

18th International Colloquium Tribology, TAE, Germany

During January, Ostfildern Germany, is a very grey little town, which as the name suggests is outside of any metropolitan area, and is at the very end stop of Stuttgart's metro system. From Monday 9 to Friday 12 January this year Ostfildern was covered in grey cloud that from time to time condensed further to a wetter atmosphere, and the few people about stepped faster through the bone chilling cold.

The Technische Akademie Esslingen (TAE) campus is on the edge of Ostfildern, against the barren fields, about 300 meters from the town centre, and it is here that the world renowned Professor W Bartz hosts the International Colloquium Tribology every second year. As a regular event it attracts the highest level of papers and participants in the tribology world, and has a huge area for delegates to safely hang their wet raincoats, scarves and a vast array of hats!

As always Monday afternoon was taken up by a meeting of the World Tribology Council, of which South Africa is a member, under the chairmanship of Professor Peter H Jost. This year most discussion revolved around the 2013 World Tribology Congress, WTC 2013, which will be held from 8 to 13 September 2013 in Turin, Italy. The Turin event follows the immensely successful WTC 2009 event hosted by Japan in Kyoto. Impressive presentations were also made by Norway and China to host the congress in 2017

The TAE colloquium was arranged into 8 plenary sessions with 22 papers, many of which ran concurrently, and 149 regular papers in 9 concurrent sessions. It would take a very dedicated team to even attend most of the papers!

The TAE theme was 'Solving Friction and Wear Problems', and a common theme was Green Tribology or Ecotribology, since being at the forefront of friction and wear reduction, tribology is inherently 'green'. The main subjects were:

Basics of Tribology

- Fundamentals of Friction and Wear
- Hydrodynamic and Elastohydrodynamic
- Materials and Surface Engineering
- Machine Elements

Tribotesting and Properties of Lubricants

- Chemical, Physical and Technological Properties
- Classification and Standardization of Lubricants
- Condition Monitoring

Automotive Lubrication

- Engine Oils and Lubrication
- Gear Lubrication
- For-Life-Lubrication

Industrial Lubrication

- Metal Working and Metal Forming Lubricants and Lubrication
- Lubrication of Industrial Gears, Compressors and Hydraulics

Lubricants and Fluids

- Hydraulic Fluids and Seals
- Base Oils for High Performance Lubricants
- Mineral Oils

- Synthetic Fluids
- Additive Developments and Technology
- Solid Lubricants
- Lubricating Greases
- Environmentally Acceptable Lubricants

Highlights were:

Global lubes market

- Volumes
- Trends
- Base oil trends

Research

- Additives
- Base oils
- Surfaces

Items of major interest were:

- A new range of additives which have the potential to reduce friction under boundary conditions, to less than 0.03. Under normal fully lubricated conditions this represents a reduction of 60%.
- Surface texturing has long been shown to reduce friction; just consider a golf ball. This technology is being thoroughly researched, and in future gears, piston rings, and many other items can be expected to have laser textured surfaces. Texturing however is not a panacea, it does not work in all applications, and can increase friction if used incorrectly.
- Several papers reported on the development of triboconditioning or tribofilms that coat a surface to create a new chemical film, generally only a few nanometres thick, that both smooth the surface and have been shown to reduce friction by between 10 and 60%. Data presented by Peugeot Citroen showed a power increase of 20 horsepower by applying tribofilms to the valve train and pistons in current production engines, with ongoing work on the crankshaft and gear train.
- IC engine fuel economy will rely on both tribofilms and lower lubricant viscosities. A method for rating heavy duty crankcase lubricants has been developed using a Volvo D12D engine, and an SAE 0W-20 viscosity grade has shown excellent race track performance.
- ZF, who supply most of the world's gears or gear technology, went as far as proposing an oil free gearbox, using a newly developed gear tooth profile and tribofilms.

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