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Energy savings through use of advanced biodegradable lubricants

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Abstract

Purpose – This paper seeks to outline the technical characteristics of certain biodegradable lubricants which can lead to potential energy savings. **Design/methodology/approach** – Reviews the reasons for introduction of biodegradable lubricants, and describes the outcome of development and establishment of suitable range of lubricants for almost all applications.

Findings – Plant-based lubricants have low toxicity, they are derived from crop resources, they are recognised as safer to use, and are rapidly biodegradable when spilled on to open land or into water. As such they break down to reduce pollution burden and are favoured by the Environment Agency when used near watercourses. Products have been developed now for almost all applications including hydraulics, engines, transmissions, compressors, metalworking, turbines, and for use in all industry sectors. Latest generation biolubricants, however, give additional advantages above and beyond the original concept to reduce pollution: the latest products have high levels of performance in terms of both loading and temperature. In particular, their frictional characteristics have been shown to be considerably more favourable than those for mineral oil, offering energy reduction during use.

Research limitations/implications – The paper is restricted to findings based on ester-based synthetic lubricants where the esters have been derived principally from renewable resources.

Practical implications – Quite apart from their environmental attributes, reduced energy consumption and therefore lower variable costs are now possible, and the concept of use of these oils to give distinct savings is becoming recognised.

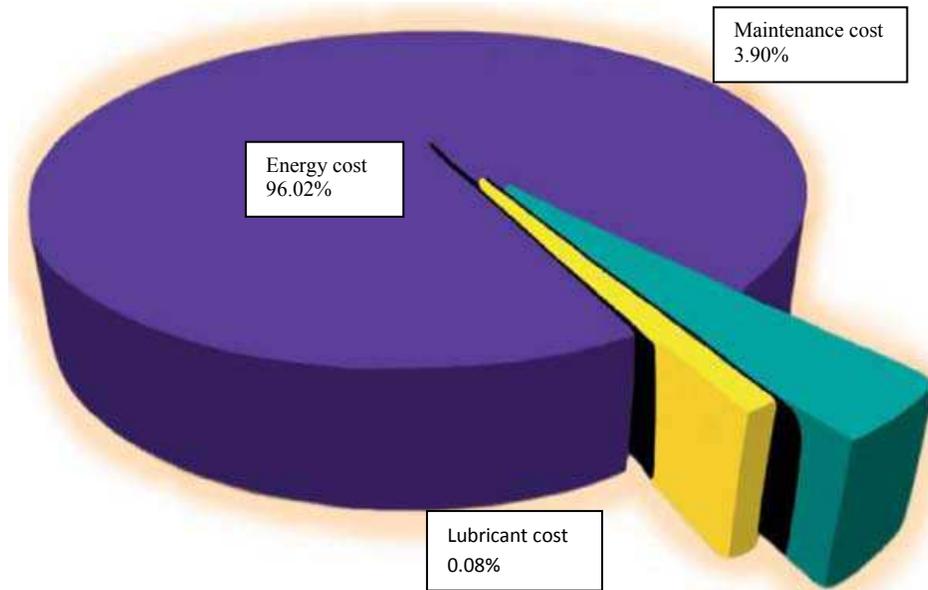
Originality/value – This study emphasises that distinct advantages for synthetic lubricants, particularly for biodegradable synthetic ester lubricants derived from renewable resources, are now being realised.

Keywords Energy conservation, Lubricants, Renewable energy

Paper type Research paper

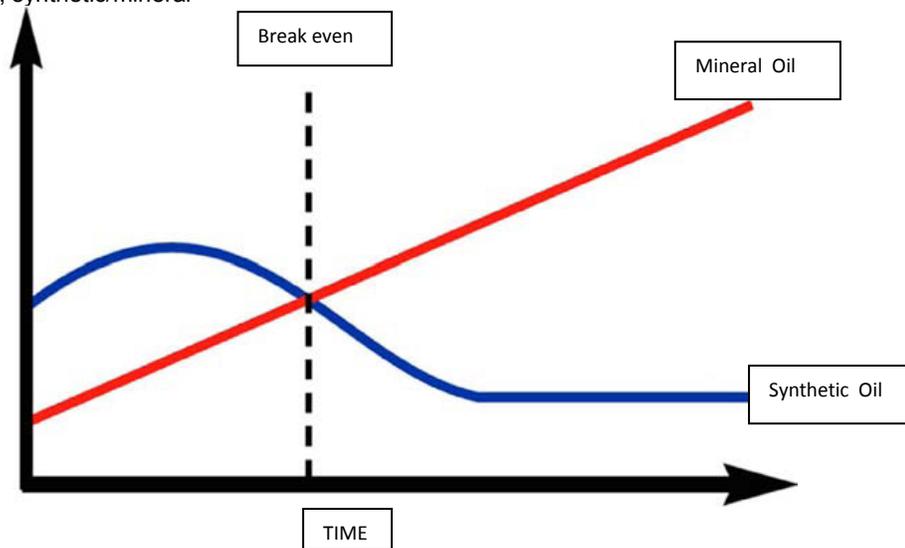
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Figure 5 Relative lubricant, energy and maintenance costs



Source: Cuthbertson (2001)

Figure 6 Break-even point, synthetic/mineral



significantly reduce oil degradation, extending life, offering extended drain, reduced consumption, reduced oil wastage and reduced disposal costs.

The total savings therefore comprise:

- . reduced energy costs;
- . extended unit life;
- . extended drain;
- . reduction in lubricant use;
- . reduced labour costs;
- . reduced waste; and
- . reduced disposal costs.

In addition, the use of biolubricants fits with ISO 14001 environmental standards, and where leakage or spillage on to land or water represents an important risk.

Summary and conclusions

In summary, it is clear that the distinct advantages for synthetic lubricants, particularly for biodegradable synthetic ester lubricants derived from renewable resources, are now being realised.

Certain synthetics give frictional benefits which offer positive and real energy reduction, and distinct cost savings. Special Biolube esters give the greatest scope.

A wide range of suitable FUCHS Planto biolubes are now available for almost all applications, achieving not only potential for cost reduction by energy savings, but giving welcome performance and environmental benefits.