NFPA No.

418

ROOF-TOP HELIPORT CONSTRUCTION & PROTECTION 1968

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Adopted Jan. 23, 1964. Where variances to these definitions are found, efforts to eliminate such conflicts are in process.

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Units of measurements used here are U. S. standard. 1 U. S. gallon = 0.83 Imperial gallons = 3.785 liters. One foot = 0.3048 meters. One inch = 25.40 millimeters. One pound per square inch = 0.06805 atmospheres = 2.307 feet of water. One pound = 453.6 grams.

Standard on

Roof-top Heliport Construction and Protection

NFPA No. 418 — 1968

1968 Edition of No. 418

This Standard was prepared by the NFPA Sectional Committee on Aircraft Hangars and Airport Facilities and submitted to the Association for Official Adoption, through the NFPA Committee on Aviation, at the 1968 Annual Meeting held in Atlanta, Georgia, May 20-24. The Annual Meeting approved the adoption of the Standard in the name of the Association.

Origin and Development of No. 418

Work on this Standard started in 1965 after the NFPA Sectional Committee on Aircraft Hangars and Airport Facilities was asked to provide guidance on the construction and protection of elevated heliports. Earlier work had been done by the NFPA Sectional Committee on Aircraft Rescue and Fire Fighting regarding fire protection in event of an accident occurring during flight operations and the NFPA Sectional Committee on Aircraft Fuel Servicing worked on safeguards needed to prevent fire accidents during fueling operations at such locations. In 1967 a Tentative Standard on Elevated Heliport Construction and Protection was approved by the Annual Meeting. This 1968 text revises the Tentative Standard (including the change in title).

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SCOPE: To develop fire safety recommendations for the construction and protection of aircraft hangars and other types of airport facilities involving construction engineering (whether above or below ground). This Sectional Committee reports to the Association through the Aviation Committee.

Standard on

Roof-top Heliport Construction and Protection

NFPA No. 418 — 1968

100. Scope.

101. These recommendations apply to roof-top heliport construction from the viewpoint of possible fire exposure and to appropriate means for the protection of such a facility against damage should a fire occur.

102. The load capability of the building, the roof, and related structural conditions such as stair and elevator bulkheads, etc., penthouses and cooling towers, must be considered in the construction of roof-top heliports. None of the aforementioned details is considered in this Standard.

NOTE 1. These recommendations do not apply to off-shore structures such as oil-well drilling platforms, or lighthouses from which helicopters may operate.

NOTE 2. The area of a roof-top heliport may vary from a 40 feet by 40 feet landing deck devised to permit clear approach and departure to a full-size roof area, possibly as large as 200 feet by 200 feet. Private small helicopter operations may require only a limited size elevated pad. Commercial operations should provide areas of sufficient size so as to permit standard approach and departure operations from one landing spot, taxiing space, and an additional location, free of rotor blast, where passengers may assemble. Reference should be made to applicable national and international standards with regard to obstruction and clearance restrictions.

200. Definitions.

201. A HELIPORT is a facility designed to accommodate operation of helicopters and includes a landing deck and associated operating facilities.

202. A LANDING DECK is a surface upon which helicopters may land. It may be a specially prepared roof surface, or a superstructure above a building roof.

300. Construction.

301. Landing deck area shall be of noncombustible and solid construction. The landing deck shall be pitched in one or two

directions, terminating in a drain trough or type of catch basin so water or fuel spillage will not be carried over the edge of the building, but will be carried off to safe locations. The landing deck shall pitch away from access stairways, elevator shafts, passenger holding rooms, and other occupied areas.

302. The roof on which the landing deck is located should be of noncombustible construction with a Class I roof covering.

303. Where pits for service or foam extinguishing systems exist, or where emergency escape hatches are used, suitable raised edges around the periphery of such installations shall be provided to prevent any spillage or drainage of fuel from entering the pit or hatchway. Service or foam pits should be fitted with appropriate drains, connected to the building drainage system.

304. Passenger holding areas shall provide shelter from rotor blast or fire exposure.

400. Drainage and Separators.

401. The landing deck area drainage should be arranged independent of the building drainage system. However, such drainage system may be connected to the building roof drainage system, after all water, oil or residue from the landing deck area passes through an approved, properly ventilated separator of such capacity that it will retain 100 percent of the full fuel load capacity of any helicopter using the landing deck. Location and installation details for the separator shall be subject to the approval of the authority having jurisdiction.

402. If a fixed foam system is installed as outlined in Paragraph 605, drainage inlets serving the landing deck should have the combined capacity to handle water at the design rate of discharge from any water hose streams supplied plus 25 per cent of the maximum foam-water solution discharge rate.

403. Separators shall be periodically inspected and any fuel accumulations disposed of in a safe manner.

404. The drainage piping and separator system shall be protected against freezing in climates where this may be a problem.

500. Landing Deck Egress.

501. At least two approved means of egress from the landing deck and roof shall be provided and shall be remote from each other. Landing decks provided for commercial helicopter operations shall have at least two enclosed stairways. Where distance factors to these stairways exceed allowable limits, the authority

having jurisdiction shall be consulted.

