Glenn Highway: Hiland to Eklutna Resurfacing

Paving with type VR

Bid amount: $1,234,567

Notice to Proceed: 6/12/2009

Start of Work: 7/6/2009

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Construction

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Glenn Highway Rut Repair

• High Traffic Volume, 4 lane = 43,000
• Rut depth avg. = 0.8” – 1.2”
• Roughness approx. = 5 inch / mile
• Night paving to minimize impact on rush hour traffic
Getting Started

Test Strip
Test Strip

Half at a time

Hauling

- 9 - 32 belly dumps hauling at anytime
- Plant located 15 miles from end of project
- Hauling at night was better for traffic and haul times
Hiland To Eklutna – 15 Miles
Eklutna to Premier Pit – 15 Miles

The Paving Train

Cat AP-1055B paver & Weiler E650 pickup machine
Rollers

- Two Dynapac CC722 for breakdown compaction (36,985 lb's operating weight each)
- One Dynapac CC624HF for intermediate compaction (28,110 lb's operating weight)
- One Cat 634C for finish rolling (25,926 lb's operating weight)

Temperatures

- Surface temperatures ranged from 50 to 75 degrees
- Air temperatures ranged from 48 to 80 degrees
- Asphalt temperatures in windrow ranged from 275 to 320 degrees
- Breakdown temperatures were seeing a drop of 40 to 70 degrees within 10 minutes
Night Paving across Eagle River Bridge

- 51,600 tons of type VR pavement
- Profile Index = 1.4
- Composite pay factor Avg. = 1.0338 over eight lots

**Why Use Crumb Rubber HMA**

- Provide the longest pavement life for high volume traffic, resisting rutting (based on Prall Testing)
- The lowest *agency* cost and *user* cost per year
- Provides good winter friction
  - Easier to debond compacted snow and black ice
Ruts fit wheel path of passenger vehicle.
Specification Changes

1. Density Profiles (by contractor process control as directed by Project Engineer)
   - Visual segregation
   - Thermal segregation (25° temp differential)
   - Adjacent to longitudinal joints
   - Paver starts & stops
   - Bridge decks

2. Joint density random numbers different from mix samples

3. Mat density 93%-99% MSG for Type R

4. Used smoothness specification for mill & fill rehab.

Type R – HMA with Crumb Rubber (2%-3%)

- Type R is a modified Plusride (dry process)
  - Uses polymer modified asphalt cement and not crumb rubber modified asphalt cement as the Plusride system does
  - The Prall value in Type R HMA is not changed by the use of “Hard” aggregate or local aggregate

Type R HMA

Type R by Weight

Coarse Aggr 51%
Fine Aggr 40
Asphalt 7
Rubber #8 2
Prall Test
- Core samples conditioned 20hrs @ 5°C
- Impact of 40 steel bearings for 15 minutes @ 950 rpm
- Cooling water (5°C) flows over sample during test
- Results are reported in volume loss (cm³)

Prall Testing HMA Core To Simulate Studded Tire Wear

Prall Test Data
- PlusRide: Prall = 13  22 yrs
- Type II:  Prall = 30-40  5-7 yrs  $70/T
- Type V  Prall = 20-23  7-9 yrs  $100/T
- “Hard” Aggr. Prall = 20-22  10-12 yrs
- Type R  Prall = 8-10  20+ yrs  $120/T
- Note rut depth is dependent on studded tire traffic (number of passes).
Recommended Changes

- Require a fine milled surface for traffic safety (cars & motorcycles). Tooth spacing on drum changed to 8mm from approx. 15mm
- Consider using WMA technology for thin lift paving with Polymer Modified Asphalt.
- Use infrared heating on compacted longitudinal joint to make it smooth and to increase density.