

SHORELINE EROSION ARMOR ROCK
BREAKWATER WAVE BARRIER WA
DEFLECTORS SEDIMENTATION CURRE
TIDES NUMERICAL MODELING CGWA
MIKE21 STWAVE BOUS2D DELFT3D SEDTRA
PLAXIS FIELD MEASUREMENTS BATHYMET

COASTAL ENGINEERING

PHYSICAL MODELS LOAD TESTING BEA
NOURISHMENT SHORELINE EROSION ARM
ROCK BREAKWATER WAVE BARRIER WA
DEFLECTORS SEDIMENTATION CURRE
TIDES NUMERICAL MODELING CGWA
MIKE21 STWAVE BOUS2D DELFT3D SEDTRA
PLAXIS FIELD MEASUREMENTS BATHYMET
PHYSICAL MODELS LOAD TESTING BEA
NOURISHMENT SHORELINE EROSION ARM
ROCK BREAKWATER WAVE BARRIER WA
DEFLECTORS SEDIMENTATION CURRE
TIDES NUMERICAL MODELING CGWA
MIKE21 STWAVE BOUS2D DELFT3D SEDTRA
PLAXIS FIELD MEASUREMENTS BATHYMET

SHORELINE PROTECTION



Beach Profile Surveys / Midway Island

PND's coastal engineers have extensive experience developing technical solutions to shoreline erosion and sedimentation challenges. Our design experience includes soft shore protection, mitigation requirements, and restoration of natural habitat.

For 35 years, PND has designed shore protection, coastal restorations, large rubble mound breakwaters, dredging, outfalls, vertical wave barriers, floating breakwaters, wave deflectors, and beach nourishment, all of which apply the specialized knowledge of coastal engineers.

