

DEC 23 1957  
Case No. 734.00  
Ref. Sym: 1612 (692)  
Project No. TM-682  
File No. 1-43, 3-2

MR. R. N. BROWNE - 1222

Attn: Mr. F. Millikin - 1222

Re: Static Test of TX-43 Parachute Attachment Assembly

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Summary of Results

Four TX-43 parachute attachment assemblies were tested by means of static loads. The number one assembly was loaded to 23,500 pounds when failure occurred in the aluminum lug. The number two assembly with a re-designed aluminum lug was loaded to 24,000 pounds when both straps of the double loop nylon strap broke. The number three assembly was loaded to 15,100 pounds when one loop of the double loop nylon strap broke. The number four assembly without nylon straps was loaded to 41,900 pounds when failure occurred by the roller pins shearing off.

Object of Test

The object of this test was to determine the structural adequacy of a TX-43 parachute attachment assembly.

Reason for Test

This test was conducted in accordance with a Work Order Authorization, dated August 22, 1957, from Division 1222 to Division 1612. F. W. Millikin, 1222, was the consultant.

Summary of Past Tests

There have been no past tests of this assembly by Division 1612.

Setup for Test

- I. For photo of test setups see Figs. 1 and 2.
- II. The following components were used in the test:

One TX-43 parachute attachment assembly with two different lug designs.

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PERSON CHANGING MARKING & DATE: <u>Emelda Selah 5/28/98</u>	RECORD ID: <u>98SN2188</u>
PERSON VERIFYING MARKING & DATE: <u>W. C. Layne 5/28/98</u>	DATED: <u>5/28/98</u>

GOL No.	
ACCOUNTABILITY CARD	<u>SM</u>
FILE No.	<u>TX-43</u>
	<u>3-2</u>

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III. The following equipment was used in the test:

- 1. One SR-4 Baldwin strain indicator, Serial No. 991903.
- 2. One box type pull bar, No. 10, G.F. 2.058.
- 3. One Simplex hydraulic ram, capacity 30 tons.
- 4. One Sprague air-operated hydraulic pump.

IV. The following instrumentation was used in the test:

Stresscoat Number 1205, 1206, and 1207.

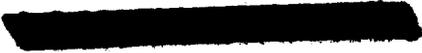
Procedure

After the setup was completed as shown in Fig. 1, for the No. 1, 2, and 3 assemblies, Stresscoat was applied to the parachute lug and a static load was applied to the nylon strap connected to the parachute attachment by means of a hydraulic ram, connecting linkage and a calibrated box type pull bar in conjunction with a Baldwin SR-4 strain indicator. The load was applied in 1000-pound increments until the first Stresscoat pattern was noted at which time the increment of loading was increased to 20 per cent of the preceding load. Since the lug failed during the test of the first assembly a redesigned lug was used during the last three tests. For test No. 4 the setup was the same except the nylon strap was replaced by a pull bar so that the ultimate strength of the remainder of the assembly could be determined.

Results

The number one parachute attachment assembly failed at 23,500 pounds. Failure occurred when the roller and inserts attached to the nylon strap pulled the loaded end of the assembly apart. The Stresscoat could not be observed in the region where failure originated since this area was obscured by the nylon straps. Figures 3, 4, 5, and 6 show the Stresscoat patterns that formed during the test. The encircled patterns were caused by tension and the unmarked patterns by compression. Table I lists the Stresscoat data and applied loads for this test. For photos of the deformation and failure, see Figs. 7, 8, and 9.

The number two assembly failed when loaded to 24,300 pounds. Failure occurred when both straps of the double loop nylon strap broke at 24,300 pounds. For photo of this failure, see Fig. 10. Figures 11 through 14 show the crack patterns that developed in the Stresscoat during the test with the marked patterns being caused from tension and the unmarked patterns by compression. Table II lists the Stresscoat data for this test.



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The number three assembly was loaded to 15,100 pounds when failure occurred in one loop of the double loop strap. For photo of this failure, see Fig. 15. The Stresscoat patterns are shown in Figs. 16, 17, and 18 and the Stresscoat data is listed in Table III.

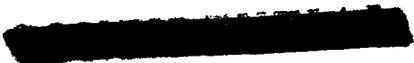
The number four assembly was loaded to failure which occurred at 41,900 pounds when the 1/2-inch diameter pins of the roller sheared off at the inserts. For deformation of the insert, see Fig. 19. For photo of failure see Fig. 20. Figures 21 through 24 show the Stresscoat patterns that formed during this test and Table IV lists the Stresscoat data.

*H. A. Warrick*  
H. A. WARRICK - 1612-2

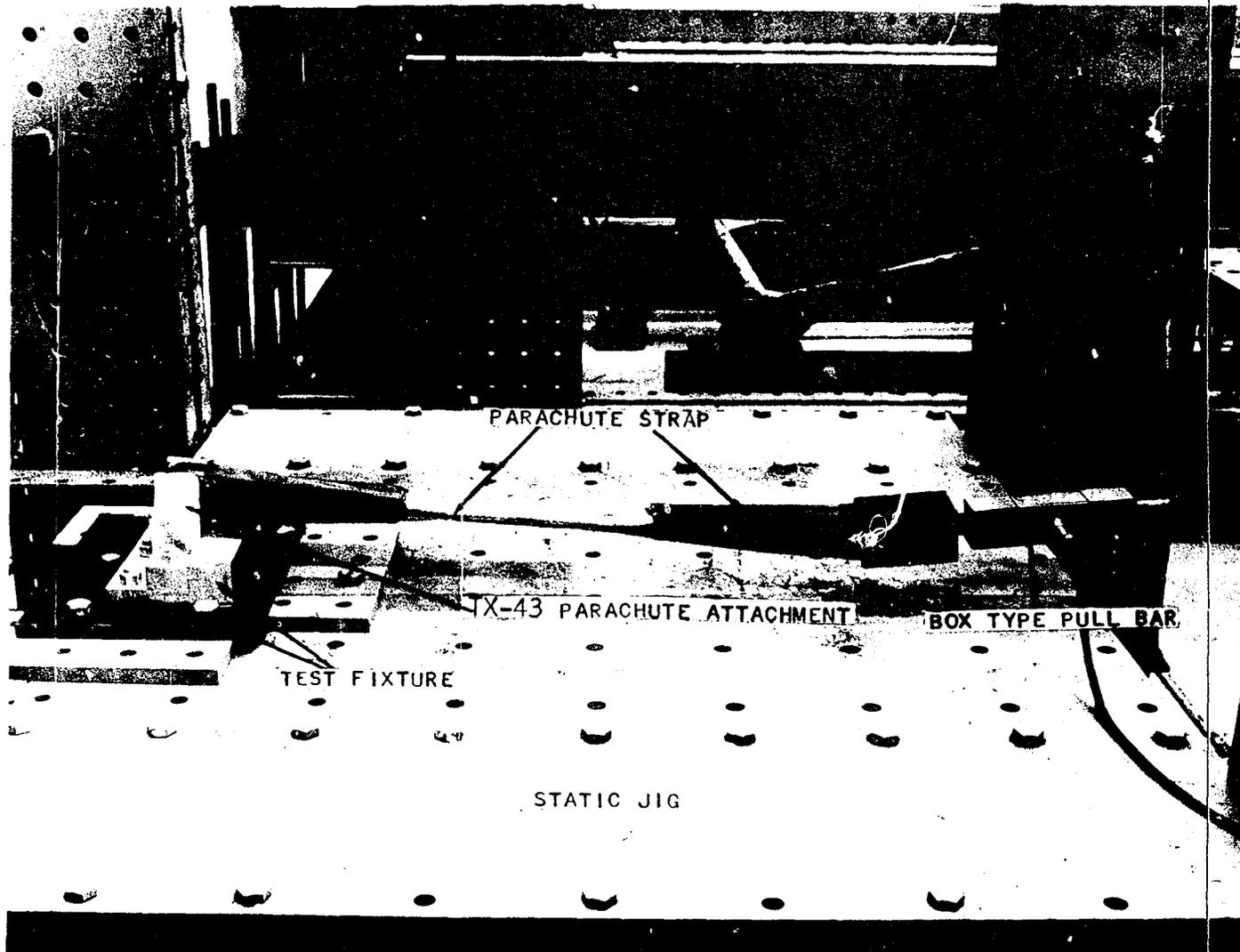
Approved by: *Paul H. Adams*  
PAUL H. ADAMS - 1612

HAW:1612-2:as

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- W. A. Gardner, 1610
- D. M. Bruce, 1282
- C. L. Gomel, 5523
- R. K. Smeltzer, 7221-3 ←
- Tech. Ref. File, 7221-3



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FIG. 1 -- TEST SETUP DURING STATIC TEST OF NOS. 1, 2, AND 3 TX-43 PARACHUTE ATTACHMENT.

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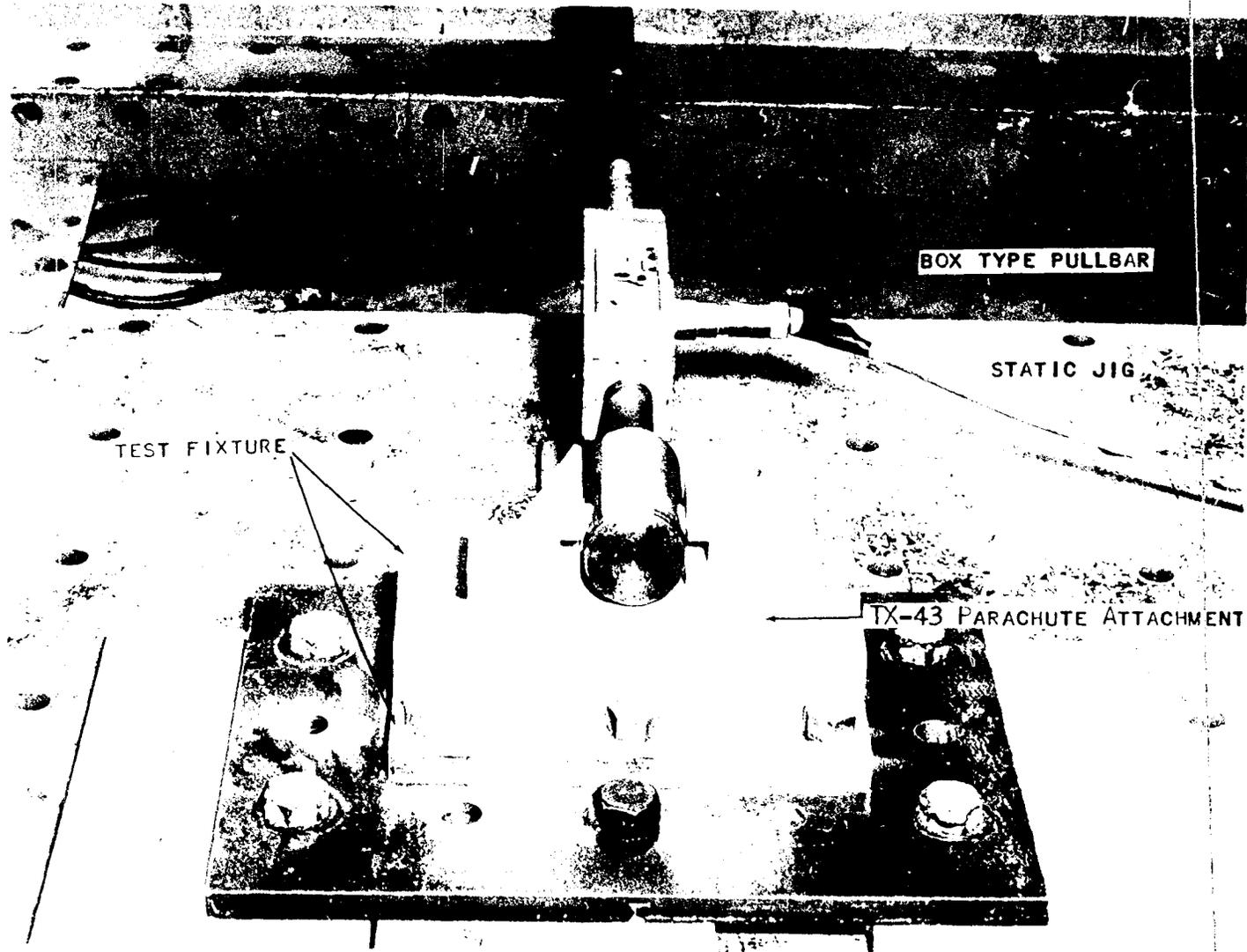


FIG. 2 -- TEST SET UP FOR STATIC TEST OF NO. 4 TX-43 PARACHUTE ATTACHMENT.

