

# MATES

## MICHIGAN DEPARTMENT OF TRANSPORTATION

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### VISUAL INSPECTION (V.I.) OF MATERIALS

Even as our scientific test methods become more sophisticated and efficient, the crucial importance of the naked-eye of an experienced engineer or inspector will never be diminished. Although most materials reaching the MDOT project job site have been tested or certified as meeting specification requirements, this only means that a small sample from a large lot of material has been taken and tested according to MDOT approved test methods. A passing test means that a sample of material meets our requirements, but does not automatically assure us that all of the material in the large lot is of passing quality. There is also the chance that the sample tested did not come from the lot delivered or that the material has degraded, become contaminated, or been damaged since sampling. Thus it is very important that MDOT job site personnel visually inspect the material, and not take for granted that it's 'good' just because it has been tested or certified.

A visual inspection (V.I.) with subsequent approval must be performed by the Project Engineer or his or her delegated Inspector before material is incorporated into the project. This visual scrutiny of delivered material is used to identify the material and compare it with its accompanying test reports, identification tags, or certifications, to determine if any obvious defects or damage exist, before approving the material for use in the project. This is the Department's final look at the material before it is used, the test reports and certifications serving as the support documentation for the material. The inspector visually checks the material to see whether there have been any substitutions, damage due to shipment, or flaws or defects in it. If such deficiencies are apparent, or the material has a non-uniform appearance, it should not be approved for use until it can be retested or replaced.

Another purpose of the V.I. is to use it on materials whose quantity is too small to warrant the expense of lab testing. These materials and their V.I. quantities are listed in the "Materials Sampling Guide."

V.I.s are to be performed on all materials coming onto the job site and approval for use given by the Project Engineer or a delegated Inspector. They should not be limited to small quantities of untested or uncertified materials, but are considered to be a routine procedure for all materials reaching the site. Again, suspicious, non-uniform appearing material that has been tested or certified should not be approved for use until a passing retest can be obtained.

#### Materials Requiring a V.I.

The following types of materials and items are to be subjected to a V.I., regardless of any previous testing and inspection.

**Tested Materials** - Materials or items that have been tested for use on a specific job before being used. They must be identified by the inspector to assure that they are the ones called for, with proper size, shape, coating, etc. Fabricated items such as paving mesh carry a tag indicating that they have been tested and approved. Watch for substitutions, or for damage due to handling and shipping. Remember, just because a material or item has been tested does not mean that it can't be sampled and retested at any point if there are doubts about its quality or authenticity.

**Tested Stock Materials** - Tested stock consists of various materials that are pretested, and used when called for, on MDOT and Federal Aid Secondary projects. They are stored and maintained by producers or brokers at their facilities. When these items or materials are shipped to the site, the same V.I. procedure described for 'Tested Material' is to be followed.

**Certified Materials** - These are materials or products that are tested by the manufacturer. Quality control testing is performed according to MDOT procedures and specifications, and the manufacturer certifies by document that the material or product meets Department specifications. The certification document should contain specific information as to just what is being certified. The V.I. checks the material that is actually delivered for such things as quantity, batch or lot numbers, manufacturer, etc. The V.I. should also, of course, check for damage, workmanship, and quality.

**Untested, Uncertified Materials or Products** - This category requires the most vigorous inspection. The material or product is checked for conformance to requirements, including the proposal and "Materials Sampling Guide." The Inspector checks to see whether any printing or markings on the package or product indicate conformance to appropriate specifications. An experienced Inspector will know whether the material or product appears to be similar to those that have been tested and used on other projects. Again, the Inspector will check for damage, quality, and workmanship.

#### Visual Inspection by Contractor's Employees

MDOT Standard Specification 1.05.04 states that if the Engineer finds materials, work performed, or finished product not within reasonably close conformity to plans and specifications, the work may be rejected. Thus, it is to the contractor's advantage to assure that satisfactory products are incorporated into the job. We realize that MDOT sampling and inspection involves only a small portion of a product at a specific time. Contractor personnel handle and install each piece and should be well aware of its condition. They know about cracked or defective pipe, rusted prestressing strand, improperly fabricated structural steel, wrong grade of asphalt, segregated aggregate, etc. Unless somebody from the company has instructed these employees to react to poor or damaged materials or products, they may be incorporated into the work with the idea that the employees are doing the company a favor.

Contractor personnel are not expected to be particularly knowledgeable regarding specification requirements; however, they should be able to identify obviously damaged or defective items. The contractor who wishes to build a quality product should instruct his personnel to set aside such items for review by MDOT inspectors. If considerable difficulty is encountered with a particular item, the contractor should bring this to the attention of the vendor or manufacturer without MDOT having to be involved.

Visual Inspection, V.I., is a dynamic and important part of quality control. It should not be considered or used simply as a way to approve items without having to go through the rigors of sampling and testing. Inspectors, wherever they are, should be conscious of the fact that when they view a material or product, they are performing a V.I.; however, it is a useful or effective V.I. only if there is a reaction when something is wrong.

-Don Malott

## RESTRICTION ON FOREIGN MATERIALS

As a result of recent congressional action, MDOT cannot allow the awarding of work either to a prime contractor or subcontractor of a foreign country listed as one that discriminates against U. S. firms. Currently, Japan is on that list. Therefore, a new special provision is being used in some MDOT contracts stating that, "Any product of which fifty percent or more of its cost is attributable to production or manufacturing in a foreign country shall be considered to be a product of such foreign country."

