

Innovative Training Methods: Tips and Techniques

Patrick O'Shaughnessy

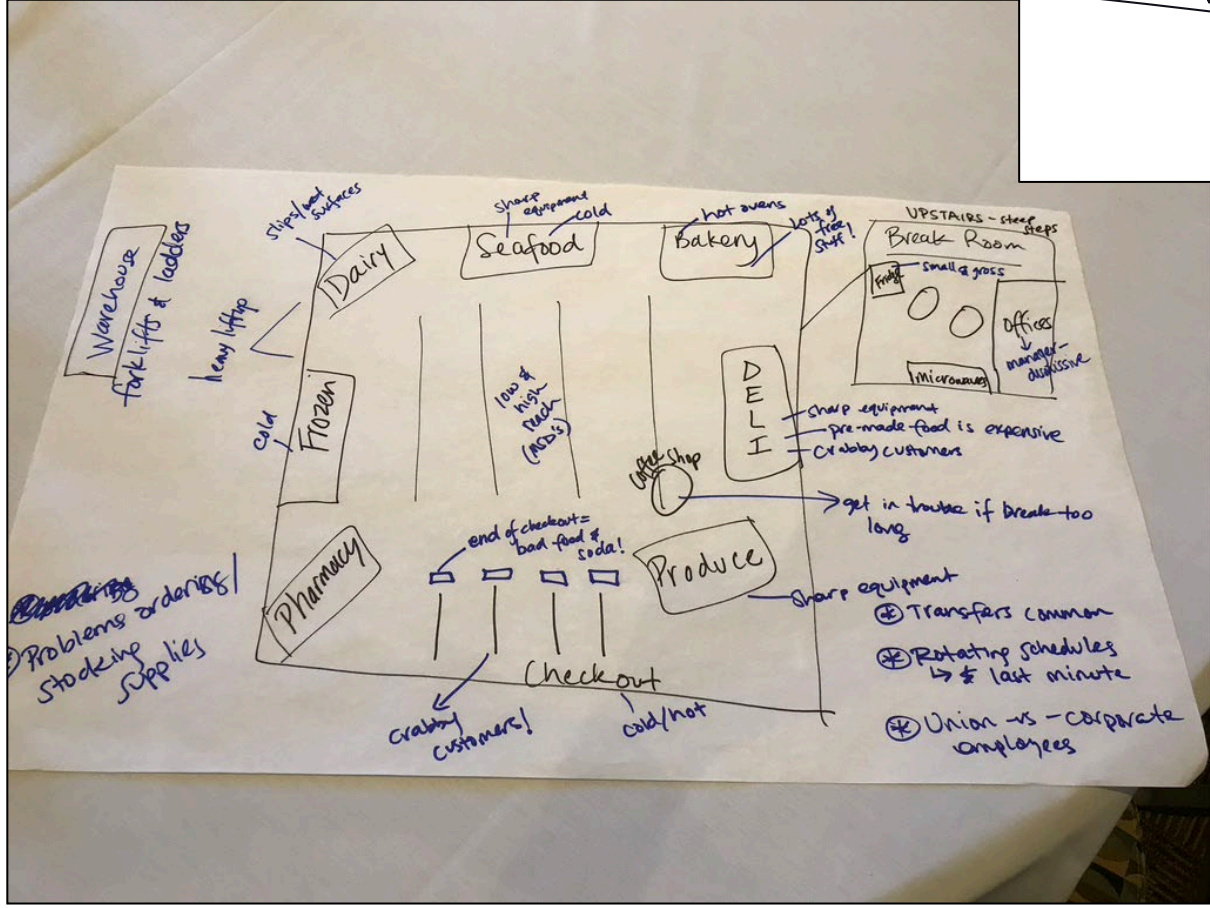


IOWA

Topics

- Hazard Mapping (Diane Rohlman)
- OSHA Training (Diane Rohlman)
- Videos – Flipped Classroom (Tom Peters)
- Statistical Techniques (Tom Peters & Patrick O'Shaughnessy)
- Virtual Reality (Nir Keren)
- Public Service Announcements (Renee Anthony)
- Health Equity (Carri Casteel)
- Professional Development (Patrick O'Shaughnessy)

Hazard Mapping



HAZARD MAPPING

TOOLBOX TALKS

HEALTHIER WORKFORCE CENTER OF THE MIDWEST

Mapping the hazards in your workplace can help you identify hazards and implement strategies to control them.

