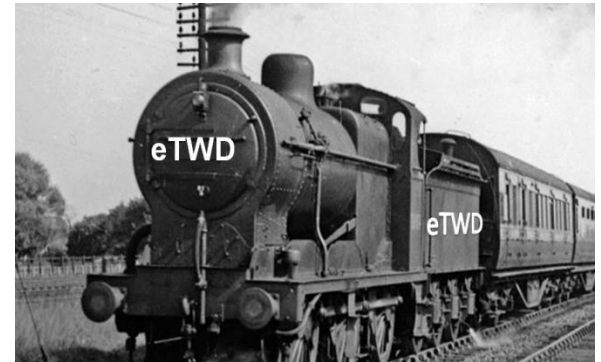


# Training Technologies for Workforce Development in Naval Shipyards



Ron Jorgenson  
NAVSEA-04XRT  
2 Sept 2014



**YardTube**  
Instructional Videos Anytime

# NAVSEA STRATEGIC BUSINESS PLAN (2013-2018)



## COMNAVSEA Mission Priorities:

- ***It's All About the Ships...Improving Ship Maintenance***
  - ▶▶ Revitalize the workforce by offering challenging work and appropriate training to create trade and technical excellence.
- ***Technical Excellence And Judiciousness... Accelerate Knowledge Transfer***
  - ▶▶ Modern Learning and Knowledge Management
- ***Culture of Affordability...Challenge every requirement***
  - ▶▶ Innovation and Learning

## STRATEGIC FRAMEWORK

### MISSION

*We design, build, deliver and maintain ships and systems on time and on cost for the United States Navy.*

### VISION

*We are the Nation's team accountable for the health of its Navy.  
We must purposefully operate to ensure the U.S. Navy can protect and defend America.  
We must be supported by a modern, efficient industrial base.  
We must be a world-class employer of choice that inspires innovation.  
We must set the value-added standard for acquisition, engineering, business and maintenance.*





## Naval Shipyard Training and Education Program

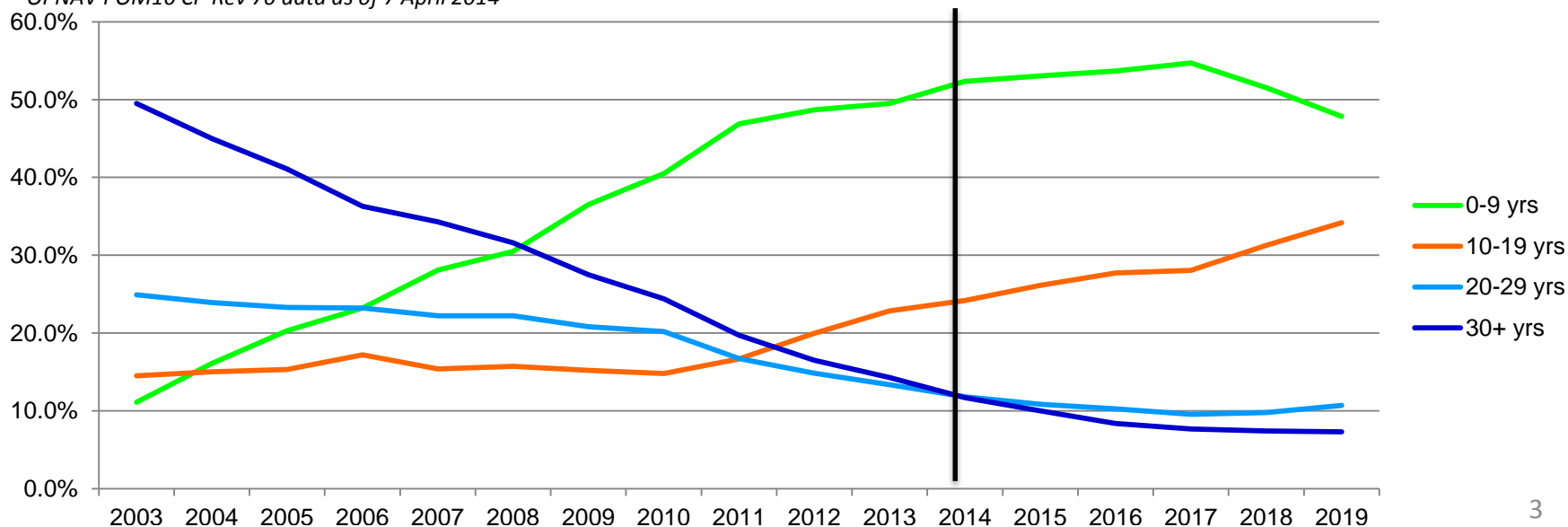
### – Current and future challenge(s) for Public Naval Shipyard Training and Execution

