

# NONLINEAR MODELLING FOR THE ASSESSMENT OF AN EXISTING CONCRETE STRUCTURE ACCORDING TO NORM SPECIFICATIONS

Oliver Zeman<sup>1</sup>, Alfred Strauss<sup>2</sup>

*Abstract*

*Maintenance and improving of existing structures due to the increase or changes in load scenarios require the assessment of the bearing capacity for such structures. Hence recalculations of these structures according to EUROCODEs are necessary. In case of reinforced concrete structures, which have been built according to the codes of ONORM B 4200 in Austria since the 1950ies, these recalculations cannot reach the required levels of safety and reliability, although they are still in service.*

*Therefore in Austria (ONR 24008) and in Germany (DIN-Nachrechnungsrichtlinie) regulatives for the recalculation of existing structures were set up. The ONR 24008 includes a procedure with four steps: step 1 (design according to EC), step 2 with reduced partial safety factors, step 3 with nonlinear modelling and reliability assessment, step 4 with increasing of the required reliability of a structure.*

*In this article an assessment of an existing bridge structure on the Austrian Tauern railway was made. Recalculations according to step 1 and 2 of ONR 24008 supposed the requirement of strengthening measurements. As a result, step 3 was applied on this structure and a nonlinear model of the decisive pillar was set up in ATENAScience. The input of the geometrical data and the material parameter was done with the software application GiD.*

*Moreover, the problems, which appeared during modelling and the calculation process are discussed. As a result an assessment of the bearing capacity at the ultimate limit states (ULS) and the serviceability limit states (SLS) were made. The assessment of the SLS includes the*

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<sup>1</sup> Master Student, Department of Civil Engineering and Natural Hazards, University of Natural Resources and Applied Life Sciences, Vienna, A-1190, Austria, E-mail: [oliver.zeman@boku.ac.at](mailto:oliver.zeman@boku.ac.at)

<sup>2</sup> Associated Professor, Department of Civil Engineering and Natural Hazards, University of Natural Resources and Applied Life Sciences, Vienna, A-1190, Austria, E-mail: [alfred.strauss@boku.ac.at](mailto:alfred.strauss@boku.ac.at).

*limitation of the crack widths and of the acceptable stresses according to EN 1992-2 which is decisive for the considered structure.*