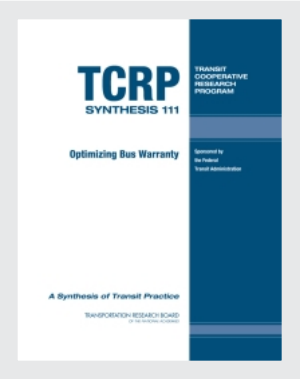

Optimizing Bus Warranty

DETAILS

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TRANSIT COOPERATIVE RESEARCH PROGRAM

TCRP SYNTHESIS 111

Optimizing Bus Warranty

A Synthesis of Transit Practice

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TRANSPORTATION RESEARCH BOARD

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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, to adapt appropriate new technologies from other industries, and to 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.

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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 report documents how a sample number of transit agencies address key aspects of their warranty programs. Included are the steps taken to more accurately monitor warranty coverage periods, optimize the warranty process, and maximize warranty reimbursement to fulfill FTA requirements and taxpayer expectations. The intended audience for this synthesis is bus transit management and operations, as well as agency supporting staff.

The approach to this synthesis included a literature review, a survey of transit agencies, and telephone interviews with three agencies selected as case examples. Of the 38 U.S. and Canadian agencies that volunteered to participate, 31 completed the survey for an 82% response rate.

John J. Schiavone, Guilford, 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

Note: Many of the photographs, figures, and tables in this report have been converted from color to grayscale for printing. The electronic version of the report (posted on the Web at www.trb.org) retains the color versions.

OPTIMIZING BUS WARRANTY

SUMMARY

Despite its importance, this appears to be the first known state-of-the-practice study that examines transit bus warranty. Although automobile dealers maximize profits by closely monitoring warranty to ensure that manufacturers pay for warranty-related repairs, transit agencies lag behind. Although FTA requires agencies to aggressively seek warranty reimbursement, reality is such that many agencies lack the resources, time, and motivation. More pressing is the need to meet peak service requirements, deal with increasingly complex bus technologies, and cope with ever-present pressures to do more with less. As a result, some funds legitimately due to agencies go unclaimed, in effect depriving taxpayers and rewarding bus and equipment manufacturers that benefit by not having to pay out funds already set aside for warranty.

This synthesis documents how a select number of transit agencies address key aspects of their warranty programs. Included are the steps taken to more accurately monitor warranty coverage periods, optimize the warranty process, and maximize warranty reimbursement to fulfill FTA requirements and taxpayer expectations. Given the lack of transit funding, instituting a more effective warranty program to recoup monies legitimately owed to agencies for faulty workmanship and materials is relatively straightforward and makes good business sense. Establishing a strong warranty program is also consistent with FTA's emphasis on Transit Asset Management Systems and bringing transit systems into a State of Good Repair.

The primary instrument used to collect data and assist others to strengthen their warranty programs was a survey consisting of more than 100 questions, which was completed by 31 of 38 solicited agencies of varying sizes totaling close to 20,000 buses, an 82% response rate. Another source of information consisted of three case examples: the Rockford (Illinois) Mass Transit District (MTD), Potomac and Rappahannock Transportation Commission (PRTC) in Northern Virginia, and Dallas Area Rapid Transit (DART). Information was also obtained through a literature review that included warranty aspects of FTA's *Best Practices Procurement Manual*, FTA's Triennial Review Program, and Standard Bus Procurement Guidelines (SBPG) developed by APTA.

This study revealed several noteworthy findings. Most importantly is that each public transit agency has a requirement to FTA and taxpayers to aggressively seek reimbursement for warranty repairs. Successful warranty programs are those where a dedication to the active pursuit of warranty is instilled in several agency departments as a team effort, with primary responsibility residing with maintenance personnel. A thorough warranty tracking process, whether of manual pen-and-paper design or a computer-based program, is another essential element of efficient warranty.

Survey results show that while most warranty administrative personnel are trained for their jobs, there are times when a warranty repair is made but no claim for reimbursement is submitted. Of those agencies that acknowledge not submitting claims, many note that a more streamlined process would help them do so. Innovative warranty techniques identified in this synthesis include the use of digital photographs, Internet-based claims processing, real-time online tracking of submitted claims, software that flags warranty work, an Internet site to share warranty information, reviewing claims with vendors on a regular basis, and

use of e-mail to track claim status with vendors. Critical components to optimize warranty reimbursement include the use of strong contractual language, excellent record keeping, and employee dedication to warranty recovery.

Nearly half of those surveyed opt for the extended engine and transmission warranty coverage options offered in the SBPG; however, the process can deprive agency technicians of the experience they will need to make repairs once warranties expire. The top three bus component areas where vendors are called in to make the warranty repairs include engines, transmissions, and air conditioning. Although many agencies use vendor-made repairs as a learning experience for their own technicians, most admit that those technicians are only marginally prepared to make repairs after warranty coverage ends.

Other findings point to areas where agencies are not obtaining full warranty reimbursement. Although the SBPG recommends that agencies add fringe benefits and overhead to arrive at fully loaded hourly warranty labor rates, one-third of the responding agencies do not. Only about one-third of those surveyed assess a 15% handling charge for warranty parts, even though the SBPG recommends doing so.

Survey respondents suggest that agencies might become more thoroughly familiar with FTA warranty requirements and APTA's SBPG to more aggressively pursue warranty recovery. They also support implementation of a standardized, Internet-based warranty claim form to help streamline the process, a concept supported by the vast majority of survey respondents. The SBPG might also be revised to clarify how diagnostic time is to be charged for warranty repairs, to standardize vendor reporting of the warranty repairs made, and to revisit the 15% parts handling charge to be more representative for all agencies. It was also suggested that an electronic bulletin board might be established where agencies could collectively discuss warranty-related topics.

CHAPTER ONE

INTRODUCTION

PROJECT BACKGROUND AND PURPOSE

Warranty is a written guarantee issued to the purchaser of a product by its manufacturer or representative promising to repair or replace that product, if needed, within a specified amount of time or accumulated mileage. Transit agencies typically specify warranty terms, conditions, and coverage periods, often using the Standard Bus Procurement Guidelines (SBPG) issued by APTA for guidance. The hope is that new buses and related equipment will operate trouble-free throughout the warranty period, especially when full-size buses have a minimum useful life of 12 years and agencies already have their hands full keeping their aging fleets operational. This expectation is rarely, if ever, fulfilled. Regardless of how well a new product is constructed and maintained, faults typically develop within the warranty period that will need to be repaired.

Despite its importance, warranty is rarely addressed in transit studies. This synthesis of practice examines how agencies structure the warranty function, especially when certain aspects of transit are unique in contrast to other transportation modes. First is the relatively small size of the bus market. An original equipment manufacturer (OEM) automaker, for example, builds more vehicles in a single day than a typical North American bus OEM builds in a year. Given low-volume production and low-bid procurements, bus OEMs cannot match the engineering, research and development (R&D), and quality control resources of their automotive counterparts.

Additionally, bus OEMs assemble vehicles from parts sourced from many suppliers, as do automakers. However, with much larger supplier contracts, automakers have the financial leverage to influence those suppliers to meet more rigorous quality and reliability standards. Bus OEMs lack such leverage, which can lead to higher initial failures and warranty claims.

If warranty is viewed as compensation for a product expectation not met, the process of making the repair and seeking compensation by agencies becomes yet another task in an already long list of everyday jobs needed to meet daily service requirements. Transit is also unique in that there are no corresponding incentives associated with warranty such as there are with automobile dealers. A purchaser of a new car is keenly aware of warranty coverage and insists on having repairs made. The dealer makes the repair at no charge and at the same time is given an opportunity to gain customer satisfaction and repeat business after the warranty expires. Because private dealership survival depends on profit, they are strongly motivated to seek warranty reimbursement for all parts and labor.

Circumstances are different in bus garages. Representatives from FTA and local government, who together fund bus purchases, impose an oversight function to ensure agencies have a warranty program in place. FTA's triennial review requirements for warranty programs are presented in the next chapter. Additionally, FTA's State of Good Repair initiative and its emphasis on Transit Asset Management places a strong focus on warranty management and recovery.

However, unlike automobile dealers, those representatives are not present on a daily basis to make sure each and every warranty repair is fully identified and reimbursed. These responsibilities fall to an agency's maintenance department, where pressures to submit warranty claims and seek reimbursements are not immediately pressing job functions in an atmosphere where making bus pull-out the number one priority.

In addition, although an automobile customer is likely to insist on having a minor defect repaired under warranty, transit agencies are more apt to focus on more immediate fleet repair needs. As indicated by the survey responses, 68% report there are times when a warranty repair is made but a claim is not submitted. Where the job of warranty is a part-time assignment, agencies simply may not have the resources to determine if warranty coverage is still in effect when repairs are made. Even in cases where warranty coverage is clear, agencies report that they may not have the time to submit a claim and seek reimbursement, especially when warranty repairs are minor.

Not seeking warranty in effect becomes a penalty for taxpayers and a benefit for OEMs, because OEMs expect a certain level of warranty and build the corresponding cost into the price of every bus and product they sell. Over time, unclaimed warranty monies legitimately owed to the agency can be substantial.

It is within the context of transit's unique position that this synthesis uses existing literature and a sampling of agencies to

summarize the state of transit bus warranty practice. Doing so will help agencies understand how their warranty program compares with others, learn from each other's warranty approaches, and apply what they have learned to optimize their own warranty program and maximize financial compensation. In particular, the synthesis examines the following:

- Standard and extended warranty coverage periods
- In-house and vendor warranty repairs
- Warranty staffing
- Warranty training
- Tracking warranty coverage periods
- Procedures for submitting claims and obtaining reimbursement
- Handling warranty disputes
- Fleet defects
- Special warranty requirements imposed by vendors
- Innovative measures to improve warranty efficiency.

TECHNICAL APPROACH

This synthesis includes a literature review, a survey of transit agencies, and telephone interviews with three agencies selected as case examples. A Transportation Research Information Services (TRIS) search using several different keywords was conducted to aid the literature review, as were literature suggestions provided by the oversight panel.

The survey questionnaire was designed to elicit warranty statistics directly from those responsible for transit bus warranty. Once the survey questionnaire was finalized and approved by the oversight panel it was posted on the Bus Fleet Maintenance List Serve, which is managed by the University of South Florida, Center for Urban Transportation Research (CUTR), to solicit perspective respondents. Of the 38 U.S. and Canadian agencies that volunteered to participate, 31 completed the survey for an 82% response rate. Table 1 shows the distribution of responding agencies by fleet size.

The 31 agencies responding to the survey operate a combined fleet of just over 19,000 buses as categorized by four size classifications:

- Small—up to 99 buses
- Medium—100–499 buses
- Large—500–999 buses
- Very Large—more than 1,000 buses.

The smallest agency represented operates a fleet of 25 buses, whereas the largest has 5,766 buses, providing a broad range of experiences, resources, and leverage. A listing of all participating agencies is attached as Appendix A, sorted by fleet size. A copy of the survey questionnaire is attached as Appendix B.

REPORT ORGANIZATION

Following this introductory chapter, chapter two summarizes the findings of the literature review, including relevant sections of FTA's *Best Practices Procurement Manual* and triennial review requirements and APTA's SBPG. Warranty materials from the Texas Department of Transportation (DOT) and CUTR, University of South Florida, are also presented.

Chapter three, the first of two chapters to present survey findings, examines the state of the practice, with a focus on agency warranty policies that include standard versus extended warranties, vehicle and component warranties, and whether warranty repairs are made in-house, by bus manufacturers, or by vendor representatives. Chapter four examines how agencies manage their warranty programs; in particular, this chapter presents warranty staffing levels, warranty training, claim submittal and reimbursement procedures, tracking methods, and the handling of warranty violations and disputes. Implications regarding fleet defects and add-on components are also examined along with special warranty requirements imposed by vendors including prerequisite technical training and procedures for returning parts, submitting claims, and obtaining reimbursements.

Innovative agency and vendor measures to improve warranty efficiency are included in both chapters. Because warranty is influenced by available agency resources, chapters three and four present relevant practices by agency size where pertinent,

TABLE 1
RESPONDING AGENCIES BY FLEET SIZE

Agency Size (in buses)	No. of Agencies	Fleet by Type of Bus			
		40 foot and larger	30–39 foot	Under 30 foot	Totals by agency size
Small up to 99	8	190	192	161	543
Medium 100–499	12	2,509	792	112	3,302
Large 500–999	7	4,455	379	476	5,310
Very Large 1,000 and Over	4	9,633	147	141	9,921
Total	31	16,787	1,510	890	19,076

Source: Survey responses.

thereby allowing individual agencies to determine how their procedures compare with agencies of similar resources.

Chapter five consists of three case examples that examine specific aspects of warranty:

- A small transit agency, represented by the Rockford Mass Transit District (MTD) in Illinois with 75 buses has four of its full-time agency personnel cooperatively working on a part-time basis to administer its warranty program.
- A medium-sized agency, represented by the Potomac and Rappahannock Transportation Commission (PRTC), that realized that its growing fleet size demands more precise warranty tracking procedures.
- A systems approach to warranty in use by Dallas Area Rapid Transit (DART), a large agency, that includes a comprehensive tracking mechanism to ensure it can identify warranty coverage to maximize warranty reimbursement.

The synthesis ends with a summary of key findings and suggestions for future research (chapter six).

TERMINOLOGY

Various terms are used to describe organizations that provide transit services and those that provide vehicles and products. For this study, organizations that provide public transportation services are called “transit agencies” or “agency.” However, in chapter two, “Literature Review,” FTA’s *Best Practices Procurement Manual* and triennial review documents the term “grantee,” which is retained to reflect FTA’s nomenclature.

In this study, the term OEM is used to describe the original equipment manufacturer of buses and major bus components, while the term “vendor” is used generically to refer to any supplier or manufacturer offering buses, major components, parts, and related services to transit agencies. The SBPG, however, refers to the bus OEM as “contractor.”

CHAPTER TWO

LITERATURE REVIEW

Although no published studies were found that reviewed how transit agencies approach their warranties, several documents were located to serve as valuable companion documents to this study; FTA's *Best Practices Procurement Manual* (n.d.) (BPPM) is one and another is FTA's Triennial Review Program FY2012 Workshop, as well as the Texas DOT *Maintenance, Management, and Safety Guide.*

FTA *BEST PRACTICES PROCUREMENT MANUAL*

FTA's BPPM provides recipients of FTA funds with guidance on how to conduct third-party procurements to assist in meeting the standards of FTA *Circular 4220.1D* (http://www.fta.dot.gov/grants/13054_6037.html). The *Manual* consists of suggested procedures, methods, and examples that FTA encourages agencies to use, which are based on the federal acquisition process and "best practices" of grantees and others in the industry. The *Manual* notes that the suggested procedures are not mandatory, and that the *Manual* will be updated periodically with new subjects and additions or changes. As noted earlier, the term contractor used by both FTA and APTA is retained in this chapter to denote bus OEM.

Section 6.3.5: Warranties

Section 6.3.5 of FTA's BPPM pertains exclusively to warranties. It references several FTA Circulars including the one mentioned earlier. It declares that general warranty and extended warranty are both eligible capital costs as long as they incorporate industry standards. The reference to industry standards is important in that it mentions the SBPG, described here, as an industry standard. A discussion contained within Section 6.3.5 of FTA's BPPM defines warranty as:

> . . . a promise or affirmation given by a contractor to the purchaser regarding the nature, usefulness, or condition of the supplies, equipment, or performance of services furnished under the contract. The principal purposes of a warranty are to delineate the rights and obligations of the contractor and the purchaser for defective items and services, and to foster quality performance. The benefits to be derived from a warranty must be commensurate with the cost of the warranty to the purchaser.

FTA's guidance document continues by encouraging grantees to exercise sound business decisions in structuring broader warranties such as extended warranty as a matter of trade practice or as an industry standard where such warranties are advantageous and cost-effective. Such business decisions must be based on market research and price/cost analysis. Again, FTA explicitly mentions APTA's SBPG as an industry standard. The case example of Rockford MTD's warranty program in chapter five includes its process for justifying extended engine warranties.

Note that FTA had once treated *normal* warranty and *extended* warranties differently. However, with the passage of TEA-21 in 1998, FTA revised its policies in *FTA Circular 9030.1C, Urbanized Area Formula Program: Grant Application Instructions*, dated October 1, 1998 (http://www.fta.dot.gov/legal/guidance/circulars/9000/433_1152_ENG_HTML.htm).

Standard warranty costs are eligible for reimbursement under FTA grants to the extent that the grantee determines they are customary or an industry standard. Here the standard recommended warranty coverage periods cited in the SBPG are considered an industry standard. Details of these recommended warranties are provided in the section that follows.

Regarding extended warranties, FTA states they become eligible costs to the extent that:

1. The grantee determines what form of warranty would be advantageous and cost-effective as part of the grantee's procurement planning effort; and
2. Extended warranty costs are evaluated separately and determined to be "fair and reasonable." No guidance on applying these two provisions was found; agencies are advised to establish appropriate justification for extended warranties based on established industry standards such as the SBPG and by conducting their own cost/benefit analysis.

FTA TRIENNIAL REVIEW

Overview

The triennial review is one of FTA's management tools for examining grantee performance and adherence to current FTA requirements and policies. It was mandated by Congress in 1982, and occurs once every three years. The triennial review examines how recipients of Urbanized Area Formula Program funds meet statutory and administrative requirements. FTA's Triennial Review Program FY2013 Workshop provides an

overview of triennial review requirements (http://www.fta.dot.gov/images/content_images/5-24_0700_Grantee_Handbook.pdf). The document makes it clear that the guide is not a substitute for primary reference documents, but instead serves as a portable summary for the reviewer's use, particularly during a site visit. Reviewers can periodically consult FTA's website (http://www.fta.dot.gov) for the most recent policies and directives.

Warranty Provisions

Under Part A: Vehicle Maintenance, grantees are required under FTA triennial review requirements to have a current written maintenance program or plan for FTA-funded rolling stock. Regarding warranty, the grantee's maintenance program must be consistent with manufacturers' minimum maintenance requirements for vehicles under warranty. For vehicles under warranty, FTA recognizes that grantees must perform a series of preventive maintenance (PM) actions if warranty is to remain valid. If the grantee either does not perform these required maintenance routines or performs them at greater intervals than the manufacturer's maximum intervals, the grantee runs the risk of invalidating vehicle warranty provisions. FTA's triennial review guidance also notes that some operators have relied on oil analysis to extend oil change intervals beyond the engine manufacturer's recommended interval. This is acceptable to FTA provided the grantee has a letter from the manufacturer of the vehicles' engines stating that this practice will not void the engine warranty.

Under Part C: Warranty Program, FTA requires grantees to have a system in place for identifying warranty claims, recording claims, and enforcing claims against manufacturers. Most importantly, FTA requires grantees to have an aggressive warranty recovery program to ensure that the cost of defects is borne properly by the equipment manufacturer and not the grantee and FTA. The program needs to include procedures that clearly identify warranty repairs, record the warranty claim, submit the claim to the manufacturer, and follow up on unpaid claims.

During triennial reviews, an FTA representative will seek evidence that the grantee's PM program meets or exceeds the manufacturer's recommended program, and that it has a documented warranty recovery program. FTA representatives will review grantee records and files for the warranty program to learn how timely and aggressively the grantee has been in pursuing and collecting warranty claims. The representative will also compare records of warranty claims submitted with claims settled.

According to FTA the grantee is deficient if it does not have a warranty recovery system, does not have records documenting that warranty claims are pursued, or is not pursuing warranty claims diligently. If deficient, the grantee will be asked to submit to the FTA regional office a written system for managing warranty claims with a plan for implementation.

APTA STANDARD BUS PROCUREMENT GUIDELINES

The SBPG is available through APTA for various bus sizes and types such as standard diesel, compressed natural gas (CNG), 30-foot, 40-foot, etc. (www.apta.com). Originally referred to as the "White Book," the SBPG is part of APTA's Bus Standards Program and outlines a process for procuring buses. The document was developed using a cross section of representatives from the public and private sectors of the public transit industry for use by transit agencies. FTA encourages its use and claims that it is the most effective source for determining transit industry practices regarding bus procurements (see http://www.fta.dot.gov/13057_6086.html). As mentioned in the previous section, FTA considers the SBPG an industry standard for the purposes of applying warranty coverage.

Although some agencies use the SBPG "as is," others find it necessary to modify sections to suit their particular needs. The document is organized into 11 sections that include general information and instructions, general and special provisions, federal requirements, technical specifications, quality assurance, forms and certifications, contract documentation, and various appendices.

Of particular interest to this project is Section 7, which specifically addresses Warranty Requirements. As noted earlier, the term "contractor" in the SBPG refers to the bus OEM or vendor entering into a contract with the agency to provide buses or products specified. Warranty terms and conditions of the SBPG are summarized here to make agencies aware of its many provisions.

