INTRODUCTION:

A task under the State of Good Repair (SGR) project was to perform an assessment of current vehicle maintenance practices.

The PB Team was on site at AC Transit the week of September 17, 2012. Following an introduction meeting on Monday, September 17th at the ACT General Office (GO), the Team traveled to AC Transits Division 2 in Emeryville and observed maintenance activities and had discussions with various staff members.

The Team travelled to Division 4 located in East Oakland on Tuesday, September 18th and observed maintenance activities and had discussions with various staff members. They then returned to Division 2 later that evening to observe the daily service activities. On Wednesday, September 19th the Team was at Division 6 located in Hayward, first meeting with the Technical Services department for discussions on new bus procurement, staffing for support of maintenance activities, and projects. The Team then visited with the Division 6 service garage and observed maintenance activities and had discussions with various staff members.

Thursday, September 20th the Team was at the Central Maintenance Facility (CMF) for familiarization with the central inventory, component rebuild, heavy repair and body shop. The team discussed work flow, staffing, and issues with various staff members.

FINDINGS:

The PB Team found an ACT management team which is knowledgeable and cooperative in answering the questions posed regarding the maintenance of the bus fleet. In many cases when questioned if a certain business practice had been considered as an alternative to the method currently being used, the staff stated that “they used to do it that way, but was changed when upper management changes were enacted or when staff was reduced.”

The cleanliness of the maintenance work areas was acceptable. It was found at D2 there is a former brake rebuild and repair bay where equipment that is either surplus or not utilized on a regular basis is stored. The equipment is scattered and has not been cleaned or maintained. While this is probably found in other areas throughout ACT and not a huge issue, it is one which more attention to detail would result in an improved image.

The effectiveness and utilization of the maintenance software system is being addressed in a separate task, however the floor supervision is expending excessive time in maintaining spreadsheets and logs to document operations. The front line supervision at all three service garages are using hard copy spreadsheets for floor reports, bus status reports, manpower tracking, etc. The fact is that the front line management is spending more time maintaining spreadsheets that supervising employees.

The fleet is normally washed three (3) times a week at each of the garages. The bus exterior has an appearance of being clean. However, the fleet aesthetics reveal numerous scrapes and dents on all buses and in some cases unpainted replacement panels have been installed.
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Questions regarding this revealed while having 4 to 6 Senior Body Mechanics at each operating division, none of these employees appear to have the painter classification at the operating garages. This has resulted in buses having to be transferred to the CMF for painting. PB was told there is movement to re-activate the paint booths at the operating garages and have a “visiting” painter program in order to avoid transfer of buses between the divisions and CMF.

The PB Team is tasked to perform an assessment of the mechanical, functional and general aesthetic condition of a percentage of the revenue fleet. One of the intents of this assessment is to determine if additional scheduled or campaign processes should be inserted into the maintenance plan that will be developed as part of the state of good repair program. During this investigative trip, the PB Team was able to look through the interiors of a representative sample of buses. It has been recognized that the general cleanliness and amount of graffiti is abnormal and should be unacceptable. Questions were asked regarding scheduled interior cleaning on a mileage or time basis with answers that there is a 3,000 mile scheduled interior clean in the system. However, it was not discovered if there is a dedicated service crew to perform this cleaning and what expectations were for the finished product. The current process needs to be monitored as it is not providing the districts customers with clean buses.

Contributing to cleanliness issues on the articulated buses is the condition of the articulated joint bellows. The PB staff recognized that the lower part of the bellows of many if not all buses are damaged and open for intrusion of dust and dirt into the coach interior. ACT staff communicated there has been a fix developed in-house which attaches a cover to the lower half of the bellows, but only a prototype has been completed.

The maintenance staff at each of the three (3) operating divisions was queried about the amount of buses at the CMF for heavy repair. It was reported that D2 had eight (8) buses at the CMF with three (3) at the division waiting to go. D4 reported thirteen (13) buses at the CMF with three (3) at the division waiting to go. D6 reported four (4) buses at the CMF. This totals up to thirty-one (31) out of service buses for CMF or 7% of the peak service requirement (454 buses on 6/25/12). For October 1, the CMF Logbook listing the repairs in progress at CMF showed twenty-two (22) buses. The least amount of time a bus had been at CMF was twelve (12) days and the most was one hundred thirty-four (134) excluding bus 1211 that is listed for major fire damage, which is offsite and out of service for 347 days. The average amount time for the buses at CMF excluding the top and bottom number of days is fifty-nine (59) days.

