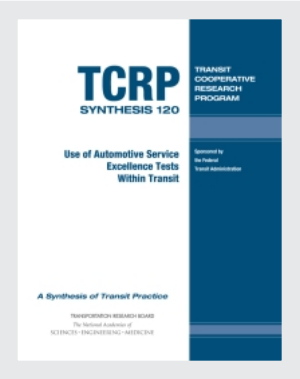

Use of Automotive Service Excellence Tests Within Transit

DETAILS

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TRANSIT COOPERATIVE RESEARCH PROGRAM

TCRP SYNTHESIS 120

Use of Automotive Service Excellence Tests Within Transit

A Synthesis of Transit Practice

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Deep River, Connecticut

SUBJECT AREAS
Maintenance and Preservation • Public Transportation • Vehicles and Equipment

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TRANSPORTATION RESEARCH BOARD

WASHINGTON, D.C.
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TRANSIT COOPERATIVE RESEARCH PROGRAM

The nation's growth and the need to meet mobility, environmental, and energy objectives place demands on public transit systems. Current systems, some of which are old and in need of upgrading, must expand service area, increase service frequency, and improve efficiency to serve these demands. Research is necessary to solve operating problems, adapt appropriate new technologies from other industries, and introduce innovations into the transit industry. The Transit Cooperative Research Program (TCRP) serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it.

The need for TCRP was originally identified in *TRB Special Report 213—Research for Public Transit: New Directions,* published in 1987 and based on a study sponsored by the Urban Mass Transportation Administration—now the Federal Transit Administration (FTA). A report by the American Public Transportation Association (APTA), *Transportation 2000,* also recognized the need for local, problem-solving research. TCRP, modeled after the successful National Cooperative Highway Research Program (NCHRP), undertakes research and other technical activities in response to the needs of transit service providers. The scope of TCRP includes various transit research fields including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

TCRP was established under FTA sponsorship in July 1992. Proposed by the U.S. Department of Transportation, TCRP was authorized as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). On May 13, 1992, a memorandum agreement outlining TCRP operating procedures was executed by the three cooperating organizations: FTA; the National Academies of Sciences, Engineering, and Medicine, acting through the Transportation Research Board (TRB); and the Transit Development Corporation, Inc. (TDC), a nonprofit educational and research organization established by APTA. TDC is responsible for forming the independent governing board, designated as the TCRP Oversight and Project Selection (TOPS) Committee.

Research problem statements for TCRP are solicited periodically but may be submitted to TRB by anyone at any time. It is the responsibility of the TOPS Committee to formulate the research program by identifying the highest priority projects. As part of the evaluation, the TOPS Committee defines funding levels and expected products.

Once selected, each project is assigned to an expert panel appointed by TRB. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, TCRP project panels serve voluntarily without compensation.

Because research cannot have the desired effect if products fail to reach the intended audience, special emphasis is placed on disseminating TCRP results to the intended users of the research: transit agencies, service providers, and suppliers. TRB provides a series of research reports, syntheses of transit practice, and other supporting material developed by TCRP research. APTA will arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by urban and rural transit industry practitioners.

TCRP provides a forum where transit agencies can cooperatively address common operational problems. TCRP results support and complement other ongoing transit research and training programs.

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Learn more about the Transportation Research Board at **www.TRB.org**.

FOREWORD

Transit administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to the transit industry. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire transit community, the Transit Cooperative Research Program Oversight and Project Selection (TOPS) Committee authorized the Transportation Research Board to undertake a continuing study. This study, TCRP Project J-7, "Synthesis of Information Related to Transit Problems," searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute a TCRP report series, *Synthesis of Transit Practice.*

This synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

By Donna L. Vlasak
Senior Program Officer
Transportation Research Board

The Automotive Service Excellence (ASE) program is nationally recognized as the standard industry credential provider for automotive professionals. This synthesis documents how the ASE program is accepted and used within the transit bus maintenance community. Barriers preventing more widespread application and suggestions for additional research based on the findings are also provided.

Survey responses regarding the program were obtained from 16 transit agencies surveyed and their staff technicians, instructors, and maintenance managers/supervisors/union representatives. Also, a survey mailing was distributed by ASE to its list of transit bus participants. A literature review presents information about ASE and its application to bus transit. Three case study examples provide targeted insight into how ASE is used to validate technician ability, provide incentives, and enhance training programs.

John J. Schiavone, J Schiavone Consulting, Deep River, Connecticut, collected and synthesized the information and wrote the report, under the guidance of a panel of experts in the subject area. The members of the topic panel are acknowledged on the preceding page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

CONTENTS

USE OF AUTOMOTIVE SERVICE EXCELLENCE TESTS WITHIN TRANSIT

SUMMARY

The Automotive Service Excellence (ASE) program is nationally recognized as the standard industry credential provider for automotive professionals. What began as a technical knowledge validation program primarily for automotive and truck technicians was expanded, beginning in 2004, to include bus technicians as part of a TCRP-funded project. Test questions are developed by subject matter experts in various vehicle areas, such as engines and braking systems. Participation in the program is voluntary, although some transit agencies pay higher wages to those with ASE certifications.

This synthesis documents how the ASE program is accepted and used within the transit bus maintenance community. Barriers preventing more widespread application and suggestions for additional research based on the findings are also provided.

A total of 402 survey responses regarding the program were obtained from technicians, instructors, and maintenance managers, supervisors, and union representatives from 16 transit agencies, Also, 108 survey responses were received through a mailing generated by ASE to its list of transit bus participants. A literature review was also conducted to present information about ASE and its application to bus transit. In addition, three case examples provide targeted insight into how ASE is used to validate technician ability, provide incentives, and enhance training programs.

A survey respondent from New York City Transit commented: “This survey is intriguing. I hope it’s used for more than just collecting data.” More than 500 survey responses combined with other investigations revealed several key findings about the ASE Transit Bus Certification Program that could help the program prosper:

- Transit technicians, instructors and managers, supervisors, and union representatives value testing and certification as a way to validate technical ability and competence.
- ASE is widely respected as the organization to provide national testing and certification for transit bus technicians.
- Despite the support, nearly half of maintenance technicians surveyed are not sure about the purpose and value of ASE certification, suggesting that additional communication about the program and its value to transit is needed. A national webinar has been suggested, along with return on investment research.
- Although most agencies do not pay maintenance personnel a higher wage for achieving ASE certifications, there is widespread belief among survey respondents that those with ASE certifications should receive increased financial compensation and other incentives.
- Although nearly all survey respondents support testing and certification, there are many who do not see it as proof of a technician’s abilities. A majority of all survey respondents believe it is possible to be a good technician but not pass ASE tests, despite ASE’s own studies in the automotive sector showing otherwise.
- Labor and management are not seen by survey respondents as doing enough to support ASE in transit, and both groups could do more.

- As part of its standards program, APTA has developed training curriculum on a joint labor–management basis that incorporates elements of ASE testing, thereby allowing agencies to establish uniform training programs and increase the likelihood of technicians achieving ASE certifications.
- A statewide technician training program in Florida developed by the Florida Department of Transportation and Center for Urban Transportation Research has integrated ASE style testing and tasks as part of its classroom and on-the-job curriculum, and requires students to take and pass all eight ASE transit certification tests as part of its own program. The program is highlighted as a case example.
- ASE, Universal Technical Institute, CDX Global, the Southern California Regional Transit Training Consortium, the Transportation Learning Center, and other organizations also offer training assistance to help technicians pass ASE testing.
- Training efforts already in place are viewed as insufficient for technicians to pass ASE testing. A majority of all survey respondents say they need more training.
- The Potomac and Rappahannock Transportation Commission, another case example, contracts its maintenance services and insists on ASE certification as a way to validate the contractor's technical competence in maintaining the agency's fleet and satisfying contractual obligations.
- VIA Metropolitan Transit, San Antonio, Texas, the third case example, integrates elements of ASE to provide technician training and financial compensation.

The findings report that transit maintenance personnel, like their peers in the automotive industry and other craft professionals, take pride in passing tests and acquiring certifications that validate their knowledge and skills. ASE is accepted by most agencies as the organization to provide such certifications, although more can be done to increase awareness of the program and prove its value to transit. Most of the transit maintenance personnel surveyed report that they require more training in an industry where ensuring passenger safety is paramount and where the pace of technological change is accelerating. In addition, about half of those technicians surveyed do not believe the training they receive is sufficient to pass ASE testing and achieve certification. The findings show that most technicians seek recognition for their abilities through certification, yet many believe there is not sufficient training to achieve it.

Of the many comments received, several noted that technicians responsible for maintaining safety equipment on vehicles are not required to be certified.

CHAPTER ONE

INTRODUCTION

PROJECT BACKGROUND AND PURPOSE

ASE, formally known as the National Institute for Automotive Service Excellence, is a nonprofit organization established in 1972 to improve the quality of vehicle maintenance and repair by testing automotive technicians and certifying their abilities. Certification provides tangible proof that technicians have the skills and knowledge required to safely and efficiently carry out their job.

ASE certifies technicians through a series of written tests. Exams are segmented by subspecialties such as automobile, medium and heavy truck, school bus, and collision repair. There are more than 40 individual exams; test questions are written by subject matter experts (SMEs) including maintenance managers, technicians, vehicle manufacturers, and instructors.

In 2004, work began to expand the ASE program to include the testing and certification of transit bus technicians. The program was made possible through funding provided by TCRP, known as TCRP Project E-06. It is described in greater detail in chapter two. According to ASE, more than 3,000 technicians have passed more than 10,000 individual ASE Transit Bus tests and 601 (approximately 20%) have attained ASE Transit Bus Master Technician designation. The Master designation is given to those technicians who attain certifications in virtually all vehicle areas (i.e., brakes, engines, transmissions, etc.). Technicians with ASE certification must recertify every 5 years to keep certifications current. The number of transit bus technicians with ASE certification, however, is small in comparison to the total number of bus technicians. According to *TCRP Report 178: A National Training and Certification Program for Transit Vehicle Maintenance Instructors* (Transportation Learning Center 2015), there are nearly 53,000 technicians employed by transit agencies across bus, heavy and light rail, and paratransit modes.

The purpose of this synthesis is to document how a diverse cross section of transit bus maintenance personnel view the ASE certification program and what they believe can be done to improve acceptance and participation. The focus of this effort is on maintenance personnel—technicians, instructors, and maintenance managers; supervisors; and union representatives—because the ultimate acceptance of ASE rests with them. Their viewpoints are the most telling in terms of what is right and what is wrong with the current ASE program, how the program is used, how it could be improved, whether training is adequate, how best to prepare technicians for ASE certification, and what in their collective opinion is to be done to improve the program and motivate others to participate.

TECHNICAL APPROACH

The approach to this synthesis includes a literature review, multiple surveys conducted of transit agency maintenance personnel, and in-depth investigations of three case examples. Separate surveys were designed to elicit viewpoints directly from three transit occupations: technicians, instructors, and maintenance managers, supervisors, and union representatives. Once the survey questionnaires were finalized and approved by the oversight panel they were distributed to 16 transit agencies of different sized fleets.

The oversight panel selected to survey 16 transit agencies with an average of 15 technicians from each agency. Including responses received from instructors, maintenance managers, supervisors, and union representatives, more than 400 surveys were received from the 16 agencies. Agencies were selected based on (1) their willingness to engage both labor and management in the process; (2) their willingness to set time aside for technicians to complete the survey on agency time; and (3) their joint commitment to ensure surveys were completed.

In addition to the more than 400 surveys received from the 16 target agencies, ASE sent surveys to its mailing list of those who have taken at least one of its transit series tests, which resulted in an additional 108 responses. Table 1 shows a breakdown of the 510 responses received from the selected 16 transit agencies and the ASE mailing for all three occupations surveyed.

Surveys developed for each occupation shared the same core questions regarding ASE's transit program. Using a standard set of questions for each group allowed comparisons to be made. An Internet-based survey tool recommended by TRB was used to classify responses.

A listing of transit agency participation is included as Appendix A, and examples of contract language used by transit agencies to award compensation and other incentives

TABLE 1
BREAKDOWN OF SURVEY RESPONSES

Source	Technicians	Instructors	Manager/Supervisor/Union Rep.
16 Target Agencies (402 total responses)	246	37	119
ASE Mailing (108 total responses)	81	6	21
Subtotals	327	43	140
Total: All Surveys	510		

Source: Survey responses.

are shown in Appendix B, and all questionnaires are presented as Appendix C.

Three case examples were selected as noteworthy applications of the ASE program. They include integration of ASE at two transit agencies and a state-wide training program where ASE is an integral part of the curriculum.

The data collected through the literature review, surveys, and case examples document the level of ASE program awareness, viewpoints toward testing and ASE, how tests are used, recertification ratios, compensation, challenges and barriers, and future issues to address. Material presented in this synthesis documents how the industry regards and is using ASE certification, and how best to retain and attract technicians to the program.

REPORT ORGANIZATION

The report is organized into five chapters. Following the Introduction, chapter two summarizes the findings of the literature review, which is used to provide detailed information about ASE and other organizations that interact with it. Chapter three reports on views held by the three occupations surveyed—technicians, instructors, and maintenance managers; supervisors; and union representatives—regarding six key areas of the ASE program:

- ASE certifications
- Opinions regarding the ASE program
- Opinions regarding ASE testing
- Opinions regarding compensation
- Training
- Recommendations for improving ASE.

Chapter four presents three case examples of ASE program integration within transit:

- How VIA Metropolitan Transit, San Antonio, Texas, worked with its union to integrate ASE into its technician recognition and training program.
- How Potomac and Rappahannock Transportation Commission (PRTC) of Northern Virginia and its maintenance contractor First Transit use ASE to meet contractual requirements to validate that technicians are qualified for their jobs.
- How the Florida Department of Transportation (FDOT) and the Center for Urban Transportation Research (CUTR) teamed up to help technicians achieve ASE Master Certification as one element of its multi-faceted statewide training program.

The synthesis ends with chapter five, Conclusions, which summarizes the major findings, identifies barriers preventing further ASE implementation, and offers suggestions for further research.

CHAPTER TWO

LITERATURE REVIEW

Much of the literature regarding the ASE program and its application to bus transit comes from ASE, APTA, and other organizations related to the ASE testing and certification program.

AUTOMOTIVE SERVICE EXCELLENCE HISTORY AND BACKGROUND

Overview

As mentioned earlier, ASE stands for the National Institute for Automotive Service Excellence and serves as the focus of this synthesis. It was founded in 1972 as a nonprofit, independent organization offering training, testing, and certification services to validate and improve the knowledge and skills of automotive technicians. ASE is nationally recognized as the standard industry credential provider for automotive professionals; more than 300,000 technicians hold current ASE certifications. Detailed information about ASE's testing and certification program can be found at https://www.ase.com.

Certification of technicians by ASE offers tangible proof of their technical proficiency; providing a level of assurance to automobile dealers, fleet operators, customers, and the public that highway vehicles are serviced by qualified personnel. Many automobile dealerships proudly display posters indicating to customers that their technicians are ASE certified and thereby qualified to work on their vehicles. ASE exams are not easy; only two of every three test-takers pass on their first attempt. To remain certified, technicians must be retested every 5 years.

Table 2 shows the various areas in which ASE offers certification and the number of technicians holding ASE certifications in each group. Details about the Transit Bus Technician Program are provided later in this section. As indicated in Table 2, the vast majority of those certified (223,230) are automobile technicians; the next largest group (43,958) is parts specialists, which points to the wide range of certifications offered by ASE. Others holding large percentages of ASE certifications are associated with heavy and medium trucks (37,196) and advanced engine (racing) performance technicians (36,093). As noted in Table 2, just over 3,000 technicians have at least one transit bus certification.

Test Development Process

ASE test questions are not prepared by any single individual at ASE. Instead, ASE holds national workshops where SMEs in each specific test area prepare the questions. SMEs include working technicians, training representatives from vehicle manufacturers, customer service professionals, and educators and instructors. Exams are segmented by the various subspecialty areas (e.g., automobile, medium and heavy truck, and transit bus). There are more than 40 exams offered by the ASE program, each designed to discern knowledge of specific job-related skills.

Procedures used by ASE for writing and validating test questions follow best practices used in other nationally recognized credentialing programs:

- Test-writing workshops typically include 10 to 15 SMEs. A separate workshop is conducted for each ASE certification test.
- SMEs at each workshop review and modify job tasks necessary for success in a particular job category (i.e., engines, preventive maintenance inspections, etc.).
- Questions are written to specific job tasks; repair and diagnostic scenarios must reflect current technology, and trick questions and manufacturer-specific questions are not acceptable. Each question is reviewed and modified by the entire workshop group for clarity and technical accuracy. Each question must have one correct answer and three incorrect multiple-choice answers.
- Accepted questions are included as nonscored "pretest" questions in actual ASE tests to determine how well they perform.
- Based on how well a given question performs in pretest, it may become an actual test question or may be reconsidered in a future workshop. Questions that "make the cut" have been validated by both SMEs and working technicians.
- ASE continues to monitor a question even after it passes pretesting. Every question is tracked for proper performance each time it is used in a test.
- When a question becomes technically outdated, it is removed from the pool of test questions.

Test Taking Process

Tests were traditionally completed with pencil and paper. In 2012, ASE moved its test takings to a computer-based format. All certification testing, however, is still administered at secure, proctored test centers. The computer-based testing format provides immediate test results and accommodates

TABLE 2
ASE CERTIFICATION CLASSIFICATIONS

ASE Classification	Number of Individuals with ASE Certifications*
Automobile Technicians	223,230
Service Consultants	15,953
Maintenance/Light Repair Technicians	6,322
Advanced Engine Performance Specialists	36,093
Collision Repair/Refinish Technicians	20,685
Collision Damage Estimators	7,104
Medium/Heavy Truck Technicians	37,196
Truck Equipment Installation and Repair Technicians	2,728
Engine Machinists	949
Compressed Natural Gas Technicians	1,865
Transit Bus Technicians	**3,065**
School Bus Technicians	4,572
Parts Specialists	43,958
Net Total Service Professionals	313,033*

*Note: "Net Total" means individuals with multiple certifications are counted only once. For example, a technician with both Transit Bus certifications and Automobile certifications is only counted once (that is why the net total is less than the combined Number of Individuals with ASE Certifications).

