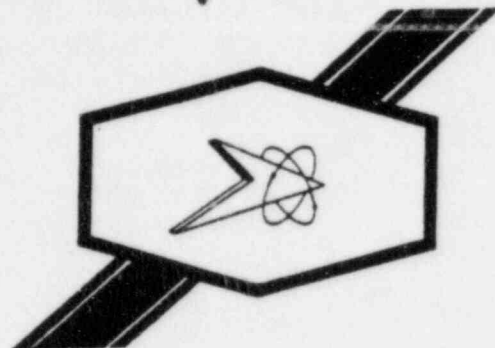


Imperial



TECHNICAL REPORT

NUMBER
215-78-G

TITLE
COMPATIBILITY TESTING - CONCRETE 1411 EPOXY MORTAR

FOR

CUSTOMER
BROWN & ROOT

Submitted by: Gerald E. Arnold

Approved: *J. Bear*

Date: 1/25/78

SOUTHERN IMPERIAL COATINGS CORPORATION, INC.
P. O. Box 29077, * New Orleans, Louisiana 70189
Phone: (504) 254-1433

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SUMMARY - Compatibility testing was initiated at the request of Brown and Root engineers relative to the South Texas Project. Elcometer adhesion and DBA tests were conducted to demonstrate the compatibility of Concresive 1411 to Imperial's NUTEC 11S/REACTIC 1201 system. The results of these tests indicate that the Concresive 1411 is compatible with the Imperial products.

INTRODUCTION - Concresive 1411 is a 100% epoxy masonry and concrete mortar which is designated for use in repairing concrete damage at the South Texas Project. Brown and Root engineers requested that Imperial conduct tests to demonstrate that the proposed NUTEC 11S/REACTIC 1201 coating system and Concresive 1411 are compatible.

METHODS -

- a) Specimens - 2" x 3 1/2" x 2" concrete specimens prepared in accordance with Bechtel CP956

| Coupon No. | Batch | Pour Date | Curing Compound |
|--------------------|-------|-----------|-----------------------|
| 478, 479 & 486 | 1-53 | 5-6-76 | NUTEC #10 (5606/5607) |
| 509, 512, & 513 | 1-53 | 5-6-76 | NONE |

- b) Surface preparation - 100 psi compressed air

- c) Application and Curing Data

| Product | Batch # | Date and Time Applied | °F/% R.H. | DFT | Cure Data |
|-----------------|--------------------|-----------------------|-----------|----------------|--------------------------------|
| Concresive 1411 | Lot 77654 | 1-5-78 9:30 a.m. | 70°F/64% | Fill Voids* | 4 days @ 70-80° 45-65% R.H. |
| NUTEC #11S | 3227/3228/ 3229 | 1-9-78 1:30 p.m. | 58°F/46% | .020"-.025" | 3 days @ 70-80° 45-65% R.H. |
| REACTIC #1201 | 2467/2568 | 1-12-78 10:00 a.m. | 58°F/66% | .005"-.006" | 4 days @ 70-80° 45-65% R.H. |

*Concresive 1411 was applied to the entire surface - not just voids. An approximate DFT of 5-10 mils was obtained.

- d) Testing

1. Elcometer adhesion testing was performed in accordance with Imperial Test Method 03.

High strength aluminum dollies were applied to the coated specimens by means of an epoxy resin-type adhesive. The dollies were placed 1-13-78 at 11:00 a.m. and removed with an Elcometer adhesion tester 1-16-78 at 9:00 a.m.

2. Two of the six concrete specimens were then submitted to Coastal Science Associates for DBA testing in accordance with the test parameters established for the South Texas Project. The concrete coupons were subjected to 24 hours of LOCA simulated conditions with a maximum temperature of 307°F. and a maximum pressure of approximately 57 psig. The coating damage inflicted by the Elcometer testing was not repaired prior to DBA testing.

RESULTS -

a) Elcometer Adhesion

| Lab. Panel # | Concrete Coupon # | Force required to remove dolly | Mode of Failure |
|--------------|-------------------|--------------------------------|---------------------------------|
| 3706 | 478 | 350 psi | 100% concrete failure |
| 3707 | 479 | 500 psi | 80% 1411/concr. 20% concrete |
| 3708 | 486 | 475 psi | 100% concrete failure |
| 3709 | 509 | 450 psi | 100% concrete failure |
| 3710 | 512 | 500 psi | 100% concrete failure |
| 3711 | 513 | 400 psi | 100% concrete failure |

b) DBA

| Lab. Panel # | Concrete Coupon # | Results |
|--------------|-------------------|---|
| 3710 | 479 | * Coating intact. Some delamination on broomed and smooth surfaces. |
| 3707 | 512 | No Defects. |

*Delamination was determined by "sounding" the test specimen. This

observation was confirmed by removing the coating in the "defective" areas. The failure was found to occur between the Concresive 1411 and the concrete surface.