Questions posed to ACT staff at each location revealed very little garage management participation in the budget process. When asked if the budget was zero based, the answer was no it was not. There was discussion that manpower has been reduced over the last several years to the point it is today and that procedures that were in place previously were not kept up as a result of the reduction in staff and changes in management leadership.

Maintenance personnel at D2 were reported to be used to support the transportation departments lack of operators in various normally transportation related functions. These include transport of buses and exchange of in service buses for non mechanical issues. The amount of this type of activity was not quantified during our time at the service garages, but in
discussion with personnel it was communicated the amount of time spent doing this affects the maintenance department in supporting the departments mission. It was not determined if the other garages experience the same issues.

Managers expressed that work loss also affected their ability to adequately maintain the fleet. The bargaining unit contract contains holidays (11 per year), accumulated vacation, sick time and the ability to take emergency leave. In addition employees are paid for a twenty minute lunch and two ten minute breaks leaving a 7.2 hour work day. When calculated at a rate in which an employee takes one sick day per month, and has four weeks’ vacation (10-15 years of tenure), the available work hours available are 1562 without calculation for efficiencies or unscheduled work loss (OJI, Emergency, or FMLA Leave).

ACT Maintenance has been performing a 3,000 mile preventive maintenance inspection (PMI). While some urban properties continued with a 3,000 mile safety inspection after automatic slack adjusters were introduced to the transit industry, none we are aware of are performing a PMI at this mileage unless there is a need for 3,000 mile oil and filter changes. PB estimates this PMI has been taking 3 hours to complete. We were told that in a recent maintenance meeting it was decided to eliminate the 3,000 mile PM and change to a 3,000 mile safety inspection. The safety inspection includes an inspection of the brake and suspension system, functionality of the lights, condition of floor covering, stanchions, etc. We have estimated the safety inspection will take approximately one hour to complete. In a month at a garage with a monthly mileage of 575,000 miles would perform approximately 96 3,000-mile PM’s were performed which at 3 hours each equal about 288 hours per month. The movement to a one-hour safety inspection is calculated to result in 96 labor hours and would free up approximately 192 hours a month (2,304 hours per year).

A maintenance issue brought up by staff at each of the garages is the amount of time spent changing particulate filters (PF) and the amount of failures of reconditioned cores. ACT has a vendor performing the cleaning of PF cores and they are not tracking the cores by their serialized number. The garage staff believes that ACT cores are not always returned from the vendor, as they are supplying cores from other fleets or applications. The suspicion is that cores are either supplied that were not ACT cores, the cores that have been cleaned do not sufficiently flow after cleaning or the cores have exceeded their useful life.

It was discovered there is not a set procedure or identification for tracking in-house or vendor supplied parts for warranty. A procedure identified as MAINTSOP-007, Defect Card Warranty was discovered. This procedure is intended for work performed on a coach that is still covered by a factory warranty. The PB Team did see warranty bins at the divisions with an ACT tag identifying them as a warranty part. Additionally, one tech support supervisor handles the warranty parts that are shipped to the CMF. It is understood the only warranty parts being identified are if they are removed from a bus that is still in warranty or if by chance it is recognized as a warranty part. There is no physical identification tag / coloring and the maintenance system does not identify a component for a vehicle as warranty when a replacement component is disbursed for the same bus within a warranty period.
The PB Team met with Technical Services / Training staff at the training technical support facility adjacent to D6. Items discussed were their involvement with the acquisition of the fleet of Gillig buses currently under contract, bus orders to follow, warranty tracking, quality assurance and training of technicians. As a result of the number of support staff in Technical Services and Training, the group is not able to support all requests for assistance. The main focus of Training is conducting an apprenticeship program. At one time there were more trainers connected to a subsidized training program. Those allocations were changed and the training staff reduced. The technical staff has one member handling warranty administration and tracking / updating the Fleet Detail Report. The two other staff members are handling specification writing and the Gillig pilot bus inspection. There is limited time allotted for technical support staff to attend to the operating garages due to the assigned duties of the Technical Manager and supervisors.

At CMF, the PB Team found a large central facility that is underutilized. The facility has the tooling to support remanufacturing of mechanical components and fabrication of tools, body parts and parts. The facility was built in the mid eighties and was probably sized for anticipated fleet expansions. In addition, when the FTA or its predecessor UMTA funded these types of buildings for larger transit agencies, they were rebuilding most all of their own components. Business has changed and in many cases it is more economical to purchase selected components on the outside. The heavy repair and body shop area had twenty-five (25) buses listed there for repair with six (6) at the garages waiting to be brought to CMF for repair. It was explained that buses being brought to heavy repair for powertrain replacement do not have a completed powerplant assembly supplied but rather the mechanic is supplied with an engine / components and the build-up of the package occurs on the floor in heavy repair. In addition, it was explained that with the manpower in the remanufacturing area, lacks the necessary surplus of engines to stay ahead of supply so they are always behind on the supply schedule. Currently turn around in this area is longer than would be expected. The PB Team was told the agency was purchasing ten (10) new engines to be added as cores to assist in reducing the turnaround time.