Source: ASE.

both initial certification and recertification testing. ASE is also offering a greater choice of testing dates and times, including weekends.

Applicants register online for an ASE test and have 90 days in which to schedule an appointment at more than 450 test centers across the country. Appointments can be made at time slots offered during the day, evening, or on a weekend, subject to test center availability. Registering by telephone is also an option.

Recertification

ASE certifications expire every 5 years, which requires retesting to keep certifications current. Tests are updated to reflect advances in technology and repair procedures, ensuring that technician skills and knowledge are kept up to date. As a result, different questions are added for recertification testing. Ideally, agencies would provide the updated training needed to pass recertification, although this is not always the case.

Fees

There are separate fees to register and to take tests. A $36 registration fee covers each 3-month window in which applicants can register for any number of tests. With some exceptions, the fee for each Certification Test or Recertification Test is approximately $35. Some agencies reimburse technicians for ASE fees, at least for those tests that technicians pass.

Master Technician Status

ASE also offers Master Technician status where technicians must pass a specified number of tests in a given series (e.g., automobiles, trucks, and transit buses). To receive Master Certification classification in the transit bus series a technician needs to pass one of two engine repair tests [either compressed natural gas (CNG) engines or diesel engines] and all of the remaining tests within the transit bus series of tests; seven of the eight offered. As mentioned earlier in the Introduction, to date of the more than 3,000 individuals who have passed at least one ASE transit series test, slightly more than 600 (about 20%) have attained ASE Transit Bus Master Technician designation, implying that one in five have achieved Master status.

Master Technician candidates must also document at least 2 years of relevant hands-on work experience and recertify in each test area every 5 years. If one of the required certifications expires, Master Technician status is lost but can be reinstated by taking the required recertification test(s), even after they expire. As with all ASE tests there is no time limit on returning for recertification. Once you pass your original ASE test, you only need to take the recertification test to be reinstated no matter how long it has been expired.

Blue Seal Workshop Certification Program

In addition to certifying technicians and other automotive professionals, ASE offers a program whereby the entire workshop facility gains certification. Called the ASE Blue Seal of Excellence Recognition Program, businesses must meet specific criteria to achieve certification. For repair businesses including transit garages at least 75% of technicians performing diagnosis and repairs must be ASE certified. In addition, each area of service offered in the shop (e.g., engine repair and the parts room) must be covered by at least one ASE-certified

individual. Of the survey respondents, 15% claim their shops are Blue Seal certified, including PRTC, one of the case examples highlighted in chapter four.

The initial application fee for the Blue Seal of Excellence Recognition Program at the time of this report was $235. Once approved, workshops receive several promotional items including a wall plaque personalized with the business name, date of participation, and ASE logo. Eligibility status is evaluated each year by ASE to ensure that certification credentials remain current. The annual renewal fee is $65. Recipients of the Blue Seal recognition program are also listed on the ASE website, a benefit intended primarily for automobile dealerships to gain consumer confidence and increase business.

AUTOMOTIVE SERVICE EXCELLENCE TRANSIT BUS PROGRAM

Until recently, ASE did not offer a series of certifications specifically for the transit bus technician. Instead, bus technicians took certifications intended for the automobile and truck markets. Recognizing this gap, TRB organized a meeting in 2004 with ASE and representatives from various transit agencies, APTA, the Transportation Learning Center, and the two major transit unions, the Amalgamated Transit Union (ATU) and Transport Workers Union of America (TWU). TCRP Project E-06, Transit Bus Mechanics: Building for Success—The ASE Transit Bus Maintenance Certification Test Series, details the multi-organizational effort taken to establish an ASE program for transit bus technicians (Kunce 2012).

During its initial meeting the group reinforced interest in a new ASE test series specifically for transit bus technicians and identified eight categories for certification; ASE refers to the Transit Bus Series as the H Series:

H1—Compressed Natural Gas (CNG) Engines
H2—Diesel Engines
H3—Drive Train
H4—Brakes
H5—Suspension & Steering
H6—Electrical/Electronic Systems
H7—Heating, Ventilation & Air Conditioning
H8—Preventive Maintenance & Inspection.

TRB acquired funding from U.S.DOT to cover costs associated with the development of various task lists, which represent the essential tasks or skills SMEs collectively believe technicians need to demonstrate knowledge of to receive certifications.

Each of the test series (e.g., Diesel Engines) is classified by Content Areas, under which the various job tasks reside. For example, one of the Content Areas under Diesel Engines is "General Engine Diagnostics." A work task under that area is: "Listen for and diagnose engine noises; determine needed repairs." Once all tasks are identified, SMEs develop questions to demonstrate knowledge in each of the tasks. Workshops to develop the transit task lists through joint labor–management participation were held during September and October of 2004.

Additional funding was then approved for full development of the transit test series in early 2005. Each test question had to survive review by all SME groups. Questions were written to address practical problems of diagnosis and repair experienced by technicians in their day-to-day work. Next, all questions were pre-tested and quality-checked on a national sample of technicians. Questions that met ASE standards of quality and accuracy were included in the scored sections of the tests; those rejects were revisited or discarded altogether.

The first two tests, Brakes (H4) and Electrical/Electronic Systems (H6), were introduced in May 2006, with recertification slated for the fall of 2010. The Diesel Engines (H2) and HVAC (Heating Ventilation & Air Conditioning) (H7) were introduced in May 2007; recertification in January 2012. The Drive Train (H3) and Steering & Suspension (H5) tests were introduced in May 2008; recertification in January 2013. The Compressed Natural Gas (CNG) Engines (H1) and Preventive Maintenance & Inspection (PMI) (H8) tests were introduced in May 2009; recertification in January 2014.

The existing eight Transit Bus certifications may be expanded in the future if sufficient interest exists (chapter three reveals a strong interest in hybrids and doors). Table 3 shows the current offering of eight tests with respective number of questions and testing time for certification and recertification.

Transit Participation and Certifications to Date

As mentioned earlier, a total of 3,065 technicians have passed one or more of the ASE Transit Bus tests. In total, 10,557 ASE Transit Bus tests have been passed, with 601 technicians attaining ASE Transit Bus Master Technician designation. Educational and other programs to help prepare technicians for ASE testing are described here.

AUTOMOTIVE SERVICE EXCELLENCE EDUCATIONAL PROGRAMS

In addition to testing and certification, ASE has created various educational programs to assist both entry-level and senior technicians with their careers. To accomplish this, ASE has formed relationships with key educational organizations and established three other programs to help recruit and train entry-level technicians. Together the various organizations within ASE provide a structure to deliver information, advice, and services to help technicians progress. A summary of each organization is provided here; additional information can be found at https://www.ase.com.

TABLE 3
NUMBER OF QUESTIONS AND TESTING TIME

ASE Computer Based Tests—2015		Certification Tests		Recertification Tests	
Test	Name	Number of questions	Testing time	Number of questions	Testing time
Transit Bus Tests					
H1	Compressed Natural Gas (CNG) Engines	60	1¼ hours	25	30 min
H2	Diesel Engines	60	1¼ hours	25	30 min
H3	Drive Train	50	1 hour	20	30 min
H4	Brakes	60	1¼ hours	25	30 min
H5	Suspension & Steering	55	1¼ hours	23	30 min
H6	Electrical/Electronic Systems	60	1½ hours	25	45 min
H7	Heating, Ventilation, & A/C	50	1 hour	25	30 min
H8	Preventive Maintenance & Inspection	60	1¼ hours	25	30 min

Source: ASE.

NATEF

The National Automotive Technicians Education Foundation (NATEF) was founded in 1983 as a nonprofit, independent organization with a single mission: to evaluate technician training programs against standards developed by the automotive industry and recommend qualifying programs for accreditation by ASE. The NATEF process has resulted in certified automotive training programs in all 50 states at the secondary and postsecondary levels. Under a program called Continuing Automotive Service Education, NATEF also works with students to increase career awareness opportunities in the automotive repair industry, and evaluates providers of in-service technician training programs.

AYES

The Automotive Youth Educational Systems (AYES) was founded in 1997 as a partnership among automotive manufacturers and dealerships. The program, with active affiliations in 45 states, encourages young people to consider careers in the automotive service sector and prepares them for entry-level career positions. Through its dealership and school partners, AYES strives to enhance the public image of dealerships and dealership careers, build local partnerships between dealerships and high quality schools, and foster positive working environments in dealerships. AYES coordinates mentoring, job shadowing opportunities for students, and takes part in career days and career fairs at local schools.

ATMC

The Automotive Training Managers Council (ATMC) was founded in 1984 by original equipment manufacturer (OEM) and aftermarket automotive training professionals for the exchange of training ideas and strategies helpful to training professionals. ATMC members use networking and the exchange of ideas to improve training performance and stay current with the latest training techniques. The Council sees itself as a think tank for the automotive training industry, using its collective wisdom and experience to determine how people will best learn and then helping them prepare for that future.

As a subject for future research, the transit community might investigate the various ASE educational programs as a way of enhancing their own training efforts.

TEST PREPARATION AND STUDY GUIDES

ASE offers several services to help candidates prepare for testing. ASE's website, under Test Prep & Training, contains four areas of assistance (http://www.ase.com/Test-Prep-Training.aspx):

- Study Guides
- Official ASE Practice Tests
- Test Taking Tips
- CBT (Computer Based Training) Test-Drive.

Study Guides

ASE has produced a free study guide available on their website (https://www.ase.com) that encompasses all eight transit topic areas in one document. The guide reviews the ASE program and offers test-taking guidance. It also cites the number of questions asked in each content area (i.e., four questions will be asked pertaining to starting and charging systems). Job tasks from which test questions will be based are also provided (i.e., charge battery using slow or fast charge method as appropriate).

Individual study guides are also available through Delmar Cengage Learning, an organization distinct from ASE. The guides, developed for each Transit Bus "H" Series subject

area except H1 (CNG Engines), cost about $25 each and can be purchased at http://www.delmarlearning.com. Each Delmar Cengage Learning study guide contains questions that reflect those used on ASE tests.

In addition to the study guides mentioned here, a link on ASE's website contains a listing of other training resources, such as those available from Motor Age, Mitchell, Chilton, UTI and others (http://www.ase.com/Test-Prep-Training/More-Training-Resources/Other-Training-Sources.aspx).

Those wanting to prepare for ASE certification testing are strongly urged to obtain the study guides offered through Delmar, ASE, and others. Together they provide valuable assistance, especially when no other training is available. As indicated in chapter three, however, the guides are intended to supplement, not replace, formal training. Some of these publications may not be periodically updated, however, which may make it difficult to use them for recertification.

Official Automotive Service Excellence Practice Tests

Official ASE Practice Tests can be found online (http://www.ase.com/Test-Prep-Training.aspx) to help technicians prepare for ASE certification exams by providing sample questions of similar content and format to those used on actual ASE tests. These online practice tests allow candidates a chance to practice taking ASE-style tests without the stress of the real thing. The practice tests are half the length of the regular ASE tests, and give feedback in the form of a performance report with explanations for both correct and incorrect answers. The Official ASE Practice Tests start at $14.95 each (at time of this report), with discounts for multiple purchases.

Test Taking Tips

ASE also has a link on its website (http://www.ase.com/Test-Prep-Training.aspx) offering an interactive format regarding how to interpret the types of questions found on ASE tests. Here candidates can learn more about the kinds of questions they will experience. They can also review a recording of a live ASE webinar, "Testing 1, 2, 3—Three Key Elements of ASE Test Preparation."

CBT Test-Drive

The "Start CBT Test Drive" link offered on ASE's website (http://www.ase.com/Test-Prep-Training.aspx) allows candidates to try out the computer-based testing system used at ASE's Test Centers. The demonstration presents sample questions from a variety of ASE tests to allow candidates to practice the navigational controls of the computer-based tests, just as they appear at the Test Centers.

BENEFITS AND METRICS

In a PowerPoint presentation entitled The ROI of ASE, How Certification Improves Key Performance Indicators (http://www.tirebusiness.com/assets/PDF/TB97505125.PDF) ASE claims ROI (return on investment) benefits to its certification program including:

- 40% improvement in productivity,
- Reduced job turnover,
- 60% reduction in repeat failures (shop comebacks),
- Improved public trust and recognition,
- Increased training effectiveness, and
- Technician recognition.

The presentation explores how ASE certification adds value to both the individual automotive professional and the companies employing them. It quantifies the various advantages ASE certification provides in demonstrating technical knowledge and building consumer trust and confidence, and the positive impact on key performance indicators.

In another PowerPoint presentation, ASE Certification, The Industry Advantage, Tony Molla of ASE points to how ASE certification affects performance in four major areas:

- Repair accuracy (fix-it-right or FIR the first time);
- Productivity;
- Performance reviews; and
- Compensation, including bonuses or additional performance compensation.

The study results show a clear correlation between the number of ASE certifications held and higher results in all performance areas surveyed. Moreover, research indicates that taking an ASE or any test does more than document how much someone knows. Testing, especially multiple-choice testing, appears to help people retain what they have learned and better apply it on the job. ASE research has also shown that the simple act of preparing for a credentialing exam can enhance on-the-job (OTJ) performance.

In the same PowerPoint presentation, ASE also points to an Arizona Department of Transportation study where those with ASE certifications received up to $170 in monthly bonuses, worker turnover decreased from 35% to less than 5%, shop comebacks (repeat failures) fell from 65% to less than 1%, and overtime was reduced by 35%. ASE also emphasizes a research study (http://scholar.lib.vt.edu/theses/available/etd-04052006-133702/unrestricted/KoloDissertation.pdf) conducted by Virginia Tech that shows:

- Technicians who possess ASE certification perform better and have more positive perceptions of their profession than their noncertified counterparts.
- Knowledge and experience gained while obtaining ASE certification enhances a technician's job knowledge.

- Fewer customer complaints directed at certified technicians . . . may be attributed to increased levels of professional knowledge and experience obtained [through] certification.
- Knowledge gained preparing for the exams can be directly applied to the service bay. More productivity and fewer comebacks are the result.
- For the employee, ASE certification offers the opportunity to prove to themselves and others that they are among the most efficient in their professional peer group.
- Certification reflects achievement and demonstrates a commitment to the automotive service and repair profession. It demonstrates the "can do" attitude of an individual who is secure in his or her ability.

Others have also extolled the benefits of ASE certification. In one example, NAPA (National Auto Parts Association), a national franchise of auto parts supply stores and repair shops, recognized that automobile technicians must have current skills and knowledge to keep pace with the ever-changing vehicles and the methods and tools needed to repair them. As a result, NAPA openly states that its AutoCare repair centers employ qualified ASE-certified technicians, who must recertify every 5 years to remain current with developing technology, and urges customers to look for the blue and white ASE-Certified seal at local NAPA stores (www.napaonline.com).

In an article written for the U.S. auto repair industry entitled "ASE Certification: It's a Matter of Common Sense," Gary Goms (http://www.counterman.com/ase-certification-it-s-a-matter-of-common-sense/) states:

> In the real world, the automotive service industry in the United States is an industry with no threshold professional standards. In other words, anybody without the benefit of education or training is legally entitled to call him or herself an auto technician. Unfortunately for the automotive service industry, this glaring lack of professional standards has opened the door to incompetence and fraud.

To counter this, Goms states that ASE certification tests are the "yardstick" for measuring auto mechanic competencies and establishing such a threshold standard. According to Goms, preparing for, taking, and passing ASE certification results in each student developing more intellectual curiosity, and becoming more dedicated to achieving professional status. Earning ASE certificates helps technicians to develop learning habits that stay with them through the rest of their professional lives. The more academics they learn, the more professional and the more intellectually aware they become.

In an article written for *Mass Transit Magazine,* Dennis Cristofaro, formerly Manager of Bus Maintenance Training for the Chicago Transit Authority and now Operations Training Specialist with PACE Suburban Bus, asks: "The ASE Certification Credential: What Does it Mean to Our Industry?" (Dec. 2006–Jan. 2007). At the time it was published, Cristofaro was also an active member of the committee that prepared the ASE transit series test questions. The program was just being launched and its acceptance in transit was uncertain. To gain support for the program he likened the need for technician certification to credentialing required by doctors, lawyers, and other professional occupations. Given the responsibility technicians have for ensuring safety, security, on-time dependability, and comfort, Cristofaro maintained that it is absolutely essential that a credentialing mechanism such as ASE be in place to validate and recognize knowledge, skills, and abilities. Eight years later, more than 3,000 technicians have passed a total of more than 10,000 ASE Transit Bus tests, a testament to the benefits bus transit sees in credentialing.

APTA STANDARDS AND AUTOMOTIVE SERVICE EXCELLENCE

Background

Standards represent an important program activity at APTA and within the public transportation industry. APTA, through its policy and planning committees, has played a major role in the development of standards. Hundreds of industry volunteers serving on numerous working committees have developed standards for bus, rail transit and commuter rail operations, maintenance, procurement, and Intelligent Transportation Systems. These consensus-based standards are being used to achieve operational efficiencies and safety improvements in services, facilities, and vehicles.

Although some terms are often used interchangeably, types of documents published by APTA include:

- Standards: A generally accepted practice, method, or prescribed manner by which something is achieved by authority as a rule, measure of quality, or value.
- Recommended Practices (RP): An established or usual way of doing something usually based on repeated actions or widely established processes.
- Guidelines: General options on how to accomplish the task at hand.
- White Papers: Documents that only provide information; no action is described.

Recommended Practices for Training

An entire page of APTA's Standards website is dedicated to buses: http://www.apta.com/resources/standards/bus/Pages/default.aspx. Included is a section devoted to training, specifically a series of RPs offering guidance for establishing standardized bus maintenance training programs to help technicians pass ASE certification tests.

The RPs are developed by APTA's Bus Maintenance Training Committee (BMTC) consisting of transit labor organizations, including ATU and TWU; instructors; maintenance

managers; OEMs; and the Transportation Learning Center (TLC), which helped organize the joint labor–management participation.

