

# WORKING TOGETHER

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A SYSTEMS APPROACH FOR TRANSIT TRAINING



# INTRODUCTION

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The transit industry is building effective labor-management partnerships to address its critical skills challenges resulting from changing technology, shifting workforce demographics and growing ridership. Led by the American Public Transportation Association (APTA) and the Amalgamated Transit Union (ATU), and with staff support from the Transportation Learning Center, transit systems and local unions – from ATU, Transport Workers Union (TWU), International Brotherhood of Electrical Workers (IBEW) and elsewhere – have been working together to develop a system of consensus training guidelines. The results are presented in this report.

This joint activity is both important and unprecedented for our industry. On issues such as training, where management and labor have parallel interests, our industry can get far better solutions for everyone by working together.

We recommend these consensus guidelines – and this process – to public transportation systems and their unions. Working together, we can build a better public transportation industry.



WARREN S. GEORGE  
International President  
Amalgamated Transit Union



WILLIAM W. MILLAR  
President  
American Public Transportation Association



# OVERVIEW

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## WORKING TOGETHER: A SYSTEMS APPROACH FOR TRANSIT TRAINING

Transit faces a critical skills challenge driven by changing technologies, shifting workforce demographics and record-breaking growth in ridership.

**Working Together: A Systems Approach for Transit Training** outlines how constructive training partnerships provide the most effective way for the transit industry to address its skill challenges. National labor-management committees have met regularly for several years to develop consensus training guidelines. These joint committees have been focusing on five transit maintenance occupations: bus, rail signals, traction power, rail vehicles and elevator/escalator. A parallel joint effort has been crafting a national framework for transit apprenticeship.

Consensus national training guidelines make it possible for transit organizations and partnerships to assess the current skills of their workforce through a skills gap analysis. They can use the guidelines to conduct a training gap analysis that measures the quality of their current curriculum and training materials. After identifying current skills gaps and training gaps, the recommended guidelines can be used to create a customized training improvement plan. Among other applications, the training guidelines can be used for courseware mapping which can lead to courseware sharing among transit training programs.

Emerging from the work of these committees is a national system to support transit training partnerships. Local partnerships are possible between labor and management at a single location and regional training partnerships among transit systems and their training partnerships. When labor and management work together, they can create effective and sustainable systems of training. Regional training consortia are powerful tools to provide cost-effective and high-quality training to transit agencies.

Improving transit workforce skills through partnership-based, data-driven training yields very high rates of return on training investments. Labor and management, by working together, can solve the transit skills challenge and strengthen the entire industry.



**Honorable Rodney Slater**  
Former US Secretary of Transportation

Recruiting the next generation of skilled workers is an imperative for America's public transportation industry. With transit's career ladder jobs young people can start building their careers

soon after high school and connect their professional development to academic opportunities. With expanded training resources, transit labor and management working together can reach out to train young people for productive careers © Transportation Learning Center 2009

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# SECTION ONE: STRENGTHENING TRANSIT THROUGH A SYSTEM OF QUALITY TRAINING

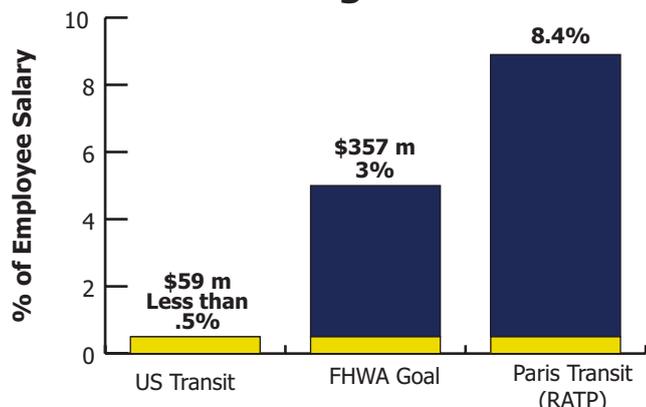
Changing technologies, shifting workforce demographics and record-breaking ridership levels make the effective development of new skills for the transit workforce more urgent than ever.

Transit labor and management have been working together actively since 2004 to resolve this skills challenge. Through a consensus-based approach, participating leaders are developing training guidelines to improve the quality of the industry's training, expand training capacity more rapidly and greatly reduce training costs. The American Public Transportation Association (APTA) and partner transit unions, led by the Amalgamated Transit Union (ATU), are national sponsors of this effort with the Transportation Learning Center, a labor-management nonprofit, providing staff support. The Federal Transit Administration, the US Department of Labor and the Transit Cooperative Research Program have also provided essential support.

Transit capital equipment is expensive and complex. New technologies such as hybrid-electric propulsion, intelligent transportation systems and advanced electronics are continually coming on line. Operating and maintaining this capital equipment requires making a parallel investment in transit's human capital. Yet in most cases, quality training for modern electronics, contemporary propulsion and other systems is not available to the transit workforce.

While transit's advanced equipment requires an increasingly skilled workforce, a large portion of the most skilled technicians are nearing retirement, with some 40 percent of skilled transit mechanics reaching retirement age in the next decade. There is a pressing need to train those who will move into these highly skilled positions. New workforce demographics demand fresh forms of training.

