To:		ENGINEERING INSTRUCTION *New York State Department of Transportation*	94-034
SUPERSEDED BY EI 97-030 EFFECTIVE 4/23/98			Supersedes: Part of EI 90-001

Title: FILLING CRACKS AND/OR JOINTS IN PAVEMENTS AND FILLING SHOULDER JOINTS BETWEEN CONCRETE PAVEMENT AND ASPHALT CONCRETE SHOULDERS

Distribution:	Approved:
Central Office(30) Regions(32) Consultants(34)	G J Clark 9/20/94 Date P. J. Clark, Deputy Chief Engineer, Facilities Design Division

EFFECTIVE DATE. This instruction takes effect with the letting of October 20, 1994.

PURPOSE OF INSTRUCTION. The purposes of this instruction are: (1) to replace two special specifications that were transmitted with EI 90-001; (2) to provide some background on the reasons why the replacement is being made; (3) to provide some guidelines on the usage of the replacement items; (4) and to provide some instructions on how the replacement specifications are to be implemented. The intent of this instruction is that it be an interim instruction until the Technical Services Division revises Engineering Instruction 90-001. This revision is planned to occur toward the end of this year. Because the instruction is intended to be only short lived and because it will affect only Regional Designers and Main Office staff in the Design Quality Assurance Bureau, there was only limited circulation of the instruction and the normal clearance process was waived.

TRANSMITTED MATERIALS. The attached materials are special specifications:

18403.7505 FILLING CRACKS AND\OR JOINTS IN PAVEMENTS AND SHOULDERS USING ASTM D3405 WITH RECYCLED TIRE RUBBER.....GALLONS

18403.7506 FILLING SHOULDER JOINTS BETWEEN PORTLAND CEMENT CONCRETE PAVEMENT AND ASPHALT CONCRETE SHOULDERS USING ASTM D3405 WITH RECYCLED TIRE RUBBER.....GALLONS

18403.7507 FILLING SHOULDER JOINTS BETWEEN PORTLAND CEMENT CONCRETE PAVEMENT AND ASPHALT CONCRETE SHOULDERS USING FIBER REINFORCED ASPHALT CEMENT.....GALLONS

USAGE GUIDELINES. The first of the three transmitted specifications replaces item 18403.7502, which is hereby disapproved in the Engineer's Estimate Handler System (EEHS). The second and third items replace item 18403.7503, which also is hereby disapproved in the EEHS.

In the most usual case, the second and third of the transmitted items are to be bid as an optional pair, thus it will be necessary to include both items in the contract if the joint between PCC pavement and an asphalt shoulder is to be filled. The contract quantity in the optional pair for the item 18403.7507, which uses the asphalt cement reinforced with fibers, should be 96% of that of item 18403.7506, which uses ASTM D3405. This difference in quantity is necessary because the fibers added to the asphalt cement "bulk up" the material and the specification calls for the quantity to be measured prior to the time the fibers are added.

BACKGROUND. The specification 18403.7502 being replaced allowed the use of ASTM D3405, ASTM D1190

or Asphalt Cement with Fiber Reinforcement to fill cracks and joints in pavements, including shoulder pavements. Recent surveys of the performance of these materials indicated that neither of the latter two is as durable in filling pavement and shoulder joints and cracks as ASTM D3405. In addition to obtaining better performance from the ASTM D3405 material, it is also possible to formulate ASTM D3405 with recycled tire rubber and thus help the Department meet its requirement under §1038 of ISTEA to incorporate recycled tire rubber in its pavements.

One gallon of ASTM D3405, blended with 10% recycled tire rubber will use approximately one pound of recycled tire rubber.

The other item being replaced, item 18403.7503, is used to fill the joint at the edge of the pavement between concrete pavements and asphalt shoulders. Here, performance of the materials is not as much of an issue because all perform about equally in filling that joint. The ASTM D1190, however, was only rarely being used by Contractors and there was confusion in the way that item 18403.7503 would be measured if the contractor selected, as many did, to use the asphalt cement with fibers. Use of the optional pair of bidding items will clear up that confusion and permit the use of alternative materials at a location where their performance has proved satisfactory.

