

# Whemco Slag Pots

Design And Performance



# Whemco Steel Castings





**WHEMCO – STEEL CASTINGS, INC.  
MIDLAND, PA  
FACILITY OVERVIEW**

**Midland: – Castings – Slag Pots**

- ◎ 185,000 Sq Ft Foundry
- ◎ 50-ton Electric Arc Furnace
- ◎ 2 - Nine Ton Induction Furnaces
- ◎ Heat Treating Furnaces Car Body / Pit
- ◎ Quench Tank – 23 ft square, 41090 gals. 10.7 ft deep
- ◎ Pattern Shop



# Objective

- To explore how slag pot material properties impact service life under demanding conditions
- Understanding these properties helps in optimizing slag pot usage ultimately improving efficiency and safety in melting operations





# What Is A Slag Pot?

- Vessels that are designed to collect and transport molten slags generated by metal melting operations.
- Melting operations can be ferrous or nonferrous and the operating conditions should be governed by the nature of the melt process.
- Typical service conditions are defined by high temperatures, thermal cycling and abrasive slag



# Finishing Floor





# Slag Carriers

Rail Car



Mobile Carrier



# Material Properties Of Whemco Slag Pots

- Composition
  - Cast steel
- Key Properties
  - Thermal Shock Resistance
  - Abrasion Resistance
  - Material Strength
  - Weldability





# Influence Of Material Properties On Service Life

- Typical Properties
  - 60 – 65 ksi min Ultimate Tensile Strength
  - 30 – 35 ksi min Yield Strength
  - 40 ft-lbs Impact Strength

Measured At Room Temperature!

Aren't Slag Pots Subjected To Elevated Temperatures!!



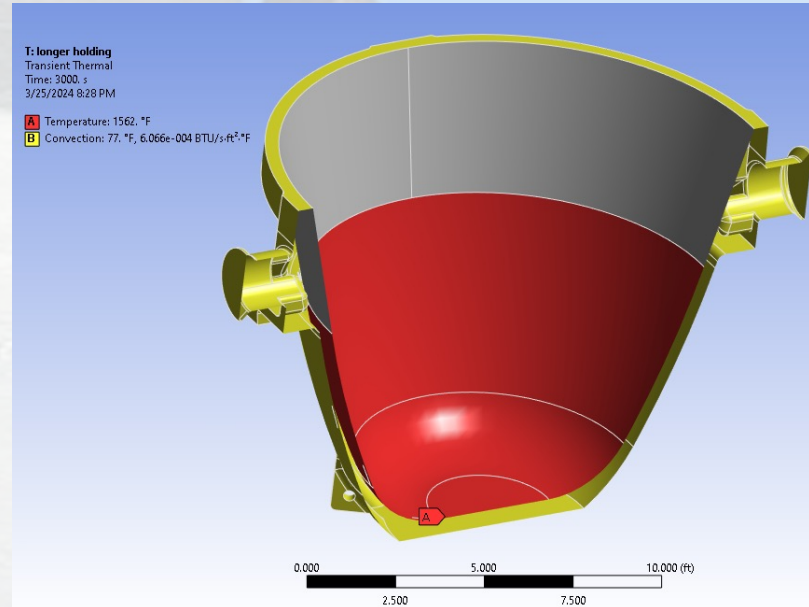
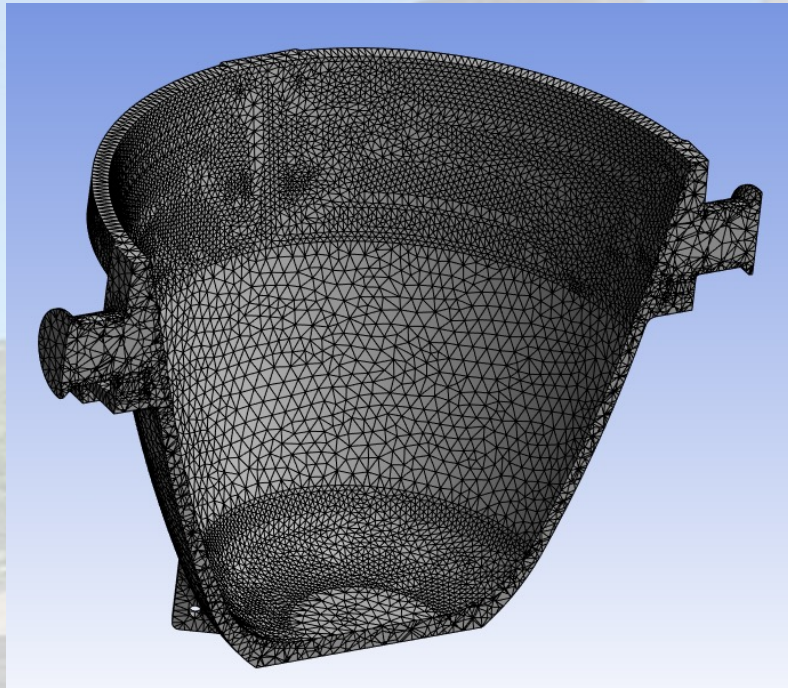
# WHEMCO Slag Pot Chemistry – stronger than LA