## Transit Training Investment



As a whole, the transit industry has not had sufficient resources to invest in training. Transit currently commits less than 0.5 percent of payroll to training, while the strongest industries strive for investments of four, five and even six percent. The Federal Highway Administration has set a training investment goal of three percent of payroll. While the industry works legislatively to increase the funds available for transit training, this joint process is creating effective approaches to training that can be implemented quickly and at a reasonable cost.

Through a partnership-based, data-driven process, labor and management experts have built the foundation for a comprehensive set of training guidelines. This joint effort began with bus maintenance occupations in 2004. Since 2005, it has also addressed maintenance training for transit rail vehicles, elevator/escalator, signals and traction power, along with a framework for transit apprenticeship. A companion project was launched in 2008 to explore developing a joint system of certification for rail car technicians. All of this work brings together maintenance managers, trainers and skilled technicians.

Faced with these converging forces of change, the transit industry needs innovative strategies to address transit's skills shortage. This is an industry-wide challenge that requires an industry-wide solution.

# WORKING TOGETHER TO MAKE BETTER TRAINING A REALITY

A systems approach to transit training builds on the connections that link together all the components of good training:

- **Identifying the knowledge**, skills and abilities transit workers need to perform their jobs at the highest level of expertise with today's advanced technologies.
- **Organizing training** around the skill gaps of current workers.
- **Preparing** for transit's workforce demographic changes, including training, recruiting and developing future generations of workers.
- **Recognizing** that working together gives transit managers and their unions the best chance to successfully develop and implement quality training.
- **Building a national partnership** that links individual transit systems, their unions and the entire industry.

An interconnected system of training guidelines makes it possible for each local transit system to build on the solid foundation of a consensus national blueprint. The national training guidelines provide a common starting point for setting up new training or upgrading existing training in a way that fits with industry needs.

This shared foundation of training guidelines, approved curriculum and courseware makes it much easier to expand local training. Individual transit systems and their unions will no longer be in the difficult and expensive position of developing their own training programs in isolation. By sharing these resources, transit locations can deliver more and better training, quickly and at a greatly reduced cost.

## A Partnership-Based, Data-Driven Process

To establish a systems approach for transit training, experts from labor and management representing transit agencies nation-wide jointly developed recommended training practices in critical maintenance occupations along with guidelines for apprenticeship. This framework for transit training builds directly on the knowledge of national and local experts from labor and management. These partnerships rely on jointly developed data to prioritize training needs.

**Partnerships work in addressing mutual concerns:** Labor-management partnerships work because they address concerns shared by both parties. Industry-based, labor-management partnerships have a successful track record in the US, including the limited training partnerships in transit, and in other countries where industries thrive with joint training systems. There is abundant evidence that the most successful, cost efficient and durable training systems come from industry-based, labor-management partnerships. With over 90 percent of transit's hourly workers represented by unions, the US public transportation industry is ready for constructive labor-management partnerships.



**Dr. Beverly A. Scott**

General Manager/CEO MARTA  
Chair, APTA Executive Committee,  
2008-2009

Over the past eight years, national leaders of transit management and labor have been building new partnerships to strengthen workforce training.

The most recent product of this joint effort is a system of consensus training guidelines. These are tools we can use to jointly build the skills our industry so urgently needs.

Regardless of differences that may exist in other arenas, it is a priority for transportation labor and management to agree to work together on the vital need for more and better workforce training. And everyone needs to recognize the importance of strictly separating the joint work on training from any and all disagreements that may arise in other aspects of the labor-management relationship.

Partnership-based training for technically challenging jobs benefits both labor and management. Managers may focus on improved maintenance efficiency and equipment reliability and safety as well as increased customer satisfaction. The Center's research report, **Metrics of Success**, provides a comprehensive analysis of the gains resulting from joint training systems. The workforce and their unions particularly welcome the opportunity to shape training and operations, especially when it means they will have the tools needed to do quality work. Work-based learning leads to more opportunities for internal promotion up career ladders. This strategy of "growing your own" technicians has benefits for both labor and management especially when a great number of allied transportation sectors are competing for a shrinking technical workforce.

#### **Data-Driven Approach to Training:**

The basis of solid agreement in joint training partnerships is jointly developed data about training needs. When both sides can rely on jointly developed data, they are already 95 percent of the way toward agreement on joint solutions.

This partnership-based, data-driven model for developing training is a natural fit for the US public transportation industry. Public transportation is uniquely well suited for partnerships across locations because individual systems do not compete for customers or revenue.



#### **Bill George**

President Pennsylvania AFL-CIO  
Chair, Keystone Development  
Partnership

Building on the success of our Keystone Transit Career Ladder Partnership since 2001, Pennsylvania has created a broad system of industry partnerships for workforce development and economic development. We have strong labor-management partnerships in manufacturing, in utilities, in trucking and logistics, and we're just getting started. Working together, public sector and private sector, labor and management, that's the best way to rebuild our economy.

