

Special Specification 4160

QIC Fender Repair



1. DESCRIPTION

Repair damaged fender components, replace wale and walkaway members, and clean and coat existing piling as shown in the contract plans. Bulk anodes will be installed on the steel piles in accordance with Special Specification "Cathodic System Conversion to Bulk Anodes".

2. MATERIALS

Furnish the following materials, unless shown otherwise on the plans:

Steel for Wales. Furnish ASTM A690 steel H-pile sections for wale beams in accordance with Item 442, *Metal for Structures*. Provide ASTM F3125, Grade 325 Type 1 Heavy Hex galvanized bolts, nuts, and washers or ASTM F1852, Type 1 galvanized Tension Controlled bolts in accordance with Item 447, *Structural Bolting*. Furnish steel for walkways from ASTM A36 carbon steel in accordance with Item 442.

Coatings for New Steel. Provide inorganic zinc primer in accordance with the System III-B or IV paint protection system specified in Item 441, "Steel Structures." Provide a marine-grade immersion top coating system, recommended by the manufacturer for marine immersion service, and meeting the requirements of NORSOK Standard M-501, Coating System No. 7. Submit a manufacturer's certification that states the material meets the requirements of NORSOK Standard M-501, Coating System No. 7. The system shall also fulfill the pre-qualification requirements for NORSOK Standard M-501, Coating System No. 1.

Coatings for Existing Steel and New Hardware. Provide a marine-grade immersion top coating system, recommended by the manufacturer for marine immersion service, and meeting the requirements of NORSOK Standard M-501, Coating System No. 7. Submit a manufacturer's certification that states the material meets the requirements of NORSOK Standard M-501, Coating System No. 7. The system shall also fulfill the pre-qualification requirements for NORSOK Standard M-501, Coating System No. 1. Upon completion of installation of new wale beams, coating system to also be used to coat new connection hardware.

Fender Pads. Provide ultra-high molecular weight - polyethylene (UHMW-PE) pads meeting the Maritime International Standard for UHMW and the properties in Table 1. Provide yellow UHMW-PE pads of the dimensions shown in the plans. Machine the pads before delivery to the site with the following tolerances: Thickness: $\pm 1/16"$; Width/length: $\pm 1/4"$; Hole Location: $\pm 0.05"$.

Table 1
UHMW-PE Properties

Property	Value	Test Method
Molecular weight	3.5 - 6 million	ASTM D4020-18
Izod Impact Strengths - Double Notch, 73F	18 ft-lbs/in ² (min)	ASTM D256-10, Method A
Hardness	65 Durometer, Min	ASTM D2240-15e1
Tensile Strength Yield Break Elongation at Break	3000 psi, min 4500 psi, min 300% min	ASTM D638-14

Wale Clips. Fabricate stainless steel wale clips using ASTM A276 Type 316 stainless steel bar in accordance with the dimensions in the plans. Weld in accordance with AWS D1.6 using electrodes

compatible with Type 316 stainless steel. Provide ASTM F593 Type 316 stainless steel threaded studs and ASTM F594 Type 316 stainless steel nuts and washers. Weld threaded studs to wale clips using the Drawn Arc Stud Welding process. Provide Loctite 232 Retaining Compound, or approved equivalent, for use with the stainless steel nuts and studs.

Bulk Anodes. Provide bulk anodes for fender piles in accordance with Special Specification *Cathodic System Conversion to Bulk Anodes*.

Replacement Parts. Provide to the Department additional replacement parts as follows:

- Five (5) Type A (8 foot long) UHMW-PE fender pads;
- Fifteen (15) wale fender clips complete with threaded studs, nuts and washers. Package each wale clip with the necessary nuts and washers.

3. EQUIPMENT

Provide equipment necessary to complete the work. Operate all water-going vessels, barges, etc. in accordance with United States Coast Guard regulations.

