



DreamFAB

Deconstruction and refabrication for the reuse of steel buildings

Zhongcheng Ma SCEC seminar

D.Sc (Tech) 11.2.2026

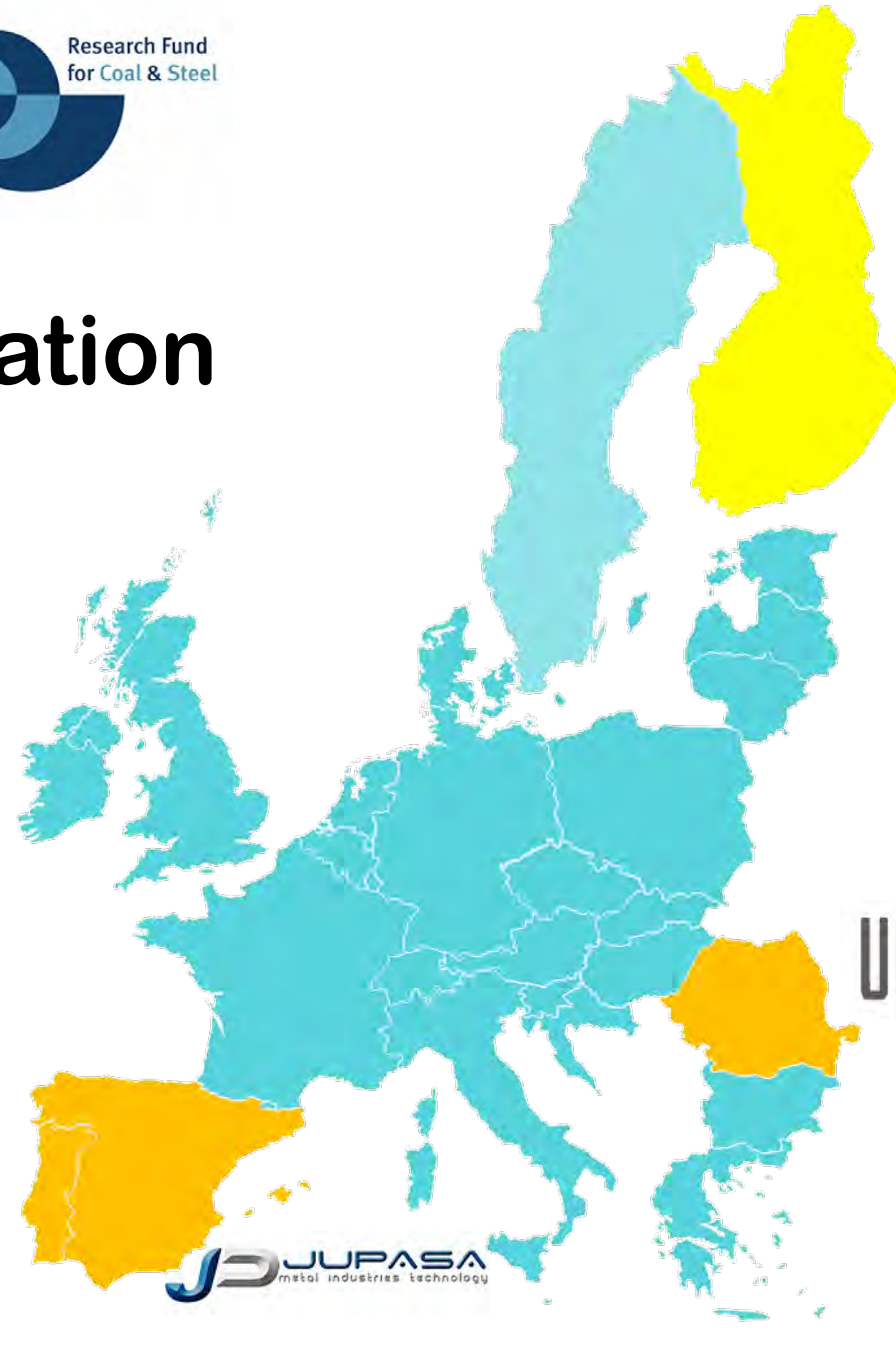


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Project general information

Call: *RFCS-2022*
Instrument: *RPJ (RR)*
Start date: 01/09/2023
End date: 31/08/2027
Budget: 2.45M euros



