

Optimal use of High Strength Steel grades within bridge

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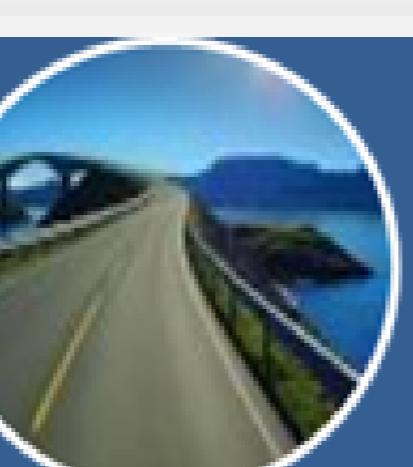
ULiège – Ustutt (University of Stuttgart) – UC (University of Coimbra) – BWI (Belgian Welding Institute) – Industeel BE – GRID Consulting Engineering

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ULiège

Fatigue

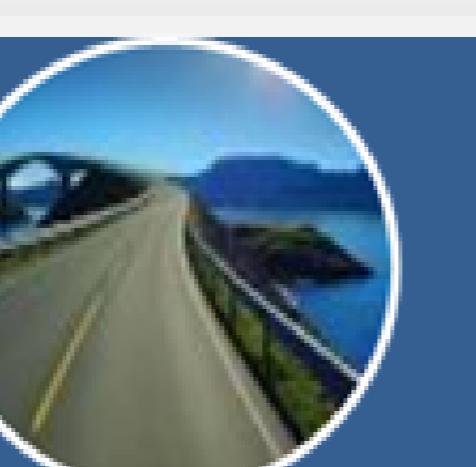
GRID



UStutt

Stability

Design of BRIDGES



BWI

Welding

- Classical steel & Eurocode
- HSS & Eurocode
- HSS without Eurocode

Post treatment qualification

Proposals Eurocode modifications

UC



Impact of Bridge Design

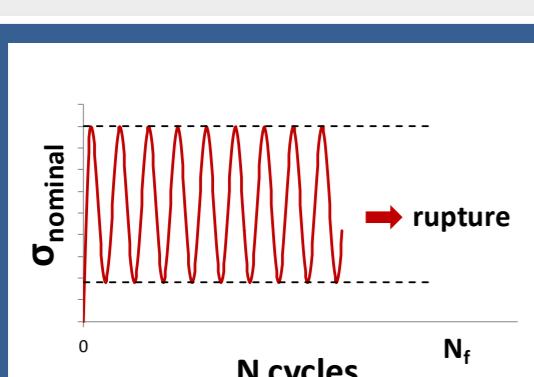
- Life Cycle Assessment
- Life Cycle Cost
- Life Cycle Performance

Guidelines for HSS in bridges

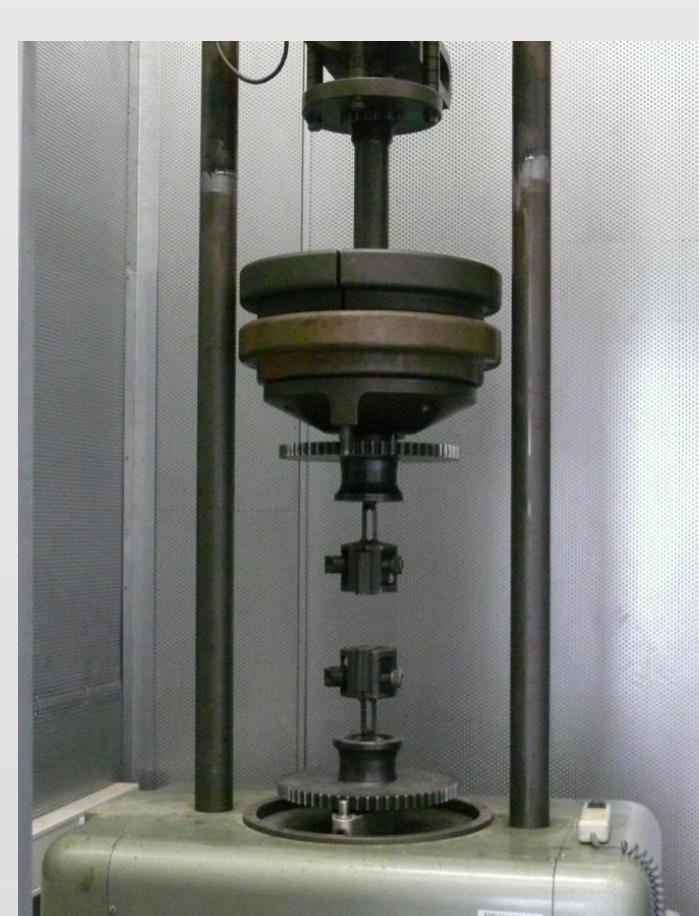
Interest of HSS in bridges



The research has received funding from the European Union's Research Fund for Coal and Steel (RFCS) research program (RFSR-CT-2014-00026)



