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The high strength and stainless steel, glass structures - support for the space industry

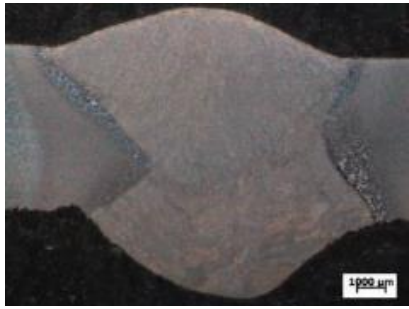
Pavel Ryjáček, Faculty of civil enginnering CTU)
Department of steel and timber structures

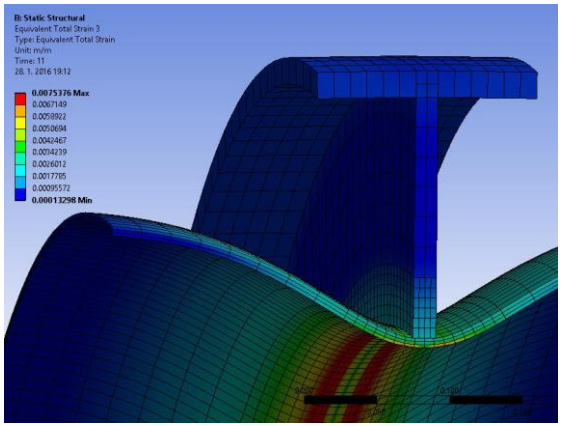
Motivation

- To present activities at the Department of Steel and Timber Structures, that can be used for the space activities and related research
- Steel and metal structures
  - High strength steel, aluminium, thin-walled structures
  - Connections – welded, bolted, riveted, bonded
  - Industrial and technological structures, bridges
- Fire design
- Glass structures

High strength steels

- Slender and lightweight elements
- Structural analysis and optimization
- Welding of HSS steel, modelling of the fabrication processes
- Fatigue tests, fatigue resistance improvement (HIFIT treatment)