### **The process of developing recommended training guidelines**

Developing industry training guidelines starts with a thorough understanding of the knowledge, skills and abilities transit workers need to perform their jobs at a high level of expertise. The national committees, made up of industry experts, come to an agreement on these components. More than 100 national labor and management experts from over 45 organizations around the country participated in the subject matter expert steering committees – See list of participants, at the back of this publication. In addition, shop floor experts supported this work during regular site visits to dozens of transit systems.

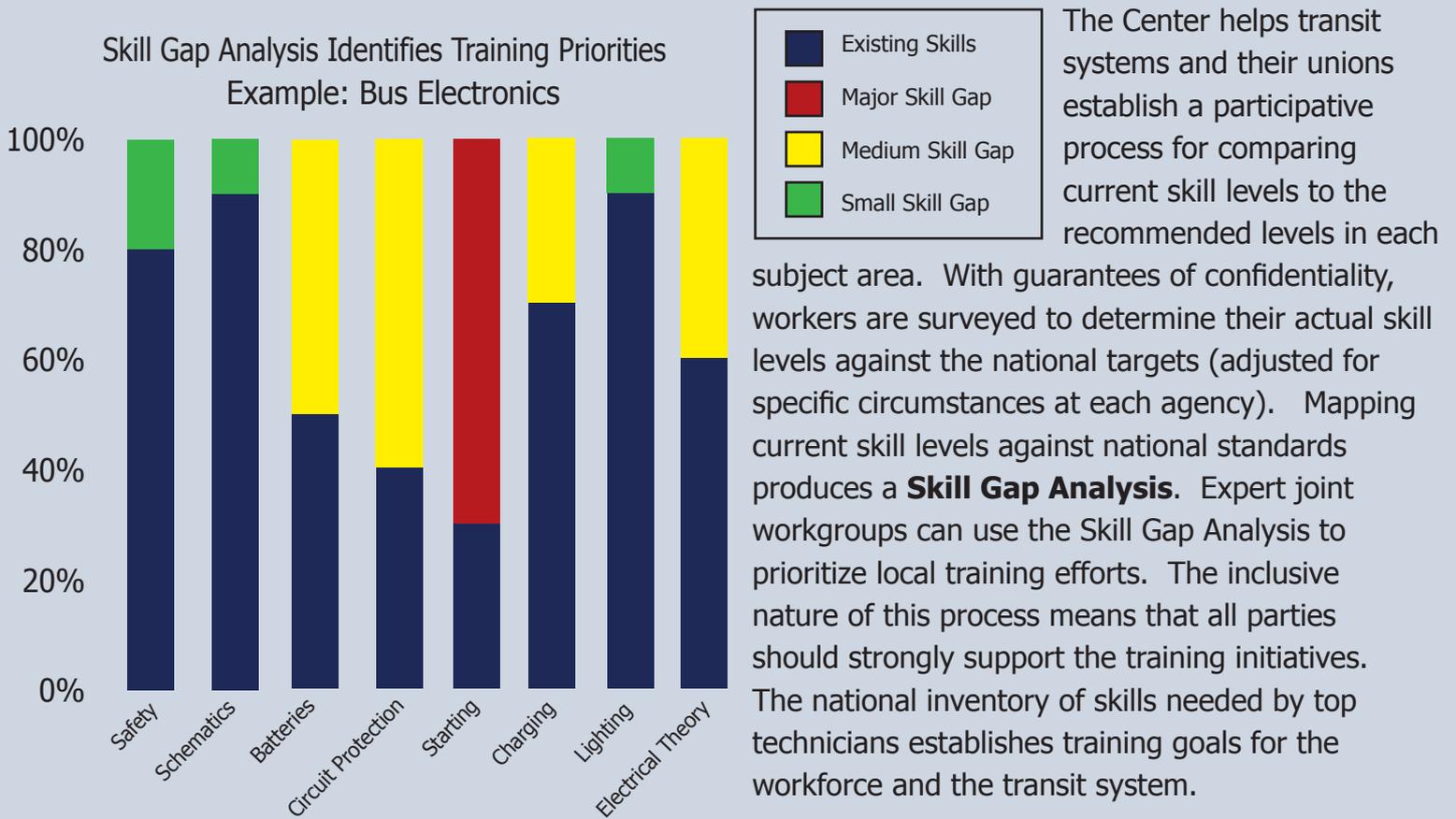
Step one is to develop a **comprehensive task list** of all that an expert technician must be able to do to be a top technician. The second step is to translate the task list into a statement of **necessary skills** and specific **learning objectives** for each occupation. Next, the committee members team up to identify the specific **learning objectives** required to gain knowledge of those skills. The final step is developing a consensus-based **recommended order of instruction** for each occupation. The task list, necessary skills, learning objectives and order of instruction make up the recommended training guidelines for each occupation.

# ADDING VALUE LOCALLY USING NATIONAL TRAINING GUIDELINES

National training guidelines provide the foundation for improving training quickly and less expensively through a series of value-added activities in each location. These implementing steps can start with mapping the current skills of the workforce against the skills required to be expert technicians. The steps move on to mapping existing training programs and courseware against the national guidelines.

