December 18, 2018

LOS ANGELES FIRE DEPARTMENT

RALPH M. TERRAZAS
FIRE CHIEF

November 5, 2018

BOARD OF FIRE COMMISSIONERS
FILE NO. 18-131

TO: Board of Fire Commissioners

FROM: Ralph M. Terrazas, Fire Chief

SUBJECT: LAFD FLEET METRICS

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	____ Approved		____ Approved w/Corrections		____ Withdrawn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

SUMMARY
The Los Angeles Fire Department (LAFD) Board of Fire Commissioners requested information on performance metrics used by the Maintenance Section of the Supply and Maintenance Division, to determine how long fire apparatus are in service. This report presents the requested information and focuses on one particular metric called *Fleet Availability Index* which is the chief performance indicator used by the Maintenance Section to measure the operational readiness of the LAFD fleet and the effectiveness of LAFD fleet maintenance operations. Data from this metric can be used by the Department to guide and justify fleet related decisions.

RECOMMENDATION
That the Board receive and file.

FISCAL IMPACT
There is no fiscal impact associated with this report.

DISCUSSION
Best-in-class fleets use a variety of metrics to measure fleet resources and fleet-related activities. The resulting data from these metrics is then used to gauge capacity and performance and ensure that fleet resources are optimum and fleet operations are productive and efficient.

There are many different measurements that management can use as fleet performance indicators and these are broadly grouped into three main categories: Fleet Financial Metrics; Fleet Operational Metrics; and Fleet Maintenance Metrics.

Different metrics are more relevant to different sections of the Fire Department. Fleet financial metrics are of interest to the Administrative Service Bureau. Fleet operational metrics are of interest to the LAFD operational bureaus, and fleet maintenance metrics are of interest to the Supply and Maintenance Division.

Fleet *financial* metrics focus on acquisition cost, total life cycle cost, residual value, and salvage revenue of vehicles as well as the economics of fleet capital expenditures and operational expenditures, vehicle ownership vs. leasing, depreciation, cost per mile, cost per incident, and the budget's impact on fleet retention, fleet replacement, and fleet expansion as well as fleet's impact on budget development, Municipal Improvement Corporation of Los Angeles (MICLA), grants, and the general fund.

Fleet *operational* factors such as design, contract specifications, classification, type, acquisition, assignment, utilization, and retirement of vehicles, driver behavior, and vehicle accidents directly impact or are impacted by Department operations. The LAFD's various operational divisions such as the Fire Chief's Office, the Planning Section, Risk Management, Emergency Operations, Emergency Medical Services Bureau, Fire Prevention Bureau, and the Training and Support Bureau are well served to analyze these fleet related operational elements to establish and insure proper fleet configuration, utilization, and right sizing.

Fire Department operations ultimately dictate the number and type and design of fleet assets. Nevertheless, fleet utilization – expressed in the number of miles, hours, days, or incidents is a key metric for fleet operators that show the actual amount of time that an asset is actively being used. This key performance indicator allows fleet operators to determine assets that are being over/under utilized and to manage their fleet in a way that yields optimal use with the least amount of units and the lowest cost of ownership.

Fleet *maintenance* metrics such as those listed in this report are fundamental to answering the Board's question about how long apparatus are in service. The answer to this question, however, is more than just determining the age of vehicles. A more useful measurement of how long vehicles are in service is the *Fleet Availability Index* which is an amalgam of several different fleet maintenance factors which not only relate to how long vehicles are in service, but also reflect how long vehicles in the fleet are out of service.

With due consideration of the Board's request to provide information on how long vehicles are in service, this narrative asserts that *fleet availability* is the most appropriate key performance indicator for the Maintenance Section to report on. The *Fleet Availability Index* is a basic, but comprehensive, measurement that quantifies the operational readiness of the LAFD fleet and the efficiency and productivity of the fleet maintenance section.

Below is a list of metrics that are useful to the Maintenance Section when calculating and analyzing fleet availability.

FLEET MAINTENANCE METRICS			
Metric	What is Measured?	Target	Current Score
Backlog	Number of vehicle repairs in queue or deferred	Varies	At target
Preventative Maintenance Compliance	Number of preventive maintenance tasks performed on time at scheduled intervals. A fleet maintenance program can quickly become ineffective resulting in increased vehicle down time if tasks are not completed on schedule.	95% on time	At target
Scheduled Repair Rate	The portion of the Shop's workload that consists of repairs that are planned and performed before a breakdown occurs. This metric is crucial since repairs that are not planned and prepared for in advance result in unexpected and expensive breakdowns, roadside repairs, tows, and progressive damage all of which extend out of service times.	98% of workload should be scheduled and planned in advance. Applies to all preventive, preemptive, predictive, and reactive repairs	More data needed
Unscheduled Repair Rate	This is the portion of fleet repairs that are unplanned and must be performed because a vehicle breaks down while in use and remains out of service until the needed repairs are performed	Not more than 2% of fleet repairs should be unscheduled. Scheduled and unscheduled repair rates indicate the effectiveness of a fleet's preventive maintenance program.	More data needed
Repair Turn Over Rate	Elapsed time to complete a repair	As short of time as possible in order to maximize availability	More data needed
Staffing	Total labor available divided by total labor required – expressed as a percentage.	97 position authorized 89 positions staffed 4 new hires pending 4 vacancies	Tracking to be on target

