

ENGINEERING DIRECTIVES AND STANDARDS

Volume : II Effective Date :
Chapter : 2 Revision Date : 11/01/1979
Section : 1 Subject : **CONSTRUCTION OF AT-GRADE RAILROAD-HIGHWAY CROSSINGS**
Directive : 2

1. **BACKGROUND.** Louisiana Revised Statute 45:841 provides, among other things, that "The owner. . . of any railroad. crossing any public road. . . to construct and maintain a suitable and convenient crossing over such public road. in accordance with the standard specifications furnished by the Department of Highways. . .;" also, Louisiana Revised Statute 48:382 provides, among other things, that "..... the owner of the facility or utility shall provide a means of crossing the highway which, in the opinion of the Chief Engineer, is appropriate and adequate.

In view of a past history of highway user dissatisfaction in at-grade railroad-highway crossings, in general, and a lack of uniformity in at-grade crossing construction among the railroads, the Department conducted a study of a rubber pad type of at-grade railroad-highway crossing construction. The study culminated in a Highway Research Report "Evaluation of Railroad Rubber Pad Crossings", dated May, 1972.

The Board of Highways, on September 7, 1972, recognizing the need for a policy decision on the above subject and acting under authority vested by Louisiana Statutes above, adopted a "Railroad-Highway Grade Crossing Policy".

2. **POLICY.** Therefore, the DOTD, Office of Highways' policy will be as follows:

- (a) The Office of Highways will require use of rubberized crossings of railroads on all new construction where ADT is 1000 vpd or over, and the Department is responsible for all costs. Where ADT is less than 1000 vpd and the crossing is not subject to vehicles stopping on the crossing, full width timber crossings shall be used, except that if the crossing is at an angle of 45 degrees or less, measured from the centerline of the highway, rubberized crossing may be used. If the crossing is subject to vehicles stopping on the crossing, rubberized crossings shall be used.
- (b) All permits by railroad companies to cross hard surfaced highways will require rubberized or timber crossings as outlined above.
- (c) The Office of Highways will embark on a program of improving existing crossings. The railroad companies will be required to pay the equivalent of their current standard crossing. The Department will pay the difference between the standard crossing and the rubber or timber crossing as outlined above.
- (d) Under special conditions and upon approval of the Chief Engineer, concrete crossing may be used in lieu of the rubberized or timber crossings.

1) **Rubber Pad Type Railroad Grade Crossing**

- (a) The rubber (elastomeric) pad type of railroad grade crossing shall be used under either of the following conditions:

+ When highway ADT is 1000 vpd or over at the railroad highway crossing; or

- + When the crossing is subject to vehicles stopping on the crossing.
- (b) The rubber (elastomeric) pad type of railroad grade crossing may be used in lieu of the other approved types of at-grade crossing construction when the railroad-highway crossing is at an angle of 45 degrees or less, measured from the centerline of the highway.
- (c) The rubber (elastomeric) pad type of railroad grade crossing shall conform to Standard Plan RM-42 and to specifications therefor, see copy attached.
- (d) In specifying rubber (elastomeric) pad railroad grade crossing the requirements under "General Requirements", hereinafter, shall be followed.

2) **Timber Panel Railroad Grade Crossing**

- (a) The timber panel railroad grade crossing shall be that designated in the Board of Highways' policy as full width timber crossing. Timber panel railroad grade crossing shall be used for all at-grade railroad-highway crossings where the highway ADT is less than 1000 vpd and where the crossing is not subject to vehicles stopping on the crossing.
- (b) When the railroad-highway crossing is at an angle of 45 degrees or less, measured from the centerline of the highway, the Engineer's discretion shall be used in designating timber panel railroad grade crossing in lieu of rubber pad railroad grade crossing.
- (c) The timber panel crossing shall conform to Standard Plan RN-43 and to the specifications therefor, see copy attached.
- (d) In specifying timber panel railroad grade crossing the requirements under "General Requirements", hereinafter, shall be followed.

3) **Concrete Railroad Grade Crossing** - At the writing of this directive no acceptable standard concrete railroad grade crossing has been designated.

4) **General Requirements**

- (a) Railroad grade crossing shall extend for the full width of the highway to the edge of surfaced shoulders or a minimum of 3 feet outside the edge of traveled way or back of curbs. (See standard plan.)

