Delete subsection 705.03.C.2.d on page 375 of the Standard Specifications for Construction, in its entirety and replace it with the following:

d. **Pile Splicing.** Piles considered to be primary members or part of the superstructure, as defined by the Engineer, must follow the *AASHTO/AWS D1.5:2010, Bridge Welding Code* (as modified by 12SP-707A - Structural Steel and Aluminum Construction), hereafter called AWS D1.5 in accordance with subsection 707.03.D.8 of the Standard Specifications for Construction, except as modified herein. Piles considered to be primary members will be stated on the contract plans and are subject to 100 percent visual testing (VT) inspection and 100 percent ultrasonic testing (UT) inspection. Primary member piles do not require a quality control plan (QCP), but do require MDOT's *AASHTO/AWS D1.5 – Field Welding Plan* (MDOT Form 0395) to be completed and submitted for review and approval by the Engineer prior to welding.

Ensure non-primary member piles, hereafter called piles, are welded in accordance with the *American Welding Society (AWS) D1.1:2010, Structural Welding Code – Steel* (as modified by 12SP-707A - Structural Steel and Aluminum Construction), hereafter called AWS D1.1, except as modified herein. Non-primary member piles require a QCP (MDOT Form 5627) to be completed in Adobe portable document format (PDF) and submitted for review and approval by the Engineer prior to welding. Submit welding procedure specifications (WPS) in accordance with AWS D1.1.

Do not splice timber piles. Provide steel piles in full length sections or splice them as shown on the plans and approved by the Engineer. Provide piling and splices as required to obtain the required nominal pile driving resistance and penetration. Piles spliced using complete penetration butt welds must develop the full moment capacity of the pile section across the splice location. Weld piles as detailed on the plans.

i. **Welder Credentials.** Welders must possess a valid AWS welder certification and appropriate MDOT welder credential (MDOT Qualified Welder or MDOT Certified Welder). Welders must obtain the appropriate MDOT welder credential and present a certificate to the Engineer prior to beginning welding. The period of effectiveness for MDOT tested field welders is 2 years, unless the welder does not engage in welding for at least 3 months, or a specific reason exists to question the welder’s ability. The Engineer may witness the welder testing and may require a confirming welder test during the progress of the work.

Agencies approved by the Department may perform welder certification tests for welding non-primary member piles. The Engineer will not accept welder tests by unapproved agencies. For additional information about the MDOT Welder
Certification Program visit the web location listed below:


For additional information about the MDOT Welder Qualification Program visit the web location listed below:


ii. Welding Requirements. Perform welding in accordance with AWS D1.1 by the shielded metal arc welding (SMAW) process using E7015, E7016, or E7018 electrodes. Do not use gas metal arc welding (GMAW), or other gas shielded processes. The Engineer may approve submerged arc welding (SAW) or other processes for welding.

Blast clean or grind contact surfaces, joints, and surrounding area before welding. Remove loose mill scale, paint, galvanizing, grease, oil, rust, moisture, and other contaminants from base metal before welding. Grind joints before welding to remove pitting, kerfs and irregularities. Prepare joints and remove all foreign material in accordance with AWS D1.1, Section 5.

For the alternate pile splice detail, bring the splicer sleeves into as close contact with the pile sections as practical. If the separation between the pile section and splicer sleeve exceeds 1/16 inch, increase the legs of the fillet weld by the amount of the separation distance, which must not exceed 3/16 inch. Misalignment of pile splices or lack of full bearing contact for partial penetration groove welds requires approval of the Engineer. Smoothly transition weld profiles by grinding stop-start areas or other irregularities.

Do not perform pile welding when the ambient temperature is below 0 degrees Fahrenheit (F) or during periods of precipitation, unless heating and housing the area as approved by the Engineer. When the ambient temperature is below 32 degrees F, preheat the pile metal a minimum distance of 3 inches in all directions from the weld joint to a minimum of 70 degrees F and maintain the temperature during welding.

