

FY 2010 RESEARCH PROBLEM STATEMENT

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TITLE ([more info](#))

Feasibility of using Recycled Concrete in New Construction Applications

PROBLEM (Description of need) ([more info](#))

With an increasing emphasis being placed on the use of "green" materials for construction and the need for sustainable infrastructure, much attention has been placed on the reuse or reclamation of demolished concrete in new construction. Potential areas of use have focused on recycled concrete as aggregate, ground recycled concrete as "filler" in new concrete as well as partial replacement with this fine material for raw feed used in cement production. While attention has been given to applications using such material over the past 15-20 years, relatively little data exists related to the long-term performance of this material when incorporated into new construction. Specifically in the state of Oregon guidance is lacking for the types of applications where using such recycled or reclaimed material is appropriate and justified. In fact, in the current 2008 ODOT specifications it is stated in section 00290.20 (c) that "If the Engineer provides written approval, concrete may be reused as aggregate if it meets the requirements of Section 02610 through Section 02690". Essentially stating that as long as the material meets the aggregate requirements in these sections it is deemed acceptable for use. However, more specific guidance especially related to the long-term durability of these materials is needed. Specific concerns with use of recycled concrete as aggregate or filler may include the incorporation of deleterious substances from the parent material, quality control issues where recycled material from multiple sources is included as well as the need to meet strength and constructability requirements in new construction. The use of such material, which may otherwise be land filled, in new construction, represents a significant possibility for "green" material selection and sustainable design. However, the successful incorporation of this material is dependent upon research that demonstrates these materials can be used successfully to meet the design requirements of the new application while ensuring long-term durability and performance.

PROPOSED RESEARCH, DEVELOPMENT OR TECHNOLOGY TRANSFER ACTIVITY ([more info](#))

1. It will be essential to conduct a thorough literature review to analyze current research efforts to avoid duplication of sound existing work while identifying key areas that merit further investigation.
2. As part of the literature review existing standards and recommendations from outside agencies will provide a starting point for guidance that may be useful to include for ODOT specifications.
3. Define an experimental approach to assess the main areas identified in parts 1 and 2 for needed research to better characterize and identify applications of recycled concrete aggregates for use in new construction.
4. Develop guidelines that incorporate testing methodologies and quality control measures to ensure the successful incorporation of waste concrete to new materials.
5. Perform selected field trial (s) to verify the proposed approach/testing methodologies
6. Incorporate the research results into a final report that includes documentation and analysis of the data collected in the research program as well as recommendations for guidelines that can be used by ODOT for the use of recycled concrete in new construction

BENEFITS ([more info](#))

1. Significant environmental and sustainable construction benefits where amount of land filled or waste material is reduced.
2. Potential for reduced construction costs if existing material that is demolished can be reused in new construction in close proximity to demolished existing components.
3. Possible incorporation of these recycled materials to a variety of applications where their use is most appropriate (e.g. recycled aggregate in new concrete, filler in new concrete, base material, fill material, aggregate for asphaltic concrete construction, raw feed for cement production, etc.)
4. Fundamental research that is lacking in the area will not only provide guidance for ODOT but for other state DOTs and transportation agencies. Represents an area where ODOT can emerge as a lead expert agency in the United States.

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