
Evaluation of the tribological characteristics of steel 40X after deformational cutting hardening

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The article considers a possibility of increasing wear resistance of machine parts by means of deformational cutting surface hardening as an alternative to the existing hardening technologies. Surface hardening by deformational cutting is carried out using solely standard metal cutting machines excluding additional equipment and separate hardening operation. The technology is less labour-intensive and more economical than traditional ones. The article describes an original technique for accelerated comparative tribological tests on the friction machine AmslerA135 to confirm the improved surface wear resistance after application of deformational cutting hardening. This study shows the results of research aimed to compare the surfaces of steel 40X samples after deformational cutting hardening, bulk hardening and without hardening as well. The article reports on the measured microhardness and gives an analysis of the microstructure of micro-sections surface layer of tested samples longitudinal sections. The findings of this investigation demonstrate that the deformational cutting hardening allows to create a hardened surface layer of high hardness with a special macro-geometry, which is more labour-intensive in comparison with those obtained after bulk hardening.

Keywords: deformational cutting, surface hardening, hardness, wear resistance, heat treatment, hardening, tribological tests

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