TALK ABOUT IT

- How can you become familiar with your work site?
- How can mapping your worksite prevent injuries?

FLOOR LAYER'S STORY

The floor layer crew is going to a new job site. The project is behind schedule and the floor layers need to complete the job in the next two weeks. This means plenty of overtime work. The carpenters and the electricians are completing work on another section of the building. Because it's a new job site and there are a lot of people working on site, the crew leader decides to use hazard mapping to identify hazards.

Healthier Workforce Center of the Midwest

Hazard Mapping

Watch later Share

HAZARD MAPPING

Widget Shaping

Lockers

Packaging Station

Watch on YouTube

HEALTHIER WORKFORCE CENTER OF THE MIDWEST

OSHA Training

The screenshot displays the OSHA Training website interface. At the top, a navigation bar includes categories like 'FOOD & BEVERAGE', 'REAL ESTATE', 'ENVIRONMENTAL HEALTH & SAFETY', and 'Other Industries'. The main header features the '360 OSHACAMPUS' logo and navigation links for 'Explore Courses', 'For Business', and 'Useful Info'. A large banner image shows a construction worker in a yellow hard hat and safety vest. Below the banner, the page is titled 'OSHA 10-HOUR TRAINING' and lists key features: 'Official DOL Card and Study Guide Included', '100% Online, Self-Paced Course Format', 'Most Trusted OSHA Training Provider Since 1997', and 'Construction and General Industry Courses Available'. Two buttons, 'CONSTRUCTION' and 'GENERAL INDUSTRY', are visible. A filter section shows 'Filter By: Language', 'Type', and 'Length', and 'Order by: Popularity'. Below this, a product grid displays four course cards, each labeled 'BEST SELLER' and priced at '\$58.00'. The courses are: 'OSHA 10-HOUR CONSTRUCTION', 'OSHA 10-HOUR GENERAL INDUSTRY', 'OSHA 10-HORAS CURSO EN ESPAÑOL PARA CONSTRUCCIÓN', and 'OSHA 10-HORAS CURSO EN ESPAÑOL PARA INDUSTRIA GENERAL'. Each card includes a 5-star rating and a 'BUY NOW' button.

Home > OSHA 10-Hour Training

OSHA 10-HOUR TRAINING

- Official DOL Card and Study Guide Included
- 100% Online, Self-Paced Course Format
- Most Trusted OSHA Training Provider Since 1997
- Construction and General Industry Courses Available

CONSTRUCTION | GENERAL INDUSTRY

Filter By: Language ▾ Type ▾ Length ▾ Order by: Popularity ▾

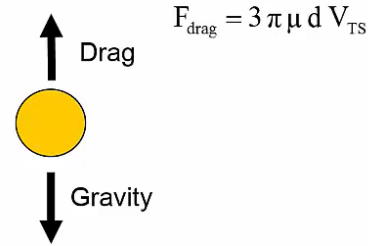
8 ITEMS OSHA 10-HOUR TRAINING ✕ CLEAR ALL ✕

| Course Title | Price | Rating |
|---|---------|--------|
| OSHA 10-HOUR CONSTRUCTION | \$58.00 | ★★★★★ |
| OSHA 10-HOUR GENERAL INDUSTRY | \$58.00 | ★★★★★ |
| OSHA 10-HORAS CURSO EN ESPAÑOL PARA CONSTRUCCIÓN | \$58.00 | ★★★★★ |
| OSHA 10-HORAS CURSO EN ESPAÑOL PARA INDUSTRIA GENERAL | \$58.00 | ★★★★★ |

