

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE	PAGE OF PAGES 1 2
2. AMENDMENT/MODIFICATION NO. 0005	3. EFFECTIVE DATE 09/13/01	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)	
6. ISSUED BY CODE	7. ADMINISTERED BY (If other than Item 6) CODE			
US ARMY ENGINEER DISTRICT, HONOLULU CORPS OF ENGINEERS, BUILDING S-200 FORT SHAFTER, HAWAII 96858-5440 CONTRACT SPECIALIST: JODY MURAOKA				
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)			(X)	9A. AMENDMENT OF SOLICITATION NO.
			X	DACA83-01-B-0004
				9B. DATED (SEE ITEM 11) 08/06/01
				10A. MODIFICATION OF CONTRACT/ORDER NO.
				10B. DATED (SEE ITEM 13)
CODE	FACILITY CODE			

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. Accounting and Appropriation Data (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

- A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
- B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc). SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
- C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
- D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

FY01 BUP Barracks Repair, Buildng 503A, Fort Shafter, Oahu, HI

See Page 2 of 2 Pages

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF SIGNER (Type or print)	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____	16C. DATE SIGNED
(Signature of person authorized to sign)		(Signature of Contracting Officer)	

1. **CHANGES TO THE SOLICITATION.** Attached hereto are new and revised pages to the solicitation. The revision mark "(Am-0005)" is shown on each new and revised page.

a. REVISED PAGES/PROVISIONS/CLAUSES/PARAGRAPHS. The following are revised pages to the solicitation. Changes are indicated in **bold** print. Although the entire section is being re-issued under Am-0005, only the following pages\provisions\clauses\paragraphs changed in this section.

Section 01000

Section 03930, Pages 1 & 2

Section 03930, Paragraphs 2.1.4, 3.1.2, 3.1.2.1, 3.1.2.2 and 3.3.5

2. The bid opening date of September 18, 2001, is hereby extended to September 20, 2001, 2:00 P.M., Hawaiian Standard Time.

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DIVISION 03 - CONCRETE

SECTION 03930

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SECTION 03930

CONCRETE REHABILITATION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 31/C 31M	(1996) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(1997) Concrete Aggregates
ASTM C 39	(1997) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 109/C 109M	(1999) Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)
ASTM C 117	(1995) Materials Finer than 75-Micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 136	(1996; Rev. A) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 144	(1997) Aggregate for Masonry Mortar
ASTM C 348	(1997) Test Method for Flexural Strength of Hydraulic Cement Mortars
ASTM C 496	(1996) Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
ASTM C 881	(1990) Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C 882	(1999) Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear

1.2 DEFINITIONS

1.2.1 Epoxy Resin Binder

A two-component epoxy bonding system in low and medium viscosities used by itself as a primer or for producing epoxy concrete or mortars when mixed with aggregate.

1.2.2 Epoxy Concrete

A combination of epoxy resin binder and fine and coarse aggregate used in the repair of spalling along joints or cracks, small surface spalls or "popouts."

1.2.3 Epoxy Mortar

A combination of epoxy resin binder and fine aggregate used in the surface repair of non-structural cracks and filling of saw kerfs.

1.2.4 Non-Pressure Epoxy Grout

A combination of epoxy resin binder, a mineral filler and a thixotropic agent used in cementing dowels in place and the repair of non-structural cracks.

1.3 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-05 Design Data

Job mix formula

SD-06 Test Reports

Sieve analysis test for aggregate

Epoxy resin binder tests

Epoxy grout tests

SD-07 Certificates

Epoxy resin binder

Epoxy grout

SD-08 Manufacturer's Instructions

Epoxy repair material

Submit for mixing and applying.

1.4 QUALITY ASSURANCE

1.4.1 Design Data

1.4.1.1 Job Mix Formula

Submit, at least 15 days before work commences, a job-mix formula for each use of epoxy concrete and epoxy mortar. Test reports shall accompany the mix design. Identify the proposed source of the materials and state the proportions of aggregates and epoxy resin. When determining job mix, use samples of materials to be used on the job.

- a. Trial batches: Perform a minimum of three trial batchings in a certified testing laboratory. Try different aggregate-resin

proportions to obtain satisfactory placing and finishing characteristics but keep the proportion by weight of aggregate to epoxy resin binder at least five to one. When mixing, add the fine aggregates first, and then the coarse aggregates. The final trial batch should be sufficiently wet so that some fines will "bleed" to the surface during finishing operations.

b. Supporting criteria: Include in the submittal the following data for each trial batch:

(1) Proportions by weight

(2) Unit weights and specific gravities of constituents

(3) Batch weights

(4) Compressive strengths of 3 by 6 inch cylinders, made in accordance with ASTM C 31/C 31M, air cured for 7 days and tested in accordance with ASTM C 39. Compressive strength shall be a minimum of 3000 psi.

