



# CITY OF TAMPA

Pam Iorio, Mayor

Internal Audit Department

Cynthia D. Miller, Audit Director

November 15, 2004

Honorable Pam Iorio  
Mayor, City of Tampa  
1 City Hall Plaza  
Tampa, Florida

RE: Tampa Fire Rescue, Fire Maintenance Division, Audit 04-06

Dear Mayor Iorio:

Attached is the Internal Audit Department's report on Tampa Fire Rescue, Fire Maintenance Division.

The Fire Maintenance Division has already taken positive actions in response to our recommendations. We thank the management and staff of Tampa Fire Rescue and the Fire Maintenance Division for their cooperation and assistance during this audit.

Sincerely,

Cynthia D. Miller  
Director of Internal Audit

cc: Dennis Jones, Fire Chief  
Darrell Smith, Chief of Staff  
Bonnie Wise, Revenue & Finance Director  
J.D. Taylor, Assistant Fire Chief - Administration

**TAMPA FIRE RESCUE  
FIRE MAINTENANCE DIVISION  
AUDIT 04-06  
NOVEMBER 15, 2004**

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Auditor

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Audit Supervisor

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Audit Director

**TAMPA FIRE RESCUE  
FIRE MAINTENANCE DIVISION  
AUDIT 04-06**

**INTRODUCTION**

The Fire Maintenance Division consists of an Automotive Repair Center Supervisor, a Fleet Mechanic Supervisor, 3 – Master Fleet Mechanic EVT's (Emergency Vehicle Technician), 3 – Fleet Mechanic II's and an Automotive Services Attendant.

Tampa Fire Rescue's vehicle inventory consists of 207 different pieces of equipment. In addition to combat equipment (fire engines, aerials and rescue units), the inventory includes support vehicles (boats, cars, vans) and auxiliary equipment (forklifts, trailers and many other types of equipment). During the period under audit (January 1, 2003, to July 17, 2004), the Division completed 2,914 work orders. According to Tampa Fire Rescue policy, combat and support vehicles receive preventive maintenance three (3) times per year.

**STATISTICS**

	<b>FY2001</b>	<b>FY2002</b>	<b>FY2003</b>	<b>FY2004</b>
	<b><u>Actual</u></b>	<b><u>Actual</u></b>	<b><u>Actual</u></b>	<b><u>Actual</u></b>
Personnel Services	\$642,057	\$591,737	\$579,005	\$612,450
Operating Expenses	<u>374,618</u>	<u>409,147</u>	<u>462,777</u>	<u>489,372</u>
Total Expenditures	<u>\$1,016,675</u>	<u>\$1,000,884</u>	<u>\$1,041,782</u>	<u>\$1,101,822</u>

Source: FAML6450

**STATEMENT OF OBJECTIVES**

This audit was conducted in accordance with the Internal Audit Department's FY04 Audit Agenda. The objectives of this audit were to ensure that:

1. Fire Maintenance Division operations were effective and efficient;
2. Tampa Fire Rescue's preventive maintenance policies were followed; and
3. Assist the Fire Maintenance Division with identifying its level of compliance with the Commission on Fire Accreditation International, Inc.'s Accreditation Standards.

## **STATEMENT OF SCOPE**

The audit period covered Maintenance Division activity that occurred from January 1, 2003, to July 17, 2004. Source documentation was obtained from the Maintenance Division. Original records as well as copies were used as evidence and verified through physical examination.

## **STATEMENT OF METHODOLOGY**

Because of the reliance placed on the data contained in the MaintStar database, tests were conducted on all work orders completed during the audit period. Sampling was not performed. Microsoft Access was used to extract data from the database. Microsoft Access and Excel were used to analyze the data. The review of the accreditation standards was based on interviews and observations. Management's assertions were traced to supporting documentation as considered necessary.

To achieve the audit's objectives, reliance was placed on computer-processed data contained in the MaintStar database maintained by the Fire Maintenance Division. We assessed the reliability of the data contained in the database including relevant general and application controls and found them to be adequate. We also conducted sufficient tests of the data. Based on these tests and assessments, we concluded the data was sufficiently reliable to be used in meeting the audit's objectives.

## **STATEMENT OF AUDITING STANDARDS**

We conducted our audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to afford a reasonable basis for our judgments and conclusions regarding the organization, program, activity or function under audit. An audit also includes assessments of applicable internal controls and compliance with requirements of laws and regulations when necessary to satisfy the audit objectives. We believe that our audit provides a reasonable basis for our conclusions.

