

Transit Partnership Training:

Metrics of Success

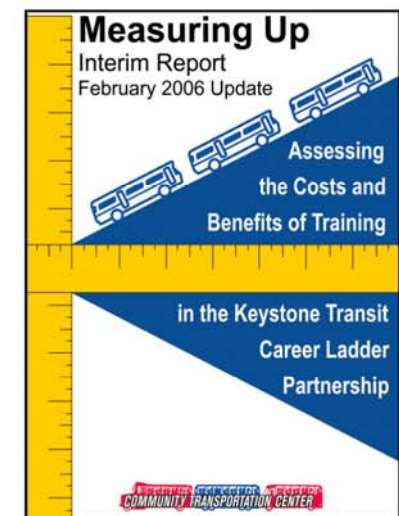
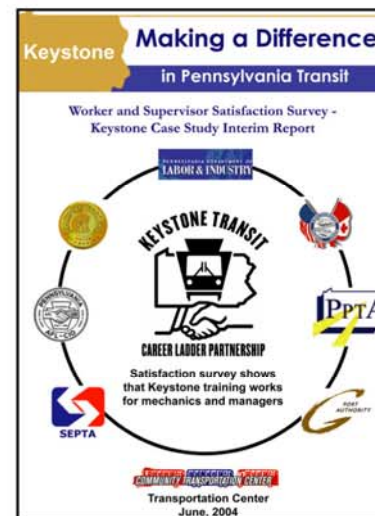
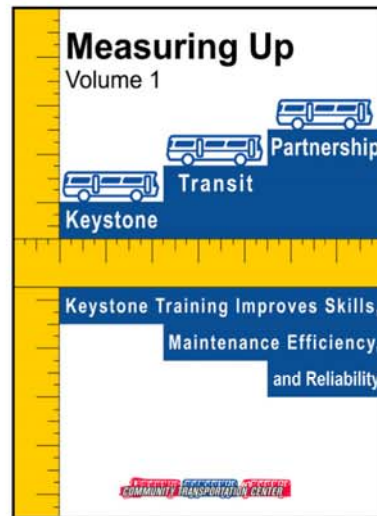


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Metrics of Success

You can never know how well you're doing until you find ways to measure outcomes. The Community Transportation Center has followed through on this basic insight by developing a series of four in-depth research reports over the past four years on the work of the Keystone Transit Career Ladder Partnership – the longest operating, largest and so far the most successful of the statewide joint labor-management transit training partnerships supported by the Center.

The key findings of this research are highlighted in this overview. For employees and their supervisors, this unique partnership-based, data-driven customized approach to training at statewide scale has been a great success. It has:

- Increased skills and produced significant promotions in filling maintenance vacancies
- Been embraced by employees and supervisors
- Led to quantifiable improvements in employee knowledge.

For transit systems, it has led to significant improvements in efficiency and cost savings. It has:

- Improved equipment reliability and achieved longer mean distance between failures of vehicles
- Reduced unnecessary part replacement and improved labor efficiency, resulting in major maintenance cost savings

The Center would like to acknowledge those who made these reports possible. The research was supported by the US Department of Transportation and the Pennsylvania Department of Labor and Industry. Much of the work was done by labor-management work groups throughout the state, especially data managers at SEPTA. At the Center this research was led by Senior Research Associate Xinge Wang and Director of Workforce Development Jack Clark. Their hard work and creativity have been exceptional in these projects.



Brian J. Turner
Director

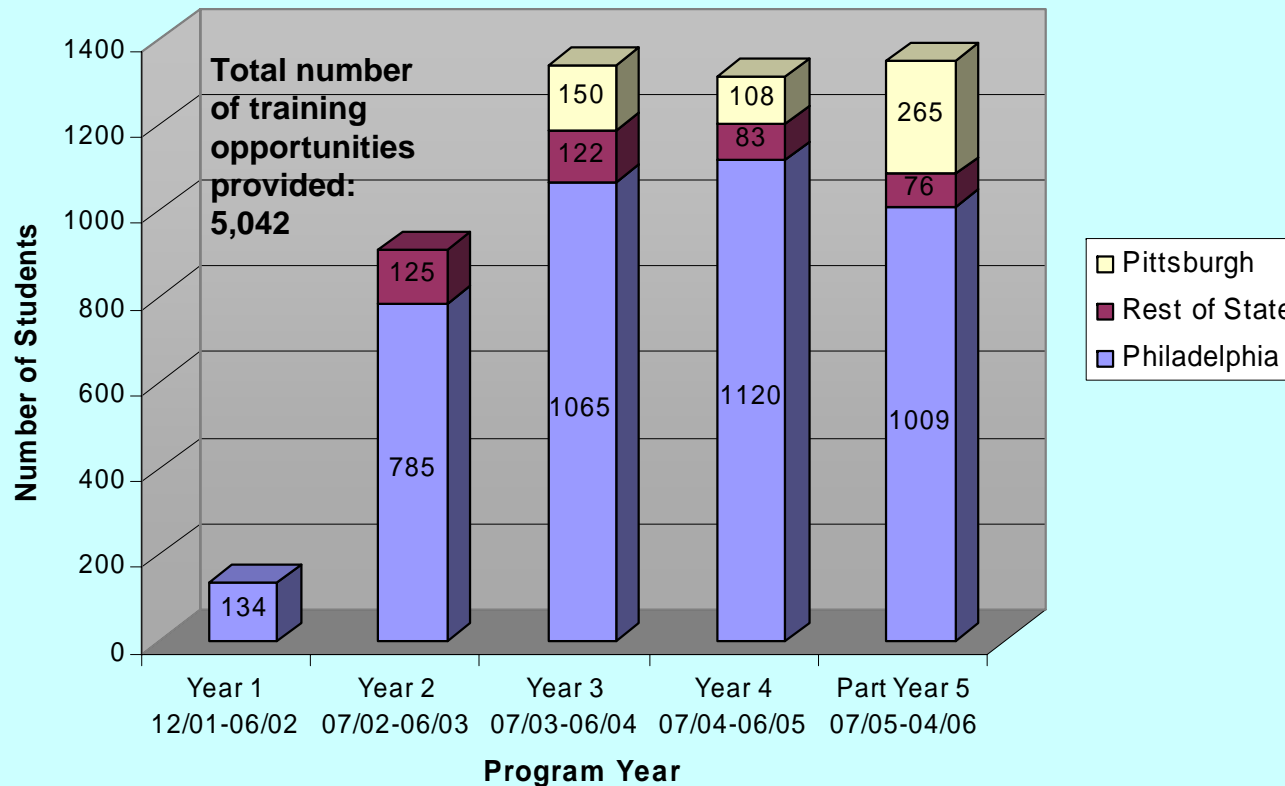


Keystone Bus Trainees in
Classroom

Transportation Center Reports on Metrics of Success

- **Pennsylvania Transit on the High Road (2003)**
- **Making a Difference in Pennsylvania Transit (2004)**
- **Measuring Up (I) Keystone Training Improves Skill, Efficiency and Reliability (2005)**
- **Measuring Up Interim Report (February 2006 Update): Assessing the Costs and Benefits of Training (2006)**

