Oregon Department of Transportation

Rail and Public Transit Division

Vehicle Preventive Maintenance Program Handbook

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PART I: VEHICLE PREVENTIVE MAINTENANCE PROGRAM

Per Federal Transit Administration (FTA) and Rail and Public Transit Division (RPTD) requirements for managing federally-funded assets, agencies will have a documented Vehicle Maintenance Program approved and in place. Specifically, all vehicles used to provide public transportation must be included in the program, which will include comprehensive written Vehicle Maintenance Plan. Regardless of vehicle fleet funding, it is important for all agencies providing public transportation to have a strong vehicle maintenance program since well-maintained vehicles are essential to providing a safe and secure ride for your customers. Preventive maintenance is required to ensure vehicles remain in a state of good repair. Preventive maintenance also helps to avoid breakdowns that may jeopardize passenger safety; helps ensure that all equipment, such as wheelchair lifts, is functioning properly; and conserves vehicle maintenance budgets by reducing avoidable unplanned major repairs.

PURPOSE AND COMPONENTS OF A VEHICLE MAINTENANCE PROGRAM

The purpose of a vehicle maintenance program is to:

1. Ensure that the fleet is in a state of good repair
2. Ensure that a sufficient number of agency vehicles are available to meet daily service demands
3. Ensure that agency vehicles are safe, serviced regularly, and clean
4. Ensure that good vehicle maintenance is provided at a reasonable cost

Significant components of an effective vehicle maintenance program include:

1. A comprehensive Vehicle Maintenance Plan
2. An established vehicle service preventive maintenance schedule, based on manufacturer’s recommendations and warranty requirements
3. A thorough and documented inspection program including daily driver pre-trip vehicle inspections and post-trip inspections.
    a. Documentation should include how to report problems, who to report problems to, and who assigns the corrective actions taken
4. Mileage or time-period based periodic mechanical vehicle service and inspections and corrective actions as required
5. Required annual vehicle safety inspection schedule for each vehicle, to be performed by a certified mechanic
6. A regular vehicle exterior and interior cleaning program

7. A cost-effective vehicle repair function for unplanned break-downs, which may include both in-house and out-sourced repair services
8. A policy and facility for safe and secure off-hour vehicle storage
9. A vehicle management information system (either automated or manual) to schedule and track vehicle maintenance activities, as well as vehicle labor and parts costs, by vehicle
10. Maintenance records of all service and repairs (invoices, or in-house reports if agencies perform services) for each vehicle. Maintain these records throughout the life of the vehicle and retain records for three years following the disposal of the vehicle.

CAPITALIZED VEHICLE PREVENTIVE MAINTENANCE

Preventive maintenance projects are reimbursable at the capital match rate in the FTA 5310 and 5311 grant program. Capitalized preventive maintenance allowable costs include:

1. Scheduled or routine maintenance, such as changing belts, hoses, and distributor parts
2. Oil changes and tune-ups
3. Tire purchases and tire maintenance
4. Wheelchair lift servicing and repairs
5. Annual safety inspections performed by a certified mechanic
6. Associated maintenance labor, parts, and supplies

Preventive maintenance in a capital grant is limited to one major component rebuild or planned overhaul per vehicle included in the grant. Agencies considering a major vehicle re-build, should complete a brief cost-benefit analysis to determine if the additional vehicle life secured by a re-build justifies the re-build cost, and whether the same funds applied towards a new vehicle would provide the agency greater value.

Unauthorized capitalized maintenance expenses include:

1. Vehicle fuel
2. Vehicle oil, lubrication, or engine fluids purchased for inventory*
3. Vehicle parts and other expendables purchased for inventory*
4. Shop supplies
5. Repairs resulting from accidents covered by insurance
6. Insurance policy deductibles, or other costs covered by insurance
7. Repairs that should be charged to warranties or service agreements

* The cost of lubrication, oil, engine fluids, and parts that are expended in the course of a specific vehicle service are allowable as capitalized preventive maintenance, as a portion of the total vehicle servicing cost.

VEHICLE MAINTENANCE PLAN

Publicly owned transportation vehicle assets represent a significant investment of public funds. It is the goal of the FTA to ensure that all public transit assets, including vehicles, are preserved and maintained cost-effectively, in a state of good repair, and that they remain in safe condition. RPTD's responsibility is to see that this goal is met.

