

**TITLE 28**  
**FLOATING STRUCTURES**

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**Chapter 28.01**

**PURPOSE AND SCOPE**

(Added by Ord. No. 163535,  
effective Nov. 3, 1990.)

**Sections:**

- 28.01.010     Statement of Purpose and Intent.
- 28.01.020     Scope.

**28.01.010     Statement of Purpose and Intent.**

It is the purpose of this Title to promote the public's health, safety and welfare through the regulation of floating structures and their appurtenances. These regulations recognize that waterborne structures, by their very nature confront different environmental factors than do structures located on land. Furthermore, it is recognized that waterborne structures have distinctive design requirements such that strict adherence or application of the land-oriented Specialty Codes is not always appropriate and that modifications or exceptions should be made in appropriate circumstances in the application of those codes.

**28.01.020     Scope.**

(Amended by Ordinance No. 178745, effective October 1, 2004.) This Title does not apply to the construction, maintenance, or operation of vessels or boats, except a boat shall not discharge waste into the waters of the City except as allowed by federal (Coast Guard approved sanitation devices) or state regulations.

The Oregon Structural Specialty Code, adopted by reference by the City in other portions of this ordinance, is to be modified as appropriate by a nautical application or tradition.

Examples: "ladders" (stairways) are often steeper in nautical use and in floating structures than allowed in the Oregon Structural Specialty Code; and floating homes often use circular stairways as the main and only stairway because of both space limitations and the nautical and design application. We direct that exceptions be made in this and similar circumstances to allow for the nautical character and unique needs of floating structures. If an impasse occurs between a permit applicant and the City, the appeal process shall be used to resolve the matter.

Floating structures moved into the City of Portland shall comply with this code as for new construction.

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**Chapter 28.02**

**DEFINITIONS**

- A. Addition:** An increase in the floor area or height of a structure or building.
- B. Alteration:** Any change or modification of existing construction.
- C. Berth:** An open (uncovered) waterside area defined by floating walkways and fingerfloats, for the wet storage of a boat.
- D. Boathouse:** A covered floating structure used primarily for the wet or dry storage of a boat.
- E. Combo:** A boathouse-floating home combination.
- F. Dangerous Structure:** See PCC 24.15.060.
- G. Fire Apparatus Access Roads:** Roads providing the driving surface for fire department vehicles responding to an emergency, extending from a public right of way to a point nearest a moorage or marine gangway or pier.
- H. Floating Home (Houseboat):** A floating structure used primarily as a dwelling unit.
- I. Floating Structure:** A structure supported by a flotation system and held in place by piling and mooring devices, including but not limited to boathouses, floating homes, marinas, and walkways.
- J. Gangway:** A variable slope structure intended to provide pedestrian access between a fixed pier or shore and a floating structure.
- K. Houseboat:** See floating home.
- L. Marina:** Floating structure(s) used primarily for the service, and/or repair, sale or moorage of boats in berths, but may include other occupancies.
- M. Moorage:** A site used for the mooring of one or more floating structures or boats and includes the piling, mooring connectors, piers, ramps, gangways, walkways, and the land area used in conjunction therewith.

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- N. Moored or Mooring:** The attachment of a boat or floating structure in one location temporarily or permanently to piles, walkways, gangways, piers or other structures.
- O. Mooring Connectors:** A connection between a floating structure, floating home, boathouse, berth, or marina, and a pile, pier, walkway, ramp, gangway or other structure, with the capability to hold the structure in place under reasonably expected conditions.
- P. Mooring Site:** A site within a moorage designed or used for the mooring of a boat, boathouse, floating home or other occupied floating structure.
- Q. New Construction:** A new building or structure or an addition to an existing building or structure.
- R. Pier:** A nonfloating fixed platform extending out over the water from shore to which gangways are usually attached.
- S. Ramp:** A fixed sloped structure providing pedestrian access between portions of a moorage which are at different elevations.
- T. Repair:** The reconstruction or renewal of any part of an existing structure for the purpose of its maintenance.
- U. Specialty Codes:** A code of regulations adopted under ORS 447.020(2), 455.020(2), 479.730(1) or 480.535 commonly referred to as the Structural Specialty Code, Mechanical Specialty Code, Plumbing Specialty Code and the Electrical Specialty Code.
- V. Tender House:** An uninhabitable, floating, accessory building.
- W. Transient Tie-Up:** A floating structure used exclusively for the open moorage of pleasure boats on a short term, maximum 72-hour stay.
- X. Walk:** A fixed portion of a floating home structure providing access to and around a floating home.
- Y. Walkway:** A covered or open floating structure used for ingress or egress to a mooring site. There are three types:
- 1. Fingerfloat:** A fingerlike floating structure, usually attached perpendicular to a main walkway, which physically defines a berth and provides direct pedestrian access to and from a berthed boat or floating home.

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2. Main Walkway: A floating structure to which several fingerfloats are attached, thereby providing direct pedestrian access between the berths and marginal walkways or shore.
  3. Marginal Walkway: A floating structure which provides pedestrian access between two or more main walkways and shore.
- Z. Waste:** Means garbage, litter, or sewage including kitchen, bath and laundry waste except for effluent from Coast Guard approved sanitation devices.