General SBPG Warranty Provisions

Before addressing Section 7, warranty is also mentioned elsewhere in the SBPG. In Section 2, Instructions to Proposers (IP), Section IP 13.5: *Proposal Selection Process* describes the process by which proposals will be evaluated and a selection made for a potential award. One evaluation criterion includes steps the proposer took with other agencies to resolve fleet defects and warranty claims.

The General Conditions (GC) section addresses warranty twice. In Section GC1, *Definitions*, three warranty definitions are clarified:

- Extended Warranty: A warranty available for purchase above the standard warranty.
- Pass-Through Warranty: A warranty provided by the contractor, but administered directly with the component supplier.
- Superior Warranty: A warranty for a bus part or component that remains in effect after all contractual warranties for the entire bus have expired. The remaining warranty is administered directly between the supplier and the agency.

Section GC6, *Intellectual Property Warranty*, explicitly states that the contractor shall defend any suit or proceeding brought against the agency based on a claim that infringes any patent, and the contractor will pay all related damages and costs.

In Section 4, Special Provisions (SP), subsection SP 7.4, *Agency-Furnished Property*, makes it clear that warranty administration is the agency's responsibility unless the parties agree to transfer warranty responsibility to the contractor. And, Section 6, Technical Specifications (TS), Section TS 5.6, *Training*, states that the contractor shall have competent technical service representatives available on request to assist the agency in resolving technical issues during the warranty period, but that this does not relieve the contractor of responsibilities under Section 7: Warranty Requirements.

SBPG Section 7

As mentioned previously, Section 7 is the primary area of the SBPG document that addresses warranty.

Basic Provisions

Section 7 begins with "Basic Provisions," which recommends warranty coverage for the entire bus and various systems and subsystems as follows:

- Complete bus: 1 year/50,000 miles
- Body and Chassis Structure: 3 years/150,000 miles
- Primary Load Carrying Members of Body/Chassis: 12 years/500,000 miles
- Propulsion—Standard warranty: 2 years/100,000 miles
- Propulsion—Extended: 5 years/300,000 miles
- Emission Control System: 5 years/100,000 miles.

Section 7 also recommends that the following subsystems be warranted at 2 years/100,000 miles:

- Brake system: excluding friction surfaces
- Destination signs
- Heating, ventilating: excluding floor heaters and front defroster
- Air conditioning unit and compressor: excluding floor heaters and front defroster
- Door systems
- Air compressor
- Air dryer
- Wheelchair lift and ramp system: mechanical only
- Starter
- Alternator: Alternator only; does not include the drive system
- Charge air cooler
- Fire suppression
- Hydraulic systems
- Engine cooling systems: Radiator including core, tanks, and related framework, including surge tank
- Transmission cooler
- Passenger seating; excluding upholstery
- Fuel storage and delivery system.

Extended Warranties

Regarding extended warranties, Section 7 has a provision extending drivetrain warranty to 5 years/300,000 miles. Section 7 also allows agencies to add any additional subsystems to be warranted at 2 years/100,000 miles in addition to those listed. Chapter three of this report examines how closely the agencies surveyed follow guidelines offered by the SBPG, including standard and extended warranties.

Serial Numbers, Extensions, and Voiding Warranty

SBPG Section 7 also requires contractors to provide agencies with a complete electronic list of serialized unit numbers for major components installed on each bus to facilitate warranty tracking. The list includes the engine, transmission, alternator, starter, and other such components. This section also stipulates that warranties are to be extended if materials are not available or if proper repairs cannot be made in a timely manner.

Section 7 also states that warranty is voided if parts fail as a result of misuse, negligence, accident, or repairs not conducted in accordance with the contractor-provided maintenance manuals. Warranty could also be voided if agency technicians are not "adequately trained," or if inspections and scheduled PM procedures are not "conducted as recommended by the contractor."

Exceptions

SBPG Section 7 makes it clear that warranty does not apply to scheduled maintenance items, normal wear-out items, and items furnished by the agency. The last condition is important because agencies typically add fareboxes, next-stop annunciation systems, and other such equipment to buses after they take delivery from the OEM. It also states that should an agency specify a specific product and reject the bus OEM's preferred product, the standard supplier warranty for that product is the only warranty provided to the agency; this alternate product also is not eligible under "Fleet Defects" summarized here.

Pass-Through Warranty

At any time during the warranty period the contractor may request approval from the agency to assign or "pass through" its warranty obligations to others, but only on a case-by-case basis approved in writing by the agency. When doing so the contractor has to state in writing that the agency's warranty reimbursements will not be impacted as a result of the pass-through warranty process. Warranty administration by others

does not eliminate the warranty liability and responsibility of the contractor. This last clause is important in that agencies can always turn to the contractor for warranty if a subsystem supplier should dispute or neglect a claim submitted under the pass-through process.

Superior Warranty

In this Section 7 provision of the SBPG the contractor is required to pass on to the agency any warranty offered by a component supplier that is superior to (i.e., extends beyond) the warranty coverage period provided by the bus OEM or specification. The contractor is required to provide a list to the agency noting the conditions and limitations of the Superior Warranty no later than the start of production. It is the agencies' responsibility, however, to track superior warranty coverage periods to obtain appropriate reimbursement.

Fleet Defects

Fleet defect is defined by the SBPG as cumulative failures of 25% of the same components in the same or similar application in a minimum fleet size of 12 or more buses where such items are covered by warranty. The SBPG also states that a fleet defect only applies to the base warranty period in sections entitled "Complete Bus," "Propulsion System," and "Major Subsystems." When a fleet defect is declared, the remaining warranty on that component stops. The warranty period does not resume until the fleet defect is corrected.

For the purpose of establishing fleet defects in the SBPG, each option order is treated as a separate bus fleet. In addition, should there be a change in a major component within either the base order or an option order the buses containing the new major component will become a separate bus fleet for the purposes of fleet defects.

Under the SBPG fleet defect provisions, the contractor is required to correct a fleet defect under the warranty provisions defined in "Repair Procedures" (see the following section). After correcting the defect, the agency and the contractor mutually agree to a work program designed to prevent the occurrence of the same defect in all other buses and spare parts purchased under the contract.

Fleet defect warranty provisions do not apply to agency-supplied items such as radios, fare collection equipment, communication systems, and tires. In addition, fleet defects do not apply to interior and exterior finishes, hoses, fittings, and fabric.

Repair Procedures

The SBPG states that the contractor is responsible for all warranty-covered repair work. At its discretion, the agency may perform warranty work if it determines it needs to do so based on transit service or other requirements. Such work is then reimbursed by the contractor.

Regarding warranty repairs made by the contractor, the agency must notify the contractor within 30 days of first identifying a warranty-related defect. The contractor or its designated representative is then required to begin work on warranty-covered repairs within five calendar days. The agency must make the bus available to the contractor to complete the repairs, and the contractor provides all spare parts and tools required to complete repairs at its own expense. At the agency's option, the contractor may remove the bus from the agency's property while repairs are made.

If the agency itself performs warranty-covered repairs, the SBPG recommends that the agency correct or repair the defect(s) using parts supplied by the contractor specifically for this repair. At its discretion, the agency may use contractor-specified parts available from its own stock if deemed in its best interests.

The agency may require the contractor to supply parts for warranty-covered repairs being performed by the agency. Those parts are allowed to be remanufactured but must have the same form, fit and function, and warranty. Any parts needed to make warranty repairs must be shipped prepaid to the agency by the contractor within 14 days of receipt of the request for those parts and may not be subjected to an agency handling charge.

Defective Component Return

The contractor may request that parts covered by the warranty be returned for inspection and verification with freight costs paid by the contractor. Materials must be returned in accordance with the procedures set forth in the "Warranty Processing Procedures" summarized here.

Failure Analysis

It is important to note that agencies can request that the contractor provide a failure analysis of fleet defect, safety-related parts, or major components removed from buses under warranty that could affect fleet operation. Reports must be delivered within 60 days of the receipt of the failed parts.

Reimbursement for Labor and Other Related Costs

The contractor is required under terms of the SBPG to reimburse the agency for labor. The amount is determined by the agency based on a qualified technician at a straight time wage hourly rate, which includes fringe benefits and overhead adjusted for the agency's most recently published rate in effect at the time the warranty work is performed, plus the cost of towing if applicable.

Reimbursement for Parts

The contractor is also required to reimburse the agency for defective parts and for any other parts that must be replaced to correct the warranty defect. The reimbursement is based on the current price at the time of repair and includes taxes, where applicable, along with 15% handling costs. Handling costs are not paid if parts are supplied by the contractor and shipped to the agency.

Reimbursement Requirements

The contractor is required under the SBPG to respond to a warranty claim with an accept or reject decision including necessary failure analysis no later than 60 days after the agency submits the claim and any defective part(s) if requested. Reimbursement for all accepted claims must occur no later than 60 days from the date of acceptance of a valid claim. The agency may dispute a rejected claim or claims where the contractor did not reimburse the full amount. Both the agency and contractor agree to review disputed warranty claims during the following quarter to reach an equitable decision. They also agree to review all claims at least once per quarter throughout the entire warranty period to ensure open claims are being tracked and properly reimbursed.

Warranty After Replacement/Repairs

If any component, unit, or subsystem is repaired, rebuilt, or replaced by the contractor or by the agency with contractor approval, the component, unit, or subsystem is given the same warranty period of the original. In other words, the warranty period begins anew, implying that agencies need to track this distinct warranty period separate from the vehicle itself.

If an item is declared a fleet defect, the warranty stops with the declaration. Once the fleet defect is corrected, the item(s) then have three months or the remaining time and/or miles of the original warranty, whichever is greater. This remaining warranty period begins on the repair/replacement date for corrected items on each bus if the repairs are completed by the contractor, or on the date the contractor provides all parts to the agency.

Warranty Processing Procedures

The following is a list of items required of the agency for processing warranty claims. Only one failure per bus per claim is allowed.

- Bus number and vehicle identification number
- Total vehicle life mileage at time of repair
- Date of failure or repair
- Acceptance or in-service date
- Contractor part number and description
- Component serial number
- Description of failure
- All costs associated with each failure or repair (invoices may be required for third-party costs):
  - towing
  - road calls
  - labor
  - materials
  - parts
  - handling
  - troubleshooting time.

Forms

The agency can use its own warranty forms if all of the above information is included. Electronic, computer-generated claim forms can also be used and sent by means of the Internet if available between the contractor and agency.

Return of Parts

When returning defective parts the agency is required to tag each part with the following:

- Bus number and vehicle identification number,
- Claim number,
- Part number, and
- Serial number (if available).

Time Frame

Each claim must be submitted by the agency no more than 30 days from the date of failure and/or repair, whichever is later. All defective parts must be returned to the contractor, when requested, no more than 45 days from the date of repair. As stated earlier, reimbursement for all accepted claims must occur no later than 60 days from the date of acceptance of a valid claim. Reimbursements are to be transmitted to an address provided by the agency.

TEXAS DEPARTMENT OF TRANSPORTATION: MAINTENANCE MANAGEMENT AND SAFETY GUIDE

Based on guidance offered by FTA and other jurisdictions where public funds are used to purchase, operate, and maintain public transportation vehicles, agencies are required to develop a written maintenance plan to protect the public's investment. An example of such a program has been developed by the Texas Department of Transportation (TxDOT) requiring its transit agencies to have (http://www.dot.state.tx.us/PTN/documents/mgmtguide.pdf):

- A written maintenance plan,
- PM inspections and scheduled services,

- Provisions for accessible equipment,
- Management of maintenance resources,
- Warranty compliance and recovery, and
- Standards for maintenance subcontractors.

The requirements serve as a worthy example for all public transit agencies to consider when operating equipment with state and federal assistance. Of interest to this study are processes TxDOT requires for warranty. Some of the reasons given by TxDOT as to why transit agencies fail to receive maximum benefit from a warranty program include:

- Warranty coverage is not understood and therefore never submitted;
- Repair work is performed before it is determined that the failure was warranty-related;
- Information for the warranty claim is lost;
- Failed part cannot be matched to the warranty claim;
- Warranty claim not submitted on time; and
- Apathy or "too much paperwork."

The apathy referred to by TxDOT is fueled by the lack of incentive public transit agencies have to aggressively pursue warranty as mentioned in the Introduction (chapter one).

TxDOT's warranty document instructs agencies to pursue warranty claims effectively and promptly, and reminds one that warranty is only valid if a transit agency adheres to a manufacturer's maintenance recommendations. It offers a warranty recovery system, warranty records, and annual summaries of warranty claims submitted and received that all need to be maintained by the transit agency. Sample hard-copy examples of a Warranty Claim and Warranty Claim Summary are also offered as basic examples.

In one of its "helpful to know" tips, TxDOT points out that agencies should determine up front if warranties cover only failed parts, or if modifications needed to correct the problem are also covered. Others tips include knowing that the warranty compensation others are receiving can be a useful bargaining tool and the reimbursable labor rate should include a percentage for overhead. The TxDOT manual also states that warranty is an opportunity to provide feedback to manufacturers regarding their product as most manufacturers rely on this information when considering product improvements, which can result in field corrections (recall notices and campaigns).

CENTER FOR URBAN TRANSPORTATION RESEARCH LESSONS LEARNED IN TRANSIT EFFICIENCIES

In its publication *Lessons Learned in Transit Efficiencies, Revenue Generation, and Cost Reduction*, CUTR, University of South Florida, highlights warranty efficiency by providing two examples of agencies doing their own warranty repairs in-house (http://ntl.bts.gov/lib/4000/4600/4633/lessons.pdf). The study finds that relationships can be developed with vehicle manufacturers to enable a transit agency to become certified as an authorized warranty center, resulting in payments made to the agency for warranty repairs performed on its own or other vehicles. The following are case examples provided in the CUTR study.

Ben Franklin Transit (BFT), Richland, Washington, has 100 Ford vanpool vans and 30 paratransit vehicles built on Ford chassis. The agency applied for and gained designation as a Ford Authorized Warranty Center, allowing its maintenance personnel to perform all warranty work required on its fleet. It negotiated an hourly rate with Ford higher than the agency's own labor costs. Ford also pays BFT 20% above each part's cost as administrative fees. Furthermore, Ford provides training to the agency's technicians free of charge. Prior to the warranty arrangement, the local Ford dealers were unable to quickly complete warranty work. With BFT's designation as an authorized warranty center the agency is also enjoying the advantage of less down time for its fleet. Ford is considering using BFT as a test center for new vehicles, and would provide the agency with free test vehicles and pay for necessary repairs at the rates noted previously.

Central New York Regional Transportation Authority (Centro), Syracuse, New York, with a fleet of Ford paratransit vans, has also became an authorized Ford Warranty Center allowing it to perform warranty repairs in a manner that brings in profits for the agency. Its designation as a Ford warranty dealer also allows Centro to compete for warranty work on other Ford vehicles owned by social service agencies.

CHAPTER THREE

SURVEY RESPONSES: WARRANTY SPECIFICATIONS, COVERAGE PERIODS, AND REPAIRS

INTRODUCTION

This chapter reports on the survey results as they pertain to procurement specifications, warranty coverage periods, and whether warranty repairs are made in-house by agency personnel or vendor representatives.

APTA PROCUREMENT SPECIFICATIONS: WARRANTY SPECIFICATIONS

Of the participating agencies, nearly all include a section dedicated exclusively to warranty in their bus procurement specifications. While the majority of agencies follow warranty coverage periods listed in the SBPG for full-size buses, responses for specific items varied depending on the bus system and component.

APTA WARRANTY COVERAGE PERIODS

As described in the previous chapter, the SBPG recommends warranty coverage periods for the complete bus and for several individual bus components and systems. Chapter two also noted that FTA considers the standard warranty provisions contained in the SBPG as an industry standard, whereas extended warranties need to be justified. This section presents agency practices regarding the SBPG's recommended warranty coverage periods beginning with the complete bus and ending with specific bus components.

Complete Bus, Body and Chassis, and Primary Load Members

Table 2 compares agency practices for adopting the SBPG's recommended warranty coverage periods for complete bus, body and chassis, and primary load members. The SBPG's complete bus warranty recommendation of 1 year/50,000 miles is used by 70% of the agencies surveyed, 79% use the SBPG's recommended 3 years/150,000 mile body and chassis warranty period, and 77% use the SBPG's recommended warranty period of 12 years/500,000 miles for chassis primary load members.

Those that do not follow the SBPG's recommended coverage periods for these items modified them by typically increasing the time and mileage requirements. For those not following the SBPG's recommended coverage period for the complete bus, warranties were extended in some cases from the traditional one-year period to two years; miles were extended to 150,000, were made unlimited, or not specified. For those agencies surveyed and not following the SBPG recommendations for body and chassis warranties, coverage periods were extended from three years to 12 years, with miles extended to as much as 600,000, were not specified, or were made unlimited. Of those surveyed that do not follow the SBPG recommendations for primary load members, coverage periods were reduced to a low of only one year/300,000 miles, or in one case extended to a high of 600,000 miles.

Diesel Bus: Drivetrain

Table 3 presents agency practices for adopting SBPG drivetrain warranties for diesel buses, including those that prefer the standard warranty coverage period of 2 years/100,000 miles for engine, transmission, and differential and axles, and those that choose the SBPG's extended coverage of 5 years/300,000 miles. Regarding engines, 74% follow SBPG guidance either for standard or extended coverage, consistent with those who use SBPG guidance for complete bus and chassis coverage. Nearly half of all respondents (48%) favor the extended engine warranty coverage option. Engine warranties used by those going outside the SBPG's recommendations varied from one to three years, to unspecified mileages, or making them unlimited.

Agency selections for diesel bus transmission warranty coverage are nearly identical to those expressed for engines, with 56% favoring the extended coverage. Regarding diesel bus differentials and axles, 50% of participating agencies favor the standard warranty coverage period of 2 years/100,000 miles compared with 38% that favor extended coverage.

As presented in chapter two, FTA recognizes the SBPG as an industry standard and has stated that general warranty and extended warranty are both eligible capital costs. However, FTA also encourages agencies to exercise sound business decisions in structuring broader warranties such as extended warranty where such warranties are advantageous and cost-effective. Such business decisions must be based on market research and price and cost analysis. As discussed in the chapter five case example, Rockford MTD satisfies this requirement and is prepared for FTA triennial reviews by having documentation prepared to justify its extended engine warranty. The agency could not, however, justify the extra costs associated with extended transmission warranty and therefore does not specify it.

TABLE 2
WARRANTY COVERAGE PERIODS: BUS AND CHASSIS

	SBPG	Other
Complete Bus	1 year/50K miles	1–2 years/50–150K, not specified, or unlimited miles
Response	70%	30%
	SBPG	Other
Body and Chassis	3 years/150K miles	1–12 years/150–600K, not specified, or unlimited miles
Response	79%	21%
	SBPG	Other
Primary Load Members	12 years/500K miles	1–12 years/300–600K miles
Response	77%	23%

Source: Survey responses.

TABLE 3
WARRANTY COVERAGE PERIODS: DIESEL BUS DRIVETRAIN

	SBPG		Other
Diesel Bus—Engine	Standard 2 years/100K miles	Extended 5 years/300K miles	1–3 years/300K, not specified, or unlimited miles
Response	26%	48%	26%
	SBPG		Other
Diesel Bus—Transmission	Standard 2 years/100K miles	Extended 5 years/300K miles	2–4 years/150–200K or unlimited miles
Response	26%	56%	18%
	SBPG		Other
Diesel Bus—Diff./Axles	Standard 2 years/100K miles	Extended 5 years/300K miles	2–5 years/ unlimited miles
Response	50%	38%	12%

Source: Survey responses.
Diff. = differential.

TABLE 4
WARRANTY COVERAGE PERIODS: CNG BUS DRIVETRAIN

	SBPG		Other
CNG Bus—Engine	Standard 2 years/100K miles	Extended 5 years/300K miles	2 years/unlimited miles
Response	36%	36%	28%
	SBPG		Other
CNG Bus—Transmission	Standard 2 years/100K miles	Extended 5 years/300K miles	2–5 years/not specified or unlimited miles
Response	27%	40%	33%
	SBPG		Other
CNG Bus—Diff./Axles	Standard 2 years/100K miles	Extended 5 years/300K miles	2–5 years/200K or unlimited miles
Response	38%	19%	43%

Source: Survey responses.
Diff. = differential.

CNG Bus: Drivetrain

When it comes to the drivetrain of CNG buses, responding agencies again favor APTA's guidance. As shown in Table 4, CNG engine warranty periods are divided equally, with 36% favoring the standard warranty period and the same percentage favoring extended warranty. Regarding transmissions of CNG buses, 40% prefer the extended coverage, while only 19% opt for extended coverage for differential and axles. Again, those modifying SBPG coverage periods did so by not specifying mileage limits or making them unlimited.

