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The Development of Surface Treatment Technologies for the Protection of Ductile Iron and ADI

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Abstract: This paper describes alternative surface treatment technologies in order to improve the corrosion protection and the wear properties of ADI (austempered ductile iron) and ductile iron. These alternatives include (a) electroless nickel plating on both ADI and ductile iron; (b) a deposition of zinc coatings by the flame thermal spraying technique on ADI; (c) a deposition of a boronizing layer by thermochemical treatment followed by an austempering heat treatment in order to produce ADI and (d) ion nitriding technologies applied on ductile iron. All surface treatments were characterized by optical microscopy, scanning electron microscopy and chemical microanalysis, microhardness tests, wear tests and/or electrochemical corrosion tests. Results show that the surface treatments can improve the corrosion protection and/or the wear resistance without changing the microstructural features on either ductile iron or ADI. This is important since it is necessary to preserve their final properties. These materials have gained international interest because of their applications and low cost production in various fields of engineering; therefore, modified ADI and ductile irons with superficial treatments open up a new area of research.

Key words: Ductile iron, ADI, surface treatments, wear resistance, corrosion resistance.