#### **Chapter 28.03**

#### **ADMINISTRATION AND ENFORCEMENT**

##### **Sections:**

28.03.010	Responsibility
28.03.020	Permits and Inspections
28.03.030	Fees
28.03.040	Appeals
28.03.050	Enforcement
28.03.060	Abatement of Dangerous Buildings

##### **28.03.010 Responsibility.**

(Amended by Ordinance No. 176955, effective October 9, 2002.) The Bureau of Development Services shall administer and enforce the provisions of this Title except that the Harbor Master shall have the initial responsibility for the inspection of existing moorages as well as the permitting, testing and inspection of standpipes. In the event that the Harbor Master determines a violation of this Title has occurred at a moorage under his jurisdiction, he shall report the same to the Bureau which will then have the enforcement authority thereof.

The State of Oregon Marine Board shall have responsibility for enforcing pleasure boat rules and regulations pertaining to operation and carriage requirements; and issuance of a certificate of title, identifying number plate, and disposition of all abandoned floating homes, combos and boathouses.

The State of Oregon Department of Environmental Quality shall have responsibility for enforcing violations pertaining to the dumping of waste into the waters of the City.

Nothing in this Title is intended to displace or conflict with any other relevant federal, state statute, rule or regulation nor grant exemption therefrom.

**28.03.020      Permits and Inspections.**

It shall be unlawful for any person, firm or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, or convert any structure regulated by this Title, except as provided for herein, or cause the same to be done without first obtaining a separate permit for each structure from the building official as required by this Title.

Exemption from the permit requirements of this Title shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this Title or any other rules or regulations of the City of Portland, the State of Oregon, or the Federal government.

Failure to comply with the terms of this Title subjects a person to such remedies as the Director, in the exercise of his/her reasonable discretion, deems appropriate, and as may be otherwise limited by law.

Unless otherwise exempted, separate plumbing, electrical and mechanical permits are required for any work performed covered by this Title.

**A.      Permits and inspections shall be required for the following:**

- 1.**      The new construction of floating homes or combos capable of supporting full time residency and any alteration work performed on these same floating structures involving over 50 percent of the structure.
- 2.**      The new construction of an addition of habitable space to a floating home or combo capable of supporting full time residency.
- 3.**      Existing or new floating homes or combos capable of supporting full time residency moved into the City of Portland.
- 4.**      The new construction of public and private floating structures such as, but not limited to, moorages, marinas, yacht clubs, places of assembly, living quarters, marine service stations and repair facilities; and attendant piling, mooring connectors, piers, ramps, gangways, walkways, land structures, roadways and parking areas.
- 5.**      Any new and/or alteration to any electrical, plumbing, heating/air conditioning installation on a floating structure, including wood stoves.

**B.      Permits and inspections are not required for the following:**

- 1.**      Repairs and alterations with like materials in a like manner to less than 50 percent of a moorage structure except as otherwise allowed in Section 28.05.020, B, 3, Walks.

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2. Replacement of piles provided the replacement piles are like material, installed in a like manner and total less than 50 percent of the piles supporting the structure. (NOTE: A permit is required from the U. S. Army Corps of Engineers.)
  3. Construction, alteration or repair of individual boathouses, swim or ski floats, or combos not capable of supporting full time residency.
  4. The attachment or reattachment of flexible water and sewer connections to individual floating homes and boathouses.
  5. Construction, alteration or repair of tender houses not meant or used for living purposes.
  6. Relocation of boathouses, floating homes, combos or other floating structures within a moorage or between separate moorages as long as the unit moved is in good repair and the distance between units is not diminished by the move.
  7. Other exceptions allowed pursuant to the various specialty codes.
- C. Arrangements with regard to permits and inspection for projects constructed outside of Portland but intended for use in Portland are to be made with the Chief Plans Examiner prior to the commencement of construction.
- D. It is the constructor's responsibility to request inspection prior to proceeding with the next phase of work. Instructions for requesting inspection are provided at permit issuance.

#### **28.03.030 Fees.**

Fees shall be paid in advance for all permits and inspections as required by other titles of the City of Portland Code.

#### **28.03.040 Appeals.**

- A. Right of Appeal. A person aggrieved by a requirement, decision, or determination arising out of this Title, may appeal to the Floating Structures Board of Appeal. An appeal may be made by sending written notice of the appeal to the Appeals Board secretary within ten days of notification of the applicability of the requirement, decision or determination. Appeals forms for that purpose shall be provided by the Bureau. Professional engineering is not required by the appellant in order to make the appeal.

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The appeal shall thereupon be directed to the Director, who shall review it within ten days of its submission, and who shall thereafter in writing affirm, annul, or modify the underlying requirement, decision or determination. In the event the appellant is dissatisfied with the decision of the Director, they can appeal that decision within 5 days to the Floating Structures Board of Appeal, which shall hear the appeal within 15 days thereafter. The Floating Structures Board of Appeal may, by a majority vote, affirm, annul, or modify the action of the Director. Decisions of the Board shall be final.

