

GENERAL NOTES

COMPUTED BY: *HE*
CHECKED BY: *FLM*

FHWA REGION	STATE	PROJECT	
5	OHIO		

LAKE COUNTY
LAK-44-4.14

PAVEMENT

ITEM SPECIAL - SUBSEALING EXISTING CONCRETE PAVEMENT

1.1) DESCRIPTION

THIS ITEM OF WORK SHALL CONSIST OF SEALING VOIDS UNDER THE EXISTING CONCRETE PAVEMENT.

2.1) SUBSEALING LOCATIONS

THE LOCATIONS FOR SUBSEALING SHALL BE AS DIRECTED BY THE ENGINEER AND SHALL BE BASED UPON THE RESULTS OF THE DYNAPLECT TESTING.

3.1) MIX DESIGN

THE MIX DESIGN FOR SUBSEALING IS AS FOLLOWS:

1 PART (BY VOLUME) PORTLAND CEMENT TYPE 1 OR 11

3 PARTS (BY VOLUME) POZZOLAN (NATURAL OR ARTIFICIAL)

WATER TO ACHIEVE REQUIRED FLUIDITY

ADMIXTURE (ASTM C-494 TYPE F) TO ACHIEVE REQUIRED STRENGTH

IF AMBIENT TEMPERATURES ARE BELOW 55°F, AN ACCELERATOR WILL BE USED SUBJECT TO APPROVAL OF THE ENGINEER.

3.2) PORTLAND CEMENT

PORTLAND CEMENT SHALL MEET THE REQUIREMENTS. PORTLAND CEMENT TYPE 1, 11 OR 111 AS PER ASTM C-150.

3.3) POZZOLANS

POZZOLANS SHALL MEET THE REQUIREMENTS OF ASTM C-618, EXCEPT THAT THE CONTRACTOR MAY USE OTHER POZZOLANS IF HE CAN SHOW TEST DATA MEETING REQUIREMENTS OUTLINED IN THIS SECTION AND PREVIOUS USE OF THE MATERIAL FOR THIS PURPOSE ON OTHER PUBLIC WORKS PROJECTS.

3.4 FLOW CONE

FLUIDITY OF THE GROUT SLURRY SHALL BE MEASURED BY THE CORPS OF ENGINEERS FLOW CONE METHOD AS PER THEIR SPECIFICATION CRD-C 79-77. TIME OF EFFLUX FOR POZZOLANIC GROUTS SHALL RANGE FROM 16 TO 22 SECONDS. THESE MEASUREMENTS SHALL BE MADE TWO TIMES ON EACH SHIFT.

3.5 MATERIAL SUBMISSION

THE CONTRACTOR SHALL SUBMIT IN ADVANCE A PROPOSAL FOR MATERIALS AND ADDITIVES MEETING THE REQUIREMENTS OF SECTION 3.1 ABOVE. SUBMITTALS SHALL INCLUDE MILL CERTIFICATIONS FOR THE CEMENT, PHYSICAL AND CHEMICAL ANALYSIS FOR THE POZZOLANS AND INDEPENDENT LABORATORY TESTING OF THE GROUT SLURRY SHOWING ONE DAY, THREE DAY, AND SEVEN DAY STRENGTHS, FLOW CONE TIMES, SHRINKAGE AND EXPANSION OBSERVED AND TIME OF INITIAL SET. THE SEVEN DAY STRENGTH SHALL NOT BE LESS THAN 800 PSI.

4.1 EQUIPMENT

THE CONTRACTOR SHALL FURNISH ALL EQUIPMENT NECESSARY OR INCIDENTAL TO THE ADEQUATE PERMANENCE OF THIS WORK AS FOLLOWS:

4.2 GROUT PLANT

THE GROUT PLANT SHALL CONSIST OF A PROGRESSIVE CAVITY CEMENT INJECTION PUMP HAVING A VARIABLE SPEED CONTROL AND A CONTINUOUSLY AGITATED MIXING AND HOLDING TANK. THE MIXING MACHINE SHALL BE CAPABLE OF PROVIDING A HOMOGENEOUS MIXTURE. THE PUMP SHALL CONSIST OF A ROTOR OPERATING IN CLOSE PROXIMITY TO A STATOR THUS CREATING A HIGH SHEARING ACTION. THE PUMPING SYSTEM SHALL CONTAIN A BYPASS RETURN LINE ACTING AS A PRESSURE RELEASE.

THE DRY MATERIALS SHALL BE ACCURATELY MEASURED BY WEIGHT IF IN BULK OR SHALL BE PACKAGED IN UNIFORM VOLUME SACKS AND THE WATER SHALL BE BATCHED THROUGH A METER OR SCALE WITH A TOTALIZER FOR THE DAY'S CONSUMPTION.

4.3 WATER TANKER

WATER SHALL BE SUPPLIED FROM A WATER TRUCK WITH ADEQUATE CAPACITY AND PRESSURE FOR DELIVERY TO THE GROUT PLANT.

