

# Michigan Department of Transportation - M•DOT

# Mates



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## PRIVATIZATION ACCOMPLISHMENTS IN INSPECTION/TESTING

With the recent trend toward privatization of state government operations, parallel with an increasing number of retirements within State employment, the Department has been prompted to explore and develop alternative means necessary to fulfill increasing work load demands. The Structural Services Unit, in the Materials and Technology Division, has pursued the mobilization of consultant services and other resources of privatization to assist in the field and shop inspection and testing of structural materials used in MDOT highway projects.

The utilization of consultant services for field coring of new portland cement concrete pavements was proposed and implemented to offset demands imposed as a result of a fifty percent shortage of technical field personnel within the Pavement coring subunit. This has allowed M&T to accomplish its objectives with minimal interruptions in operations. Prior to commencement of the 1992 construction season, two pavement construction projects were selected for consultant coring on an experimental basis. Selection of consultant projects was determined based on an estimated work load which could not conceivably be handled using existing forces.

Initial encounters with the consultant during the early stages of coring operations were troublesome. However, once specification and operational details were worked out, giving the consultant a more comprehensive understanding of MDOT specifications and objectives, few problems were encountered thereafter. M&T is anticipating future utilization of consultant services to offset personnel shortages in the area of portland cement concrete pavement coring operations for the 1993 and future construction seasons.

Recent investigation and developments toward 'end result' specifications (MATES, Issue No. 8, June, 1987) associated with portland cement concrete have prompted M&T to pursue privatization in the areas of portland cement concrete batch plant inspections and construction scales calibration inspections. As a consequence, special provisions have been established requiring that responsibilities for scales and batch plant inspections shall be scheduled by the contractor and performed by a private inspector or inspection agency prior to supplying material to the project site. Initial response from industry was somewhat negative. However, once specifications were established and operational objectives were clearly understood, inspection commitments continue to be fulfilled with minimal interruption and delay in construction operations. In the future, M&T is proposing further privatization of scales and batch plant inspection requirements. The Division will still maintain personnel responsible for monitoring and maintaining quality assurance of the privatized operations.

Privatization of inspection operations has also been accomplished in the areas of prestressed concrete and structural steel bridge fabrication. For the past several years the Structural Services Unit has utilized consultant services to perform all shop fabrication inspection. Inspection consultant services are under the administration and oversight of the Unit's engineering staff. Contracted consultants have developed technical staff in conformance with M&T

operational procedures, which establishes minimum requirements for consultant inspector qualification. Privatization of fabrication inspection has prompted consultants to move toward upgrading the level of technical expertise for their personnel, thereby ensuring that the inspector is capable of meeting the Department's requirements. Prestressed concrete shop fabrication inspectors must acquire and maintain either Level I or Level II certification (depending on specific application) through the Prestressed Concrete Institute. Fabrication inspectors for structural steel must fulfill requirements for certification through the American Welding Society (AWS) and acquire and maintain minimum certification as an AWS QC-1 Inspector. In addition, structural steel inspection personnel must also successfully complete written examinations pertaining to various levels of non-destructive testing of structural steel welding. The consultant is responsible for the recertification and training of inspection personnel, as well as maintenance of a comprehensive and technologically up-to-date pool of qualified inspectors.

The Department is required to maintain complete oversight of all relative consultant activities. Consultant fabrication inspection is monitored by the Structural Services Unit technical personnel through unannounced independent assurance inspections. Competency of each inspector is closely monitored to ensure that all phases of fabrication inspection are complete.

M&T specifications also make provisions for minimum quality standards that a prestressed concrete fabricator must meet. Fabrication facilities are required to obtain certification through the Prestressed Concrete Institute. Such certification assures MDOT that the fabricator's facilities are maintained in compliance with the industry's minimum standards and creates uniformity between fabrication facilities.

The Structural Services Unit is also involved with the development and implementation of contractor quality control/quality assurance (QC/QA) specifications for portland cement concrete testing and inspection. Such responsibilities are currently maintained by MDOT Construction and M&T personnel. QC/QA specifications require the contractor to submit a proposed plan for concrete testing and inspection prior to commencement of concrete placement. The contractor is required to either maintain a staff of qualified technical personnel or contract with a private testing agency for preparation of mix designs and QC field testing of the concrete. Payment to the contractor for in-place concrete is not only based on the quality of the finished product, but also on whether or not the QC specification requirements are fulfilled. MDOT Construction and M&T personnel will continue to maintain responsibility for oversight of all contractor QC concrete construction activities.

It is essential that the Department properly select, train, and oversee consultants and the associated operations. It is equally important that private industry provide adequate resources and make available trained, competent inspection personnel to fulfill the current and future technical consulting contract demands...

**HERE IN THE 'WILD KINGDOM'**

-John Staton  
-Steve Cook

## Materials and Technology Engineering and Science

MATES is a news bulletin authorized by the transportation director to disseminate technical information to MDOT personnel, and is published by the Materials & Technology Division. The cost of publishing 800 issues at \$0.05 per issue is \$40.00 and it is printed in accordance with Executive Directive 1991-6.

## 1992 TIMBER BRIDGE AWARD COMPETITION

This article is intended to bring our readers up to date on recent activities relating to our unique timber arch bridge in Eagle River. As you may recall from our June 1991 MATES (Issue No. 54), this three-pin, twin-arch timber structure carries state trunkline M 26 over the Eagle River in the Keweenaw peninsula. This structure is completely constructed of glue-laminated members fabricated from 147 MBF (thousand board feet) of Industrial Grade southern yellow pine, enough lumber to build three to four average size homes. The 152-ft long structure, with a clear roadway width of 38 ft, was designed according to the AASHTO Standard Specifications for Highway Bridges, HS-25 loading.