Hybrid Bus: Drivetrain

Warranty coverage practices for hybrid drivetrain components differ from those expressed for diesel and CNG buses,

TABLE 5
WARRANTY COVERAGE PERIODS: HYBRID BUS DRIVETRAIN

	SBPG		Other
Hybrid Bus—Engine	Standard 2 years/100K miles	Extended 5 years/300K miles	2 years/200–300K or unlimited miles
Response	7%	64%	29%
	SBPG		Other
Hybrid Bus—Drive Motor/Gen.	Standard 2 years/100K miles	Extended 5 years/300K miles	2–3 years/not specified or unlimited miles
Response	39%	50%	11%
	SBPG		Other
Hybrid Bus—Diff./Axles	Standard 2 years/100K miles	Extended 5 years/300K miles	2–5 years/ 150K or unlimited miles
Response	56%	28%	16%

Source: Survey responses.
Gen. = generator; Diff. = differential.

with 64% of the respondents favoring extended hybrid engine warranty coverage and 50% extended warranty coverage for hybrid drive motors and generators as listed in the SBPG. As with diesel and CNG buses, most participating agencies (56%) choose standard differential/axle coverage over extended coverage. Table 5 shows agency warranty coverage practices for hybrid drivetrain components.

Other Specified Components and Systems

The SBPG also has recommended warranty coverage periods for a variety of specific bus components and systems such as brakes, door systems, starters, and alternators. The recommended coverage period for these items is 2 years/100,000 miles. Table 6 shows survey respondent practices for adopting

TABLE 6
WARRANTY COVERAGE PERIODS: OTHER SPECIFIED COMPONENTS AND SYSTEMS

	SBPG	Other
Brake System (exclude friction surfaces)	2 years/100K miles	2–3 years/50–150K, not specified or unlimited miles
Response	48%	52%
Destination Signs	2 years/100K miles	1–12 years/50K, not specified, or unlimited miles
Response	38%	62%
AC Unit and Compressor	2 years/100K miles	2–5 years/50–100K, not specified or unlimited miles
Response	37%	63%
Door System	2 years/100K miles	1–3 years/50–150K, not specified or unlimited miles
Response	57%	48%
Air Compressor	2 years/100K miles	1–3 years/50–200K, not specified or unlimited miles
Response	50%	50%
Wheelchair Lift and Ramp System	2 years/100K miles	1–3 years (5 years parts only)/50–150K, not specified or unlimited miles
Response	50%	50%
Starter	2 years/100K miles	1–3 years/50–350K, not specified or unlimited miles
Response	50%	50%
Alternator	2 years/100K miles	1–3 years/50–150K, not specified or unlimited miles
Response	48%	52%
Fire Suppression	2 years/100K miles	1–3 years/50K, not specified or unlimited miles, or parts only
Response	46%	54%

Source: Survey responses.

the SBPG warranty coverage period for other specified components and systems. As shown, respondents were nearly evenly split between using the SBPG recommendation as is and modifying the SBPG's coverage periods. Two notable exceptions are destination signs, where 62% of respondents diverge from the SBPG, and air conditioning, where 63% specify other coverage periods.

Regarding destination signs, of those responding that diverge from the SBPG recommendation 25% specify less time/mileage coverage and 75% specify coverage periods extending beyond the SBPG's 2-year/100,000-mile standard coverage period. Many opt for three-year coverage, with one agency specifying 12-year destination sign coverage. For those agencies that deviate from the SBPG's air conditioning warranty recommendations, all choose more stringent coverage that includes 2 years/unlimited mileage or three years with 150,000 miles, unspecified mileage, or unlimited mileage.

WARRANTY COVERAGE: REPLACEMENT PARTS

Drivetrain Components

In addition to warranty coverage specified for buses and related components negotiated with new bus procurements, responding agencies also purchase replacement parts with warranty coverage. Regarding new and rebuilt drivetrain components such as engines, transmissions, and differentials and axles, these agencies specify a wide variety of warranty coverage periods. Table 7 presents those practices. This table shows that most participating agencies report a two-year coverage period with varying mileages for replacement engines and transmissions whether purchased new or rebuilt, which follows the SBPG's standard coverage period for these components when part of new bus procurements. The responses are understandable since many agencies buy spare engines and transmissions as part of new bus procurements. When it comes to differentials and axles, responding agencies favor two-year coverage for new units; however, coverage drops to one year for rebuilt units. Some agencies reported that they rebuild their own drivetrain components for which no warranty is provided.

Other Replacement Components

For non-drivetrain replacement components purchased separately as spares, responding agencies provided coverage periods for light emitting diode (LED) lights, destination signs, and camera systems as shown in Table 8. The 10-year coverage required for LED lights stems from the extended life offered by these products that replace traditional incandescent lights.

TABLE 7
WARRANTY COVERAGE: REPLACEMENT PARTS

Replacement Engines: New			
1 year/100K, not specified or unlimited miles	2 years/100K, not specified or unlimited miles	3 years/ 100–300K miles	5 years/300–350K or not specified miles
18%	46%	12%	24%

Replacement Engines: Rebuilt		
1 year/12–100K or unlimited miles	2 years/100K, not specified or unlimited miles	5 years/ 300K miles
33%	59%	8%

Replacement Transmissions: New		
1 year/ not specified miles	2 years/100–150K, not specified or unlimited miles	5 years/300K or unlimited miles
7%	64%	29%

Replacement Transmissions: Rebuilt			
0.5–1.5 years/ 100K, not specified or unlimited miles	2 years/100K, not specified or unlimited miles	3 years/unlimited miles	5 years/ 300K miles
43%	43%	7%	7%

Replacement Differentials/Axles: New			
1 year/ not specified or unlimited miles	2 years/ 50–100K, not specified or unlimited miles	3 years/ 100–300K miles	5 years/ 300K miles
15%	55%	15%	15%

Replacement Differentials/Axles: Rebuilt		
1 year/50–100K or unlimited miles	2 years/ not specified miles	5 years/ 300K miles
60%	20%	20%

Source: Survey responses.

TABLE 8
WARRANTY COVERAGE: OTHER REPLACEMENT PARTS

Replacement Part Purchased Separately	Warranty Coverage
LED Lights	10 years/miles not specified or lifetime
Destination Signs	5 years/miles not specified
Camera System	2 years/miles unlimited 3 years/miles unlimited

Source: Survey responses.

IN-HOUSE VERSUS VENDOR WARRANTY REPAIRS

When the need for warranty repairs arises, agencies either make them in-house with their own technicians and submit warranty claims for these repairs or call in the bus OEM or particular component vendor to make the repair. The vast majority of agencies surveyed (87%) make some warranty repairs and call in vendors to make others. Only two of the very large agencies make all of their warranty repairs; two agencies reported that they call in vendors to make all warranty repairs.

Determining who makes the repairs depends on several factors; for most agencies (68%), it is determined by the nature of the repair. In some cases, engines in particular, the vendor requires agency technicians to be trained and authorized to perform warranty repairs on their equipment. For 32% of survey respondents, procurement specifications determine who makes warranty repairs, while labor agreements with unions determine who makes warranty repairs 19% of the time. Other factors reported include availability of technicians and parts, availability of the vendor within the required time frame, and the need to meet service requirements (i.e., making pull-out).

In cases where vendors are called in to make repairs, the top three bus component areas are engines, transmissions, and air conditioning. Table 9 shows the major bus component areas where responding agencies have vendors come on site to make some warranty repairs. Nearly all responding agencies, 97%, have vendors make warranty repairs to engines, 87% use vendors for transmission repairs, and 84% use vendors for air conditioning repairs. Other areas not shown in the table where vendors are used for warranty repairs less frequently include automatic passenger counters (APC), radio, automatic vehicle location (AVL), wheelchair ramps, and Wi-Fi.

Vendors are typically called in to make engine, transmission, and air conditioning repairs because this equipment is also manufactured in large volumes for the trucking industry. Because their market penetration is so extensive, dealerships and repair facilities for this equipment are typically close by and convenient to agencies such that service representatives can easily be dispatched to make warranty repairs.

When vendors are called in for warranty repairs, most survey respondents (87%) report having them made at a combination of on-site agency and off-site vendor facilities. The others either have vendor-made repairs done at the agency's facility or have the vendors take vehicles off site to make repairs. In some cases, vehicles must be sent off property because the agency lacks specialized equipment such as a chassis dynamometer or wheel alignment equipment. As noted by Rockford MTD in chapter five, going off site can add cost because the bus needing to be transported between locations costs labor time that neither party wants to pay.

Having vendors make warranty repairs has both advantages and disadvantages. Doing so relieves agency personnel of having to make the repair and submit claims, allowing them to work on other maintenance functions. However, having vendors perform warranty work deprives agency technicians of work and the training opportunity that comes with doing their own repairs. After warranty coverage ends, agency technicians will need to perform the repairs for the remainder of equipment life.

Nearly all agencies surveyed take advantage of vendor repairs as a training or learning opportunity; 60% do so when time permits and 33% do so more than half of the time. One agency noted that the vendor is required to work with its technicians when making warranty repairs. As noted in chapter five, Dallas Area Rapid Transit (DART) closely monitors on-site vendor warranty work and uses it as an opportunity to understand what went wrong and the steps taken to correct it. Rockford frequently uses vendor-made repairs as a learning opportunity for its own technicians. The agency also

TABLE 9
BUS COMPONENT AREAS WHERE VENDORS MAKE REPAIRS

Engines	Transmissions	Air Conditioning	Hybrid Drives Major Hybrid Components	Differentials & Axles	Camera Systems	Fire Suppression	Destination Signs
97%	87%	84%	52%	52%	48%	48%	35%

Source: Survey responses.

schedules vendor training toward the end of bus warranty periods so that technicians can more readily put that training to use. One small agency reports not using vendor repairs as a learning opportunity because it simply cannot spare a technician for the extra vendor training. One agency mentioned that, in some cases, the vendor does not allow agency technicians to work alongside its staff. Another agency believes the vendor may be withholding information as a way to retain business after the warranty ends.

When it comes to feeling prepared to make repairs on their own when warranty coverage ends, 48% of responding agencies reported that their own technicians are adequately prepared, while 52% admitted that their technicians are only marginally prepared to make repairs after warranty. A few agencies expressed reservations about making repairs responsibly for more complex systems such as engines, transmissions, and hybrid-drive systems after warranty coverage ends.

After warranty coverage ends, a majority of agencies (74%) reported that they do not continue with original warranty service providers, whereas 26% do. Responding agencies that continue to use the warranty repair vendor after warranty do so because their technicians are not adequately trained to make the repairs, or because they do not have the time to make the repairs in their own shop.

CHAPTER FOUR

SURVEY RESPONSES: WARRANTY MANAGEMENT

INTRODUCTION

This chapter examines how agencies manage their warranty programs. Topics covered include warranty staffing levels and training, claim submittal procedures, labor and parts allocation, warranty tracking and reimbursement, vendor topics, fleet defects, and warranty violations and disputes. The chapter concludes with a list of agency suggestions to optimize warranty.

WARRANTY STAFFING

Survey results revealed that agencies use staff in a variety of ways to manage warranty depending on agency size; some engaged full-time with warranty administration, others on a part-time basis, splitting their work load with other maintenance-related assignments. Table 10 shows the breakdown of personnel dedicated full-time and part-time to administering warranty by agency size. Not reflected in the personnel count of this table are agencies such as DART, described in the chapter five case example, which uses a team approach where every maintenance staff member is charged with helping to ensure that warranty repairs are identified and claims submitted.

Small-Sized Agencies

All small agencies represented in the survey have no full-time staff dedicated to warranty. Instead, 75% have one to two workers dedicated part-time to warranty, with the remaining 25% employing three to four workers on a part-time basis.

Medium-Sized Agencies

Of the medium-sized agencies surveyed, 67% have one or two workers dedicated full-time to warranty, with the remainder having no full-time warranty staff. Of those medium-size agencies using staff on a part-time basis for warranty, 25% have one or two staff working on warranty part-time with the remainder using three to ten staff working warranty on a part-time basis.

Large-Sized Agencies

Of the large agencies surveyed, all have full-time staff dedicated to warranty; 86% have one or two such workers, while 14% have three or four full-time warranty staff. Although all large agencies have full-time warranty staff, 72% do not supplement that staff with part-time assistance; 14% use one or two staff on a part-time basis; and 14% use five to six staff working warranty on a part-time basis.

Very Large-Sized Agencies

All very large agencies surveyed have full-time staff dedicated to warranty; 50% have one or two such workers, 25% have three or four full-time warranty staff, and 25% have five or six full-time warranty workers. Seventy-five percent of the large agencies do not supplement their warranty departments with part-time assistance; the remaining 25% use one or two workers on a part-time basis.

Other Work Assignments

For agencies with staff dedicated to warranty on a part-time basis, 34% also work in maintenance and repair, 32% share work in the parts department, 26% share work at clerical/administrative functions, and 8% work in other positions.

WARRANTY TRAINING

Training for administrative aspects of warranty work takes place at 74% of participating agencies, with 26% not providing training. Given the importance of recouping warranty funds, the number of untrained warranty personnel, which exists in every agency size category surveyed, is significant. Table 11 shows the warranty breakdown training by agency size. As noted in that table, medium-sized agencies participating in the survey provide the highest percentage of warranty training, whereas 50% of the small agencies provide no training.

Most surveyed agencies, 54%, conduct their own warranty training, with bus OEMs providing warranty training to the remainder. For DART, OEM training consists of a one-time session provided online per contract requirements.

It is interesting to note that 90% of responding agencies do not have specific language requiring vendors to provide administrative warranty training. However, since 46% of agencies surveyed reported that warranty training is provided

TABLE 10
NUMBER OF AGENCY PERSONNEL INVOLVED WITH ADMINISTERING WARRANTY

Agency Size	Number of Agency Personnel Dedicated Full-Time to Warranty				Number of Agency Personnel Dedicated Part-Time to Warranty				
	0	1–2	3–4	5–6	0	1–2	3–4	5–6	10
Small	100%					75%	25%		
Medium	33%	67%			50%	25%	8%	8%	8%
Large		86%	14%		72%	14%		14%	
Very Large		50%	25%	25%	75%	25%			
All Agencies	39%	52%	6%	3%	45%	35%	10%	6%	3%

Source: Survey responses.

TABLE 11
AGENCIES THAT PROVIDE WARRANTY TRAINING

Agency Size	Agencies Where Warranty Personnel Are Trained	Agencies Where Warranty Personnel Are Not Trained
Small	50%	50%
Medium	92%	8%
Large	71%	29%
Very Large	75%	25%
All Agencies	74%	26%

Source: Survey responses.

by OEMs, agencies must either assume that bus OEMs and vendors will provide training if asked without putting the request in writing or that written warranty instructions provided by the vendors are sufficient for agencies to do their own training.

Of responding agencies that offer warranty training, 48% provide less than one hour per employee, a small amount of time given the warranty's importance, whereas 52% provide over an hour. Responses for those spending under and over one hour of warranty training per employee are shown in Table 12 by agency size.

Of responding agencies providing more than an hour of administrative warranty training per employee the amount of training varies widely, which illustrates just how inconsistent agencies are when it comes to preparing warranty personnel for their jobs. Two responding agencies provide one to two hours, another two provide three to six hours, four provide eight to 12 hours, and two provide 16 to 24 hours of warranty training per employee. One outlier is Orange County Transportation Authority, which provides 80 hours of warranty training per employee. Several agencies reported that much of the training is informal and achieved by pairing experienced warranty workers with trainees (i.e., mentoring). At Metropolitan Atlanta Rapid Transit Authority (MARTA), much of the warranty staff has substantial understanding, with more than 20 years' experience.

SUBMITTING CLAIMS

A warranty claim is a document agencies use to declare that a product has failed and to request reimbursement. It includes pertinent information required by the vendor including agency name, defective product, diagnostic steps taken by the agency, and amount of reimbursement being requested broken down by parts and labor. Vendors also request the return of the failed part or digital photographs of those parts. Submitting or "filing" claims is the act of sending this documentation to the appropriate OEM or vendor. When asked if warranty claims are submitted manually or electronically, the 31 responding agencies provided 42 responses, indicating that many use both manual and electronic methods for submitting warranty claims. Responses are nearly equal,

TABLE 12
TIME SPENT ON WARRANTY TRAINING

Agency Size	Less Than an Hour per Employee	More than an Hour per Employee
Small	86%	13%
Medium	42%	50%
Large	29%	71%
Very Large	0	75%
Total	48%	52%

Source: Survey responses.

with 52% reporting they submit claims electronically ranging from e-mail attachments to a computer-generated form from the Internet, while 48% reported using manual "pen and paper" methods.

The method for submitting claims depends on each vendor's requirements. As noted in the chapter five case example of Rockford MTD, the maintenance manager did not understand why all claims were not completed and submitted electronically given today's widespread Internet use. The PRTC example also supports electronic claim submittal; doing so would save time over manually entering much of the same information repeatedly for each claim.

OEM versus Vendor Claim Submittals

As noted in chapter two, the SBPG allows OEMs to assign or "pass through" their warranty obligations to others, but only on a case-by-case basis and only with agency approval. Given that engine, transmission, and air conditioning vendors typically have dealers located in major metropolitan areas, many agencies make arrangements with the bus OEMs to submit warranty claims directly to the individual subsystem vendors. Survey results show that most agencies, 74%, submit warranty claims to both the bus manufacturer and subsystem vendors, whereas 26% submit all claims through the bus manufacturer. In some cases the claim is submitted to the subsystem vendor and reimbursed by the bus OEM. Others reported that they submit claims to bus OEMs for standard warranty and then go directly to subsystem vendors for extended and superior warranties.

When agency warranty claims are submitted to subsystem vendors, 64% of responding agencies sometimes inform the bus OEM, 20% always inform the bus OEM, and 6% never inform the bus manufacturer. For 10% of surveyed agencies this question was not applicable, because all claims are submitted through the bus OEM.

Reasons for Not Submitting Claims

Sixty-eight percent of responding agencies reported that there are times when a warranty repair is made but a claim is not submitted, which is significant; only 29% of respondents reported they always submit a claim. In addition to violating FTA warranty program requirements, not submitting a claim for warranty repairs deprives the agency of revenue, may create incomplete repair histories, and may diminish an agency's ability to claim a fleet defect.

In cases where warranty claims are not submitted, 67% of the surveyed agencies reported that the effort to submit the claim is not worth the reimbursement, 33% reported not submitting claims because of the cumbersome filing process, and 19% admitted they sometimes simply forget to submit claims. Other reasons for not submitting claims include the time pressures needed to assure bus availability to make pull-outs, technicians that did not save the failed part, failure to obtain required pre-approval, designating the repair as a maintenance activity rather than warranty, or the nature of the failure is unclear. One agency has a policy of not submitting warranty claims if the repair takes 15 minutes or less to complete.

Of agencies that make warranty repairs without submitting claims, 38% believe that a more streamlined process from the vendor would help them send in more claims, 28% that more agency staff would help, 24% say a more streamlined process by their own agency would help, and 10% cite needing more time to submit claims.

Claim Forms

The majority of survey respondents (78%) use the warranty claim form provided by each vendor, 16% use their own standardized warranty claim form, and the others use a combination of the two.

Several agencies expressed frustration with having to complete a separate warranty form for each vendor, stating that there should be a standard claim form for the transit industry. When asked if they favor the industry adopting a standardized warranty claim form and process for submitting claims, 77% were in favor; of those, 95% believe claim standardization should be made part of the SBPG. Concerns about standardized forms center on the observation that there are too many variables for standardized forms to fit every agency.

Innovative Warranty Submittal Procedures

Responding agencies use and/or suggest a wide array of efficient and innovative methods to optimize submitting warranty claims, including:

- Forwarding digital photographs of failed parts by e-mail instead of sending the actual part.
- Use of bar coding on all parts that will be processed for warranty.
- Use of on-line, Internet-based warranty claims processing with the vendor.
- Use of reports that pull data directly from the agency data management system utilizing the vendor's warranty form, saving time versus entering the information separately into their form or system.
- Fleet software designed to flag possible warranty jobs and that force technicians to enter warranty repair notes.
- Review claims with vendors to ensure timely feedback. (Note: the SBPG calls for agencies and vendors to jointly review all claims at least once per quarter throughout the entire warranty period to ensure that open claims are

being tracked and properly reimbursed. See chapter two for details.)
- Use of e-mail to follow-up on claims submitted to vendors.

