



NEWPORT BEACH

Harbor Commission Staff Report

April 8, 2026
Agenda Item No. 6.2

TO: HARBOR COMMISSION

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TITLE: Review and Discuss Proposed Additions to Mooring Specifications and Inspection Requirements for Helical Anchor and Dynamic Tackle Systems

ABSTRACT:

In November of 2024, the Harbor Commission recommended a pilot program to convert three City-owned moorings in the C field from traditional anchors to helical systems. The tests have proved successful, and the City now wishes to update the approved mooring specifications and inspection requirements to include the helical anchor and dynamic tackle systems for other mooring permittees who are interested in converting to this system.

Any change to the mooring specifications requires Harbor Commission approval.

Any change to the inspection requirements requires a Harbor Commission recommendation to update the municipal code that would be forwarded to the City Council for adoption.

RECOMMENDATION:

- 1) Determine this action is exempt from the California Environmental Quality Act (CEQA) pursuant to Sections 15060(c)(2) and 15060(c)(3) of the CEQA Guidelines because this action will not result in a physical change to the environment, directly or indirectly;
- 2) Provide direction to staff regarding the adoption of recommended additions to mooring specifications and inspection requirements for helical anchor and dynamic tackle mooring systems; and
- 3) Review and discuss the proposed amendments to Chapter 17 of the City of Newport Beach Municipal Code and related Mooring Specifications.

FUNDING REQUIREMENTS:

The proposed amendments are not expected to create any significant fiscal impact on the City. Reduced inspection frequency for qualifying systems may modestly reduce costs for

mooring permittees and the City over time. Permit holders, including the City, will continue to bear installation, testing, and inspection costs.

DISCUSSION:

BACKGROUND

The Harbor Department continues to evaluate advancements in mooring technology to enhance safety, environmental stewardship, and long-term cost efficiency within Newport Harbor. Traditional block or deadweight mooring systems have served the harbor for decades but present certain limitations, including seabed disturbance from weights, chain sweep, variable holding performance, and higher cyclical loading on hardware components.

Engineered helical screw anchor systems paired with dynamic (elastic/energy-absorbing) tackle components represent a significant improvement in mooring design. These systems achieve their holding capacity from soil shear strength rather than deadweight mass and are engineered to reduce peak loads during wind, wake, current, and storm events.

The proposed amendments to the mooring specifications establish minimum technical standards for:

- Helical screw anchor products
- Installation and certification requirements
- Load testing protocols
- Data logging and recordkeeping
- Inspection and maintenance intervals
- Enforcement authority

City of Newport Beach Municipal Code section 17.25.020 Anchorage, Berthing and Mooring Regulations (J) Specifications reads:

Specifications for the size of chains required on moorings, weights of moorings, and other mooring equipment shall be established by the Harbor Commission.

The specifications for offshore moorings were last updated in 2022, and the specifications for onshore moorings were last updated in 2025.

Changes to the Municipal Code can be recommended by the Harbor Commission but can only be adopted by the City Council.

A. SUMMARY OF PROPOSED MUNICIPAL CODE AMENDMENTS

1. Amendments to Section 17.01.030 – Definitions

The following terms would be added:

- Anchor, helical screw (Anchor)
- Chance Helical Anchor

- Installation Supervisor
- Equivalent

These definitions clarify product standards, certification requirements, and equivalency review procedures.

2. Amendments to Section 17.25.020 – Anchorage, Berthing and Mooring Regulations

The revisions would:

- Establish City findings supporting adoption of minimum technical standards.
- Apply standards to all new or replacement helical screw anchor installations.
- Authorize the Harbormaster to match anchor systems to vessel length categories.
- Require installation by certified maritime construction contractors.
- Require installation data logging and submittal prior to service.

3. Acceptable Products and Equivalency

Staff recommends that the revisions specify:

- Use of Chance Helical Anchors as the recognized standard or approved equivalent products.
- Use of Seaflex dynamic mooring systems as the recognized standard or approved equivalents.
- Detailed documentation for equivalency review, including certified material test data and fabrication drawings.
- Authority for independent technical review at applicant expense.

4. Installation and Load Testing Requirements

All newly installed anchors must:

- Be load tested to 120% of the rated vertical working load.
- Maintain test load for a required duration to be determined
- Demonstrate vertical displacement not exceeding one inch during testing.
- Submit certified test reports prior to placement into service.

Anchors failing testing must be remediated or replaced at the owner's expense.

B. RECOMMENDED HELICAL ANCHOR CONFIGURATIONS

Based on engineering analysis and the Mooring Anchor Weight Calculations (September 20, 2022), staff recommends the following minimum standards:

1. Vessels 70 Feet or Less

- Chance 1-1/2" Round Corner Square Shaft (SS5 Series)
- 8" and 10" helix configuration
- Minimum 10' embedment below mudline

- Safe Working Load (FS = 4.0): 3,150 lbs

Largest calculated mooring load for 70-foot vessel: 3,130 lbs (within Safe Working Load (SWL)).

