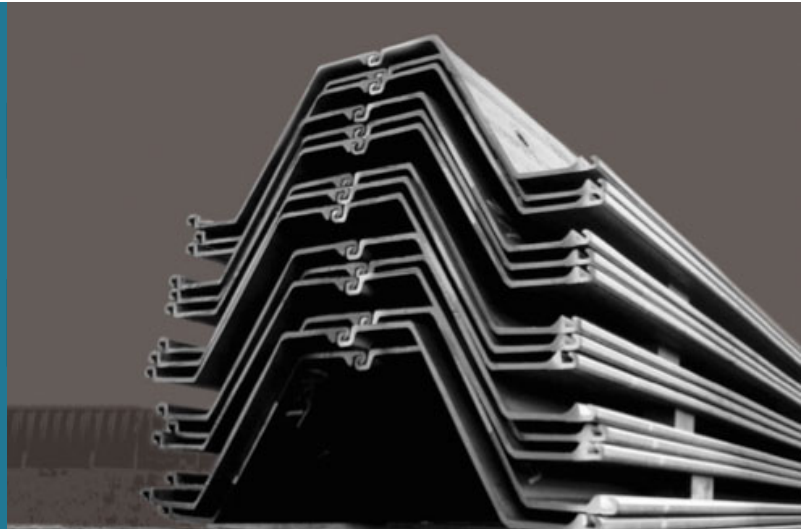


## METAMARINE

Development of an innovative industrial process to protect steel against corrosion



### Inspiration

In the marine environment, corrosion is the Achilles heel of steel. Partially emerged in sea water, steel structures are weakened by the severe corrosive attack they are subjected to. Tirelessly, over time, piling sheets installed in the form of underwater sea structures rust. All our efforts are focused on reducing the corrosion rate of the piling sheets, which are mostly manufactured in Luxembourg.

For several years, the Luxembourg Institute of Science and Technology (LIST) and ArcelorMittal have been working together on the issue. During the previous research project, they worked on the development of a new steel product aimed at improving the corrosion resistance properties of piling sheets. The concept developed at the time was relevant and effective, and it is natural that the two partners aim to further their efforts within the framework of a new project. With METAMARINE, the partners will strive to transfer the concept to a single concrete ArcelorMittal product.

### Innovation

Taking into account the previously developed concept of a new steel product, LIST and ArcelorMittal will seek to find the optimal treatment conditions for sheet piles to improve their corrosion resistance. Over the course of the project, the partners will strive to develop a method which could become an industrial process to be used on the manufacturing line of steel piling sheets.

Research activities will above all be performed in the LIST laboratories in Belvaux, Luxembourg, and subsequently a test phase will be undertaken on the La Rochelle port site in France with the assistance of the La Rochelle University. Tests in the natural environment will be undertaken and compared to results obtained in laboratory tests undertaken by LIST researchers. Additionally, in order to predict the evolution of the new steel product during the manufacturing process, a model will be established which would allow for the optimisation of the observed corrosion resistance results and mechanical properties.

Once these stages are completed, the researchers will undertake a feasibility study on an industrial scale on the hot rolling line of ArcelorMittal in Esch/Belval in Luxembourg.

### Impact

By the end of the project, the partners target to develop an effective industrial process guaranteeing that the piling sheets manufactured in Luxembourg exhibit a high level of protection against corrosion.

ArcelorMittal will then have all necessary elements in order to invest in Esch/Belval plant for the installation of a new manufacturing process for piling sheets.

### Partners

ArcelorMittal (LU)

### Financial Support

Fonds National de la Recherche

### Contact

5, avenue des Hauts-Fourneaux  
L-4362 Esch-sur-Alzette  
phone: +352 275 888 - 1 | [LIST.lu](http://LIST.lu)

Dr Patrick CHOQUET ([patrick.choquet@list.lu](mailto:patrick.choquet@list.lu))  
© Copyright June 2023 LIST

LUXEMBOURG  
INSTITUTE OF SCIENCE  
AND TECHNOLOGY

