Testing and modelling of industrial tribo-systems for sheet metal forming

Galling is a well-known problem in sheet metal forming of tribological difficult materials such as stainless steel. In this work, new, environmentally friendly lubricants and wear resistant tool materials are tested in a laboratory environment using a strip reduction test as well as in a real production tool at the Danish company Grundfos A/S. The performance of the different tribo-systems in laboratory tests agrees very well with their performance in the production. The production tool is modified to measure the punch load as well as punch and die temperatures 1mm from the active tool surface. The backstroke force and tool surface temperature are found to be highly sensitive to the initiation of galling. Furthermore the results combined with numerical investigations indicates that the level of the interface temperature is a vital factor predicting the initiation of galling.

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