WARRANTY LABOR

Labor Allocation

Most agencies surveyed (58%) use a combination of actual labor time needed to make repairs and flat-rate times provided by manufacturers. Flat-rate times are the established number of labor hours OEMs will typically pay for common warranty repairs regardless of how much time is actually spent on the repair. Of the remaining agencies, 29% reported using only the actual labor time to make the warranty repair, whereas 13% strictly use the flat-rate times provided by the manufacturer. Of those responding agencies that use OEM flat-rate times, the majority (67%) reported using those times in more than 50% of all claims submitted. Several agencies that reported using actual time noted that the time is sometimes questioned by manufacturers and in some cases agencies reported lowering labor time to get the claim approved.

Labor Rates

As noted in chapter two, the SBPG states that warranty labor should be based on a qualified technician at a straight time wage hourly rate, which includes fringe benefits and overhead. Of the agencies surveyed, however, 31% do not include overhead in their hourly warranty labor rates charged to the OEM. Again, monies legitimately due to agencies are left unclaimed.

Both base and fully loaded warranty labor rates trend higher with agency size. The range for base labor rates for all responding agencies is $24 to $61 per hour; the fully loaded labor rates range from $43 to $113 per hour. Table 13 breaks down the warranty labor rates based on agency size and includes median rates. As shown in that table, although hourly warranty labor rates tend to trend high with agency size there are exceptions.

WARRANTY PARTS

The SBPG allows agencies to add a 15% handling charge for warranty parts not supplied by the vendor. Despite that provision, only 26% of responding agencies mark up warranty part costs to recoup handling. Of those agencies that do mark up warranty parts, 63% charge 15% as recommended by the SBPG, while 38% mark up parts by 20%. One agency charges 35% for parts handling. One immediate step agencies can take to maximize their warranty program appears to be to add a 15% handling charge for warranty parts not supplied by the vendor.

SHOP SUPPLIES, DIAGNOSTIC TIME, AND TOWING CHARGES

A majority of responding agencies, 90%, do not charge vendors for shop supplies, while most (62%) also do not charge separately for troubleshooting and diagnostic time. Although the SBPG allows agencies to charge for labor, there was no mention found in the APTA document regarding diagnostic time. As noted in the chapter five case example for Rockford MTD, the agency charges diagnostic labor time only when it is required by an experienced technician to make a warranty repair. Otherwise, the time is considered a training exercise for less experienced workers.

All but one of the responding agencies charges vendors when towing is required for warranty repairs. The SBPG allows applicable towing cost as a legitimate warranty expense. Of those charging for towing, 65% pass the actual charge on to the vendor and 15% charge a flat-rate fee. In some cases, the flat fee is established by the vendor, with one agency charging a flat fee of $175 per tow. The remainder charge a fee based on per-mile cost established by the agency, one agency marks up the actual towing charge, and two agencies have their own tow truck. One of the agencies with a tow truck charges a warranty tow fee based on a formula of two technicians at their standard warranty labor rate plus an hourly charge for the tow truck operation.

The SBPG does not offer guidance on how towing charges are to be applied. One agency comments that vendors have

TABLE 13
WARRANTY LABOR RATES

Agency Size	Range for Agencies Using Base Hourly Labor Rate*	Median Rate*	Range for Agencies Using Fully Loaded Hourly Labor Rate*	Median Rate*
Small	$38	$38	$48–$72	$63
Medium	$24–$45	$38	$43–$95	$74
Large	$60–$61	$60	$54–$104	$61
Very Large	$60	$60	$93–$113	$99

Source: Survey responses.
*Rounded to the nearest dollar.

pushed for towing not to be covered, feeling that it is hard to control costs.

WARRANTY REIMBURSEMENT

Agencies participating in the survey are nearly equally divided on how warranty reimbursements are made: 26% receive reimbursement by check, 26% receive parts credits, and 38% receive warranty reimbursements using both payment types. Parts credits, also known as parts memos, are credits given to the agency to purchase parts from that vendor when needed. One agency admits, however, that keeping track of parts credits is not worth the time. Another agency notes that parts credits end up favoring the vendor in that it restricts the agency to parts—and pricing—offered by that one vendor. Others reported receiving warranty reimbursement in the form of actual replacement parts.

Forty-eight percent of responding agencies distribute warranty reimbursements from vendors to a general agency fund, 39% distribute reimbursements to the maintenance department, and the others distribute warranty funds to a warranty department account or accounts receivable.

A majority of responding agencies, 74%, estimate that they recover 80% to 100% of warranty repair monies requested from vendors, 13% recover 50% to 80%, and 13% recover less than 50%.

Innovative and efficient methods to optimize reimbursement of warranty claims used by the responding agencies include:

- Clear, strong contractual language stating what the warranty is, how the warranty is to be processed, and all terms and conditions. Language should reference always getting something back of value, either in a replacement part or a refund in the form of a check, and never accepting any credit memos.
- Excellent record keeping and follow up.
- Real-time warranty online tracking of submitted claims.
- Employees dedicated to warranty recovery.
- Where agencies have on-going payments for new buses, accept credit against payments due for new buses for warranty claims not paid in a timely manner.

WARRANTY TRACKING

Warranty tracking is arguably the most critical function to maximize warranty processing and reimbursements. It applies not only to keeping accurate records to determine which vehicles and individual parts have which coverage conditions and for how long, but is also critical for keeping tabs on reimbursement status, parts credits received in lieu of warranty payments, and to satisfy FTA triennial review requirements.

Tracking Methods

Tracking warranty is not easy given the number of bus parts, the varying terms and warranty periods offered for each part and component, determining whether the parts are to a new bus purchase or installed afterwards as a replacement, and that buses remain in service for at least 12 years. Nearly half of the agencies surveyed use a combination of manual (pen and paper) and electronic data accounting methods to keep track of warranty-related activities; the remaining agencies surveyed are almost evenly split on exclusively using manual or electronic methods. In reality, however, any electronic data method for tracking warranty involves some level of manual investigation to determine if a part is actually under warranty or to follow up on a delinquent reimbursement.

Manual tracking typically consists of investigating whether each part being charged on a work order is being used to replace a defective part covered under warranty. When buses are new; for example, within the first year when the comprehensive complete bus warranty is still in effect, determinations are easier to make. As the bus ages, however, manually keeping track of warranty coverage becomes progressively more difficult to determine if the failed part is:

- Covered by superior warranty,
- Covered by an extended warranty,
- Covered by the bus OEM or an aftermarket supplier,
- Being used to replace a part that previously failed and therefore may have a separate warranty,
- Is the result of a manufacturing defect or was an agency-induced fault, or
- Covered by which specific terms and conditions.

One agency with manual warranty tracking conducts a daily review of work orders by its warranty administrator to determine coverage; others do it weekly. It is difficult to determine just how many valid warranty repairs go undetected and are not reimbursed using manual tracking methods. The keys to any warranty tracking method, especially those done manually, are reported as dedication, persistence, and a team approach.

As bus fleets increase in size, manual warranty tracking becomes increasingly difficult. Although only about 36% of the small and mid-sized agencies surveyed use electronic methods to track warranty, that number jumps to more than 80% for the large and very large agencies surveyed. Maintenance information systems (MIS) purchased from companies that specialize in developing maintenance data programs or those developed in-house by agency personnel have varying levels of capability to capture warranty information for individual buses and components. The process used by DART as presented in chapter five is an efficient example and is included as a standard operating procedure (SOP) that describes the warranty coverage periods and warranty terms for each fleet of buses. As with any MIS-based tracking system, however,

the process is constantly evolving as agencies seek more efficient ways to track warranty given the many variables.

Kitsap Transit reports that it recently moved to a new fleet management software program, and before year's end is planning to have the capability of identifying every part under warranty on every bus. When operational, the system will flag any part used in a repair that generally comes with a warranty (e.g., starters, alternators, compressors, or door motors) and will not issue a replacement part to a particular bus until a determination can be made as to whether that part is covered by warranty or not. The process is similar to that in use by PRTC, as also noted in the chapter five case example.

One agency expressed frustration with its computer-based system stating that the parts inventory is controlled by one software program while fleet tracking is controlled by another, and the two cannot communicate. Another admits to having an automated warranty tracking system as part of its MIS, but personnel with access do not utilize it and those who would have no access. Instead, they manually check each part charged out to determine warranty coverage. Several agencies mentioned using standard spreadsheet programs such as those offered by Excel to track warranty.

Tracking Methods for Replacement Parts

Most of the responding agencies, 80%, use the same method to track replacement parts and components bought outside new bus procurements; 20% use other methods.

Agencies not using the same tracking method track such components using various means that include manually checking each part charged out, the use of spreadsheets, using the parts department for tracking, a weekly review of work orders by warranty administrator, use supervisory personnel to identify warranty parts, track the last date the part was installed, and apply date codes. One agency admitted to not tracking these components at all.

Warranty Reports

When asked if their tracking system issues periodic reports showing buses and components covered under warranty such as start and end dates and mileages, a majority of responding agencies, 65%, reported having such tracking capabilities. When an individual wants to know what is covered under warranty for a bus at Metro Transit, Minneapolis/St. Paul, they simply type the bus number in the MIS and a chart is displayed that depicts the warranty coverage for that particular bus. The information is provided in real time based on the actual bus mileage and age as maintained by the MIS. Metro's comprehensive warranty tracking and reporting system was developed in-house utilizing the agency's own data management system and Microsoft Access. A Warranty Closed Claims Report, included as Appendix C, shows the disposition of each claim classified by vendor and garage location. It includes labor and parts paid, parts handling charge, total amount claimed, total amount reimbursed, and claim closing dates. A Cancelled Warranty Report, included as Appendix D, documents those claims rejected by vendors and the reasons why.

DART's MIS system does not issue periodic warranty coverage reports. However, the agency has established custom reporting capability for tracking individual bus and component warranty start and end dates through another software program. The agency reminds others that after the bus manufacturers' warranty has ended, there is still a need to track the component and system manufacturer's warranty, which may exceed the original contractual warranty (also known as superior warranty). Two agencies noted that their MIS systems are new, indicating a move to such reporting tools.

On the other side of the reporting spectrum is an agency that declares its MIS is "supposed" to issue periodic reports, implying that the system is not very efficient. Other agencies with smaller fleets claim that it is easy for them to "know" which buses and parts are covered and therefore do not need reports. Indeed, nearly a one-third of those surveyed admit to not having periodic reporting of active warranty coverage; two of these noted that their systems should provide this valuable data, indicating a lack of personnel with the information technology expertise to implement and train staff. Agencies without sufficient warrant documentation, regardless of the reason, may not satisfy the FTA triennial review requirements summarized in chapter two.

Identifying Warranty Repairs

When agencies were asked to describe how they determine if repairs are covered under warranty once the work order is closed out, responses varied greatly. At a majority of agencies surveyed (58%), maintenance department personnel review records afterwards to identify if the repair is covered under warranty; 26% of agencies claim to have automated MIS-based systems that flag components under warranty; and 13% review warranty status of repairs before beginning the work. One agency relies on vendor confirmation of warranty status.

Of particular interest is that more than half of the agencies surveyed (52%) admit that they do *not* have a quick and efficient way to identify if repairs are covered under warranty. Given the pressures of making pull-out each day, the likelihood that legitimate warranty repairs may go unclaimed is considerable. As noted earlier, 68% of responding agencies admit to instances where they make warranty repairs, but corresponding claims seeking reimbursement are not made. This does not include instances where the agency may not be aware that warranty coverage applies because their tracking methods are insufficient.

The lack of tracking sophistication is exemplified by one agency that simply "tells the supervisors and technicians to send us anything that could be possible warranty and we sort out what is and isn't." Another admits "we should [learn to] check warranty status on a component before starting the repair," implying the procedure is currently not used.

Others are more proactive and have more precise ways to identify warranty coverage. For all new buses in its fleet, Santa Clara Valley Transportation Authority assumes all repair work is warranty-related unless discovered otherwise or an indication is given that warranty has ended. At the city of Edmonton Fleet Services, its MIS generates an e-mail copy of all closed jobs that contain warranty flags. The jobs are reviewed and claims issued for valid warranty repairs. At New York MTA the MIS is coded at the beginning of each contract to list all warranty terms and conditions, and is set up to automatically identify all warranty repairs.

Other agencies such as Broward County, Florida; Kitsap Transit, Washington; and Connect Transit, Illinois, are optimistic that a new computer-based MIS will give them greater capability to track future warranty.

Notice of Expiring Warranty Periods

A majority of agencies surveyed, 65%, reported that their tracking systems are lacking in that they do *not* have a way of alerting them when the warranty period of a bus or component is about to expire. One small agency reports they "know" because of the small size of its fleet; others are counting on planned MIS systems to provide this kind of alert once the system is fully up and running. Metro Transit, Minneapolis/St. Paul, an agency with more capabilities as described earlier, uses a color-coded system in its MIS to denote coverage periods: Green—still in warranty; Yellow—coming out of warranty within the next 90 days; Red—out of warranty. An example of Metro's color-coded report showing warranty coverage coming to an end is provided as Appendix E.

Although 35% of agencies surveyed do have tracking systems that alert them when warranties are about to expire, the majority lack that capability, thereby limiting their ability to identify items in need of repair before warranty coverage ends.

Self-Rating of Warranty Tracking Capability

When asked to rate their warranty tracking abilities, it is interesting to note that only 19% of responding agencies admit to having an excellent process for tracking warranty coverage periods and identifying warranty repairs. Nearly 50% acknowledge that they have a good process that could use some improvement, whereas 32% report they need to improve their warranty tracking methods. The responses provide a clear indication that agencies need to focus more attention on warranty tracking to recoup monies legitimately due to them by vendors.

Of responding agencies with an excellent tracking program, 42% have agency-developed systems while 58% have tracking systems supplied to them by companies that specialize in MIS.

Tracking Outstanding Claims

Just over half of responding agencies report that their warranty tracking system monitors outstanding claims, whereas 47% say they need to check manually. Metro Transit, Minneapolis/St. Paul, has what it calls a "60 day" report that is sent to vendors for claims that have not been settled and are 60 days or older. This report allows the agency to ensure the vendor has received the claim and that claims are paid in a timely manner. Other agencies note that their systems will provide this information in the future after enhancements are made.

Warranty Repair Histories

Nearly all responding agencies keep a history of the warranty repairs they make themselves. Of those, 87% use that information to determine fleet defects. Metro Transit, Minneapolis/St. Paul, has developed a system that automatically monitors fleet defects based on parts usage for each bus group.

When vendors make warranty repairs, nearly all responding agencies reported receiving a report of the repair; of these, 56% require a complete report from vendors including the fault and labor and parts used. The others receive a vendor report with limited repair data. Of agencies that keep a history of warranty repairs by vendors, 89% use such vendor warranty reports for determining fleet defects.

For Connect Transit, Bloomington, Illinois, most vendor reports are sufficiently detailed; however, there are some rare instances where the information is not as detailed as it could be. The agency believes there should be a standard process for vendors to provide a list of needed information for every warranty repair they make. King County Metro, Seattle, Washington, notes that vendor repair data are very difficult to capture in great detail. As a result, the agency relies on its own maintenance staff at the various garage locations to keep headquarters informed regarding vendor repairs, and believes the process needs improvement to enable better tracking for fleet defects.

SPECIFIC VENDOR TOPICS

Training

When asked if vendors require agency personnel to undergo prerequisite training before warranty claims can be submitted, 35% of agencies surveyed reported that such training is required for technicians. Agencies note an engine OEM in

particular that first requires technicians to undergo and pass on-line training and become certified before performing any warranty work to make certain faults are properly diagnosed and repaired. King County Metro is one agency that certifies their technicians to make engine warranty repairs, also ensuring they are prepared to address engine faults after warranty expires. Other surveyed agencies contact the engine OEM to make warranty repairs. In addition to engines, agencies reported needing prerequisite technical training for transmissions, air conditioning, wheelchair lifts, and fire suppression systems.

Regarding administrative warranty training, only 13% of the agencies surveyed report it as a vendor prerequisite. Regardless of a vendor's imposing it as a prerequisite, 74% of warranty administrative personnel at agencies surveyed do receive training as noted earlier in chapter three.

Warranty Return Parts

Virtually every vendor has certain parts replaced under warranty that it wants sent back or held for them to inspect and verify. The majority of responding agencies, 71%, reported that they must return or hold 50% or more of their failed warranty parts for vendors to inspect before reimbursement can be made. New York MTA has negotiated an arrangement where it has the option to dispose of parts without invalidating the warranty claim. Rockford MTD plays it safe and holds all parts used for warranty repairs until the claim is closed; Edmonton reports that it must hold all warranty parts.

Other Vendor Requirements

Responding agencies described a variety of vendor-imposed warranty requirements:

- Use of the vendor's diagnostic procedures as proof of proper troubleshooting,
- Detailed reporting of the diagnostic methods used,
- Data downloads from the component's electronic control modules,
- Prior authorization before agencies are allowed to make warranty repairs,
- A deadline for the return of defective parts,
- A deadline for claim submission,
- Disallowing reimbursement of diagnostic time, and
- Proof of proper PM.

Coast Mountain Bus Company, Vancouver, BC, Canada, sends digital photographs of parts requested by vendors, making it necessary to only send back or hold about 10% of failed warranty parts. Bi-State Development Agency (St. Louis County, Missouri and the St. Clair County Illinois Transit District) also sends digital photographs when requested. The use of digital photographs in lieu of shipping failed parts when submitting warranty claims represents an innovative way to streamline the warranty process, saving the time and costs associated with packing and shipping failed parts. Once the photographs are received vendors can then make a determination to have the parts scraped or returned if needed for further analysis. Either way, the use of digital photographs can make the warranty claim process more efficient for both agencies and vendors.

King County, Seattle, reports that one of its hybrid vendors requires pre-approvals for hybrid system components based on reports generated from its electronic diagnostic software. Coast Mountain Bus also noted similar vendor requirements for troubleshooting trees and electronic control module images before warranty claims are accepted.

Rejected Claims

Most responding agencies, 68%, reported that only 10% or less of their warranty claim are completely rejected by vendors; one agency reported no claim rejections, and another a rejection rate of less than 5%. Twenty-nine percent of responding agencies reported that between 10% and 30% of their warranty claims are completely rejected by vendors. One agency admits to having 30% to 50% of its warranty claims completely rejected by vendors, an indication that its warranty process needs to be revisited.

About the same number of responding agencies, 65%, reported that 10% or less of their warranty claims are partially rejected by vendors, with 29% reporting between 10% and 30% partially rejected by vendors.

Excessive labor time is the primary reason for having warranty claims rejected, as reported by 52% of responding agencies. The second most frequently mentioned reason, as reported by 45% of responding agencies, is that the vendor reviewed the failed part and found no defect. Thirty-five percent of responding agencies reported claims being rejected because a part or system was out of warranty or submitted beyond the claim limit. Other reasons given by vendors for rejecting warranty claims include:

- Item not covered
- Incomplete documentation
- Part not returned
- Improper installation or repair
- Accident damage
- Unauthorized repair
- Protocol not followed
- Excessive parts mark-up.

Replacement Parts

Almost half of surveyed agencies say the requirement to purchase replacement parts from the vendor providing the warranty depends on the part, 29% are not required to purchase

replacement parts from the vendor, and 23% are required to purchase replacement parts from the vendor providing the warranty.

As noted in chapter two, the SBPG recommends that for warranty repairs made by the vendor, the vendor shall provide all spare parts and tools required to complete repairs at its own expense. If the agency performs warranty repairs, the SBPG recommends that the agency use parts supplied by the vendor; however, the agency can use contractor-specified parts available from its own stock if deemed in its best interests. Under the SBPG, agencies can also require the vendor to supply parts for warranty-covered repairs being performed by the agency.

When asked if they purchase OEM replacement parts or those approved by the OEM when making warranty repairs, 50% of responding agencies do so, 39% report that it depends on the part, and 11% do not purchase OEM or OEM approved parts.

Most agencies, 90%, say they have never had a claim rejected because of using aftermarket parts, typically referred to as those parts not manufactured or recommended by the OEM. Aftermarket parts that caused warranty claim rejection include transmission filters and oxygen sensors.

Add-On Equipment

Only one agency, King County, Seattle, reported having had claims rejected because of add-on equipment such as cameras, AVL systems, fareboxes, and next-stop voice annunciation systems. For example, the agency had a farebox installed with smart card capability; subsequently it contracted with a vendor to install an integrated AVL, next-stop announcement, and destination signage system. An integration issue with the farebox soon developed and neither manufacturer is willing to assume warranty responsibility, each side blaming the other for the interface problem. King County believes that the agency is being held hostage by the vendors, having to assume the time and costs associated with resolving the problems on its own.

