PREDICTION OF THE EFFECT OF ONLINE COOLING TIME ON WARPAGE IN A MULTI-WAY PLASTIC INJECTION MOULD USING A MACHINE LEARNING ALGORITHM BASED ON IN-MOULD SENSOR DATA

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Abstract
In this study, the warping problem of the dishwasher chassis bottom cover part produced by plastic injection method; It has been investigated in many ways in terms of the effect of online cooling time using in-mould temperature and pressure profiles. For this, four cavity temperature and four cavity pressure sensors are placed in the multi-path plastic injection mold. Taking the 225°C injection set temperature as constant; As a result of trial production using six different online cooling times: 23, 26, 29, 30, 31, 32 and 40 seconds, part warpages formulated as a combination of length, mass and height measurements were calculated. Obtained with the help of temperature and pressure sensors inside the mold; Part warpages were predicted using multiple linear regression and CART machine learning algorithms based on maximum cavity temperatures and pressures, cavity temperatures at the beginning of the cycle, cavity temperatures at the 20th second of the cycle, cavity temperatures at the end of the cycle and online cooling times. The most successful in predicting part warpages are multiple linear regression (R2 -prediction 96.02%) and CART machine learning (R2 -prediction 95.48%) algorithms; It was realized in the models established according to maximum cavity temperatures and online cooling time. Accordingly, the warpage rate in the chassis bottom cover part was closest to zero, the weight of the part was the lightest, and the length of the part was closest to the technical drawing dimension, when the online cooling time was applied as 32 seconds.

Keywords: Cavity sensors, cooling time, machine learning, plastic injection, warpage

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CERTIFICATE

KATILIM BELGESİ - CERTIFICATE OF PARTICIPATION

AYDOĞAN ÇAĞLAR AKÇAY

ÇOK YOLLU PLASTİK ENJEKSİYON KALIBINDA ÇEVRİMİÇİ SOĞUMA ZAMANININ ÇARPILMAYA ETKİSİNİN KALIP İÇİ SENSÖR VERİLERİNE DAYANAN MAKİNE ÖĞRENMESİ ALGORİTMASI İLE KESTİRİMİ

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