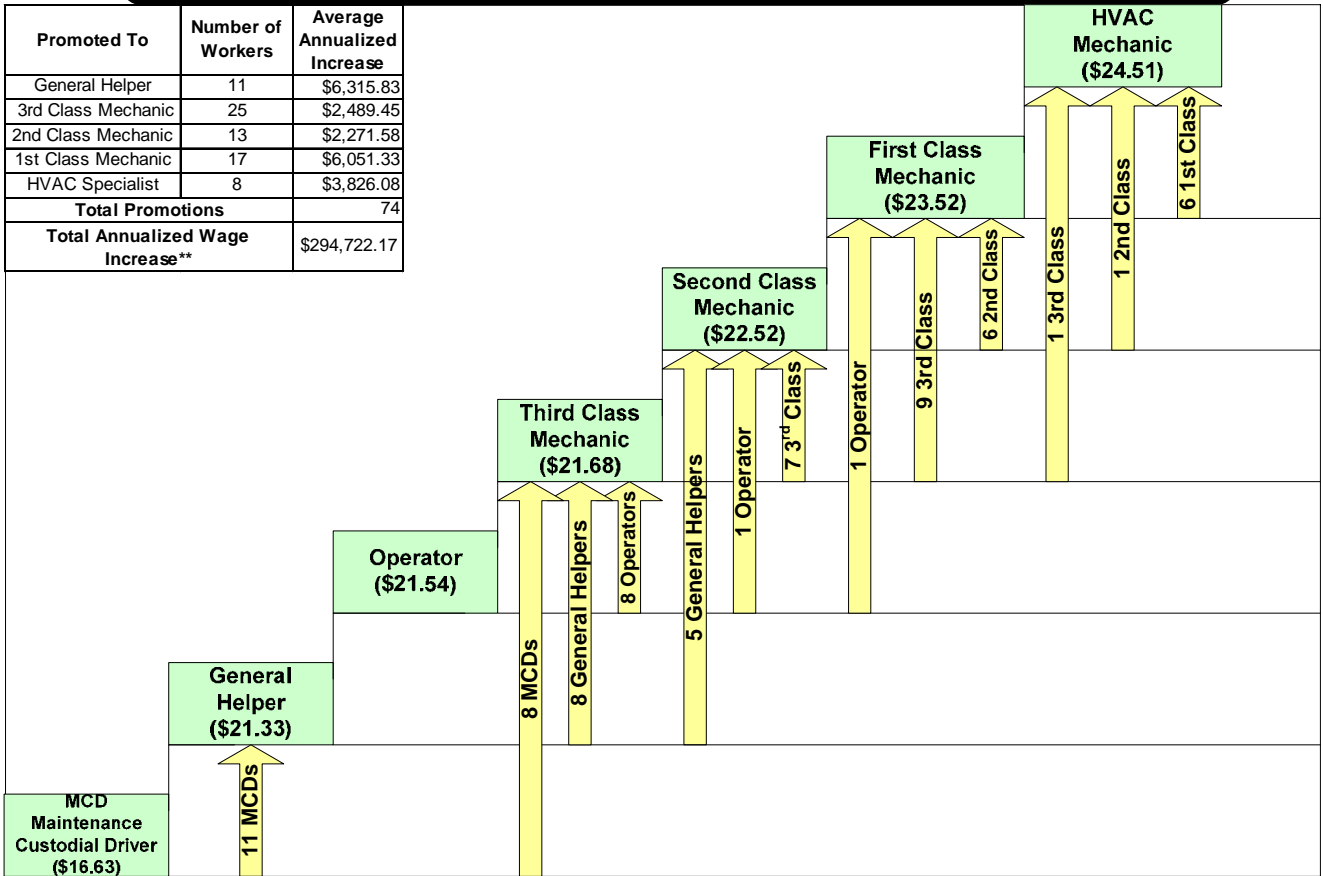
**Keystone Transit Career Ladder Partnership
Number of Trainees by Location and Year**



The largest location in a national Transit Technology Career Ladder Program, the Keystone Transit Career Ladder Partnership started in Philadelphia in the winter of 2001 and quickly expanded to become a statewide program. It has provided over 5,000 training opportunities to more than 2,000 Pennsylvania transit employees in bus, rail and facilities maintenance.

This chart shows the number of trainees by program year in the three Keystone locations: Port Authority in Pittsburgh, SEPTA in Philadelphia and over thirty smaller transit properties in Pennsylvania.

**Keystone Transit Career Ladder Partnership
Philadelphia Promotions and Wage Increases* 12/1/2001 – 6/30/2005**



* The wage rates shown in the green boxes are top rates in each classification. Entry rate for a classification is based on a percentage of the top rate, in most cases, 60 percent. After 48 months (108 months for MCD; 12 months for 1st Class and HVAC Specialist), the wage advances to 100 percent top rate. Wage progression is based on overall Authority seniority rather than seniority under each classification.

** Annualized wage increases in the data table were calculated using the actual wage increase of each promoted worker, rather than the top rates.