NOTE: For further information on exit principles, see Life Safety Code (NFPA No. 101).

600. Fire Protection.

601. A manual fire alarm station connected to an approved system for notifying the fire department shall be installed at each point of egress from the heliport. (See NFPA Standard for the Installation, Maintenance and Use of Auxiliary Protective Signaling Systems for Fire Alarm Service (NFPA No. 72B-1967).

602. A fixed standpipe system shall extend to the roof level. Sufficient outlets shall be provided to permit effective hose stream coverage of the roof, landing deck and helicopter parking positions without requiring excessive lengths of hose. Such standpipe systems shall be installed in accordance with the Standard on Standpipe and Hose Systems (NFPA No. 14).

603. Helicopter rescue and fire control recommendations for heliports are given in NFPA No. 403* (see Appendix A herein for an extract). For these roof-top heliports, this minimum protection shall be supplied. Where helicopters in Category H-3 are operated, the protection shall be arranged as follows:

a. At least two foam hose lines supplied from fixed outlets shall be available, each having a capacity of not less than 100 gpm foam water solution. They shall be located remotely from each other, having the ability to discharge effective foam streams to provide coverage of the critical portions of the landing deck and adjacent roof areas. (The area to be protected shall determine the actual number of lines needed.)

NOTE: The water standpipe hose system may be modified to be useful as foam hose line protection by the addition of approved combination nozzles, air-foam liquid concentrate, and proportioning equipment.

b. The air-foam liquid concentrate provided shall be adequate in quantity to permit continuous operation of the hose lines available for a minimum period of fifteen minutes, except where a fixed foam system is installed in accordance with Paragraph 605 herein. In the latter case, the hose lines should be provided with a 7½-minute supply of air-foam liquid concentrate over and above that required for the fixed system.

*Suggestions for Aircraft Rescue and Fire Fighting Services at Airports and Heliports published in Volume 10 of the National Fire Codes and in separate pamphlet form.

c. The foam hose line system shall be restored to full operational condition before the heliport can be returned to flight operational status.

604. Where foam hose line protection is installed, the following recommendations are offered:

a. Hose lines should preferably be of the reel type, arranged for full operation with all or a portion of the hose unreeled.

b. Operating controls should be of the quick-acting, quarter-turn type.

c. Hose nozzles should be of the shutoff type or should have a shutoff valve at the nozzle inlet.

605. In addition to the protection stipulated in Paragraph 603 for helicopter rescue and fire control activity and the standpipe and hose equipment specified in Paragraph 602, fixed foam systems, supplemented by foam hose lines, may be required for protection against flammable liquid spill fires. Each fixed foam system installation normally must be engineered for each roof-top heliport to achieve the desired purposes, but the following guidelines are offered:

a. Peripheral approved fixed foam discharge nozzles should be installed to provide protection for the entire landing deck, but not necessarily for the entire roof area of the building and the helicopter parking positions, if the landing deck is a clearly defined and marked-out space with adequate provision to prevent the flow of flammable liquids to other parts of the building roof area. The foam solution discharge should be at a rate of at least 0.16 gallons per minute per square foot and an adequate quantity of the extinguishing agent should be available to continue this discharge for at least fifteen minutes, with start of discharge occurring not more than 10 seconds after system actuation.

b. The foam discharge nozzles may be installed at deck level, or as fixed or oscillating turrets.

c. The effect of air turbulence and wind conditions on the range and distribution of the foam streams should be considered in the design of such a system.

d. Operation of the fixed foam system should be from emergency control stations located at points of egress. An additional control station may be provided in the heliport control room, if such exists. Heliport personnel should be trained in the operation of the system.

NOTE: The Standard on Foam Extinguishing Systems (NFPA No. 11), the Standard for Foam-Water Sprinkler and Foam-Water Spray Systems (NFPA No. 16), and the Standard on Aircraft Hangars (No. 409) should be referred to when designing fixed foam systems for this service.

606. All fire protection equipment provided on roofs and landing decks shall be protected against extremes of weather (freezing temperatures, snow, icing, and severe exposure to the sun) so as to be fully operational at all times.

NOTE: Bulk supplies of extinguishing agents for fixed systems should be located in protected areas, heated where necessary.

607. The automatic sprinklers should be installed in areas or rooms communicating with the roof or landing deck.

608. Elevators serving roof-top heliports should be provided with emergency electrical energy in event of power failure. Each automatic elevator should be equipped with manual override for use in emergency.

700. Fueling.

701. Fueling of helicopters on roof-top heliports, and the installation and operation of fixed fueling systems at such facilities, where permitted by local regulations, shall be in accordance with the Standard on Aircraft Fuel Servicing (NFPA No. 407).

