Managing Large Quantities of Post-Disaster C&D Debris

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Overview

• Disaster debris classifications
• Landfill ramifications
• Disaster planning
Disaster Classifications

- Hurricanes
- Tornados
- Floods
- Fires
- Earthquakes

- Much of debris is
  - Soil, building materials, vegetative waste
Hurricanes

- Building Material
  - Residential vs. Commercial
- Sediments/Soil
- Vegetative Waste
- Personal Property
  - Appliances
    - White Goods, E-Waste
  - HHW
Tornados

• Building Material
  – Residential vs. Commercial

• Vegetative Waste

• Personal Property
  – Appliances
    • White Goods, E-Waste
  – HHW
Floods

- Sediments/Soil
  - Sandbags, reinforcing materials
- Building Material
  - Drywall, insulation
- Personal Property
Fires

- Ash
- Burnt wood
- Personal Property
- Metal
- Concrete
- Soil
Earthquakes

- Building Materials
  - Residential vs. Commercial
- Personal Property
  - Appliances
- Infrastructure
  - Concrete
  - Asphalt
Landfill Ramifications

• Depletion of disposal capacity
  – May double + annual disposal
    • Hurricane Isabel ~10M CY in MD/VA
  – Total capacity and individual cells

• Increased equipment needs
  – Compaction equipment
  – Increased working face

• Increased personnel requirements
  – Longer hours
  – May need to import workers
Landfill Ramifications

• Spike in gas generation
  – Increase in organic materials and moisture
  – Drywall $\rightarrow H_2S$

• Change in debris type and density

• Landfill operations impacts

• Health & Safety

• Documentation!
Landfill Operations Impacts

• Additional equipment operators
  – Training for landfill operations

• Increased traffic
  – Queuing problems

• Landfill compaction

• Material screening
Landfill Operations Impacts

- Daily cover needs
- Increased leachate generation
- Change in leachate characteristics
- Slope stability and landfill settlement
- Existing infrastructure protection
  - Monitoring wells
  - Extraction wells
Health & Safety

- Unfamiliar site users/operators
- Increased urgency to operations
- Material screening
- Increased traffic
- Personnel fatigue
- Hot loads – Fires
- Long working hours
  - Darkness/lighting
Documentation

• Material types
  – Disposed vs. diverted
• Material amounts
• Disposal location
• State vs. Federal requirements
Disaster Planning

- Space planning
  - Disposal location
    - Avoid sideslopes if possible
- Disposal capacity
- Maintenance of permit grades and elevations
- Material types and treatment
- Material separation/segregation
The Goal

- Avoid the disaster after the disaster