

UNCLASSIFIED

JUN 13 1960

File No. TX-53, 3-2
T-16806, T-16807
Project No. 13-838-00

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW	
IP Review Date: <u>7/2/98</u>	Declassification (Circle Number): 1. Classification Retained <u>U</u>
Authority: <u>CIADC</u> <u>EAADP</u> Name: <u>W. J. [unclear]</u>	2. Classification Changed to: _____
IP Review Date: <u>7/23/98</u>	3. Contains No DOE Classified Information _____
Authority: <u>RP</u> Name: <u>R. B. [unclear]</u>	4. Coordinates With _____
	5. Contains UCAI? <u>No</u>
	6. Comments: <u>OK for [unclear]</u>

TO: DISTRIBUTION

Re: Static Tests of Half-Scale TX-53 Crush Nose

Summary of Test

Three half-scale TX-53 crush noses were tested to failure. The first, made of 6061-T6 aluminum, failed at 105,000 pounds compressive load. A second nose, also of 6061-T6 aluminum, failed at 46,500 pounds load. Strain readings taken during the test of the second unit indicated a maximum stress at 45,000 pounds load of 14,850 psi tension near the forward edge of the nose section. The third unit was made of 3003 aluminum, and failed at 77,000 pounds. Failure of the first two units was a combination of rolling and tearing of the aft edge; the third failed by rolling only.

Object of Test

The object of this test was to determine locations and magnitudes of highest stresses, in the half-scale TX-53 crush nose, statically tested to failure. Details of the test unit are given in Dwg. No. SK9(1217) 18286. Three units were tested; two fabricated from 6061-T6 aluminum, the third from 3003 aluminum.

Authorization for Test

The test was performed in accordance with a Work Order Authorization from Organization 1217 to A. W. Reger, 1613. Mr. R. W. Sargent, 1217-1, 3-2 was the consultant.

TX-53
3-2

Equipment and Instrumentation

The following equipment was used in the test:

- Baldwin test machine, 300,000 pounds capacity.
- Fairchild strain gage indicator.

The following instrumentation was used:

- Thirteen Baldwin SR-4 rectangular rosette strain gages, type FABR-25-12, resistance 120.0±0.5 ohms, gage factor 2.12±1%, lot no. 10-59-#19.
- Stresscoat, type 1206, average sensitivity during test of 700 microinches per inch.

RECEIVED

JUN 13 1960

CENTRAL RECORDS FILE

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW DOWNGRADING OR DECLASSIFICATION STAMP	
CLASSIFICATION CHANGED TO: <u>U</u>	AUTHORITY: <u>R. B. [unclear]</u>
PERSON CHANGING MARKING & DATE: <u>Emelda Selach 7/30/98</u>	RECORD ID: <u>98 SW 3078</u>
PERSON VERIFYING MARKING & DATE: <u>W. C. [unclear] 7/30/98</u>	DATED: <u>7/23/98</u>

UNCLASSIFIED

UNCLASSIFIED

Summary

The first test unit, fabricated of 6061-T6 aluminum, was coated with No. 1006 Stresscoat and assembled into the test machine as shown in Fig. 1. Load was applied to the aft end of the nose section by an aluminum plate and steel cylinder. Three rectangular rosette strain gages were also mounted on the unit, two of which are shown in Fig. 2.

Load was applied in increments of 5000 pounds, with strain gage readings taken at each increment. Between increments the load was returned to zero and a search made for Stresscoat cracks. Testing continued until the unit failed.

Testing of the second nose section, also made of 6061-T6 aluminum, was essentially the same as the first, except no Stresscoat was used, and additional strain gages were mounted. Locations of strain gages are shown in Figures 3 and 4. Gages No. 19 thru 30, not shown, were mounted diametrically opposite gages No. 7 thru 18, and in the same arrangement.

The third unit, made of 3003 aluminum, was loaded to failure without instrumentation.

Results

Results of the Stresscoat test on the first unit are given in Table I. Crack patterns formed are shown in Figures 5 and 6. These crack patterns indicated the highest tensile stresses in the Stresscoated portion of the unit occurred in the region of the forward row of holes.