## **AUDIT CONCLUSIONS**

Based upon the test work performed and the audit findings noted below, we conclude that:

1. Fire Maintenance Division operations were effective; however, while mechanic efficiency appeared reasonable, it could not be reliably assessed.
2. The Fire Maintenance Division performed preventive maintenance according to policy, but daily and weekly inspections and maintenance procedures performed by station personnel need to be updated and additional oversight may be required to ensure the procedures are adequately performed.

3. The Fire Maintenance Division generally complied with the Commission on Fire Accreditation International, Inc.'s Accreditation Standards; however, documentation supporting that compliance needs improvement.

While the findings discussed below may not, individually or in the aggregate, significantly impair the operations of the Fire Maintenance Division, they do present risks that can be more effectively controlled. Before we completed our audit, Tampa Fire Rescue personnel began to implement some of the Internal Audit Department's recommendations.

## **PERFORMANCE MEASURES & MANAGEMENT REPORTING**

### **EFFECTIVENESS**

“Comebacks” are an industry performance measure to gauge operations and mechanic effectiveness. Comebacks are repairs that are not performed correctly causing a vehicle to return to the shop for the same complaint within a short period of time.

The City’s Fleet Maintenance Division uses a 1% goal and 30-day window when evaluating comebacks for sedans and light trucks. Because the Maintenance Division has not defined comebacks and given the differences in fire apparatus and sedans and light trucks, a 5-day return window was used for this test. Of the 2,914 work orders examined, 19 were identified as comebacks (a 0.65% error rate).

Based on the results of this test, fire maintenance operations were found effective. However, the criteria used for this test (5-day window) may have been too restrictive. Had a 30-day window been utilized, additional comebacks may have been identified.

### **EFFICIENCY**

Time standards are defined as “the time necessary for a qualified worker, working at a pace ordinarily used, under capable supervision, and experiencing normal fatigue and delays to do a defined amount of work following the prescribed method.”<sup>1</sup> The use of time standards is beneficial in that they allow for the evaluation of actual performance and productivity, determination of training needs, comparison of repair methods, assessment of labor and equipment requirements, balancing and scheduling work loads and benchmarking.<sup>2</sup>

To measure the efficiency of maintenance operations, a comparison of standard times to actual repair times is a standard industry practice. These time standards may be industry-published or developed in house based on historic data. The fire apparatus industry does not publish time standards because fire apparatus are unique; i.e., design and build specifications change with every purchase. Except for preventive maintenance, in house time standards have not been developed.

When time standards are used, a second performance measure, direct labor productivity, which compares the actual direct labor charged to available hours, may also be used. However, the measure has little value if time standards are not used. The reason for this is mechanics could record more direct labor to a job than should be necessary to complete a given repair task. The Fire Maintenance Division relies on direct mechanic supervision to ensure mechanics are efficiently performing their duties.

As a result of a previous audit recommendation, the Fire Maintenance Division implemented a direct labor productivity goal of 70%. However, it does not track or report this measure to management. Fire Maintenance Division personnel averaged 64.5% (direct labor hours

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<sup>1</sup> Centeno G., Repair Time Standards for Transit Vehicles, University of South Florida, Tampa: 2002

<sup>2</sup> Ibid.

charged to available time) for the one-year period ending June 30, 2004, and 66.2% for the one-year period ending December 31, 2003. The second calculation was made because the Maintenance Division has a data entry backlog of completed work orders (some going back to 2003). According to a 1999 study, a 60% performance is typical for organizations operating without time standards. This improves to an average of 85% or a 42% increase in productivity when time standards are established.<sup>3</sup>

Because of the level of direct supervision mechanics receive some reliance may be placed on this performance measure, though not as much if standard repair hours were incorporated into their operations. Because of the lack of repair time standards and the backlog of data entry, the efficiency of current maintenance operations could not be reliably assessed.

### **RECOMMENDATION 1**

Standard repair times should be developed based on historic data for the more common repair tasks. These standards should be incorporated into fire maintenance operations by using the MaintStar application to compare them to mechanics' actual repair times.

### **AUDITEE RESPONSE**

Standards for common repair tasks are being developed at this time. They will be ready for utilization through the MaintStar system by March 2005.

