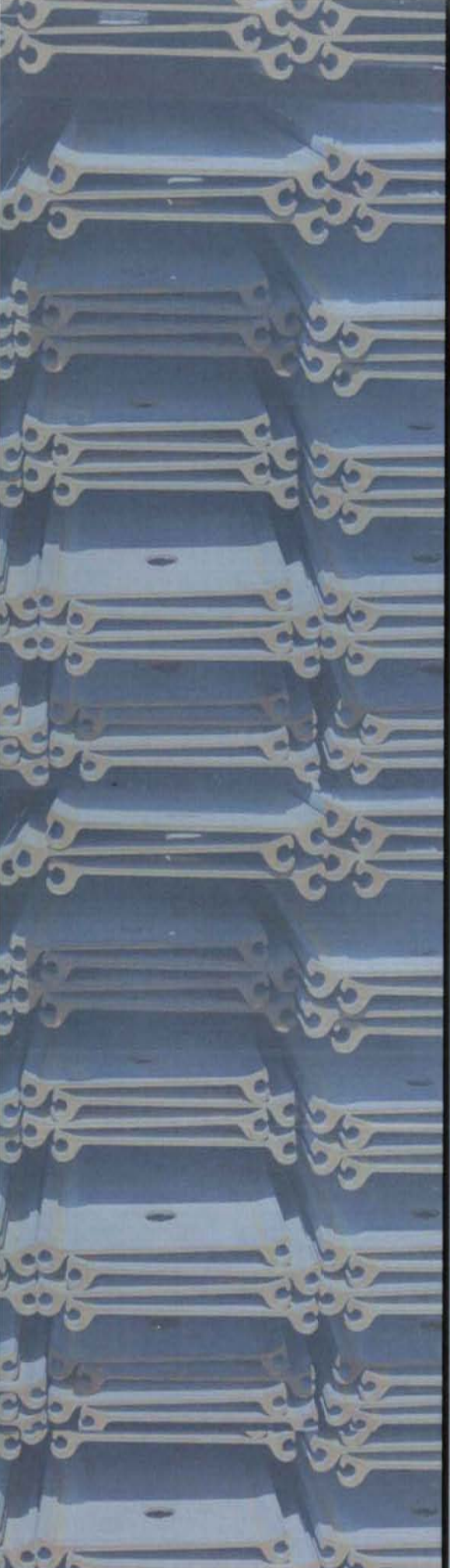


OPEN CELL™ TECHNOLOGY

P | N | D
Incorporated

CONSULTING
ENGINEERS

"This has been an extremely low-cost dock for us, first in construction costs as well as in maintenance."
- Warrenton Fiber Company

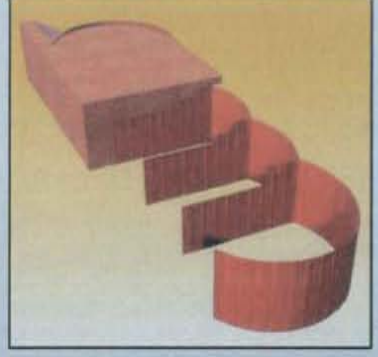
"After six years of heavy use and exposure to Knik Arm waves and ice, the structure is in good shape and functioning without maintenance." - North Star Terminal and Stevedore Company

"For deep structures, the Open Cell concept solves many problems with construction, cost, and function."
- Wilder Construction Company

"The City of Nome now has three Open Cell bulkheads in its port system. These structures are exposed to the open ocean environment where waves can reach 14 feet and sea ice can be 5 feet thick! After 10 years of such exposure, the Open Cells are performing well." - City of Nome

"Regarding the Barge Docking Facility in Council Bluffs, Iowa, we are pleased to inform you that we have finished offloading work of four barge shipments so far and will be receiving six more barge shipments this year. As designed very well by PND, we managed to offload the oversized cargoes from the barges at this Barge Docking Facility giving us efficient crane, self-propelled trailer work area as well as temporary cargo storage area with sufficient ground capacity."
- Hitachi Transport System (America), Ltd.

