

Job title	POST-DOCTORAL RESEARCHER – MECHANICS OF MATERIALS		
Department:	DIRD/WP7	Contract Type:	Limited-term contract 18 months
Direct supervisor:	S. Assaf	Work time:	Full time (35h/Week)
Scientific supervisors:	M. Risbet, J. Marteau, S. Bouvier	Status:	Executive
Job Localization:	Railenium – Compiègne UTC/Roberval UMR 7337	Salary:	33 – 35 k€ grossannual
Availability:	15/04/2017		

Context

The French Technological Research Institute **Railenium** aims at being a first-rank research organization for testing and approval in rail transportation. Railenium serves rail industry in order to develop collaborative innovation and to accelerate the development of new solutions. Railenium relies on the pooling of skills, human resources, financial means and materials of its 28 members: system operators (SNCF et Eurotunnel), companies from rail transportation (suppliers, main system builders and engineers), research organizations and universities. Its activities cover urban transport, high-speed and conventional rail.

In heavy haul rail (axle loading around 32 tons), wear resistance of rails is a fundamental property because it conditions the life-span of rails. Steels that resist wear and fatigue contact are nowadays researched in order to limit maintenance operations and to increase the life-span of rails. It is proved that rails having a fine perlite microstructure show greater wear resistance for wheel-rail interaction with heavy hauls. The optimization of the performance of these rails requires the investigation of the metallurgical structure and its evolution with loading.

In order to reinforce its team specialized in vehicle rail mechanical interaction (wheel-rail contact, rail dynamics, contact metallurgy, rolling noise...), Railenium is looking for a post-doctoral researcher. This **post-doctoral researcher** will contribute to understanding how rails are worn at the microstructure scale in order to be able to propose ways for improving steels (metallurgical structure obtained with thermal treatment, chemical composition).

Main tasks

The main tasks will be:

- State of the art and definition of an experimental protocol for the examination of the microstructure and micro-crack growth at the rail surface;
- Microstructure analysis before and after loading to examine wear mechanisms, understand these mechanisms and model them;
- Investigation of the microstructure, the mechanical and chemical properties of the specimens before and after loading;
- Development of wear scenario taking into account material changes at the scale of the microstructure;
- Proposal and ranking of ways for improving wear resistance of steel grades for heavy haul rails.

The candidate must hold a PhD in mechanics of materials. Skills in metallography and knowledge of relations between microstructure and properties are required. Good mastery of structural characterization techniques is highly recommended (SEM and associated techniques such as EDX or EBSD). Tribological expertise is an asset. The candidate should have skills as well as a taste for experimental procedures and data treatment.

Skills

Knowledge	Soft skills
<ul style="list-style-type: none"> - Mechanical engineering - Experimental techniques for structural characterization - Good English language skills 	<ul style="list-style-type: none"> - Team spirit - Autonomy/ spirit of initiative/ reactivity - Taste for research and development in rail industry

Your application (resumes and covering letters) should be addressed by mail as soon as possible under the reference VN-2017/18 to: samir.assaf@railenium.eu and christelle.mesureur@railenium.eu.