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Project objectives

Structural safety

- Increased imperfections
- Multiple welding-cutting cycles

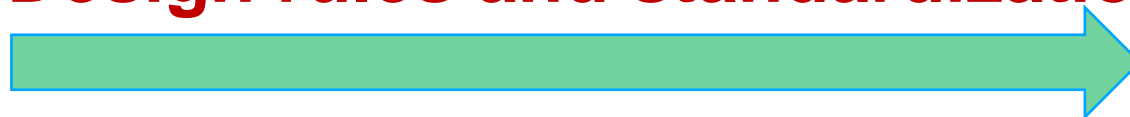
Demountable solutions

- Composite construction
- Mechanical truss joints

Robot-assisted deconstruction

- Framework & architecture
- AI, digital twin & mixed reality
- Demonstrators

Design rules and standardization

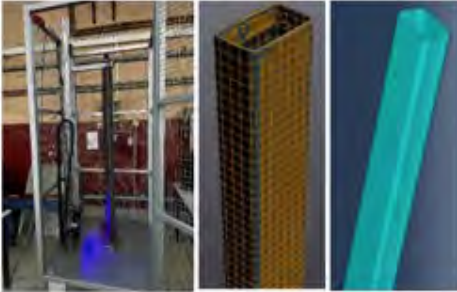




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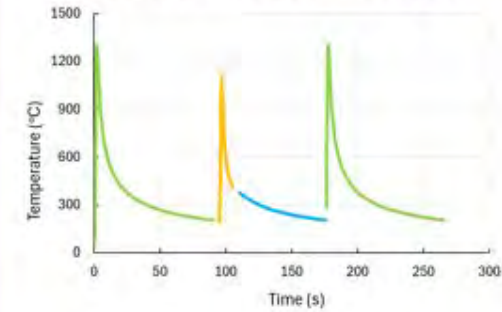
WP3: Increased imperfections



WP7: Robot-assisted
deconstruction



WP4: Refabrication methods



WP5: Demountable
composite construction



WP6: Demountable trusses



WP8: Standardization, BIM and LCA



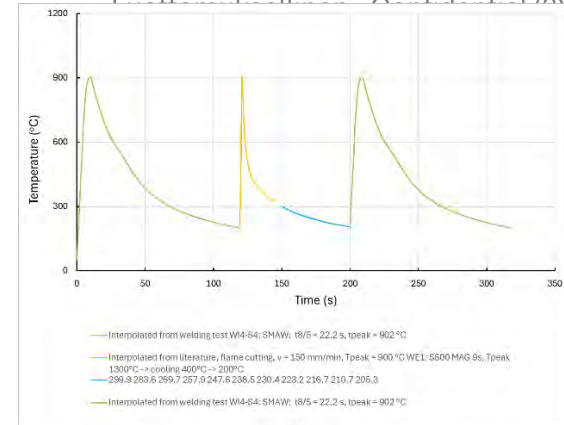
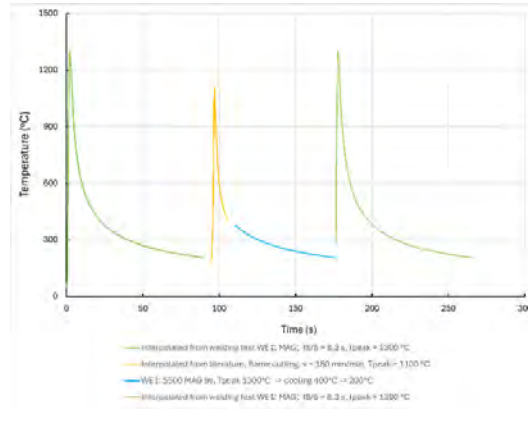
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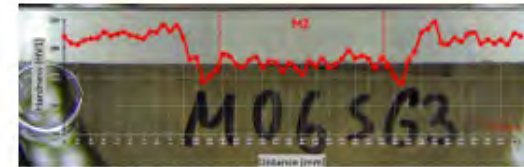
WP4: Refabrication method

- T4.1 Optimal welding parameters (D4.1)
- T4.2 Multiple welding-thermal cutting-welding cycles (D4.2)
- T4.3 Effects of re-welding
- T4.4 Finite element analyses

Gleeble heat treatment



Thermal cycles for Gleeble (MAG & SMAW)