"The Open Cell design provides an uncomplicated structure which saved considerable cost over the alternative tied-back cantilever wall system. The Open Cell dock is being used to load-out very heavy loads, 600-ton bridge segments, using a 545-ton carrier for the new East Span of Oakland Bay Bridge Skyway in California. The structure has required no significant maintenance - even with our heavy use. Our pile driving crew had no previous Open Cell experience - construction was completed successfully without significant problems."
- KFM (Kiewit FCI Manson)



The Open Cell™

The Open Cell bulkhead, used primarily on docks and similar structures, is a cellular flat sheet pile structure in which each cell's sheet piles are driven in the shape of a U when viewed from above. The system functions as a horizontally tied membrane relying solely on the vertical flat sheet pile anchor wall to restrain a curved flat sheet pile arch face. The bulkhead becomes a series of U-shaped vertical member structures that does not need toe embedment for stability.

Nova Award

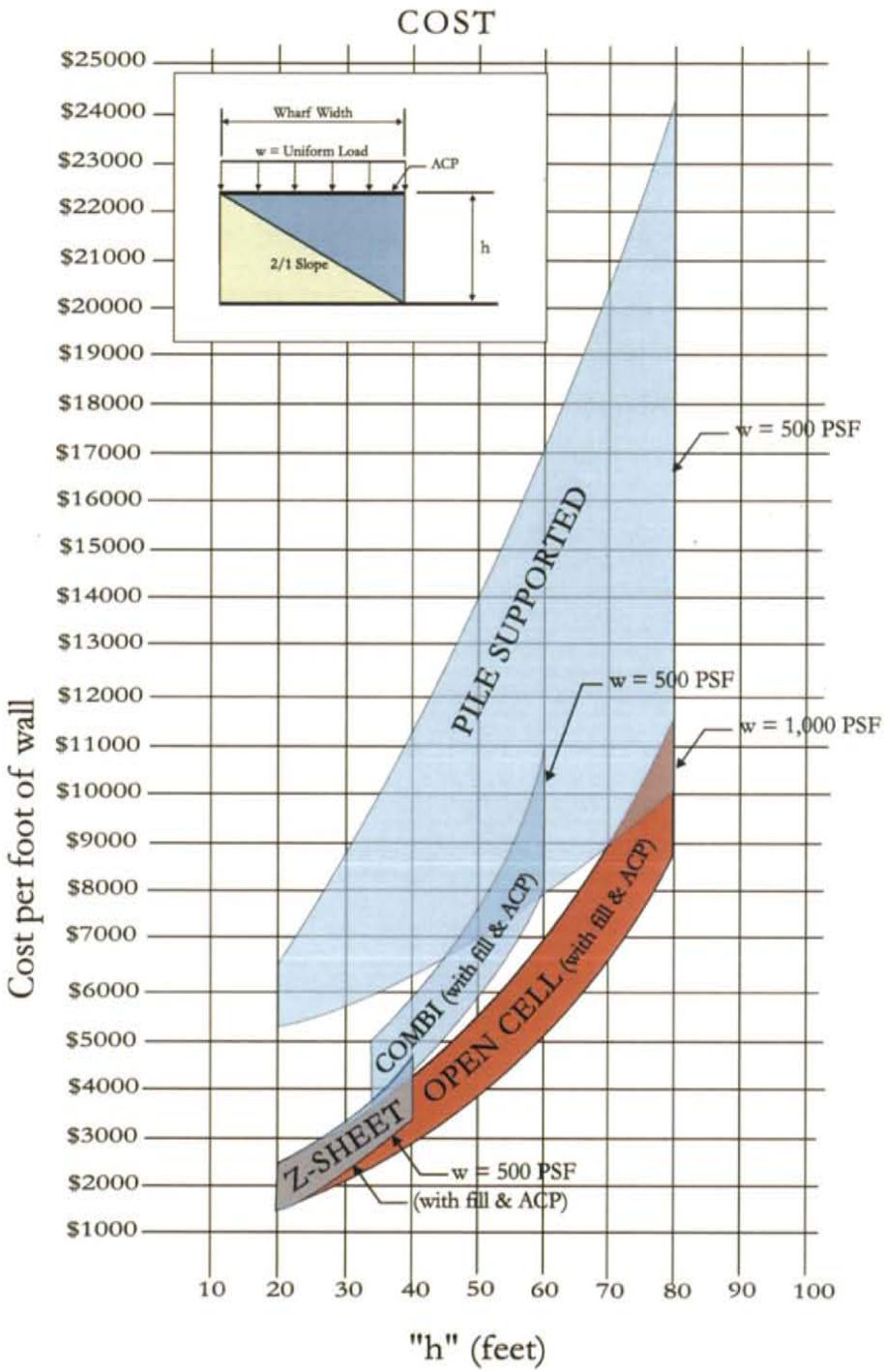
The Open Cell bulkhead was presented a NOVA Award in 1998. The NOVA award, which has been referred to as the "Nobel Prize" for construction, is awarded annually to revolutionary solutions, processes, or products that improve the quality, efficiency, and cost effectiveness of construction, and is presented by the Construction Innovation Forum, Inc. (http://www.cif.org).

