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SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
1st Review Date: 9/22/98
Authority: ADD
Name: [illegible]
2nd Review Date: 9/24/98
Authority: ADD
Name: W Layne
Determination (Circle Numbers):
1. Classification Retained
2. Classification Changed to: U
3. Contains No DOE Classified Information
4. Coordinate With:
5. Contains UCNI? no
6. Comments:
OK for Opennet

APR 7 1958

Case No. 746.00
Ref. Sym: 1612 (698)
Project No. TM-747
File: TX-41, 3-2

MR. P. E. JOCKLE, JR. - 1218

Attn: Mr. A. E. Sensel - 1218-2

Re: Static Test of TX-41 Short Afterbody

RECEIVED
APR 8 1958
R & D FILES
CDL No.
BM
TX-41
3-2

Summary of Results

The TX-41 short afterbody was loaded to 137.5 per cent of limit load (68,750 pounds), simulating parachute loads, with the direction of load making an angle of 24 degrees with the longitudinal axis of the afterbody. No failure or damage occurred as a result of this test.

Object of Test

The test was performed to demonstrate the structural adequacy of the TX-41 short afterbody for parachute loads up to 137.5 per cent of limit parachute loads.

Reason for Test

The test was performed as a result of the Work Order Authorization, dated December 10, 1957, and the memorandum, Load Criteria for TX-41 Short Afterbody Static Test, dated December 16, 1957, both from Division 1218 to Division 1612.

Function of Object Tested

The TX-41 afterbody contains the parachute and transmits the parachute deployment loads to the weapon.

Summary of Past Tests

No previous static tests have been performed by Division 1612 on the TX-41 afterbody.

Setup for Test

Figures 1, 2, and 3 show the setup for the test.

The unit tested was the TX-41 short afterbody (XAC-976 - Ballistic tail section), Serial No. AAX-003-K7, Dwg. No. DS(1218)87514. The rings on

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RECORD ID: 98SN4455
W C Layne 9/28/98
PERSON VERIFYING MARKING & DATE
DATED: 9/24/98

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each end of the afterbody are 14S-T6 aluminum forgings while the skin between the two rings is 0.100-inch 24S-T3 aluminum.

The following equipment was used:

12 - One-inch calibrated links, Nos. 2, 3, 4, 5, 6, 8, and 10; and Nos. C, E, D, G, and H.
1 - Two-inch calibrated pull rod, No. 7.
1 - Baldwin strain indicator, Serial No. J-59252.
1 - Fairchild strain indicator, Model 101=C-2.
1 - Miller hydraulic ram.
1 - Hydraulic console.

The following instrumentation was used:

24 - A-7 strain gages (used as four rosettes and six biaxials), Res. = 120 ± .5 ohms, G.F. = 1.97.
Stresscoat No. 1206 - Sensitivity at time of test = 700 micro-inches per inch.

Procedure

The TX-41 short afterbody was Stresscoated with No. 1206 on both the interior and exterior of the unit. The afterbody was then mounted in the static jig as shown on Figs. 1, 2, and 3. The longitudinal axes of the afterbody made an angle of 24 degrees with the direction of the resultant applied load. Each of the twelve nylon shrouds lines would make an angle of approximately six degrees with the longitudinal axis of the unit if the direction of the resultant applied load and longitudinal axis of the afterbody were made co-linear.

After the tension in the twelve nylon shroud lines was approximately equalized from reading of the calibrated links the initial Stresscoat load of 10,000 pounds was applied to the unit. This load was released and the unit was inspected for cracks in the Stresscoat. This procedure was repeated with each new load being 1.2 times the preceding one until a load of [illegible],500 pounds was reached.

After the Stresscoat test was completed, the unit was dismounted and strain gages were mounted based primarily on the results of the Stresscoat test. Strain gages were mounted at 10 locations consisting of four rosettes and six biaxials. The locations of the strain gages are shown on Figs. 4 through 9. The afterbody was again mounted in the static jig, identical to the setup shown in Figs. 1, 2, and 3. The tension in the nylon shroud lines was equalized for a small load and the unit was then loaded in increments to 137.5 per cent of limit load (68,750 pounds). The tension in each of

the nylon shroud lines was checked by the calibrated links as the load was increased and was adjusted as required. Strain readings were taken after each increment of load.