## Adding Value through the Training Guidelines:

### 1. Mapping Workforce Skills



## Adding Value through the Training Guidelines:

### 2. Mapping Existing Training

The consensus training guidelines, model curriculum and learning objectives for each occupation can be used to assess existing training programs. Do current training offerings address all the subjects in the recommended curriculum? Are all the learning objectives adequately covered? Is the transition from the classroom to the workplace sufficiently supported? Are the most useful training aids (mockups, simulators, etc.) available?

The Center is working with the Transit Cooperative Research Program (TCRP) and the Federal Transit Administration (FTA) to refine methods for assessing previously existing training offerings and creating

a **Training Gap Analysis**. With a local Training Gap Analysis in hand – and produced in partnership with local managers and union representatives – transit systems have a clearly defined strategy for improving the design and delivery of training in each property or region.

|   |  |
|---|--|
|  | Training Component meets Recommended Training Practices      |
|  | Major Training Gap - ideal recipient for courseware sharing  |
|  | Medium Training Gap - ideal recipient for courseware sharing |
|  | Small Training Gap - ideal courseware for sharing            |

## Training Gap Analysis Identifies Strengths and Weaknesses in Local Training Practices

| Learning Objectives/<br>Course Offerings | Safety | Schematics | Batteries | Circuit Protection | Starting | Charging | Lighting | Electrical Theory |
|--|--------|------------|-----------|--------------------|----------|----------|----------|-------------------|
| Course Outline                           | ✓      |            | ✓         | ✓                  |          | ✓        |          | ✓                 |
| Instructor's Guide                       | ✓      |            | ✓         |                    | ✓        |          |          |                   |
| Class Exercises                          |        | ✓          | ✓         |                    | ✓        | ✓        |          | ✓                 |
| Model Test Questions                     | ✓      |            | ✓         | ✓                  |          |          | ✓        |                   |
| Hands-on Training System                 |        |            | ✓         | ✓                  |          |          | ✓        |                   |
| Mentoring                                |        |            | ✓         |                    | ✓        |          | ✓        | ✓                 |

### Adding Value through the Training Guidelines:

#### 3. Sharing Courseware

Transit agencies have a strong incentive to share courseware materials with each other. Each local service provider operates in a geographically distinct market. By definition, transit in one city or state is not in economic competition with transit organizations in other cities or states.

This lack of competition between transit systems, also known as “market segmentation,” makes it possible to create an industry-wide consortium for sharing training courseware. Many transit systems have solid training in a number of key subjects. But few, if any, have quality training systems that cover all aspects of maintenance occupations.

The recommended guidelines can serve as a guide for developing an industry-wide map of where good quality materials exist. The consensus curriculum and learning objectives provide a consistent language for categorizing transit training materials and courseware. Transit systems and their unions have shown almost unanimous willingness to participate in this system of courseware sharing. Every location can serve as both a recipient and a donor of quality training materials. Prior to sharing with other systems, however, the courseware needs to be validated against the learning objectives of the recommended training guidelines.

## Adding Value through the National Training Guidelines: 4. Developing Regional Training Networks

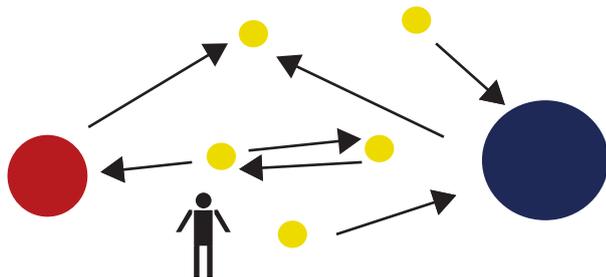
Having a set of national guidelines means that transit properties can come together on a regional basis for delivering quality training. Larger systems and their unions, which generally have more internal training capacity, can partner with smaller transit organizations.

Statewide transit training partnerships are producing positive results in Pennsylvania and Utah. Pilot efforts are underway with New Jersey Transit, Dallas Area Rapid Transit and among transit agencies in the San Francisco Bay Area and Upstate New York. Sub-state regional partnerships, so far not working with their unions, also operate for Florida's medium and smaller properties and in Southern California. Internet-based technologies are being explored for delivering instructor-led training on a regional basis.