On August 26, 1992, the Eagle River timber bridge was officially entered in the 1992 Timber Bridge Design and Construction Award Competition sponsored by the National Forest Products Association, Special Task Group on Timber Bridges, and the U. S. Department of Agriculture, Forest Service. This modern wood bridge competition is open to all bridge owners (i.e., towns, cities, counties, and states), bridge architects, designers, contractors, and developers. Eligibility criteria for this competition required that all candidate bridges must have been open to traffic prior to January 1, 1992, and they must be located in the United States. Awards will be presented in each of the following four categories; 1) pedestrian/light vehicular bridges, 2) vehicular bridges with main span over 40 ft, 3) vehicular bridges with main span under 40 ft, and 4) rehabilitation of existing bridges using wood components. Our Eagle River structure was entered in the second award category, "Vehicular Bridges with Main Span Over 40 Feet."

Deadline for competition entry was September 30, 1992, after which a distinguished panel of judges, representing a wide diversity of timber bridge design expertise, will evaluate and select a 1st Place Award winner and Award of Merit winners in each of the four categories. Candidate bridges will be judged on the basis of their design innovation, visual appeal, cost effectiveness, and the use of sound engineering principles. The competition is intended to highlight the innovative and efficient use of engineered wood products in helping to solve the problem of deteriorating bridges in the nation's highway infrastructure.

Award winners will be presented a plaque featuring a color photograph of the winning bridge along with the names of the designer, contractor, and owner. A separate plaque will be permanently affixed to the bridge itself for public display.

At the time this article went to press, the judges' decisions in the competition were not yet known. We will publish any decision relative to our Eagle River bridge entry in a future MATES issue. If you are interested in learning more about the history, fabrication, and construction of the Eagle River timber bridge, contact me in the Research Laboratory at (517) 322-5731.

-Glenn Bukoski

## SHRP UPDATE

Earlier MATES issues (Nos. 43 and 57) described MDOT's involvement in the Strategic Highway Research Program (SHRP), particularly that related to the national Long Term Pavement Performance (LTPP) study. Michigan currently has 14 locations scattered throughout the state at which performance will be monitored over a long period of time (up to 15 years) and the data that is collected will be incorporated with that from about 1,000 other locations around the U.S. and Canada. It is expected that analyses of the data will yield new, more realistic pavement design criteria.

Thirteen of Michigan's locations are part of SHRP's general pavement studies (GPS) of existing, in-service pavements. Each location consists of one 500-ft performance monitoring section. Various pavement designs are included in the GPS studies including pcc concrete and bituminous with and without overlay.

An additional Michigan location (eastbound US 10 in Bay County) is part of SHRP's special pavement studies

(SPS). In these studies new construction, rehabilitation, or maintenance special performance monitoring sections are built. At the US 10 location the study involved portland cement concrete pavement rehabilitation. Here there are nine 500-ft sections consisting of various pcc rehabilitation treatments including rubblizing, crack and seat, and joint repair with bituminous overlay. The bituminous overlay is 8 in. thick over one-half the crack and seat area and 4 in. over most of the rest of the site.

In addition to the US 10 SPS location, Michigan has four maintenance effectiveness SPS sites, one each adjacent to one of our GPS locations. These 500-ft sites are part of a nationwide study intended to evaluate the effectiveness of four widely used treatments: thin overlay, chip seal, slurry seal, and crack seal. In addition, MDOT's Maintenance Division added a section at each site using another material in which they are interested. Although these maintenance treatments are common, billions of dollars are spent annually on them by highway maintenance authorities and there is little documentation regarding their effectiveness.

Each SHRP location has had extensive material sampling and testing done in order to characterize its as-built condition, including subbase, base, and surface layers. In addition, pavement deflection, friction coefficients, and distress conditions were measured and will continue to be measured periodically through the life of the section.

Meaningful evaluation of pavement performance can't be accomplished without knowledge of the traffic loading history of the section. Hence, MDOT provides SHRP with traffic data, historical and continuing, in order to assess its effect on pavement performance. MDOT's Transportation Planning Services Division has installed permanent two-lane weigh-in-motion, automatic vehicle classification systems at each of the 14 LTPP locations.

In addition, MDOT will construct two of SHRP's 32 'structural factor' SPS test sites. These experiments are expected to provide fundamental quantitative information on the effects of various conditions—information that is needed to improve design procedures.

The first site concerns the effects of drainage and structural parameters on the performance of asphalt pavements. Structural factors to be studied include asphalt concrete surface thickness and the type and thickness of base layers. In all, 12 different performance monitoring sections will be constructed as part of US 27 relocation (St. Johns bypass) currently scheduled for letting in February 1993.

The second site will examine the effects of drainage and structural factors on jointed portland cement concrete pavements. Structural factors studied include pavement type (jointed plain at the Michigan site), concrete flexural strength, concrete thickness, base type, and lane width. Twelve different performance monitoring sections will be built as part of the six-mile reconstruction of US 23 just north of the Ohio border, scheduled for completion during 1993.

The Strategic Highway Research Program is a five-year effort and is nearing the end of its existence (March 1993) as a unique and relatively independent entity. Two major efforts will continue, however. First, implementation of the research results or products will be an emphasis area for AASHTO, TRB, and FHWA. Second, and more to the point of this update, the long-term pavement performance study will continue, as intended, for up to a total of 20 years. Oversight for this program, however, was transferred to the FHWA last July, and they have executed contracts for regional coordination with the same firms that had previously contracted with SHRP for the same sort of services, so we expect the transition to go smoothly.

-Dave Church

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