- Low Alloy pots are much more likely to deform than a WHEMCO slag pot
- WHEMCO slag pots will resist high temperature deformation due to micro alloyed chemistry.



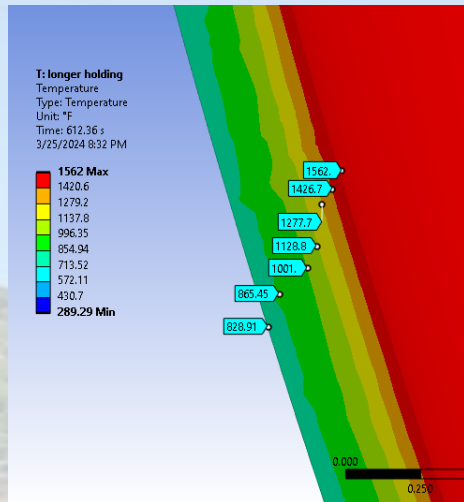


# Heat Transfer Simulation

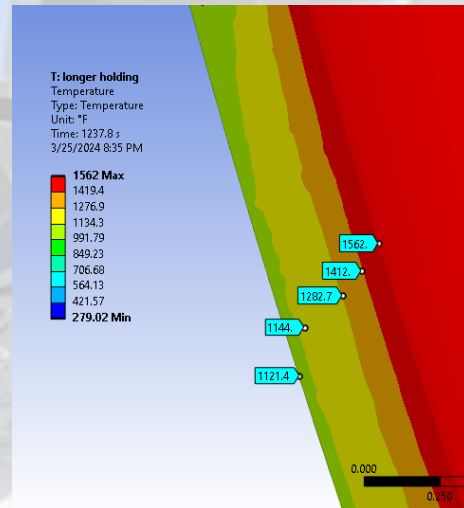