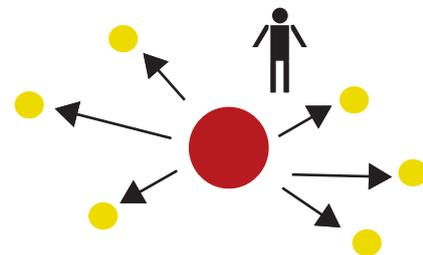
### Network Models



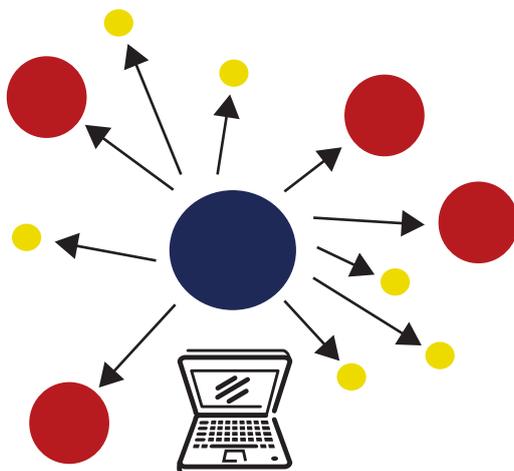
**Model A: Two Training Centers**



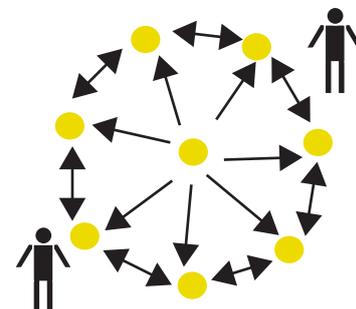
**Model B: One Training Center**



**Model C: Technology Based Training**



**Model D: Peer-to-Peer Sharing**



All parties in a regional training network stand to gain from sharing courseware and providing regionally based training classes. The result is consistently high quality training at enormously lower costs.

Regional training networks are a cost-effective way to develop comprehensive courseware and deepen regional training partnerships. This approach relies on already existing materials and a willingness of transit agencies to share these within the industry. By applying a training gap analysis and sharing courseware from other locations, high quality training can quickly be developed for a large number of transit organizations and their employees.

Expanding regional training consortiums to include community colleges and technical schools will further strengthen transit training. Unions and agencies can work with these entities to expand training capacity and to create a career ladder partnership. Linking career ladders to academic ladders by developing college credit for courses that fulfill national training guidelines can provide workers with a strong incentive to improve their professional skills.

## **Adding Value through the National Training Guidelines:** **5. Developing New Courseware**



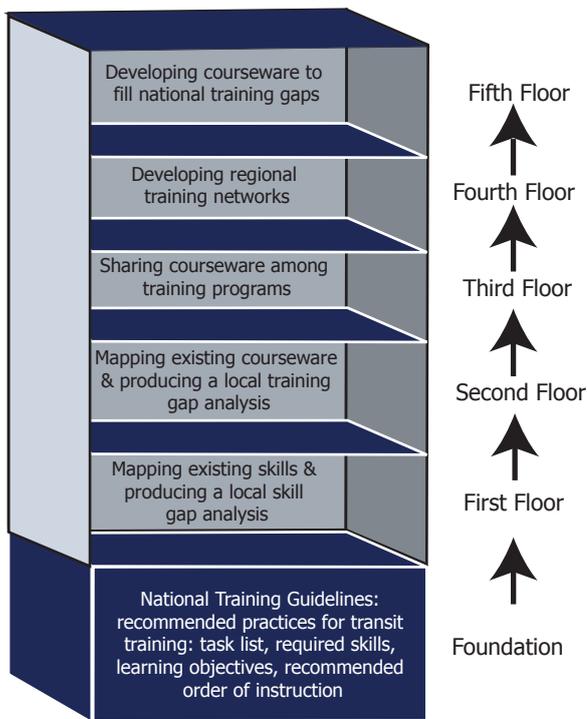
By combining the Training Gap Analyses across transit systems, it is possible to develop a national, industry-wide Training Gap Analysis. Such an effort, taking place initially with transit elevator/escalator maintenance, can put transit systems and their unions in a position to act together as a national consortium to create new training courses and materials to fill in existing training gaps.

The need for developing new training courses will arise regularly with the development of new technologies—a hardy perennial in the world of transit today. A consortium of transit systems concerned with a particular occupation or technology can come together to share the expense of developing new courseware. With the emergence of consensus training guidelines, it is appropriate to explore updating how training is specified in new procurement, particularly procurement involving technologies that are new to the world of transit. This can be a complementary approach to the cost-effective development of new training that can then be applied on an industry-wide basis.



## Transit Training: A Systems Perspective

These different applications of the national transit training guidelines are part of a single system. It is a system of training that makes quality training better, faster and cheaper.



The guidelines serve as a foundation consisting of required skills, the task list, the learning objectives and the recommended order of instruction. These provide the basis for a suite of value-added initiatives, as illustrated in the following chart.

Underlying this systems approach is the fundamental structure and process of partnership. Labor-management training partnerships can help lead the industry to partnership approaches on other issues. These broader benefits from a systems approach for transit training start with access to higher quality, lower cost training on an industry-wide basis. With these system resources, all stakeholders in the US transit industry have new and unique opportunities for quality training.



## SECTION TWO: WORK OF THE JOINT COMMITTEES FOR RECOMMENDED GUIDELINES IN TRANSIT TRAINING

The previous section detailed the data-driven process for defining the skills needed for top technicians in each area. What follows is a glance at both the large areas of knowledge each committee addressed and a small sample of learning objectives developed by each committee.

Five committees are dedicated to developing recommended training guidelines for bus maintenance, transit rail signals, traction power, rail vehicles and elevator/escalator occupations. Building off the committee work is a labor-management apprenticeship committee.

