# Industrial Resources Council

Improving Performance of Transportation Projects Using Industrial Materials

NC Sustainable
Roadways Workshop
Sept. 17, 2014

IRC
Industrial Resources Council

## Sustainable Highways

- Construction of transportation systems can significantly impact the environment.
- Environmental impact can be reduced through sensitive system design.
- Quality and cost can be maintained while meeting technical performance standards

## Drivers for Environmental Stewardship

- National and international focus on energy, climate change and sustainability
- National and state focus on waste reduction, pollution prevention, and recycling
- Escalating costs of energy, labor and materials
- Environmental effects of mining, processing and transporting materials

## FHWA Recycling Policy

- Recycling & Reuse can offer Engineering, Economic and Environmental Benefits
- Recycled materials should get <u>first</u> consideration in materials selection
- Engineering & environmental properties are important
- Life Cycle Costs assessment is helpful
- Restrictions on recycled material without technical basis should be removed

## Industrial Resources Council

- **A collaborative partnership working to develop markets for industrial materials**
- **Goals:**
  - **Create awareness & increase understanding**
  - **Share technical & environmental information**
  - **Develop codes, standards, and regulatory guidance through organizational partnerships**
- **National, regional and state workshops**

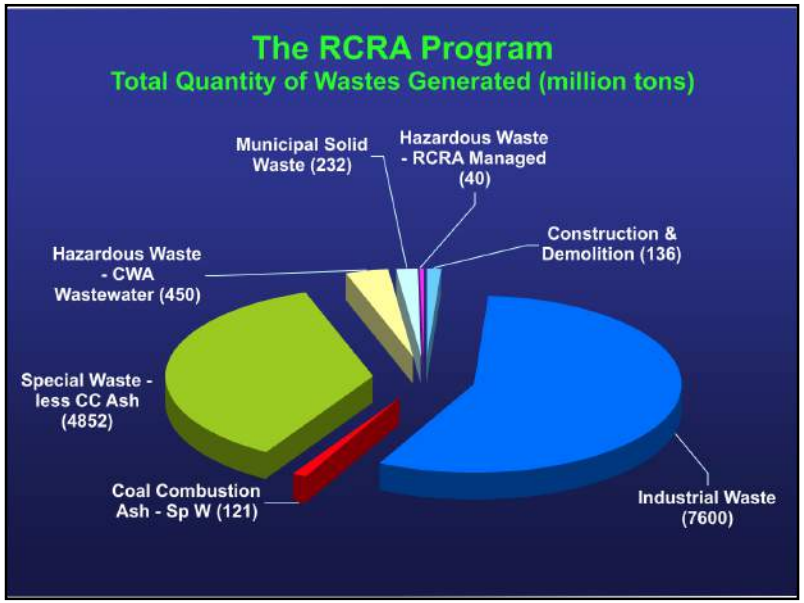
**http://www.industrialresourcescouncil.org/**

## How can the IRC help transportation Agencies?

- IRC is comprised of non-profit industry associations who spearhead their industry's efforts on material utilization
  - American Coal Ash Association
  - Construction & Demolition Recycling Association
  - AFS- FIRST (Foundry Industry Recycling Starts Today)
  - National Council for Air & Stream Improvement
  - National Slag Association
  - Rubber Manufacturers Association

## Why should Agencies care about IRC materials?

- Material volumes are large
  - Less fragmented than Municipal Solid Waste
- Industrial materials can:
  - Provide comparable or better performance
  - Meet engineering standards
  - Save money
  - Help achieve sustainability goals



## Availability of IRC Materials

- Generation Rate:
  - **CCPs**
    - **122 million TPY**
  - **Steel Mill Residuals**
    - **19.7 million TPY**
  - **Foundry Sands & Slags**
    - **10 million TPY**
  - **Paper Mill Residuals, Boiler Ash & Others**
    - **15 million TPY**
  - **Tires**
    - **300 million tires/yr**
  - **Recycled Concrete**
    - **180 million tons est.**
    - **325 million total C&D**
- Number of Facilities:
  - **Power Plants: ~500**
  - **Steel Mills: ~130**
  - **Foundries: 2,800**
  - **Pulp & Paper Mills: ~430**
  - **Tires: Municipal, commercial & industrial generation points**
  - **Recycled Concrete: ~2,300**

## Industrial Material Applications

- Manufactured products
  - Cement
  - Asphalt
  - Concrete pavement
  - Concrete products
    - Brick, block, mortars
  - Flowable fill/CLSM
- Geotechnical applications
  - Bases and subbases
  - Structural fills
  - Embankments
- Soil amendments
  - Manufactured topsoils
  - Rain gardens & swales
  - Mulches & composts