High strength steels

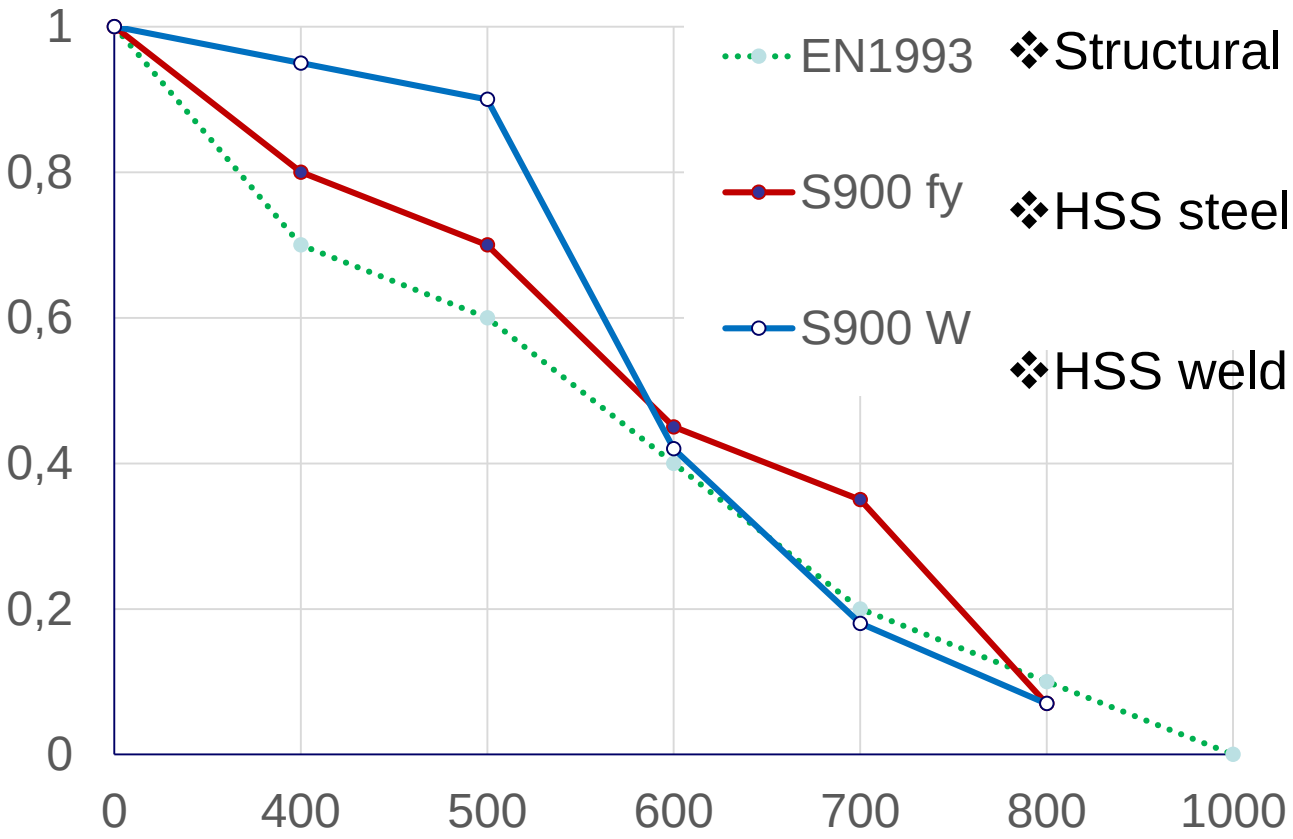
Deflector for ARIANE 6 project

Fabricated in MCE Slaný

Fire tests on structures

– **Cardington** 2003

❖Reduction factor, k_y

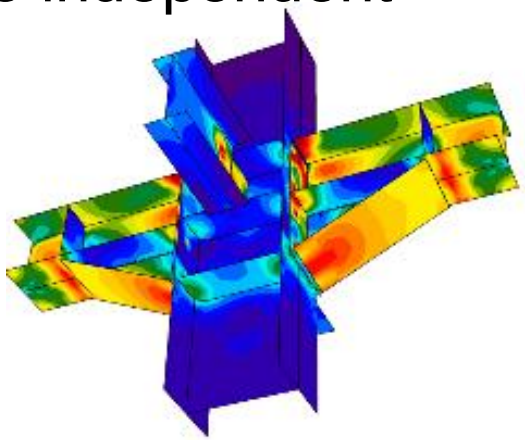


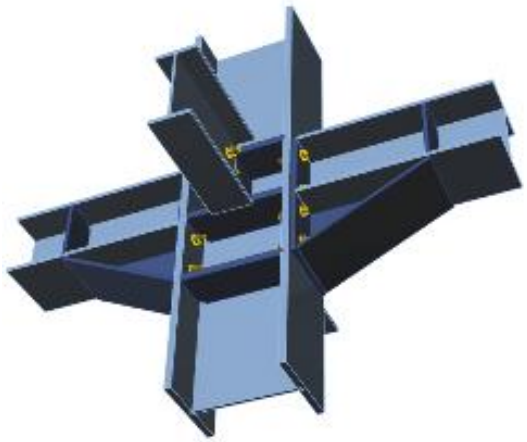
Fire tests on structures

- **Cardington** 2003
  - Component model
- **Mokrsko** 2008
  - Composite slab
  - With improved fire resistance
- **Veselí** 2011
  - Composite slab
  - Connections with improved fire resistance

Connection design by FEA

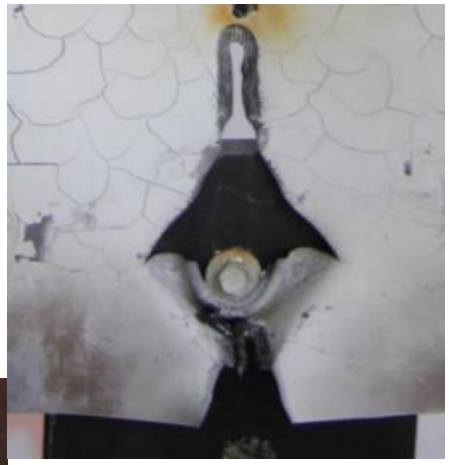
- **Component based Finite Element Method**
- **Features**
  - Complex geometry
  - Generally loaded
  - Code independent





Cold-formed thin-wall profiles

- High load capacity – low weight
- Stability analysis – design with testing support

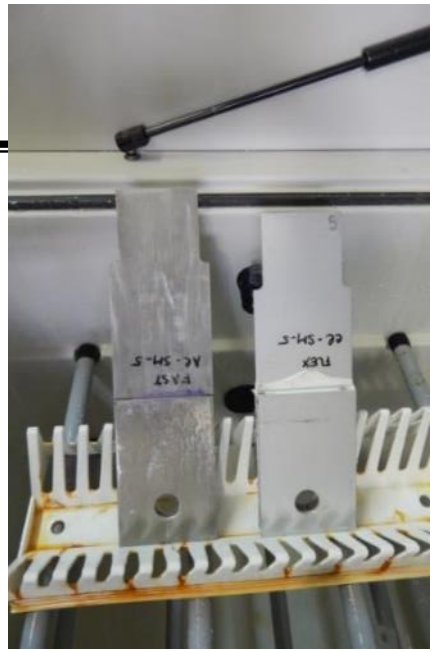


Stainless steel structures

- Corrosion and abrasion resistance
- Ductile behavior, non-magnetic (for electronic devices)
- Can be used as 3D additive manufacturing – foorbridge MX3D Amsterdam
- Laser welded profiles – precise manufacturing, low residual stresses.

Glued connection for glass Structures

- Resistant to salt, acids, UV, corrosion
- Glued connection - tensile strength, shear strength, ageing
- Layered glass, impact resistance



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Thank you for your attention

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