

INTERNAL AUDIT REPORT

2020-06

Emergency Vehicle Preventive Maintenance

Anchorage Fire Department

June 11, 2020

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Municipality of Anchorage

Ethan Berkowitz, Mayor

Internal Audit Department

June 11, 2020

Honorable Mayor and Members of the Assembly:

I am pleased to present for your review **Internal Audit Report 2020-06, Emergency Vehicle Preventive Maintenance, Anchorage Fire Department**. A brief summary of the report is presented below.

In accordance with the 2019 Audit Plan, we have completed an audit of Emergency Vehicle Preventive Maintenance at the Anchorage Fire Department. The objective of this audit was to determine if the Anchorage Fire Department Maintenance Shop performed preventive maintenance activities according to industry standards and in a timely manner. To accomplish our objective, we examined preventive maintenance activity records of 20 selected emergency apparatus that covered the period from 2010 (the approximate time of implementation of FleetFocus M5) through November 2019 for accuracy, timeliness, and proper documentation. We also reviewed Anchorage Fire Department Maintenance Shop personnel training records and certifications.

Our audit revealed that the Anchorage Fire Department Maintenance Shop did not perform preventive maintenance activities according to industry standards or in a timely manner. Specifically, the preventive maintenance program was not actively administered. We found no evidence that the Anchorage Fire Department Maintenance Shop had comprehensive preventive maintenance standards, policies, procedures, or adequate records to address the needs of its fleet. In addition, the Anchorage Fire Department Maintenance Shop did not always perform preventive maintenance scheduled in FleetFocus M5 and did not adequately document the preventive maintenance activities performed for the Anchorage Fire Department's Fleet. Finally, Anchorage Fire Department fleet maintenance mechanics did not always possess sufficient Emergency Vehicle Technician certifications as required by industry standards.

There were four findings in connection with this audit. Management was responsive to the findings and recommendations.

Michael Chadwick, CIA, CICA
Director, Internal Audit



Municipality of Anchorage

Ethan Berkowitz, Mayor

Internal Audit Department

June 11, 2020

Internal Audit Report 2020-06 Emergency Vehicle Preventive Maintenance Anchorage Fire Department

Introduction.

The Anchorage Fire Department (AFD) Maintenance Shop (Maintenance Shop) repairs and maintains a fleet of emergency vehicles. The fleet has 76 emergency apparatuses consisting of pumpers, tenders, ladder trucks, ambulances, and mini-pumpers.¹ The Maintenance Shop also maintains a parts inventory for fleet maintenance and repair. The current Maintenance Shop building, dedicated in 1982, is a 12,000-square-foot facility consisting of three drive-through bays, which can accommodate up to six pieces of apparatus at a time, and two additional bays which can be used for other purposes, such as a body shop or paint booth. The shop also contains a kitchen, lounge, office, shower, and locker room, as well as an area above the office for storing parts and supplies. Maintenance Shop staff use the vehicle maintenance control and management application, FleetFocus M5, for planning and scheduling of the Maintenance Shop's fleet maintenance activities. The Maintenance Shop is staffed with one Fire Lead Mechanic, eight Fire Mechanics, and one Fire Logistics Technician. The Maintenance Shop serves AFD, and most of the Girdwood Fire Department and the Chugiak Volunteer Fire Department.

The Maintenance Shop performs a combination of preventive maintenance (PM) and repair activities. Preventive maintenance includes activities such as scheduling vehicle inspections, lubrication, adjustment, cleaning, testing, repair, and/or worn parts replacement to prevent potential problems and maximize vehicle availability. Preventive Maintenance is used in fleet management to proactively avoid or reduce vehicle breakdowns, and the frequency of the PM activities may be based on factors

¹The Maintenance Shop also services 45 utility and light-duty staff vehicles, as well as 80 other pieces of specialty equipment, such as gurneys, gurney lifts, trailers, and all-terrain vehicles.

such as time, mileage, engine hours, or gallons of fuel used. The primary goal of an effective PM program is to avoid or mitigate the consequences of an equipment failure due to breakage of parts or components, which would require more expensive and untimely repairs, which could also result in unplanned vehicle service outages.

