

1. Report No. ND 97-01	2. Report Date August 2001	3. Contract No. N/A	4. Project No. IM-1-094(040)193
5. Title and Subtitle  Whitotopping an Existing Asphalt Pavement with Polyolefin Fiber Enriched PCC		6. Report Type <i>Click on link to open report</i>  Work Plan <input type="checkbox"/> Construction <input type="checkbox"/> <u>Evaluation</u> <input checked="" type="checkbox"/> Final <input type="checkbox"/>	7. Project No. 8. Project No. 9. Project No. 10. Project No.
11. Author(s)/Principle Investigator(s) Curt Dunn, John Wolf,		12. Performing Organization Name and Address NDDOT M+R <input checked="" type="checkbox"/> North Dakota DOT NDDOT OTHER* <input type="checkbox"/> Materials and Research Division NDSU <input type="checkbox"/> 300 Airport Road UND <input type="checkbox"/> Bismarck ND 58504-6005 UGPTI <input type="checkbox"/> OTHER* <input type="checkbox"/> *see supplementary notes	
13. Sponsoring Agency Name and Address North Dakota DOT Materials and Research Division 300 Airport Road Bismarck ND 58504-6005		14. Supplementary Notes	
15. Abstract  <b>Purpose and Need</b> Rehabilitation techniques and methods are being considered by highway agencies as our roadway system ages. One technique is whitotopping. This technique involves the application of a thin lift of portland cement concrete (PCC) over an existing asphalt roadway. The use of PCC as an overlay material may have some advantages such as control of reflective cracking and rutting. PCC, however, is brittle in nature and has a tendency to crack in tension. Plastic shrinkage cracks can form before the concrete hardens as well as the formation of stress cracks after hardening. The whitotopping concept is based on the belief that when the PCC is bonded to the underlying asphalt the two layers behave as one composite layer. The bonding of the two pavement layers into one composite layer should force the neutral axis in the PCC slab downward. This will tend to cause the PCC to act more in compression and reduce the tensile stresses placed on the PCC. To improve PCC properties the addition of reinforcing fibers are sometimes added to attempt to create a more ductile failure mechanism, to increase toughness, and to prevent the formation of large cracks.  <b>Objective</b> The objective of this study is to determine if a thin lift of PCC, reinforced with polyolefin fibers, can serve as an alternative to a conventional bituminous overlay of existing asphalt pavement.  <b>Scope</b> Items that will be monitored and evaluated on the whitotopping experimental section will include: What are the distresses in the pavement, what is the overall pavement condition, have the fibers affected the ride of the PCC section, do the fibers show an ability to control reflective cracking, comparison of performance of the fiber reinforced PCC section to adjacent bituminous overlay sections. The evaluation period for this study will be approximately five years with evaluations annually. The project is located on the crossroad at the Steele interchange on Interstate 94 which is near reference point 193.  <b>Summary</b> The cracks in the polyolefin fiber concrete mix have increased drastically in severity since the last review. It appears some maintenance may be required in the three 25' sections to prevent any further breakups and improve the overall ride. It was apparent to the review team that in general, as the joint spacing increases, the performance of the concrete decreases. Joint spaces of less than 15' were performing at a satisfactory level. However, panels with joint spacing of greater than 15' showed several signs of cracking, faulting, and spalling. There was also a noticeable difference in performance between the NB and SB lane. This is thought to be a result of different lane thickness. The NB lane with a 4.5" section of PCC seems to be performing much better in all panels less than 25' in length. Other than the three 25' panels, the NB lane has experienced almost no distresses while the SB lane has experienced cracking, faulting, and moderate spalling. The subgrade modulus also seemed to have an impact on how the roadway was performing. It seemed that most of the distresses found before construction were concentrated in the same location as the 25' panels. Upon collecting FWD data it was discovered that this area had some of the lowest soil moduli in the entire test section. The field team believes that subgrade problems should be repaired prior to constructing a whitotopping project			
16. Key Words Pavement Concrete Reinforcement Fibers Whitotopping Polyolefin	17. Distribution Statement No restrictions. This document is available to the public from:  North Dakota Department of Transportation Materials and Research Division: 300 Airport Road Bismarck ND 58504-6005 Office: (701) 328-6900 Fax: (701) 328-0310	18. No. of Pages 57	19. File type/Size pdf/4.0 mb