Dushyant Singh et al., Agrotechnol 2014, 2:4
http://dx.doi.org/10.4172/2168-9881.S1.011

OMICS Group Conferences
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3rd International Conference on
Agriculture & Horticulture
October 27-29, 2014 Hyderabad International Convention Centre, India

Effect of heat-treatment under changeable applied load on wear response of agricultural grade medium carbon steel: A multiple range analysis

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Low alloy medium carbon steels have tremendous potential for agricultural application because of its low cost and obtaining excellent combination of various properties after heat treatment. In the present study abrasive wear response of medium carbon steel used for soil working components of agricultural implements i.e. rotavator blade, cultivator sweep, plough share etc. was studied under three heat treatment processes and three load conditions. Micro structural, mechanical, and tribological properties of medium carbon SAE-6150 steel were altered by annealing, intercritical annealing and quenching and tempering heat-treatment processes. A rotating rubber wheel type test apparatus was used to measure the wear rate of heat-treated and control specimen at 75, 200 and 375 N loads. This technique of wear measurement is very similar to working condition of soil working components of agricultural implements. The study revealed that under low load (75 N) condition, both the inter-critically annealed and quenched and tempered SAE-6150 medium carbon steels gave identical wear resistance. However, inter-critically annealed material under medium load (200 N) condition and quenched and tempered material under high load (375 N) condition exhibited supremacy in terms of abrasive wear resistance.

Biography

Dushyant Singh has completed his PhD from Rajiv Gandhi Technical University, Bhopal (Madhya Pradesh). He is serving as scientist, a premier agricultural engineering organization. He has published more than 20 papers in reputed journals, 12 bulletins, 12 manuals, 25 articles, 04 book chapters and presented more than 35 research papers in national and international forums. He has been serving as referee for various national and international journals. He is working on design, development and manufacturing of agricultural implements and machines, prototype production, heat-treatment and surface modification for service life enhancement of engineering components.

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