### **RECOMMENDATION 2**

The Automotive Repair Center Supervisor should assist with eliminating the current data entry backlog and then be responsible for taking care of any future overflow.

### **AUDITEE RESPONSE**

This is being done at this time. This backlog should be caught up by May 2005.

### **RECOMMENDATION 3**

Effectiveness and efficiency performance measures should be defined and developed. The performance measures should be tracked and reported to management.

### **AUDITEE RESPONSE**

These performance measures are being developed at this time. They should be available for analysis by the Chief of Administration through the MaintStar system by December 2004.

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<sup>3</sup> Niebel B. & Freivalds A., Methods Standards & Work Design Time Study, Boston: WCB McGraw Hill. 1999.

## **PREVENTIVE MAINTENANCE**

Fire Rescue vehicles and apparatus receive preventive maintenance three times per year. The Fire Maintenance Division scheduled and performed preventive maintenance as required. In between this maintenance, apparatus are supposed to receive daily and weekly maintenance at the fire stations. According to SOPs 901.00 to 903.00, operators are to perform prescribed tasks at the start of every shift and during and after pumping operations. Compliance with the SOPs is documented in the Apparatus Maintenance Book, which is stored in each vehicle.

While each book examined during the audit indicated that the required maintenance was performed, certain repairs indicated compliance might be lacking or that the prescribed maintenance tasks need revision. For example, repairs on stuck valves and valve controls were observed. Maintenance personnel indicated that if proper daily and weekly maintenance were performed, these items should not otherwise be stuck. The tasks listed in the SOPs do not appear to have been updated since 1988.

## **RECOMMENDATION 4**

The sufficiency of the daily and weekly inspection procedures listed in SOPs 901.00 to 903.00 should be reviewed and updated on a periodic basis to keep up with changes in apparatus and to address repair trends identified by the Maintenance Division. Additional monitoring by station supervisors may be necessary to ensure inspections and maintenance are performed as prescribed.

## **AUDITEE RESPONSE**

The final updates are being typed at this time. The Chief of Operations will reemphasize the need for monitoring daily/weekly checks by station supervisors, and will revise SOPs to address repair trends identified by the Maintenance Division.

## **SUPPLY PARTS**

Supply parts are non-inventoried parts because they are not used often enough to warrant inclusion in the inventory. They may be purchased in advance so they are on hand when needed or ordered on an as-needed basis. Under certain circumstances, the cost of the part or part repair is unknown until an invoice is received. At times, work orders were closed prior to obtaining part costs and the cost was added to a subsequent work order for the same vehicle. This practice understates the cost of the applicable work order and overstates the cost of the subsequent work order.

## **RECOMMENDATION 5**

Work orders should either remain open until the cost is known or when closed, reopened in order to capture and accurately reflect the true costs of repairs on the applicable work order.

## **AUDITEE RESPONSE**

Work orders will be reopened in order to capture true costs of repairs on the applicable work orders.

## **ACCREDITATION STANDARDS**

An objective of this audit was to assist the Fire Maintenance Division with identifying its level of compliance with the Commission on Fire Accreditation International, Inc.'s (CFAI) Accreditation Standards. Obtaining accreditation by an independent body is a voluntary decision to adhere to a set of standards designed to enhance the efficiency and effectiveness of operations and to identify and correct deficiencies in those operations.

The CFAI recommends that departments perform a self-assessment before beginning the accreditation process. The self-assessment process identifies areas of strength and weakness within a department and provides an opportunity to prioritize and implement change given limited resources. The CFAI publishes a Fire and Emergency Self Assessment Manual to be used as the basis for an evaluation and eventual accreditation.

Tampa Fire Rescue requested that the Internal Audit Department address these standards as audits of Tampa Fire Rescue are conducted. The Fire Maintenance Division is the first division of Tampa Fire Rescue to undergo this review. The Self Assessment Manual was obtained and sections applicable to the Fire Maintenance Division were discussed with the Assistant Fire Chief – Administration and the Supervisor of the Fire Maintenance Division.

Based on the review, the operations of Tampa Fire Rescue's Maintenance Division appeared to comply with the accreditation standards. Documentation that may be requested by the accreditation team was identified and reported to management under separate cover. The following areas were identified as needing improvement and significant enough to be included in the audit report.