Patent

The Open Cell system is patented, holding patent # US-6,715,964 B2.

OPEN CELL™ MATERIALS & COST

PND research has included working with Chaparral Steel, a U.S. manufacturer of flat sheet piles. Chaparral produces an improved version of the original PS31 and PS27.5. Since Chaparral and its distributor, L.B. Foster Company, became interested in the Open Cell concept, they have actively promoted its use with their clients as a cost-reduction incentive on many projects.

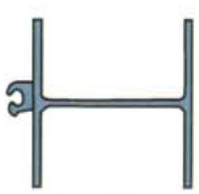


The entire Open Cell structure is simply constructed with the flat sheet pile and H-pile. The connecting wye pile can either be fabricated from flat sheets by welding or from an extruded wye connector. The Chaparral sheet pile is the recommended material for the Open Cell application because it provides high interlock tolerances while maintaining the necessary strength.

SWC 120

Flat Sheet

Wye Pile



Anchor Pile

OPEN CELL™ TECHNOLOGY

Open Cell technology presents a unique solution for waterfront structures providing the ***LOWEST COST and HIGHEST PERFORMANCE.***

The first Open Cell structure was completed in 1981 for ARCO Alaska, Inc., to support and protect a bridge servicing the oil fields. Since then, hundreds of satisfied owners and contractors have become convinced of the unique performance and low cost of Open Cells through their own experiences. The system delivers proven performance under both ideal and extreme conditions:

- ***HIGH LOAD CAPACITY***
- ***EASILY MODIFIED FOR INCREASED LOADING OR UNFORESEEN CONDITIONS***

- ***ICE*** (Note adjacent photo of Port of Nome, subject to severe ice and 14-foot seas)
- ***MINIMAL SHEETPILE TOE EMBEDMENT REQUIRED***
- ***SOFT SOILS APPLICABILITY***

- ***ACCOMMODATES LONG-TERM SETTLEMENT***
- ***CORROSION RESISTANCE*** (As evidenced in the adjacent photo, the flat sheets used in the Open Cell present a less corrosive surface than corrugated Z-sheets)

- ***DEEP WATER (65 FEET + WALL HEIGHT)***
- ***INSENSITIVE TO SCOUR***
- ***SEISMIC CONDITIONS*** (Note adjacent photo of failed tie-back sheet pile system with undamaged Open Cell bulkhead in background)

CONSTRUCTION

The simplicity of the Open Cell™ system is an advantage during construction because Open Cells require relatively few critical steps, which translates into a more efficient speed of construction. The speed of Open Cell construction is demonstrated with the projects pictured on this page.

Initially, fill is placed to provide a work pad for bulkhead construction. Next, a shore-based crane places a single-level template at the end cell or near the center of construction. The cell is driven and the template is moved to the next cell. The first tail wall and interior wall are driven. After several cells are installed in this manner, fill is placed in lifts in the cells as work progresses.

Depending upon fill and in-situ material properties, vibracompaction can be utilized to compact material above and below water table level. A typical vibracompaction pile developed by PND is shown above on the right.

Port MacKenzie Open Cell - Matanuska Susitna Borough, Cook Inlet, Alaska
This dock followed a typical Open Cell construction sequence. Despite the fact that this construction took place in the middle of winter with ice, snow, and tide ranges of up to 40 feet, the 500-foot-long cell construction was completed in less than 60 days of field work.