- Degradation of Skill & Experience in overall workforce- bi-product of increasing workload and mid 90's workforce shaping decisions
- 2003 Experience avg 18.2 years - 2014 Experience avg 13.1 years
- 2017 Projection (Rock bottom) 11.1 years

\*Blue collar workforce is ~ 2 yrs below the SY avg.

*C-4 NSY – Targeted Manning is ~34,000 by end of 2016, Production is ~ 54%*

OPNAV POM16 CP Rev 76 data as of 7 April 2014



# NAVSEA STRATEGIC BUSINESS PLAN (2013-2018)



## ▶▶ Modern Learning and Knowledge Management

- NAVSEA has one of the most diverse product and services sets in the world. We must employ people with a wide variety of trade, technical, business and management skills. We must implement strategies and approaches that apply to and support the learning and development of the entire workforce.
- **Focus Area Objectives:**
  - ▶ Provide individual-focused learning and development opportunities within an overall career management framework supportive of NAVSEA's mission priorities.
  - ▶ Increase mentoring and coaching by experienced personnel (including Flag Officers, and Senior Executive Service members) leveraging the relationships of the Develop and Retain Integrated Business Operations Team.
  - ▶ Provide a variety of mechanisms for employees to share their knowledge and collaborate with others.
    - ▶ Use technology to facilitate collaboration on programs, products, projects, or services.
    - ▶ Recognize those who promote collaboration and share knowledge.
    - ▶ Stand up one or more interactive, cross-organizational teams to build the structure and early content of a NAVSEA knowledge repository.
  - ▶ Leverage existing apprentice programs and skill strengthening opportunities for workers.



## Naval Shipyard Training and Education Program

- **INITIATIVES TO ENHANCE AND ACCELERATE WORKFORCE DEVELOPMENT AND WORK EXECUTION**
- **Production Continuous Skills Training (CTD)**
  - > Skills Training Simulators in use for welding, and Painting
    - > **Welding Skills (Lincoln Vortex 360)**
    - > **SIM SPRAY Painting**
- **Yard Tube Videos**
- **PMF (Electronic Trng Tablets)**
- **E-TWD (Electronic Work Tablets)**

# Lincoln Electric VRTEX 360 Weld Training Simulator



# WELDOMETER

Arc Time		Trip	Total
Arc Time SMAW		00:05:46	00:05:46
Arc Time GMAW		00:05:31	00:05:31
Arc Time FCAW		00:00:00	00:00:00

Base Metal	lbs		Coupons	
	Trip	Total	Trip	Total
Plate 10 ga	1.3	1.3	1	1
Plate 1/4"	0.0	0.0	0	0
Plate 3/8"	123.3	123.3	33	33
Pipe 2" XXS	0.0	0.0	0	0
Pipe 6" Schedule 40	0.0	0.0	0	0

Gas	CF	
	Trip	Total
90% Argon/10% CO <sub>2</sub>	1.3	1.3
75% Argon/25% CO <sub>2</sub>	0.0	0.0
100% CO <sub>2</sub>	0.0	0.0