- (b) When applicable, the railroad grade crossing shall be constructed by the Railroad Company. The bituminous filler and the header shall be the railroad's responsibility; unless highway contract operations include placing of bituminous material, then the Project Engineer will negotiate for placing of bituminous material by the highway contractor against the header board. (See standard plan.)
- (c) The edge of pavement and gutter and the crown on either side of the railroad crossing shall be adjusted to fit the grade of the railroad track by use of liberal transition curved surfaces. The height of any curb adjacent to railroad tracks shall be reduced to one (1) inch at a point of 4-feet from the near edge of grade crossing by standard transitions unless otherwise provided on the plans.

(d) Exceptions to this directive must be approved by the Chief Engineer.

3. **OTHER ISSUANCES AFFECTED.** This directive supersedes EDSM NO. 11.2.1.2, dated January 1, 1977. All directives, memoranda or instructions issued heretofore in conflict with this directive are hereby rescinded.
4. **EFFECTIVE DATE.** This policy will become effective on November 1, 1979.

DEMPSEY WHITE
DOTD CHIEF ENGINEER

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUPPLEMENTAL SPECIFICATIONS

ELASTOMERIC RAILROAD GRADE CROSSING

DESCRIPTION: This work consists of constructing elastomeric railroad grade crossings at the locations shown on the plans, in accordance with plan details, the applicable requirements of the specifications of the American Railway Engineering Association (AREA), the railroad company and the following requirements.

The installer of the railroad grade crossing shall survey the site to insure that all components of the elastomeric assembly unit fit accurately, especially noting special pie-shaped units for curved rail crossing, as may apply.

MATERIALS: The elastomeric assembly units furnished shall be equal in composition and quality to original samples which have been tested and approved by the Department's Materials Section. The elastomeric assembly consists of elastomeric units, creosote treated timber shims (as may apply), end plates, washers and plugs, steel washers, metal spikes and galvanized lag screws.

The crossing pads shall be of steel reinforced molded elastomer with an acceptable non-skid pattern on the riding surface. A manufacturer's analysis and certification shall be furnished stating the composition of the steel and elastomer used.

The aggregate ballast, track-ties, shims and header boards, rails, plates and hardware used for construction or reconstruction of the crossing shall meet the requirements of the specifications of the AREA as approved by the railroad company.

CONSTRUCTION REQUIREMENTS: All work performed in the construction or reconstruction of the crossing prior to installation of the elastomeric unit shall be done in strict compliance with AREA standards of construction. The grade crossing subbase treatment shall be in accordance with the Department's Supplemental Specifications therefor. The aggregate ballast materials shall be compacted to such a degree that undue settlement will not occur after completion of the installation. Approved mechanical compaction methods shall be used for compaction.

Grade Elevation of tracks and crossing pads shall be a maximum of 1¼" above finished highway grade as based on engineering judgment of soil conditions and condition of ballast in order to provide for subsequent settling under rail and highway traffic. Temporary asphaltic ramps shall be placed for use of highway traffic until settling of tracks and crossing pads have stabilized. The asphaltic ramps shall then be removed to provide a smooth riding surface through the grade crossing.

The elastomeric units shall be installed in accordance with the manufacturer's installation procedures.

The asphaltic filler material shall be standard hot or cold asphaltic mixture that is acceptable to the engineer. The material shall be properly compacted and the finished surface shall be level with the top of the existing pavement surface.

MEASUREMENT AND PAYMENT: When the Elastomeric Railroad Grade Crossing is a construction bid item, measurement and payment will be in accordance with the project special provisions.

Rev. 3/79 Page 1 of 2 SUPPLEMENTAL SPECIFICATIONS TREATED TIMBER RAILROAD GRADE CROSSING

DESCRIPTION: This work shall consist of furnishing and constructing a treated timber railroad grade crossing at the locations shown on the plans in accordance with plan details, the applicable requirements of the specifications of the American Railway Engineering Association (AREA), the railroad company and the following requirements. The installer of the railroad grade crossing shall survey the site to insure that all components of the sections fit accurately.

MATERIALS: The crossing sections shall be made of a fine-grained hardwood timber of red oak or gum. The gum shall be one of the following, stated in order of preference: (1) black gum, (2) tupelo gum, (3) sweet gum. If shims are used, they shall be of the same material.

All timber shall be treated with creosote or creosote coal-tar preservative in accordance with AREA specifications for the preservative treatment of wood with creosote, Chapter 17.

The aggregate ballast, track ties, shims and header boards, rails, plates and hardware used for the construction or reconstruction of the crossing shall meet the requirements of the specifications of the AREA as approved by the railroad company.

FABRICATION OF SECTIONS: The intermediate sections shall be in lengths which are multiples of the tie spacing used in the track.

The center sections of the crossing shall be of such width that two of them will make up that portion between the running rails, allowing sufficient flange-way opening.

