Recommended Good Practice Requirements

for the

Location, Construction and Operation of

MARINAS

1941

Adopted by
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The National Fire Protection Association was organized in 1896 to promote the science and improve the methods of fire protection and prevention, to obtain and circulate information on these subjects and to secure the cooperation of its members in establishing proper safeguards against loss of life and property by fire. Its membership includes over a hundred national and regional societies and associations and five thousand individuals, corporations, and organizations.

Membership in the National Fire Protection Association is open to any Society, Corporation, Firm or Individual interested in the protection of life or property against loss by fire. All the valuable engineering and popular literature issued by the Association is sent, as issued, to every member. The Association is the clearing house for all the authoritative information on fire protection and prevention and members are privileged to submit to it their individual problems for solution. The Association is always glad to send samples of its publications to prospective members.

This pamphlet is one of a large number of publications on fire safety issued by the Association. The standards, prepared by the technical committees of the National Fire Protection Association and adopted in the conventions of the Association, are intended to prescribe reasonable measures for minimizing fire losses. All interests concerned have opportunity through the National Fire Protection Association to participate in the development of the standards and to secure impartial consideration of matters affecting them.

This standard, prepared by the N.F.P.A. Marine Section Committee on Boat Basins and Municipal Marinas, was first presented in 1938, and revised and adopted by the Association in 1940. Record of the discussion and action thereon appears in the N.F.P.A. Proceedings for 1938 and 1940.

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RECOMMENDED GOOD PRACTICE REQUIREMENTS FOR THE LOCATION, CONSTRUCTION AND OPERATION OF MARINAS.

The rapid increase in the use of motor craft for pleasure purposes has drawn attention to the prevailing inadequate facilities for the safe and convenient harboring of these boats when in commission, but not in use, and the largely absent suitable means for servicing them. This has led to congestion and its attendant fire hazards which in many instances are rendered more acute by unsafe fueling practices and absence of adequate fire fighting facilities. In addition, many of the present harbors, or, as they are more commonly known, marinas, are poorly located with respect to prevailing winds, waves and currents, and as a result the general appraisal of their fire and storm hazard is such as to adversely affect the individual boat and threaten the growth of the industry.

The following good practice requirements are intended to remedy these conditions and serve as a guide for municipal authorities or other interested persons when determining the location and design of harbors or marinas for this purpose.

1. Location.

The adequacy of the marina will in a large measure depend upon its location, with the other related features forming important contributing factors. In general, however, the suitability of any given location may be determined by a consideration of the following factors:

(a) The extent to which any given location is exposed to high winds and resulting wave action requires careful consideration. The minimum demands for shelter and protection require the location to be shielded from storms, moving ice and similar abnormal weather conditions. The records of the U. S. Weather Bureau should be consulted for this purpose.

(b) The range of tides and the minimum depth of water over the proposed location at maximum low water should be such as to assure safe mooring during any period of abnormally high or low water.

(c) The area of the proposed location should be sufficient to contain the number of piers of proper design and layout for the total estimated number of boats to be berthed. There should also be sufficient remaining clear space or roadstead for turning and entrance and exit operations.

(d) Other important factors requiring careful consideration include adequate fire protection and the ability of fire apparatus to readily reach and operate in all parts of the marina. These factors and the needs of convenience require a land approach by an improved road; accessibility on the water side to fireboats or tugs equipped with fire pumps; permanent land equipment such as turret nozzles, hydrants, hose and water sprays; and the accessibility of the marina to tugs and other craft for the removal of boats at time of fire.

(e) Owing to the combustible construction of motor craft, the inherent hazard of the flammable and explosive fuels, and the combustibility in part at least, of piers, fires of varying extent are always possible at these marinas. For this reason the importance of a marina location under protection of a municipal fire department is apparent, and the feature of convenient access as described in sub-paragraph (d) above also assumes added importance.

2. Design, etc.

(a) The basin should be designed with the end in view of avoiding congestion. The layout of the main mooring piers and bulkhead should be such that the intended number of boats can be readily accommodated. Each boat should be accessible for emergency removal without the necessity for moving any other boat. The space between main piers and the width of the roadstead should be ample for convenient maneuvering in connection with boats entering, mooring and leaving the basin. To accomplish this, it is recommended that the space between such piers be not less than twice the overall length of the largest craft to be moored within any section of the marina.

(b) The marina basin should, wherever possible, be provided with both an entrance and an exit remote from each other so as to avoid congestion and reduce the collision hazard common to a single entrance which must also serve as an exit. Two such openings to the basin are essential to rapid evacuation of the basin in case of fire or other emergency; when conditions permit, these openings should be located parallel to the direction of the flow of the current. Where this arrangement is not feasible and a single opening must be depended upon, the opening should be centrally located so as to be equally accessible from all points within the marina.

