# Overview of C&D Materials Reuse

#### Tom Napier U.S. Army Corps of Engineers Construction Engineering Research Lab



7/2010 9:56:11 AM

**Construction Engineering Research Laboratory** 

# WHAT'S REUSABLE OR RECYCLABLE?





9/7/2010 9:56:11 AM

Construction Engineering Research Laboratory

#### Buildings

- Restoration or adaptive reuse
- Relocation







- Concrete
  - Recyclable
    - Compacted base
    - Engineered fill
    - Fill
    - Erosion control
    - Trails
  - Recycling concrete is common, if not universal





9/7/2010 9:56:11 AM

Construction Engineering Research Laboratory

- Lumber
  - Reusable
    - Resale
    - Antique millwork
  - Lumber resale is somewhat nichemarket
  - Timber resale is a robust market







**Construction Engineering Research Laboratory** 



- Lumber
  - Recyclable (clean)
    - Mulch
    - Engineered wood products
    - Boiler fuel
  - Wood recycling & grinding services are widely available











Construction Engineering Research Laboratory

- Metals
  - Reusable
    - Pre-engineered metal buildings most practical
  - Recyclable
    - New metal products
  - Metal recycling is universal









Construction Engineering Research Laboratory

#### Gypsum Drywall

- Reusable (clean scrap)
  - Resale (minimum halfsheets, typical)
- Recyclable (clean scrap)
  - Drywall manufacturing
  - Soil amendments
  - Most recycled GWB comes from construction sites
- Demolition drywall is problematic if LBPcontaminated
- Recycling infrastructure is regional
  - Agricultural markets could expand







/7/2010 9:56:11 AM

- Asphalt roofing
  - Recyclable
    - Hot mix asphalt
    - Cold patch
    - Ground cover
    - Fuel



- New roofing (pre-consumer materials)
- Recycling infrastructure is limited, but expanding
- See CMRA Best Practices Guide





Construction Engineering Research Laboratory

- Carpet
  - Reusable
    - Resale
    - Restoration
  - Recyclable
    - New carpet
    - Other polymer products
    - Waste-to-energy & cement kilns
  - Leased as a service
  - Recycling infrastructure is limited, but expanding

**CARPETAMERICARECOVERYEFFORT** <sup>5M</sup> Developing market-based solutions for the recycling and reuse of post-consumer carpet

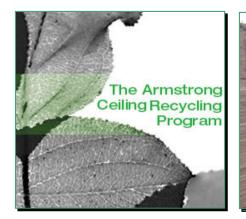




**Construction Engineering Research Laboratory** 

- Acoustic tile
  - Reusable
    - Resale
  - Recycling
    - New acoustic tile (preconsumer)
    - Armstrong World Industries is the only post-consumer recycler at present











9/7/2010 9:56:11 AM

Construction Engineering Research Laboratory

- Other reusable architectural items
  - Insulation
  - Vinyl siding
  - Wood siding
  - Doors
  - Windows
  - Interior paneling
  - T&G flooring
  - Etc.





9/7/2010 9:56:11 AM

Construction Engineering Research Laboratory

- Other reusable mechanical & electrical items
  - Furnaces & heaters
  - Air conditioning units (residential capacity)
  - Duct accessories
  - Plumbing fixtures & equipment
  - Electrical fixtures & equipment
  - Etc.





9/7/2010 9:56:11 AM

**Construction Engineering Research Laboratory**