# Resulted Thermal Gradient Within Pot Wall

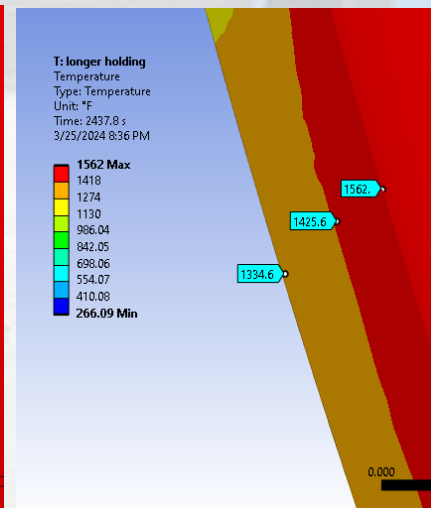
10min



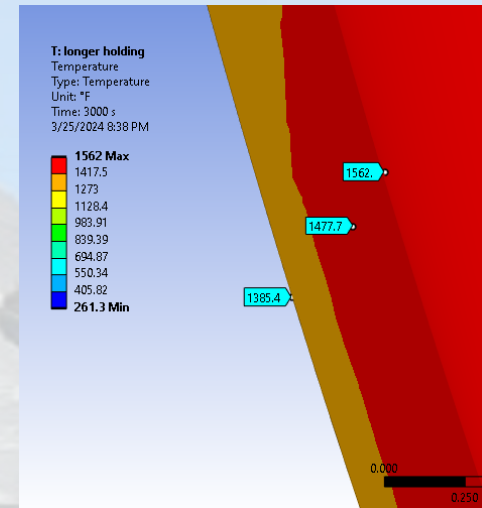
20min



40min

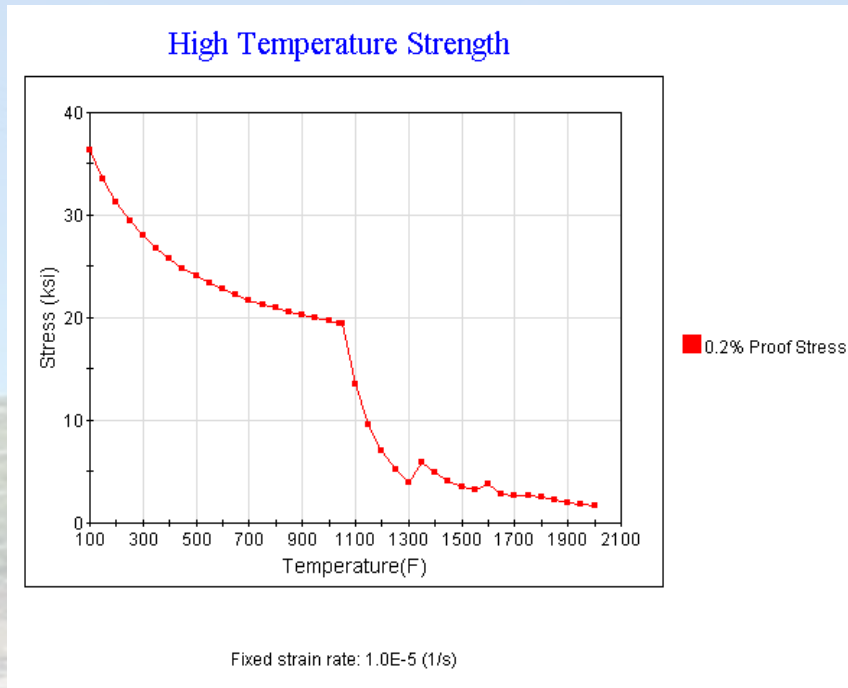


50min



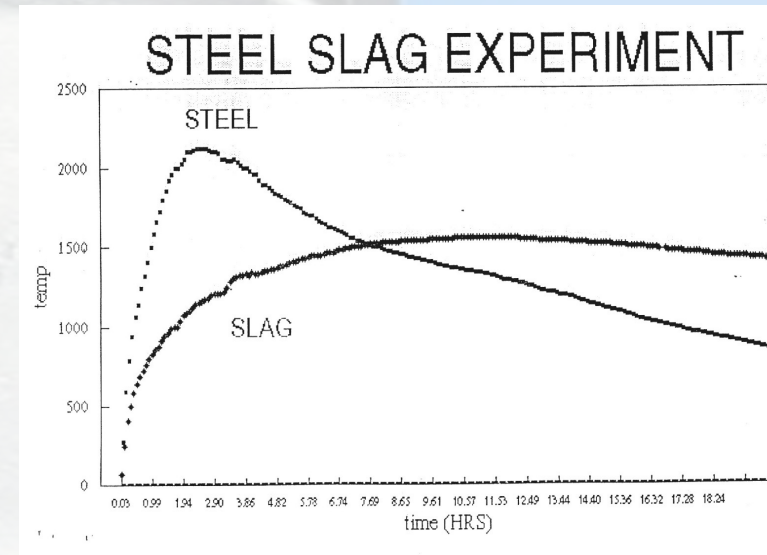


