HIGHWAY FACTORS GROUP CHAIRMAN'S FACTUAL REPORT

Highway Attachment – CSX Maintenance of Way Instructions (MWI) 901-08 – Road Crossing Installation

Biloxi, Mississippi

HWY17MH010

(19 pages)

PURPOSE:	To establish a uniform procedure governing the construction and rehabilitation of road crossings and the selection of road crossing surface materials.
SAFETY:	Observe all applicable Safety, and Operating Rules and Regulations; and Safe Job Procedures.
LOCATION:	All CSXT owned or maintained tracks.
ENVIRONMENTAL:	Observe all applicable Federal, State and Local environmental rules and regulations.
REFERENCES:	Division Trackworks – Road Crossing Installation Standard Drawings: 2521, 2522, 2524, 2527, 2535, 2536, 2538, 2539 2602, 2613.

I. DISCUSSION

A. Many crossings are covered by contracts. A review for contractual obligations should be made to ensure CSXT constructs the crossing as required and is reimbursed accordingly.

B. Coordination with the proper governmental agency or outside party responsible for the crossing is essential.

1. All street and road closures must be coordinated prior to closing.

2. Proper barricades must be placed at all crossings during the time that they are closed to prohibit vehicles from entering the work zone. All state and local regulations must be met in the erection and installation of these barricades.

3. Many States highway and local road departments have policies, which allow them to assist in providing barricades, detour routing, and/or paving at no cost to CSXT. In the initial contact with the governmental agency, arrangements must be made to obtain this assistance where available.

4. A review of the highway traffic density, both current and projected, must be made during the planning for the project.

5. In some cases the crossing to be repaired may be the only access and special arrangements must be made such as:

a. Coordination with local resident/residents to leave their vehicle on the opposite side of the crossing.
b. Having material readily available to place in quickly to allow emergency vehicles access.
c. Constructing a temporary crossing.
d. Adjust work hours if necessary to accommodate special needs.

6. See Planning and Installation Checklist attached to this instruction and provided as a separate document.

C. The horizontal and vertical geometrics of highway crossings require special attention. Highway crossing areas are usually areas that have multiple ownership and that alignments may be dictated by the governmental organization that controls the highway. The following design concepts were extracted from the *Policy on Geometric Design of Highways and Streets*, published by the American Association of State Highway and Transportation Officials. They should be considered where appropriate.

1. Horizontal Alignment – If practical, the highway should intersect the track at right angle with no nearby intersections or driveways. This layout will enhance the vehicle driver's and locomotive operator's view of the crossing area, reduces conflicting vehicular movements from crossroads and driveways, and is preferred for two wheeled vehicles. To the extent practical, crossings should not be located on railroad or highway curves.

2. Vertical Alignment – It is desirable from the standpoint of sight distance, ride ability, braking and acceleration distances that the crossing be made as level as practical. Vertical curves should be of sufficient length to ensure an adequate view of the crossing. In some instances, the roadway vertical alignment may not meet acceptable geometrics for a given design speed because of restrictive topography or limitations of right-of-way. As a recommended guideline, the crossing surface should be on the same plane as the top of rail for a distance of 30 inches outside the rails[1]. The surface of the highway should also not be more than 3 inches higher or lower than the top of the nearest rail at a point 30 feet from the rail unless superelevation makes a different level appropriate. Tracks that are superelevated or a roadway approach that is not level, require site specific analysis.

II. CRITERIA REQUIRED FOR A QUALITY CROSSING

Road crossing construction and rehabilitation is resource intensive and disruptive to rail and highway traffic, therefore special care must be taken to ensure that the crossing is properly installed. The entire "Crossing Zone" requires special care and maintenance practices. The "Crossing Zone" is the crossing surface including all new required pavement and the track / right of way approaching the crossing for 50 feet each side of the crossing.

1 High speed roadways (50MPH and greater) with considerable truck traffic (20% and greater) should have the level distance increased to 20 feet.

A. DRAINAGE

1. If the crossing is well drained and shows no signs of subgrade problems, extra care must be taken to ensure that drainage facilities and "hard pan" are not damaged. "Hard pan" is a densely compacted layer of ballast and other materials lying beneath the ties. It is relatively impervious and acts like a subballast layer. This layer must be located at a depth that will promote drainage and not pool water.

2. Good drainage must be provided from all four quadrants of the crossing and crossing zone. Ditches, pipes and/or French drains should be installed, if necessary, to obtain the adequate drainage. Check and maintain all existing pipes and ditches on the right-of-way that drain the crossing zone.

