

Project Information Form

Project Title	Evaluation of the Combined Effect of Recycled Asphalt Pavement (RAP), Recycled Asphalt Shingles (RAS), and Different Virgin Binder Sources on Performance of the Blended Binder for Mixes with Higher Percentages of RAP and RAS
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Funding Source(s) and Amounts Provided (by each agency or organization)	Caltrans \$90,315
Total Project Cost	\$90,315
Agency ID or Contract Number	DTRT13-G-UTC29
Start and End Dates	November 24, 2014 to September 30, 2015
Brief Description of Research Project	<p>As virgin material sources become increasingly scarce, and the volume of pavement material that is routinely recycled increases, it becomes more desirable to use significantly higher amounts of RAP and RAS for pavement construction.</p> <p>The California Department of Transportation (Caltrans) has recently increased the allowable RAP content to 25 percent in asphalt mixes. Caltrans-industry-academia task group has proposed increasing the RAP and RAS percentages to allow binder replacement up to 40 percent. Virgin binders from different sources blend differently with the age-hardened oxidized binder in RAP and RAS. There are concerns that depending on the source of the virgin binder, the rheological properties of the blended binder could vary appreciably that will result in highly variable cracking performance.</p> <p>The University of California Pavement Research Center has proposed and studied a methodology to evaluate the effect of RAP and RAS without extraction and recovery by testing of the fine aggregate matrix (FAM) using solid torsion bar fixture with the dynamic shear rheometer (DSR).</p>

	<p>The specific objective of this proposed study is to investigate the effect of different binder sources used in California by conducting a small laboratory study and measuring the rheological properties of the blended binders without extraction and recovery of the aged binder.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>(Attach Any Photos)</p>	
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>Caltrans used the results to help influence the following decisions:</p> <ul style="list-style-type: none"> - Do not allow use of RAS in asphalt mixes - Continue development of fine aggregate mix (FAM) testing as surrogate for chemical extraction - Increase allowable RAP content to 25% <p>Require testing before allowing higher RAP contents because of variability of RAP and source binder and their interactions</p>
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project website 	<p>Http://ncst.ucdavis.edu/project/ucd-ct-to-013</p>