APTA recommends the use of these documents by organizations that have a training department or conduct training for the maintenance of transit buses, that contract with others for transit bus maintenance training, and that influence how training for transit bus maintenance is conducted.

The RPs begin by recommending a learning environment that combines classroom lectures, mentoring, practical training, and includes practice tests as part of the training program. The introduction also describes the level of computer skills needed by technicians, and the types of questions typically found on ASE tests. Another section, course descriptions and objectives, lists the learning objectives each course is recommended to achieve, which are tied to the ASE task list. The ASE reference ensures that regardless of how many learning objectives are contained in the RPs, those job tasks used specifically by ASE to develop their questions are addressed in the APTA training. By incorporating APTA's learning objective in their training programs, instructors are sure to develop a comprehensive approach to learning that includes the knowledge technicians need to gain ASE certification.

Learning objectives are organized on four levels, 100–400, with Level 100 representing basic tasks and Level 400 highly advanced tasks. The division by levels allows a training department to structure its program to first teach basics and increase the level of mastered knowledge over time. The final section of APTA's training RPs recommends the minimum acceptable grade required to pass the course and all practical tests.

SOUTHERN CALIFORNIA REGIONAL TRANSIT TRAINING CONSORTIUM

Southern California Regional Transit Training Consortium (SCRTTC) is a nonprofit organization created in response to the industry's need for a trained technical workforce. It includes a coalition of 46 transit operators, community colleges, and other educational institutions based in California and Colorado. SCRTTC has developed and delivered curriculum designed to meet the technical needs of transit agencies, having trained more than 4,300 transit employees and delivered more than 61,000 hours of training.

SCRTTC uses standard operating procedures to develop courseware and has processes in place to ensure that instructors meet established accreditation standards. Course topics come from a committee of transit and educational members based on the immediate training needs of its membership. Once the core topic is selected, a subset of committee members begins content development designed to fit within one of four training tracks: Basic, General, Advanced, and Specialty; a structure similar to the four levels used by APTA.

Courses are typically delivered by community college instructors, some of whom are also SMEs in the particular subject being taught. In other cases, transit agency instructors teach the courses. Agency instructors first attend community college courses that provide soft skills training required to become effective instructors. In all cases, the community college is teaching a course developed and approved by the consortium. About 60% of the training is conducted at transit agency facilities depending on the course being offered. Much of the instruction is hands-on, where students learn by doing.

Although SCRTTC did not originally design its courses with passing ASE tests in mind, SMEs now consider the ASE Task List when developing new courses or upgrading existing ones. Doing so ensures that the training includes material needed to help technicians pass ASE tests and obtain certification. As evident in its work, SCRTTC is a staunch supporter of standards-based training and as such believes transit has a positive view toward the ASE program and that the standards established by ASE are worth training to (D. Stumpo, personal communication, Jan. 23, 2015). Additional information can be found at: www.scrttc.com.

CENTER FOR URBAN TRANSPORTATION RESEARCH

CUTR at the University of South Florida was established in 1988 to provide objective expertise in the form of research, comprehensive training and education, and technical assistance. CUTR's National Center for Transit Research is designated as one of 22 University Transportation Centers in the country. CUTR has a faculty of 37 full-time researchers and is home for the National Bus Rapid Transit Institute. In addition, CUTR maintains a widely used list serve (created by and formerly maintained by TRB) dedicated to the exchange of bus maintenance and technology topics among transit bus professionals.

Important to this study is CUTR's Certified Transit Technician (CTT) training program developed in conjunction with the Florida Department of Transportation (FDOT), which includes several key ASE elements as part of its program. A detailed case example is included in chapter four.

TRANSPORTATION LEARNING CENTER

The Transportation Learning Center (TLC) is a partnership of national transportation leaders that develops industry-wide solutions and provides support for local and statewide partnerships in areas of common labor–management interest, such as workforce development and safety. The Center's growing network of regional Transit Career Ladder Partnerships has helped create jointly developed transit training standards, national apprenticeships, and systems of qualification for technical occupations—all of which help improve the quality of transit training while cutting cost.

TLC works on a joint labor–management basis to develop training standards for both bus and rail maintenance. The standards, established for a broad range of maintenance areas, define the learning objectives to be achieved during training. TLC has been instrumental in identifying skilled technicians and instructors to serve as SMEs, thereby adding validity to the learning objective development process. TLC has played a key role in developing bus training standards through APTA's BMTC. As described earlier, those standards are based on the ASE Task Lists and designed in part to help technicians prepare for and pass the ASE certification tests.

TLC has also established an online platform, the Transit Training Network (http://www.transittraining.net), to facilitate sharing of transit technical training materials across agencies. The courseware sharing initiative could be useful to technicians looking to prepare for ASE testing.

TLC is also involved in other training activities including an Elevator/Escalator Training Consortium for developing standards-based training materials, a similar Consortium for Rail Signals training, a Mentoring Guidebook to make effective use of the many highly skilled baby boomer technicians before they retire, two papers that explore the benefits of hands-on learning, train the trainer programs, and a host of other front-line worker training initiatives.

Of particular interest to this study are two Transit Learning Center projects. One is *TCRP Report 178: A National Training and Certification Program for Transit Vehicle Maintenance Instructors* (2015) (http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_178.pdf), which recommends a program structure and business plan for establishing a national system for training and certification for transit bus and rail maintenance instructors. It proposes a suite of tools for the evaluation and accreditation of instructors. The national approach recommended by the study eliminates the need for each agency to develop redundant and unnecessary programs, courses, and qualifications. Finally, it will ensure a new generation of instructional professionals because the courses and process of certification will ensure that any instructor granted certification will have the documented skills to be effective.

The other TLC project is TCRP Report Project E-07, *TCRP Report 170: Establishing a National Transit Industry Rail Vehicle Technician Qualification Program: Building for Success* (http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2359). The program establishes a system of qualifications for rail vehicle technicians that integrates national training standards, progressive classroom curricula, OJT learning modules, an apprenticeship framework, and mentoring. Both written and hands-on assessments are used to confirm that technicians have the practical knowledge and skills required to perform their jobs at the highest level of expertise. The research project developed all content and infrastructure necessary to deliver the system of qualifications to transit rail agencies; an organization is now required to see it through.

CDX GLOBAL

As part of TCRP's Innovations Deserving Exploratory Analysis (IDEA) Program, Transit Project 62 (http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2860), CDX Global located in Australia developed an Internet-based electrical training module for transit technicians. The training module was created to meet a growing demand for increased understanding of modern transit bus electrical systems, which have become increasingly complex. CDX Global worked closely with APTA's BMTC members to ensure that the material would be useful to technicians wanting to prepare for the ASE electrical exam, to smaller transit agencies without training departments, and to those agencies looking to enhance their existing training programs.

After consulting extensively with transit training managers, a module, CDX Bus: Modern Electrical Systems, was developed. CDX Global adapted its model of "Know-See-Do-Prove" to the bus transit industry because of its successful application in the automotive industry. That model takes into account the learning styles of technicians in a blended learning approach, where theoretical concepts are explained in computer-based courses and then matched with hands-on training. According to CDX Global, this approach successfully accelerates retention of principles and concepts, and lays the groundwork for more specific manufacturer training.

CDX Bus: Modern Electrical Systems was finalized (http://www.trb.org/Main/Blurbs/169360.aspx) after extensive worldwide review by maintenance training managers and technicians to provide critical information on:

- Electrical theory and practice,
- Multiplexing,
- Alternative fuel vehicles,
- Safe handling of high voltage systems on hybrid-diesel buses, and
- Diagnosis and repair using ladder logic and electrical schematics.

The module is available through the Jones and Bartlett Learning website (http://cdxauto.com/CDXBusOverview) as a free trial or on a yearly subscription basis. Each module comes complete with:

- Videos and diagrams,
- Interactive digital volt ohm meter simulations,
- Quizzes and exams, and
- Assessment and reporting tools.

Jones and Bartlett Learning markets this course to various transit training departments including SCRTTC (www.scrttc.com).

UNIVERSAL TECHNICAL INSTITUTE

Universal Technical Institute (UTI) is a nationally recognized provider of technical education training for students seeking careers as professional automotive, diesel, collision repair, motorcycle, and marine technicians. Through a nationwide campus-based school system, UTI offers specialized technical education programs under several brands including UTI, Motorcycle Mechanics Institute, Marine Mechanics Institute, and NASCAR Technical Institute.

Prominently displayed on UTI's website homepage is a statement that its Diesel & Industrial Technology program is Master Certified by ASE's Education Foundation (NATEF). Graduates of UTI's Diesel & Industrial Technology program are well prepared to pass ASE tests. UTI is also proud to proclaim that three of its instructors were recently awarded the prestigious ASE World Class Technician Award, given to professional technicians who have tested and obtained ASE certification in 22 specialty areas.

UTI has training facilities at ten campus locations throughout the United States and uses hands-on training extensively in its educational programs. In addition to traditional campus-centered training where students travel to attend courses, UTI has another division that provides on-site training to meet specific client needs. Customers include public transit agencies, both through its own representation under the UTI banner and under contract through transit bus OEMs.

CHAPTER THREE

SURVEY RESPONSES

INTRODUCTION

This chapter reports on the ASE program as expressed through survey responses received from technicians, instructors, and maintenance managers, supervisors, and union representatives from 16 transit agencies, a total of 402 responses. Survey responses were also received through a mailing generated by ASE to individuals who have taken at least one ASE transit test, a total of 108 additional responses. Survey responses to questions from the staff of the 16 transit agencies are presented in tables and text, whereas ASE mailing responses are indicated separately within the text. A total of 510 transit maintenance personnel responses are presented.

Responses received from the 16 target agencies differ from the ASE mailing responses in that the target agencies represent a cross section of technicians, some of whom have not taken an ASE test, may not be aware of ASE, or may not have an interest in the program. Those responding to the ASE mailing, however, have been motivated for one reason or another to take at least one ASE test and therefore have some experience with and interest in the process.

SURVEY RESPONSE TALLY

Table 4 shows the breakdown of all survey responses received and Table 5 the breakdown of transit agency participation.

The remaining tables in this chapter are formatted to show the number of responses received for a given question number. In most cases, only agency responses are shown; in other cases, they are combined with ASE mailing responses. Most tables show separate responses from each of the three occupations surveyed:

- Technicians,
- Instructors, and
- Managers, supervisors, and union representatives.

WORK EXPERIENCE

Table 6 shows the work experience in years for technicians, instructors, and maintenance managers, supervisors, and union representatives from transit agencies and ASE mailing respondents combined.

As indicated in this table, almost half of all technicians who responded to both surveys have more than 10 years of experience. Most of the instructors responding to the surveys also have more than 10 years of experience working as instructors, and the majority has also worked more than 10 years in management and as technicians before becoming instructors.

Most managers, supervisors, and union reps as a group also have more than 10 years of experience in their occupation. Almost half of all managers, supervisors, and union reps have worked more than 10 years as technicians. The point here is that respondents in all three occupations represented in this study have a significant amount of maintenance experience, implying that there is an aging workforce with impending retirements. It is interesting to note that most instructors have more experience working as technicians than they do working as instructors. In addition, the career path for most managers, supervisors, and union reps tends to bypass work as instructors; most of them have less than one year of experience as an instructor.

AUTOMOTIVE SERVICE EXCELLENCE CERTIFICATIONS

Question #5: Automotive Service Excellence Transit Program Awareness

As shown in Table 7, the majority of the 16 target agencies surveyed is aware of the ASE transit bus certification program, with instructors having a higher level of awareness.

Question #6: Number of ASE Certifications

Those responding to the ASE mailing have more certifications than those from the 16 target agencies. Although just over half of the target agency technicians surveyed hold no ASE certifications, more than half of those responding to the ASE mailing are Master Certified (having attained certifications in all test areas).

Most target agency instructors are Master Certified, whereas all instructors from the ASE mailing are Master Certified. Although the majority of managers, supervisors, and union reps responding to the ASE mailing are Master Certified, the majority of managers, supervisors, and union reps from the

TABLE 4
BREAKDOWN OF ALL SURVEY RESPONSES

	Number of Responses Received From:		
Source	Technicians	Instructors	Manager/Supervisor/Union Rep
Transit Agencies (402 total)	246	37	119 (108 management, 11 union)
ASE Mailing (108 total)	81	6	21 (17 management, 4 union)
Subtotals	327	43	140
Total: All Surveys	510		

Source: Survey responses.

TABLE 5
BREAKDOWN OF TRANSIT AGENCY PARTICIPATION

	Number of Responses Received From:		
Transit Agency	Technicians	Instructors	Manager/Supervisor/ Union Rep
Capital District Transportation Authority (CDTA)	4	3	6
Central Florida Regional Transportation Authority (LYNX)	15	2	3
Connecticut Transit	30	2	16
King County—Seattle	30	3	5
Kitsap Transit	8	0	6
Long Beach Transit	16	2	3
Metropolitan Atlanta Rapid Transit Authority (MARTA)	8	4	7
New York City Transit	29	10	16
Niagara Frontier Transportation Authority (NFTA)	7	1	7
OmniTrans (San Bernardino)	11	0	12
Orange County Transportation Authority (OCTA)	16	5	16
Polk Transit	4	0	4
Potomac and Rappahannock Transportation Commission (PRTC)	18	0	5
Rockford Mass Transit (IL)	7	0	2
Santa Clara Valley Transportation Authority (VTA)	24	1	5
VIA Metropolitan Transit (San Antonio)	19	4	6
Subtotals	246	37	119
Total Survey Participation (16 Agencies)	402		

Source: Survey responses.

TABLE 6
WORK EXPERIENCE (target agencies and ASE responses combined)

Years of Work Experience	<1 (no.)	1–2 (no.)	3–5 (no.)	6–10 (no.)	>10 (no.)
Technician Responses/246 + 81					
Years worked as technician	17	22	51	46	110
Instructor Responses/37 + 6					
Years worked as instructor	—	6	8	7	7
Years worked as manager/union rep	—	6	8	9	14
Years worked as technician	6	1	6	4	20
Manager/Supervisors/Union Rep Responses/119 + 21					
Years worked as Manager/Supervisor/Union Rep	—	29	7	19	64
Years worked as technician	28	6	16	19	50
Years worked as instructor	87	12	9	3	8

Source: Survey responses.

TABLE 7
ASE TRANSIT PROGRAM AWARENESS (transit agencies)

Aware of Transit ASE Program	Yes (no.)	No (no.)
Technician Responses/246	196	50
Instructor Responses/37	35	2
Manager/Supervisor/Union Rep Responses/119	104	15

Source: Survey responses.

TABLE 8
NUMBER OF ASE CERTIFICATIONS

Number of ASE Certifications	0 (no.)	1–2 (no.)	3–5 (no.)	>5 (no.)	Master (3)
Technician Responses					
Transit Agencies/246	125	39	30	16	36
Instructor Responses					
Transit Agencies/37	8	3	7	4	15
Manager/Supervisor/Union Rep Responses					
Transit Agencies/119	76	11	8	6	18

Source: Survey responses.

target agencies have *no* ASE certifications. Details are shown in Table 8.

Question #9: Reason for Not Passing

Most respondents from both groups who have taken at least one ASE test blame their own lack of preparation for not passing, as shown in Table 9.

Question #10: Test Question Difficulty

Regarding test difficulty, most believe test questions are "just right" as indicated in Table 10. However, as revealed in the "Awkward Questions" section, more than half of all survey respondents believe at least some of the ASE questions are too awkward to answer (i.e., complexly worded, tricky, etc.). Overall, however, respondents appear to indicate that the tests are fair (i.e., passable) and candidates need to adequately prepare in order to pass.

Survey comments regarding ASE testing reflect a variety of opinions, including the following:

- Some of the questions can be vague and manufacturer-specific.
- Study hard and do not take too many tests at once.
- [The questions] only prove that someone can take a test. The questions [do not reflect] real-world problems.
- The test could be difficult or easy—if you don't read the questions word for word it could be a problem.
- It appears that ASE has to trick the test taker to make the test more difficult. I have been taking ASE tests for

TABLE 9
REASON FOR NOT PASSING ASE TESTS (of those who have taken an ASE test)

Reason for Not Passing ASE Tests	Not Enough Preparation (no.)	Not Enough Training (no.)
Technician Responses		
Transit Agencies/76	51	25
Instructor Responses		
Transit Agencies/15	11	4
Manager/Supervisor/Union Rep Responses		
Transit Agencies/31	26	5

Source: Survey responses.

TABLE 10
TEST QUESTION DIFFICULTY (of those who have taken an ASE test)

How Would You Rate ASE Questions?	Too Easy (no.)	Too Difficult (no.)	Just Right (no.)
Technician Responses			
Transit Agencies/152	4	24	124
Instructor Responses			
Transit Agencies/30	0	4	26
Manager/Supervisor/Union Rep Responses			
Transit Agencies/65	3	8	54

Source: Survey responses.

TABLE 11
ASE RECERTIFICATION PLANS (of those who have taken an ASE test)

Do You Plan to Recertify, Keep Current?	Yes (no.)	No (no.)	Not Sure (no.)
Technician Responses			
Transit Agencies/168	70	42	56
Instructor Responses			
Transit Agencies/31	19	4	8
Manager/Supervisor/Union Rep Responses			
Transit Agencies/69	27	24	18

Source: Survey responses.

more than 20 years and have noticed that the tests are more about how the question is worded.
- I think these tests are rather difficult especially if you really had no training in any of the sections . . . being tested.
- It is a lot about test taking technique. A lot of questions try to "fool" you by twisting words around.
- The tests are as realistic as can be considering the mechanic is diagnosing problems without the benefit of using all senses (touch, sight, smell, etc.).
- I believe if you have a good background in the material being tested you will do [well] on the test.
- A lot of the questions asked do not represent what really happens in a shop.

Question #11: ASE Recertification Plans

As indicated in chapter two, holders of ASE certifications are required to recertify to keep their certifications valid. Most respondents who have taken at least one ASE test do have plans to recertify and keep current with the ASE certification program. Those responding to the ASE mailing are most positive in their recertification plans (Table 11). The relatively large number of those who are not sure, approximately one-third, indicated a need for an outreach effort to provide more information about the benefits associated with ASE. The survey did not seek reasons for those who are not planning to recertify. It might be that they do not see value in continuing either because of lack of incentives, financial compensation, or motivation.