Strain readings were negligible and are not included herein. Failure occurred at 105,000 pounds load and consisted of a combination of rolling and tearing of the metal at the aft edge of the section. This failure is shown in Fig. 7. Work-hardening of the aluminum during the repeated loading and unloading procedure of the Stresscoat test might possibly account for this first unit going to a higher load than subsequent test units, and failing more by fracture of the metal rather than rolling or crushing.

Strain readings from the test on the second unit are given in Table II and principal stresses in Table III. The highest stress determined at 45,000 pounds load was 14,850 psi tension at strain gage location Nos. 16, 17, and 18 (Fig. 4). Failure occurred at 46,500 pounds and was similar to the failure of the first unit, except that tearing of the metal was not as extensive.

Failure of the third unit occurred at 77,000 pounds, and consisted of rolling only with no tearing of the metal. Figures 8 and 9 show the nose section after collapse.

UNCLASSIFIED

Distribution

-3-

T-16806
T-16807

UNCLASSIFIED

W. M. Sigmon

W. M. SIGMON - 1612-1

Bill Johnson
BILL JOHNSON - 1613-3

R. S. Hooper

R. S. HOOPER - 1613-3

BJ:1613-3:ms

Enc: Figs. 1-9
Tables I-III

Copy to:

- E. I. Bruce, 1217
- Attn: R. W. Sargent
- W. A. Gardner, 1610
- D. M. Bruce, 1282
- J. M. Wiesen, 1442
- J. R. Harrison, 5523
- R. K. Smeltzer, 3421-3



