Training Objectives

- To become familiar with different modes of transporting, offloading, and rehandling of dredged material.
- To identify uses and limitations of different methods.
Linkages

Dredging/Excavation → Staging/Rehandling → Treatment → Disposal

Transportation

Transportation Modes

- Pipeline
- Barge
- Conveyor
- Railcar
- Truck/Trailer
Generally Speaking:

- Mechanical dredges typically produce dense, near in situ water content material that is hauled by barge, railcar, truck/trailer, or conveyor systems.
- Hydraulic dredges produce dredged material slurries ranging from 5-20% by volume that can be transported by pipeline to either a rehandling site or disposal site.

Rehandling/Temporary Storage

Temporary storage may be needed for dewatering or other pretreatment or equalization prior to treatment and disposal.
Transport Considerations

- Transport distance.
- Scale of project.
- Batch transport
  - not efficient for hydraulic dredging since pipeline transport is inherent with removal.
  - is a step in the process train for mechanical dredging but reslurry & pipeline is an option.

Pipelines

4/20/2005
Environmental Dredging Workshop
Seattle, Washington 2005
Pipelines

- Direct pumping to rehandling, treatment and/or disposal site when location is near.
- Typical distances only few kilometers unless booster pumps are used.

Booster Pumps

- Used when dredge has limited hp to pump treatment or disposal site
- Must be carefully selected
- Designed for
  - Feed rate
  - Slurry concentration
  - Pumping distance
  - Pump pressures
  - Pipe diameter
  - Leakage containment
Booster Pumps

- Next to pump discharge
  - Designed so discharge pressure does not exceed bursting strength of pipeline
- Near mid-point of pipeline
  - Designed so that the velocity pressure exceeds suction head of the pump
  - Typically at about 40% of line length from main pump

Floating and Submerged Pipelines

Connected to Hardpoint
Slurry Transfer

- Mechanically dredged material may also be diluted with water and pumped through a pipeline as a slurry to nearby treatment/disposal sites.
Slurry Transfer

- Mechanically dredged material may also be loaded into a hopper equipped with a piston pump.

Transport By Barge

Barge

- Mechanically dredged material is placed in a scow or barge for transport to a rehandling facility.
- In certain situations, pumping directly into a barge may be feasible.
Hydraulically Loading Barge

Hydraulic crane offloading barge and loading feed hopper with raw dredged material at Claremont DMRF

Typical Offloading

4/20/2005
Environmental Dredging Workshop
Seattle, Washington 2005
Offloading Small Barge

Hydraulic Pump
Offloading
Hydraulic Offloader

Debris
Conveyors

- Mechanical conveyors can move material from barges to adjacent rehandling facilities or to move material relatively short distances.
- Material should be dewatered for transport by conveyor.
- Floating conveyors are not recommended.
Conveyors

- Conveyor systems used in dewatering facilities

Railcar

- Rail spurs may be used or even constructed to link rehandling/treatment facilities to the rail network.
- Many licensed landfills have rail links, so long-distance transport by rail is potentially an option.
Truck/trailer

- Dredged material re-handled directly from barges or railcars to roll-off containers or dump trucks for transport to treatment/disposal site.
- The material should be dewatered prior to truck transport over surface streets.
- In some smaller sites where dewatering may be difficult or the cost of disposal is not great, conditioning with materials such as lime or cement for hauling may be feasible.

4/20/2005  Environmental Dredging Workshop
Seattle, Washington 2005

Offloading Directly to Truck

4/20/2005  Environmental Dredging Workshop
Seattle, Washington 2005
Loading Container Box

Offloading Railcar to Truck
Dewatered/ Stabilized Material

4/20/2005
Environmental Dredging Workshop
Seattle, Washington 2005

Dewatered/ Stabilized Material

4/20/2005
Environmental Dredging Workshop
Seattle, Washington 2005
Decon Truck Leaving Site

Truck Leaving Site

Project Managers

- Should consider the compatibility of the dredge with the subsequent transport of the dredged sediment.
- Should consider potential contaminant losses to the water column and atmosphere during transport, dewatering, temporary storage, or treatment.
- Should consider the difficulty in removing all sediment from barges, especially when unloading them mechanically.

(Continued)
Project Managers

• Should consider the need to treat water prior to discharge, especially when decontaminating equipment and dewatering dredged material.
• Should include the costs of water treatment in cost estimates for the alternative.
• Should recognize that water treatment costs may also affect choices regarding dredging operation and equipment selection.
• Should evaluate implementation risks, both to workers and to the community, between the various transportation methods.

QUESTIONS?
Thank You

Norman R. Francingues, MSEE
frasang@canufly.net