Florida Department of Transportation

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GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

KEVIN J. THIBAULT, P.E.
SECRETARY

August 5, 2020

Khoa Nguyen
Director, Office of Technical Services
Federal Highway Administration
3500 Financial Plaza, Suite 400
Tallahassee, Florida 32312

Re: State Specifications Office
Section: **530**
Proposed Specification: **5300201 REVETMENT SYSTEMS.**

Dear Mr. Nguyen:

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

The changes are proposed by John Shoucair to correct the reference in the Test Method for Los Angeles Abrasion, specify the use of prepackaged bags approved on the APL list, and correct subsequent references that assume in-place mixing was performed on site. The bag measurement is also to be changed in the Standard Specification..

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to daniel.strickland@dot.state.fl.us.

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.
State Specifications Engineer

DS/dh
Attachment
cc: Florida Transportation Builders' Assoc.
State Construction Engineer

REVETMENT SYSTEMS
(REV 8-4-20)

SUBARTICLE 530-2.1.1 is deleted and the following substituted:

530-2.1 Riprap:

530-2.1.1 General: Meet the following requirements:

~~Portland Cement.....Section 921~~
~~Fine Aggregate.....Section 902~~
~~Grout.....Section 934~~
Type D-2 Geotextile Fabric* .....Section 985
*Use products listed on the Department's APL.

SUBARTICLE 530-2.1.2 is deleted and the following substituted:

530-2.1.2 ~~Sacks~~Prepackaged Sand-Cement Bags: Provide prepackaged sand-cement bags that meet the following requirements:

1. Evenly proportioned sand and cement in the ratio of five cubic feet of sand to 94 pounds of cement. Material proportioned by mass shall use a sand density of 85 pounds per cubic foot.
2. Sealed package of 80 pounds of sand-cement in a bag.
3. Bag made of scrim-reinforced paper capable of holding the sand-cement without leakage.
4. Sand meets requirements of Section 902-3.3
5. Type I/II cement meets requirements of Section 921.

Prepackaged Sand-Cement Bags shall be one of the products listed on the Department's Approved Product List. Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6. Include with the submittal a product data sheet, safety data sheet, product label, and a self-certified statement the product meets the requirements of this Section. ~~Provide sacks made of jute, cotton, or scrim reinforced paper capable of holding the sand-cement mixture without leakage. Ensure that sack material is permeable and absorptive enough to permit passage of water to provide for hydration of the cement. Ensure that paper used in sacks is non-asphalt laminated with a polyester fiber scrim reinforcement in a three-way directional pattern, has an embossed finish, and is perforated approximately 3/32 inch in approximate one inch centers. Extend perforations continuously through the entire wall.~~

~~Provide sacks of uniform size and dimensions, in order to provide uniformity of lines in the completed work. Use sacks that are free from holes and strong enough to withstand handling without ripping or splitting. Use only one type and size of sack at any one structure.~~

SUBARTICLE 530-2.1.3.3 is deleted and the following substituted:

530-2.1.3.3 Physical Requirements of Broken Stone and Broken Concrete: Use broken stone and broken concrete meeting the following physical requirements:

Absorption (FM 1-T85)	Maximum 5%
Los Angeles Abrasion (ASTM C535~~FM 1-T096~~)	Maximum loss 45%*
Soundness (Sodium Sulphate) (AASHTO T104)	Maximum loss 12%** (after five cycles)
Flat and elongated pieces	Materials with least dimension less than one third of greatest dimension not exceeding 10% by weight.
Dirt and Fines	Materials less than 1/2 inch in maximum dimension accumulated from interledge layers, blasting or handling operations not exceeding 5% by weight.
Drop Test***(EM 1110-2-2302)	No new cracks developed, or no existing crack widened additional 0.1 inch, or final largest dimension greater than or equal to 90% original largest dimension of dropped piece.

* Ensure that granite does not have a loss greater than 55% and that broken concrete does not have a loss greater than 45%.
** The Engineer may accept rubble exceeding the soundness loss limitation if performance history shows that the material will be acceptable for the intended use. The Engineer will waive the soundness specification for rubble riprap (broken stone and broken concrete) when project documents indicate it will be placed in or adjacent to water or soil with a sulfate content less than 150 parts per million and a pH greater than 5.0.
*** The Engineer will waive the Drop Test unless required to ensure structural integrity. Provide all equipment, labor and testing at no expense to the Department. EM refers to the US Army Corps of Engineer's Specification Engineering Method.