### Transit Bus Technicians

Buses, which by far are the most widely used mode of public transportation, have become increasingly complex over the last 15 years. To address skills needed to effectively maintain them, a joint labor-management committee began defining recommended training practices in 2005. This work, part of APTA's Standards Development process with support from the Center and EDSI, is closely tied to creating a system of bus maintenance certification and related testing through the Institute for Automotive Service Excellence (ASE) under a TCRP project. The Bus Maintenance Committee is co-chaired by ATU International VP Bob Hykaway and Chicago Transit Authority Manager of Bus Maintenance Training Dennis Cristofaro.

### Sample Transit Bus Brakes Learning Objectives

#### 101 THEORY & UNDERSTANDING

- Identify basic brake system components
- Describe operation of foundation brake system
- Describe the importance of replacing components with similar components
- Describe why grease or oil on brake shoes can cause pulling or grabbing brakes
- Describe how temperature affects brake performance
- Describe causes of overheated brakes
- Explain the purpose of the belt tension gauge
- Describe the operation of double check valve and relay valve
- Describe the function of anti-compounding
- Use air schematics to troubleshoot brake systems

### Bus Maintenance Subject Areas

Bus Electronics

Brakes

Diesel Engine

HVAC

Trans. & Drivetrain

Steering & Suspension

PMI

Adv. Diesel Diagnostics

Hybrids

Alternative Fuels (CNG)

Body

## Transit Rail Signals Technicians

Properly functioning signals systems are critical to the safety of all transit systems, but the highly skilled nature of this work makes it difficult for transit systems to find well-trained technicians. Taking up the challenge of improving training for signals technicians is a joint labor-management committee that is developing recommended curriculum for this occupation. The committee's work has extended to assisting in the creation of an Internet based course on direct current circuits, on which APTA staff did the major work. This course was presented at the June 2007 Rail Conference in Toronto, Canada. Leading the Signals Committee is Cameron Beach, a prominent industry consultant, board member for San Francisco Muni and former chief operating officer at Sacramento Regional Transit District, and Jim Lindsay, financial secretary of ATU Local 1277 in Los Angeles.

### Sample Signals Curriculum Courses/ Module Titles

#### Responsibilities / Course content Learning Objective Statements

- Demonstrate ability to use switch obstruction gauge
- Demonstrate ability to use oscilloscope/spectrum analyzer
- Demonstrate ability to use shunt strap/shunt cord
- Demonstrate ability to use RR volt/ohm meters
- Demonstrate ability to use automatic train stop test equipment
- Demonstrate ability to use frequency specific volt meters
- Demonstrate ability to use IJ checker
- Demonstrate ability to use megger
- Demonstrate ability to use relay testers
- Demonstrate ability to clamp on amp meter (both AC and DC)
- Demonstrate use of search coils
- Demonstrate ability to use stop watches

### Rail Signals Subject Areas

Human Machine Interfaces

Interlocking

Train Stops

Signals

Power Distribution

Grade Crossing

Switches/Switch Machine

Train Controls

Overview



## Transit Traction Power Technicians

Traction power, also known as wayside power, is how electrical power is distributed to rail and trolley vehicles. The distribution of electricity that powers public transportation vehicles is a complex and dangerous system requiring the attention of highly skilled technicians. Traction power maintainers typically work on the electric distribution system from its incoming utility source through electrical substations, to the catenary or third rail to power the vehicle. Technicians must understand all aspects of alternating and direct current theory, switchgear, transformers and other advanced equipment along with the mechanical aspects of the physical system itself. Recommended guidelines for this occupation detail the necessary learning objectives and their order of instruction for these tasks. Cameron Beach and Jim Lindsay are the labor and management co-chairs of this committee along with the Signals Committee.

### Traction Subject Areas

Linear Induction

Power Control Systems

Power Distribution Theory

Battery Systems

Cathodic Protections

Theory & Operation of Sub-Stations

Third Rail & Catenary Maintenance

AC & DC Theory

Regulatory Agency Authority

Safety Practices

### Sample Maintaining Traction Power Equipment

- Troubleshoot system by using codes from local control panel (LCP)
- Use stinger to move vehicles in absence of 3rd rail power
- Inspect and troubleshoot DC breakers
- Replace DC breakers
- Inspect and troubleshoot AC breakers
- Replace AC breakers
- Inspect, clean and troubleshoot transformer
- Inspect and troubleshoot DC cubicle (01 x relay and 02 motor)
- Inspect and troubleshoot AC cubicle (01 x relay and 02 motor)
- Inspect and troubleshoot ETS system
- Replace ETS system
- Inspect and troubleshoot transfer trip
- Replace transfer trip
- Inspect and troubleshoot interference terminal cabinet
- Replace interference terminal cabinet
- Inspect and troubleshoot battery bank
- Replace battery bank
- Inspect and troubleshoot battery charger
- Replace battery charger
- Perform a 3rd rail isolation disconnect



## Transit Rail Vehicle Technicians

Electronic controls, sensors, diagnostics, communications and signal systems are just some of the advanced components of rail vehicles. Today's technicians must have a strong command of electronics, alternating and direct current theory and computer diagnostic software in addition to traditional mechanic and welding skills. A labor-management partnership formed in 2007 to explore strategies for improving rail vehicle technician training. The recommended training guidelines will become the basis for guidelines for future apprenticeship programs. The rail vehicle training guidelines also provide the starting point for a joint industry project, funded by TCRP, to explore developing a joint system of certification for transit rail car technicians. With staff support from the Center, this committee has developed learning objectives and a recommended order of instruction for training rail vehicle technicians. The Rail Vehicles Committee is co-chaired by John Costa, chairman of the ATU New Jersey State Council, and Jay Shah, superintendent of rail car maintenance for New York City Transit.

