

VISOKA ŠOLA ZA PROIZVODNO INŽENIRSTVO

DIPLOMSKO DELO

**NAPOVEDOVANJE TOKA MATERIALA V ORODJIH ZA
EKSTRUDIRANJE S PROGRAMOM MOLDFLOW**

**PREDICTION OF MATERIAL FLOW IN EXTRUSION DIES
WITH MOLDFLOW SOFTWARE**

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POVZETEK

Obstoječi postopek izdelave ekstruzijskih in koekstruzijskih orodij z več vzporednimi izhodi je v podjetju Kum-plast izveden izkustveno, brez uporabe numeričnih simulacij. Posledica je večkratno testiranje in korigiranje orodij, kar je stroškovno in časovno nesprejemljivo. Namen diplomskega dela je bilo preveriti, ali je mogoče s pomočjo programa MoldFlow (Autodesk Moldflow Insight), ki je sicer namenjen za numerične simulacije postopkov brizganja plastike, zanesljivo napovedati tudi tok materiala skozi orodje pri postopku ekstrudiranja in s tem povezane napake na končnem izdelku. Izdelano je bilo testno orodje, s katerim se je izvedlo preizkuse, pri katerih se je opazoval tok taline na izhodu iz orodja. V programu MoldFlow je bil pripravljen numerični model dejanskega orodja. Iz napovedi toka taline skozi orodje smo skušali napovedati potek prodiranja ekstrudiranih profilov in morebitne napake profilov zaradi neenakomernega toka taline. Žal z analizo numeričnih rezultatov nismo uspeli zanesljivo napovedati poteka prodiranja profilov skozi testno orodje.

Ključne besede: ekstrudiranje plastike, numerične simulacije, MoldFlow

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SUMMARY

The existing manufacturing process of extrusion and co-extrusion dies with multiple parallel outputs is done empirically in the company Kumplast, without using numerical simulations. This results in multiple testing and correction of dies, which is a costly and inefficient. The purpose of the thesis was to examine whether it would be possible to reliably predict the flow of material through extrusion die and related defects on the finished product with the program MoldFlow (Autodesk Moldflow Insight), which is intended for numerical simulation of injection molding processes. Testing die was manufactured. Tests were carried out, where profile flow at exit from the die was observed. In the MoldFlow software, a numerical model was prepared. From the prediction of melt flow through the die, we tried to predict the curve and speed of extruded profiles. Unfortunately the numerical results were unable to predict the deformation of profiles and speed at extrusion process reliably.

Keywords: Plastic extrusion, numerical simulations, MoldFlow