Question #12: Expansion to Other Subject Areas

As noted in chapter two, there are currently eight different ASE transit bus certifications offered. Although most technicians, and managers, supervisors, and union reps are uncertain as to whether the program should be expanded to other areas, instructors clearly favor expansion (see Table 12). Of those who favor expansion, there is strong interest in the subject of hybrid-electric propulsion systems.

According to the responses from managers, supervisors, and union representatives, less than one-quarter indicated that their agency workshop is ASE Blue Seal Certified. As described in chapter two, ASE's Blue Seal of Excellence Recognition Program is one where the entire workshop facility gains ASE certification. Repair shops must meet specific criteria to achieve certification where typically three-quarters or more of technicians must be ASE certified.

OPINIONS REGARDING THE AUTOMOTIVE SERVICE EXCELLENCE PROGRAM

Question #15: Bus Technician Certification

A critical study question asked if bus technicians should be tested and certified. As shown in Table 13, most respondents favor testing and certification of bus technicians. Again, those responding to the ASE mailing are most in favor. Technicians from the 16 transit agencies were less supportive of testing and certification, which is understandable given that

TABLE 12
EXPANSION OF ASE CERTIFICATIONS TO OTHER AREAS (transit agencies)

Should ASE Be Expanded into Other Subject Areas?	Yes (no.)	No (no.)	Not Sure (no.)	Hybrid (no.)	Doors (no.)
Technician Responses					
Transit Agencies/246	70	54	122	45	37
Instructor Responses					
Transit Agencies/37	16	7	14	14	11
Manager/Supervisor/Union Rep Responses					
Transit Agencies/119	52	14	53	43	32

Source: Survey responses.

TABLE 13
SHOULD BUS TECHNICIANS BE TESTED AND CERTIFIED?

Should Bus Technicians Be Tested and Certified?	Yes (no.)	No (no.)	Not Sure (no.)
Technician Responses			
Transit Agencies/246	112	64	70
Instructor Responses			
Transit Agencies/37	28	2	7
Manager/Supervisor/Union Rep Responses			
Transit Agencies/119	79	14	26

Source: Survey responses.

more than half of them do not have any ASE certifications. Technicians from the ASE mailing, however, strongly support testing and certification. Instructors revealed the strongest support for testing and certification.

Question #16: Automotive Service Excellence as the Certification Organization

When it comes to whether ASE should provide the certification, responses nearly mimic those of whether bus technicians should be certified. Technicians and managers, supervisors, and union reps from the transit agencies are least in favor, whereas all three groups from the ASE mailing are most supportive toward ASE being the appropriate organization. Table 14 shows the results. There appears to be no clear consensus for other organizations taking the place of ASE; suggestions included the agency itself, vendors, and community colleges as possible alternative testing and certification organization candidates.

Question #19: Is Automotive Service Excellence Good for Bus Technicians?

When asked if the ASE certification is good for bus technicians, regardless of whether they are rewarded through incentives or financial compensation, responses shown in Table 15 again mirror the last two questions. One-third of technicians and managers, supervisors, and union reps were not sure. Most respondents in all three occupations believe bus technicians should be certified, that ASE is the appropriate organization, and the program is beneficial for bus technicians.

Reasons favoring ASE as stated by respondents include:

- It shows that techs are trained and tested on one standard and ensures the riding public and government officials that our techs are the best at what they do.
- [ASE is] a good tool to help measure employee knowledge and where employer training should be focused.

TABLE 14
SHOULD ASE PROVIDE THE CERTIFICATIONS?

Should ASE Provide the Certifications?	Yes (no.)	No (no.)	Not Sure (no.)
Technician Responses			
Transit Agencies/246	111	53	82
Instructor Responses			
Transit Agencies/37	19	6	12
Manager/Supervisor/Union Rep Responses			
Transit Agencies/119	62	14	43

Source: Survey responses.

TABLE 15
IS ASE GOOD FOR BUS TECHNICIANS?

Is ASE Good for Bus Technicians?	Yes (no.)	No (no.)	Not Sure (no.)
Technician Responses			
Transit Agencies/246	105	51	90
Instructor Responses			
Transit Agencies/37	30	1	6
Manager/Supervisor/Union Rep Responses			
Transit Agencies/119	71	9	39

Source: Survey responses.

- Provides third-party testing and eliminates the perception of subjective decisions for technician promotions.
- Allows management to select technicians and assign them accordingly to their skill level.
- Allows technicians to take pride in what they do; feel accomplished in certain areas.
- I think any system that allows technicians to develop skills and certify their abilities is good.
- Knowledge is power and can only benefit the company and employee.
- I feel the ASE testing makes the technicians better at their jobs and keeps them focused on specific areas they're working on. . . . [but] don't think it should be required as part of the job. We have some very good technicians that just don't want to spend the time or like taking tests.

Comments from those with contrary views toward the ASE program included:

- Passing a test doesn't mean you can do the repairs.
- Anyone can test well, but not everyone can wrench.
- Some mechanics are better at hands on rather than sitting in a class.
- ASE tests and certifications . . . are just to make your managers and property look better. [It] has no bearing on work performed.

Question #22: Organizational Support for Automotive Service Excellence

Most respondents do not believe that labor and management are doing enough to support ASE programs and believe both groups should be doing more. The exception is managers; as a group they believe they are doing enough to support the ASE program (see Tables 16 and 17).

Question #26: Certification of Managers/ Supervisors/Union Reps

Most respondents also believe managers, supervisors, and union reps should be certified (Table 18).

Question #27: Certification of Instructors

Most respondents believe instructors should be certified (Table 19).

OPINIONS REGARDING THE AUTOMOTIVE SERVICE EXCELLENCE TESTING

There has been anecdotal evidence to suggest that passing ASE tests does not necessarily translate into being a good technician. Those assumptions appear to be true, at least in

TABLE 16
MANAGEMENT SUPPORT OF ASE (transit agencies)

Management Support	Yes (no.)	No (no.)	Not Sure (no.)
Technician Responses			
Does Management do enough to support ASE?	38	40	22
Should Management do more?	55	20	25
Instructor Responses			
Does Management do enough to support ASE?	29	60	11
Should Management do more?	80	5	15
Manager/Supervisor/Union Rep Responses			
Does Management do enough to support ASE?	49	35	16
Should Management do more?	49	23	28

Source: Survey responses.

TABLE 17
UNION SUPPORT OF ASE (transit agencies)

Union Support	Yes (no.)	No (no.)	Not Sure (no.)	No Union (no.)
Technician Responses				
Does the Union do enough to support ASE?	15	41	30	14
Should the Union do more?	50	16	22	12
Instructor Responses				
Does the Union do enough to support ASE?	13	60	26	1
Should the Union do more?	82	—	17	1
Manager/Supervisor/Union Rep Responses				
Does the Union do enough to support ASE?	11	48	28	13
Should the Union do more?	56	7	23	14

Source: Survey responses.

TABLE 18
SHOULD MANAGERS/SUPERVISORS/UNION REPS BE CERTIFIED?

Should Managers/Supervisors/Union Reps Be Certified?	Yes (no.)	No (no.)	Not Sure (no.)
Technician Responses			
Transit Agencies/246	126	68	52
Instructor Responses			
Transit Agencies/37	17	9	11
Manager/Supervisor/Union Rep Responses			
Transit Agencies/119	43	41	35

Source: Survey responses.

TABLE 19
SHOULD INSTRUCTORS BE CERTIFIED?

Should Instructors Be Certified?	Yes (no.)	No (no.)	Not Sure (no.)
Technician Responses			
Transit Agencies/246	179	32	35
Instructor Responses			
Transit Agencies/37	27	5	5
Manager/Supervisor/Union Rep Responses			
Transit Agencies/119	95	13	11

Source: Survey responses.

the opinions of those who took the surveys for this study (Table 20). When asked if it is possible to pass ASE tests but not be a good technician, the vast majority of survey respondents from each of the three occupations agree. When asked if it is possible to be a good technician but not pass ASE tests, the vast majority also overwhelmingly agree. Instructors are the exception, where half believe those who pass ASE tests are better technicians than those who fail. The opinions expressed through the surveys appear to imply that while there is solid support for the ASE program, passing tests and gaining certification is not necessarily an indication of being a competent technician. As noted in chapter two, ASE has data to suggest otherwise. Additional ROI research may be required to quantify the benefits of ASE.

TABLE 20
ASE CERTIFICATIONS AS INDICATOR OF TECHNICIAN'S ABILITIES
(transit agencies)

ASE Certification	Yes (no.)	No (no.)	Not Sure (no.)
Technician Responses			
Are those who pass ASE tests better technicians than those who fail?	29	57	14
Possible to pass ASE tests but not be a good technician?	89	7	4
Possible to be a good technician but not pass ASE tests?	88	7	5
Instructor Responses			
Are those who pass ASE tests better technicians than those who fail?	50	38	12
Possible to pass ASE tests but not be a good technician?	76	12	12
Possible to be a good technician but not pass ASE tests?	96	1	3
Manager/Supervisor/Union Rep Responses			
Are those who pass ASE tests better technicians than those who fail?	36	44	20
Possible to pass ASE tests but not be a good technician?	85	11	4
Possible to be a good technician but not pass ASE tests?	91	4	5

Source: Survey responses.

Question #30: Does Passing Automotive Service Excellence Make You a Better Technician?

Selected comments capture the sentiment of survey respondents:

- ASE testing could be a great tool for the employee, but not used exclusively to determine a person's abilities.
- ASE basically tests your word comprehension. You can be a poor reader and fail a written test, and still have a strong mechanical aptitude.
- I knew a person that had ASE certifications and was honestly one of the worse technicians that I have ever worked with.
- ASE certification does not produce a good technician, only experience can do that.

Question #32: Awkward Questions

Regarding test difficulty, most respondents believe that test questions are "just right," an indication that the tests can be passed. However, when asked if at least some of the ASE questions are too awkward to answer, more than half of all survey respondents indicated yes. Some ASE test takers may not understand a question, which may cause them to answer incorrectly even though they may understand the underlying knowledge being tested. As indicated in chapter two, "ASE's Test Development Process," trick questions are not acceptable and each question is monitored and tracked for proper performance over time. ASE is interested in reexamining some of its questions.

Question #33: Inclusion of Hands-On (Practical) Testing

As indicated in chapter two, TLC's TCRP E-7 project proposes hands-on, practical assessments as a companion to written testing for rail car technician qualification assessments. The hands-on assessments incorporate standards-based work tasks and are conducted by each transit agency at their own facility on equipment familiar to the technicians. As indicated here, a majority in three of the six categories believes ASE certifications should include hands-on testing (Table 21). However, as indicated in the following comments, some of the respondents recognize the difficulties associated with controlling and arranging for practical assessments.

- I think the hands on would help those who are not good test takers, but the logistics of doing that would be difficult.
- Give [technicians] a choice—paper test or hands on test so the mechanic can … [choose].
- The hands-on testing should not be done by ASE, but handled by the individual transit authority's training instructors.
- Although [the concept of hands-on testing] is interesting, I think it would be highly impracticable. It is something that has never happened with the automotive ASE tests and they've been around a lot longer.
- Practical application tests would provide a better assessment of a technicians' understanding of the transit vehicles systems.

OPINIONS REGARDING COMPENSATION

A majority of survey respondents reported that their agencies do not pay technicians a higher salary for ASE certifications. Although the survey did not ask, it is understood that agency compensation depends on the number of tests passed and whether certifications are kept current or not. Regardless of whether agencies provide any financial compensation, most in all three groups surveyed believe technicians, as well as instructors and managers, supervisors, and union reps, should be paid more. It is interesting to note that more instructors and managers, supervisors, and union reps believe technicians should receive greater compensation for ASE certifications than themselves, an indication of the value they place on technicians that hold ASE certification.

The surveys also asked how much more per hour those with ASE certifications should receive; the responses ranged from $0.25 to $35.00.

Collective bargaining agreements vary between agencies regarding compensation for ASE certification. Examples of contract language used by transit agencies to award compensation and other incentives are shown in Appendix B. The Capital District Transportation Authority, Albany, New York, is one example where an hourly premium is paid when

TABLE 21
SHOULD ASE INCLUDE HANDS-ON TESTING?

Should ASE Include Hands-On Testing?	Yes (no.)	No (no.)	Not Sure (no.)
Technician Responses			
Transit Agencies/246	126	66	54
Instructor Responses			
Transit Agencies/37	22	4	11
Manager/Supervisor/Union Rep Responses			
Transit Agencies/119	78	21	20

Source: Survey responses.

TABLE 22
ARE STUDY GUIDES USEFUL? (transit agencies)

	Very Useful (no.)	Somewhat Useful (no.)	Not Useful at All (no.)
Technician Responses/117	36	71	10
Instructor Responses/33	11	22	—
Manager/Supervisor/Union Rep Responses/62	33	29	—

Source: Survey responses.

obtaining and keeping current at least two ASE certifications. Other Appendix B examples include contract language from Victor Valley Transit Authority, Hesperia, California; VIA, San Antonio, Texas; and Centre Area Transportation Authority, State College, Pennsylvania.

Comments regarding compensation include:

- People with ASE certifications are more marketable so their pay needs to be higher to keep them with an organization.
- If not paid more, the company should offer some type of incentive program to reward the ones who have their ASE certifications.
- I respect the technicians, managers, and supervisors that can get the job done with or without being certified.

TRAINING

Question #44: Study Guides

As indicated by the survey, most respondents are aware of the ASE study guides and have used them to prepare for testing (Table 22). As shown in this table, the majority of instructors who responded believe the guides are "very useful," whereas technicians and managers, supervisors, and union reps find them "somewhat useful."

Comments regarding the study guides indicated that they are intended to supplement other training, not to be used as stand-alone training materials.

- The guides are useful in that they prepare you to take an ASE exam. They are in no way a place to find all the information in order to pass. Passing these tests [is] dependent on experience and knowledge, not one or the other, so to expect that the books contain all the answers is impossible.
- The study guides help you understand how the test questions are structured. The guides do not train you on the technical subject matter. There needs to be a connection between the learning institution and the certification agency.

Question #47: Training Provided

Although most respondents work at agencies where training is provided, the majority report that they could use more training or the training they do receive does not come close to being enough as indicated in Table 23.

Responder comments capture the frustration of inadequate training:

- [There is] not enough manpower to cover [the work that needs to be done] while [technicians are] in training. Lack of staff is the biggest reason for not getting the needed training accomplished.
- It is book training, not hands-on.
- [I was] very satisfied with the in-house training we used to get, but now we learn on the job by trial and error . . . they don't care.

Questions #49: Training Quality

Many agencies include vendor training supplied by the bus manufacturer as part of the overall procurement. However,

TABLE 23
DESCRIBE THE AMOUNT OF TRAINING PROVIDED (transit agencies)

Describe the Amount of Training Provided	As Much as Needed (no.)	Some, But Could Use More (no.)	Does Not Come Close to Being Enough (no.)	N/A (no training provided) (no.)
Technician Responses/241	50	107	65	19
Instructor Responses/36	11	16	9	—
Manager/Supervisor/Union Rep Responses/119	32	61	20	6

Source: Survey responses.

understanding that vendors add the cost of training to the price of each bus, agencies must weigh the amount of training specified in their procurements against the number of buses that can be purchased in times of budgetary constraints.

As shown in Tables 24 and 25, the highest number of survey respondents in all three groups is somewhat satisfied with the vendor training they receive, whereas nearly one-quarter are not satisfied.

Responder comments regarding vendor training included:

- Vendor training is usually provided when the equipment is new; training would be better provided after vehicles have been in service for a while, when issues actually arise.
- Vendor training is provided to satisfy contractual agreements; at least that is how the vendors look at it. The quality of vendor training takes a significant hit because of that.
- The good vendors are as supplier-neutral in their technical training as possible. The not-so-good vendors hype their own products at the expense of . . . their competitors in the "training" sessions.

When asked to rate the quality of training provided by agency instructors, responses mirrored those provided of vendor training with most survey respondents in all three groups claiming they are "somewhat satisfied" as shown in Table 25. A higher number, however, are "very satisfied" with agency instructors than they are with vendor training. Almost half of all technicians surveyed either receives no training or are "not satisfied at all" with the agency training they do receive.

Comments amplify the training shortage:

- What we provide is outstanding; we just can't provide classes often enough or all the different classes needed.
- Large properties often have the luxury of drawing on a wide variety of skills [from] various instructors. Training units of smaller properties often do not have enough trainers to develop new types of expertise due to the constant pressure of providing "basic" training.
- We get trained now, but more training is always better.
- What training?

Except for managers, supervisors, and union reps, survey respondents from the other two occupations do not believe the current level of training being provided allows technicians to pass ASE testing, as seen in Table 26. The majority of respondents in all three occupational groups either receive no training or the training they do receive is not seen as sufficient to pass ASE testing.

Almost all technicians responding called for more training, as shown in Table 27.

The following comments reflect the need for additional training as well as the need for management training. Technicians who are promoted into management jobs because of their mechanical skills typically are not trained with the new skill sets needed to manage people, budgets, and other administrative tasks. In addition, it appears that many agencies may fill

TABLE 24
SATISFIED WITH THE QUALITY OF VENDOR-SUPPLIED TRAINING? (transit agencies)

Satisfied with Vendor-Supplied Training?	Very Satisfied (no.)	Somewhat Satisfied (no.)	Not Satisfied at All (no.)	N/A (no vendor training provided) (no.)
Technician Responses/241	22	120	66	33
Instructor Responses/36	16	22	2	2
Manager/Supervisor/Union Rep Responses/119	14	67	21	17

Source: Survey responses.

TABLE 25
SATISFIED WITH AGENCY INSTRUCTORS? (transit agencies)

Satisfied with the Quality of Training Provided by Agency Instructors?	Very Satisfied (no.)	Somewhat Satisfied (no.)	Not Satisfied at All (no.)	N/A (no agency training provided) (no.)
Technician Responses/241	61	105	40	35
Instructor Responses/27	11	16	—	—
Manager/Supervisor/Union Rep Responses/119	36	49	12	22

Source: Survey responses.