Overturning Denied Claims

Of responding agencies that had warranty claims denied, a significant 79% have been successful in overturning a vendor's original refusal; the issue being that agencies need to question rejected claims if they have a valid case. Reasons given for convincing the vendor to honor the original warranty include:

- Having solid records, a good maintenance program, and warranty agreements in place.
- Providing all required documentation and failed parts. Include failure reports regarding defective parts being returned, and, if needed, provide additional information about the failure and nature of the repair. Present the facts and history.
- Reviewing disputes with a field service representative.
- Documenting the troubleshooting steps used to determine the part had failed and follow up with reports showing there were no further complications after replacing the suspect part.
- Inviting vendor(s) to review the failure.
- Using third-party testing to verify the reason for failure.
- Where warranty has expired in the previous several months, providing documentation showing the same issue with similar buses in the fleet.
- Showing the history of common fleet defects (even if it does not support the fleet defect requirement described under Fleet Defects in the following section).
- Presenting contract language supporting the dispute, and reviewing proper interpretation of the contract with the vendor.
- Reminding the vendor if a reasonable claim is rejected that the agency has the choice to not buy their products and to advise other agencies to not buy their products.
- Negotiating claim amount.
- Litigation.

FLEET DEFECTS

APTA's SBPG Definition

Surveyed agencies were informed of the SBPG that defines fleet defects as:

> Cumulative failures of twenty-five (25) of the same components in the same or similar application in a minimum fleet size of twelve (12) or more buses where such items are covered by warranty. . . . When a Fleet Defect is declared, the remaining warranty on that item/component stops. The warranty period does not restart until the Fleet Defect is corrected. . . . After correcting the Defect, the Agency and the Contractor shall mutually agree to and the Contractor shall promptly undertake and complete a work program reasonably designed to prevent the occurrence of the same Defect in all other buses and spare parts purchased under this Contract. . . . The Contractor shall update, as necessary, technical support information (parts, service, and operator's manuals) due to changes resulting from warranty repairs.

Based on the information provided, 68% of responding agencies claim to be aware of all aspects of the SBPG definition, whereas 32% were not. Specific aspects of the definition that agencies were not aware of include: the warranty period does not restart until the fleet defect is corrected, the minimum fleet size is 12, and the failure rate is 25%.

Fleet Defects Declared

The majority of responding agencies, 52%, reported no fleet defects in the previous five years; 30% reported one to four fleet defects, 13% reported 10 to 30, and just one agency declared more than 50 fleet defects in the previous 5 years. Reasons for

declaring fleet defects are too diverse to categorize and include everything from engines, brakes, transmissions, and cracked frames to axle alignment, windshields, and electrical problems.

Most responding agencies, 72%, reported never having a fleet defect they could not substantiate, while the remainder had fleet defects but did not claim them because they could not be substantiated. Of those who did not submit fleet defect claims, 55% did not file because failures fell short of the 25% fleet requirement and 36% because they lacked the required documentation.

Of responding agencies that declared a fleet defect, 72% noted that vendors honored their claims, although some reported that vendor recognition took a significant amount of time; 28% report declaring fleet defects but that the bus manufacturer failed to recognize them as such.

Reasons given for vendors rejecting fleet defects include:

- A testing procedure caused premature failure.
- Not all of the failed parts were returned.
- Vendor disagreed with the agency's reasoning.
- Vendor believed that the part met published life expectancy.
- Failures occurred outside the warranty period.
- Percent required to meet a fleet defect was not sufficient.

Technical Support Documentation

A significant number of agencies, 30%, reported that they have had fleet defects where the bus manufacturer failed to update technical support documentation (i.e., parts, service, and operator's manuals) resulting from warranty repairs. Comments on this oversight included vendors that tended to leave such updates to component manufacturers, which rarely takes place, and manufacturers that do not take documentation updates seriously.

WARRANTY VIOLATIONS AND DISPUTES

Survey results indicated that warranty disputes are not widespread. Nearly all participating agencies, 94%, reported that they have warranty disputes with 10% or less of the claims they submit. Two agencies reported having no disputes at all. Just two agencies reported having vendor disputes with 10% to 30% of all warranty claims.

Surveyed agencies cited many strategies they have found effective in resolving warranty violations and disputes. Among them is a suggestion by many to establish strong relationships and communication channels with the vendors, which will allow agencies to have effective dialog, which often results in their receiving warranty assistance, sometimes even after the warranty period has expired. In addition to establishing good communications with vendors, agencies suggested substantiating warranty issues with maintenance records and testing, having clear warranty language and using that language to resolve disputes, using third-party testing, and providing as much repair detail as possible including digital photographs and even video clips to document failures. As one agency noted, negotiating is all about both parties "bending a little." Others suggested withholding payment of retained funds for bus purchases and to keep appealing the vendor's decision.

OUT OF BUSINESS VENDORS

Of agencies surveyed, 32% reported having had an instance where a vendor went out of business during the warranty period. Of these, 67% reported that the vendor was a part or component manufacturer, whereas 36% reported that the vendor was a vehicle manufacturer. When a vendor has gone out of business during the warranty period, more than 90% of those agencies report that the vendor covered the remaining warranty period. One agency reported the vendor provided parts but no compensation for labor, another that the vendor had the failed parts manufactured at the agency's expense, another agency had to find an alternate supplier, one agency became responsible for all costs incurred, and two reported having paratransit hybrid buses out of service because parts and service support was lacking.

SUGGESTIONS FROM SURVEY PARTICIPANTS

Surveyed agencies were asked to add any suggestions or advice regarding warranty they would pass along to their peers. Their suggestions, organized by agency size, can serve as guidance to those looking for ways to optimize their warranty programs.

Small-Sized Agencies

- Advise your technicians of warranty coverage periods when new buses arrive and keep reminding them throughout the warranty period. (Rockford MTD)
- Warranty negotiations can only be accomplished in large agencies with a lot of buying power. Small purchasers are at the mercy of the manufacturer. (Unidentified)
- Our agency doesn't realize a fraction of the warranty recovery that we should, and it's only a matter of a lack of staff to initiate, track, and follow up on warranty claims. (Unidentified)
- Reward effective warranty recovery, send warranty recovery money back to the shop so staff can see the "payoff" for time and effort spent on warranty claims, and don't let warranty claims become a nuisance. (Whatcom Transportation Authority)

Medium-Sized Agencies

- Create a comprehensive warranty policy. (ABQ Ride, Albuquerque Transit Department)

- Standardized warranty forms and practices would provide a great benefit. Electronic warranty submittal and record keeping would also be beneficial. However, when dealing with the many different agencies and systems, achieving a standardized system could be problematic. (Santa Clara Valley Transportation Authority—VTA)
- Get the extended warranty coverage, clearly identify all warranty periods for buses and components, and after receiving new units schedule a meeting with the manufacturer and your maintenance staff to review those warranties. (Montgomery County)
- Make sure all warranty issues are addressed in your procurement where possible, include vendor training regarding their warranty claim submittal process, and insist that the OEM take the lead on warranty retrofits if it involves a totally new system upgrade from what was delivered on the vehicle. (Kitsap Transit)
- Hire a full-time warranty administrator, be extremely vigilant in the claims process, strongly emphasize to technicians that they need to be proactive in warranty administration. (San Bernardino—Omnitrans)

Large-Sized Agencies

- Be sure to include handling fees in all warranty contracts. We typically charge 15%. Also, develop a system that allows you to effectively track all warranties; be diligent in archiving all correspondence with vendors, you will benefit from this; and hold the vendors to what is agreed upon contractually. (Metro Transit—Minneapolis/St. Paul)
- The return on investment for warranty recovery is huge; it's worth having a dedicated team recovering warranty. Also, keep good records, involve your maintenance team in warranty recovery, and offer recovery bonus to your maintenance/inventory employees. (Orange County)
- Don't depend on someone else to do your warranty work. (Metropolitan Atlanta Rapid Transit Authority)
- Start a network for all transit agencies to join and collaborate regarding bus warranty. (City of Edmonton Fleet Services)
- Remember there are two types of warranty, contractual and commercial, and both of these can be applicable to the same fleet, same parts and systems. Know the time frames and limitations to each one; otherwise, you will be giving money away that rightfully would be going to your transit agency to correct a condition that the supplier should have already addressed. Go by the facts and just the facts, know the terms of your contract. Communicate clearly and consistently. (DART, Dallas)

Very Large-Sized Agencies

- Conduct an overall inspection just before the warranty period expires. (Coast Mountain Bus Company, Vancouver, BC)
- Create relationships with the manufacturer and component suppliers. If unsure of a potential claim call and discuss the issue before making the claim. Communicate warranty requirements with maintenance employees. (Denver Regional Transportation District)
- Make sure your contract specification is strong, reasonable, and enforceable. Have enough warranty staff to ensure claim processing within the time requirements of the vendors. Pay very close attention to failure trends and use the fleet defect language of your contract. (King County Metro, Seattle)
- Be sure your contract language is strong, educate vendors on your warranty and fleet defect procedures, and provide a dispute resolution that does not necessitate legal action. (New York City Transit)

CHAPTER FIVE

CASE EXAMPLES

ROCKFORD MASS TRANSIT DISTRICT (MTD)

Agency Overview

The Rockford MTD, the smallest agency of the three case examples, provides fixed-route and paratransit service to the cities of Rockford, Loves Park, Machesney Park, and Belvidere, Illinois, with a combined fleet of 75 buses. Vital service statistics are provided in Table 14.

Warranty Personnel and Training

Four workers are assigned to handle warranty, with each individual dedicated to warranty on a part-time basis, including the maintenance manager, the maintenance shop foreman, and two clerk assistants. Each full-time employee has other job duties within the maintenance department.

With only three bus types, warranty training requirements are minimal. The agency does, however, specify that bus manufacturers provide warranty training, which amounts to refresher training of about one hour per person for each new bus purchase.

Warranty Periods

Rockford follows the SBPG as the basis for assigning new bus warranty coverage periods. The engine is the only component where OEMs are required to provide an extended warranty (5 years/300,000 miles) because it is the only component Rockford can justify from a cost standpoint. To justify extended warranty, the agency tracks parts and labor costs for each engine warranty repair and documents costs within the extended coverage period (i.e., costs incurred between the standard 2-year/100,000 period and the extended coverage period of 5 years/300,000 miles). It then compares those costs with the cost of purchasing the extended engine warranties. With this documentation Rockford's maintenance department is able to prove to its own accounting department and FTA that the combined costs paid by vendors during the extended warranty period exceed the combined extended warranty cost for a given fleet of buses. Since the same justification could not be made for transmissions, extended warranties are not purchased for that component.

Warranty Tracking

Because the agency typically has only one set of buses in warranty at a given time, tracking warranty coverage becomes a relatively easy task. Even though the agency's MIS allows it to track warranty coverage periods electronically, the process is primarily done manually because of the low vehicle count. Technicians, the foreman, a maintenance assistant, and the maintenance manager work together to collectively identify warranty repairs. The work order serves as the basis for generating warranty claims, which are done manually through pen and paper forms. The same method is used to track warranty of replacement parts and components bought outside new bus procurements.

Because of the small fleet size, Rockford sees no need to issue periodic reports showing warranty start and end dates. All maintenance workers including the technicians are informed of warranty coverage periods. Even if a warranty-eligible repair gets by the technician, foreman, and assistant, the maintenance manager will know what is covered and for how long. The maintenance manager reviews warranty claims monthly to determine those that are still outstanding. Although Rockford believes it has a good process for tracking warranty coverage periods and identifying warranty repairs it recognizes the need for improvements. One area involves warranty repairs made during the Preventive Maintenance Inspection (PMI) where technicians fail to generate a separate work order. In these cases, the repair gets "buried" within the PMI work order and the warranty repair is sometimes missed. Another occasional oversight involves longer-period rust and structural warranties where the agency sometimes forgets that these warranties still apply.

Warranty Documentation

While Rockford may track its warranty coverage periods manually, it still uses a detailed warranty spreadsheet program to document warranty claims separately for its bus fleets. The spreadsheets include a listing of each warranty repair broken down by labor and parts. The data sheets itemize each warranty claim, showing the claim amount and actual reimbursements received. Supporting this documentation are periodic warranty reports issued by the bus OEMs detailing individual claims that show the amount submitted and the amount actually paid out.

TABLE 14
ROCKFORD MTD—VITAL BUS SERVICE STATISTICS

Population Served	Number of Buses	Annual Revenue-Miles	Annual Passenger Trips
240,414	75	565,200	98,300

Source: Rockford MTD.

In addition to supporting the agency's own warranty record keeping system, this documentation, along with the justification mentioned earlier to support extended engine warranty, is used to satisfy FTA triennial review requirements.

Claim Forms

Rockford uses warranty claim forms provided by each bus OEM, which are very similar. A typical example of a bus OEM warranty claim form is provided as Appendix F. Most claim forms include instructions for ordering warranty parts, submitting warranty claims, and returning warranty parts. One of the forms used by Rockford uses reference numbers for each area of the form that corresponds to numbered sections of the instructions. These numbered references provide thorough instructions for completing each required section, making it difficult to incorrectly complete the form.

One copy of the five-part claim form is retained by the agency, three are returned to the OEM, and a fifth copy is kept with the part if returned or examined on site by the OEM. All three bus OEMs require manual submission of claims (pen and paper). Given how extensive the Internet has become, Rockford's maintenance manager is not sure why a more streamlined approach using electronic claim submittal has not yet been adopted. The agency appears to believe that OEMs want to make it as difficult as possible so that they receive fewer claims. One of the reasons the paper method takes additional time to complete is that OEMs require much of the same information for each claim (i.e., agency name, contact information, etc.), whereas electronic versions would have that information pre-entered.

Warranty repairs having to do with engines, transmissions, and air conditioning are typically handled directly with the appropriate vendor. The OEM is kept informed of all warranty work performed by subsystem vendors and the dialog that takes place between them and Rockford staff. All other claims regarding the vehicle are directed to the bus OEM. Rockford believes that OEMs should adopt a more streamlined process for submitting claims. Although claim forms are very similar among its three bus OEMs, Rockford believes the industry would benefit from a standardized warranty process, one that establishes and recommends an electronic, Internet-based claims processing format.

Instead of using flat-rate times Rockford specifies that actual labor time be paid for warranty repairs. Before submitting a claim, however, the maintenance manager will review the flat rate manual to see if the time being submitted is close to the OEM allotment. Overhead is used to calculate Rockford's $37.51 hourly labor rate, but the agency does not mark-up parts costs, nor does it charge for towing, because bus OEMs do not allow Rockford those charges. The agency is now considering adding a handling charge for warranty parts.

Rockford has a mixed approach for charging diagnostic time to warranty claims. If diagnosing the problem was difficult for skilled technicians, diagnostic time is charged, otherwise the agency uses the diagnostic time as a training exercise for its less-skilled technicians and it is not charged. In cases where vendors question labor time or other aspects of the warranty claim, Rockford works with them to negotiate reimbursement acceptable to both parties. Rarely is a claim rejected outright.

Warranty reimbursements are made by check; spare parts credits proved to be too much of an accounting inconvenience. Warranty monies reimbursed are classified between labor and parts and placed in the appropriate agency account.

Warranty Repairs

Warranty repairs are made by the agency or OEM depending on the nature of the repair. Generally, Rockford's own technicians perform day-to-day warranty repairs. However, as a small agency with limited staff, vendors are called in if a large number of units need attention, if an update or retrofit needs to be made on many or all units, or if the warranty repair requires a large time commitment. As mentioned previously, the agency does not typically make warranty repairs on major drivetrain components such as the engine, transmission, and differential and axle except to remove and replace it with a new or vendor-repaired unit. Nor does Rockford tend to make air conditioning-related warranty repairs.

When vendors make warranty repairs Rockford frequently uses it as a learning opportunity for its own technicians. The agency has established good working relationships with its vendors. As such, field service representatives visiting the facility generally work with agency technicians to explain the fault and repair procedures, sometimes even working together as a team to facilitate repairs. This informal training complements more formal training provided by vendors as part of new vehicle procurements.

With no formal training department, Rockford relies primarily on vendor training. Instead of scheduling all of its OEM-provided training up front as part of new bus procurements, Rockford schedules training on engines, transmissions, and air conditioning, units that get repaired under warranty by subsystem vendors, toward the end of the warranty period. Doing so provides training in proximity to the

time when Rockford technicians will be required to take over repairs from the subsystem vendors. This in combination with the informal training received from subsystem vendors while they make warranty repairs places Rockford's technicians in a better position to handle drivetrain and heating, ventilating, and air conditioning repairs after the warranties end.

Virtually all warranty repairs are done on site. There has been an instance or two where buses had to be sent off property because required equipment such as an alignment rack or a dynamometer needed to complete the repair was not available on site. The agency notes that going off site can add costs that neither party wants to pay, including transportation and related labor costs.

Regarding innovative methods for warranty repairs, the agency has a policy of looking more closely at major components during the last few weeks or miles before the warranty is ready to expire. By doing so the agency sometimes identifies a bearing noise, oil leaks, etc., that may not have been caught until after the warranty had expired.

Vendor Relationships

Rockford is a believer in forging strong vendor relationships. Doing so has allowed them to resolve warranty disputes in an amicable manner, and obtain technical assistance and goodwill warranty after warranty periods expire. Goodwill warranty occurs when the vendor agrees to pay part or all of a repair shortly after warranty coverage has expired as an act of "good will." Forming strong vendor working relationships also benefits Rockford in other ways. As a small agency without a formal training department, Rockford has been successful in getting vendors to provide targeted training when needed.

Even after warranty coverage ends, Rockford's maintenance manager keeps vendors informed of any technical problems. In addition to keeping OEMs aware of technical issues that may impact other customers, the communication helps Rockford obtain assistance to facilitate repairs. In one example, Rockford experienced an unusual rear tire wear condition on a fleet of buses that developed after warranty had expired that it could not fully resolve. The maintenance manager contacted the bus OEM, providing photographs and other information. The bus OEM in turn dispatched a service representative who solved the problem by adding shims and making other minor adjustments.

Rockford's advice to smaller agencies with limited resources is to establish many vendor contacts to obtain as much warranty and technical assistance as possible. Rockford has found that most vendors are responsive to agency requests and will travel to provide assistance, even if the agency is small. However, smaller agencies need to reach out and seek assistance from the OEMs—the worst they could do is say "no."

POTOMAC AND RAPPAHANNOCK TRANSPORTATION COMMISSION (PRTC)

Agency Overview

PRTC provides public transportation to six jurisdictions in Northern Virginia. In addition to commuter bus service to Washington, D.C., PRTC provides connections to nearby Metrorail stations, a cross-town connector service, and a unique flex-routing service to help those who have difficulty using fixed bus stops. The agency also operates Virginia Railway Express (VRE), a commuter rail service into Washington, D.C. Vital bus service statistics are provided in Table 15.

Warranty Personnel and Training

Three maintenance workers at PRTC work part-time at warranty, a clerk who also has parts department responsibilities and two maintenance management personnel. Vendors provide the warranty training, with each of the three workers receiving less than an hour. The agency does not specify that warranty training be provided in its bid specifications.

Warranty Periods

Like most other agencies PRTC uses the SBPG for its warranty coverage periods, opting for extended warranty options for engines, transmissions, and differentials. It also requires a two-year complete bus warranty instead of the typical one-year warranty. Regarding major drivetrain components purchased separately as replacement parts, the agency specifies an extended warranty of 5 years/300,000 miles.

Warranty Tracking

With its fleet size growing, the agency realized it could no longer manually track warranty. The old method of trying to "remember" warranty periods was resulting in too many warranty repairs going undetected. In addition, even if the warranty was detected after completing the repair, the defective part in too many cases had already been discarded and was not available for return. Starting with replacement parts, the MIS was modified to print the letter "W" next to each replacement part listed on the work order that comes with a warranty. The MIS is coded such that anytime the same replacement part number is charged out of the parts room for

TABLE 15
PRTC—VITAL BUS SERVICE STATISTICS

Population Served	Number of Buses	Annual Revenue-Miles	Annual Passenger Trips
486,692	135	3.2 million	3.4 million

Source: PRTC.

that bus, the part is flagged as having warranty coverage. The procedure immediately notifies the technician and supervisor that additional investigation is needed to determine whether a claim needs to be submitted. Most importantly, it lets them know that the failed part needs to be set aside until a final determination can be made. This is significant for repairs made during night shifts because warranty is handled by the day-shift foreman and clerk handling warranty on a part-time basis, who also works days.

Each work order has a "recent repair history" section showing dates, work order numbers, odometer readings, and a brief description of the repair activities going back about eight previous work orders. If not listed in the recent repair history section or if additional detail is needed, the previous work order containing full work details can be retrieved and reviewed. The review allows the day-shift foreman and warranty clerk to determine if the failed part still covered under warranty did so because of faulty workmanship or if it falls outside the warranty scope (e.g., faulty installation).

PRTC is currently investigating whether to apply a similar procedure to new bus warranties. In a similar fashion to replacement parts, each new bus would be coded with warranty coverage periods applicable to the entire bus, extended drivetrain warranties, and any superior warranties that extend beyond those offered by the bus OEMs.

