**Title:** Microstructure and wear behaviour of laser hardened AISI 1541 steel

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**Abstract:**

Laser surface hardening of steels is an attractive application for industry due to laser beam enabling a localized hardening to a required depth. However, local depletion in carbon was appointed as a limitation for the technique. In the present study, laser surface hardening was performed together with carburizing for the surface of AISI 1541 steel by coating with graphite layer. An Yb:fiber laser was used as the heat source and laser scan speeds of 10 and 20 mm/s, and laser power of 200W, 400W and 600W were studied. The microstructures, hardness and wear behavior of the treated surfaces using different laser parameters were studied. The hardness values increased with heat input, with the case depth showing a maximum of 700 μm for the highest laser intensity. The microstructure of the laser hardened zone consists of ferrite, a small amount of retained austenitic phase and martensite, with the amount of martensite varying gradually along the depth. A maximum hardened surface layer, with 770 HV, was obtained with the laser power of 400 W, and the scanning speed of 10 mm/s. The heat affected zone showed an average hardness value of 400 HV and the base material was 260 HV, indicating that the surface hardness was greatly increased compared with the substrate. The values of friction coefficient obtained for the hardened surfaces were lower than the friction coefficient of the base material, also indicating improvement in wear properties.

**Biography:**

Rafael Siqueira has completed his D.Sc at the age of 34 years from Technological Institute of Aeronautics. He is the Postdoctoral fellow in the Laser and Optics Applications Development Laboratory, from Institute for Advanced Studies, Brazil. He has published more than 20 papers in reputed journals and conferences.

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