MnROAD was initially built in the early 1990s and has seen approximately 13 years of traffic and environmental loadings. As MnROAD enters Phase II of its existence several research projects were initiated that necessitated the reconstruction of pavement test sections over the next three years for 2007-2009. These research projects were prioritized and developed to help answer the local and national questions we have related to the Design Guide, Innovative Construction, Preventive Maintenance, Recycled Materials, Rehabilitation, Surface Characteristics, and other Non-Pavement Research MnROAD can help support. The primary efforts related to the construction for 2008-2009 will be National Pooled Fund Research, SHRP-II composite pavements, and Mn/DOT/partner research studies. Details related to the 2007 research projects are listed below.

Effects of Implements of Husbandry "Farm Equipment" on Pavement Performance
MnROAD has constructed two heavily instrumented test sections to determine pavement response (i.e. possible damage) under various agriculture equipment configurations. These HMA test sections were designed to represent a “thin” 7-ton and a “thicker” 9-ton roadway. Loading will be done in the spring and fall of each year under a national three year pooled fund study which includes participation from Iowa, Illinois, Minnesota, Minnesota Local Road Research Board, and the Professional Nutrient Applicators Association of Wisconsin. Several other partners have also joined the research an effort including the Wisconsin LTAP and equipment manufactures to use the MnROAD facility to test their equipment and to truly determine the effects each has compared to a typical 5-axle semi using the instrumentation from each of these test cells along with others on the low volume road. More information can be found at http://www.pooledfund.org/projectdetails.asp?id=375&status=4 or by contacting the Minnesota pooled fund technical lead Shongtao Dai (Shongtao.dai@dot.state.mn.us).

Field Investigation of Highway Base Material Stabilized With High Carbon Fly Ash
Fly ash is a byproduct produced from the combustion of coal. It is a material having cementitious properties and is frequently used to enhance mixtures of Portland cement concrete. High Carbon Fly Ash has a carbon content that is out of range for use in the concrete industry. Laboratory testing has shown high carbon fly ash to be a viable stabilizing material. Field construction is necessary to validate the structural and environmental performance of high carbon fly ash stabilized bases. This work is a portion of Phase II of a fly ash stabilization project performed by Bloom Consultants, LLC and is sponsored by the U.S. Department of Energy. Phase II is a two year project entitled Use of High Carbon Fly Ash to Stabilize Recycled Pavement as Base Course, and it is funded by DOE for $750,000.

MnROAD constructed three instrumented test sections on the low volume road to evaluate the physical and environmental properties of base materials stabilized with high carbon fly ash in comparison to recycled pavement materials and crushed stone. This study will include construction, aggregate characterization, field testing, and long-term monitoring of the test cells. The three test cells consist of a 4” HMA over 8” of a fly ash treated full depth reclamation (FDR), non-treated FDR, and a class-6 crushed stone base as the control. This is
of interest to both Mn/DOT and many cities and counties. In summary, Bloom Consultants, LLC will pay MnROAD $150,000 for the construction and use of test cells and for the pavement testing that will be conducted by MnROAD personnel. More information can be obtained from Roger Olson (roger.olson@dot.state.mn.us) or Haifang Wen, University of Wisconsin (hwen2@wisc.edu).

**PCC Surface Characteristics – Rehabilitation**

One method to rehabilitate Portland cement concrete pavements without the need to restore structural capacity is to diamond grind the surface. This process removes much of the pavement roughness and restores texture and friction. This pooled fund is utilizing two test sections on the MnROAD mainline to look into the details in the grinding operation, such as blade spacing, depth of cut, kerf configuration, etc. There is a need for a standardized specification for diamond grinding that optimizes ride quality, quietness, safety against hydroplaning and splash/spray, and concrete durability. This summer work was completed to implement initial research from Purdue University who developed an innovative grind to compare with our traditional grind in the laboratory. MnROAD’s low volume road was used as a initial test bed to try three 18” grinding patterns (traditional, innovative 1 pass, innovative 2 pass), which were monitored before two mainline (I-94) test cells were ground later this summer. Mn/DOT has partnered with Texas DOT, FHWA, American Concrete Paving Association (ACPA), and Diamond Surface, Inc. for this pooled fund study. More information can be found at http://www.pooledfund.org/projectdetails.asp?id=363&status=4 or by contacting the Minnesota pooled fund technical lead Bernard Izevbekhai (Bernard.Izevbekhai@dot.state.mn.us), Larry Scofield (lscofield@pavement.com), or Terry Kraemer (terryk@diamondsurfaceinc.com) who has kindly donated the grinding completed at MnROAD this summer.

**MnROAD Field Investigation of Polyphosphoric Acid Modified Asphalt**

Polyphosphoric acid (PPA) has been used for some thirty years to stiffen asphalt for paving applications. PPA and polymer modified asphalts have improved the pavement performance at high temperatures (i.e., rutting) without adversely affecting the low temperature properties (i.e., low temperature cracking). The use of PPA is seen as a lower-cost alternative to polymers in order to achieve the same increased performance. The Federal Highway Administration, Office of Infrastructure, is completing a laboratory project to address the risks and benefits associated with the use of polyphosphoric acid as an asphalt modifier. FHWA also aimed to clearly identify which grades can and cannot be used and the pitfalls associated with the use of polyphosphoric acid with certain antistrip compounds. The MnROAD study will build upon the findings of this study and conduct a field trial to assess the performance of PPA mixes over a 5 year period. This study is a joint venture between Mn/DOT, Innophos, Inc., Federal Highway Administration, MTE Services, Inc., Marathon Petroleum, DuPont, and Paragon Technical Services. Construction of four MnROAD Low Volume Road test cells to study the performance of asphalt mixtures modified with polyphosphoric acid was completed in 2007. The binders studied include PPA, PPA + SBS polymer, SBS polymer, and PPA + Elvaloy polymer. More information can be obtained from Tim Clyne (tim.clyne@dot.state.mn.us).