

<p><u>COMPANY :</u></p> <p>CRM Group Research Center of Metallurgy</p>	<p><u>CONTACT:</u></p> <p>Claudia COFANO Fonction: Program Leader Tél : +32 (0)4 236 88 24 E-mail : Claudia.Cofano@crmgroup.be Adresse : CRM GROUP LIEGE Science parc Rue Bois Saint Jean 8 B-4102 Ougrée (Belgium)</p>
<p>1. <u>COMPANY</u></p> <p>CRM Group offers R&D and technology solutions to its numerous industrial members, focusing on process & product developments and their applications from an innovation and value creation perspective. The CRM Group activities and expertise deal with the whole value chain of metals and associated materials, including the development of advanced steel solutions for several key markets, made of high added value steel products.</p> <p>https://www.crmgroup.be/en</p> <p>2. <u>INTERNSHIP DESCRIPTION</u></p> <p>Title : FEA of welding processes</p> <p>Background : Welding processes belong to the most important and widely used methods creating connections in the steel industry. All the information about a welded specimen's shape and residual stresses are especially important in im-proving the production quality and to determine the resistance of the steel structures.</p> <p>The welding process results in microstructural changes in the steel alloy, which means modification in the material properties. Heating and cooling also causes volumetric changes which results in residual stresses in the welded sections. Thermal deformations – which are elastoplastic in the region of welding – and the residual stresses from these effects indicate residual deformations. It makes the assembly of welded structures difficult and leads to deterioration of the quality. Using finite element method in the product development can have benefits on the manufacturing quality and by the minimization of residual stresses or residual deformations.</p> <p>The residual stress distribution can be used to improve the design methods concerning stability, cracking and fatigue behavior of steel structures. The simulation could also be used for optimizing fabrication processes.</p>	

Key objectives : The goal of this internship is to be able to consider the effects of welding manufacturing parameters on the residual stresses and deformations of steel sheets for construction applications and to use them to better predict the performance of design under in use load conditions.

Main tasks :

- Bibliographic survey.
- Definition of welding manufacturing parameters to be investigated.
- Development of a FE model using a commercial code.
- Set up a test campaign for the FE model validation.
- Estimation of FE results improvement.
- Reports and presentations describing the work and the conclusions.

Candidate requirements :

- Background in studies of mechanical/material/welding engineering.
- Knowledge of FEM program (LS-Dyna and/or Abaqus) will be preferred.
- Knowledge of 3D CAD design software (Solidworks) will be preferred.
- Fluent in English, both speaking and writing will be preferred.
- Independent and results oriented working style.
- Team spirit and open minded personality.

Working environment

The position will be at the CRM offices in Sart-Tilman (Liège).

Working period

The internship contract is for a 4 months period, minimum.