All RPTD vehicle grant recipients must complete a *Vehicle Maintenance Plan*. The Vehicle Maintenance Plan is an agency policy document that should address or include:

1. Goals and objectives of the agency's maintenance program, and how these were established;
2. An inventory of the agency's vehicle assets, and a schedule and process for periodically updating the inventory;
3. A description of maintenance responsibilities within the agency, encompassing management, supervision, drivers, and maintenance staff;
4. A preventive maintenance plan with the following components:
   - ✓ A preventive maintenance servicing schedule for each vehicle in the agency fleet, based on manufacturers' recommendations for the size, type and components or equipment contained on that specific vehicle;
   - ✓ A process for managing and monitoring vehicle warranties and, if applicable, service agreements, to ensure all service requirements are met;
   - ✓ A vehicle daily servicing plan designed to prepare the vehicle for daily revenue service (typically includes interior cleaning and key fluids checks);
   - ✓ A vehicle inspection procedure which should include both driver's daily pre-trip inspections and post-trip inspections, reports;
   - ✓ Mechanic's mileage-based service and inspections;
   - ✓ A procedure for follow-up for repairs arising from pre-trip and post-trip inspections, and documentation regarding any vehicle being pulled from service until required repairs are made;
   - ✓ A schedule for periodic exterior vehicle cleaning and more thorough interior cleaning, that takes into account seasonal and environmental conditions;
   - ✓ An annual vehicle safety inspection by a certified mechanic. This inspection must include all safety components and is not complete unless it includes inspection of ADA-related equipment such as lifts, tie-downs, handrails, etc.

- ✓ New driver vehicle orientations, to ensure proper and safe use of the vehicle and any installed equipment;

5. A consumables re-stocking procedure assigning responsibility and date intervals for restocking fuel, oil, parts, and supplies. ***Note:*** *These items are* ***not*** *eligible for reimbursement in a capitalized preventive maintenance grant agreement - these items are only eligible as operating expenses, in ODOT RPTD grant programs which fund operating expenses;*
6. A vehicle repair policy for unplanned mechanical breakdowns, whether repairs are performed in-house or are contracted out;
7. A vehicle storage procedure for safe and secure vehicle storage off-hours;
8. The agency's vehicle management information system (VMIS) established to document vehicle inspections, maintenance and repair activities. The system should track actual dates, services performed, parts used, costs incurred, and when the next service/inspection is due (miles and/or date).

INDIVIDUAL VEHICLE PREVENTIVE MAINTENANCE SCHEDULE AND RECORDS

All grant recipient agencies are required to prepare a preventive maintenance schedule for every grant-funded vehicle. Base vehicle preventive maintenance schedules on manufacturer's recommendations for the specific vehicle.

Vehicle Condition Definitions: RPTD has established vehicle condition definitions that comply with FTA guidelines, and are useful to agencies for assessing and documenting the status of their vehicle fleet. These definitions can be found in the Asset Management section.

Forms and Checklists: For agencies that do not have their own forms and checklists, please request copies from your RTC or the Capital Program Coordinator.

Records Retention Requirement: Retain all individual vehicle records, including procurement, maintenance and repair records for three years after disposition of the vehicle.

Scheduled Service Intervals: The preventive maintenance schedule should include expected service triggers for maintenance services to be performed. These may be either time periods (example: every three months), or miles elapsed (example: every 3,000 miles). Establish service intervals for different types of maintenance as multiples of a common denominator, whether mileage-based or time-based. This minimizes the frequency of preventive maintenance servicing, and optimizes vehicle in-service operation.

For example, if oil is changed every 3,000 miles, schedule tire rotations every 6,000 miles and transmission fluid changes every 24,000 miles (as long as these intervals meet manufacturers' recommendations). For a time-based service interval program, this example could equate to every three months, six months, and twelve months.

The scheduled service should address every component included in the manufacturer's warranty requirements schedule, including all safety equipment and ADA-accessibility equipment such as wheelchair lifts.

Service intervals should also take into consideration seasonal and environmental factors, such as winter conditions, salted or sanded roads, rough road conditions, city-versus-rural driving, coastal fog and sea salt conditions, regular hill or mountain driving, etc.

Wheelchair Lift Maintenance: A survey of major wheelchair lift dealers in Oregon indicates that because of widely varying lift usage rates, manufacturers recommend that preventive maintenance for powered lifts be scheduled based on lift cycles, rather than on time-based intervals. For instance, if a dial-a-ride bus deploys the lift 30 times a day, it would require more frequent service than a limited-route van requiring eight deployments a day. Oregon began using cycle counters on vehicle lifts in April 2005.

Agencies should include a vehicle lift preventive maintenance section in the Vehicle Maintenance Plan. The lift preventive maintenance section should address the following:

1. A preventive maintenance schedule based on lift cycles, according to manufacturers' recommendations
2. Regularly scheduled visual lift inspections by drivers, and by mechanics during in-shop maintenance
3. New staff orientation and training on operation of the lift and of the cycle counter (for drivers and shop technicians)

Vehicle Maintenance Schedule Chart: Maintain a tracking chart in the vehicle file documenting both the maintenance service schedule and the next service due for each vehicle component. Maintain this chart for as long as the vehicle provides public transportation.

