



PhD grant: 3 years – start September 2012

Oil ageing effects in boundary and mixed lubrication

**Laboratoire de Tribologie et Dynamique des Systèmes (LTDS-UMR 5513)
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In the actual context of sustainable development, limiting pollutions generated by vehicles is one of the most important societal issues of occidental countries. The development of low SAPS (Sulphated ashes, Phosphorus and Sulfur) lubricant is one option to act positively as sulfur and phosphorous atoms, found in exhaust gas, are known to be poisonous for catalytic converter. The strong reduction of sulphur and phosphorus content in lubricant is so preconized by actual emission regulation (EURO6 for 2014). A strong need of low or no SAPS lubricant is so needed.

The aim of this work is to study oil ageing effect of the new generation of low SAPS lubricants, compatible with post-treatment systems and brought to market today, under boundary and mixed lubrication.

The first part of the work will be related to the implementation of oil ageing protocols in laboratory (oxidative and non oxidative atmospheres) and in real engine. This will be completed with oil bulk analyses (performed at Total).

Secondly, the effect of ageing oil on friction and wear will be studied. Post-mortem surface characterizations (AES and XPS) will allow to determine the composition of tribofilms. Comparison of both tribological and surface analyses results between the different protocols will be done for a better understanding of ageing induced-modifications and related tribochemical processes.

Secondments: The PhD student will have to visit (6 to 9 months) different academic or industrial partners of the project like the University of Leeds and Total Company.

Training: Scientific training, industrial secondments, advanced instrumentation, business training...

Skills: Chemical or material science MsC degree

Languages: English and French if possible

Salary (take-home pay): 2110 €/month + 810 €/month

Eligibility criteria: cannot be French – must not have been in France more than 12 months prior to recruitment.

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