Results

The results of the Stresscoat test are shown in Table I. The locations and areas of Stresscoat cracks are shown on Figs. 10 through 20.

The unit was loaded to 137.5 per cent of limit load (68,750 pounds) without producing damage. The strain readings and computed maximum and minimum principal stresses are shown on Table II. The maximum computed stress on Table II was about 33,000 psi (tension) on 14S-T6 aluminum at strain gage location (11, 12) shown on Fig. 7.

Conclusions

It is concluded that the TX-41 short afterbody is structurally adequate for the condition tested.

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

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

HPW:1612-2:as

Copy to:
W. A. Gardner, 1610
D. M. Bruce, 1282
C. L. Gomel, 5523
R. K. Smeltzer, 7221-3

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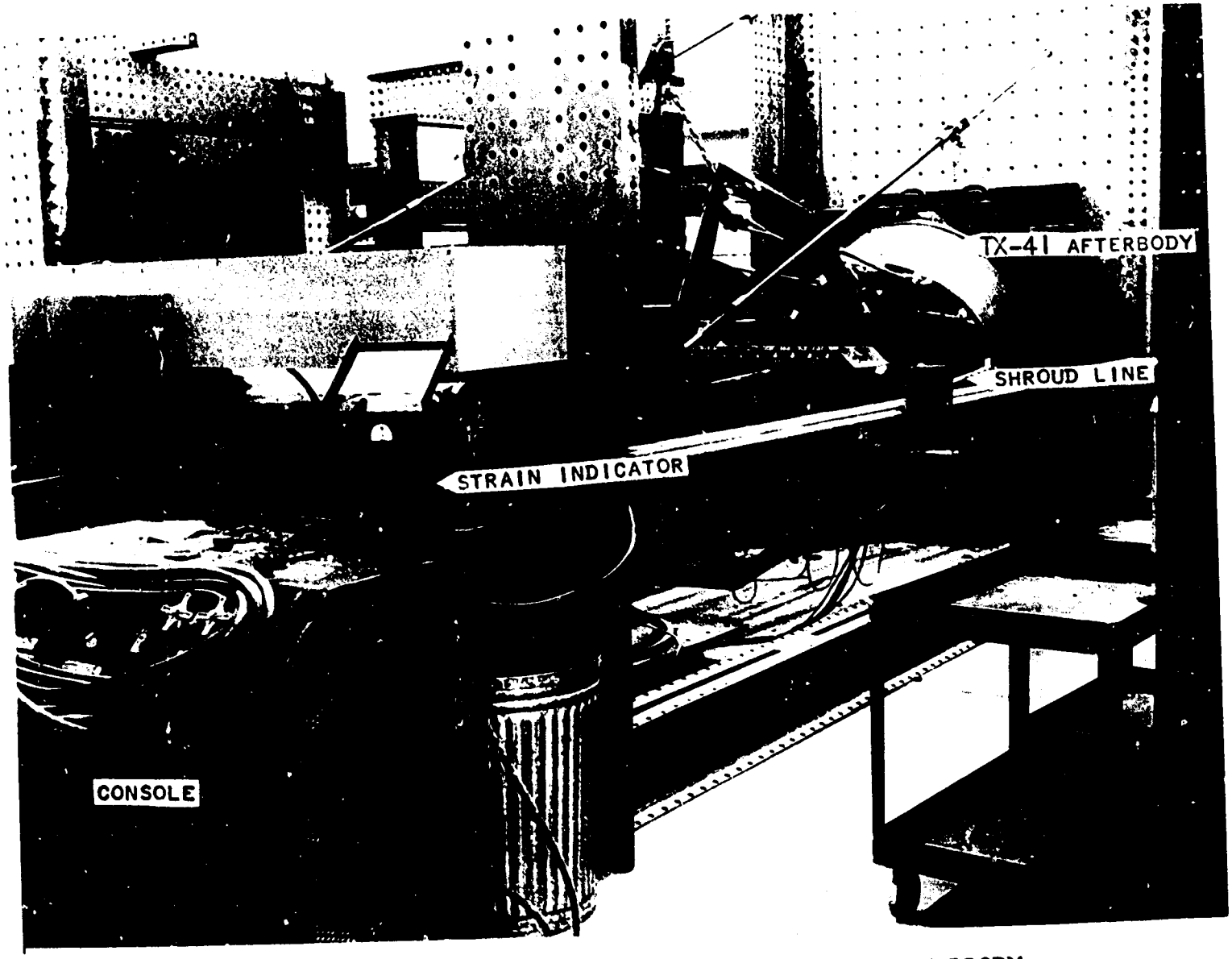

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FIG. 1 -- TEST SETUP -- STATIC TEST OF TX-41 SHORT AFTERBODY.

