WEAR RESISTANCE OF LAYERS HARD FACED BY THE HIGH-ALLOYED FILLER METAL

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Resume

The objective of this work was to determine the wear resistance of layers hard faced by the high-alloyed filler metal, with or without the austenite inter-layer, on parts that operate at different sliding speeds in conditions without lubrication. The samples were hard faced with the filler metal E 10-UM-60-C with high content of C, Cr and W. Used filler metal belongs into group of alloys aimed for reparatory hard facing of parts damaged by abrasive and erosive wear and it is characterized by high hardness and wear resistance. In experiments, the sliding speed and the normal loading were varied and the wear scar was monitored, based on which the volume of the worn material was calculated analytically. The contact duration time was monitored over the sliding path of 300 mm. The most intensive wear was established for the loading force of 100 N and the sliding speed of 1 $m.s^{-1}$, though the significant wear was also noticed in conditions of the small loading and speed of 0.25 $m.s^{-1}$, which was even greater that at larger speeds.

Article info

Article history:
Received 02 February 2016
Accepted 22 July 2016
Online 22 October 2016

Keywords:
Hard facing;
Filler metal;
Abrasive wear;
Wear resistance;
Sliding speed.

Available online: http://fstroj.uniza.sk/journal-mi/PDF/2016/12-2016.pdf

ISSN 1335-0803 (print version)
ISSN 1338-6174 (online version)

1. Introduction

Large number of machine parts and devices, especially in construction industry are exposed, on a daily basis, to rigorous exploitation conditions when the working parts of machines and devices are in the constant contact with hard and brittle abrasive materials. Due to their high hardness, such materials affect the working life of parts causing its shortening. Frequently, the working parts lose their original designed geometry, while the fracture of parts is frequent, as well. To prevent that and to extend the working life of parts, like the stone crusher's teeth [1], loading excavator bucket's teeth [2] knives of the terrain leveling grader board [3] and others, there is a tendency to manufacture them from the high quality and more adequate materials. However, even thus manufactured parts are worn relatively quickly, so the necessity for their replacement or reparation occurs. Considering that waiting for purchase of the new part could last quite a long time, what is usually accompanied with high costs, the alternative is reparation by hard facing of the damaged parts.

The reparation by hard facing can create significant savings [4, 5], while simultaneously the working surfaces, which are more wear resistant than those on the original new parts are, are obtained. This subject was investigated by authors of paper [6 - 8] and [9 - 19] and in those papers the previously stated observations were confirmed. Thus, the objective of this work was to establish the possibility for extending the working life of the machine parts by hard facing the damaged surfaces with use of the adequate filler metal and to determine the influence of the sliding speed in the tribological