Objective and Scope. The objective of this audit was to determine if the Maintenance Shop performed PM activities according to industry standards and in a timely manner. Specifically, we examined PM activity records of 20 selected emergency apparatus that covered the period from 2010 (the approximate time of implementation of FleetFocus M5) through November 2019 for accuracy, timeliness, and proper documentation. Finally, we reviewed Maintenance Shop personnel training records and certifications.

We conducted this performance audit in accordance with generally accepted government auditing standards, except for the requirement of an external quality control review. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. The audit was performed during the period of September 2019 through January 2020.

Overall Evaluation. The Maintenance Shop did not perform PM activities according to industry standards or in a timely manner. Specifically, the PM program was not actively administered. We found no evidence that the Maintenance Shop had comprehensive PM standards, policies, procedures, or adequate records to address the needs of its fleet. In addition, the Maintenance Shop did not always perform PM scheduled in FleetFocus M5 and did not adequately document the PM activities performed for AFD's Fleet. Finally, AFD fleet maintenance mechanics did not always possess sufficient Emergency Vehicle Technician (EVT) certifications as required by industry standards.

FINDINGS AND RECOMMENDATIONS

1. Preventive Maintenance Program Not Actively Administered.

a. **Finding.** The PM program was not actively administered. We found no evidence that the Maintenance Shop had comprehensive PM standards, policies, procedures, or adequate records to address the needs of its fleet. We heard numerous times that PM activities could not be adequately accomplished with the resources currently available. However, until the Maintenance Shop is actively administered, it is difficult to know if the existing resources are being fully utilized. Lacking this basic data/management information, it is challenging to articulate what types of resources the Maintenance Shop may need. For example, we found the following:

- *No Policies and Procedures (P&Ps)* - Existing AFD P&Ps only addressed the general operational needs for emergency apparatuses, but did not contain any detailed procedures, policies, strategies, or instructions directed specifically to the Maintenance Shop.
- *Unclear PM Standards* - AFD staff provided inconsistent statements on which maintenance standards they elected to follow. During interviews and discussions, some AFD personnel stated that the Maintenance Shop followed National Fire Prevention Association (NFPA) standards for inspection, maintenance, testing, and retirement of in-service emergency vehicles. However, other AFD personnel stated that the Maintenance Shop did not follow NFPA standards but was “moving in that direction in the future” to adopt the standards. Moreover, some staff stated that they followed the manufacturers’ recommendations for PM, while other staff stated that they were aware that maintenance was not done in accordance with manufacturers’ recommendations.

- *FleetFocus M5 Does Not Define PM Activities* - FleetFocus M5 did not contain any information of what semi-annual and annual PM consisted of. Instead, staff told us that semi-annual maintenance consisted of “just a quick oil change and inspection” and annual PM was described as “a full bumper-to-bumper inspection”.
- *Limited Supervisory Authority* - The Maintenance Shop supervisor (Lead Mechanic) has very limited authority. According to the Lead Mechanic’s job description, this position “. . . directly supervises others on a regular basis.” However, the level of supervisory authority exercised by the Lead Mechanic is limited. The only supervisory action that the Lead Mechanic is permitted to make is “assign”. The Lead Mechanic is not permitted to take any of the following supervisory actions regarding the Maintenance Shop staff: hire, reward, promote, transfer, settle grievances, lay off, discipline, and/or discharge. As a result, the Lead Mechanic is unable to enforce accountability in the Maintenance Shop.
- *Limited Management Oversight* – The current organizational structure has a Battalion Chief managing the Maintenance Shop, amongst other emergency response duties. While this individual may have significant experience in emergency response management, managing a vehicle maintenance shop may not be his primary area of expertise. In addition, his Kelly shift schedule and other duties prevent him from dedicating full-time attention to the Maintenance Shop.