D# 103974

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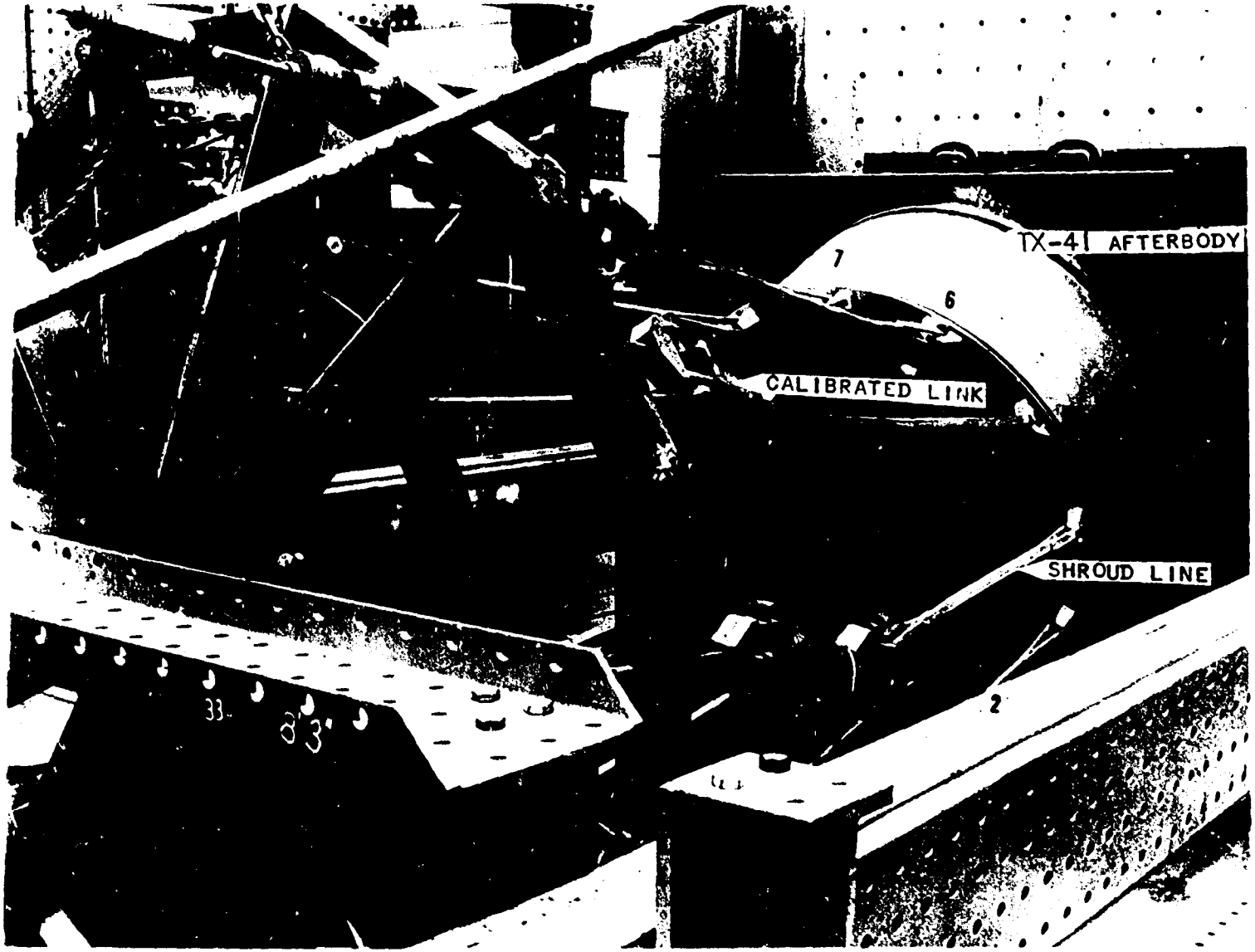

FIG. 2 -- TEST SETUP -- STATIC TEST OF TX-41 SHORT AFTERBODY.

