897.13 DPWH
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REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA

MAR 23 2006

DEPARTMENT ORDER NO. 23 Series of 2006 03-24-06

SUBJECT: DPWH Standard Specification on the Use of Thormajoint in Bridge Expansion Joint

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In line with the continuing efforts to upgrade the construction technology thru the adoption of successful research studies, this Department has approved the Use of Thormajoint in Bridge Expansion Joints to extend the service life of bridges and reduce traffic related problems due to damaged joints and repetitive maintenance works, subject to its specification hereto attached. A Certificate of Conditional Approval had been issued by this Department, accrediting the use of Thormajoint in DPWH projects from January 2006 until January 2011.

This order takes effect immediately.

HERMOGENES E. EBDANE, JR.
Acting Secretary

WIN6U00077

DPWH STANDARD SPECIFICATION ON THE USE OF THORMAJOINT (BJ 200) IN BRIDGE EXPANSION JOINT

1.0 Description

This item shall consist of furnishing and placing thormajoint in bridge expansion joints in accordance with this specification and as shown on the Plans, or as directed by the Engineer.

Thormajoint combines an elastomer modified bitumen binder and selected single sized aggregates for the strength and flexibility of the joint. It accommodates up to ±25mm movement in horizontal direction but it can move in all directions. The joint is constructed in-situ and is a hot process.

2.0 Material Requirements

2.1 Binder - BJ200 is an elastomer-modified bitumen, formulated to combine good fluidity for the installation process and flexibility with the following properties:

Properties	Requirement	Test Method
Softening point, ^{0}C (Ring & ball method)	95 to 115	ASTM D 36 or AASHTO T 53
Flow resistance @ 60^{0}C, mm	5 max.	ASTM D 1191 or AASHTO T 187
Cone penetration @ 25^{0}C, 150g, 5 sec.; dmm	10-30	
Safe heating temp. ^{0}C	220 max.	
Pouring temp. ^{0}C	190 to 210	
Safe heating time, hr.	7 max.	

2.2 BJ Stone - BJ stone is a single size aggregate normally chosen from the Basalt, grit stone, gabbros or granite group. The use of a single aggregate enables a higher binder content to be reached. It will also ensure a constant ratio of stone to binder. This is important to give the joint its optimum combination of flexibility and load bearing capacity.

Joint Depth	Stone size
50mm to 75mm	14mm or 20mm
76mm to 100mm	20mm

2.3 Caulking – Premolded expansion joint filler (sponge rubber type) conforming to AASHTO M 153.

2.4 Steel Plate - Use appropriate size of plate based on plate selection table. Material shall be A36 conforming to AASHTO M 270.

3.0 Construction Requirements

The binder fills the gap and the voids between the single sized aggregates. Its purpose is to impart flexibility to expansion joint so that it accommodate the various movements of bridge.

3.1 Installation Procedure

1. Layout - In case the trenches are not preformed, joints are laid out on the site by locating the exact gap opening and measuring 250mm on both sides from the center of the gap. The center of the layout shall be the center of the gap. Chalk mark both sides of the joint width. Cut the full depth using a concrete cutter. A strict minimum of 50mm depth is observed, in cases where there is wearing course and the thickness is less than 50mm, the deck shall be chipped upon the approval of the bridge engineer to attain the required minimum depth. After cutting the full depth of the joint, break the joint location by using a jackhammer. Remove all broken slabs to open a trench. The side wall shall also be free from loose debris and shall at least be at right angle with the exposed deck.

2. Cleaning - Clean the trench thoroughly by using compressed air to remove all visible dusts. It is best to wire brush the sides of the trench as well as the deck to remove all loose particles.

3. Installation of Premolded Joint filler - Install a compressible premolded rubber type joint filler on the trench gap. Make sure that the premolded expansion joint filler was installed approximately 25mm below the deck level at 25% minimum compression to allow the binder to fill the top portion and prevent from falling.

4. Hot Air/Flame Cleaning/Pre-heating - The trench is then cleaned and pre-heated by using hot compressed air. This shall remove all remaining debris and will completely clean and heat the trench to prepare it for priming.

