

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW	
1 st Review Date: 7/11/98	1. Classification Requested: U
Authority: ADD	2. Classification Changed to: U
Name: <i>W. C. Layne</i>	3. Contains No DOE Classified Information
2 nd Review Date: 8/20/98	4. Coordinate With:
Authority: ADD	5. Contains UCAF:
Name: <i>W. Layne</i>	6. Comments: <i>Declassify</i>

AUG 15 1956
 Case No. 690.00
 Ref. Sym: 1612 (355)
 Project No. TM-421
 File: TX-28, 3-2

RECEIVED
 AUG 15 1956
 R & D FILES

MR. S. A. MOORE - 1224
 Attn: Mr. L. M. Spivey - 1224
 Re: Static Test of TX-28 Front Case

CDL No.	
ACCOUNTABILITY CARD	Bh
FILE No.	TX-28
	3-2

Summary of Results

The TX-28 front case (XMC-712) was statically tested to three loading conditions, one simulating an ejection condition and the other two simulating free fall conditions. The case withstood the test loads which ranged to a maximum of 200 per cent of limit load for the ejection condition and 150 per cent of limit load for free fall conditions without producing any damage.

When the case was Stresscoated and loaded to 150 per cent of limit load for the ejection condition and a free fall condition, stress computations from the Stresscoat cracks indicated maximum stresses from 14,000 to 15,000 psi at 150 per cent of limit load for these two conditions.

Object of Test

The object of the test was to determine the strength and deflection characteristics of the TX-28 front case (made from 24ST-4) under a loading condition simulating ejection loads and under loading conditions simulating free fall. The limit loads for these three conditions are shown in Table I.

Reason for Test

The test was performed as a result of the Work Order Authorization dated June 8, 1956 from Division 1224 to Division 1612.

Function of Object Tested

The object tested furnishes part of the external shape for the TX-28 and supports the fusing and firing components. The case tested is the nose on the weapon that is carried externally and is the rear of the weapon that is carried internally. The free-fall loads are for the weapon that is carried internally and the ejection load conditions are for the internal version.

Summary of Past Tests

Two previous static tests have been performed on the TX-28 front case by Division 1612.

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW DOWNGRADING OR DECLASSIFICATION STAMP	
CLASSIFICATION CHANGED TO: U	AUTHORITY: <i>W. C. Layne</i>
Emelda Selph 8/25/98	RECORD ID: 98SN3794
PERSON CHANGING MARKING & DATE	DATED: 8/20/98
<i>W. C. Layne 8/26/98</i>	
PERSON VERIFYING MARKING & DATE	

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The results of the first of these two tests are given in the report, Static Test of TX-28 (Internally Carried Version) Front Case and Fin, Ref. Sym: 1612 (316), Project No. TM-382, dated April 18, 1956. The "Summary of Results" from that report is as follows:

"A TX-28 fin mounted to a front case was statically tested to 150 per cent design limit load (2760 pounds) simulating air loads. Both the fin and the case withstood this load without any signs of failure or yielding."

A second test has been run on the TX-28 but the test report has not been published at the time of this writing. This previous report will be identified as follows: Static Test of TX-28 (Internally Carried Version) Front Case and Fin, Ref. Sym: 1612 (356), Project No. TM-422.

Setup for Test

The drawing number for the TX-28 front case (XMC-712) is 5Y-119275.

Figures 1 and 2 show the setup for Condition I. Figures 3 and 4 show the setup for Condition II. The setup for Condition III is identical to Condition II except that the test item is rotated 90° about its longitudinal axis in Condition III as compared to Condition II.

The following test equipment was used:

- 3 - SR-4 Strain Indicators, Serial Nos. J-59252, J-92499, and 199375.
- 3 - One-inch calibrated pull bars; Serial No. E, No. 5, and No. H; sensitivity in microinches per inch per pound = 0.1078, 0.1088, and 0.1070.

The following instrumentation was used:

- 4 - Starrett dial indicators, graduated to 0.001 inch and a range of 1.0 inch.
- 1208 Stresscoat with a sensitivity of about 650 microinches per inch at time of test.

Procedure

The case was Stresscoated with Stresscoat No. 1208 and mounted to the static jig as shown in Figs. 1 and 2. For Condition I, the case was mounted to the jig so that the large access door was on the right when viewing the test unit from the nose. Tension loads for Condition I at the three locations, Stations 13, 27, and 40, were applied vertically in increments of

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10 per cent of limit load from 20 to 150 per cent of limit load. The case was unloaded after each increment and permanent deflections were read for zero load. Vertical deflections were taken on the bottom of the case at Stations 0, 16, and 33 for each load increment. After each load increment the case was examined for Stresscoat cracks.

For Condition II, the case was Stresscoated with Stresscoat No. 1208 and mounted to the static jig as shown in Figs. 3 and 4. However, for this condition the case was rotated about its longitudinal axis so that the large access door was on the left when viewing the case from the nose. The case was loaded at the same stations and in the same percentage increments as for Condition I with vertical deflection readings being taken at Station 0, 16, and 33. After each increment the case was unloaded and permanent deflections were read for zero load. The case was inspected for Stresscoat cracks after each increment of load.

For Condition III, the case was mounted to the static jig so that the large access door was on the bottom. The directions of the loads and the stations on the unit for application of the loads were identical to those shown in Figs. 3 and 4 for Condition II. Vertical deflection readings were again taken at Stations 0, 16, and 33 for each 10 per cent increment of load between 20 and 150 per cent of limit load. Also, permanent deflections were read for zero load after each increment.

After loading the case to 150 per cent of limit load for each of the three loading conditions, the case was mounted in the jig as shown in the previous photographs, Figs. 1 and 2. The loads for Condition I were then applied in 10 per cent increments from 150 to 200 per cent of limit load with vertical deflection readings being taken for each load increment at the three stations 0, 16, and 33.

Results

The areas of Stresscoat cracks which resulted from loading the case to 150 per cent of limit for Condition I are shown in Figs. 5 and 6. The calculated stresses for the areas of Stresscoat cracks are given in Table II. The largest computed stress in this table is 14,000 psi.