- B.** Alternate materials and methods of construction. The provisions of this code are not intended to prevent the use of any material or method of construction not specifically prescribed by this Title, provided any alternate has been approved and its use authorized by the Director or the Board of Appeal.  
Alternates may be approved providing that the proposed design, material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this Title in suitability, strength, effectiveness, fire resistance, durability, safety and sanitation.
- C.** Modifications. Whenever there are practical difficulties involved in carrying out the provisions of this code, or when the strict application of the land Specialty Codes does not allow the use of traditional nautical design, the Director or the Board of Appeal may grant modifications for individual cases, providing that findings are first made that a special individual reason makes the strict letter of the codes impractical, that the modification is in conformity with the purpose and intent of the codes and that such modification does not lessen any fire protection requirements or any degree of structural integrity.
- D.** Fee for appeal. There shall be a nonrefundable fee for each appeal of \$50.00.
- E.** Board of appeal. In order to determine the suitability of alternate materials and methods of construction and to provide for reasonable interpretation of the provisions of this Title, there is hereby created a Floating Structures Board of Appeal, consisting of seven members and three alternates, all of whom are to be appointed by the Mayor.  
The Board is composed of seven members and three alternates, each of whom is to be actively engaged in the following:

Member  
Number

- |   |  |
|---|--|
| 1 | Architect - plus Alternate Architect     |
| 2 | Engineer - plus Alternate Engineer       |
| 3 | Constructor - plus Alternate Constructor |
| 4 | For Profit Moorage Representative        |

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- 5 Non-profit Moorage Representative
- 6 Yacht Club Representative
- 7 Floating Home Resident

A quorum shall consist of five members with an Architect, Engineer, or Constructor being at least two. All persons shall be appointed for three-year terms and no person shall serve more than two consecutive terms. The Director or its designee shall be an ex-officio member and shall act as Secretary. No Board member or alternate may participate in a case in which they have a financial interest. If such a case comes before the Board, the member's alternate shall attend or the Mayor shall appoint a substitute. Any Board member or alternate may be removed from office by the Mayor for due cause, including malfeasance, incapacity, or neglect of duty.

The Board may use any or a combination of the following to resolve the appeal:

1. Approve the appeal as submitted or with modifications.
2. Disapprove the appeal with suggestions for resubmission.
3. Require the project conform to appropriate State Specialty Codes and other relevant City regulations.
4. Grant modification or relief from specific requirements of the State Specialty Codes or other relevant City regulations.
5. If specific technical or engineering information is to be considered, the Board has the option of seeking expert advice.  
The Board's decision shall be in writing, a copy of which shall be sent to the aggrieved, with a copy to be retained by the Director, and which shall thereafter constitute the criteria that when satisfied, will mandate approval of any required permit by the Bureau.  
On the yearly anniversary of the adoption of this Title, the Board shall report to the Director, and the City Council of their findings and recommendations as to the reasonableness, practicality, and administration of this Title, and any recommendations for change.

#### **28.03.050 Enforcement.**

The Director may pursue enforcement of this code under the provisions of PCC 3.30.015, Remedies.

#### **28.03.060 Abatement of Dangerous Buildings.**

(Amended by Ordinance No. 171455, effective August 29, 1997.) The Director may pursue abatement of dangerous floating structures under the provisions of PCC 29.40, Dangerous and Derelict Structures.

**Chapter 28.04**

**REGULATIONS FOR FLOATING  
STRUCTURES**

**Sections:**

- 28.04.010      General
- 28.04.020      Maintenance

**28.04.010      General.**

Floating structures and moorages shall comply with these specific regulations as well as applicable Specialty Codes, and all other applicable regulations of the City, State, and Federal governments. Where conflicts exist between these specific regulations and other regulations, this Code shall apply.

Other than the retroactive improvements required in subsections 28.05.010A and 28.05.020A, all installations lawfully in existence at the time of the adoption of this Title may continue, provided such continued use is not dangerous to life or adjoining property and is maintained in good working order. Existing floating structures moved to the City of Portland shall comply with this Code as though they were new construction or, they must be approved by the Floating Structures Board of Appeal.

**28.04.020      Maintenance.**

All floating structures and supporting structural systems, electrical, plumbing and mechanical installations and devices required by this title shall be maintained in good serviceable condition.

**Chapter 28.05**

**REGULATIONS PERTAINING TO  
EXISTING CONSTRUCTION**

**Sections:**

- 28.05.010      Floating Homes
- 28.05.020      Moorage Sites

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#### **28.05.010 Floating Homes.**

For the purpose of this chapter, floating homes and combos that contain a toilet shall be considered one and the same.

- A.** Retroactive improvements required of existing floating homes
  - 1.** Identification. Within 60 days of the adoption of this ordinance, all floating homes shall be identified by number or letter.
- B.** Regulations pertaining to repairs of floating homes.
  - 1.** Repairs not requiring the replacement of more than 50 percent of a floating home may be made with like materials in a like manner provided the repair or replacement does not cause an unsafe or overloaded condition and shall not require a permit.
  - 2.** Repairs requiring the replacement of 50 percent or more of a floating home shall be made in accordance with the provisions for new construction and shall require a permit.
- C.** Regulations pertaining to alterations and additions to floating homes.
  - 1.** Alterations of up to 50 percent, by size, and additions of up to 25 percent, by size, may be made with like materials in a like manner without regard to new construction clearance above water or separation requirements provided the alteration or addition otherwise complies with the provision for new construction. Additions in excess of 25 percent or the addition of an additional story shall be made in accordance with the provisions for new construction including separation requirements or alternatives and shall require that the existing structural system support all existing and new loads and comply with new flotation requirements.
- D.** Separation required between existing floating homes.
  - 1.** The separation existing at the time of the adoption of this ordinance between one floating home and another is approved.
  - 2.** Floating homes may be relocated within a moorage provided the distance between units is not diminished.

