



energy efficiency

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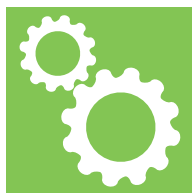
The 2015 Edition of
Energy Media Event

November 12th,
Milan (Italy)

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RECOVERING ENERGY
UPGRADING THE WORLD'S OLDEST
ENERGY RECOVERY PLANT
IN BJØLVEFOSSEN, NORWAY

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ENERGY EFFICIENT LUBRICANTS

By John Hayes, LE Sales Consultant, Lubrication Engineers Inc (USA) and Angus Macdonald, Director, Lubrication Engineers International Ltd (UK)

Energy reduction of 21% at Miller Concrete Products, Pennsylvania (USA)

Customer Profile

A.C. Miller Concrete Products in Blairsville, Pennsylvania, is a concrete casting company, specializing in the manufacturing of box culverts, retaining walls, bridge sections and prefabricated tunnel systems. They have been a Lubrication Engineers (LE) customer since 2001.

Application

An essential piece of equipment in the manufacturing process is the Wiggert HPGM 2250 counter current concrete mixer. This machine mixes the concrete components in batches for each casting. The Wiggert mixer is rated at 75 HP driven through a planetary drive reduction box. The gearbox requires an ISO 150 EP gear oil.

Challenge

The mixer requires washdown following

each day's production run. Condensation and washdown water would find its way into the planetary and emulsify with the gear oil, forcing replacement of the oil at times on a weekly basis. Oil analysis indicated water content to exceed 20%.

LE Solution

John Hayes, LE lubrication consultant, recommended Duolec Vari-Purpose Gear Lubricant (1604), which is a high performance gear oil acceptable for use in any industrial gear or bearing application that requires a high thermal stability, extreme pressure lubricant. Duolec 1604 separates readily from water and is fortified with a shear stable tackifier to provide adhesion to the metal during use. It contains Duolec, LE's proprietary temperature activated, dual acting, liquid additive that increases film strength and EP characteristics.

Results

The customer installed Duolec 1604 in the gearbox. With its exceptional demulsibility characteristics, maintenance is able to routinely drain separated water from the bottom of the gearbox. In fourteen years using duolec gear oil, no emulsification has occurred. Water stays at the bottom of the gear drive and is easily drained out. Also, no repairs have been made to the gear drive, including the planetaries and torque converter. Internal inspection indicates very little wear or deposits. Oil is now changed only a year. Oil analysis indicates further drain interval extension is possible and is being discussed.

An unexpected benefit was a realized drop in energy requirements to run the mixer. Upon changing to Duolec 1604, amperage dropped from 24 to 19 amps, a significant energy savings of 21%.

CUSTOMER ENERGY SAVINGS EXPLANATION

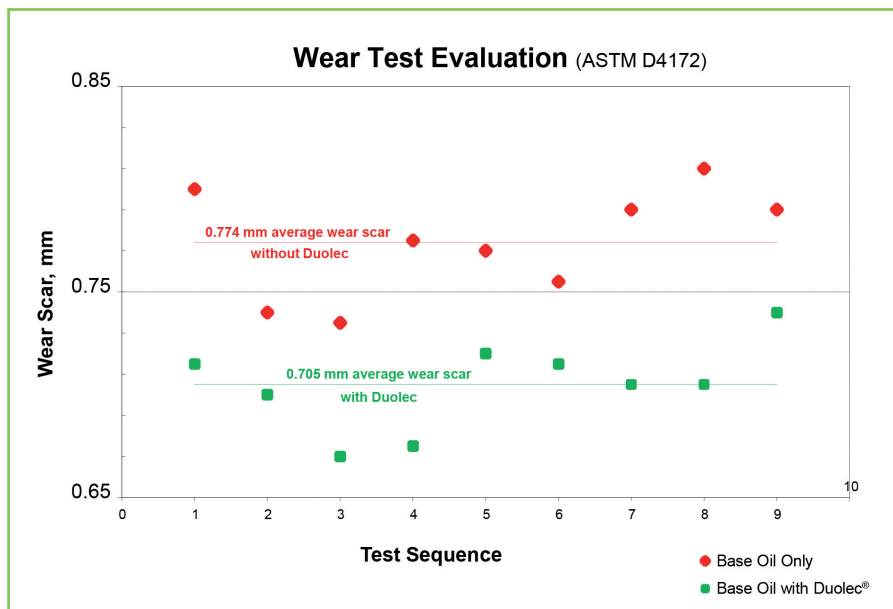
Friction robs electrical energy

Friction is a result of the metal-to-metal contact that occurs between two opposing surfaces moving relative to one another. Even between highly machined surfaces, under microscopic view, asperity contact occurs. The greater the amount of contact, the greater the amount of friction. As a result, more energy is required to move the surfaces relative to one another. This friction results in higher electrical power costs.

