

Utlysning av examensarbete:

Slitting induced defects in sheet metal and plates

Background

Steel plates are one of the most common types of steel elements produced in the world. During the last two decades the yield strength of the hardest steel grades has had an extraordinary improvement. Materials with yield strength of 1.5 [GP] and higher, are now commonly used specially in automotive industry.

Steel plates are formed by, cutting, welding, and rolling etc. in to desirable forms. Almost all of these steps require one form of cutting process. The hardness of material has made the cutting process more susceptible to defects both for material itself and the cutting equipment. These defects are often leading to unnecessary fatigue failure of manufactured parts. On the other hand the extraordinary hardness of material results in shorter life span for cutting equipment. To address these problems an initiative has been taken by Jernkontoret to help the metal industry to bring this problem into focus.

Aim of the study

The main purpose of this study is to approach the problem from the plate material point of view. Which mechanical processes is the plate going through? Which of the material parameters affecting this process? How is the failure or defect generation correlated to state of the stress? The main focus of this study is on the slitting process, which is continues shearing process in a slitting line.

Experiments and Numerical simulation

A failure model must be calibrated for this process using experimental techniques. This model will be implemented in Finite Element Software. The simulation and subsequent experimental study of the plates edges will be a base for how to optimize the process with the goal to reduce the induced defects on the cut edges.

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