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IMPROVED PROTECTIVE COATINGS FOR SONAR DOMES.(U)
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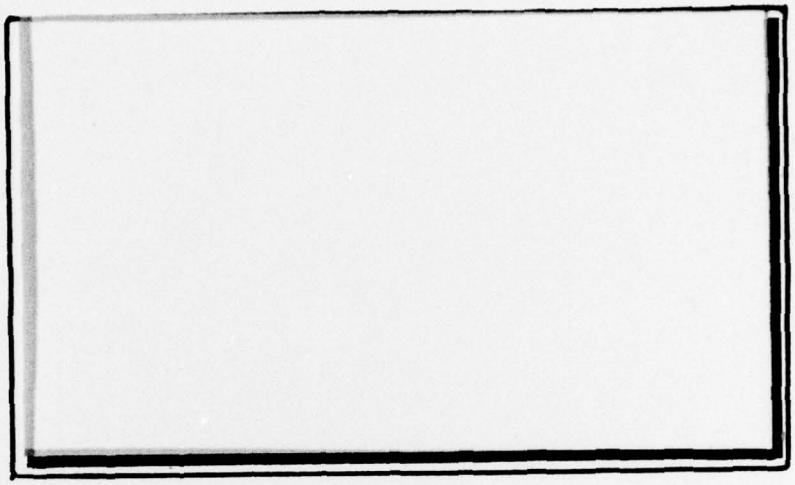

TECHNICAL MEMORANDUM

U.S. NAVAL APPLIED SCIENCE LABORATORY
NAVAL BASE
BROOKLYN, NEW YORK 11251

(6) IMPROVED PROTECTIVE COATINGS FOR SONAR DOMES.

(9) Lab. Project 9300-43, Technical Memorandum #5

SS-041-001, Task 8481/2

(12) 9p. (11) 4 APR 1966

(14) NASL-9300-43-TM-5

MATERIAL SCIENCES DIVISION

Approved: E. A. Imbembo

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Acting Associate Technical Director

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NAVAL BASE, BROOKLYN, NEW YORK 11251

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Lab. Project 9300-43
Technical Memorandum #5

Ref: (a) NASL Program Summary, Sub-Project SS-041-001, Task No. 8481/2, Improved Protective Coatings for Sonar Domes, of 1 Dec 1965
(b) FONECON between A. Cizek (NASL) and R. Kramer (Code 634A, BUSHIPS) on 21 Feb 1966
(c) N.Y.U. ltr (Contract NObs 90357) to A. Cizek (NASL) of 9 Feb 1966 (with copy to Mr. R. Kramer, Code 634A)
(d) Lab. Project 9300-43, Progress Report #1, Improved Protective Coatings for Sonar Domes of 25 Mar 1966

Encl: (1) Copy of reference (c)
(2) Table 1 - Results of Sonic Erosion Test
(3) Photo L-21081, View showing degree of erosion of experimental sonar dome coating systems

1. The U.S. Naval Applied Science Laboratory is conducting a program, described in reference (a), for the development of sonar dome coating systems which have good erosion resistance, good anti-fouling properties, and are able to remain adhered when exposed to high level sonic pulses generated by high power sonar transducers. A similar objective is being pursued under BUSHIPS contract NObs 90357 by Prof. Max Kronstein of New York University.

2. This report presents data on six coating systems prepared by Prof. Kronstein under contract NObs 90357 and submitted under reference (c) for screening in the NASL new high sonic pulse facility. The request for the screening study was made by the Bureau of Ships on the occasion of reference (b).

3. The coating systems submitted for evaluation are described in enclosure (1). The facility and test procedure, described in reference (a), used for screening of the coating systems, consists of a test tank and a single SQS-26 sonar transducer as the high pulse generator.

4. The results of the tests on the six coating systems are tabulated in Table 1, and the erosion patterns are shown in enclosure (3).

5. The results of tests indicate that with the exception of Panel "a", which is actually a Mare Island Paint Laboratory developed exterior dome coating system used as a control, all the experimental coating systems formulated under the NObs 90357 contract eroded down to the base metal, and are not considered suitable for use on sonar domes.

COPY

NEW YORK UNIVERSITY

School of Engineering and Science
University Heights, Bronx, N.Y. 10453
Area CODE 212 - LUDLOW 4-0700

Research Division

February 9, 1966

Mr. A. Cizek
Applied Naval Science Laboratory
U.S. Naval Station
Brooklyn, New York 11201

Reference: NObs 90357

Dear Mr. Cizek:

We are returning six of the test panels which you gave us. They are coated with the following systems:

a) One panel (Gates) is coated with:
1 coat Wash Primer F.117.
5 coats red lead vinyl primer F119.
1 coat GACO Primer N-100-9

Repeated applications of GACO N-29 Neoprene paint to 20 mil total thickness.

