Center for Inland Bays
Scientific & Technical Advisory Committee
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Ash 101: Coal Ash Production & Use

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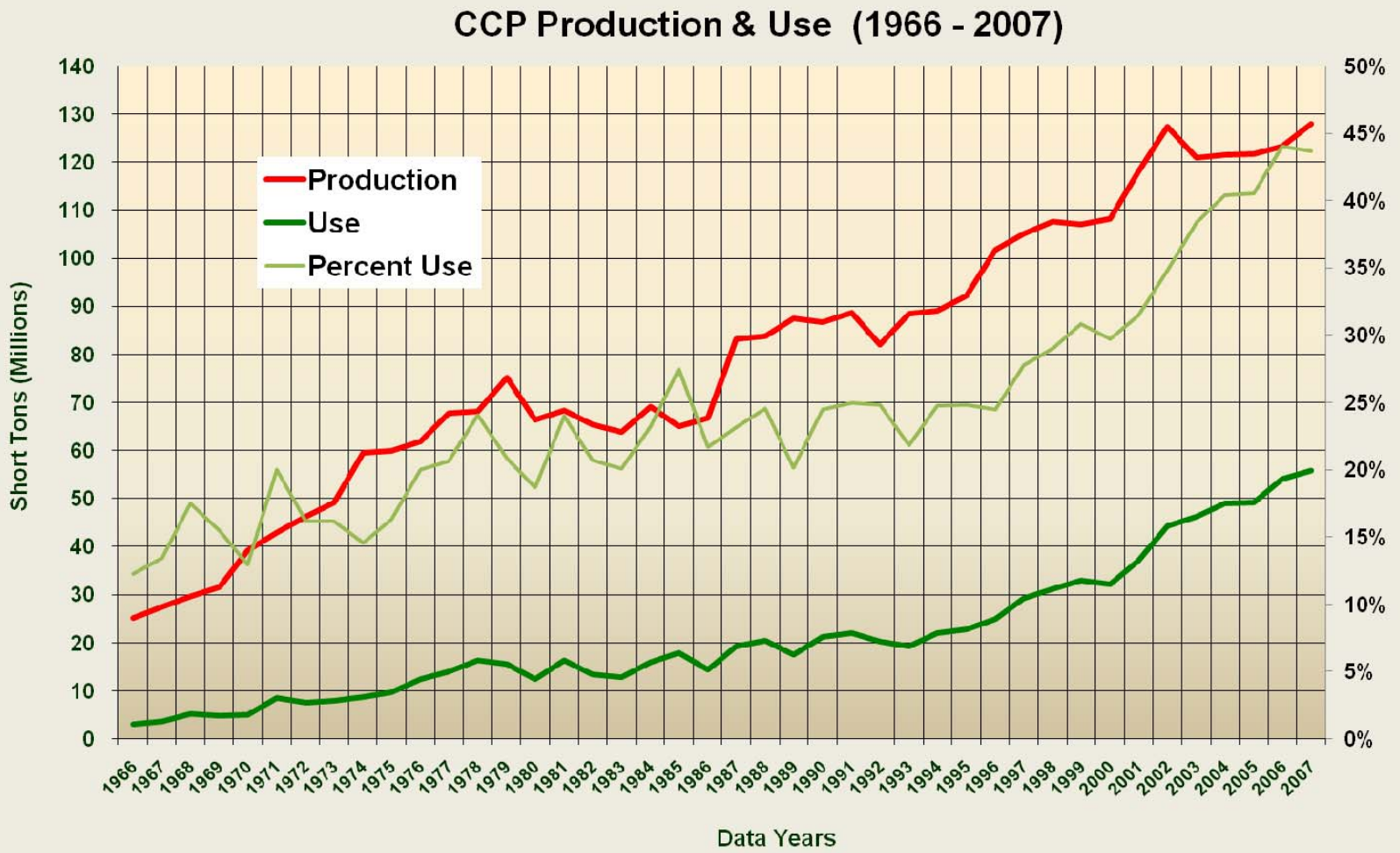
ACAA

Production and Utilization



Coal Ash vs. CCPs

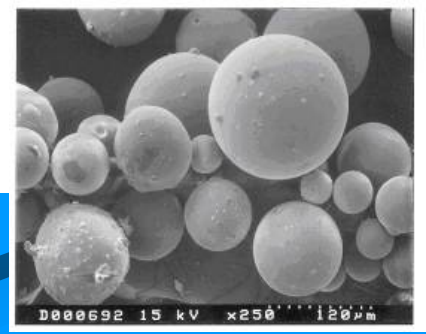
- Coal combustion products are the residuals from the combustion of coal and include:
  - Fly ash
  - Bottom ash and boiler slag
  - Air emission control system residues
- Although “Ash” and “CCPs” are terms often used interchangeably, CCPs is the more applicable terminology
- Numerous technical standards apply to CCP uses

Beneficial Rules of Thumb

- For each ton of fly ash used instead of portland cement, approximately one ton of CO2 can be avoided or postponed
- Fly ash is typically less expensive than portland cement
- CCPs can replace virgin, earthen or manufactured materials

What Makes CCPs Useful?

