Thesis Title	Effect of Hard Surface Finish Processes on Abrasive Wear in Impeller Mixing Applications
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Abstract

Hard surface finish processes are processes to increase ability of materials for wear resistance. There are advantages and disadvantages among the processes. In this study, a company that utilizes agitators and mixers had a problem on low stress abrasive wear on the surfaces of equipments. This was due the abrasion of equipment during usages. The aim of this study was to determine the effect of hard surface finish processes on abrasive wear in equipment of mixing applications. The processes were surfacing of satellite 6 on low carbon steel grade A36 using 4 processes in total with 8 conditions: 1. Shield Metal Arc Welding (SMAW) without Post Weld Heat Treatment (PWHT), 2. SMAW with PWHT after butler layers, 3. SMAW with PWHT after hard surface finish layers, 4. Gas Tungsten Arc Welding (GTAW) without PWHT, 5. GTAW with PWHT after butler layers, 6. GTAW with PWHT after hard surface layers, 7. Brazing and 8. High Velocity Oxygen Fuel Spraying (HVOF). The research operations were to test for selection of test procedure and compare the abrasive wear resistance among the hard surface finish processes. In addition, there were the hardness measurement and microstructure analysis on the surface of specimens. The results showed that the test procedure with changing abrasive sand every 8 hour yielded the consistent test results. The best wear resistant was from the GTAW process without PWHT. This resulted from its microstructure that had distributed carbides together with suitable hardness to prevent abrasive wear. The primary carbides presented in every hard surface finish processes could be M_7C_3 with orthorhombic crystal system. Nevertheless, welding processes with PWHT after hard surface layer

could also have the formation of $M_{23}C_6$ secondary carbides near the network of primary carbide. The result form this study could benefit for increasing the usage life of equipment in mixing application.

Keywords: Hard Surface Finish / Abrasive Wear / Stellite 6