The areas of Stresscoat cracks which resulted from loading the case to 150 per cent of limit load for Condition II are shown in Fig. 7. The calculated stresses for the areas of Stresscoat cracks are shown in Table III.

The deflection data for the three loading conditions are shown in Tables IV, V, and VI. The corresponding curves of per cent of load versus deflection are given on Figs. 8, 9, and 10. The largest measured deflections were 0.872 inch at Station 0, 0.618 inch at Station 16, and 0.375 inch at Station 33, all of which resulted from 200 per cent of limit load for

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Condition I. The greatest measured permanent deflections were 0.090 inch at Station 0, 0.077 inch at Station 16 and 0.059 inch at Station 33, all of which resulted from loading the unit to 200 per cent of limit load for Condition I.

Conclusions

The case indicated it has sufficient strength to withstand the conditions tested without producing excessive stresses or deflections.

Harry P. Wheeler
HARRY P. WHEELER - 1612-2

Approved by:

Paul H. Adams
PAUL H. ADAMS - 1612

HPW:1612-2:as

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TABLE I

LIMIT LOADS -- STATIC TEST OF TX-28 FRONT CASE

Condition No.	Loads in Pounds at Following Stations		
	Sta. 13	Sta. 27	Sta. 40
I	2270 Up	2680 Up	2160 Up
II	2400 Down	2400 Down	1450 Up
III	2400 Left	2400 Left	1450 Right

NOTE: Station numbers are from the nose to the rear with station zero being at the nose.

The direction of the loads are the directions that would be observed when the nose of the case is closest to the observer and the large access door is to be observer's right.

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TABLE II

CALCULATED STRESSES FROM STRESSCOAT PATTERN, CONDITION I
STATIC TEST OF TX-28 FRONT CASE

<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>
Per Cent of Limit Load	Location of Stresscoat Patterns Figs. 5 and 6	Stresscoat Sensitivity, Microinches/Inch	Indicated Calculation	Calculated Stresses for 150 per cent of Limit Load for Stresscoat Areas in Col. 2
20		700		
30		700		
40		700		
50		700		
60		700		
70		700		
80	1	700	150/75 Ee	14,000
90	2	700	150/85 Ee	12,400
100	3	700	150/95 Ee	11,000
110	4	700	150/105 Ee	10,000
120	5	700	150/115 Ee	9,100
130	6	700	150/125 Ee	8,400
140	7	700	150/135 Ee	7,800
150	8	700	150/145 Ee	7,200

NOTE: E = 10,000,000
Material = 24ST-4 Aluminum Alloy

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TABLE III

CALCULATED STRESSES FROM STRESSCOAT PATTERNS, CONDITION II
STATIC TEST OF TX-28 FRONT CASE

<u>Per Cent of Limit Load</u>	<u>Location of Stresscoat Patterns Fig. 7</u>	<u>Stresscoat Sensitivity, Microinches/Inch</u>	<u>Indicated Calculation</u>	<u>Calculated Stresses for 150 Per Cent of Limit Load for Stresscoat Patterns Col. 2</u>
20		650		
30		650		
40		650		
50		650		
60		650		
70	1	650	150/65 Ee	15,000
80	-	650	150/75 Ee	13,000
90	2	650	150/85 Ee	11,500
100	3	650	150/95 Ee	10,300
110	-	650	150/105 Ee	9,300
120	4	650	150/115 Ee	8,500
130	-	650	150/125 Ee	7,800
140	-	650	150/135 Ee	7,200
150	5	650	150/145 Ee	6,700

NOTE: E = 10,000,000
Material = 24ST-4 Aluminum Alloy

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TABLE IV

DEFLECTION DATA, CONDITION I -- STATIC TEST OF TX-28 FRONT CASE

Per Cent of Limit Load	Deflection in Inches					
	Station 0		Station 16		Station 33	
	Total Deflection	Permanent Deflection	Total Deflection	Permanent Deflection	Total Deflection	Permanent Deflection
0	0	0	0	0	0	0
20	.058	--	.041	--	.016	--
30	.086	--	.067	--	.040	--
40	.140	.032	.100	.022	.063	.018
50	.180	.043	.125	.029	.081	.022
60	.213	.048	.149	.032	.094	.025
70	.258	.054	.178	.032	.111	.027
80	.299	.054	.204	.038	.126	.029
90	.340	.065	.232	.040	.142	.034
100	.380	.066	.260	.040	.160	.036
110	.425	.070	.290	.041	.182	.038
120	.464	.081	.319	.047	.196	.041
130	.512	.076	.353	.048	.218	.041
140	.550	.087	.383	.053	.236	.045
150	.599	.090	.420	.054	.260	.050
*150	.630	--	.451	--	.275	--
160	.677	--	.482	--	.293	--
170	.720	--	.511	--	.310	--
180	.774	--	.545	--	.332	--
190	.822	--	.582	--	.352	--
200	.872	.090	.618	.077	.375	.059

* Loaded from 150 to 200 per cent of limit load after testing for Condition II and III was completed.

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TABLE V

DEFLECTION DATA, CONDITION II -- STATIC TEST OF TX-28 FRONT CASE

Per Cent of Limit Load	Deflection in Inches					
	Station 0		Station 16		Station 33	
	Total Deflection	Permanent Deflection	Total Deflection	Permanent Deflection	Total Deflection	Permanent Deflection
0	0	0	0	0	0	0
20	.046	.015	.027	.008	.016	.010
30	.062	.013	.038	.009	.022	.022
40	.086	.017	.055	.009	.032	.032
50	.108	.018	.070	.011	.041	.032
60	.133	.027	.088	.015	.051	.028
70	.155	--	.102	--	.058	--
80	.183	.032	.122	.020	.072	.019
90	.215	.042	.143	.022	.086	.024
100	.246	.041	.168	.029	.100	.030
110	.276	.052	.185	.035	.114	.031
120	.298	.054	.202	.033	.124	.032
130	.336	.053	.225	.035	.140	.035
140	.365	.064	.243	.041	.150	.043
150	.400	.062	.261	.037	.160	.037

