

# Cross Connections

## STLE Anniversary Spotlights Tribology Innovations

By Ed Salek

**T**he Society of Tribologists and Lubrication Engineers (STLE) is celebrating 75 years as the organization representing scientists and engineers involved in the tribology and lubricants business sector. While we're proud of our heritage, the focus for the project is on the people and innovations that have fostered progress in every sort of mechanical system — from engines in our cars to joints in our bodies.

To support this project, a team of industry volunteers is compiling a fascinating tribology and lubricants timeline that will be exhibited at the 75th Anniversary Annual Meeting in Chicago, May 3–7. Research is still underway, but here's an early look at a portion of what will be highlighted.

Some of the events predate the founding of STLE (then known as ASLE) in March 1944. A good example from that category is the Stribeck curve, which was first described in late 1901 and is one of the fundamental concepts in the field of tribology. The Stribeck curve defines the effect that changes in load, viscosity and speed have on friction. It is named for the German engineer Richard Stribeck.

Another example dates to 1898, when Henry Timken was awarded a patent for the tapered roller bearing, which has become one of the most widely used industrial products in the world. This patent created the foundation for the bearing company that still carries his name.

Equally important, in 1907, Sven Wingqvist patented a multi-row self-aligning bearing. This created the foundation for SKF, a global bearing and seal manufacturer founded in Wingqvist's home country of Sweden.

The 1940s saw the introduction of polyalkylene glycol, or PAG, oils, among the first synthetic lubricants to be developed and commercialized. They were created under mandate from the U.S. Navy in response to hydraulic fluid fires on ships resulting from ordnance strikes during World War II.

A familiar product born in the 1950s was what's now known as WD-40. It was developed in 1953 as a rust prevention solvent and degreaser in a small San Diego lab by Rocket Chemical Co. Five years later, in 1958, the product was introduced to the public as WD-40.

In June 1955, the first patents on polyurea grease were issued to a team working at what was known at the time as Standard

Oil of Indiana and is today part of BP. Polyurea greases have become a preferred choice for filled-for-life applications in bearings and are important in steel plants and electric motors.

In the early 1960s, tribology began to merge with medicine through the work of Sir John Charnley. He was a British orthopedic surgeon who pioneered the hip replacement operation. It was a rarity at the time but is now one of the most common medical procedures in the world.

When the timeline moves into the 1970s, two of the most well-known consumer products make their appearance. The Jiffy Lube fast oil change business debuted in 1971 and has been a part of Shell since 2002. Three years later, in 1974, Mobil 1 synthetic motor oil was first sold.

In late 1985, the first patent for high-performance calcium sulfonate complex grease was issued to researchers at what was then Witco Corp. (now part of LANXESS Canada).

A noteworthy development in the 21st century has been the introduction of metallocene polyalphaolefins, or mPAOs, by a variety of companies. These synthetic lubricants target a variety of automotive and industrial applications, including gear oils, greases and automotive lubricants.

Because the timeline is still under development, ILMA members are invited to contribute their recommendations for other noteworthy events, inventions or products by sending an email with details to me ([esalek@stle.org](mailto:esalek@stle.org)) by no later than Dec. 31.

While history is important, what might be coming next is also critical. STLE's *Report on Emerging Issues and Trends in Tribology and Lubrication Engineering*, informally known as the *Trends Report*, has gained a reputation for identifying current and future developments in the field since it was first published in 2014.

Work is underway on a third edition of the *Trends Report*, with a target release date of early 2020. It builds on the previous trends and conclusions but also has been refocused and reorganized to reflect the rapid pace of change affecting all areas of relevant technology. As a result, the 2020 report has consolidated application sectors into four high-interest topics: transportation, medical and health, energy and manufacturing.

The latest research has identified more than 140 trends for consideration in these four sectors. Transportation yielded the highest number (57), with considerable interest surrounding not only the implications and opportunities presented by electric and self-driving vehicles, but also developments in internal combustion engines. ♦



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