Florida Department of Transportation Research

Developing Improved Opportunities for the Recycle and Reuse of Materials in Road, Bridge and Construction Projects

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Reducing waste and reusing materials is now a part of the everyday fabric of life. Recycling glass, paper, and plastic is an activity in many households and businesses. Similarly, the transportation sector generates huge quantities of concrete, asphalt, rubber, steel, and glass. The Florida Department of Transportation (FDOT) is actively engaged in technical research to facilitate use of recycled materials. But an equally important and less researched aspect of recycling relates to the business of using these materials. In this project, University of Florida researchers conducted a series of four tasks to address this, including costs of recycled materials, their availability, and the readiness of private sector contractors to use these materials.

In the first task, researchers reviewed the literature and examined industry practice for four materials: recycled asphalt pavement (RAP), crushed concrete, waste tires, and crushed glass. They found extensive use of RAP in new pavement, which improved pavement performance up to a certain amount. Beyond that, pavement longevity steadily decreased. On the other hand, FDOT currently uses 100% of all crushed concrete produced in Florida because it is effective as aggregate in new concrete and asphalt pavements or in base layers. Over 90% of the waste tires generated in Florida — over 190,000 tons in 2010 — found use as fill materials, in energy generation, in artificial reef creation, and in road construction. For crushed glass, FDOT has approved use of no more than 15% crushed glass in asphalt mixtures.

In a survey of all state departments of transportation, the researchers found that all states had specifications that allowed the use of recycled materials, but incentives, mandates, or actual legislation promoting the use of recycled materials were generally rare.

In the second task, the researchers characterized the properties of waste materials used in FDOT construction projects and estimated the quantity of these materials being used. By 2020, 75% of waste generated by FDOT must be reused. Knowledge of the material properties of recycled materials is a necessary prerequisite to exploring reuse and recycle opportunities.

Crushed concrete at a recycling facility in Gainesville.

In the third task, the researchers interviewed industry professionals about reuse and recycling. Interviews with people from major aggregate recycling firms, HMA producers, Portland cement concrete producers, and FDOT contractors led to better understanding of factors influencing reuse and recycling of construction materials.

In the fourth task, the researchers conducted a focus group with industry professionals to develop strategies to improve reuse and recycling of waste materials from the FDOT construction program. Based on the input from the interviews and focus group, the researchers developed extensive recommendations that provide many opportunities for promoting and facilitating the use of recycled construction materials.

Florida continues to grow, and with it its transportation infrastructure. Projects like this are one way that FDOT contributes to sustainability of that infrastructure, seeking positive incomes for Florida's citizens and its environment.

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For more information, visit http://www.dot.state.fl.us/research-center