## **POLICY & PROCEDURES MANUALS**

Documentation of the Fire Maintenance Division's policies, procedures, duties and functions were out-of-date and incomplete. A "core competency" of the accreditation standards requires having procedures and methods in place for the apparatus maintenance program. For example, there is an undocumented policy that all vehicles undergo preventive maintenance three times per year. Policies on what constitutes an out-of-service condition and how repair decisions are made and prioritized were also not documented.

Documenting such policies improves communication of management's directives, objectives and goals. It will help Fire Maintenance personnel understand what is required of them and help fire station personnel understand how the Maintenance Division operates.

## **RECOMMENDATION 6**

In order to document compliance with CFAI standards and improve the communication of management's objectives, Standard Operating Procedure (SOP) 806.00, "Apparatus Maintenance," and Rules and Regulations, Section 100.15 (old Section 400.06), need to be updated and expanded to include items identified during this review.

## **AUDITEE RESPONSE**

Updates and expansion of these sections are in progress and to be completed by February 2005.

## **MECHANIC PROFICIENCY AND TRAINING**

One of the accreditation evaluation criteria advises that there should be “an adequate number of trained and certified maintenance personnel available to meet the objectives of the established program.” The highest level of mechanic certification is the Emergency Vehicle Technician (EVT) designation. In order to obtain this designation, a mechanic must pass a combination of EVT and ASE (National Institute for Automotive Service Excellence) exams. Because vehicle technology and service techniques change rapidly, technicians must keep up-to-date with modern repair practices and standards. Ongoing training stimulates personnel, improves job skills and the timeliness and quality of repairs. A mechanic with the EVT designation must re-certify through examination every five years.

There are no assurances that Fire Maintenance mechanics keep up with changes in vehicle technology and service techniques. Per discussion with TFR personnel, mechanic training opportunities have been very limited. Mechanic proficiencies and training requirements were not documented in a policy manual. At one time, the Fire Maintenance Division had five EVT's. One passed away and two allowed their certifications to lapse. One of these re-certified; the other retired. Today, the Division has three certified EVT's and four mechanics working towards obtaining EVT certification. The Fire Maintenance Division does not monitor compliance with re-certification requirements.

## **RECOMMENDATION 7**

Desired mechanic proficiencies and training requirements should be included in a policy manual in order to document management's commitment to ensuring and improving mechanic job skills.

## **AUDITEE RESPONSE**

This is being developed at this time. This will be completed by March 2005.

## **RECOMMENDATION 8**

The Fire Maintenance Division should monitor mechanic compliance with re-certification requirements.

## **AUDITEE RESPONSE**

This shall be done by the Maintenance Center Supervisor.

## APPARATUS SPECIFICATIONS & ACCEPTANCE

Two of the accreditation evaluation questions deal with the development of apparatus specifications and the acceptance of new apparatus. Described as a best practice, procurement of apparatus and equipment should occur from specifications drawn from “applicable provisions for performance requirements, national standards and federal and state regulations” and only after obtaining input from staff officers and departmental members. Another best practice identified in the accreditation standards is that all new apparatus undergo “road performance tests conducted in accordance with a nationally recognized standard” prior to acceptance.

Tampa Fire Rescue uses a committee to develop apparatus specifications. While the Fire Maintenance Division is consulted during the development of apparatus specifications, the committee does not include a member of the Fire Maintenance Division. The committee’s makeup and responsibilities are not documented in a policy manual.

According to the Maintenance Specifications Supervisor, who accepts the vehicle on behalf of Tampa Fire Rescue, apparatus are tested by an independent testing facility for performance. The results of the tests are documented and included with other delivery documents. A team of TFR personnel inspect and road test the apparatus prior to acceptance. The acceptance process is not documented in a policy manual.

### **RECOMMENDATION 9**

The makeup, duties and responsibilities of the committee developing apparatus specifications should be documented in a policy manual.

### **AUDITEE RESPONSE**

This is being developed at this time by the Specifications Officer. This will be completed by March 2005.

### **RECOMMENDATION 10**

Because maintenance activity is not limited to the engines, drive trains, etc., but extends to all apparatus components and the Maintenance Division’s unique perspective may avoid unforeseen maintenance problems, consideration should be given to adding a Maintenance Division employee to the specifications committee as a full-time member.

### **AUDITEE RESPONSE**

A Maintenance Division person will be included as a full-time member of the Specifications Committee as outlined in #9.