

**BUILDING****Light Metal Alloys****24\_BUILD\_LMA\_WAAMconnectors**

**TITLE:** WAAM technology for structural steel connections with advanced design

**DESCRIPTION**

This challenge aims to improve the methods and practices used in the design and fabrication of steel connectors for new and existing structures exploiting the potential of novel 3D printed metal technology (such as WAAM) in terms of new geometries and improved structural performances.

Nowadays, steel connectors are a crucial point in both design and construction phases of steel frames, especially in seismic prone areas where high demand is requested for moment resisting frames thus requiring ad-hoc costly solutions (high strength bolts, stiffeners, full penetration weldings,..) . New layouts and geometries are currently realized using fused metal and cast iron with specific formwork that involve:

- waste of material
- poor flexibility (difficulty in adapting to changes in plan)
- high costs
- time consumption

The proposed solution is to use metal 3D printing technology for large parts such as Wire and Arc Additive Manufacturing (WAAM) to design and manufacture a new class of steel connectors for frame structures with high flexibility in the geometry and structural performances of the outcome.

The following technological results will be achieved during the project:

- Off-site manufacturing of novel steel joints for moment resisting frames
- Development of new designs methods for efficient steel connectors exploiting the potential of WAAM fabrication methods.

**Objectives** of the project:

- Reduction of manufacturing time
- Increased productivity
- Reduction of weight
- Increased geometrical flexibility towards a new class of efficient connectors
- Reduction of material waste
- Reduction of environmental impact