3. A level granular working area must be provided around highway crossing warning devices. If this area is excavated for drainage, it should be filled with free draining size #5 ballast (see MWI 301). Provisions must be made to protect buried cables. Normally a level area 6 feet to the front / side and 2 feet to the rear of the mast foundation is required for maintenance of gate or flasher mechanisms. Refer to drawing 2613 for details.

4. Roadway approaches and ditches should be sloped or diverted away from the crossing.

5. In cases where roadway descends to the crossing, other drainage mechanisms such as slot drains should be considered to divert as much water away from the crossing as possible.

6. If there is evidence of sub-grade problems, the stability must be improved. Consider using asphalt (HMA) underlayment, geogrids, or geotextiles. When these materials are used, they must be installed in accordance with the instructions contained in MWI 1003 or MWI 1004.

B. BALLAST

1. Ballast in the crossing must be granite or trap rock meeting CSXT Specifications (MWI 301).

2. **Ballast must be clean and free draining** both in cribs and under ties within the crossing. Tracks that have ties replaced or surfaced must have a minimum of 4 inches of ballast below bottom of tie after tamping is complete. Tracks that are renewed by panel method will comply with standard drawings (12 inches of ballast under the tie). Engineering judgment may be used to reduce the depth of ballast required under a panel based on existing site conditions; at no time should the depth of ballast be reduced to less than 4 inches under the crossties.

3. Ballast within the entire crossing zone must be clean. Ballast that is fouled with mud or debris can degrade the proper operation of crossing warning devices.

4. If ties are replaced in the crossing, the ballast must be renewed.

5. A sufficient quantity of ballast to perform crossing renewal and planned track raise must be available on site to prevent delay in restoring the track upon crossing installation.

6. Ballast cross section below bottom of tie which supports the track must be compacted solidly before the crossing surface and pavement approaches are placed. Preferred methods of compaction are:
   a. Vibratory roller
   b. Train traffic (4 tonnage trains or 20,000 tons accumulated minimum)
   c. Dynamic Stabilizer
      - Cribs must be filled with ballast during operation.
      - 2 to 3 passes but shall not violate manufacturer's operating instructions.

7. The finished ballast cross-section in the crossing zone approaching the crossing must comply with Standard Drawing 2602. Care must be taken to ensure that no surplus ballast is present to impede drainage except as noted in paragraph II.A.3. above. Additional drainpipe may be required.

C. CROSSTIES

1. The old pavement should be saw cut three (3) feet from the rail. If ties are to be inserted, locate the saw cut on one side approximately six (6) feet from the rail or the minimum needed to install the ties. This will vary depending on site conditions and material used (panel installation, 8 foot 6 inch vs. 10 foot ties).

2. All ties through the entire crossing must be in a like new condition, wood, and provide consistent support. If any single tie needs to be replaced, it will be replaced with a new tie and all remaining ties through the entire crossing and the 5 approach ties must be in like new condition. If multiple locations of consecutive ties need to be replaced, then all ties within the crossing will be replaced. Branch line ties and relay ties will not be installed within the crossing.

3. If ties removed from the crossing are still sound, they may be reinstalled in tangent track.

4. Ten-foot wood ties with positive restraint fasteners and plates are required for all full width concrete road crossing surfaces. These 10-foot wood ties must extend for a minimum of 10 ties beyond each end of crossing

5. Crossings in concrete tie territory are to be constructed on 10-foot long wood ties with positive restraint fasteners and plates. These 10-foot wood ties must extend for a minimum of 10 ties beyond each end of crossing as a transition to concrete ties. The use of clips with corrosion prevention coating, such as galvanized e-clips (013.0027032.1) will be used.

6. Ties should be installed using the most appropriate method for the particular crossing.

Normal methods include:

a. Mechanized tie installation equipment
b. Pre-plated ties (see drawing 2532)
c. Tie packs (see drawing 2526)
d. Track Panels (see drawing 2515)

7. During tie replacement or track panel construction, the ties will be placed on 19 - ½ inch centers for rubber interface, timber, and concrete crossings. Other manufacturers of crossing surfaces may require ties to be installed at different centers, generally 18 inch.

8. Tie plates / fasteners should prevent rail movement and rotation. Tie plates must be replaced if worn beyond the limits shown below:

• Shoulder height	11/32 inch minimum
• Rail seat width (6 in. base rail)	6-1/4 inches maximum
• Rail seat width (5-1/2 in. base rail)	5-3/4 inches maximum
• Spike hole size	27/32 inch maximum
• Plate thickness at edge	11/32 inch minimum
• Rail seat flatness	1/16 inch maximum convex
• Plate bottom flatness	1/8 inch maximum convex

9. All ties in the crossing are to be spiked with two rail-holding spikes on the gage side and two on the field side. If the plates do not have the rail holding positions then plates will be replaced. Positive restraint fastener plates will be installed per standard drawing 2512.

