

Senior Capstone Design Project

In an effort to magnify and enhance relations with the University of South Florida, Chromalloy Castings has teamed up with USF's mechanical engineering department in hopes of solving one of the facility's most notorious material handling issues.

The team of four students was taking part in its Senior Capstone Design project, a course aimed toward putting the concepts learned in the mechanical engineering curriculum into practice.

Although USF's Capstone program is geared mainly toward projects dealing with rehabilitation, USF highly encourages students to partner with outside companies so as to ease the students' transition into the engineering industry and to offer companies innovative solutions to problems they may be experiencing.

With the size and weight of molds ever increasing, Chromalloy has a vested interest in maintaining the safety and well-being of its employees as well as ensuring that the quality of its product is not compromised by poor material handling practices. Because of this, Chromalloy would like to introduce a policy whereby molds weighing in excess of 50 lbs. may no longer be lifted by hand.

Due to the manual lifting of molds weighing in excess of 100 lbs., a high volume of scrap is currently experienced in the Dewax and Mold Prep areas of the facility. In an attempt to create a system that can reduce the amount of scrap produced as a result of mishandling, the team designed a manipulator which utilizes components of a previously used machine that was not up to the task. The synthesis of fresh ideas and existing technology proved to be decisive and provided a means to lift, transport and rotate the molds 180 degrees.

In order to accomplish these tasks, the team designed a system where the molds would be lifted using forks, then clamped from the opposite end, enabling the mold to be supported from both sides during rotation.

The system was then attached to a back plate, which allowed the entire assembly to be bolted to the existing manipulator and to utilize the manipulator's existing motor functions.

The molds themselves also had to be altered in order to accommodate the lifting forks of the new manipulator. These molds were fitted with handling pipes flanking each side of the pouring cups.

The new manipulator was tested with the new molds in green state and after having been fired in the furnace, both tests were successful.

This new manipulator now gives Chromalloy Castings a decisive edge in its ability to safely and effectively handle and transport the molds, and will drastically reduce the amount of scrap at the facility.