Each vehicle maintenance chart should include:

1. Vehicle manufacturer, year, make, model, size, and type;
2. Vehicle chassis VIN number, license plate number, and internal agency inventory tag or vehicle number;
3. A checklist of major vehicle components requiring scheduled maintenance or service - component list must include ADA equipment;
4. Annual safety inspections - either as a separate line item or identified in a line item with an interval that meets the requirement of annual inspection (the safety components inspected should be identified in the checklist);
5. Scheduled maintenance activities to be performed, identified by either date (time period), odometer reading (elapsed mileage), or number of lift cycles;

6. Dates the scheduled maintenance or service was actually completed, including any repairs made, depending on software used;
7. Vehicle odometer mileage at time of each maintenance or service;
8. Warranty maintenance service performed, whether noted as part of the regular scheduled maintenance, or performed separately;
9. Name, initials or unique employee identifier (e.g., ID Badge number) of person who performed the maintenance, if agency has in-house maintenance shop;
10. Initial of agency staff member responsible for vehicle maintenance (per Vehicle Maintenance Plan), if service is contracted to another facility;
11. For contracted work, vendor invoices and associated documents in the vehicle file confirming that work was done on date noted in chart.

Vehicle Preventive Maintenance Records: Maintain vehicle maintenance records for each vehicle, verifying maintenance has been performed according to vehicle manufacturers' established preventive maintenance schedule. The maintenance records will also show that recommended repairs are made on a timely basis.

Vehicle maintenance and repair documentation is an FTA and ODOT requirement for all federally or state funded assets. All vehicle maintenance records must be made available when requested by RPTD staff or its representatives.

Keep vehicle maintenance records for each vehicle in separate files, these include:

1. Vehicle Maintenance Schedule for each vehicle (see above);
2. Documentation of annual safety inspections, including ADA components, performed by a certified mechanic with manufacturer-certified training for the vehicle and for specialized, on-board ADA components;
3. Completed daily pre-trip and post-trip driver checklists documenting that all safety features are functioning. The driver's pre-trip checklist must include deploying any wheelchair lift equipment and interlock features. The post-trip checklist must include indications of service or repairs required, action taken to do the work, and whether or not the vehicle must be taken out of service until repair or service is done, based on agency maintenance policies and safe operation standards;
4. Chart of periodic maintenance performed according to maintenance schedule (see below);
5. Copies of all parts or services invoices, or internal repair orders, documenting that the maintenance and repairs were performed.

VEHICLE REPAIRS AS PART OF PREVENTIVE MAINTENANCE

Vehicle repairs include planned major parts replacements (one instance per vehicle per biennium may be reimbursed in a capital preventive maintenance grant); repairs arising out

of pre-trip, post-trip, or mileage/time-based inspections (including annual safety inspections); and wear and tear repairs or replacements (e.g., nicks and minor windshield chips, cracked light covers, individual seat tears, tires, planned brake jobs, lift repairs, bus washing and detailing, etc.)

Although defined as maintenance repairs, warranty/recall servicing, warranty/recall parts replacement, and repairs resulting from accidents, are not eligible expenses in RPTD capitalized preventive maintenance grants. Warranty work should be performed in a timely manner, and agencies should access the manufacturer's warranty via the vendor if assistance is needed to determine what is covered. Any warranty work not covered should be reimbursed as an operating expense, not in the capitalized preventive maintenance grant. Accident repairs are covered by insurance. Any deductibles or charges resulting from an accident are considered operating expenses that cannot be reimbursed from a capital preventive maintenance grant.

Agencies should use some form of Vehicle Repair Work Order form or sheet to record the repair activities. It should include, at a minimum, the start and end date of repairs; the reason for the repair (for example, bus wouldn't start, check engine light came on, inspection finding, or accident); what repairs were made; labor hours; parts used; and who did the work. A Work Order should be used whenever the agency performs the repair service in-house. If a vendor does work, agencies should require work orders or invoices from the company performing the maintenance or repair that, at a minimum, state the issue, parts installed and separate labor charges.

Once the work is completed, the repairs should be documented on the Vehicle Maintenance Chart (see above) and the Work Order should be kept in the individual vehicle maintenance file, where it becomes part of the historical record for that vehicle. These documents are also provided either as required reimbursement documents, or as the basis for completing the vehicle Preventive Maintenance Reimbursement Request attachment form (the Excel spreadsheet developed for use in lieu of providing copies of vendor receipts).

VEHICLE CLEANING

It is important that vehicles be regularly cleaned inside and out. Agency preventive maintenance plans should address the issues of regular vehicle cleaning.