# How Does Steel Behave At High Temperature?



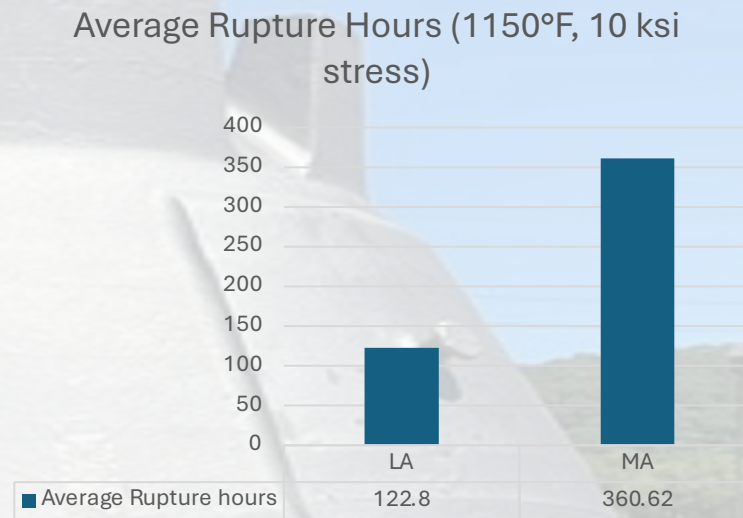
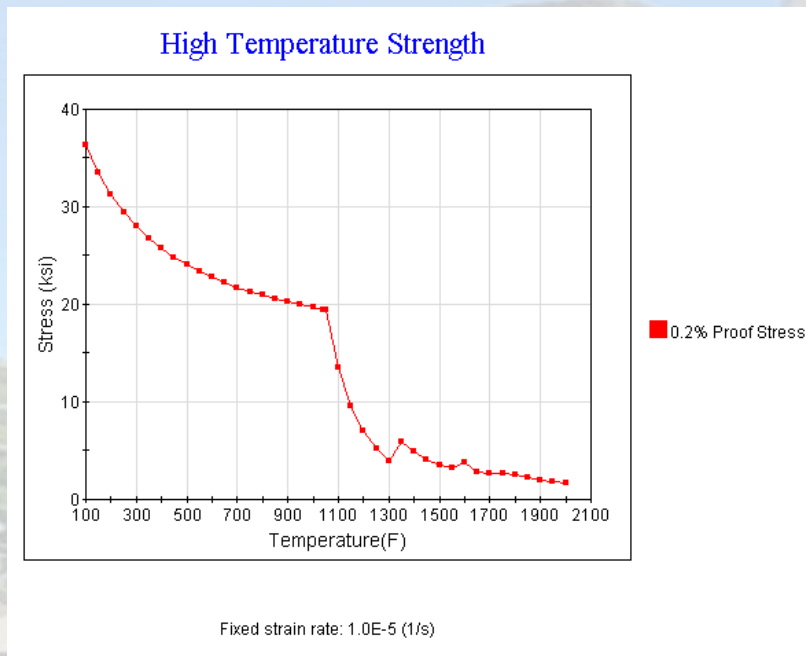
# Implications

- Temperature Control Is Critical
- Slag Only Please! No Steel!
- Pot Protection Options
- Whemco MA Material!!





