

## OILS &amp; LUBRICANTS

# Energy efficiency drives lubricant development

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**T**he drive for lubricant development is currently based on energy efficiency, says South African Institute of Tribology president **John Fitton**.

"With the global economic downturn, the possibility of electricity tariff increases and environmental pressures, the research focus is linked to carbon dioxide. This link is such that, if your energy and machinery are used more efficiently and more effectively, this will reduce the environmental footprint and increase profits in the long run," he says.

Many developments in the materials of construction and lubricants are taking place internationally. Most of these are environmentally driven, he says.

Pollution and the environmental impact are areas companies must focus on to ensure a solid client base, as well as to ensure that they comply with environmental management regulations. Improved efficiency will reduce waste and spillage and save money, Fitton explains.

Environmental contamination mitigation specialist Procon Environmental Technologies MD **Andy Miller** founded the company in 1993 based on the premise that prevention is better than cure, but, where cure is necessary, holistic solutions are key.

Procon is the sole distributor of a product from US-based Oppenheimer Biotechnology Incorporated that contains naturally occurring microbes that are able to degrade oil pollutants. The microbes degrade the pollutants into natural compounds that aid in soil fertilisation. The product is also effective in treating fuel spills, sewage, wastewater and industrial waste.

"In one instance, 30 000 l of diesel was spilled into a large vlei which fed into a stream from which a local township drew water," explains Miller. "We immobilised the spill to prevent spreading, and removed dead vegetation and free-floating diesel. We used the augmented-by-remediation process to introduce naturally occurring oil-degrading microbes and monitored the site over two months until remediation targets were met. We took great pleasure in that job, especially in the speed with which we achieved results," he adds.

Under carefully controlled conditions, bioremediation is a practical and cost-effective

method to remove hydrocarbons from contaminated surfaces and subsurfaces. It is a natural and safe process for marine and plant life, nondisruptive and noninvasive to the environment, Miller maintains.

Procon also markets oil recapturing and oily water treatment equipment. Its flagship product is the Ultraspin oily water separator that uses hydrocyclone technology to separate oil from water, says Procon environmental engineer **Jacques Steyn**.

Oily water is captured by a floating skimmer in a oily water pit. This empties into a hydrocyclone that creates a vortex and generates 1 000 times the force of gravity. The oily water mixture is separated by centrifugal forces and the oil is discharged in one direction while the water is tapped off from the opposite side. Oil is recovered at a rate of about 95%, which is then recycled for industry use. Where the alternative is to discharge it into the environment or to send it for disposal, it now becomes a valuable product again, says Steyn.

Research based on hydrocyclone designs in refinery conditions shows that oil is recovered at a rate of 310 000 l/d. The return on investment is calculated by multiplying the rate of recovery by the cost of oil for every litre and subtracting the cost of equipment. In the case of a large refinery that tested such a system, the return on the investment figure was 554%, says Steyn.

Oily water separator and bioremediation products can be used to separate oils, fats and solids from process and effluent streams, as well as to treat contaminants, he adds.

With the world's focus on global warming and environmental accountability, Procon has seen its business grow at least 30% year-on-year and the focus on reuse, recycling and efficiency has added to the demand for environment-friendly but efficient solutions.

## The Waste Act

Oil and grease recycling organisation Recycling Oil Saves the Environment (Rose) Foundation CEO **Raj Lochan** says that the Waste Act No 59 of 2008 came into effect on July 1, 2009. This Act provides for national norms and standards in regulating the management of waste, and provides for specific waste-management measures as well as the remediation of contaminated land,

besides other waste-management issues.

Entrenched in the Act is the principle of extended producer responsibility. Because of this clause, the Rose foundation is looking at oil drum and container reconditioning.

A recent survey shows that none of the drum reconditioning companies are fully compliant. However, some drum reconditioners are preparing for ISO 14001 environmental management system certification. The companies are eager to comply and participate with Rose in improving environmental compliance.

Rose plans to facilitate the preparation of an incentive-based model with industry role-players. The foundation believes that it is imperative that the Chemical and Allied Industries Association becomes part of this initiative as most of the members sell chemicals in drums that are later reconditioned by these plants.

The foundation has already conducted independent audits on drum reconditioning plants in Cape Town, Durban and Johannesburg.

"From these audits, it can be concluded that environmental compliance needs to be urgently addressed," says Lochan.

Many workshops have been held to canvas the support of the respective businesses, organise the industry and make role-players realise that compliance will be mandatory. To further ensure compliance, Rose members' customers and their own blend plants will be encouraged to use only approved reconditioners.

Lochan maintains that the environmental chain must be incentivised in different ways to facilitate compliance, such as putting a toll on new drums manufactured and using the income to achieve compliance standards.

Sludge, tar, grease and oil are a well-known aspect of the 'dirty' work of manufacturing and mining. However, in terms of the Waste Act, these substances are serious pollutants and it has become the responsibility of producers to reduce, recycle and eliminate all polluted waste streams.

The Rose foundation opened a new bulk storage facility in Weenen, near Estcourt, in KwaZulu-Natal. Vinko's Oil received two 23 000-l tanks and two 4500-l tanks complete with piping and pumps, which were made available by the National Oil Recycling Association of South Africa.

At industrial heating fuel suppliers FFS Refiners' plant, in Pietermaritzburg, the Rose foundation supplied extra tankage to complement the existing facility. This allows collectors of used oil to drop off oil at the facility, instead of having to drive to Durban.

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