

1210000 FLOWABLE FILL
RESPONSE TO COMMENTS FROM INTERNAL/INDUSTRY REVIEW

Michael Bergin
352-955-6666
michael.bergin@dot.state.fl.us

Comment: (Internal Review 12-18-09) (as per Larry Jones, these comments need to be addressed prior to Industry Review. He will discuss with Mike.)

1. I have one comment in Section 121-2, ** “..., admixtures and may be added at the jobsite and mixed in accordance with the manufactures recommendation.” This indicates that the admixture may be added a the jobsite and may be mixed in accordance with the manufactures,...” We definitely want them to add the admixture in accordance with the manufactures recommendations.

I recommend that we change the sentence to read, “High air generators or foaming agents may be used in lieu of conventional air entraining admixtures and shall be mixed in accordance with the manufacturer’s recommendation. ~~These may be added at the jobsite.~~”

2. In 121-6, it appears that the Department will only require a bulk cement delivery ticket when cellular concrete is delivered. In an effort to minimize political retribution from the ready mix industry, I suggest we remove this language and require the cellular concrete producer to provide a statement of certification signed by the batcher that the delivered material is in compliance with the requirements of this specification. My thinking is that the industry will look at the current language and say that we have to provide a delivery ticket and the cellular concrete basically hands over a copy of a cement delivery ticket from the tanker. I’m not sure how this will go over with the ready-mix industry, but then again maybe they won’t care since the cellular concrete is a specialized material.

3. In addition to these I talked to Larry on the phone and requested that we make 2 other changes while we were in 121. These included removing “Type I” after “Cement” in the Mix Design table since we already tell the contractor that he can use Type I, II, or III.

4. In addition we removed “Fly Ash” from the table and added the term “Pozzolans or Slag” to allow pozzolans other than fly ash and to include the use of slag as a component material.

Response: (1-5-10)

1. From the Specifications Office: Change was made as per Larry Jones.
2. This language has been removed. The preformed foam will be added at the job site to the mixture delivered from a production facility meeting the requirements of 347-3.
3. From the Specifications Office: Change was made as per Larry Jones.
4. From the Specifications Office: Change was made as per Larry Jones.

David OHagan

Comments: (Internal Review 12-21-09)

Has FDEP looked at this new stuff? It ain't Mother Nature's and that always raises their eyebrows...

[THIS IS LARRY'S REPLY TO DAVID (12-22-09)

Are you aware of any problems FDEP has with Portland cement concrete?

This material has been used on numerous highway projects over the past 20 plus years. You probably were marketed by an Elastizell representative when you were a consultant.

<http://www.elastizell.com/engfill.htm>

I essentially followed the guidance of ACI 523.1R-06 which specifically presents MSE wall fills as a recommended use in Chapter 7. This document is available through our IHS subscription for ACI-ASTM-AASHTO standards. [link for David](#)

THIS IS DAVID'S RESPONSE (12-23-09)

It's not the PC I'm worried about. It's disposal of the PCC and these aggregates when the truck is washed out or when the road is modified. Since I am witnessing the craziness of FDEP and their stormwater rule development first hand, I no longer assume anything is A-OK by them – especially when it contains manmade products. I will review your links – Thanks.

LARRY'S RESPONSE (1-5-10)

In my opinion, this concern regarding waste concrete disposal (truck washout) should not be addressed in this specification, as I cannot find this type language in Sections 346 or 400.

This should be a much larger issue addressed in more general terms in Division I (This issue seems to be addressed in Article 4-6, or you may wish to strengthen the language in it, 6-5.3, 8-4.9 or Section 7).]

Response: From the State Specifications Office: SMO researched the leaching of fly ash and it was found there are no known detrimental impacts at this time. No changes made.

Bruce Dietrich
414-4371

Comments: (Internal Review 12-23-09)

(Per David OHagan to Bruce Dietrich: Please get with Larry Jones on this revision. I do not know if this stuff would only be under approach slabs or not. If not, is there a design criteria for pavement resting on this new flowable fill?)

I believe you mentioned that the cellular fill was intended for use behind MSE walls and only under shoulder pavement. By putting it as an option in Section 121, a contractor could also use it in mainline utility cuts.

I don't think we have any experience with this material in Florida under truck loadings, so I think it is premature to add it to a general spec, particularly with lower compressive strength requirements.

I would suggest a separate developmental spec that you would control the use on and evaluate its performance before opening up to general use.

