

The City of Evans Fire Rescue Department

Apparatus Replacement Plan



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By Assistant Fire Chief

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Introduction

The Fire Chief has asked me to identify and assess the condition of our existing fleet and to recommend a manageable fleet replacement schedule. These efforts culminated in a comprehensive study that included a survey of all current vehicles in the fire department fleet, an analysis of fire apparatus replacement schedules in surrounding jurisdictions and a proposed apparatus replacement schedule. There are at least three different life cycles to consider: service life, technological life and economic life as well as some immeasurable costs.

The service life of a vehicle is when a piece of equipment is capable of performing its needed duty. Service life is dependent on a number of factors and variables. The most important are mileage, number of responses, overall wear and tear, pumping capacity and operating capability.

The technological life of a vehicle is its capability to serve in the role it was initially designed for. While older vehicles may still be capable of performing the tasks they were designed for, they cannot match the performance requirements of new vehicles. Speed, acceleration and braking ability with new technologies such as antilock braking systems, traction control and rollover stability are some of the new technological advances of newer apparatus.

The economic life of a vehicle is its total expense for effective use over a given period of time. These costs include: depreciation, operating costs, fuel, oil, maintenance, repairs, downtime replacement and operator training. All these factors come into play when determining the vehicles economic life. The cost to maintain a given vehicle increases with time, until it is more expensive to operate than maintain.

Background

In the last ten years the fire department and the role of our fire apparatus delivery service has significantly expanded. In addition to fire suppression equipment, fire apparatus are currently stocked with the basic medical equipment, rescue equipment, hazardous materials equipment, and all the tools needed to provide a quick and proper deployment of any nature. Most of the fire department's fleet was purchased in the 1980s and 1990s and some are not of current standard to accommodate these additional equipment loads and do not meet current standards for fire apparatus. These safety issues include, open cab passenger compartments, lack of ABS and other safety features.

In 2006 and 2007 our current ladder truck was diagnosed with significant defects. It was declared unsafe for use during an annual test due to improper repairs to the ladder section prior to our ownership. It has experienced significant hydraulic cylinder leaks, electrical equipment failures, and numerous other problems that required much down time as well as significant repair costs. One of our front line pumpers has also had an engine failure and suffers from a number of other ongoing mechanical problems.

The ages of our primary apparatus are 23, 13, and 8 years for our front-line engines, 18 years for our ladder and 7 for our rescue truck. Some of these apparatus exceed the commonly recognized maximum recommended total life span of 10-15 years for engines and 15-20 for ladders. NFPA 1901 requires that apparatus that does not meet the 1991 standard be removed from front line service and/or be considered for upgrading or replacement. There is a direct tie between ISO insurance rates and our apparatus fleet. Our current ISO rating of a Class 4 requires us to have four pumpers (what we call engines); three front-line and one reserve. While we meet this total number now, two of our engines (includes the ladder as a pumper) are well beyond their service life.

Preliminary Recommendation

One of the most important capital assets of the city and its individual departments is a fleet of reliable automotive and fire apparatus. Firefighters depend heavily on the performance and capabilities of their vehicle when operating to protect life, property and the environment. To maximize these capabilities and minimize their risk of injury, it is imperative that the apparatus be equipped with the latest safety features and current operating capabilities.

Replacing fire equipment is necessary, yet a very costly expenditure. Today's fire apparatus could cost up to \$1,000,000 depending on its specifications and capabilities.

Fire apparatus replacement should be carefully planned out and conducted on a regular basis to avoid shortfalls within a fleet. Replacement should be based on the service life variables and life cycles mentioned. Currently there is no replacement plan for these fire apparatus and I suggest following the NFPA standard with consideration of our own variables. The following plan for replacement shows the year and value of apparatus, it also will show its expected life cycle, giving us opportunity in advance to plan for its replacement. The construction life of ordering an apparatus should also be considered when preparing to replace a particular piece of equipment. Some construction times can take up to a full year. This process typically includes approval to purchase, bid process, award of bid, manufacturer meetings, specifications conference, acceptance testing and training.

My recommendation is to replace front line fire engines on a 10 year cycle of frontline service with 5 years in reserve engine, with evaluation of service life at 10 years. For ladders I recommend replacement on a 15 year cycle of frontline service with 5 years in reserve, with their evaluation of service life done at 15 years. Light utility vehicles should be replaced on an 8-10 year cycle, evaluating service life at 8 years. The evaluation of service life for all pieces of apparatus is done throughout their life but should have a thorough examination prior to placing it a reserve capacity. The following table will show the current deficiencies in our fleet replacement schedule due to vehicle age.

Current vehicles in service

Year/ Make	Age	Life expectancy	Current value	Status	SRV Life	Tech Life	Econ Life
1983/ Brush	25	10	3,500	Primary	Exceeds	Exceeds	ok
1986/Engine	22	10	21,000	Primary	Exceeds	Exceeds	ok
1990/Ladder	18	15	185,000	Primary	Exceeds	Exceeds	Exceeds
1994/Utility	14	10	5,500	Primary	Exceeds		
1996/Engine	12	10	175,000	Primary	Exceeds		
1997/Utility	11	10	7,000	Primary	Exceeds		
1999/Rescue	9	10	150,000	Primary		Exceeds	
1999/Utility	9	10	2,000	Primary			
2001/Engine	7	10	350,000	Primary			*
2002/Utility	6	10	10,000	Primary			
2003/ P.U.	5	10	15,000	Primary			

* Current maintenance and repair problems.

Options / Recommendation

My recommendation would be to replace as soon as possible the 1983 Brush, 1986 engine and the 1990 ladder, all of which exceed their service and technical life spans. The 1990 LTI ladder also exceeds its economical life and has a number of operational and safety problems. The other apparatus exceeding their recommended service life should be evaluated annually and replaced as soon as possible or when deemed necessary.

There are several options for the purchase of fire apparatus

1. Purchase the apparatus outright.
2. Lease the apparatus for 5 years and buy it out at the end of the lease period.
3. Lease the apparatus for 10 years and buy it out at the end of the lease period.
4. Lease the apparatus for 10 years and then return it at the end of its lease.

All of these options obviously have different weighting factors and practicality, the best choice for the city would be to lease purchase the apparatus. The amount of the annual payment to be made is dependent on, down payment, percentage rates and whether it's on a five or ten year lease option. The table below is an example of the possible costs for a Quint apparatus which can serve as both a fire pumper and an aerial ladder.

Unit Price	Down Payment	# Years	Interest %	Annual Payment	Quarterly Payment	Monthly Payment
675,000.00	10,000.00	10	5.40	87,867.17	21,641.20	7,189.78
675,000.00	10,000.00	5	5.40	155,417.07	38,191.28	12,681.10

The advantages of a lease program would be:

- Reduced maintenance costs, warranty coverage 3-10 years on various components
- Takes advantage of new technologies and safety features
- Predictable annual cost
- Current NFPA standards met
- Vehicles purchased termed "lemon" can be replaced

The disadvantages of a lease program would be:

- Variable debt
- No real ownership during lease

Summary

Its common knowledge that the city general funds and all of the internal departments are bound by the economic restraints that we all face; If there is no replacement plan established for apparatus it will soon be extremely difficult, if not irreversible to maintain a fleet of safe and reliable apparatus. The ongoing annual payment may be easier to absorb than being hit with those large one time needs. Fire apparatus are a large and substantial financial burden, but are truly a necessary tool for us to protect life and property for our citizens. I hope that this information has been helpful and the needs of a replacement plan are understood. If there are any questions please contact me.