Consumables	lbs		Electrodes	
	Trip	Total	Trip	Total
SMAW - 1/8" E6013	0.0	0.0	1	1
SMAW - 1/8" E7018	0.2	0.2	10	10
SMAW - 1/8" E8010	0.0	0.0	1	1
GMAW - .035" Solid Wire	0.0	0.0		
GMAW - .045" Solid Wire	0.8	0.8		
FCAW-G - .045" E71T-1	0.0	0.0		
FCAW-S - 5/64" E71T-8	0.0	0.0		

Simulated Welder Time	26:17:45
-----------------------	----------



Weldometer: Tracks Material Costs and Savings

Horizontal Tee 3/8"

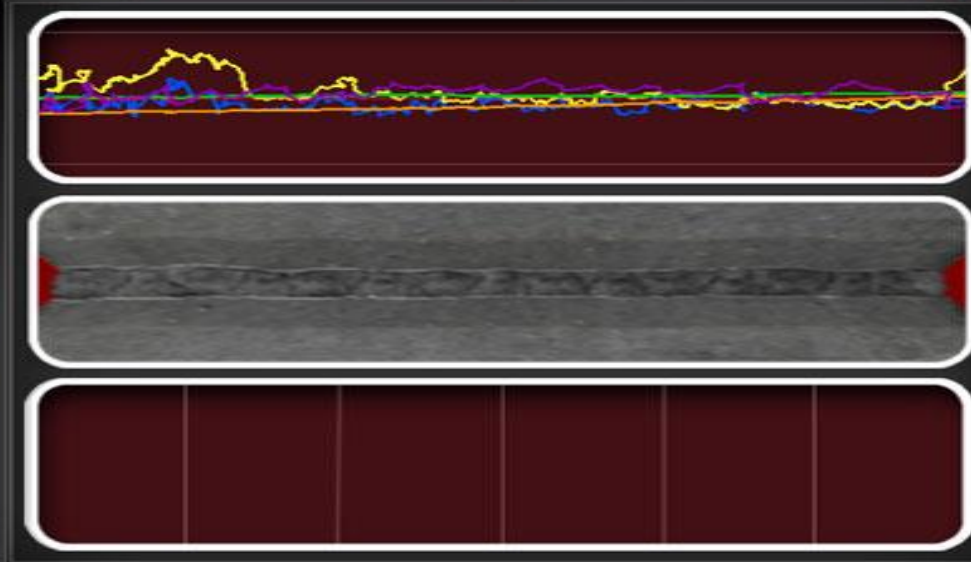
SMAW E7018 Excalibur

Stringer/Drag

- Position
- Arc Length
- Work Angle
- Travel Angle
- Travel Speed

Pass 1

- Inc. Fusion/Pen
- Slag Inclusion
- Porosity
- Undercut
- Poor Bead Pl.
- Wrong Weld Size
- Convex/Ex. Reinf.
- Concave/Underfill
- Excess Spatter
- Melt Through



Position: 95  
 Arc Length: 93  
 Work Angle: 100  
 Travel Angle: 99  
 Travel Speed: 96  
 Score: 96



Discontinuities	%
Inc. Fusion/Pen.:	0
Slag Inclusion:	0
Porosity:	0
Undercut:	0
Poor Bead Pl.:	0
Wrong Weld Size:	0
Convex/Ex. Reinf.:	0
Concave/Underfill:	0
Excess Spatter:	0
Melt Through:	-

- ◀ Prev
- Menu
- Actions and Cues
- Theory
- New Coupon
- EndPass
- Next ▶

**Live Action Student Evaluation Report (LASER) Screen** The LASER screen summarizes the student's welding performance for each weld made. Detailed information about the student's welding technique for each pass is displayed on this screen.

