



RESEARCH OF INFLUENCE OF LUBRICANTS ON WORKING AND OPERATING
 PROPERTIES OF CORROSION-STEEL STEELS

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The effect of LCL friendly lubricating and cooling liquids (LCL) based on vegetable oils was investigated. It was found that LCL on the basis of sunflower (LCLs) and rapeseed oil (LCLr), compared with mineralized water. Petroleum-based (LCLn) was also examined for comparison.

Electrochemical studies of polished specimens in LCL and mineralized water were performed to determine the ability of the LCL to protect the surface of the machined parts from corrosion.

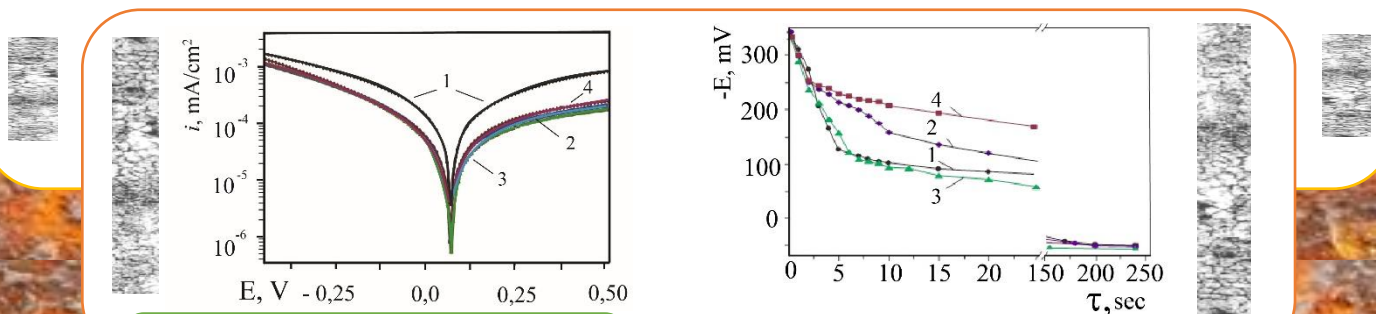


Fig.1 Polarization curves of the 12Kh18AG18Sh steel, obtained on the samples with a polished surface: 1 – water, 2 – CCr, 3 – CCs, 4 – CCp

Fig. 2. Time dependences of the electrode potential of steel 12Kh18AG18Sh after machining in: 1 – water, 2 – ZORr, 3 – ZORs, 4 – ZORn.

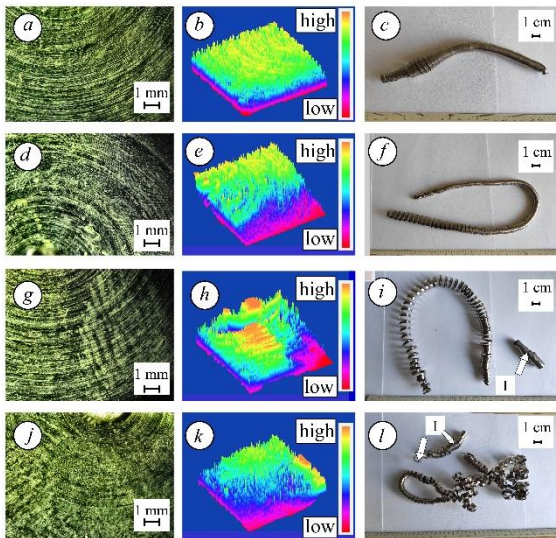


Fig.3 Surface of *high-nitrogen* steel samples after turning in CCs: (100 rpm) – a; (200 rpm) – d; (315 rpm) – g; (500 rpm) – j; 3D visualization of the surface after turning: (100 rpm) – b; (200 rpm) – e; (315 rpm) – h; (500 rpm) – k; shavings: (100 rpm) – c; (200 rpm) – f; (315 rpm) – i; (500 rpm) – l.

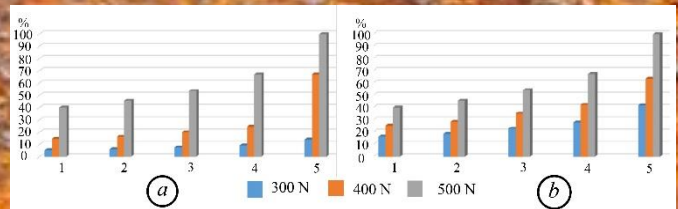


Fig. 4. Relative wear rate under rolling friction for: 45 – a steel; steel 12Kh18AG18Sh – b; Environments: 1 – Shell HF-E 46 (synthetic oil); 2 – Shell HF-R (oil of biological origin); 3 – ZORs (concentration of 3% mass); 4 – ZORr (concentration of 3% mass); 5 – industrial I12A oil.

CONCLUSIONS

The results of the surface roughness evaluation of the 12X18AG18S steel samples after grinding in the above media obtained after processing the profilograms showed that the surface quality of the steel samples during grinding in LCLs improved by almost 1.5... 2.0 times compared to treatment in LCLn and without treatment fluid 12 times, which shows the prospect of using vegetable oil for LCL.

It has been shown that chips and corrosion products on its surface can be unique indicators that allow to analyze the performance of machining processes of a workpiece and material properties. It is reported that when increasing the machining speed to 500 rpm, chip breakage occurs without the use of chip breakers. This avoids the formation of long chips that can damage the work surface.

The use of LCL as a lubricant in tribo (steel 45 - high-nitrogen steel) in the conditions of rolling friction allowed us to establish that the intensity of wear (P = 500 N) in comparison with industrial oil I12A when using LCLs is lower by 45%, and at LCLr 35%.