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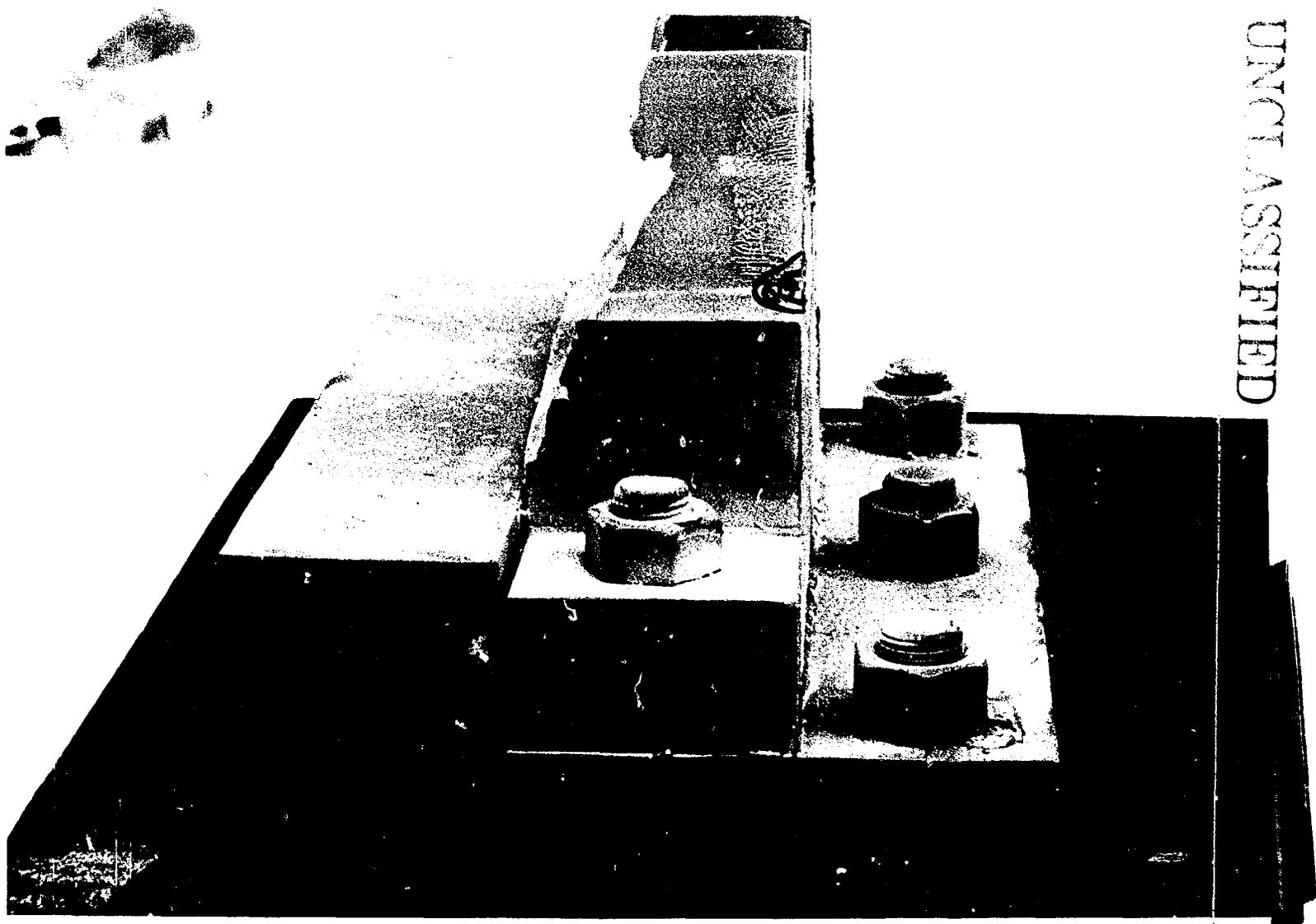


FIG. 3 -- STRESSCOAT CRACK PATTERNS AND FAILURE WHICH OCCURRED DURING STATIC TEST OF NO. 1 TX-43 PARACHUTE ATTACHMENT.

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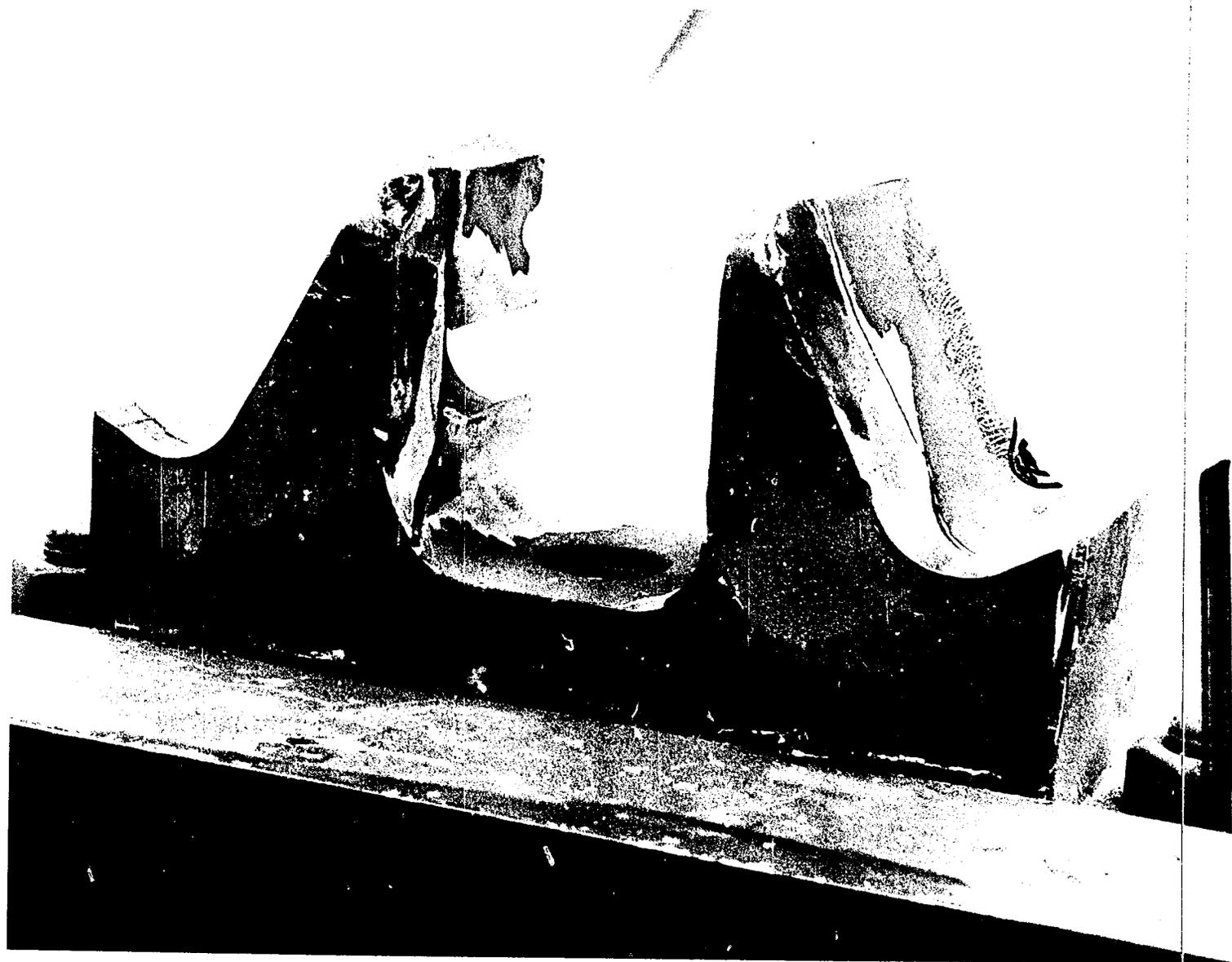
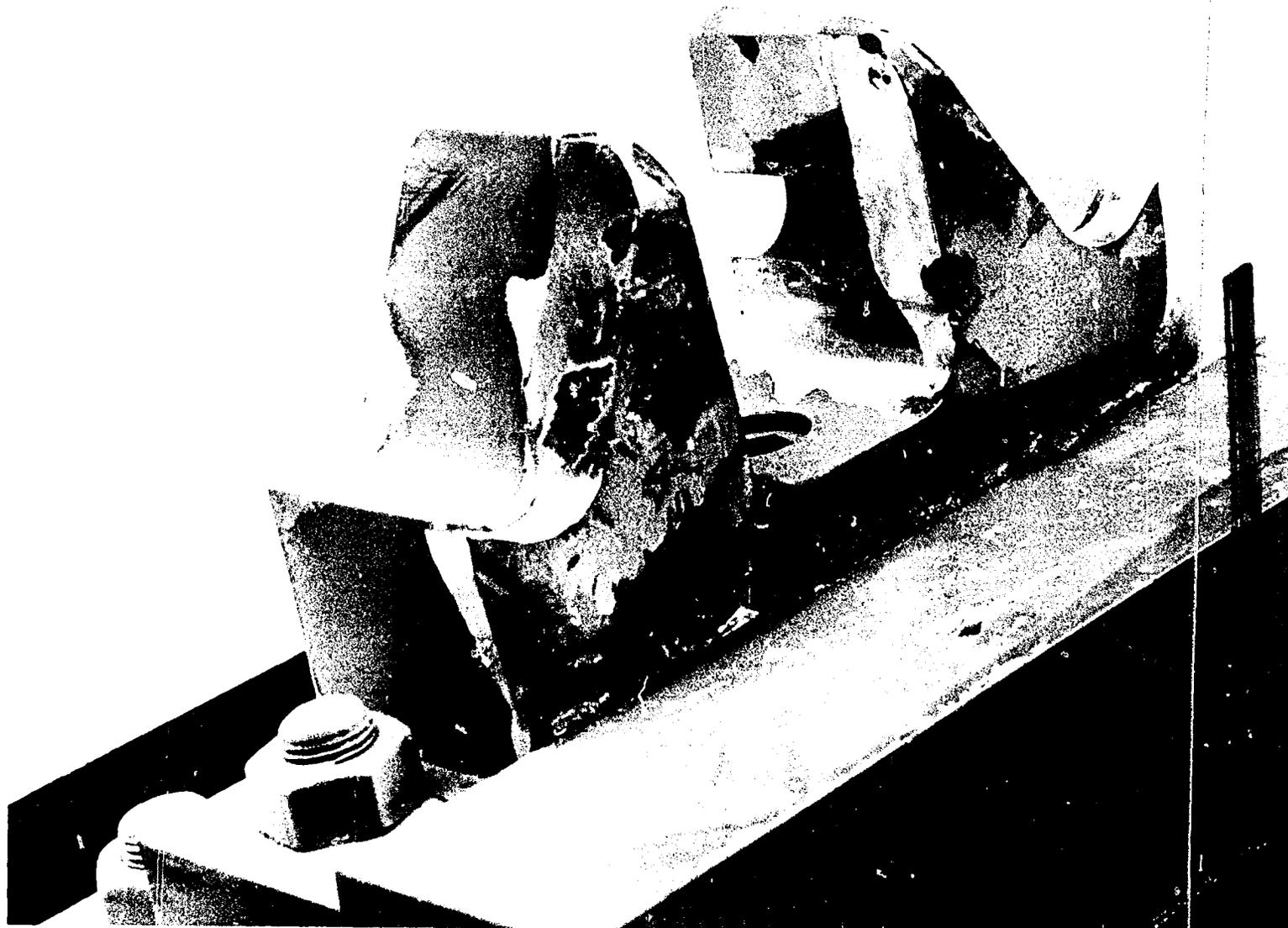


FIG. 4 -- STRESSCOAT CRACK PATTERNS AND FAILURE WHICH OCCURRED DURING STATIC TEST OF NO. 1 TX-43 PARACHUTE ATTACHMENT.

