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APTA Bus In-Plant Inspection Working Group

# In-Plant Inspection for Bus Procurements

**Abstract:** This *Recommended Practice* establishes recommended minimum bus inspection requirements for new bus inspections and details what specific documentation is required during the bus procurement and manufacturing phase.

**Keywords:** bus procurement, in-plant inspections

**Summary:** In March 2010, APTA issued the "Standard Bus Procurement Guidelines RFP," which outlines a request for proposals for a negotiated bus procurement contract. The outline was created to facilitate the development of a bus package that is consistent throughout the industry, providing a uniform format for numbering and organizing such documents. The document was developed by a cross-section of representatives from the public and private sectors of the public transit industry for use by transit agencies. It is understood that transit agencies may need to modify this document to reflect local and state rules, regulations and laws, and that they will insert their standard contract language in the appropriate places in the document. However, modifications to the standard format should be made in a manner that will maintain the structural integrity of the document. The numbering of unused articles should be maintained and accompanied by the notations "Not used" or "Reserved." The in-plant bus inspection section of the RFP can be used as a standalone document but is also incorporated into the appendixes. The section does not require that the inspector be an employee of the agency or a firm hired by the agency. The only requirement is that the inspection cannot be an agent or employee of the manufacturer. This document is a *Recommended Practice* for conducting the in-plant bus inspections. For federally funded procurements, agencies should note that federal funds typically include a line item for grant administration costs including costs of in-plant inspection services. For additional information regarding budgets and other helpful information, refer to Appendix A.

**Scope and purpose:** The in-plant inspection process is not intended to replace or otherwise modify a manufacturer's fundamental contractual responsibilities and legal obligations. Furthermore, this document is not meant to substitute for a manufacturer's quality assurance responsibilities as described in the "Standard Bus Procurement Guidelines RFP." Finally, this document is designed to give agency project management staff the flexibility to tailor inspections to each contracted manufacturer's specific vehicle design and manufacturing process.


## Participants

The American Public Transportation Association greatly appreciates the contributions of the **Bus In-Plant Inspection Working Group,** which provided the primary effort in the drafting of this *Recommended Practice*.

# Contents

# 1. Decision to perform in-plant inspection

Transit agencies may decide to train and use one or more inspectors from within the agency or to contract out the inspection. There is no requirement to stipulate which method is chosen.

## 1.1 FTA-funded purchases

The basis for the in-plant inspection services is found in FTA requirements contained in 49 CFR Part 663.

Any grantee that purchases revenue service rolling stock with a procurement contract that exceeds $100,000 must certify to the FTA that it will conduct or cause to be conducted pre-award and post-delivery audits verifying compliance with Buy America provisions. Besides the certification that must be filed with the FTA as part of the Annual List of Certifications and Assurances, the grantee is required to keep records including pre-award and post-delivery audit certifications that show that the regulations have been followed.

If a grantee is using another grantee's procurement contract to purchasing revenue vehicles (i.e., "piggybacking"), then the purchaser may rely on the pre-award audit completed prior to the original contract. However, the grantee must review the audit and prepare its own signed certifications. The grantee may conduct its own pre-award audit. In any case, the pre-award audit must be completed prior to contract award.

## 1.2 Build size

These regulations establish a requirement for conducting "in-plant" bus inspections for all bus orders that are more than 10 buses or modified vans, or 20 or more of the vehicles that are purchased for a FTA recipient / subrecipient in an area with a population of less than 200,000. [49 CFR 633.37 ]. For orders that exceed these quantities, an agency must send a resident inspector to the manufacturer's production facility during the final assembly period to:

- Monitor the final assembly process; and
- Complete a final report describing the construction activities and explaining how the construction and operation of the buses fulfill the contract specifications.

It is recommended to have full-time onsite representation oversee the production.

# 2. General overview of events leading to vehicle production

The general events leading to the production of buses under a contractual agreement are as follows.

## 2.1 Solicitation/procurement process

The solicitation/procurement process is typically accomplished through an invitation for bids (IFB) or a request for proposals (RFP). Another possibility is that the purchasing authority may purchase options from another transit authority's contract.

## 2.2 Buy America pre-award audit

Prior to contract award, the agency must complete the Buy America pre-award audit requirements as outlined in 49 CFR Part 663. This includes the certifications required in 49 CFR Part 663.