RECOMMENDATIONS: (Prioritized)

1. Maintenance System

Issues with the maintenance system should be addressed in order to have accurate information needed for making daily decisions and short/long term planning. A maintenance oriented IT person needs to be assigned this as his sole duty to determine the amount of input performed by whom and utilize the maintenance system for a hierarchy of reports generated from the information inputted in the system. The input and use of reports should be consistent between the divisions. In order to correctly make daily decisions and evaluate performance the information must be accurate. It is recommended the individual assigned to this be given objectives and goals for completion and their performance judged on improved utilization of the current system. The issues with the maintenance system along with detailed recommendations are being addressed in an additional PB report.
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2. Bus Cleanliness

Due to the condition of the interiors of the ACT revenue fleet, the PB Team advocates creation of an immediate plan of improvement. The plan would need to determine an expectation level for bus interior cleanliness, graffiti and damage and the resources required to reach and sustain that level. The plan for this action would become part of the overall preventive maintenance plan being developed. It is recommended expectations be placed on daily service levels of cleaning, graffiti removal, drivers area and glass. Scheduled interior cleaning based on time or mileage should be established for sub fleets. These scheduled interior cleanings are recommended to be performed on the dayshift and when completed passengers are able to board and sit on a seat without visually seeing graffiti, dirt or contacting dirt or grime. Staff performing cleaning should have the resources necessary to perform their job including step ladders to reach the ceilings and roof mounted exit hatches. Procedures identifying the personal safety equipment, cleaning materials, cleaning supplies and identification of MSDS sheets should be established, communicated and distributed. It is recommended the amount of dedicated staff to perform both the daily service function (fueling, oiling and daily cleaning) and the scheduled cleaning needs to be calculated, established and sustained in order to provide patrons with clean transportation. In addition, procedures for the closing of bus doors and windows need to be enacted. Buses sitting on the lots idle or at night before and after daily service with the doors or windows open are subject to dirt / moisture from night air but also from exhaust of buses running in their vicinity.

3. Articulated Bus Bellows

In order to reduce the amount of dirt being introduced into the passenger areas of the articulated buses it is recommended ACT move forward as expeditiously as possible to repair / replace the damaged bellows on the articulated buses. Buses which continue to have this defect will affect the ability to maintain cleanliness expectations or result in requiring more frequent scheduled intervals.

4. Particulate Filters

The amount of particulate filter changes and the quality of cleaning was identified as an issue during discussion with the ACT staff. It is recommended a procedure for particulate filter replacement and cleaning be drafted. PB learned the filter elements are serialized so they can be tracked. The procedure should include a tracking methodology that identifies where each particulate filter core is located; in which bus, core bin, vendor (for cleaning), testing and stock for reuse. In addition the procedure should include the ability to track the amount of times, when and who cleaned the filter. Filters being removed and installed in buses would have the serial number recorded on the repair order. The PB Team was told ACT has a filter flow tester. A test procedure should be instituted for filters being returned to stock, either by a vendor or completed in-house. A no-go flow rate should be established so filters that doesn’t meet the criteria are removed from inventory and either re-cleaned or replaced. A calculation should be made on how many core filters are required to maintain the flow and purchase new units to
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meet that level of inventory. The tracking methodology should be available in a report showing  
the amount of spare cores, their inventory and purchase status and location.

5. Manpower Planning

Identify and quantify all items which divisional maintenance personnel are going to be  
responsible for performing that are not direct maintenance functions. These items must be  
directed from the Senior Staff level so all are aware of them and their inclusion as maintenance  
functions. This would include items like making bus changes for operations that are non-  
mechanical in nature, which divisions are supplying scheduled support mechanics for on-street  
operations, special service functions, etc. The identification and quantification of these items  
would then be included in manpower planning. Manpower planning should be zero based and  
support the creation of the annual budget. It is recommended each task in the maintenance  
department be identified, quantified for how many events and the time per event in order to  
establish an expectation. Unscheduled labor for driver defect repair, breakdown maintenance,  
etc. must be estimated. An investigation of how much unscheduled work loss and its sources  
needs to be established. The daily hours needs to be adjusted from 8 to 7.2 accounting for the  
20 minute lunch and 2-10 minute breaks. Using the 7.2 hours per day, minus scheduled and  
contractual work loss, an expected amount hours for manpower planning needs to be  
established. This will be the amount of hours per Full Time Employee (FTE). As the scheduled  
maintenance plan in the State of Good Repair program is established, the adjusted hours for a  
FTE will be critical in determining the amount of FTE’s required to meet the expectations of the  
program.

