



January 30, 2013

**To:** Gary Wayne Marshall  
Corporate Quality Control Manager

**Subject:** Test Section Summary  
Crumb Rubber Modified 9.5mm SP HMA  
Including Pre-blended Elastico Additive

On December 7<sup>th</sup> 2012, Reeves Construction Company produced and placed 9.5mm SP mix modified with crumb rubber including pre-blended Elastico. This mix was produced at Reeves Construction's Plant located in Vienna Georgia. In accordance with GDOT Section 400, approved equipment and introduction method was utilized to incorporate CR/Elastico at a rate of 7% of the asphalt binder. This mix was placed at variable widths and depths using a Roadtec paver equipped with a 10-ft wedge lock S-Type screed. The compactive process included a vibratory steel wheel roller in the breakdown position followed by a pneumatic tire roller and a steel wheel static finish roller used to achieve acceptable in-placed density. This approved GDOT 9.5mm SP mix design included 30% RAP with PG64-22 base binder.

Prior to modifying the 9.5mm mix with CR/Elastico, the in-place mat exhibited frequent pulling and tearing due to a long haul distance and inconsistent placement operations. In addition to multiple short pulls and tie-ins on numerous streets, the mix frequently fell below optimum placement temperature. Mix temperatures ranged from 310 F down to 275 F. Although once the CRM was added, the uncompacted mat directly behind the screed appeared to be noticeably slicker/richer and more workable with uniform mat texture (See Photo 1).



PHOTO 1, CRM Modified Uncompacted Mat



Historically, crumb rubber modification must include additives, like TOR(trans-polyoctenamer) or vestenamer to improve workability issues that affect successful placement and serviceability characteristics of the finished product. Modified mixes without these additives tend to be excessively sticky and do not flow well under the paver screed. This often results with poor mat texture and inconsistent screed pre-compaction. The tackiness of the hot mat is especially an unacceptable obstacle when using the rubber tire roller in the intermediate position. Excessive pickup and tearing of the mat is experienced under the pneumatic tires regardless of operation techniques. The use of the rubber tire roller in the compaction process is detrimental in achieving target density requirements; thus, any factors that may limit its use are excluded.

Although, visual observations of the mat with the elastico additive after the rubber tire placed the established number of passes did not display any signs of pickup or pull/tearing (See photo 2).



PHOTO 2, Mat after the Rubber Tire Roller.



Samples of the modified mixture were taken to Reeves design lab to be evaluated for rutting susceptibility using the asphalt pavement analyzer or Loaded Wheel Tester. In accordance with GDOT GDT-115, 75mm gyratory specimens were tested at 64 degrees C for 8000 cycles. These specimens measuring 4.1% air voids resulted in an average deformation of 2mm. GDOT Design Section 828 allows a maximum 8mm of deformation for this 9.5mm SP type 1 mix. The original design without CRM modification proved to rut 5.05mm. Therefore, the measured rut on the modified mixture indicated performance enhancement of the in-place material.

If you have any questions or further information is required, please feel free to contact me at (478) 455-0811 or email [tfelix@reevescc.com](mailto:tfelix@reevescc.com).

Sincerely,

*Tony J. Felix*

Assistant Quality Control Manager