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FIG. 5 -- STRESSCOAT CRACK PATTERNS AND FAILURE WHICH OCCURRED DURING STATIC TEST OF NO. 1 TX-43 PARACHUTE ATTACHMENT.

MARKED PATTERNS TENSION  
UNMARKED PATTERNS COMPRESSION

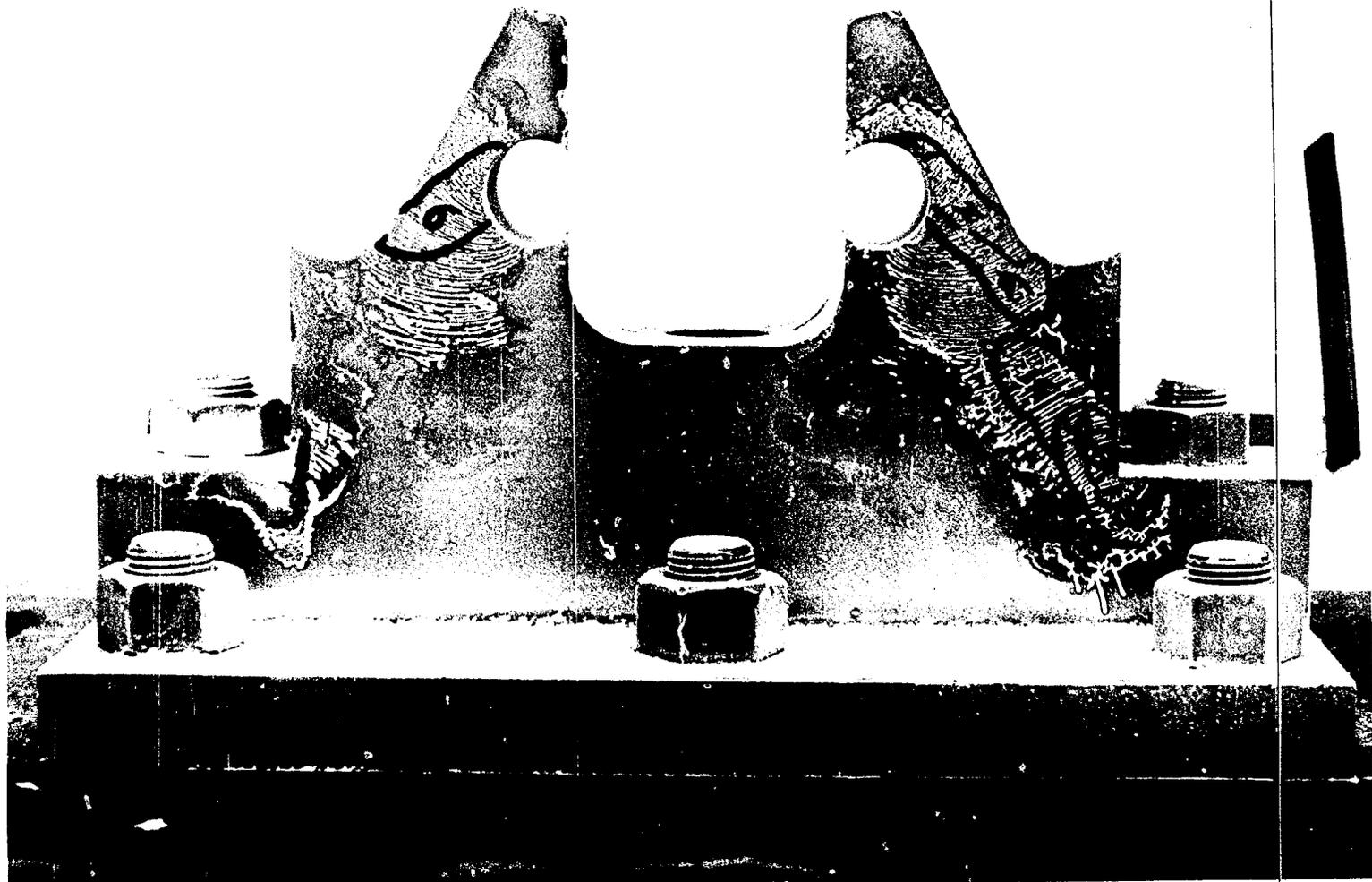


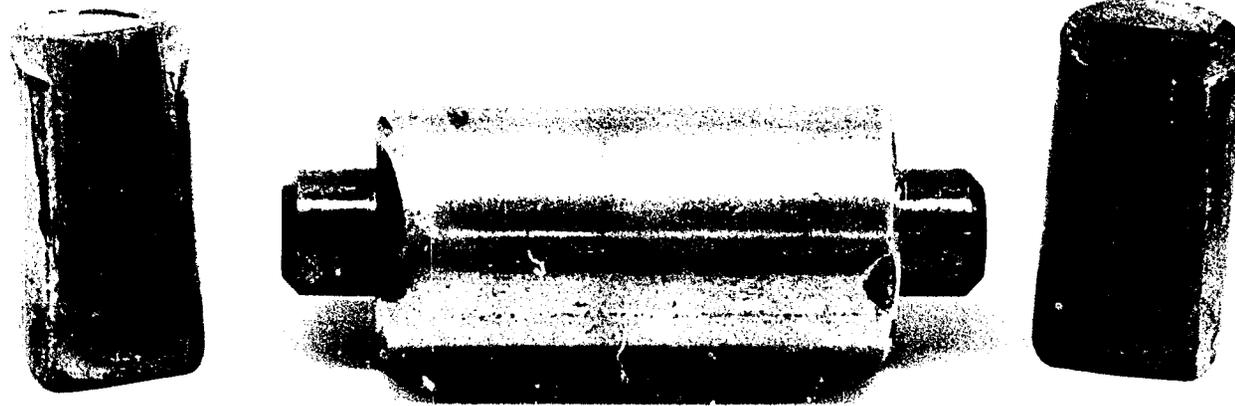
FIG. 6 -- STRESSCOAT CRACK PATTERNS WHICH OCCURRED DURING STATIC TEST OF NO. 1 TX-43  
PARACHUTE ATTACHMENT.

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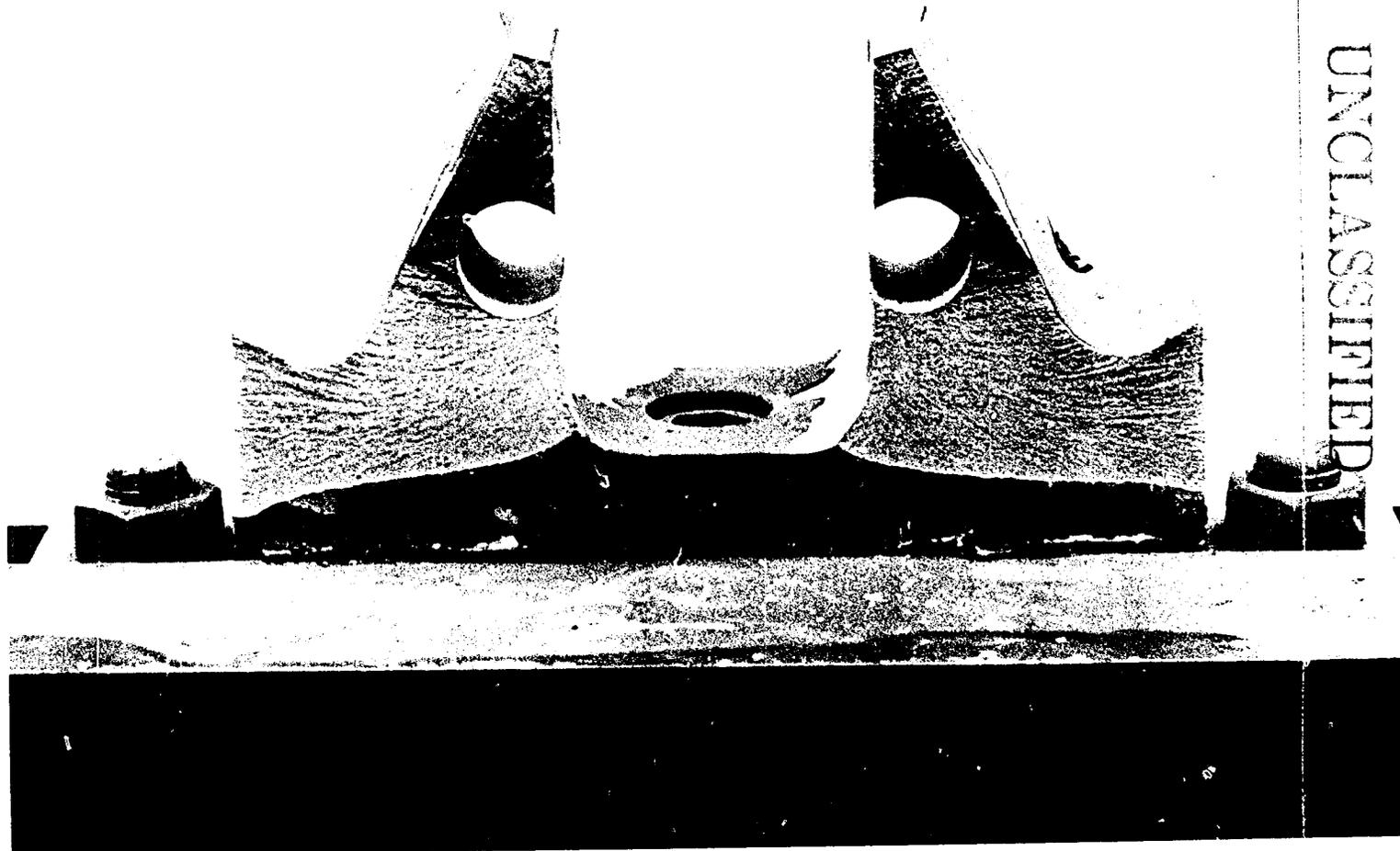


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FIG. 7 -- DEFORMATION OF INSERTS AND ROLLER WHICH OCCURRED DURING STATIC TEST OF NO. 1 TX-43 PAPACHUTE ATTACHMENT.