The depth of the section shall be such that the top surface of the crossing will lie in the plane of the tops of the rails with the bottom of the section resting directly on the cross ties.

CONSTRUCTION REQUIREMENTS: All work performed in the construction or reconstruction of the crossing prior to the installation of the sections shall be done in strict compliance with AREA standards of construction. The grade crossing subbase treatment shall be in accordance with the Department's Supplemental Specifications therefor. The aggregate ballast materials shall be compacted to such a degree that undue settlement will not occur after completion of the installation. Approved mechanical compaction methods shall be used for compaction.

Grade Elevation of tracks and crossing pads may be a maximum of 1 1/2" above finished Highway grade as based on engineering judgment of soil conditions and condition of ballast in order to provide for subsequent settling under rail and highway traffic. Temporary asphaltic ramps shall be placed for use of highway traffic until settling of tracks and crossing pads have stabilized. The asphaltic ramps shall then be removed to provide a smooth riding surface through the grade crossing.

The sections shall be installed in accordance with the manufacturer's installation procedures and AREA standards. All bored holes shall be filled with creosote oil before lag screws are placed.

The asphaltic filler material shall be standard hot or cold asphaltic mixture that is acceptable to the engineer. The material shall be properly compacted and the finished surface shall be level with the top of the existing pavement surface.

MEASUREMENT AND PAYMENT. When the Prefabricated Sectional Treated Timber Railroad Grade Crossing is a construction bid item, measurement and payment will be in accordance with the project special provisions.

Subbase Treatment at Railroad "Highway Grade Crossing"

4. Place and compact clean ballast, cross ties, rails and construct grade crossing surface. (This work is to be included under pay item for grade crossing construction as may apply).

TYPE A SUBBASE TREATMENT: The existing subgrade shall be shaped to approximately the same cross slope as that of the roadway and compacted with mechanical tampers to the satisfaction of the engineer. Fill material shall be furnished as required and shall be "Selected Material" in accordance with Subsection 203.06 of the Standard Specifications or as approved by the engineer. After final shaping, plastic filter cloth shall be installed on the subbase prior to placing ballast and perforated drain pipe.

TYPE B SUBBASE TREATMENT: After the ballast has been removed, the existing subgrade material shall be excavated to the required depth and properly disposed of. The subbase shall be constructed with either (1) soil cement, (2) asphaltic concrete, or (3) portland cement concrete with calcium chloride additive in accordance with the plans and the following requirements.

(1) Soil Cement Subbase. The soil for soil cement shall be selected materials classified A-6 or better under test procedure DOTD Designation: TR 423 that will stabilize with cement. The soil materials shall be combined with portland cement and water, mixed, uniformly compacted and shaped by approved methods.

The percentage of cement will be determined in accordance with DOTD Designation: TR 432 prior to mixing. The minimum amount of cement used shall not be less than 8 percent by volume.

Plastic filter cloth shall be placed in the excavation prior to placement of soil cement mixture,

(2) Asphaltic Concrete Subbase. The asphaltic concrete subbase may be constructed of any of the types of asphaltic concrete mixtures, except Type 5B, listed in Section 501. The spreading, finishing and compaction of asphaltic concrete shall be such that the surface of the mixture, after compaction, shall be reasonably smooth and meet the slope and profile requirements required. The average densities for the type mix furnished shall be the minimum density specified for traffic lanes in Subsection 501.22(b). Sampling and testing for density shall be the top 4 inches of the finished sections.

Plastic filter cloth shall be placed in the excavation prior to placement of asphaltic concrete.

(3) Portland Cement Concrete with Calcium Chloride as an additive for reduced "setting" time. Portland Cement Concrete to which calcium chloride is added shall be Class 'A' Concrete. Concrete placed and shaped by approved methods shall be reasonably smooth and meet the slope and profile requirements required.

This subbase mix is allowed for rapid consolidation and availability to allow reopening of tracks to rail traffic in 5-6 hours.

Plastic filter cloth shall be placed in the excavation prior to placement of the concrete.

NOTE: The calcium chloride is added to the concrete mix with 1 inch slump in the mixer at the crossing site in the amount of 1 lb. calcium chloride per bag of Portland cement at temperatures from 70° F and above, or 2 lbs. of calcium chloride per sack of Portland cement at air temperatures between 70° F and 40° F. Mechanical vibrators shall be used in working the mix to match the roadway cross slope.

MEASUREMENT: Type A Subbase shall be measured by the square yard of actual area which has been compacted and shaped.

Type B Subbase shall be measured by the cubic yard (net section) of subbase actually constructed.

