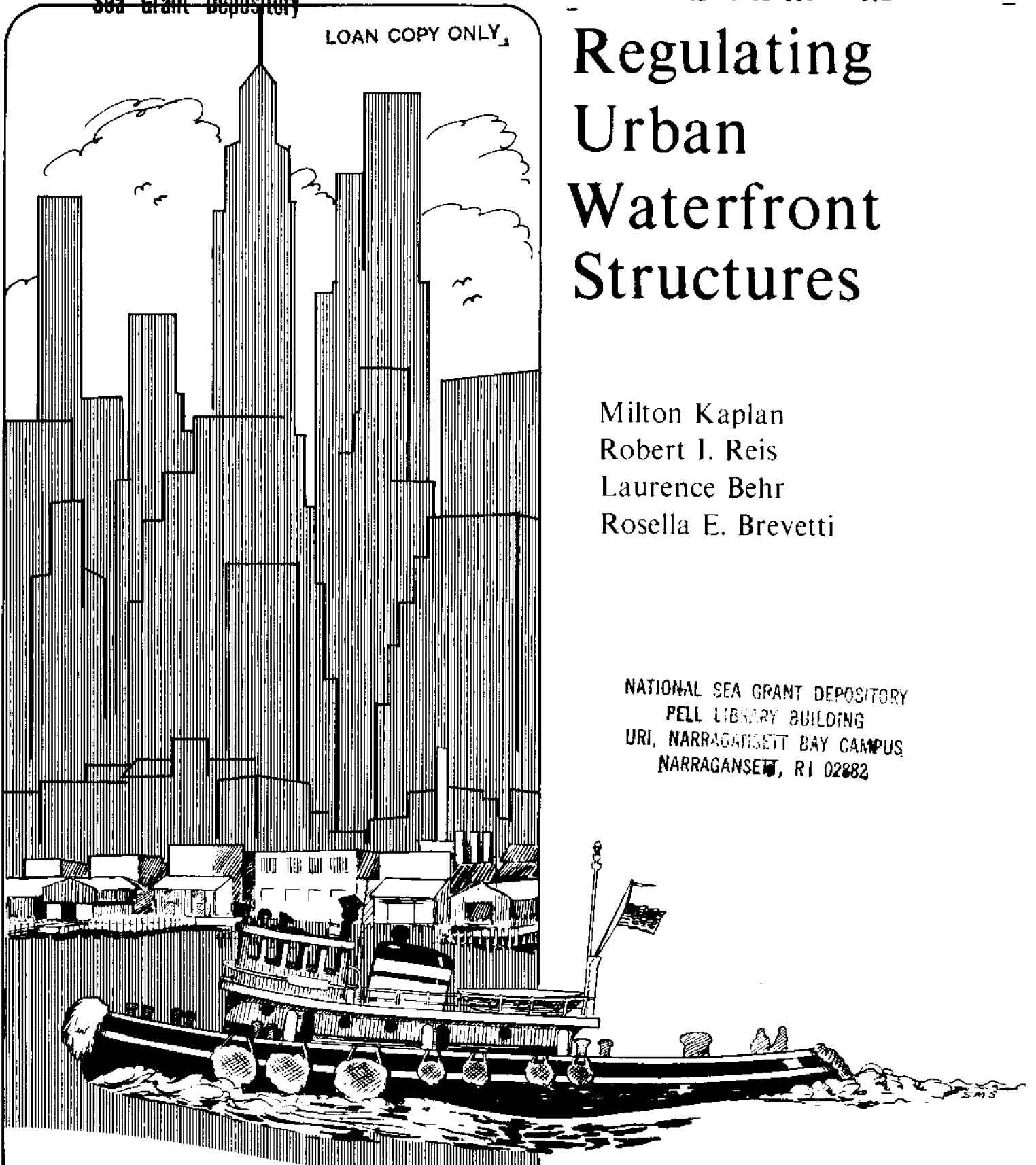


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REGULATING UNCONVENTIONAL URBAN WATERFRONT STRUCTURES

I. Introduction

Recent years have seen an increased interest in the aesthetic attractions of the waterfronts of major American coastal cities. Due to the scarcity of waterfront land in these cities, in increasing numbers restaurants, museums, business offices, store complexes, hotels and condominiums are being constructed or fashioned from converted structures upon pilings, wharves, piers and docks. Another growing phenomenon is the conversion to such uses of ships that are permanently moored to the land.