## "Greener" Roadways

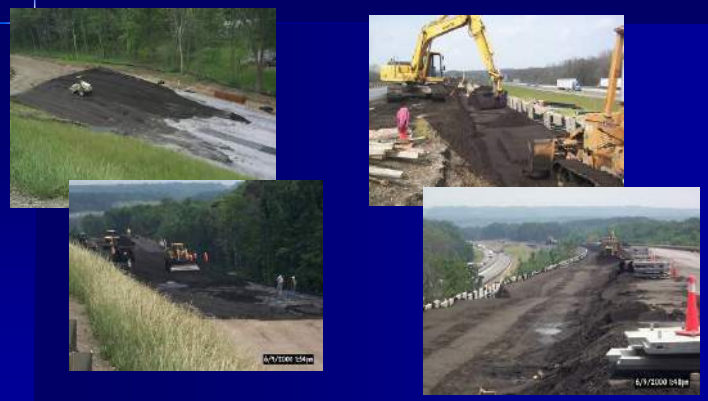
**Sub-base Materials** using fly ash, bottom ash, iron and steel slags, recycled concrete, recycled asphalt or foundry sands

**Pavements** using concrete or asphalt containing coal ash, foundry sand, recycled concrete, asphalt shingles, or steel slags

**Embankments and Fills** using CCPs, steel slag, tires, recycled concrete or foundry sands

**Landscaping materials** using compost, foundry sands and other industrial materials

## Construction - Engineered Fill



## Asphalt



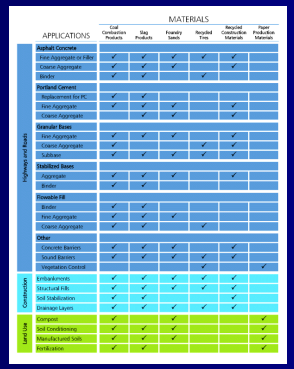

## Cement Manufacturing & Concrete Products


## Flowable Fill (CLSM)


## Specialty Soils & Landscaping Products



## IRC website




- Industrial Resources Council is a resource for information about how to use industrial materials in various applications
- http//www.industrialresources council.org

## Industry Snapshots

- Where does each material come from
- Info on generators
- How much material
- Most common uses

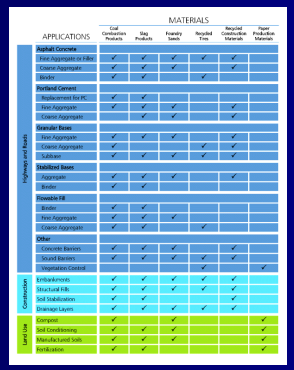

## Material Profiles


- Snapshot of each material type
- Downloadable as PDF's
  - CCP's
  - Foundry Sands & Slags
  - Steel Furnace Slags
  - Pulp & Paper Industry Materials
  - Reclaimed Concrete Aggregate
  - Tire-Derived Materials

## Application Profiles


- Structural fill
- Embankments
- Granular bases
- Stabilized bases
- PCC Concrete
- Hot Mix Asphalt
- Flowable Fill
- Portland Cement
- Other PCC concrete products
- Soil Stabilization

## Sustainable Materials Matrix




- Matches between Materials and Applications
- Downloadable PDF
- E-version provides additional details
- Work in progress
- FHWA wants your inputs!

## E-matrix

- How is material used in this application?
- How does it perform?
- Technical issues?
- QA/QC Issues?
- Environmental issues?
- Other Resources


## IRC, FHWA & DOT's

- Sustainable highways require efficient material management systems to account for embedded costs
- DOT leadership important
  - DOT's set construction standards
  - Most pavement miles controlled at county or local level
- Materials are often the highest cost in any construction project
  - Recovered materials can save dollars
  - Specifications should be performance-based, not material-based

## Working Together

- FHWA encourages support for a proposed project to build a robust web-based E-matrix
- FHWA webinar series:
  - http://www.industrialresourcescouncil.org/Events/SustainableMaterialsWebinars/
- National & regional workshops:
  - September 17, 2014, Raleigh, NC with NCDOT
  - December 3, 2014, Columbus, OH with OHDOT

## For More Information

American Coal Ash Association
www.acaa-usa.org

Construction & Demolition Recycling Association
www.cdrecycling.org
www.concreterecycling.org

AFS-FIRST, Inc.
www.foundryrecycling.org

## For More Information

National Council for Air & Stream Improvement
269-276-3548
www.NCASI.org

National Slag Association
www.nationalslag.org

Rubber Manufacturers Association
www.rma.org