PSU OMI Presentation

Materials and Manufacturing Research Institute
Mechanical and Materials Engineering Department,
Portland State University
3/3/21

Portland State University
Materials
Manufacturing
Research
Institute

Maseeh College of Engineering and Computer Science
PORTLAND STATE UNIVERSITY

OMI continues to:

- Serve as a unique model partnership program
- Develop and insert technology into Oregon Industry
- Strengthen University-industry relationships
- Enhance relevant basic and applied research that addresses Oregon Industry needs
- Enhance global competitiveness and family wage job opportunities
- Enhance student exposure to key industry career paths and opportunities
- Foster student success, MS MSE program has a 100% placement rate

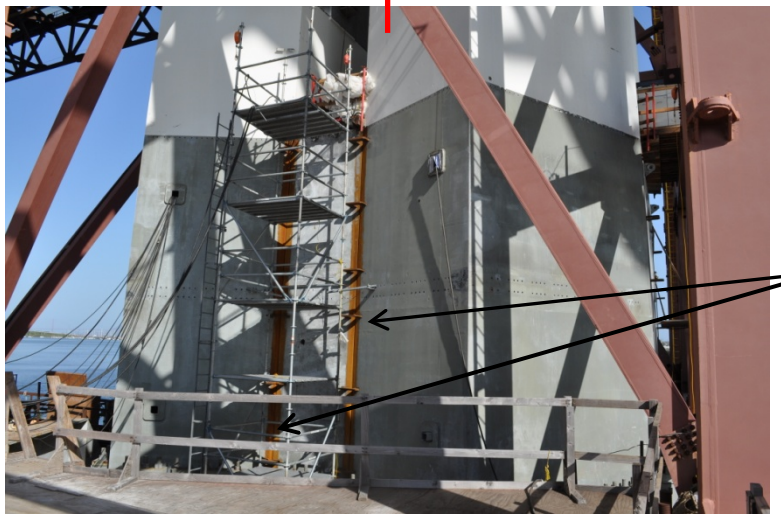
PSU OMI abbreviated partner list

- Advanced Surfaces and Processes
- ATI
- Blount
- Boeing
- Columbia Steel
- Evraz
- Gunderson
- Intel
- Madden Fabrication
- Marks Metals
- Materials Technology
- Novellus
- PGE
- Precision Castparts Corp.
- Weir
- And others

In current FY approved OMI projects would have been 80% of the MMRI budget.

