PhD grant: 3 years – start September 2012

Lubricant additives optimization for contacts involving iron based or Al-Si alloys

Laboratoire de Tribologie et Dynamique des Systèmes (LTDS-UMR 5513)
Ecole Centrale de Lyon(ECL), Ecully (France)

In the actual context of reducing gas consumption of vehicles, the use of light alloys such as Al-Si in internal Combustion Engine (ICE) is of great interest. In terms of boundary lubrication, this generates some issues as the lubricants used in ICE are usually optimized for contacts involving steel and cast iron materials. The optimization of lubricant additives actions in case of contacts involving various kinds of materials is becoming a key point and will be the aim of this project.

It is proposed to focus here on the tribological behavior of contacts involving different couples of materials (iron based and Al-Si alloys) in order to find a versatile lubricant. The scientific objective is to understand tribochemical mechanism with each combination of lubricants and materials.

The experimental strategy will be to perform tribological tests under boundary lubrication conditions (Cameron-Plint TE77) to characterize wear and friction behavior. To investigate tribochemical phenomena, the strategy is to analyze friction surfaces after tribological tests. Surface analyses tools such as XPS and AES analyses will be used in order to characterize tribofilm composition. XANES (DLS) will be performed as well.

***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*:** Material science, surface science, mechanics.
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.

Contact Persons:
Clotilde Minfray (ECL): clotilde.minfray@ec-lyon.fr
Fabrice Dassenoy (ECL) : fabrice.dassenoy@ec-lyon.fr