In addition, the department will be able to take advantage of the usage of recycled tire rubber if the contractor elects to use item 18403.7506.

ADDITIONAL SPECIFICATION INFORMATION. In addition to the above special specifications being replaced, this instruction also affects items 02403.7502, 08403.7502, 09403.750201, 18403.7501, 18403.750201, 18403.750202, and 18502.2505; all of which are hereby disapproved and replaced by Item 18403.7505.

IMPLEMENTATION. The designers should make the substitutions of items and quantity adjustments for the optional bidding, by amendment if necessary, effective with the letting of October 20, 1994. If a designer desire that one or the other of the bidding pair not be included in the contract to fill the joint between PCC pavement and an asphalt shoulder, he/she should obtain the necessary approval to do so from the contact persons prior to the amendment or PS&E deadline.

The specifications will be Main Office Inserts.

CONTACT PERSON. Mr. David Graves of the Materials Bureau, telephone (518) 457-4285 for technical questions and Larry Brown of the Design Quality Assurance Bureau at (518) 457-4093.

ITEM 18403.7505 - FILLING CRACKS AND/OR JOINTS IN PAVEMENTS AND SHOULDERS USING ASTM D3405 WITH RECYCLED TIRE RUBBER

DESCRIPTION

This work shall consist of cleaning and filling cracks and/or joints in existing rigid, flexible, or overlaid pavements and shoulders with ASTM D3405 with recycled tire rubber.

NOTE: In this specification, the word "joint" may be substituted for the word "crack" wherever it appears.

MATERIALS

Filler shall meet the requirements of ASTM D3405; Joint Sealants, Hot-Poured for concrete and asphalt pavements. In addition, the material shall contain a minimum 10% by weight of recycled tire rubber. The recycled tire rubber shall be ground from processing whole scrap tire material taken from automobiles, trucks, or other equipment owned and operated in the United States. The material will be accepted on the basis of the manufacturer's certification that it conforms to the requirements of ASTM D3405, that it contains a minimum of 10% recycled United States tire rubber, and that the name of the Primary Source (Manufacturer) and trade name appears on the current approved list. Each container shall be legibly marked with the following information:

Manufacturer's Name
Trade name of the filler
Manufacturer's lot or batch number
Pouring temperature
Safe heating temperature

The supplier shall provide the contractor with the trade name of the sealant, the manufacturer's batch number, recommended pouring temperature, safe heating temperature, and a copy of the manufacturer's recommendations pertaining to heating and application. The recommended pouring temperature shall be 10°F below the manufacturer's designated safe heating temperature, with an allowable variation of ±10°F. Filler material that has exceeded the safe heating temperature, been heated at the pouring temperature in excess of six hours, or reheated, shall not be used.

The Department reserves the right to conduct sampling and testing to verify specification compliance.

ITEM 18403.7505 - FILLING CRACKS AND/OR JOINTS IN PAVEMENTS AND SHOULDERS USING ASTM D3405 WITH RECYCLED TIRE RUBBER

CONSTRUCTION DETAILS

General. The Contractor shall furnish all equipment necessary for cleaning and filling the pavement cracks. All equipment shall be approved by the Engineer before its use.

Filling shall be done at locations shown on the Plans or as directed by the Engineer.

All cracks shall be thoroughly cleaned of all dust, dirt, moisture, foreign material, incompressibles or any other extraneous materials by high pressure air, hot air lance, wire brush or other suitable method or tool approved by the Engineer. Suitable traps or devices shall be installed on the compressed air equipment to prevent moisture and oil from contaminating the crack surfaces. The Contractor shall maintain these devices and see that they are functioning properly. The cracks shall be cleaned a minimum of 3/4" deep. The material and debris removed from the crack shall be removed from the pavement to prevent re-contamination of the crack.

Immediately prior to filling and after the crack has been prepared as specified above, both crack faces shall be thoroughly cleaned to a minimum depth of 1/2" using compressed air. The crack sides shall appear thoroughly clean and dry prior to filling. The Contractor may be ordered to reclean cracks if, in the opinion of the Engineer, adequate cleaning and drying is not being obtained. Final cleaning or recleaning may be performed with the use of a hot air lance. When using a hot air lance, care shall be taken so as not to burn, scorch, or ignite the adjoining pavement. Any cracks not filled the same day shall be recleaned prior to filling.

