

عنوان مقاله:

Estimating friction coefficient of cold rolling mills based on lubricant parameters using a numerical method

محل انتشار:

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خلاصه مقاله:

Today, cold rolling is considered one of the most important industries of any advanced country. Increasing in production rate has always been one of the main concerns of every growing industry. These industries usually encounter some obstacles which can be solved by scientific methods; although, there have been different limitations for this aim. Modeling cold rolling considering lubrication parameters is a complicated phenomenon, such that even the few presented models are suffering in the practical perspective due to the complexity and the time-consuming nature of the model. On the other hand, there have been many fast and capable models that simulate cold rolling using coulomb friction which obviously makes the analysis of the lubricant parameters impossible. In this paper, as an effort to make simulating cold rolling process models more practical, a shear stress equivalence method between these two types of models is presented, then the equivalent friction coefficient relevant to the lubricant parameters is calculated for each of the two stands. Afterwards, utilizing a full factorial design, a data set is generated. This data set is used to fit a set of linear and non-linear regression models using least square method. The sum of square errors for these equations are 14% and 5%, respectively. To evaluate the results, the predicted friction coefficients for two types of oils used in cold rolling mills are compared to the measured experimental data in each stand, and it is shown that the results are in good agreement.

کلمات کلیدی:

Friction, Cold Rolling, Least Square Method

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