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**Mathematical modelling of soft reduction in Abaqus software
with the application of tensile testing under crystallization
conditions on Gleeble-3800**

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ABSTRACT

As a result of increased production level of thin slab at Casting and Rolling Complexes, soft reduction modelling is a vital task in the field of metallurgy and metal forming. Key element of soft reduction is the metal deformation immediately after solidification of a liquid alloy. The article gives the results of mathematical modelling of stress–strain state of material during soft reduction in Abaqus software. Automobile steel HC420LA is used as a sampling material. A set of experiments were carried out by tensile tests using the module Pocket Jaw of Gleeble-3800. Specimens in the shape of a stud-bolt with a diameter of 10 mm and a length of 160 were heated to the liquid stage (1450°C), then cooled to solid stage temperatures, and deformed with different strain rates. There is also an analytical description of stress–strain curves obtained during the tests in the article.

KEYWORDS: soft reduction, mathematical modeling, tensile testing, stress–strain state