

**Developing a Joint System of Training and Apprenticeship
in American Transit:
Lessons from the Experience in Other Industries**

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September 29, 2007

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Introduction

Transit systems in the United States are facing unprecedented challenges in obtaining the workforce skills in maintenance departments to address pervasive technological changes, to replace an impending wave of retirements of “baby boom” workers, and to accommodate significant growth in transit ridership.

Several new technologies have been driving change in the transit industry, especially advanced electronics used in controls for engines, transmissions, or brakes and in all aspects of communications, including global positioning satellite (GPS) systems. Many technologies such as electronic fare cards, automatic vehicle location (AVL) supporting real-time information systems, and new transit rail lines have increased customer convenience and led directly to growing ridership. In addition, environmental concerns are driving adoption of new clean propulsion technologies. Earlier innovations such as compressed natural gas are being augmented by cleaner-burning diesel and hybrid gas-electric and diesel-electric propulsion systems. Prospects are for continued changes; biodiesel, hydrogen, ultra-clean diesel and fuel cell power are on the horizon.

At the same time, transit agencies will soon experience major increases retirements, resulting in significant losses of experienced mechanics. Surveys show that nationwide 40 percent of skilled transit mechanics will be eligible to retire over the next eight years. Some agencies are facing retirement of up to 70 percent of their skilled maintenance workforce in the next five years (Unpublished survey results, Community Transportation Center, 2004; Center for Urban Transportation Research, 2000).

Transit employment is growing faster in transit than any other sector in the transportation industry. The US Bureau of Labor Statistics projects a 40.6 percent growth in employment between 2000 and 2010 for a total demand of 88,400 jobs in transit maintenance. Transit rider ship has been trending upward since 1995, reversing a slow decline in prior decades. The 10 billion rides recorded in 2006 are the highest in 50 years. It is 30 percent higher than in 1995. Ever-worsening traffic congestion, rising fuel prices and growing environmental concerns are expected to drive further transit growth in the future (American Public Transportation Association, 2007).

The industry is facing this confluence of challenges with insufficient training capacity. Transit has a history of generally inadequate and often volatile funding available for training. Lack of training and career paths make the transit industry less attractive to new recruits and leave the industry without means to develop the skills needed in the present challenging environment.

This paper reviews training innovations and lessons that may be applicable to the transit industry from practices used in other industries. It draws on a rich body of experience of joint apprenticeship and training programs, as well as employer-sponsored training.

The Case for Apprenticeship in Transit Maintenance

Apprenticeship offers an appealing means of producing skilled maintenance workers to cope with technological changes, looming retirements, and the maintenance demands brought by growing ridership. The unique nature of the work performed in transit maintenance often prevents agencies from finding employees from other industries with the technical skills or knowledge required for such work. This has led transit agencies to seek more effective ways of developing their own training. The attractiveness of apprenticeship for transit lies in its long-term commitment to progressive skill acquisition through a combination of practical on-the-job training and classroom instruction. Apprenticeships offer advantages over shorter-term training in that apprenticeships are able to produce highly skilled, versatile workers with solid theoretical and practical knowledge. Developing workers with such characteristics is particularly important in transit maintenance, where the work is varied and often unpredictable.

Several features make apprenticeship attractive to employers and to workers alike. For employers, apprenticeship can offer an assured supply of “home grown” skilled workers. This is especially important in work that is unique and best learned through a combination of classroom instruction and on-the-job training. Apprenticeship provides an organized process through which older experienced workers can pass along their knowledge and skills to a new generation of workers.

Without a supply of trained workers, employers often resort to pirating their workers from one another, which only further reduces the incentives to train and can lead to inflationary pressures on wages. Apprenticeship offers increased productivity and returns to training. Although most formal training is provided to managers, training for front-line workers often

has a higher payoff in terms of real productivity gains and improved adaptability of the workforce to changes in technology or market circumstances.

For workers, apprenticeship offers the opportunity to earn while learning, according to a progressive pay scale that increases as skills improve. This feature is particularly desirable for individuals who cannot afford to leave the labor force to enter full-time training in a school or institution. The progressive pay scale — an integral feature of apprenticeship — provides workers with built-in incentives to improve their skills. Apprenticeships help establish career ladders.

By design, apprenticeship trains to industry standards. According to federal regulations, registered apprenticeships are limited to skilled trades occupations that are "clearly identified and commonly recognized throughout an industry" (Federal Register, February 18, 1977, p. 10141). An industry must be organized to develop and endorse such standards.

Apprenticeship is not short-term task training. Apprenticeship emphasizes broad training in all aspects of the trade. Broad training makes apprentice-trained workers flexible and more able to adapt to changes in technology or equipment. Apprenticeships are designed to provide a solid foundation prior to specializing. For example, plumbers and pipefitters take the same initial two years of curriculum prior to receiving instruction in their specialties, such as plumbing, pipefitting or sprinkler fitting.

As an instructional scheme combining work and study, apprenticeship offers the pedagogical advantages of blending theoretical and practical learning. Apprenticeship is a premier example of "learning-by-doing," which cognitive theorists have recognized has significant benefits. Apprentices learn to apply what they know and often gain a clearer and deeper understanding of the work. By offering training on the job supplemented by classroom instruction, apprenticeship provides an ideal unity of thought and action. By its nature, apprenticeship involves learning "how to do" a task by performing on the job and "why a task is done that way" in related instruction.

As a learning approach, apprenticeship has numerous additional attractive features. By offering applied learning in a paid on-the-job setting, apprenticeship can motivate individuals who may not respond well to traditional classroom learning. Apprenticeship also provides a natural environment to foster mentoring relationships because apprentices generally work