TABLE 26
DOES TRAINING ALLOW TECHNICIANS TO PASS ASE TESTING? (transit agencies)

Does Training Allow Technicians to Pass ASE Testing?	Yes (no.)	No (no.)	N/A (no training provided) (no.)
Technician Responses/241	98	92	51
Instructor Responses/36	21	12	3
Manager/Supervisor/Union Rep Responses/119	52	46	21

Source: Survey responses.

TABLE 27
WOULD YOU LIKE MORE TRAINING? (transit agencies)

Would You Like More Training?	Yes (no.)	No (no.)
Technician Responses/241	223	18

Source: Survey responses.

TABLE 28
INSTRUCTORS' VIEWS REGARDING TRAINING SUPPORT
(Instructors Only, Transit Agencies)

	Very Supportive (no.)	Somewhat Supportive (no.)	Inadequate Support (no.)
Instructor Responses/27	11	16	—

Source: Survey responses.

maintenance management positions with individuals who possess management skills, yet lack technical aptitude to provide assistance to technicians on the shop floor when needed. The combination of technically unskilled technicians and those who supervise those technicians may not be appropriate for carrying out proper maintenance procedures. Comments included:

- Everyone wants more training, but it costs.
- Managers could use more management-based training.
- Managers are sometimes hired from the outside with no mechanical skills; skilled managers [need] to lead skilled workers.
- Technology and our jobs are constantly evolving; you should never become idle in your education.

Question #56: Instructor's Views on Training

As indicated in Table 28, most instructors responding believe their agency is very supportive when it comes to providing maintenance training.

Instructors were also asked to weigh in on various ways to improve training. Nearly all responding instructors agreed that technicians might be provided with more hands-on training, followed by the need for more training in general (Table 29).

Most responding instructors are trained for their jobs and are generally satisfied with that training; however, all instructors responding to the survey would like more training. As mentioned in chapter two, TLC has just concluded a *TCRP project (F-19) TCRP Report 178: A National Training and Certification Program for Transit Vehicle Maintenance Instructors* (http://www.trb.org/Main/Blurbs/172367.aspx) recommending a program that would provide nationally sanctioned training and certification for both transit bus and rail maintenance instructors.

Question #59: Manager's Views on Training

Most managers, supervisors, and union reps also ranked the need for more hands-on training first on their list of training priorities followed by more vendor training and more overall training (Table 30).

TABLE 29
INSTRUCTORS' VIEWS ON IMPROVING TRAINING
(instructors only, target agencies, and ASE responses combined)

Instructor's Views on Improving Training	Yes	No
Instructor Responses		
Provide more financial support	71	29
Add more instructors	61	39
Add more training	81	19
Provide more training to instructors	76	24
Give technicians more paid time to take training	65	35
Provide technicians with more hands-on training	95	5
Obtain more training from vendors	71	29
Institute an apprenticeship program	79	21

Source: Survey responses.

TABLE 30
MANAGER/UNION REP VIEWS ON IMPROVING TRAINING
(managers/union reps only, target agencies, and ASE responses combined)

Manager/Union Rep Views on Improving Training	Yes	No
Manager/Supervisor/Union Rep Responses		
Provide more financial support	74	26
Add more instructors	59	41
Add more training	89	11
Provide more training to instructors	68	32
Give technicians more paid time to take training	63	37
Provide technicians with more hands-on training	91	9
Obtain more training from vendors	90	10
Institute an apprenticeship program	78	22

Source: Survey responses.

SUGGESTIONS FOR IMPROVING AUTOMOTIVE SERVICE EXCELLENCE PARTICIPATION

There were two suggestions for improving ASE participation that were highlighted by survey respondents: (1) provide technicians with more training and (2) increase compensation for achieving ASE certification. Of the many comments received, the following summarize the key steps required for improving ASE:

- Like anything else, if you want better mechanics you need to pay them for their ASE certifications. It makes them better mechanics, which equals less lost time on repairs and less shop comebacks (repeat failures).
- Publicize it more so people know about it.
- Give more [training] classes to help [technicians] pass ASE testing.
- Management must make a shift in their thinking. They must realize that we are very important to the organization . . . and we are not very easy to replace.
- Need more ASE support.
- Need to have more clout for inspectors. The brake inspector might have an ASE certification; same for chassis and engines.
- Better support from everybody involved with making a 50,000 lb missile (i.e., transit bus) doing 45 mph nearing a school zone safer.

Respondents appeared to indicate that a competent transit technical workforce supports initiatives that promote state of good repair, asset management, and workforce development.

CHAPTER FOUR

CASE EXAMPLES

INTRODUCTION

The three case examples included in this chapter focus on ASE program integration: two are transit agency examples, while a third examines a state-wide training program. VIA, San Antonio, Texas, incorporates the ASE Task List into its own training program and offers incentives for certifications. PRTC insists that its maintenance contractor, First Transit, employ ASE-certified technicians as a way of validating their competency. FDOT and CUTR offer a training program throughout Florida that uses ASE as key elements to both classroom and OJT learning.

VIA METROPOLITAN TRANSIT

Agency Overview

VIA provides public transportation services in Bexar County, Texas, which includes the city of San Antonio. Bus lines are separated into Metro, characterized by frequent service routes; Skip, featuring limited stop routes; Express; streetcar routes serving the downtown area; and VIA Primo, the bus rapid transit line. VIA provides special event service from its Park & Ride locations to events such as San Antonio Spurs basketball games and various annual activities. VIA also offers VIATrans paratransit services. Vital bus service statistics are provided in Table 31.

Maintenance Department Overview

VIA employs 159 maintenance workers: 113 technicians, 34 body and paint specialists, and 12 electronics technicians working three shifts, seven days per week. Technicians are represented by the Amalgamated Transit Union (ATU). Inspections, overhauls, running repairs, and body work are all done at one facility location.

Maintenance Training

As buses became more complex and new technologies were introduced to an aging workforce more familiar with older buses, VIA realized it had to update its training program to keep pace. Training is now provided to technicians in two ways. The first is directed toward new hires, which must have 3 years of full-time work experience as a technician in any field or a 2-year certificate in automotive technology. They are provided with in-house training for 3 months. Courses include air system, electrical, and preventive maintenance inspection, where the split is approximately 75% hands-on and 25% classroom instruction.

In addition to mandatory training for new hires, any employee can be selected to participate in a Targeted Maintenance Training Program (TMTP), an intense 18-month program covering all bus areas. VIA selects employees for the TMTP training program based on: having a positive attitude toward their job, a willingness to try to do a good job, and on-time job attendance. According to VIA, employees who demonstrate a positive attitude toward work are more likely to learn and will make the most use of the training provided.

The TMTP program is made up of various training modules. Students are given three attempts to pass a post-module test to advance from one module to the next. If they do not pass at a third attempt, no additional in-house training opportunities are provided. All training is given on agency time. Employees have the opportunity to take a test that is offered twice each year that can advance them in pay based on their test scores. Although this is not mandatory, VIA also encourages technicians to take various online training programs at home offered by vendors. Otherwise, most training takes place at VIA's facility and is provided by one trainer and one associate instructor. Tuition assistance is also available for employees taking college courses. For machinists, welders, painters, and other skilled positions limited to a small number of workers where creating a dedicated course is not cost-effective, VIA sends employees to a local community college for specialized training.

Although VIA does not use formal mentors, once technicians earn lead-person status they become the "go to" people who other technicians come to for technical assistance when supervisors are busy. Originally, VIA only had one lead-person per shift; however, the increased emphasis on training has produced a greater number of highly skilled lead technicians who can offer expertise to others in-house. As compensation, VIA pays them 5% more than journey technicians.

TABLE 31
VIA—VITAL BUS SERVICE STATISTICS

Population Served	Number of Buses	Annual Revenue Miles	Annual Passenger Trips
1.8 million	463 buses and 148 paratransit vans	29 million	47 million

Source: VIA.

VIA claims that its training approach has resulted in a cultural shift among technicians. Because VIA once relied on traditional General Motors Corporation RTS buses for many years, many senior technicians were not sure about working on new low-floor designs with multiplexed electrical systems and advanced onboard electronics. The emphasis VIA now places on training provides those technicians with a way to learn new systems or opt for early retirement if they have no interest in learning new technologies. Owing in part to enhanced skills learned through its TMTP program, VIA technicians now participate in APTA's annual Bus Maintenance Rodeo competition, where they have earned several awards. VIA's maintenance director credits its TMTP program for taking mechanics once seen as "parts changers" to highly skilled technicians capable of accurately diagnosing faults, with skill sets needed to maintain and repair today's highly advanced buses.

ASE Integration

Although VIA supports the ASE program, its maintenance training program is not centered on technicians passing ASE tests to gain certification. As with other agencies, the primary objective of VIA's training is to ensure that technicians have the necessary knowledge and skills required to maintain and repair its specific fleet of buses and operating environment; hence, its TMTP "targeted" training program. VIA sees merit in the Task List established by ASE; learning objectives created by SMEs used by ASE to develop test questions. Discussions with local ATU representatives revealed that the union also values ASE as a way of keeping workforce skills current with new technologies and to compensate them for their proven abilities.

As VIA was updating its training courses it reviewed the ASE tasks to make sure applicable subjects are covered not only in its classroom training, but also incorporated into OJT. The tasks are well suited as a checklist to make certain that students can demonstrate essential job skills as part of the learning process. In some cases, the ASE tasks were modified to suit VIA's bus fleet.

Currently, only nine of 159 VIA technicians have one or more ASE certifications and 13 are ASE-certified supervisors and trainers. There is an annual incentive of $120 for each certification. VIA understands that this bonus is not as much as other agencies offer and is looking to increase ASE certifications by boosting compensation. VIA reimburses workers for the ASE tests and related fees only if they successfully pass each test. A complete description of VIA's ASE incentives is included in Appendix B.

VIA values the validation of technician skills offered by ASE and incorporates elements of the ASE testing into its own training program. The agency worked with the union to develop the training program and the internal testing protocol for advancement, as well as policies regarding ASE testing and certification. The ASE Task List for the transit bus series can be found as part of the ASE study guide at www.ase.com (search: study guides).

POTOMAC AND RAPPAHANNOCK TRANSPORTATION COMMISSION

Agency Overview

PRTC is comprised of six member jurisdictions in suburban Northern Virginia. Bus services originate and are provided within three member jurisdictions. In addition to commuter bus service to Washington, D.C., and other major regional employment destinations, PRTC supplies connections to nearby Metrorail stations, a cross county connector service, and local flex-routing service. The agency also operates Virginia Railway Express, a commuter rail service into Washington, D.C. Vital bus service statistics are provided in Table 32.

Contracted Operations

PRTC contracts with First Transit to operate and maintain its fleet of 154 buses. Founded in 1955 as American Transportation Enterprises, First Transit has had several acquisitions and name iterations over the years. In 1999, the firm was acquired by FirstGroup, plc, a large transportation organization based in the United Kingdom, and became First Transit. In the United States, First Transit has 242 contracts controlling more than 11,200 transit vehicles.

TABLE 32
PRTC—VITAL BUS SERVICE STATISTICS

Population Served	Number of Buses	Annual Revenue Miles	Annual Passenger Trips
486,692	154	3.2 million	3.4 million

Source: PRTC.

Maintenance Department Overview

PRTC/First Transit employs 19 technicians and three supervisors. Technicians are represented by the American Federation of State, County, and Municipal Employees (AFSCME) labor union. All maintenance activities take place at a single operating garage, although future plans call for a satellite facility in the western portion of the service area.

Maintenance Oversight

To ensure that its bus fleet is properly maintained to contractual agreements, PRTC employs a third-party firm to conduct maintenance audits three times annually to physically inspect a third of its bus fleet at random. The audit also includes an examination of key maintenance records, analyzing fluid samples (engine oil, transmission fluid, and coolant), and a road test of one-quarter of the fleet sample. Incentives are outlined in the contract in part based on miles between service interruptions; PRTC's agreement with First Transit includes contract deduction provisions that can be earned back at year's end, based on good faith efforts to reduce or eliminate the cause of deductions applied and other measures of performance, including the results of the third-party performance evaluations.

A review is also made of maintenance worker qualifications as agreed to by PRTC and First Transit. Five heating, ventilation, and air conditioning work orders are examined to note if refrigerant-related repairs are being made by qualified technicians; 20 of the 22 First Transit technicians and foremen are air conditioning certified. PRTC also requires that the ratio of buses per technician not exceed eight. With a fleet of 154 buses and 19 technicians, the ratio is eight buses per technician.

ASE Requirement

As part of PRTC's contract with First Transit, technicians are required to have a certain level of experience and ASE certifications. The contract reads:

> Maintenance personnel will be trained to proficiency on each of PRTC's vehicles and sub-systems before the start of service. Contractor will be required to ensure that all repairs involving warrantied vehicles, sub-systems, parts, etc., are performed at all times by maintenance personnel who are properly certified to perform such work such that qualifications cannot be questioned when submitting warranty claims. All mechanics (defined as mechanics and foremen) must have at least one ASE certification and five (5) years' experience on heavy duty trucks or buses. Alternately, mechanics may be graduates of a certified two-year technical/vocational institute and have two (2) years' experience with heavy duty trucks or buses. At least 33% of the maintenance staff (defined as mechanics only) shall be ASE Master Certified for medium and heavy duty trucks, not including the maintenance manager. In addition, all mechanics (defined as mechanics and foremen) shall receive a minimum of 16 hours of technical/refresher training annually.

During the maintenance audit that takes place three times annually the level of experience for each technician is reviewed. Investigations are made to determine if all technicians have at least one ASE certification or the required educational backgrounds, a minimum of 33% of all technicians are ASE Master Certified, and they receive the required hours of annual training. Although not a requirement by PRTC, the maintenance workshop operated by First Transit has been ASE Blue Seal Certified for the past 8 years. As mentioned in chapter two, ASE grants this certification to workshops where at least 75% of technicians are ASE certified and each area of service offered in the shop is covered by at least one ASE-certified technician.

Hiring and Training

To meet PRTC's requirements and to maintain its own Blue Seal certification, First Transit only hires technicians with ASE certification. As part of its training program, all technicians are given ASE study guides produced by Delmar as part of its training program, and the ASE website is used to accustom students to the ASE test taking process and to prepare them for certification. As with VIA, passing ASE is not used as the focus of First Transit's training program, but as one element of it.

First Transit encourages all of its technicians to acquire additional ASE certifications and reimburses them for all fees associated with taking the ASE tests as long as they pass. Compensation for acquiring ASE certification is given on a sliding scale where there is a $5 difference per hour for achieving Master Certification status.

Summary

PRTC insists on the ASE certifications as a nationally recognized method for substantiating technician competency.

Doing so gives PRTC the confidence that the bus equipment they own is being maintained in a way that will provide safe and efficient operation. Likewise, First Transit also sees the value in ASE by using the study guides and other ASE materials in its training and encouraging employees to become certified.

CENTER FOR URBAN TRANSPORTATION RESEARCH/FLORIDA DEPARTMENT OF TRANSPORTATION TRAINING PROGRAM

Background

The Transit Maintenance Analysis and Resource Center (TMAARC) originally started out as the Florida Maintenance Training Program in 1990 when FDOT and CUTR signed a joint participation agreement, which established TMAARC as a comprehensive training program for transit bus technicians in the state of Florida. It consists of classrooms, labs, a resource center of various training programs and materials, and a pathway to professional accreditation. Administration of the program is the responsibility of CUTR, described in chapter two.

Certified Transit Technician Program

The CUTR/FDOT Certified Transit Technician (CTT) Program provides transit bus technicians in Florida with targeted maintenance training as a means of achieving four certifications:

- State Post Secondary Adult Vocational certification
- ASE Master Certification
- Florida Transit Maintenance Consortium certification
- Associate of Science degree.

After registering for the voluntary program, online technicians progress through a series of 15 modules (course offerings) organized under three levels: Technician 1, Technician 2, and Technician 3. The curriculum for each level consists of:

Technician 1
- Equipment Preventive Maintenance
- Basic Electrical Systems
- Wheelchair Lift/Ramp
- Diesel Engine Preventive Maintenance
- Steering and Suspension.

Technician 2
- Hydraulics
- Diesel Electrical and Diesel Engine Electronics
- Drive Train
- Intermediate Electrical Systems
- Transit Brakes/Air System.

Technician 3
- Alternative Fuels System
- Advanced Electrical Systems
- Heating and Air Conditioning
- Transmission Diagnosis, Rebuild, and Repair
- Diesel Engine Diagnosis, Rebuild and Repair.

Each level provides more than 600 hours of training, roughly split between 40% classroom, which is taken first, followed by 60% of OJT. The program makes it clear that it provides more OJT than classroom. ASE study guides are given to students as part of the training program, and ASE plays an integral role in the program itself. To date, 34 students have graduated from the program.

Classroom Training

Classroom training is offered at the Pinellas Suncoast Transit Authority in St. Petersburg, Florida, and at Volusia County Transit (Votran) in South Daytona, Florida. Classroom training is also given at other transit agency locations in the state if minimum attendance levels can be met. Students sign up for classes at the TMAARC website; all classroom training is 3 to 5 days in duration. Supplemental instruction is provided online, which includes Virtual Hands-On Training, a concept that allows students to do real-time troubleshooting over the Internet miles away at their worksite. Students from remote locations make actual repairs to equipment that is located at a distant facility. The procedure is used as part of the Tech 2: Diesel Electrical and Diesel Engine Electronics class. In addition, three-dimensional (3D) modeling is offered as a computer-based, distance learning structure, where students can log on to the Internet and run through portions of the course while viewing 3D animated components and troubleshooting diagrams. This approach is used as the first two days of the Tech 1: Basic Electrical Systems class.

The CTT program pays overnight lodging and per diem expenses, and the transit agency pays normal wages and travel costs to and from the training site. Each transit agency controls who attends and when; the program dictates how, where, and when instruction is given.