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TABLE VI

DEFLECTION DATA, CONDITION III -- STATIC TEST OF TX-28 - FRONT CASE

Per Cent of Limit Load	Deflection in Inches					
	Station 0		Station 16		Station 33	
	Total Deflection	Permanent Deflection	Total Deflection	Permanent Deflection	Total Deflection	Permanent Deflection
0	0	0	0	0	0	0
20	.046	---	.024	---	.012	---
30	.062	---	.037	---	.019	---
40	.083	---	.050	---	.026	---
50	.100	---	.059	---	.032	---
60	.116	---	.070	---	.038	---
70	.138	---	.083	---	.046	---
80	.157	---	.094	---	.052	---
90	.180	---	.108	---	.060	---
100	.200	---	.121	---	.065	---
110	.223	---	.137	---	.074	---
120	.245	---	.150	---	.082	---
130	.272	---	.165	---	.091	---
140	.295	---	.179	---	.099	---
150	.321	.020	.195	.012	.108	.011

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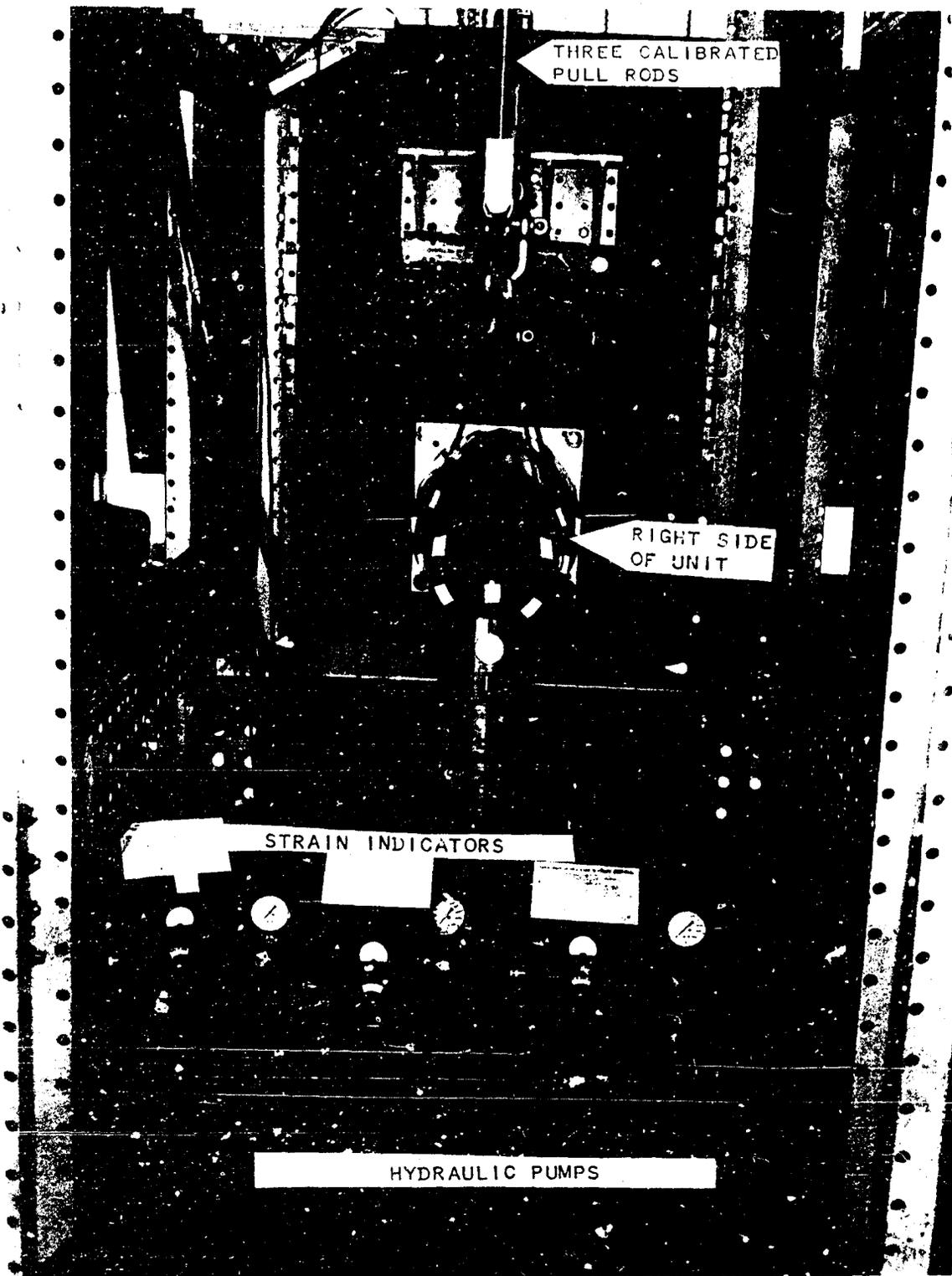