The Contractor shall be responsible for protecting traffic and property from hazard or damage during the crack cleaning operation. Materials and methods used for this purpose will be subject to the approval of the Engineer.

The filler shall be heated in a melter constructed either as a double boiler, with the space between inner and outer shells filled with heat-transfer medium; or with internal tubes or coils carrying the filler through a heated oil bath and into a heated double wall hopper. Direct heating shall not be used. Positive temperature control, mechanical agitation and recirculation pumps shall be used. The unit shall be provided with separate thermometers to indicate the temperature of the heat transfer medium and the filler material in the hopper. The mixing unit shall be capable of maintaining the specified mixing temperature, with an allowable variation of ±10°F. Before any crack filling shall commence, the Engineer shall inspect the filling apparatus to ascertain the presence and working condition of the thermometers. Under no circumstances will the Engineer permit any crack filling if thermometers are found to be defective or missing.

ITEM 18403.7505 - FILLING CRACKS AND/OR JOINTS IN PAVEMENTS AND SHOULDERS USING ASTM D3405 WITH RECYCLED TIRE RUBBER

The Contractor shall be responsible for a safe and efficient method by which the Engineer will be able to accurately measure the temperature of the filler as it is discharged from the applicator wand. The proposed method must be submitted to the Engineer for his approval before the commencement of crack filling operations. The Contractor shall provide the Engineer with two (18" stem) thermometers having a temperature range sufficient to meet the requirement of this specification.

The discharge hose shall be equipped with a controlled heating apparatus or shall be insulated sufficiently to maintain the proper filler temperature. The application wand shall be returned to the machine and the material recirculated as necessary to maintain the proper filler application temperature between individual crack filling operations. Reasonable care should be taken so as not to obliterate pavement markings.

If in the opinion of the Engineer, the Contractor displays an inconsistency in his ability to perform the cleaning or filling operation, he shall order the Contractor to cease his operations until such time as he can comply with the required criteria in a consistent manner.

The filler shall not be placed when pavement or ambient temperatures exceed 80°F or fall below 40°F, except if the manufacturer's recommendations state a minimum application temperature greater than 40°, then that temperature supersedes the specification minimum. All cracks must be thoroughly dry and clean at the time of filling.

A copy of the manufacturer's recommendations pertaining to the heating and application of the filler shall be submitted to the Engineer prior to the commencement of work. These recommendations shall be adhered to and followed by the Contractor, with such exceptions as this specification may require.

The recommended pouring temperature shall be 10°F below the manufacturer's designated safe heating temperature, with an allowable variation of ±10°F. Filler material that has exceeded the safe heating temperature, been heated at the pouring temperature in excess of 6 hours, or reheated shall not be used.

Cracks shall be filled by slightly overfilling and using a "V" shaped squeegee to form a maximum band width of four inches 1/16" to 1/8" thick with tapered edges centered over the crack. The squeegee shall have a flexible (neoprene type) edge capable of conforming to the pavement surface. During the filling operation the distance between the filler application wand and squeegee shall not exceed 2 feet. Traffic shall not be allowed on the filler until it has cured sufficiently to prevent tracking. Blotting with fine aggregate will not be allowed. Filler that becomes damaged or that is installed improperly shall be repaired.

ITEM 18403.7505 - FILLING CRACKS AND/OR JOINTS IN PAVEMENTS AND SHOULDERS USING ASTM D3405 WITH RECYCLED TIRE RUBBER

Damaged or deficient areas shall have the filler removed, the surfaces properly cleaned and new filler installed to the satisfaction of the Engineer at the Contractor's expense.

METHOD OF MEASUREMENT

The quantity to be paid for shall be the actual number of gallons of filler corrected to 60°F gal. used to complete the work.

No payment will be made for waste material.

BASIS OF PAYMENT

The unit price bid shall include the cost of all labor, equipment and materials necessary to complete the work.

ITEM 18403.7506 - FILLING SHOULDER JOINTS BETWEEN PORTLAND CEMENT CONCRETE PAVEMENT AND ASPHALT CONCRETE SHOULDERS USING ASTM D3405 WITH RECYCLED TIRE RUBBER.