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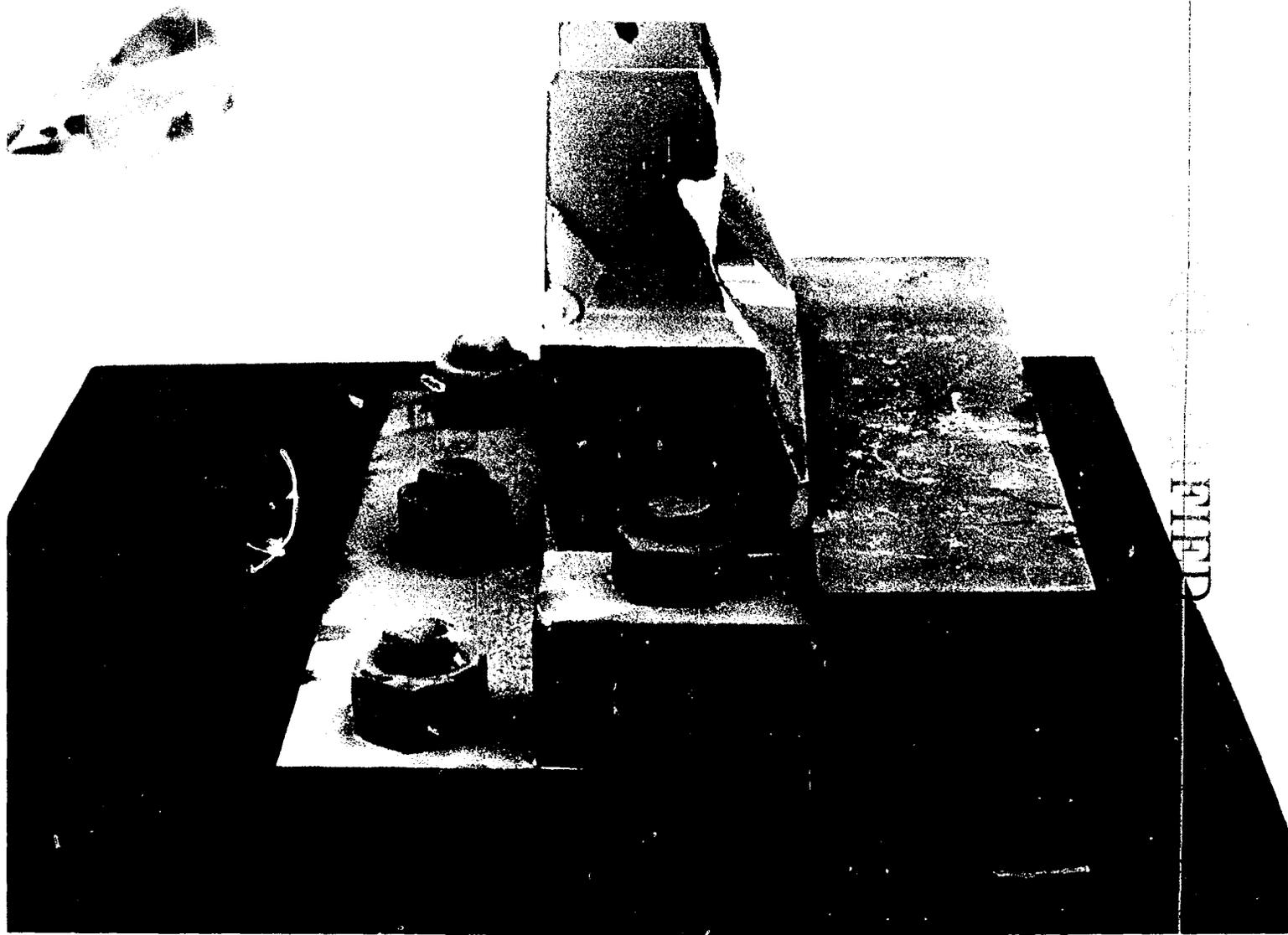


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FIG. 8 -- FAILURE WHICH OCCURRED DURING STATIC TEST OF NO. 1 TX-43 PARACHUTE ATTACHMENT.

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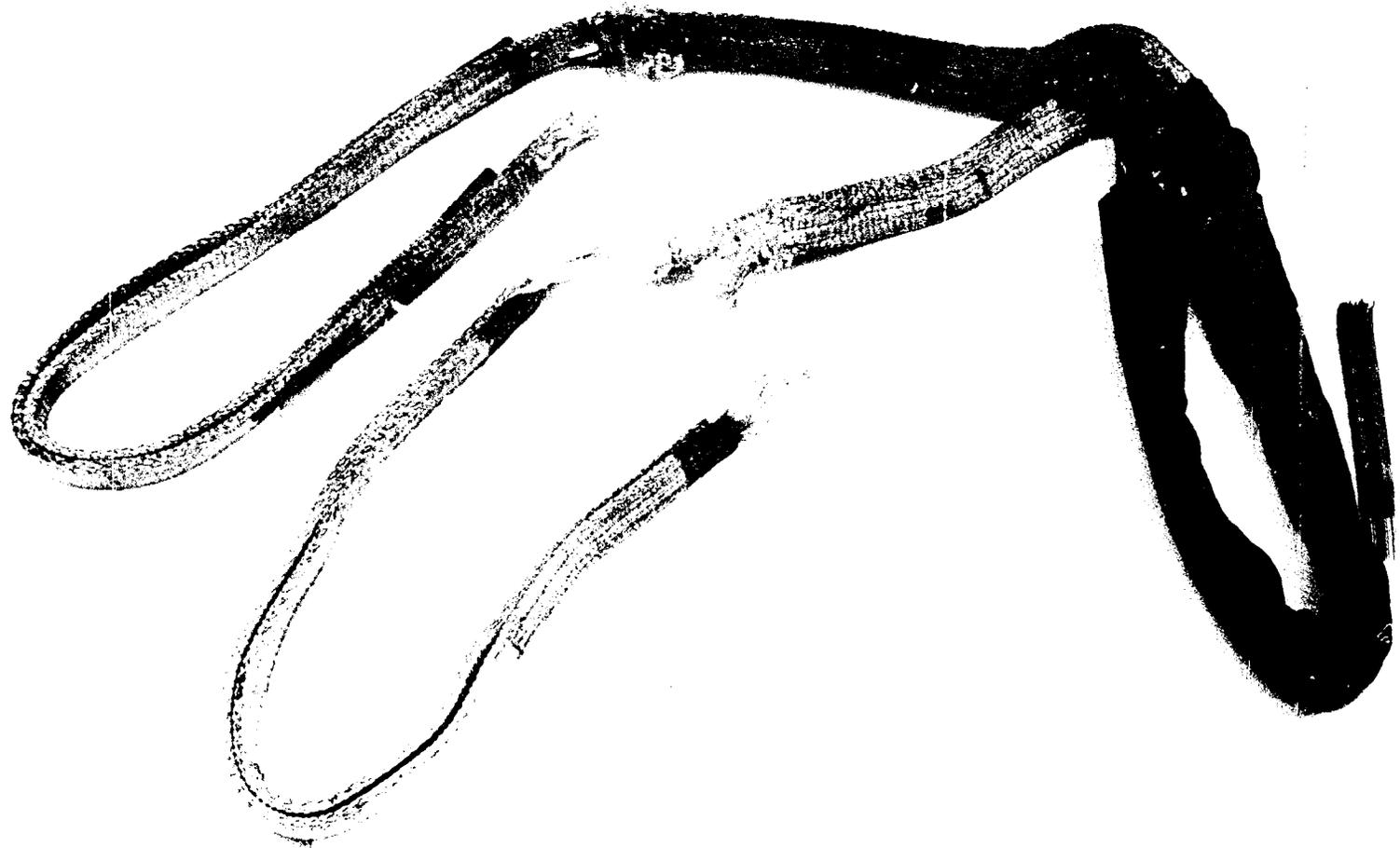
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FIG. 9 -- FAILURE WHICH OCCURRED DURING STATIC TEST OF NO. 1 TX-43 PARACHUTE ATTACHMENT.

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FIG. 10 -- FAILURE OF PARACHUTE STRAP DURING STATIC TEST OF NO. 2 TX-43 PARACHUTE ATTACHMENT.

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MARKED PATTERNS TENSION  
UNMARKED PATTERNS COMPRESSION

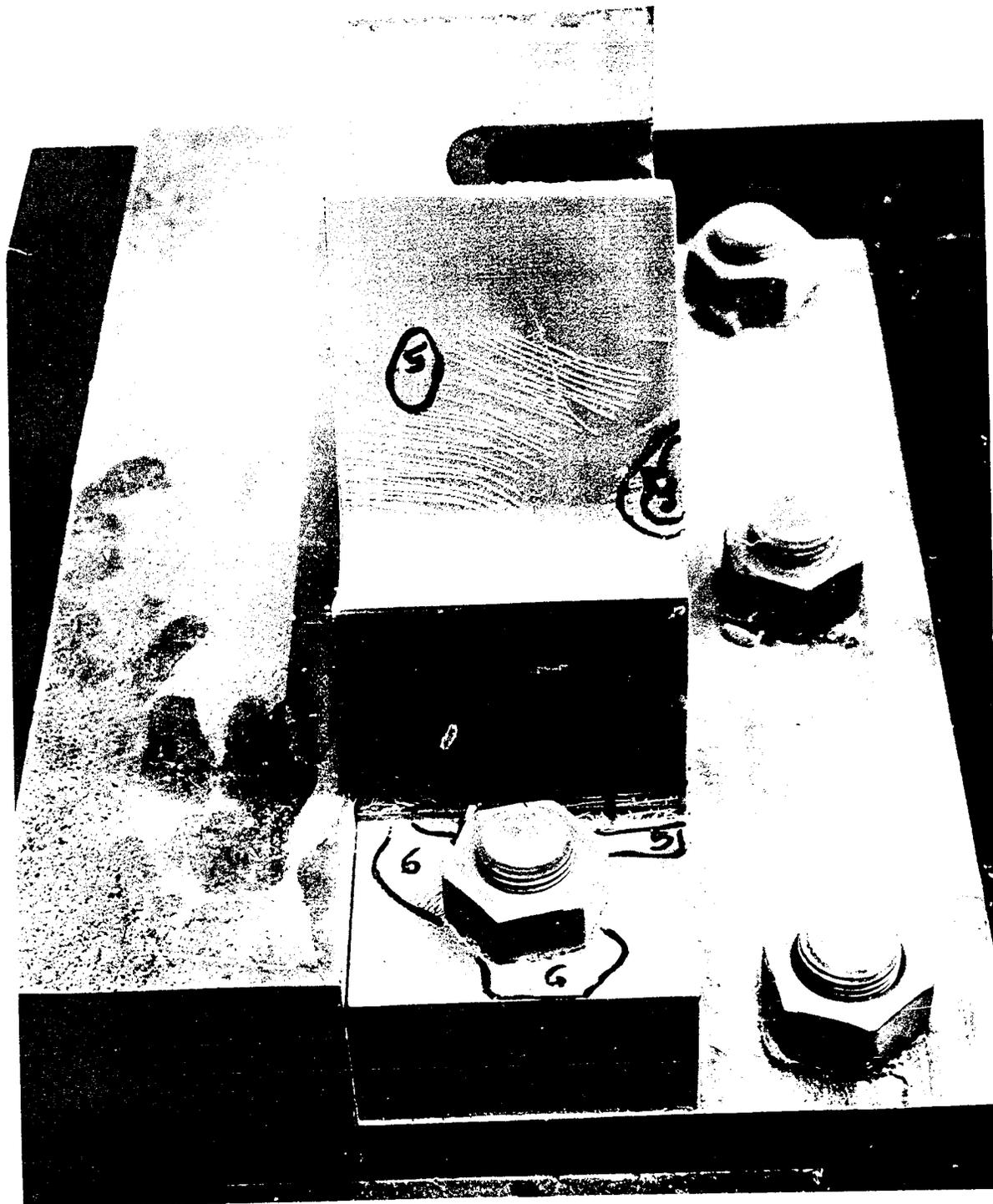


FIG. 11 -- STRESSCOAT CRACK PATTERNS WHICH OCCURRED DURING STATIC TEST OF NO. 2 TX-43 PARACHUTE ATTACHMENT.