Point McIntyre - Phillips Petroleum Co., North Slope, Alaska
This 600-foot bulkhead was constructed to protect the Point McIntyre wellhead facilities from waves and ice. Field construction time for the project was about two weeks.

Williams Alaska Petroleum Port Development - Williams Alaska Petroleum, Inc., Anchorage, Alaska
This 1,100-foot bulkhead was constructed to provide additional uplands for Williams' operations as well as a dock for bulk cargo handling. Construction of the bulkhead was completed in less than 60 days.

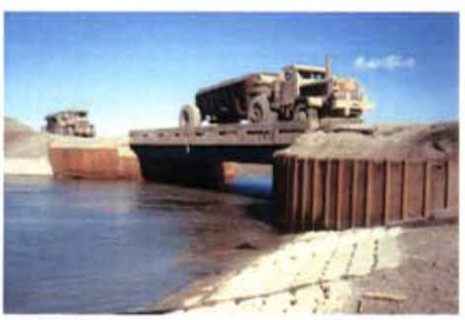
BRIDGE ABUTMENTS

Meltwater Bridge - ConocoPhillips Alaska, Inc., North Slope, Alaska
The Meltwater Bridges, utilizing Open Cell abutments, are clear examples of the strength of the Open Cell. The bridges are located on the North Slope of Alaska, and expereince extreme snow and ice conditions.

Open Cell™ Bridge - ConocoPhillips Alaska, Inc., North Slope, Alaska
This Open Cell bridge abutment is located in the North Slope of Alaska, and, as evidenced in the above photo, is able to withstand extreme snow and ice conditions.

Cornelius Pass Bridge - Willamette & Pacific Railroad, Burlington, Oregon
The creek crossing was bridged with a combination of Open Cell abutments and a recycled bridge section, which came from a nearby abandoned rail line. The abutments were necessary to keep fill slopes out of the creek and within the right-of-way.

North Slope Haul Road - ConocoPhillips Alaska, Inc., North Slope, Alaska
Various heavy-haul bridges have utilized the Open Cell structure for bridge abutments because of its high-load capacity, resistance to scour, and resistance to ice forces.



C Street Bridge at Ship Creek - Municipality of Anchorage, Anchorage, Alaska
This 136-foot-long bridge over the tidally influenced Ship Creek is located on soft marine sediments. The Open Cell bulkhead was used to provide a stable erosion-protected surface for a cast-in-place footing for the box girder bridge.

RETROFIT EXISTING BULKHEADS

Tampa Berths 1 & 2 - Tampa Port Authority, Tampa, Florida

The existing bulkhead was failing due to corrosion. In addition, the Port wished to dredge the face from -28 to -38 feet, which nearly coincided with the level of the bedrock. The solution was an Open Cell™ bulkhead that encapsulated the entire original bulkhead. Tail walls were extended through the original bulkhead at areas split with use of a splitter pile.

SOFT SOILS

La Brea Industrial Development - National Gas Company, La Brea, Trinidad

This 500-meter deep-draft heavy-load cargo wharf services the extensive oil and gas industry in Trinidad and Tobago and drives the development of the upland marine facility for construction and repairs of offshore drilling and production modules. The site geology consists of soft clays with pitch impregnated zones underlain by firmer materials. Lack of fill material in the area required the use of clay backfill for the majority of the area. High seismic requirements and soft weak soils were accommodated by the Open Cell system.

