

Don't Cry Over Spilled Lubricants

The impact of environmentally acceptable lubricants in pile driving applications

By Matt Houston, RSC Bio Solutions



The pile driving industry is at a crossroads. As regulations become more stringent and performance is increasingly paramount, organizations are feeling the pinch to be both compliant and perform at their peak. Equipment failures, spills and leaks are followed by costly fines, cleanup fees and increased downtime – further emphasizing compliance concerns and public scrutiny over environmental impact.

With this changing landscape, organizations are looking for ways to be both fiscally and environmentally responsible. That has opened the door for an emerging category of bio-based and biodegradable lubricants known as environmentally acceptable lubricants (EALs).

EALs defined

While the United States has been very prescriptive about defining and regulating EAL usage, Canada has taken a more holistic approach by focusing on the outcomes that should be avoided. While both countries have focused heavily on marine-based spills, leaks and discharges, they are beginning to focus more on land-based issues as well.

According to Environment Canada, the Canadian Environmental Protection Act addresses “the need to virtually eliminate the most persistent and bioaccumulative toxic substances and the need to control and manage pollutants and wastes if their release into the environment cannot be prevented.”



According to the U.S. Environmental Protection Agency (EPA), an EAL is a “lubricant that is biodegradable, exhibits low toxicity to aquatic organisms and has a low potential for bioaccumulation.”

It is easy to connect the dots between these two regulations and recognize that readily biodegradable EALs offer a viable alternative to bio-accumulative and toxic substances. They can reduce the workplace hazards and environmental risks associated with spills or leaks that can not only tarnish a company’s reputation, but also lead to costly remediation involving cleanup, potential regulatory fines and equipment or employee downtime.

EAL benefits for pile driving industry

Designed to meet performance, regulatory and environmental needs better than traditional petroleum lubricants, the benefits of EALs are appealing to pile driving contractors, operators and regulatory agencies for many reasons:

- EALs are compatible with a wide variety of equipment types, including fluid-to-torque auger drills, drive caps and impact hammers, striker plates and vibrators with specialty gears
- EALs perform equal to, or better than, petroleum lubricants
- EALs can last longer and have a longer life when maintained properly
- EALs minimize environmental impact
- EALs offer low total cost of ownership in light of reduced fines, cleanup costs and longer product life

Types of EALs and implications for pile driving applications

There are four types, each made of different components and each offering distinct attributes.

Triglycerides (HETG)

Also referred to as Natural Esters, these lubricants are made of vegetable, rapeseed (canola), sunflower, coconut, palm or

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Table 1

	HETG	HEES	HEPG	HEPR	Standard Petroleum
Readily Biodegradable	Yes	Yes	Yes	Yes	No
Ecotoxicity	Low	Low	Low*	Low	High
Bioaccumulation Potential	No	No	No	No	Yes
Sheen	No	No	No	No	Yes
Seal Compatibility	Good	Good	Poor	Good	Good
Wear Performance	Very Good	Very Good	Very Good	Very Good	Very Good
Oxidation Performance	Poor	Good	Very Good	Very Good	Very Good
Low Temperature Performance	Poor	Very Good	Very Good	Very Good	Poor
Viscosity Index	Very Good	Very Good	Very Good	Very Good	Poor

*SOLUBILITY MAY INCREASE THE TOXICITY OF SOME PAGs

soybean oil. They offer a high viscosity index, very good wear properties and are compatible with most seals and hoses.

Synthetic Esters (HEES)

Esters are synthesized by the reaction of an alcohol with an acid to form an ester. This reaction process allows for the flexibility to customize the type of ester used for a particular application. They deliver high performance, good thermal and oxidation stability and extended fluid life.

Polyalkylene Glycols (HEPG)

Made of synthetic, petroleum-based oil, HEPGs are created by the polymerization of ethylene or propylene oxide. This option offers excellent high- and low-temperature viscosity performance and fire-resistant properties.

Polyalphaolefins (PAOs) and related hydrocarbon products (HEPR)

Often referred to as classic mineral oil-based lubricants, HEPRs are synthesized hydrocarbons derived from crude oil meant to provide a low-viscosity base oil that is readily biodegradable. They are highly durable, offer extended wear protection and excellent thermal stability, seal compatibility and temperature range performance.