These developments present unique problems for the application of building construction, fire safety, and sanitation codes. The provisions of these codes, usually patterned upon standardized uniform or model codes, are adapted to structures based upon the land. They are not completely adequate for application to structures built over or floating in the water. They are particularly deficient in regard to standards for special construction materials needed to resist corrosive marine environments, ingress and egress capacity and other fire safety requirements, and materials and modes for connection to electrical, water and sewage disposal infrastructure systems. Therefore specifications to cover these aspects of the new waterfront developments are usually developed by engineers on a case-by-case basis to meet the exigencies of the situation at hand.

In New York City, the responsibility for enforcing construction, sanitation and fire safety codes in the waterfront area is vested in the New York City Department of Ports and Terminals. Recognizing the trend toward use of the waterfront for the types of developments described above, and anticipating future increases in the frequency of such projects, the department undertook a study of experience with the problem elsewhere, to determine the necessity or feasibility of framing special standards that might be applied uniformly. The State University of New York at Buffalo Sea Grant Law Program was asked to assist by conducting a survey of pertinent regulatory developments in other jurisdictions around the country. This report is the product of that survey.

It should be admitted at the outset that very little energy has been expended on this problem to date, even by those large cities that, like New York, are experiencing an intensified

interest in nontraditional uses of the waterfront. Nonetheless, the findings regarding the ways in which several cities do regulate such developments should be of interest to administrators concerned with this problem.

II. Methodology

In the first phase of the survey telephone interviews were conducted with city building departments and port authority executives in the major ports of the United States. Several of the interviews failed to uncover anything more concrete than information that these kinds of developments were largely being regulated on a case-by-case basis, as in New York City. In order to expand and intensify the survey, we developed a questionnaire inquiring into the existence of specific provisions in 12 areas of regulation, relevant to nontraditional waterfront developments. This questionnaire was mailed to 150 American towns and cities having significant waterfront development.

Forty-three agencies responded to the questionnaire. Of these, eight indicated that their municipality had not encountered these types of developments. Although 33 respondents reported that such structures were regulated by the use of specific code provisions, only 10 initially cited the particular code or codes used. Follow-up letters were sent to the agencies that reported specific regulations dealing with the subject of the investigation. Seven responded.

III. Results

A. In General

Many respondents indicated that they used mainly uniform or model codes, including the International Conference of Building Officials (ICBO) Uniform Building Code, the Uniform Building Code Standards, the Standard Building Code, the Building Officials and Code Administrators (BOCA) Basic Building Code, the Uniform Mechanical Code, the Uniform Plumbing Code, the National Electrical Code, the Uniform Fire Code, the Fire Prevention Code, and the National Fire Protection Association (NFPA) Life Safety Code. For the most part, these codes do not contain provisions specifically directed at the special problems involved in nontraditional waterfront developments. However, as several of the respondents indicated, many of the provisions of these codes are applicable to waterfront structures, and, where not directly

applicable, can sometimes provide a basis for determining appropriate specifications. Moreover, several of these codes do contain certain provisions that are, to some degree, particularly relevant to waterfront developments. The following catalog is not intended to be exhaustive:

ICBO Uniform Building Code: contains general requirements and specifications for the use of pile foundations (§§2908-2909).

ICBO Uniform Building Code Standards (No. 38-3, Standpipe Systems): provides that an on-site static water supply may be considered for the secondary source of water supply for standpipe systems (§38.306[b]).

ICBO Uniform Fire Code (1979 edition): requires that the area beneath piers and wharves be kept free of combustible debris; and that all electrical equipment be in accordance with the Electrical Code as it applies to wet, damp and hazardous locations (Appendix F, Marinas, ¶¶3[a], [g]).

Life Safety Code, NFPA 101 (1976): Chapter 16, Unusual Structures, applies to ships or vessels "no longer mobile and permanently fixed to a foundation or mooring" (ch 16, Unusual Structures, §16-1.2.2), and to "structure[s] fully surrounded by water" (§16-1.2.5). Section 16-2.3, Capacity of Means of Egress, provides that the width and capacity of means of egress for unusual structures must accord with chapter 5 of the code, except for structures fully surrounded by water and arranged in accordance with United States Coast Guard regulations. Section 16-2.5.3, Arrangement of Means of Egress, provides that piers "occupied for other than cargo handling and storage shall have exits arranged in accordance with chapters 8 through 15" of the code, plus one of the following measures if the pier extends over 150 feet from the shore:

- the pier must provide two separate ways of travel to shore, such as two well-separated walkways or independent structures;
- the pier deck shall be open and fire resistive, and its supports noncombustible;
- the pier must be open and unobstructed, and 50 feet or less wide if it is under 500 feet long, or no less than 10 percent of its length if over 500 feet long.