FIG. 1 -- GENERAL VIEW OF TEST SETUP FOR CONDITION I -- STATIC TEST OF TX-28 FRONT CASE

D# 77104

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REF. SYM: 1612 (355)
TM-421

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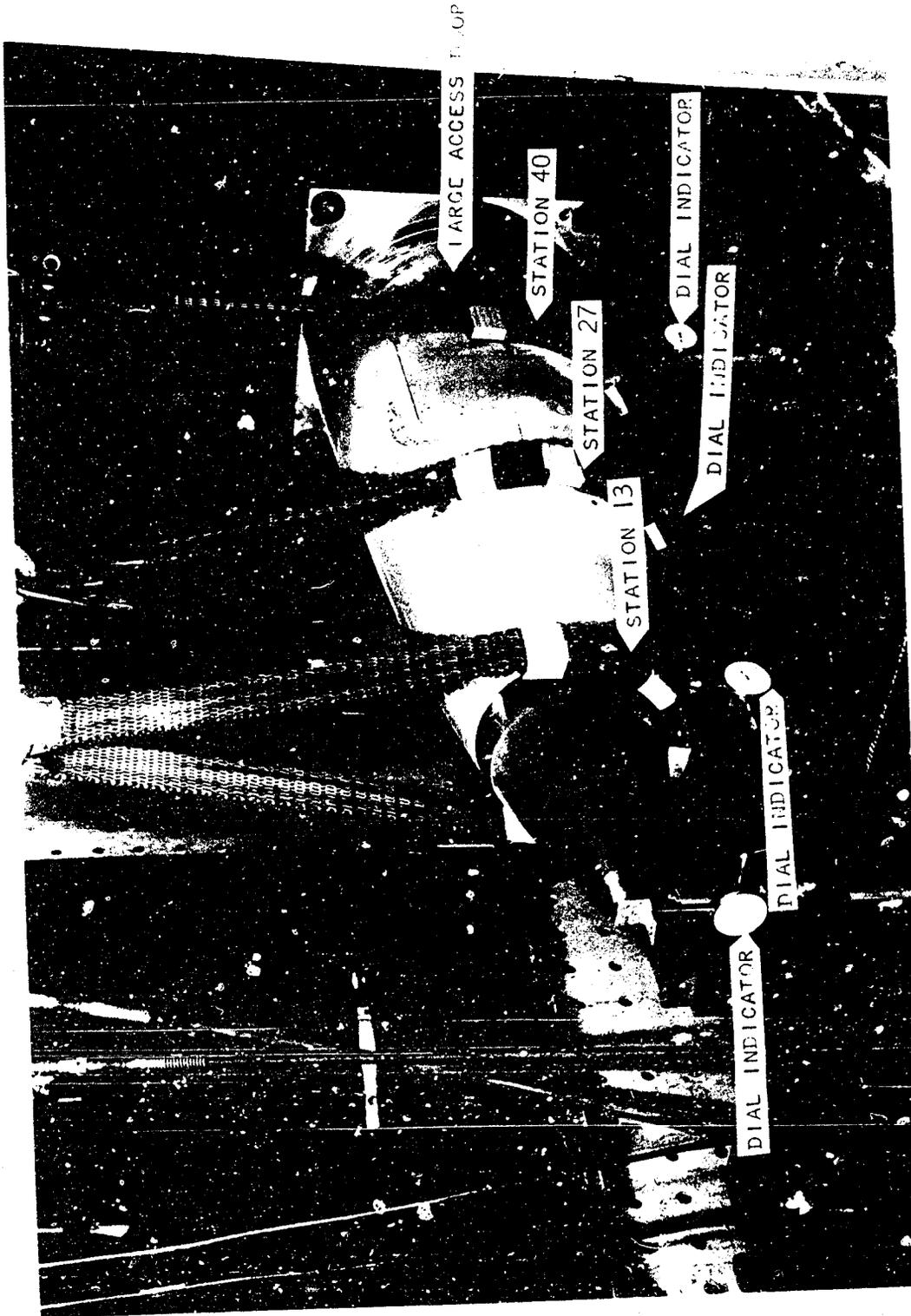


FIG. 2 -- CLOSE-UP VIEW OF TEST SETUP FOR CONDITION I -- STATIC TEST

REF. SYM: 161 (385)
T-471

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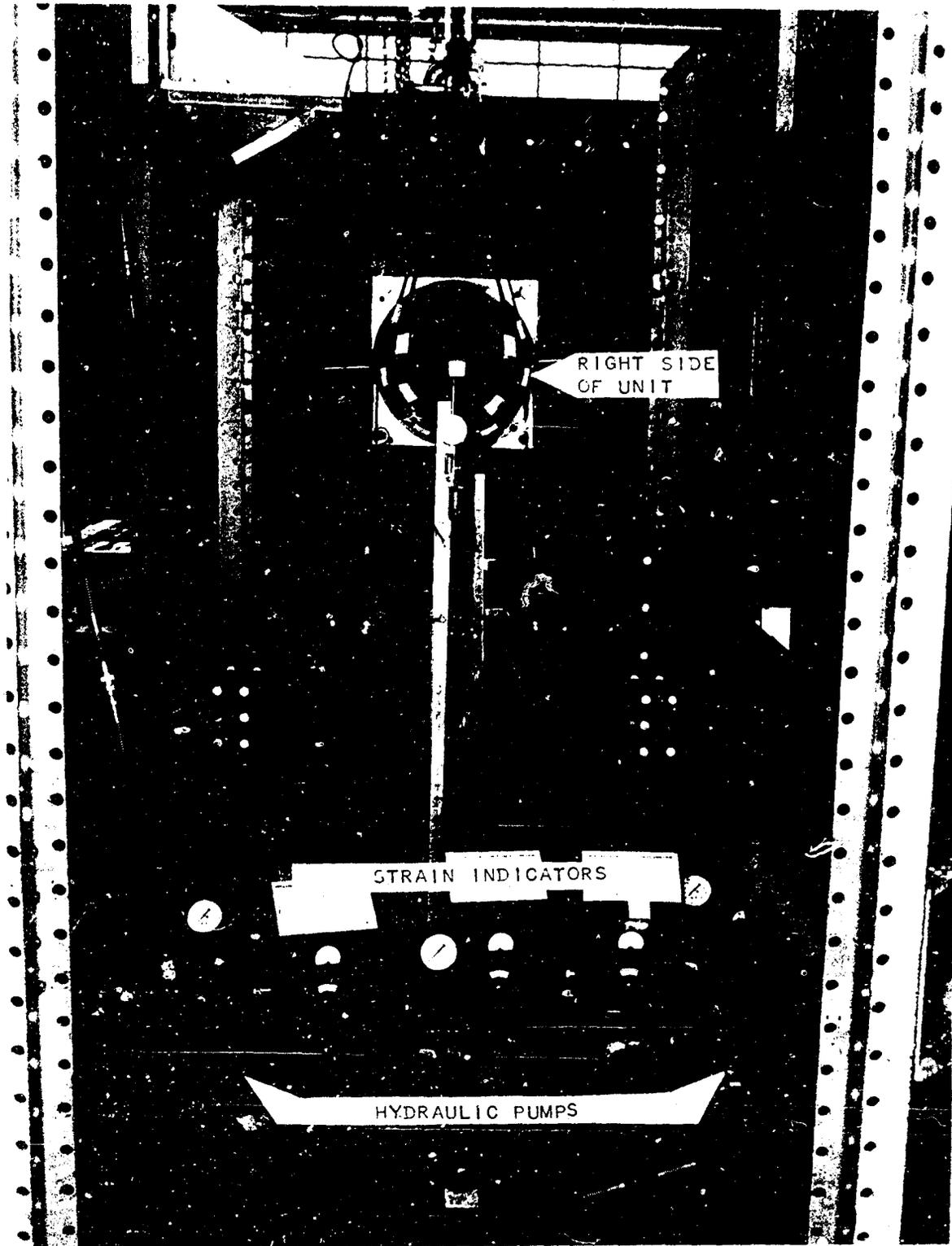


