



Beach Nourishment

Alaska Department of Natural Resources
Coastal Processes and
Erosion Responses Seminar
6-7 October 2009 Anchorage

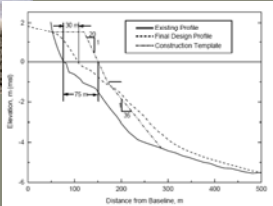
Orson P. Smith, PE, Ph.D.



Beach Nourishment



Grading initial trapezoidal construction template

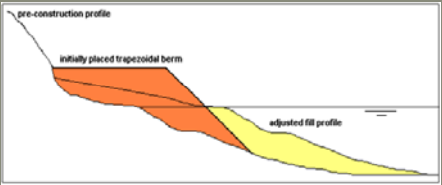


Engineering guidance:

- USACE, 2003, *Coastal Engineering Manual*
- National Research Council, 1995, *Beach Nourishment and Protection*
- Various publications of PIANC (International Navigation Assn.)

Coastal Processes & Erosion Responses Seminar 6-7 October 2009 - Anchorage 2

Placement design



Coastal Processes & Erosion Responses Seminar 6-7 October 2009 - Anchorage 3

Initial adjustment & spreading losses

original shoreline
spreading losses
PLAN VIEW
nourished shoreline
offshore adjustment of initial placement prism
spreading losses
adjusted profile (coarse fill material)
initial fill placement
adjusted profile (fine fill material)

Coastal Processes & Erosion Responses Seminar 6-7 October 2009 - Anchorage 4

Place natural material on beach

Indiana Dunes National Lakeshore beach nourishment.
US Army Corps of Engineers photo.


Coastal Processes & Erosion Responses Seminar 6-7 October 2009 - Anchorage 5

Restore recreational uses

Shore Protection at Coney Island, Brooklyn, NY.
US Army Corps of Engineers photo.

Coastal Processes & Erosion Responses Seminar 6-7 October 2009 - Anchorage 6

Offshore borrow site, hydraulic transport & placement



Beach fill placement by hydraulic dredge. US Army Corps of Engineers photo.

Coastal Processes & Erosion Responses Seminar 6-7 October 2009 - Anchorage 7

Beach Nourishment

Pro's

- Beach fill protects onshore structures from waves, runup, and erosion
- Beach uses are restored
- Appears natural
- Rapid rebound of beach organisms



Coastal Processes & Erosion Responses Seminar 6-7 October 2009 - Anchorage 8

Beach Nourishment



Con's

- Requires source of fill
 - Dredging offshore material may accelerate erosion
- Requires maintenance
- Expensive at remote sites
 - Mobilize specialized equipment

Coastal Processes & Erosion Responses Seminar 6-7 October 2009 - Anchorage 9

1995 NRC evaluation of beach nourishment projects

Objectives	Criteria for Success	Measures of Performance
Provide, enhance, or maintain a recreational beach	Acceptable width and capacity during the beach-going season	Periodic beach surveys using quantifiable observation techniques, such as aerial photography
Protect facilities from wave attack	Sufficient beach material remaining to dissipate wave energy	Evaluation of structure and flood damage after storms
Maintain an intact dune or seawall system	No overtopping during storms that do not exceed design water level and wave height	Periodic dune or structure inspections

Coastal Processes & Erosion Responses Seminar 6-7 October 2009 - Anchorage 10

1995 NRC evaluation (continued)

Objectives	Criteria for Success	Measures of Performance
Create, restore, or maintain beach habitat	Post-fill erosion rates comparable to historical values and seasonal extremes do not exceed design profile	Periodic beach surveys include beach sediment characterization
Protect the environment	Sediment extent and condition and the vegetation of the back-beach or dune meeting environmental needs	Observations of habitat characteristics and condition
Avoid long-term ecological changes in affected habitats	Return to pre-nourishment condition within an acceptable time period	Periodic monitoring of faunal assemblages of great concern

Coastal Processes & Erosion Responses Seminar 6-7 October 2009 - Anchorage 11

Nikiski beach nourishment

Photo of Rightenders Dock at Nikiski, Alaska, prior to 2004 beach nourishment to protect a sheet pile wall on its north side, where longshore sediment transport is blocked by the dock structure (photo provided by PND Engineers).

Coastal Processes & Erosion Responses Seminar 6-7 October 2009 - Anchorage 12