**Upper Screen:** The top portion of the screen shows the technique parameters being tracked and the graph of these parameters over the course of the virtual reality weld made:

- Position
- Contact Tip to Work Distance
- Work Angle
- Travel Angle
- Travel Speed

**Lower Screen:** The lower portion of the screen lists each of the potential discontinuities. When a student uses incorrect welding techniques, this causes specific weld discontinuities:

- Incomplete Fusion/Penetration
- Slag Inclusion
- Porosity
- Undercut
- Poor Bead Placement
- Wrong Weld Size
- Convex/Extra Reinforcement
- Concave/Underfill
- Excess Spatter
- Melt Through



# Training Program Benefits



Steel Coupon



Virtual Coupon

## TURN YOUR WELDING PROGRAM GREEN:

### VR WELDING TECHNOLOGY:

- Reduces material waste
- Saves energy
- Tracks material and cost savings using the Weldometer™

### COST SAVINGS/REDUCTIONS:

- Base Materials
- Electrodes
- Shielding Gas
- Consumable Parts
- Energy Consumption
- Increased Training Touch Time



## Naval Shipyard Training and Education Program

- **Yard Tube Videos-** Centrally Managed - locally streamed across 4 Naval Shipyards.
- Went live on 3/17/14, includes shipyard geographic hubs ~ 320 videos and growing.
- Four to five minutes videos (like you tube) on job specific techniques, and processes.
- Captures knowledge/technique for accomplishment, used for “JIT” refresher and existing training, will be accessible via E-TWD

### **Types of Videos (Sampling):**

#### **Safety**

Confined Space Entry  
Arc Flash Protection

#### **Industrial Process**

Ball Valve – Disassembly/Clean/Inspect  
Joint Insert Brazing



**Instructional Videos Anytime**



## Naval Shipyard Training and Education Program



### Industrial Process (Continued)

Chain Hoist Inspection and Operation

NDT X-Ray Inspection- Visual and eqpt usage

EHF Inspection and Installation

Freeze Seal Installations

Hydrostatic Test Stand Operations

Fiber Optic Cable Connector assembly

Lock wiring

Mechanical Joint Make-up

TLI - Testing

Pipe Hangar Installation

Pipe Cutting

Nuclear Repair Processes

# Training with PC Tablets in NAVSEA 04X Project Management Fundamentals Course

## Specifications/Background



- Samsung Galaxy Note 10.1 2013, Android OS
- Employed as stand-alone, (not networked) participant guides and references
- Stylus & S-Note software allows for personalized student notes
- Customized student notes are converted to Pdf format and posted for student retrieval via shared network drive, via MS SharePoint portal
- Introduced in Dec. 2013
- Set of 100 tablets with supporting equipment and travel cases
- NAVSEA 04X owned (GFE)
- Used by over 700 participants to date
- Deliverables ~ 8 courses per year with 80 students per course at 4 different locations.
- The Why??? Significant reduction in course materials and preparation costs

# Benefits of Tablet Use

- ❖ Cost Savings (currently)
  - ~55% Return-on-Investment on the initial \$60k investment
  - 1.5 year payback period (projected)
  
- ❖ Instructional Quality
  - Improved graphics and portability promotes participant learning
  
- ❖ Content Flexibility
  - Training content updates can be transferred to tablets electronically without time-consuming and expensive page inserts
  - Greater potential for embedded interactive content as technology applications progress (Android mobile)
  
- ❖ Added Benefits
  - Encourages Post class room experiential learning continuing with Sharepoint Portal/Site dedicated to newly enrolled participants and alumni.
  - Familiarization with tablets will promote adoption/transition to eTWD technology implementation.