Sections 16-2.6, Measurement of Travel Distance to Exits; 16-2.8, Illumination of Means of Egress; 16-2.9, Emergency Lighting; 16-

2.10, Marking of Means of Egress; 16-3.1, Protection of Vertical Openings; and 16-3.3, Fire Alarm Systems all provide that unusual structures shall conform to the relevant code provisions applicable to other structures, but allow an exception for structures surrounded by water subject to pertinent Coast Guard Regulations. Section 16-4.1, Special Provisions for Vehicles and Vessels, provides that any vessel permanently moored and occupied for purposes other than navigation shall be subject to the code provisions applicable to buildings of similar occupancy.

Life Safety Code, NFPA 303 (1975): provides fire protection standards for Marinas and Boatyards; Chapter 5, Electrical Wiring and Equipment, provides standards, too extensive to summarize here, intended to supplement those of the National Electric Code, NFPA #70, in areas that are wet or continuously damp, exposed to rain or wind-driven spray, or subject to flooding by abnormally high water.

National Electric Code, NFPA70: Article 555, Marinas and Boatyards, contains extensive provisions pertinent to electrical receptacles and apparatus, wiring methods and materials, and grounding, for areas exposed to the weather or water.

Uniform Plumbing Code: Section 315 of the General Regulations, Protection of Piping, Materials and Structures, requires that piping and connections must not be subject to undue strains or stresses, and that provisions must be made for expansion, contraction and structural settlement. Accordingly, piping must not be directly embedded in concrete or masonry walls or footings. This section also provides that piping subject to undue corrosion shall be protected in an approved manner.

B. Authorities Applied in Particular Cities

Thirteen respondents cited the specific codes applicable to waterfront developments within their experience:

1. Alameda, California: Uniform Building Code; Uniform Fire Code; Uniform Plumbing Code; Local Floating Home Ordinance

2. Alexandria, Virginia: Virginia Uniform Building Code, based on 1978 BOCA Basic Building Code; site plan ordinance

3. Anacortes, Washington: Uniform Building Code; Uniform Plumbing Code; Uniform Mechanical Code; Uniform Fire Code; Uniform Building Code Standards

4. **Corpus Christi, Texas:** Standard Building Code
5. **Eureka, California:** Uniform Building Code; Uniform Fire Code; Uniform Mechanical Code; Uniform Plumbing Code; National Electrical Code
6. **Marquette, Michigan:** Michigan State Construction Code; the Marquette City Zoning Ordinance; Basic Fire Prevention Code 1978; National Electrical Code, National Fire Protection Association Standard No. 101 (1976); BOCA Basic Building Code; BOCA Basic Property Maintenance Code
7. **Providence, Rhode Island:** 1975 BOCA Basic Building Code, modified
8. **Philadelphia, Pennsylvania:** Philadelphia Building Code, modeled upon the BOCA Basic Building Code
9. **Port Angeles, Washington:** Uniform Building Code (1976)
10. **Sandusky, Ohio:** BOCA Basic Building Code, modified
11. **Seattle, Washington:** Uniform Building Code, with a supplement of modifications to cover conditions unique to the area
12. **Vancouver, Washington:** Uniform Building Code (1976 ed)
13. **Woodbridge, New Jersey:** State of New Jersey Uniform Construction Code, modeled upon various standard codes

C. Detailed Responses

Seven respondents answered at length regarding the procedures and code provisions with which they regulate waterfront structures. The following is a summary of their replies.

1. Alameda, California

The city's Ordinance No. 1610 is specifically aimed at regulating the construction and maintenance of floating homes and floating home moorages within the city. The ordinance defines a floating home as

any building supported by means of flotation, designed to be used without a permanent foundation, used,

intended, or designed to be built, used, rented, leased, let, or hired out to be occupied, or which is occupied for living purposes by one family with facilities for living, sleeping, cooking and eating
 (§10-814[D])