D. RAIL

1. Rail should be replaced if existing rail:
   a. has surface imperfections
   b. is surface bent
   c. exceeds 75 percent of the allowable wear for either top or side wear
   d. is programmed for renewal within the crossings expected service life
   e. has excessive base wear or nicks (limits are)

• base width (6” base rail)	5-7/8 inches minimum
• base width (5-1/2” base rail)	5-3/8 inches minimum
• notching in base	not visible

2. No bolted rail joints are allowed in the crossing.

3. Thermite welds may not be located within the crossing on main tracks and sidings and should not be located within crossings on other tracks.

4. No bolted rail joints are allowed within the Crossing Zone on main, branch or siding tracks, where the rail is greater than 110 lbs/yd. They may be closer to the crossing on other tracks at the discretion of the Division Engineer.

5. Only bonded insulated joints are permitted in the Crossing Zone on main, branch or

siding tracks.

6. Bolted joints within the Crossing Zone must be welded out as soon as possible.

7. Thermite welds in the crossing zone due to rail replacement or panel installation must be made within 30 days.

8. Thermite welds in the crossing zone should be staggered and at least 10 feet away from the edge of the crossing, and supported by good ties.

9. Ensure that the rail anchoring pattern is correct. See MWI 703.

E. SURFACING

1. If practicable in multiple track crossings, all tops of rail should be brought to the same plane.

2. The minimum practical track raise should be used to limit its effect on the highway profile. Coordinate with the proper governmental agency or outside party responsible for the crossing as necessary.

3. Crossings should be surfaced so that at least one future surfacing cycle can be performed without the crossing being left lower than the surrounding track. The track runoff will be located outside the crossing zone.

4. Solid tamping is important. The tamper must use double insertions and, if capable, tamp the total length of the tie. Care must be taken to avoid center binding of the tie.

5. When track is tamped, ballast **MUST** be compacted before the crossing surface and pavement are placed. Preferred methods of compaction are:
   a. Train traffic overnight (4 tonnage trains or 20,000 tons minimum)
   b. Dynamic Stabilizer (2 to 3 passes for 50 feet each side of crossing but shall not violate manufacturer's operating instructions)

6. The finished ballast cross-section in the crossing zone approaching the crossing must comply with Standard Drawing 2602 with no surplus ballast to impede drainage except as noted in paragraph II.A.3. Permitted cross-section tolerances for track maintenance work are given in MWI 1113, section H.

F. TEMPORARY CROSSING

1. Ballast & Cold Mix
   a. Must be of sufficient quantity and strength to support the expected road traffic.
   b. Cold mix must be removed from the track as soon as it is not needed. Use a double or triple layer of filter fabric to aide in removing cold mix while keeping ballast clean.
   c. Ballast must be standard CSXT specification for main track. Other materials are not

permitted.

2. Modular Temporary Crossing
   a. Must be of sufficient size and strength to support the expected road traffic.
   b. Must be secured to track.

G. CROSSING SURFACE MATERIAL AND INSTALLATION

1. Material:
   a. There are several CSXT Standard Road Crossing designs. Unless the crossing is covered by an agreement/contract, the Standard design will be determined during the preplanning inspection. The Division Engineer will select the appropriate Standard design for other projects.
   b. A heavy duty crossing surface is justified on heavy vehicular traffic roads.
   c. See Section III for details on available crossing surface materials.

2. General installation:
   a. The ends of rubber interface sections, located in traffic lanes, must be supported on a tie.
   b. Concrete and other crossing surface materials should be installed according to the manufacturer's instructions.
   c. Where truck traffic is considerable (20% and greater), an asphalt header or apron may be considered. This is placed adjacent to the concrete crossing surface to absorb impact.
   d. Spike at end of crossing on both sides should be heeled over to secure wood filler blocks or rubber interface from sliding out. The wood filler blocks or rubber interface will most likely move in the direction with the greatest traffic.
   e. For heavy duty concrete crossings, weld metal panel joints with an approved electrode. Refer to MWI 801 for an approved electrode.
   f. Crossing timbers can be held in place during lagging with a crossing timber clamping tool (015.1301300.1).

H. ASPHALT PAVEMENT

1. The paving contractor will saw cut the existing pavement before the reconstruction. See Section II.C.1 for location criteria.