6. CMF Down Buses

It is recommended the turnaround time for the buses at the CMF be reduced. It is anticipated  
the workload of powertrain replacements will be increasing due to the aging of the fleet. This  
will be better quantified during the latter part of the State of Good Repair investigation. The staff  
recognizes these events will be coming up due to the amount of buses purchased in larger  
quantities and the years they were purchased. The in-house remanufacturing and purchase of  
ginees needs to be planned so buses that arrive at CMF for a power train replacement have a  
completed new unit available and are not out of service awaiting a replacement or the buildup of  
an assembly. Planning should include reducing the amount of major work performed to buses  
based on their retirement schedules.

7. Fleet Body Damage

The ACT fleet exhibits body damage needing correction that would improve the aesthetic  
condition of the fleet. The current method of dealing with body damage allows the fleet to  
appear as it does. The PB Team was told the plan is to re-certify the paint booths at the  
individual garages so a “visiting” painter from CMF can come on property and perform painting  
to scheduled buses that have had body work completed. This voids having to schedule all  
buses to CMF for any type of painting needed. This program needs to be evaluated and  
determine if the fleet condition improves. PB recommends that when the paint booths are
recertified, ACT assign a painter at each division. ACT may be able to go back to the “visiting” painter in the future; however, catch-up of correcting the current fleet condition cannot be expected to be accomplished using this strategy.

8. Warranty Program

The PB team is recommending the establishment of a warranty program covering bus warranty, vendor supplied parts and CMF rebuilt components. Parts remanufactured at the CMF and components purchased should have a means of easy identification for date of purchase / remanufacturing when received into inventory. Serial number history should be established so when a part is removed from a bus the time of purchase / remanufacturing can be easily identified by the technician. A tag system is currently in place for new bus warranty parts that would be used for these warranty parts. Tracking systems should allow for a performance analysis to determine the reliability and costs of products remanufactured or purchased. Using the data gathered failure rates can be determined, economies can be monitored which provides documented information for how parts are obtained in the future.

9. Technical Service / Training / QA Program

In order to sustain an improved condition or sustain the condition of new equipment being received, PB recommends expanded responsibilities for the Technical Service and Maintenance Training programs and the inclusion of a Quality Assurance program. It is recommended a Quality Assurance inspector be domiciled at each of the three operating garages and at least one (1) at the CMF along with one (1) Supervisor over all of the maintenance related inspectors. These three (3) groups should work hand in hand with each other supporting each other’s goals.

Technical Service should be responsible for

- Investigating new technologies available for transportation vehicles.
- Writing all technical specifications for procurement of all buses, support vehicles, bus related parts, technology purchases, tools and supplies.
- Maintaining MSDS sheets in all bus service facilities.
- Review current, update current as necessary, create new and distribute ACT Standard Operating Procedures.
- Managing the new bus specification development, ACT Team communication and feedback on bus specification, manufacturing inspection process, acceptance inspection and process and coordination of new buses for operator training.
- Over site management, tracking and documentation of bus manufacturer warranty repairs.
- Coordinating and tracking in-house and vendor campaigns.
- Managing a comprehensive warranty program that includes new bus parts, in-house remanufactured parts and vendor supplied parts.

Maintenance Training should be responsible for:
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- The ACT Apprenticeship program.
- Determining the amount of new bus manufacturer training and coordination with Technical Services and the operating divisions.
- Coordination of Bus Manufacturer Training.
- Conducting in house technical training classes.

Quality Assurance should be responsible for:

- Monitors that the ACT Maintenance Department follows the Standard Operating Procedures.
- Road Call investigation and scrubbing of data for performance reports.
- Investigation into repeat road calls and resolution.
- Provides Technical Service feedback regarding operating division and CMF performance.
- Providing input to Maintenance Training on operating division and CMF training needs.
- QA follow-up inspection of completed scheduled items.
- Address technical issues on the garage floor working with technicians, uses Technical Services for support regarding issue investigation.
- Review of CMF repairs upon completion and provide feedback for any correction before release to the operating garages. During this inspection, items which the operating garage need repaired should be identified and communicated to the division maintenance manager.