One way to help actively administer the PM program is to have comprehensive P&Ps and standards. For example, maintenance standards provide specific guidance for the frequency of required PM checks, details of the specific inspection and maintenance activities to be performed during these checks, the training and certifications required for personnel performing these activities, and the rationale for performance of these checks based on the manufacturer’s recommendations. Comprehensive, written P&Ps for PM activities are important to ensure that the Maintenance Shop services and

maintains the AFD Fleet in accordance with local experience, operating conditions, and the manufacturer's recommendations.

b. Recommendations. The AFD Chief should:

- Ensure that written P&Ps are implemented for the Maintenance Shop.
- Consider adopting and following nationally recognized standards for emergency vehicle maintenance.
- Ensure that FleetFocus M5 is populated with specific PM activities.
- Consider reviewing and updating the supervisory actions that can be taken by the Maintenance Shop's Lead Mechanic.
- Consider restructuring and designating a dedicated manager with vehicle maintenance shop experience to actively manage the Maintenance Shop.

c. Management Comments. Management concurred and stated, "The AFD Maintenance Shop does not have Maintenance Shop specific policies and procedures or a Maintenance Operations Manual. This is an oversight by AFD Admin and will be addressed in the future. We are unable to project a deadline due to the workload at the maintenance shop. We will have a better understanding of the scope of the project now that the Lead Mechanic position is filled.

"Included in the AFD Maintenance Shop Operations Manual and/or Policies and Procedures will be specific information on the adoption of appropriate national standards and manufacturer's recommendations. Staff will be directed to follow those adopted standards and appropriate recommendations.

"The FleetFocus M5 application implementation was not managed well. The platform is not set up correctly to allow maintenance staff to accurately document work which eliminates the ability to manage preventive maintenance. The recent promotion of a new Lead Mechanic will bring an experienced FleetFocus M5 user to the management

of the shop. The Lead Mechanic will provide training to shop staff and ensure the proper set up of the program to address the requirements of the national standards.

“We are limited by Municipal code 3.70.060, C, 2 which does not allow represented personnel to supervise. The Lead Mechanic is a represented position within IAFF, Local 1264, therefore it is not allowed to perform supervisory actions outside of assigning work, coaching and counseling. Prior to the removal of Supervisors from IAFF the Lead Mechanic was a supervisory position. The Lead Mechanic was not removed from IAFF when the Battalion Chiefs (the other supervisors in IAFF) were moved to non-reps. The supervision of the AFD Maintenance Shop was assigned to the Deputy Chief of Administration but when that position was re-classified down the supervision of the shop was moved to an Operations Battalion Chief.

“While it is not ideal to have an Operations Battalion Chief supervise the AFD Maintenance Shop we have no other alternatives at this time. We will continue to research alternatives and plan to have a solution to propose in the future.”

- d. **Evaluation of Management Comments.** Management comments were responsive to the audit finding and recommendations.

2. **Preventive Maintenance Not Always Performed as Scheduled.**

- a. **Finding.** The Maintenance Shop did not always perform PM scheduled in FleetFocus M5. Although the Maintenance Shop staff scheduled semi-annual PM and annual PM in FleetFocus M5, our review of 234 individually scheduled PM activities in FleetFocus M5, covering 20 in-service emergency apparatus, found that PM activities were performed late approximately 38 percent of the time. The length of time these PM activities were overdue varied from as little as approximately one week to as long as 31 months, averaging six months late. Although an effort was made in 2017 to catch up on overdue PM inspections, we did not see a significant improvement in

completing overdue PM inspections since that time. According to some Maintenance Shop staff, they are running a repair shop that reacts to broken equipment as it comes up rather than a maintenance shop that proactively maintains vehicles. The table below shows the timeliness of PM activities for the different types of apparatus that we reviewed.