Store and use electrodes in accordance with AWS requirements. Dry all electrodes in an oven at a minimum of 500 degrees F for a minimum of 2 hours before use unless from a hermetically sealed container. Store the electrodes in a hot box at a minimum of 250 degrees F after drying. Use electrodes within 2 hours of exposure to the atmosphere or redry as described above. Do not redry electrodes more than one time. Do not use electrodes that have been wet.

iii. Weld Inspection. Remove slag from all weld passes including finished welds. Ensure the surface of welded joints are sufficiently uniform, surface should not be coarse or contain, ripples, sharp corners, interpass valleys, underfill or undercut. Welds must not contain cracks, lack of fusion, excessive porosity, or lack of penetration. Verify fillet weld size using a fillet weld gage.

Repair cracked welds or welds the Engineer determines are unacceptable. Repair
welds in accordance with AWS D1.1, Section 5.26. Grind all arc strikes and tack welds to base metal. Peening is not permitted. Repair unacceptable welds at no additional cost to the Department.

Nondestructive testing (NDT) of pile welds will be determined by the Engineer if visual inspection and any necessary repairs do not result in an acceptable weld. NDT will be performed in accordance with AWS D1.1. Blast clean or grind welds before the NDT can be performed. The Engineer will determine the frequency, location, and type of NDT to be performed for each weld. Generally, liquid dye penetrant or magnetic particle testing is performed for fillet and partial penetration butt welds, whereas ultrasonic testing (UT) is performed for complete penetration butt welds. The Engineer may perform additional NDT of any or all welds in accordance with AWS D1.1. All costs associated with performing NDT will be paid by the Department if initial testing indicates an acceptable weld. If testing identifies defects warranting rejection, repair the welds and hire qualified NDT personnel to retest the welds until the welds are acceptable to the Engineer. All costs associated with performing the initial test, weld repairs and retests of unacceptable welds will be at no additional cost to the Department. No additional compensation will be granted for delays, down-time, or idle equipment and labor for NDT of pile welds.

Ensure NDT is performed by personnel qualified as Level III, Level II or Level I (working under the direct supervision of the NDT Level II) in accordance with the latest American Society for Nondestructive Testing (ASNT) Recommended Practice No. SNT-TC-1A to perform all tests. The Engineer may witness NDT.

Penetrant testing (PT) is required for inspection of the web complete joint penetration weld terminations if cope holes are used at the web flange juncture. Ensure PT is performed in accordance with subsection 707.03.C.10 of the Standard Specifications for Construction.

Add the following pay item in subsection 705.04, on page 380 of the Standard Specifications for Construction:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pile, Steel, Splice</td>
<td>Each</td>
</tr>
</tbody>
</table>

Delete the 9th paragraph in subsection 705.04.A.1, page 381 of the Standard Specifications for Construction.

Add the following subsection 705.04.A.8, on page 381 of the Standard Specifications for Construction.

8. **Pile, Steel, Splice** The Department will pay for **Pile, Steel, Splice**, includes the cost of all work and materials required to splice and inspect steel H and CIP shell piles. Payment for test and production pile splices will be limited to the following table that defines pile length to be the length needed to achieve the required bearing as directed by the Engineer:
Table 705-3
Splices Per Pile Length

<table>
<thead>
<tr>
<th>Pile Length (feet)</th>
<th>Number of Splices</th>
</tr>
</thead>
<tbody>
<tr>
<td>L ≤ 50</td>
<td>0</td>
</tr>
<tr>
<td>50 &lt; L ≤ 100</td>
<td>1</td>
</tr>
<tr>
<td>100 &lt; L ≤ 150</td>
<td>2</td>
</tr>
<tr>
<td>150 &lt; L ≤ 200</td>
<td>3</td>
</tr>
<tr>
<td>200 &lt; L ≤ 250</td>
<td>4</td>
</tr>
</tbody>
</table>

Furnished pile up to 40 feet in length must not contain more than 3 shop or field splices. Furnished pile in excess of 40 feet in length must not contain more than 4 shop or field splices. Should pile be furnished with shop welded splices, furnish a weld inspection report from a Certified Welding Inspector (CWI) indicating all welds meet AWS D1.1 (non-primary piles) or AWS D1.5 (primary piles) and give 2 weeks of notice to the Engineer before beginning work in the shop. MDOT reserves the right to conduct UT or any other NDT on shop or field welded splices.

Payment for splices on piles considered to be primary members will include the cost of the required NDT for acceptance per AWS D1.5, except as modified by the contract.