

NCAT RUTTING STUDY

RSN 90-1

The premature rutting of asphalt concrete roads is a common problem throughout the country. In order to learn how to design and construct rutting resistant pavements, the National Center for Asphalt Paving Technology (NCAT) began a five-year long nationwide study of the problem in 1987. Although the final report is due in September 1991, the NCAT has provided preliminary findings and recommendations to the Oregon State Highway Division (OSHD) and other participating states.

Each of the following three sites in Oregon were cored to provide both detailed cross-sections and material for testing:

- Vilas Road near Medford: 9/16-inch maximum rut depth in a 3 year old overlay.
- US #97 near Crescent: 9/16-inch maximum rut depth in a 6 year old overlay.
- US #30 near Holbrook: 5/16-inch maximum rut depth in an 18 year old overlay.

Preliminary findings by the NCAT indicate that the rutting at each site was caused by the following:

- Vilas Road: densification of the surface lift due to low initial compaction, and moisture damage and/or densification of the lower lifts due to low initial compaction.
- US #97: densification of the surface lift due to low initial compaction, and plastic flow in the lower lifts due to excessive asphalt content.
- US #30: moisture damage in all lifts. This may be caused by a permeable upper lift.

Preliminary recommendations by the NCAT for the design and construction of rut-resistant pavements are:

- 1) Verify that the laboratory compaction used in mix design simulates compaction after a few years of traffic. Adjust laboratory compactive effort as needed.
- 2) Compact mix samples in the laboratory periodically during construction. Modify mix design as needed to maintain 4% voids in laboratory compacted mix samples.
- 3) When desired density is not reached during construction, additional compaction should be used rather than increasing the asphalt content.

Implementation:

- The OSHD Materials Laboratory is currently evaluating mix design procedures as recommended in item 1). Initial results indicate that there is a good correlation between laboratory and field compaction.
- Contract specifications were modified to require lab compaction of AC mixture at least once during each project as recommended in item 2).
- Further efforts will be made to coordinate with OSHD field/operations personnel in adjusting the mix design or field compaction procedures as recommended in item 3).

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