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Plastic deformation and microstructure evolution of bearing ring blank during cold rolling process

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ABSTRACT

Bearing ring blanks of the high-speed rail bearings, machine tool spindle bearings, and wind power bearings have been manufactured through the ring rolling technology. Yet, the plastic deformation and microstructure evolution of bearing ring blanks during the cold rolling process remains unclear. In this work, the deformation and damage evaluation of bearing ring blanks made of GCr15 bearing steel are characterized by the electron backscatter diffraction (EBSD) technique. Furthermore, their microstructure changes in cold rolling are investigated through band contrast images, and their texture evolutions after various deformation ratios are analyzed by the technique of 3D-Euler space distribution. This work provides valuable guidelines for enhanced understanding the role of the cold rolling technology on the microstructure evolution of bearing ring blanks.

KEYWORDS: plastic deformation, microstructure and texture evolution, cold rolling