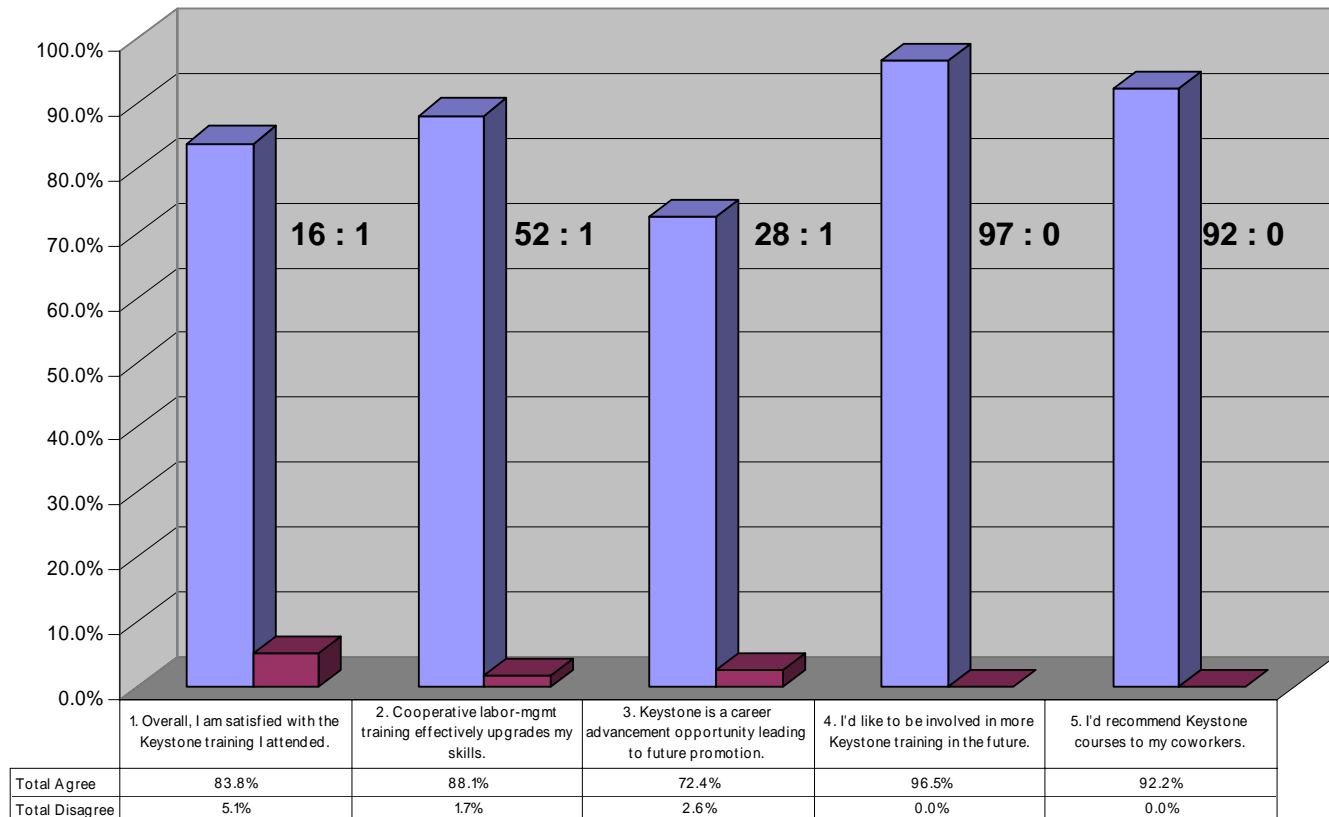
Building on strong labor-management partnerships and utilizing data-driven decision making process, Keystone has made it possible for a record number of mechanics to upgrade their skills and move up the transit career ladder in an industry facing dramatic technological change and skill shortages.

This chart illustrates examples of bus maintenance worker career ladder promotions through Keystone Philadelphia and corresponding wage increases. The 74 promotions achieved in the first four program years helped to alleviate SEPTA's skills gap caused by emerging new technologies and an exodus of senior maintenance workers due to retirement.

Training satisfaction surveys conducted in 24 Pennsylvania transit properties show that Keystone has generated broad support from supervisors and workers.

This chart illustrates Pittsburgh trainees' positive impression of Keystone. Workers are very satisfied with the Keystone training they have received. From their training and post-training experience, they feel that labor-management training programs are an effective way to upgrade their skills. Nearly all the trainees would like to be involved in more Keystone training in the future and would recommend the courses to their coworkers.

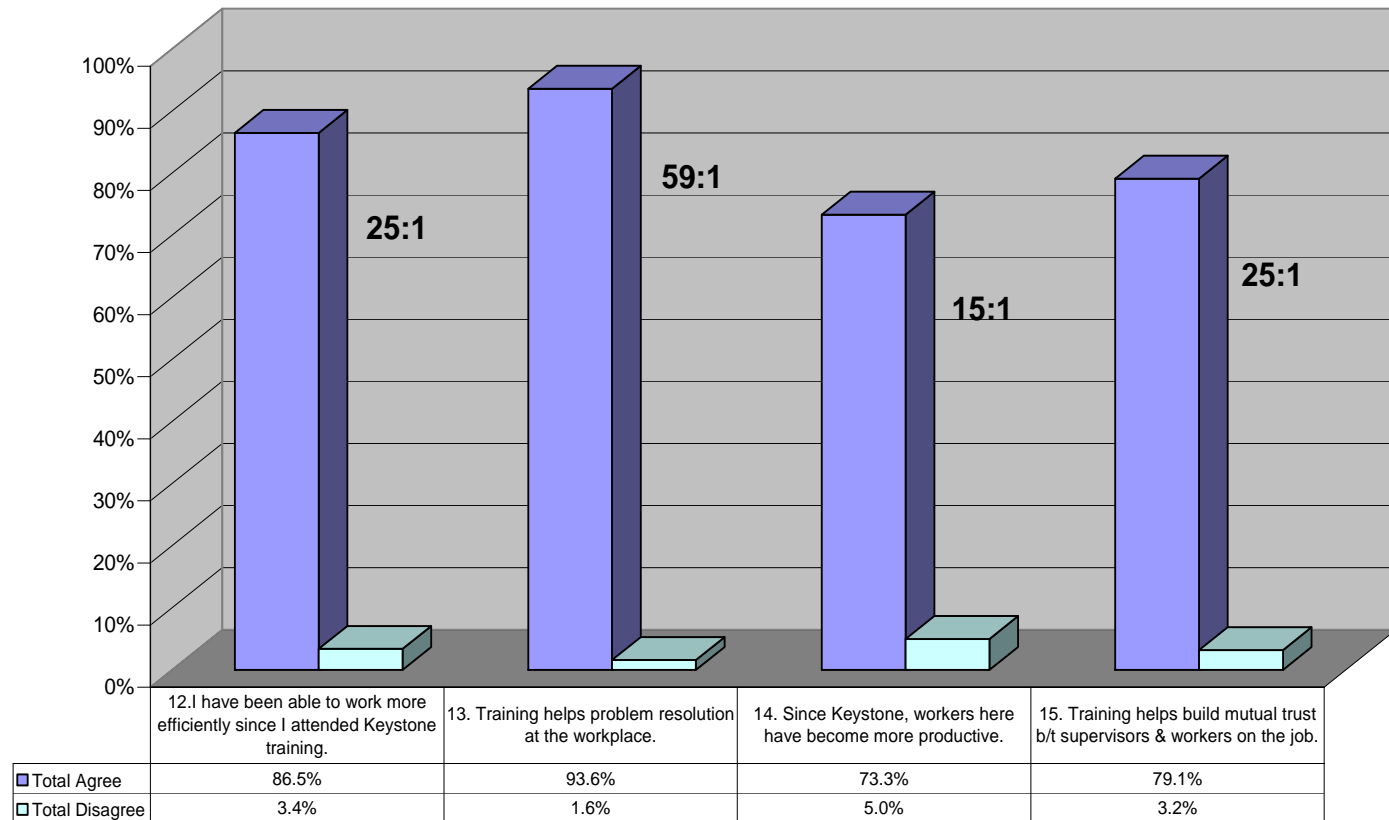
Pittsburgh Worker Survey - Overall, workers are satisfied with the joint training and would like to be involved in more



Statewide Worker Survey - Training helps augment individual worker skills. Overall efficiency and productivity has improved dramatically

When questioned about the impact of Keystone training on participating individuals and their workplace, workers from smaller properties responded very positively (see chart).