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3. Floating homes of new or existing construction moved from one moorage to another shall be spaced a minimum of 6 feet apart between the nearest exterior walls and 4 feet apart at the nearest roof projections, or be provided with the alternative protection system as required below.
  4. New, main floor additions to existing floating homes, of up to 25 percent by size, may be built with the same separation as exists at the time of the adoption of this ordinance between the floating home being expanded and the next adjacent floating home.
  5. New, main floor additions to existing floating homes, in excess of 25 percent by size, and second floor additions of any size, shall be spaced a minimum of 6 feet apart between the nearest exterior walls and 4 feet apart at the nearest roof projections, or be provided with the alternative protection system as required below.
- E.** Alternate protection systems to minimum separation between adjacent houseboats.
1. When the wall to wall separation is less than 6 feet but more than 3 feet, or the roof to roof separation is less than 4 feet but more than 2 feet, the structure being moved or added to shall be equipped throughout with a complete automatic sprinkler system installed in compliance with NFPA 13 or all of the following:
    - a. All windows in the affected wall or walls shall be 1/4 inch thick, fixed, wireglass in 16 gauge steel frames, or alternative wood frames if approved by the Fire Marshal. If this requirement negates natural ventilation requirements, a manually activated mechanical ventilation system providing two air changes per hour with 20 percent outside air shall be provided.
    - b. All doors in the affected wall or walls shall be 1-3/4 inches thick, solid core, and be self closing. Door lights shall be limited to 25 percent of the door area and be 1/4 inch thick, fixed wireglass in 16 gauge steel frames.
    - c. A fire alarm system consisting of 110 volt rate of rise detectors placed on the outside of the exterior wall or walls in question and throughout the building interior shall be provided. All detectors are to be interconnected to an interior and exterior alarm. The number and placement of detectors shall be as determined by the Fire Marshal. The exterior alarm shall be capable of being heard for a distance of 150 feet.

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2. When the wall to wall separation is less than 3 feet or the roof separation is less than one foot, the structure being moved or added to, shall be equipped throughout with a complete automatic sprinkler system in compliance with NFPA STANDARD 13.

#### **28.05.020 Moorages.**

##### **A. Retroactive requirements required of existing moorages.**

1. Identification. All moorages shall be provided with identification as follows:
  - a. All moorages shall be identifiable by name and address from the street on which they front at or near the point of emergency vehicle access.
  - b. The head of the gangway providing access to the moorage shall be obviously identifiable from the point of emergency vehicle access; or in those cases having a secondary access road, from the shore end of the access road; or the facility shall be signed as required to provide such identification.
  - c. The location and identification of all floating structures shall be obvious from the head of the gangway or a sign shall be provided indicating the layout of the moorage and the walkway and structure identification method.
  - d. The walkway and structure identification shall be logical and obvious.
  - e. Moorage identification work shall be done under benefit of Fire Marshal's Office permit.
2. Fire protection standpipe. The following described fire protection standpipe system shall be required at all moorages within one year of the effective date of this title; or an agreement shall be established within 6 months of the effective date of this title for such an installation to be completed within 3 years from the date of the agreement, unless an alternative arrangement has been previously approved by the Fire Marshal.

**EXCEPTION 1:** Installations requiring the use of pumps may have an additional year for the installation of the pump or pumps.

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**EXCEPTION 2:** Installations for moorages serving only pleasure boats may have an additional 3 years for the installation of the complete system (6 years total) from the date of adoption of this ordinance.

**EXCEPTION 3:** Installations for moorages used exclusively for loading and off loading boats or vessels and transient tie-up moorages. Moorages having any portion of a floating structure more than 250 feet from the point of fire apparatus set up, shall have a dry standpipe system designed and installed in accordance with the Uniform Fire Code and the following:

- a.** Have a water supply that complies with any one of the following:
  - (1)** Municipal water providing 500 GPM.
  - (2)** A fire hydrant within 1,000 feet from the closest point of fire department access to a moorage site exit ramp.
  - (3)** The Willamette or Columbia Rivers or associated bodies of water with pump or pumps capable of providing 250 GPM at 100 psi to any single outlet on the standpipe system. Pumps are to be powered with natural gas or propane and be listed by Underwriters Laboratory.
- b.** Have a fire department connection located within 150 feet of fire apparatus set up.
- c.** Have pipe sized to provide 250 gallons per minute at 100 p.s.i. pressure to any single outlet with a maximum input pressure of 150 p.s.i.
- d.** Have adequate drain valves installed to ensure complete drainage.
- e.** Have gate valve outlets made of noncorroding metal, 2-1/2 inch I.D. with National Standard threads spaced a distance apart as follows:
  - (1)** For moorages having marine service stations, floating homes or other type of structures having permanent living quarters, valves are to be every 100 feet and within 50 feet of the end of walkways.
  - (2)** For moorages serving only boathouses, valves are to be every 150 feet and within 75 feet of the end of the walkways.

