Florida Department of Transportation

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605 Suwannee Street
Tallahassee, FL 32399-0450

STEPHANIE KOPELOUSOS
SECRETARY

May 18, 2010

Monica Gourdine
Program Operations Engineer
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Re: Office of Design, Specifications
Section 121
Proposed Specification: **1210000 Flowable Fill**

Dear Ms. Gourdine:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

These changes were proposed by Larry Jones of the State Structures Design Office to add provisions for lightweight cellular concrete as an optional type of flowable fill.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via Email to ST986RP or rudy.powell@dot.state.fl.us.

If you have any questions relating to this specification change, please call Rudy Powell, State Specifications Engineer at 414-4280.

Sincerely,

Rudy Powell, Jr., P.E.
State Specifications Engineer

RP/dt
Attachment
cc: Gregory Jones, Chief Civil Litigation
Florida Transportation Builders' Assoc.
State Construction Engineer

FLOWABLE FILL.
(REV *3*~~2112~~ *12*~~411222~~ *10*~~09~~)

SECTION 121(Pages 179 – 181) is deleted and the following substituted:

121-1 Description.

Furnish and place ~~F~~*f*lowable ~~F~~*f*ill as an alternative to compacted soil as approved by the Engineer. Applications for *conventional flowable fill* ~~this material~~ include~~,~~ beddings~~;~~ *;* encasements~~;~~ *;* closures for tanks *and*~~,~~ pipes~~;~~ *;* and general backfill for trenches*, embankments* ~~or~~*and walls*. *Applications for cellular concrete flowable fill include beddings; encasements; closures for tanks and pipes; and general backfill for embankments and walls.*

121-2 Materials.

Meet the following requirements:

Fine Aggregate*.....Section 902
Portland Cement (Types I, II, or III).....Section 921
Water.....Section 923
~~Air Entraining~~ Admixtures** .....Section 924
Fly Ash, Slag and other Pozzolanic Materials....Section 929
Preformed Foam .....ASTM C 869

*Any clean fine aggregate with 100% passing a 3/8 inch mesh sieve and not more than 15% passing a No. 200 sieve may be used.

**High air generators or foaming agents may be used in lieu of conventional air entraining admixtures and *shall* ~~may~~ be added at jobsite and mixed in accordance with *the* manufacturer's recommendation. ~~*These may be added at the jobsite.*~~

121-3 Mix Design.

Conventional f~~F~~lowable *f*~~F~~ill is a mixture of portland cement, fly ash, fine aggregate, ~~air entraining~~ admixture and water. Flowable fill contains a low cementitious content for reduced strength development. *Cellular concrete f*~~F~~*lowable f*~~F~~*ill is a low density concrete made with cement, water and preformed foam to form a hardened closed cell foam material. Cellular concrete f*~~F~~*lowable f*~~F~~*ill may also contain fine aggregate, fly ash, slag and* ~~*chemical*~~ *admixtures.*

Submit mix designs to the Engineer for approval. The following are suggested mix guides for excavatable~~,~~ ~~and~~ non-excavatable *and cellular concrete* flowable fill:

	Excavatable	Non-Excavatable	*Cellular Concrete*
Cement ~~Type 1~~	75-100 lb/yd^3	75-150 lb/yd^3	*Min 150 lb/yd^3*
Pozzolans or Slag~~Fly Ash~~	None	150-600 lb/yd^3	*Optional*
Water	*	*	*
Air**	5-35%	5-15%	****
28 Day Compressive Strength**	Maximum 100 psi	Minimum 125 psi	*Minimum 80 psi*

	Excavatable	Non-Excavatable	*Cellular Concrete*
Unit Weight ~~(Wet)~~**	90-110 lb/ft^3	100-125 lb/ft^3	*20-80 lb/ft^3*
Fine Aggregate	***	***	*Optional*

*Mix designs shall produce a consistency that will result in a flowable self-leveling product at time of placement.
**The requirements for percent air, compressive strength and unit weight are for laboratory designs only and are not intended for jobsite acceptance requirements.
***Fine Aggregate shall be proportioned to yield 1 yd^3.
*****In cellular concrete, p~~P~~reformed foam shall be proportioned at the job site to yield 1 yd^3 in accordance with the design requirements.*

121-4 Production and Placing.

Use flowable fill manufactured at a production facility that meets the requirements of 347-3. ~~*Cellular concrete may be produced on site with manufacturer approved equipment.*~~

Deliver flowable fill using concrete construction equipment. Revolution counter are waived. Place flowable fill by chute, pumping or other methods approved by the Engineer. Tremie flowable fill through water. *Cellular concrete flowable fill may not be placed within three feet of the bottom elevation for roadway base courses.*

121-5 Construction Requirements.

