Recycling Concrete Pavement – Industry Survey Responses

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FHWA Cooperative Agreement with CP Tech Center

RCA Deliverables
- Recycling Concrete Pavement Materials – A Practitioners Reference Guide
- Tech Brief Series
- 4 Webinars
  - Introduction to Recycling
  - Environmental Considerations
  - Construction Considerations
  - Case Study Experience
- Website
- RCA Usage Survey
Recycling Benchmarking Survey

• ACPA Surveyed Contractor Members
  – 26 Contractor Firm Responses

• State responded to Survey Request through NCC list serve
  – 16 Agency Responses

• Survey conducted Q1 2016
Concrete Pavement Reuse and Recycling – Proven Technologies!
Stats on Recycling in the USA

- 140 Million Tons of Concrete are recycled each year in the USA*
- 72 Million Tons for RAP were produced in 2014**
- More than 150,000 miles of highway are paved with concrete in the United States.
- 5% of 445 million cy of Ready mix is returned to the plant annually

* Construction Demolition & Recycling Association
** National Asphalt Paving Association
Concrete Recycling: A Proven Technology!

At least 44!

41 of 50 states allow use of RCA in various applications (FHWA, 2004)
Uses of Recycled Concrete Aggregate Nationally

- Used as Aggregate (Base), 65.5%
- Used in Asphalt Concrete, 9.7%
- Use in New Concrete Mixtures, 6.5%
- Used as Fill, 7.6%
- Use as High-Value Rip Rap, 3.2%
- Others, 7.6%
Industry RCA Survey Responses

26 Firms Worked in 19 States Representing 18.3% of 2014 National Volume of Concrete Paving (1063 Projects)
Project Owners Represented

- All 26 firms worked on State Projects
- 15 worked on County Projects
- 15 worked on City Projects
- 9 worked on Private Projects
Who does the Recycling

- Self Perform Recycling - 6
- Outsource - 14
- Both Approaches - 5
Percent of Paving Projects that included Pavement Removal?

26 Firms with 1063 Projects

- 81-100%: 7 projects
- 61-80%: 7 projects
- 41-60%: 3 projects
- 21-40%: 4 projects
- 0-20%: 5 projects
Total Volume of Pavement Removals Awarded

Total Cubic Yards

- 0-5,000: 5
- > 150,000: 7
- 5,000-50,000: 6
- 100,000-150,000: 3
- 50,000-100,000: 5
- 50,000-100,000: 5
- 100,000-150,000: 3

Total Volume of Pavement Removals Awarded:

- > 150,000: 7
- 100,000-150,000: 3
- 50,000-100,000: 5
- 5,000-50,000: 6
- 0-5,000: 5
- 0: 12
Average Volume of Removals Per Project

Cubic Yards/Project

- 0-1,000: 4
- 1,000-10,000: 6
- 10,000-20,000: 5
- 20,000-40,000: 7
- >40,000: 3
What % of Concrete Removals Was Recycled in Any Manner?

% of Concrete Removals Recycled per Project

- 0-20: 3%
- 21-40: 3%
- 41-50: 3%
- 61-80: 3%
- 81-100: 14%

Total: 14%
Where Was the RCA Used?

% Used on Source Project

- 81-100%: 4
- 61-80%: 3
- 41-60%: 1
- 21-40%: 5
- 0-20%: 6

Total projects: 15
Where Was the RCA Used?

% Used on Different Project

- 61-80 %: 1
- 41-60 %: 1
- 20-40 %: 5
- 0-20 %: 14

% Commercially Marketed

- 81-100 %: 4
- 61-80 %: 0
- 41-60 %: 5
- 21-40 %: 1
RCA Product Application

- Granular Subbase 42%
- Embankment/Wasted on Project 12%
- Misc. Applications 1%
- Crushed Products for Other Markets 16%
- Granular Shoulders and Other Crushed Products 15%
- Concrete Aggregate 14%
- Misc. Applications 1%

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Recycling Thresholds

• Minimum Quantity for On-Site Recycling ~ 5,000 cy
• Minimum Quantity for Hauling to Commercial Recycling Facility ~ 5,000 cy
• Maximum distance to haul to a Commercial Facility ~ 10 miles
Barriers to Recycling On Projects Where Recycling Not Performed

- Specifications limit uses
- Cost prohibitive for small quantity
- Locally available sources
- MRD in source concrete
Use of Material Not Recycled

1. Most stockpiled for future recycling
2. Commercial landfill
3. Buried on project
## Environmental Concerns

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<td>Storm water runoff</td>
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<td>Training of Personnel</td>
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Did Environmental Concerns Actually Limit RCA Utilization on one or more of your projects?

- Yes - 3
- No - 15
- Undecided - 5
Do You Utilize Specific Measures to Mitigate Waste Generation and Disposal with RCA?

- Yes - 10
- No - 11
- Undecided - 3
Companion DOT Survey

- 16 Agency Responses
- Focus of questions more on agency goals, specifications, and barriers to allowing RCA
- Summary will be included in Final Report