### Rail Vehicle Subject Areas

|                                   |
|-----------------------------------|
| Coupler Systems                   |
| Trucks & Axles                    |
| Auxiliary Inverters & Batteries   |
| Current Collection & Distribution |
| Propulsion & Dynamic Breaking     |
| Communication Systems             |
| Monitoring & Diagnosis            |
| Door Systems                      |
| HVAC                              |
| Car Body                          |

### Sample Rail Vehicles Curriculum Courses/Module Titles

| Monitoring and Diagnosing               |   | Responsibility Type  |   |   |
|---|---|--|---|---|
| Major Component                         | Sub-Components                          | Preventive Maintenance<br><b>Inspect, clean, consumable repair or replacement</b><br>(time/mile-based) | Maintaining (Running Repair)<br><b>Check, adjust, troubleshoot, test, repair and/or replace</b> | Overhaul (Heavy Repair)<br><b>Inspect, repair, rebuild or replace</b> |
| <b>Monitoring and Diagnostic System</b> |   | n/a  | n/a   | n/a   |
|   | operator display                        | test   | test, replace   | test, replace   |
|   | local panel indicator                   | test   | test, replace   | test, replace   |
|   | trainline multi-plexer/<br>klip station | test   | test, replace   | test, replace   |
|   | train line controller                   | test   | test, replace   | test, replace   |
|   | software                                | upload/download  | upload/download   | upload/download   |
|   | analyze data                            | n/a  | n/a   | n/a   |
|   | access system with laptop               | n/a  | n/a   | n/a   |
| <b>Event Recorder</b>                   |   | n/a  | n/a   | n/a   |
|   | sensors/inputs                          | n/a  | replace   | replace   |
|   | hard drives                             | n/a  | replace   | replace   |
|   | circuit boards                          | n/a  | replace   | replace   |
|   | power supplies                          | n/a  | replace   | replace   |
|   | batteries                               | replace  | replace   | replace   |
|   | software                                | upload/download  | upload/download   | upload/download   |

## Transit Elevator/Escalator Technicians

The Elevator/Escalator Maintenance Training Committee formed to engage transit systems and transit unions in a dialogue about how to develop first-rate skills for the in-house technicians who maintain these systems that are so critical to safety and service quality. The pervasive use of digital control technologies into elevator and escalator design poses a major challenge for transit agencies that maintain these systems in-house. The curriculum, courseware and training guidelines adopted by the joint labor-management committee are designed to meet or exceed the licensing requirements of jurisdictions. The apprenticeship program will ultimately be registered with the US Department of Labor. The elevator/escalator committee has started exploring how the participating systems can set up effective systems to share existing courseware materials and develop courseware materials where gaps exist for excellent courseware. Organized on a joint labor-management basis, the elevator/escalator committee is co-chaired by Ed LaGuardia, infrastructure manager of SEPTA and a leader of APTA's technical forum on elevators and escalators, and Hiram Nix, a skilled technician and member of ATU Local 689 at Washington Metro.

### Elevator/Escalator Subject Areas

Controllers

Ladder Drawings, Schematics

Mechanical Theory

Hydraulic & Pneumatic Theory

AC Theory

DC Theory

Tools & Testing Equipment

Intro to Electricity & Electronics

Electrical & Job Safety

Orientation & Background

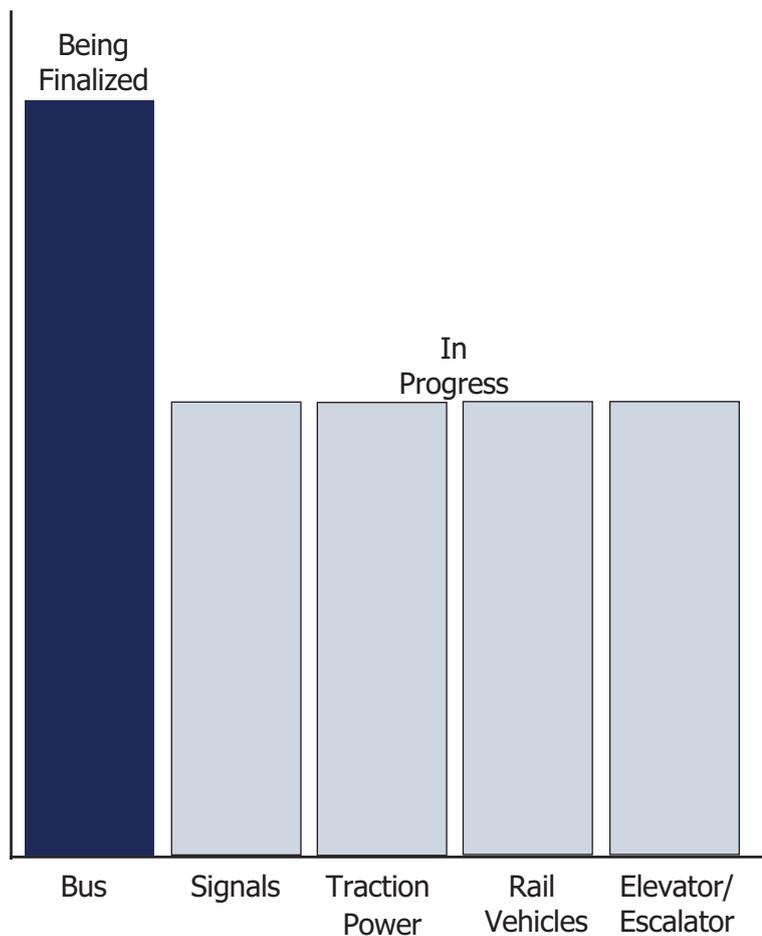
## Sample Elevator/Escalator Curriculum Course/Module Titles