Flipped Classroom

- Students watch a YouTube lecture and perform homework
- A demonstration or laboratory assignment is used to reinforce learning
- Here we discuss gravitational settling

Gravity → Gravitational Settling



$$F_{\text{gravity}} = \text{mass} * \text{gravitational constant} = (\text{volume}) * \text{density} * g = \left(\frac{\pi}{6} d^3\right) \rho_p g$$

Force of Gravity = Force of Drag
Solve for V_{TS}

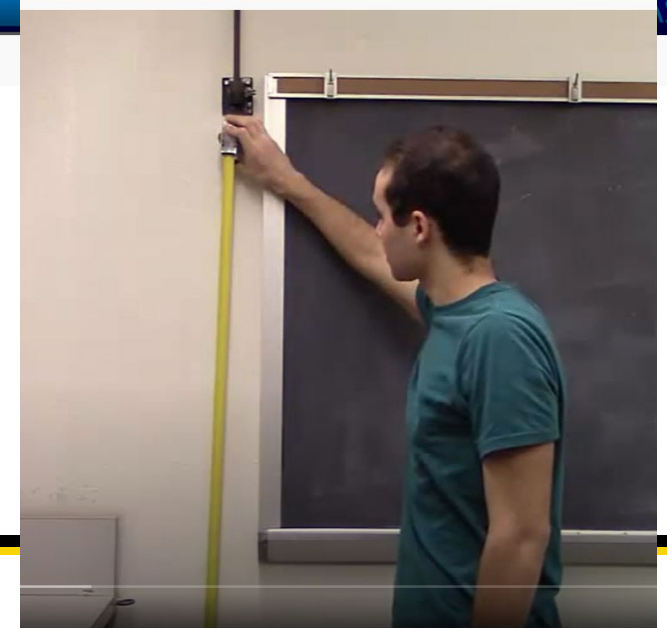
$$V_{\text{TS}} = \frac{\rho_p d^2 g}{18 \mu}$$

Labels: Particle Density (ρ_p), Particle Diameter Squared (d^2), Gravitational Constant (g), Fluid Viscosity (μ), Terminal Settling Velocity (V_{TS})

Directly proportional to particle density and particle size squared ($\propto \rho_p d^2$)



Module 5: Importance of Particle Size



Occupational Safety and Health Videos



HOME ABOUT COURSE TOPICS RESOURCES NEWS CONTACT



A multi-institutional education program that develops and disseminates web-based modules to train a variety of learners on health and safety issues associated with emerging technologies.

- University of Minnesota – Peter Raynor
- University of Iowa – Tom Peters
- Dakota County Technical College

- Occupational Hygiene Principles
- Risk Assessment Principles
- Occupational Health and Safety Regulations and Guidelines
- Introduction to Aerosols
- Importance of Particle Size
- Personal Sampling Interactive Activity



Susan Arnold, PI

OSH Statistical Techniques

- Using statistical techniques beyond a course in statistics embeds learning
- Involve OSH-related problems as part of labs or homework exercises that utilize statistical methods learned
- Examples:
 - Compare results from two airflow measurement devices, using a t-test. Students write up results of the test in their report.
 - Compare centerline capture ductwork velocities among three inlets with ANOVA
 - Use linear regression to develop a calibration for a rotameter

Instructional Design Using Virtual Reality

- Utilize interactive, constructive engagements to enhance risk assessment skills
- VR applications can provide a rich medium for informing students' mental models of complex topics

Risk Analysis & Management

(System Safety Analysis)

- Students are tasked with designing industrial systems
- Develop a conceptual approach to their system design
- Conduct Preliminary Hazard Analysis and adjust the concept accordingly
- Design the system with an Immersive Virtual Reality application
- Conduct risk assessments using their method of choice
- Write a Risk Analysis report for their systems.