Warranty Documentation

As noted in chapter two, agencies are required under FTA triennial review requirements to have a system in place for identifying warranty claims, recording claims, and enforcing claims against the manufacturers. These efforts are needed to ensure that the cost of defects is borne properly by the equipment manufacturer and not the grantee and FTA. To satisfy this requirement, PRTC uses a spreadsheet program presented as Appendix G that tracks each warranty claim. It shows the:

- Bus number,
- Claim number and date submitted,
- Description of the fault and repair,
- Labor and part costs submitted to the vendor,
- Labor and part costs actually paid by the vendor,
- Difference in amounts submitted and paid, and
- Claim status (in process, closed, rejected).

The spreadsheet example provides clear documentation that warranty claims are being reordered per FTA requirements. Despite its procedures, the agency admits that it could do more to improve its warranty tracking methods.

Claim Forms

Although claims are submitted both manually and electronically, PRTC much prefers the electronic method developed by one of its bus OEMs. The clerk enters all data directly into a computer-based form, which is submitted by means of the Internet. For the vast majority of cases based on the part(s) being claimed, the program automatically enters the labor hours allowed by the OEM for the warranty repair. A place on the e-form allows the agency to note if the bus is down because of the warranty repair (i.e., replacement parts are not in stock); if so, the bus OEM expedites the part(s), thereby minimizing bus down time. An e-mail is generated if the bus OEM has a follow-up question or to confirm that the claim has been received. An average e-claim can be completed and submitted with five minutes.

Manual, pen and paper claim submittals take much longer. One particular bus OEM using this method at PRTC requires the clerk to call for warranty authorization before submitting a claim, which often results in missed calls, multiple phone messages, and delays. Even though the completed claim can be faxed to help expedite the process, the fax machine is physically located in another area of the facility. The contrast in submitting claims at PRTC certainly makes the case for adopting a standardized process through the SBPG that involves Internet-based electronic warranty claims processing.

Warranty Repairs

Like most other agencies, PRTC makes some warranty repairs and calls in vendors at other times to make others. Vendors are typically called in to make warranty repairs on engines, transmissions, differentials, air conditioning, destination signs, and fire suppression systems. Technicians work with vendors when making warranty repairs, using it as a learning opportunity. The agency feels that technicians are well prepared to make warranty repairs after warranty has ended, due in part to working with vendors and the agency's efficient training program. Additionally, nearly all technicians have Automotive Service Excellence (ASE) certifications, with nearly 40% of them ASE Master Certified.

DALLAS AREA RAPID TRANSIT (DART)

Agency Overview

DART provides public transportation services to the city of Dallas, Texas, and 12 surrounding cities. Its extensive network of transportation modes includes a fleet of more than 600 buses, 163 light rail vehicles, and two streetcars to service 130 routes over a 700-square-mile service area. Vital bus service statistics are provided in Table 16.

Warranty Personnel, Training, and Team Approach

DART sees its warranty program as an integral part of maintaining its $4.8 billion worth of assets in a state of good repair, and for providing critical feedback to both internal agency staff and vendors regarding systems performance.

TABLE 16
DART—VITAL BUS SERVICE STATISTICS

Population Served	Number of Buses	Annual Revenue-Miles	Annual Passenger Trips
4,145,659	619	20.1 million	38.7 million

Source: DART.

Two full-time employees are assigned to administer warranty; one for bus warranty recovery, the other for rail warranty recovery. The bus warranty administrator has been trained by the bus OEMs in line with requirements set forth in DART's specifications, and received about 16 hours of warranty training for each bus procurement contract.

The agency approaches warranty as a team effort, not only in the recovery of warranty funds but to help vendors improve their products, resulting in reduced downtime and cost for DART. Employees administrating warranty view their jobs as a part of a business to ensure the agency receives something in return of value for every legitimate warranty repair due them, and to ultimately improve the reliability and operating cost of DART's equipment.

Although primary bus warranty tasks are handled by one full-time staff member, responsibility is also shared among technicians, maintenance supervisory personnel, and various other departments including Fleet Services, Fleet Engineering, Procurement, Finance, and Material Support. Sharing of information among various departments is helpful in indentifying waranty repairs, warranty trends, and fleet defects.

DART takes a system view toward warranty that goes beyond rolling stock; extending to facility equipment, rail stations, communication, signals, parking lots, lighting, and even landscaping. Warranty coverage is applied to virtually every product and service the agency procures.

Warranty Periods

DART uses the SBPG as a general rule for establishing warranty periods with some significant exceptions. For the complete bus, DART specifies 2 years/150,000 miles instead of the more traditional 1-year/50,000-mile period. The agency currently only procures CNG buses, and for engines and transmissions specifies 2-year/unlimited mileage coverage. Subcomponents such as starters, destination signs, and fire suppression also get 2-year/150,000-mile warranty coverage. Replacement camera systems are required to have a two- or three-year unlimited mileage warranty depending on the type.

Warranty Classifications

DART classifies warranty into two distinct groups, each having its own set of conditions: contractual warranty and commercial warranty. A contractual warranty is where terms and conditions are negotiated as part of a larger procurement. A two-year bumper-to-bumper bus warranty negotiated as part of a vehicle purchase is an example of a contractual warranty. A commercial warranty is defined as a warranty that has not been negotiated. This is where DART purchases, for example, a certain number of brake valves as replacement parts and accepts the standard warranty terms and conditions offered by the vendor (e.g., a six-month warranty, parts no labor).

Commercial warranty also applies to warranty coverage on individual bus parts that extend beyond the contractual warranty period offered by the bus OEM. An example is a three-year warranty offered by the original destination sign manufacturer that continues beyond the standard two-year warranty provided by the bus OEM. The third year of that coverage is considered a commercial warranty under DART's classification; others call it superior warranty. Terms and conditions for commercial warranties are generally provided by the individual part supplier within the context of the overall bus procurement.

Because each classification has its own set of warranty conditions, DART's ability to track warranty to each classification is essential to maximizing its warranty program. For example, a part replaced prior to the end of a complete bus warranty may have a separate commercial warranty with a separate set of conditions that apply after the contractual bus warranty expires. Understanding whether contractual or commercial warranty conditions apply allows DART to more accurately submit claims and avoid delays caused by vendor disagreements where each insists the other is responsible for warranty.

Warranty Tracking

Key to DART's effective approach to warranty is a comprehensive tracking system, an integral part of its computer-based MIS, developed by a vendor with strong input and customization by agency personnel. DART is continually refining its warranty tracking system to better identify warranty coverage for both types of warranty classifications.

For contractual warranties that apply to new bus purchases, conditions are created in the MIS with pertinent information including the warranty start date for the entire bus and separate coverage periods for subcomponents. Warranty start dates correspond to the acceptance date of each bus. An SOP is developed for each type bus in DART's fleet. The purpose is to clarify the active warranty periods and warranty terms and conditions for each new bus order. It documents warranty coverage periods for the entire bus and individual components including superior warranty, the warranty start date for each individual bus in that fleet, and instructions for processing warranty claims for that particular bus type and components. A copy of a typical warranty SOP is included as Appendix H.

A similar process is used for commercial warranties, such as rebuilt starter motors, where warranty terms are specified by the vendor. Any time a technician orders a part, that part is logged in the MIS with the appropriate bus number, part number, warranty start date and mileage, and warranty terms. Removed warranty parts are identified with a bright orange tag containing the work order number, bus number, and other information. Logging all pertinent information into the MIS allows DART personnel to access a full range of warranty data including detailed contractual and commercial warranty language for each bus or individual part.

Should the same part number appear on another work order within the warranty coverage period the MIS will automatically print a "Warranty Applies" heading on the work order. All completed work orders flagged by the MIS as having warranty implications are reviewed by the maintenance specialist, who more closely investigates all work entries made by the technician using MIS data as needed. If the maintenance specialist notes that any of the work done by the technician is warranty related, a claim is submitted by the warranty clerk to the appropriate vendor.

All technicians are instructed that if there be any doubt if a removed part is covered by warranty, it is to be tagged and returned to Materials Management for warranty consideration. Once verified that warranty coverage applies, and if undamaged, a warranty claim is processed. Claims become part of the permanent vehicle history file. DART is also experimenting with ways to incorporate bar coding information provided on some replacement parts into its existing tagging system for tracking warranty coverage periods.

An MIS-based custom reporting program developed by DART is used to track parts usage patterns to help identify fleet defects. The agency specifies a fleet failure rate of 20%, not the 25% recommended by the SBPG. Additionally, a "hit list" report identifies components installed or removed from a bus within a 12-month period, the generally accepted time frame for components covered under commercial warranty.

Warranty Repairs

DART uses a clause in its warranty specification that gives the agency right of first refusal to have its own technicians perform warranty-related work depending on its own work load and other conditions. DART technicians are trained and authorized to make warranty repairs to the bus and all the subcomponents. At the sole discretion of DART, the vendor may be called to perform warranty work.

Except in cases where revenue vehicles are taken off site to the dealer for warranty repairs, DART closely monitors on-site vendor warranty work and uses it as an opportunity to understand what went wrong and the steps taken by the vendor to correct it. DART shop personnel oversee and document all warranty repair work made by vendors. No vendor is allowed to conduct warranty work on site without DART's permission. DART also insists that the vendor provide all training needed for DART technicians to make warranty repairs as part of the vendor-provided training program.

Claims Processing and Reimbursement

All warranty work, whether performed by DART or vendors, is entered into the MIS as a work order and becomes part of the permanent vehicle history file. Warranty claims are generated by the MIS using the information taken directly from the work order and can be printed as hard copies or as an Adobe PDF file by the maintenance specialists. The PDF-formatted claims are e-mailed to the respective vendor or OEM. The only time claims are not submitted is when the vendor makes the repair on site. The warranty repair is, however, documented on a work order and included in the vehicle history file.

DART uses a standardized warranty claim form developed for its needs within the MIS. Its bus specification informs vendors that DART's form will be used to submit warranty claims. The agency has, however, remained open to the use of other warranty forms and processes if they present an advantage for DART as a way to improve recovery of warranty claims.

DART currently uses a fully loaded labor rate of $70.65 per hour, with a fleet defect labor rate of $75.82. A warranty handling cost of 15% is applied to warranty parts priced at $650 or less. Those warranty parts greater than $650 have a flat rate handling charge of $100 applied. Troubleshooting and diagnostic time is charged; actual towing charges and other applicable costs are passed on to the vendor as appropriate.

DART's aggressive warranty program results in the collecting of more than 89% of the total warranties submitted. A report is generated by the maintenance specialists showing outstanding claims yet to be paid. The key to obtaining full reimbursement and avoiding disputes according to DART is to make clear in the warranty specification what the warranty is, how the warranty is to be processed, and all terms and conditions. The goal, as stated earlier, is to always get something of value, either in the form a refund check or replacement part. Teamwork, coordination, and communication, both internally within various agency departments and externally with vendors, serve as the basis for DART's successful warranty program.

CHAPTER SIX

CONCLUSIONS

Warranty coverage is an important but seldom investigated topic. This is the first known study that examines transit bus warranty, presents relevant FTA and APTA materials, reports how a sampling of agencies address various aspects of their warranty program, and highlights successful agency practices. This chapter presents key findings and offers suggestions.

KEY FINDINGS

Although no publications were found documenting how transit agencies handle warranties, other documents offer some guidance. They reveal that FTA requires grantees to have an aggressive warranty recovery program to ensure that the cost of repairs made during the warranty period are absorbed by the equipment manufacturer, not by agencies and FTA. APTA's Standard Bus Procurement Guideline (SBPG) is considered an industry standard by FTA for agencies to reference when developing their own warranty programs. A maintenance plan developed by the Texas Department of Transportation serves as an example to satisfy FTA requirements that warranty is maintained by adhering to the manufacturer's preventive maintenance recommendations.

Survey results present collective agency practices regarding several warranty topics. For warranty recovery programs, all surveyed agencies use elements of the SBPG as a basis for crafting their own programs. When it comes to practices regarding warranty time and mileage coverage periods, most surveyed agencies use the standard SBPG periods, with half preferring options for extended engine and transmission warranty coverage. This chapter also noted that the vast majority of those surveyed use their own technicians to make some warranty repairs and call in vendors to make others. The top three bus components or systems where vendors are called in to make the warranty repairs are engines, transmissions, and air conditioning. Despite using warranty repairs as a training exercise when time permits, most agencies admit their technicians are only marginally prepared to make repairs after warranty coverage ends, because of the dependence on vendors to make those repairs.

Survey results concerning warranty management focuses on an agency's ability to aggressively pursue a warranty claim. It depends on the dedication an agency has to managing its warranty program; a program that engages technicians and multiple agency departments to accurately and efficiently identify warranty coverage periods and vigorously seek reimbursement. Warranty staffing depends on agency size, with the smaller agencies surveyed having no full-time staff; the majority using one or two personnel dedicated part-time to warranty. Larger agencies surveyed tend to have full-time warranty staff. More than 25% of all responding agencies do not provide warranty administrative training; that number grows to 50% for small agencies. For those that do train their warranty staff, about half provide less than an hour of warranty training per employee, a small amount given the amount of revenue that could be generated from a better informed and prepared workforce.

Regardless of staffing and training levels, most surveyed agencies admit there are times when warranty repairs are made but a claim is not submitted. A more streamlined, Internet-based electronic process for submitting claims would result in more warranty reimbursements. A majority of surveyed agencies favor this approach.

Information obtained through the survey also showed that agencies are nearly equally split between submitting warranty claims using an electronic format and those using more traditional "pen and paper" methods. Innovative techniques for submitting claims include the use of digital photographs, Internet-based claims processing, software that flags warranty work, suggestions that an electronic bulletin board be established to share warranty information, reviewing claims with vendors on a regular basis, and the use of e-mail to track claim status with vendors.

It was also revealed that many agencies are not taking full advantage of provisions contained in the SBPG. Although it recommends that agencies add fringe benefits and overhead to calculate warranty labor rates, nearly one-third of those surveyed do not. Only one-quarter of surveyed agencies charge 15% handling for warranty parts as recommended by the SBPG. Efficient methods to optimize warranty reimbursement as presented by participating agencies include the use of strong contractual language, excellent record keeping, online tracking of submitted claims, and employee dedication to warranty reimbursement.

A process to track warranty was found to be an essential element to optimizing warranty. Nearly one-half of the agencies surveyed use a combination of manual (pen and paper) and electronic data accounting methods to track warranty;

the remaining half are nearly evenly divided on exclusively using manual or electronic methods. It is interesting to note that fewer than 20% of responding agencies admit to having an excellent process for tracking warranty coverage periods and identifying warranty repairs. Nearly half of participating agencies acknowledge that their process could use some improvement.

Specific vendor topics are also addressed. Regarding warranty claims being completely rejected by vendors, two-thirds of respondents reported this being the case with 10% or less of their warranty claims, and one-third state that vendors reject between 10% and 30% of warranty claims. Of responding agencies that had warranty claims denied, nearly 80% have been successful in overturning the vendor's original denial by having solid documentation and other evidence. Regarding fleet defects, one-third of all surveyed agencies were not familiar with all aspects of the SBPG definition. A third of all surveyed agencies also experienced vendors going out of business while products were still covered under warranty.

Agencies offer their own advice to help optimize warranty:

- Create a comprehensive warranty policy.
- Develop strong relationships with manufacturer and component suppliers.
- Keep technicians informed of warranty coverage periods and emphasize that they need to be proactive with regard to warranty administration.
- Motivate staff to initiate, track, and follow up on warranty claims.
- Allow staff to see the payoff for time and efforts spent on warranty claims.
- Do not let warranty claims become a nuisance.
- Have the industry adopt a standard for warranty claim forms and electronic, Internet-based submittal procedures through APTA's SBPG.
- Obtain extended warranty coverage as long as it can be justified.
- Include vendor training in your procurment specifications.
- Be extremely vigilant in the claims process.
- Be sure to include handling fees in all warranty contracts.
- Hold vendors to what is agreed upon contractually.
- The return on investment for warranty recovery is huge; it's worth having a dedicated team recovering warranty.
- Start a network for all transit agencies to join and collaborate regarding bus warranty.
- Communicate warranty terms and conditions clearly and concisely in your specifications.
- Make sure your contract specification is strong, reasonable, and enforceable.
- Have enough warranty staff to ensure claim processing within the time requirements of the vendors.
- Conduct an overall bus inspection just before the warranty period expires.

Case examples present more detailed information. Agencies with a smaller number of vehicles to keep track of, as described in the Rockford Mass Transit District case example can monitor warranty more easily by simply "memorizing" coverage periods and terms, and using basic computer-based spreadsheets to satisfy FTA and internal agency reporting requirements. Potomac and Rappahannock Transportation Commission is an example of a medium-sized agency where its growing fleet size compelled them to transition from manual warranty tracking methods to more extensive use of computer-based programs. Larger agencies such as Dallas Area Rapid Transit with hundreds of vehicles, however, require more sophisticated tracking programs with the capability to flag warranties and issue a variety of reports to ensure vendors are charged for warranty-related work.

SUGGESTIONS FOR FURTHER RESEARCH

The following items are offered for future study:

- Agencies might become more thoroughly familiar with FTA warranty requirements and the SBPG to more aggressively pursue warranty recovery.
- The guidelines might be enhanced to include a standardized, Internet-based warranty claim form to help streamline the process.
- The guidelines might also be improved to clarify how diagnostic time is to be charged for warranty repairs, to standardize vendor reporting of the warranty repairs made, and to revisit the 15% parts handling charge to be more *representative* for all agencies.
- An electronic bulletin board might be established where agencies could collectively discuss warranty-related topics.

ABBREVIATIONS AND ACRONYMS

AC	Air conditioning
APC	Automatic passenger counters
AVL	Automatic vehicle location
BPPM	*Best Practices Procurement Manual*
Centro	Central New York Regional Transportation Authority
CNG	Compressed natural gas
CUTR	Center for Urban Transportation Research (Florida)
DART	Dallas Area Rapid Transit
DOT	Department of transportation
ECM	Electronic control module
GC	General conditions
IP	Instructions to Proposers
LED	Light emitting diode
MIS	Maintenance information system
MTA	Mass Transit Administration
MTD	Mass Transit District
OEM	Original equipment manufacturer
PM	Preventive maintenance
PMI	Preventive maintenance inspection
PRTC	Potomac and Rappahannock Transportation Commission
SAE	Society of Automotive Engineers
SBPG	Standard Bus Procurement Guidelines
SP	Special provisions
TRIS	Transportation Research Information Services
TS	Technical Specifications
TxDOT	Texas Department of Transportation

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APPENDIX A

Participating Agencies

Agency	Number of Buses
Sumter County, FL	25
Connect Transit (Bloomington Normal Public Transit), IL	46
MetroLINK, Rock Island, IL	59
CATA, State College, PA	66
Rockford Mass Transit, IL	75
StarMetro, Tallahassee, FL	84
Victor Valley Transit Authority, Rural San Bernardino County, CA	90
Whatcom Transportation Authority, WA	98
	(subtotal small 543)
Potomac & Rappahannock Transportation Commission (PRTC), Woodbridge, VA	148
ABQ Ride, Albuquerque, NM	157
Kitsap Transit, Bremerton, WA	158
OmniTrans, San Bernardino, CA	163
Transit Authority of River City (TARC), Louisville, KY	223
Capital District Transportation Authority (CDTA), Albany, NY	278
Broward County, FL	313
Charlotte Area Transit System, NC	323
Montgomery County Government, MD	342
Bi-State Development Agency St. Louis, MO; St. Claire County, IL	374
Capital Metro, Austin, TX	383
VTA, San Jose, CA	440
	(subtotal medium 3,302)
Utah Transit Authority	590
DART, Dallas, TX	619
Maryland Transit Administration	700
MARTA, Atlanta, GA	768
Orange County Transportation Authority, CA	794
Metro Transit, Minneapolis/St. Paul, MN	888
City of Edmonton Fleet Services Alberta, Canada	951
	(subtotal large 5,310)
RTD, Denver, CO	1,201
Coast Mountain Bus, BC, Canada	1,462
King County, Seattle, WA	1,492
NY–MTA, New York, NY	5,766
	(subtotal very large 9,921)
Total Buses in Survey Fleets	19,076

APPENDIX B

Survey Questionnaire

SYNTHESIS QUESTIONNAIRE

OPTIMIZING BUS WARRANTY

Note: This form is designed to be used electronically. Simply place the cursor inside the shaded box and either type in your response or left-click within the appropriate Yes/No answer box.

