris Wheel Lubrication Manual at  
<http://www.manualslib.com/manual/51340/Ferris-Industries-5900624.html?page=33>.  
<http://www.madehow.com/Volume-6/Ferris-Wheel.html#ixzz3EJN9w1sK>  
[http://web.bryant.edu/~ehu/h364proj/sprg\\_98/lynch/how.htm](http://web.bryant.edu/~ehu/h364proj/sprg_98/lynch/how.htm)  
<http://adventure.howstuffworks.com/london-eye1.htm>  
<http://www.ien.com/article/giant-ferris-wheel/112680>  
<http://famouswonders.com/hama-water-wheels/>

### **SAIT Programme, 2014-15**

**14 October 2014: Afternoon Seminar, ‘Hydraulics’:** 12:30 – 16:30, Science Park, 1 Northway off Marlboro Drive, Kelvin, Sandton, Johannesburg. Please phone 011 804-3710 or e-mail [secretary@sait.org.za](mailto:secretary@sait.org.za) or [admin@sait.org.za](mailto:admin@sait.org.za) to book your place.

**20 – 24 October 2014: 5-day Lubrication Engineering Course (93)** – Science Park, 1 Northway off Marlboro Drive, Kelvin, Sandton, Johannesburg. Please note – this course is fully booked.

**19 & 20 November 2014: SAIT CLS Study Course** – Science Park, 1 Northway, off Marlboro Drive, Kelvin, Sandton, Johannesburg. **21 November 2014: STLE - CLS, OMA & CMFS exams** – Science Park, 1 Northway off Marlboro Drive, Kelvin, Sandton, Johannesburg.

**2 – 6 February 2015: Lubrication Engineering Course (94)** – 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](mailto:secretary@sait.org.za) or Isabel at [admin@sait.org.za](mailto: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](mailto:secretary@sait.org.za) or [admin@sait.org.za](mailto:admin@sait.org.za)**



*“understanding friction, lubrication and wear”*

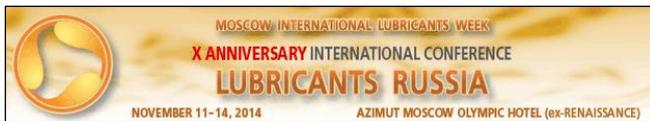
## ***SAIT News, September 2014***

### ***International Tribology Events:***

**TriboBR**

Second International Brazilian  
Conference on Tribology - TriboBR-2014

**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>



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



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



**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](http://www.tae.de/fuels)**