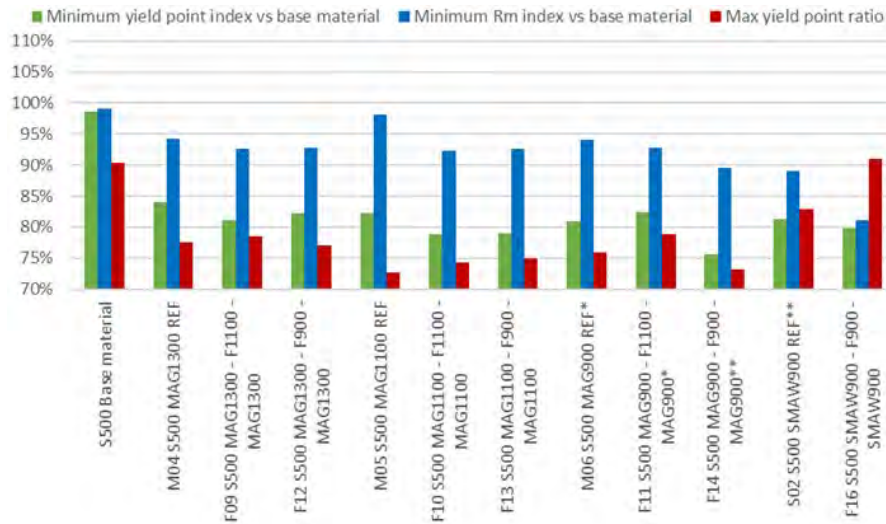


F1 M06SG3 S500 MAG900 REF*
MZ = 12 mm

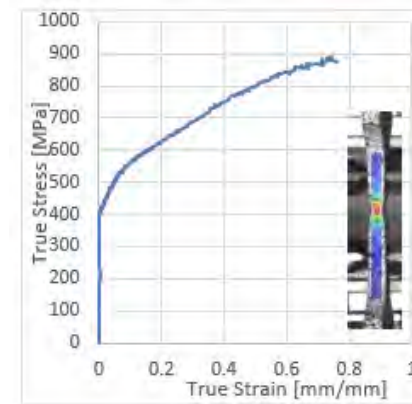


F0SG3 S500 MAG1100 - F1100 - MAG1100
MZ = 19.5 mm

Hardness profile for Gleeble simulated tensile specimens

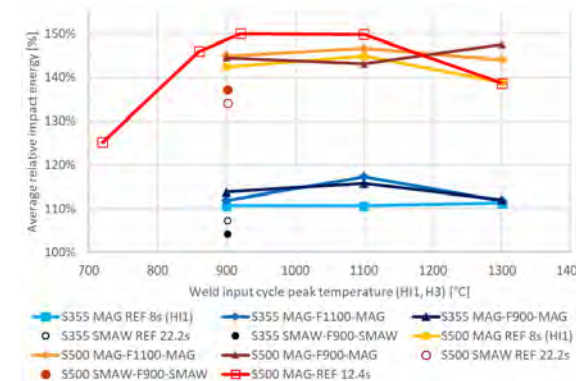


Tensile strengths



M02SG2 S355 MAG1100 REF

True stress-strain curves



Charpy impact energy

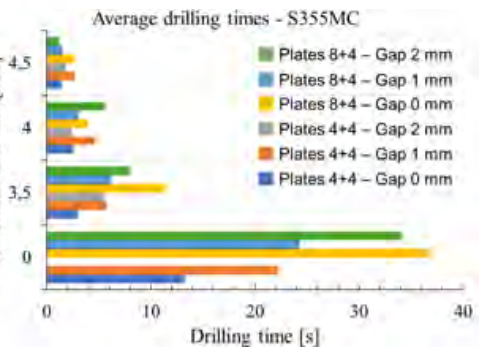


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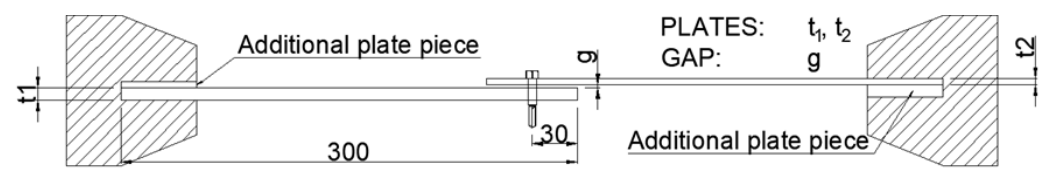


