

Comparative evaluation of the tribological properties of low-and medium-carbon steels after heat treatment and severe plastic deformation

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Abstract

© 2016 Advance Study Center Co. Ltd. The paper presents the results of a comparative tribological study of structural steels with a carbon content of 0.1% and 0.45%. The following three conditions are studied: Initial (hot rolled), after heat treatment (improvement) and after improvement with subsequent severe plastic deformation (SPD) processing by equal-channel angular pressing (ECAP). It is established that the materials after different types of processing have different structural states, and demonstrate different shear strength of adhesive bonds and adhesion (molecular) components of the friction coefficient in contact with the tool steel of the R18 type. At the same time, it is revealed that the greatest effect of hardening due to microstructure refinement is observed on the specimens of low-carbon steel. Medium-carbon steel after SPD processing has approximately the same tribological properties as after heat treatment.