SUBARTICLE 530-2.1.3.4 is deleted and the following substituted:

530-2.1.3.4 Source Approval and Project Control: The Engineer will approve construction aggregate sources in accordance with 6-2.3. ~~as amended by the following:~~

1. The Engineer may perform Independent Verification tests on all materials placed on the project.

2. The Engineer will check the gradation of the riprap by visual inspection at the project site. Resolve any difference of opinion with the Engineer in accordance with the method provided in FM 5-538. Provide all equipment, labor, and the sorting site at no expense to the Department.

3. The Engineer may test components in a blend of rubble processed from different geologic formations, members, groups, units, layers or seams. The Engineer may select components based on like color, surface texture, porosity, or hardness. The Engineer will reject any blend if a component that makes up at least five percent by volume of the blend does not meet these specifications.

SUBARTICLE 530-2.3.4 is deleted and the following substituted:

530-2.3.4 Gabion Rock: Use rock meeting the requirements of ASTM D6711 to fill gabions. The rock must be reasonably free from thin, flat or elongated pieces. Rock size must be at least 1.25 times greater than the aperture size of the wire mesh or fabric. Each range of sizes may allow for a variation of 5% oversize rock by weight, 5% undersize rock by weight, or both.

Physical Property Requirements	Acceptable Range
Los Angeles Abrasion ~~, ASTM C131~~ and ASTM C~~D~~535	Maximum loss 40%
Bulk Specific Gravity	Minimum 2.20
Absorption, ASTM C127 and ASTM C128	Maximum 3%

SUBARTICLE 530-3.2 is deleted and the following substituted:

530-3.2 Sand-Cement Bags:

~~**530-3.2.1 Mixing Materials:** Proportion sand and cement in the ratio of 5 cubic feet of sand to 94 pounds (one bag) of cement. If proportioning the materials by mass, use a density of 85 pounds per cubic foot (loose volume) for sand. The Contractor may batch sand at the moisture content occurring in the stockpile.~~

~~Mix the sand and cement until the mixture is of uniform color.~~

~~**530-3.2.2 Filling Sacks:** Accurately measure the mixed material into each sack, taking care to place the same amount of material in each sack; keep at least the top 6 inches of the sacks unfilled to allow for proper tying or folding and to ensure against breaking of the sack during placing.~~

530-3.2.1~~3~~ Placing: Place the ~~filled~~ bags~~sacks~~ with their ~~tied or folded~~ ends all in the same direction. Lay the bags~~sacks~~ with broken joints, in a regular pattern. Ram or pack the bags~~sacks~~ against each other so as to form a close and molded contact ~~after the sand and cement mixture has set up~~. Remove and replace bags~~sacks~~ ripped or torn in placing with sound, unbroken bags~~sacks~~. Then, thoroughly saturate all bags~~sacks~~ with water.

530-3.2.2~~4~~ Grouting: Immediately after watering, fill all openings between bags~~sacks~~ with dry grout composed of ~~one part~~one-part Portland cement and five parts sand.

530-3.2.3~~5~~ Toe Walls: ~~The Contractor may construct toe walls of riprap for fill slopes of poured in place concrete in lieu of sand cement in sacks. Meet the concrete requirements as specified in Section 347. If using~~ Use sand~~-~~cement bags~~in sacks~~ for the toe walls if required.~~,~~ ~~f~~Fill the entire trench excavated for the toe walls with sand~~-~~cement ~~in~~ bags~~sacks~~.

SUBARTICLE 530-4.1 is deleted and the following substituted:

530-4 Method of Measurement.

530-4.1 Sand-Cement Bags: The quantity to be paid for will be the volume, in cubic yards, calculated from the minimum dimensions shown in the Plans or Standard Plans,

satisfactorily placed and accepted.~~of sand actually used in the sand cement mixture and grout, satisfactorily placed and accepted.~~

~~If sand cement is proportioned by volume, the sand will be measured loose in an approved measure prior to mixing with cement. If sand cement is proportioned by weight, approved scales will be used for this purpose and the volume will be calculated using a standard conversion factor for sand of 85 pound per cubic foot. No adjustment of batch weights to allow for varying moisture content of the sand will be made.~~

~~For toe walls, the quantity to be paid for will include only the volume of sand cement in sacks or concrete placed within the neat lines shown in the Plans for the toe walls.~~

SUBARTICLE 530-5.7 is deleted and the following substituted:

530-5.7 Payment Items. Payment will be made under:

Item No.	530- 1-	Riprap Sand-Cement Bags - per cubic yard.
Item No.	530- 3-	Riprap Rubble - per ton.
Item No.	530- 4-	Articulating Concrete Block Revetment System - per square yard.
Item No.	530- 5-	Gabion
Item No.	530- 74-	Bedding Stone - per ton.

