

Horvath Professor of Materials Science and Engineering December 2023

The Horvath Professorship funding has been critical to the growth of Professor Sanders' Alloy Research Central (ARC) research activities. Over the fiscal year, funding was used to support Professor Sanders' sabbatical, staff, students, and to develop material production capabilities.

Specific activities

- Professor Sanders was on sabbatical from Summer-Fall 2022 at the Norwegian University of Science and Technology (NTNU) in Trondheim Norway. While in Norway, he collaborated with Norwegian materials companies Hydro on aluminum recycling and extrusion and Elkem in cast iron processing. Funds were used for travel within Norway, and research activities continue with NTNU, Hydro, and Elkem.
- Staff support for new research initiative and new industrial collaborations
- Short term graduate support when funding is slow to arrive, specifically one semester for an MS student
- Staff time and equipment expenditures to assist with capability development in core strategic areas related to alloy design and processing. These include:
 - Design and construction of a direct-chill (DC) casting machine to enable an industry standard process for extrusion billet production (Figure 1).

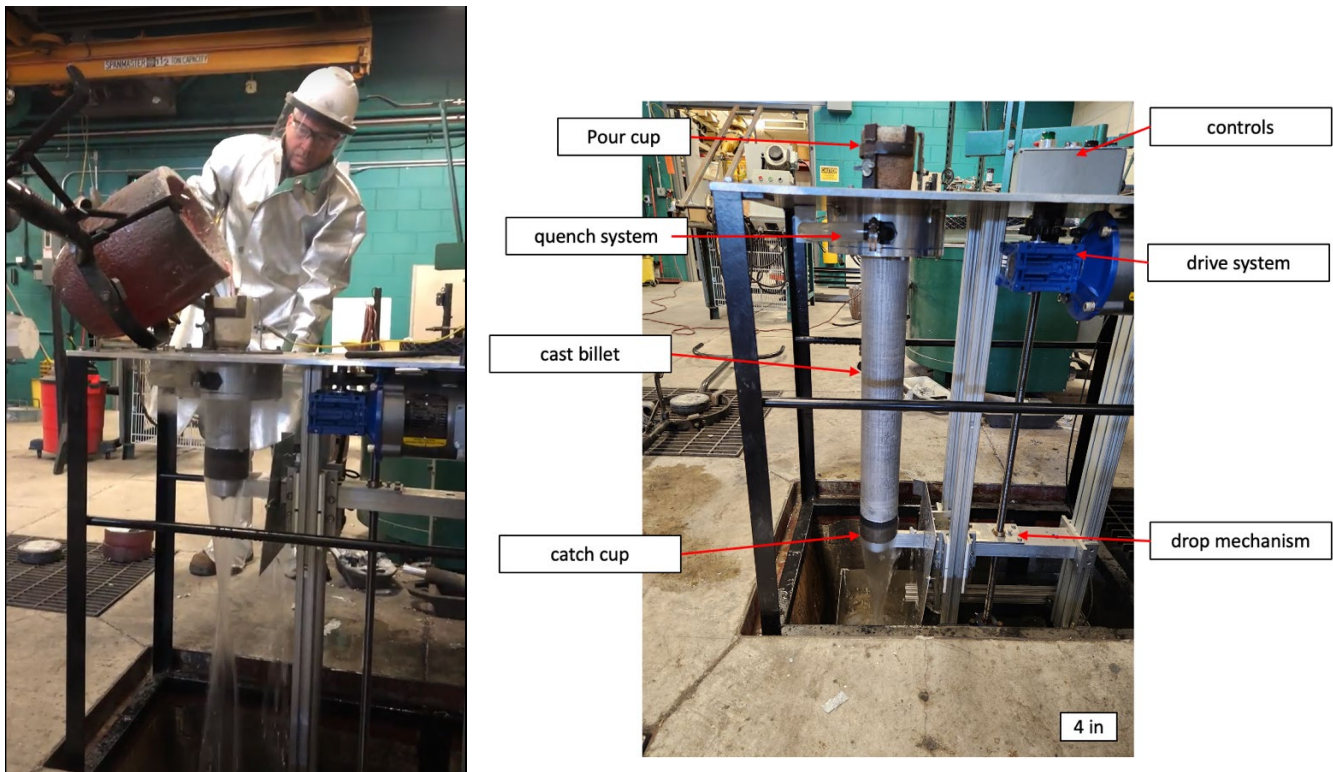


Figure 1. Direct chill casting in which molten aluminum is poured in the top (left), and then solidified into a cylinder by forming an exterior skin in a water-cooled metal mold (under pour cup) and then further solidified by water running over the exterior of the billet as it is lowered (seen on left). Billet is 30" long & 3.5" in diameter.

- Development of a small plate die-caster to develop high ductility die-cast alloys
- Additional improvements in aluminum degassing to produce low porosity castings
- Climate control for optical emission spectrometer room to reduce seasonal measurement variation
- In addition, 15% of the funds were borrowed and repaid when planned funding did not arrive in time for student and staff activities.