Problem Statement

A machine room is built for a fabricating a system that delivers hot water to consumers that require hot water for kitchen services and similar.



Figure 1. The Boiler



Figure 2. Cold and hot water ports

The machine room is equipped with a boiler (see figure 1) that heats the water to a temperature of 300 [°F] and a pressure of 80 [PSI]. The temperature of the water that go to the consumer should be 180 [°F] or less. Colder water that return from consumers (see figure 2) need to be collected, cooled further, and sent back to the boiler to be reheated again and continue the process.

The boiler controls the temperature and the pressure based on information provided from measurements along the pipes. Hot water to consumer is used for food processing and water purity is critical. ----->

Pause (k)

Component Selection GUI

Pressure Transducer





Steam
80 psi
300 (oF)

Water
Return to
Boiler

Supply
to
consumers

urn
om
umers

Problem 3

A machine room is built for a fabricating a system that
water for kitchen services and similar.



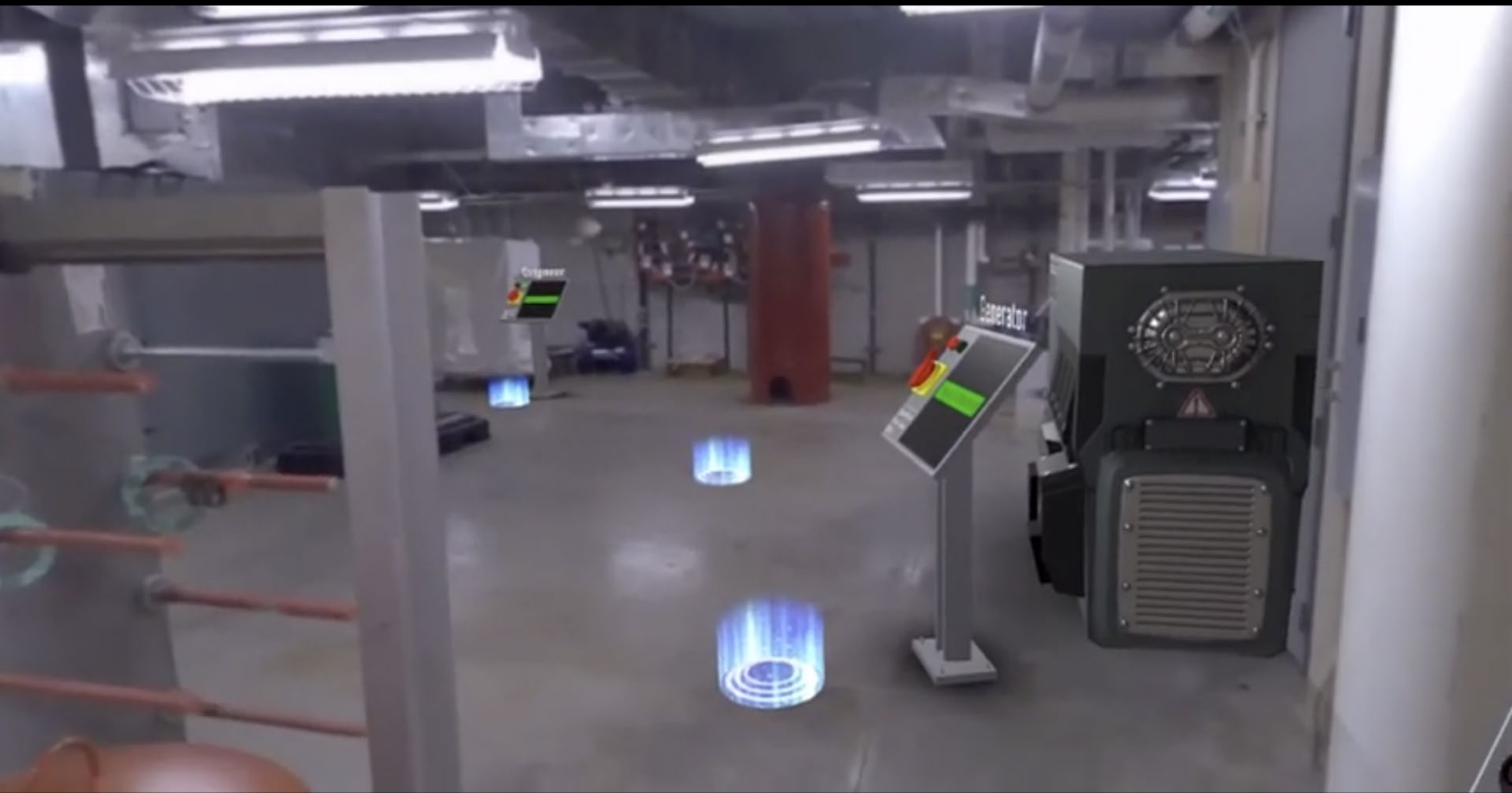
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Heat Exchanger