2 coats polyisobutylene antifouling paint F 134.

b) Different ones of our experimental paints, as follows:

#1 : 1 coat of wash primer F 117.
3 coats of red lead vinyl primer F 119.
1 coat GACO Primer N-100-9.
9 coats of our experimental paint V-3-72. This is a systematic combination of a combined vehicle of a Hypalon 30 Synthetic rubber with phenolic resin and tung oil, whereby the pigment is milled with dehydrated castor oil.

Enclosure (1)

#3 : 1 coat of wash primer F 117.
3 coats of red lead vinyl primer F 119.
8 coats of our experimental paint V-3-52, up to 16 mil thickness.

#4 : Same as #3, followed by
2 coats antifouling paint F 134.

#5 : 1 coat wash primer F 117.
3 coats red lead vinyl primer F 119.

13 coats of new experimental paint V-3-56. This a synthetic rubber paint whereby the rubber is combined with synthetic resins after the resins have been heat-combined with tung oil and bodied linseed oil. To total thickness of 20 mils, after which were applied
2 coats of antifouling paint F 134.

#6 : 1 coat wash primer F 117.
3 coats red lead vinyl primer F 119.
12 coats experimental paint V-3-62, to total thickness of 19-20 mils.
This experimental paint is similar to V-3-56, modifying its resin component. Then
2 coats antifouling paint F 134.

The preparation of these panels has been delayed somewhat by the fact that due to difficulties in the Railway Express transportation we have not been able to receive the F 134 paint from Norfolk.

After you will have any exposure results, we would be very much interested to get together with you in their inspection.

Yours very truly,

/s/ Max Kronstein
Senior Research Scientist

cc: Mr. R. Kramer
Code 634 A
Navy, BuShips, Washington, D.C.

U.S. Naval Applied Science Laboratory

Panel No.	Paint Coating System (Gates) (1)(2)	Dry Film Thickness (Total) Mils	Power Volt-Amperes (Average)	Test Period Hours	RESULTS OF NASL SIN Top Pai Rem
a.	1 coat Wash Primer F117 5 coats Redlead F119 1 coat Gaco Primer N100-9 20 Mils Dry Film Gaco N-29 2 coats F134	38.0	235	4½ 23	0.08 0.20
1	1 coat Wash Primer F117 3 coats Redlead F119 1 coat Gaco Primer N100-9 9 coats Exp. Paint V-3-72	22.0	235	4½ 23	0.23 1.12
3	1 coat Wash Primer F117 3 coats Redlead F119 8 coats Exp. Paint V-352	28.0	235	4½ 23	1.11 2.85
4	1 coat Wash Primer F117 3 coats Redlead F119 8 coats Exp. Paint 2 coats A.F. F134	30.0	235	4½ 23	0.95 2.50
5	1 coat Wash Primer F117 3 coats Redlead F119 13 coats Exp. Paint V-3-56 2 coats A.F. F134	40.0	235	4½ 23	2.13 6.00
6	1 coat Wash Primer F117 3 coats Redlead F119 12 coats Exp. Paint V-3-62 2 coats A.F. F134	40.0	235	4½ 23	4.05 9.00

NOTE: (1) Coating systems were prepared and applied by Prof. Max Kronstein of NYU under contra

(2) Panel No. designation and coating system data were supplied by Prof. Kronstein.

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TABLE 1

RESULTS OF SONIC EROSION TEST OF PAINT SYSTEMS USING NASL SINGLE SQS-26 SONAR TRANSDUCER EQUIPMENT

Test Period Hours	ERODED AREA, SQ. IN. Top Coat Paint Removed	Paint Removed To Bare Metal	Remarks
4½	0.080	0.000	Mare Island Paint Laboratory exteri Anti-fouling formula F134 showed "ch
23	0.208	0.000	Anti-fouling formula F134 top coat in a 1" x 1¼" area.
4½	0.237	0.160	Badly eroded to base metal.
23	1.120	0.920	Badly eroded to base metal.
4½	1.118	0.105	Badly eroded to base metal.
23	2.858	0.358	Badly eroded to base metal.
4½	0.950	0.000	Slight erosion of top coat.
23	2.500	0.500	Badly eroded to base metal.
4½	2.132	0.048	Badly eroded to base metal.
23	6.000	0.105	Badly eroded to base metal.
4½	4.050	0.035	Badly eroded to base metal.
23	9.000	0.203	Badly eroded to base metal.

f NYU under contract NObs 90357. The coatings were applied to 12 in. x 12 in. x 1/8 in. hot rolled mild steel
f. Kronstein.