2. The crossing surface will extend a minimum of two (2) feet beyond the edge of the existing roadway / sidewalk or comply with state regulations, whichever is greater. Other widths must have the approval of the Director Engineering Standards or the Division Engineer.

3. Estimated quantity of asphalt pavement should be accurate to ensure quality and minimize waste. Saw cutting of asphalt prevents unintentional removal of material; therefore cut asphalt for tie replacement approximately 6 feet from the edge of rail on tie installation side and 3 feet on the opposite side. For this kind of work, estimate 0.9 ton

per linear track foot. For routine surface work through crossing saw cut at 3 feet from the rail on both sides. For this kind of work, estimate 0.7 ton per linear track foot.

4. Ballast under the asphalt pavement must fill in the cribs including under the rubber or timber flangeway and field interface sections. Shoulder ballast must be level with top of tie and compacted with vibratory equipment by the asphalt-paving contractor prior to paving.

5. Asphalt pavement should be full depth between top of tie and road surface except for farm / residential crossings. Compacted pavement must be thick enough to lock into the rubber interface material.

6. Tack coat must be used where new asphalt meets old pavement. The Tack must meet the state D.O.T. specifications for the state in which the crossing is located.

7. Asphalt (bituminous concrete) pavement used must be a dense-graded mix, which meets the state D.O.T. specifications for asphalt pavement construction for the state in which the crossing is located. Certificates must be given to the Roadmaster.
   a. Use base or binder mix for all but the top two (2) inches of the pavement cross-section.
   b. Use surface mix for the top wearing surface only (Two inches thick maximum). Base or binder mix may be used for the entire depth of pavement on farm / residential crossings.
   c. The asphalt pavement must be compacted in a minimum of 2 lifts (4 inch maximum per lift).

8. Asphalt pavement material must be sufficiently hot (minimum 200°F) for proper compaction. Optimal temperature is greater than 250°F.

9. The roller used to compact the asphalt should be a steel-wheeled vibratory type. It must be narrow enough to fit between the gage side flangeway interface material and between the outside of the crossing and old pavement. It should exert a minimum force of 12,000 lb/roll at 2400 vpm and operated at a speed of less than 3 ft/sec. Normally, a 36-inch vibratory roller will meet these criteria. A roller with equivalent compaction force but less than 26” wide must be used between the rails on a Rubber / Asphalt / Timber (RAT) or Timber / Asphalt type crossing.

10. The roller must be operated parallel to the rail and up against the rubber, concrete, or timber surface material to ensure good asphalt compaction. Use caution not to dislodge rubber interface sections or the clamps / spikes that secure the rubber.

11. Asphalt should be compacted to at least 91% of maximum theoretical density (air voids less than 5% in the compacted mix). For quality assurance, asphalt core borings may be taken to verify compliance.

12. Paved road surface should be level with the top of rail for 30 inches from the field side of each rail unless there is a conflict with State regulations. In case of a conflict, the State

regulations will govern. For new construction, highway surface should not be more then 3 inches higher or lower than the top of the near rail 30 feet from the rail along the road centerline, unless track superelevation dictates otherwise. If practicable, slope the pavement 1 inch in 10 feet to meet existing highway surface. On high speed roads (50MPH and greater), the surface may have to be even smoother to reduce impacts on the crossing surface. High speed roadways with considerable truck traffic (20% and greater) should have the level distance increased to 20 feet.

13. On unpaved roads, the asphalt pavement on the field side of the rail must be of sufficient volume so it does not move or slip away from the rail under the expected roadway traffic. State regulations may require a minimum length "apron".

14. The crossing should be closed to highway traffic long enough for the hot asphalt pavement to cool (hand touchable) and stiffen to support loads without rutting.

15. The old pavement removed may not always be the same amount that was delivered for the current paving project. For example, the maximum thickness should be approximately 8" for any paving project. Depending on rail height, the *average* crossing timber is 8". If a previous paving project had a thicker pavement section due to insufficient fill material (e.g. ballast), the amount of pavement removed will be greater than what was delivered if done correctly with sufficient fill material. This should be noted on the paving invoice.

16. Old pavement, ballast, and surface material must be disposed of in a proper manner complying with CSXT policies. Refer to Environmental Guidelines manual.
    a. Different materials must be handled separately for removal or stockpile at CSX designated sites.
    b. Asphalt pavement with only some ballast stuck to the bottom may be a recyclable material so keep it as clean at possible.
    c. Solid waste containers are available if needed. Contact 800-633-6085.

