



Low-cost shore protection



Coastal Processes and Erosion Responses Seminar – Anchorage
6-7 October 2009

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Wooden bulkheads and groins



Pro's

- Can use Alaska timber
- Requires modest construction skill
- No specialized equipment required
- Readily repairable

Con's

- Planks must be buried
- Salt-water corrodes hardware
- Fines escape between planks
- Limited resistance to ice
- Metal hardware of failed wooden structures can be hazardous

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Prefabricated concrete units



Pro's

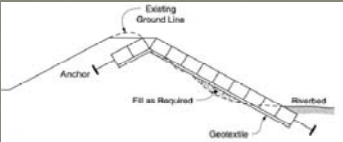
- Transportable by barge
- An alternative to larger rock or concrete elements
- Requires modest construction skill
- Conventional construction equipment is sufficient
- Can be interlocked to form a wall or revetment
- Moderately resistant to ice abrasion and pressure

Con's

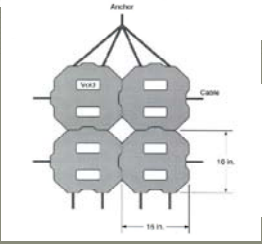
- Salt-water corrodes interlocking hardware
- Fine material can escape through gaps between modules (without a gravel or fabric filter below)
- Once interlocking fails, the matrix comes apart
- Impermeability causes wave reflection
- Smooth surface allows maximum runup

Photos from International Navigation Assn. (PIANC), 2005. Catalog of Prefabricated Elements, Working Group 36 Report

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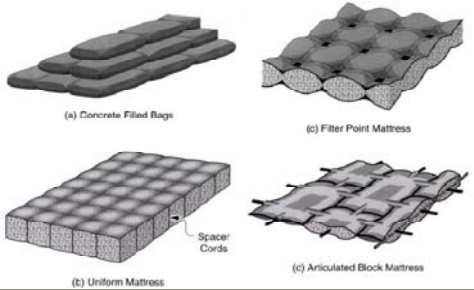


Articulated Concrete Mattress constructed at Aniak, AK along the Kuskokwim River in 1997



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Concrete-filled fabric protection



(a) Concrete Filled Bags (b) Uniform Mattress (c) Filter Point Mattress (d) Articulated Block Mattress

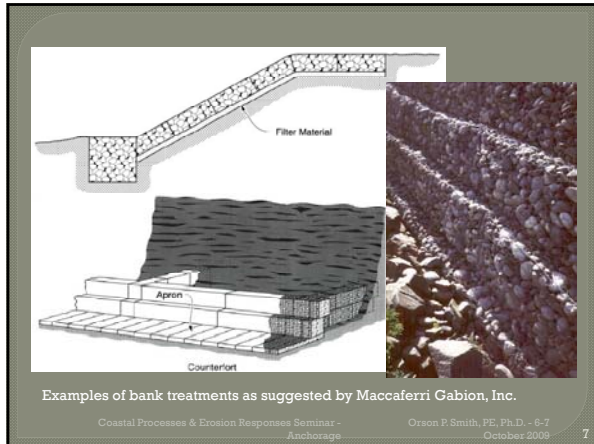
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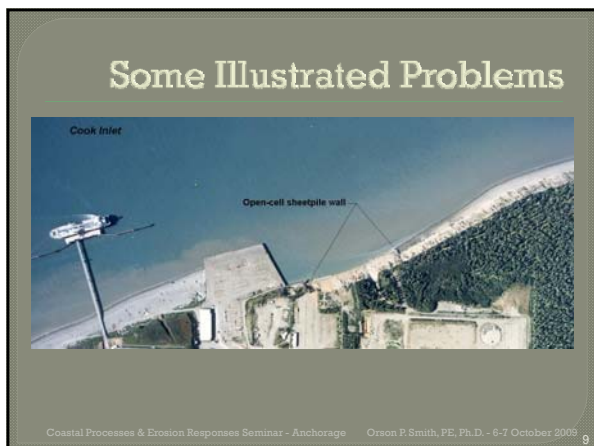
Wire-mesh baskets filled with cobbles or sand-bags

- **Pro's**
 - Transportable
 - An alternative to larger rock or concrete elements
 - Requires modest construction skill
 - No specialized equipment required
 - Can be wired together as an interlocked retaining wall
- **Con's**
 - Salt-water corrodes wire
 - Ice distorts shape and causes wires to fail
 - Sunlight degrades sand bag fabric
 - Wave forces distort baskets
 - Wire from failed gabions is hazardous

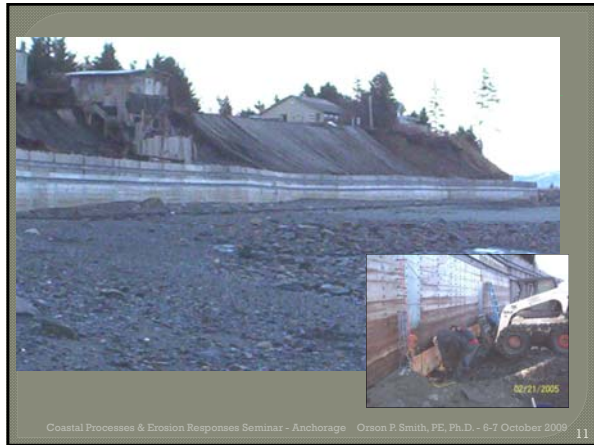
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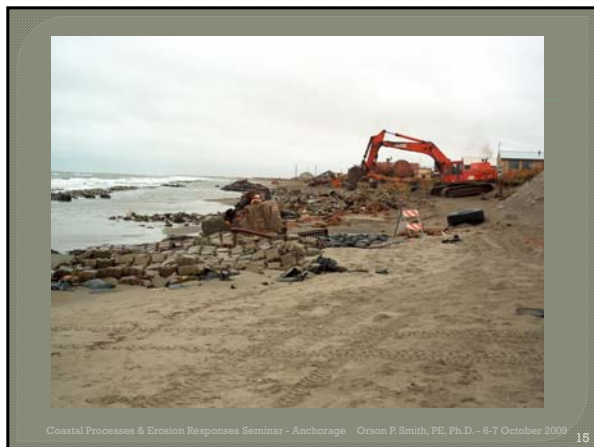












Conclusions

- Low-cost techniques don't work very well
 - Only suitable for emergency response, replaced by more substantial protection as early as possible
- Vertical walls have wave reflection that induces toe scour
- Don't forget the filter layer

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