REVETMENT SYSTEMS
(REV 8-4-20)

SUBARTICLE 530-2.1.1 is deleted and the following substituted:

530-2.1 Riprap:

530-2.1.1 General: Meet the following requirements:

Type D-2 Geotextile Fabric* .....Section 985
*Use products listed on the Department's APL.

SUBARTICLE 530-2.1.2 is deleted and the following substituted:

530-2.1.2 Prepackaged Sand-Cement Bags: Provide prepackaged sand-cement bags that meet the following requirements:

1. Evenly proportioned sand and cement in the ratio of five cubic feet of sand to 94 pounds of cement. Material proportioned by mass shall use a sand density of 85 pounds per cubic foot.
2. Sealed package of 80 pounds of sand-cement in a bag.
3. Bag made of scrim-reinforced paper capable of holding the sand-cement without leakage.
4. Sand meets requirements of Section 902-3.3
5. Type I/II cement meets requirements of Section 921.

Prepackaged Sand-Cement Bags shall be one of the products listed on the Department's Approved Product List. Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6. Include with the submittal a product data sheet, safety data sheet, product label, and a self-certified statement the product meets the requirements of this Section.

SUBARTICLE 530-2.1.3.3 is deleted and the following substituted:

530-2.1.3.3 Physical Requirements of Broken Stone and Broken Concrete: Use broken stone and broken concrete meeting the following physical requirements:

Absorption (FM 1-T85)	Maximum 5%
Los Angeles Abrasion (ASTM C535)	Maximum loss 45%*
Soundness (Sodium Sulphate) (AASHTO T104)	Maximum loss 12%** (after five cycles)
Flat and elongated pieces	Materials with least dimension less than one third of greatest dimension not exceeding 10% by weight.
Dirt and Fines	Materials less than 1/2 inch in maximum dimension accumulated from interledge layers, blasting or handling operations not exceeding 5% by weight.
Drop Test***(EM 1110-2-2302)	No new cracks developed, or no existing crack widened additional 0.1 inch, or final largest dimension greater than or equal to 90% original largest dimension of dropped piece.

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** The Engineer may accept rubble exceeding the soundness loss limitation if performance history shows that the material will be acceptable for the intended use. The Engineer will waive the soundness specification for rubble riprap (broken stone and broken concrete) when project documents indicate it will be placed in or adjacent to water or soil with a sulfate content less than 150 parts per million and a pH greater than 5.0.
*** The Engineer will waive the Drop Test unless required to ensure structural integrity. Provide all equipment, labor and testing at no expense to the Department. EM refers to the US Army Corps of Engineer's Specification Engineering Method.

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530-2.1.3.4 Source Approval and Project Control: The Engineer will approve construction aggregate sources in accordance with 6-2.3.

1. The Engineer may perform Independent Verification tests on all materials placed on the project.

2. The Engineer will check the gradation of the riprap by visual inspection at the project site. Resolve any difference of opinion with the Engineer in accordance with the method provided in FM 5-538. Provide all equipment, labor, and the sorting site at no expense to the Department.

3. The Engineer may test components in a blend of rubble processed from different geologic formations, members, groups, units, layers or seams. The Engineer may select components based on like color, surface texture, porosity, or hardness. The Engineer will reject any blend if a component that makes up at least five percent by volume of the blend does not meet these specifications.

SUBARTICLE 530-2.3.4 is deleted and the following substituted:

530-2.3.4 Gabion Rock: Use rock meeting the requirements of ASTM D6711 to fill gabions. The rock must be reasonably free from thin, flat or elongated pieces. Rock size must be at least 1.25 times greater than the aperture size of the wire mesh or fabric. Each range of

sizes may allow for a variation of 5% oversize rock by weight, 5% undersize rock by weight, or both.

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Absorption, ASTM C127 and ASTM C128	Maximum 3%

SUBARTICLE 530-3.2 is deleted and the following substituted:

530-3.2 Sand-Cement Bags:

530-3.2.1 Placing: Place the bags with their ends all in the same direction. Lay the bags with broken joints, in a regular pattern. Ram or pack the bags against each other so as to form a close and molded contact. Remove and replace bags ripped or torn in placing with sound, unbroken bags. Then, thoroughly saturate all bags with water.

530-3.2.2 Grouting: Immediately after watering, fill all openings between bags with dry grout composed of one-part Portland cement and five parts sand.

530-3.2.3 Toe Walls: Use sand-cement bags for the toe walls if required. Fill the entire trench excavated for the toe walls with sand-cement bags.

SUBARTICLE 530-4.1 is deleted and the following substituted:

530-4 Method of Measurement.

530-4.1 Sand-Cement Bags: The quantity to be paid for will be the volume, in cubic yards, calculated from the minimum dimensions shown in the Plans or Standard Plans, satisfactorily placed and accepted.

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