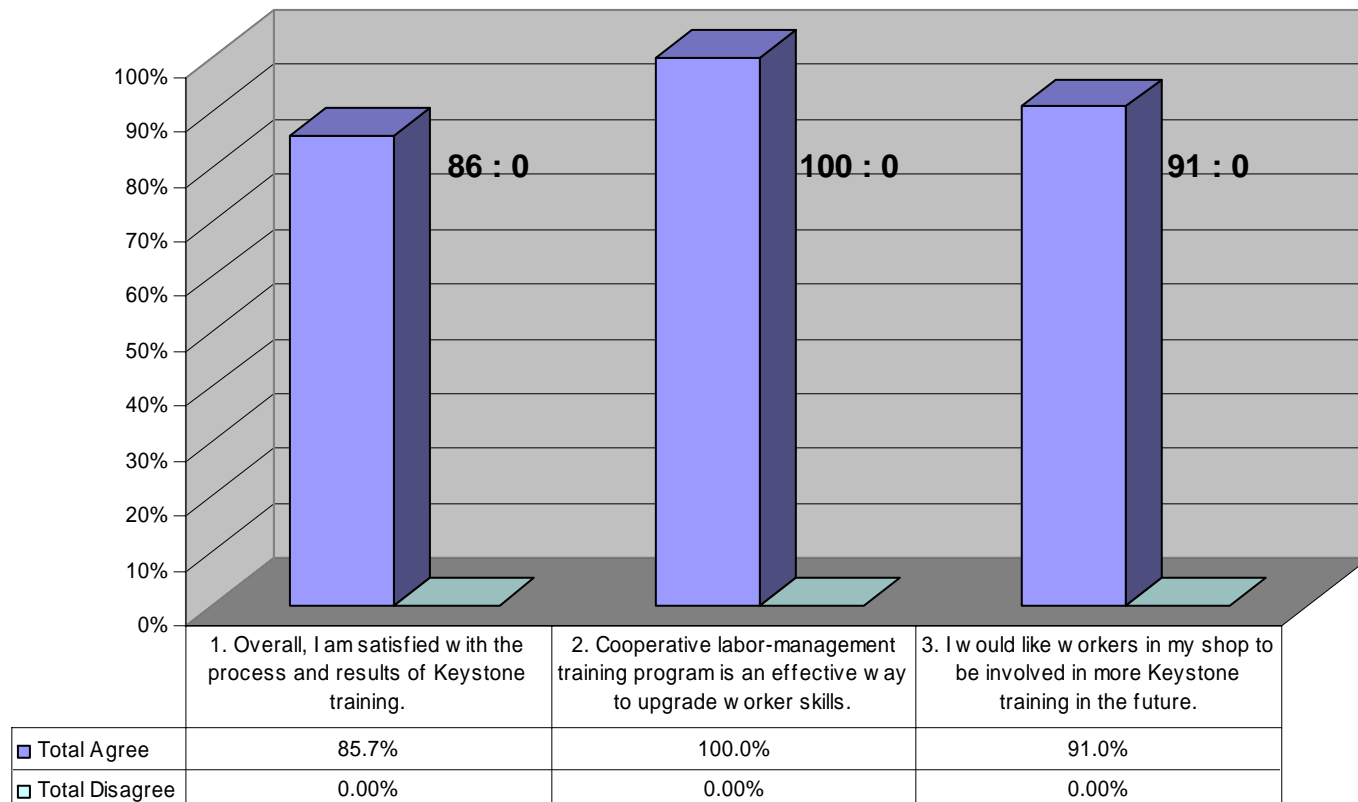
Over 86 percent of them feel that they have been able to work more efficiently since training. Three out of four trainees believe that workers in their shop have become more productive because of training and that training helps build mutual trust between supervisors and workers.



SEPTA Supervisor Survey - Overall satisfaction with Keystone training was very high

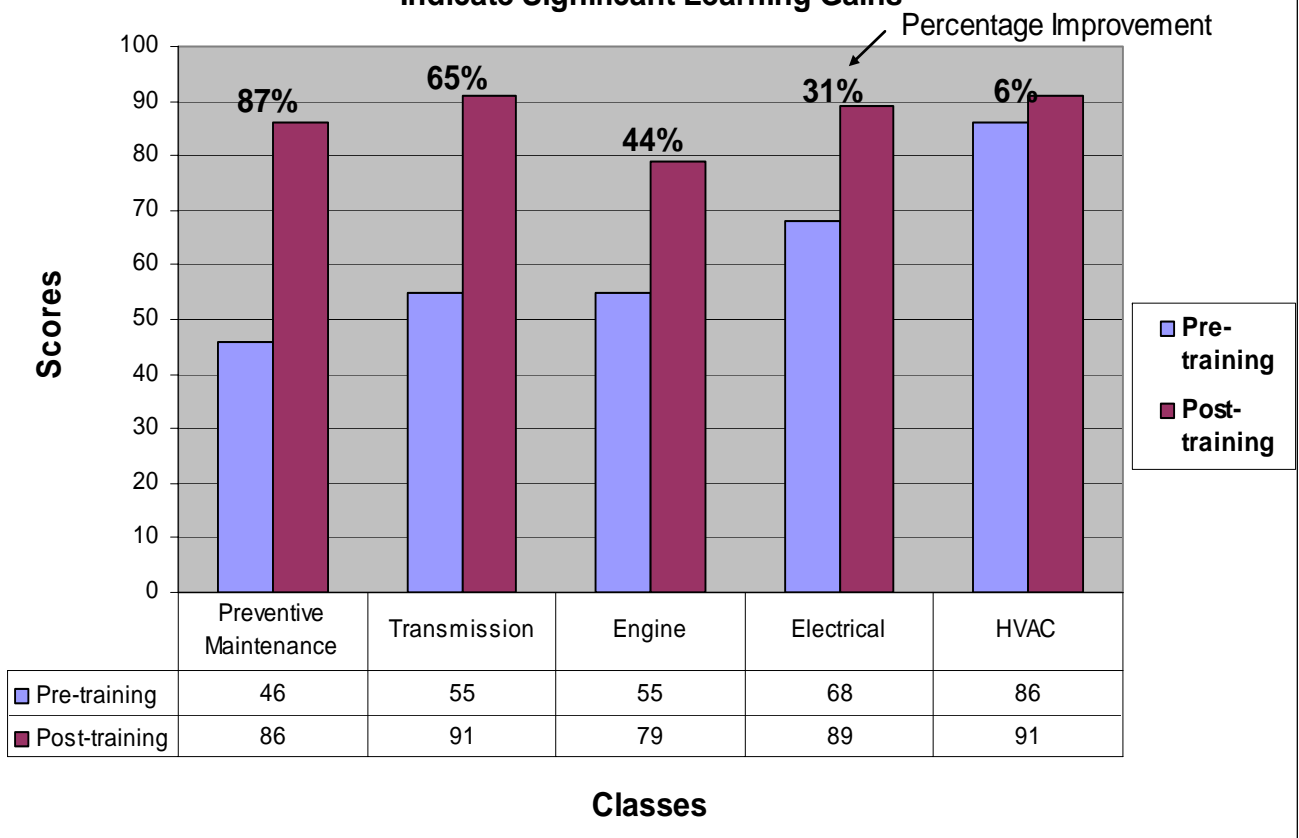
Front-line supervisors at various Keystone locations were also polled on their experience with Keystone. In general, they were very satisfied with the process and results of the training provided.