UNCLASSIFIED

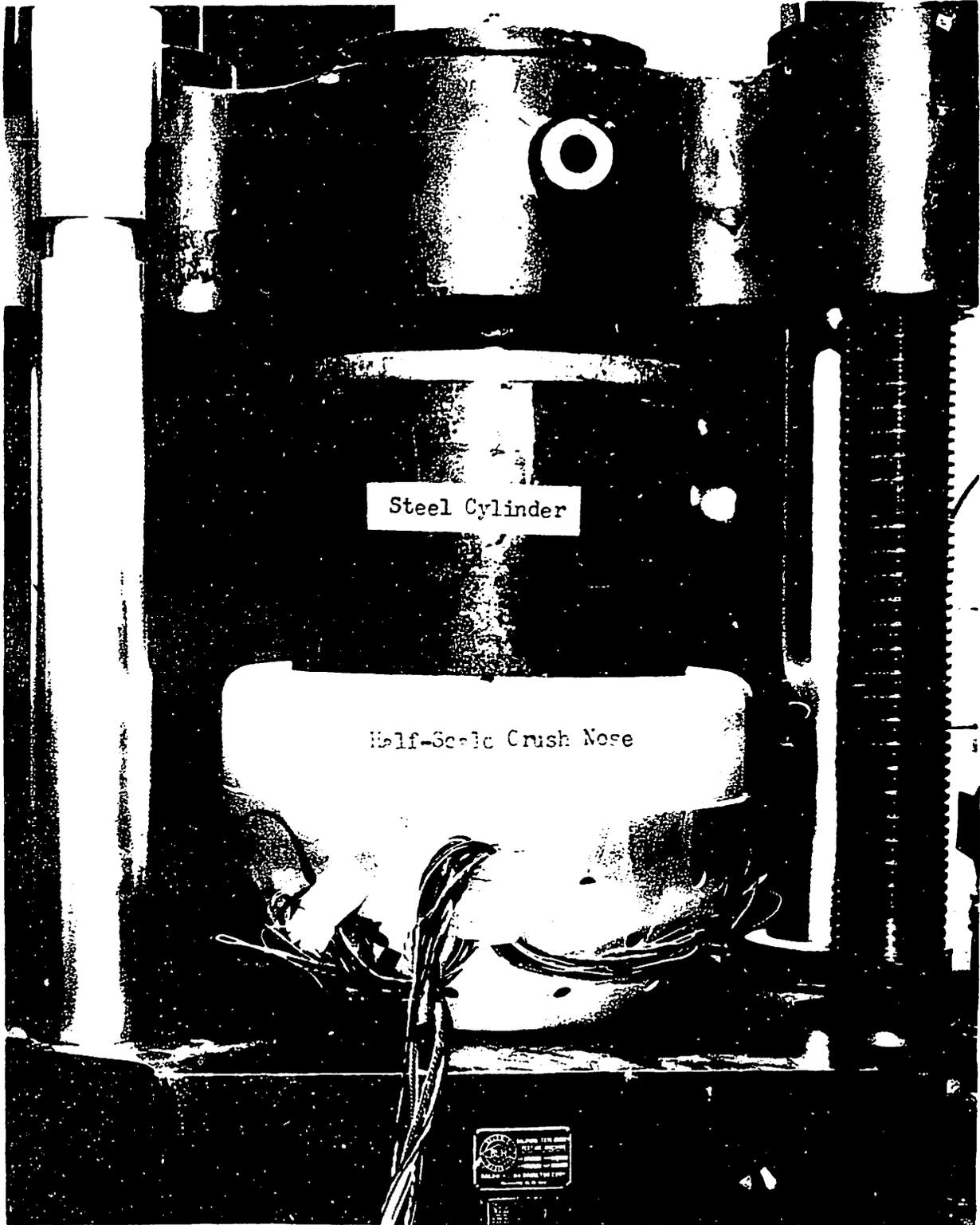


FIG. 1 SETUP FOR STATIC TESTS OF HALF-SCALE TX-88 CRUSH NOSE.

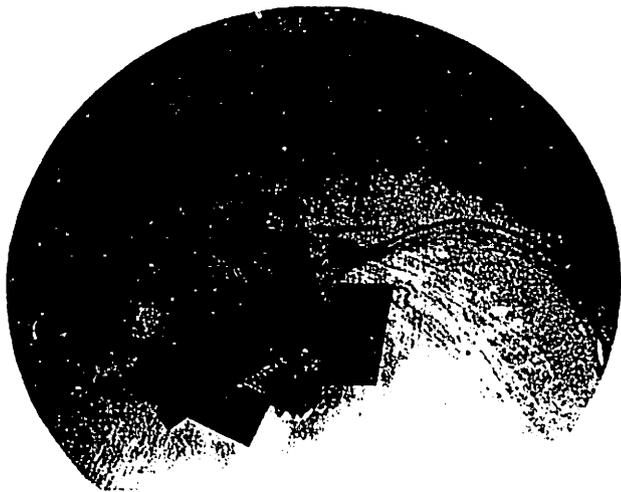
T-10-10

D#0-8460

UNCLASSIFIED

UNCLASSIFIED

SK9(1217)18286-6061 T6



Case nos. 1, 2, 3 are on inner surface at this point.

UNCLASSIFIED

FIG. 7. Schematic diagram of the inner surface of the shell of a shell fragment. The shell fragment is shown in cross-section. The inner surface of the shell is shown with a textured appearance. The case numbers 1, 2, and 3 are indicated on the inner surface. The diagram is labeled with the number 7 and the text 'Schematic diagram of the inner surface of the shell of a shell fragment'.

D#0-8459

#867

UNCLASSIFIED



UNCLASSIFIED

FIG. 3 LOCATIONS OF STRAIN GAGES ON THE INSIDE OF THE SECOND TEST UNIT - STATIC TESTS OF HALF-SCALE TX-53 CRUSH ROSE.

