Industrial Resources Council
Sustainable Roadway Materials
GTR In Liquid Asphalt

Joe Harvey
J.T. Russell & Sons, Inc
September 17, 2014

Introduction

- Asphalt Binders are certified or “Graded” based on Temperature.
  Example: **PG 64-22**

  **PG:** Performance Grade
  **64:** upper temperature specification in Degrees C
  **-22:** lower temperature specification in Degrees C

Typical NCDOT Paving grades include: PG58-28, PG64-22, PG70-22, PG 76-22

Higher Grade= More Viscous, used in higher traffic volume applications
Higher Grades (PG76-22) are achieved by adding polymers and modifiers, resulting in higher Costs

Overview

- Use Ground Tire Rubber in Place of Polymer to produce PG 76-22 GTR for SCDOT
- Project was on Interstate 77, placed during 2011 & 2012 paving seasons
- Consisted of 4500 liquid tons of PG 76-22 GTR

Method

- Terminal blend of base PG 64-22 and GTR by the wet method of blending at our Healing Springs, NC Terminal.
- Deliver to HMA plant two and half hours away
Materials

1. Base asphalt PG –selective of asphalt base to be used- chose PG 67-22

2. GTR- contains fibers, polymers, and elastomers used in conventional asphalt modification
   30 mesh from Liberty Tire Recycling- gradation spec
   Free of metal, deleterious materials, oversized rubber particles.
   Ambient Grind: no cryogenic material
   Passenger tire only: no aviation or equipment tires

3. Stabilizing additive- minimal percent of GTR

Production

• Base asphalt bulk stored on site at the terminal ready for blending

• GTR delivered to terminal in 2000 pound bulk sacks on covered trailers
  – CofA for each shipment from grinder
• GTR is added to base asphalt in the mixing tank at elevated temperature along with stabilizing additive at proper proportions
• GTR is allowed to “wet” and mix until uniform.

• PG 76-22 GTR is pumped to holding tanks where it is held until ready to load in tanker for delivery to HMA plant.
• QC testing is preformed at this point.
Quality Control

• Liquid asphalt base
  – Start with M320 certified PG 64-22-verified by independent lab.
  – True graded 67-22- provides consistent starting point for formulations

GTR delivered with CofA for each shipment

• GTR delivered with CofA for each shipment
  – Free of deleterious materials, metal, trash- visual inspection
  – Gradation report: No 16, No 30, No 40, No 50, No 80 sieves- samples taken to confirm CofA’s
  – Passenger tires only: no off road or aviation tires
  – Ambient grind only- no cryogenic material

Testing

• Daily testing from holding tanks of PG 76-22 GTR- DSR machine onsite
• Retain samples from tanks
• Monthly M320 certifications to verify process
• Split samples with SCDOT

Issues

• Product must be agitated at terminal and HMA plant site to prevent settling of GTR.
• PG 76-22 GTR samples must be stirred prior to testing to obtain accurate results
• Moisture in GTR- excessive foaming in mixing tanks
• GTR production must be scaled to meet HMA plant demands, challenge to store bulk, must be made as needed.
Significance

- Recycled material: GTR used to displace 10% of liquid asphalt binder in PG 76-22 GTR.
- Every two tons of HMA placed using PG 76-22 GTR = 1 tire recycled
- Project:
  - 4,500 tons of PG 76-22 GTR
  ~90,000 tons HMA = 45,000 TIRES RECYCLED

Cost Savings

- Elevated polymer prices and shortage
- Savings to contractor and department

QUESTIONS?

Contact Information

If you have any questions please contact

Joe Harvey
J.T. Russell & Sons, Inc
336-859-0902: Office
704-985-2833: Cell
jharvey@jtrussellandsons.com