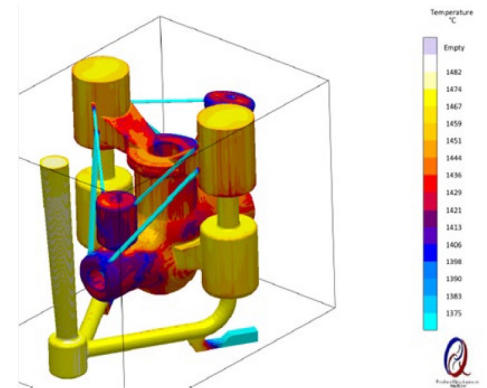
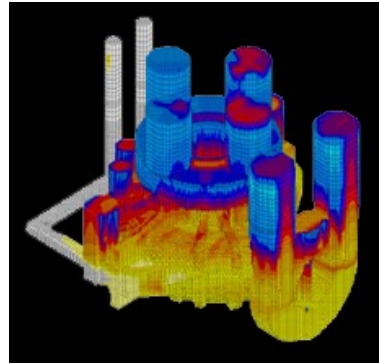




Product Development  
Analysis

[www.PDA-LLC.com](http://www.PDA-LLC.com)



- Located in Midwest for over 29 years – **Pioneered CAE applications in Metal Casting since early 90s.**
  - Provider of technological and engineering solutions to over **175 OEMs and metal casters** including **AI & Data Analytics.**
  - Specialize in design of casting, process & rigging and manufacturing of large heavy section ferrous (**100,000 #** pour weight of steel castings – 110MW split cases, valve bodies, locomotive truck frames, mining excavator, lifting hooks etc; **200,000 lb** pour weight of iron – Windmill hubs & blade maneuvering castings conversion/development, AC6000 HP V16 engine housing & Oil Pan, IFE for locomotives, 500# and 2000# Projectiles, large plastic machinery etc) and large aluminum structural castings with pour weights of **5,000 #** (AEGIS destroyer, transmission & gear box housings etc)
  - **Member of Manufacturing Innovation Institutes - America Makes; LIFT (Lightweight Innovations for Tomorrow); and MxD**
  - Contract Research background with **DOE, DOD, DLA, NASA** and professional societies like **AFS.**
  - **Partnership with various Metal Casters, 3D Printing for Turnkey Reverse Engineering and Low Volume Contract Mfg.**
- 
- 1994-2002 – DOE funded USCAR/USAMP program on Mg Castings (SCMD & HIMAC)
  - 1996-2000 – DOE funded Lost Foam Casting Consortium by AFS/UAB
  - 1998-2000 – DOE funded Alcoa led Thin Wall Aluminum Castings by SSM
  - 2018-2022 - ORNL and SNL funded MetalTek led Ni-based (Haynes 231 and 282) High Temperature Superalloy Valve Body Castings Development for CPS

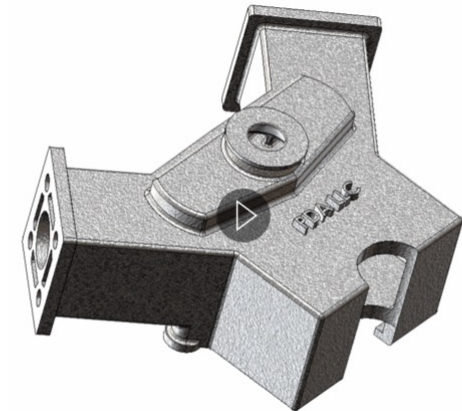


# • What role does your organization play in the large near net shape market space?

- Casting Requirement Development working with OEMs
- Design for Manufacturability & Casting Conversion
- Experience and CAE tools required in developing process and rigging for large castings
- Develop Best Practice for Large Near Net Casting Design & Manufacturing
- Design for additive toolingless casting manufacturing including feature and part consolidations
- Heavily engaged in AM Toolingless casting contract research projects participation
- Workforce Development working with AFS



AFS Foundry Connection



- **What do you see as current technical and/or market challenges in the US infrastructure for production of large-scale metal components**
  - Current capacity/suppliers, skill/talent gap and financial strength of the industry
  - Lack of best practices for large castings design, development & manufacturing in public domain
  - Movement of molds/cores/castings in the shop
  - Key metallic raw materials supply chain issues
  - NDT, Heat Treatment, Distortion, Dimensional Inspection, Weld repair
- **What do you see the largest challenges and/or opportunities for future innovation in the large near net shape market space?**
  - Capital investments and talents/workforce required
  - Low volumes and lack of multi year commitments by OEMs
  - Long lead times for key technology providers
  - Commercialization from R&D investments