DESCRIPTION

This work shall consist of cleaning and filling the shoulder joint between portland cement concrete pavement and asphalt concrete shoulders with plastic joint material ASTM D3405 with recycled tire rubber.

MATERIALS

Filler shall meet the requirements of ASTM D3405; Joint Sealants, Hot-Poured for concrete and asphalt pavements. In addition, the material shall contain a minimum 10% by weight of recycled tire rubber. The recycled tire rubber shall be ground from processing whole scrap tire material taken from automobiles, trucks, or other equipment owned and operated in the United States. The material will be accepted on the basis of the manufacturer's certification that it conforms to the requirements of ASTM D3405, that it contains a minimum of 10% recycled Unites States tire rubber, and that the name of the Primary Source (Manufacturer) and trade name appears on the current approved list. Each container shall be legibly marked with the following information:

Manufacturer's Name
Trade name of the filler
Manufacturer's lot or batch number
Pouring temperature
Safe heating temperature

The Department reserves the right to conduct sampling and testing to verify specification compliance.

CONSTRUCTION DETAILS

General. The Contractor shall furnish all equipment necessary for cleaning and filling the shoulder joints. All equipment shall be approved by the Engineer before its use.

Filling shall be done at locations shown on the Plans or as directed by the Engineer.

All joints shall be thoroughly cleaned of all dust, dirt, moisture, foreign material, incompressibles or any other extraneous materials by high pressure air, hot air lance, wire brush or other suitable method or tool approved by the Engineer. Suitable traps or devices shall be installed on the compressed air equipment to prevent moisture and oil from contaminating the joint surfaces. The Contractor shall maintain these devices and see that

they are functioning properly. The joints shall be cleaned a minimum of 3/4" deep. The material and debris removed from the joint shall be removed from the pavement and shoulder to prevent re-contamination of the joint.

Immediately prior to filling and after the joint has been prepared as specified above, both joint faces shall be thoroughly cleaned to a minimum depth of 1/2" using compressed air. The joint sides shall appear thoroughly clean and dry prior to filling. The Contractor may be ordered to reclean joints if in the opinion of the Engineer adequate cleaning and drying is not being obtained. Final cleaning or recleaning may be performed with the use of a hot air lance. When using a hot air lance, care shall be taken so as not to burn, scorch, or ignite the adjoining pavement. Any joints not filled the same day shall be recleaned prior to filling.

The Contractor shall be responsible for protecting traffic and property from hazard or damage during the joint cleaning operation. Materials and methods used for this purpose will be subject to the approval of the Engineer.

The filler shall be heated in a melter constructed either as a double boiler, with the space between inner and outer shells filled with heat-transfer medium; or with internal tubes or coils carrying the filler through a heated oil bath and into a heated double wall hopper. Direct heating shall not be used. Positive temperature control, mechanical agitation and recirculation pumps shall be used. The unit shall be provided with separate thermometers to indicate the temperature of the heat transfer medium and the filler material in the hopper. The mixing unit shall be capable of maintaining the specified mixing temperature, with an allowable variation of ±10°F. Before any joint filling shall commence, the Engineer shall inspect the filling apparatus to ascertain the presence and working condition of the thermometers. Under no circumstances will the Engineer permit any joint filling if thermometers are found to be defective or missing.

The Contractor shall be responsible for a safe and efficient method by which the Engineer will be able to accurately measure the temperature of the filler as it is discharged from the applicator wand. The proposed method must be submitted to the Engineer for his approval before the commencement of joint filling operations. The Contractor shall provide the Engineer with two (18" stem) thermometers having a temperature range sufficient to meet the requirements of this specification.

The discharge hose shall be equipped with a controlled heating apparatus or shall be insulated sufficiently to maintain the proper filler temperature. The application wand shall be returned to the machine and the material recirculated as necessary to maintain the

proper filler application temperature between individual joint filling operations. Reasonable care should be taken so as not to obliterate pavement markings.

If in the opinion of the Engineer, the Contractor displays an inconsistency in his ability to perform the joint cleaning or filling operation he shall order the Contractor to cease his operations until such time as he can comply with the required criteria in a consistent manner.