4. CONSTRUCTION

- 4.1. Coordination for on-water work. Delineate the work area as necessary, and in accordance with US Coast Guard requirements, to alert and warn both recreational and commercial vessels of ongoing construction work. Perform work on only one fender (west fender at Bent 35 or east fender at Bent 36) at a time.
- 4.2. Extent of Repairs. The plans indicate the extent and type of damage reported at the time the plans were prepared. Additional damage may have occurred in the period between plan preparation and contract award. Document type, length and location of wales and fender pads before ordering or fabricating replacements. Determine number of fender pads and clips to fabricate based on the types/length of pads, the required number of clips per pad, and the additional pads and clips to be provided to the Department as outlined above. Submit to the Department drawings of the proposed location of each type of fender pad and include the required number of pads per type.
- 4.3. Removal. Do not remove any existing fender components until the replacement components have been delivered to the project site and are ready for installation. Remove all damaged elements indicated in the plans. Remove other damaged elements as approved. Remove all UHMW-PE fender pads and clips, steel wales, steel wale attachments to existing piling, and walkways. All existing steel H and pipe piles are to remain in place unless directed otherwise by the Department. Avoid damaging existing H or pipe piles during item removal. Dispose of removed material in accordance with federal, state, and local regulations. Repair or replace steel H or pipe piles damaged during removal at no expense to the Department.
- 4.4. New Steel Members. Shop-paint new steel sections with 3.0 mils minimum Dry Film Thickness (DFT) inorganic zinc primer in accordance with the System III-B or IV paint protection system specified in Item 441, "Steel Structures." Apply a marine-grade immersion coating system recommended by the manufacturer for marine, immersion service, and meeting the requirements of NORSOK Standard M-501, Coating System Nos. 1 and 7 for wale beams. Submit product data sheets and obtain approval of paint system before performing the work.
- Erect and attach new wales and walkway members after the existing steel piles have been cleaned as outlined in section 4.4.1 below but before applying the primer and subsequent coatings. Weld new steel members to existing members in accordance with Item 448, *Structural Field Welding*. Bolt wales to support members in accordance with Item 447, *Structural Bolting*.
- 4.4.1. Follow the requirements for cleaning, preparing, and coating existing steel in accordance with Item 446, *Field Cleaning and Painting Steel*. Clean surfaces in accordance with SSPC-SP10 with a profile of 2 to 3 mils.

- 4.5. Existing Steel Members to Remain. Clean, prepare, and coat existing steel H and pipe piles to the limits shown in the plans. Field-coat a marine-grade immersion coating system recommended by the manufacturer for marine, immersion service, and meeting the requirements of NORSOK Standard M-501, Coating System No. 7 for existing fender piles and new hardware. Submit product data sheets and obtain approval of paint system before performing the work.
- 4.5.1. Follow the requirements for cleaning, preparing, and coating existing steel in accordance with Item 446, *Field Cleaning and Painting Steel*. Clean the surfaces and remove all coatings, rust and scale by Ultra High Pressure Water Jetting to SSPC-SP WJ-2L. In sure that at the time of recoating, the degree of flash rusting is not worse or greater than light (L). A jagged surface profile of 2-3 mils is required. SSPC SP11 is also considered acceptable.
- 4.6. Stripe Coat: Apply a stripe coat of epoxy intermediate coating in accordance with Item 446, with a minimum thickness of 3 mil DFT, to all edges, welds, bolt patterns, protrusions, and other areas that are otherwise difficult to coat using spray or roller methods.
- 4.7. Application. Apply the marine grade immersion top coat to all surfaces, including new hardware, in accordance with the manufacturer's requirements. If a second coat is required by application technique, do not apply second coat until first coat has fully cured.
- 4.8. Bulk Anodes. Connect bulk anodes to existing steel H and pipe piles in accordance with the plans and Special Specification *Cathodic System Conversion to Bulk Anodes*. Properly clean piling before welding of bulk anodes.
- 4.9. Fender Pads. Install wale clips on new wales and align clips with holes in fender pads. Apply a coat of the Loctite restraining compound to the threaded studs. Place the fender pads over the studs and secure with the UHMW nuts installed snug tight. Do not over-tighten nuts to avoid cracking fender pads. Replace any wale clips or fender pads damaged during installation at no cost to the Department.

5. MEASUREMENT

This item will be measured as Lump Sum. Bulk anodes for existing steel piles will be measured as outlined in Special Specification *Cathodic System Conversion to Bulk Anodes*. Additional repair work directed or approved by the Department will be measured as outlined in Article 4.4, *Changes in the Work*.

6. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under *Measurement* will be paid for at the unit price bid for *QIC Fender Repair*. This price is full compensation for removing and replacing fender pads, wales, wale supports, and walkways; repairing or replacing damage fender components; cleaning and painting existing steel pile; furnishing replacement fender pads and clips; and, the furnishing of all materials (except bulk anodes), equipment, labor, tools, and incidentals. Payment for additional work will be made in accordance with Item 4, *Scope of Work*.