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Enclosure (2)

Remarks

Mare Island Paint Laboratory exterior dome coating system.
Anti-fouling formula F134 showed "checking" of the surface before test.

Anti-fouling formula F134 top coat eroded in a checkered pattern in a 1" x 1½" area.

Badly eroded to base metal.

Badly eroded to base metal.

Badly eroded to base metal.

Badly eroded to base metal.

Slight erosion of top coat.

Badly eroded to base metal.

Badly eroded to base metal.

Badly eroded to base metal.

Badly eroded to base metal.

Badly eroded to base metal.

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12 in. x 12 in. x 1/8 in. hot rolled mild steel plates furnished by NASL.

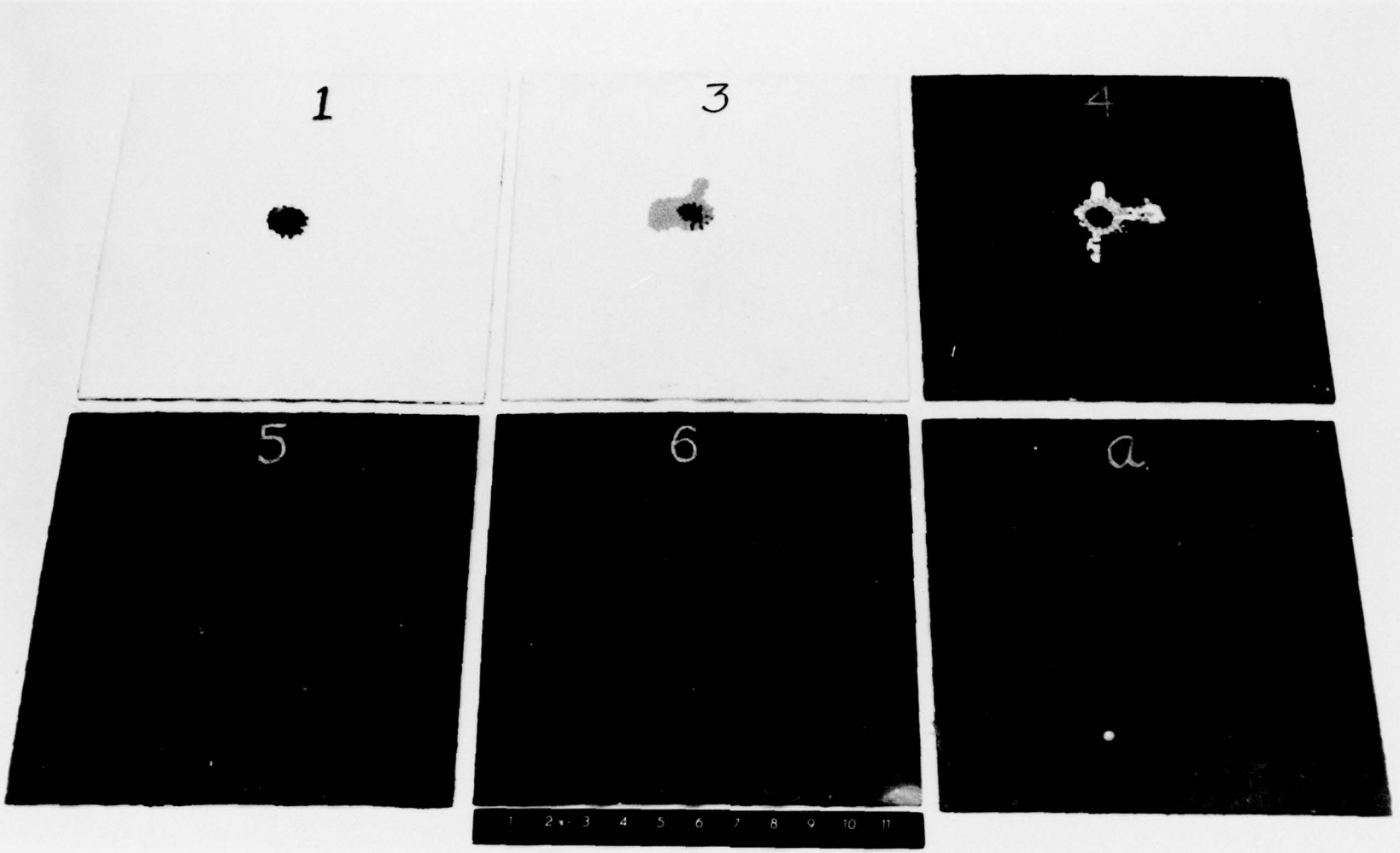

PHOTO L-21081

View showing degree of erosion of experimental sonar dome coating systems.

U.S. NAVAL APPLIED SCIENCE LABORATORY

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