Pre- and post-test questions are given for each of the 15 classroom training modules. The tests are stylistically created to mimic the ASE question format. In the eight relevant ASE subject areas (H1–H8), the ASE Certification Test is actually used to satisfy the final requirement of those classroom modules; technicians are required to take and pass all eight Transit ASE tests and become ASE Master Certified as part of the FDOT/CUTR training program, even though ASE only requires the passing of seven tests for Master classification.

The CTT program identifies, schedules, and pays for the ASE tests prior to the student taking them so students incur no out-of-pocket expenses. Use of ASE style questions in pre- and post-testing to confirm classroom learning combined with having students achieve ASE Master Certifications in all

eight transit areas reveals just how much FDOT and CUTR value ASE as a measure of technician competence.

On-the-Job Training

OJT follows classroom training and is used to complete each of the 15 training modules. The OJT format is structured to accept many methods of instruction as long as the ASE Task List is used as the basis for the training. Even if OJT is performed differently, the ASE Task Lists ensure that the same material is covered.

OJT using the ASE Task List is carried out at the student's agency. As with VIA, ASE tasks serve as real-world jobs that technicians will be expected to perform. Technicians are given work orders for jobs that coincide with the ASE tasks. Work orders also serve to document and verify the OJT portion of the training.

Maintenance managers and supervisors at each agency verify that tasks have been correctly performed. A signed OJT completion form is sent to the program administrator who updates each student's progress on the web.

Certifications

After successfully completing classroom and OJT portions of the CTT training program at all three levels, graduates receive a State Post Secondary Adult Vocational certification and a Florida Transit Maintenance Consortium certification in addition to the ASE Master Certification, which is used to validate successful completion of the training program.

Costs

The cost to FDOT for each of the training levels is approximately $1,700, or $5,100 to complete all three levels of the CTT program, 15 modules total. In addition to the training, the program pays lodging, per diem, ASE testing costs, all administrative costs, and provides for the instructor, curriculum, and facility. In other words, FDOT pays all training CTT program costs.

College Credit

When students complete all three curricula levels of the CTT training program they can continue their education and receive an Associate of Science (AS) degree at Hillsborough Community College (HCC). To do so, they present their Post Secondary Adult Vocational certificate to HCC when they enroll in the AS program where HCC awards 27 "block" credits toward the degree. Students then need 33 additional college credits for the degree, which they either can take online or at an accredited training institution where they live, and transfer the 33 credit hours to HCC for the degree.

Agency Responsibilities

If the agency is not providing the classroom training it must supply a means for the student to travel to and from a training site, which is not unlike current agency policy. Agency personnel must also supervise the OJT portion of the training and sign off on the ASE-based OJT tasks. Participating agencies must also pay students their regular wages while attending class, which again is not unlike current agency policy.

ASE Integration

To summarize, the FDOT/CUTR maintenance training program offered throughout Florida incorporates many aspects of the ASE program. Classroom instruction consists of a comprehensive curriculum with pre- and post-tests administered that mimic ASE style tests. ASE tasks are used to guide OJT training that follows classroom instruction and serve as a checklist to ensure all students perform similar tasks. The combination of classroom and OJT guarantees that students can perform on both an academic and hands-on level, making certain students who achieve certifications as part of the Florida program are indeed competent technicians when they reach the shop floor. Extensive use of ASE program elements is an indication that FDOT and CUTR value what ASE brings to their statewide training program, a program that provides skill training that culminates in certification.

CHAPTER FIVE

CONCLUSIONS

This synthesis reports on the application of the Automotive Service Excellence (ASE) testing and certification program to maintenance staffs (technicians, instructors, and management/supervisory/union representatives) of transit bus agencies. It was accomplished through a literature review, three case examples, and 402 responses from the staffs of 16 transit agencies, as well as 108 responses from ASE transit bus test participants. Eight years after first being introduced to transit, the purpose of this investigation was to determine how the ASE program is being accepted and applied in the maintenance community, identify any barriers preventing more widespread acceptance, and suggest future research and activities to help overcome those barriers.

SUMMARY OF FINDINGS

The study offers several significant findings. In the literature review in chapter two it is reported that ASE is a well-established and respected national organization with a focused mission to certify the technical abilities of automotive professionals. Intended primarily for automobile dealerships to show their customers that their technicians are qualified, ASE also extends to medium and heavy truck, school bus, collision, and other vehicle-related occupations. In 2004, it was expanded to include bus technicians as part of a TCRP-funded project. Beginning in 2006, the first of a series of ASE certification tests was developed jointly by labor and management as a standardized method for validating technician skills specifically for transit bus technicians. Bringing transit technicians into the ASE fold recognizes them nationally among their peers in the larger sphere of automotive professionals.

ASE has been likened to a yardstick for measuring mechanical competencies, similar to the credentialing required by doctors and lawyers. Evidence suggests that preparing for, taking, and passing ASE certification results in students developing more intellectual curiosity and becoming more dedicated to achieving increased professional status. In the process of earning ASE certification, technicians develop learning habits that they will retain for the rest of their professional lives; the more they learn, the more professional they become.

The literature also revealed that ASE extends beyond certification and offers several training and test preparation services including study guides and websites where candidates become familiar with the test taking process. It was also revealed that ASE has several training and recruitment activities that could be of benefit to transit. One program evaluates training programs against established standards, another encourages young people to consider careers in the automotive service sector, and a third provides training ideas and strategies helpful to training professionals.

Chapter two also noted several training programs within transit designed to help prepare technicians for ASE certification. APTA's Standards Program, led by the Bus Maintenance Training Committee (BMTC), includes a series of Recommended Practices (commonly referred to as standards) that provide guidance for establishing maintenance training programs to help technicians achieve ASE certification. In developing training standards, the joint labor–management BMTC purposely developed its set of learning objectives using the ASE Task List, thereby providing agency training departments with an educational approach consistent with passing ASE tests. Although the Southern California Regional Transit Training Consortium did not originally design its courses with passing ASE tests in mind, its subject matter experts now consider the ASE Task List when developing new courses or upgrading existing ones. In addition, the Transportation Learning Center has worked with BMTC from its inception to strengthen labor participation in the committee's efforts to develop training programs that include ASE elements. Of particular interest is the Certified Transit Technician (CTT) program established jointly by the Florida Department of Transportation (FDOT) and the Center for Urban Transportation Research (CUTR), and featured in this study as a case example.

More significant findings are revealed in chapter three, which presents the survey results. Survey respondents, the majority of whom have more than 10 years' experience in their occupations as technicians, instructors, and managers, supervisors, and union representatives, indicated solid support for certification. Survey responses also favor ASE as the organization to provide the certification. However, another relatively large number of technicians from the 16 target agencies were not sure about ASE providing certification, indicating that more needs to be done to inform them about ASE and to provide them with additional recognition for their ASE achievements.

Of those who have at least one ASE certification, most plan to recertify with ASE to keep their credentials current,

which represents another vote of confidence for ASE. Again, there are a large number of those who are unsure, implying some uncertainty regarding the value of certification and the need for additional communication and incentives.

When asked what could be considered one of the most significant survey questions: Is ASE good for transit, most respondents answered in the affirmative, an indication that respondents believe steps might be taken to continue and expand program participation. Three survey comments captured the sentiments:

- It shows that techs are trained and tested under one standard and ensures the riding public and government officials that our techs are the best at what they do.
- [ASE] provides third-party testing and eliminates the perception of subjective decisions for technician promotions.
- [ASE] allows technicians to take pride in what they do, and feel accomplished in certain areas.

Although survey respondents show solid support for ASE certification, they also believe that holding a certification is not a clear indication of a technician's true abilities. The vast majority in each occupation, including nearly all technicians, believe one can pass ASE tests but not be a good technician. Conversely, the vast majority believes that it is possible to be a good technician but not pass ASE tests. Despite these beliefs that tend to downplay the significance of certification, ASE's own research as presented in chapter two provides evidence that technicians who hold ASE certifications show improved job performance over those who do not. Nevertheless, more needs to be done to communicate the benefits of ASE certification.

More than half of all survey respondents believe at least some ASE test questions are awkward and difficult to answer. Despite this, most respondents in each occupation indicated that the test questions are "just right." When it comes to rating ASE test questions in terms of difficulty, indications were that although test questions are fair, a revisiting of some questions may be required. When asked if hands-on exercises would be a more representative indicator of a technician's abilities about half concur. Several, however, believe practical testing, while useful, would be too difficult to administer as part of a testing and certification program.

The survey result discussed in chapter three also found that most agencies do not offer increased compensation for achieving ASE certification, although more than two-thirds of survey respondents believe technicians should be compensated for ASE certifications. It is interesting to note that more instructors and managers, supervisors, and union representatives as a group believe technicians should get paid more than even themselves for holding ASE certifications.

When it comes to the level of support of management and labor for the ASE program, most respondents believe that both sides are not doing enough.

Regarding training, most survey respondents are aware of the ASE study guides and have used them to prepare for testing. Most instructors believe the guides are "very useful," while technicians and managers, supervisors, and union reps find them "somewhat useful." Response comments indicated that the guides are useful as a supplement to other training, not as stand-alone training materials.

Another significant finding of this study shows that less than one-quarter of the technicians surveyed believe they get as much training as they need. Nearly one-third reported that the training they receive is not sufficient, whereas some say they get no training at all.

Except for the managers, supervisors, and union reps, survey respondents (technicians and instructors) do not believe that the current training allows technicians to pass ASE testing. Although there is solid support for attaining certification, technicians appear to believe that they do not get enough training and that the training they do get is not sufficient to attain certification. Almost all survey respondents indicated that more training is needed.

Survey respondents also ranked the need for more hands-on training first on their list of training priorities, an indication that transit focuses too heavily on classroom learning. Responses also point to the need of increased training for managers, supervisors, and union representatives as a group. It was implied that some who are promoted into management positions from the ranks of technicians appear to have no formal training.

When it comes to ways to improve ASE participation, three primary suggestions from survey respondents emerged:

1. Provide those with ASE certifications increased compensation and other incentives in recognition of their abilities, a practice widely accepted in other professions.
2. Provide technicians with more training to allow them to attain certification. Technicians must keep current with rapidly changing technology; their maintenance and repair actions can seriously impact public safety.
3. Stronger industry support from management and labor would help increase the visibility and importance of ASE certification. Doing so complements the state of good repair, asset management, and workforce development initiatives.

Chapter four explored three case examples where elements of the ASE program are effectively used in bus maintenance and training. Metropolitan Transit (VIA) in San Antonio, Texas, incorporates task lists developed by ASE to enhance its own training program. The tasks represent the essential skills that technicians must have to efficiently and safely perform work assignments as defined by subject matter experts within transit. Although VIA recognizes that incentives given to those who achieve ASE certification are currently modest,

it is working to improve them. As another example of how a transit agency uses ASE certification, the Potomac and Rappahannock Transportation Commission (PRTC) in suburban Washington, D.C., insists that its maintenance contractor employ ASE-certified technicians as a way of substantiating their abilities to adequately maintain PRTC-owned equipment.

Chapter four also highlights the CUTR/FDOT Certified Transit Technician (CTT) Program in Florida, which requires participants to acquire ASE Master Certification as a way of validating the training provided and ensuring technicians are adequately prepared for their jobs. Classroom and on-the-job training provided through the CTT program include essential ASE program elements, helping to ensure that technicians can acquire Master Certification and graduate from the program. The emphasis CUTR/FDOT places on the ASE program is a strong indication of the value it places on the testing and certification organization.

BARRIERS TO WIDESPREAD IMPLEMENTATION

The synthesis findings indicated that there are several barriers preventing widespread acceptance and implementation of ASE certification:

- Although there is a general awareness of ASE in transit maintenance, it appears that many are uninformed of its benefits. More than half of the technicians from the target agencies surveyed either say they are not sure if ASE is good for bus technicians or say it is not.
- Lack of support for the ASE program by both labor and management at some agencies.
- Perception by many that pay increases, other incentives, and recognition offered to those who achieve ASE certification is insufficient and serves as a barrier to motivate technicians to participate in the ASE program.
- A general lack of training within transit that prevents more technicians from attaining certification.

SUGGESTIONS FOR FURTHER RESEARCH

Suggestions for further research include investigations into ways to overcome the barriers presented earlier:

- Determine what could be done to improve awareness and benefits of ASE throughout the transit bus maintenance community. Also, determine how ASE test preparation services might be made known to more transit bus technicians. A national webinar is suggested, along with presentations at industry meetings.
- Conduct a return-on-investment study to overcome the perception by many in transit who do not believe certifications necessarily translates into being a better technician.
- Determine how labor and management could come together to fully understand the benefits offered through certification and provide stronger support for ASE. A qualified and competent workforce not only bolsters self-esteem, but improves work efficiency and limits agency exposure to liability. The validation of technical ability offered through ASE certification reinforces state of good repair, asset management, and workforce development initiatives.
- More closely examine how agencies provide financial compensation, advancement pathways, incentives, promotions, and other motivations for obtaining ASE certification as best practice examples for other agencies to consider and follow.
- Although there are many efforts underway to provide training to bus technicians, survey respondents appear to indicate it is inadequate to achieve ASE certification. A research project is suggested to consolidate the many disparate elements into a unified training effort and determine what additional resources are required to make certain technicians acquire needed skills that serve as a pathway to ASE certification. Include how educational programs developed by ASE and others outside of transit could be applied to enhance those efforts.
- Expand the current ASE offering to include hybrid bus and other certifications.

ABBREVIATIONS AND ACRONYMS

AFSCME	American Federation of State, County and Municipal Employees
ASE	Automotive Service Excellence
ATMC	Automotive Training Managers Council
ATU	Amalgamated Transit Union
AYES	Automotive Youth Educational Systems
BMTC	Bus Maintenance Training Committee
BRT	Bus rapid transit
CASE	Continuing Automotive Service Education
CATA	Centre Area Transportation Authority
CBT	Computer based training
CDTA	Capital District Transportation Authority
CNG	Compressed natural gas
CTA	Chicago Transit Authority
CTT	Certified Transit Technician
CUTR	Center for Urban Transportation Research (FL)
DOT	Department of transportation
FDOT	Florida Department of Transportation
FMTP	Florida Maintenance Training Program
FTMC	Florida Transit Maintenance Consortium
HCC	Hillsborough Community College
HVAC	Heating, ventilation and air conditioning
IDEA	Innovations Deserving Exploratory Analysis
NAPA	National Auto Parts Association
NATEF	National Automotive Technicians Education Foundation
NTI	National Transit Institute
OEM	Original equipment manufacturer
OJT	On-the-job training
PM	Preventive maintenance
PMI	Preventive maintenance inspection
PRTC	Potomac and Rappahannock Transportation Commission
PSAV	Post-Secondary Adult Vocational
PSTA	Pinellas Suncoast Transit Authority
ROI	Return on investment
SCRTTC	Southern California Regional Transit Training Consortium
SME	Subject matter expert
TLC	Transportation Learning Center
TMAARC	Transit Maintenance Analysis and Resource Center
TMTP	Targeted Maintenance Training Program
TRIS	Transportation Research Information Services
TTN	Transit Training Network
TWU	Transport Workers Union of America
UTC	University Training Center
UTI	Universal Technical Institute
VIA	VIA Metropolitan Transit (San Antonio)
VVTA	Victor Valley Transit Authority

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APPENDIX A

Listing of Transit Agency Participation

Transit Agency	Number of Responses Received From: Technicians	Instructors	Manager/Supervisor/ Union Representative
Capital District Transportation Authority (CDTA)	4	3	6
Central Florida Regional Transportation Authority (LYNX)	15	2	3
Connecticut Transit	30	2	16
King County—Seattle	30	3	5
Kitsap Transit	8	0	6
Long Beach Transit	16	2	3
Metropolitan Atlanta Rapid Transit Authority (MARTA)	8	4	7
New York City Transit	29	10	16
Niagara Frontier Transportation Authority (NFTA)	7	1	7
OmniTrans (San Bernardino)	11	0	12
Orange County Transportation Authority (OCTA)	16	5	16
Polk Transit	4	0	4
Potomac and Rappahannock Transportation Commission (PRTC)	18	0	5
Rockford Mass Transit (IL)	7	0	2
Santa Clara Valley Transportation Authority (VTA)	24	1	5
VIA Metropolitan Transit (San Antonio)	19	4	6
Subtotals	**246**	**37**	**119**
Total Survey Participation (16 agencies)	**402**		

Source: Survey responses.

APPENDIX B

Examples of Labor Contract Language Regarding ASE Testing and Certification

VIA, SAN ANTONIO, TEXAS

SECTION 15. [Automotive Service Excellence (ASE) Incentives] Recognizing the value of continuous knowledge and skill enhancement through training and certification, VIA will provide incentive to skilled vehicle Fleet & Facilities employees pursuing certification in programs provided by the National Institute for Automotive Service Excellence (ASE) according to the following schedule:

(a.) VIA will annually pay a skilled vehicle Fleet & Facilities employee—$120 per active ASE certification held by the employee on October 1 of the respective year, up to a maximum of eight (8) certifications. The ASE certifications eligible for payment shall be determined by the Vice President Fleet & Facilities. A list of certifications approved for payment shall be posted in the garage at all times.

(b.) VIA will reimburse a skilled vehicle Fleet & Facilities employee for approved ASE registration and testing fees associated with certification exams upon the successful passing of the ASE certification exam. The employee must present proof of successfully passing the certification exam prior to reimbursement. VIA will not cover registration and testing fees in cases where employees do not pass the certification exam. VIA will not pay for employee's time preparing for and taking certification exams. The ASE registration and testing fees eligible for reimbursement shall be determined by the Vice President Fleet & Facilities. A list of ASE registration and testing fees approved for reimbursement shall be posted in the garage at all times.

For the purposes of this section, skilled vehicle Fleet & Facilities employees shall include Shop Helpers/Shop Repairmen (mechanics, machinists, welders, bodymen, painters, electronic technicians, farebox technicians).