D#0-3464

T-16006

#862

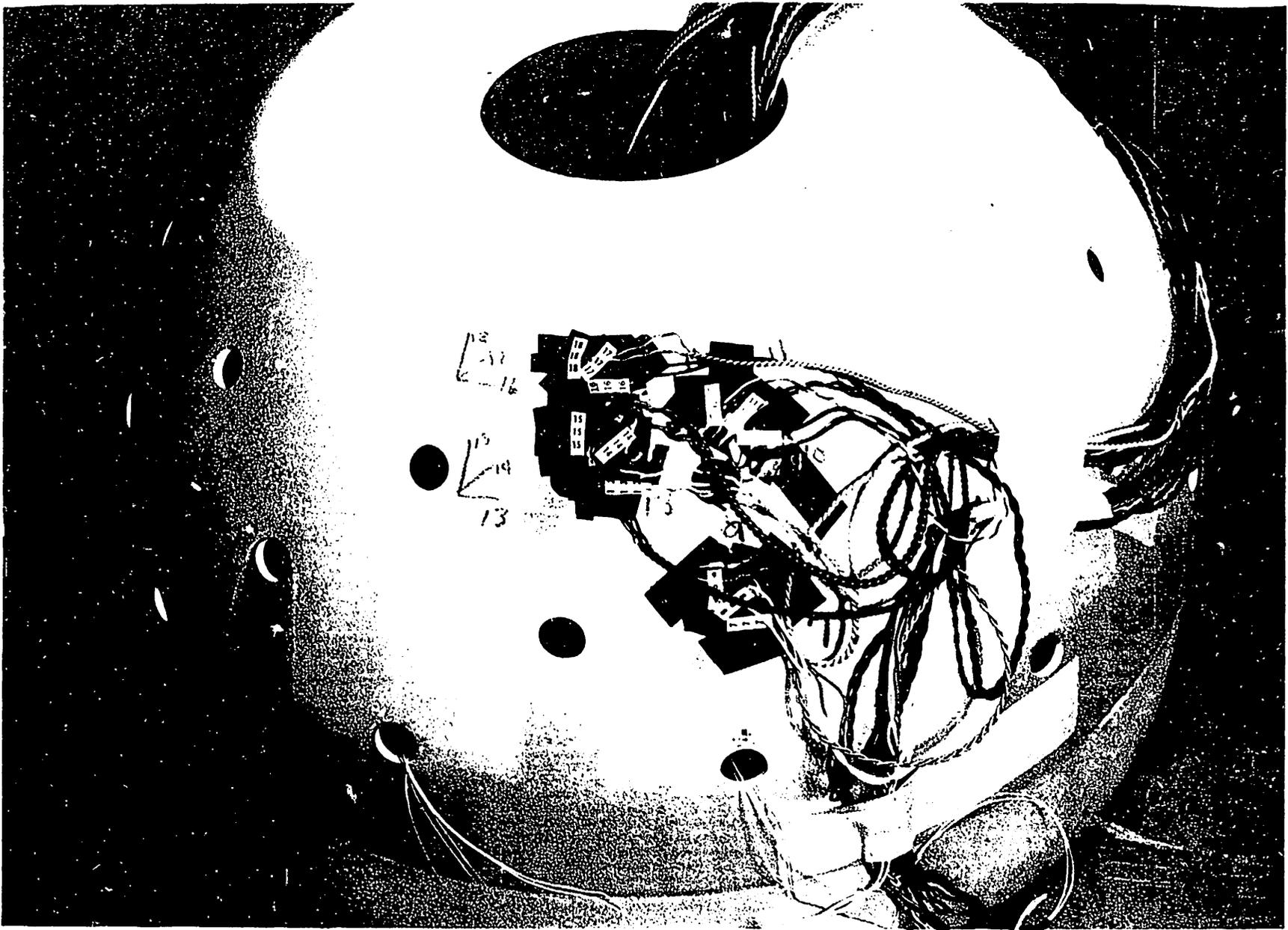


FIG. 4 LOCATIONS OF STRAIN GAGES ON THE SECOND TEST UNIT - STATIC TEST OF HALF-SCALE TX-53 CRUSH NOSE.

D# 0-3463.