## Naval Shipyard Training and Education Program

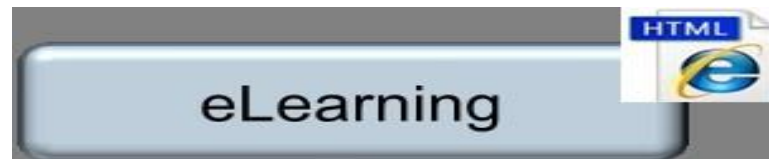
- **E-TWD (Electronic Technical Work Document)**
- Transitions from Paper system to electronic work tablet on the deck plate to accomplish work
- Wireless infrastructure embedded in NSY's by end of 2014
- Design Build in Progress ECD end of FY- 2015
- Go live in FY-16 at a NSY near you
- **Benefits-** Real time problem identification/resolutions Reduction in support services, significant reduction to administrative errors.
- \* Reduced maintenance costs through engineered efficiencies in planning and work execution processes



# Naval Shipyard Training and Education Program



Oracle will be the major commercial software for the eTWD System Solution



## CORPORATE TRAINING SYSTEM OPPORTUNITIES/CHALLENGES

- Embedded Yard Tube Videos for “JIT”
- CBT Training
  
- We are designing and Building the Corp Training for Implementation Schedules



# Naval Shipyard Training and Education Program

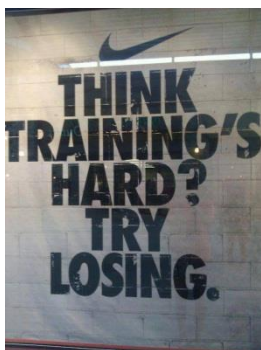
- Takeaways

Learning is not compulsory... neither is survival.  
*W. Edwards Deming*  
meetville.com

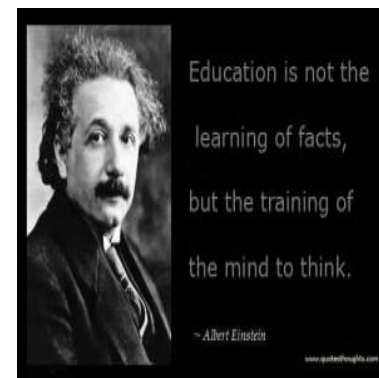
**If You Think Education Is Expensive, Try Ignorance**

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The roots of education are bitter, but the fruit is sweet.  
*Aristotle*  
meetville.com



Yes, you can teach an old dog new tricks!



**Revitalize the workforce by offering challenging work and appropriate training to create trade and technical excellence.**



**BACK UP SLIDES**

# YardTube

From the front office

May 08, 2014

- One of the greatest challenges we now face across NAVSEA is bridging the knowledge gap that exists between our newest hires and our seasoned employees. I'd like to take the next two columns to discuss initiatives we are pursuing to bridge that gap. In this edition of the *Observer* I'll focus on **YardTube, the shipyard's adaptation of YouTube**.
- In mid-March, the YardTube initiative went live in all four Naval Shipyards. YardTube shows three to five minutes videos on various training topics. Videos are streamed on Naval Shipyard intranets and may show employees how to set up a lathe or a mill, explain a new Command initiative, and everything in between. YardTube's primary goal is to capture the wealth of knowledge of experienced shipyard workers and technical processes and create an instructional tool to enhance existing training. YardTube videos are easy to understand – much like what you'd watch on YouTube before trying to do work on your car.
- Each shipyard can access about 300 videos posted on the shared YardTube site, and more YardTube videos are constantly being made corporately and locally at each shipyard. All the videos are produced with in-house resources, most being filmed by Norfolk Naval Shipyard's Instructional Design Center or its Nuclear Corporate Training Initiatives Division.
- Each shipyard maintains a Top 10 list of desired topics on which it wants to train its workforce via YardTube videos. These lists are the main driver behind the topics of new videos, which are tied to the real-time skill development needs of the workers at the Naval Shipyards. This is a great initiative to increase the proficiency and knowledge of our younger employees. It's a huge step toward meeting our training challenges and something that has the potential to go beyond the shipyards and into other areas within NAVSEA that face similar challenges of training the next workforce.

Captures knowledge/technique for accomplishment, used for "JIT" refresher and existing training, will be accessible via E-TWD