## 2.3 Contract in place

Once the solicitation/procurement process and Buy America pre-award audit are completed, all the required contractual documents are submitted, and the agency-specific procurement approvals and actions are completed, the contract can then be signed by the agency and the bus manufacturer. The contract can now be considered to be in place.

## 2.4 Notice to Proceed

Once the contract is in place, the agency will issue a Notice to Proceed to the bus manufacturer. The Notice to Proceed begins the contractual agreement between the agency and the bus manufacturer. The bus manufacturer has now been officially notified that the agency intends to purchase the agreed amount of buses at the contract price.

## 2.5 Pre-production meeting

Following the Notice to Proceed, the agency and the bus manufacturer will participate in one or several pre-production meetings. The purpose of pre-productions meeting is to:

- Verify the vehicle configuration/specification;
- Verify the terms of the production process;
- Set up the resident inspection process (if applicable);
- Identify hotel accommodations (if applicable);
- Establish the lines of communication between the agency's designated contact and manufacturer's designated representative;
- Review and clarify required documentation/paperwork for the vehicles;
- Clarify vehicle acceptance and delivery matters;
- Identify pilot or prototype bus requirements (if applicable); and
- Recommended to establish a "contract freeze" date for change orders.

During the time spent at the bus manufacturer's facility, a plant tour is typically conducted to familiarize the transit property with the production process.

> **NOTE:** Pre-production meetings can be held at the bus manufacturer's facility, or previously agreed upon location as designated by the grantee.

## 2.6 Prototype/pilot bus build

A prototype or pilot bus may be built prior to the production of the remainder of the buses if required in the contract. A prototype or pilot bus establishes the design and configuration of a vehicle that best meets the technical requirements of the agency.

> **NOTE:** The requirement for a prototype or pilot bus must be identified in the solicitation document. For small orders or orders of previously manufactured buses, a prototype or pilot bus is typically not recommended.

## 2.7 Configuration audit

A configuration audit should be conducted following the completion of the prototype, the pilot bus or the first bus in serial production. After this configuration audit, the final design for the production buses is complete, and no more configuration changes should occur from that point forward. The production buses will be built to the configuration of the prototype, the pilot bus or the first bus in serial production. The buses on the production line may be inspected for quality issues. The completed buses will be inspected and accepted according to agreements made in the pre-production meeting(s)

> **NOTE:** 1) If the Agency intends to purchase the standard type vehicle as produced by the manufacturer, then a pilot or prototype bus is not recommended. The production buses will be built to the agreed-upon configuration. The buses on the production line may be inspected for quality issues. The completed buses will be inspected and accepted according to agreements made in the pre-production meeting(s).

2) The agency may agree to leave the pilot or first bus in serial production for a predefined period as an aid to the inspection process once the configuration audit is completed. The terms to this agreement should be outlined prior to the contract award.

Once the configuration has been established, the Agency should conduct the required Buy America post-delivery audit if the buses are federally funded (see CFR 49 Part 633). This audit is to verify compliance with final assembly requirements and final documentation of Buy America compliance and must be completed prior to title transfer.

# 3. Pre-production meeting

## 3.1 Responsibilities

### 3.1.1 Agency

- Provides conformed copy of technical requirements.
- Recommended staff to be involved may include the following:
    - Project manager
    - Technical engineer
    - Contract administrator
    - Quality assurance administrator
    - Warranty administrator
- Process for inspector's role (to deal with agency) for negotiated changes after freeze date.
- Contractual requirements:
    - Milestones
    - Documentation
    - Title requirements
    - Deliverables
    - Payments
    - Reliability tracking

### 3.1.2 Manufacturer

- Identifies any open issues.
- Recommended staff to be involved may include the following:
    - Project manager
    - Technical engineer(s)
    - Contract administrator
    - Quality assurance administrator
    - Warranty administrator
- Production flow (buses/week, shifts).
- Delivery schedule and offsite component build-up schedule.
- Bus QA documentation (including supplier application approvals and/or any certifications required for the specific production).
- Communication flow/decision making.

### 3.1.3 Inspector

- Agree on decisions inspectors can and cannot make.
- Primary contact for problems, etc.
- Production flow process (description of manufacturing by station).
- Factory hours (manage inspection schedule based on production hours).
- Plant rules.
- Safety requirements.

- Orientation requirements.
- Work environment.
- Inspector's office space (per contract).

