

Laser Reinforcement for Metallic Wheels Surfaces, Which Carry Subway Train Vans

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Abstract

Laser reinforcement was widely adopted in many industrial establishments through the recent years. Many methods have used this new technology for reinforcement of metallic surfaces and other processes, which may cause different changes in the properties of these surfaces.

Two methods of laser reinforcement were used in this research aiming to reinforcement the metallic wheels surfaces, of subway train vans in Russian Capital (Moscow). These two methods were used as following :

1) using of impulsive laser radiation on the surface of steel sheet, which leads to specific structural-phase transformations in the treated surface, Which leads to increase the micro-hardness and wear resistance of the treated surface. Experiment showed that the values of microhardness and the wear resistance of treated steel surface increased by 50% and 75% respectively.

2) using of continuous laser radiation on the surface of steel ,leads to uniform and homogenous reinforcement of treated uniform with that surface achieved by using the impulsive Laser radiation, that's because the values of micro-hardness are distributed uniformly according the length of reinforced reel of the treated surface . Therefore wear resistance of the treated surface has increased to 85%, and thus the exploitation period of the steel wheels has increased almost to the same rate.

The results of this research showed that using continuous Laser CO₂ radiation in reinforcing processes of steel wheels surfaces suggests better properties than those of continuous Laser radiation.

¹ For the paper in Arabic see pages (255-286).

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