As shown in this chart, all supervisors surveyed in Philadelphia believe that cooperative labor-management training programs are an effective way to upgrade worker skills. More than 90 percent would like to send workers in their shop to more Keystone training in the future.



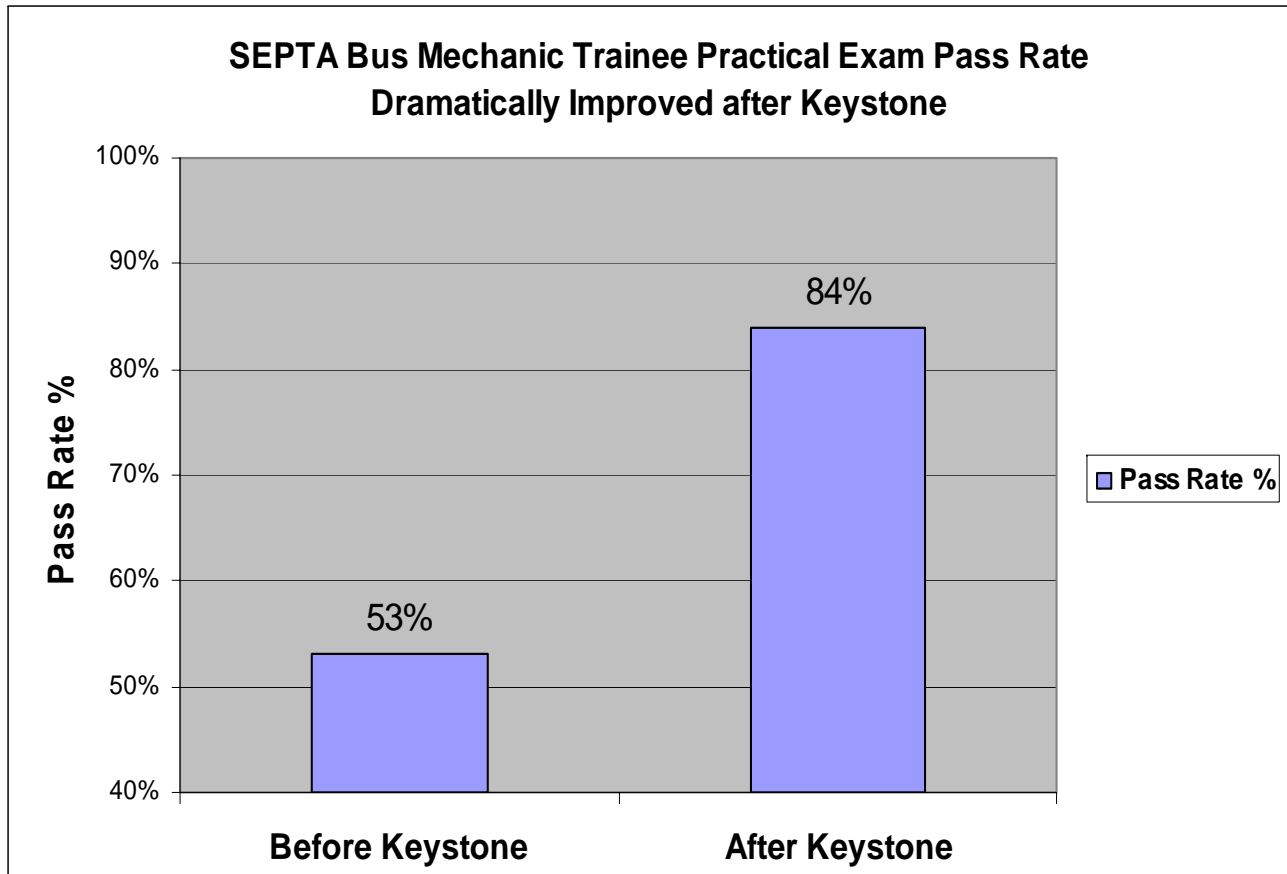


Keystone Philadelphia Pre-training and Post-training Test Results for Selected Courses Indicate Significant Learning Gains



The Center's report *Measuring Up Volume 1* published in 2005 goes beyond the earlier work by quantitatively investigating the impact of Keystone training on employee job task knowledge and job performance as well as changes in the practices and results of vehicle maintenance.

This chart gives an overview of pre- and post-training test results from selected Keystone Philadelphia courses. Learning improvements of up to 87 percent indicate significant knowledge gains.

