

Research and Analysis about Corrosion on Cupronickel Heat Exchange Tubes of Auxiliary Condenser

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Abstract An inspection of a ship revealed severe corrosion in the BFe30-1-1 cupronickel heat exchange tubes of the auxiliary condenser. After performing eddy current testing on these heat exchange tubes, areas with significant corrosion were selected. Macro observation, chemical composition analysis, energy dispersive spectroscopy (EDS), and Raman spectroscopy were used on the selected samples to detect corrosion products and analyze the causes of corrosion. The experimental results indicate that the incomplete removal of oil films during production led to the formation of residual carbon films during heat treatment, which in turn triggered electrochemical corrosion, ultimately becoming the primary factor for the extensive corrosion of the cupronickel tubes. Additionally, residual water stains after operation are also an important cause of accelerated corrosion in the cupronickel tubes.

Keywords heat exchange tube, BFe30-1-1 cupronickel, residual carbon film, electrochemical corrosion

Reference

- [1] HU Yong. (2005). Physical Analysis about Erosion on Copper Tube of Condenser by Residual Carbon Film. *Guangxi Electric Power*, (04), 49-51.
- [2] LIU Zheng, TIAN Fang&LI Bing. (2013). Residual Carbon Film Effect on the Corrosion Perforation of Condenser Copper Pipe. *Northeast Electric Power Technology*, 34(03), 27-30.
- [3] SHI Xuezheng, WANG Weiyong&ZHANG Dingcai. (2008). Research on Heat Transfer Performance of Condensing Strengthened Tube of Marine Condenser. *Refrigeration Technology*, (01), 11-15.
- [4] YANG Ping, WU Yiping, MENG Xu&GE Honghua. (2011). Research on Performance of Brass-based Alloys in Simulated Cooled Water. *Journal of Shanghai University of Electric Power*, 27(01), 34-36+48.