Date:

Transit Agency Name:

Respondent Information:

Name:

Telephone:

E-mail:

Purpose of this Survey: Warranty is an important but often overlooked transit bus function. Although manufacturers incorporate warranty costs into every new bus and component sold, some agencies fail to seek reimbursement for warranty repairs because their process is cumbersome and often considered a nuisance. Others, however, have effective procedures in place to optimize the warranty function and obtain full warranty reimbursement.

This questionnaire is intended to obtain in-depth information to provide a state-of-the-practice look at how agencies of different sizes manage bus warranty operations. The report produced from this study will focus on innovative and effective procedures used by agencies to establish warranty specifications, track warranty coverage periods, file claims, receive reimbursement, train warranty personnel, and settle vendor disputes. The information will also be used to examine the pros and cons of in-house versus vendor repairs, and the warranty implications of add-on equipment and using aftermarket parts. The collective information gathered through this synthesis will help improve warranty operations. Feel free to use additional pages and attach documents. Instructions for returning the survey by February 7 are found on the last page. **Thank you for your participation!**

Transit System Characteristics

1. How many total buses are in your fleet?

Fleet breakdown by type:

40 foot and larger	Total Number
30–39 foot	Total Number
Under 30-foot	Total Number

Comments:

Warranty Personnel

2. How many people at your agency are involved with administering warranty such as tracking warranty periods, processing claims, seeking reimbursement, etc.?

Number of personnel working full-time at administering warranty

Number of personnel working part-time at administering warranty

2a. If you have personnel that work part-time at administering warranty, what other agency activities are they engaged in? (Choose all that apply.)

☐ Clerical/admin.
☐ Parts department
☐ Maintenance & repair
☐ Other (specify):

Comments:

3. Are warranty administrative personnel trained for their job?

Yes ☐ No ☐

3a. If yes, who provides the warranty training? (Choose all that apply.)
☐ Agency
☐ Manufacturer/vendor
☐ Other (specify):

3b. How much administrative warranty training is provided per person? (Choose one)
☐ Less than an hour per employee
☐ More than an hour per employee

3c. If more than an hour per year, approximately how many administrative warranty training hours are provided per employee?

3d. Do you have specification language requiring manufacturers/vendors to provide administrative warranty training?
Yes ☐ No ☐

If yes, would you be willing to share those requirements?
Yes ☐ No ☐

Comments:

Warranty Specifications

4. Do your bus procurement specifications include a section dedicated to warranty? (Note: replacement components will be addressed later.)

Yes ☐ No ☐

5. Below are excerpts from APTA's Standard Bus Procurement Guidelines (White Book) for heavy-duty buses regarding warranty period recommendations for 12-year, heavy-duty buses. Indicate if you use those recommendations for the major items listed below or if you use another warranty period.

Note: Chose one response for each category.

Note: Only complete for heavy-duty, 12-year buses.

5a. Complete Bus
☐ 1 year/50K miles, or ☐ Other: Years Miles

Comments:

5b. Body & Chassis (including structural elements of the suspension and engine cradle but excluding primary load carrying members)
☐ 3 years/150K miles, or ☐ Other: Years Miles

Comments:

5c. Primary load carrying members of Body & Chassis
☐ 12 years/500K miles, or ☐ Other: Years Miles

Comments:

5d-1. Propulsion (Diesel)
Engine:
☐ 2 years/100K miles, or
☐ 5 years/300K miles, or
☐ Other: Years Miles

Transmission:
☐ 2 years/100K miles, or
☐ 5 years/300K miles, or
☐ Other: Years Miles

Differential/Axles:
☐ 2 years/100K miles, or
☐ 5 years/300K miles, or
☐ Other: Years Miles

Comments:

5d-2. Propulsion (CNG if applicable)
Engine:
☐ 2 years/100K miles, or
☐ 5 years/300K miles, or
☐ Other: Years Miles

Transmission:
☐ 2 years/100K miles, or
☐ 5 years/300K miles, or
☐ Other: Years Miles

Differential/Axles:
☐ 2 years/100K miles, or
☐ 5 years/300K miles, or
☐ Other: Years Miles

Comments:

5d-3. Propulsion (Hybrid if applicable)
Engine:
☐ 2 years/100K miles, or
☐ 5 years/300K miles, or
☐ Other: Years Miles

Drive Motors/Generators:
☐ 2 years/100K miles, or
☐ 5 years/300K miles, or
☐ Other: Years Miles

Differential/Axles:
☐ 2 years/100K miles, or
☐ 5 years/300K miles, or
☐ Other: Years Miles

Comments:

5e. Brake system (excluding friction surfaces)
☐ 2 years/100K miles, or ☐ Other: Years Miles

5f. Destination signs
☐ 2 years/100K miles, or ☐ Other: Years Miles

5g. AC unit and compressor (excluding floor heaters and front defroster)
☐ 2 years/100K miles, or ☐ Other: Years Miles

5h. Door systems
☐ 2 years/100K miles, or ☐ Other: Years Miles

5i. Air compressor
☐ 2 years/100K miles, or ☐ Other: Years Miles

5j. Wheelchair lift and ramp system (mechanical only)
☐ 2 years/100K miles, or ☐ Other: Years Miles

5k. Starter
☐ 2 years/100K miles, or ☐ Other: Years Miles

5l. Alternator: excluding drive system
☐ 2 years/100K miles, or ☐ Other: Years Miles

5m. Fire suppression:
☐ 2 years/100K miles, or ☐ Other: Years Miles

Comments:

6. Do your warranty specifications for new buses include any unique or innovative warranty terms and conditions?

Yes ☐ No ☐

6a. If Yes, please describe them:

6b. Are you willing to make your new bus warranty specifications available to others?
Yes ☐ No ☐

7. Regarding major drivetrain components <u>purchased separately</u> (replacement parts) for use in 12-year, heavy-duty buses, please indicate your warranty periods for:

Engines New:	Years	Miles
Engines Rebuilt:	Years	Miles
Transmissions New:	Years	Miles
Transmissions Rebuilt:	Years	Miles
Differentials/Axles New:	Years	Miles
Differentials/Axles Rebuilt:	Years	Miles
Other (specify):	Years	Miles
Other (specify):	Years	Miles

Comments:

8. Regarding other replacement parts purchased separately, indicate your warranty coverage requirements <u>only if they are beyond the traditional one-year period</u>.

Item (specify):	Years	Miles
Item (specify):	Years	Miles
Item (specify):	Years	Miles
Item (specify):	Years	Miles

Warranty Repairs

9. Describe your agency's approach to making repairs during the warranty period. (Choose one)

☐ We use our own mechanics to make <u>all</u> warranty repairs
☐ We use vendors to make <u>all</u> warranty repairs
☐ We make some warranty repairs and call in vendors to make others

9a. What determines whether the agency makes repairs or whether vendors make them. (Check all that apply.)
☐ Labor agreement with union
☐ Procurement specification
☐ Depends on nature of repair
☐ Other (specify):

Answer questions 10–14 only if vendors make warranty repairs.

10. Do vendors make repairs at your facility or are buses/components sent off property for repairs? (Choose one)

☐ All vendor warranty repairs are done on our property
☐ All vendor warranty repairs are done off-site
☐ Combination of on-site/off-site

Comments:

11. Identify those bus areas where <u>vendors</u> make warranty repairs. (Choose all that apply.)

☐ Engines
☐ Transmissions
☐ Differentials and axles
☐ Hybrid drives and other major hybrid components
☐ Air conditioning system
☐ Destination signs
☐ Camera systems
☐ Fire suppression system
☐ Other (specify):
☐ Other (specify):
☐ Other (specify):

Comments:

12. When vendors make repairs, do you use it as a learning opportunity for your own mechanics so they gain experience? (Choose best response.)

☐ Never
☐ Occasionally when time permits
☐ Frequently (more than 50% of the time)
☐ We have a formal program where the vendor is required to work alongside one or more of our mechanics when warranty repairs are made

Comments:

13. With vendors doing some or all warranty repairs, do you feel that your mechanics are adequately prepared to take over when the warranty period is over? (Choose best response.)

☐ Yes, without question
☐ Marginally
☐ No, not at all

Comments:

14. Once the warranty period is over, do you find yourself paying the same vendors to make repairs?

Yes ☐ No ☐

14a. If yes, are you paying for the repairs because: (Choose best response.)
☐ Mechanics are not trained or qualified to make the repairs
☐ We don't have the time
☐ All of the above

Innovative Methods for Warranty Repairs

15. List any innovative and efficient methods your agency uses to optimize warranty repairs.

Filing Warranty Claims

16. Do you file warranty claims manually or electronically? (Choose one)

☐ Manually (pen/paper)
☐ Electronically (via Internet)
☐ Other (specify):

Comments:

17. Are claims submitted to the bus manufacturer or the vendor of the particular subsystem component? (Choose best response.)

☐ All claims submitted through the bus manufacturer
☐ Some through the bus manufacturer, others through subsystem vendors

Comments:

18. When claims are submitted directly to subsystem vendors; do you inform the bus manufacturer? (Choose best response.)

☐ Yes, always
☐ Sometimes
☐ Never
☐ Not applicable, all claims go through the bus manufacturer

19. Are there times when a vendor is called in to make a warranty claim and no formal claim is submitted? (Choose one)

☐ Yes
☐ No
☐ Not applicable (we make all our warranty repairs)

Comments:

20. Are there times when you make a repair covered under warranty and don't submit a warranty claim for it?

Yes ☐ No ☐

20a. If yes, state the reason(s) for not filing claims. (Check all that apply.)
☐ Effort to submit claim is not worth the reimbursement
☐ The warranty filing process is too cumbersome
☐ We don't have the time or resources to file all claims
☐ Sometime we forget to file claims
☐ Other (specify):

Comments:

20b. If yes, what would help to file more clams?
☐ More agency staff
☐ A more streamlined filing process by the vendors
☐ A more streamlined process by our own agency
☐ Other (specify):

21. Do you have a standardized warranty claim form you make all vendors use?

☐ Yes, we have a standardized form
☐ No, we use the claim form provided by each vendor

Comments:

22. Would you favor the industry adopting a standardized warranty claim form and process for filing claims?

Yes ☐ No ☐

Comments:

22a. If yes, should it be made part of the APTA Guideline?
Yes ☐ No ☐

Comments:

23. How is warranty labor allocated? (Choose best response.)

☐ We submit the actual labor time used to make the warranty repair
☐ We use flat-rate times provided by the manufacturer
☐ We use a combination of the two

Comments:

23a. If manufacturer flat-rate times are used, approximately how many of your total warranty claims filed are based on those times?
☐ Less than 50% of all claims filed
☐ More than 50% of all claims filed
☐ We don't use flat-rate times

Comments:

23b. Is shop overhead reflected in your labor and parts cost?
Yes ☐ No ☐

23c. Which labor rate do you charge for warranty? (Choose one)
☐ A base labor rate of per hour
☐ A fully loaded labor rate of per hour

23d. How are parts costs allocated? (Choose one)
☐ We charge the actual price we pay for the part
☐ We mark-up our parts

23e. If parts are marked-up, what is the percentage of increase?
%

23f. Do you charge separately for shop material costs such as haz-mat fees, etc.
Yes ☐ No ☐

23g. Do you charge separately for troubleshooting and diagnostic time?
Yes ☐ No ☐

23h. Regarding warranty repairs that require the bus to be towed back to the shop: (Check all that apply.)

- ☐ We charge the flat-rate fee established by the vendor
- ☐ We charge based on per-mile costs established by the agency
- ☐ We pass along costs charged to us by the towing company
- ☐ We mark-up towing company charges by %
- ☐ Other (specify):

Comments:

Innovative Methods for Filing Warranty Claims

24. List any innovative and efficient methods your agency uses or you would recommend to optimize the filing of warranty claims.

Warranty Reimbursement

25. In what form are warranty payments made? (Choose one)

- ☐ Checks
- ☐ Parts credit
- ☐ Combination of the two
- ☐ Other (specify):

Comments:

26. Which department receives the warranty reimbursements?

- ☐ Maintenance department
- ☐ Goes to general agency fund
- ☐ Other (specify):

Comments:

27. If you were to add up the amount of warranty monies requested through all claims submitted, approximately how much of that money/credit is actually reimbursed by the vendors?

- ☐ 80–100%
- ☐ 50–80%
- ☐ Less than 50%

Comments:

Innovative Warranty Reimbursement Methods

28. List any innovative and efficient methods your agency uses or you would recommend to optimize reimbursement of warranty claims.

Warranty Tracking

29. How do you track the warranty periods of new buses?

- ☐ Manually
- ☐ Electronically
- ☐ Combination of both

Comments:

30. Do you use the same method to track replacement parts and components bought outside the new bus procurement?

Yes ☐ No ☐

30a. If no, how do you track parts and components bought outside the new bus procurement?

Comments:

31. Does your tracking system issue periodic reports showing buses and components covered under warranty (warranty start and end dates/mileages)?

Yes ☐ No ☐

Comments:

32. After a work order/repair order is closed out, describe how you determine if repairs are covered under warranty?

33. Do you have a quick and efficient way to determine if repairs are covered under warranty?

Yes ☐ No ☐

33a. If yes, describe them:

34. Does your tracking system have a way of alerting you when the warranty period of a bus or component is about to expire?

Yes ☐ No ☐

Comments:

35. How would you best characterize your agency's tracking of warranty coverage periods: (Choose best response.)

☐ We have an excellent process for tracking warranty coverage periods and identifying warranty repairs
☐ We have a good process that could use some improvement
☐ We need to improve the way we track warranty coverage periods and identify warranty repairs

Comments:

35a. If you have an excellent tracking process is it an agency-developed system or purchased?
☐ Agency developed
☐ Purchased Name:

36. Does your warranty tracking system monitor outstanding claims that have not yet been paid?

☐ Yes, our tracking system issues periodic reports of outstanding claims
☐ No, we need to manually check to see if claims are outstanding

Comments:

37. When you make your own warranty repairs, do you keep a history of that work?

Yes ☐ No ☐

Comments:

37a. If yes, is that history used for determining fleet defects?
Yes ☐ No ☐

Comments:

38. When vendors make warranty repairs, do you keep a history of that work? (Choose best response.)

☐ Yes, we insist on a complete report of the repair including the fault, and labor and parts used to facilitate the repair
☐ Yes, but the repair data they give us is limited
☐ Not applicable, we do our own warranty repairs

Comments:

38a. If yes, is that history used for determining fleet defects?
Yes ☐ No ☐

Comments:

Specific Vendor Topics

Note: Although you can mention vendor names if necessary to answer the questions below, they will not be used in the report.

39. Do any vendors require you to undergo training before warranty claims can be submitted? (Choose all that apply.)

☐ Mechanics must take prerequisite training before making warranty repairs
☐ Administrative personnel must take prerequisite training before submitting claims
☐ Other (specify):

39a. If mechanics are required to take prerequisite training before making warranty repairs, specify the training subjects (engines, brakes, etc.).

40. Overall, what percentage of warranty repair parts do you return or hold for a vendor rep to inspect before reimbursement is made?

☐ 10% or less
☐ 10% to 30%
☐ 30% to 50%
☐ More than 50%

Comments:

41. Identify any other special warranty requirements insisted by your vendors.

42. Overall, how many warranty claims submitted are completely rejected by vendors?

☐ 10% or less
☐ 10% to 30%
☐ 30% to 50%
☐ More than 50%

Comments:

43. Overall, how many warranty claims are partially rejected by vendors (reduction of labor and/or parts amounts)?

☐ 10% or less
☐ 10% to 30%
☐ 30% to 50%
☐ More than 50%

Comments:

44. What are the top three reasons given by vendors for rejecting or reducing claim amounts?

1.
2.
3.

45. When making warranty repairs, are you required to purchase replacement parts from the vendor providing the warranty?

☐ Yes
☐ No
☐ Depends on the part

Comments:

46. When making warranty repairs, are you required to purchase OEM replacement parts or those approved by the OEM?

☐ Yes
☐ No
☐ Depends on the part

Comments:

47. Using aftermarket parts or adding systems to buses after they've been manufactured can void the original warranty.

47a. Have you ever had a claim rejected because you used aftermarket parts—replacement parts not manufactured or approved by the OEM?
Yes ☐ No ☐

If yes, list replacement aftermarket parts that voided warranty
1.
2.
3.

If yes, what were the reasons given for why using replacement aftermarket parts voided the warranty?

47b. Have you ever had a claim rejected because you added systems such as cameras, AVL, fareboxes, annunciators, etc. and those systems affected the warranty of standard bus items?
Yes ☐ No ☐

If yes, list the add-on systems and equipment that voided warranty of standard bus items.
1.
2.
3.

If yes, what were the reasons given for why adding on systems/equipment voided warranty of standard bus items?

47c. Have you been successful in overturning the vendor's original refusal to honor warranty claims?
Yes ☐ No ☐

47d. How did you convince the vendor to honor the original warranty?

Fleet Defects

The APTA Procurement Guidelines define fleet defect as:

> "Cumulative failures of twenty-five (25) percent of the same components in the same or similar application in a minimum fleet size of twelve (12) or more buses where such items are covered by warranty. . . . . When a Fleet Defect is declared, the remaining warranty on that item/component stops. The warranty period does not restart until the Fleet Defect is corrected . . . After correcting the Defect, the Agency and the Contractor shall mutually agree to and the Contractor shall promptly undertake and complete a work program reasonably designed to prevent the occurrence of the same Defect in all other buses and spare parts purchased under this Contract . . . The Contractor shall update, as necessary, technical support information (parts, service, and operator's manuals) due to changes resulting from warranty repairs."

48. Were you aware of all aspects of this definition before reading it here?

Yes ☐ No ☐

48a. If no, which aspects were you unaware of?

49. About how many fleet defects have you declared in the past 5 years?

49a. List the nature of the fleet defects:
1.
2.
3.

50. Have you had any cases where you felt you had a legitimate fleet defect but did not declare because it could not be substantiated?

Yes ☐ No ☐

50a. If yes, why couldn't it be substantiated? (Choose all that apply.)
☐ Lack of proper documentation
☐ Failures fell short of 25% fleet requirement
☐ Other (specify):

51. Have you had cases where you declared a fleet defect but the bus manufacturer failed to recognize it as such?

Yes ☐ No ☐

51a. If yes, list the nature of the disputed fleet defects:
1.
2.
3.

52. Have you had any fleet defects where the bus manufacturer failed to update technical support information (parts, service, and operator's manuals) due to changes resulting from warranty repairs?

Yes ☐ No ☐

Comments:

Warranty Violations & Disputes

53. About how many of your claims involve violations and/or disputes with vendors?

☐ 10% or less
☐ 10% to 30%
☐ 30% to 50%
☐ More than 50%

Comments:

54. What procedures do you find effective in resolving warranty violations and disputes?

Vendors That Go Out of Business

55. Have you had a case where a vendor went out of business during the warranty period?

Yes ☐ No ☐

55a. If yes, was it the manufacturer of a complete vehicle or part/component?
☐ Complete vehicle
☐ Part/component

55b. If yes, what was the outcome when equipment failed during the warranty?

General Comments

56. Please add anything else regarding warranty and ways to optimize it that were not already covered:

57. What advice would you give your peers regarding ways to optimize bus warranty?

1.
2.
3.

Please return the completed version and any attachments via e-mail to John by February 7, 2013, at JohnJSchiavone@cs.com. Material can also be sent to him at (please contact him before mailing):

John Schiavone
32 State Street
Guilford, CT 06437

If you have any questions on the survey or the project, please do not hesitate to call John at 203-453-2728. Thank you very much for your participation in this important project!