BULK CARGO

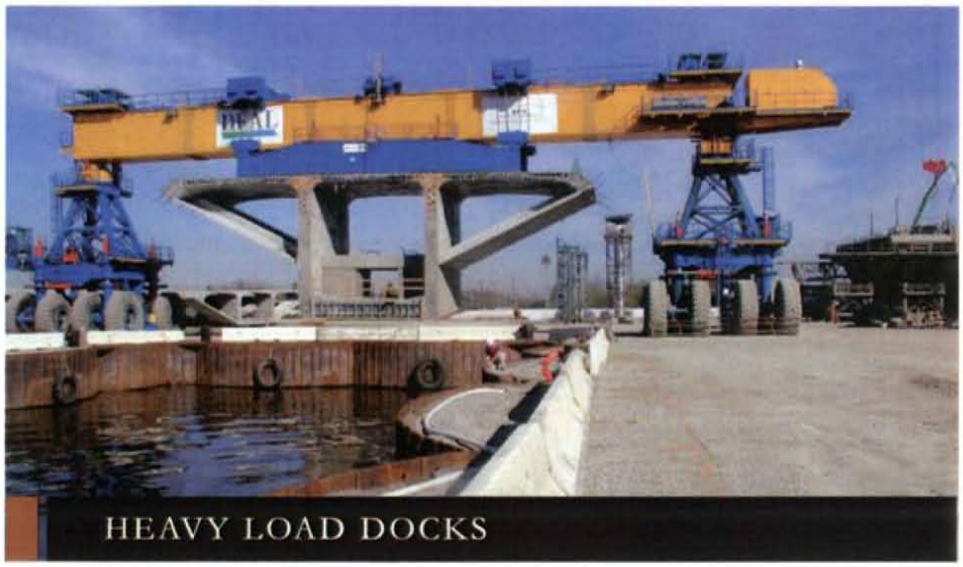
Northstar Island - BP Exploration (Alaska), Inc., Beaufort Sea, Alaska
This project incorporated a 360-foot-long Open Cell™ bulkhead at the south end of Northstar Island. The dock provides deep water access to the island while still providing ice resistance and scour protection. This project earned the Pile Driving Contractors Association's first "Driven Pile Project of the Year Award" in its inaugural competition in 2001.

Beelman Dock - Beelman Trucking, Venice, Illinois
These bulkheads on the Mississippi River are utilized for shipment of a variety of bulk freight including coal. The current facility supports conveyor systems extending over permanently moored barges for vessel loading.

CONTAINER DOCKS

APL Dock - American President Lines, Dutch Harbor, Alaska (right)
American President Lines' dock in Dutch Harbor was expanded 300 feet. The Open Cell bulkhead dock provided two acres of upland area and a dock capable of handling increased crane size and 100-ton axle container handlers.

Ballyhoo Dock - City of Unalaska, Dutch Harbor, Alaska (left)
The City of Unalaska retained PND to design an extension to its Ballyhoo facility. An Open Cell system was designed to meet the severe earthquake potential in the region as well as high vertical loads. Depth from the top of the bulkhead to mudline was approximately 60 feet.



HEAVY LOAD DOCKS

KFM Stockton Barge Slip - KFM (Kiewit FCI Manson), Stockton, California
The barge slip was designed for the transportation of precast concrete bridge segments to be used for the East Span Replacement of the Oakland Bay Bridge. Vehicle loads on the dock are more than 1,345 tons in soft silty clay soils. The Open Cell™ sheet pile barge dock was utilized at this site because of its lower cost than other dock options, such as tied-back walls.

Council Bluffs Transfer Facility - Hitachi America, Council Bluffs, Iowa (below)
This temporary dock provides barge-to-land transfer of heavy equipment for the adjacent Mid-America power plant. During construction it was discovered that soil conditions varied considerably across the site. Instead of uniform sand, a substantial portion of the site was covered with soft clay. The Open Cell structure was completed on time by modifying the tail walls to achieve overall structural stability.

Port of New Iberia - Omega Services, New Iberia, Louisiana (below) This bulkhead for Omega Services is capable of supporting 6,000-ton modules. Modules are transferred over the Open Cell bulkhead structure onto barges that transport them to the Gulf of Mexico.

North Star Dock - BP Exploration (Alaska), Inc., Anchorage, Alaska (left) Underlying soft marine sediments were encountered at the Port of Anchorage site designated for prefabricated oil field modules bound for the North Slope. An Open Cell bulkhead provided the dock structure to support a transfer of 2,500-ton modules onto barges.

EROSION CONTROL

Endicott Causeway Breach - BP Exploration (Alaska), Inc., North Slope, Alaska (above left)
High current flows and ice created potential scour depths in excess of 40 feet through the causeway breach. Open Cell™ technology was used to protect the abutments for this critical transportation link.