SECTION 16. [Facility Maintenance Certification Incentives] Recognizing the value of continuous knowledge and skill enhancement through training and certification, VIA will provide incentive to skilled Fleet & Facilities employees pursuing certification in programs according to the following schedule:

VIA will annually pay a skilled Fleet & Facilities employee $120 per active certification held by the employee on October 1 of the respective year, up to a maximum of two (2) certifications. The certifications eligible for payment shall be determined by the Vice President Fleet & Facilities. A list of certifications approved for payment shall be posted in the garage at all times.

VIA will reimburse a skilled Fleet & Facilities employee for approved registration and testing fees associated with certification exams upon the successful passing of the certification exam. The employee must present proof of successfully passing the certification exam prior to reimbursement. VIA will not cover registration and testing fees in cases where employees do not pass the certification exam. VIA will not pay for employee's time preparing for and taking certification exams. The registration and testing fees eligible for reimbursement shall be determined by the Vice President Fleet & Facilities. A list of registration and testing fees approved for reimbursement shall be posted in the garage at all times.

For the purposes of this section, skilled Fleet & Facilities employees shall include Shop Helpers/Shop Repairmen (Fleet & Facilities/plant repairman, wood shop repairman).

VICTOR VALLEY TRANSIT AUTHORITY (VVTA), HESPERIA, CALIFORNIA

Maintenance Staffing Qualifications and Descriptions

Appropriate staffing levels will be required for routine preventative maintenance, running repairs, and training for revenue vehicles and non-revenue vehicles. Rebuilding of major components, including engines and transmissions, and major body repairs, is assumed to be purchased. The maintenance staffing levels proposed by the Contractor must be listed according to skill level for the variety of equipment. The following is a general description of maintenance staffing categories:

1. **"A" Mechanic**—The highest-level line mechanic. Under general supervision, performs the most difficult repair tasks and supervises subordinates; is capable of performing all repairs and adjustments to all vehicle systems; acts as shift leader and trains "B" and "C" mechanics; performs quality control functions for subordinates.

   I. **Purpose of Position:**

   To diagnose and make logical decisions for the purpose of maintaining and repairing vehicle mechanical failures in a professional manner consistent with factory recommended procedures. This position requires a highly skilled and educated individual who has obtained the necessary qualifications, over a period of time, to become completely self-sufficient in the diagnosis and repair of any and all issues that could arise in the normal operation of a transit bus facility. Individual must be adequately prepared to make all decisions regarding the proper repair procedures to be followed for each and every mechanical problem encountered in the day-to-day operations. Individual must be able to follow factory repair and diagnosis procedures without assistance from other mechanics or outside sources more than 95% of the time.

   II. **Primary Job Functions:**

   - Perform any and all diagnostic procedures assigned to evaluate and implement a logical and efficient procedure for the timely and proper repair sequence to be followed for any mechanical failure which could arise in the transit bus environment.
   - Perform appropriate diagnostic tests on all assigned vehicles and equipment in accordance with factory recommended policies and procedures.
   - Services and/or repairs all assigned transit vehicles, automobiles, and miscellaneous light and heavy mechanical

equipment without requiring assistance from piers and management.
- Must know how and who to contact to get assistance when necessary through equipment manufacturers, educators, and trades people.
- Must be able to complete all diagnosis and repairs using factory recommended procedures within industry time standards.
- Continues to keep updated on new technology relating to transit bus maintenance and repair procedures.
- Performs minor bodywork; repair seats and replace glass.
- Uses computer management systems to their fullest potential in accurately and clearly recording vehicle work orders, labor, and parts as well as time management and all other system functions.
- Uses factory repair and parts manuals, (both hard copy and computer systems), as well as computerized diagnostic equipment to their full capability.
- Must possess a complete set of heavy equipment tools and a roll-a-way tool box necessary to perform the essential functions of the position.
- Ability to perform emergency roadside repairs.
- Applies sound safety practices in the transit maintenance environment. Maintains a clean and orderly work area.
- Works as a team with other employees in a directed work team environment. Maintains professional effective working relationships with other transit employees, supervisors, administrators, passengers, outside contractors, suppliers and the public.
- Ability to maintain personal hygiene and grooming standards that are appropriate within the work environment.
- Operates transit vehicles in non-revenue service for coach change outs throughout the VVTA service area.
- Attend training as needed to maintain knowledge of emerging technology, current mechanical, and shop procedures.
- Other duties as required.

III. **Essential Knowledge and Skills:**

- High school graduate or its equivalent.
- 2 year associates degree in automotive or medium/heavy duty vehicle technology or equivalent trade school certificate plus 5 years' experience working on transit bus vehicles.
- 10 years' experience working on automobiles, medium/heavy duty trucks, and/or transit buses along with some manufacturers training may be substituted for a 2 year degree or certificate.
- ASE Master Certificate in transit bus or medium/heavy duty truck required.
- EPA Certified in both 608 and 609 air conditioning systems required.
- Complete knowledge of the modifications, repair, and maintenance of light and heavy duty gasoline, electric, and diesel powered transit bus equipment.
- Must be able to complete assignments within industry time standards as published in the Chilton/Mitchell labor guide and/or times developed by management through time proven experience.
- Completes service and repairs using professional workmanship and able to keep repeat repairs to less than a 5% comeback ratio based on industry time standards.
- Must be able to evaluate parts accurately as to whether they are serviceable or unserviceable.
- Must be familiar with and able to use all types of auto/truck mechanical and machinist tools and equipment effectively including all relevant electronic and computerized diagnostic equipment.
- Must possess the knowledge and ability to use repair manuals, parts books, and reference material, in hard copy and computerized versions.
- Must be able to pass an employment physical examination (pre-employment or renewal) including a substance abuse screening.
- Must possess a Commercial Driver's License Class B or better with passenger endorsement.
- Must have a clean driving record.

2. **"B" Mechanic**—Under general supervision, performs a wide variety of preventive maintenance and minor repairs. Tasks: maintains, troubleshoots, diagnoses, and/or repairs a broad range of vehicle systems including engine and emissions, drive train, brakes, climate control, electrical and specialty electrical systems, electronic systems, accessibility equipment, transmissions, and steering and suspension. Completes work orders and PMI forms with comments. May train and monitor the performance of "C" mechanics.

I. **Purpose of Position:**

To diagnose and make logical decisions for the purpose of maintaining and repairing vehicle mechanical failures in a professional manner consistent with factory recommended procedures. This position requires a skilled and educated individual who has obtained the necessary qualifications, over a period of time, to become knowledgeable in the diagnosis and repair of any and all issues that could arise in the normal operation of a transit bus facility. Individual must be adequately prepared to make most decisions regarding the proper repair procedures to be followed for the majority of the mechanical problems encountered in the day to day operations. Individual must be able to follow factory repair and diagnosis procedures with very little assistance from other mechanics or outside sources.

II. **Primary Job Functions:**

- Perform diagnostic procedures assigned to evaluate and implement a logical and efficient procedure for the timely and proper repair sequence to be followed for most mechanical failures which could arise in the transit bus environment.
- Perform appropriate diagnostic tests on assigned vehicles and equipment in accordance with factory recommended policies and procedures.
- Services and/or repairs all assigned transit vehicles, automobiles, and miscellaneous light and heavy mechanical equipment requiring little assistance from supervisors and/or leads.
- Must be a team player and willing to accept advice and direction from A mechanics, leads, and supervisors.
- Must be able to complete most diagnosis and repairs using factory recommended procedures within industry time standards.
- Continues to keep updated on new technology relating to transit bus maintenance and repair procedures.
- Performs minor bodywork; repair seats and replace glass.
- Able to use computer management systems to accurately and clearly record vehicle work orders, labor, and parts as well as time management and all other system functions.

- Uses factory repair and parts manuals (both hard copy and computer systems), as well as computerized diagnostic equipment to their full capability.
- Must possess a complete set of heavy equipment tools and a roll-a-way tool box necessary to perform the essential functions of the position.
- Ability to perform emergency roadside repairs.
- Applies sound safety practices in the transit maintenance environment.
- Maintains a clean and orderly work area.
- Works as a team with other employees in a directed work team environment. Maintains professional effective working relationships with other transit employees, supervisors, administrators, passengers, outside contractors, suppliers, and the public.
- Ability to maintain personal hygiene and grooming standards that are appropriate within the work environment.
- Operates transit vehicles in non-revenue service for road tests and coach change outs throughout the VVTA service area.
- Attends training as needed to maintain knowledge of emerging technology, current mechanical and shop procedures.
- Other duties as required.

III. **Essential Knowledge and Skills:**

- High school graduate or its equivalent.
- Some junior college classes in automotive or medium/heavy duty vehicle technology or an equivalent trade school or manufacturers training plus a minimum of 15 years' experience working on automobiles, medium/heavy duty trucks, and/or transit buses.
- Of the 15 years' experience a minimum of 5 years must be in the transit bus industry.
- ASE certified in the following areas: diesel engines, driver train, brakes, suspension and steering, HVAC and PMI in transit bus or medium/heavy duty truck required. (*Must possess at time of hire or be able to obtain certification within 1 year of employment start date.*)
- EPA Certified in both 608 and 609 air conditioning systems required. (*May be obtained within 6 months of start date.*)
- Thorough knowledge of the modifications, repair, and maintenance of light and heavy duty gasoline, electric, and diesel powered transit bus equipment.
- Must be able to complete most assignments within industry time standards as published in the Chilton/Mitchell labor guide and/or times developed by management through time proven experience.
- Completes service and repairs using professional workmanship and able to keep repeat repairs to less than a 5% comeback ratio based on industry time standards.
- Must be able to evaluate most parts accurately as to whether they are serviceable or unserviceable.
- Must be familiar with and able to use all types of auto/truck mechanical and machinist tools and equipment effectively including all relevant electronic and computerized diagnostic equipment.
- Must possess the knowledge and ability to use repair manuals, parts books, and reference material, in hard copy and computerized versions.
- Must be able to pass an employment physical examination (pre-employment or renewal) including a substance abuse screening.
- Must possess a Commercial Drivers' License Class B or better with passenger endorsement.
- Must have a clean driving record.

3. **"C" Mechanic**—Mechanic's helper. An entry-level position that performs routine maintenance and repair under immediate supervision.

I. **Purpose of Position:**

To work with and assist A and B mechanics in the maintaining, diagnosing, and repairing of vehicle mechanical failures in a professional manner consistent with factory recommended procedures. This position requires a dedicated individual who has obtained some experience and training in maintaining and repairing vehicles and is willing to work with more experienced mechanics and learn from their knowledge and direction. Individual must be able to follow factory repair and diagnosis procedures under the guidance and direction of other more knowledgeable and experienced mechanics.

II. **Primary Job Functions:**

- Perform maintenance and repairs according to factory recommended procedures as directed.
- Services and/or repairs all assigned transit vehicles, automobiles, and miscellaneous light and heavy mechanical equipment as directed by supervisors and/or leads.
- Must be a team player and willing to accept advice and direction from A and B mechanics, leads, and/or supervisors.
- Continues to seek out and advance his/her knowledge in the transit bus maintenance and repair procedures.
- Performs minor bodywork; repair seats and replace glass.
- Able to learn and use computer management systems to accurately and clearly record vehicle work orders, labor, and parts as well as time management and all other system functions.
- Learns and uses factory repair and parts manuals (both hard copy and computer systems), as well as computerized diagnostic equipment.
- Must possess a complete set of heavy equipment tools and a roll-a-way tool box necessary to perform the essential functions of the position.
- Applies sound safety practices in the transit maintenance environment.
- Maintains a clean and orderly work area.
- Works as a team with other employees in a directed work team environment. Maintains professional effective working relationships with other transit employees, supervisors, administrators, passengers, outside contractors, suppliers, and the public.
- Ability to maintain personal hygiene and grooming standards that are appropriate within the work environment.
- Operates transit vehicles in non-revenue service for road tests and coach change outs throughout the VVTA service area.
- Attends training as needed to maintain knowledge of emerging technology, current mechanical and shop procedures.
- Other duties as required.

III. **Essential Knowledge and Skills:**

- High school graduate or its equivalent.
- Some junior college classes in automotive or medium/heavy duty vehicle technology or equivalent trade school or manufacturer training helpful. 5 years' experience working on automobiles, medium/heavy duty trucks, and/or transit buses.

- ASE certified in transit bus or medium/heavy duty truck in the areas of brakes, steering and suspension, diesel engines, and preventive maintenance. (*Must have or be able to obtain certification within 1 year of start date of employment.*)
- A working knowledge of the modifications, repair, and maintenance of light and heavy duty gasoline, electric, and diesel powered transit bus equipment.
- Must be able to meet an acceptable level efficiency on assigned tasks as observed by the immediate supervisor/lead.
- Completes service and repairs using professional workmanship and able to keep repeat repairs to less than a 10% comeback ratio based on industry standards.
- Must be familiar with and able to use all types of auto/truck mechanical and machinist tools and equipment effectively.
- Must possess the ability to learn and use repair manuals, parts books, and reference material in hard copy and computerized versions.
- Must be able to pass an employment physical examination (pre-employment or renewal) including a substance abuse screening.
- Must possess a Commercial Drivers' License Class B or better with passenger endorsement.
- Must have a clean driving record.

4. **Parts Clerk**—Assists with all aspects of the Parts Department, including ordering parts, maintaining proper inventory, issuing parts, communicating with vendors, conducting periodic inventory audits, generating purchase orders, keeping the Asset Works program current, generating needed reports, and performing related duties as required.

I. **Primary Job Functions:**

- Review, edit, and update daily fuel report.
- Generate daily work orders for graffiti window insert and film replacement and post parts and labor. Schedule window replacements as necessary as well as seat repair and/or replacement. Schedule graffiti paint repair and any other necessary graffiti related repairs.
- Manages accounts payable to include: invoice tracking and entering into accounting program, assigning account numbers, communicating with vendors on payment issues, and copying and filing of packing slips, invoices, and purchase orders.
- Assist with purchase orders, placing orders, and distribution of parts to mechanics.
- Assimilates all receipts for hazardous waste removal such as batteries, tires, light bulbs, etc. etc., along with waste manifests for oil, coolant, and filters and provides them to the maintenance clerk for the proper filing and tracking.
- Assists parts clerk to maintain a complete inventory of parts to ensure adequate supply within maximum and minimum guidelines.
- Assists with ongoing monthly periodic and annual inventory checks.
- Issues parts as needed.
- Checks incoming parts orders for accuracy and closes purchase orders.
- Assists with keeping parts and storage area clean and organized.
- Prints out and applies bin and parts labels properly.
- Issues purchase orders to be applied to stock or work order as required for the authorization of the maintenance manager.
- Ensures proper return of inventory and cores to the proper vendor.
- Retrieve and sort mail to distribute to the intended recipients.
- Provide appropriate MSDS sheets to the maintenance clerk for proper filing and distribution.
- Other duties as required.

II. **Essential Knowledge and Skills**

- High school graduate or its equivalent.
- Minimum of 2 years' experience in the acquisition, disbursement and inventory of parts and supplies, utilizing modern storeroom and inventory practices.
- Basic knowledge of computers and the ability to learn computerized maintenance programs.
- Ability to identify and locate a variety of parts and supplies.
- Must be able to pass an employment physical examination (pre-employment or renewal) including a substance abuse screening.
- Clean driving record.

5. **Servicers, fuelers, washers, and hostlers**—Fuel, clean, wash, and park buses. May add fluids as necessary and perform other basic vehicle-related tasks.

VVTA reserves the right to approve all off-site maintenance work. Maintenance work currently done off-site includes the following:

- Body work—various vendors
- Engines and transmissions—various locations
- Selected machine work—various vendors

CENTRE AREA TRANSPORTATION AUTHORITY (CATA), STATE COLLEGE, PENNSYLVANIA

ASE Certification Demonstration Program

It is CATA's hope that through a program where employees can earn yearly bonuses for ASE certification, that this demonstration project will assist CATA in having maintenance staff that is up-to-date on changes in the field, and that through certifications, employees would become better qualified for promotion should openings occur. This is a demonstration project. The program will be evaluated for changes or continuation on a daily basis. The Company reserved the right to cancel the program at any time.

Master Transit ASE Certification

There are eight ASE certifications within the Master Transit ASE certification. CATA will only recognize the Transit ASEs. It is at CATA's discretion to recognize or accept future tests and certifications added by ASE. It is estimated that it would take approximately 1 year for an employee to gain all eight certifications.

CATA will purchase one set of study guides for the certification test. These booklets will be available through sign-out in the Maintenance Supervisor/Facilities Manager's office.

The employee will be responsible for scheduling and paying for any ASE tests in advance. If the candidate successfully passes

the test, CATA will reimburse the cost of the test. To receive the reimbursement, the employee must submit proof of the cost paid to take the test, and proof of a passing grade. Once the employee has been certified for an individual certification, the employee will be responsible for any costs of recertification in the future.

Mechanics—Class I and II

The employee will submit to CATA proof of the current ASEs they hold by November 1 of each year. They would then receive a bonus check for $100 per valid ASE transit certification. Proof of valid certification must be submitted every year. If an employee submits proof of certification in the first year of certification, the employee will be responsible to submit the paperwork in order to receive the bonus, even if the certification is valid for five years.

Class II—Once a Class II Mechanic obtains seven of eight transit certifications within the Master Transit ASE certification, he/she moves to the Class I rate of pay. He or she would stay at that rate of pay even if the certifications lapse; however, he/she would only receive a bonus check based on the number of current ASE certifications held. Once he/she is promoted a probation period of 60 days will be applied (if necessary, an extension of the probation period will apply). During this time the employee will be evaluated every 30 days.

Class I—Current Class I Mechanic would be eligible for the $100 bonus per current certification.

Service Persons

Should a Service Person wish to move up to become a Class II Mechanic, he or she would need to complete the following ASE certifications: H3 Drive Train, H4 Brake Systems, H5 Suspension Systems, and H8 Bus Preventative Maintenance. Such a move would only become possible in the case of an opening in that job grade. Once he/she is promoted a probation period of 60 days will be applied (if necessary, an extension of the probation period will apply).

Following at least two years as a Class II Mechanic, the employee could become a Class I Mechanic upon successful completion of seven of the eight Master Transit ASE certification tests.