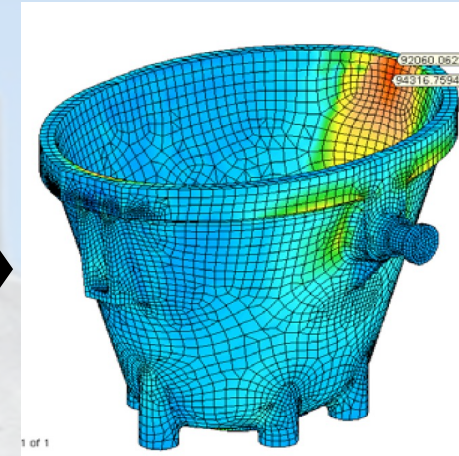
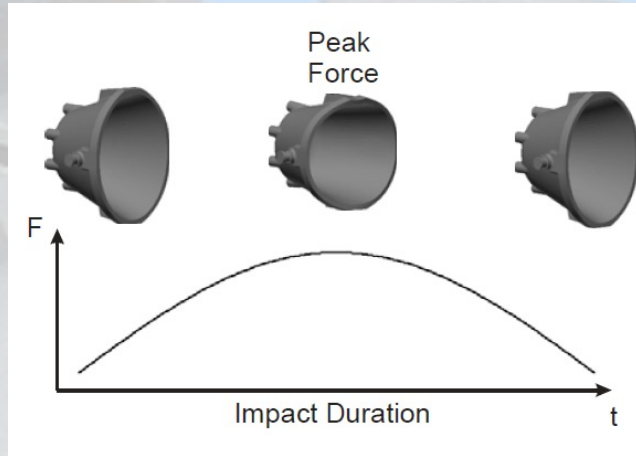
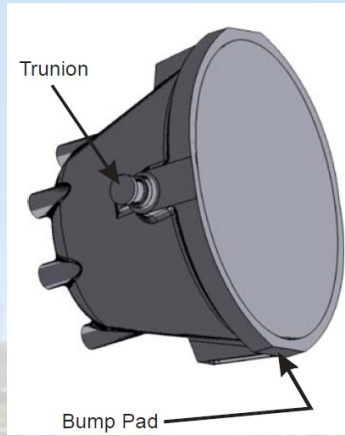
# Whemco MA – Improved Resistance To Deformation At Elevated Temperatures



Whemco MA Material 3x's Resistance To Deformation At Elevated Temperatures Compared To Typical Low Alloy Steel



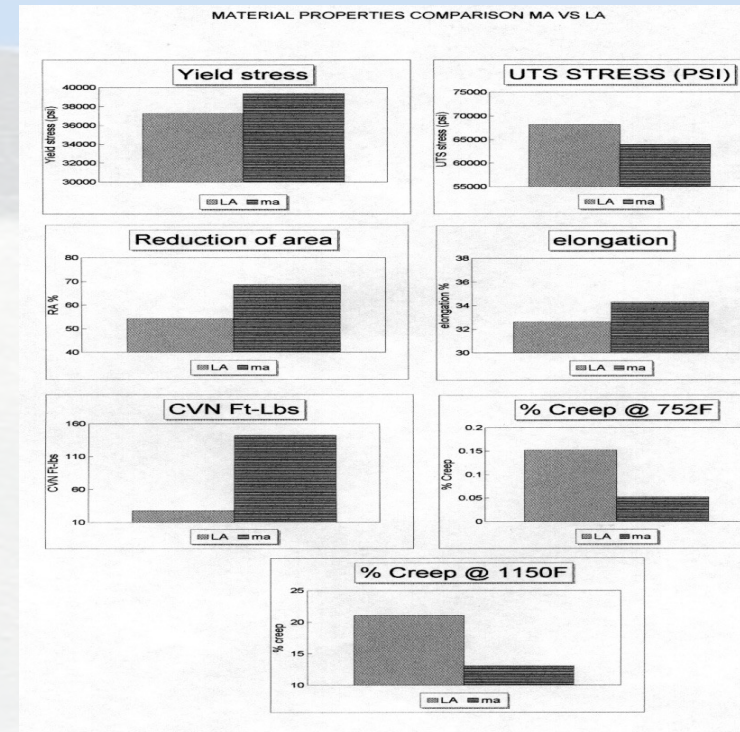
# What About Impact Resistance?





# Slag Pot Chemistry Determines Properties Whemco MA Material

- Design Requirements
  - IMPROVED CREEP RESISTENCE
  - TOUGHNESS
  - WELDABILITY



# Design and Technical Support

- WHEMCO can supply a steel slag pot for various melting operations.
- Pots are designed to perform with designated mill equipment and mill surroundings.
- WHEMCO Steel Castings has experienced field service personnel that can review new and existing operating conditions to help maximize slag pot life.
- Ability to collaborate with the individual melt sites and carrier suppliers with proven solutions in mind.





# Proven Solutions

- Understand The Operating Conditions
- Understand The Slag Pot Material
  - Recommended Practices
    - Preheating
    - Temperature Control
    - Pot Cycling
    - Pot Protection
    - Weld Repair Procedures