FLEET MAINTENANCE METRICS			
Metric	What is Measured?	Target	Current Score
Vehicles Down	Measures the number of vehicles out of service at any one time. Not the best barometer of fleet maintenance operations because the number of vehicles in the shop is mostly influenced by the size, vocation, and utilization of fleet vehicles including driver abuse and accidents. Nevertheless, the number of vehicles in the shop directly affects fleet availability.	Vehicles Down is based on the number of vehicles out of service for repair at any given time and is expressed as a percentage of the total number of vehicles in the fleet (by vehicle and mission type). The Shops' target for this metric is less than 50% of the number of reserve apparatus, by type.	Below target
Comeback Rate	This measures the frequency that vehicles return to the shop for the same repair within a certain time period. A high comeback rate indicates poor service quality and increases out of service time.	Not more than 1% of vehicle repairs performed should come back for the same repair.	More data needed
Technician Productivity	Ratio of paid hours to actual work hours applied to repairing vehicles.	75% (or 1560 hours of wrench turning time out of 2080 paid hours annually.)	More data needed
Auto Parts fill rate & time	Parts availability directly impacts how long vehicles are in the shop. Low fill rate corresponds to high fill time both of which translate to longer out of service times	Fill rate is the percentage of parts filled from inventory on hand. Target is 60% to 90% fill rate, meaning 60-90 repairs out of 100 are performed with stock parts that the Shop has on hand.	Below target
Fleet Availability Index	This value is based on the total number of days vehicles are out of service divided by the total number of days vehicles are in the fleet. This score can be applied to the total fleet, a cross section of the fleet (by year, make, model, type, battalion, bureau, etc.) or to individual vehicles.	95% The most critical vehicles should have the greatest availability rate.	Below target

The *Fleet Availability Index* can be used by the Department to scale and adjust the Supply and Maintenance Division's operational performance. From this single metric, other key performance indicators such as vehicle reliability, vehicle suitability, vehicle usage, how long vehicles are in service, how long vehicles are out of service, fleet right sizing, life cycle costing, fleet replacement scheduling, and even customer service can be extrapolated or associated – either directly or indirectly.

Attachment 1 at the end of this report shows the combined *Fleet Availability Index* for LAFD emergency apparatus is 84.9% as of September 2018. This score ranges from a low of 76% for rescue ambulances to a high of 97% for Brush Patrols. Put in practical terms, this means that, on average, LAFD's ambulance fleet is only operational 76% of the time. A snap shot of the number of vehicles and days out of service is also included in Attachment 1. The data shows that the Department must have sufficient front line and reserve vehicles of every type to compensate for this deficit in fleet availability.

CONCLUSION

The Fire Department fleet is unique in that its vocation is to be ready when it is needed regardless of whether or not it is actually used. Other fleets can measure their operational readiness against how much the vehicle is actually used. For LAFD, "use" is not just responding to incidents, but also being ready to respond if and when a vehicle is needed. All LAFD emergency apparatus, whether in frontline service or in reserve status, are expected to be ready and available 95% percent of the time - whenever they are needed (5% unavailability is necessary and acceptable for routine maintenance.) The mission of the Maintenance Section is to provide a safe, reliable, and fully functional fleet of fire apparatus in support of LAFD's public safety mission to preserve life and property.

Board report prepared by Mark Clark, Equipment Superintendent, Supply and Maintenance Division.

Attachment:
Attachment 1

ATTACHMENT 1

Combined Fleet Availability Index - September 2018				
Vehicle Type	Total Days in Fleet (Date in service to present)	Total Days Out of Service (Sum of all days in shop)	Total Days Available (Days in fleet minus days out of service)	Availability (Total days available divided by total days in fleet)
Ambulance	529,342	124,330	405,012	76.5%
Triple	921,213	109,300	811,913	88.1%
Aerial	326,714	57,129	269,585	82.5%
Emergency Sedan	499,807	80,103	419,704	83.9%
Brush Patrol	58,900	1,608	57,292	97.2%
Heavy Special	213,262	11,845	201,417	94.4%
Foam Tender	25,115	4,407	20,708	82.4%

Vehicles (of all types) Out of Service – September 2018		
Bureau	Number of Vehicles Out of Service	Average Number of Days in Shop
Operations Central Bureau	27	123
Operations South Bureau	23	153
Operations Valley Bureau	23	224
Operations West Bureau	21	136
Other Bureaus	35	88