Numerical Modelling of Round Bars Rolling Process in Three-High Skew Rolling Mill HDQT-R 30-12

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Abstract:

In the 21st century, numerical analysis is a standard tool used in research and development of technological processes. Numerical modelling must be used to describe the behaviour of different materials during the forming process. With the help of mathematical modelling, the real process is transformed into an abstract mathematical model, on which subsequent calculations take place. Based on this, it is possible to simulate the forming tprocess of three-high skew rolling mill, which is able to roll a large range of metallic materials as well as various grades of steel with different chemical composition. This paper presents the results of theoretical analysis of rolling which was performed on three different grades of carbon steel with different carbon amount such as S235JRC, C45, C60 and one corrosion-resistance austenitic steel AISI 321 with an initial diameter of 30 mm. The final diameter of rolled bars was 22 mm and has been carried out in a single pass. For the corrosion-resistance steel, there was used a different rolling speed. The numerical analysis of this process of rolling was performed with the use of software DEFORM 2D/3D. With the use of this software, there was analysed the behaviour of tested materials during rolling and the values of effective strain and stress during rolling were evaluated.

Key words:

FEM, numerical analysis, three-high skew rolling, steel, round bar