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MARKED PATTERNS TENSION  
UNMARKED PATTERNS COMPRESSION

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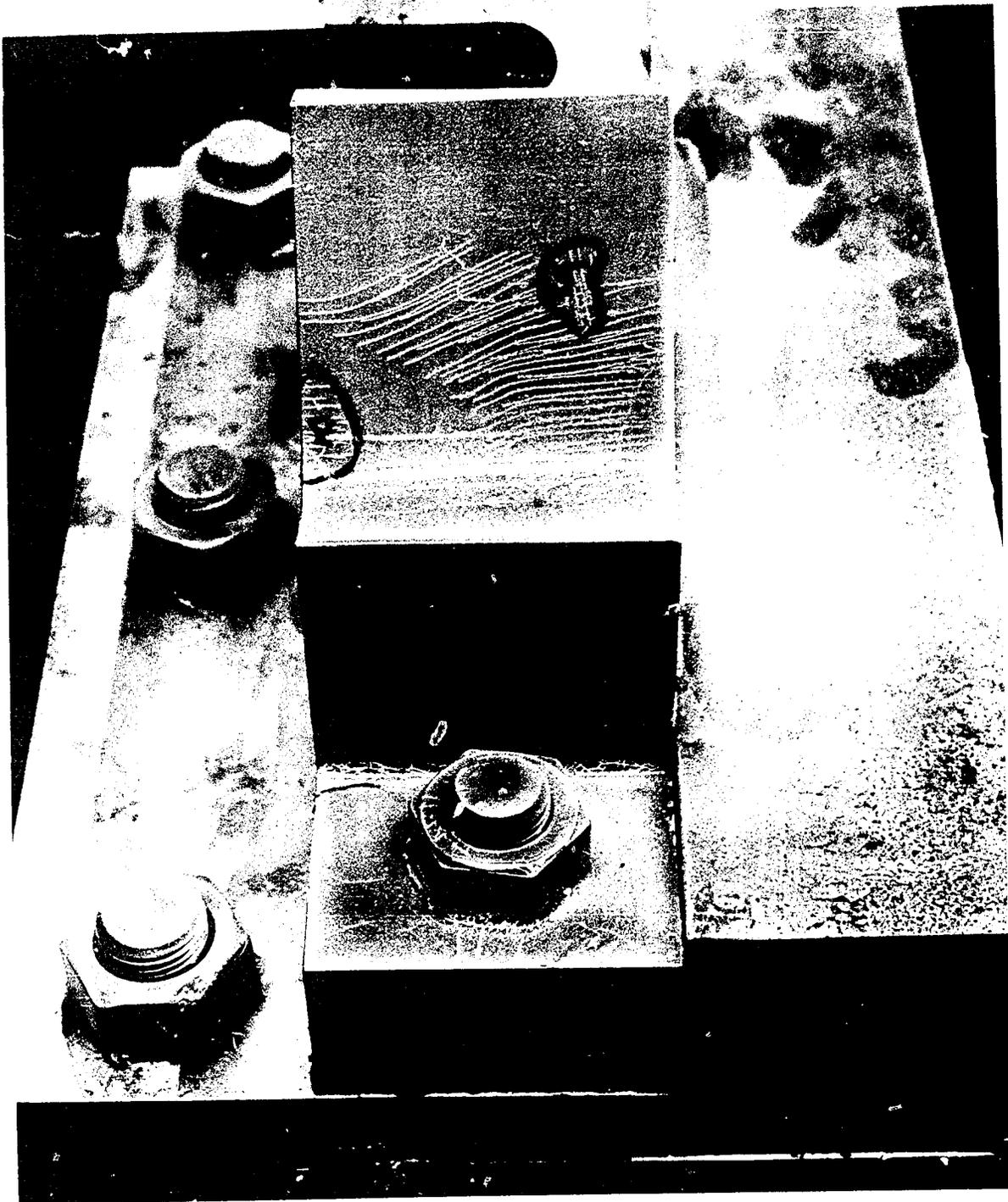


FIG. 12 -- STRESSCOAT CRACK PATTERNS WHICH OCCURRED DURING STATIC TEST OF NO. 2 TX-43 PARACHUTE ATTACHMENT

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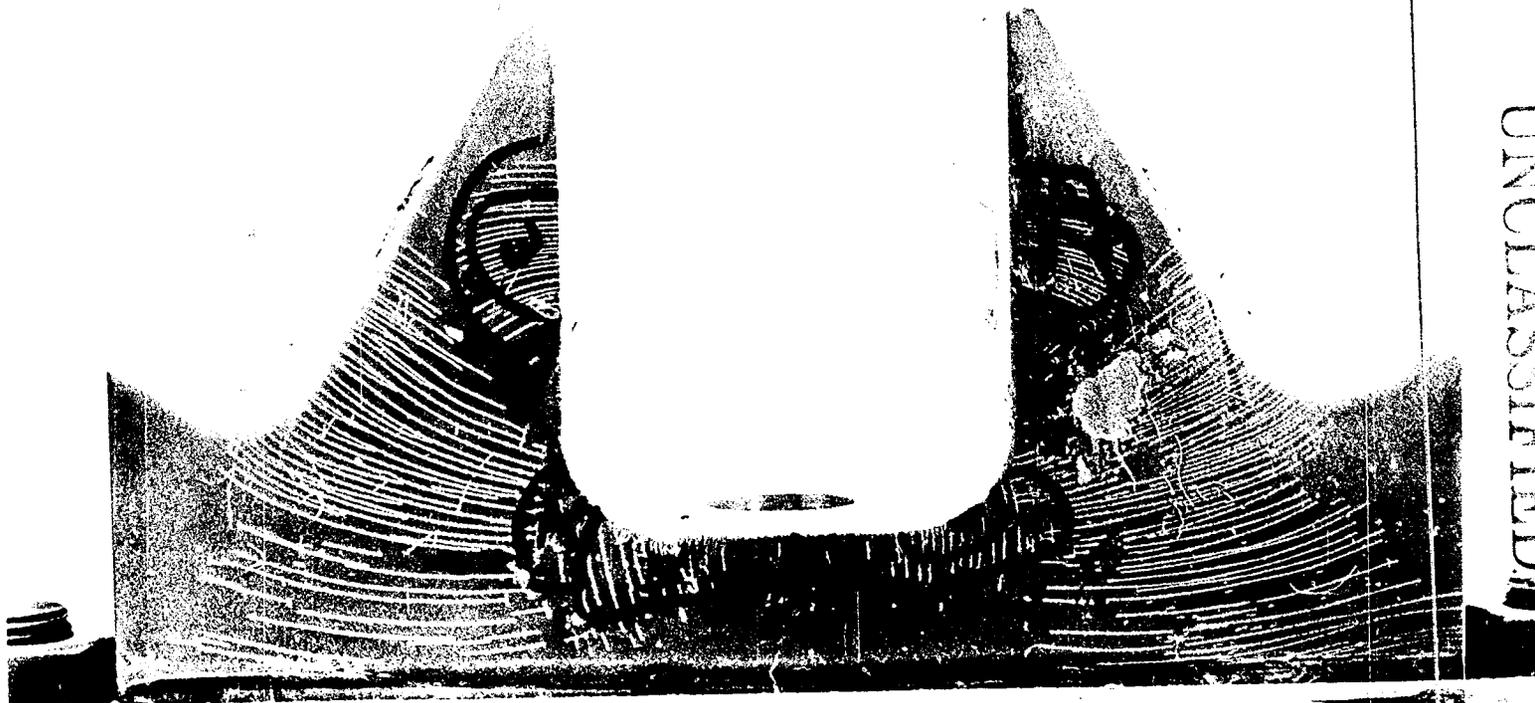
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MARKED PATTERNS TENSION  
UNMARKED PATTERNS COMPRESSION

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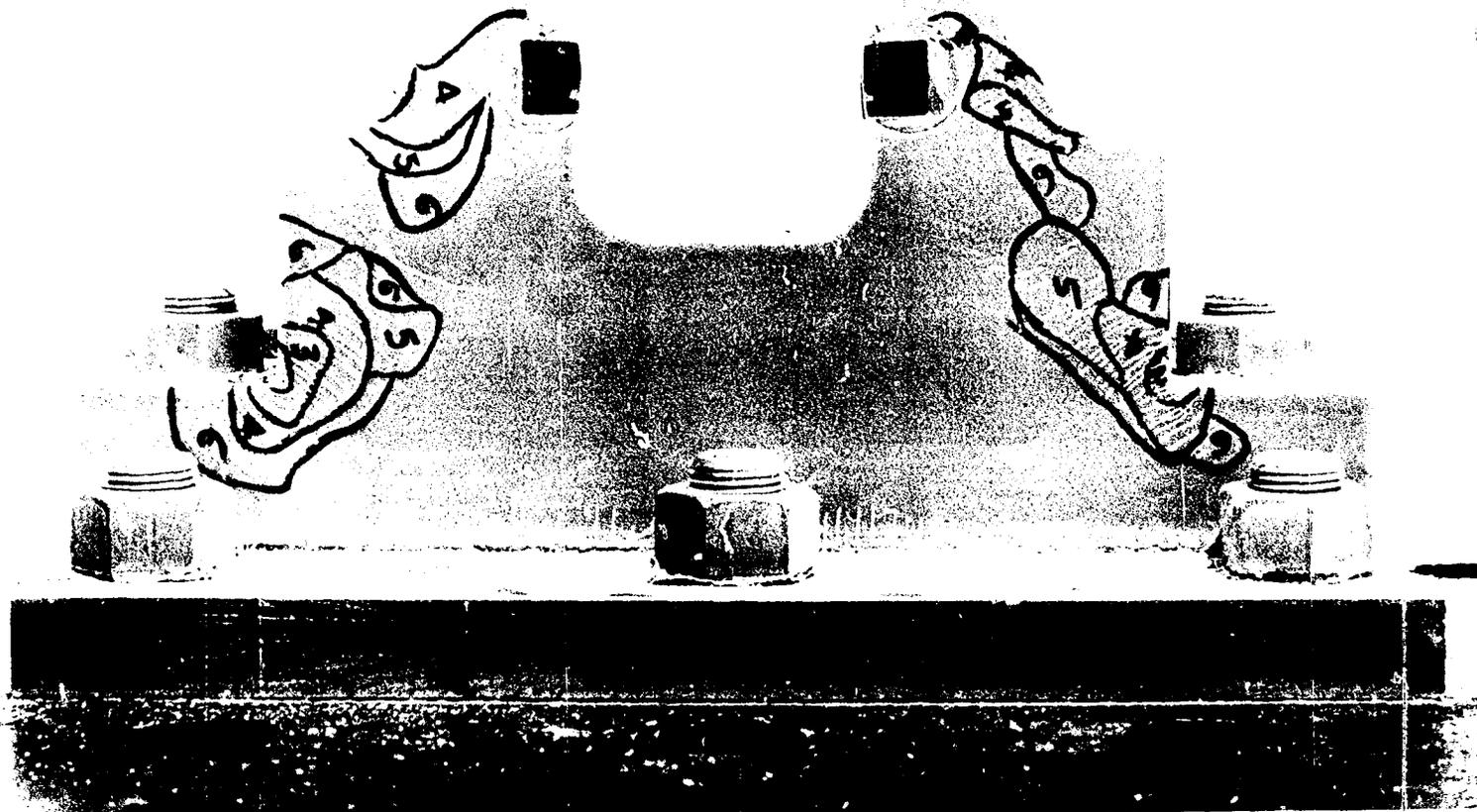
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FIG. 13 -- STRESSCOAT CRACK PATTERNS WHICH OCCURRED DURING STATIC TEST OF NO. 2 X-43  
PARACHUTE ATTACHMENT.