Floating homes intended to be used as dwellings for more than one family are prohibited (§10-814[D]). The design, construction, quality of materials, use and occupancy, location and maintenance of all floating homes within city limits are regulated in order to provide minimum standards to safeguard life or limb, health, property and public welfare (§10-811). The provisions of the ordinance embrace the construction, alteration, repair, demolition, removal, relocation or berthing of all floating homes within the city (§10-812). Floating home sites, floating home moorages and appurtenant structures and facilities are regulated as well (§10-812). Although the provisions are retrospective, the Building Official may grant an exception to strict compliance if a determination is made that a floating home existing prior to the effective date of the ordinance does not by reason of a violation of the ordinance adversely affect public health, safety and welfare and otherwise is in compliance with other requirements (§10-813). All floating homes proposed to be moved into the city or from one moorage site to another within the city must comply with the requirements pertaining to new floating homes (§10-810). Floating homes must comply with the same requirements for a dwelling structure contained in the enumerated codes, including the Uniform Building Code, the Uniform Mechanical Code, and the Uniform Plumbing Code (§§10-821, 10-822, 10-823, 10-821). Unless the floating home conforms to the requirements enumerated in the ordinance, is moored at an approved site, and the owner has been issued a Certificate of Occupancy, the home cannot be used or occupied (§10-831). A certificate of occupancy must also be obtained by the owner prior to moving a floating home into the City of Alameda or moving a floating home between sites in the city (§10-831). An application for a certificate of occupancy must be accompanied by a fee in an amount set by the Building Official (§10-832[B]). Building permits are mandatory for the construction, alteration, repair, improvement or demolition of any floating home moorage structure or facility (§10-833).

Article 4 outlines the requirement for and location of moorages. Registers must be maintained by owners and operators of all floating home moorages on the premises under their control. Moorages may not be located in any waterway or fairway, or in the public waters of any street or street end (§10-842).

2. Anacortes, Washington

Any structure located in or over the water, under the jurisdiction of the City of Anacortes, has to have the approval of the Department of the Army Corps of Engineers and perhaps other government agencies, including, but not limited to, the Department of Fisheries, Coast Guard, and the Environmental Protection Agency. Structures located within 200 feet of water must have a Shoreline Management Substantial Development Permit. Generally, the City of Anacortes follows the Uniform Plumbing Code, Uniform Building Code, Uniform Building Code Standards, Uniform Mechanical Code, and Uniform Fire Code. However, it would require special engineering and plans drawn by a licensed structural engineer to regulate unconventional waterfront structures of the types specified in the questionnaire.

3. Marquette, Michigan

Although there are no residences, restaurants or museums located on floating vessels, such structures would be regulated by the Michigan State Construction Code; the Marquette City Zoning Ordinance; Basic Fire Prevention Code 1978; National Electrical Code; NFPA No. 101 (1976); BOCA Basic Building Code; and the BOCA Basic Property Maintenance Code 1976. All land-based structures must meet the requirements of the Michigan Construction Code. Structures of any nature are regulated by the National Fire Protection Association, Life Safety Code, and the BOCA Basic Property Maintenance Code. Permits for docks and similar structures are required by the Michigan Department of Natural Resources. According to the Marquette County Sanitary Code, no sewage drainfield may be located any closer than within 50 feet of any lake, stream, or river.

4. Philadelphia, Pennsylvania

Structures permanently attached to land and those located on piers, wharves, and the like are regulated by various code provisions that apply to all structures. However, the codes do not specifically mention structures. A variance can be requested if there are problems in meeting general building or fire code requirements because of structural peculiarities. This would involve hearings with the Board of Building Standards, the Board of Safety and Fire Prevention, or both. The Philadelphia Building Code is modeled upon the BOCA Basic Building Code.

5. Port Angeles, Washington

The building code of the City of Port Angeles presently

incorporates the Uniform Building Code. Although the building code does not cover ships, the interpretations can be reasonably extended to apply, as a matter of discretion, to certain facets of the occupancy of these structures, such as occupant loads, fire protection, ingress and egress. In one specific case involving these types of structures, the officials drew up the necessary requirements.

6. Providence, Rhode Island

The Department of Building Inspection regulates any type of building, whether the building is permanently affixed to the land or is on unconventional foundations, in accordance with the Rhode Island State Building Code, which is a modified version of the 1975 BOCA Code. Appeals from applications of the sections of the Rhode Island State Building Code are taken to the Building Board of Review. Two conversions of ferries into restaurants were handled in this manner, resulting in solutions to most of the problems of applying the building code.

7. Seattle, Washington

The City of Seattle has adopted the 1979 edition of the Uniform Building Code. Conditions unique to the area are covered by supplemental modifications including chapters 56 and 74 which regulate waterfront structures and houseboats.

