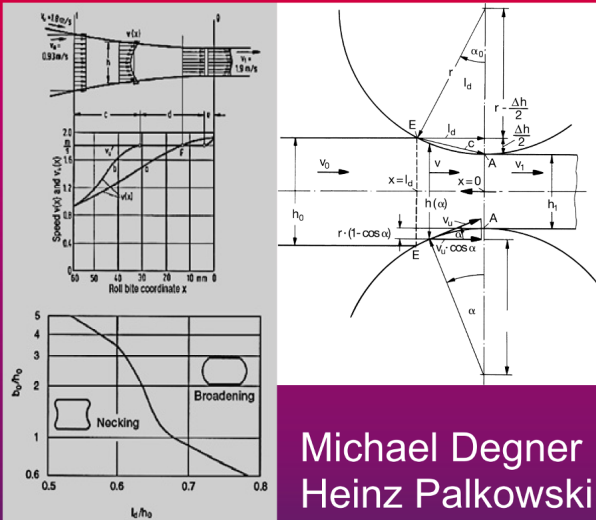


Fit for hot and cold rolling of strips

Basics



The image illustrates the basics of rolling of strips, showing the relationship between the initial and final thicknesses (h_0 and h_1) and the initial and final lengths (l_0 and l_1).

The top diagram shows a strip being rolled between two horizontal rollers. The initial thickness is h_0 and the initial length is l_0 . The final thickness is h_1 and the final length is l_1 . The initial velocity is v_0 and the final velocity is v_1 . The initial angle is α_0 and the final angle is α . The initial and final thicknesses are related by the equation:

$$h_0 = h_1 \frac{v_1}{v_0} \frac{\cos \alpha}{\cos \alpha_0}$$

The bottom diagram shows a graph of the ratio h_0/h_1 versus the ratio l_0/h_0 . The curve shows that the ratio h_0/h_1 decreases as the ratio l_0/h_0 increases. The graph is divided into two regions: "Necking" (left) and "Broadening" (right).

Michael Degner
Heinz Palkowski



★★★★★

production.

Flat rolling is a forming method aiming in reduction the cross-section area of a work piece (e.g. semi-finished ingots), enlarging its length and adjusting its properties like geometry, ductility, strength and surface finish structure.

In the flat rolling process the rolls are cylinder-like and the cross-section of the rolled material is rectangular.

The material is squeezed from height in prior length direction, but partly as well in width direction. The width flow direction is undesired in many applications. Under the assumption that width size is larger than tenfold height size the rolling pocess can be considered to be without material spreading (plain deformation). In this case the stripe model of the elementary plasticity theory can be applied for calculation of the integral parameters like roll force, roll torque and roll power.

Regarding material insert temperature it will be distinguished between hot and cold rolling. Hot rolling is performed above the recrystallization temperature of the material. Cold rolling usually takes place at ambient temperature. But the material temperature can increase due to dissipation effects during cold rolling. In the case of flat rolling the material is hot rolled in the first rolling steps. This is because of the reduced roll forces needed and the increased material formability at high temperature levels. Disadvantages of hot rolling are the high energy use and scale formation. Due to heat loss of the material hot rolling is not practicable for thin strip. In this case cold rolling is performed. Cold rolling in the process chain of an integrated steel works improves the material surface finish and material properties.

This book gives the basic equations and nomenclature of hot and cold rolling technology including the derivation from physical laws like mass and energy constancy and the third Newton axiom. These equations are used for the exercises given in "Fit for hot and cold rolling of strips".

[Rezension \(in German\)](#)

Reviews

There are yet no reviews for this product.