

AERIAL DEVICE MAINTENANCE & INSPECTION

Aerial devices are critically important pieces of apparatus to fire departments. Aside from the obvious size difference when compared to other types of apparatus, aerial apparatus is different because of the mechanical function of the aerial device itself. It's important for organizations to take steps to make certain that these devices stay in safe working order to safeguard personnel and to help prevent mechanical damage and/or structural failure of the aerial device itself.

While there are many potential causes of loss to aerial devices, there are two that are identifiable with preventable results. First is **metal fatigue**; second is **improper and/or lack of proper maintenance**. There are some definitive steps that may be taken to help reduce wear and tear and the potential of structural failure.

BUDGET AND MAINTENANCE

- It is recommended that organizations set aside enough money in its budget to conduct the proper tests and maintenance as well as being prepared long-term to deal with parts and components that may need to be repaired or replaced.
- Perform routine maintenance & inspection on every aerial device and within the range indicated by the manufacturer's instructions. Items such as cables, rail guides and pulleys should be free of debris and be properly lubricated. Look for any obvious signs of neglect or damage to the aerial device during a documented visual inspection.

TESTING

There are very specific testing requirements for all types of aerial devices. These are spelled out in the NFPA Standard 1911 the Standard for the Inspection, Maintenance, Testing and Retirement of In-Service Automotive Fire Apparatus.

TWO LEVELS OF TESTING

1. **Annual Testing** may be conducted by a qualified individual (as defined in NFPA 1911 Chapter 19) once a year. As defined in NFPA 1911-19.8 this is essentially a visual inspection and a documented operational test. However, there are a number of related tests in NFPA 1911 that are required in conjunction with the actual aerial tests, including but not limited to: pumps & waterways; electrical systems; breathing air systems; cab & chassis; and road testing.
2. **Nondestructive Testing (NDT)**, sometimes referred to as a five-year Nondestructive Test, must be conducted by a highly qualified and certified NDT Level II Technician as defined by the American Society of Nondestructive Testing. NDT is a general term for one of a number of different methods that can be used to inspect the aerial device's structural components without physically altering or damaging the materials. These could include, but are not limited to, liquid penetrant inspection; magnetic particle inspection, radiography, metal hardness and ultrasonic testing. When properly conducted, the tests are designed to detect any metal fatigue, cracks or deformities in the frame, ladder, ladder rails, turntable, out rigger, bolts or any other critical metal structural component. These tests must be conducted at least every five years AND whenever the aerial device has been damaged or stressed beyond normal limits.

SELECTING THE PROPER TEST AGENCY

Fire departments are responsible to know what test is required, when it's required and for making certain the testing service provider conducts it. There are a number of testing agencies through-out the United States, both regionally and nationally, that can provide NFPA 1911 testing. However, the number able to provide non-destructive testing is smaller. Be specific by asking for either the Annual Test or the Nondestructive Test. Many fire departments have thought they were getting the NFPA required testing completed by a company only to find out later the agency they chose was not performing, nor certified to perform, the NDT.

When selecting a service company, verify that the third party meets certification and testing standards and has the proper insurance prior to signing an agreement. If the company cannot provide documentation that the personnel and the test they will perform will meet the testing standard or if they cannot provide the appropriate certificate of insurance, look for another test agency to perform the work.

[Find contact information for aerial device testing companies currently available in the market place.](#)

TEST RESULTS

A written report from the testing agency will be provided with an explanation of the findings. This report should detail all of the tests that were conducted, but also the results of each of the specific inspection and test items and any required repairs.

Occasionally, there will be critical items identified which will require the aerial device to be placed out-of-service until repairs are made. It is strongly recommended that these repairs be made by a qualified mechanic or technician.

More often non-critical issues may be discovered that suggest maintenance or repair. While these items may not require the aerial device to be taken out of service,

don't ignore them. Small problems left unattended can lead to larger problems. An example of this would be a small oil leak. Not enough to fail the test, but large enough to leave residue on metal surfaces; the oil residue will allow dirt to accumulate on these surfaces; the dirt particles will cause abrasion as metal to metal contact occurs and eventually cause uneven and/or premature wear.



SUMMARY

Follow these best practice recommendations to help ensure the safe and reliable operation of aerial devices.

- Plan a budget for aerial maintenance, testing and repairs.
- Refer often to the manufacturer's recommendations for use, service and maintenance.
- Follow the [NFPA 1911 Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles](#). Know the difference between Annual and Nondestructive testing.
- Research testing agencies before hiring one to conduct the testing. Know their qualifications and what they are going to perform.