I. QUALITY ASSURANCE

1. Crossing rehabilitation or construction is to be performed to meet these instructions. Failure of rail, track surface and gage, or roadway surface should not occur within the intended maintenance cycle. Either Engineering or Purchasing and Materials may direct or perform sample inspections of the following activities or materials:
    - Drainage
    - Ballast
    - Ties
    - Crossing material
    - Pavement (asphalt may be cored to verify material characteristics and density)
    - Rail and welding

2. If a crossing fails before its intended maintenance cycle and it requires a speed restriction for rail traffic or a detour for vehicular traffic, a report will be made by the Assistant Division Engineer-Track to the following people:
    - Chief Engineer - Maintenance of Way
    - Chief Engineer - Production
    - Division Engineer
    - Director Engineering Standards.

   The report should describe the problem and contain photographs.

J. POSITIVE TRAIN CONTROL

1. It is best practice to reference the end of an existing road crossing surface with marking the rail with paint before removing the existing material. If multiple tracks (e.g. double main line) are being worked on, mark the location of the end of each road crossing using paint for both rails.

2. Any road crossing whose length changes greater than one foot (1') must enter a change request per MWI 2114.

III. MATERIAL SELECTION

(Also refer to drawings 2521, 2522, 2524, 2527, 2535, 2536, 2538 and 2539)

CSXT has six (6) standard crossing surfaces for wood tie installations. There are 4 basic levels of service based on the amount and severity of the highway crossing traffic. They are:

1. Heavy Duty (1 design, drawing 2527)
2. Normal Duty (3 designs, drawings 2535, 2536, and 2538)
3. Light Duty (1 design, drawing 2521)
4. Farm / Residential Use (2 designs, drawings 2522 and 2536)

There is no specific criteria as to which crossing design should be used, and discretion should be exercised on a case by case basis, but generally, the heavier the truck traffic, the faster the highway speed, or the higher the railroad tonnage is, the more durable the crossing should be. When track is replaced with panels, consider using heavy duty surface for long life. Consideration should be given to consider the recommendation of state and local authorities if they have expressed it. Refer to the paragraphs below for more information. Factors to consider are:

1. Severity of interrupting the railroad
2. Severity of interrupting the highway
3. Railroad tonnage and speed
4. Highway vehicle traffic count
5. Highway vehicle weights
6. Highway vehicle speed

Many Highway Departments measure traffic or vehicle count as AADT (Average Annual Daily Traffic) and Truck AADT (Truck Average Annual Daily Traffic). If this data is available, use it in conjunction with the following chart. When using this method, one truck equals 100 cars.

The governmental agency or outside party responsible for the road at the crossing should be contacted to determine vehicle count. For light duty, private, farm and residential crossings, gather information from the person contacted to close the crossing.

The type of crossing material selected should generally follow the chart below:

HIGHWAY TRAFFIC **RAILROAD TRAFFIC**

Cars per Day*	**0 – 10 MGT / year**	**10+ MGT / year**
0 – 50,000	Normal Duty (Rubber / Asphalt / Timber) See paragraph A2 Normal Duty (Timber / Asphalt) or Rubber / Asphalt) A3 [1] Light Duty (Rubber / Asphalt) A5 [2] Farm Duty (Rubber / Asphalt) A6 [2] Farm Duty (Timber / Asphalt) A7	Normal Duty (Rubber / Asphalt / Timber) See paragraph A2 Normal Duty (Timber / Asphalt) or Rubber / Asphalt) A3 [2] Farm Duty (Timber / Asphalt) A7
50,000 – 100,000	Normal Duty (Rubber / Asphalt / Timber) A2 Normal Duty (Timber / Asphalt) A3	Heavy Duty (Concrete on 10’ wood ties) A1 Normal Duty (Rubber / Asphalt / Timber) A2 Normal Duty (Timber / Asphalt) or Rubber / Asphalt) A3
100,000+	Heavy Duty (Concrete on 10’ wood ties) A1	Heavy Duty (Concrete on 10’ wood ties) A1

*** When calculating cars per day, multiply each truck by 100.**

[1] Crossing must handle less than 5000 cars per day.

[2] Crossing must handle less than 500 cars per day.

If track warrants Positive Restraint Fasteners (Pandrol or NorFast Plates), use Heavy Duty Concrete (A1) or Light Duty Rubber / Asphalt (A5) as appropriate.

A. WOOD TIE INSTALLATIONS – CSXT has designs for heavy, normal, light duty and farm / residential duty applications for crossings. These designs use various combinations of concrete, timber, or rubber interface and asphalt pavement material.

1. Heavy Duty Highway Crossings (Concrete) – Shown on CSXT Standard Drawing number 2527. This crossing material consists of 8 ft. 1-1/2 in. long concrete center (gage) and field panels. They must be installed on 10 ft. ties.

