

Executive Summary

The Technical Committee on Fire Department Apparatus has required that **“tires shall be replaced at least every seven (7) years or more frequently...”** This requirement lacks supporting scientific documentation. The goal of this project is to determine if there is evidence that supports a mandatory seven (7) years tire replacement schedule for Fire Department Apparatus. Additionally, this project aims to develop guidance for Fire Departments regarding the maintenance and replacement of apparatus tires, providing recommendations for future revisions of this requirement in NFPA 1911.

The above mentioned objectives are carried out through the following specific tasks:

1) **Task 1: Review of Literature and Data Collection.** A comprehensive review of the literature and available data to determine if the seven year replacement requirement is supported by any existing research.

2) **Task 2: Identification of Tire Aging Issues.** A comprehensive analysis on the factors affecting the tire aging process. One commonly held belief is that tire failures are mainly due to poor maintenance or extreme condition. However, tire aging is a distinctly different phenomenon from the maintenance and inflation issues. Aging is affected by the heat generated in tires and the degradation that occurs due to the chemical reaction within the rubber components due to oxidation.

3) **Task 3: Identification of Tire Maintenance issues.** Identification of the factors which could result in tire failures or decreasing the tire lifetime. Comprehensive research with a primary focus on how to maintain the fire apparatus tire at the highest state of readiness within the years of service, and how to extend the tire lifetime through proper maintenance methods.

4) **Task 4: Tire Lifetime Assessment Technology.** Introduction of the existing technologies that can be used to test the tire usage and condition stage and how these technologies can be used to evaluate the fire apparatus tire condition which usually have a low mileage.

5) **Task 5: Final Report.**

From the present research, it is found that no literature convincingly supports a seven year tire replacement criteria. Further, it is realized that the wear and tear of the tire are due more importance while considering a tire replacement. As mentioned in the rubber manufacturer’s association statement, since service and storage conditions vary widely, accurately predicting the actual serviceable life of any specific tire based on simple calendar age is not possible. A tire should be removed from service for multiple reasons: tread wear to minimum tread depth, tire damage like cuts, cracks, bulges etc., improper inflation pressure and storage conditions. A specific inspection and maintenance of fire apparatus tire is recommended.