PM Activity 2010 through November 2019		
	Percent of Overdue PM Activities	Average Number of Months PM Overdue
Pumpers (Engines)	61%	4
Ladder Trucks	81%	6
Tenders	86%	12
Ambulances	17%	4

Source: Auditor analysis of 234 individually scheduled PM activities for seven engines, three ladder trucks, two tenders, and eight ambulances.

The Maintenance Shop facility has three drive-through bays which can accommodate up to six pieces of apparatus at a time. These bays are used both for repair and PM activities. A manager of another vehicle maintenance shop stated that they use one bay for only PM activities to help ensure that PM activities were completed as scheduled. If other needed repairs are discovered while performing the PM activities, then those repairs are noted for future work.

Timely performance of PM activities is used to avoid or reduce vehicle breakdowns, and to mitigate the consequences of an equipment failure due to breakage of parts or components, which could require expensive and untimely repairs and could also result in unplanned vehicle service outages.

- b. **Recommendation.** The AFD Chief should ensure that the Maintenance Shop performs all scheduled PM activities scheduled in FleetFocus M5 in a timely manner.
- c. **Management Comments.** Management concurred and stated, “The Maintenance Shop staff have attempted many times to get in front of the Preventive Maintenance issue. To address limited staffing AFD Administration re-classed a Deputy Chief of Administration down to Fire Mechanic in 2016 bringing the budgeted Fire Mechanic staffing to seven. In 2017 we conducted a Safety Stand Down to allow the shop to address significant out of schedule PMs. Unfortunately, once the stand down was completed the focus again turned to the repair workload allowing no time to meet the PM schedule.

“The situation worsened in 2018 when two mechanics were off work most of the year due to injuries and another was off for nearly eight months. We added two temporary mechanics to maintain minimum staffing. Since that time one mechanic retired which absorbed one of the temporary hires but we have continued to experience at least one employee off for extended periods of time due to work related injuries or FMLA.

“We are carrying an unbudgeted fire mechanic which has helped us maintain staffing of seven mechanics to compensate for the typical long-term absence of one employee due to WC or FMLA.

“Under the current staffing model used at the shop the Fire Mechanics have approximately 12,584 work hours available. Under our current system those hours are dedicated to apparatus repair leaving little time available for preventive maintenance work.

“Based on national standards, approximately 6,900 work hours are needed to complete preventative maintenance for all AFD, CVFRD and GFD apparatus and vehicles.

“We are hoping that the new Lead Mechanic will provide a more organized workflow which will include more focus on preventative maintenance which in turn should reduce the hours spent on repairs.”

- d. **Evaluation of Management Comments.** Management comments were responsive to the audit finding and recommendation.

3. **Lack of Adequate Documentation for Preventive Maintenance Performed.**

- a. **Finding.** The Maintenance Shop staff did not adequately document the PM activities performed for AFD’s Fleet. Specifically, our review of PM records for 20 in-service emergency apparatus found there was insufficient documentation for 183 of 191 (96%) PM activities shown as completed in FleetFocus M5. Although documentation showed that PM activities were performed, detailed checklists describing the results of the required PM inspections were missing. Missing PM checklists varied with apparatus type with 97 percent missing for ladder trucks, 96 percent missing for ambulances, 92 percent missing for pumpers, and 100 percent missing for tenders.

It is our understanding that the mechanics were instructed to follow industry standards by completing detailed checklists during the performance of their semi-annual and annual PM checks. This standard requires detailed checklists to be filled out each time by a qualified mechanic and retained as part of the permanent maintenance record for each apparatus.

- b. **Recommendation.** The AFD Chief should ensure that the Maintenance Shop properly documents all scheduled PM activities scheduled in FleetFocus M5.
- c. **Management Comments.** Management concurred and stated, “The FleetFocus M5 application implementation was not managed well. The platform is not set up correctly to allow maintenance staff to accurately document work which eliminates the ability

to manage preventive maintenance. The recent promotion of a new Lead Mechanic will bring an experienced FleetFocus M5 user to the management of the shop. The Lead Mechanic will provide training to shop staff and ensure the proper set up of the program to address the requirements of the national standards.”