WP6: Mechanical truss joints

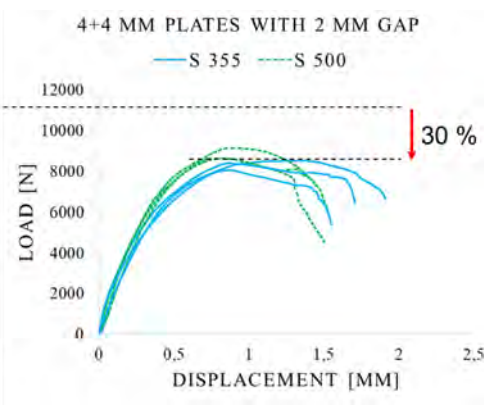
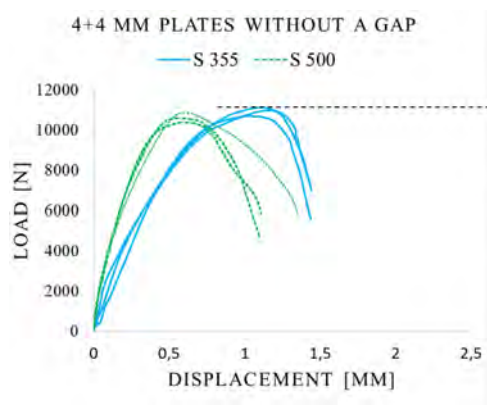
- T6.1 Solution development (D6.1)
- T6.2 Structural behavior of demountable truss joints (D6.1)
- T6.3 Full truss structures
- T6.4 Design rules and manufacturing guidelines



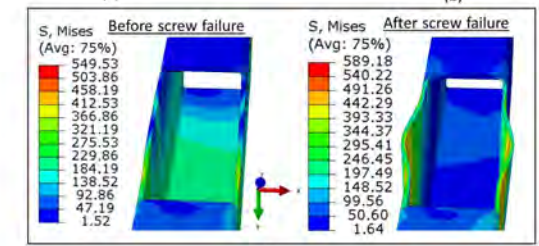
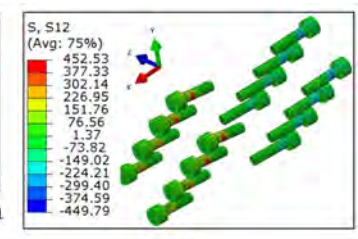
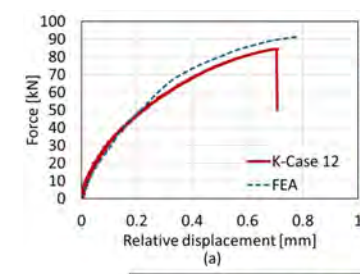
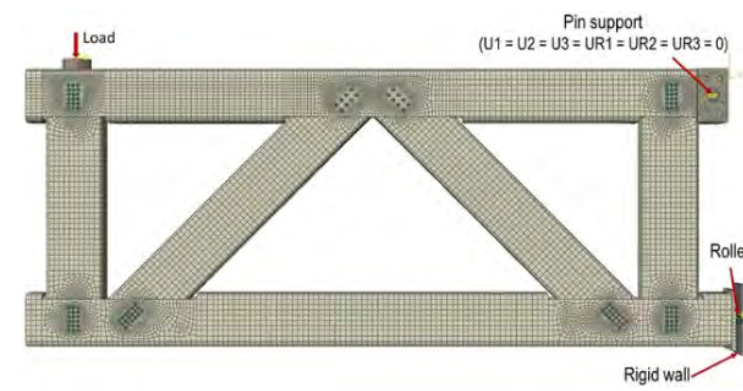
1300 Drillability tests