The catalog information follows:

Stock Control Number	*Rail Weight*	*Description*
014.5250300.1	115 – 122	Crossing Concrete Panels, Heavy Duty, for 10-foot wood ties. Order by "Track Feet" in approximately. 8-ft. increments. Each 8-ft. 1-1/2 in. section incl. 1 concrete center panel and 2 concrete field panels with rubber flangeway fillers.
014.5250305.1	132 – 136	
014.5250310.1	141	

Approximate weights of these panels are:

Center Panel,	115 – 122 lb. rail	2850 pounds
Field Panel,	115 – 122 lb. rail	1550 pounds
Center Panel,	132 – 141 lb. rail	3125 pounds
Field Panel,	132 – 141 lb. rail	1675 pounds

The heavy duty concrete crossing design should be used where the preponderance of the highway traffic is composed of trucks, where the environmental or other concerns for the disposal of asphalt must be minimized and/or where maintenance history indicates a need for its use.

2. Normal Duty Highway Crossing (Rubber / Asphalt / Timber) (RAT) – Shown on CSXT Standard Drawing number 2535. This design uses 10 inch wide by 8 ft. 1-1/2 in. long wooden timbers that are placed against rubber interface material adjacent to the rails. This will give the crossing more strength. The timbers are attached to the ties with timber screws. Use equipment, such as a backhoe arm, to handle crossing timbers. **Do not** use hands to handle crossing timbers. Clamps for the rubber interface are not needed. Full depth compacted asphalt pavement is used for the remaining road surface area. The rubber interface material should be reused from existing crossings. Do not requisition new rubber. If rubber is not available, use the Timber / Asphalt design with wooden filler blocks described in the following paragraph no. 3. The catalog information for the RAT crossing timber follows:

Stock Control Number	*Rail Weight*	*Description*
042.1150010.1	115 – 122	Crossing Timbers 7-1/2" thick 8' 1-1/2" long per CSX drawing 2535. Four timbers per bundle (2 gage, 2 field). Use with rubber rail seal. Order by "Track Feet" in 8-ft. increments.
042.1320010.1	132	Crossing Timbers 8" thick 8' 1-1/2" long per CSX drawing 2535. Four timbers per bundle (2 gage, 2 field). Use with rubber rail seal. Order by "Track Feet" in 8-ft. increments.

042.1360010.1	136 – 141	Crossing Timbers 8-3/8” thick 8’ 1-1/2” long per CSX drawing 2535. Four timbers per bundle (2 gage, 2 field). Use with rubber rail seal. Order by “Track Feet” in 8-ft. increments.
013.8230080.1	all	Screw Timber 5/8” X 12” with Torx square washer head.

3. Normal Duty Highway Crossing (Timber / Asphalt) or (Rubber / Asphalt) – Shown on CSXT Standard Drawing number 2536 for Timber / Asphalt and 2521 for Rubber / Asphalt. This design uses 10 inch wide by 8 ft. 1-1/2 in. long wooden timbers with wooden filler blocks adjacent to the rails. The timbers are attached to the ties with timber screws. Use equipment, such as a backhoe arm, to handle crossing timbers. **Do not** use hands to handle crossing timbers. Full depth compacted asphalt pavement is used for the remaining road surface area. The catalog information for the following:

Timber / Asphalt

Stock Control Number	*Rail Weight*	*Description*
042.3060115.1	115	Crossing Timbers 7-1/2” thick 8’ 1-1/2” long with wood filler blocks per CSX drawing 2536. Four timbers per bundle. Order by “Track Feet” in 8-ft. increments.
042.3060122.1	122	Crossing Timbers 7-1/2” thick 8’ 1-1/2” long with wood filler blocks per CSX drawing 2536. Four timbers per bundle. Order by “Track Feet” in 8-ft. increments.
042.1320132.1	132	Crossing Timbers 8” thick 8’ 1-1/2” long with wood filler blocks per CSX drawing 2536. Four timbers per bundle. Order by “Track Feet” in 8-ft. increments.
042.1360136.1	136	Crossing Timbers 8-3/8” thick 8’ 1-1/2” long with wood filler blocks per CSX drawing 2536. Four timbers per bundle. Order by “Track Feet” in 8-ft. increments.
042.1360140.1	140	Crossing Timbers 8-3/8” thick 8’ 1-1/2” long with wood filler blocks per CSX drawing 2536. Four timbers per bundle. Order by “Track Feet” in 8-ft. increments.
042.1360141.1	141	Crossing Timbers 8-3/8” thick 8’ 1-1/2” long with wood filler blocks per CSX drawing 2536. Four timbers per bundle. Order by “Track Feet” in 8-ft. increments.
013.8230080.1	all	Screw Timber 5/8” X 12” with Torx square washer head.
015.0001282.1	all	Counterbore diameter 1/2" double flute to

Stock Control Number	*Rail Weight*	*Description*
		be added to step drill (015.0001283.1) & attached with set screw.
415.0078530.1	all	Socket Adapter 1" Drive for 5/8" hex insert Torx bit.
451.0200188.1	all	Socket Retainer for 1" Drive impact.

