



Czech Technical University in Prague  
Department of Steel and Timber Structures

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**BENCHMARK STUDY**  
LATERAL-TORSIONAL BUCKLING  
OF CLASS 4 I-SECTION  
AT ELEVATED TEMPERATURES

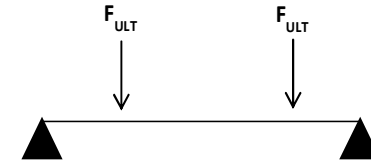
Martin Prachař, Carlos Couto, Nuno Lopes, Michal Jandera,  
Paulo Vila Real, František Wald

# Contents

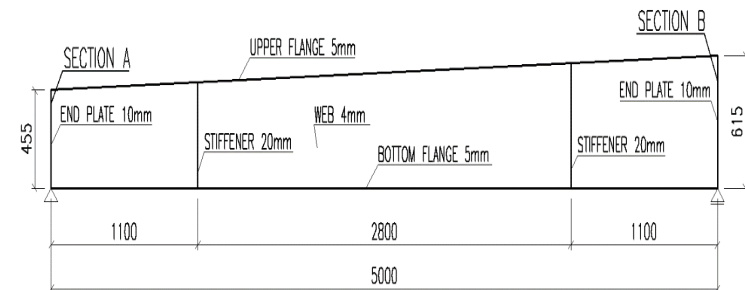
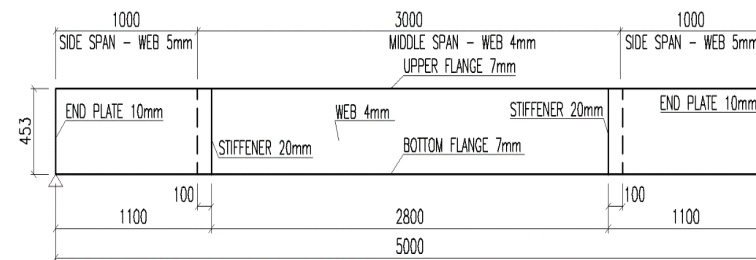
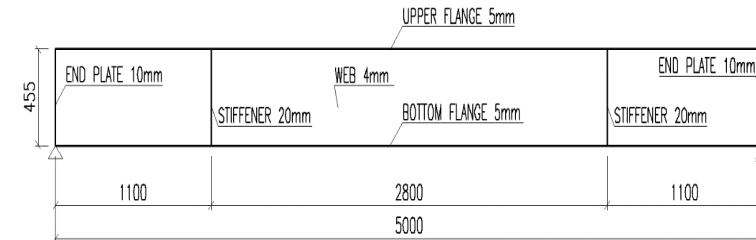
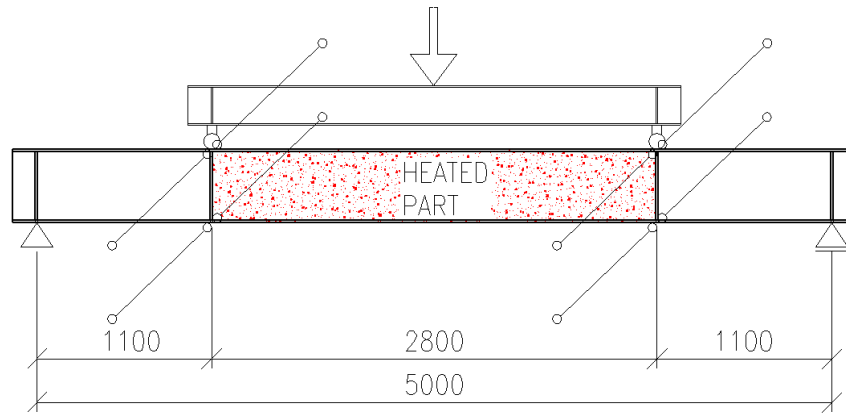
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- ❑ Description of the benchmark study
- ❑ Results

