

# Terminal 4 Fender Study and Replacement

Tacoma, Washington

**Owner:** Port of Tacoma

**Description:** The existing fendering system at the Port of Tacoma's Terminal 4 was not adequate to handle the size and class of ship currently operating there. Consequently, the Port hired INCA Engineers, Inc., A Tetra Tech Company (INCA) to study potential fender alternatives that would provide outstanding pier fender protection without interrupting service. Following the adoption of INCA's recommended solution, the Port authorized INCA to prepare plans and specifications.

The selected fender pile system consists of modules spaced 80-feet on center. Each fender module has two steel pipe piles driven vertically to position and support a prefabricated fender panel. This fender panel has two steel pipe sleeves which slide over the fender piles and two additional steel pipes oriented vertically. The four pipes are tied together at the bottom with a steel pipe waler and at the top with two steel beam walers. The vertical pipes are sleeved with HDPE pipe, which acts as a rub strip. The upper steel walers are faced with UHMW-PE rub strips. All steel portions of this alternative are galvanized to reduce corrosion.

The fender impact absorption mechanism includes a pair of four-foot diameter by four-foot long cylindrical rubber fenders. The rubber fenders are bolted to the existing wharf curb. The fenders are bolted to the upper steel beam walers.

## Special Features:

- ▶ Simple construction
- ▶ High energy capacity
- ▶ Innovative marine fender design saved time and money
- ▶ Fast installation and minimum disruption to operation
- ▶ Line handling guard