However the use of enhanced, high performance lubricants can reduce this friction. When friction is reduced, less electricity is required to drive a gearbox, air compressor, pump, etc.

LE's proprietary Duolec dual-acting additive imparts synergistic properties to gear lubricants, providing both anti-wear (AW) and extreme pressure (EP) protection. The result of revolutionary technology designed specifically for use in LE gear lubricants, Duolec increases oil film strength and is temperature-activated to provide a protective layer that smooths metal surfaces and minimizes the effects of any contact, thereby reducing friction and preventing surface wear. When friction, heat & wear is reduced in equipment,





Duolec is activated, working in stages to provide a dual layer of AW and EP protection. In EHD and mixed film conditions, the AW components of Duolec kick in. After loads become even greater, the EP performance is activated. When incorporated into gear oils, Duolec reacts quickly with the changing conditions to provide protection. The friction- and wear-reducing capabilities of Duolec can be seen in the wear test evaluation result illustration.

Duolec additive technology is used exclusively in LE lubricants, helping customers worldwide protect their gearboxes and experience longer lubricant intervals, energy reductions, fewer part replacements and less expensive downtime.

LE Energy Saving Programme

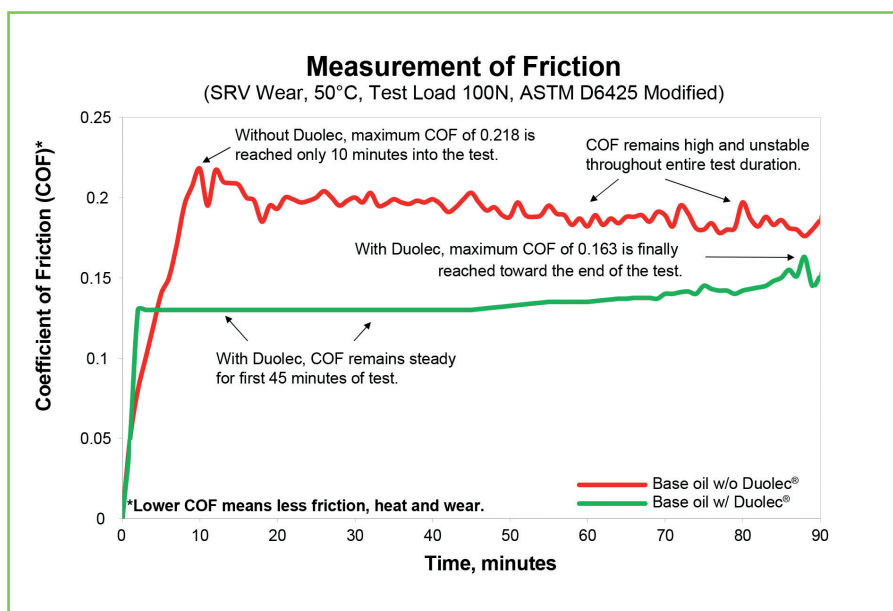
AC Miller is just one of thousands of industrial customers who are experiencing significant reductions in their electrical consumption due to converting their critical applications to LE lubricants.

The LE Energy Saving Programme can save electrical energy across the board on gearboxes, air compressors, refrigeration systems, pumps, hydraulic systems, ball mills, etc. LE has documented energy savings not only on stationary in plant equipment, but also on rolling stock of all types. Friction reductions in engines correlate directly to improving fuel efficiency and extending drain intervals. Whether your fleet consists of over-the-road trucks, off-road equipment, stop-and-go vehicles or smaller personal vehicles, LE lubricants can improve efficiency. Users of LE lubricants have documented fuel efficiency improvement ranging from 2% to 15% in all types of engines.

Documented Savings

The following are averages of actual documented savings through the use of LE lubricants in the following equipment:

Gearboxes15%
 Air Compressors.....12%
 Electric Motors.....4%. ■



it is also often then possible to experience significant reductions in energy consumption due to the improved efficiency of the equipment.

Beneficial Qualities of the Duolec additive technology

Duolec activates in stages as loads and temperatures increase in gearboxes and forms a solid-like protective layer on metal surfaces as well as helping to improve oil film strength. It thereby reduces friction and prevents surface wear.

How does the Duolec additive help LE gear oils to save energy?

Under normal conditions of speed and

load, two metal surfaces are separated by a lubricant film known as hydrodynamic lubrication. An increase in load or decrease in speed reduces the film, allowing metal-to-metal contact and raising the temperature of the contact zone due to friction.

The heat causes the lubricant to lose viscosity, which weakens its film strength and its ability to minimize contact. Under these conditions, lubrication changes from hydrodynamic to elasto-hydro-dynamic (EHD) to mixed film to boundary lubrication.

Duolec continues to provide protection when EHD, mixed and boundary conditions are present. As heat increases,