36 lap-shear tests



14 K-joint sub-truss tests and 12 FEAs

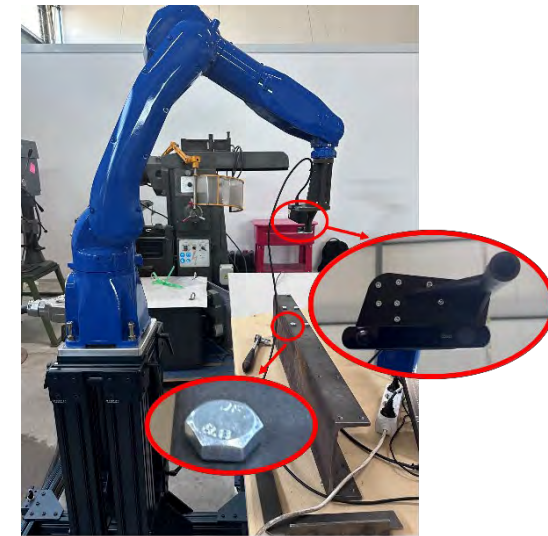
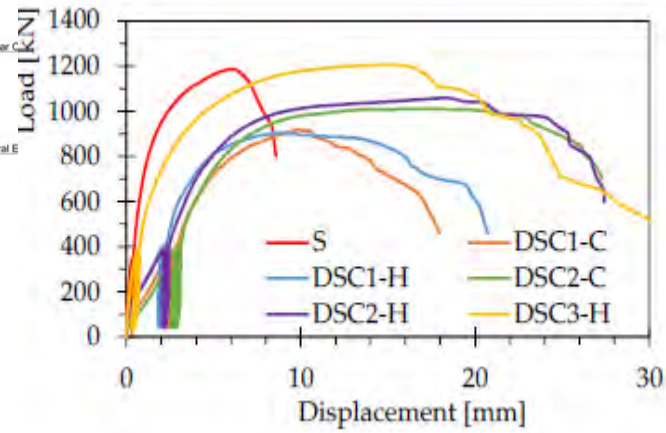
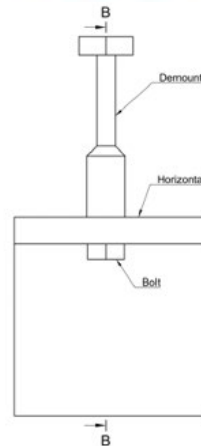




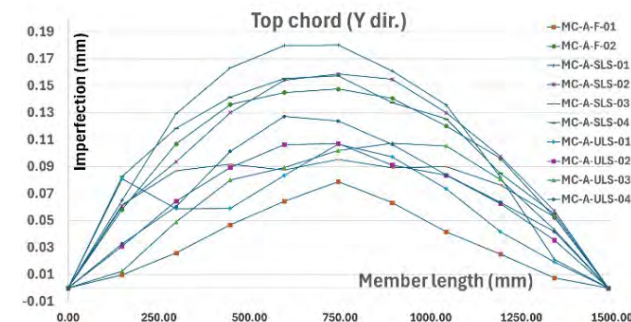
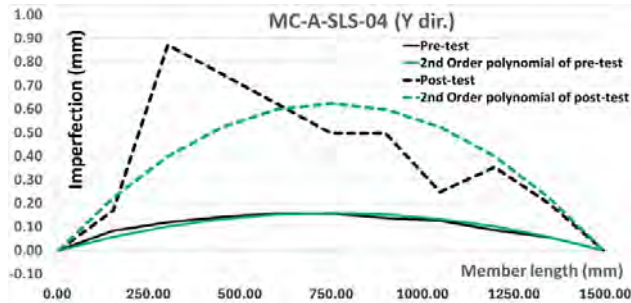
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T5.2 Experimental characterization (27 push-out tests)

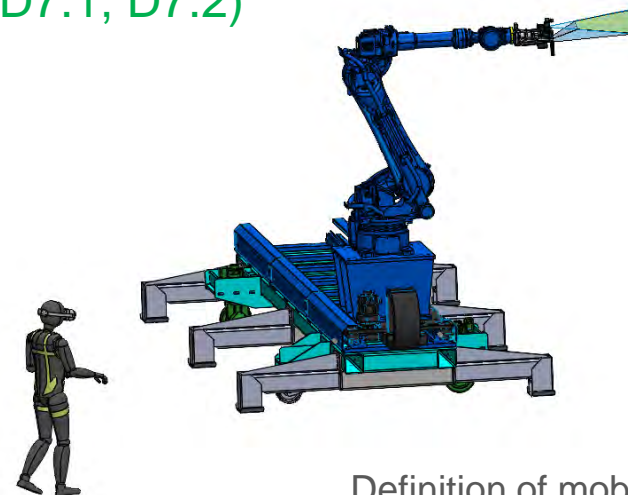


T3.2 Increased imperfection under serviceability loading cycles

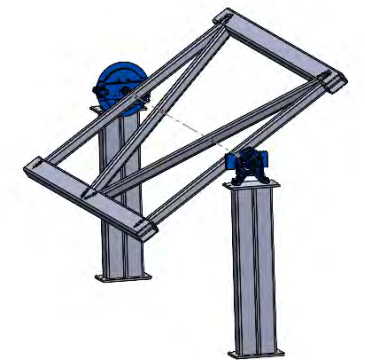


T7.1-3 Robot-assisted construction/deconstruction (D7.1, D7.2)

System setup to detect screws and define movements of robot



Definition of mobile platform





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Thank you!

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