| 200 Level Courses |  |
|-------------------|--|
| 200               | Overview of vertical transportation            |
| 200 - 1           | Elevator/Escalator Types and Styles            |
| 200 - 2           | Elevator/Escalator Components and Controls     |
| 200 - 3           | Simulator Orientation                          |
| 200 - 4           | Hydraulic and Pneumatic Diagrams               |
| 200 - 5           | Elevator and Escalator as-built drawing review |

## A Framework for Transit Maintenance Apprenticeship

A national framework for transit apprenticeship, registered with the US Department of Labor, will help transit create and sustain career-ladder systems of training for workers. The committee's goal is to construct a national system of apprenticeship and training guidelines for successful implementation of recommended training. The steering committee has developed a proposed certified system of apprenticeship guidelines for the US Department of Labor. Once this is complete, the Center's Board of Directors will serve as an initial executive-level National Transit Joint Apprenticeship and Training Committee that oversees the technical work conducted by the Apprenticeship Steering Committee. The National Joint Steering Committee for Transit Apprenticeship is co-chaired by Dennis Cristofaro, manager of bus training for the Chicago Transit Authority and James Gardner, vice president of ATU Local 192 in Oakland.

### Transit Apprenticeship Framework



# JOINT MAINTENANCE TRAINING STANDARDS COMMITTEES & TRAINING PARTNERSHIPS

## PARTICIPATING SYSTEMS & LOCALS

| Transit System                              | Union   | City           | State |
|---|---|----------------|-------|
| Sacramento Regional Transit District        | IBEW Local 1245                               | Sacramento     | CA    |
| San Diego Trolley                           | IBEW Local 465                                | San Diego      | CA    |
| LA Metro                                    | ATU Local 1277                                | Los Angeles    | CA    |
| Santa Clara Valley Transportation Authority | ATU Local 265                                 | San Jose       | CA    |
| AC Transit                                  | ATU Local 192                                 | Oakland        | CA    |
| BART  | SEIU Local 1021                               | San Francisco  | CA    |
| San Francisco MUNI                          | TWU Local 250 A; IAM Local 1414; IBEW Local 6 | San Francisco  | CA    |
| WMATA                                       | ATU Local 689                                 | Washington     | DC    |
| MARTA                                       | ATU Local 732                                 | Atlanta        | GA    |
| Chicago Transit Authority                   | ATU Local 241 & 308; IBEW Local 134 & 9       | Chicago        | IL    |
| TARC  | ATU Local 1447                                | Louisville     | KY    |
| MBTA  | ATU Local 589; IBEW Local 103                 | Boston         | MA    |
| Metro Transit                               | ATU Local 1005                                | Minneapolis    | MN    |
| New Jersey Transit                          | ATU Local 819                                 | Newark         | NJ    |
| New York MTA/New York City Transit          | TWU Local 100                                 | New York       | NY    |
| Capital District Transit Authority          | ATU Local 1321                                | Albany         | NY    |
| CENTRO                                      | ATU Local 580                                 | Syracuse       | NY    |
| GCRTA                                       | ATU Local 268                                 | Cleveland      | OH    |
| Central Ohio Transit Authority              | TWU Local 208                                 | Columbus       | OH    |
| TriMet                                      | ATU Local 757                                 | Portland       | OR    |
| Port Authority of Allegheny County          | ATU Local 85                                  | Pittsburgh     | PA    |
| SEPTA                                       | TWU Local 234                                 | Philadelphia   | PA    |
| Altoona Metro Transit                       | ATU Local 801                                 | Altoona        | PA    |
| LNTA  | ATU Local 956                                 | Allentown      | PA    |
| Capital Area Transit                        | ATU Local 1436                                | Harrisburg     | PA    |
| Metropolitan Transit Authority              | ATU Local 1235                                | Nashville      | TN    |
| Utah Transit Authority                      | ATU Local 382                                 | Utah Statewide | UT    |
| King County Metro                           | ATU Local 587                                 | Seattle        | WA    |
| Community Transit                           | IAM Local 130                                 | Everett        | WA    |

# TRAINING PARTNERSHIPS IN TRANSIT