The filler shall not be placed when pavement or ambient temperature exceed 80°F or fall below 40°F, except if the manufacturer's recommendations state a minimum application temperature greater than 40°, then that temperature supersedes the specification minimum. All joints must be thoroughly dry and clean at the time of filling.

A copy of the manufacturer's recommendations pertaining to the heating and application of the filler shall be submitted to the Engineer prior to the commencement of work. These recommendations shall be adhered to and followed by the Contractor, with such exceptions as this specification may require.

The recommended pouring temperature shall be 10°F below the manufacturer's designated safe heating temperature, with an allowable variation of ± 10°F. Filler material that has exceeded the safe heating temperature, been heated at the pouring temperature in excess of 6 hours, or reheated, shall not be used.

Joints shall be filled by slightly overfilling and using a "V" shaped squeegee to form a band 4" wide and 1/16" to 1/8" thick, with tapered edges, centered over the joint. The squeegee shall have a flexible (neoprene type) edge capable of conforming to the pavement surface. During the filling operation, the distance between the filler application wand and the squeegee shall not exceed 2 feet. Traffic shall not be allowed on the filler until it has cured sufficiently to prevent tracking. Blotting with fine aggregate will not be allowed. Filler that becomes damaged or that is installed improperly shall be repaired. Damaged or deficient areas shall have the filler removed, the surfaces properly cleaned and new filler installed to the satisfaction of the Engineer at the Contractor's expense.

METHOD OF MEASUREMENT

No payment will be made for waste material.

ITEM 18403.7506 - FILLING SHOULDER JOINTS BETWEEN PORTLAND CEMENT CONCRETE PAVEMENT AND ASPHALT CONCRETE SHOULDERS USING ASTM D3405 WITH RECYCLED TIRE RUBBER.

For ASTM D3405 Only

The quantity to be paid for shall be the actual number of gallons of ASTM D3405 corrected to 60°F gal. used to complete the work.

No payment will be made for waste material.

BASIS OF PAYMENT

The unit price bid shall include the cost of all labor, equipment and materials necessary to complete the work.

ITEM 18403.7507 - FILLING SHOULDER JOINTS BETWEEN PORTLAND CEMENT CONCRETE PAVEMENT AND ASPHALT CONCRETE SHOULDERS USING FIBER REINFORCED ASPHALT CEMENT.

DESCRIPTION

This work shall consist of cleaning and filling the shoulder joint between portland cement concrete pavement and asphalt concrete shoulders with fiber reinforced asphalt cement.

MATERIALS

The materials used shall meet the following requirements:

Asphalt Cement: The asphalt cement shall be paving grade asphalt supplied by a primary source as defined in Section 702 and meeting the specification for Materials Designation 702-0500, Viscosity Grade AC-20.

Fibers: The fibers shall meet the following requirements:

Type of Fiber: Polyester
Tensile Strength: 70 ksi min.
Specific Gravity: 1.32-1.40
Melt Temperature: 475°F min.
Elongation: 33% ± 9%
Length of Fiber: .25 in ± .03 in

Each container shall be legibly marked with the following information:

Manufacturer's Name
Trade Name of Fiber
Type of Fiber

Composition of Sealant Mixture: The asphalt cement shall meet the requirements of Grade AC-20, and when mixed, shall contain a minimum of 5.0%, by weight, of polyester fibers.

Mixing Temperatures: The filler shall be mixed at the temperatures recommended by the fiber manufacturer but shall in no case exceed 325°F.

Acceptance of the bituminous material is based on the name of the primary source appearing on the Department's Approved List of Asphalt Cement for Paving and is contingent upon certification of compliance to these specification requirements by the primary source and subsequent suppliers.

ITEM 18403.7507 - FILLING SHOULDER JOINTS BETWEEN PORTLAND CEMENT CONCRETE PAVEMENT AND ASPHALT CONCRETE SHOULDERS USING FIBER REINFORCED ASPHALT CEMENT.

Acceptance of the polyester fibers is based on certification by the manufacturer that the fibers meet the material properties listed under the section "MATERIALS".

CONSTRUCTION DETAILS

General. The Contractor shall furnish all equipment necessary for cleaning and filling the shoulder joints. All equipment shall be approved by the Engineer before its use. Filling shall be done at locations shown on the Plans or as directed by the Engineer.