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- (3) For moorages having only open moorage of pleasure boats, standpipes shall only be required along the marginal walkway with valves required only at intersecting main walkways, or not less than every 200 feet and 100 feet from the end of marginal walkways not having intersecting main walkways.
  - f. All fire protection standpipe systems shall be installed under benefit of permit from the Fire Marshal's Office.
  - g. Standpipe systems shall be tested in accordance with Uniform Fire Code Appendix III.C(88). The Harbor Master shall be notified at least 24 hours in advance of all tests and tests shall be done in their presence or the presence of their representative. An annual service test will be conducted by the Fire Bureau to assure the continuity of the system upon the signing of a waiver of liability and submitting a \$150.00 fee for each test.
- B. Regulations pertaining to repairs to moorages.
1. Repairs requiring the replacement of 50 percent or more of the piling shall be made in accordance with the provisions for new construction.
  2. Repairs not requiring the replacement of more than 50 percent of the piling may be made with like materials in a like manner.
  3. Walks: The following repairs of existing walks are allowed without permit or inspection:
    - a. Replacement of the decking, stringers and flotation logs.
    - b. Repair or replacement of up to 50 percent of the concrete portions of a concrete float.
  4. The repairing of any portion of a moorage in like manner to the original construction is allowed providing the resulting repair or replacement does not cause an unsafe or overloaded condition.
- C. Regulations pertaining to alterations and additions to moorages.

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- 1.** Walkways and supporting structure. Alterations and additions of up to 50 percent in area may be made with like materials in a like manner provided the alteration or addition does not cause an unsafe or overloaded condition.

**EXCEPTION:** Gangways and standpipes required as a result of any addition shall be provided in conjunction with such addition.

#### **Chapter 28.06**

#### **NEW CONSTRUCTION**

**Sections:**

28.06.010	Minimum Standards.
28.06.020	Materials and Installations.
28.06.030	Conventional Construction Methods and Materials for Floating Homes and Walkways.
28.06.040	Engineered Construction.
28.06.050	Fire Safety.
28.06.060	Gangways, Ramps, Walkways and Walks.
28.06.070	Identification

**28.06.010 Minimum Standards.**

The following are minimum standards by which moorages and floating structures are to be designed and built. Moorages and floating structures may be designed to a higher standard and be deemed to conform to these regulations.

**28.06.020 Materials and Installations.**

- A.** Structural materials. Structural members and connectors within 18 inches of the water shall be fabricated of materials or be coated or treated such that the materials will resist deterioration due to their proximity to the water except logs used for flotation and steel piling. In general: framing lumber shall be pressure treated with an approved preservative; framing connectors shall be hot-dipped galvanized or noncorrosive metal except for anchoring chain and pins; plywood shall have exterior type adhesive; exposed plywood shall be exterior grade.
- B.** Thermal insulation. Main floor insulation shall be of a type approved for damp locations.

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- C.** Underfloor ventilation. All enclosed floating home, combo, or boathouse wood construction systems, shall be ventilated in accordance with the building code.

#### **28.06.030 Conventional Construction Methods and Materials for Floating Homes and Walkways Using Log Support Systems.**

- A.** Floating homes. The following methods and materials are approved without engineering provided the highest point of the roof structure measured from the top of the first floor joists does not exceed 75 percent of the minimum width of the log float.
  - 1.** The logs and stringers forming the floats under floating homes and living portions of combos shall conform to these provisions: (See drawings at end of title.)
    - a.** The structure on the float cannot be larger than the float, except for decks.
    - b.** Raft logs are to be 16-inch minimum diameter at the tip and shall be spaced no greater than 18" between tangent points.
    - c.** Bearing walls should align over stringers or center line of logs. When not feasible, adequate support for bearing walls shall be provided.
    - d.** If the building inspector finds the completed log raft insufficiently stable for the intended structure he or she may then require the stringer layout to compose a rigid frame by the addition of side chords and fixed joints or cross bracing.
    - e.** Logs shall be Douglas Fir, Sugar Pine, Lodge Pole Pine, Western (Idaho) White Pine, Alaska Yellow Cedar and Sitka Spruce, sound and free of all bark above the water line.
    - f.** In a floating home foundation float at least 75 percent of all logs shall be full length. Segmented logs must be alternated between full-length logs. All outboard logs shall be full length.
    - g.** Logs shall be notched so as to provide sufficient bearing for the stringers. The seat of the notch shall be a minimum of 4-1/2 inches above the water level.

