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LOS ANGELES FIRE DEPARTMENT

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FIRE CHIEF

October 19, 2015

BOARD OF FIRE COMMISSIONERS
FILE NO. 15-121

TO: Board of Fire Commissioners

FROM: Ralph M. Terrazas, Fire Chief

SUBJECT: VEHICLE CONDITION SCORE CARD AND VEHICLE REPLACEMENT GUIDELINES

FINAL ACTION:	_____ Approved	_____ Approved w/Corrections	_____ Withdrawn
	_____ Denied	_____ Received & Filed	_____ Other

SUMMARY

The Los Angeles Fire Department (LAFD) Board of Fire Commissioners requested a comprehensive assessment of the automotive fleet with data that guides and justifies the Department's vehicle replacement policy. Using a vehicle condition scoring matrix, the Equipment Superintendent (LAFD Fleet Maintenance Section) assesses various data streams to determine current vehicle condition and will assign a numerical "condition score" to each vehicle in the LAFD fleet. Thereafter, each vehicle will be assessed annually and its condition score updated for as long as the vehicle is maintained by the LAFD. Score "thresholds" for retiring each vehicle type will ensure that relevant vehicles are replaced at the right time and sequence. A description of this plan with partial data is presented in this report. A complete data set however, will take one calendar year to collect for the entire fleet.

RECOMMENDATIONS

That the Board:

1. Review and approve the Maintenance Section's plan to annually evaluate and "score" the overall condition of all Department vehicles using a customized vehicle scoring application developed by the Equipment Superintendent called *Apparatus Asset Assessment.*

2. Direct the Department to be guided in vehicle acquisition and replacement decisions based on vehicle condition scores to ensure the vehicles are replaced within the identified time frame.

3. Direct the Department to use and accept vehicle condition scores that exceed established thresholds as justifiable criteria and cause for vehicle acquisition and replacement.

FISCAL IMPACT
Full implementation of these recommendations will have minimal direct fiscal impact on Department expenditures for the following reasons:

1. Vehicle condition scores will be developed from existing data streams.

2. Vehicle assessments will occur in conjunction with already scheduled annual preventive maintenance inspections.

3. Data will be extracted from the Department's existing Fleet Information Management System, and;

4. Vehicle condition reports will be developed by existing staff.

Because this plan is designed to guide the Department in fleet replacement decisions, the *Apparatus Asset Assessment* will compel the Department to either replace or not replace vehicles depending on overall vehicle condition. Actual fleet acquisition and disposal, however, is subject to budgetary limitations and operational needs.

Direct cost savings to the Department will be realized by streamlining fleet replacement planning and budget preparation through the use of vehicle condition scores that will guide the Department's fleet replacement strategy and decision making.

DISCUSSION
The LAFD vehicle fleet consists of 1,257 light and heavy apparatus of various types. Each type of vehicle has an expected life span which, subject to operational needs and budget restrictions, forms the basis for the Department's fleet replacement schedule.

No State or federal rules exists that mandate when fire apparatus must be retired. Nevertheless, National Fire Protection Association (NFPA) recommendation, industry best practices, progressive fire agencies, and LAFD's own Fleet Maintenance Division, all assert that fire department vehicles have a useful life expectancy and sooner or later, they must be replaced.

Following are comments and recommendations from subject matter experts regarding fire apparatus replacement:

- *The Commission of Fire Accreditation International (CFAI) states that apparatus replacement intervals should be based on the effects of variables such as age, use, and maintenance costs on the useful life span of fire apparatus (Commission on Fire Accreditation International, 1997).*

- *NFPA 1912 states "...Apparatus not manufactured to applicable NFPA fire apparatus standards or that are over 25 years old should be replaced."*

- *R. Craven (former president of the California Fire Mechanics Association) identifies three categories of fire apparatus life span: service life, technological life, and economic life.*

- *Various authors suggest that the useful life of fire apparatus varies among fire departments and is affected largely by apparatus utilization, local environment, local operating conditions, routine workload, and scope of preventive maintenance program.*

Currently, the LAFD's fleet replacement policy dictates that heavy apparatus (Triples, Trucks, and Specialty Apparatus) are due for replacement after 10 years in front line service; rescue ambulances are due for replacement after 6 years in front line service, and light vehicles are due for replacement at 90,000 miles or 6 years in service. Based on age and mileage criteria alone, the Department has (179) heavy apparatus currently due for replacement, (95) rescue ambulances due for replacement, and as many as (506) light vehicles due for replacement. These age and mileage criteria are consistent with other best-in-class fleets. However, age and mileage alone do not take into consideration overall vehicle condition which provides information and compelling fleet replacement guidance. A more strategic and compelling vehicle replacement policy is needed to guide and validate fleet replacement actions. To this end, vehicle condition must be considered when making fleet replacement decisions and vehicle condition thresholds must be implemented so the appropriate vehicles are replaced at the appropriate time.

Establishing replacement cycles for different vehicle types is both an art and a science. It involves judgment, predictions, forecasts, and assumptions on one hand and analysis of available data on the other. Therefore, the following three approaches will be utilized to identify, prioritize, select, justify, and replace vehicles that have exceeded their useful and economic life span:

1. The Supply and Maintenance Division will conduct an economic lifecycle cost analysis (LCA) on all vehicles to determine the optimum replacement point that results in the lowest total overall cost to the Department. This approach is based on an economic truism which states that as a vehicle ages, the cost of capital diminishes and its operating costs increase. The combination of these two cost factors produce a cost curve that shows the optimum time to replace vehicles is when the operating costs begin to exceed the capital costs. The LCA will show that deferring replacement of vehicles beyond this optimum financial threshold results in increased fleet costs that are essentially transferred from capital budgets to operating budgets. This approach is especially useful in determining when to replace light vehicles.