FIG. 3 -- GENERAL VIEW OF TEST SETUP FOR CONDITION II -- STATIC TEST OF TX-28 FRONT CASE

D# 77103

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REF. SYM: 1612 (355)
TM-421

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#541

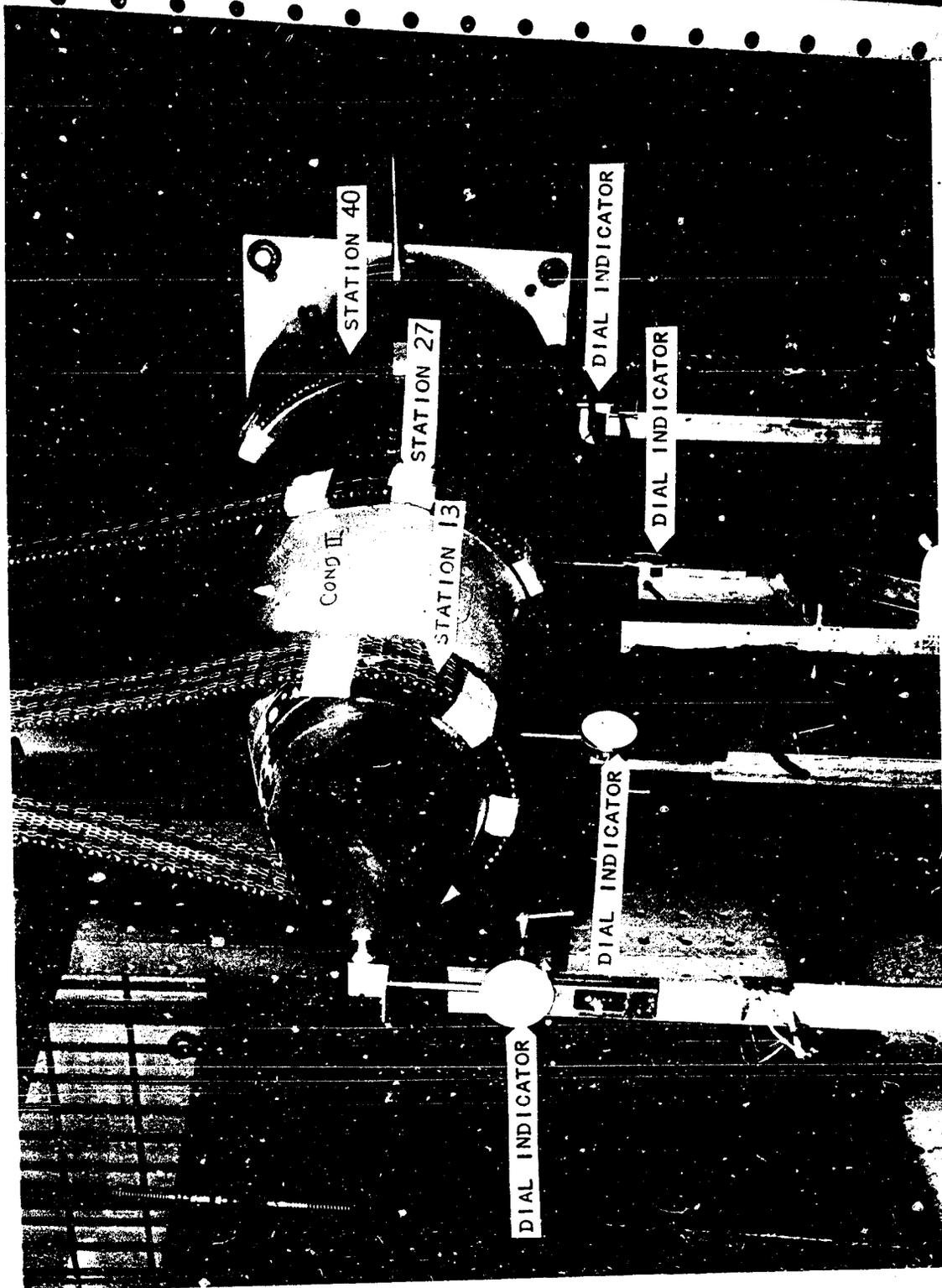


FIG. 4 -- CLOSEUP VIEW OF TEST SETUP FOR CONDITION II -- STATIC TEST
OF TX-28 FRONT CASE

REF. SYM: 1612 (355)
TM-421

