

**Request for Research Funding for FY 2021-2022**

<b>Requesting Office</b>	SMO	<b>Priority</b>	8 of 10
<b>Proposed Title</b>	Determining the Effect on Asphalt Mixture Performance by Increasing New Asphalt Binder Content Due to Inactive RAP Binder in the Mixture		
<b>Justification</b>	<p>FDOT uses RAP in almost all structural mixtures and in most dense graded friction courses. The use of RAP is beneficial in that it uses a recyclable material, and it reduces asphalt mixture cost by reducing the quantity needed of new aggregate and asphalt binder. With respect to asphalt binder, FDOT has always assumed that all the asphalt binder contained in the RAP is reactivated and useful in the new asphalt mixture it is added to. This significantly reduces the amount of new asphalt binder needed. In the international asphalt community, there has long been debate as to whether all the binder in RAP is in fact reactivated. Much research has been conducted over the last decade and the consensus is that a portion of the RAP binder is not reactivated, however this exact amount varies by each research study. For example, Georgia DOT (GDOT) recently completed research and has implemented a new policy that only 60% of the RAP binder should be considered to be reactivated. GDOT then adds additional new asphalt binder to make up for the 40% of RAP binder considered to be inactive. GDOT implemented this approach to address asphalt mixtures issues, including a dry appearance and premature aging in the in-place asphalt mixture, as well as increased segregation and coarse streaking in the mixture during construction. GDOT also identified pavement evaluation data which indicated pavement repair and maintenance was needed earlier than expected on high RAP sections. Since FDOT uses many aggregate types (GA granite, AL granite, Nova Scotia granite, and various FL limestones) it is essential that FDOT validate the research findings of others for the conditions that exist in Florida.</p>		
<b>Impact</b>	<p>FDOT's number one pavement distress is cracking/raveling, which can be caused by several means, one of which is low asphalt binder content. FDOT would like to research means of increasing the asphalt binder content in structural mixtures containing RAP without compromising performance against rutting. By decreasing the amount of activated RAP binder contribution by a certain percentage, this would then afford the replacement of that binder with new asphalt binder. The goal of this research is to determine if reducing the available RAP binder contribution and replacing it with new asphalt binder will increase mixture performance, determine any detrimental impacts, and determine how to implement these changes during production.</p>		
<b>Affected Offices</b>	Materials		
<b>Existing Work</b>	There is considerable research in this area. This project is needed to study this concept and potential research implementation using Florida materials, mix types, and our acceptance program.		
<b>Keywords Used In Existing Work Search</b> (Cannot leave blank)	RAP binder contribution		
<b>Related Contracts (Give contract numbers)</b>	None		
<b>Funding Request</b>	\$240,000	<b>Anticipated Duration</b>	2 years
<b>Project Manager</b>	Greg Sholar	<b>Contracting Method</b>	RFP to all registered vendors
<b>Urgency</b>	2	This project is needed to enhance current methods and potentially provide increased life to Florida pavements containing RAP materials	
<b>Implementability</b>	1	Findings from this project have a high probability of being implemented.	

**Project Benefits:**

**This project will explore the potential of increasing the asphalt content of RAP mixtures to increase their durability/life span with respect to cracking and/or raveling. The research will determine the amount of binder increase for different mix and binder types as well as the**

amount of RAP in the mixture. The project will explore potential down sides of this concept such as increase potential for rutting. Finally, the project will provide recommendations on implementing this concept into Florida's acceptance system for asphalt mixtures.

Project Benefits (Select all that apply and explain)	Quantifiable Benefits (units, dollars, etc...if applicable)	Methodology or Data Sources Used to Determine Quantifiable Benefits. If not applicable, please give justification of project benefits
○ Materials Enhancement	X	The outcome of this project has the potential to increase the life span of Florida's pavements containing RAP materials.
○ Materials Savings		
○ Time Savings		
○ Lives Saved/Injuries Prevented		
○ Other (Explain)	X	Increased pavement life. This research could increase the life span of Florida's pavements which would reduce the cost of the resurfacing program over time.

\*Comments should explain and support urgency, financial benefit, and implementability scores