NFPA No.

418-T

Tentative

Tentative Standard on

ELEVATED HELIPORT CONSTRUCTION, PROTECTION

May, 1967

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This pamphlet circulates for review and comment these recommendations of the NFPA Sectional Committee on Airport Hangars and Airport Facilities and approved by the Aviation Committee which were Tentatively Adopted at the 1967 NFPA Annual Meeting.

Comments are solicited on these Tentative Recommendations from all those interested. Such comments should be forwarded to the NFPA Office by October 1, 1967 to receive full Committee consideration.

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National Fire Protection Association
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Elevated Heliport Construction and Protection

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1967 Edition of No. 418-T

This Tentative Standard is the work of the NFPA Sectional Committee on Aircraft Hangars and Airport Facilities. It was processed through the NFPA Committee on Aviation prior to submittal to the 1967 NFPA Annual Meeting, held in Boston, Mass., May 15-19. It was endorsed as a Tentative Standard by action of Annual Meeting and is published in this form for distribution and comment by all interested persons and organizations prior to further study by the sponsoring Sectional Committee. It is planned to submit the text, as it may be revised, at a future NFPA Annual Meeting for Official Adoption in conformance with the NFPA Regulations Governing Technical Committees.

Origin and Development of No. 418-T

Work on this Standard commenced in 1965. Several drafts were prepared by the Sectional Committee and processed at Committee meetings held during 1965-1966. The Sectional Committee recommended that the present text be Tentatively Adopted by the Association at its meeting held December 13-14, 1966. Following approval by the NFPA Committee on Aviation, the material was published in the *1967 NFPA Technical Committee Reports* for study and evaluation by the NFPA membership and others interested. It was unanimously approved as a Tentative Standard at the 1967 Annual Meeting.

Committee on Aviation

Jerome Lederer,† *Chairman,*
Flight Safety Foundation, 468 Park Avenue South, New York, N. Y. 10016

Harvey L. Hansberry (SFPE), *Vice-Chairman,*
Federal Aviation Agency, National Aviation Facilities Experimental Center
Federal Aviation Administration, Atlantic City, N. J. 08405

George H. Tryon† (SFPE), *Secretary,*
National Fire Protection Association, 60 Batterymarch St., Boston, Mass. 02110

J. C. Abbott, British Overseas Airways Corp. (Personal)

Cmdr. G. C. Ball, Canadian Forces.

H. F. Blumel, Jr., American Airlines. Chairman of Sectional Committee.

Henry G. Bone, Jr., The Boeing Co. (Personal)

R. E. Breiling, Associated Aviation Underwriters.

E. Thomas Burnard, Airport Operators Council International.

R. C. Byrus, University of Maryland. Chairman of Sectional Committee.

J. M. Chase, Flight Safety Foundation. Chairman of Sectional Committee.

N. L. Christoffel, United Air Lines. (Personal)

W. F. Clark, United States Aviation Underwriters.

C. W. Conaway, Factory Insurance Association.

G. T. Cook, Department of the Air Force.

B. V. Hewes, Airline Pilots Assn.

H. Prater Hogue, The Boeing Company. (Personal)

G. C. Koth, Factory Mutual Engineering Division.

C. Hayden LeRoy, National Transportation Safety Board.

John E. Lodge, Board of Trade. (United Kingdom)

R. Dan Mahaney,† Manager, Dulles International Airport.

C. M. Middlesworth,† Federal Aviation Administration, National Aviation Facilities Experimental Center.

J. A. O'Donnell, American Airlines. Chairman of Sectional Committee.

F. E. Parker, Australian Dept. of Civil Aviation.

R. C. Petersen, Port of New York Authority. (Personal)

H. B. Peterson, U. S. Naval Research Laboratory.

Thomas A. Raffety, American Association of Airport Executives.

E. E. Reed, American Petroleum Institute.

H. F. Roberts, Fire Equipment Manufacturers Association.

J. E. Schlund, Fire Marshals Assn. of North America.

E. F. Tabisz, Underwriters' Laboratories of Canada.

Alternates.

Ross A. Knight, Airport Operators Council. (Alternate to E. Thomas Burnard.)

(Appointment pending.) (Alternate to C. W. Conaway.)

Roscoe L. Bell, Dept. of the Air Force. (Alternate to G. T. Cook.)

William L. Collier, Air Line Pilots Association. (Alternate to B. V. Hewes.)

John T. Stephen, American Association of Airport Executives. (Alternate to Thomas A. Raffety.)

W. V. Paulhus, American Petroleum Institute. (Alternate to E. E. Reed.)

James Sievert, Fire Equipment Manufacturers Association. (Alternate to H. F. Roberts.)

G. L. Toppin, Underwriters' Laboratories of Canada. (Alternate to E. F. Tabisz.)

Liaison Representatives.†

Allen W. Dallas, Air Transport Association.

Stanley Green, Aerospace Industries Association of America, Inc.

S. Krzyczkowski, International Air Transport Association.

W. A. McGowan, National Aeronautics and Space Administration.

J. A. Pope, National Business Aircraft Association.

Dr. A. F. Robertson, National Bureau of Standards.

E. J. C. Williams, Air Ministry, United Kingdom.

Chief, Aerodromes, Air Routes and Ground Aids Section, International Civil Aviation Organization.