**NOTE:** As a result of this meeting, documentation should be produced detailing final production requirements and the planned configuration of the bus.

## 3.2 Build schedule

The bus manufacturer's contract administrator shall supply a fleet build production schedule based on the dates in the Notice to Proceed, and a description of the manufacturer's schedule for plant operations.

The production schedule should contain specific milestone dates, such as:

- First vehicle on production line (date on which any work will begin);
- First vehicle off production line;
- First vehicle through manufacturer's quality assurance inspections;
- First vehicle shipped to the agency;
- Last vehicle on production line;
- Last vehicle off production line; and
- Last vehicle shipped to the agency.

## 3.3 Plant tour (if meeting at OEM's location)

The agency will review the entire process from start to finish and review the work completed at each line station, including quality control measures

# 4. Prototype/pilot vehicle production

The contractor shall conduct acceptance tests at its plant on each bus following completion of manufacture and before delivery to the agency. These pre-delivery tests shall include visual and measured inspections, as well as testing the total bus operation. The tests shall be conducted and documented in accordance with written test plans approved by the agency. The underfloor equipment shall be available for inspection by the resident inspectors, using a pit or bus hoist provided by the contractor. A hoist, scaffold or elevated platform shall be provided by the contractor to easily and safely inspect bus roofs. Delivery of each bus shall require written authorization of the primary resident inspector. Authorization forms for the release of each bus for delivery shall be provided by the contractor. An executed copy of the authorization shall accompany the delivery of each bus.

Additional tests may be conducted at the agency's discretion to ensure that the completed buses have attained the required quality and have met the requirements in the APTA "Standard Bus Procurement Guidelines RFP," Section 6: Technical Specifications. The agency may, prior to commencement of production, demand that the contractor demonstrate compliance with any requirement in that section if there is evidence that prior tests have been invalidated by the contractor's change of supplier or change in manufacturing process. Such demonstration shall be by actual test, or by supplying a report of a previously performed test on similar or like components and configuration. Any additional testing shall be recorded on appropriate test forms provided by the contractor and shall be conducted before acceptance of the bus.

The pre-delivery tests shall be scheduled and conducted with 30 days' notice so that they may be witnessed by the resident inspectors, who may accept or reject the results of the tests. The results of pre-delivery tests, and any other tests, shall be filed with the assembly inspection records for each bus.

## 4.1 Visual and measured inspections

Visual and measured inspections shall be conducted with the bus in a static condition. The purpose of the inspection testing includes verification of overall dimension and weight requirements, that required components are included and are ready for operation, and that components and subsystems designed to operate with the bus in a static condition do function as designed.

## 4.2 Total bus operation

Total bus operation shall be evaluated during road tests. The purpose of the road tests is to observe and verify the operation of the bus as a system and to verify the functional operation of the subsystems that can be operated only while the bus is in motion.

Each bus shall be driven for a minimum of 15 miles during the road tests. If requested, computerized diagnostic printouts showing the performance of each bus shall be produced and provided to the agency. Observed defects shall be recorded on the test forms. The bus shall be retested when defects are corrected and adjustments are made. This process shall continue until defects or required adjustments are no longer detected.

## 4.3 Post-delivery tests

The agency shall conduct acceptance tests on each delivered bus. These tests shall be completed within 15 days after bus delivery and shall be conducted in accordance with the agency's written test plans. The purpose of these tests is to identify defects that have become apparent between the time of bus release and delivery to the agency. The post-delivery tests shall include visual inspection and bus operations. No post-delivery test shall apply new criteria that are different from criteria applied in a pre-delivery test.

Buses that fail to pass the post-delivery tests are subject to non-acceptance. The agency shall record details of all defects on the appropriate test forms and shall notify the contractor of acceptance or non-acceptance of each bus, after completion of the tests. The defects detected during these tests shall be repaired according to procedures defined in the contract.

## 4.4 Prototype/pilot vehicle acceptance

In order to assess the contractor's compliance with the Technical Specifications, the agency and the contractor shall, at the pre-production meeting, jointly develop a Configuration and Performance Review document for review of the pilot vehicle. This document shall become part of the official record of the pre-production meeting.

