F-5  Aerial Fire Apparatus  

LEARNING OBJECTIVES FOR THE F-5 EXAM

1. Define the terms and phrases commonly used with aerial fire apparatus, operations, and/or testing.
   a. NFPA 1901 Chapter 3 Definitions
      (1) rated capacity
      (2) continuous egress
      (3) burst pressure
      (4) live load
      (5) dead load
   b. NFPA 1911 Chapter 3 Definitions
      (1) operator
      (2) acoustical testing
      (3) ironing
      (4) twist
      (5) leak
      (6) ultrasonic testing
      (7) magnetic particle test
      (8) operator alert device
   c. General Knowledge
      (1) cantilever
      (2) races/base rail
      d. Lightning Reference Glossary of Terms
      (1) double acting cylinder
      (2) micron (micro-meter)
      (3) pilot valve
      (4) shuttle valve
      (5) cracking pressure
      (6) Pascal’s law
      (7) motor

2. Identify the design requirements for aerial fire apparatus:
   a. Aerial ladder requirements
      (1) rated capacity
   b. Elevating platform requirements
   c. Water delivery systems on aerials
   d. Safety systems used on aerials
   e. Operating controls
   f. Hydraulic systems and components
      (1) Hose, Tubing, and Fittings
   g. Structural components
      (1) Safety factor
   h. Stabilizing systems
   i. Operational time requirements
   j. Vehicle components
   k. Aerial ladder rated capacity
   l. Aerial platform rated capacity
   m. Tractor drawn vehicles
   n. Aerial ladder mechanisms
   o. Aerial platform mechanisms
   p. Remote breathing air systems
   q. Signs
   r. Low voltage electrical systems
   s. Driving and crew area
   t. Aerial ladder operating positions
   u. Communication systems
   v. Fold down step requirement
   w. Aerial platform water curtain

3. Understand the testing, inspection, and documentation requirements of all aerial fire apparatus.
   a. Identify the "Test and Delivery Data Requirements" for aerial fire apparatus as stated in NFPA 1901.
      (1) Road test
      (2) Delivery data requirement
   b. Identify the types of inspections and tests for aerials as stated in NFPA 1911:
      (1) Requirements for inspection and testing
         (a) Water gauge test
         (b) Water flow meter test
         (c) System pressure test
      (2) Extension cylinder
         (a) Drift test
      (3) Annual testing
      (4) N.D.T. testing
         (a) Liquid Penetrant Inspection
      (5) Horizontal load test
      (6) Weld inspections
      (7) Rotation gear inspection
      (8) Hardness test
      (9) Operational test
      (10) Articulating boom test
      (11) Max elevation load test
      (12) Hydraulic oil testing
      (13) Extension motor brake test
      (14) Tumtable inspection and test
      (15) Stabilizer test
      (16) Visual inspection
      (17) Engine speed interlock
      (18) Winch holding capacity
      (3) Inspections personnel
      (4) Retired Vehicle
   c. General requirements and which standard contains the requirement for:
      (1) Out of service requirements
      (2) Test frequency
      (3) Pressure tests
      (4) Stabilizing system
   d. Required documentation as per NFPA 1911.
   e. Understand accepted procedures for aerial apparatus testing:
      (1) Tool usage
      (2) Extension cable
   f. Required documentation as per NFPA 1911.

4. Understand and identify hydraulic systems of an aerial apparatus:
   a. Identify and understand hydraulic components
      (1) Relief valve
      (2) Filter assemblies and indicators
      (3) Hydraulic actuators
      (4) Counterbalance/holding valves
      (5) Pumps
      (6) Hoses and fittings
b. Identify and understand hydraulic schematics
   c. Identify hydraulic symbols
      (1) Relief valve
      (2) Hydraulic cooler
      (3) Fixed displacement hydraulic pump
      (4) Filter strainers
      (5) Hydraulic check valves
      (6) Metering valve
      (7) Pressure reducing valve
      (8) Flow Control Valve

d. Understand principles of hydraulics
   (1) Resistance to flow
   (2) Causes of aerated hydraulic fluid
   (3) Hose sizing and configuration
   (4) Effect of hose size on fluid velocity

e. Understanding and trouble shooting hydraulic systems
   (1) Platform system
   (2) Abnormal noises
   (3) Oil conditions
   (4) Valves
   (5) Actuator
   (6) Stabilizer systems
   (7) Pressure compensated hydraulic pump
   (8) Engine speed control

5. Understand and identify electrical systems of an aerial apparatus
   a. Identify electrical components
      (1) Electrical monitors
      (2) Electrical cable reel
 b. Identify and understand electrical schematics
 c. Identify electrical schematic symbols
    (1) Motor
    (2) Ground
    (3) SPDT Switch
    (4) Diode
 d. Understand and troubleshoot electrical systems
    (1) Controllers
    (2) Voltage drops
    (3) Digital controllers
    (4) Commutator/collector rings
    (5) Line voltage systems
    (6) GFCI circuits
    (7) Water monitor electronic controls

6. Describe activities considered to be accepted practice in service and repair of aerial apparatus
   a. Maintenance
      (1) Lubrication
      (2) Cable adjustments
      (3) Hydraulic hose replacement criteria
      (4) Filtration
      (5) Parts Criteria
 b. Repair procedures
    (1) Identify hydraulic fluid leakage
    (2) Identify fastening devices and requirements
    (3) Line voltage repair procedures

7. Understand the principles of operating aerial apparatus
   a. Stabilizing the apparatus
      (1) Emergency procedures
      (2) Stability requirements
      (3) Stabilizer pads
      (4) Short jacking
 b. Operating aerial devices from lower controls
c. Operating aerial devices from upper controls
d. Proper cab tilting procedures as per manufacturer’s recommendations
e. Safety
f. Interlocks