# Description of benchmark study



- A simply supported beam – two equal concentrated loads



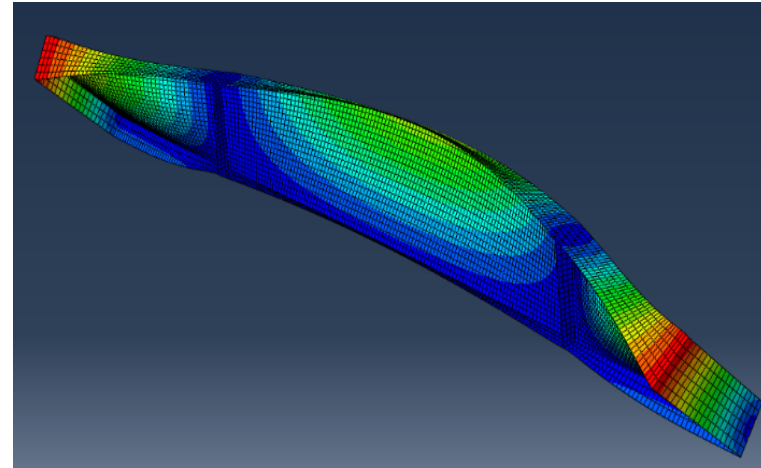
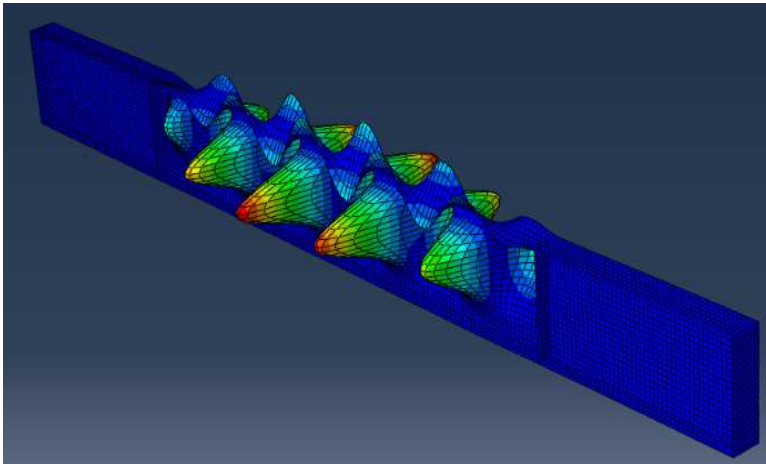
- Cross-sections  $H_{web} \times t_{web} / B_{flange} \times t_{flange}$

- 450x4/150x5      450°C
- 450x4/150x7      450°C
- (585-495)x4/150x5      650°C

# Description of benchmark study

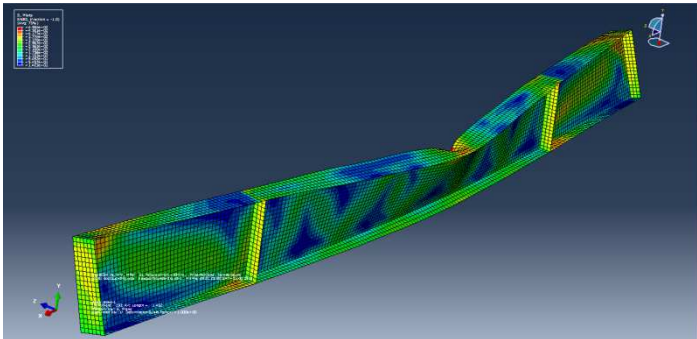
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- Numerical analyses
  - FE programs - ABAQUS and SAFIR
  - Local buckling - reason for shell finite elements
  - Initial geometric imperfection - elastic buckling eigenmodes
  - Two types of load controls – displacement and load