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MARKED PATTERNS TENSION  
UNMARKED PATTERNS COMPRESSION

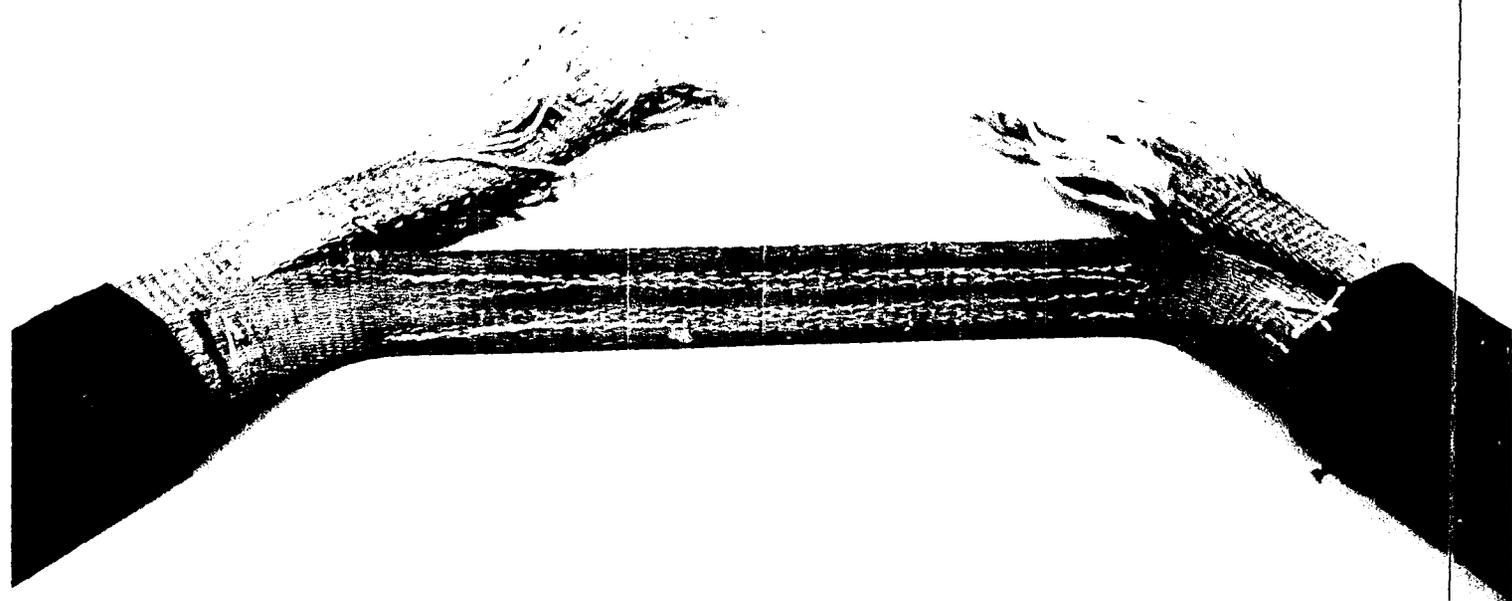
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FIG. 14 -- STRESSCOAT CRACK PATTERNS WHICH OCCURRED DURING STATIC TEST OF NO. 2 TX-43 PARACHUTE ATTACHMENT.

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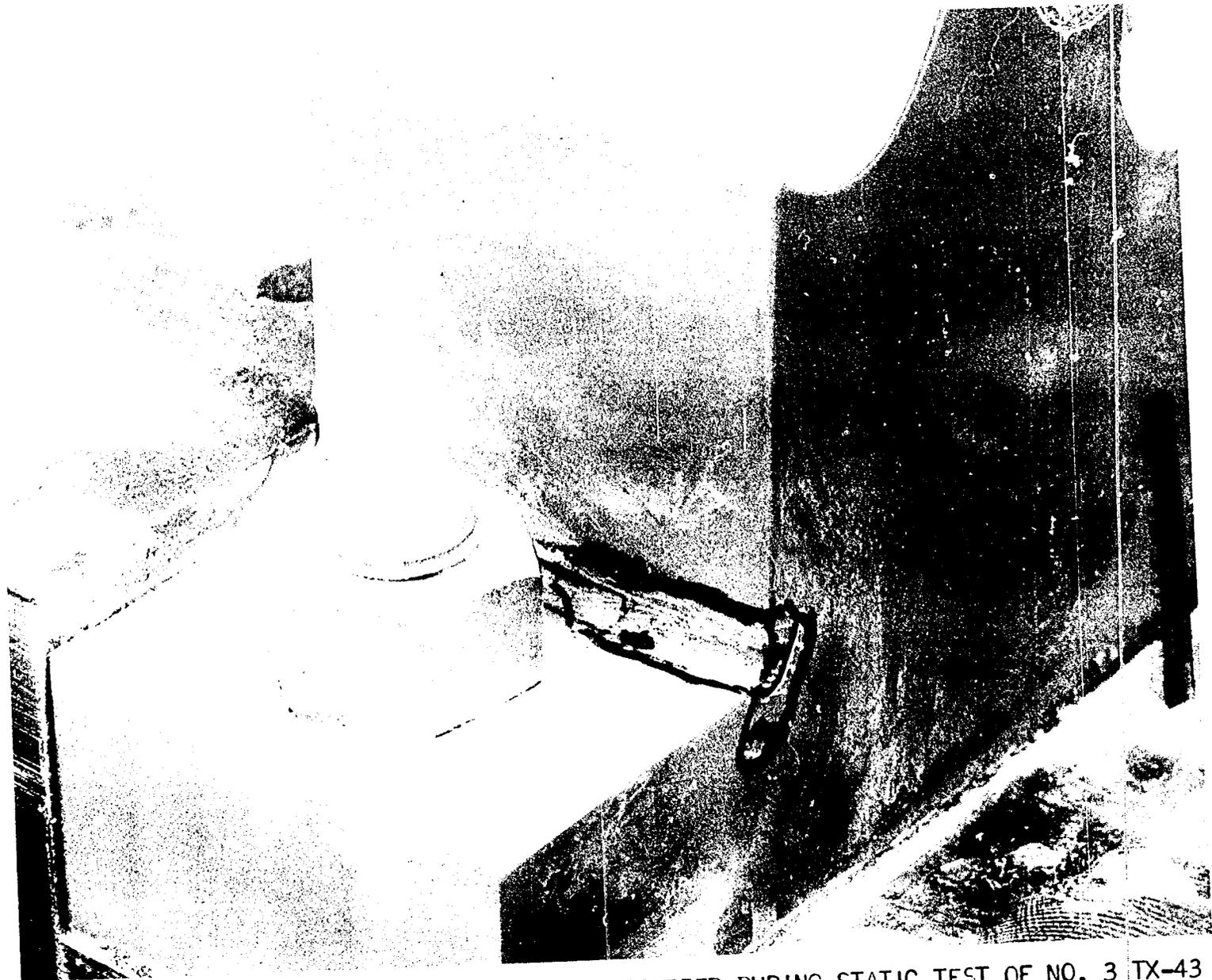
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FIG. 15 -- FAILURE OF PARACHUTE STRAP DURING STATIC TEST OF NO. 3 TX-43 PARACHUTE ATTACHMENT.

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FIG. 16 -- STRESSCOAT CRACK PATTERNS WHICH OCCURRED DURING STATIC TEST OF NO. 3 TX-43 PARACHUTE ATTACHMENT.

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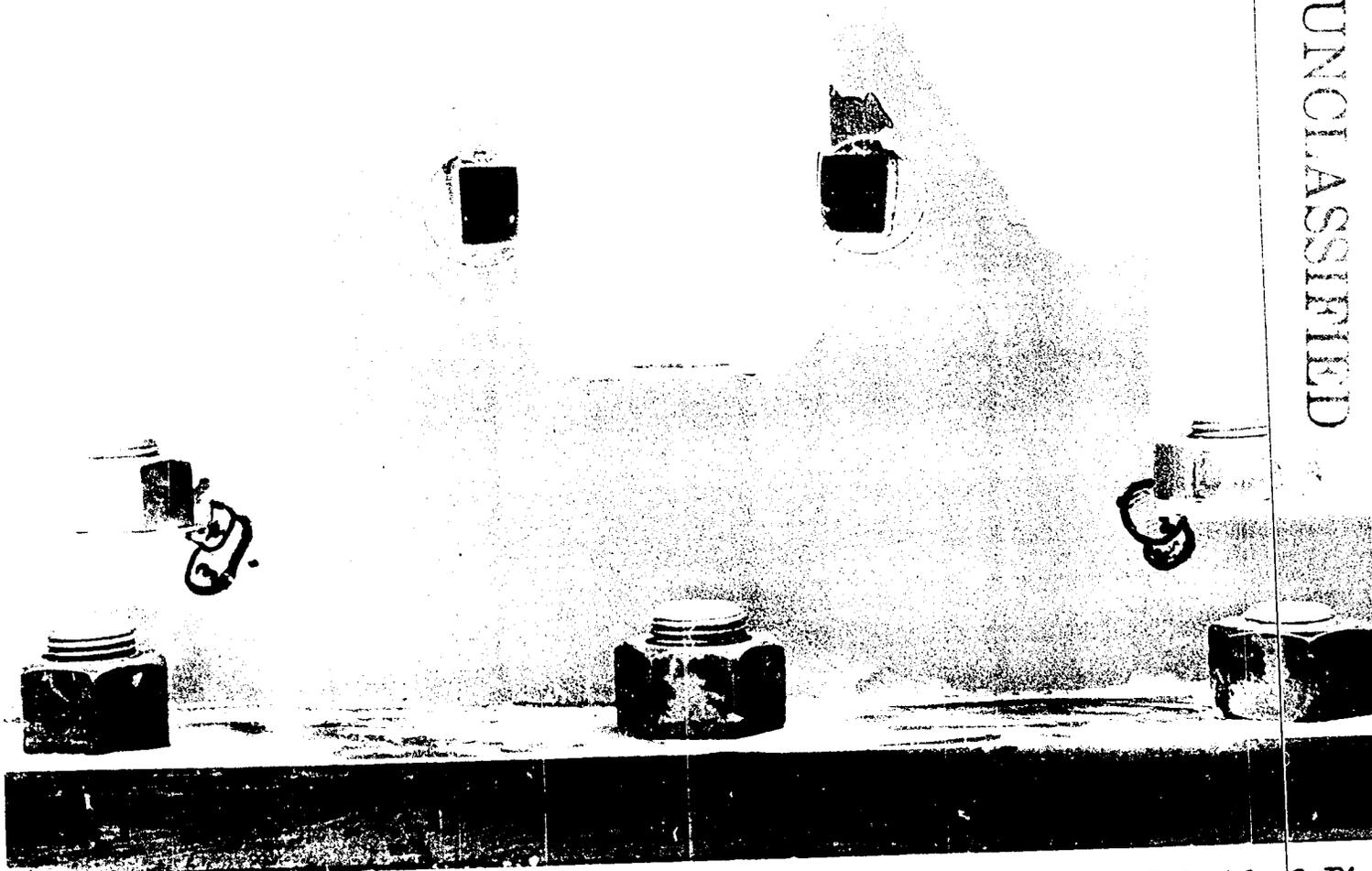
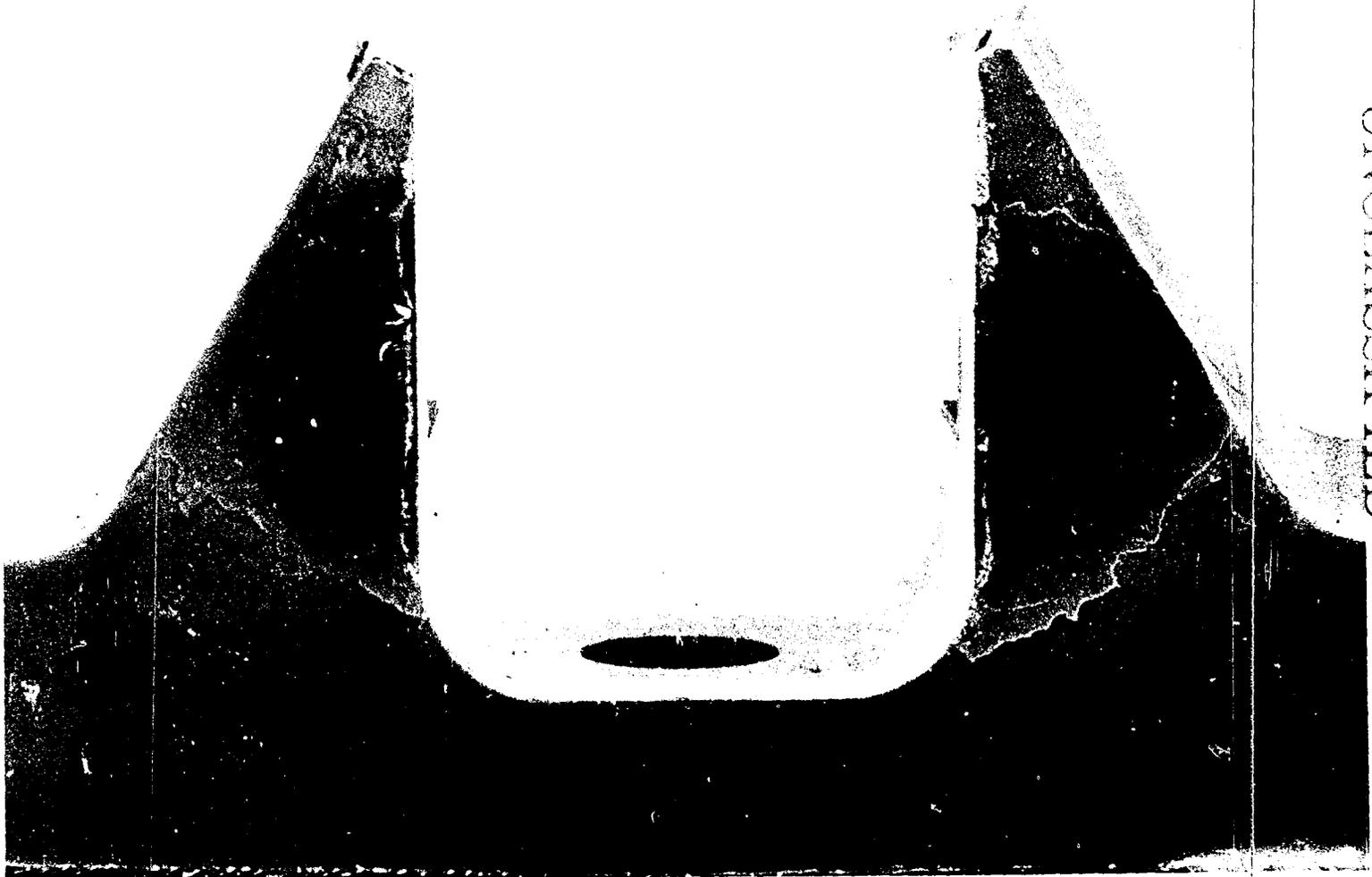