2. Vessels Greater than 70 Feet and Up to 100 Feet
 - Chance SS5 Series with 8", 10", and 12" helices
 - Minimum 12' embedment below mudline
 - Safe Working Load (FS = 4.0): 6,200 lbs

Largest calculated mooring load for 100-foot vessel: 5,770 lbs (within SWL).

C. PROPOSED INSPECTION FRAMEWORK

1. Current Requirement (NBMC 17.25.020(K))

All moorings must be lifted and inspected at least every two years.

2. Proposed Revised Section 17.25.020(K)
 - Traditional moorings: remain on 2-year lifting cycle.
 - Approved helical anchor and dynamic tackle systems:
 - Inspection one year after installation.
 - Inspection at least once every four years thereafter.
 - Harbormaster retains authority to require inspection at any time.

D. ENHANCED INSPECTION AND MAINTENANCE PROGRAM

Staff recommends incorporating the following technical refinement:

1. Sacrificial Zinc Anode Requirement

All approved helical anchors must include a 15-pound sacrificial zinc anode to protect against corrosion.

This allows inspection to focus on:

- Zinc consumption levels
- Eyelet wear
- Hardware integrity

Routine removal of properly functioning anchors would not be required unless distress is observed.

E. POLICY RATIONALE

1. Improved Engineering Performance

Helical anchor systems are embedded into the seabed and derive holding capacity from soil shear strength rather than deadweight mass. When properly

engineered and installed to site-specific geotechnical conditions, these systems provide predictable holding power with significantly reduced horizontal drag and scour. The addition of dynamic tackle components reduces peak loading during wind, wake, and storm events by absorbing shock loads, thereby decreasing stress on shackles, swivels, and ground tackle.

Because these systems experience less cyclical shock loading and seabed movement than traditional chain-drag systems, deterioration rates are generally reduced and more uniform. A one-year post-installation inspection ensures installation integrity and verifies proper embedment and component performance. Thereafter, a four-year inspection interval is considered appropriate given the reduced wear characteristics and engineered design.

2. Environmental Benefits

Traditional moorings rely on a heavy chain that sweeps the seabed as vessels swing with wind and tide. This chain sweep can disturb benthic habitat and contribute to turbidity. Helical anchor and dynamic rode systems substantially reduce chain sweep by maintaining greater tension and minimizing bottom contact.

Reducing the frequency of required lifting from every two years to every four years for qualifying systems also decreases the periodic seabed disturbance associated with retrieval and reset operations. The amendment, therefore, provides environmental benefits consistent with the City's harbor management objectives and broader water quality goals.

3. Safety and Oversight

The proposal maintains:

- A mandatory inspection one year after installation verifies proper installation and early performance.
- The Harbormaster retains authority to require inspection at any time if conditions warrant.
- Inspections may be performed by qualified marine contractors subject to written certification.

This approach preserves public safety while aligning inspection frequency with actual system performance characteristics.

4. Incentivizing Modernization

Allowing an extended inspection interval for approved helical anchor and dynamic tackle systems creates a regulatory incentive for permittees to modernize their moorings. Modern systems typically provide:

- Greater holding reliability
- Lower lifecycle maintenance

- Reduced hardware fatigue
- Improved environmental performance

At the same time, fewer routine lifts reduce administrative oversight burdens and contractor mobilization impacts, producing operational efficiencies for both permittees and the Harbor Department.

5. Commensurate Regulatory Approach

The proposed change does not eliminate inspection requirements; rather, it establishes a differentiated inspection schedule commensurate with system design and performance. Traditional moorings would remain subject to the existing two-year lifting requirement, while engineered helical anchor and dynamic tackle systems installed to approved specifications would qualify for the modified schedule.

This performance-based approach aligns regulatory oversight with technological advancement, encourages environmental stewardship, and maintains the City's authority to intervene when necessary to protect navigation, property, and public safety.

CONCLUSION

The proposed amendments to the Mooring Specifications and Municipal Code modernize the City's mooring standards to reflect advancements in helical anchor and dynamic tackle technology. The performance-based inspection schedule balances safety, environmental stewardship, regulatory oversight, and cost efficiency.

Staff requests Harbor Commission review, discussion, and direction regarding preparation of revised Mooring Specifications and a Resolution recommending revisions to the Municipal Code that would be forwarded to the City Council for consideration.

ENVIRONMENTAL REVIEW:

Staff recommends the Harbor Commission find this action is not subject to the California Environmental Quality Act (CEQA) pursuant to Sections 15060(c)(2) (the activity will not result in a direct or reasonably foreseeable indirect physical change in the environment) and 15060(c)(3) (the activity is not a project as defined in Section 15378) of the CEQA Guidelines, California Code of Regulations, Title 14, Division 6, Chapter 3, because it has no potential for resulting in a physical change to the environment, directly or indirectly.

NOTICING:

The agenda item has been noticed according to the Brown Act (72 hours in advance of the meeting at which the Harbor Commission considers the item).

ATTACHMENTS:

ATTACHMENT A – Current Mooring Specifications

ATTACHMENT B – DRAFT Revised Mooring Specifications

ATTACHMENT C – Inspection, Overhaul, and Maintenance Requirements with DRAFT
Revisions