EFFECT OF FILLER METAL ON THE FRACTURE BEHAVIOR OF WELDED JOINTS OF HIGH STRENGTH STEEL

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- High-strength steel welding
- Microstructural analysis
- High-speed mechanical testing
- Cleavage fracture

Abstract:

High-strength steels are of great importance in modern structural parts. These materials possess an excellent combination of high strength and toughness, suitable for many applications such as pressure vessels. The use of these steels in welded structures requires developing consumable electrodes which can be used to deposit weld metals with similar properties as the base metal. In particular, the fracture resistance of the weld metal should be at least that of the base metal. The weld metal microstructure, especially in a multipass weldment, is complex due to the inheritance from reheating and tempering of weld beads. This research project aims at improving the current understanding of the impact toughness of weldments made of high-strength steel.
Starting from an experimental campaign, the chosen approach relies on the quantification of microstructural parameters relevant to the cleavage fracture resistance of selected welds. This will further enable the improvement of existing knowledge on the link between the microstructure of the weld metal and its resistance to cleavage fracture. The knowledge acquired during this project will help in the development of new filler materials.