3. Construction.

(a) Bulkheads and main mooring piers should preferably be of concrete or masonry construction. Where wood construction is employed, adequate separation of main mooring piers is of added importance in order to reduce the fire exposure hazard.

(b) Each marina should be protected by breakwater and jetties where these may be required in order to provide shelter within and smooth and easy entrance and exit in all weather. Where the breakwater forms a part of the marina a draw or float bridge should be provided as a means of access thereto.

(c) At least one main pier should be designed as a service pier. It should be sufficiently wide to accommodate automotive vehicles and have the outer end constructed in the form of a "T" so as to provide sufficient vehicular turning area. Such piers should be provided with adequate wheel guards.

(d) The use of "T" or "L" head construction is recommended and should be provided for all piers where there is no breakwater to protect against the force of high winds and waves.

(e) Except for service piers, ordinary cat-walk construction is permissible for mooring piers. For cat-walks not exceeding 100 feet in length, a minimum width of 2 feet is recommended; where this length is exceeded the width should not be less than 4 feet in order to permit the transfer of wheeled fire apparatus.

(f) Where wood piles are provided they should be impregnated with creosote or equally effective material in order to guard against destruction by marine borers.

4. Fire Breaks.

Consideration should be given to the possible spread of fire from one pier to another by means of oil burning on the surface of the water. As a means of reducing the probability of this danger a series of fire breaks, the number depending upon the extent of the marina and the number of mooring piers, should be provided. These may take the form of aprons extending the length of the pier and extending vertically from the pier deck to a point below maximum low water.

5. Marine Railway and Boat Hoists.

Every marina should be provided with facilities for storing and launching small boats. Marine railway facilities or a boat elevator or hoist are desirable for use in emergency. Power units and electrical equipment must be kept above even abnormally high water.

6. Landing Floats.

Landing floats or stages, and gangways should be designed and constructed to adjust themselves to local tide or stage conditions. They should be well fended so as to prevent injury to boats coming alongside. In northern sections of the country they should be portable so as to permit removal at the end of the season.

7. Lighting.

Every marina should be provided with adequate means for illumination. This may best be accomplished by a system of electric flood lights. Where lights must of necessity be placed on the piers, the transformers and meters should be located on the land end. Circuits installed on the pier should be provided with service outlets employing marine type fittings at frequent intervals for the convenience of boat owners. Circuits should be safeguarded against the effect of vibration and the corrosive action of salt water and salt air. Installation should be in compliance with the National Electrical Code.

8. Fueling Operations.

(a) Where tide and weather exposure conditions permit, fueling operations should be outside of the marina. When such operations must necessarily be permitted within the marina, they should be regulated as hereinafter provided.

(b) Outside fueling stations, whether stationary or floating, should be so located as to minimize exposure to mooring piers and other property in case of fire or other emergency at the station.

(c) Inside fueling stations should be located near an exit opening or other location where, in case of fire on board a boat alongside, the boat may be quickly removed from the marina without endangering other boats at their berths.

(d) Fuel supply tanks buried on shore are preferable, but where this is not feasible they may be above ground, or on a pier or bulkhead provided they are protected against mechanical injury due to possible settlement of the pier or bulkhead structure, impacts due to collision, or weather and tidal conditions. No boat berths should be located within 75 feet of tanks above grade or mean high water.

(e) Fuel transfer pumps for land tanks should be located on shore in a well-ventilated, fire-resistive pump house with floor of concrete and with all electrical equipment and installation in accordance with the provisions of Article 500 of the National Electrical Code for Class 1, Group D locations. The pump house should be protected by means of approved foam or carbon dioxide fire extinguishing equipment. Both suction piping to supply connection and delivery piping to fueling station should be run below deck of pier or protected against mechanical injury. Delivery line from a shore tank should be run from the top of the tank (thereby requiring use of a pump) and designed or equipped to prevent syphoning. In such system a failure in the delivery line cannot drain the supply tanks with resultant loss and serious fire hazard. Where, of necessity, supply tank is on pier or bulkhead, the pump house may be located adjacent to the tank. It should be constructed

and equipped similarly to a pump house on shore and similar precautions against failure and/or syphoning should be taken in the layout of both suction and delivery lines.

(f) No tank barge or other fuel supply boat should be permitted within the marina. Berths and connections should be provided outside for their use when filling the storage tanks of fueling stations located within or outside the marina.