T-16806

#698

UNCLASSIFIED

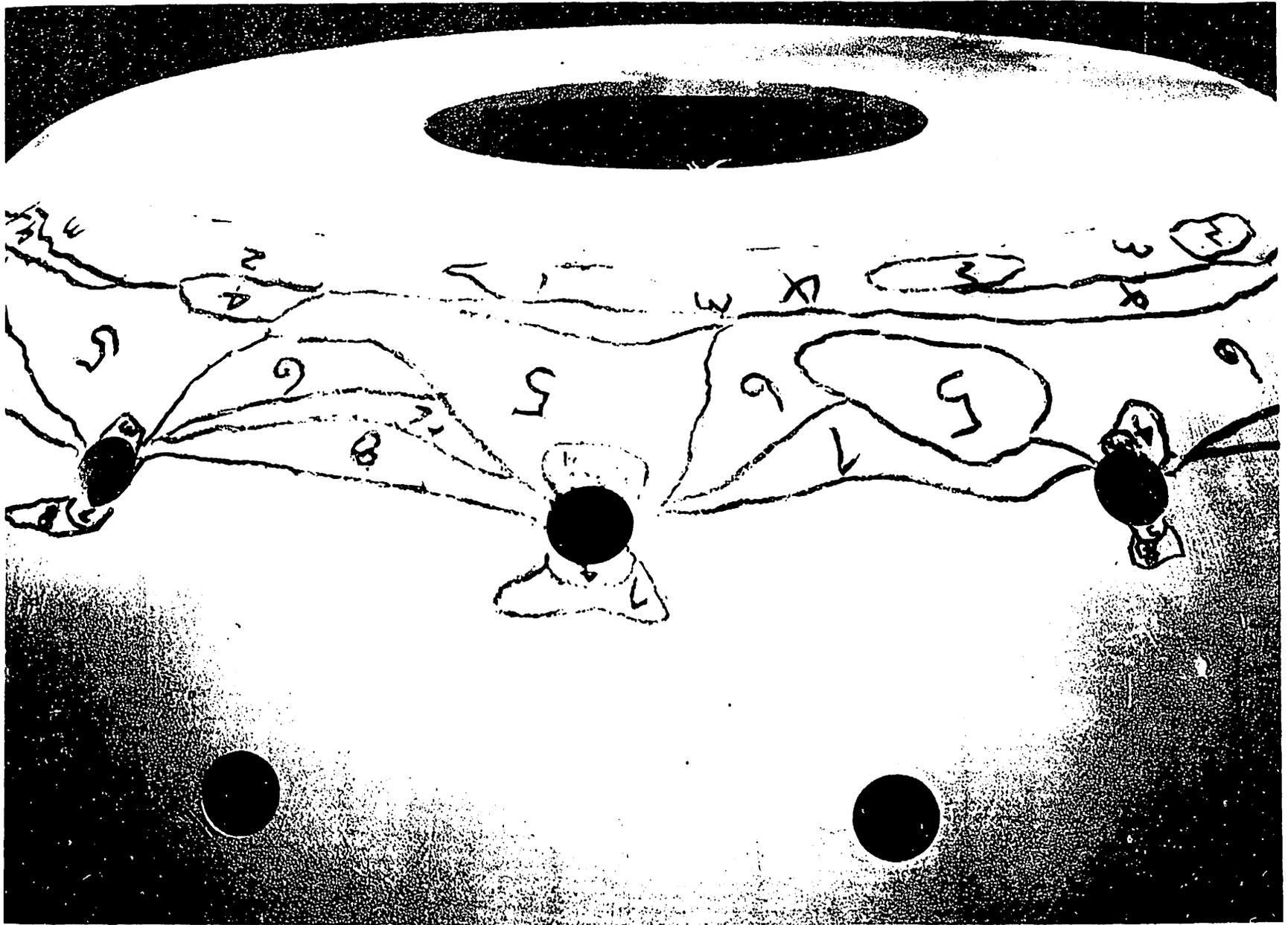


FIG. 5 STRESSCOAT CRACK PATTERNS ON FIRST TEST UNIT - STATIC TEST AT 1000 LBS - 1-10-53
 TX-53 CRUSH NOSE.

