

Assessment of Structural Behaviour in Limit State Operating Conditions

STRUBECON

No. 6876

Principal investigator

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The Project

- The studies related to limit state operating conditions of the structure by means of experimental and numerical procedures.
- To provide an assessment of structure behavior, by comparing of the parameters such as stress, strain, crack occurrence, etc., caused by certain load level and temperature at this unexpected limit state with those allowed by material properties.
- Research sub-objectives: testing of material properties for the different environmental conditions; definition of impact energy as well as the determination of the crack driving force and life assessment of structural elements; evaluation of the semi-rigid structural joints/connections behavior; development of a numerical algorithm for optimization of semi-rigid framed structures; creep buckling simulations of composite beam-type structures; proper constitutive modelling at limit operating conditions (i.e. plasticity, damage, thermomechanical coupling); application of new materials to be used at limit state – nanocomposites.
- Targeted structures: single and multi storey steel buildings, high-power electrical transmission towers, ship structures, machines, etc.
- Research group: Prof. Josip Brnić, D. Sc. (Principal investigator) — Prof. Goran Turkalj, D. Sc. — Prof. Marko Čanadija, D. Sc. — Prof. Domagoj Lanc, D. Sc. — Assist. Prof. Marino Brčić, D. Sc. — Assist. Prof. Goran Vukelić, D. Sc. — Igor Pešić, D. Sc. — Sanjin Krščanski, D. Sc. — Neven Munjas, D. Sc. — Damjan Banić, D. Sc. stud. — Edin Merdanović, D. Sc. cand.

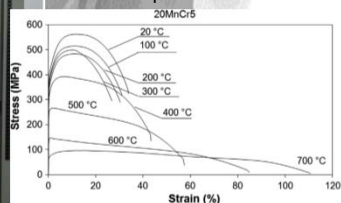
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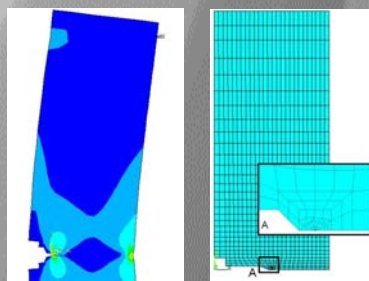
Results



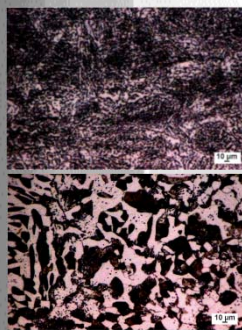
Engineering stress-strain diagrams for 20MnCr5 steel at room and elevated temperatures.



Testing system for characterization of mechanical behaviour at elevated temperatures

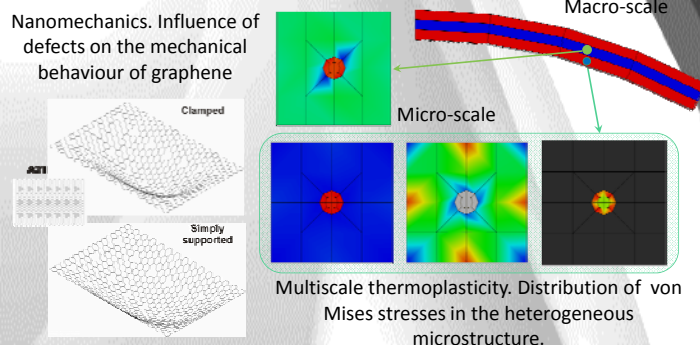


Von Mises stress distribution and the finite element model of a single-edge notched bend (SENB) specimen.



Microstructure of 1.7225 steel before and after creep at 700 °C

Nanomechanics. Influence of defects on the mechanical behaviour of graphene



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