Use straps, soil anchors or other approved means of restraint to ensure correct alignment when flowable fill is used as backfill for pipe or where flotation or misalignment may occur.

Protect flowable fill from freezing for a period of 36 hours after placement.

Place flowable fill to the designated fill line without vibration or other means of compaction. Do not place flowable fill during inclement weather, e.g. rain or ambient temperatures below 40ºF. Take all necessary precautions to prevent any damages caused by the hydraulic pressure of the fill during placement prior to hardening. Provide the means to confine the material within the designated space.

121-6 Acceptance.

Acceptance of flowable fill will be based on the following documentation and a minimum temperature of flowable fill at the point of delivery of 50ºF.

Furnish a delivery ticket to the Engineer for each load of ~~*plant mixed*~~ flowable fill delivered to the worksite. Ensure that each ticket contains the following information:

(1) Project designation,
(2) Date,
(3) Time,
(4) Class and quantity of flowable fill,
(5) Actual batch proportions,
(6) Free moisture content of aggregates,
(7) Quantity of water withheld.

~~*Furnish bulk cement delivery tickets for site mixed cellular concrete.*~~

Leave the fill undisturbed until the material obtains sufficient strength. Sufficient strength is 35 psi penetration resistance as measured using a hand held penetrometer in

accordance with ASTM C-403. Provide a hand held penetrometer to measure the penetration resistance of the hardened flowable fill.

121-7 Basis of Payment.

When the item of flowable fill is included in the Contract, payment will be made at the Contract unit price per cubic yard. Such price and payment will include all cost of the mixture, in place and accepted, determined as specified above. No measurement and payment will be made for material placed outside the neat line limits or outside the adjusted limits, or for unused or wasted material.

Payment will be made under:

Item No. 121- 70- Flowable Fill - per cubic yard.

FLOWABLE FILL.
(REV 3-12-10)

SECTION 121(Pages 179 – 181) is deleted and the following substituted:

121-1 Description.

Furnish and place flowable fill as an alternative to compacted soil as approved by the Engineer. Applications for conventional flowable fill include beddings; encasements; closures for tanks and pipes; and general backfill for trenches, embankments and walls. Applications for cellular concrete flowable fill include beddings; encasements; closures for tanks and pipes; and general backfill for embankments and walls.

121-2 Materials.

Meet the following requirements:

Fine Aggregate*.....Section 902
Portland Cement (Types I, II, or III).....Section 921
Water.....Section 923
Admixtures**.....Section 924
Fly Ash, Slag and other Pozzolanic Materials....Section 929
Preformed Foam.....ASTM C 869

*Any clean fine aggregate with 100% passing a 3/8 inch mesh sieve and not more than 15% passing a No. 200 sieve may be used.

**High air generators or foaming agents may be used in lieu of conventional air entraining admixtures and shall be added at jobsite and mixed in accordance with the manufacturer's recommendation.

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Conventional flowable fill is a mixture of portland cement, fly ash, fine aggregate, admixture and water. Flowable fill contains a low cementitious content for reduced strength development. Cellular concrete flowable fill is a low density concrete made with cement, water and preformed foam to form a hardened closed cell foam material. Cellular concrete flowable fill may also contain fine aggregate, fly ash, slag and admixtures.

Submit mix designs to the Engineer for approval. The following are suggested mix guides for excavatable, non-excavatable and cellular concrete flowable fill:

	Excavatable	Non-Excavatable	Cellular Concrete
Cement	75-100 lb/yd^3	75-150 lb/yd^3	Min 150 lb/yd^3
Pozzolans or Slag	None	150-600 lb/yd^3	Optional
Water	*	*	*
Air**	5-35%	5-15%	****
28 Day Compressive Strength**	Maximum 100 psi	Minimum 125 psi	Minimum 80 psi
Unit Weight **	90-110 lb/ft^3	100-125 lb/ft^3	20-80 lb/ft^3
Fine Aggregate	***	***	Optional

	Excavatable	Non-Excavatable	Cellular Concrete
*Mix designs shall produce a consistency that will result in a flowable self-leveling product at time of placement. **The requirements for percent air, compressive strength and unit weight are for laboratory designs only and are not intended for jobsite acceptance requirements. ***Fine Aggregate shall be proportioned to yield 1 yd^3. ****In cellular concrete, preformed foam shall be proportioned at the job site to yield 1 yd^3 in accordance with the design requirements.			

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