Spring 2014

Project Name – Extreme Cold Weather Effects on High Strength Steels for Cranes

Overview
Manitowoc has been a global leader in the crane industry for years. They have become interested in designing and manufacturing cranes for extreme cold weather environments. Proper material selection is required to have cranes safely and effectively operate at temperatures around minus 40°F.

Objectives
Create ductile to brittle transition temperature (DBTT) curves using Charpy V-notch test methods for metals commonly used by Manitowoc. Recommendations for process and chemical changes to the steel to improve toughness.

Approach
• Used previous semester's testing procedure
• Tested all steel samples over a wide temperature range
• Graphed impact energy versus temperature to create DBTT curves
• Utilized SEM, EDS, and OM to analyze fracture surfaces

Outcomes
• The sponsor is looking to enter a new market. Cold weather cranes could be a big market for them.
• The project showed that the samples they gave us are not suitable for cold weather use.
• However, recommendations were investigated and they may be the solution to the cold weather problem.