5. Priming - Heat the binder to its working temperature of 190 to 210°C. When the binder is ready for use, prime the trench with the binder. Ensure that all surfaces are evenly covered with binder. Ensure that the

top of the premolded expansion joint filler is also filled with binder up to the deck level.

6. Plating - Cover the top of the gap. Position the plate cover on the center of the gap and fixed it with locating pin. In small joint gaps, the primary purpose of the plate is to prevent the binder from continuously flowing to the gap during priming. However, in case where the joint gap exceeds 30mm in width, the plate shall be of importance to distribute vehicular loading.

7. Plate Priming - Pour binder on top of the plate and ensure that all the surface of the steel plate, including its sides are covered with binder.

8. Stone Laying - Prepare the pre-washed aggregates (normally gabbros of granite family), by putting it inside a mixing tub. Heat the aggregates while the tub is rotating until it reaches the working temperature of 150 to 180°C.

   A premix of one layer of aggregates can be put in the trench. Rake the aggregates to spread it evenly on the trench. Make sure not to lay the stone more than 25mm thick per layer.

   Aggregates size are normally 14mm or 20mm in diameter, depending on the size of the joint, pre-washed, clean and packed in 20 to 23 kgs.

9. Binder Pouring - Pour the binder on top of the stone layer. Rake the stones to spread it evenly on the trench. Ensure that each stone is covered with binder and the aggregates are in contact with each other. Pour binder to the trench and repeat stone laying and the binder pouring process until the stone and binder layer are approximately 20mm to 25mm below the wearing surface.

10. Topping - Prepare a premix of binder and stone in the tub on a 6:1 approximate proportion. Keep the mixing tub rotating while pouring the premix inside the tub. Make sure all aggregates are suitably covered with binder. Pour the premix on top of the joint to a level of approximately 20mm above the wearing surface.

11. Compaction - Wait for the temperature to drop about 80^0C, then, using a vibratory plate compactor, compact the finished expansion joint to

level the joint with the wearing surface. Make multiple passes to ensure that the joint is properly compacted. This will prevent the joint from setting on the later stage after opening to traffic

12. Top Screed Surface - After compaction, prepare a binder topping and pour the heated binder on top of the compacted joint. Wearing a heavy-duty heat resistant hand gloves, manually screed the topping. Avoid too thick binder topping (recommended thickness is about 2 to 3mm) and ensure that there are visible signs of stones after finishing the top screed. The top screed binder shall also serve as the waterproof top surface.

13. Cleaning - Clean the surrounding area and pour water on the finished expansion joint. Allow to cure to about 15 to 30 minutes depending on the ambient condition of the surrounding. The road could be immediately opened to traffic after cooling.

4.0 Method of Measurement

The installed expansion joint will be measured by the cubic metre (m^3). The quantity to be paid for shall be the volume in-placed as shown on the plans and accepted by the Engineer.

5.0 Basis of Payment

The accepted quantities, measured as prescribed in Section 4.0, shall be paid for at the contract unit price for the expansion joint which price and payment shall be full compensation for furnishing and placing all materials, including labor, equipment, tools and incidentals necessary to complete the work prescribed in this Item.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
-	Thormajoint	Cubic meter

Republic of the Philippines
Department of Public Works and Highways
Office of the Secretary

CERTIFICATE OF CONDITIONAL APPROVAL

Product Accreditation

This is to certify that

THORMAJOINT

which is exclusively distributed in the Philippines by:

ORO Filipino Enterprises and
Development Corporation
No. 1 Sunrisehill Street
Rolling Hills Subdivision
New Manila, Quezon City 1100

is duly accredited for use in DPWH bridge expansion joint projects, subject to its specifications (hereto attached) pursuant to the provisions of DPWH Department Order No. 189, series of 2002.

This accreditation shall remain in force until expiry date printed below, subject to compliance with the requirements of the aforementioned Department Order.

Conditional Approval No. : 007
Date Issued : January 2006
Expiry Date : January 2011

HERMOGENES E. EBDANE, JR.
Acting Secretary

WIN6U00067