Rubber / Asphalt

Stock Control Number	*Rail Weight*	*Description*
014.5250135.1	90 – 100	Crossing, Rubber Interface Light and Normal duty, for wood ties. Order by "Track feet" in 8 ft. increments. Each "Track foot" includes 2 gage side and 2 field side sections.
014.5250140.1	115	
014.5250142.1	122	
014.5250145.1	132	
014.5250145.1	136	
014.5250145.1	140	
014.5250170.1	141	
014.5250260.1	90 – 141	Clip/Clamp which may be used to secure rubber. Use in each crib.
014.0041400.1	132 – 136	Crossing, Rubber Interface Light duty for Pandrol plates on wood ties.
014.5250175.1	141	
014.5250250.1	132 – 141	Clip/Clamp which should be used to secure rubber interface on Pandrol plates.
014.5250265.1		Installation tool for Clip/Clamps

4. Normal Duty Highway Crossing (Timber/Asphalt) for use with 18" tie plates) – Shown on CSXT Standard Drawing number 2538. This design uses a 10 inch wide by 6 ft. 8-1/2 inch. long wooden timber with wooden filler blocks adjacent to the rails for the gage side and a 16-1/2 inch wide by 6 ft. 8-1/2 inch long wooden timber with wooden filler block for the field side. The timbers are attached to the ties with timber screws. Use equipment, such as a backhoe arm, to handle crossing timbers. **Do not** use hands to handle crossing timbers. Full depth compacted asphalt pavement is used for the remaining road surface area. The catalog information for this timber follows:

Stock Control Number	*Rail Weight*	*Description*
042.3060122.1	122	Crossing Timbers 7-1/2" thick 6.75' long with wood filler blocks per CSX drawing 2538. Four timbers per bundle. Order by "Track Feet" in 6.75-ft. increments.
042.1320132.1	132	Crossing Timbers 8" thick 6.75' long with wood filler blocks per CSX drawing 2538. Four timbers per bundle. Order by "Track Feet" in 6.75-ft.

Stock Control Number	*Rail Weight*	*Description*
		increments.
042.1360136.1	136	Crossing Timbers 8-3/8” thick 6.75’ long with wood filler blocks per CSX drawing 2538. Four timbers per bundle. Order by “Track Feet” in 6.75-ft. increments.
042.1360140.1	140	Crossing Timbers 8-3/8” thick 6.75’ long with wood filler blocks per CSX drawing 2538. Four timbers per bundle. Order by “Track Feet” in 6.75-ft. increments.
042.1360141.1	141	Crossing Timbers 8-3/8” thick 6.75’ long with wood filler blocks per CSX drawing 2538. Four timbers per bundle. Order by “Track Feet” in 6.75-ft. increments.
015.0001283.1	all	Bit Drill Step 11/16" With 3/8" Pilot 18" Overall Length
013.8230080.1	all	Screw Timber 5/8” X 12” with Torx square washer head.
415.0076810.1	all	Bit Torx adapter Insert 5/8" Impact 1" Drive
015.0001282.1	all	Counterbore diameter 1/2" double flute to be added to step drill (015.0001283.1) & attached with set screw.
415.0078530.1	all	Socket Adapter 1" Drive for 5/8" hex insert Torx bit.
451.0200188.1	all	Socket Retainer for 1" Drive impact.

5. Light Duty Highway Crossings (Rubber / Asphalt) – Shown on CSXT Standard Drawing numbered 2521. This design uses rubber interface material with full depth compacted asphalt pavement on the both sides of the rails. It is only permitted on tracks with less than 10 annual MGTs and highways less than 5,000 Cars per Day. Existing rubber interface material should be used where available.

