2011 MnROAD Reconstruction and Repairs

Introduction

MnDOT developed the plans and specifications to reconstruct three different pavement sections and repair another at the Minnesota Road Research Project (MnROAD) during the 2011 construction season.

The concrete construction contract was awarded to C.S. McCrossan and work began August 1, 2011 and concluded mid September 2011. The stabilized full depth reclaimation (SFDR) project was awarded to Midstate Reclamation and work began August 29, 2011 and finished in early September.

The construction incorporated the following innovations:

Longitudinally Tined Concrete

The addition of this surface texture has created the most complete set of pavement surface textures and types at a single facility within the USA. The inclusion of this surface texture allows MnROAD to continue being used for developing, testing, certifying, and training on various surface measurement devices such as profilers.

Roller Compacted Concrete (RCC)

Roller Compacted Concrete is a concrete mix that doesn’t require forms, joints, dowels or reinforcing. It is traditionally paved using asphalt paving equipment. It can provide the strength of concrete with the economy of asphalt. This technology has been used more in warm climates on low volume roads and shoulders. It was constructed as shoulders at the MnROAD site to demonstrate the technology and evaluate its performance in a freeze-thaw environment.

Open Graded Aggregate Base (OGAB) Special

Research at MnROAD and elsewhere has shown that concrete pavements built over well-draining aggregate base materials perform substantially better than those built over more traditional dense graded bases. MnDOT has been using OGAB on many construction projects, but it adds substantial construction costs due to stability issues. MnROAD provided a modified OGAB material. This material proved to be stable during construction; preliminary test results also show promising results for permeability of this material.

Concrete Gradation Optimization

MnDOT has realized substantial performance benefits in concrete pavements by using the 8-18 gradation band. However, this well-graded aggregate may not always be needed. This work allowed MnROAD to investigate two other
gradation bands in our concrete mixtures and evaluate their durability over time.

Repair of Thin Concrete Overlays

Substantial research has been done at MnROAD and elsewhere on the design of thin concrete overlays. However, the best practices for repair and maintenance has not been researched. The full depth panel repairs on the thin whitetopping cell will be the first step in this area.

Non-Woven Geotextiles in Thin (5”) Unbonded Concrete Overlay

There has been some desire in industry to explore a thin unbonded overlay with smaller panel sizes than what is currently out at MnROAD to help determine if the current specifications are too conservative in design of unbonded concrete overlays. Also of interest is the ability of the geotextile interlayer to provide stress relief from the underlying joints and to drain water from the overlay system.

Stabilized Full Depth Reclamation (SFDR)

The need to develop and implement new, less costly methods to renew or restore low volume roadways has become an issue facing many owners. There has been information about local agencies around the United States turning paved roadways back to gravel in an effort to save money. Gravel roadways can be very difficult and expensive to maintain.

The 2011 construction included an SFDR pavement. The contractor reclaimed the existing HMA pavement, a portion of the underlying class 5 base material, and added some additional aggregate chips for stability. This material then was treated with an engineering emulsion. It was then surfaced with a chip seal followed by fog seal and crusher dust from the same aggregate source as the chip seal. This method was chosen to determine if 100% of the in place materials can be reused in-place and then surfaced with very thin asphaltic flexible surface.

For More Information:

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