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- h.** Stringers shall be nominally a minimum of 4 inches by 10 inches for one story construction and 6 inches by 10 inches for two story or higher construction and shall be pressure treated to a retention of 0.4 pounds per cubic foot or refusal.
  - i.** Stringers inside of bearing walls shall be placed on the logs not more than 4 feet on center and fixed to the logs with headed steel rods a minimum of 5/8 inches in diameter and a minimum of 20 inches long. These pins are to penetrate the log at least 10 inches. Outside log connections are to have two pins.
  - j.** The wood construction below the joists is to be inspected for proper construction and soundness of logs, including dapped bearing connections, prior to installation of joists.
- B.** Walkways leading to floating homes. Floating walkway supports may consist of pressure treated 6 inch x 6 inch stringers not more than 6 feet-0 inches on center or 4 inch x 6 inch stringers not more than 5 feet-0 inches on center anchored to the logs with headed steel rods as described above. Single headed steel rods may be used at interior logs. Maximum joist spacing is 2 feet-0 inches on center.
- C.** Floatation. Floating homes need only have adequate flotation to maintain a clearance above the water which will result in the lowest floor being dry under all applicable load conditions.
- D.** Mooring connections. The intent of the provisions of subsection D is to provide construction which shall be adequate to keep the moorage in place under all reasonable load conditions. In some instances it may be necessary for the builder to provide additional measures.
  - 1.** Floating homes shall be anchored with connections to the logs. There shall be a minimum of two attachment points to the logs and these points shall be a minimum of one foot from each end.
  - 2.** The connections shall consist of a steel bracket or other approved connection. The bracket is to be 3/8 inch thick and adequate in size to support the pins. Pins are to be a minimum of 4 inches apart. This bracket shall be fixed with a minimum of three, headed steel rods a minimum of 5/8 inch in diameter and penetrate the log at least 10 inches. The connections from the bracket to the walkway or piling shall consist of chain with a minimum link wire diameter of 1/2 inch. If attached to walkway logs, the boom chain shall be looped around the second log or most secure log of the walkway. Walkways shall be adequately secured to

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piling. Bumpers or impact absorbing cushions must be attached to foundation float near anchorage connection points, minimum two per floating home float.

#### **28.06.040 Engineered Construction.**

- A.** General. Except those structures conforming to the conventional construction methods and materials, the minimum structural design of floating structures and moorages shall be in conformity with all applicable sections of the State Building Code and the requirements of this section. The piling, mooring connectors, the gangway, and flotation system for all floating structures shall have an engineer or architect of record who is registered in Oregon. Hereafter, where the term “engineer of record” is written it shall mean either engineer or architect of record. The Engineer of Record shall be responsible for establishing the design criteria and completing the design of the complete project. The Engineer of Record shall do this by preparing and certifying complete construction drawings and calculations for structural strength and flotation. The design criteria shall be substantiated by the Engineer of Record and noted on the first sheet of the construction drawings.

If an engineer(s) or architect of other than the Engineer of Record have been engaged to design a portion of the project (piles for example), the Engineer of Record is to:

- 1.** Verify that the other engineer(s) or architect(s) have provided drawings and calculations certified by an Oregon engineer or architect.
- 2.** Verify that the other engineer(s) or architect(s) have used design criteria (loads, load combinations, etc.) that have been established by the Engineer of Record.
- 3.** Verify the compatibility of the portion’s design with the design of the complete project.
- 4.** Verify that the designs of structural connections between the portion(s) of the project designed by other engineers and portions designed by the Engineer of Record have been accomplished by an engineer or architect registered in Oregon.
- 5.** Place review approval stamp on all drawings and calculations prepared by the other engineers showing that 1. through 4. have been accomplished.

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**B.** Loading. All floating structures, piling, mooring devices and gangways shall be designed and constructed to sustain, within the stress limitations specified in the State Building Code, all applicable loads specified in the State Building Code and this title.

1. Current loads shall be calculated on the basis of maximum current anticipated at the location of the structure.
2. Wave and wake loads shall be calculated on the basis of the maximum possible wave and/or wake that can be expected at the location of the structure.
3. Impact loads from boats, debris and other objects shall be considered with a minimum velocity of 2 feet per second.
4. Gangways not more than 6 feet wide shall be designed to sustain a live load of 50 psf unless they serve structures which contain an occupancy where more than 50 people may occupy a room at one time such as some dining establishments or meeting rooms. Those gangways and all those more than 6 feet wide shall be designed to sustain a live load of 100 psf.

**EXCEPTION:** Gangways not more than 6 feet wide serving public recreational boat launching and transient tie up facilities may be designed to sustain a live load of 40 psf.

5. All floating structures, piling, mooring connectors, gangways and ramps shall be designed and constructed to resist lateral forces produced by the reasonable combination of expected wind, current, wave/wake and impact loads at the location.

**C.** Mooring connectors.

1. Every floating structure shall be moored with connectors having the capacity to hold the structure in place under reasonably expected conditions.
2. Whatever structure the mooring connectors are attached to, whether it is a walkway, piling, or other, shall be designed to withstand the loads from the mooring connectors. The engineer of record's design criteria for the project shall include the maximum dimensions of the floating structure(s) as these determine the loads on the mooring connectors and their supports.

**D.** Piling.

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1. The floating structure shall be attached to piling which is adequate to resist lateral forces produced by any normally expected combination of wind, current, wave, wake and impact. The minimum height of the top of the piling shall be a minimum of two feet above the 100 year flood elevation as shown on the Federal Insurance Rate Maps published by the Federal Emergency Management Agency.

#### E. Flotation.

1. Floating structures shall be constructed and maintained to provide a flotation system that complies with the requirements of this chapter. The flotation devices shall be structurally sound and securely attached to the framing for the superstructure, except that foam flotation blocks may be held in place by friction only. The flotation systems shall provide support adequate to provide a level and safe walking surface under all reasonable load conditions. The following apply to all floating structures:

**EXCEPTION:** Floating homes, boathouses and combos need only have adequate flotation to maintain clearance above water under all applicable conditions.

