STUDIES CONCERNING THE TYPE DETERMINATION IN THE CASE OF THE CUP DRAWING PROCESS

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In this work we compare the evolution of the cupping force obtained while cupping A5 STAS 10318-80 sheet steel through simulation and experiments in order to validate the achieved model and analyse the influence of the punch-sheet steel friction on the distribution of tensions and strains in the cupped blank as well as on the size of the cupping ears.
Simulations were done with the help of the ABAQUS/CAE v6.5 programme.
The results obtained through simulation are compared to the experimental ones.
The force evolution function of the cupping depth for the two criteria is presented in figure 1. From the graphical representation it results that the evolution of the cupping force obtained through simulation is close to the one obtained experimentally.

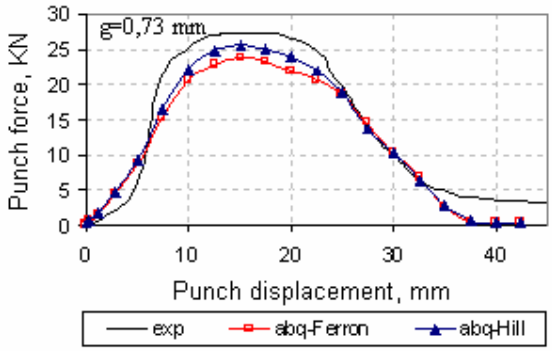

Fig.1The punch force evolution

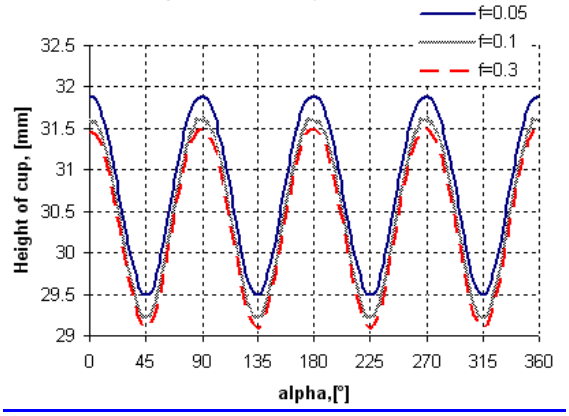

Fig.2 The cupping ears

In figure 2 we compare the cupping ears which result during the cup drawing process of A5 STAS 10318-80 sheet steel obtained through simulation for the values f=0.05, 0.1 and 0.3. During simulation the material was described with the help of Ferron criterion. The size of the cupping ears is: H=8.12mm when f=0.05, H=8.25 when f=0.1 and H=8.27 when f=0.3. We notice that the cupping ears have comparable values, but the maximum height increases along with the decrease of the punch-sheet steel friction coefficient.

The conclusion which can be drawn following the research is that if the model is made correctly simulation leads to obtaining close to reality data and allows one to establish even from the designing phase whether a given piece with a particular geometry can be achieved with the help of the cup drawing process without risks.

REFERENCES

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