Potential dimensional/performance tests that may be included in the Configuration and Performance Review include the following:

- Complete electrical system audit
- Dimensional requirements audit
- Seating capacity
- Water test
- Water runoff test
- Function test of systems/subsystems and components
- Sound/noise level tests
- Vehicle top speed
- Acceleration tests
- Brake stop tests
- Airflow tests

- PA function tests
- Air/brake system audit
- Individual axle weight
- Standee capacity
- Body deflection tests
- Silent alarm function test
- Interior lighting
- Exterior lighting
- Gradability test
- Kneeling system function
- HVAC pulldown/heat
- Speedometer
- Outside air infiltration (smoke)
- Wheelchair ramps
- Engine performance qualification
    - This test shall be jointly conducted by the contractor and engine manufacturer (including but not limited to charge air cooler performance, air to boil test, loss of coolant, fuel system electrical inputs and engine protection system).
- Transmission performance qualifications
    - This test shall be jointly conducted by the Contractor and transmission manufacturer (including but not limited to retarder operation, heat exchanger, interface with ABS and electrical inputs).

### 4.5 Buy America audit

A post-delivery Buy America audit is required for federally funded bus procurements (see 49 CFR Part 663 for additional information). The onsite resident inspectors are to monitor the production processes to verify compliance with final assembly requirements identified by the Buy America pre-award audit. This audit is to verify compliance with final assembly requirements and final documentation of Buy America compliance and must be completed prior to title transfer.

> **NOTE:** If there is not a pilot/prototype bus, then the Buy America post-delivery audit should be performed following completion of the first serial production bus. In addition to monitoring of the production processes, the agency must verify compliance that more than 60 percent of the costs of all components are produced in the United States. Finally, the agency must execute the required certificates.

## 5. Resident inspection process for serial production

At the discretion of the agency, a decision is made to perform resident inspection using the agency's personnel, a contract inspector, or a combination of both. The decision is based on factors such as the availability of personnel, knowledge/expertise in bus build project management, the size of the bus order, etc.

> **NOTE:** The decision to have the resident inspection performed by agency personnel results in a firm understanding and knowledge of the bus and affords the opportunity to identify parts that will be needed for general maintenance down the road.

### 5.1 Inspector responsibilities

The resident inspection process for the serial production of the buses begins following the completion and acceptance of the prototype or pilot vehicle if required, or according to the serial bus production schedule. Resident inspectors should represent the agency for all build-related issues (quality, conformance, etc.). Resident inspectors can also address contractual type issues but should only do so under the consult of the

 

agency's contracts administrator. Resident inspectors are sent to the manufacturer's facility according to a Resident Inspection Schedule. Typically, one or two inspectors arrive on site at the manufacturing facility about one week prior to actual production to set up the resident inspection process and to begin preliminary quality assurance inspections for items such as power plant build-up and wire harness production, and to inspect incoming parts, fasteners, fluids, etc., that will be used in the production of the buses. During the serial production of the buses, the resident inspectors should monitor the production of each bus, verifying the quality of materials, components, sub-assemblies and manufacturing standards. In addition, the configuration of each vehicle should be audited using the vehicle manufacturer's Build Specification and other documents to ensure contract compliance and uniformity.

## 5.2 Inspector rotation/scheduling

During the resident inspection phase, a single inspector or multiple inspectors could be used. If it is decided to use multiple inspectors, then the inspectors could be rotated on a biweekly to monthly basis as required. During the rotation of inspectors, a sufficient period of overlap should be provided to guarantee the consistency of the resident inspection process.

## 5.3 Resident inspector orientation

A resident inspector orientation by the bus manufacturer should take place upon the arrival of the initial inspection team. The orientation should include expectations for the use of personal protective equipment (safety shoes, safety glasses, etc.), daily check-in and check-out requirements, lines of communication, use of production documents such as speed memos and line movement charts, inspector/production meetings, inspector office arrangements, and anything else pertinent to the inspection team's involvement during the build. Many of the above items should already be formalized during the pre-production meeting.

## 5.4 Audits, inspections and tests

The resident inspection process monitors the production of each vehicle. Inspection stations should be strategically placed to test or inspect components or other installations before they are concealed by subsequent fabrication or assembly operations. These locations typically are placed for the inspection of underbody structure, body framing, electrical panels and harnesses, air and hydraulic line routings, installation of insulation, power plant build-up and installation, rust inhibitor/undercoating application, floor installation, front suspension alignment, and other critical areas.