- d. **Evaluation of Management Comments.** Management comments were responsive to the audit finding and recommendation.

4. **Mechanics Not Always Certified per Industry Standards.**

- a. **Finding.** Anchorage Fire Department fleet maintenance mechanics did not always possess sufficient EVT certifications as required by industry standards. Our review of AFD’s Training Records showed that of the eight Mechanics and one Lead Mechanic in the Maintenance Shop, only one individual was fully certified as an EVT Level 1 and was thus qualified to perform PM work on emergency fire apparatus as required by NFPA standards. For ambulances, only three mechanics and the lead mechanic possessed the required certifications to perform PM work.

It appears that requirements for the training and certification required by maintenance mechanics was miscommunicated between AFD management and shop personnel. We reviewed the job descriptions for these mechanics and no reference was made to required training and certifications. Furthermore, we found a 2012 email informing the Maintenance Shop personnel that “. . . it has been determined the Municipality Of [sic] Anchorage is not responsible for the costs of these exams. Please consider this notification that the MOA will no longer pay for these exams.” In addition, prior labor agreements provided incentive pay for employees who completed the EVT Level 1 certification, but the current labor agreement no longer offers this incentive pay. For these reasons, Maintenance Shop staff believed they no longer needed to complete these certifications. However, according to AFD management, the intent was to provide a reimbursement for certification costs.

The National Fire Prevention Association Standard 1071 outlines the ideal technical knowledge and certifications needed for mechanics to demonstrate their ability for maintaining and repairing emergency vehicles. Emergency Vehicle Technician Certifications specifically relate to the specialized equipment for emergency fleet vehicles. The standard outlines three EVT levels of qualification for fire apparatus, and three levels for ambulances. At a minimum, an EVT Level 1 is required to possess general knowledge of emergency vehicle maintenance, inspection, and testing, as well as design and performance standards. This level of certification is the minimum required to allow performance of inspections used for PM.

Requiring properly certified EVT mechanics helps to ensure that Maintenance Shop personnel have the specialized knowledge needed to properly service and maintain complex firefighting and emergency vehicles. Proper certifications also help to shield the Municipality from potential liability should questions ever arise about the quality or integrity of AFD's PM Program.

- b. **Recommendation.** The AFD Chief should ensure that Maintenance Shop personnel obtain all EVT certifications required by nationally accepted emergency vehicle maintenance standards.

- c. **Management Comments.** Management stated, "Concur with clarification.

"Prior to the 2015 CBA with IAFF Local 1264, Lead Mechanics and Fire Mechanics received an incentive for gaining and maintaining the EVT certification. In the 2015 CBA the EVT incentive pay was rolled into the base pay for the Lead Mechanic and Fire Mechanic positions. Human Resources and AFD Administration failed to update the Lead Fire Mechanic and Fire Mechanic position descriptions to require any level of EVT certification after that change occurred.

“A review of training and certification documentation found that five of the Fire Mechanics have current Emergency Vehicle Technician certifications. The Maintenance Shop Logistic Technician also has two current EVT certifications. It appears the certificates were not loaded correctly into AFD Training Tracker, our internal training and certification tracking mechanism. The Maintenance Shop Logistic Technician will be retrained on the correct procedure to load the documentation into the system by the end of 2020.

“AFD Administration scheduled EVT training for the Lead Mechanic and all Fire Mechanics to attend, unfortunately that training was canceled due to the COVID-19 Pandemic. It will be rescheduled for later in the year when travel restrictions are removed. AFD Administration will issue a directive that the Lead Mechanic and all Fire Mechanics will gain and maintain EVT certification in the areas determined by their Supervisor by December 2020. The cost of this training and certification will be borne by AFD. Once they have completed their certifications the Lead Mechanic and Fire Mechanic position descriptions will be updated with the certification requirements.”

