Numerical Study on Effect of Narrow Groove On Hot Bearing Ring Rolling Process

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Ball-section raceway groove and narrow groove ring (BGNGR) is a complex part of bearing rings. The mandrel for the forming of the narrow groove will push and press the metal and lead to instability of the rolling process. Therefore, the effect of the narrow groove on the metal flow is investigated. Two methods for BGNGR rolling are presented, and by deducing the dimensional relationship between rectangular blank and deformed ring, the finite element models for both methods are established and simulated in Forge3D software. Method I is proved to be a failure through the finite element analyses of the effect of the narrow groove on the metal flow. Based on the analysis result in Method I, the Method II with appropriate mandrel profile for the going up metal is proposed. The simulated result shows that the BGNGR whose geometry size meets the requirement can be rolled by Method II.

Keywords: Narrow groove, Blank sizes design, Metal flow, Ring rolling, FEA

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