(5) Curing time

1.4.2 Test Reports

1.4.2.1 Epoxy Resin Binder

Include the following:

- a. Viscosity
- b. Consistency
- c. Gel time
- d. Absorption
- e. Shrinkage
- f. Thermal compatibility

1.4.2.2 Epoxy Resin Grout

Include the following:

- a. Epoxy number
- b. Consistency
- c. Compressive single shear strength
- d. Pot life

1.5 DELIVERY, STORAGE, AND HANDLING

Inspect materials delivered to site for damage, unload and store with a minimum of handling. Deliver epoxy resin components and aggregate materials in original sealed containers and store in dry covered areas at temperatures below 90 degrees F. Remove from job site unused mixed materials which have reached end of working or pot life.

1.6 WEATHER LIMITATIONS

Halt work when weather conditions detrimentally affect the quality of patching or bonding concrete. Apply epoxy resin materials only when the contact surfaces are completely dry and if the atmospheric and surface temperature ranges are suitable for the specified epoxy material. Follow manufacturer's instructions for weather conditions and temperature ranges.

1.7 TRAFFIC CONTROL

Do not permit vehicular or heavy equipment traffic on the pavement in the work area during the curing period. At the end of the curing period, light local traffic may be permitted on the pavement if approved by the Contracting Officer.

1.8 EQUIPMENT

Use a container recommended by the epoxy manufacturer as the mixing vessel. Use a power drive (air or spark-proof) propeller type blade for mixing except that hand mixing may be used for small batches. Use equipment specified by epoxy manufacturer for field mixing of aggregates and epoxy resin.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Epoxy

2.1.1.1 Epoxy Resin Binder for Concrete and Mortar

ASTM C 881, Type III, Grade 1, Class C without mineral filler. For walls and ceilings use ASTM C 881, Type III, Grade 3, Class C with filler.

2.1.1.2 Non-Pressure Epoxy Grout

ASTM C 881 Type IV, Grade 3, Class C with or without mineral filler.

2.1.1.3 Crack Sealer for Pressure Grouting

ASTM C 881, Type IV, Grade 1, Class C without filler.

2.1.1.4 Crack Surface Sealer for Pressure Grouting

ASTM C 881, Type IV, Grade 3, Class C with mineral filler.

2.1.2 Anticorrosion Coating

Corrosion protection of reinforcing steel shall be with an epoxy resin/portland cement adhesive. The anticorrosion coating shall meet the minimum performance criteria.

a. Compressive Strength (ASTM C 109/C 109M)

1 day:	810 psi min.
7 day:	6,000 psi min.
28 day:	8,000 psi min.

- b. Splitting Tensile Strength (ASTM C 496): 28 days: 540 psi min.
- c. Flexural Strength (ASTM C 348): 28 day:1100 psi min.
- d. Bond Strength (ASTM C 882 modified) at 14 days
 - 0 hours open time: 1900 psi min.
 - 24 hours open time: 1500 psi min.

Material must be proven to prevent corrosion of reinforcing steel when tested under the procedures as set forth by the Federal Highway Administration Program no. FHWA/RD86/193 or other testing procedure approved by the Contracting Officer. Proof shall be in the form of an independent testing laboratory corrosion report showing prevention of corrosion of the reinforcing steel.

2.1.3 Aggregate

For material passing No. 200 sieve provide a non-plastic material composed of a minimum of 75 percent limestone dust, talc or silica inert filler. Provide dry aggregate.

- a. For epoxy concrete: ASTM C 33, maximum size 1/2 inch. Conform to the following requirements:

<u>Sieve Designation</u>	<u>Percent Passing by Weight</u>
1/2 in.	
3/8 in.	100
No. 4	93-100
No. 8	70-80
No. 16	50-65
No. 30	37-53
No. 50	20-37
No. 100	10-20
No. 200	5-10
	3-5

- b. For epoxy mortar: ASTM C 144, No. 40 sieve.

2.1.4 Polymer Modified Cementitious Patching Compound

Two component repair mortar incorporating lightweight aggregate for vertical repair application. Material shall be cementitious based containing polymer liquid and dry premixed cement and aggregate. Minimum compressive strength at 28 days shall be a minimum of 4,500 psi.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Epoxy Concrete

3.1.1.1 Patch Areas

Remove loose concrete from the spalled areas indicated. Inspect the cavity for remaining defective concrete by tapping with a hammer or steel rod and listening for dull or hollow sounds. In areas where tapping does not produce a solid tone, remove additional concrete until testing produces a

solid tone. Make the entire cavity at least one inch deep. Sawcut edges of cavity to avoid feather edging. Prepare surface of cavity by sandblasting, grinding, or water blasting. Remove dust, dirt, and loosely bonded material resulting from cleaning. Ensure cavity surfaces are dry.

3.1.2 Spalls and Joints at Walls

3.1.2.1 Epoxy Mortar

Remove loose concrete from the wall spalled areas indicated. Enlarge existing exposed horizontal construction joint to 3/4-inch deep by 3/4-inch wide. Clean out the joint with compress air and brush. Fill joint complete with epoxy mortar.

