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Engine Oil Specs Tighten Up

Rolling Oils Support Sheet Metals

BIOLUBES Soar to New Heights

What's the connection between the Eiffel Tower and the giant London Eye Ferris wheel? Built in different times, both structures have nothing in common in their respective purpose, design or architectural style, except for one thing – the tourist attractions' machines are lubricated with the same biolube made in Switzerland.

Panolin International Inc. acknowledged that getting potential customers to use biolubes was like tilting at windmills. And, indeed, it took the company a long time to win over the Paris and London authorities and convince them that the spillage risks to the Thames and Seine from its hydraulic fluids were minimal. But they finally succeeded.

Winning Over Customers

The Madetswil, Switzerland-based lubes producer boasts a thick portfolio of large-scale projects using its hydraulic bio-fluids, including the Sihwa Lake tidal power plant in South Korea (the largest such installation in the world) and the San Roque dam in the Philippines. The company is a pioneer in producing "environmentally considerate lubricants" (ECL), as its management calls the biolubes it has marketed since the mid-1980s.

Biolubricant demand in Europe gained momentum twenty years later, when the market started to grow. Only a decade ago the share of biolubes was around one percent of the total European lubricants market. In countries like Germany, Sweden, Netherlands and Austria it is now significantly higher and accounts for five to eight percent, according to some estimates. Biolubes are becoming more accepted in North America, some countries in Asia and Australia. *Lubes'n'Greases* decided to find out more about these industry trends and travelled to Panolin's offices near Zurich.

"The best ideas for new products come from customers," said Martin Ruch, customer support manager. "In the eighties we had a

by
Boris Kamchev

customer called Buehler. Its sand excavators had regular spills in Lake Geneva, leading to many problems with the authorities. They asked us to develop a biodegradable lubricant that might reduce their environmental issues. It was a turning point for us, and we developed a product that was approved by the local authorities."

In the beginning the company evaluated a variety of raw materials for its biolubes. "We've assessed most of them. At the end we made a decision to use saturated synthetic esters. We haven't changed since. Saturated synthetic esters offer biodegradability, non-toxicity and extremely good oxidation stability, which allow us to extend the oil drain interval," Ruch observed. He said that the London Eye operator has used Panolin's biodegradable hydraulic fluids since the wheel started to spin in 2000 and only now is making the wheel's first hydraulic system oil drain after more than 100,000 working hours.

Ruch recalled that 25 years ago, "biolubes had major disadvantages. Using biolubes then meant more oil changes than using mineral oils. So we had to fight this bad image of biodegradable lubricants for years. And sometimes we still do."

Even today the market offers rapeseed oil-based unsaturated esters that are not quite suitable for high-performance applications such as auxiliary drives, hydraulic systems or transmissions. "Quite costly failures with biolubes based on different technologies that some companies were promoting two or three decades ago are still happening today," Ruch said. The company keeps fighting the bad image of biodegradable lubes, and it has to convince each end user that product performance today exceeds that of products they used in the past.

Product cost is Panolin's next concern. "We have competitors that offer biolubes at a very low price without field experience. To convince end users that our higher priced products will lower overall cost is sometimes a hard sell. Especially when the economy is down," Ruch said. He added that it's quite difficult to convince somebody to buy expensive products with benefits that accrue only after five or ten years of operation.

Environmental Protection

In rating its products, Panolin refers to the Organization for Economic Cooperation and Development 301b standard that specifies how organic chemicals have to behave in nature. "Our understanding of ECL is very clear. Lubes should biode-

Shoring Up Ester Performance

In years past, biolubes made from plant oils had weaknesses that helped prevent wide acceptance. According to some industry insiders, poly-unsaturated fatty acids were prone to polymerize in sunlight, resulting in significant surface lacquer formation. This was characteristic of rape-seed oil based hydraulic fluids. "This led to sticky equipment used in forestry industry that picked up pine needles and looked like hedge hogs," recalled Thomas Norby in an interview with *Lubes'n'Greases*.

Based in Nynashamn, Sweden, Norby works as a research and development manager at the Swedish biolubes producer Statoil which is investing in a high oleic, controlled unsaturated line of esters, which are renewable and biodegradable. "In our experience we have seen very few problems with modern synthetic high performance products based on high oleic type esters."

— by Boris Kamchev

grade at least 60 percent in twenty eight days," said Patrick Lammle, company owner and CEO. "They also should have very low or no toxicity. This is what makes an ECL product."

Besides biodegradability and non-toxicity, renewability is a third important criterion for environmentally friendly products. "Renewability is a big controversy in the industry," Lammle said. "Whether this criterion makes sense or not, we make both renewable and non-renewable products. The bacteria that consume the spilled chemicals don't care where the raw materials come from, and the question of renewability has always been secondary."