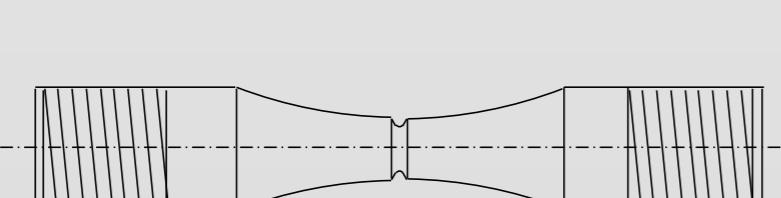
Fatigue - Modelling



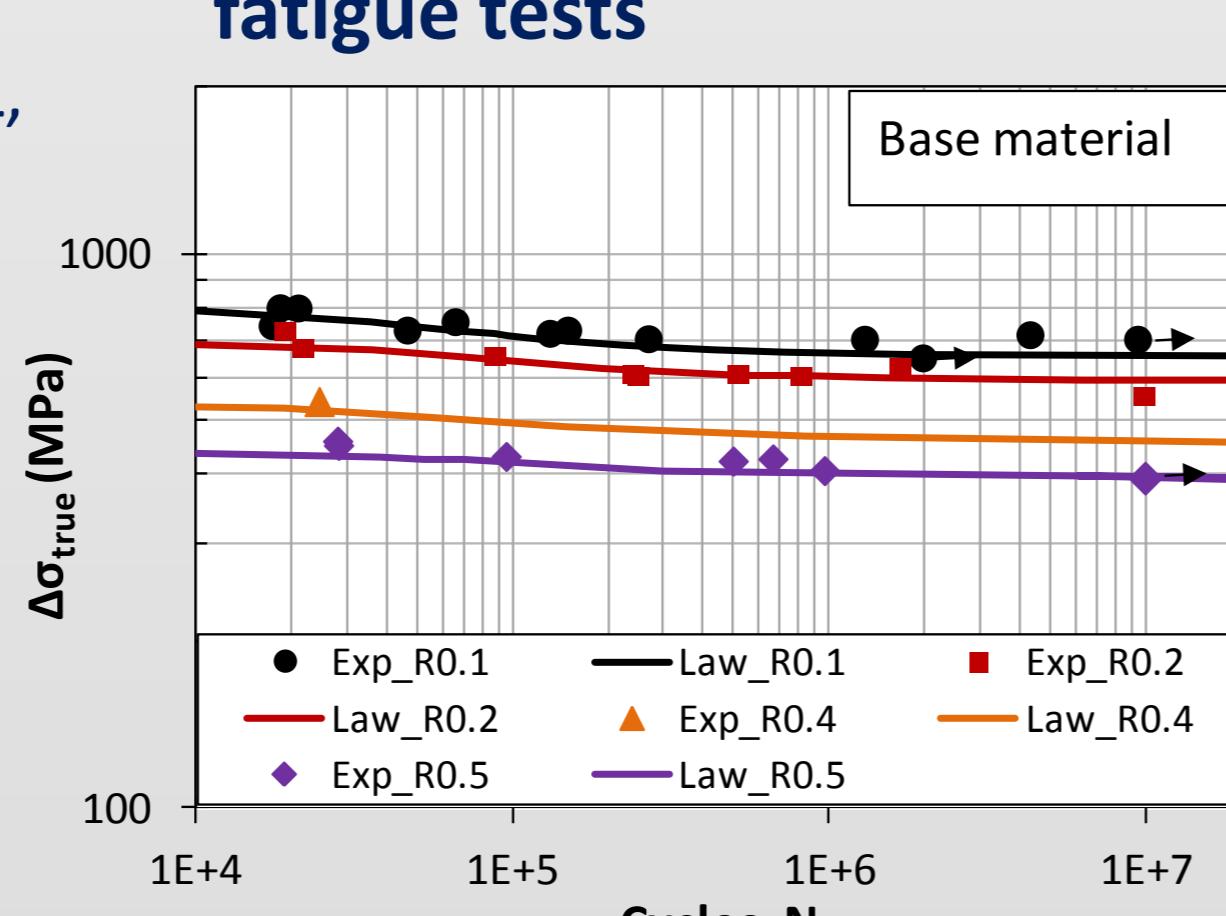
Static + fatigue study:

Material tests on HSS: S690QL, HAZ, weld metal

- Tensile
- Shear
- Bauschinger
- Fatigue



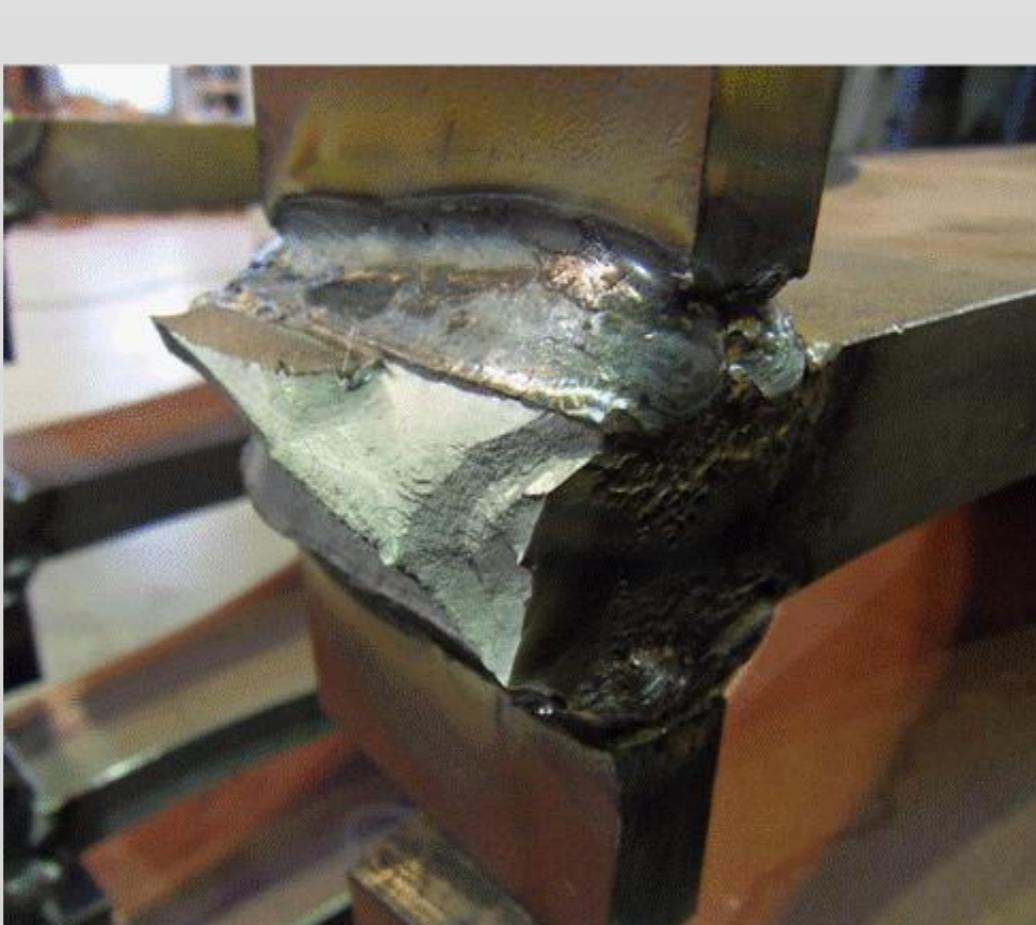
fatigue tests



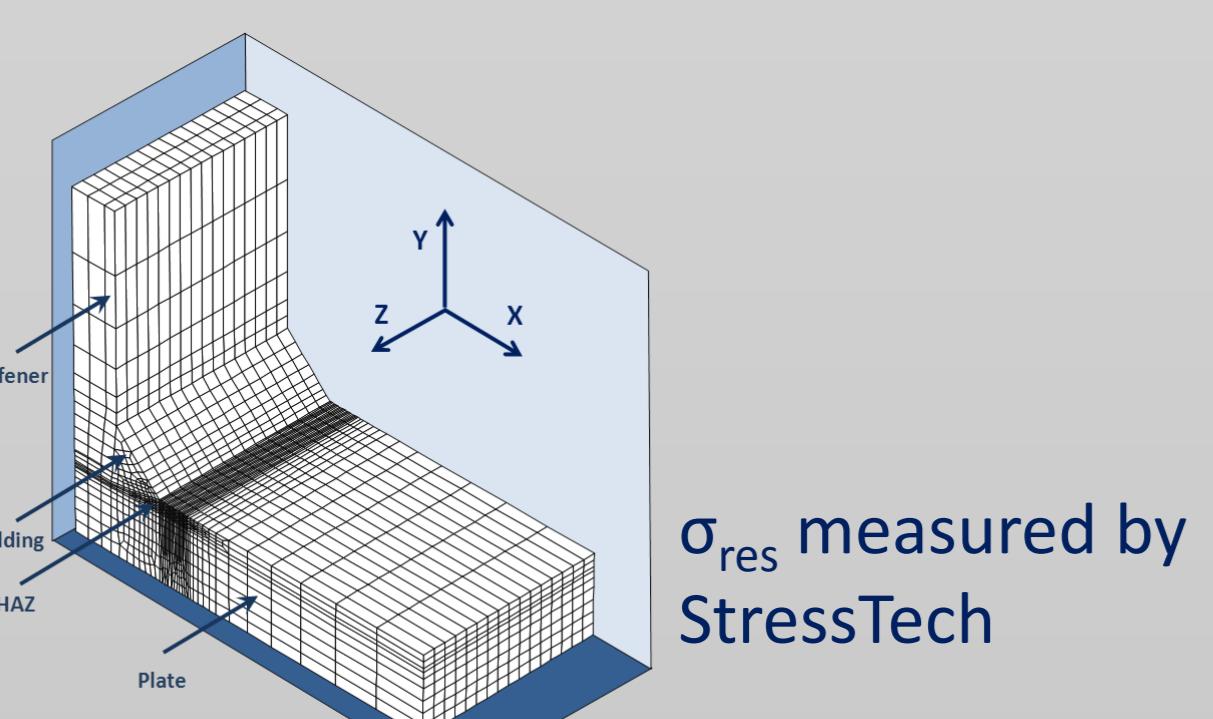