CONCLUSIONS - The results of the Elcometer adhesion and DBA testing demonstrates the compatibility of Concresive 1411 with the Imperial coating system. In all tests, the bond between the Concresive 1411 and the NUTEC #11S was excellent.

Some failures, however, did occur between the concrete surface and the Concresive 1411. Specimen # 3707 exhibited some loss of adhesion at the substrate in the adhesion test and specimen #3710 exhibited signs of delamination in the DBA test. This potential problem can be avoided by good surface preparation practices. The concrete specimens used had aged for 20 months. Apparently some contamination was present which was not readily removed by 100 psi compressed air. Use of Concresive 1411 should be restricted to damaged concrete, voids, and tie holes where a "physical bond" will be achieved and improve the performance of the overall system. Excess Concresive 1411 should be removed to avoid any potential adhesion problems.

REFERENCE - Lab. Notebook #56, p.39

COASTAL SCIENCE ASSOCIATES, INC.
6900 CANAL BLVD.
NEW ORLEANS, LOUISIANA 70124
TEL. 504-283-7251

SUBJECT: DESIGN BASIS ACCIDENT COATINGS TEST REPORT.

DATE: 1/18/78

DBA TEST CONDITIONS: HOUSTON LIGHT AND POWER, 24 HR. SCREEN TEST
HIGHEST TEMPERATURE (DEG. F) REACHED DURING RUN 307

SAMPLE NUMBER: 3707 SAMPLE TYPE: CONCRETE COUPON

| SAMPLE # | DESCRIPTION |
|----------|-------------|
|----------|-------------|

| | |
|------|--------------------|
| 3707 | SIDE 1: NO DEFECTS |
|------|--------------------|

| | |
|--|--------------------|
| | SIDE 2: NO DEFECTS |
|--|--------------------|

| | |
|--|--------------------|
| | SIDE 3: NO DEFECTS |
|--|--------------------|

| | |
|--|--------------------|
| | SIDE 4: NO DEFECTS |
|--|--------------------|

REPORT WRITTEN FOR: SOUTHERN IMPERIAL COATINGS

REPORT # 059011778

APPROVED BY.....

Charles A. Frey

COASTAL SCIENCE ASSOCIATES, INC.
6900 CANAL BLVD.
NEW ORLEANS, LOUISIANA 70124
TEL. 504-283-7251

SUBJECT: DESIGN BASIS ACCIDENT COATINGS TEST REPORT.

DATE: 1/18/78

DBA TEST CONDITIONS: HOUSTON LIGHT AND POWER, 24 HR. SCREEN TEST
HIGHEST TEMPERATURE (DEG. F) REACHED DURING RUN 307
SAMPLE NUMBER: 3710 SAMPLE TYPE: CONCRETE COUPON

SAMPLE #

DESCRIPTION

3710

SIDE 1: (SIDE WITH SAMPLE #) NO DEFECTS

SIDE 2: DELAMINATION OVER MOST OF SIDE. NO CRACKS OR BLISTERS.

SIDE 3: NO DEFECTS

SIDE 4: DELAMINATION BELOW ADHESION TEST CUT. NO OTHER DEFECTS

REPORT WRITTEN FOR: SOUTHERN IMPERIAL

REPORT # 059011778

APPROVED BY.....

Charles A. Frenzel

Box 29077 New Orleans, Louisiana 70189 U.S.A. 504-254-1433



PROFESSIONAL COATINGS

February 24, 1978

Commanche Peak Steam Electric Station
Brown & Root, Inc.
P.O.Box 1001
GLEN ROSE, TX 76043

ATTENTION: Mr. Don Sutton

Dear Mr. Sutton:

Enclosed is a copy of Imperial's Technical Report #215-78-G demonstrating the compatibility of Concrecive 1411 Epoxy Mortar, with Imperial's NUTEC #11S/ REACTIC #1201 System.

Sincerely,

Gerald E. Arnold
Technical Support Representative
Nuclear

GEA/nd

Enclosure