

Profile straightening

Profile straightening in roll forming by partial rolling

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Abstract

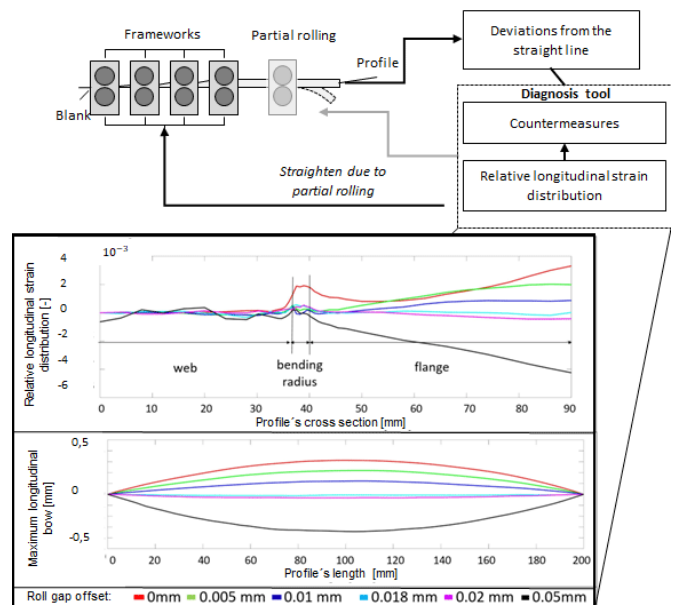
In this project an innovative process for straightening roll forming profiles is developed. Since straightening operations in roll forming are currently still strongly experience-based and therefore less efficient, in this project a diagnosis tool is being developed which straightens profiles based on a calculation model of the longitudinal strain distributions. In this process, longitudinal strains are applied selectively by partial rolling in order to homogenize the strain distribution and thus eliminate the profile errors. This influence is investigated both numerically and experimentally.

Project description

In this project, numerical and experimental investigations were carried out to identify and quantify variables influencing longitudinal strain and deviations in profile straightness. Geometric, material-side and process-side parameters were varied for this purpose. Based on the numerical and experimental findings, an analytical model was built to predict the longitudinal strain distribution. Based on this model, effective countermeasures were derived. In order to produce straight defect-free profiles, profiles with different geometries and materials were straightened using partial rolling. The procedure for developing the process and initial results are shown in Figure 1.

Results

In this project, in the first step, numerous parameter investigations are carried out with parameters from the areas of process, component and material. The results show that these parameters influence as well as the longitudinal strains and profile defects. In the second step, an analytical model is developed which shows the correlation between profile defects and longitudinal strains. Based on this, the profiles are effectively straightened by partial rolling. The results obtained in this research project for the straightening of roll-formed components promise great progress in terms of material savings, reduction of set-up times and reduction of equipment costs in profile production. At the same time, the process can be used to efficiently straighten profile errors that occur during a setup change or material change due to semi-finished product fluctuations. The results of the project are documented in detail in a final report and will soon be available from FOSTA.



[1] Illustration of the process chain and the influence of partial rolling on the longitudinal strain distribution and bow

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