FIG. 17 -- STRESSCOAT CRACK PATTERNS WHICH OCCURRED DURING STATIC TEST OF NO. 3 TX-43 PARACHUTE ATTACHMENT.

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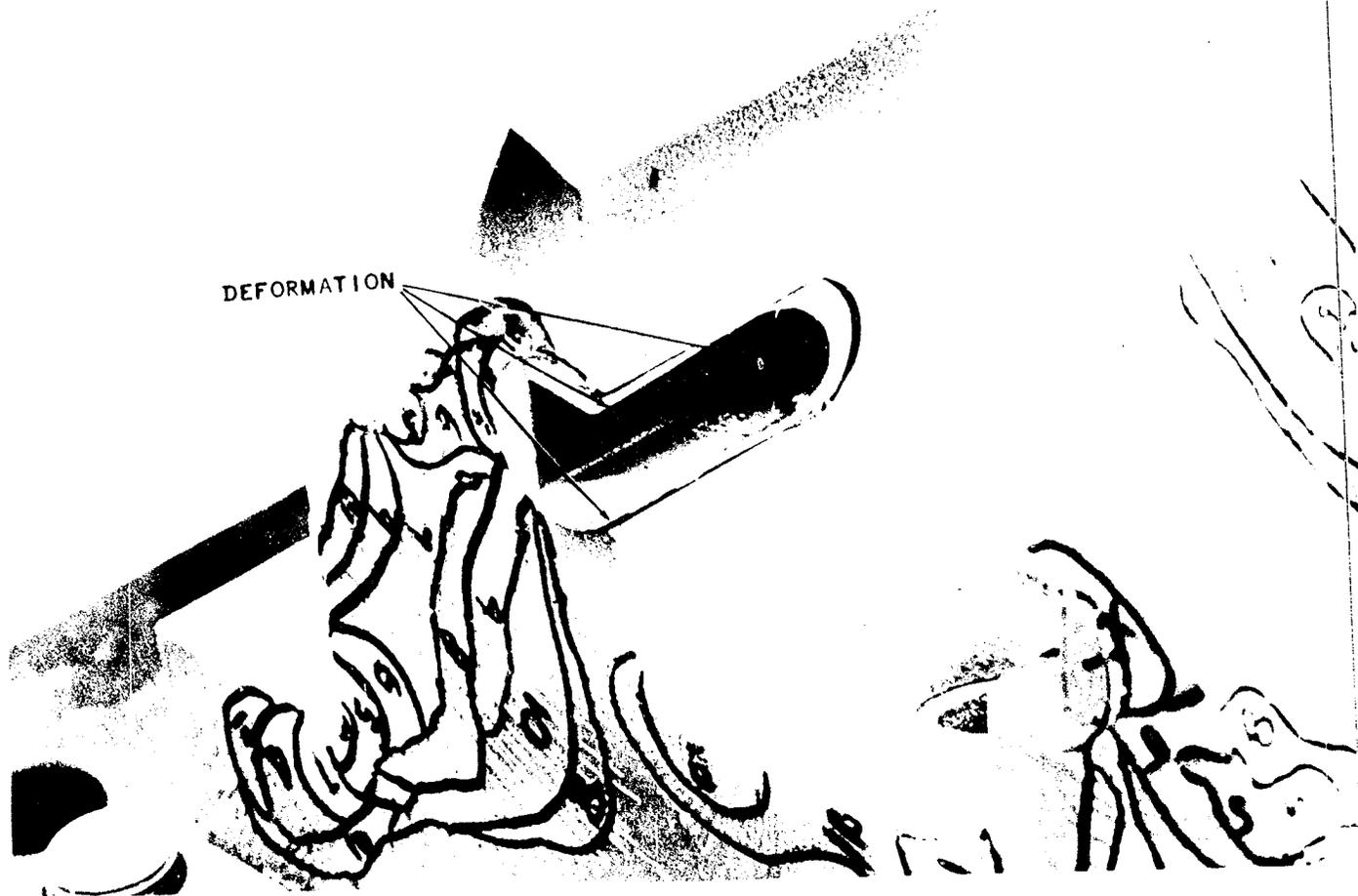
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FIG. 18 -- STRESSCOAT CRACK PATTERNS WHICH OCCURRED DURING STATIC TEST OF NO. 3 TX-43 PARACHUTE ATTACHMENT.

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FIG. 19 -- DEFORMATION WHICH OCCURRED TO INSERT DURING STATIC TEST OF NO. 4 TX-43 PARACHUTE ATTACHMENT.

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FIG. 20 -- FAILURE WHICH OCCURRED TO ROLLER DURING STATIC TEST OF NO. 4 TX-43 PARACHUTE ATTACHMENT.