fatigue tests on welded samples

Study of:

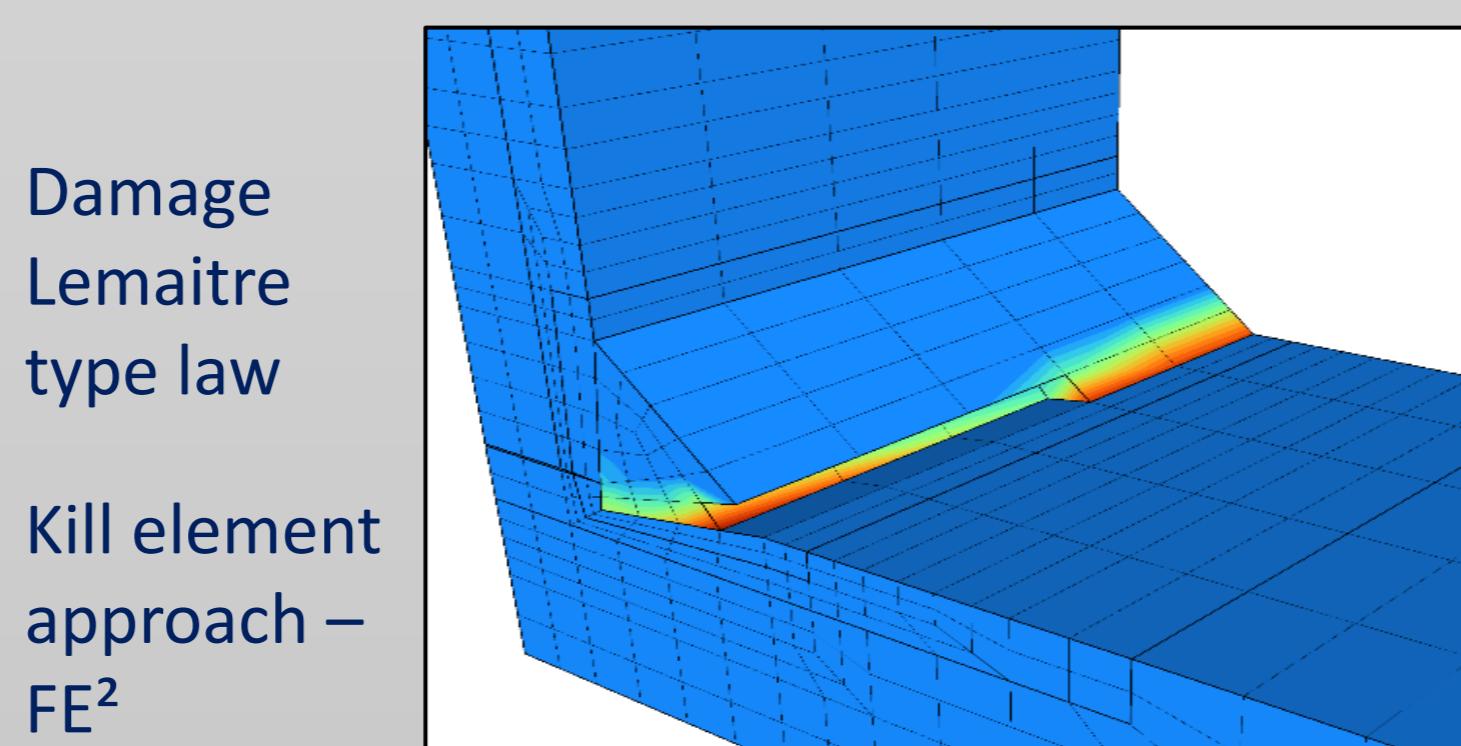
- Plates
- Welded plates
- Welded plates + PIT
- Welded plates + TIG remelting