Regular vehicle cleaning helps prevent premature vehicle aging, protects exterior paint, extends the life of protective coatings, and helps prevent rust. It also increases passenger comfort and maintains a positive agency image. Smaller vehicles may be washed at a car wash or with a portable vehicle-washing unit; larger buses may require use of a washing facility (wash rack) or a trip to the nearest truck wash facility. Washing should include periodic washing or steam cleaning the vehicle engine and undercarriage, and application of a protective coating to the painted surfaces, if recommended, and as specified by the manufacturer.

An interior and exterior cleaning schedule should be developed, which specifies cleaning activities to be performed at specified intervals. At minimum, the cleaning standards should include the activities noted below *(information provided by Basin Transit Service).*

Bus Clean-up – Daily

Run vehicle through bus washer (automatic machine)
Pressure wash wheels
Squeegee window exteriors, dry off mirrors
Clean spots off windows, interior
Clean driver area (dash, consoles, seat, fare box, windshield)
Sweep and mop floors
Replace trash bag

Bus Clean-up – Weekly

Same as daily, plus:
- Clean all interior windows
- Vacuum seats, wipe down stanchions and railings
- Clean seats with disinfectant (fabric or vinyl cleaner)

Perform at Service Interval (4-6 weeks)

Same as daily and weekly plus:
- Clean all interior bulkhead and ceiling surfaces
- Scrub floors
- Apply dressing to dash, console and driver area (such as a product that cleans, Shines and protects surfaces)
- Paint rims
- Clean water spots off mirrors (soft scrub)
- Apply exterior protectant (per manufacturers' specifications)

VEHICLE STORAGE AND SAFETY

Every transit agency is responsible for protecting its vehicle fleet through good storage and safety practices. Safe and secure vehicle storage encompasses several aspects:

1. ***A secured vehicle parking area***. This may be a parking lot with adequate lighting and security, such as security fencing, perimeter motion-detector lighting, or door/window alarms, or a covered bus parking shelter, or a bus barn, also with adequate security.
2. ***Security surveillance***. In areas more prone to crime, vandalism, or gang-related activity such as graffiti tagging, some form of additional surveillance may be desirable. This can take the form of electronic surveillance (monitored security cameras), or a

routine private patrol service, or both. Security camera monitoring during hours the agency is closed can often be contracted to a commercial security company.

3. ***Safety procedures***. Proper storage also incorporates safety procedures such as no-exception brake setting and transmission-in-park requirements of drivers; and setting up the parking area to maximize forward driving and avoid operating vehicles in reverse. Backing up is a frequent accident-generating activity. Entering and exiting safely at the storage facility is also important. Requiring procedures such as 10 MPH maximum driving speeds, and stop signs or markings at intersection points, will help to minimize unnecessary vehicle damage or collisions.
4. ***Key Control***. Keys are a vulnerability point for all vehicles. A policy and procedure for locking vehicles and assigned responsibilities for vehicle keys at shift-end should be established.
5. ***Suspicious Package Checks***. The FTA, in conjunction with the Office of Homeland Security, strongly encourage transit providers to adopt safety guidelines related to bomb threats and suspicious circumstances. Agencies should have a procedure for employees to appropriately and safely respond to the discovery of a suspicious package or device, which may include incidents at a vehicle storage facility.
6. ***Rural Transit System Considerations***. For more remote rural systems involving longer distance driving, storing vehicles off-site, such as near a driver's home for a closer route start, may be necessary. Agencies in these circumstances should ensure that vehicles are regularly inspected by a supervisor to ensure parking locations are safe; cleanliness standards are being met; and pre-trip and post-trip inspections are being performed.

RESOURCES

Federal Publications

Code of Federal Regulations (CFR) 49

• Part 37, Transportation Services for Individuals with Disabilities (ADA) 49CFR37

• Part 38, ADA Accessibility Specifications for Transportation Vehicles 49CFR38

• Part 393, Parts and Accessories Necessary for Safe Operation 49CFR393

• Part 396, Inspection, Repair, and Maintenance 49CFR396

• Part 571, Federal Motor Vehicle Safety Standards (FMVSS) 49CFR571

Other Useful National Organization Publications

• Community Transportation Association of America (CTAA) – ADA Resources

State Publications

- ODOT – RPTD State Management Plan SMP
- Oregon Administrative Rules, Public Transit Division - Chapter 732 OARS732
- Oregon Administrative Rules regarding Procurement (OAR 125, Division 55) OARDiv55
- ODOT Department of Motor Vehicles Vehicle Code DMVCode

Workgroups

- Oregon Department of Transportation, RPTD Maintenance Council
    - to join please call or email the Capital Program Coordinator 503-986-3410
- Washington State Transit Association, Maintenance Committee