2. The Supply and Maintenance Division will establish predetermined condition thresholds based on age, mileage, and other condition criteria. A criteria-based replacement strategy dictates the timing of replacement discussions, provides guidance on specific vehicle replacement considerations, and

establishes fact-based justification for specific vehicle replacement decisions. Fundamental to this type of vehicle replacement plan is the intent and objective to produce a condition score that only indicates which vehicle(s) of a particular type are due for replacement and which ones should be replaced first. This approach is especially useful in determining when to replace custom vehicles such as fire apparatus. Please note, however, vehicle condition scores are NOT used to indicate fitness for duty or vehicle safety because the overriding criterion for all apparatus in the LAFD fleet is that every vehicle is safe, reliable, and fully functional.

3. A third approach will be to replace vehicles when the cost to maintain and repair them exceeds a preset threshold dollar amount. This threshold dollar amount is generally the wholesale value of the vehicle at the time the vehicle is being assessed. Whereas the first approach focuses on costs already sustained up to the time of the condition assessment, this last approach takes into consideration expected future operating and maintenance costs that will be incurred in the year or years following the condition assessment. The intent of knowing when a vehicle's operating costs exceed this threshold amount is to replace the vehicle before a major breakdown occurs. Analysis of historical repair trends and costs can reveal the point at which vehicle repairs start to increase significantly. This is an effective replacement strategy for any vehicle for which a "blue book" value can be established and for which future repair costs can be estimated. Under this schema, fleets can avoid performing repairs that cost more than a vehicle is worth.

Custom fire apparatus – like all vehicles – have a useful life expectancy. Vehicles that are kept beyond their optimum replacement timeline subject the Department to higher vehicle operating costs, reduced vehicle salvage revenue, and longer vehicle out-of-service times due to reduced parts availability, more extensive repairs, expired warranties, and reduced overall suitability to the Department due to obsolescence and new technology and standards. Vehicle condition scores will enable the Maintenance Section to identify, validate, communicate, and justify which, when, and by how much, vehicles have exceeded their expected life cycle. After vehicle condition results are obtained, appropriate acquisition and disposal action will be taken.

The following chart represents a vehicle condition scoring matrix and would include some or all of the criteria listed in this report.

FACTOR	POINTS
AGE	1 point for each year of chronological age from date in service.
MILES OR HOURS	1 point for each 10,000 miles or engine hours equivalent.
TYPE OF SERVICE	1 – 5 points depending on severity of operation. For example, an emergency response vehicle would receive a higher score than a non emergency plug buggy or administrative sedan.

UTILIZATION	1 – 5 points based on how often the asset is used or needed. The less an asset is used, the lower this score will be (thus indicating lesser urgency to replace).
RELIABILTY	1 – 5 points depending on frequency of repair incidents.
SERVICEABILITY	1 – 5 points depending on duration of repair incidents.
AVAILABILITY	1 – 5 points based on number of days in service compared to number of days out of service.
SAFETY	1 – 5 points based on consumer reports and/or number and frequency of moving violations, accidents or injuries associated with this year, make, and model.
SUITABILITY	1 – 5 points based on technology, obsolescence, and general perception of how well a vehicle performs its function.
ENVIRONMENTAL IMPACT	1 – 5 points based on fuel usage, emissions, carbon footprint, sustainability, conservation, and "Green" initiatives.
REGULATORY COMPLIANCE	1 – 5 points based on how well vehicle complies with rules, regulations, and standards – such as new emission rules, engine tier rules, NFPA standards, Mayor's directives.
OPERATIONAL COSTS	1 – 5 points based on total maintenance and repair costs relative to original purchase price.
APPEARANCE	1 – 5 points with "1" being good condition and "5" being poor condition – based on "at-a-glance" assessment of paint, upholstery, trim, etc.
MECHANICAL CONDITION	1 – 5 Points based on number, complexity, and cost of needed repairs and maintenance.
PARTS AVAILABILTY	1 – 5 points based on availability and cost of replacement parts. A higher score indicates parts are more difficult to procure.
WARRANTY	1 – 5 points based on 1 point for each year of elapsed factory warranty.
PRIOR ACCIDENTS	1 – 5 points based on number and severity of prior collisions.
LIFE CYCLE COST	1 – 5 points based on life of vehicle maintenance and repair costs compared to the average cost for all vehicles in the same group.

Scores for each factor would be tallied and thresholds set that would rate vehicles as *excellent*, *good*, *qualifies for replacement*, and/or *needs immediate consideration*.

CONCLUSION

Current vehicle age and mileage limits are appropriately stated in LAFD's current replacement policy and the Department endeavors to replace a sufficient number of vehicles each fiscal year so that no vehicles in the fleet exceed these limits. Due to budget constraints, however, this has not been possible and as of the date of this report over 50% of vehicles in the LAFD fleet have reached or passed their expected life span.

Although age and mileage criteria are relevant factors in the vehicle replacement equation, conclusive and compelling arguments to replace or not replace a vehicle cannot be attained without more information. Consequently, justification to support new vehicle acquisition is not as compelling as it will be when purchase decisions are based on total vehicle condition and life cycle analysis.

New apparatus replacement guidelines based on age, mileage, condition, maintenance cost, and obsolescence should be utilized. The budget will also be a part of the decision-making process, but will not be specifically addressed by the guidelines. The intent is that vehicle replacement guidelines will impact the fleet replacement budget, rather than the budget impacting vehicle replacement guidelines.

Board report prepared by Mark Clark, Equipment Superintendent, Maintenance Section.