2. Clearance Above Water. The clearance above water as measured from the water line to the top of the lowest point on the floor or deck under usual dead load conditions, shall not be less than 1 foot-0 inches for walkways, and not less than 1 foot-8 inches for all other floating structures.
3. Live Loads. In addition to dead loads, the flotation system shall be adequate to support the maximum condition of the following minimum live loads. Depending on use, higher loads may be more appropriate.
  - a. 25 psf applied to the gross area; or,
  - b. A concentrated load of 600 lbs.; or,
  - c. 25 psf applied to the gross, main floor area plus 10 psf on each upper floor or loft; or,
  - d. For nonresidential occupancies, the live load required by the State Building Code for the particular nonresidential occupancy.
  - e. Pedestrian walkways or ramps serving an occupant load of 10 or more 40 psf; all others 25 psf.

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- f. Pedestrian walkways or structures serving boat launching or transient tie up facilities only 20 psf.
  - g. At locations where live loads are transmitted from gangways to floating structures, the live load may be reduced 50 percent on the gangway for purposes of calculating the reaction only. Additional flotation may have to be provided to compensate for this reaction on the floating system to maintain the prescribed clearance above water.
- 4. Stability with short term, off-center loading or wind loading. The floating structure when subjected to either off-center loading or wind loading shall not exceed the following limitations:
  - a. The maximum angle of list shall not exceed 4.0 degrees, or the clearance above water when measured from the water line to the top of the first floor or deck shall not be less than 1/3 of the normal clearance above water, whichever is the more restrictive.
  - b. The ratio of resisting moment ( $M_r$ ) to applied moment ( $M_a$ ) shall be equal or greater than unity:

$$\frac{\text{Mr}}{\text{Ma}} \geq 1$$

The resisting moment due to buoyancy ( $M_r$ ) shall be computed about a longitudinal axis passing through the center of gravity at a list angle of not more than 4.0 degrees.

- c.** The minimum off-center loading shall be considered as applicable to the completed structure and shall be considered in addition to all dead loads. It shall consist of a minimum live load of 100 pounds per lineal foot of floor length at the first floor and 50 pounds per lineal foot of floor length at each additional floor or loft. If the width of the floor or loft exceeds 20 feet then the load shall consist of 5 pounds times the width of the floor per lineal foot of floor length at the first floor and 2.5 pounds times the width of the floor per lineal foot of floor length at each additional floor or loft. These uniform live loads are to be applied halfway between the center of gravity and the outside edges of the floors. The overturning moments resulting from the off-center loadings ( $M_a$ ) shall be computed about both sides of the center axis of gravity.
- d.** Other appropriate eccentric or off-center loading due to wind, snow, live loads or combinations of these shall also be considered.

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#### 28.06.050 Fire Safety.

- A. Fire apparatus access roads. Access to moorages shall be by fire apparatus access roads having all-weather driving surfaces capable of supporting a 23-ton load. Such roads shall be a minimum 20 feet wide with not less than 13 feet-6 inches overhead clearance. They shall be provided from the nearest public way to the head of the gangway. Fire apparatus turnarounds shall be required on any fire access road having a dead end exceeding 300 feet.
- B. Moorage exits. Two exit gangways are required whenever any one of the following conditions apply:
  - 1. The marginal walkway exceeds 250 feet.
  - 2. Total distance from the nearest point of apparatus set-up (usually at the head of a gangway) to the most remote portion of the moorage exceeds 800 feet.

**EXCEPTION:** Moorages used for the moorage of pleasure boats without covers (open moorage configuration) and having not more than two floating homes (for owner and caretaker, for instance) need have only one exit gangway.

When two exit gangways are required, they shall be separated by the maximum distance possible so as to avoid the possibility of any one fire cutting off exit or access to both exit gangways.

- C. Distance between floating homes.
  - 1. Floating homes at new moorages shall be spaced a minimum of 10 feet apart between the nearest exterior walls and 8 feet apart between the nearest roof projections.
  - 2. Separation distances may be reduced to 6 feet apart between the nearest exterior walls and 4 feet apart between the nearest roof projections when one of the following is provided:
    - a. A complete sprinkler system is installed in compliance with NFPA.
    - b. One hour rated exterior walls with protected openings (fixed 1/4 inch wire glass in 16 gauge steel frames and 45-minute door assemblies).

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- D.** Occupancy separation. A covered boatwell, in a floating home, enclosed on more than two sides shall be separated from the habitable space by a wall having 5/8 inch thick type 'X' gypsum board on the boatwell side.
- E.** Fire protection standpipe. Moorages having any portion of a floating structure more than 250 feet from the point of fire apparatus set up, shall have a dry standpipe system designed and installed in accordance with the Uniform Fire Code and the following:

**EXCEPTION 1:** Installations for moorages used exclusively for loading and off loading boats or vessels and transient tie-up moorages.