The idea behind biolubes is that when spillage happens, less impact on the environment is always better than full-blown pollution. "It is the key concept from the very beginning in the early 1980s, when ECLs were introduced to the market," Lammle stressed. "The definition hasn't changed since then, as biodegradability and non-toxicity are two things that always go together. There cannot be a biodegradable product with toxic additives, or non-toxic additives with non-biodegradable base oil."

From mobile applications, in the early 2000s, Panolin expanded the use of its biolubes to stationary hydraulic applications, such as the elevators in the Eiffel Tower, and water gates in many hydro-power plants. "Today's hydraulic systems and water turbines are very demanding and require sophisticated lubricants to prevent failure. Meanwhile, we've seen

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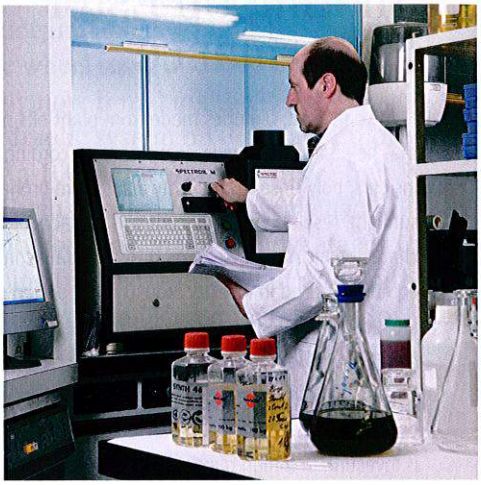
Moving Earth with Biolubes

Eberhard is one of the biggest construction company in Switzerland and a pioneer in the use of biodegradable fluids. One of Panolin's oldest customers, it started using biolubes in 1986, when it had to excavate the gravel of a river bed in a hydro-power plant project, according to Martin Eberhard, the company's owner.

Switzerland's booming economy doesn't allow the contractor's machines to stand idle for long. The company operates a fleet of 350 earth-moving machines and 50 types of trucks. "All of the hydraulic systems are lubricated with Panolin's biodegradable fluid," Martin Ruch, Panolin's customer support manager said during a visit to Eberhard's offices near Zurich. The machinery is also equipped with diesel particulate filters and runs on extra-low sulfur diesel, he said. Annually, or every 1,000 working hours, Panolin does lab analysis of an oil sample from every machine. Depending on the result, Eberhard filters the oil, or does maintenance on the hydraulic systems to ensure maximum life.

The company's machines normally operate for 8,000 to 12,000 hours, or 10 to 12 years, with no drain of Panolin's synthetic biodegradable hydraulic fluids. "It is a very cost effective approach because it is usually a life-time fill. No oil drains, no need to buy new oil," Eberhard remarked, adding that drain interval with mineral oil is usually every 3,000 hours of machine operation. With its careful approach to maintenance Eberhard takes maximum advantage of its machines and then sells them on the secondary market.

— by Boris Kamchev



Photos courtesy of Panolin

Panolin's oil analysis lab.

steady growth in these applications," Lammle said.

The Regulatory Arena

Today, a few European Union countries have introduced laws governing the use of biolubes. Belgium requires biolubes to be used in all operations taking place near non-navigable waters. France is working on a similar law. In some other EU countries, the use of biolubes is encouraged not by regulations but by commercial eco-label practices. Sweden's standard applies to chain oils, mold oils, hydraulic fluids, two-stroke oils, gear oils, metalworking fluids and greases. Germany has a similar Blue Angel eco-label standard for biolubes. "Most of the EU governments don't say that you must use biolubes everywhere, but to avoid pollution. And a company has to take all measures to prevent it," Lammle said. "The interest in biolubes has grown in recent years with more and more pressure from the governments."

Pressure also comes from society. Swiss citizens, in particular, strongly support preservation of the environment. "The companies have to adjust to this expectation. And in various countries expectations regarding the environment differ. Poor or developing countries in Asia and Africa express fewer concerns than the mature markets of Europe and North America," Lammle contended, adding that in poorer markets people ask if they need such products when economic development may take priority over environmental protection. On the other hand, in the mature markets of Western Europe and North America the move toward green technology came earlier. "Companies there usually go for the new product," Lammle said.

There are examples of large-scale projects requiring biolubes within countries that may not focus on environmental awareness, Ruch said, referring to the tidal power plant in South Korea or the Mt. Saint Michel project. "Also more and more companies ask for biolubes for their earth moving and forestry machines, and the most important OEMs approve, recommend and use biolubes for factory fill."

Look to the Future

Panolin keeps figures about volume and product mix confidential. "In 2008 we had good sales, but in the following years export volumes went down," Lammle said, noting that sales dropped up to 20 percent in the original equipment manufacturers segment. However, in 2011 volumes recovered to 2008 levels.

The company's biggest market for biolubes is still Europe. Recently, it started to push its products more aggressively in the Middle East, American and Asian markets. "The United States and Australian markets are starting to request more and more biolubes," Ruch said. "We believe in the future of biolubes. There are countries where these products have just started to sell, and it's only the beginning. We also expect the European market to grow further." □