D# 0-1937

#870

UNCLASSIFIED

UNCLASSIFIED

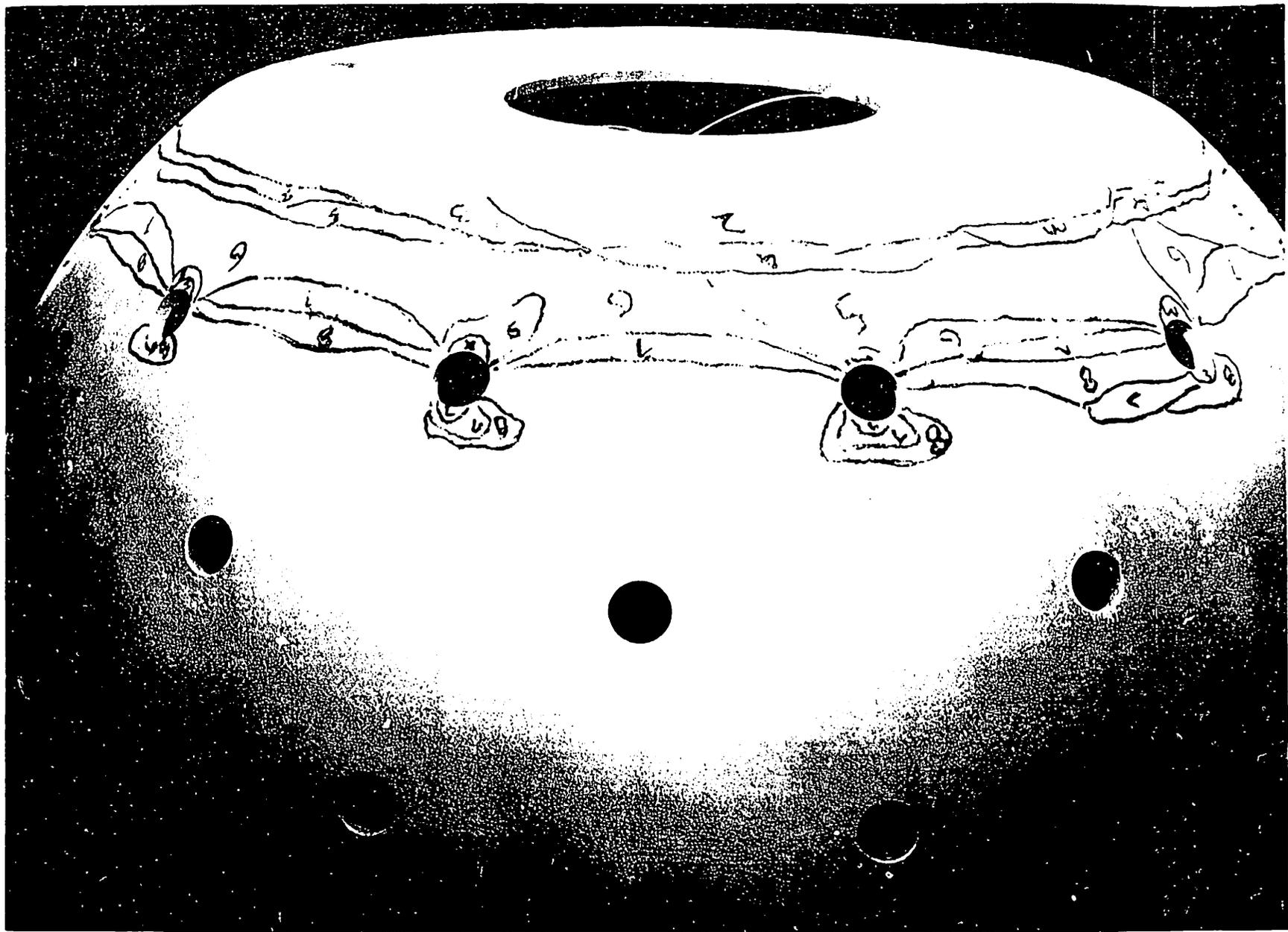


FIG. 6 STRESS COAT CRACK PATTERNS ON FIRST TEST UNIT - DATED PHOTO OF HALB-32AL. 1-19-53
TX-53 CRUSH NOSE.

D.# 0-1936

UNCLASSIFIED

#871

UNCLASSIFIED



FIG. 7 FAILURE OF FIRST TEST UNIT STATIC TEST OF HALF-SIZE TX-53 CARTRIDGE NO. 2.