- 1.** Have a water supply that complies with any one of the following:
  - a.** Municipal water providing 500 GPM.
  - b.** A fire hydrant within 1,000 feet of the closest point of fire department access to a moorage site exit ramp.
  - c.** The Willamette or Columbia Rivers or associated bodies of water with pump or pumps capable of providing 250 GPM at 100 psi to any single outlet on the standpipe system. Pumps are to be powered with natural gas or propane and be listed by Underwriters Laboratory.
- 2.** Have a fire department connection located within 150 feet of fire apparatus set up.
- 3.** Have pipe sized to provide 250 gallons per minute at 100 p.s.i. pressure to any single outlet with a maximum input pressure of 150 p.s.i.
- 4.** Have adequate drain valves installed to ensure complete drainage.
- 5.** Have gate valve outlets made of noncorroding metal, 2-1/2 inch I.D. with National Standard threads spaced a distance apart as follows:
  - a.** For moorages having marine service stations, floating homes or other type of structures, having permanent living quarters, valves are to be every 100 feet and within 50 feet of the end of walkways.
  - b.** For moorages serving only boathouses, valves are to be every 150 feet and within 75 feet of the end of the walkways.

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- c. For moorages having only open moorage of pleasure boats, standpipes shall only be required along the marginal walkway with valves required only at intersecting main walkways, or not less than every 200 feet and 100 feet from the end of marginal walkways not having intersecting walkways.
- d. Standpipe systems shall be tested in accordance with Uniform Fire Code Appendix III.C(88). The Harbor Master shall be notified at least 24 hours in advance of all tests and tests shall be done in their presence or the presence of their representative. An annual service test will be conducted by the Fire Bureau to assure the continuity of the system upon the signing of a waiver of liability and submitting a \$150.00 fee for each test.

#### **28.06.060 Gangways, Ramps, Walkways and Walks.**

- A. Gangways, ramps and walkways shall be illuminated by lights designed, constructed and maintained to provide a minimum average of 1 foot candle of light per square foot at the walking surface.

**EXCEPTION:** Recreational boat launching and transient tie up facilities.

- B. Gangways and ramps shall have a maximum slope of 1 vertical to 2.5 horizontal and shall have a non-slip walking surface or surface cleats securely fastened in place with a maximum spacing center to center of 1 foot 6 inches.
- C. Gangways shall have a minimum, unobstructed width of 5 feet when a single gangway is required and 4 feet when more than one gangway is required and shall be provided with guardrails and handrails as required by the building code. Intermediate landings shall not be required for gangways.

**EXCEPTION:** Gangways serving an occupant load less than 10 and gangways serving recreational boat launching and transient tie up facilities need not be more than 4 feet in width.

- D. Walkways shall have a minimum, unobstructed width of 6 feet, except for fingerwalkways, which may be 3 feet in width.  
Cleats, bull rails, mooring connectors, utility stands and the like may project into the required width of main and marginal walkways.
- E. A 2-foot wide walk shall be provided on at least one side of all floating homes.

#### **28.06.070 Identification.**

All moorages shall be provided with identification as follows:

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- A.** All moorages shall be identifiable by name and address from the street on which they front at or near the point of emergency vehicle access.
- B.** The head of the gangway providing access to the moorage shall be obviously identifiable from the point of emergency vehicle access; or in those cases having a secondary access road, from the shore end of the access road; or the facility shall be signed as required to provide such identification.
- C.** The location and identification of all floating structures shall be obvious from the head of the gangway or a sign shall be provided indicating the layout of the moorage and the walkway and structure identification method.
- D.** The walkway and structure identification shall be logical and obvious.

**Chapter 28.07**

**ELECTRICAL INSTALLATIONS**

All electrical work shall be designed and installed in accordance with the State of Oregon Electrical Specialty Safety Code, Title 26 and this chapter. Permits and inspections are required for all work.

- A.** Transformer pads shall not be located closer than 8 feet to combustible surfaces and 2 feet to noncombustible surfaces.
- B.** Overhead power drops shall be installed and maintained minimum of 12 feet above walking surfaces and/or the ordinary high water line.
- C.** Electrical installations within 2 feet of the water shall be considered to be in a wet environment, except that installations inside a structure and not exposed to the water may be considered to be in a dry environment.

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#### **Chapter 28.08**

##### **PLUMBING INSTALLATIONS**

All plumbing installations shall be designed and installed in accordance with the Oregon State Plumbing Specialty Code (O.S.P.S.C.), Title 25 and this chapter. Permits and inspections shall be required for all work except for flexible connections and reconnections of sewer and water lines.

- A.** Sewage ejectors shall be installed in accordance with the manufacturer's instructions and the O.S.P.S.C., except that the head pressure required by Section 318 K (6)(3) for testing drainage systems is reduced from 10 feet to 5 feet for ejectors installed at individual floating homes.
- B.** Flexible connectors for water lines shall be approved by the National Sanitation Foundation and be of the type approved for mobile home installations or marine use.
- C.** Piping materials shall be as specified in the O.S.P.S.C.
- D.** Continuously running water through the moorage supply line is an acceptable alternate to pipe insulation to avoid pipe freezing.

#### **Chapter 28.09**

##### **MECHANICAL INSTALLATIONS**

All mechanical work, including but not limited to heating, air conditioning, ventilating, gas piping and woodstoves, shall be designed and installed in accordance with the State of Oregon Mechanical Specialty Code and this chapter. Permits and inspections shall be required for all work.