The catalog information follows:

Stock Control Number	*Rail Weight*	*Description*
014.5250135.1	90 – 100	Crossing, Rubber Interface Light and Normal duty, for wood ties. Order by "Track feet" in 8 ft. increments. Each "Track foot" includes 2 gage side and 2 field side sections.
014.5250140.1	115	
014.5250142.1	122	
014.5250145.1	132	
014.5250147.1	136	
014.5250160.1	140	
014.5250170.1	141	
014.5250260.1	90 – 141	Clip/Clamp which may be used to secure rubber. Use in each crib.
014.0041400.1	132 – 136	Crossing, Rubber Interface Light duty for Pandrol plates on wood ties.
014.5250175.1	141	
014.5250250.1	132 – 141	Clip/Clamp which should be used to secure rubber interface on Pandrol plates.
014.5250265.1		Installation tool for Clip/Clamps

6. Farm / Residential Road Crossings (Rubber / Asphalt) – These very light duty road crossings are defined as private roads, city streets and with vehicular traffic speeds of 25 MPH and lower and with less than 500 Cars per day. This design is not permitted if trucks use the crossing. If the road will be handling trucks, use one of the previous designs. It is only permitted on tracks less than 10 annual MGTs. See CSXT Standard Drawing number 2522. This design uses lighter weight virgin rubber or used rubber field and flangeway interface material, with a minimum of four (4) inches of compacted asphalt.

7. Farm / Residential Crossings (Timber / Asphalt) – These are private crossings that conform to very light duty traffic criteria, and serve a limited number of users. Examples would be a road connecting two farm fields, a road providing access to an individual home, or an infrequently used access to a commercial site, such as a billboard or pumping station. The limited service requirements of these crossings allow the use of cascaded materials and minimization of asphalt quantities. Use equipment, such as a backhoe arm, to handle crossing timbers. **Do not** use hands to handle crossing timbers. Crossing material should be economized at these locations. The design is similar to the T / A crossing (Drawing 2536) but uses less asphalt pavement. Use the following guidelines:
   a. Use second hand wood material if available or order material described for Standard Duty crossings.
   b. In crossings not susceptible to frost heave such as areas below TN & NC, compacted asphalt pavement thickness to be 3 inches minimum to 4 inches maximum.

8. Former Normal Duty Highway Crossing (Concrete / Rubber / Asphalt) – This former standard, shown on CSXT Standard Drawing number 2524 uses a concrete panel with rubber flangeway filler between the rails and rubber interface material with full depth

compacted asphalt pavement on the field sides of the rails. If the crossing material is in good condition and the crossing has performed satisfactorily, it may be reinstalled. If the material is in good condition but the asphalt pavement broke up, use the crossing material in a lower duty crossing or add timbers against the rubber like the RAT crossing design for added strength.

B. Private crossings will be considered the same as a public crossing with similar traffic volumes. Some private crossings, such as concrete plant entrances, will usually have heavy truck traffic. These industrial crossings should use normal or heavy duty material.

C. Care must be taken to ensure that the correct type of rubber interface material is installed. Manufacturer's warranty (minimum of 10-year life) can only be honored if the rubber interface material is properly matched to the highway traffic conditions.

D. All other crossing other crossing materials installed on CSXT owned and/or maintained tracks must be approved by the Office of Director Engineering Standards. Road crossings, which are funded by Outside Parties, may be constructed with concrete slab or full depth rubber if specified by the Outside Party. The crossing surfaces that are currently approved are:

- Omni Improved CSX/IC Design Concrete
- KSA Full Width Concrete with Steel Perimeter
- Magnum Concrete
- Omni Heavy Duty Full Depth Rubber
- HiRail Full Depth Rubber

Platform (tieless, modular, or tub) type crossings are approved where track speeds do not exceed 15 MPH and tonnage does not exceed 10 MGT. These types of crossings should have 10 each 10' wood crossties on both approaches to transition to open track. Other applications of platform crossings must include a feasibility analysis with arrangements for inspection and approval from the Office of Director Engineering Standards prior to installation. Approved designs are:

- R. W. Summers – MBM
- Oldcastle Startrack II
- OMNI TraCast
- Hanson Premier Plus Modules

Refer to drawing 2539 for additional specifications. If the outside party desires to use another premium crossing, prior arrangements and approval must be obtained from the Office of Director Engineering Standards.

E. Other crossing designs or materials such as composites, if approved by the Director Engineering Standards, may be considered on an individual location basis.

F. Field side grinding relief is not required in any crossing surface.

G. Rubber interface material is to be ordered by the track foot for a specific crossing and installed at that location. An inventory of rubber material will not be kept on an individual Roadmaster's territory. Purchasing and Materials will identify inventory locations.

H. When material is ordered for crossings with positive restraint fasteners on wood ties, care must be taken to order material specifically designed to accommodate these fastening systems. The use of clips with corrosion prevention coating, such as galvanized e-clips (013.0027032.1) will be used.

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