

A review on the development of electro-carburisation process

ABSTRACT

The purpose of this paper is to review the early development of electro-carburisation technology and the research findings related to the electro-carburisation process. In general, conventional liquid carburisation of steel using a molten cyanide bath is carried out to improve the performance of mild steel, however this process produces toxic cyanide waste. Thus, other alternatives for liquid carburisation are necessary. Electro-carburisation process using carbonatebase molten salt, under a CO₂ environment was developed as one of the alternatives to liquid carburising. Metal to be treated is exposed to the carbon-rich liquid in the molten cyanide bath and electro-carburisation. However, the metal is simply immersed inside the cyanide bath during conventional liquid carburising, while connected to the cathode in the electro-carburisation. The electro-carburisation involves a diffusion of carbon atoms into the surface of the metal which enhance the surface hardness of the metal. The effects of electrolysis parameters to the surface hardness and case hardening of treated metal have been reported in several journals. This article summarises the research findings. Apart from that, the quenching process and heat treatment post quenching also plays an important role in the quality of the carburised metal, therefore also reviewed in this article.