

Soy-Based Fifth Wheel Truck Grease Summary



New Environmental Technology for Small Business (NETSB) Project Summary

NETSB, a program developed by the Iowa Waste Reduction Center (IWRC) at the University of Northern Iowa, strives to increase the use of new environmental pollution prevention technology by small business, resulting in measurable environmental and economic benefits.

When choosing which technologies to test, the IWRC recognized three key areas of consideration: environmental criteria, economic measures and small business use feasibility. The equipment should have a positive impact on the environment, such as pollution prevention or energy savings. The technology should be evaluated considering capital costs, operational costs and return on investment. And finally, the equipment should be applicable in a small business environment.

In 2006-2007, the IWRC placed several types of potential pollution prevention technologies at small businesses throughout Iowa including: soy-based fifth wheel truck grease, RASERS heat reclamation equipment, Zerowaste wastewater treatment systems and Green Earth® perchloroethylene dry-cleaning alternative.

Small Business Placement Description

Soy-based truck grease replaced petroleum-based grease for fifth wheel application at ten Iowa truck shops. The soy-based truck grease is manufactured by Environmental Lubricants Manufacturing, Inc.

(<http://www.elmusa.com/>). The NETSB program provided the soy-based grease to the ten facilities free of charge. Each site was shipped a 90-day supply of bulk fifth wheel soy-based grease and an adequate amount of tube grease for the drivers. The placements began in February 2007. The intent of these NETSB placements was to field-test the commercially available soy-based grease's ability to lubricate as compared to the traditional petroleum-based products being used at these service facilities.

Nine of the sites are transport companies engaged in their own maintenance and repair and the tenth site is a truck service center.

Technology Description

Soy fifth wheel truck grease is a specially formulated soybean-based grease. The applications for use in semi-truck fifth wheels include trailer hitches and other mechanical joints and applications where long-term lubrication is required. The expected benefits include providing superior lubricity to promote longer equipment life, resisting

water wash out, mostly benign when released into the environment, and superior flash and fire points to reduce fire hazards.

Soy Greases:

- Are biodegradable and non-toxic;
- Contain no environmentally hazardous ingredients;
- Contain no ozone depleting chemicals (ODCs) or hazardous air pollutants (HAPs);
- Contain low volatile organic compounds (VOCs);
- Have superior adhesion qualities; and
- Resist water wash out.



These benefits are not true of petroleum-based greases. Because the grease is eventually released into the environment,

these are important factors to consider.

Soy-based truck grease is often considered superior to conventional grease because:

- High oleic soybean-based oil offers superior lubricity and better adhesion to metal surfaces, protecting ferrous metal components from wear, rust and corrosion;
- Reduced friction lowers power consumption and increases energy savings;
- Soybean-based grease resists thinning at high temperatures;
- Soybean-based grease inherently has a higher flash point making it a safer product;
- Soybean-based grease is readily biodegradable making it safer for the environment and easier to dispose; and
- Soybean-based grease is formulated from United States grown soybeans, a renewable resource, aiding our farmers and economy and reducing our dependence on foreign oil.¹

Environmental Background

In 2002 there were approximately 1.7 million DOT-registered combination trucks using an estimated 20 to 40 million pounds of grease annually, most of which is eventually released into the environment.

The purpose of greasing the coupling between the truck and trailer at the fifth wheel docking plate is to lubricate and protect the ferrous metal components from rust and corrosion. Soy-based fifth wheel

grease is formulated for use in semi-truck couplings including trailer hitches, other mechanical joints and applications where long-term lubrication is required.

Many lubricants such as fifth wheel greases are lost directly to the environment. There is a need for viable, low-toxicity, readily biodegradable greases in total-loss uses.²

Outcomes

TECHNOLOGY ACCEPTANCE AND USE OUTCOMES

The soy-based truck grease is a drop in substitute for other products so no process or procedural changes were necessary. The grease was reported to be a feasible replacement for petroleum products based on its performance.



The overall consensus from the test sites was that the soy-based truck grease worked just as well as the petroleum-based grease, but no better. In some cases, operators thought the soy-based grease washed out easier than petroleum-based grease when it rained.

POLLUTANT REDUCTION OUTCOMES

Fifth wheel grease is inherently lost to the environment during its use. If truck shops convert to using soy-based grease, loss during use is much less of a concern than when using petroleum-based greases. Bio-based products are naturally less toxic than petroleum-based products.³

In addition, using soy-based products helps consumers avoid the conflicts related to crude oil drilling, extraction and processing when switching to a plant-based product. Using soy-based grease also supports the agricultural economy of Iowa and other Midwestern States.

REGULATORY COMPLIANCE OUTCOMES

The need for readily biodegradable and low-toxicity lubricants in environmentally sensitive areas has been recognized in Europe. The combination of increasing regulatory pressure to reduce or eliminate certain emissions of petroleum-based lubricants and Executive Order 13101, which instructs federal agencies to use environmentally preferable bio-based products, should encourage increased use of renewable products.⁴

CONCLUSIONS

Additional testing is required to determine more precisely the true performance of soy-based fifth wheel grease. At this time, it is accepted that soy-based grease works as well as its petroleum-based counterpart.

At a minimum, using soy-based fifth wheel grease is a better option when compared to petroleum-based grease considering it is lost directly to the environment during use.

ACRONYMS USED IN THE CASE STUDY

DOTDepartment of Transportation

HAPHazardous Air Pollutant

IWRCIowa Waste Reduction Center

NETSBNew Environmental
Technology for Small Business

ODCOzone-Depleting Chemicals

VOC.....Volatile Organic Compound

References

- ¹ “Marketing Opportunity Summary: Soy-Based Lubricants” United Soybean Board, January 2004.
<http://www.unitedsoybean.org/Library/RecentLibraryItems.aspx>.
- ² http://www.elmusa.com/products/data_sheets/pdf/soygrease_fifthwheel.pdf located on the manufacturer’s website at <http://www.elmusa.com/index.html>. For the Material Safety Data Sheet see http://www.elmusa.com/products/MSDS/pdf/soygrease_fifthwheel_msd.pdf.
- ³ Institute for Local Self-reliance website for The Carbohydrate Economy Clearinghouse at <http://www.carbohydrateeconomy.org/html/biochem.htm#anchor2>.
- ⁴ Market Opportunity Summary: Soy-Based Solvents. United Soybean Board. January 2006. <http://www.unitedsoybean.org/>. Summaries located at <http://www.unitedsoybean.org/Library/RecentLibraryItems.aspx>.