A problem arises with this special provision in defining what a 'product' is. For a concrete pavement, would portland cement be defined as a product, or would it be the concrete in place?

A specific example that has recently been resolved involved the use of 'Sebulite' reflective sheeting for signs, which is produced by a Japanese manufacturer. In this case, we define the product as the sign, including the re-

flexive sheeting, the wood or metal backing, and the labor to build it. If the fabricator can prove that the sheeting is less than fifty percent of the total sign cost, then Sebulite sheeting is acceptable even if the new special provision appears in the contract documents.

Reflective sheeting for signs is only one example of the problem that could affect other products. Similar situations may arise that will have to be addressed on an individual basis. In order to evaluate the product, the source and use of production components may need to be defined.

The special provision does not take the place of the 'Buy America' provision that appears in the proposal, but is to be used in conjunction with it. The 'Buy America' provision limits the use of any foreign steel permanently incorporated in a project to one-tenth of one percent of the total contract cost, or \$2,500, whichever is greater.

-Brian Ness

## TECHADVISORIES

The brief information items that follow here are intended to aid MDOT technologists by advising or clarifying, for them, current technical developments, changes or other activities that may affect their technical duties or responsibilities.

### NEW MATERIALS ACTION

The New Materials Committee recently:

Approved the following for trial installations:

Peg 6 - Wooden Tie-Down Peg  
Thorma-Joint Bridge Expansion Joint

Approved the following products:

Saginaw Trash Rack  
Safe-T-Drum Plastic Drum  
Contech A-2000 PVC Sewer Pipe  
Tackifiers  
Latex Base:  
Polysar 968 - Polysar, Inc.  
Guar Gum Base:  
Am Tac - American Excelsior Co.  
Land Tac - Midwest Land Supply, Inc.  
Excelsior/Guar Base:  
Excel Fiber Mulch - American Excelsior Co.  
Conwed 2000 - Conwed

It should be noted that some products may have restrictions regarding use. For details please contact Don Malott at (517) 322-5687.

### SPECIFICATION UPDATE

Aggregate Base - Concrete, Ramp, 3.01(3a), dated 11-25-87. This new specification provides grading requirements for 3G, a new open-graded aggregate, which is recommended for use under concrete when paving ramps and taper areas. The new gradation will provide greater stability for the paving forms and still ensure drainability.

Hand Chipping, 5.09(8c), dated 12-1-87. This revision increases the concrete mass associated with patchwork, which will result in reduced cracking and improved bonding.

Aggregates Used in Top Course Bituminous Mixtures, 7.10(8d), dated 12-22-87. Previously only 20 Series aggregates were included in this supplemental specification. Because some counties and municipalities occasionally use other than 20 Series aggregates, this revision broadens the specification to include any aggregate that may be used in top course bituminous mixtures.

Traffic Signal Cable, 8.25(5), dated 01-13-88. This specification replaces two previous traffic signal cable specifications by combining similar requirements. Also, new references to three IMSA specifications are included; No. 20-5 (Direct Burial), 50-2 (Loop Lead-In), and 51-5 (Loop).

Removing Concrete on Bridge Superstructures, 5.09(12), dated 01-28-88. This specification is intended to reduce the possibility of structural damage to bridges by limiting the size of equipment permitted during removal of various concrete components.

Steel Posts for Guardrail, 8.07(3), dated 02-23-88. This specification changes the steel post description to the latest nomenclature as used on Standard Plan III-60F. A W6x9 steel post, which is the latest available "w" shape listed in the American Institute of Steel Construction (AISC) Manual, is now referenced in the specification. The nominal 6" x 4" joist section, which is no longer produced but still available, is also permitted.

Placement of Lighted Arrow Panels in Construction Areas, 6.31(12), dated 03-17-88. This revision brings the Department's specification into conformance with the Michigan Manual of Uniform Traffic Control Devices (MMUTCD) with regard to the placement of lighted arrows during lane closures. The lighted arrows are now placed on the shoulder at the beginning of the channelizing devices taper, rather than in the closed lane upstream from the beginning of taper.

Aggregates for Use in Bituminous Mixtures, 7.10(20), dated 04-08-88. Table 7.10-2 of the 1984 Standard Specifications "Master Gradation Range for Bituminous Mixtures" requires a minimum of three percent passing the number 200 sieve for 20 series aggregates. This specification prohibits the addition of topsoil, clay, or loam to aggregates that are to be used in plant mixed bituminous mixtures in order to meet the three percent requirement in Table 7.10-2.

Bituminous Base Pulverizing and Shaping, 4.08(1) dated 06-17-88. This specification combines provisions from several special provisions on bituminous base pulverizing and shaping and replaces all previous special provisions written on the subject.

This document is disseminated as an element of MDOT's technical transfer program. It is intended primarily as a means for timely transfer of technical information to those MDOT technologists engaged in transportation design, construction, maintenance, operation, and program development. Suggestions or questions from district or central office technologists concerning MATES subjects are invited and should be directed to M&T's Technology Transfer Unit.

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