MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
REPAIR OF CONCRETE PAVEMENT
SURFACE SPALL

M&T:ARB 1 of 2 06-03-97
C&T:APPR:JTL:GJB:08-08-97

a. Description. This work shall consist of cleaning and repairing spalled areas in the surface of the concrete pavement with a fast set mortar.

The areas to be cleaned and repaired shall be as shown in the proposal or as directed by the Engineer.

All work and materials shall be in accordance with the 1996 Standard Specifications with the following exceptions and additions:

b. Materials. The fast set repair mortar shall be selected from the Department's Qualified Products List for Prepackaged Hydraulic Fast-Set Materials for Patching Structural Concrete.

c. Equipment. The chipping hammers used to prepare the repair area shall be light weight (16 kg class maximum), unless otherwise approved by the Engineer.

d. Construction.

Repair Area Preparation.-All unsound concrete and bituminous patching material shall be removed from the repair area with chipping hammers. All surfaces of the repair area shall be sandblasted to remove all contamination, followed by a final cleaning with oil-free compressed air having a minimum pressure of 620 kPa.

Mortar Placement.-The mortar shall be mixed, placed, consolidated, finished and cured as specified by the manufacturer of the Prepackaged Fast Set Mortar.

e. Measurement and Payment. The completed work as measured for **Concrete Surface Patch** will be paid for at the contract unit price for the following contract item (pay item):

Contract Item (Pay Item)	**Pay Unit**
Concrete Surface Patch	m2

Payment for **Concrete Surface Patch** includes all material, labor, and equipment required to prepare, place, consolidate, finish, and cure the fast set patching mortar.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
LONGITUDINAL CONCRETE JOINT REPAIR, CASE A

a. Description.-Longitudinal Concrete Joint Repair, Case A, shall consist of partial depth milling and chipping to remove deteriorated and delaminated concrete, preparation, placement, and finishing of the repair. Repair locations shall be as directed by the Engineer. All work shall be according to the 1996 Standard Specifications, except as specified herein.

b. Materials.-The bonding grout shall consist of equal weights of Portland cement and number 2NS sand, mixed mechanically with sufficient water to form a slurry with the consistency of thick cream.

Concrete mixture shall contain the following materials per cubic yard.

Mix Water (total)	300 lbs.
Net w/c Ratio	0.38
Portland Cement, Type I	750 lbs.
2NS Fine Aggregate, Dry	1400 lbs.
29A Coarse Aggregate, Dry	1450 lbs.
FA/TA Ratio by Absolute Vol.	0.50
Type A Water Reducer	maximum manufacturer's rec.

FA/TA = Fine Aggregate to Total Aggregate ratio

Concrete air-entrainment and slump will be as follows:

Entrained Air	5.0 - 8.0%
Slump after addition of Water Reducer	2 - 4 inches

Values are assumed for the fine aggregate (specific gravity of 2.64 and absorption of 0.95) and coarse aggregate (specific gravity of 2.72, absorption of 1.10, and unit weight of 89 lbs/ft^3). The Contractor will make the necessary proportion adjustments for aggregate absorption and specific gravity and will submit the adjusted mix design to the Engineer five days prior to concrete placement.

Curing compound shall be linseed oil based and shall meet Section 9.03.06B.

Hot-poured joint sealant shall meet Section 9.14.04A. Backer rod for use with hot-poured joint sealant shall meet Section 9.14.04B.

c. Equipment.-A planing or milling machine shall be equipped with a cutting drum designed for grinding concrete to close tolerances. The milling drum shall be able to cut continuously parallel to the joint and be adjustable to depths of 6 inches. The milling drum shall be equipped with side cutters which cut a vertical edge for repair depths greater than 2 inches. The manufacturer of the milling drum shall provide documentation (two sources) which show compliance with the stated specifications. A mobile mixer shall not be permitted for mixing the concrete.

d. Construction.-

Temperature Limitations. Concrete repairs shall not be placed at air temperatures below 50_°F, nor above 90_°F. Insulation of repairs will be required when air temperature is below 60_°F or when the pavement concrete temperature is below 50_°F.

Surface Preparation. Deteriorated concrete and patching material shall be removed by milling within the limits shown in the detail for Longitudinal Concrete Joint Repair, Case A, including deteriorated concrete to a maximum of half the pavement depth, or to the top of the tie bars. Any mesh reinforcement within the repair areas shall be removed. All slivers of concrete less than one inch in width remaining along the repair area after milling shall be removed with a light weight chipping hammer (15 lbs.). After milling and chipping, all exposed surfaces shall be sounded with a steel bar to detect for delaminations. If delaminations are detected, the effected concrete shall be removed and the areas resounded. Exposed surfaces shall be cleaned by sandblasting to remove all debris followed by air blasting with oil-free compressed air having a minimum pressure of 90 psi. Transverse joints shall be reestablished in the same configuration as the existing pavement.

Bonding Grout. The surface of the concrete shall be damp without excess water before placement of the bonding grout. Bonding grout shall be applied immediately prior to concrete placement. The grout shall be applied by either brushing or scrubbing (with a stiff bristle broom) onto the prepared concrete surface. If the grout whitens before concrete placement, it shall be removed by sand blasting and the area re-grouted. The grout shall not be retempered.