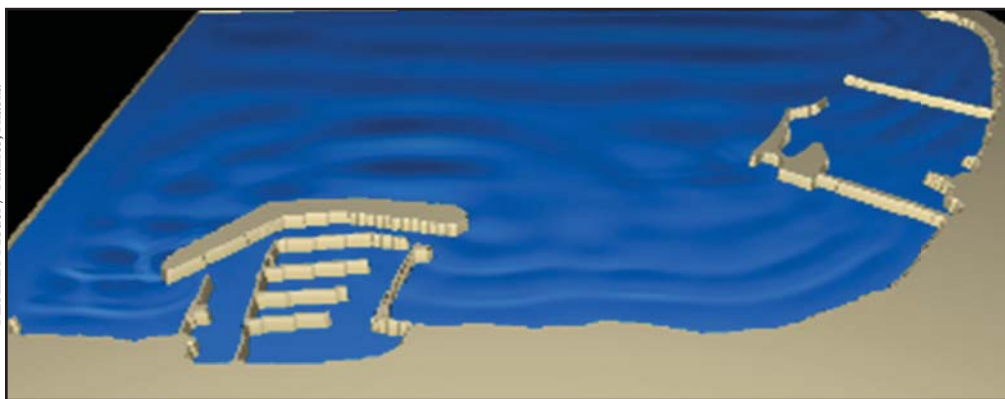


Rock Breakwaters / Wyeth, Oregon

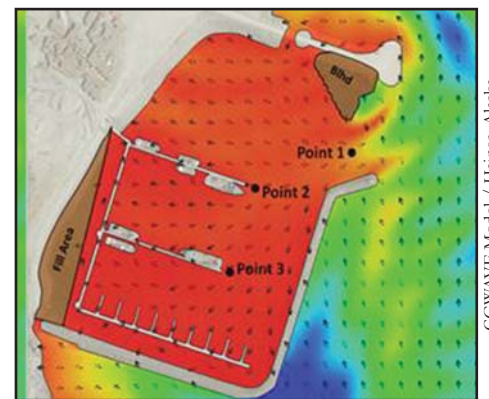


Breakwater Armor Rock Placement / Nome, Alaska

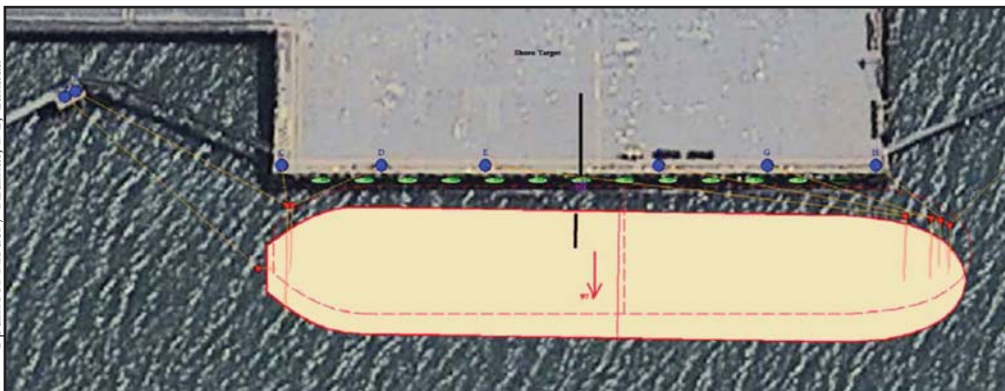
NUMERICAL MODELING



MIKE21 Model / Haines, Alaska



CGWAVE Model / Haines, Alaska

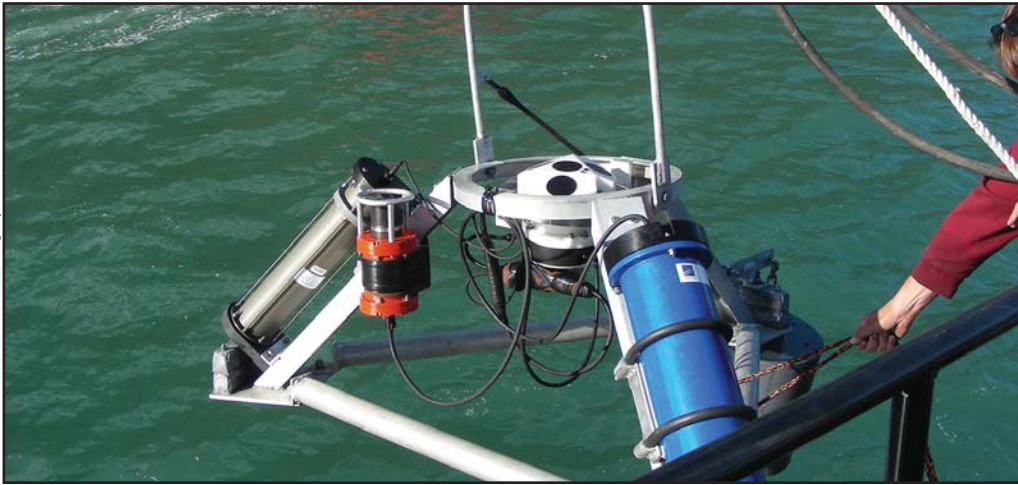


Optimoor Model / Kitimat, BC, Canada

Our coastal engineering team includes expert numerical modelers, oceanographers and technical staff. PND has direct experience applying a number of numerical models, including: CGWAVE, MIKE21, STWAVE, BOUSS2D, Delft3D, Sedtrans, SWAN and OPTIMOOR. We also have partnerships with several universities that allow application of cutting-edge, non-commercially available software when needed.

FIELD MEASUREMENTS

ADCP Deployment



Field measurements of environmental processes is an important component of coastal engineering. It is a common practice for PND's engineers to deploy a range of monitoring devices to provide accurate assessment of environmental and in-water conditions. Commonly collected data for field measurements include: bathymetric data; sedimentation and erosion monitoring; currents; side-scan sonar imagery; and wind, wave and water levels and sea ice.

Ice conditions provide an additional challenge to the coastal engineering process. Sea ice strength and thickness, as well as wind, waves, current, and ice loads provide an additional strain on safe and accessible mooring design. To address the design challenges in Arctic conditions, PND frequently utilizes specialized bottom-mounted oceanographic instruments to remove ice.



Field Investigation via Pontoon Boat

PHYSICAL MODELS

Ice Tank Testing - Arctic Offshore Island



Wave Model Testing / Kodiak Pier III, Kodiak, AK

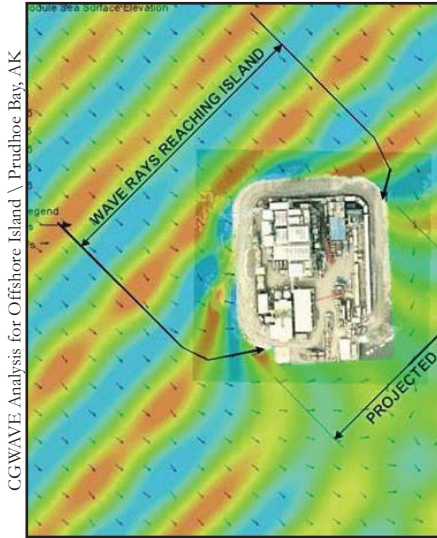


PND has performed extensive physical modeling for coastal projects. Our responsibilities have included: design, testing, and analysis of the physical wave and ice models. In addition, PND has done load testing of steel structures since the firm's founding in 1979.



Wave Tank Test

Shilshole Pier A Partially-Penetrating Breakwater \ Seattle, Washington



PND Engineers, Inc., founded in 1979, is a full-service consulting engineering firm that provides civil, marine, geotechnical, structural, and construction inspection services for a wide variety of projects.

PND's coastal engineering group comprises expert numerical modelers, oceanographers, civil design engineers, permit specialists, and field measurement engineers. Our in-house expertise ensures a well-integrated project team through all phases of a coastal project. Our experience includes waterfront projects on all five unique coastlines of North America (Atlantic, Pacific, Gulf of Mexico/Caribbean, Arctic, and Great Lakes) in addition to global experience spanning Russia, the Middle East, Central and South America.



Headquarters:

Anchorage Office
1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220

Juneau Office
9360 Glacier Highway, Suite 100
Juneau, Alaska 99801
Phone: 907.586.2093
Fax: 907.586.2099

Seattle Office
1736 Fourth Ave. S, Suite A
Seattle, Washington 98134
Phone: 206.624.1387
Fax: 206.624.1388

Houston Office

10497 Town and Country Way, Suite 210
Houston, Texas 77024
Phone: 832.930.4830

PND Engineers Canada Inc.

Vancouver Office
Suite 2000, Oceanic Plaza
1066 West Hastings Street
Vancouver, BC Canada V6E 3X2
Phone: 604.601.5247
Fax: 206.624.1388

For additional information please visit our website.
www.pndengineers.com