Plastic filter cloth and perforated steel pipe which is furnished as required will not be measured, the cost thereof shall be included in the unit cost for subbase treatment.

PAYMENT: The accepted quantity of subbase treatment will be paid for at the contract unit price for the respective item as indicated below.

Item S- , Type A Subbase Treatment, per square yard.

Item S- , Type B Subbase Treatment, per cubic yard.

PLASTIC FILTER CLOTH

MEMORANDUM TO:

W. T. BURT
MATERIALS ENGINEER

Supplemental specifications for Section 1017.15, "Plastic Filter Cloth", dated July 1979 have been approved by the Chief Engineer with approval by FHWA expected shortly. We are therefore requesting that the following materials be Included in the revision of Qualified Products List 17, "Plastic Filter Cloth". These materials have met the requirements of the supplemental specifications for the uses indicated.

A. FOR USE WITH BULKHEADS

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|----|------------------------------------------------------------------------------------------------|----------------|
| 1. | Cathage Mills, Inc. 124 Pt. 66th Street
Cincinnati, Ohio 45216 | Poly-Filter-GB |
| 2. | Laurel Plastics, Inc.
Type II Control Cloth
654 Madison Ave.
New York, New York 10021 | Laurel Erosion |
| 3. | Nicolon Corp.
4229 Jeffrey Drive
Baton Rouge, Louisiana 70816 | Nicolon 66301 |

B. FOR USE WITH FLEXIBLE REVETMENTS

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|----|--------------------------------------------------------------------------------------------------------|----------------|
| 1. | Carthage Mills, Inc.
124 Pt. 66th Street
Cincinnati, Ohio 45216 | Poly-Filter-GB |
| 2. | Laurel Plastics, Inc.
Erosion Control Cloth Type II
654 Madison Ave.
New York, New York 10021 | Laurel |
| 3. | Nicolon Corp.
4229 Jeffrey Drive
Baton Rouge, Louisiana 70816 | Nicolon 66301 |

C. FOR USE WITH RIPRAP

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|----|----------------------------------------------------------------------------|--------------|
| 1. | Carthage Mills, Inc.
GB
124 W. 66th
Street Cincinnati, Ohio 45216 | Poly-Filter- |
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| 2. Laurel Plastics, Inc.
Erosion Control Cloth Type I
654 Madison Ave. | Laurel
Laurel |
| Erosion Control Cloth Type II
New York, New York 10021 | |
| 3. Nicolon Corp.
66301
4229 Jeffrey Drive
Baton Rouge, Louisiana 70816 | Nicolon |

D. FOR USE WITH UNDERDRAINS AND RAILROAD CROSSINGS

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| 1. Advance Construction Specialities Co., Inc.
P. O. Box 17212
Memphis, Tennessee 38117 | Advafelt 200
Advafelt 400 |
| 2. American Enka Company
Enka, North Carolina 28728 | Stabilenka 140 |
| 3. Bradley Materials
P. o. Box 254
Valparaise, Florida 32580 | Filterweave NW4 |
| 4. Carthage Mills
124 W. 66th Street
Cincinnati, Ohio 45216 | Filter X Polyfilter X |
| 5. Celanese Fibers Marketing Company
P.O. Box 1414
Charlotte, North Carolina 28232 | Mirafi 140 Mirafi 140S |
| 6. Crown Zellerbach
P. O. Box 278
Camas, Washington 98607 | Fibertex 200
Fibertex 300 |
| 7. E. I. Dupont deNemours & Co.
1007 Market Street
Wilmington, Delaware 19898 | Typar T072 |
| 8. Laurel Plastics, Inc.
654 Madison Ave.
New York, New York 10021 | Laurel Erosion Control Cloth Type I |
| 9. Menardi-Southern Div. U. S. Filter Corp.
3908 Colgate
Houston, Texas 77017 | Mono filter |
| 10. Monsanto Company
800 North Lindbergh Blvd.
St. Louis, Missouri 63166 | Bidim C28, C34, C38, C42 |

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| 11. | Nicolon Corporation
4229 Jeffrey Drive
Baton Rouge, Louisiana 70816 | Polyfelt TS-200
Polyfelt TS-300 |
| 12. | Phillips Fibers Corp.
8245 Nieman Road Suite 109
Shawnee Mission, Kansas 66214 | Supac 4P, SP, SE |

Please advise if further information is desired.

HWL: do

cc: Mr. Joe Baker
Mr. Au Kemahli
Mr. Chester Calcote
Mr. Ralph Ellis

DEMPSEY WHITE
DOTD CHIEF ENGINEER