Training for New Technologies

Be prepared when your organization meets the pressures of implementing new technologies. Panelists will discuss lessons learned when designing, developing and implementing training for new technologies.

*Training should not be an afterthought.*
Training for New Technologies

PRESENTERS:

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Executive Director – Positive Train Control
MTA, Metro-North Railroad

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Director, Communications and Train Control (C&TC)
Transportation Technology Center, Inc.

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Program Manager of Instructional Design
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MODERATOR:

Melvin Clark
Rail System Safety & Regulatory Compliance Officer
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Training for New Technologies

Anthony Forcina
Executive Director - PTC
MTA, Metro-North Railroad

- Carries 83 million customers annually (275,000 per weekday).
- 737 Weekday trains (includes Amtrak but not deadheads).
- 104 Interlockings (not including Grand Central Terminal).
- 539 Electric MU’s, 68 Diesels, 52 Cab cars.
- 380 Route miles/Over 700 miles of track
- 120 Passenger stations.
Positive Train Control: 
The Poster Child for Training for New Technologies

- Mandated Technology
- Tight timeline
- Many things happening simultaneously:
  - Design
  - Development
  - Testing
  - Implementation
  - Change in railroad procedures and staffing
  - Meet training requirements
Positive Train Control:
The Poster Child for Training for New Technologies

Background for common understanding for discussion on how to develop training for new technologies
Positive Train Control:
The Poster Child for Training for New Technologies

I. Interaction with and between many systems
II. Impact on Safety Protocols
III. Impact on workforce
Cross Interaction

A list of some of the interrelated tasks and processes necessary for PTC deployment:

- Lab test functionality
- Field test brake algorithm
- Field test functionality
- Request FRA permission to conduct track data validation and verification beyond pilot territories
- File test plans with FRA for approval
- File final test reports with FRA
- Design locomotive layout for PTC equipment
- Install onboard equipment
- Test connectivity between locomotive and office
- Commission the locomotive for PTC by conducting post installation check-out tests
- Survey sites and collect data for communications equipment and towers
- Conduct an RF study of site to select best tower location
- Make regulatory filings to FCC for approval of site location
- Create communications frequency plans with other railroads
- Order and ship material for base stations
- Install base station tower
- Develop instructions, procedures, training material for those who install, operate, maintain, repair or test components
- Schedule training for active agreement workforce
- Deliver training
- Commission line segments for implementation day
- Employ PTC methodology to determine footprint
- File PTC Implementation Plan
- Survey line segments for current condition to understand PTC wayside requirements
- Apply PTC signal mapping to design
- Design Line Segments
- Peer or lab Quality Assurance (QA) test wayside design
- GPS validate wayside and base tower locations
- Order Material
- Deploy labor to construct
- Construct PTC location, including tower
- Install equipment at wayside
- Insure connectivity of site to back office through communications links
- Cut-in/in-service test PTC locations
- Update Software Configuration Management Database
- Request FRA permission to conduct field testing
- Validate track database critical features
- Validate wayside interface unit (WIU) indications with TMC
- Validate PTC route for track data
- Lab test functionality
Cross Interaction

• One change impacts so many other parts of the system
  • Be aware of connections
  • Courseware mapping is critical
• Overarching systems may need their own department
  • When appropriate, involve people from impacted departments
Impact on Safety Protocols

- Roadway Worker Protection
- New Protocols
- Possibly New Hazards
- New technologies to address added hazards
- Workforce must be trained on all these items
Impact on Workforce:

It’s not the old time railroad, it’s the new time railroad

- Incumbents may be intimidated by new technologies
- Opportunity to attract young people to techy jobs
- Training should be catered to your audience – millennials learn differently
Training for New Technologies

Joe Brosseau
Director, Communications and Train Control (C&TC)
Transportation Technology Center, Inc.

Transportation Technology Center, Inc. (TTCI) is a wholly-owned subsidiary of the Association of American Railroads (AAR) focused on providing customers with highly effective and efficient railway research, testing, training and technical support. TTCI operates the 52-square mile Transportation Technology Center, a federal railway test facility in Pueblo, CO, and serves the AAR and its member railroads, as well as the FRA and other government and commercial customers.
Training for New Technologies

I. New Railway Technologies

II. Challenges with New Technologies

III. New Technology Training Must-Haves
New Railway Technologies

- PTC is just the beginning...
- TTCI is researching the next generation of new technology for the railway industry
  - Next generation train control
  - Machine vision-based inspection systems
  - Automated ultrasonic wheel defect detectors
  - Improved rail flaw detection technology
  - Fiber Optic-based Acoustic Detection Systems
  - Drone-based technology
The Fallacy of New Technology

• New technology that is not well understood can be seen as the “silver bullet” to solve everything

• PTC is a perfect example

• It is important to provide training on what the technology does, but also what it does NOT do
The Fear of Change

• Many new technologies are seen as a disruption in how workers get their jobs done

• Training must demonstrate how the technology improves their job
Training with Tech In Progress...

