The Sander Spreading PyRoll Plugin

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This plugin provides a spreading modelling approach with Sander's formula for flat rolling.

1 Model approach

1.1 Sanders's spread equation

Sander [1] proposed Equation 1 for estimation of spreading in flat rolling. h and b are height and width of the workpiece with the indices 0 and 1 denoting the incoming respectively the outgoing profile.

$$\beta = \frac{b_1}{b_0} = \frac{h_0}{h_1}^{w} \tag{1}$$

w is the spread exponent, by Sander [1] is given in Equation 2, where R is the roll radius.

$$w = 10^{-0.76\left(\frac{h_0}{b_0}\right)^{0.39}\left(\frac{b_0}{\sqrt{R\Delta h}}\right)^{0.12}\left(\frac{b_0}{R}\right)^{0.59}} \tag{2}$$

2 Usage instructions

The plugin can be loaded under the name `pyroll_sander_spreading`.

An implementation of the `spread` hook on `RollPass` is provided, calculating the spread using Sander's model. For `sander_exponent` the equations 2 is implemented. Provide your own hook implementations or set attributes on the `RollPass` instances to alter the spreading behavior.

References

[1] U. Sander. "Beitrag zur Schaffung eines mathematischen Modells für die Berechnung der Breitung der Walzkräfte, des Umformmomentes, des Temperaturverlaufs und des Streckgrades beim Warmwalzen in Streckkaliberreihen". In: *Neue Hütte* 23.1 (1978), pp. 36–37.