Concrete Placement and Finishing. After the concrete is placed and screeded to the elevation of the surrounding pavement surface, all edges shall be sealed with mortar by working concrete outward toward existing hardened pavement concrete. Linseed oil-based curing compound shall be applied at a rate of one gallon per 12 yd^2 immediately after finishing.

Joints. Joint and crack relief shall be established through the full depth of the repair using a minimum ¼ inch wide saw cut as soon as possible after initial set without excessive raveling and before any cracking occurs. Immediately after sawing, all joints shall be thoroughly cleaned by water flushing. Immediately

prior to sealing, the joint must be clean, dry, and free of all incompressibles. The joints shall be sealed with hot-poured sealant as specified in Subsection

602.03S. The top of the sealant (after cooling) shall be flush to 1/8 inch below the surface of the pavement.

Opening to Traffic. The concrete shall achieve a compressive strength of 3000 psi before opening to traffic.

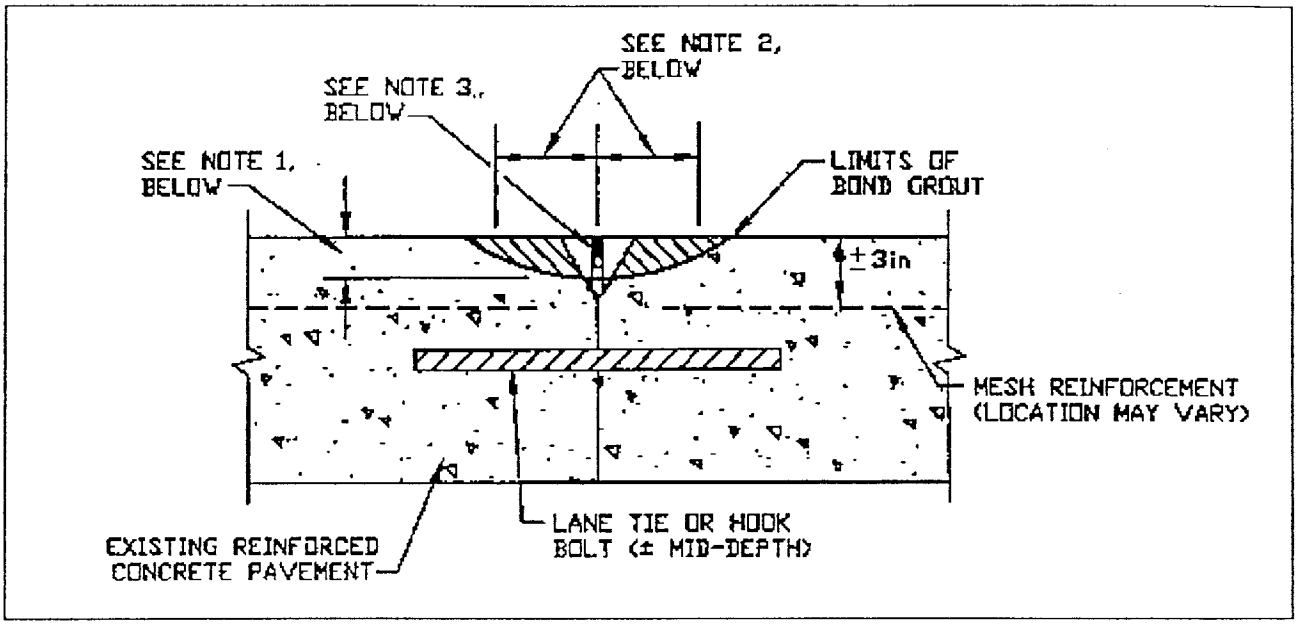
e. Acceptance.-Damage to any in-place pavement, roadway structure, or appurtenance by the Contractor's operations prior to final acceptance, shall be repaired as directed by the Engineer at no cost to the Department. The Department will perform a condition inspection on all repairs one month after the repairs are open to traffic. All repairs that fail within one month following completion of the repair shall be considered unacceptable work and shall be removed and replaced, or otherwise corrected to the satisfaction of the Engineer, at no additional cost to the Department. Failure of a repair is considered either bond loss, delamination, or spalling. Delaminations will be detected by sounding with a steel bar.

f. Measurement and Payment.-The completed work as measured for Longitudinal Concrete Joint Repair, Case A, will be paid for at the contract unit price for the following contract item (pay item):

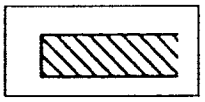
Contract Item (Pay Item)	**Pay Unit**
Longitudinal Concrete Joint Repair, Case A	feet

The completed work shall include all labor, equipment and material necessary to complete the work according to this special provision. Payment for traffic control to restore failed repairs, as described in Subsection e shall be at the Contractor's expense. Payment for traffic control to perform one month condition inspection will be at the expense of the Department.

LONGITUDINAL CONCRETE JOINT REPAIR, CASE A



AREA TO BE REMOVED



NOTES:

1. 2" MIN. REMOVAL TO A MAX. OF 1/2 THE PAVEMENT DEPTH OR TO THE TOP OF THE TIE BAR, WHICHEVER IS LESS.
2. 5" MIN. WIDTH, MAX. TO MATCH THE WIDTH OF THE SPALL.
3. ¼" SAWCUT TO EXTEND THROUGH THE DEPTH OF THE REPAIR. TOP OF 3/16" BACKER ROD TO BE LOCATED 1" BELOW PAVEMENT SURFACE.