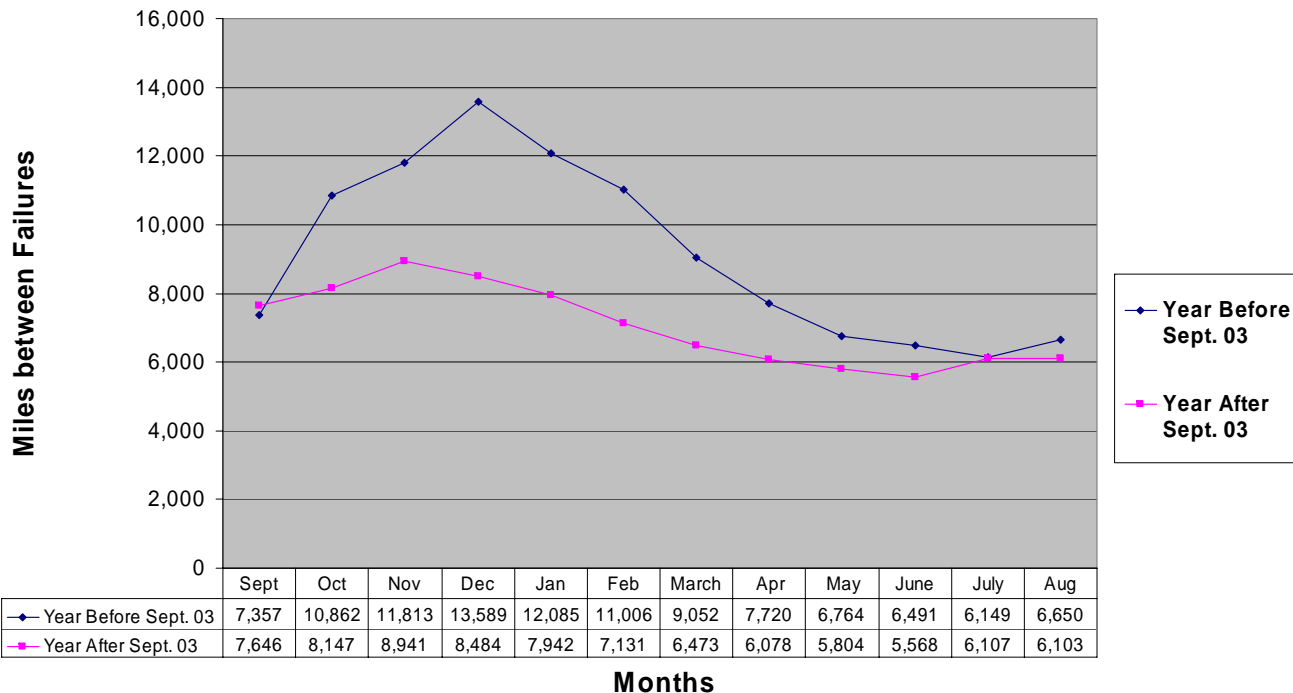


Another indicator of learning gains is success in passing the practical “hands-on” exams administered on the shop floor after classroom training, as shown in this chart.

SEPTA provides 200 hours of instruction for employees qualifying to train for a promotion in bus maintenance. After this training, employees must pass a hands-on test demonstrating knowledge and skills to do the job. Prior to Keystone, only 53 percent of the employees completing classroom training passed the performance test. Two years after the beginning of Keystone, 84 percent (or even more, subsequently) passed and earned promotions.



As a matter of course, mean distance between failures (MDBF)* tends to worsen over time due to vehicle aging



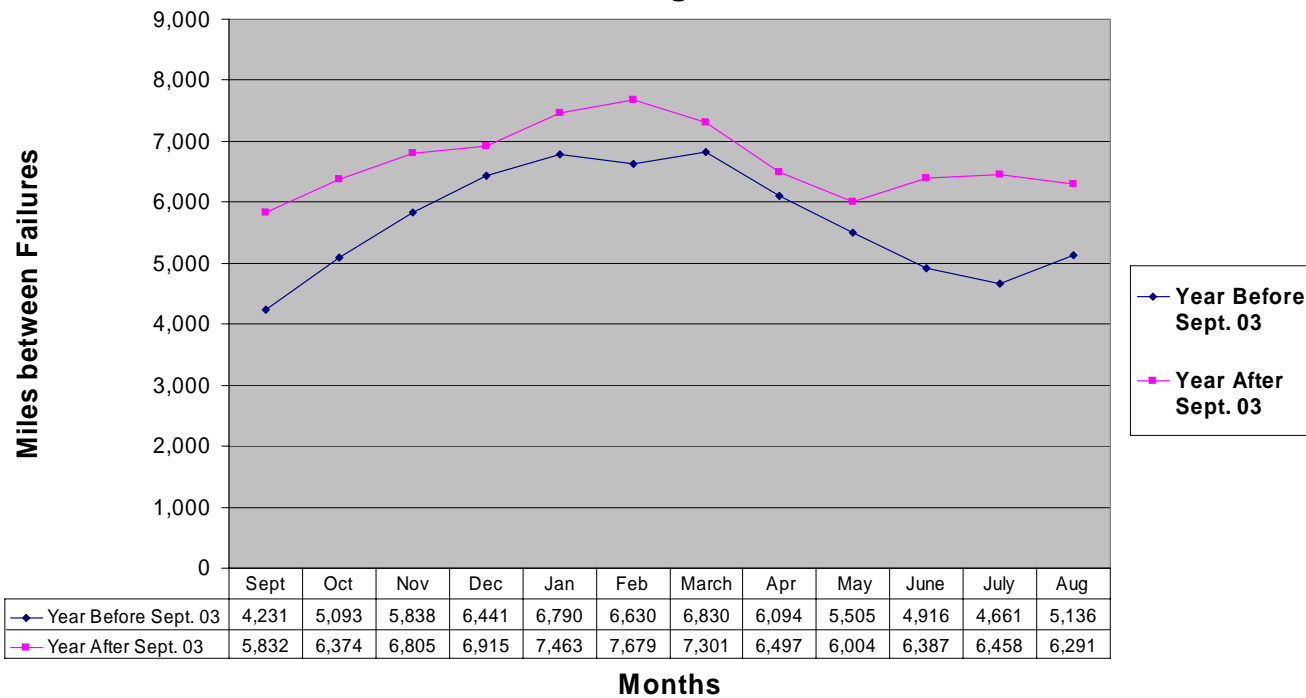
* Three-month moving average MDBF (average of the month shown, 1 month before and 1 month after).

Mean distance between failures (MDBF) is an industry standard for measuring vehicle reliability. Charts on pages 10 and 11 compare trends in MDBF between SEPTA's bus garages that did not receive any preventive maintenance (PM) training and those garages that did receive Keystone PM training.

This chart shows declining MDBF over a two year period for SEPTA city bus garages that did not receive Keystone PM training. As an ordinary development, MDBF worsened in the second year because of equipment aging and other factors.



For garages that had preventive maintenance training, mean distance between failures (MDBF)* improved in the year following training