3.1.2.2 Polymer Modified Cementitious Patching Compound

Inspect the area surrounding the spalled area for remaining defective concrete by tapping with a hammer or steel rod and listening for dull or hollow sounds. In areas where tapping does not produce a solid tone, remove additional concrete until testing produces a solid tone. Make entire cavity at least 1/2-inch deep. Sawcut edges of cavity to avoid feather edging. Remove existing coating and roughen repair surface to expose aggregates. Prepare surface of cavity by sandblasting, chipping or water blasting. Remove dust, dirt and loosely bonded material resulting from cleaning. Ensure cavity surfaces are dry.

3.1.3 Epoxy Mortar for Cracks and Saw Kerfs

Apply epoxy mortar to newly exposed loose and unsound materials. Prepare surfaces by sandblasting, scarifying or waterblasting. Remove dust, dirt, and loosely bonded material resulting from cleaning. Ensure surfaces are dry before application of epoxy mortar.

3.1.4 Epoxy Grout for Cracks

Apply grout to newly exposed concrete free of loose and unsound materials. Prepare surfaces by sandblasting, scarifying or waterblasting. Remove dust, dirt, and loosely bonded material resulting from cleaning. Ensure surfaces are dry before application of epoxy grout.

3.1.5 Anticorrosion Coating

Apply anticorrosion coating to cleaned reinforcing steel free of loose and unsound materials. Prepare surface by sandblasting or waterblasting. Remove dust, dirt, and loosely bonded material resulting from cleaning. Ensure surface is dry before application of anticorrosion coating.

3.2 MIXING MATERIALS

Make batches small enough to ensure placement before binder sets. Mix materials in accordance with manufacturer's recommendations.

3.3 PLACEMENT

3.3.1 Epoxy Concrete

Prime dry cavity surfaces with epoxy resin using a stiff bristle brush. Make coating approximately 20 mils thick. Place epoxy concrete while primer is still tacky and in layers not exceeding one inch thick. Use

vibratory floats, plates, or hand tampers to consolidate the concrete. Level each layer and screed the final surface to match the adjoining surfaces. Remove excess epoxy concrete on adjacent surfaces before the concrete hardens. Do not feather epoxy concrete out onto adjacent surfaces.

3.3.2 Epoxy Mortar

Prime surfaces with epoxy resin binder. Scrub prime coat into surface with a stiff bristle brush. Make coating approximately 20 mils thick. Place epoxy mortar while primer is still tacky. Apply at a thickness recommended by the manufacturer. Work mortar into place and consolidate thoroughly so that contact surfaces are wetted by the mortar. Finish surface of mortar to the required texture. Do not feather edge epoxy mortar onto adjacent surfaces.

3.3.3 Non-Pressure Epoxy Grout

3.3.3.1 Cementing Dowels

Immediately prior to placing the dowel, clean hole of dust and other deleterious material with a high pressure air hose. Fill hole halfway with grout. Insert dowel in hole by rotating it at least one complete turn while tapping it down. If necessary add more grout to fill hole.

3.3.3.2 Epoxy Grout for Cracks

Apply epoxy grout at a thickness recommended by the manufacturer. Work grout into place and consolidate thoroughly so that contact surfaces are wetted by the grout. Finish surface of grout to the required texture. Do not feather edge epoxy grout onto adjacent surfaces.

3.3.4 Application of Anticorrosion Coating

Application of the anticorrosion coating shall be in accordance with the manufacturer's recommendations. Apply a minimum of two (2) coats of the anticorrosion coating over the entire exposed reinforcing steel surface. The first coat shall be allowed to dry a minimum time period as set forth by the manufacturer. The final coat shall be allowed to dry before applying the repair epoxy mortar, epoxy grout, or epoxy concrete.

3.3.5 Application of Polymer Modified Cementitious Patching Compound

Application of polymer modified cementitious patching compound shall be in accordance with the manufacturer's recommendations. Prime dry cavity surfaces with epoxy resin using stiff bristle brush. Make coating approximately 20 mils thick. Work patching compound into place with trowel in layers. Thoroughly compact the patching compound onto the substrate. If sagging occurs during application, the patching compound shall be completely removed and reapplied at a reduced thickness onto the reprimed substrate.

3.4 CURING

Cure epoxy materials in accordance with manufacturer's recommendations.

3.5 FIELD QUALITY CONTROL

3.5.1 Sampling

As soon as epoxy resin and aggregate materials are available for sampling, obtain by random selection a sample of each batch. Clearly identify samples by designated name, specification number, batch number, project contract number, intended use and quantity involved.

3.5.2 Testing

At the discretion of the Contracting Officer, samples provided may be tested by the Government for verification. Test samples by an approved laboratory. If a sample fails to meet specification requirements after two tests, replace the batch represented by the samples tested and retest. Test aggregates in accordance with ASTM C 117 and ASTM C 136.

3.5.3 Inspection

Check each repaired area for cracks, spalls, popouts and loss of bond between repaired area and surrounding concrete. Check each repaired area for voids by tapping with a hammer or steel rod and listening for dull or hollow sounds. Immediately repair defects.

-- End of Section --