Choosing the appropriate EAL for pile driving equipment

When evaluating an EAL, it's important to factor in the end-user application, the job it will be performing and how the oil will be monitored or maintained. Consider the following factors when choosing an EAL:

- Operating temperature
- Operating pressure
- Seal type
- Likelihood of water ingress
- Fluid life required
- Preventative maintenance cycle
- Risk of leak or spill
- Customer choice

Compare EAL attributes and then make your choice

As you hone in on the EAL that best suits your needs, it may be helpful to see how EALs stack up against each other (see Table 1).

Best practices for success with EALs

Determining which EAL option best meets your application needs is the first step. In order to reach optimum performance

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EALs are compatible with a wide variety of equipment types, including fluid-to-torque auger drills, drive caps and impact hammers, striker plates and vibrators with specialty gears.

and ensure a successful ROI on your lubricant investment, be sure to follow these best practices:

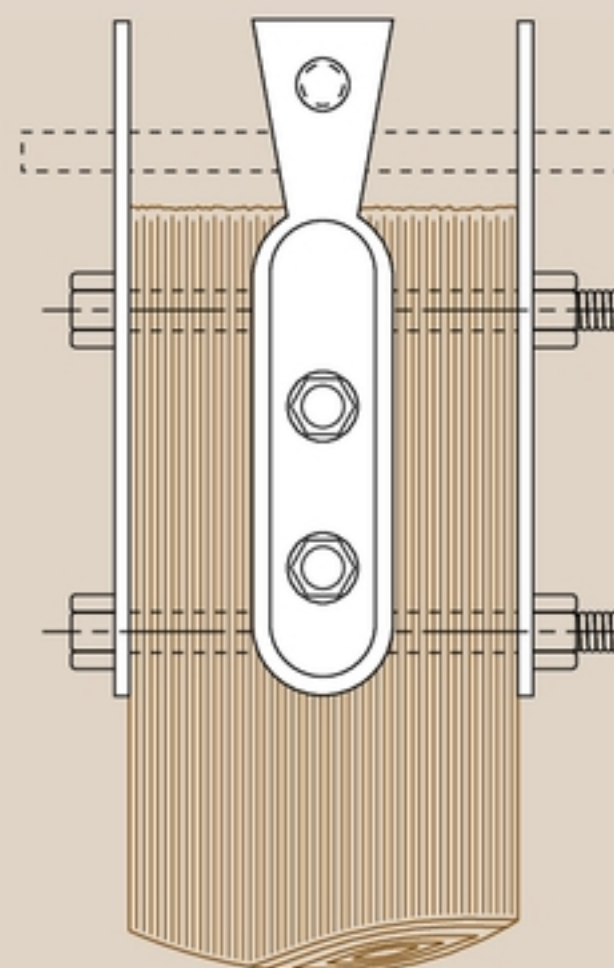
- Picking the right EAL supplier is key: Choose one that builds partnerships with clients versus completes transactions. Suppliers should go beyond selling a product; they should be invested in your success and offer guidance and expertise every step of the way.
- Begin an oil analysis program: Most suppliers will sample and test your lubricant once it's in use. Find a supplier that thoroughly explains test results, troubleshoots issues and ensures performance is optimized.
- Be sure a filtration system is in place: Keeping fluid clean and free of debris and corrosion is essential. Talk to your supplier about what filtration option works with your EAL and get it in place at the beginning.
- Develop a maintenance program immediately: An ounce of prevention is worth a pound of cure. It's critical to establish a maintenance regimen and stick to it. Falling behind – or simply letting it go – will cost you more in the long run.

The adoption of EALs offers a unique opportunity for those in the pile driving industry to get out ahead of critical environmental issues and regulations, while reducing total cost of ownership. Simply put, EALs perform equivalent to, or better than, petroleum lubricants – preventing wear and tear on parts, reducing friction (for improved performance), reducing heat and preventing corrosion, all while providing a safer and more sustainable choice for your employees and the operating environment. Making the switch from petroleum-based products to an EAL is an easy way for your company to reduce its carbon footprint, while boosting performance – the ultimate win-win. ☺



Matt Houston is the market manager of marine construction for RSC Bio Solutions. For more than 10 years, Houston has worked for a range of original equipment manufacturers in chemicals, machines and lubricants. He has earned a B.A. in marketing from Loyola University New Orleans. For more information about environmentally acceptable lubricants, visit www.rscbio.com or contact him at 440-639-8633.

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