

A Study on the Radius Angle at the Hinge Plane for the Reduction of the Thermal Deformation of Tire Mold

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Abstract— In this study, we analyzed the thermal deformation of mold using numerical method when the radius at the hinge plane and heat flux at the surface of the tire mold were changed. The minimum size of the mesh was 0.1mm, and the grid number was about more than 830 thousand. In order to analyze the thermal deformation of mold, the thinnest part of the mold was chosen as the research object, and then the temperature of 6 points on the vertical downward direction of the thinnest part was analyzed with the time change. While the numerical condition was that heat flux was 321,200 W/m², 440,000 W/m² and 880,000 W/m², and measuring time was 0.1 second, 0.2 second, 0.5 second and 1 second, respectively. As a result, the temperature gradient and amount of heat transfer at the Z=6mm were extremely large when the radius angle of the hinge plane was the 90°.

Index Terms— Computational Fluid Dynamics; Heat Flux; Hinge Plane; Temperature Deformation