4.4 DRILLING

AN AIR COMPRESSOR AND ROCK DRILLS OR OTHER DEVICE CAPABLE OF DRILLING THE GROUT INJECTION HOLES THROUGH THE PAVEMENT AND BASE MATERIAL. THE EQUIPMENT SHALL BE IN GOOD CONDITION AND OPERATED IN SUCH A MANNER THAT THE HOLES ARE VERTICAL AND NOT "OUT-OF-ROUND". THE ROCK DRILL SHALL NOT BE HEAVIER THAN SIXTY POUNDS AND THE DOWNFEED PRESSURE WHETHER BY HAND OR MECHANICAL MEANS SHALL NOT EXCEED 200 POUNDS.

4.5 TRANSPORT

NECESSARY MATERIAL TRANSPORT AND HANDLING EQUIPMENT.

4.6 MISCELLANEOUS

ALL NECESSARY HOSES, VALVING AND VALVE MANIFOLDS AND POSITIVE CUT-OFF AND BYPASS PROVISIONS TO CONTROL PRESSURE AND VOLUME, PRESSURE GAUGES WITH GAUGE PROTECTORS, EXPANDING PACKERS OR HOSE FOR POSITIVE SEAL DURING GROUT INJECTION, WOOD PLUGS, HOLE WASHING TOOLS, DRILL STEEL AND BITS.

4.7 VERTICAL MOVEMENT TESTING

THE CONTRACTOR SHALL SUPPLY EQUIPMENT TO MEASURE SLAB LIFT WHICH SHALL BE CAPABLE OF DETECTING SIMULTANEOUSLY THE LIFT OF THE PAVEMENT EDGE OR OF ANY TWO OUTSIDE CORNER SLABS ADJACENT TO A JOINT AND THE ADJOINING SHOULDER. THE EQUIPMENT SHALL HAVE THE CAPABILITY OF MAKING SUCH MEASUREMENTS TO 0.001 INCH. THESE DEVICES TO MAKE LIFT MEASUREMENTS AGAINST A STABLE REFERENCE POINT SHALL BE OF A DESIGN SATISFACTORY TO THE ENGINEER.

6.1 DRILLING HOLES

GROUT INJECTION HOLES WILL BE DRILLED IN A PATTERN DETERMINED BY THE ENGINEER IN CONSULTATION WITH THE CONTRACTOR. THEY SHALL NOT BE LARGER THAN 2 INCHES IN DIAMETER, DRILLED VERTICALLY AND ROUND, AND TO A DEPTH SUFFICIENT TO PENETRATE ANY STABILIZED BASE.

6.2 WASHING HOLES

SUBJECT TO THE ENGINEER'S APPROVAL, HOLES MAY BE WASHED OR BLOWN TO CREATE A SMALL CAVITY, TO BETTER INTERCEPT THE VOID STRUCTURE.

6.3 SUBSEALING

DURING THE SUBSEALING OPERATION, A POSITIVE MEANS OF MONITORING LIFT SHALL BE USED AS DESCRIBED IN SECTION 4.7. THE UPWARD MOVEMENT OF THE PAVEMENT IN NO EVENT SHALL BE GREATER THAN 0.05 INCH. AN EXPANDING RUBBER PACKER OR HOSE CONNECTED TO THE DISCHARGE FROM THE PLANT SHALL BE LOWERED INTO THE HOLE. THE DISCHARGE END OF THE PACKER OR HOSE SHALL NOT EXTEND BELOW THE LOWER SURFACE OF THE CONCRETE PAVEMENT. EACH HOLE SHALL BE PUMPED UNTIL MAXIMUM PRESSURE IS BUILT UP OR MATERIAL IS OBSERVED FLOWING FROM HOLE TO HOLE. MAXIMUM ALLOWABLE PRESSURE SHALL NOT BE ALLOWED TO EXCEED 100 POUNDS PER SQUARE INCH OR OTHER VALUES SPECIFIED BY THE ENGINEER TO MINIMIZE SLAB RAISING. THE PRESSURE SHALL BE MONITORED BY AN ACCURATE PRESSURE GAUGE IN THE GROUT LINE THAT IS PROTECTED FROM THE GROUT SLURRY. WATER DISPLACED FROM THE VOID STRUCTURE BY THE GROUT SHALL BE ALLOWED TO FLOW OUT FREELY. EXCESSIVE LOSS OF THE GROUT THROUGH CRACKS, JOINTS, OR FROM BACKPRESSURE IN THE HOSE OR IN THE SHOULDER AREA SHALL NOT BE TOLERATED. PAY QUANTITIES WILL BE REDUCED BY THE ENGINEER ACCORDINGLY.

6.4 CORRECTING PANEL DISPLACEMENT

PAVEMENT WHICH HAS BEEN RAISED IN EXCESS OF THE 0.05 INCH ALLOWABLE TOLERANCE SHALL BE DEEMED UNACCEPTABLE, NO PAYMENT FOR ANY SUBSEALING MATERIAL AT THE SUBJECT LOCATION SHALL BE MADE WHEN THIS TOLERANCE IS EXCEEDED.