All joints shall be thoroughly cleaned of all dust, dirt, moisture, foreign material, incompressibles or any other extraneous materials by high pressure air, hot air lance, wire brush or other suitable method or tool approved by the Engineer. Suitable traps or devices shall be installed on the compressed air equipment to prevent moisture and oil from contaminating the joint surfaces. The Contractor shall maintain these devices and see that they are functioning properly. The joints shall be cleaned a minimum of 3/4" deep. The material and debris removed from the joint shall be removed from the pavement and shoulder to prevent re-contamination of the joint.

Immediately prior to filling and after the joint has been prepared as specified above, both joint faces shall be thoroughly cleaned to a minimum depth of 1/2" using compressed air. The joint sides shall appear thoroughly clean and dry prior to filling. The Contractor may be ordered to reclean joints if in the opinion of the Engineer adequate cleaning and drying is not being obtained. Final cleaning or recleaning may be performed with the use of a hot air lance. When using a hot air lance, care shall be taken so as not to burn, scorch, or ignite the adjoining pavement. Any joints not filled the same day shall be recleaned prior to filling.

The Contractor shall be responsible for protecting traffic and property from hazard or damage during the joint cleaning operation. Materials and methods used for this purpose will be subject to the approval of the Engineer.

The filler shall be heated in a melter constructed either as a double boiler, with the space between inner and outer shells filled with heat-transfer medium; or with internal tubes or coils carrying the filler through a heated oil bath and into a heated double wall hopper. Direct heating shall not be used. Positive temperature control, mechanical agitation and recirculation pumps shall be used. The unit shall be provided with separate thermometers to indicate the temperature of the heat transfer medium and the filler material in the hopper. The mixing unit shall be capable of maintaining the specified mixing temperature, with an allowable variation of ± 10°F. Before any joint filling shall commence, the Engineer

shall inspect the filling apparatus to ascertain the presence and working condition of the thermometers. Under no circumstances will the Engineer permit any joint filling if thermometers are found to be defective or missing.

The Contractor shall be responsible for a safe and efficient method by which the Engineer will be able to accurately measure the temperature of the filler as it is discharged from the applicator wand. The proposed method must be submitted to the Engineer for his approval before the commencement of joint filling operations. The Contractor shall provide the Engineer with two (18" stem) thermometers having a temperature range sufficient to meet the requirements of this specification.

The discharge hose shall be equipped with a controlled heating apparatus or shall be insulated sufficiently to maintain the proper filler temperature. The application wand shall be returned to the machine and the material recirculated as necessary to maintain the proper filler application temperature between individual joint filling operations. Reasonable care should be taken so as not to obliterate pavement markings.

If in the opinion of the Engineer, the Contractor displays an inconsistency in his ability to perform the joint cleaning or filling operation he shall order the Contractor to cease his operations until such time as he can comply with the required criteria in a consistent manner.

The contractor shall obtain the manufacturer's recommendations pertaining to the heating, mixing, and application of the filler, and shall supply a copy to the Engineer. These recommendations shall be adhered to and followed by the contractor with such exceptions as this specification may require.

The filler shall not be placed when pavement or ambient temperatures fall below 40°F. The filler shall be pumped directly into the joint from the mixing unit. The filler shall slightly overfill the joint and be finished in a band 4" wide, 1/16" to 1/8" thick, centered over the joint.

Blotting with fine aggregate shall directly follow filler application if traffic results in tracking of the joint filling material.

METHOD OF MEASUREMENT

No payment will be made for waste material.

ITEM 18403.7507 - FILLING SHOULDER JOINTS BETWEEN PORTLAND CEMENT CONCRETE PAVEMENT AND ASPHALT CONCRETE SHOULDERS USING FIBER REINFORCED ASPHALT CEMENT.

For Fiber Reinforced Asphalt Cement Only

The quantity to be paid for shall be the actual number of gallons of asphalt cement (corrected to 60°F gals.) used to complete the work. The quantity of polyester fiber used will not be incorporated into this measurement.

BASIS OF PAYMENT

The unit price bid shall include the cost of all labor, equipment and materials necessary to complete the work.