

## RollOil Free II Newsletter No 1

Conventional oil-based emulsions that are used in the cold rolling processes get contaminated with wear particles and tramp oils. In addition, sludge accumulates in the tank system and the filtration/skimming processes are not perfectly efficient. Moreover, production losses might occur due to the fluctuations of the emulsion conditions. Therefore, affordable and environmental-friendly alternatives are required.

### The Challenge of the project

Oil-Free Lubricants (OFLs) were developed in the past as substitute to the conventional oil-based lubricants in steel cold rolling. Pilot tests revealed comparable or even better application properties. However, for a real transfer of OFLs into the industrial standard, beside a further adaptation of the OFL itself, extensive trials under industry-related conditions and process engineering modifications are required, which were not done so far. This can enable the next step into a fully industrial application of OFLs and to benefit from their great advantages in terms of maintenance, care and disposal beside their good properties in rolling.

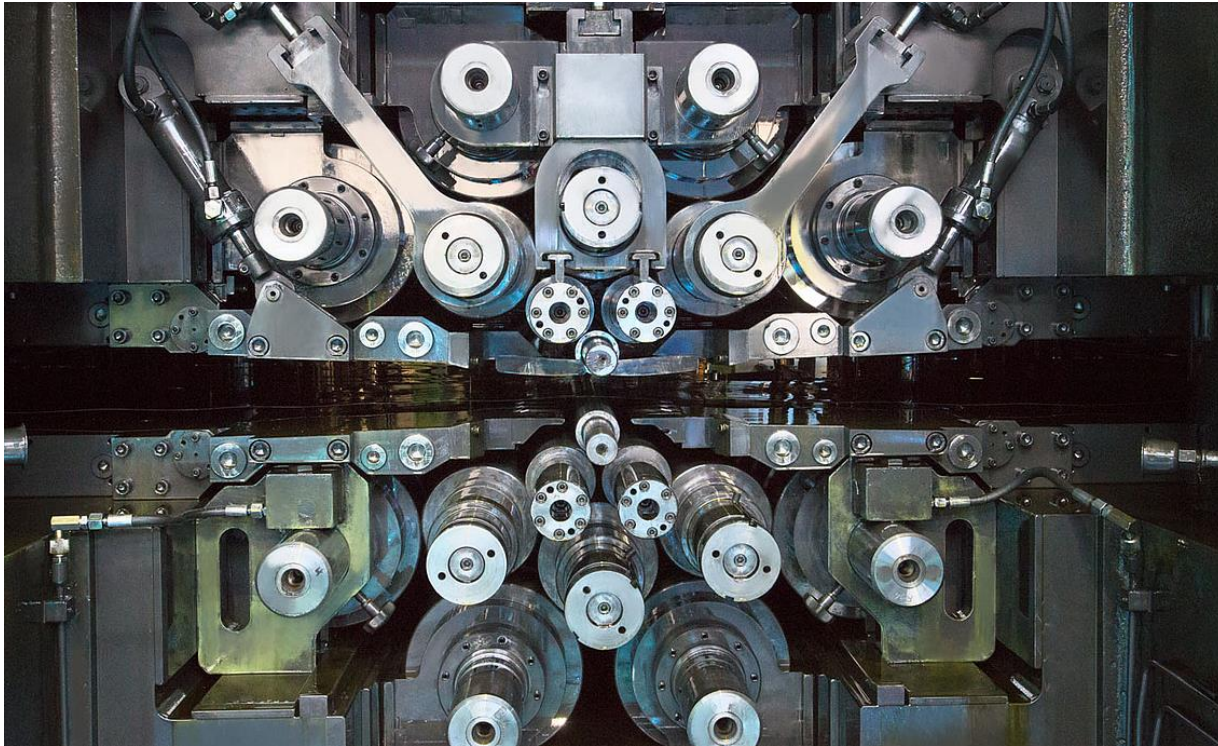
RollOilFree II aims at **testing OFLs under industrial conditions for cold rolling of packaging and automotive steels**, and at demonstrating the subsequent processability of the rolled steels down to the coated end product. Moreover, easy manageable solutions for the complete peripheral processes for the use of OFLs (care, maintenance, monitoring, etc.) will be provided. Furthermore, to grant an easy transfer into industrial practise and thereby become the new standard for greener steel production, a feasibility study will be done to permit an easy, trouble-free and widespread adaption in the European cold rolling industry.



## The Consortium

The RollOilFree II project will be carried out by interdisciplinary and well-balanced consortium with large experience in the steel sector and the technologies to be implemented. Three different countries are represented (Italy, Germany and The Netherlands), ensuring wide dissemination of project results and replication of solutions proposed. The consortium involves three rolling mills from two large multinational companies (ThyssenKrupp and Tata Steel.), a large company producing lubricants (Quaker Houghton), an Academia (Scuola Superiore Sant’Anna, the coordinator) and one research organisation, (BetriebsForschungsInstitut) with complementary skills that enable optimal coverage of the different project activities.





## The methodology

Our methodology is based on the following steps :

- Definition of a requirement matrix for OFLs based on information on emulsions that are currently used by cold rolling mills for automotive and packaging steels.
- Adaption and characterisation of OFLs based on lubrication performance (simulation of roll bite conditions), film formation capacity, plate out properties, corrosion preventing properties, wetting properties, annealing properties, cleaning properties, long-term and chemical stability. Environmental and biological properties are also considered.
- Modelling and simulation of the cold rolling process using OFLs.
- Three stages of pilot mill trials at Tata Steel to optimise and select the OFLs also through tribological characterization and testing.
- Industrial trials at the cold rolling mill of ThyssenKrupp Packaging Steels with the best OFL selected after the pilot trials.
- Investigation of the automotive steels coils rolled at the pilot plant of Tata performed by Thyssen Krupp Steel Europe regarding their behaviour towards the subsequent processing, i.e. degreasing, skin-pass rolling and coating.
- Evaluation of lubricant care and wastewater treatment system for OFLs.