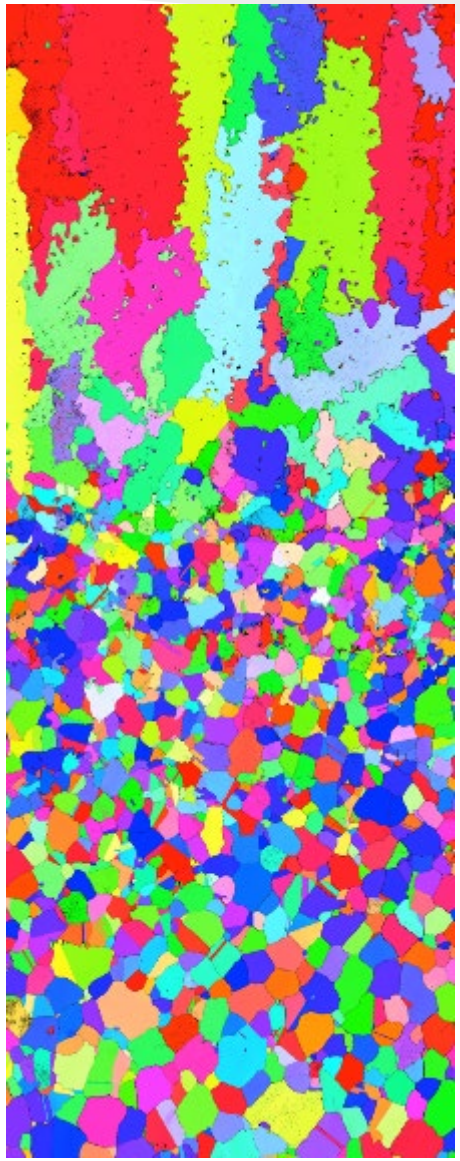
Supporting large and small projects

525ft tall tower for the Oakland Bay bridge



20 highly restrained welds 35ft long vertical welds up to 4in thick

2 PSU-AB welds



Weld Metal

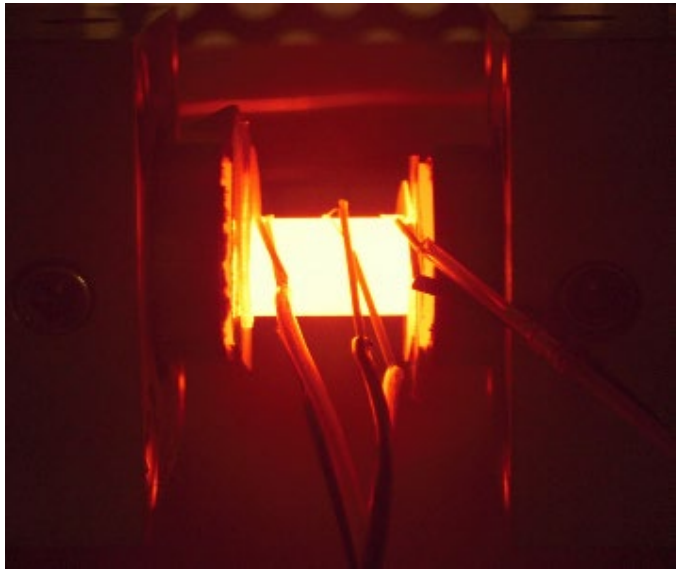
Interface

Base Metal

100 µm

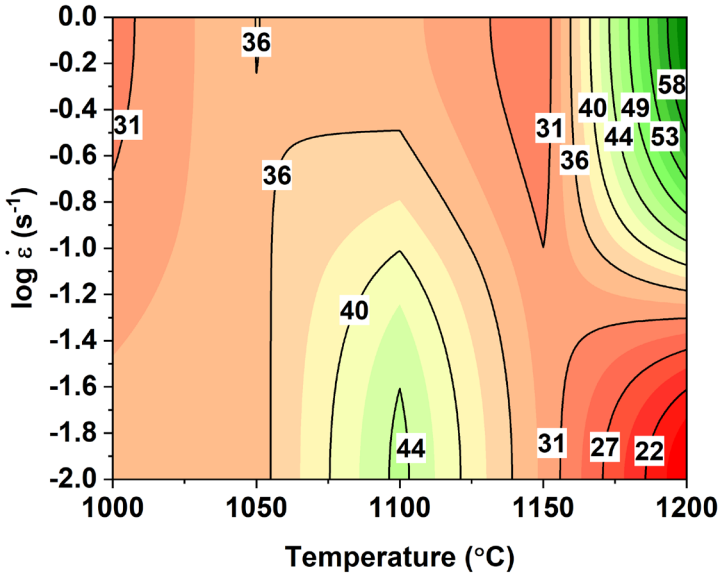
Example of impact of long term investment

- **Gleeble 1500 purchased with OMI funds 1990**
- **Gleeble 3500 purchased with Oregon Inc funds 2008**
- **Gleeble 3500 upgraded with OMI funds in 2012 and 2018**



Isothermal sample in Gleeble,
10mm x 12mm, material cost less than $20

Full scale forging
Ingot approximately 4ft x 3ft, material cost greater than $50,000



Example processing map used to find ideal conditions for forging and rolling, green is good, red is bad, map required 81 samples

9 of the last 14 OMI projects relied on the Gleeble to model metals processing

PSU is the most active university Gleeble in the U.S. primarily due to OMI projects and helps provide a competitive advantage to Oregon industry