D. # 0-1935

1-10006

UNCLASSIFIED

#812

UNCLASSIFIED



#873

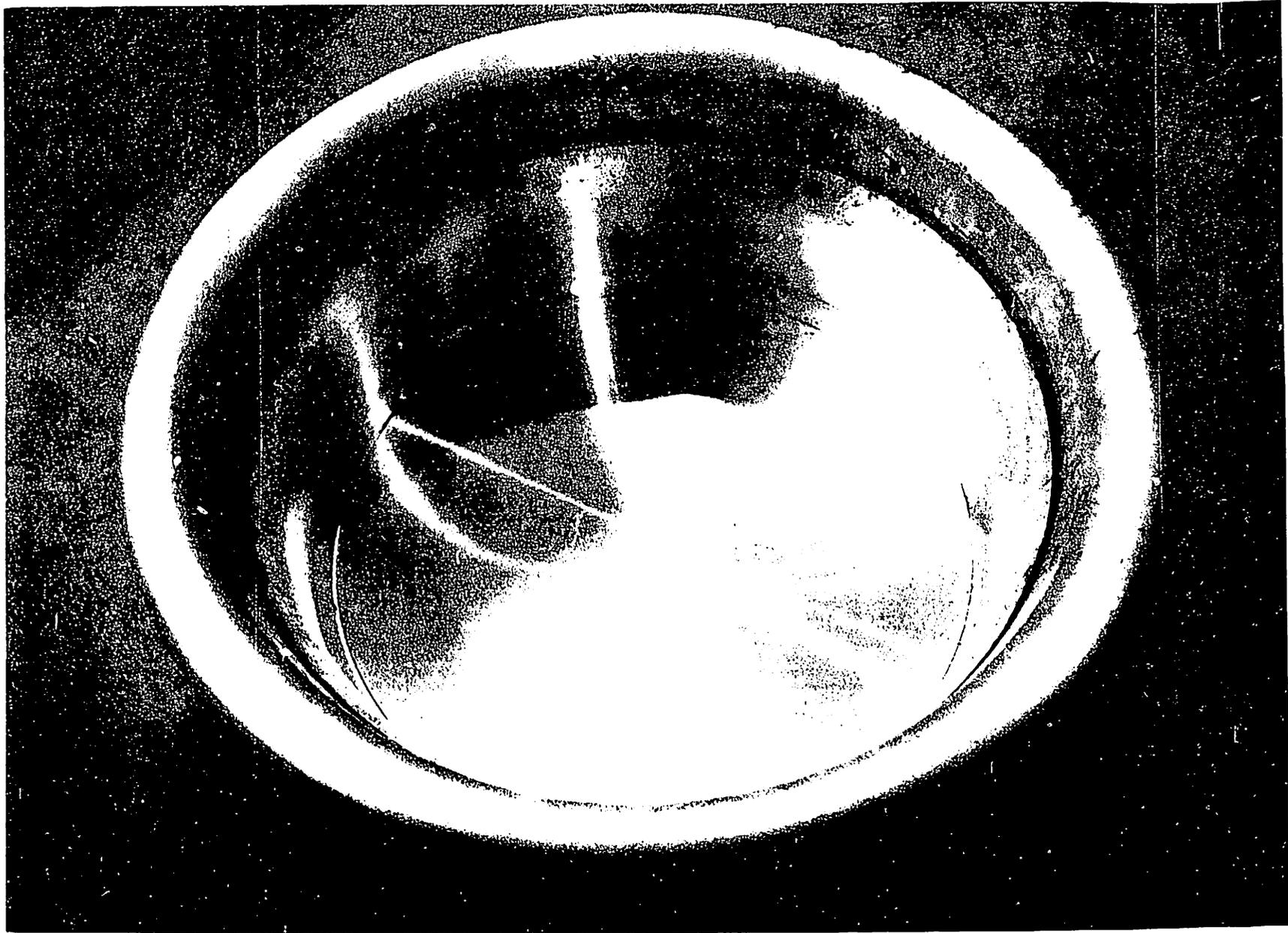


FIG. 8 THIRD TEST UNIT AFTER FAILURE - STATIC TESTS OF HALF-SCALE TX-33 CRUSH ROSE.