Static – fatigue validation



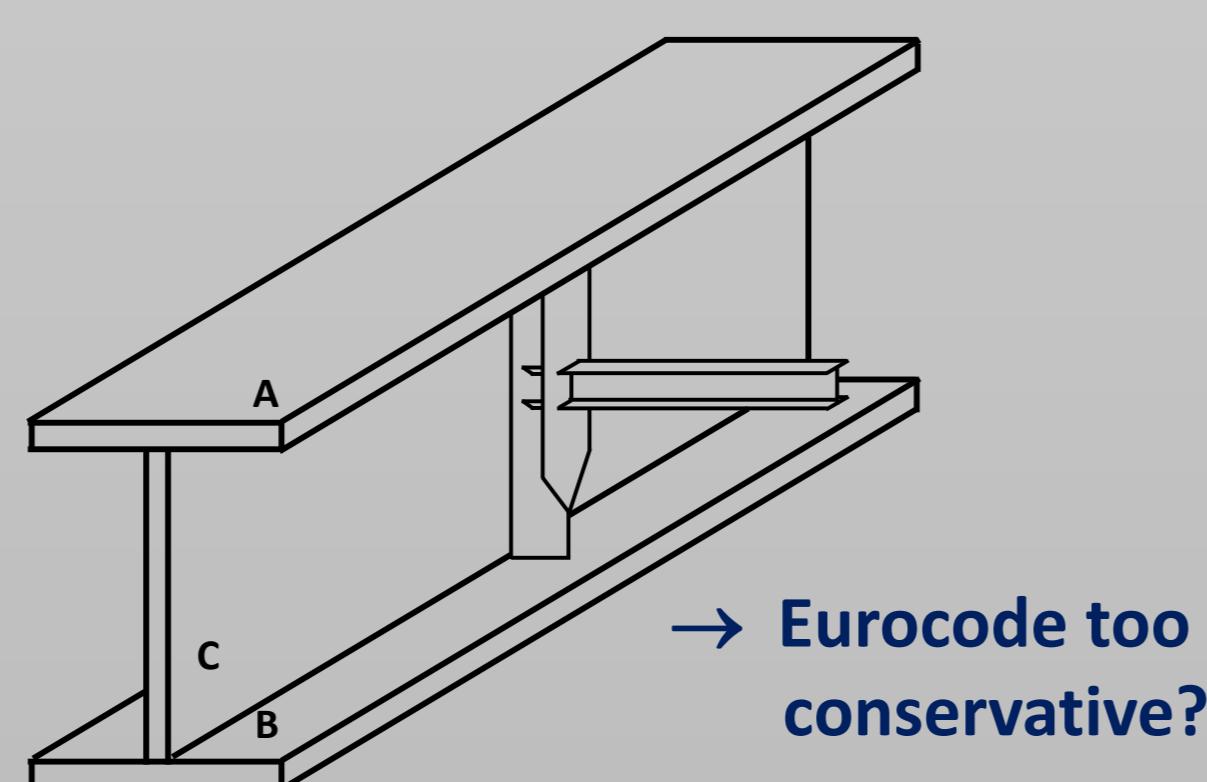
Fatigue crack propagation



Beam tests from UStutt



Study of bridge detail

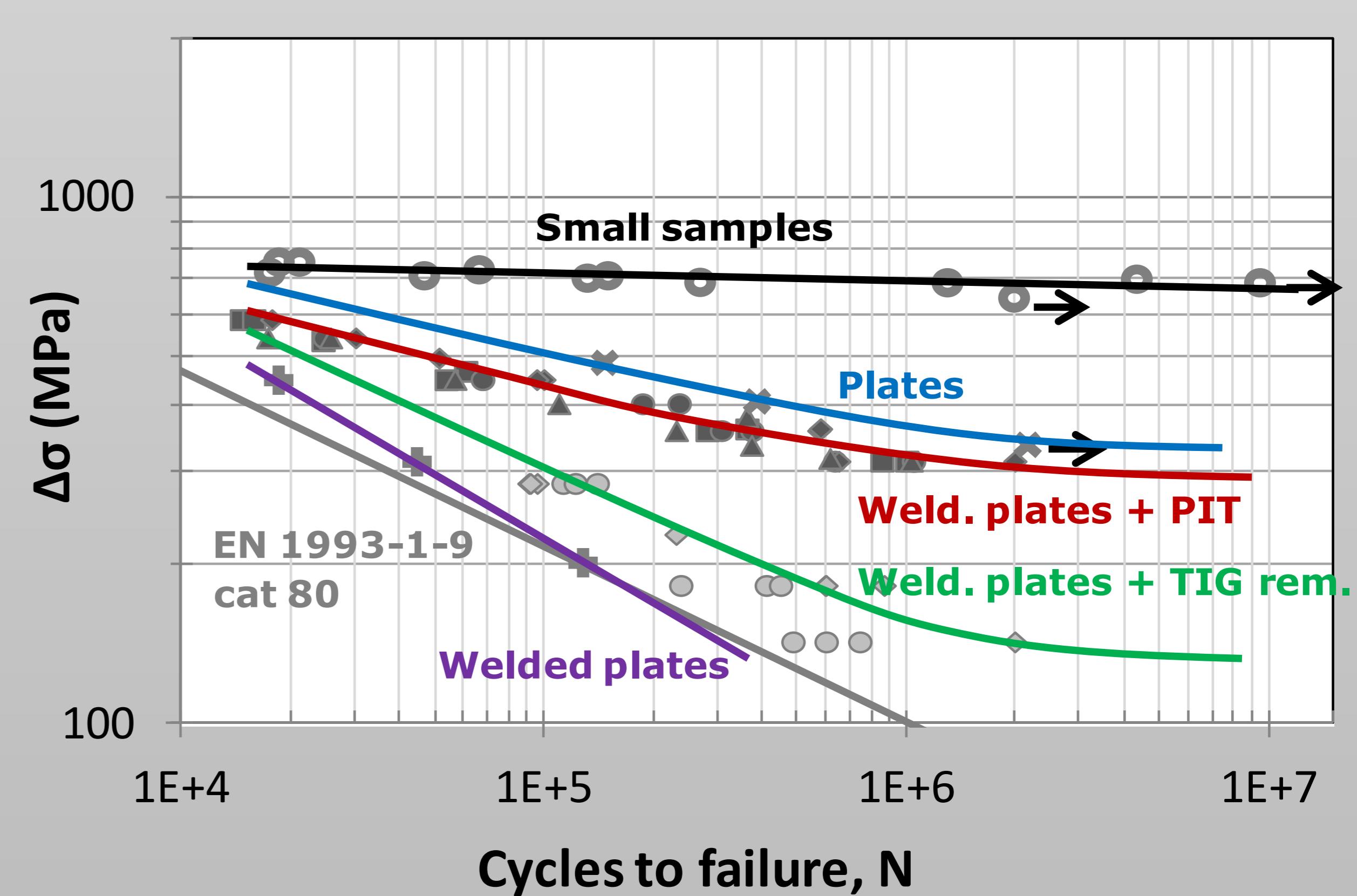


Conclusions and perspectives

- Welding, post-treatment optimized
- Damage simulation of bridge detail
- New formula for buckling
- New SN curve in Eurocode?

Effect of using HSS:

- Bridge weight ↘
- Plate thickness ↘
- Welding time ↘
- Global warming potential (GWP) ↘
- Primary energy demand (PED) ↘



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