



### Problem

- High pressure die casting is a complex and high-stakes manufacturing process that requires a well-trained workforce.

### Objectives

- Create operation simulators of a die casting machine/cell and aluminum melting reverberatory and stack furnaces, to (1) immerse operators and other shop floor personnel in the HPDC process and (2) provide greater understanding of how process changes affect casting quality and other characteristics.
- Virtual furnaces will utilize process parameters to help predict quality of the extracted metal, and allow users to visualize and optimize the melting process inside the furnace.

### Benefits to Warfighter

- Improved production & energy efficiency, quality, and safety
- Reduced scrap; lower-cost and more reliable/durable parts
- Enhanced supply chain (machine availability and production reliability) with more-efficient workforce

### Description of Project:

This project will raise the HPDC process knowledge of shop floor workers to improve process decision-making at the machine, yielding overall benefits in

- Die & machine life (↓ disruptions/downtime)
- Casting quality & production efficiency
- Workforce capabilities & safety behaviors
- Throughput & turnaround

**Team:** Purdue University Northwest,  
North American Die Casting Association

### Milestones / Deliverables

- Virtual, interactive environment for operating a die casting machine
- Virtual, interactive environment for operating a reverberatory melting furnace
- Virtual, interactive environment for operating a stack melting furnace
- Validate simulators through in-plant evaluation
- Distribute simulators through NADCA