APPENDIX C

Metro Transit, Minneapolis/St. Paul, Warranty Closed Claim Report

6/12/2013

Warranty Claims Closed By Date Range

Vendor Name	Garage	Claim #	Parts Credit	Parts Paid	Labor Paid	Handling Charge	Claim Total	Amount Short	Amount Settled	Date Closed
CUMMINS NPOWER LLC										
	3356									
		1000105374	$0.00	$39.29	$68.66	$0.00	$107.95	$0.00	$107.95	5/14/2013
	Garage Total:	1	$0.00	$39.29	$68.66	$0.00	$107.95	$0.00	$107.95	
	Vendor Total:	1	$0.00	$39.29	$68.66	$0.00	$107.95	$0.00	$107.95	
GILLIG CORP										
	3353									
		1000105169	$135.89	$0.00	$0.00	$0.00	$135.89	$0.00	$135.89	5/16/2013
	Garage Total:	1	$135.89	$0.00	$0.00	$0.00	$135.89	$0.00	$135.89	
	3354									
		1000105911	$84.52	$0.00	$0.00	$0.00	$84.52	$0.00	$84.52	5/29/2013
		1000105592	$59.52	$0.00	$0.00	$0.00	$59.52	$0.00	$59.52	5/29/2013
	Garage Total:	2	$144.04	$0.00	$0.00	$0.00	$144.04	$0.00	$144.04	
	3355									
		1000105795	$631.77	$0.00	$0.00	$0.00	$631.77	$0.00	$631.77	5/29/2013
		1000105794	$631.77	$0.00	$0.00	$0.00	$631.77	$0.00	$631.77	5/29/2013
	Garage Total:	2	$1,263.54	$0.00	$0.00	$0.00	$1,263.54	$0.00	$1,263.54	
	3356									
		1000105763	$258.00	$0.00	$0.00	$0.00	$258.00	$0.00	$258.00	5/17/2013
	Garage Total:	1	$258.00	$0.00	$0.00	$0.00	$258.00	$0.00	$258.00	
	Vendor Total:	6	$1,801.47	$0.00	$0.00	$0.00	$1,801.47	$0.00	$1,801.47	
LIFT-U										
	3351									
		1000103785	$512.82	$0.00	$0.00	$0.00	$512.82	$0.00	$512.82	5/13/2013
		1000103171	$512.82	$0.00	$0.00	$0.00	$512.82	$0.00	$512.82	5/13/2013
	Garage Total:	2	$1,025.64	$0.00	$0.00	$0.00	$1,025.64	$0.00	$1,025.64	
	Vendor Total:	2	$1,025.64	$0.00	$0.00	$0.00	$1,025.64	$0.00	$1,025.64	
LUMINATOR DIVISION										
	3380									
		1000104383	$0.00	$0.00	$0.00	$0.00	$1,072.52	$0.00	$1,072.52	5/31/2013
	Garage Total:	1	$0.00	$0.00	$0.00	$0.00	$1,072.52	$0.00	$1,072.52	
	Vendor Total:	1	$0.00	$0.00	$0.00	$0.00	$1,072.52	$0.00	$1,072.52	

APPENDIX D

Metro Transit, Minneapolis/St. Paul, Cancelled Warranty Report

Cancelled Warranty

From 5/1/2013 To 5/31/2013

6/12/2013
12:23 PM

MT Claim	Claim Date	Bus	Vendor	Claim Status	Claim Comments	Work Order Comments	Work Order Parts
1000105837	5/1/2013	7308	GILLIG CORP	CANC	Bus was full warranty, non warrantable failure.	| steering wheel will not telescope up or down | Lubricated telescop, still sticks sometimes. by TP | Trouble shoot. | Replaced steering column.	
1000105839	5/1/2013	7203	GILLIG CORP	CANC	Annual claim.	| rear door outside step light is b/o | Replaced bo LED light for steplight, okd f/s.	
1000105840	5/1/2013	1449	GILLIG CORP	CANC	Not warrantable.	| CURB SIDE MIRROR B/O, AUX FAN B/O | R/R fan driver side, R/R right side glass part of mirror	
1000105842	5/1/2013	0858	GILLIG CORP	CANC	Not warrantable.	| bo wiper switch | - Replaced B.O. Wiper Switch - - NOTE: WORK ORDER REC'D BY MAINTENANCE CLERK ON 05-03-2013 - -	
1000105843	5/1/2013	1443	GILLIG CORP	CANC	Not warrantable.	| STANCHION BY DOOR #4 BOTTOM MOUNT LOOSE, DRIVERS SEAT LOWER BACK PANEL FELL OUT, REAR SHOP AIR CONNECTOR COUPLER STUCK, OIL HYD PUMP AREA BO | Installed new bolts & secured. WC | Installed new back panel. WC | Removed frozen coupler. WC | Everything is dry in eng. compartment, no leaks found. WC	
1000105844	5/1/2013	1443	GILLIG CORP	CANC	Bulk claim.	| No Read TRAK | R/R Trak plate. WC	
1000105845	5/1/2013	1299	GILLIG CORP	CANC	Not Warrantable	| Left headlight inop. | Replaced head light. by TP	

APPENDIX E

Metro Transit, Minneapolis/St. Paul, Color-Coded Warranty Tracking

Warranty Expiration Information

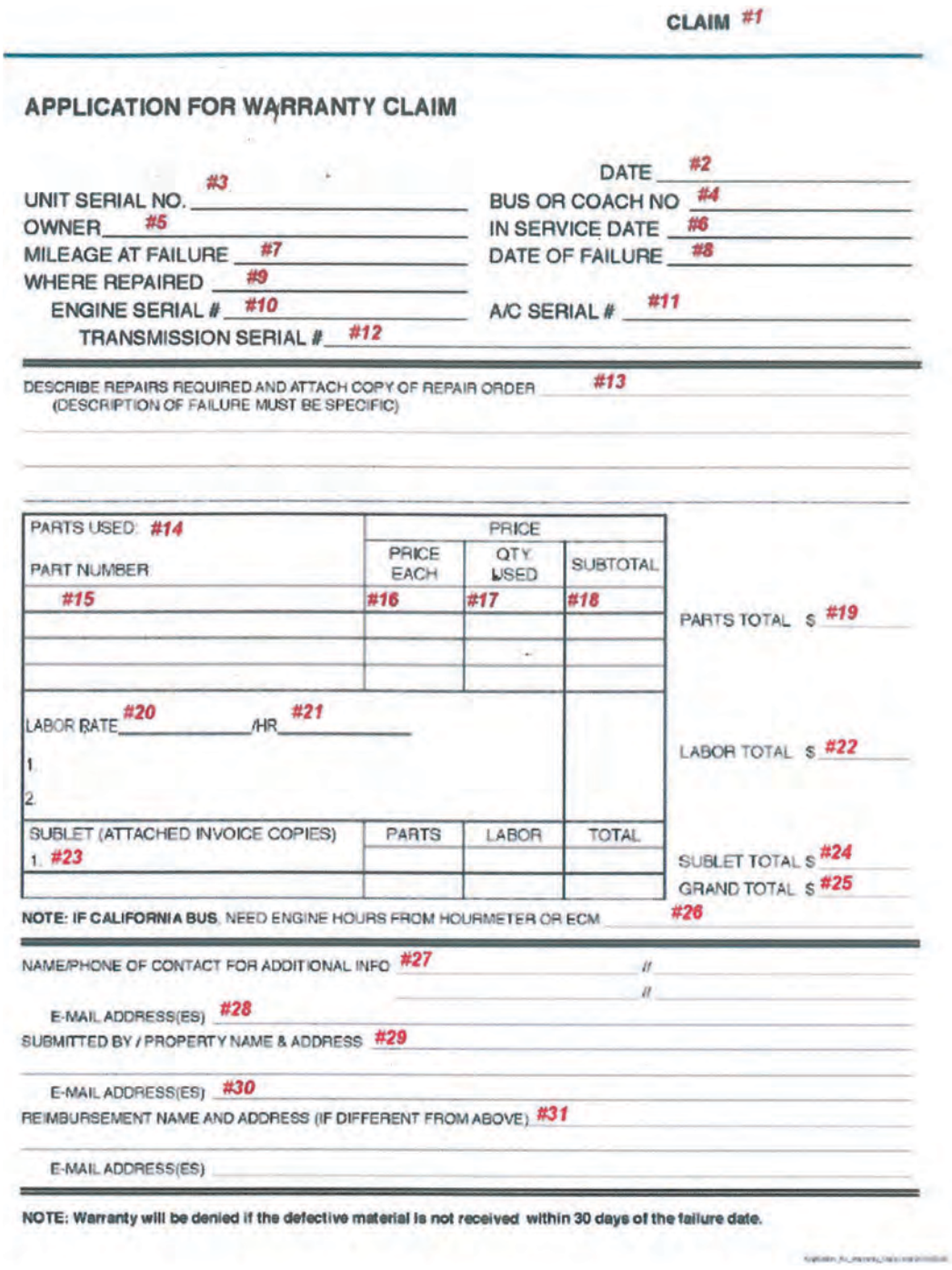
Bus No: 1203

System	Model	Coverage Years	Coverage Miles	Expiration Date	Remaining Miles
A/C SYSTEM	THERMO KING	2	1,000,000	7/21/2012	861,812
A/C TK COMPONENETS ONLY (COMPRESSOR, EVAPORATOR, CONDENSOR MOTORS)	THERMO KING	3	1,000,000	7/21/2013	861,812
ABS	WABCO	2	100,000	7/21/2012	0
AIR COMPRESSOR	WABCO	2	100,000	7/21/2012	0
AIR DRYER	CR Dual Turbo 2000	2	100,000	7/21/2012	0
ALTERNATOR	NIEHOFF	2	100,000	7/21/2012	0
AUXILIARY HEATER	WEBASTO	2	100,000	7/21/2012	0
BODY STRUCTURE	GILLIG	12	500,000	7/21/2022	361,812
Brakes - EXCLUDES Friction Material	Bendix/Meritor Brakes	2	100,000	7/21/2012	0
CORROSION	GILLIG	12	500,000	7/21/2022	361,812
DESTINATION SIGNS	LUMINATOR	3	1,000,000	7/21/2013	861,812
DIALIGHT EXTERIOR LED'S	DIALIGHT	12	1,000,000	7/21/2022	861,812
DIALIGHT STEPWELL LED'S	DIALIGHT	12	1,000,000	7/21/2022	861,812
DRIVE AXLE	ROCKWELL	2	100,000	7/21/2012	0
DRIVERS SEAT	RECARO	2	100,000	7/21/2012	0
ENGINE (Full Warranty)	ISL, 280H.P.	2	100,000	7/21/2012	0
ENGINE only -(includes EGR valve & cooler, oil pan gaskets, rocker gaskets, major castings). DOES NOT include any accessories (i.e. turbo, injectors, A.C., etc.)	ISL, 280H.P.	5	300,000	7/21/2015	161,812
HYDRAULIC SYSTEM	SAUER SUNDSTRAND	2	100,000	7/21/2012	0
RADIATOR	MODINE	4	1,000,000	7/21/2014	861,812
SHOCK ABSORBERS	KONI	2	100,000	7/21/2012	0
SLACK ADJUSTERS	HALDEX	2	100,000	7/21/2012	0
STARTER	DELCO	2	100,000	7/21/2012	0
STEERING AXLE	ROCKWELL	2	100,000	7/21/2012	0
SURVEILLENCE SYSTEM (DVR, Access Points, Camera's, Caddy)	VERINT	2	1,000,000	7/21/2012	861,812
TRANSITMASTER (IVLU, Voice Radio, Data radio, WI-Port, MDT)	TRAPEZE	2	1,000,000	7/21/2012	861,812
TRANSMISSION	VOITH D864.5	4	150,000	7/21/2014	11,812
TRANSMISSION OIL COOLER	MODINE	2	100,000	7/21/2012	0
WHEELCHAIR RAMP	Ricon Ramp FR2SS	2	100,000	7/21/2012	0

Wednesday, June 12, 2013 Page 1 of 1 Printed By: Reichsjd

APPENDIX F

Sample Warranty Claim Form



CLAIM #1

APPLICATION FOR WARRANTY CLAIM

DATE #2

UNIT SERIAL NO. #3 _____ BUS OR COACH NO #4 _____

OWNER #5 _____ IN SERVICE DATE #6 _____

MILEAGE AT FAILURE #7 _____ DATE OF FAILURE #8 _____

WHERE REPAIRED #9 _____

ENGINE SERIAL # #10 _____ A/C SERIAL # #11 _____

TRANSMISSION SERIAL # #12 _____

DESCRIBE REPAIRS REQUIRED AND ATTACH COPY OF REPAIR ORDER #13
(DESCRIPTION OF FAILURE MUST BE SPECIFIC)

PARTS USED: #14	PRICE			
PART NUMBER	PRICE EACH	QTY USED	SUBTOTAL	
#15	#16	#17	#18	PARTS TOTAL $ #19
LABOR RATE #20 /HR #21 1. 2.				LABOR TOTAL $ #22
SUBLET (ATTACHED INVOICE COPIES)	PARTS	LABOR	TOTAL	
1. #23				SUBLET TOTAL $ #24
				GRAND TOTAL $ #25

NOTE: IF CALIFORNIA BUS, NEED ENGINE HOURS FROM HOURMETER OR ECM #26

NAME/PHONE OF CONTACT FOR ADDITIONAL INFO #27 _____ // _____

// _____

E-MAIL ADDRESS(ES) #28 _____

SUBMITTED BY / PROPERTY NAME & ADDRESS #29 _____

E-MAIL ADDRESS(ES) #30 _____

REIMBURSEMENT NAME AND ADDRESS (IF DIFFERENT FROM ABOVE) #31 _____

E-MAIL ADDRESS(ES) _____

NOTE: Warranty will be denied if the defective material is not received within 30 days of the failure date.

APPENDIX G

PRTC Warranty Claim Tracking

Unit Number	VIN	Claim No.	Claim Date	Description	Parts Submitted	Labor Submitted	Total	Parts Paid	Labor Paid	Total Paid	Difference	Status
321	55263	2000	8/14/2012	A/C Inop.	$27.22	$192.50	$219.72	$27.22	$192.50	$219.72	$0.00	Closed
314	54754	2001	8/14/2012	Kneel Inop.	$385.00	$385.00	$770.00	$385.00	$231.00	$616.00	−$154.00	Closed
311	54751	2002	8/14/2012	Kneel leaking down	$137.88	$385.00	$522.88	$137.88	$385.00	$522.88	$0.00	Closed
311	54751	2004	8/9/2012	Tag steering issue	$821.85	$408.10	$1,229.95	$821.85	$408.10	$1,229.95	$0.00	Closed
335	55277	2009	8/2/2012	Claim rejected		$96.25	$96.25				−$96.25	Rejected
321	55263	2012	8/9/2012	A/C not cold	$97.44	$231.00	$328.44			$0.00	−$328.44	In process
301	54741	2013	8/15/2012	Route sign not working	$360.00	$115.50	$475.50	$360.00	$115.50	$475.50	$0.00	Closed

VIN = vehicle identification number; A/C = air conditioning; Inop. = inoperable.

APPENDIX H

DART Warranty Standard Operating Procedure

SOP NUMBER	REVISION	EFFECTIVE DATE	PAGE
NPB-3121	0	MARCH 18, 2013	1 of 6

STANDARD OPERATING PROCEDURE

DALLAS AREA RAPID TRANSIT
MAINTENANCE DEPARTMENT

WARRANTY COVERAGE PERIOD FOR DART (OEM) BUS
FLEETS 38 THRU 39

0	**09/11/12**	**INITIAL RELEASE**	**DRC-2415**	**ET**
REV	**DATE**	**DESCRIPTION**	**RLSE NO.**	**INIT**

ORIGINATED BY: _____ **DATE: _____**
Name, Maintenance Specialist III

APPROVED BY: MDC WORKFLOW DOCUMENT # 1467235 **DATE: _____**
Name , V.P. of Maintenance

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FIGURES

APPENDIXES

1.0 SCOPE

This Standard Operating Procedure (SOP) pertains to all DART Bus Maintenance Personnel involved with the Warranty Coverage Period for all (OEM) (CNG) Model Buses.

2.0 PURPOSE

To clarify the active Warranty Periods of the applicable bus fleets within DART's Revenue Fleet.

3.0 DEFINITIONS

HVAC	Heating, Ventilating and Air Conditioning
(OEM)	(OEM)

4.0 REFERENCES

MDC	MANUAL AND/OR DOCUMENT DESCRIPTION	SECTION	PAGE
NPA-0020	Standard Operating Procedure, Rail/Bus/Facilities Warranty Claim Process	N/A	Complete Document
N/A	DART Contract #C-1018492-01	N/A	Complete Document

5.0 FORMS

None

6.0 REQUIRED SAFETY EQUIPMENT OR SPECIAL TOOLS

None

7.0 PROCEDURE

A. The complete bus contract C-1018492-01 is warranted and guaranteed to be free from defects due to design or workmanship for 2 years or 150,000 miles, whichever occurs first beginning on the in-service date or acceptance date at DART for each bus.

B. Figure 1 depicts the applicable Warranty for the OEM (CNG) Buses on specific components and subsystems. The period is only for which occurs first; years or mileage. Refer to Appendix A, pages 8–15, for specific warranty start dates for individual buses.

C. OEM emission control system warranty coverage for a non-engine related failure of the emission control system is 5 years or 100,000 miles, whichever comes first.

D. For fleets 38 and 39, Appendix A depicts the warranty period for:

- Bumper to Bumper
- OEM Emission Control System
- Basic Body and Chassis
- Bus Structural Integrity

E. Follow procedures outlined in SOP NPA-0020 for any defects covered by listed warranties.

F. The OEM engine warranty process will be incorporated in a separate work instruction or SOP. Refer to OEM Engine Warranty work flow 1463693 for processing of OEM warranty claims.

G. If there are any questions regarding the validity of the component to be returned for warranty, the supervisor or maintenance specialist at the section should be queried. If it is still unclear as to the status of the component, complete the tag per SOP NPA-0020 and ship it to the warranty specialist.

7.1 OEM **Warranty: see Figure 1**

A. OEM's 3-year limited warranty starts from the date of final acceptance of the bus. The coverage includes parts and labor on the OEM Series unit and cameras,

B. The Warranty is invalidated if the warranty label is removed, damaged, or the product has been tampered with or opened.

7.1a Fleet Services Options (OEM Warranty)

A. The mechanic shall record the serial number of the component(s) installed and document the troubleshooting and corrective actions taken in the OEM MIS work order notes, attach a warranty tag to the defective part, and ship the part to the warranty specialist.

B. If telephone technical service is needed, contact OEM's service center during the hours of 8:00 a.m. to 8:00 p.m., Monday through Friday eastern standard time at 877-xxx-xxxx.

C. Return equipment in the original material or equivalent.

7.2 OEM Hardware Warranty: see Figure 1

A. OEM's one-year limited warranty provides coverage on the Modem and related components; i.e., Vehicle Router/GPS antenna connector. This warranty begins on the date of sale (September 20, 2012) of the Products to the original purchaser ("customer"). The warranty period on the Modems expires December 31, 2015.

B. The Warranty is invalidated if the product is damaged or operates intermittently due to electrical system voltage sags or surges outside the range of 10 to 18 volts DC.

7.2a OEM Hardware Warranty

A. The mechanic shall record the serial number of the component(s) installed and document the troubleshooting and corrective actions taken in the OEM work order notes, attaches a Warranty tag to the defective part and ships the part to the Warranty Specialist.

B. If telephone technical service is required, contact OEM technical support during the business hours of 8:00 a.m. to 5:00 p.m., Monday through Friday Eastern standard time at 1-xxx-xxx-xxxx.

C. Return equipment in the original materials or equivalent.

7.3 OEM Warranty: see Figure 1

A. OEM System 2-year limited warranty coverage begins on the in-service date or acceptance date at DART. The warranty includes the OEM controller box, the primary camera, and the driver camera.

B. OEM shall provide the following support: answering of telephone calls at extension 1-xxx-xxx-xxxx and e-mail support at customer. abc@efg.net. This support is available Monday thru Friday during 9:00 p.m. and 5 a.m. U.S. Pacific Time excluding holidays.

7.3a OEM Warranty

A. OEM may troubleshoot, repair, or replace components of the OEM system based on the training received from OEM.

B. The mechanic shall record the serial number of OEM component(s) installed and document the troubleshooting and corrective actions taken in the OEM MIS work order notes.

C. If telephone tech support is needed, contact OEM Monday through Friday from 9:00 a.m. to 5:00 p.m. U.S. Pacific Time at extension 866-xxx-xxxx or e-mail support at customer.service@abcefg.net.

D. For additional support, contact the main support line at 1 (xxx) xxx-xxxx and ask to speak with a member of the Technical Support Management Team.

E. Return equipment in the original packing materials or equivalent.

FIGURE 1
WARRANTY PERIOD

TOTAL WARRANTY COVERAGE (WHICHEVER OCCURS FIRST)		
ITEM	**YEARS (total)**	**MILEAGE (total)**
Complete Bus	2	150,000
Engine	2	Unlimited
Transmission	2	Unlimited
Basic Body and Chassis	3	150,000
Bus Structural Integrity	12	500,000
Brake System (excluding friction materials)	2	100,000
Destination Signs	2	Unlimited
HVAC System	2	Unlimited
Paint	2	Unlimited
OEM 1 Drive System	2	Unlimited
OEM 2 Hardware	3	Unlimited
OEM 3 components	3	Unlimited

Buses Warranty Start/End Dates

Bus Number	Warranty Start Date	Bumper to Bumper Warranty Expiration Date	OEM Emission Control System Warranty Expiration Date	Basic Bus Body and Chassis Warranty Expiration Date	Bus Structural Integrity Warranty Expiration Date
38001					
38002					
38003					
38004					
38005					
38006					
38007					
38008					
38009					
38010					
38011					
38012					
38013					
38014					
38015					
38016					
38017					
38018					
38019					
38020					
38021					
38023					
38024					

Abbreviations 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
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
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