## 5.5 Vehicle inspections

Each bus is subjected to a series of inspections after the bus reaches the point of final completion on the assembly line. Typically, the vehicle manufacturer performs its own quality assurance inspections following assembly line completion before releasing each bus to the resident inspectors. The inspections for each vehicle are documented, signed off upon passing and included in the vehicle record.

These are the typical inspections performed on each bus by the resident inspectors:

- Water test inspection
- Road test inspection
- Interior inspection (including functionality)
- Hoist/undercarriage inspection
- Exterior inspection (including roof)
- Electrical inspection
- Wheelchair ramp/lift inspection

### 5.5.1 Water test inspection

The water test inspection checks the integrity of the vehicle's body seams, window frame seals and other exterior component close-outs for their ability to keep rainwater, road splash, melting snow and slush, and other exterior water from entering the inside of the vehicle. The vehicle's interior is inspected for signs of moisture and water leaks. To perform the leak inspection, interior ceiling and side panels are removed, and access doors are opened. If any moisture or water is detected, then the source of the leak will be located and repaired by the manufacturer, and the vehicle will be tested again.

### 5.5.2 Road test inspection

The road test inspection checks all the vehicle's systems and sub-systems while the vehicle is in operation. Typically, the road test inspection is performed immediately following the water test inspection to reveal any standing water that may be present due to a leak, but was not noticed during the "static" water test. Objectionable vibrations, air leakage and other factors that affect ride quality are recorded and reported to the vehicle manufacturer for resolution. Vehicle stability, performance, braking and interlock systems, HVAC, and other critical areas are checked to ensure that the vehicle is complete and ready to provide safe and reliable service.

The following tests may be performed and recorded during the road test:

- Acceleration test
- Top speed test
- Gradability test
- Service brake test
- Parking brake test
- Turning effort test
- Turning radius test
- Shift quality
- Quality of retarder or regenerative braking action

During the road test, a vehicle may be taken to a weigh station to record the vehicle's front axle weight, rear axle weight and total vehicle (curb) weight.

### 5.5.3 Interior inspection

The interior inspection checks the fit and finish of the interior installations.

In addition, the inspection also verifies the installation and function of systems and subsystems according to the Build Specification. All systems and functions accessed from the interior are inspected for functionality, appearance and safety.

Examples of systems/functions inspected include the following:

- Interior and exterior lighting controls
- Front and rear door systems
- Flooring installation
- Passenger and operator's seat systems
- Wheelchair securement and ramp systems
- Fire suppression system
- Electrical installations (multiplex, tell-tale wiring, panels, etc.)
- Window systems and emergency escape portals
- Operator dash/side panel controls/indicators

### 5.5.4 Hoist/undercarriage inspection

The hoist/undercarriage inspection checks the installation of components, wiring, air lines, presence of fluid leaks, etc., located under the vehicle. Typically, this inspection is performed following the road test. The vehicle is lifted onto a hoist or pulled over a pit for the inspection. Areas inspected are the front suspension, air bags, air line routings, electrical connections and routings, drive-train components, linkages, and any other system or component that may be prone to early failure due to inadequate installation techniques. All lines, cables, hoses, etc., are inspected for proper securement and protection to prevent rubbing, chafing or any other condition that could result in a failure. The engine/powerplant and HVAC compartments are also inspected during this time.

### 5.5.5 Exterior inspection

The exterior inspection checks the fit and finish of components installed on the exterior of the vehicle. Access panels are opened and accessories are inspected for proper installation. In addition, vehicle paint, graphics and proper decals are also inspected. Acceptable paint finish quality (orange peel, adhesion, etc.) should be agreed on with the vehicle manufacturer prior to production to ensure consistency of inspections.

### 5.5.6 Electrical inspection

The vehicle's main electrical panels and other sub-panels are inspected for proper components, to include relays, fuses, modules, terminal strips, decals, etc. In addition, electrical harnesses are inspected for proper wiring and termination techniques, bulkhead protection, looming and other items that could result in future electrical failure. Onboard vehicle compartment schematics are verified for accuracy.

### 5.5.7 Wheelchair ramp inspection

The wheelchair ramp assembly is inspected for proper installation and performance. Clearances critical to the operation of the ramp are verified, and the ramp's electrical systems are inspected to ensure appropriate wire routings and protection. The successful integration of the ramp assembly into the vehicle is verified, and the vehicle interlocks are checked during automatic and manual ramp operation.