(g) All fueling operations should be in accordance with the provisions of Section 72 (f) and (g) of the 1939 Fire Protection Regulations for Motor Craft of the National Fire Protection Association as follows:

"In fueling:—before tank fills are opened or gasoline brought on board, all engines, motors and fans shall be shut down, galley fires put out, and all doors, ports, windows and hatches closed. On completion, after hose or cans have been removed, any spillage shall be wiped up and the boat opened. If practicable, it shall remain open for at least five minutes before starting any engine or motor or lighting a fire. No smoking shall be permitted during a fueling operation.

"In order to guard against a possible spark during fueling operation, nozzle of the hose or can shall be put in contact with the fill pipe or funnel *before* starting to run in gasoline and this contact shall be kept until the flow has stopped.

"NOTE: There is a serious hazard from static discharge unless this rule is observed."

Every fuel hose should be equipped with a self-closing control valve at the hose nozzle. The use of approved portable filling buggies at fueling stations should be permitted. Can fueling should be permitted in a marina only when a boat is at the fueling station and prohibited while at its berth.

FIRE PROTECTION.

9. Fire Alarm and Watch Service.

(a) Where the marina is under municipal protection, a city fire alarm box should be provided on the shore at a convenient location.

(b) When central office fire and watch system service is available, a system of approved combined watch and fire alarm boxes is desirable for the double purpose of affording supervision of the watchmen, and as a means of transmitting alarms of fire to the city fire department. Where this is not available, an approved watchmen's clock system should be provided with stations so located throughout the marina as to insure complete coverage by watchmen's tours.

NOTE: The central office type of system here referred to offers the subscriber an outside independent and skilled system of supervision over the watchmen, and insuring early detection of any lapse of duty due to dereliction, injuries or illness. The value of this feature cannot be overemphasized.

(c) When the marina is not under public protection and no central office signaling service is available, the telephone must be depended upon as a means of transmitting alarms of fire. The number and location of telephones for this purpose will depend upon the extent of the marina. When volunteer help is depended upon for fighting fire, a siren or similar warning signal is essential.

(d) It is suggested that where storage is congested or individual values are high, that portable automatic alarm devices be installed in the boat and connected to a central station system.

10. Water Supply and Hose Lines.

(a) When a public water supply is available, fire hydrants should be installed on the grounds approaching the piers. These should be so spaced with reference to the location and length of the mooring piers that at least two lines, none of which shall exceed 200 feet in length, may be concentrated on a fire at any point on the mooring piers.

If a municipal fire department is not available, an adequate supply of 1½ or 2½-inch, cotton, rubber-lined fire hose should be provided and properly housed in a hose house equipped with play pipes, nozzles, hydrant wrenches and spanners.

(b) Where piers exceed a length of 250 feet, each should be provided with a 2-inch water line extending the length of the pier and be equipped with 1½-inch hose connections at 75-foot intervals. The line at the shore end should be provided with a 2½-inch hose adapter so as to permit connection to a fire hydrant outlet of the same size; a supply of hydrant wrenches, spanners and nozzles should be provided. Such lines should be normally dry in sections of the country where freezing temperatures are likely to occur. A permanently attached connection should be permitted on the service pier.

(c) If piers are provided with water lines, each pier should be equipped with at least one hose reel, properly protected from the weather and equipped with 75 feet of 1½-inch linen fire hose with nozzle attached.

(d) When no public water supply is available there should be provided an approved fire pump of not less than 500 g.p.m. capacity, depending upon the extent of the marina. This should be installed to take suction from any available fresh water stream, or if necessary, from salt water; the pump should discharge into a system of piping supplying hydrants or hose connections, so spaced that the required number of hose lines may be readily concentrated on any fire which might occur on any of the mooring or service piers. When such a private water supply system is installed, a supply of approved 1½ or 2½-inch cotton, rubber-lined fire hose, play pipes, nozzles, wrenches and spanners should be provided at one or more convenient locations and properly housed. The supply should be such as to permit the concentration of streams on any fire as previously described. Where piers exceed 250 feet in length they should be provided with pipe lines, hose outlets and hose as recommended in paragraphs (b) and (c) of this section.

(e) Where the marina is of considerable extent, or where there is apt to be congestion and especially of high values, land turret nozzles, preferably of the spray type are suggested as an effective supplementary means for controlling and preventing the spread of fire.

11. First Aid Appliances.

(a) At each marina there should be provided and properly housed on the land side an approved chemical engine on wheels and containing a fire retarding chemical or gas suitable for use on oil and electric fires. There should also be provided a sufficient number of hand chemical extinguishers of the same type; these should be likewise housed at the shore end of the piers.

(b) On each mooring and service pier there shall be provided a suitable number of sand pails, painted red with the words lettered thereon "For Fire Only." These should be distributed at frequent intervals on each pier.