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#542

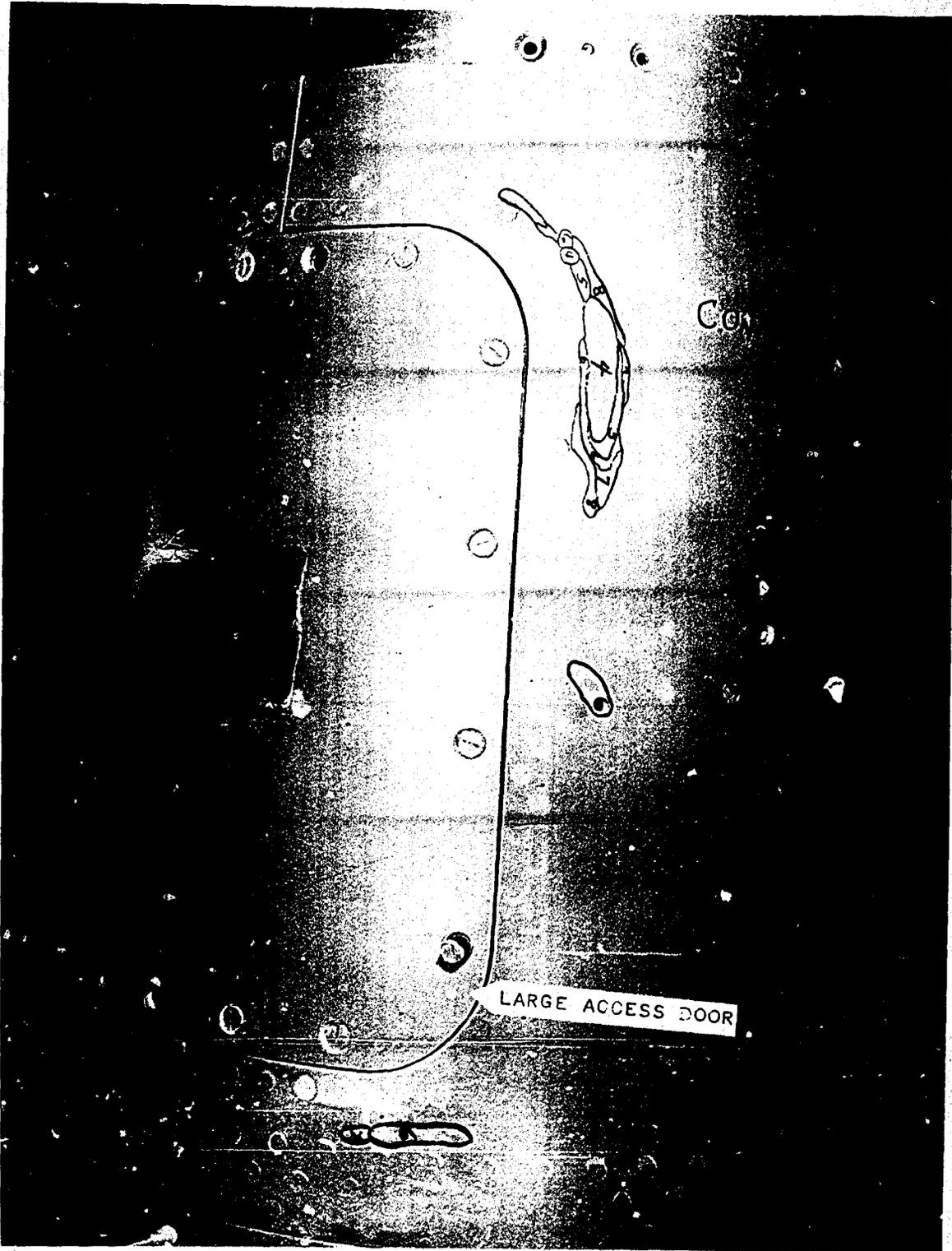


FIG. 5 -- AREAS OF STRESSCOAT CRACKS NEAR TOP OF UNIT FROM TEST
LOADING TO CONDITION I -- STATIC TEST OF TX-28 FRONT
CASE

DW 77101

#543

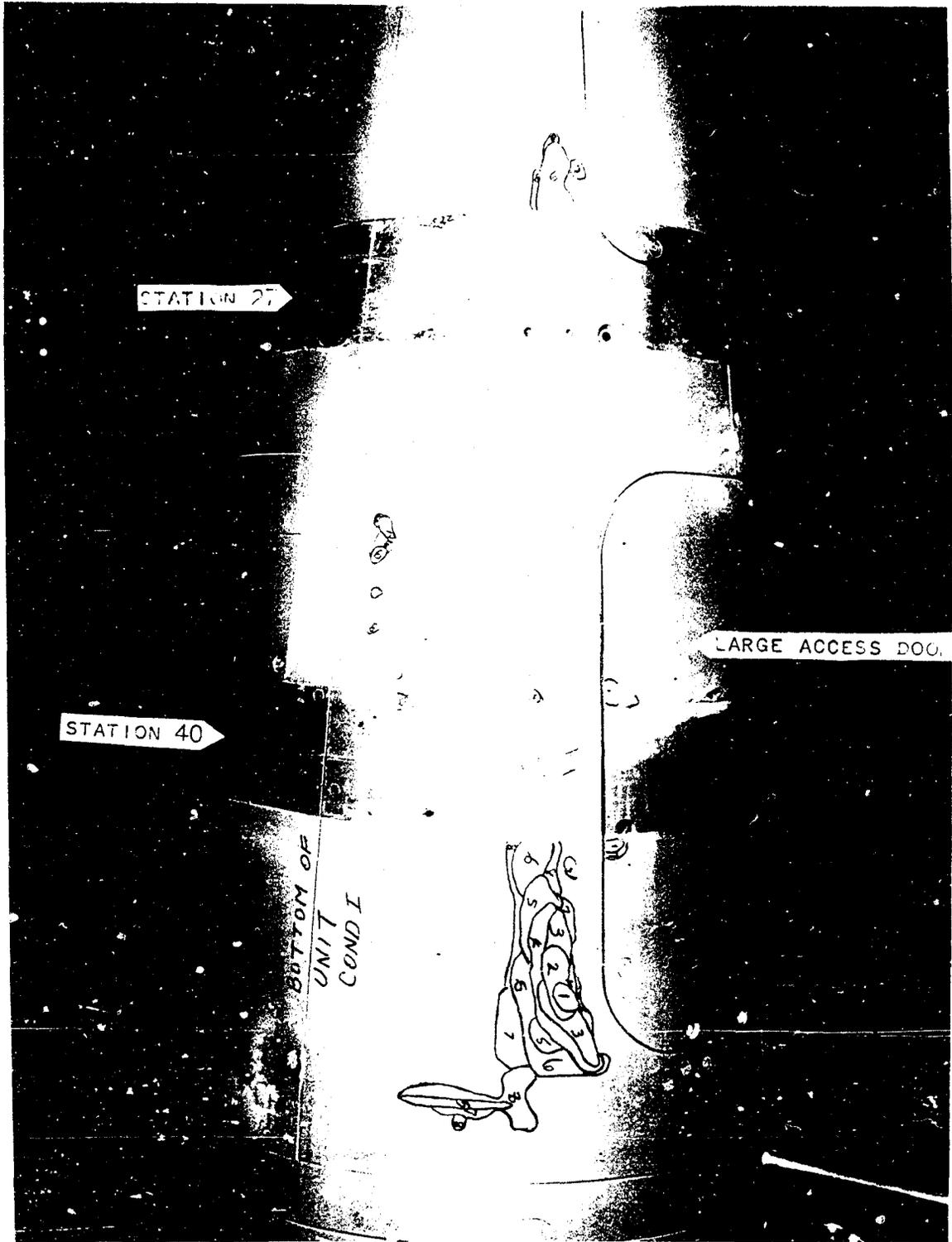


FIG. 6 -- AREAS OF STRESSCRACK CRACKS NEAR BOTTOM OF UNIT FROM TEST LOADING TO CONDITION I -- STATIC TEST OF TX-20 FRONT CASE

