Navajo Nation/BIA

2010/2011
Asphalt-Rubber
Chip Seal Project
The Navajo Nation Covers Approximately 24,742 Square Miles
Project locations throughout the Navajo Nation

- Eastern Agency
- Western Agency
- Fort Defiance/New Lands Agency
- Shiprock Agency
- NECA N-13
- NIIP Roads
- Chinle Agency
Asphalt-Rubber Chip Seal - Project Facts:

- Total Mileage – Approximately 368 Centerline Miles
- Square Yardage – Approximately 7.5 Million Square Yards
- Asphalt-Rubber Binder – Approximately 18,400 Tons
  Standard AR Binder 81.5% PG 64-22/18.5% 14 Mesh CRM
- Tires Recycled – Approximately 550,000 Tires
- Aggregate – Approximately 127,000 Tons (4 Suppliers)
  Standard 3/8 Aggregate (BIA Stringent Requirements)
- Fog Seal Emulsion – Approximately 3,200 Tons
- Man Hours – Approximately 35,000 Hours
# Asphalt-Rubber Binder Requirements

<table>
<thead>
<tr>
<th>Test Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotational Viscosity, 177(^\circ) C (350(^\circ) F), Pascal Seconds</td>
<td>1.5 – 4.0</td>
</tr>
<tr>
<td>Penetration, 4(^\circ) C (39(^\circ) F), 200 g, 60 sec. (ASTM D5); 1/10 mm</td>
<td>10 Minimum</td>
</tr>
<tr>
<td>Penetration, 25(^\circ) C (77(^\circ) F), 100 g, 60 sec. (ASTM D5); 1/10 mm</td>
<td>25 - 75</td>
</tr>
<tr>
<td>Resilience, 25(^\circ) C (77(^\circ) F) (ASTM D3407); %</td>
<td>20 Minimum</td>
</tr>
<tr>
<td>Softening Point, (ASTM D36); 0(^\circ) C (0(^\circ) F)</td>
<td>55 (131) Minimum</td>
</tr>
<tr>
<td>Ductility, 4(^\circ) C (39(^\circ) F), (ASTM D113); 1 CPM</td>
<td>5 Minimum</td>
</tr>
</tbody>
</table>

Application Rate Specified at .55 to .70 Gallons Per Square Yard
## Aggregate Gradation Requirements

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent by Mass Passing Designated Sieve (AASHTO T27 &amp; T11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 Inch</td>
<td>100 Percent</td>
</tr>
<tr>
<td>3/8 Inch</td>
<td>70 – 85 Percent</td>
</tr>
<tr>
<td>No. 4</td>
<td>0 – 15 Percent</td>
</tr>
<tr>
<td>No. 8</td>
<td>0 – 5 Percent</td>
</tr>
<tr>
<td>No. 200</td>
<td>0 – 1 Percent</td>
</tr>
</tbody>
</table>

Aggregate was specified to be Hot Pre-Coated and delivered to the Project Site at a temperature ranging from 250 – 325 Degrees F.

Application Rate Specified at 25 to 35 Pounds Per Square Yard
Aggregate Physical Requirements Included:

LA Abrasion
Sodium Sulfate Soundness Loss (Course and Fine)
Fractured Faces
Flat and Elongated Particles
Durability Index (Course and Fine)
Clay Lumps & Friable Particles
The BIA Required an on site Quality Control Laboratory. The requirement stated that the testing laboratory had to be AASHTO accredited qualified to perform sampling, testing and inspection as required in the contract. The on site Laboratory had to be included in the contractors Quality Control Plan. This requirement was unique to the BIA!
Roadside Vegetation was a problem throughout the Navajo Nation.
Flooding was also an issue throughout the Navajo Nation.
Western Agency
Western Agency residential streets!
Western Agency – Rural Roads.
Eastern Agency
Eastern Agency – All Rural Roads.
Let’s Get Rained out, not scared out!
Still not scared out!
Oops, Rained Out!
Fort Defiance
New Lands
Lupton
Fort Defiance – Residential Area.
New Lands - Rural Area
When you go down out here it takes awhile to get going again!
Better get while the gettens’ good!
Lupton – Asphalt-Rubber Double Chip Seal
Shiprock Agency
Beautiful Country on the Navajo Nation!
Beautiful Country, still some bad roads!
Too much crack sealant, not enough road!
NECA – N13
N 13, One Long Highway!
Here we go again! Another afternoon shower!
NIIP Roads
Chinle Agency
Yes, there is traffic on the Navajo Nation!
It was Common for the Pavement to Just End!
There was much interest concerning the asphalt-rubber chip seal on the Navajo Nation. We had visitors from various agencies as the project progressed.
Special Thanks To:

The Bureau of Indian Affairs – Gallup New Mexico
(Irvin Bekis, Herby Larson, Alfred Myron, Alfred Reed and all of our COR’s and inspectors)
The Bureau of Indian Affairs – Phoenix Arizona (Joe Cano)
International Surfacing Systems
(Greg Erks, Dick Armstrong and the ISS chip seal crews)
Our PG Asphalt Supplier (Paramount Petroleum)
Our Rubber Supplier (Crumb Rubber Manufacturers)
Our Emulsion Supplier (Quality Emulsions)
Our Four Aggregate Suppliers
(Fann Contracting, Brimhall Construction, Consolidated Aggregates and C & E Concrete)
Aggregate Transport (Mundall Trucking)
QA/QC (AMEC (MacTec) Engineering)
Questions?