



CASE STUDY

HyperXtrude Technology Predicts Flow Behavior and Profile Deflection in Extrusion Dies

Overview

Using Altair HyperXtrude Sweden based AB Elektrokoppar was able to identify the flow problem in the extrusion die. Altair HyperXtrude is used to analyze material flow through the die and predict final profile shape as it exits the die. Profile deformation predictions from HyperXtrude were in good agreement with experimental measurements from the Elektrokoppar extrusions.



Business Profile

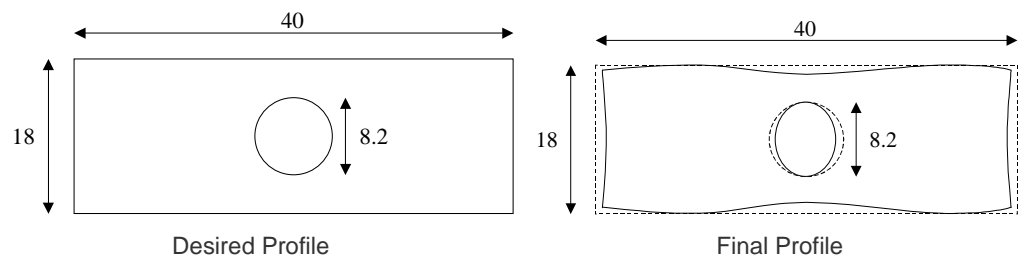
AB Elektrokoppar is a manufacturer of electric conductor material in copper and aluminium and is among the leaders within this sector.

The company employs 114 people who in 2005 produced and sold 130000 metric tons coppers products mainly for the for electric industry, but also copper wire for mechanical applications.

Challenge

Elektrokoppar AB extrudes pure aluminum through a rectangular cross section containing a hole in the center. The profile shows unwanted deformations. The hole became elliptical and the outer surface developed a dip in the vicinity of the hole. In addition, the width of the final product was smaller than required 40 mm

Elektrokoppar AB has asked Altair Engineering to simulate the flow during extrusion.



HyperXtrude can be used to understand flow pattern in extrusion dies and predict profile deflection.



Solution

The problem was analyzed at different extrusion speeds. Imbalance in the flow was noticed from the analysis which attributes to the profile deflection.

Results

The results from the analysis correlate well with what Elektrokoppar was observing in reality. The profile is bending inwards at the middle on the top and bottom. The velocity distribution inside the die gives us an indication where the flow is choked and what can be done to correct the problem. Recommendation was given to Elektrokoppar. HyperXtrude successfully validates the problem that Elektrokoppar was having.

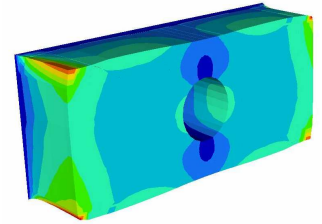
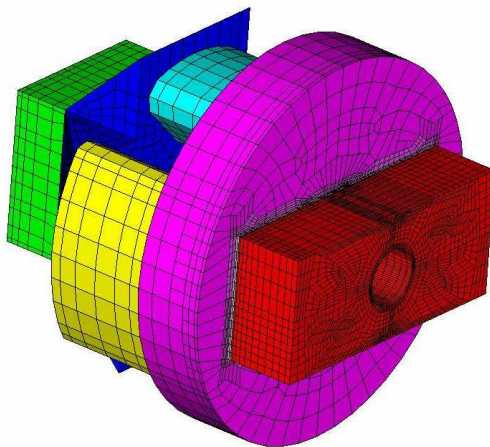


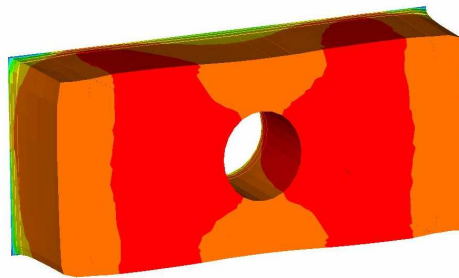
Fig. 1 Profile deflection using HyperXtrude



Fig. 2 Velocity Distribution



FE Mesh



Velocity distribution

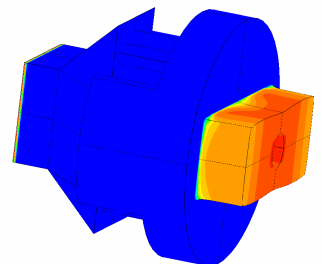


Fig. 3 Temperature Distribution

Benefits

Minimize die design time and cost through robust, reliable and fast analysis. Helping troubleshoot existing die as was done for Elektrokoppar. Validate new die designs, and helping calculate optimal bearing/land lengths. Reduce the production cost incurred due to costly die trials.

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