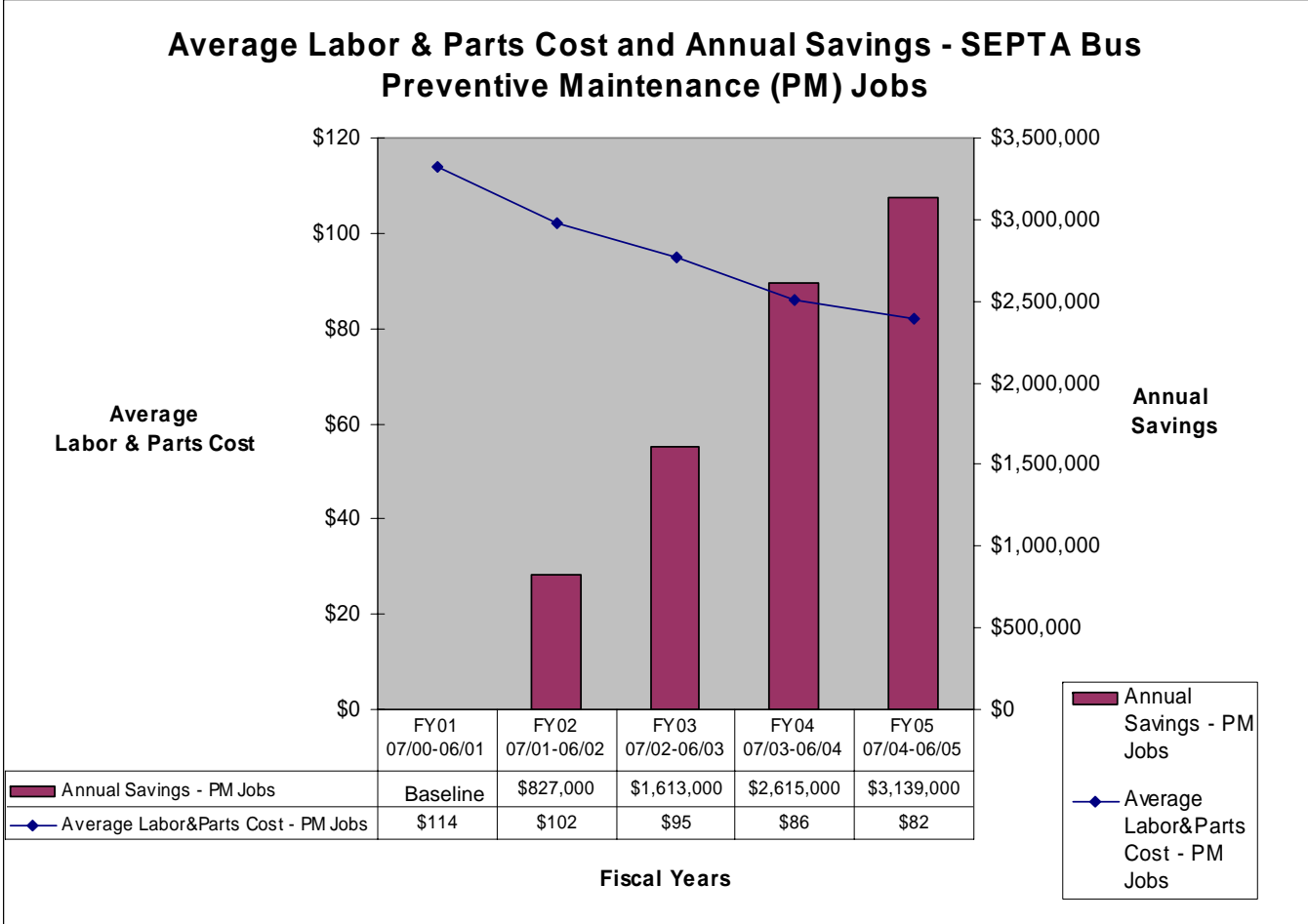


* Three-month moving average MDBF (average of the month shown, 1 month before and 1 month after).

This chart illustrates the comparison of MDBF over time for SEPTA city garages that received hands-on Keystone PM training between June and August 2003. Starting from September 2003 (the first month after training), MDBF improved for each month in the entire year. During the summer months (June, July and August) when MDBFs are historically lower because of the large number of senior mechanics on vacation leave, the post-training MDBF improvement was particularly significant. This improvement in vehicle reliability may be attributed to a larger base of mechanical knowledge and skills dispersed among trainees at all seniority levels following the training.

Early in 2006, the Center released its most recent report on the quantitative case study of the Keystone Partnership. This *Measuring Up: Interim Report* breaks new ground in comparing the value of savings in SEPTA's maintenance program with the costs of this innovative partnership training program.

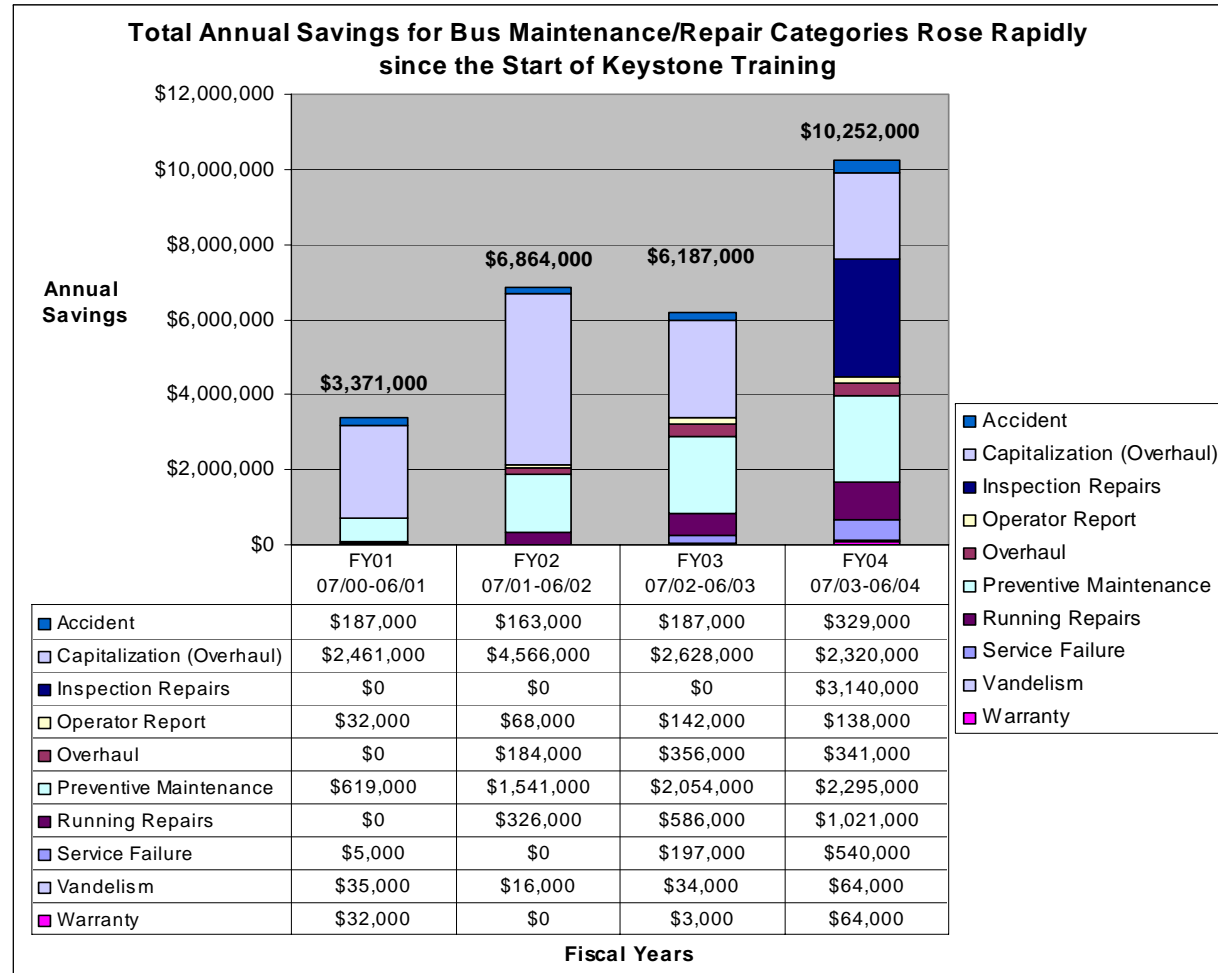
This chart showcases an example of labor and parts cost savings found in nearly all the major bus maintenance/repair categories in the years since Keystone training began. A preventive maintenance (PM) job that used to cost \$114 in labor and materials cost only \$82 after four years of Keystone training. SEPTA has saved a total of \$8,194,000 on bus PM jobs.