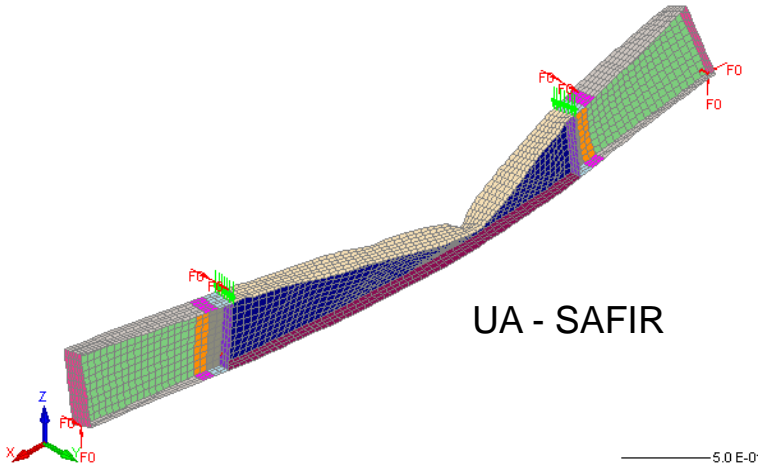


# Results

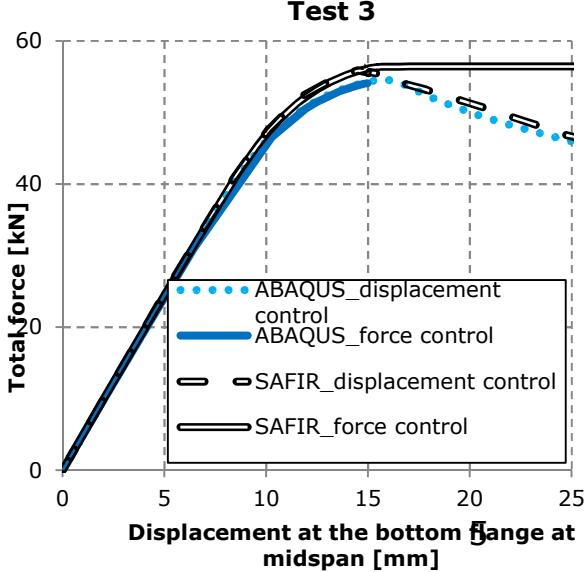
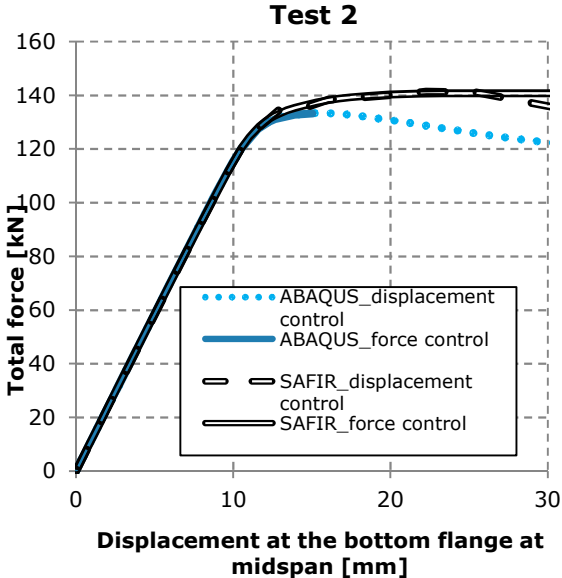
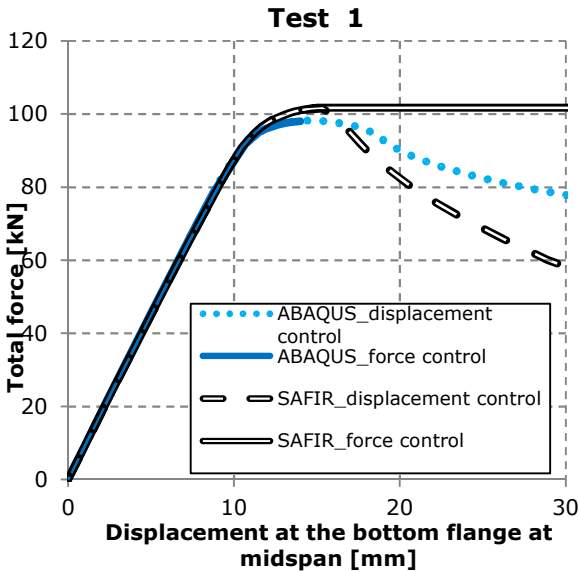
Comparison of results



CTU - ABAQUS



UA - SAFIR



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Thank you for your attention.

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