• Training is a challenge while new technology is still in development
• Ongoing changes as:
  • Bugs are identified
  • Technology is rolled out in new scenarios
• New features are implemented
• With complex technology, real operational experience is necessary, which requires training
• Balance is needed
New Technology Experts

- New technologies require experts to support training development
  - Experts in the how the technology works
  - Experts on each railroads’ implementation
- Limited experts are generally available, with ongoing development activities
- Training must be a priority early
  - Start early with awareness training
  - Move into in-depth training as needed
  - Expect change and follow-on training
New Tech Training Must-Haves

- Overview of “why” and how each piece fits together
- Then, detailed training on individual components/frontline workers
  - Focus on each group – make it relevant
  - Avoid getting into the weeds (not “all or none”)
- Hands-on training
- Explain that things will change
- Experts in the new technology AND on the specific implementation on your railroad
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Julie Deibel-Pundt
Program Manager of Instructional Design
Transportation Learning Center

The Transportation Learning Center is a nonprofit organization dedicated to improving public transportation at the national level and within communities. To accomplish this mission, the Center builds labor-management training partnerships that improve organizational performance, expand workforce knowledge, skills and abilities, and promote career advancement.
ADDIE MODEL

ANALYSIS
Needs, requirements, tasks, participants’ current capabilities.

DESIGN
Learning objectives, delivery format, activities & exercises.

DEVELOP
Create a prototype, develop course materials, review, pilot session.

IMPLEMENT
Training implementation, tools in place, observation

EVALUATE
Awareness, knowledge, behavior, results
Courseware Dev’t on New Technologies

ADDIE MODEL

A - ANALYSIS
Needs, requirements, tasks, participants’ current capabilities.

I - IMPLEMENT
Training implementation, tools in place, observation

D - DEVELOP
Create a prototype, develop course materials, review, pilot session.

E - EVALUATE
Awareness, knowledge, behavior, results

D - DESIGN
Learning objectives, delivery format, activities & exercises.

Training Needs Analysis may not be done well, if at all

Staff changes more often

Content changes
Changes in Staffing & SMEs

- More Personnel Changes
- Limited pool of experts
  - Competition
  - Burnout
- Knowing the players is especially important b/c tech will be changing constantly
- Communication of design changes must go through multiple (moving) layers
Changes in Staffing

Solutions

• Collect org charts from everyone (SI, Designer, Agency, Union)
• Attend meetings that aren’t directly related
• Get on any email chains that will inform you of staff changes
• Build Relationships to learn of changes sooner, levels of expertise, etc.
Your Training is Only as Good as Your Front End Analysis

- What is the ideal state?
- What is the current state?
- What is the gap?
- Which topic areas need to be covered?
- What will the length of training be?
- Who is the audience?
- What resources are available?
- What Format will the training be?
- What is your timeline?
A Good TNA Can Limit Most Training Problems

- Topic isn’t pertinent to me. Why am I here?
- Too Simple → boredom
- Too complex → tuned out
- Not in a medium that works for the audience
- Training is too long, too short
Training Needs Analysis for New Technologies

How do you answer these questions when the technology isn’t even designed?
• Who will use the new technology?
• How will they use it?
• What functions will be replaced?
• What processes will change?
TNA: Possible Solutions

- Open line of communication between designers & end users
- Keep re-evaluating the TNA
- If hiring an outside firm to develop training:
  - Determine your needs beforehand: a course for each audience, shuffled into current training, etc.
  - Clearly state your expectations – suggest a cycling TNA process and workforce involvement
Content is Forever Shifting

**Challenges**

- Information is missing
- Information is changing
Content is Forever Shifting

Solutions

• Ideally wait until technology is FINAL
• Be realistic about training needs
• Possibly train in stages:
  • Broad overview early on
  • More detailed after tech is final
• Establish safe spaces for SMEs to reveal the truth
• Flag areas that will change
Three Key Takeaways:

1. Build Trust
2. Be Flexible
3. Approach challenges creatively
Questions and Answers
Please, tell us what you think