D# 77102

REF. SYM: 1612 (355)
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FIG. 7 -- AREAS OF STRESSCOAT CRACKS RESULTING FROM CONDITION II --
STATIC TEST OF TX-28 FRONT CASE
REF. SYM: 1612 (355)
TR-421

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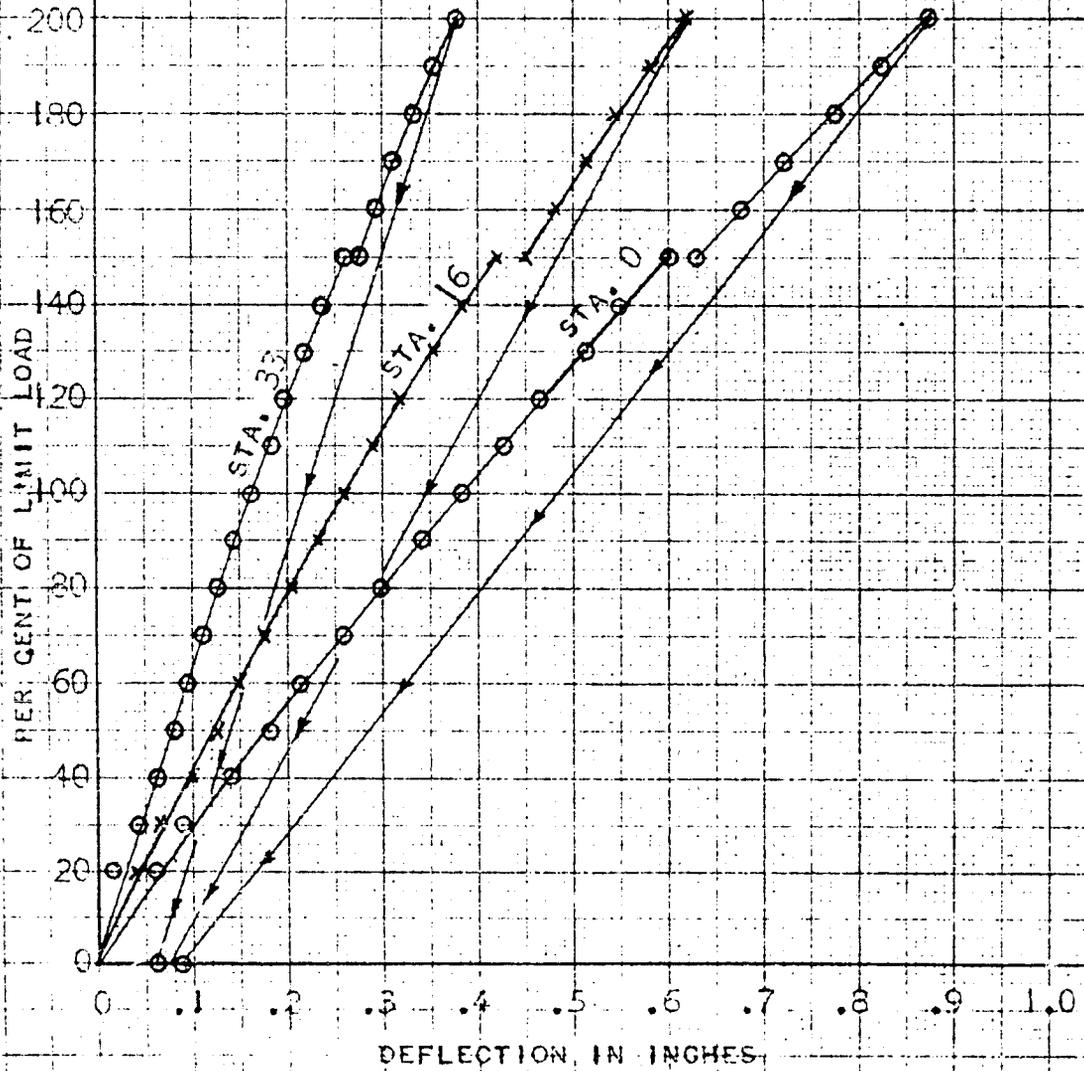


