

Shtoda, M. (2025). Research on the Width Increasing Capability of Different Caliber Systems When Rolling Slabs. In: Campilho, R.D., Ivanov, V., Pinto, G.F., Baptista, A., Silva, F.J.G. (eds) Advances in Design, Simulation and Manufacturing VIII. DSMIE 2025. Lecture Notes in Mechanical Engineering. Springer, Cham. https://doi.org/10.1007/978-3-031-95218-0_15

Keywords: Modeling in QForm, Deformed State, Caliber Filling

Abstract:

Although many studies have been carried out on the deformed state of metal during rolling in calibers, the question of the behavior of metal during rolling in calibers is still not sufficiently understood. This fact complicates calculations related to the transverse flow of metal, more precisely to the filling of calibers. Particularly relevant issues of caliber filling arise when solving practical problems of obtaining a profile with insufficient billet width. The paper analyzes the results of mathematical modeling with the finite element method in the QForm program of various caliber systems with increased spreading compared to free rolling on a smooth barrel. It is shown that the maximum value of the total spreading can be achieved with a combination of a cut I-beam caliber and subsequent rolling on a smooth barrel. This proposes a new dispersed caliber system that includes a minimum of four calibers - cut I-beam caliber with a shaped ridge, two or more specially shaped I-beam calibers, and a smooth barrel. The results of mathematical modeling in the QForm UK program show the possibility of obtaining a slab with a width of at least 800 mm from a 410 × 500 mm steel billet using the proposed technology. Such value of spreading is not possible with the use of known caliber systems.

Published in: [Lecture Notes in Mechanical Engineering](#) (LNME)

Date of Conference: 17–20 June 2025

Conference paper First Online: 13 June 2025

ISBN Information: Online ISBN 978-3-031-95218-0

Electronic ISSN:

DOI: https://doi.org/10.1007/978-3-031-95218-0_15

Publisher: Springer, Cham

Conference Location: Porto, Portugal