

Recycled Concrete Aggregates A Sustainable Choice

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- Presentation is based on statistical data collected from different states across the US and their uses of RCA
 - Advantages and benefits of using RCA
 - Uses for RCA throughout the US
 - State Guidelines
 - Sources for acceptable concrete
 - Processing Methods
 - Concerns and QC Measures

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- Advantages and Benefits of RCA
 - The Federal Highway Administration (FHWA) stated that RCA is a “valuable” resource that shouldn’t be wasted (FHWA, 2004)
 - Concrete is 75% aggregate
 - Proportioning and properties are critical to the performance of the finished product
 - Cost savings
 - Based on state feedback the savings ranges from an average of \$3.00 per ton in rural areas and \$6.00 per ton in Urban areas
 - Increased yield
 - RCA typically is 5-10% lighter using standard or modified proctors

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- Advantages and Benefits of RCA continued
 - Reduces environmental impact
 - Carbon and emissions
 - Cost Savings continued
 - Reusing concrete saves valuable landfill space
 - Steadily rising tipping rates
 - Fuel to transport to waste facilities

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- Advantages and Benefits of RCA continued
 - Performance and installation
 - Michigan Department of Transportation stated RCA “performs comparably or better than virgin aggregates because of the cementitious action that can still occur within the compacted base, adding more supporting strength for the highway” (RMRC, 2008)
 - FHWA concluded that the engineering, economic and environmental benefits of using RCA should give states a reason to seriously consider using it in their respective transportation system, noting that it is the aggregate base of choice for some states. (FHWA, 2004)

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- Uses of RCA throughout the US
 - 39 States responded to the survey
 - 33 Allow for RCA in the aggregate base
 - 7 Do not allow RCA
 - Maine allows the first lift (12”) of the base course to include up to 50% RCA
 - Arizona allows for 50% by weight

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- Sources of acceptable materials
 - DOT pavements
 - Commercial buildings
 - Runways
 - Sidewalks
 - Curb and gutters

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- Processing Methods Primary Steps
 - Demolition- Reducing concrete to a manageable size
 - Manual or mechanical pre separation- remove wood, iron, brick, and other materials
 - Primary Screening- remove soil, gypsum, etc.
 - Primary Crushing
 - Magnetic Separation- Removal of ferrous materials

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- Processing Methods Secondary Steps
 - Secondary Screening- Initial separation into desired sizes
 - Manual or Mechanical Removal of Contaminants- Lightweight removal such as plastic, paper, and wood
 - Secondary Crushing- Final crushing of concrete
 - Final Screening- Screening to final gradation
 - Resulting RCA ready for transport to site and incorporated into your project

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- Quality Control Methods
 - Most states that allow RCA require the material to test the same as limestone or virgin aggregates
 - Another common specification was to only allow RCA produced from the material from the project
 - Maine tests for PH when using RCA in low laying or wet areas
 - Delaware limits use when there is subsurface drainage in place

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- Concerns
 - Fines clogging geotextile or rodent screens
 - Runoff changing PH of vegetated areas
 - Inclusion of deleterious materials
 - Freeze –thaw
 - Corrosion of metal pipe

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- Conclusion- Recycled Aggregates are a viable and sustainable option for our future infrastructure upgrades
 - States need to advance their current Specifications
 - Improve research and technology transferring between states
 - Create a uniform specification for environmental impacts

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Thank You

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