## 5.6 Audits

During serial production of the bus's quality assurance inspection, tests may be performed to ensure that the manufacturer's quality standards are being followed. These inspection audits could be on items such as torque wrench calibrations, proper techniques for fastener installations, proper use and type of adhesives, use of correct installation drawings on the production line, etc.

## 5.7 Communications

The lines of communications, formal and informal, should be discussed and outlined in the pre-production meeting. As previously discussed, resident inspectors should represent the agency for all bus-build related issues (quality, conformance, etc.). Resident inspectors can relay communications addressing contractual type issues but should do so only under the consult of the agency's contracts administrator. Actual personnel contacts for the manufacturing facility should be established during resident inspector orientation. These contacts could include quality assurance, production, material handling, engineering, and buy-off area personnel.

## 5.8 Documentation

The following documents/reports are typically generated during the bus build process:

- Vehicle Build Specification
- Sales Order

- Pre-production meeting notes
- Prototype and production correspondence (vehicle build file)
- Manufacturer's Vehicle Record (Warranty file)
    - Vehicle line documents
    - Serialization documents (Warranty file)
    - Alignment verification
    - Brake testing
    - HVAC testing and checkout
    - Manufacturer's QA checklist and signoff
- Weight Slip (Prototype & Warranty file)
- Prototype Performance Tests document (vehicle build file)
    - Acceleration Test
    - Top Speed Test
    - Gradability Test
    - Interior Noise Test A – Stationary
    - Interior Noise Test B – Dynamic
    - Exterior Noise Test A – Pull Away
    - Exterior Noise Test B – Pass-By
    - Exterior Noise Test C – Curb Idle
    - Turning Radius Test
    - Turning Effort Test
    - Parking Brake Test
    - Service Brake Test
- Vehicle Acceptance Inspections – Production (Warranty file)
    - Water Test Inspection Report
    - Road Test Inspection Report
    - Interior Inspection Report
    - Hoist/Undercarriage Inspection Report
    - Exterior Inspection Report
    - Electrical Inspection Report
    - Wheelchair Inspection Report
- Speed Memos (Warranty file)
- Agency Vehicle Inspection record (Warranty file)
- Release for Delivery documentation (Warranty file)
- Post-Production Acceptance – Certificate of Acceptance (Accounting)
- Post-Delivery Inspection Report – (Fleet Management & Warranty files)

## 6. Vehicle release for delivery

Upon satisfactory completion of all inspection, audit and test criteria, and resolution of any outstanding issues affecting the purchase of any or all buses, proper documentation (the Release for Delivery) is signed by the designated resident inspector authorizing the bus manufacturer to deliver the vehicle to the agency's facility, where it will undergo a post-delivery inspection process and final acceptance. The satisfactory sign-off of the Release for Delivery should complete the resident inspector's duties for each bus. In final preparation for delivery, the bus manufacturer may request the resident inspector to do a final walk-through of the bus after it has been cleaned and prepped for shipping.

## 7. Post-delivery and final acceptance

The agency shall conduct acceptance tests on each delivered bus. These tests shall be completed within 15 days after bus delivery and shall be conducted in accordance with the agency's written test plans. The purpose of these tests is to identify defects that have become apparent between the time of bus release and delivery to

 

the agency. The post-delivery tests shall include visual inspection, along with a verification of system(s) functionality and overall bus operations. No post-delivery test shall apply new criteria that are different from criteria applied in a pre-delivery test.

Buses that fail to pass the post-delivery tests are subject to non-acceptance. The agency shall record details of all defects on the appropriate test forms and shall notify the contractor of acceptance or non-acceptance of each bus within five days after completion of the tests. The defects detected during these tests shall be repaired according to procedures defined in the contract after non-acceptance.

## 7.1 Certificate of Acceptance

- **Accepted**
- **Not accepted:** In the event that the bus does not meet all requirements for acceptance. The agency must identify reasons for non-acceptance and work with the OEM to develop a timeline of addressing the problem for a satisfactory resolution and redelivery.
- **Conditional acceptance:** In the event that the bus does not meet all requirements for acceptance, the agency may conditionally accept the bus and place it into revenue service pending receipt of contractor furnished materials and/or labor necessary to address the identified issue(s).