Employee	EVT level	Cert Expires
Lead	EVT - Maint- Insp & Testing of Ambulances	5/31/2024
Lead	EVT - Ambulance Cab- Chassis and Body	6/11/2021
Lead	EVT - Ambulance Electrical Systems	10/31/2020
Lead	EVT - Ambulance Heating Air-conditioning + Ventilation	6/11/2021
Lead	EVT - Design & Performance Standards of Ambulances	10/21/2020
Lead	EVT - Maint- Insp & Testing of Fire Apparatus	5/31/2024
Lead	EVT - Management Level I Supervisor	5/31/2024
Lead	EVT - Management Level II Supervisor	5/31/2024
Mechanic	EVT - Maint- Insp & Testing of Ambulances	10/17/2024
Mechanic	EVT - Ambulance Cab- Chassis and Body	6/5/2024
Mechanic	EVT - Ambulance Electrical Systems	6/5/2024

Employee	EVT level	Cert Expires
Mechanic	EVT - Design & Performance Standards of Ambulances	6/5/2024
Mechanic	EVT - Maint- Insp & Testing of Fire Apparatus	10/16/2024
Mechanic	EVT - Ambulance HVAC	5/31/2024
Mechanic	EVT - Maint- Insp & Testing of Ambulances	10/16/2024
Mechanic	EVT - Ambulance Cab- Chassis and Body	10/16/2024
Mechanic	EVT - Fire Pumps and Accessories	10/16/2024
Mechanic	EVT - Foam Systems	10/16/2024
Mechanic	EVT - Management Level I Supervisor	10/16/2024
Mechanic	EVT - Maint- Insp & Testing of Ambulances	6/7/2024
Mechanic	EVT - Aerial Fire Apparatus	10/17/2020
Mechanic	EVT - Allison Automatic Transmissions	6/8/2023
Mechanic	EVT - Ambulance Electrical Systems	10/16/2024
Mechanic	EVT - Design & Performance Standards of Ambulances	6/7/2024
Mechanic	EVT - Fire Apparatus Electrical Systems	6/8/2023
Mechanic	EVT - Maint- Insp & Testing of Fire Apparatus	6/8/2023
Mechanic	EVT - Management Level I Supervisor	6/9/2022
Mechanic	EVT - Management Level II Supervisor	10/13/2022
Mechanic	EVT Level I Fire Apparatus Tech	6/30/2023
Mechanic	EVT Level II Fire Apparatus Tech	6/30/2023
Mechanic	EVT Master Fire Apparatus Tech	6/30/2023
Mechanic	EVT - Maint- Insp & Testing of Ambulances	10/17/2023
Mechanic	EVT - Aerial Fire Apparatus	10/12/2024
Mechanic	EVT - Allison Automatic Transmissions	10/12/2024
Mechanic	EVT - Ambulance Heating Air-conditioning + Ventilation	10/17/2023
Mechanic	EVT - Design & Performance Standards of Ambulances	10/12/2024
Mechanic	EVT - Fire Apparatus Electrical Systems	6/13/2023
Mechanic	EVT - Fire Pumps and Accessories	6/13/2023
Mechanic	EVT - Maint- Insp & Testing of Fire Apparatus	6/13/2023
Mechanic	EVT Ambulance Cab- Chassis- & Pwrtrn	10/12/2024
Mechanic	EVT Level I Ambulance Tech	6/30/2020
Mechanic	EVT Level II Ambulance Tech	6/30/2020
Mechanic	EVT Master Ambulance Tech	6/30/2020

Employee	EVT level	Cert Expires
Log Tech	EVT - Management Level I Supervisor	6/5/2024
Log Tech	EVT - Management Level II Supervisor	10/20/2020

- d. **Evaluation of Management Comments.** Management comments were responsive to the audit finding and recommendation.

Discussion With Responsible Officials. The results of this audit were discussed with appropriate Municipal officials on March 10, 2020.

Audit Staff:
Derek Reynolds