Chevron Alaska Facility - Chevron USA, Inc., North Kenai, Alaska (above right)
Fuel spills on upland property began leaking into Cook Inlet, which is subject to severe wave and ice conditions. The Open Cell bulkhead sheet piles were driven into an underlying clay layer with the top of the wall above high-tide wave action. An oil-collection system was installed behind the erosion-control bulkhead and is operating smoothly.

FEDERAL GOVERNMENT PROJECTS

U.S. Coast Guard Dock - U.S. Coast Guard and City of Unalaska, Dutch Harbor, Alaska
The U.S. Coast Guard and the City of Unalaska financed a 530-foot dock for utilization by both entities. The dock consists of a heavy-duty 325-foot Open Cell sheet pile dock and a medium-duty 180-foot pile-supported concrete deck panel dock with 2.5± acres of upland fill.

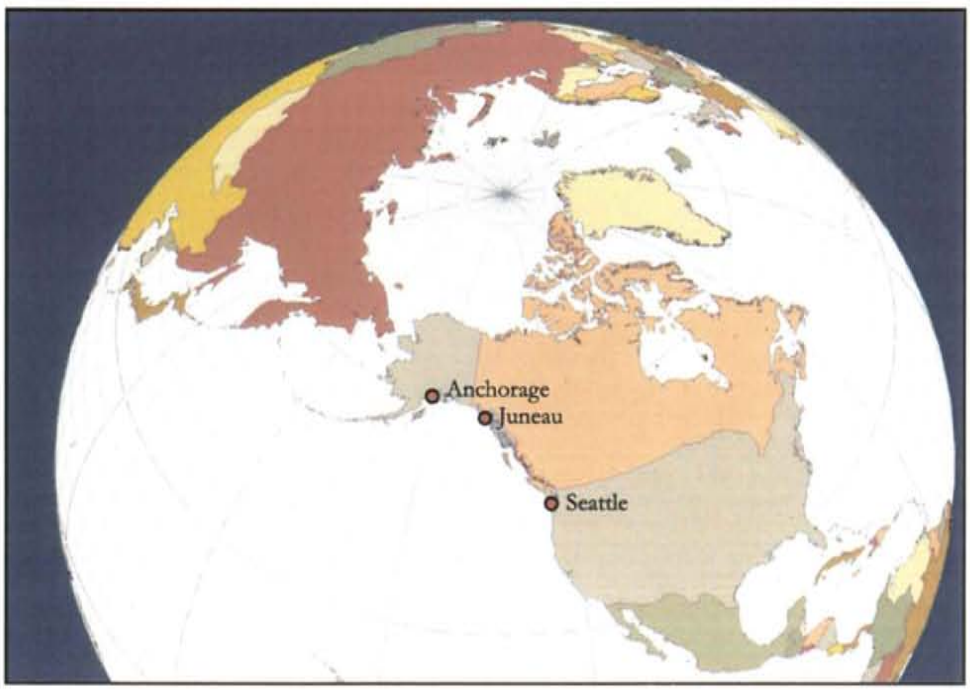
Corps of Engineers Louisville District - Paducah, Kentucky
Ohio River Locks and Dams 52 & 53 Replacement Project - Olmstead Locks and Dam Miter Gate Storage Yard utilized an Open Cell bulkhead to support the miter gates storage yard.

DOCK FINISHING

Various types of edge finishing can be employed to obtain a linear face on which to moor and operate. Continuous or intermittent steel beams and concrete have been utilized. The bulkhead can be left with a curved face and equipped with or without a steel pipe bullrail along its perimeter. Fender systems for various docks have been employed from simple to the sophisticated. The following are several different styles of finishing that have been employed.

PND Incorporated is a consulting engineering firm that provides civil, marine, geotechnical, structural, surveying and construction inspection services for a wide range of projects. The firm was founded in 1979, with offices now located in Anchorage and Juneau, Alaska; and Seattle, Washington.

PND has performed planning, design, and construction inspection for many marine facilities. These projects have included the design of floating and fixed docks, passenger boarding gangways, fender systems, and upland facilities that are used by various sized vessels, including 1,000-foot-plus cruise ships, ferry vessels, and recreational facilities for pleasure craft. As a firm that specializes in these types of projects, PND has the advantage of knowing the detailed requirements related to all phases of the design, construction, operation and maintenance of these facilities.



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