The following are the requirements to take the tests:

- By test #4—Completed alternator or starter rebuild
- By test #6—Completed alternator or starter rebuild
- By test #7—Completed engine rebuild

CAPITAL DISTRICT TRANSPORTATION AUTHORITY (CDTA), ALBANY, NEW YORK

The CDTA contract reads:

> Effective in the payroll period after the signature by both parties of this contract and forward, mechanics and forepersons shall receive premium pay for obtaining and maintaining ASE Certifications relating to their current position.

Premiums paid under this section will be as follows:

Number of ASE Certifications	Premium Over Base Wage*
Two (2) Certifications	$0.40
Four (4) Certifications	$0.80
Eight (8) Master Certifications	$1.60

**CDTA is considering raising the premium in its upcoming contract with the intent to entice more technicians to take advantage of the ASE program.*

APPENDIX C

Survey Questionnaires

TRANSIT AGENCY
Transit Bus Technicians
Transit Bus Instructor
Maintenance Manager and Union Representatives

TCRP Transit Cooperative Research Program

TCRP Synthesis J-07: Use of Automotive Service Excellence (ASE) Tests Within Transit—Transit Bus Technician

*Questions with an asterisk must be answered.
Background Information

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1. Name: (Optional)

2. Title:*

3. Transit Agency:*

4. Total Years Spent Working as a Transit Bus Technician:*

- 0
- 1-2
- 3-5
- 6-10
- More than 10

ASE Certifications

5. Are you aware the ASE program includes certification for transit bus technicians?*

- Yes
- No

6. How many ASE Certifications do you have?*

- 0
- 1-2
- 3-5
- More than 5
- Master

7. Have you failed any ASE tests?*

- Yes
- No
- Never took one

8. If yes, how many ASE tests have you failed?*

- 1-2
- 3-5
- More than 5

9. If yes, which reason below best describes your reason for not passing?*

- Not enough preparation on my part
- Not enough training given to me

10. ASE tests are:*

- Too easy
- Too difficult
- Just right
- Never took one

Comments

11. Do you plan to recertify and keep current with ASE?*

- Yes
- No
- Not sure
- Never took one

12. Would you like to see ASE certifications offered in other areas?*

- ○ Yes
- ○ No
- ○ Not sure

13. If yes, check all that apply*

- ☐ Hybrid propulsion
- ☐ Door systems
- ☐ Other
- ☐ Other

14. Other comments regarding ASE certifications

Opinions Regarding the ASE Program

15. Should transit bus technicians be tested and certified?*

- ○ Yes
- ○ No
- ○ Not sure

16. Should ASE be the organization that provides technicians with testing and certification?*

- Yes
- No
- Not sure

17. Is there another organization that should provide testing and certification instead of ASE?*

- Yes
- No
- Not sure

18. If yes, which organization?*

19. Overall do you think the ASE program is good for transit bus technicians?*

- Yes
- No
- Not sure

20. If yes, why:

21. If no, why not:

22. Does management at your agency do enough to support the ASE program?*

- Yes
- No
- Not sure

23. Should management do more to support the ASE program?*

- Yes
- No
- Not sure

24. Does the union do enough to support the ASE program?*

- Yes
- No
- Not sure
- No union representation

25. Should the union do more to support the ASE program?*

- Yes
- No
- Not sure
- No union representation

26. Should maintenance managers/supervisors and labor representatives be tested and certified?*

- Yes
- No
- Not sure

27. Should instructors be tested and certified? *

- Yes
- No
- Not sure

28. Other comments regarding the ASE program:

Opinions regarding ASE testing

29. Do you think those who pass ASE tests are better technicians than those who fail?*

- Yes
- No
- Not sure

30. Do you think it's possible to pass ASE tests but not be a good technician?*

- Yes
- No
- Not sure

31. Is it possible to be a good technician but not pass ASE tests?*

- Yes
- No
- Not sure

32. Are some ASE questions too awkward to answer?*

- Yes
- No
- Not sure

33. Do you think the testing should include hands-on exercises?*

- Yes
- No
- Not sure

34. Other comments regarding ASE testing:

Opinions Regarding Compensation

35. Does your agency pay technicians more for ASE certification?*

- Yes
- No
- Not sure

36. If yes, how much more per hour?*

37. Do you think technicians should get paid more for ASE certification?*

- Yes
- No
- Not sure

38. If yes, how much more per hour?*

39. Do you think instructors should get paid more for ASE certification?*

- Yes
- No
- Not sure

40. If yes, how much more per hour?*

41. Do you think managers, supervisors and labor representatives should get paid more for ASE certification?*

- Yes
- No
- Not sure

42. If yes, how much more per hour?*

43. Other comments regarding compensation:

Training

44. Are you aware of the ASE study guides to help prepare technicians for testing?*

- Yes
- No

45. Have you used or reviewed any of the study guides?*

- Yes
- No

46. If yes, have you found them to be useful?*

- Very useful
- Somewhat useful
- Not useful at all

Comments

47. Does your agency offer maintenance training?*

- Yes
- No
- Not sure

48. How would you describe the amount of training provided?*

- As much as we need
- Some, but could use more
- Doesn't come close to being enough
- Does not apply, no training provided

Comments

49. Are you satisfied with the quality of the vendor-supplied training?*

- Very satisfied
- Somewhat satisfied
- Not satisfied at all
- Does not apply, no vendor training provided

Comments

50. Are you satisfied with the quality of training provided by agency instructors?*

- Very satisfied
- Somewhat satisfied
- Not satisfied at all
- Does not apply, no agency training provided

Comments

51. Do you feel the training allows technicians to pass ASE testing?*

- Yes
- No
- Does not apply, no training provided

Comments

52. Would you like more training?*

- Yes
- No

53. Other comments regarding training:

Recommendations for Improving ASE

54. What do you think should be done to improve the ASE program and get more technicians to participate?

TCRP Transit Cooperative Research Program

TCRP Synthesis J-07: Use of Automotive Service Excellence (ASE) Tests Within Transit—Transit Bus Instructor

*Questions with an asterisk must be answered.
Background Information

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1. Name: (Optional)

2. Transit Agency:*

3. Title:*

4. Total Years Spent Working as a Transit Bus Instructor:*

- 0
- 1-2
- 3-5
- 6-10
- More than 10

5. Total Years Spent Working in Transit Bus Management/Supervision or as a Labor Representative:*

- **1-2**
- **3-5**
- **6-10**
- **More than 10**

6. Total Years Spent Working as a Transit Bus Technician:*

- **0**
- **1-2**
- **3-5**
- **6-10**
- **More than 10**

ASE Certifications

7. Are you aware the ASE program includes certification for transit bus technicians?*

- **Yes**
- **No**

8. How many ASE Certifications do you have?*

- 0
- 1-2
- 3-5
- More
- Master

9. Have you failed any ASE tests?*

- Yes
- No
- Never took one

10. If yes, how many ASE tests have you failed?*

- 1-2
- 3-5
- More than 5

11. If yes, which reason below best describes your reason for not passing?*

- Not enough preparation on my part
- Not enough training given to me

12. ASE tests are:*

- Too easy
- Too difficult
- Just right
- Never took one

Comments

13. Do you plan to recertify and keep current with ASE?*

- Yes
- No
- Not sure
- Never took one

14. Would you like to see ASE certifications offered in other areas?*

- Yes
- No
- Not sure

15. If yes, check all that apply

- ☐ **Hybrid propulsion**
- ☐ **Door systems**
- ☐ **Other** _____
- ☐ **Other** _____

16. Other comments regarding ASE certifications

_____

Opinions Regarding the ASE Program

17. Should transit bus technicians be tested and certified?*

- ○ **Yes**
- ○ **No**
- ○ **Not sure**

18. Should ASE be the organization that provides technicians with testing and certification?*

- ○ **Yes**
- ○ **No**
- ○ **Not sure**

19. Is there another organization that should provide testing and certification instead of ASE?*

- Yes
- No
- Not sure

20. If yes, which organization?*

21. Overall do you think the ASE program is good for transit bus technicians?*

- Yes
- No
- Not sure

22. If yes, why:

23. If no, why not:

24. Does management at your agency do enough to support the ASE program?*

- **Yes**
- **No**
- **Not sure**

25. Should management do more to support the ASE program?*

- **Yes**
- **No**
- **Not sure**

26. Does the union do enough to support the ASE program?*

- **Yes**
- **No**
- **Not sure**
- **No union representation**

27. Should the union do more to support the ASE program?*

- Yes
- No
- Not sure
- No union representation

28. Should maintenance instructors be tested and certified?*

- Yes
- No
- Not sure

29. Should maintenance managers/supervisors and labor representatives be tested and certified?*

- Yes
- No
- Not sure

30. Other comments regarding ASE testing:

Opinions regarding ASE testing

31. Do you think those who pass ASE tests are better technicians than those who fail?*

- Yes
- No
- Not sure

32. Do you think it's possible to pass ASE tests but not be a good technician?*

- Yes
- No
- Not sure

33. Is it possible to be a good technician but not pass ASE tests?*

- Yes
- No
- Not sure

34. Are some ASE questions too awkward to answer?*

- Yes
- No
- Not sure

35. Do you think the testing should include hands-on exercises?*

- Yes
- No
- Not sure

36. Other comments regarding ASE testing:

Opinions Regarding Compensation

37. Does your agency pay technicians more for ASE certification?*

- Yes
- No
- Not sure

38. If yes, how much more per hour?*

39. Do you think technicians should get paid more for ASE certification?*

- Yes
- No
- Not sure

40. If yes, how much more per hour?*

41. Do you think instructors should get paid more for ASE certification?*

- Yes
- No
- Not sure

42. If yes, how much more per hour?*

43. Do you think managers, supervisors and labor representatives should get paid more for ASE certification?*

- Yes
- No
- Not sure

44. If yes, how much more per hour?*

45. Other comments regarding compensation:

Training

46. Are you aware of the ASE study guides to help prepare technicians for testing?*

- Yes
- No

47. Have you used or reviewed any of the study guides?*

- Yes
- No

48. If yes, have you found them to be useful?*

- Very useful
- Somewhat useful
- Not useful at all

Comments

49. How would you describe the training support your agency provides?*

- Very supportive
- Somewhat supportive
- Inadequate support

50. How would you describe the amount of training provided to technicians?*

- They get as much as they need
- They could use a little more
- They could use a lot more

51. Are you satisfied with the quality of training provided to technicians?*

- Very satisfied
- Somewhat satisfied
- Not satisfied at all

52. Are you satisfied with the quality of the vendor-supplied training?*

- Very satisfied
- Somewhat satisfied
- Not satisfied at all
- Does not apply, no vendor training provided

Comments

53. Do you feel the training is sufficient to allow technicians to pass ASE testing?*

- Yes
- No
- Does not apply, no training provided

54. What should be done at your agency to improve training?*

	Yes	No
Provide more financial support	○	○
Add more instructors	○	○
Add more training	○	○
Provide more training to instructors	○	○
Give technicians more paid time to take training	○	○
Provide technicians with more hands-on training	○	○
Obtain more training from vendors	○	○
Institute an apprenticeship program	○	○
Enter another option	○	○
Enter another option	○	○
Enter another option	○	○

55. Are instructors provided with training for their jobs?*

- ○ Yes
- ○ No
- ○ Not applicable

56. If yes, are you satisfied with the quality of instructor training?*

- ○ Very satisfied
- ○ Somewhat satisfied
- ○ Not satisfied at all

57. If no training provided, would you like instructor training?*

- Yes
- No

Comments

58. Are you aware of the TRB project to investigate the feasibility of starting a national training and certification program for transit maintenance instructors?*

- Yes
- No

59. Other comments regarding training:

Recommendations for Improving ASE

60. What do you think should be done to improve the ASE program and get more technicians to participate?

TCRP Transit Cooperative Research Program

TCRP Synthesis J-07: Use of Automotive Service Excellence (ASE) Tests Within Transit—Maintenance Manager and Union Representative

*Questions with an asterisk must be answered.
Background Information

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1. Name: (Optional)

2. Transit Agency:*

3. Title:*

4. Are you a Maintenance Manager/Supervisor or Union Representative?

- Maintenance Manager/Supervisor
- Union Representative

5. Total Years Spent Working in Transit Bus Management/Supervision or as a Labor Representative: *

- **1-2**
- **3-5**
- **6-10**
- **More than 10**

6. Total Years Spent Working as a Transit Bus Technician: *

- **0**
- **1-2**
- **3-5**
- **6-10**
- **More than 10**

7. Total Years Spent Working as a Transit Bus Instructor: *

- **0**
- **1-2**
- **3-5**
- **6-10**
- **More than 10**

ASE Certifications

8. Are you aware the ASE program includes certification for transit bus technicians?*

- Yes
- No

9. How many ASE Certifications do you have?*

- 0
- 1-2
- 3-5
- More than 5
- Master

10. Have you failed any ASE tests?*

- Yes
- No
- Never took one

11. If yes, how many ASE tests have you failed?*

- 1-2
- 3-5
- More than 5

12. If yes, which reason below best describes your reason for not passing?*

- Not enough preparation on my part
- Not enough training given to me

13. ASE tests are:*

- Too easy
- Too difficult
- Just right
- Never took one

Comments

14. Do you plan to recertify and keep current with ASE?*

- Yes
- No
- Not sure
- Never took one

15. Would you like to see ASE certifications offered in other areas?*

- ○ Yes
- ○ No
- ○ Not sure

16. If yes, check all that apply*

- ☐ Hybrid propulsion
- ☐ Door systems
- ☐ Other
- ☐ Other

17. Is your workshop certified through the ASE Blue Seal of Excellence Recognition Program?*

- ○ Yes
- ○ No
- ○ Not sure

18. Other comments regarding ASE certifications

Opinions Regarding the ASE Program

19. Should transit bus technicians be tested and certified?*

- Yes
- No
- Not sure

20. Should ASE be the organization that provides technicians with testing and certification?*

- Yes
- No
- Not sure

21. Is there another organization that should provide testing and certification instead of ASE?*

- Yes
- No
- Not sure

22. If yes, which organization?*

23. Overall do you think the ASE program is good for transit bus technicians?*

- Yes
- No
- Not sure

24. If yes, why:

25. If no, why not:

26. Does management at your agency do enough to support the ASE program?*

- Yes
- No
- Not sure

27. Should management do more to support the ASE program?*

- Yes
- No
- Not sure

28. Does the union do enough to support the ASE program?*

- Yes
- No
- Not sure
- No union representation

29. Should the union do more to support the ASE program?*

- Yes
- No
- Not sure
- No union representation

30. Should maintenance managers/supervisors and labor representatives be tested and certified?*

- Yes
- No
- Not sure

31. Should instructors be tested and certified?*

- Yes
- No
- Not sure

Opinions regarding ASE testing

32. Do you think those who pass ASE tests are better technicians than those who fail?*

- Yes
- No
- Not sure

33. Do you think it's possible to pass ASE tests but not be a good technician?*

- Yes
- No
- Not sure

34. Is it possible to be a good technician but not pass ASE tests?*

- Yes
- No
- Not sure

35. Are some ASE questions too awkward to answer?*

- Yes
- No
- Not sure

36. Do you think the testing should include hands-on exercises?*

- Yes
- No
- Not sure

37. Other comments regarding ASE testing:

Opinions Regarding Compensation

38. Does your agency pay technicians more for ASE certification?*

- Yes
- No
- Not sure

39. If yes, how much more per hour?*

40. Do you think technicians should get paid more for ASE certification?*

- **Yes**
- **No**
- **Not sure**

41. If yes, how much more per hour?*

42. Do you think instructors should get paid more for ASE certification?*

- **Yes**
- **No**
- **Not sure**

43. If yes, how much more per hour?*

44. Do you think managers, supervisors and labor representatives should get paid more for ASE certification?*

- Yes
- No
- Not sure

45. If yes, how much more per hour?*

46. Other comments regarding compensation:

Training

47. Are you aware of the ASE study guides to help prepare technicians for testing?*

- Yes
- No

48. Have you used or reviewed any of the study guides?*

- Yes
- No

49. If yes, have you found them to be useful?*

- Very useful
- Somewhat useful
- Not useful at all

Comments

50. Does your agency offer maintenance training?*

- Yes
- No

51. How would you describe the amount of training provided?*

- As much as technicians need
- Some, but they could use more
- Doesn't come close to being enough
- Does not apply, no training provided

Comments

52. Are you satisfied with the quality of the vendor-supplied training?*

- Very satisfied
- Somewhat satisfied
- Not satisfied at all
- Does not apply, no vendor training provided

Comments

53. Are you satisfied with the quality of training provided by agency instructors?*

- Very satisfied
- Somewhat satisfied
- Not satisfied at all
- Does not apply, no agency training provided

Comments

54. Do you feel the training allows technicians to pass ASE testing?*

- Yes
- No
- Does not apply, no training provided

55. Are maintenance managers and supervisors provided with training for their jobs?*

- Yes
- No
- Not applicable

56. If yes, are you satisfied with the quality of that training?*

- Very satisfied
- Somewhat satisfied
- Not satisfied at all

57. Are union representatives provided with training for their jobs?*

- Yes
- No
- Not applicable

58. If yes, are you satisfied with the quality of that training?*

- Very satisfied
- Somewhat satisfied
- Not satisfied at all

59. Would you like more training?*

- Yes
- No

Comments

60. What should be done at your agency to improve training?*

	Yes	No
Provide more financial support		
Add more instructors		
Add more training		
Provide more training to instructors		
Give technicians more paid time to take training		
Provide technicians with more hands-on training		
Obtain more training from vendors		
Institute an apprenticeship program		
Enter another option		
Enter another option		
Enter another option		

61. Other comments regarding

Recommendations for Improving ASE

62. What do you think should be done to improve the ASE program and get more technicians to participate?

Abbreviations and acronyms used without definitions in TRB publications:

A4A	Airlines for America
AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FAST	Fixing America's Surface Transportation Act (2015)
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
MAP-21	Moving Ahead for Progress in the 21st Century Act (2012)
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TDC	Transit Development Corporation
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation

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