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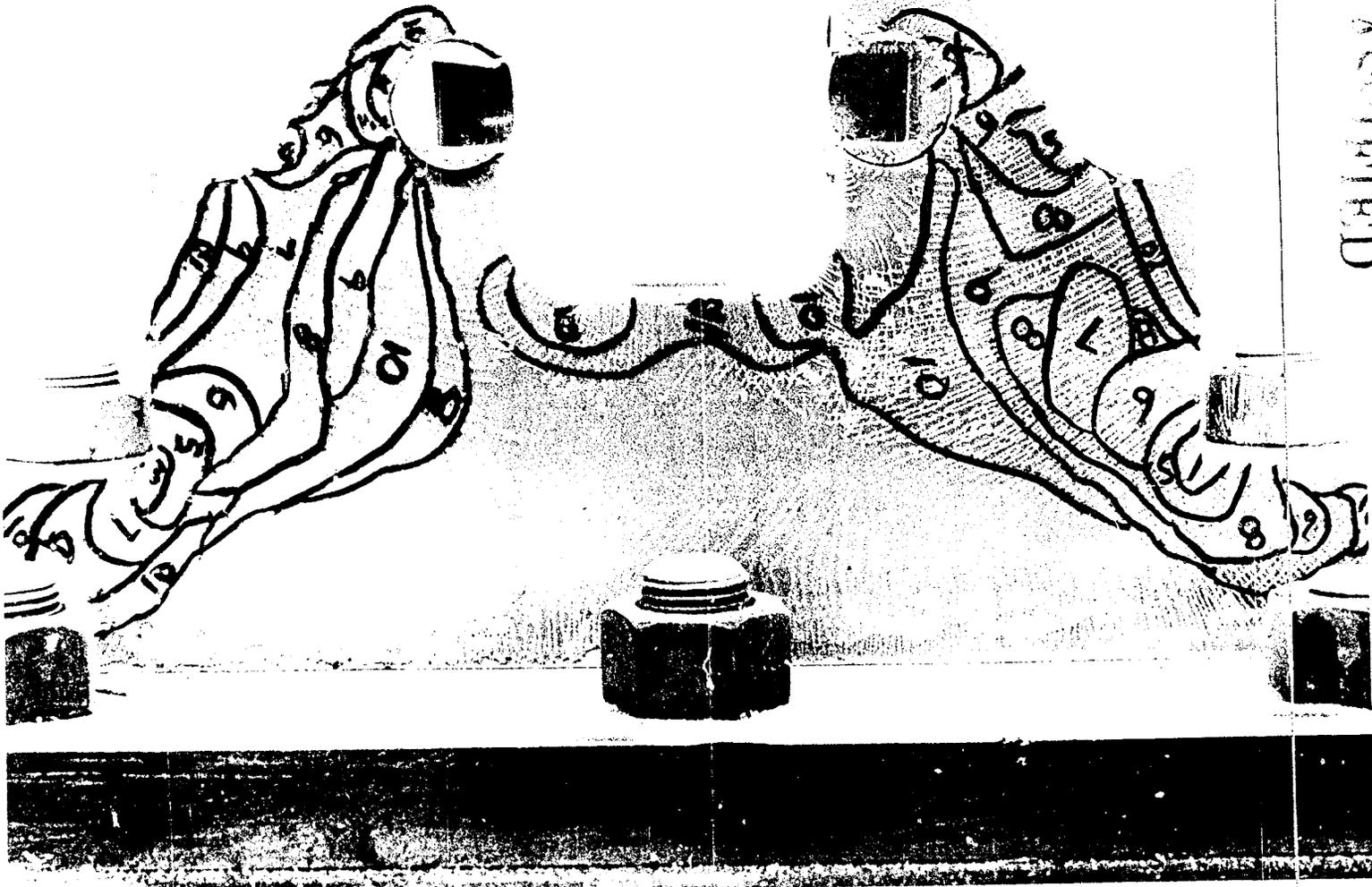
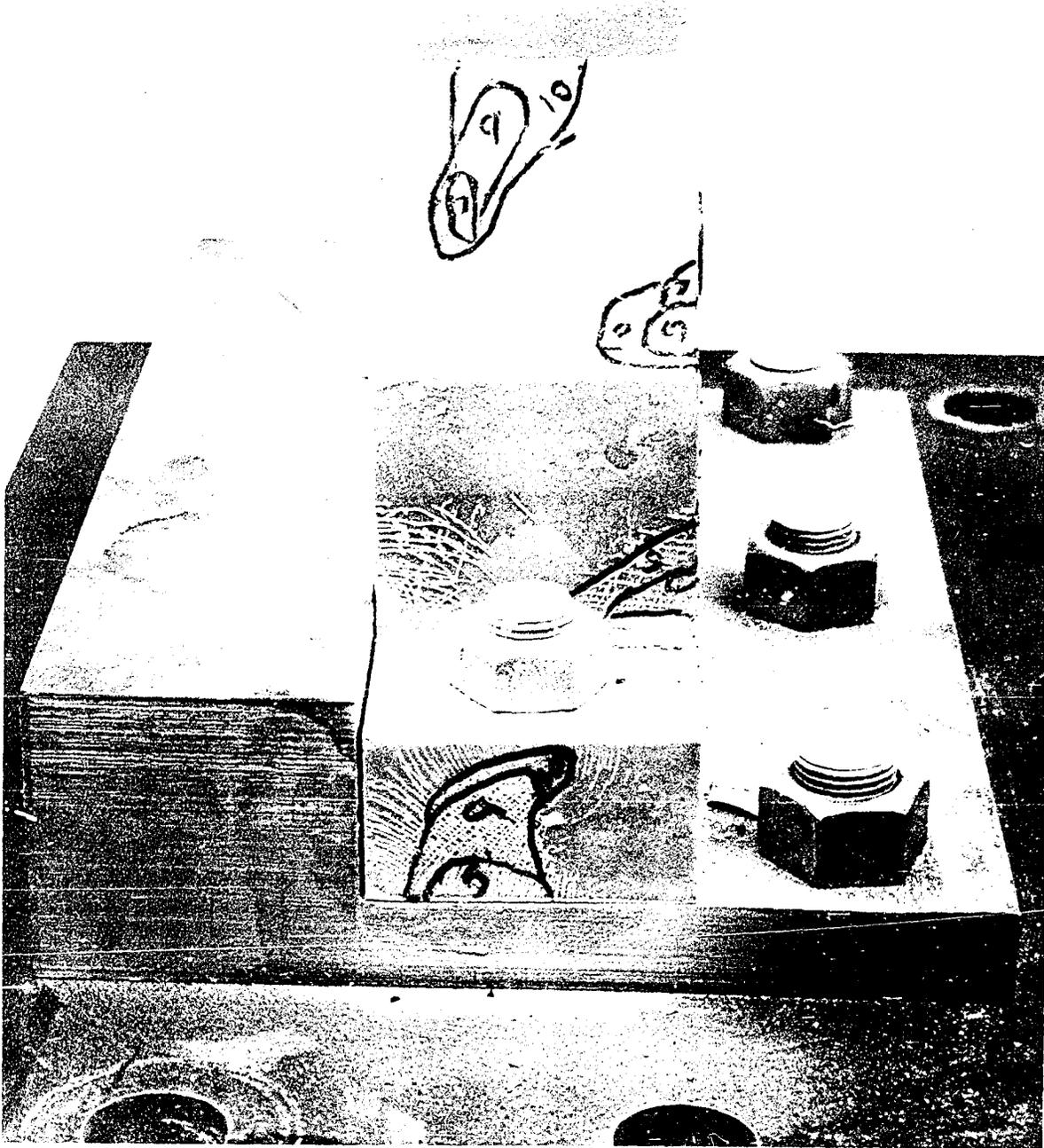


FIG. 21 -- STRESSCOAT CRACK PATTERNS WHICH OCCURRED DURING STATIC TEST OF NO. 4 TX-43 PARACHUTE ATTACHMENT.

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FIG. 23 -- STRESSCOAT CRACK PATTERNS WHICH OCCURRED DURING STATIC TEST OF NO. 4 TX-43 PARACHUTE ATTACHMENT.

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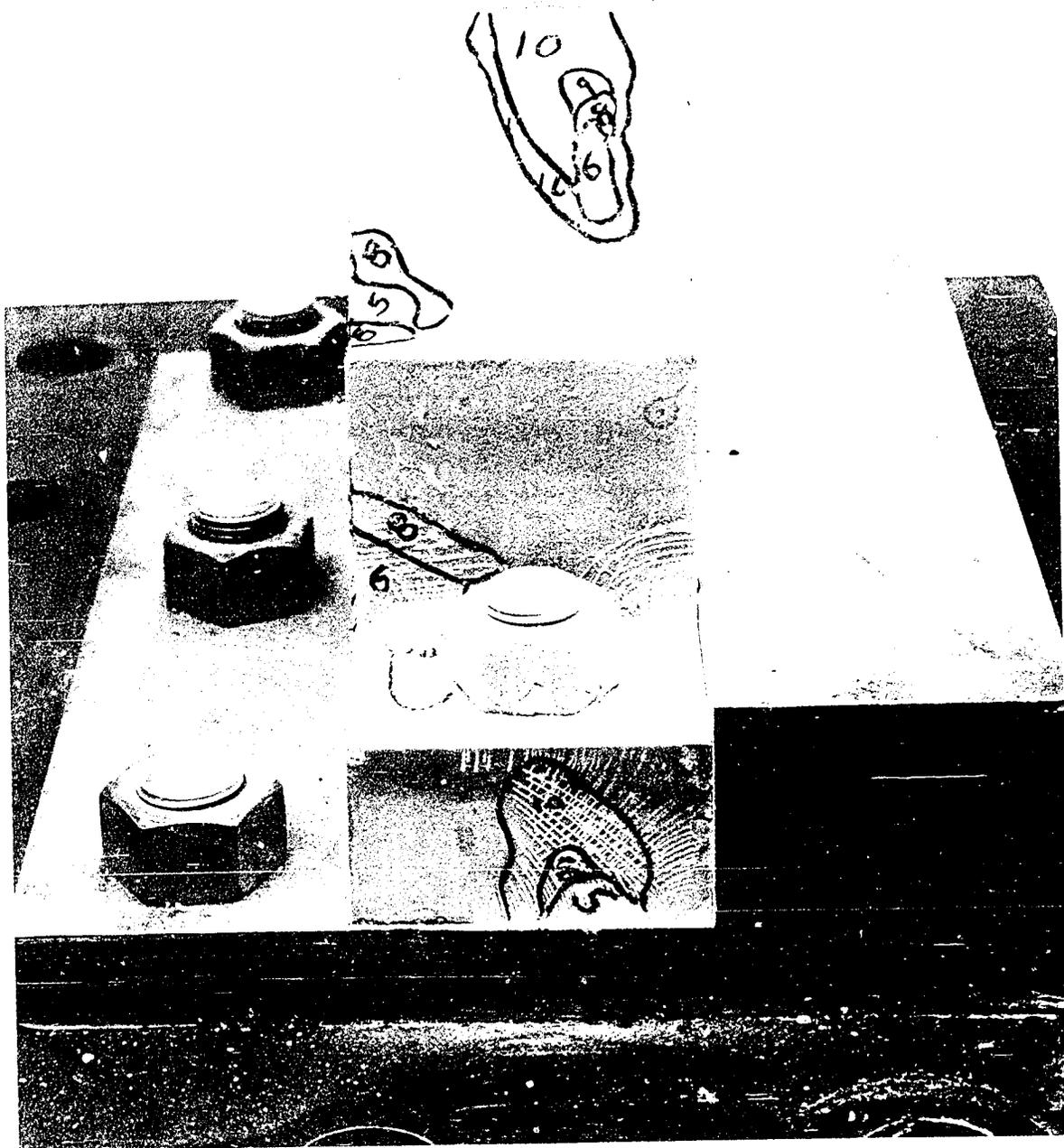


FIG. 24 -- STRESSCOAT CRACK PATTERNS WHICH OCCURRED DURING STATIC TEST OF NO. 4 TX-43 PARACHUTE ATTACHMENT.

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TABLE I

STRESSCOAT DATA FROM STATIC TEST OF NUMBER ONE  
XW-43 PARACHUTE ATTACHMENT - STRESSCOAT NO. 1206

<u>Load (Pounds)</u>	<u>Sensitivity of Stresscoat Microinches/Inch</u>	<u>Stresscoat Numbers on Attachment</u>	<u>Photos of Stresscoat Patterns</u>	<u>Apparent Stress at Maximum Load</u>
5,000				
6,000				
7,000				
8,000	750	1	Fig. 6	22,070
9,600	750	2	Figs. 4,5,6	18,900
11,520	750	3	Figs. 4,5,6	15,750
13,824	750	4	Figs. 3,4,5,6	13,100
16,620	750	5	Figs. 4,5,6	10,900
19,940	750	6	Figs. 3,4,6	9,100
23,500	750			

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TABLE II

STRESSCOAT DATA FROM STATIC TEST OF NUMBER TWO  
XW-43 PARACHUTE ATTACHMENT - STRESSCOAT NO. 1205

<u>Load (Pounds)</u>	<u>Sensitivity of Stresscoat Microinches/Inch</u>	<u>Stresscoat No. on Attachment</u>	<u>Photos of Stresscoat Patterns</u>	<u>Apparent Stress at Max. Load</u>
6,000				
7,000				
9,850	800	1	Fig. 11	20,300
11,800	800	2	Figs. 13,14	17,000
15,400	800	3	Figs. 11,13,14	13,000
18,500	800	4	Figs. 11,12,13,14	10,800
22,200	800	5	Figs. 11,12,13,14	9,000
24,300	800	6	Figs. 11,13,14	8,230

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TABLE III

STRESSCOAT DATA FROM STATIC TEST OF NUMBER THREE  
XN-43 PARACHUTE ATTACHMENT - STRESSCOAT NO. 1206

<u>Load (Pounds)</u>	<u>Sensitivity of Stresscoat Microinches/Inch</u>	<u>Stresscoat No. on Attachment</u>	<u>Photos of Stresscoat Patterns</u>	<u>Apparent Stress at Maximum Load</u>
6,000				
7,000				
8,000				
9,000	950	1	Fig. 15	16,400
10,800	950	2	Figs. 15,16	13,700
12,950	950	3	Figs. 15,16,17	11,400
15,100				

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STRESSCOAT DATA FROM STATIC TEST OF NUMBER FOUR  
XW-43 PARACHUTE ATTACHMENT -- STRESSCOAT NO. 1207

Load (Pounds)	Sensitivity of Stresscoat Microinches/Inch	Stresscoat No. on Attachment	Photos of Stresscoat Patterns	Apparent Stress at Surface Load
6,000		800	Fig. 21	49,400
7,000	1	800	Fig. 23	41,100
8,400	2	800	Fig. 23	34,000
10,100	3	800	Fig. 23	27,800
12,300	4	800	Figs. 21, 23	22,900
14,760	5	750	Figs. 21, 22, 23, 24	18,250
17,710	6	750	Figs. 21, 23, 24	13,250
21,250	7	750	Figs. 21, 22, 23	12,200
25,500	8	750	Figs. 21, 23, 24	12,700
30,600	9	750	Figs. 21, 22, 23, 24	10,600
36,720	10	750	Figs. 21, 22, 23, 24	8,800
41,900				

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