Noise Hazard Assessment

- Students are tasked with evaluating a machine room for noise hazards
- VR interaction with equipment, deploying noise level probes, and applying maintenance functions
- Excel spreadsheet generated with time-stamped noise levels collected with the probes installed
- Students conduct post-simulation risk analyses and submit reports



Generat

83.8 dB

REC.

Off On

Inspection Results:
Vibrations: Above Normal
Drive Belt: Loose

Maintenance Options:
 Replace Belt
 Install Noise Enclos



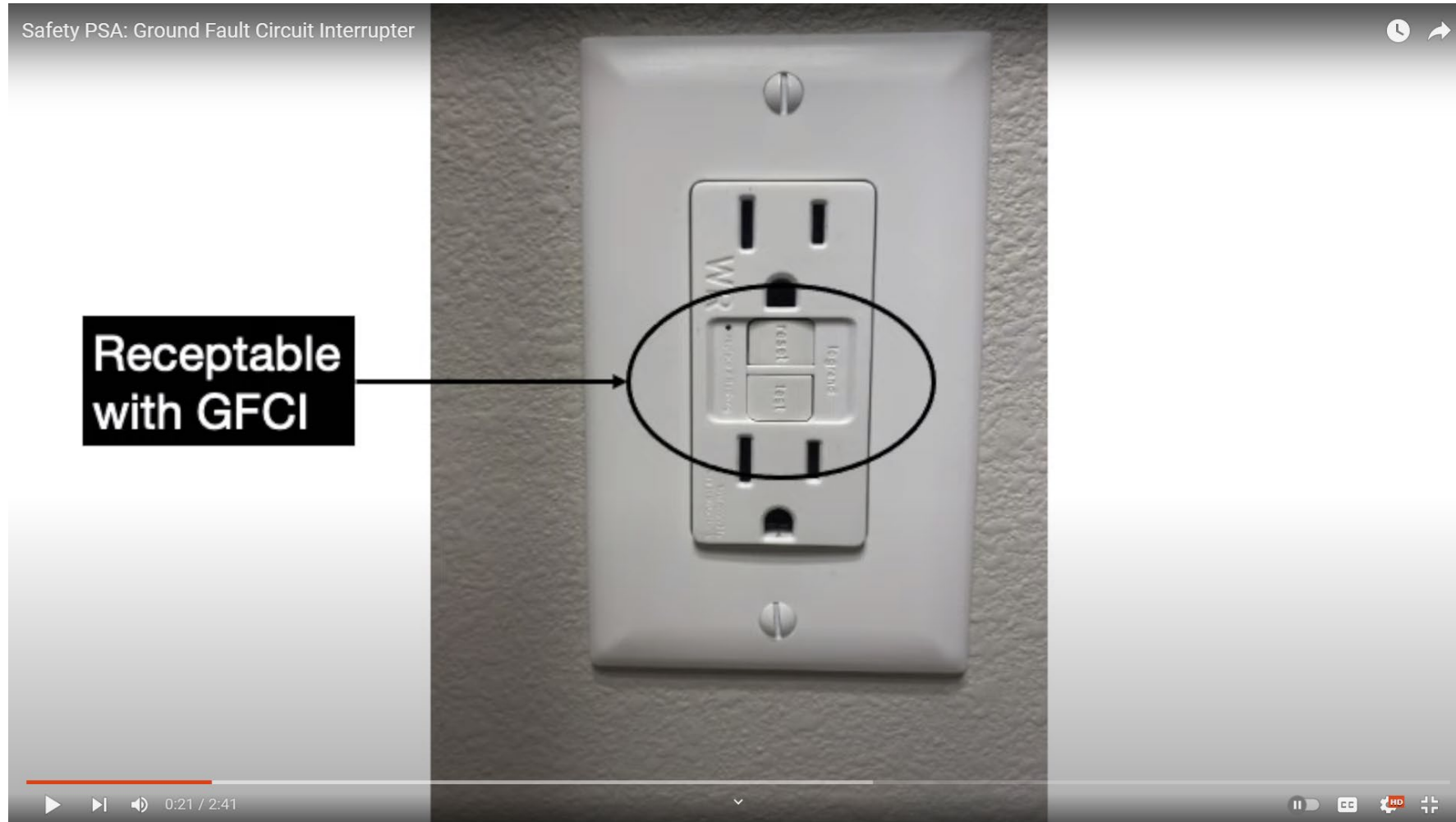
Public Service Announcements

- Use “Community Engaged Learning” to apply materials in the class to solve problems during a safety consultation
- Develop PSA’s specific to the organization (or in general)
- Examples:
 - Ladder Safety
 - Electrical Safety/Ground Fault Circuit Interrupter

