

## Index 21930 Fender Systems - Prestressed Concrete Piles

### Design Criteria

*Structures Design Guidelines (SDG) 3.14*

### Design Assumptions and Limitations

***Do not use this fender system unless approved by the District for use on the specific project.***

***Design Standards*** Index 21930 includes a fully designed Fender System with 14" square prestressed concrete piling having an **"Energy Capacity" of 38 ft-kip.**

Refer to **SDG 3.14** for additional Fender System design criteria, assumptions and limitations. Use this standard with Index 21220.

### Plan Content Requirements

In the Structures Plans:

Include Index 21930 on waterways where a fender system is required and no barge traffic is present

Prepare and include in the plans supplemental project specific designs and details for the following items:

- Electrical service for navigation lights including conduit path from bridge to fender system and identification of service point. Coordinate design with Index 21220 and ***Specifications*** Section 510.
- Access ladders and catwalks from bridge to fender system are optional and may be included at the discretion of the District.

Designate in the plans the type of decking material to be used for catwalks: 2" x 12" Plastic Lumber or Fiberglass Open Grating. Catwalk decking material shall be determined by the District.

Complete the following "Data Tables" and include them in the plans. One "Estimated Bill of Materials Table" and one "Fender System Table of Variables" are required for each Fender System location within a project. For projects with multiple fender systems or configurations, clearly note which Fender System the Tables are applicable to. See ***Introduction I.3*** for more information regarding use of Data Tables.

Base the Minimum Pile Tip Elevations on the minimum embedment of 20 feet for the 14" square prestressed concrete piles into soil having a blow count (N) greater than 6.

Provide the required Clearance Gauge details in the plans adjacent to the Data Tables. Specify the numeral height, sign dimensions, foot marks and intermediate foot marks (when required), based on coordination with the USCG District Commander, ***33 CFR 118.160*** and the USCG ***Bridge Lighting and Other Signals Manual***.

Table for use with Index 21930 Fender Systems - Prestressed Concrete Piles:

| ESTIMATED BILL OF MATERIALS<br>FENDER SYSTEM - PRESTRESSED CONCRETE PILES<br>DESIGN STANDARDS INDEX NO. 21930 |               |      |          | Table Date<br>07-01-11 |
|---|---------------|------|----------|------------------------|
| MARK  | NO.<br>REQ'D. | UNIT | QUANTITY |                        |
| A1  |               | MB   |          |                        |
| A2  |               | MB   |          |                        |
| A3  |               | MB   |          |                        |
| A4  |               | MB   |          |                        |
| A5  |               | MB   |          |                        |
| A6  |               | MB   |          |                        |
| B   |               | MB   |          |                        |
| C   |               | MB   |          |                        |
| D   |               | MB   |          |                        |
| * E   |               | MB   |          |                        |
| F1  |               | MB   |          |                        |
| F2  |               | MB   |          |                        |
| F3  |               | MB   |          |                        |
| F4  |               | MB   |          |                        |
| F5  |               | MB   |          |                        |
| F6  |               | MB   |          |                        |
| G1  |               | MB   |          |                        |
| G2  |               | MB   |          |                        |
| H1  |               | MB   |          |                        |
| H2  |               | MB   |          |                        |

NOTE: For Member Marks, Sizes and Dimensions see Design Standards Index No. 21930, Sheet 7.

Bill of Materials Table above is for an entire fender system (left and right fenders).

\* Provide 2'-6" wide Fiberglass Open Grating for full length of fender in lieu of 2" X 12" Plastic Lumber when called for in Plans. Provide Stainless Steel Mounting Hardware and install per Manufacturer's recommendations. See Index 21930 for notes. Include the cost of Fiberglass Open Grating and miscellaneous items required to install the grating in the price for Plastic Marine Lumber (Non-Reinforced).

| FENDER SYSTEM<br>TABLE OF VARIABLES<br>INDEX NO. 21930 |         |                      | Table Date<br>07-01-11 |
|--|---------|----------------------|------------------------|
| CONTROL POINTS   | STATION | OFFSET<br>Lt. or Rt. |                        |
| A  |         |                      |                        |
| B  |         |                      |                        |
| C  |         |                      |                        |
| D  |         |                      |                        |
| DIMENSION "L"  |         |                      |                        |
| CLEAR CHANNEL WIDTH                                    |         |                      |                        |
| CHANNEL SKEW ANGLE                                     |         |                      |                        |
| MHW or NHW ELEVATION                                   |         |                      |                        |
| MLW or NLW ELEVATION                                   |         |                      |                        |
| PILE CUTOFF ELEVATION                                  |         |                      |                        |
| MINIMUM PILE TIP ELEVATION LEFT FENDER                 |         |                      |                        |
| PILE LENGTH LEFT FENDER                                |         |                      |                        |
| MINIMUM PILE TIP ELEVATION RIGHT FENDER                |         |                      |                        |
| PILE LENGTH RIGHT FENDER                               |         |                      |                        |
| NUMBER OF WALE ROWS                                    |         |                      |                        |

NOTE: Work this Table with Design Standards Index 21930.

## Payment

Include quantity for Composite Marine Lumber 10" X 10" Wales Mark A under Pay Item for Plastic Marine Lumber (Reinforced). Include quantity for all other Plastic Lumber under Pay Item for Plastic Marine Lumber (Non-Reinforced).

In TRNS\*PORT, include estimated quantities for the Index 21930 fender systems.

| <b>Item number</b> | <b>Item description</b>                                  | <b>Unit Measure</b> |
|--------------------|--|---------------------|
| 471-1-1            | Fender System, Plastic Marine Lumber, Reinforced         | MB                  |
| 471-1-2            | Fender System, Plastic Marine Lumber,<br>Non- Reinforced | MB                  |
| 455-34-2           | Prestressed Concrete Piling, 14" Sq.                     | LF                  |