

Uniaxial Compression of 42CrMo4 on Different Testing Devices: Influence on Identification of Material Parameters for Plasticity Models

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Abstract. Knowing the parameters associated with a plasticity model and a specific material is necessary for a good predictability of the material behavior during forming. Parameter identification is based on experimental data. To make sure to have good quality experimental results, specialized testing devices are widely used. In this work, uniaxial compressions at constant temperature and strain rate on hot 42CrMo4 steel are performed on a Gleeble testing device and a DIL805 A/D plasto-dilatometer. Resulting stress/strain curves are compared. On the same material, additional uniaxial compression tests are performed on an industrial press. A specific testing tool was designed for this purpose, equipped with displacement and load sensors. The specimens are heated in a furnace next to the press. Neither strain rate or temperature are constant and homogeneous in this test so it's impossible to compare directly the results obtained on the press with the ones obtained with specialized devices. The results obtained with the three methods are then used to perform a parametrical identification for the Hansel-Spittel model. The three sets of parameters are compared and discussed. The purpose of this work is to assess the possibility to use industrial devices to perform parameter identification.