

Project Title: Descale Header Clamp

Team Members: Josh Arntz
Alex Vankov
William Daugherty
John Olig

Faculty Advisor: Dr. Bongsu Kang

Area: Mechanical Engineering

Sponsor: Steel Dynamics Inc.

Steel Dynamics Inc. (SDI) is a leading industrial metals manufacturer and is one of the largest steel producers and metal recyclers in the United States. SDI began operating their second steel mill in Colombia City, Indiana back in 2002. This facility allowed the company to offer structural steel products. As part of the manufacturing process, the semi-finished bars are reheated in a large furnace to 2000°F, which causes iron oxide to build up on the outside of the bar and form “scale”. This scale layer accounts for approximately 3% of the bars mass. The hot bar is passed through a descaler which uses high pressure jets of water to blow off the scale. The descaler has several different sizes that are interchangeable depending on the size and shape of the bar in production. Currently, SDI has resorted to using the largest size descaler they have to run all their products. This is due to a specific point in the system being unreliable. The descaler assembly connects to the high-pressure supply line using a specially designed clamp. This clamp is unreliable when consistently changing descaler assemblies, causing high pressure leaks. SDI is looking to redesign the clamp and descaler intake pipe to eliminate leakage when descalers are interchanged with regular operation.

The goal of this project is to investigate the causes of the leakage and redesign the header and clamp to eliminate the root causes of the leakage. Also, the redesigned intake header must be able to be installed 180 times without sustaining damage that causes leaking. Additionally, if the solution can reduce the number of personnel needed under the installation crane to install the descaler, that is a safety win for SDI. The budget for this project is \$50,000.