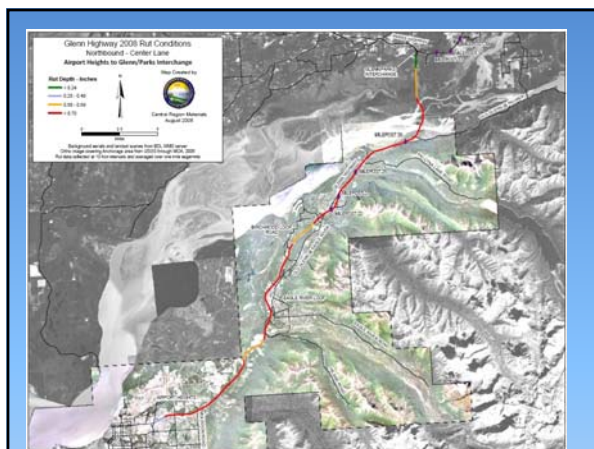




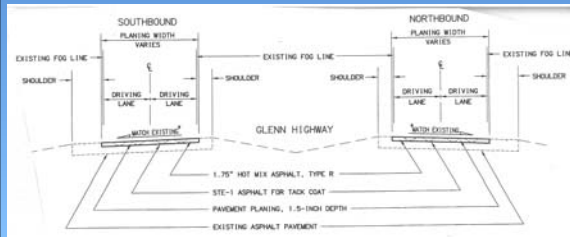
Glenn Highway Rut Repair

- 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





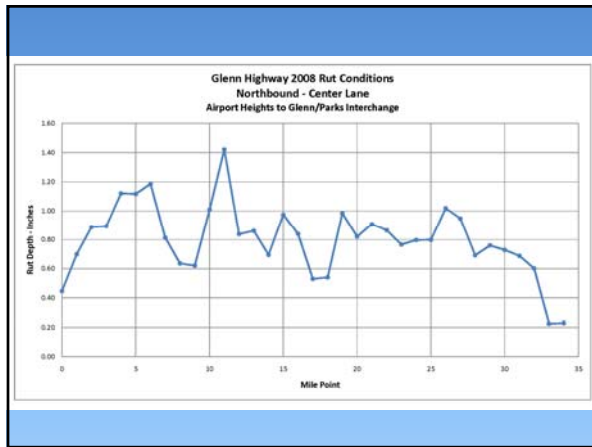
- 51,600 tons of type VR pavement
- Profile Index = 1.4
- Composite pay factor Avg. = 1.0338 over eight lots

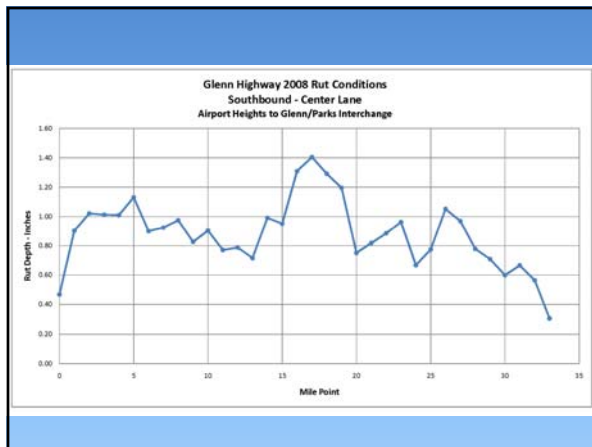
Why Use Crumb Rubber HMA

- ❖ 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







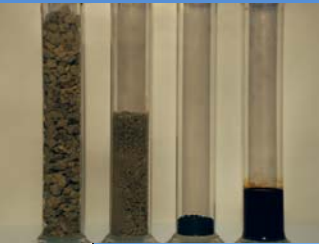
Specification Changes

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



Rubber Mix Volumes

Component	Elmore (%)	AC Couplet (%)
Coarse	51%	49%
Fine	29%	29%
Rubber	4%	3%
AC	16%	18%

Type R by Weight

Coarse Aggr	51%
Fine Aggr	40
Asphalt	7
Rubber #8	2

Prall Test

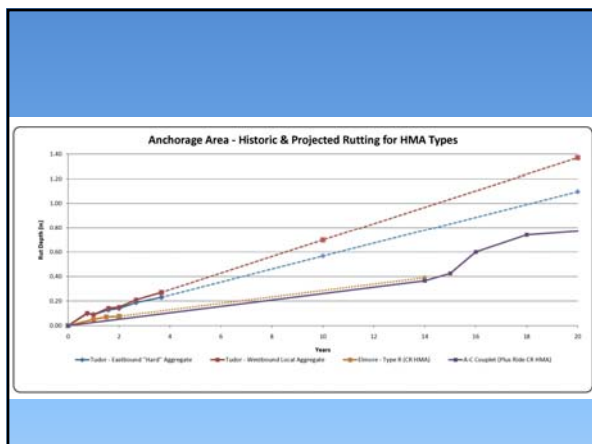
- Core samples conditioned 20hrs @ 5°C
- Impact of 40 steel bearings for 15 minutes @ 950 rpm
- Cooling water (5°C) flows over sample during test
- Results are reported in volume loss (cm³)

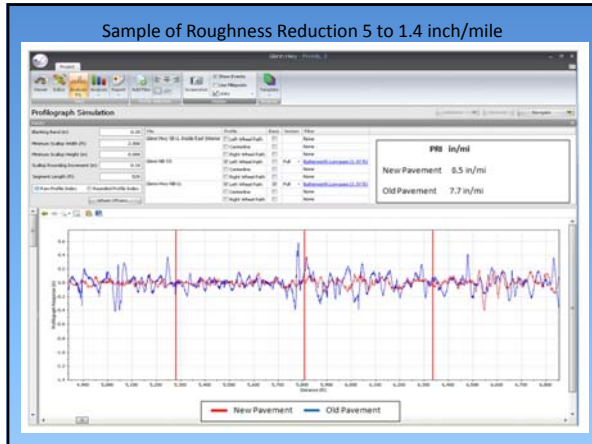


Prall Testing HMA Core To Simulate Studded Tire Wear

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.