# Appendix A: Resident inspection budget

When determining the amount of funds needed for the resident inspection budget, information such as the location of the manufacturer's production facilities, the timeframe of the bus production process, hotel accommodations, air travel, and transportation needs should be considered. In addition, employee time/labor should also be taken into consideration. For budgetary estimates, the CONUS (www.gsa.gov) website can be used as a guide for lodging and per diem expenses for locations within the continental United States. For travel outside the United States, the OCONUS (www.defensetravel.dod.mil) website can be used. Typically, the dollar amounts given for lodging in CONUS and OCONUS are on the high side and should be used as a reference only.

## Location of manufacturer's facilities

The location of the vehicle manufacturer's production facility must be taken into consideration when planning the resident inspection budget. The production facilities may be located in more than one location, requiring additional expenses and personnel to perform the inspection process. In addition to the resident inspection process, funding for pre-production meetings, engineering reviews and project oversight may be needed and possibly included in the resident inspection budget.

The description of the manufacturer's schedule for plant operations should contain information such as:

- Number of days worked per week for each plant section;
- Number of hours worked per day to include start and stop times;
- Typical overtime/weekends worked; and
- Planned plant closings for holidays, inventory, etc., during production run.

## Hotel accommodations

Hotel accommodations for resident inspectors account for a large portion of the resident inspection budget. Considerations such as proximity to the bus manufacturer's facility, safety, hotel blackout dates and hotel amenities should be taken into consideration. Typically the bus manufacturer will have hotel recommendations with preferred rates, which should be considered. For extended period bus builds, it may be advantageous to set up a Purchase Order for lodging to reduce out-of-pocket expenses on the inspector. It should be predetermined if incidental expenses (movies, food, beverages, laundry, etc.) incurred by resident inspectors will be covered in the lodging expenses or handled separately.

## Air travel

Air travel for resident inspectors accounts for another large portion of the resident inspection budget. The decision to fly or drive should be made. Items to take into consideration are lost employee travel time, possible additional hotel expense, vehicle needs, weather, etc. Air accommodations should be made as early as feasible to take advantage of lower airfares and to ensure that reservations are available. Internet websites for air travel are a useful tool to estimate ticket expenses.

## Transportation needs

Transportation for resident inspectors while on site could be in the form of a rental vehicle, agency vehicle or a combination of the two.

Rental vehicles can be a large expense when additional daily insurance fees are included in each rental. Some items to be considered in determining the feasibility of using a rental vehicle are:

- Length of stay;
- Number of resident inspectors; and
- Rental car agency policies
- Agency insurance requirements for employee operated vehicles

Use of an agency vehicle can save a lot of money over the course of a long bus build. Expenses such as oil changes and general upkeep would be minimal compared with the extra expenses of a rental vehicle. Use of an agency vehicle also affords the flexibility of changing schedules without having to change a rental agreement. Inspectors can leave the vehicle securely parked at an airport and return home during plant shutdowns (planned, holidays, etc.), and return at a later date.

## References

Code of Federal Regulations, 49 CFR Part 661, Buy America Requirements. www.gpo.gov/fdsys/pkg/CFR-2008-title49-vol7/xml/CFR-2008-title49-vol7-part661.xml

Code of Federal Regulations, 49 CFR Part 663, Pre-Award and Post-Delivery Audits of Rolling Stock Purchases. http://www.gpo.gov/fdsys/pkg/CFR-2009-title49-vol7/xml/CFR-2009-title49-vol7-part663.xml

## Definitions

**agency:** Transit agency or authority authorized to procure buses

**final assembly:** The installation and interconnection of the engine, transmission, axles, including the cooling and braking systems; the installation and interconnection of the heating and air conditioning equipment; the installation of pneumatic and electrical systems, door systems, passenger seats, passenger grab rails, destination signs, wheelchair lifts; and road testing, final inspection, repairs and preparation of the vehicles for delivery.

## Abbreviations and acronyms

| | |
|---|---|
| **ADA** | Americans with Disabilities Act |
| **APTA** | American Public Transportation Association |
| **CFR** | Code of Federal Regulations |
| **CONUS** | continental United States |
| **ECO** | engineering change order |
| **EPA** | Environmental Protection Agency |
| **FTA** | Federal Transit Administration |
| **HVAC** | heating, ventilation and air conditioning |
| **IFB** | invitation for bids |
| **MRL** | master resolution list |
| **QA** | quality assurance |
| **RFP** | request for proposals |
| **NTP** | notice to proceed |
| **OCONUS** | outside the continental United States |
| **OEM** | original equipment manufacturer |