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Lubricants from rape seed oil

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The excellent lubricating ability of plant oils as been well known for quite a long time. Plant il was used as lubricant when mineral oils were ot yet known. During World War II triglyceride ils were popular in various applications, for exam-le, for lubricating steam engines. Rape seed oil vas widely used owing to its high viscosity index. he war over, mineral oils with properties improved y additives priced rape seed oil out of the market f technical oils. Since then rape seed oil was used lmost exclusively as a food substance.

Following a strongly increased cultivation of ape seed towards the end of the 1970's a new earch began also for technical applications for rape eed oil. Raision Tehtaat based their development vork – naturally – on the natural characteristics of ape seed oil : the lubricating ability, which remains xcellent also in wet conditions, the high viscosity ndex and the good compression strength.

Due to the natural properties of rape seed oil he company concluded to use it as a lubricant, to egin with as hydraulic oil and in lubricants in-ended for various kinds of chains and sliding sur-aces. Their share of the annual use of lubricants in Finland is approximately 30 per cent.

The company received assistance in its devel-pment work from research institutes and colleges f higher learning with special knowledge of lubri-ants and hydraulics. Having studied the suitability f plant oil for hydraulic applications by laboratory ests in cooperation with the Hydraulics and Auto-nation Laboratory of the Tampere University of Technology the company performed a practical test.

The test was performed in mine conditions vith two identical bucket loaders, in which the hy-draulics had been renewed. In one loader a top grade of mineral oil was used as hydraulic oil, while the other loader used hydraulic oil based on ape seed oil and produced by Raision Tehtaat. Both loaders performed a test run of 1500 hours n similar conditions.

Measurements and oil analyses showed that the ydraulic oil based on rape seed oil reduced wear considerably and kept its properties unchanged much better than the hydraulic oil based on miner-l oil. With mineral oil the coefficient of efficiency of the hydraulic pump decreased by 24 per cent, while with rape seed oil it decreased only by 8 per cent.

Fig. 1 : Viscosi.y-index in practical tests.

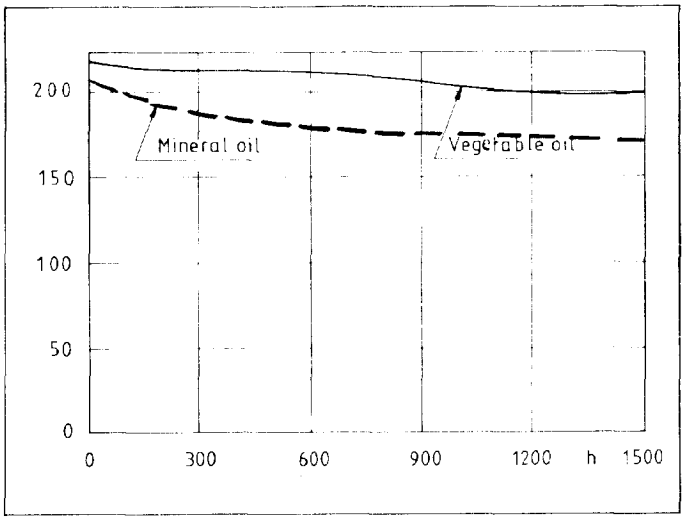
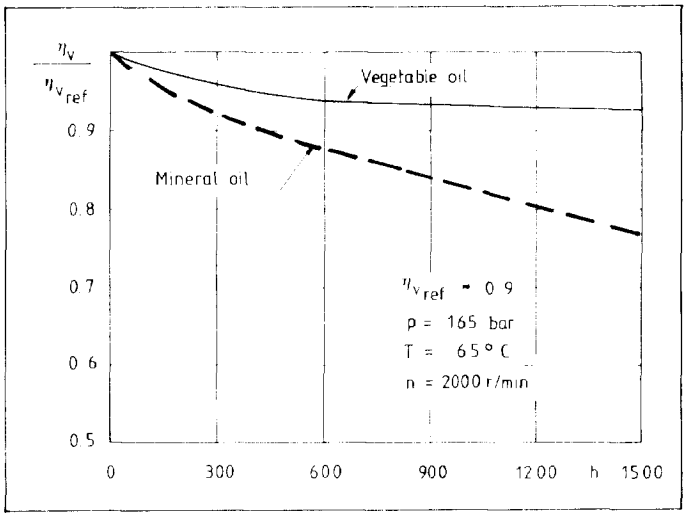


Fig. 2 : Volumetric efficiencies of gear pumps in practical tests.



In central lubrication systems it has been possible in many cases to reduce the oil consumption by one half of the consumption of mineral oil by using lubricating oil based on rape seed oil for the lubrication of sliding surfaces and chains. In the early stages of the development work the major problem was the ability to prevent oxidation, which was much poorer with rape seed oil than with min-

eral oil. Today, however, we have found anti-oxidation agents, which are particularly suitable for rape seed oil and which improve the oxidation resistance for rape seed oil when used as hydraulic oil to the same level as the best mineral oils and make possible an operation for thousands of hours at a temperature of + 50... 80° C and at a maximum pressure of 300 bars.

We have also succeeded in lowering the pour point, so that the hydraulic oil can be used in outdoor operation in the severest conditions occurring in Finland.

An additional advantage of rape seed lubricant besides their good lubricating ability and their high viscosity index is the fact that they do not damage the environment or the skin.

Raision Tehtaat has begun marketing these lubricating oils and the company has been granted a patent on the use of plant oil as a lubricant.

Résumé

Les usines finlandaises de Raisio, Raision Tehtaat, ont développé une gamme de lubrifiants basés sur l'huile de navette, dont le point de départ ont été les caractéristiques naturelles de l'huile de navette, un haut pouvoir lubrifiant et un haut indice de viscosité.

Dans les tests comparatifs pratiques on a constaté que les lubrifiants basés sur l'huile de navette réduisent l'usure et qu'ils maintiennent leurs caractéristiques mieux que les huiles minérales.

Les Usines de Raisio ont commencé la commercialisation des lubrifiants à l'huile de navette, et elles ont obtenu un brevet sur l'utilisation de l'hui végétale comme lubrifiant.

Renseignements sur l'auteur

– M. Tapio Tavenius, ingénieur, travaille au usines de Raisio comme chef du Service des lubr fiants de l'Industrie des huiles végétales.

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Zusammenfassung

Der finnische Konzern Raision Tehtaat ha eine auf Rapsöl basierende Schmierstoffreihe en twickelt, ausgehend von den natürlichen Eigenscha ten, hoher Schmierfähigkeit und hoher Visko sitätsindex, des Rapsöls.

Durch in der Praxis durchgeführte Vergleichs teste konnte festgestellt werden, dass auf Raps basierende Schmieröle der Forderung nach ver schleisssenkenden Eigenschaften und Langzeitstra pazierbarkeit besser nachkommen als Mineralöle.

Raision Tehtaat hat mit dem Vertrie pflanzlicher Schmieröle begonnen. Die Verwendun von Pflanzenöl als Schmiermittel ist der Fa. Raisio Tehtaat patentiert worden.

Angaben zum Verfasser :

Ing. Tapio Tavenius ist Leiter der Schmierstoffabtei lung der Pflanzenölindustrie bei Raision Tehtaat.

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