D# 0-3420

T-156.6

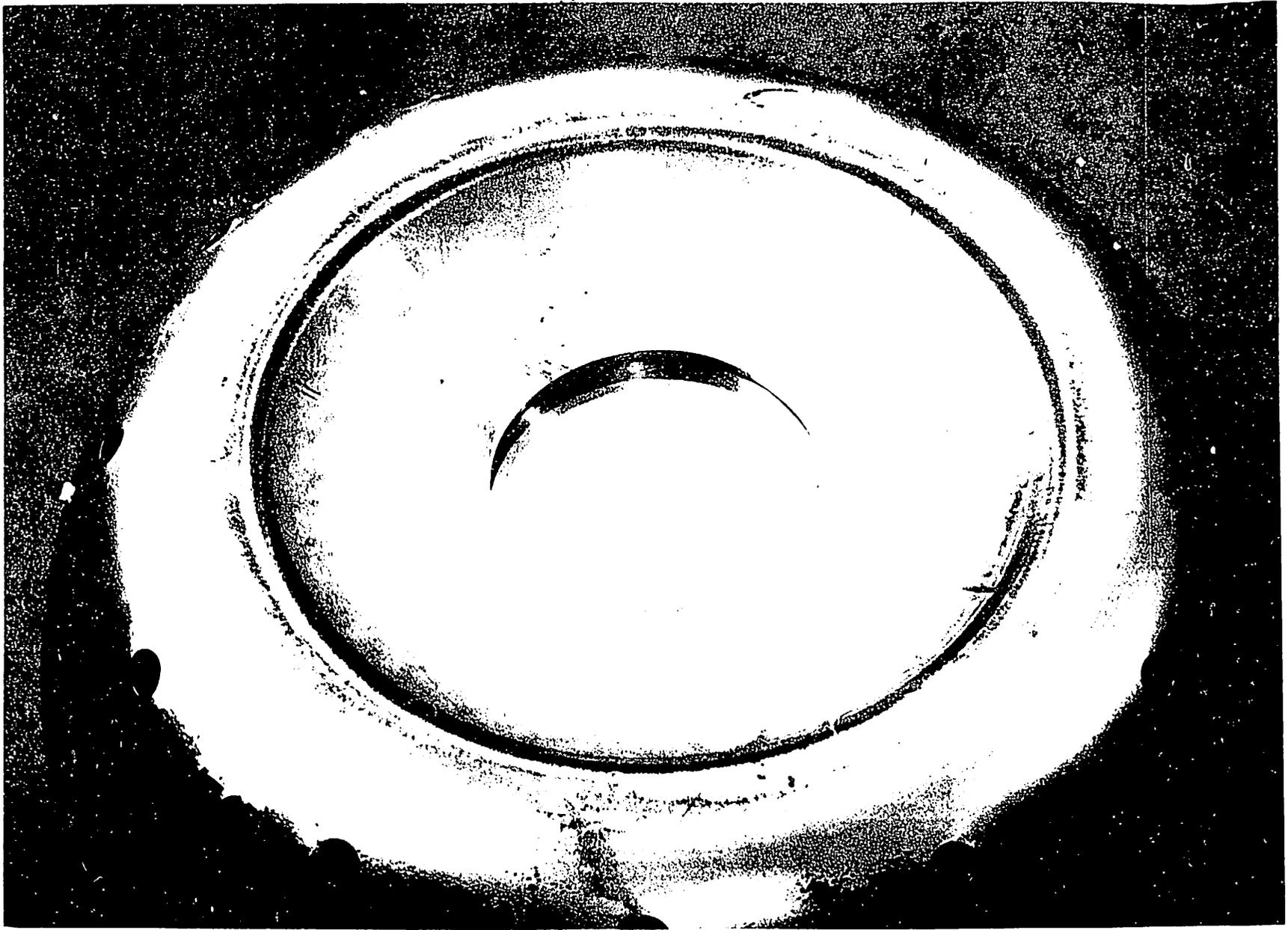
UNCLASSIFIED



UNCLASSIFIED



#8-14



UNCLASSIFIED

FIG. 9 THIRD TEST UNIT AFTER FAILURE - STATIC TESTS OF HALF-SCALE TX-53 CROSS ROSE.

D#0-3921

T-16806

