Reviewed By:
J. R. Phalen, P.E.
Materials & Research
Engineer

Prepared By: PCW
Peter C. Winters
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RESEARCH UPDATE

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USE OF 60/70 VS 85/100 PENETRATION GRADED ASPHALT CEMENT

REFERENCE:
Work Plan 82-B&R-21, Research Report 85-1

HISTORY:
In 1982 a research project was undertaken to compare the performance of bituminous concrete using 60/70 penetration graded asphalt cement with the 85/100 penetration graded asphalt cement usually used. The use of 60/70 pen. graded asphalt cement was proposed as a means to reduce the risk of rutting to be expected from the road's high traffic volumes. It was also expected that some increase in reflected cracking would result. The evaluation was incorporated into a paving project on U.S. Route 302 in the town of Berlin Vt. consisting of a leveling course and a 1-1/4" wearing course.

Approximately 5700 tons of bituminous concrete using 60/70 pen. graded asphalt cement (60/70 mix) was produced and placed during Sept./Oct. of 1982. Two hundred seventy tons of mix using 85/100 pen. graded asphalt cement (85/100 mix) was also produced and placed on a segment of the project for comparison. The referenced report (85-1) was published in January of 1985 and discussed details of the design, production, testing and application of the two mixes. The report noted that the mix design was the same for both mixes with the single variable being the grade of asphalt cement used. Testing of asphalt samples showed that the 60/70 mix asphalt had an average penetration value of 70 while the average for the 85/100 asphalt was 86. Further details of testing including viscosity (2263 for 60/70 vs. 1475 for the 85/100) and residue from thin film oven test (41-46 pen. for 60/70 vs. 49 pen.for the 85/100) are available in the report.

The asphalt test results suggest that cross contamination may have occurred producing a blending of asphalts which narrowed the difference in penetration values between the two mixes to 16. The average difference between the specifications would have been 27.5 and the maximum 40.

STATUS:
The 1985 report presented the following table and the summary contained the following statement. "With the exception of reflective cracking, the areas with two different grades of asphalt have performed and appear nearly identical."

(Over)

Table 1.

	60/70	85/100
*1) Reflective cracking (%)	39	77
2) Rutting Values	2/16	2/16
3) Mays Meter (Inches/Mile)	31	39
4) Friction Value (@ 40 MPH)	42	44

* Results from test section only, other data collected throughout the project,including the test section.

In April of 1987 a field inspection revealed that reflective cracking in the 60/70 mix had increased to 68% while in the 85/100 mix it had increased to 90%.

A rutting survey in January of 1988 revealed that in an area free of turning movements 5/16" was the deepest rut reading in both the 85/100 mix and the 60/70 mix. The average rut depth in the 85/100 mix was 3/16" while in the 60/70 mix it was 2/16". At the intersection of U.S. Route 302 and the Berlin State Highway, rut readings were taken in the vicinity of stopbars in order to determine the difference in performance of pavements exposed to stop condition traffic. The deepest reading in the 85/100 mix was 8/16" while the average reading was 2/16". In the 60/70 mix the deepest reading was 10/16" with an average reading of 2/16".

There was no surface rippling in the area of the traffic light with either type of mix.

Updated rideability readings and skid numbers are not available for 1985 or 1986.

As of January 1988 there were no surface cracks which were not reflected cracks.

CONCLUSION:

There was no significant difference in rutting between the two pavements. There was an unexpected reduction in reflective cracking with the 60/70 mix. The overall performance was very similar.

The similarity of performance may be due to the similarity in penetration values attained in the two mixes which were at the closest extreme ends of their respective ranges.

Although this project will continue under informal observation, no formal inspection or further reporting is planned.

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