Appendix A
Extracts of Guidance on Helicopter Rescue and Fire Fighting
from the
NFPA Suggestions for Aircraft Rescue and Fire Fighting Services at Airports and Heliports†

NFPA No. 403 — 1967

* * * *

Article 100. Introduction

* * * *

112. Heliports designed *exclusively* for handling helicopter operations are generally limited in area and are separately evaluated as regards helicopter rescue and fire fighting services. For the purposes of this text, the term "heliport" shall include all areas exclusively used for helicopter operations, including such areas referred to as "helipads" and "helistops." Heliports may be located at ground level, on platforms constructed specifically for the purpose, or on the roofs of buildings. The degree of fire protection suggested depends on the size of the helicopters, the number of occupants, the maximum operational fuel load of the helicopters using the facility, personnel available for rescue and fire fighting purposes and the frequency of operations. Suggestions for heliport aircraft rescue and fire fighting services are contained in Paragraphs 214, 315 and Table 2 (as contained in this Appendix).

* * * *

Article 200. Basis for Suggestions

214. . . . . It is suggested that heliports provide fire protection as outlined in Table 2 (as contained in this Appendix). The purpose of the protection suggested is basically aimed at life safety for the occupants of the helicopter in event of an accident followed by fire. Since automatic protection is not feasible, heliport management and service personnel should be trained in the use of this equipment to afford maximum benefits. An auxiliary purpose is to provide protection to the heliport itself, especially for platform or roof-top heliports. It is widely recognized that fires may follow

†Extracts from NFPA No. 403 are editorially modified with references updated for use in this Appendix.

helicopter accidents and that this experience is a helicopter design problem.

NOTE: This material is concerned with helicopter rescue and fire fighting. However, the importance of designing crash-fire-worthiness into future helicopters cannot be stressed too strongly. Cellular or breakaway fuel tanks to limit fuel spillage and all other possible construction safety features should be incorporated in new helicopter design.

* * * *

223. The suggested minimum amounts of extinguishing agents in Table . . . . 2 should be provided on the . . . . heliport regardless of the availability of other fire fighting equipment off the . . . . heliport.

* * * *

Article 300. Suggestions

315. Protection at Heliports

a. Table 2 (as contained in this Appendix) indicates the quantities of water (for foam production) and the quantity of dry chemical that are suggested for heliports categorized as follows:

H-1 — This category includes all heliports where the helicopters using the facility carry less than 6 persons, have operational fuel loads of less than 100 gallons.

H-2 — This category includes all heliports where the helicopters using the facility normally carry passengers (less than 12), have operational fuel loads of less than 200 gallons, and where the number of movements exceeds an average of 4 movements per day over any 3-month period. (Where the frequency of movements is less than that specified, the decision as to whether to apply these suggestions should be based on a judgment of the heliport management and any regulatory agency having jurisdiction.)

H-3 — This category includes all heliports where the helicopters using the facility normally carry 12 or more passengers and have operational fuel loads of more than 200 gallons regardless of the frequency of movements.

NOTE: Where an airport is also used as a heliport the fire and rescue protection suggested by Table 1 would apply.

b. For effective use of the fire protection recommended for heliports in categories H-2 and H-3, it is important that the extinguishing equipment be capable of discharging the agents at the

Table 2

Heliport Fire Protection Suggestions

Extinguishing Equipment	Heliport Category H-1	Heliport Category H-2	Heliport Category H-3
Water for Foam Production			
Amount of water	None†	500 Gals.††	1500 Gals.††
Total Rate of Discharge	None†	100 GPM	200 GPM from two 100 GPM nozzles or one mobile unit with turret
Foam Compatible Dry Chemical			
Portable Hand Extinguishers*			
Number	2	2	2
Minimum Rating**	20-B:C	20-B:C	20-B:C
Minimum Agent Capacity	30 lbs.	30 lbs. — or —	30 lbs. — and —
Wheeled Extinguishers			
Number	None	1	1
Minimum Rating**		160-B:C	160-B:C
Minimum Agent Capacity		150 lbs.	150 lbs.

†Many times a water supply meeting the suggestions for Category H-2 may be available. In such cases foam equipment suitable to permit its use should be provided assuming personnel are available to utilize the equipment in event of an emergency.

††The amount of water should be immediately available from a hydrant, standpipe, pressurized tank, reservoir, or mobile vehicle so that it can be dispensed at the rates indicated and at a satisfactory pressure. Additional water should be available to provide a continuing rescue and fire fighting capability wherever feasible.

*Portable hand extinguishers to be mounted on cart or wheels with a minimum 6-foot hose and nozzle.

**For rating information, see NFPA Standard on Installation of Portable Fire Extinguishers (No. 10). See also Fire Protection Equipment List of Underwriters' Laboratories, Inc. or Underwriters' Laboratories of Canada.

rates indicated. The foam rates are those which provide the maximum nozzle flow rate capable of being handled by one man. The amount of agents and rates suggested should be sufficient in the hands of trained operators to provide initial fire control thus permitting occupants to evacuate or be rescued assuming that they are not incapacitated or killed on impact. Additional water is recommended to permit complete extinguishment.