†Non-voting member.

Sectional Committee on Aircraft Hangars and Airport Facilities

H. F. Blumel, Jr., *Chairman,*
American Airlines, 633 3rd Ave., New York, N. Y. 10017

J. C. Abbott, British Overseas Airways Corp.

J. J. Brenneman, United Air Lines.

C. W. Conaway, Factory Insurance Association.

J. D. Cook, National Automatic Sprinkler & Fire Control Association.

A. D. DesRoches (SFPE), Canadian Forces.

Donald L. Drumm, American Insurance Association.

Stuart C. Hand (SFPE), J. S. Frelinghuysen Corp.

Harvey L. Hansberry (SFPE), (ex-officio), Federal Aviation Agency.

R. E. Hitchcock, Mohawk Airlines, Inc.

E. B. Hoge, Eastern Air Lines.

G. C. Koth, (SFPE), Factory Mutual Engineering Division.

Jerome Lederer† (ex-officio), Flight Safety Foundation.

R. C. Petersen (SFPE), Airport Operators Council.

E. E. Reed, American Petroleum Institute.

H. F. Roberts, Fire Equipment Manufacturers Association.

J. H. Sellers, Insurance Company of North America.

Alternates.

C. F. Averill, National Automatic Sprinkler and Fire Control Association. (Alternate to J. D. Cook.)

K. J. Brewer, Canadian Forces. (Alternate to A. D. DesRoches.)

A. J. Mercurio (SFPE), Factory Insurance Association. (Alternate to C. W. Conaway.)

W. V. Paulhus, American Petroleum Institute. (Alternate to E. E. Reed.)

Arthur Makowski, Fire Equipment Manufacturers Assn. (Alternate to H. F. Roberts.)

Liaison Representatives.†

Frank J. Hanrahan, American Institute of Timber Construction.

T. R. Higgins, American Institute of Steel Construction.

†Non-voting member.

Tentative Standard on
Elevated Heliport Construction and Protection

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100. Scope.

101. These recommendations apply solely to roof-type heliport construction as a part of building construction, regardless of location (see Notes).

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 an elevated 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, for the boarding and unloading of passengers. 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 possible 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 be located below the landing deck level. These areas should provide shelter from rotor blade 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. Accumulated fuel trapped in separators shall be removed periodically and disposed of in a safe manner.

403. 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. On large, commercial landing decks, more than two approved means of egress may be required, at least two being enclosed stairways. On small landing decks (1600 sq. ft. or less), a single fixed stairway and an emergency ladder may suffice.

600. Fire Protection.

601. A manual fire alarm station connected to the local fire department shall be installed at each point of egress from the heliport.

602. A fixed standpipe system shall extend to the roof level and be available for fire department use at the roof level and on the landing deck. Sufficient outlets shall be provided to permit effective hose stream coverage of the roof and landing deck 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 of this guidance). For these elevated heliports, this minimum protection shall be supplied. For elevated heliports accommodating helicopters in Category H-3 (as described in Appendix A), 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 and the system capacity shall determine the actual number of lines needed). The water standpipe hose system may be modified to be useful as foam hose line protection by the addition of approved combination nozzles and supplemental 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.

NOTE: A full recharge of the air-foam liquid concentrate supply may be desirable in some cases where delivery of the recharge would delay return of the heliport to operational status.

604. Where foam hose line protection is supplied from fixed outlets, 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.

*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. 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 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 line protection, may be required for protection against flammable liquid spill fires. Each fixed foam system installation normally must be engineered for each elevated heliport to achieve the desired purposes, but the following guidelines are offered:

a. Peripheral approved fixed foam discharge nozzles should be installed in such a manner as to provide protection for the entire landing deck, but not necessarily for the entire roof area of the building 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. It is recommended that, where this is done, the foam solution discharge should be at a rate of at least 0.10 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, depending on circumstances.

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

d. Operation of the fixed foam system should be from an emergency control station, or stations, located at point(s) of egress or access, and personnel having duties at the heliport should be trained in the operation of the system.

e. Drainage inlets on the roof and landing deck should have the 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.

f. Portions of 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) may be helpful in designing fixed foam systems for this service.

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

NOTE: In many cases, bulk supplies of extinguishing agents for fixed systems may be located on the floor below the landing deck and piped to the discharge outlets on the roof and deck.

607. The installation of automatic sprinklers in areas or rooms communicating with the landing deck (for example: passenger holding rooms, corridors, and stairwells) is recommended.

608. Where elevated heliports are serviced by elevators, such elevators should be provided with emergency electrical energy in event of power failure, and automatic elevators (no operator provided) should be equipped with a manual override for exclusive fire department use in emergency.

700. Fueling.

701. Fueling of helicopters on elevated landing decks, 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.

* * * *

Article 200. Basis for Suggestions

214. As indicated in Paragraph 212, Tables 1 and 1A do not apply to heliports. It is suggested that heliports provide fire protection as outlined in Table 2. 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

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 Tables 1, 1A, and 2 should be provided on the airport or heliport regardless of the availability of other fire fighting equipment off the airport or heliport.

* * * *

Article 300. Suggestions

315. Protection at Heliports

a. Table 2 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

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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.	30 lbs.
		—	—
		or	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.