Toetab TÜ ja TTÜ doktorikool
"Funktsionaalsed materjalid ja tehnoloogiad" (FMTDK)

ESF projekt 1.2.0401.09-0079

WEAR RESISTANCE OF THE PLASMA SPRAYED LASER REMELTED COMPOSITE COATINGS.

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In the current work, the laser remelting of the plasma sprayed self-fluxing alloy – recycled hardmetal coatings is studied. Nickel-based and iron-based self-fluxing powders, mixed with 25 %wt. recycled WC-Co hardmetal, were used as the spray materials. For laser remelting, the 4 kW Nd:YAG laser was applied. The laser beam power equaled to 1.75 kW and 1.5 kW, the scan speed was 10 mm/min. After laser remelting, cross-sections of the coated specimens were studied by the means of OM, SEM and EDS. It was observed, that hardmetal particles had dissolved in the self-fluxing alloy matrix, forming a eutectic structure. Microhardness values, measured at the cross-sections of the coatings, varied from HV0.1 2.7 to 18.8 in the case of Ni-based self-fluxing alloys and from HV0.1 4.9 to 9.4 in the case of Fe-based self-fluxing alloys. Composite coatings showed 1.1 – 2.1 times worse abrasive wear resistance than the reference material (steel C 45). Composite coatings, containing Ni-based self-fluxing alloys, showed 1.25 times lower erosive wear resistance at impact angle 30°, but 1.6 times higher wear resistance at the impact angle 90° than the reference material. Composite coatings, containing Fe-based self-fluxing alloys, showed 1.2 times higher wear resistance at impact angle 30°, but 1.4 times lower wear resistance at impact angle 90°, than the reference material. Composite coatings, containg Ni-based self-fluxing alloys, have shown neither increase nor decrease in the impact wear resistance, composite coatings, containing Fe-based self-fluxing alloys, showed 1.3 times better impact wear resistance, in comparison with the reference material.