Influence of Kinematics during Roller Clinching on Joint Properties

Abstract: Roller clinching is an effective way to join continuous sheet metal components. In contrast to translational clinching, joining with rotational tool movement is a continuous process in which the semifinished parts can be fed through the joining device at a constant high velocity without stopping and accelerating. Because of the special kinematics, which differs from translational clinching, the clinchpoint reveals an asymmetric joint formation. This paper deals with the influence of different rolling radii of the tools and blankholder forces on the clinchpoint formation and the resulting mechanical joint properties. Experiments are performed to determine tensile and shear strengths of the rotational clinchpoints. They are compared to the properties of translational clinchpoints. Furthermore, the kinematic mechanisms during roller clinching influencing the clinchpoint geometry are identified.

Stichworte: Kinematics, Rollers, Joining, Sheet metal, Shear (Mechanics), Mechanical properties, Geometry

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