FIG. 3 -- LOAD-DEFLECTION CURVES FOR CONDITION I -- STATIC TEST OF TX-20 FRONT CASE

REF. SYM: 1612 (355)
TM-221

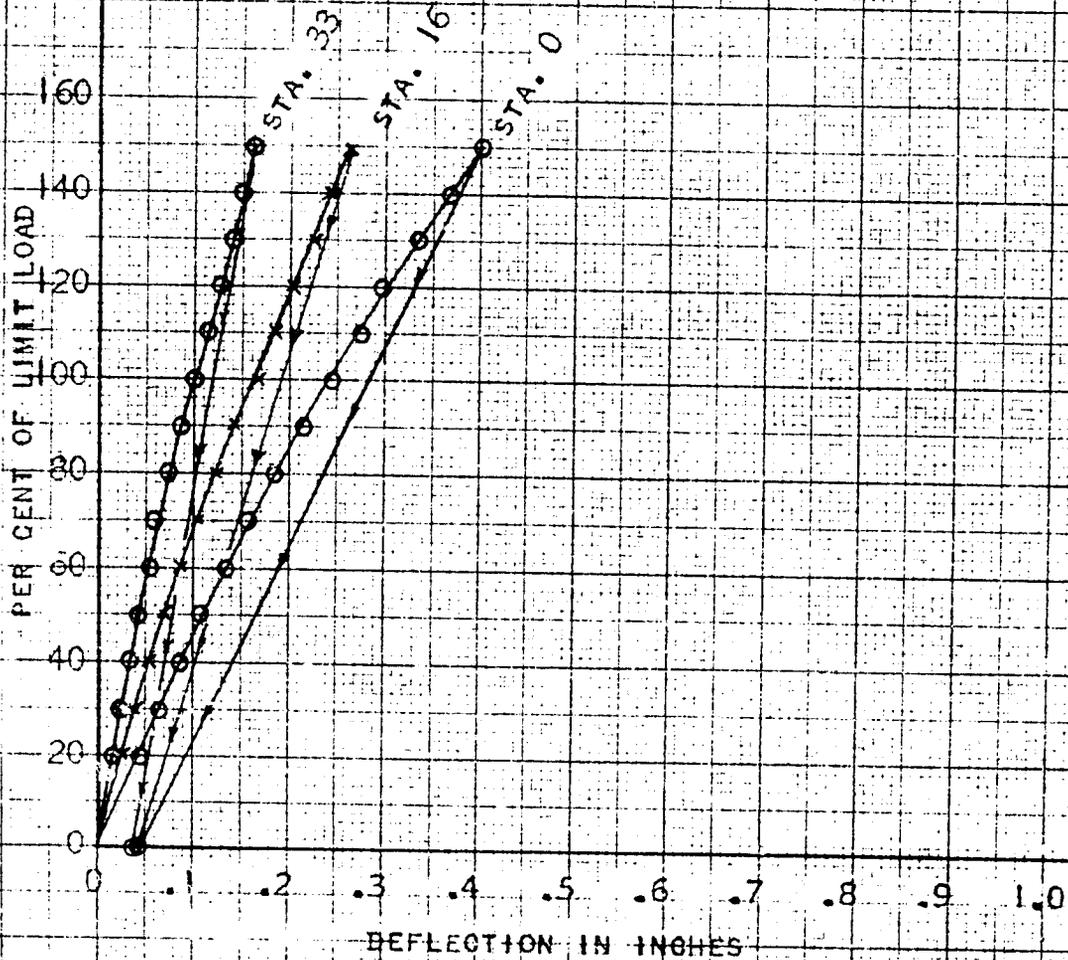


FIG. 9 -- LOAD-DEFLECTION CURVES FOR CONDITION II -- STATIC TEST OF TX-28 FRONT CASE

REF. SYM: 1612 (355)
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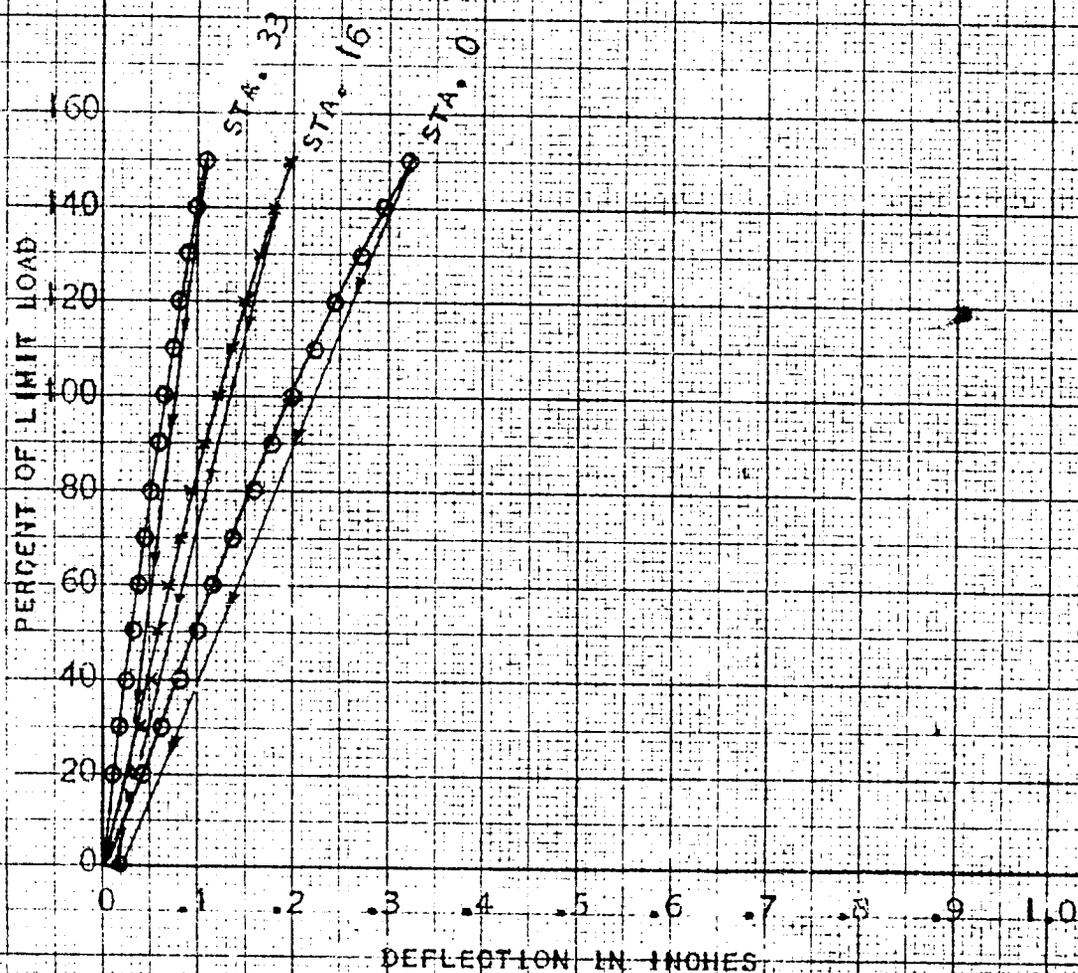


FIG. 10 -- LOAD-DEFLECTION CURVES FOR CONDITION III -- STATIC TEST OF TX-28 FRONT CASE

REF. SYM: 1612 (355)
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