6.5 RADIAL CRACKS

CRACKS EMANATING RADIIALLY FROM THE GROUT INJECTION HOLES WILL BE PRESUMED TO HAVE BEEN CAUSED BY IMPROPER INJECTION TECHNIQUES BY THE CONTRACTOR. FOR EACH 5 LINEAL FEET OF SUCH CRACK MEASURED, THE CONTRACTOR'S PAY QUANTITY SHALL BE REDUCED BY ONE CUBIC FOOT OF GROUT.

6.6 TRANSVERSE CRACKS

IN THE EVENT THAT TRANSVERSE CRACKS DEVELOP BETWEEN ADJACENT GROUT INJECTION HOLES, THE CONTRACTOR WILL BE REQUIRED TO REPAIR THESE CRACKS BY THE EPOXY INJECTION METHOD TO THE SATISFACTION OF THE ENGINEER OR AT THE DISCRETION OF THE ENGINEER, HE MAY REQUIRE REPLACEMENT OF THE ENTIRE PANEL OR A PORTION THEREOF.

6.7 HOLE PATCHING

UPON COMPLETION OF THE SUBSEALING, ALL DRILL HOLES WILL BE SEALED FLUSH WITH THE SURFACE OF THE PAVEMENT WITH A FAST SETTING SAND/CEMENT MATERIAL TO BE APPROVED BY THE ENGINEER.

6.8 WEATHER CONDITIONS

GROUT SUBSEALING SHALL NOT BE PERFORMED WHEN DAY TIME TEMPERATURES ARE BELOW 35°F, OR IF THE SUBGRADE AND/OR BASE COURSE MATERIAL IS FROZEN.

6.9 UNANTICIPATED CONDITIONS

IN THE EVENT THE ENGINEER DETERMINES THAT CONTINUED GROUT INJECTION AT ANY SPECIFIC LOCATION DUE TO MAJOR VOIDS IS NO LONGER ECONOMICALLY FEASIBLE, HE MAY DIRECT THE CONTRACTOR TO CEASE GROUT INJECTION AT THAT LOCATION. THE CONTRACTOR WILL BE PAID AT THE UNIT PRICE FOR THE MATERIAL USED UP TO THAT POINT.

7.1 OPERATIONAL LIMITS

THIS WORK SHALL BE PERFORMED AS PER THE MAINTENANCE OF TRAFFIC REQUIREMENTS.

8.1 MEASUREMENT

THE QUANTITIES TO BE PAID FOR WILL BE MEASURED AS FOLLOWS:

8.1.1 HOLES

HOLES DRILLED THROUGH THE EXISTING CONCRETE SLABS, AT THE LOCATION AND TO THE DEPTH SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER WILL BE MEASURED PER EACH. HOLES WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH. SUCH PAYMENT WILL BE FULL COMPENSATION FOR DRILLING, PLUGGING, AND SEALING THE HOLE AFTER THE SUBSEALING IS COMPLETED.

8.1.2 SUBSEAL MATERIAL

THE SUBSEAL MATERIAL SHALL BE PAID FOR ON THE BASIS PER CUBIC FOOT (DRY MEASURE) OF MATERIAL INCORPORATED INTO THE PAVEMENT STRUCTURE.

THE UNIT CONTRACT PRICE PER CUBIC FOOT (DRY MATERIAL) SHALL BE FULL COMPENSATION FOR THE FURNISHING OF ALL LABOR, MATERIALS, INCLUDING WATER AND ADDITIVES, EQUIPMENT AND TOOLS, AND ALL OTHER COSTS NECESSARY AND INCIDENTAL TO ACCOMPLISH THE SUBSEALING OF THE PAVEMENT AT THE DESIGNATED LOCATIONS IN ACCORDANCE WITH THESE SPECIFICATIONS AND THE DETAILS ON THE PLANS.

8.2 DEDUCTIONS

8.2.1 MIXED MATERIAL MAY NOT BE HELD IN THE MIXER OR INJECTION PUMP SUP FOR MORE THAN ONE HOUR AFTER MIXING. ANY MATERIAL HELD FOR LONGER TIMES SHALL BE WASTED AND WILL NOT BE PAID FOR.

8.2.2 MATERIAL WASTED BY UNCONTROLLED FLOW AS DESCRIBED IN SECTION 6.3 WILL NOT BE PAID FOR AND WILL BE DEDUCTED FROM THE PAY QUANTITIES BY THE ENGINEER.

9.1 QUANTITIES

THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN INCLUDED IN THE GENERAL SUMMARY TO BE USED AS OUTLINED ABOVE.

ITEM SPECIAL - HOLE FOR SUBSEALING	2,800 EACH
ITEM SPECIAL - SUBSEAL MATERIAL	2,800 C.F.