BAE Systems, Inc.
San Diego Ship Repair
STEM Presentation

By: Jim Marden
Welding Engineer
My Background

• Born and raised in Michigan
• Bachelors Degree in Welding Engineering Technology From Ferris State University
  • Lab based program
  • Welding Processes
  • Welding Automation
  • Metallurgy
• Northrup Grumman Avondale Shipyard in New Orleans (Welding Engineer)
• Huntington Ingalls Industries In Pascagoula, MS (Welding Engineer)
• BAE Systems San Diego Ship Repair (Welding Engineering/Engineering Manager)
BAE Systems San Diego Ship Repair is a full service facility located on San Diego Bay consisting of 17 acres

**SHOP CAPABILITIES**
Carpenter Shop  
Electric  
Machine Shop  
Paint/sandblast Shop  
Pipe Fabrication Shop  
Rigging Shop  
Sheet metal Shop  
Structural Shop  
Titanium Fabrication
San Diego Ship Repair

- New 55,000 Ton floating dry dock (Pride of California)
- 26,000 Ton floating dry dock (Pride of San Diego)
- 4 piers totaling 2085 feet of berthing and 96,000 square feet of production space.
- 2,000 employees
Shiprepair is not what it used to be

- Shipbuilding used to be done with a sludge hammer and rivets
- Today we have the most advance war ships in the world
- Engineering is in the forefront in every aspect of ship construction
  - Less crew
  - Less weight
  - More space for weapons
  - Overall more efficient
The who and what of BAE engineering

- **Welding Engineering**
  - Welding Procedures Specifications
  - Workforce Training
    - New equipment, materials, techniques
  - Process Improvements
    - Safety, quality, schedule, cost
  - Trouble shoot problems
    - Interface with trades and government to solve problems.

- **Mechanical/Marine Engineering**
  - Lifting Fixtures
    - Safety, quality, schedule, cost
    - Material Strengths
  - Ships Stability
    - Calculations for ships safety
  - Mechanical Systems
    - Diesel Engines
    - Propulsion Systems
New Technology

- **What can we do better, faster, easier?**
- 3D Scanners
- Finite Element Analysis
- Faro Laser Tracker
- Welding Automation
What skills do students need?

- Critical thinking skills
  - Students need to understand how to break down problems piece by piece.
  - Understand workflow
  - Project Management
    - Give students long term projects that they must manage
- Ability to apply knowledgebase into the field
  - Students must understand the basics of engineering, but also must be able to apply the knowledge in particle applications
- Lab based classes
  - A student's biggest strength is hands on learning.
- Communication Skills
  - Students must be able to communicate problems at all levels.
    - PHD to no degree
How to get students involved?

• Currently 28% of students are interested in a STEM career field. However, 57% will lose interest by the time they graduate.
• Get your students involved with originations in fields they are interested in
  • American Welding Society (AWS)
  • American Society of Naval Engineers (ASNE)
  • American Society for Engineering (ASEE)
  • Invite these society's into your class room to get students engaged and excited.
  • Student Chapters