I do see a potential pavement application to lighten the dead load for existing roads that have muck deposits, but we would need to do controlled test studies to determine the suitability.

I don't see any material spec for the preformed foam mentioned in 121-3 and this should be provided.

Response:

Language has been added to clarify that cellular concrete flowable fill will not be used as a trench backfill. The material requirements for preformed foam (ASTM C 869) have been added to 121-2.

Gordon Wheeler
414-4366

Comments: (Industry Review 2-5-10)

Concerning spec 121, flowable fill changes:

“Conventional flowable fill” is a vague term in the spec and the State Utilities Office suggests not using it or clarification of it by putting the headings for excavatable and non-excavatable under a common heading of conventional in the table as shown below:

	Conventional Flowable Fill		(?Unconventional Flowable Fill?)
	Excavatable	Non- Excavatable	Cellular Concrete

Response: Conventional flowable fill is defined in the first sentence of 121-3. No changes made.

Ken Zinck
386-740-3471
ken.zinck@dot.state.fl.us

Comments: (Industry Review 3-8-10)

Comments by Construction Materials Group at District 5 Materials & Research Karen Carlie at (386) 740-3499

1. 121-1: Please consider re-defining places of use as general backfill. Embankments and MSE walls would be difficult to construct. These flowing materials need boundary forms, that have leak-proof joints, which embankment and walls do not.
2. 121-2 and 121-3: Please provide consistency in the terms used in describing pozzolans. Fly ash, slag, and other Pozzolanic materials, are all used, but it seems like fly ash and slag are the most appropriate pozzolans for this application.
3. 121-6 says to base acceptance on the delivery ticket and not to disturb the material until it reaches 35 psi penetration resistance but there are no testing frequency requirements or

placement limitations. I am concerned about this acceptance procedure for applications that will be supporting pavements and traffic (i.e., MSE walls, embankments).

4. Is cellular concrete flowable fill structurally supportive? If paved immediately over, are there pavement support factors to take into consideration? Does mass placement (embankment and wall fill) need engineered?
5. 548 RETAINING WALL SYSTEMS. It seems that excavatable flowable fill should be specified for retaining wall applications.

Response:

1. You are correct, flowable materials will always need forms if they are not poured into an excavation. This requirement is stated in the last sentence of 121-5. No changes made.
2. Fly ash is a pozzolan, however, slag is not considered a pozzolan. All of these materials are required to comply with Section 929 which should provide sufficient clarification; if more clarification is needed, it should be added to Section 929. No changes made.
3. This requirement has been part of the specification for several years, I am not aware of problems due to direct support of traffic or pavement compaction with conventional fill. As requested by Bruce Dietrich during the internal review period, cellular concrete flowable fill will not be directly supporting pavements or traffic until we have more experience with the material. It is not allowed in trench cuts, and Section 548 restricts the material placed within three feet of the bottom of the base to granular backfill; at this time, the same restriction is intended for embankments.

**The following sentence has been added to 121-4:
Cellular concrete flowable fill may not be placed within three feet of the bottom of roadway base courses.**

4. Yes, cellular concrete flowable fill is structurally supportive. According to ACI 523.3R-93, cellular concrete with a unit weight of 70 pcf will have a usual strength range of 450 to 600 psi in 28 days. This strength range increases with increased density. This material is not yet approved for use as base or sub-base, so it will not be directly paved over. Yes mass placement as embankment or wall fill needs to be engineered. No changes made.
5. Disagree, excavatable flowable fill has a strength maximum to make it more easily excavatable. This is why it is used in locations where utilities may need to be repaired. Utilities should never be installed in the reinforced portion of an MSE wall. Because cellular concrete flowable fill requires less trucking, it can be less expensive to place in large areas than sand based flowable fill. No changes made.

Olivia Evans
904-737-5200 ext 103
oliviae@procrete.com

Comments: (e-mail to Larry Jones sent 3-18-10)
The statement “concrete may be produced on site with manufacturer approved equipment” should remain in the specification.

Response:

This language, originally proposed by a cellular concrete vendor, was revised at the request of Mr. Michael Bergin (FDOT State Structural Materials Engineer) prior to the internal review period. Similar comments from Mr. Bergin incorporated into the Specification are presented above. No changes made.

From the State Specifications Office: As per Mike Bergin, the term admixtures will be used in 121-2 and-3 instead of specifying the type of admixture. Changes made prior to industry review.