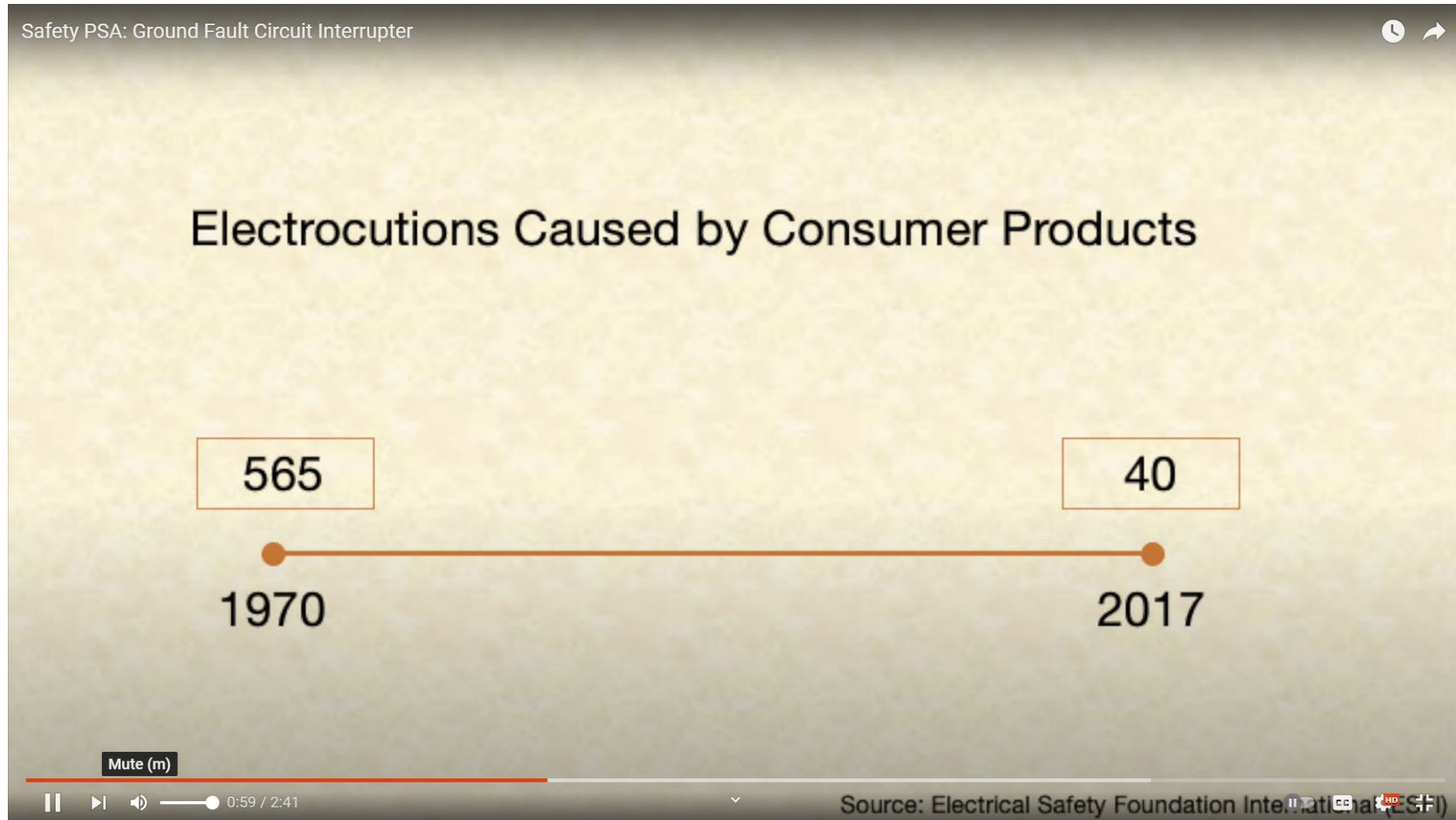
Ladder Safety Tips



Ground Fault Circuit Interrupter



Ground Fault Circuit Interrupter



Ground Fault Circuit Interrupter



Ground Fault Circuit Interrupter



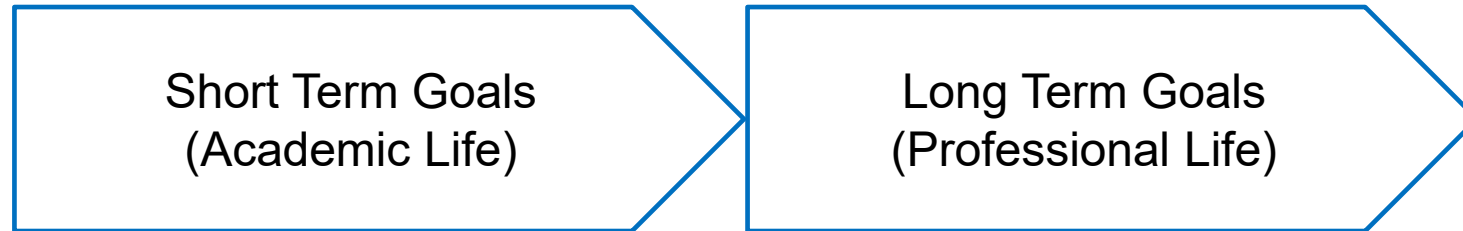
Health Equity

- Full lecture in our survey course on Occupational Health: “Racism and Occupational Health”
 - Brandi Janssen and Carri Casteel
- Outline
 - Concepts/definitions of race and racism in the US
 - Racial Disparities in the workplace
 - Historic segregation and occupational risk
 - Structural/Institutional racism in the workplace
 - Racism in health care
 - Workplace strategies

Professional Development Topics

- Topics can be added to course material
- Seminars devoted to a PD topic
- Examples:
 - Interview skills – mock interviews
 - Communicating with workers
 - Diversity-Equity-Inclusion in the workplace
 - Harassment in the workplace
 - Email etiquette

Individual Development Plan



Facilitates discussions with mentor(s)/advisor(s)

Helps student to think about needed professional skills

Helps faculty understand the professional development concepts most desired/needed for curriculum planning