Chapter 74, relating to houseboats, defines a floating home as a "building constructed on a float used in whole or in part for human habitation as a single-family dwelling, which is moored, anchored or otherwise secured in waters within the city limits" (§7401). According to section 7402, every floating home moorage is to be located on privately owned or controlled premises. Floating home moorages are required to have firm substantial walkways with a net width of not less than four feet (§7405). The moorage and walkways to every floating home site must be illuminated at a minimum average intensity of five-foot candles (§7406). Floating home moorages must have not less than 20 feet of land frontage abutting a public street sufficiently improved for automobile traffic (§7404). Fire extinguishing equipment is mandatory for floating home moorages (§7407). The mandatory equipment includes: one fire extinguisher, 2A, 20-B:C rating minimum in each hose station required, and standpipes for all portions of floats exceeding 250 feet in distance from fire apparatus access and marine service stations. The standpipe system must be installed in accordance with standards set forth in Uniform Building Code Standard No. 38-3 and article 10 of the Fire Code. Hose stations labeled "Fire Hose-Emergency Use

Only" must be spaced in order to provide protection to any portion of floats or floating vessels. Hoses must be enclosed in an approved cabinet and mounted on a reel or rack. Waterlines, which are required to be normally dry where the area is subject to freezing temperatures, must be equipped with a single 2 1/2 inch fire department connection (§7407). A lawfully installed water service connection must be made to provide water service piping securely fastened and stabilized above water to an outlet connection at each floating home site or to a moorage. The water piping must be connected to the water service outlet serving the floating home. The connection must be securely fastened and stabilized above high water line (§7408).

Floating home moorages within 300 feet of a public sewer are required to have lawfully installed sewage connections (§7409). Within the limits specified in section 7409, floating home moorages must have a local side sewer system for the collection of sewage connected to the public sewer (§7410).

Floating homes required to have a lawfully installed connection to a public sewer must be connected to the local side sewer system (§7411).

Plumbing systems in every floating home must meet the requirements of the Seattle Plumbing Code except as otherwise approved.

Floating home moorages must be provided with adequate garbage storage and collection facilities. No refuse is to be thrown into the waters (§7414).

Floating homes and floating home moorages are provided with electrical service as approved by the lighting utility (§7415). Electrical equipment and wiring in all floating homes must conform to the requirements of the Seattle Electrical Code (§7415). New construction or major alterations of floating homes moved into city waters must conform to the requirements for dwellings set forth in all other applicable codes and ordinances [§7416]. Floating homes must comply with the minimum housing standards set forth in the Seattle Housing Code, unless approval is obtained as therein provided.

Floating home moorages are required to continuously conform to a moorage site plan that has been approved by the Building Official. The moorage site plan must show:

- the dimensions of the floating home moorage site;
- the location of abutting public waterways;
- the location and dimensions of private waterways and land access to the moorage;
- the location and identification of individual floating home sites;
- the location and dimensions of offstreet parking spaces;
- the location and dimensions of walkways and any accessory structures or facilities;
- the water service system;
- the local side sewer system; and
- the electrical service and lighting system.

Owners or operators of floating home moorages are required to maintain a current register of all floating homes moored on the premises under their control (§7419).

D. Conclusion

The cities that responded lack a comprehensive set of building code standards specifically directed at nontraditional waterfront development. For the most part, they adapt code provisions applicable to land-based structures. Whenever necessary to meet the demands of an unconventional waterfront structure, they proceed as New York City's Department of Ports and Terminals does at present, by applying standards specially developed to meet the situation.

The cities of Alameda and Seattle, which have adopted the Uniform Building Code, also have extensive provisions regulating the construction and maintenance of floating homes. Because of the similarity of floating homes to the larger vessels now being used for permanently emplaced museums, shops, and the like, such floating home codes should be of some value in the formulation of regulations for the larger vessels.

Concerning the various model codes the respondents cited as applying to their waterfront areas, it may be said that the

agencies responsible for their promulgation have yet to specifically address the special problems of the new waterfront development types. Of course, the greater part of the provisions of these codes will directly apply to such developments, to the extent that a particular development resembles its land-based counterparts. Moreover, some of the provisions of these codes are suitable for application to the more particularized problems of non-traditional waterfront structures and uses, especially the fire safety provisions for piers and similar waterfront construction, the electrical code provisions for electrical apparatus exposed to weather and water, and standards governing the use of piling foundations.

In sum, compilation of comprehensive regulations covering the entire range of problems these developments present will require considerable innovation and expertise. The large number of correspondents who indicated interest in the results of the survey suggests that such a compilation would be widely used and appreciated.