- Non-hazardous nature
- Mineralogical components allow them to be used in lieu of other natural materials
- Locally available
- Economical
- Can be conveyed in dry or in moistened form



Leading Use for Fly Ash

- Additive to concrete as a replacement for portland cement
  - Enhances durability
  - Reduces permeability
  - Improves workability
- When used in concrete it can reduce greenhouse gases and improve performance while conserving natural resources.

Other Fly Ash Uses

- Cement production
- Masonry blocks and grouts
- Stabilization of soils
- Road base material
- Specialized applications such as metal castings, plastic fillers and in paints
- Structural fills and mine reclamation
- Waste stabilization and odor control

Bottom Ash Uses

- Heavier than fly ash and granular in nature
- Used as raw feed for cement production
- Use in soil applications to improve drainage and blended with other materials for composting
- Used in masonry blocks, bricks and concrete products
- Can be used in road base and mineral fillers in asphalt and shingles
- A component of artificial aggregates

FGD: Materials From Air Emission Control Systems

- Flue gas is scrubbed before leaving the stack to remove sulfur and nitrogen oxides
  - “Wet” processes such as flue gas desulphurization (FGD)
  - “Dry” process such as spray dryers
  - Other FGD technologies
- Other ways to scrub – selective and non-selective catalytic reduction (uses ammonia)

FGD Gypsum Factors

- Provides high quality byproducts, such as synthetic gypsum, that is, in some ways, superior to natural mined gypsum
- Can be used in many agricultural settings
- Is often an ingredient in portland cement production

FGD Gypsum – cont.

- Approximately 8.2 million tons (80%) of synthetic gypsum is used each year
- 30% of the wallboard produced annually uses synthetic gypsum exclusively

Sustainable Construction

- Architects are requiring increased amounts of fly ash in concrete
- Bottom ash is widely used in green roofs
- Pervious concrete is used to control storm water runoff
- CCPs are found in flooring applications, composites, geotechnical uses, etc.
- LEED and other rating systems award points for CCP use

Green Highway Partnership

- Public/private sector partnership that promotes more environmentally sensitive transportation planning
  - Storm water management
  - Ecosystem protection
  - Use of recovered industrial byproducts
- EPA Region 3, FHWA, state agencies and industry are partners
- www.greenhighways.org

CCP Industry Goals

- EPA, DOE and industry have set the goal of 50% utilization of all CCPs by the year 2011 as part of the Resource Conservation Challenge
  - 2007 utilization was approximately 42%
- Support the implementation of state beneficial use guidelines
- Provide technical information on characteristics, performance and potential uses whenever needed
- Participate in the development of technical standards

Regulatory Issues

- Three decades of research and analysis support non-hazardous determination
- EPA Coal Combustion Products Partnership supports CCPs use – see (http://www.epa.gov/epaoswer/osw/conserve/c2p2/index.htm)
- Many states have beneficial use or regulatory guidelines for CCPs

However

- Projects should be evaluated on a case-by-case basis to determine appropriate characteristics and processes
- Potential for leaching needs to be considered and mitigated, as appropriate
- Climatology, geology, water sources and other factors are part of any characterization
- Local, state and federal regulations may apply as well as engineering standards

Conclusions

- CCPs can be used in many ways and support sustainable construction
- They conserve natural resources and other materials, reduce the need for landfill space and help offset CO2 emissions
- When properly managed and engineered, CCPs do not have a negative impact on public health and the environment

Conclusions - cont

- We cannot ignore the impacts of inefficient resource management on our environment and society.
- Use, reuse and recovery of industrial materials has a role in sustainability

More Information

- www.ACAA-USA.org
- http://www.EPA.gov/epaoswer/osw/conserve/c2p2/
- http://www.NETL.DOE.gov/
- **http://www.caer.uky.edu/kyasheducation/index.html**
- **Several FHWA related websites (RMRC; Turner-Fairbank, FHWA, etc.)**

Questions?

Thank You

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