This chart summarizes the total savings at SEPTA analyzed so far by the Center. The annual savings for all bus maintenance/repair categories rose rapidly from \$3,371,000 in the first year of Keystone to \$10,252,000 in the fourth year.

Taking Keystone program costs into consideration, an investment of \$2,907,000 in training SEPTA's bus maintenance workforce, in conjunction with other factors such as the emphasis on improved preventive maintenance, is associated with combined cost savings of \$26,674,000 in vehicle maintenance and repair over a four year period.

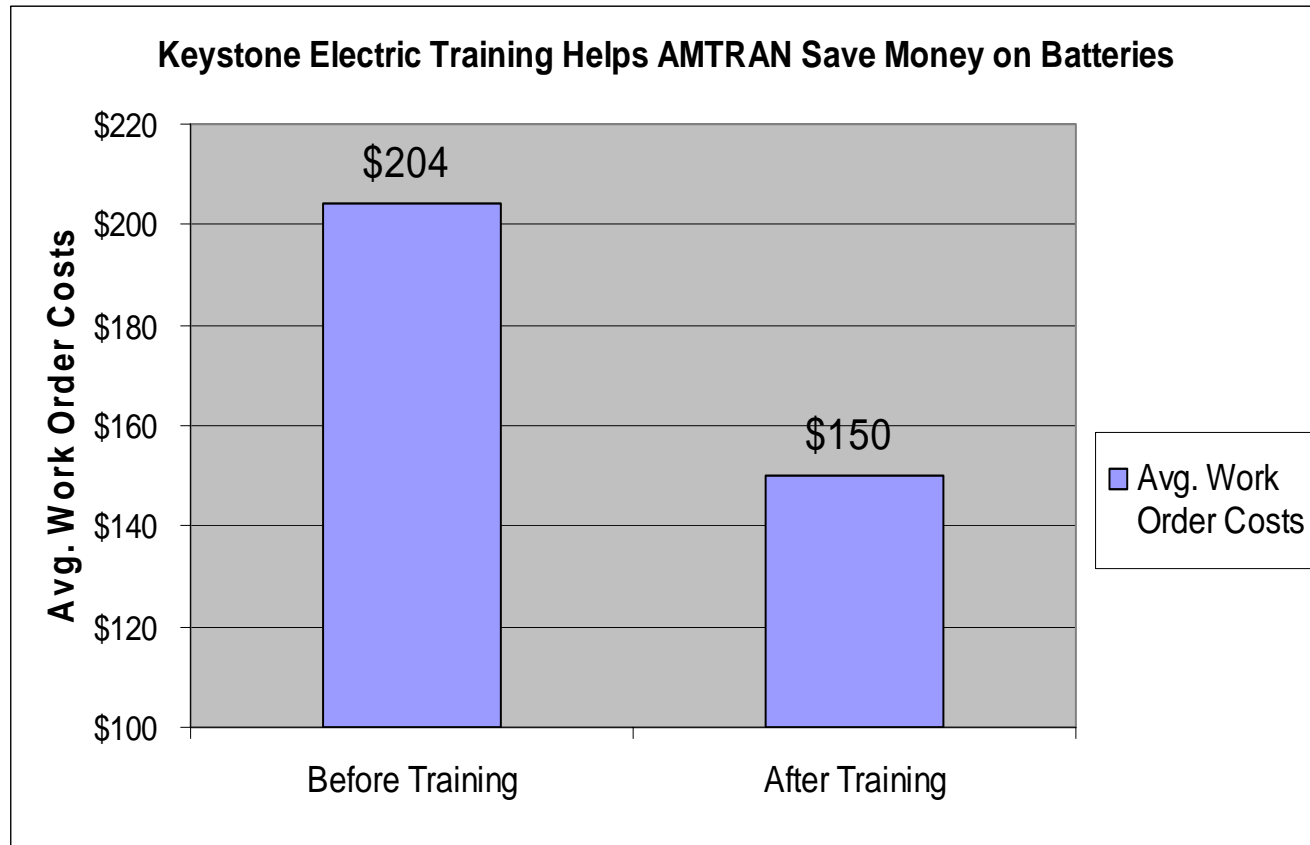
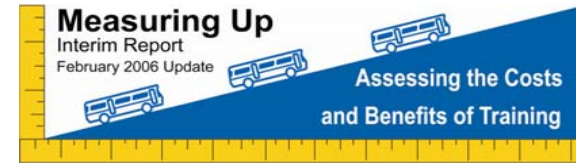
It is worth stressing that benefits observed in the report derive from multiple sources affecting the organization. The Center is working with our partners to analyze the many variables such as preventive maintenance and procurement practices to quantitatively isolate the specific contribution of training.



Though no large-scale quantitative study has been conducted in the smaller properties due to data limitations, substantial anecdotal evidence exists suggesting significant improvements in maintenance operations since Keystone training.

This chart shows savings on battery replacements at AMTRAN, a smaller transit property in Altoona, PA. The maintenance manager at AMTRAN traced the savings on battery replacement after sending five of his mechanics to a Keystone basic electric course. Because the workers could understand the whole system and perform some basic maintenance tasks such as fixing the wiring, the frequency of jobs replacing two batteries dropped sharply, resulting in a \$54 saving for each work order involving battery replacement.

Relevant quotes from smaller properties are found on the next page.



Perspectives from Smaller Transit Properties in the Keystone Partnership

Keystone Career Partnership has been a God-sent program to the smaller Class 4 and Class 5 properties across the Commonwealth. ***The Authority is experiencing fewer A/C failures and our repairs are lasting longer through multiple cooling seasons. A side bar to fewer A/C failures is fewer customer complaints.*** The mechanics that have attended classes come back to the Authority with their “batteries charged” and ready to go. They feel good about themselves, their jobs and bring back a wealth of knowledge garnered from the training session they attended. The entire Keystone program has been a “win-win” program for ATA.

- Charlie Shilk, Director of Maintenance
Area Transportation Authority, Johnsonburg

Everyone we sent has come back home showing results. ***Our electrical problems are fewer with faster repairs because they now know what to look for. Our A/C's have become more reliable.*** All in all, this program is a plus.

-Doug Greenwood
Director of Maintenance
Cambria County Transit Authority,
Johnstown

The changes we have seen [since Keystone training] include ***the reduction of batteries being replaced, better troubleshooting of our electrical problems with a small decrease in down time***, which I think will get better with time and experience.

-Gary Williams
Director of Maintenance
AMTRAN, Altoona



Graduates of Keystone funded
Classes for promotions



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