D# 103969

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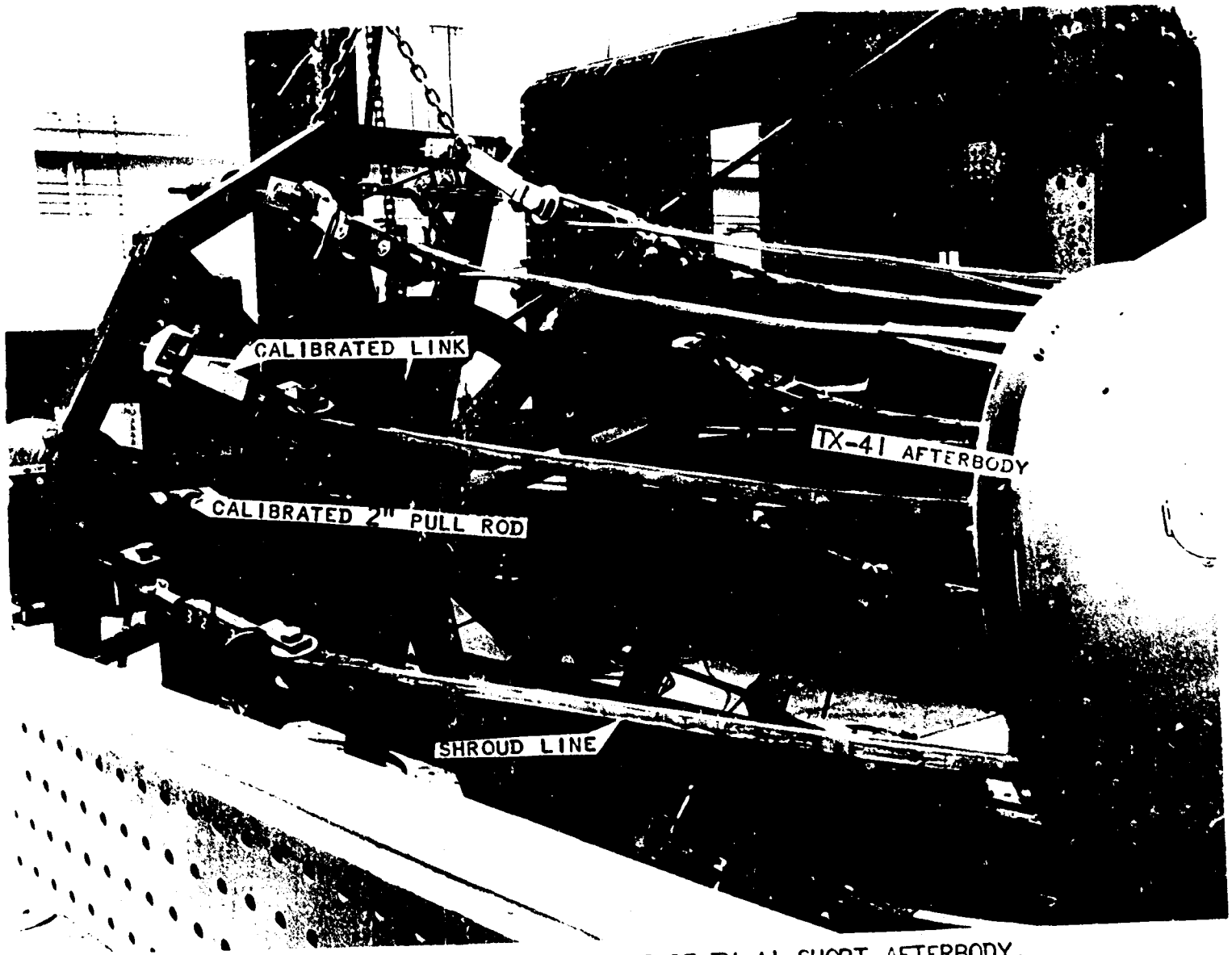

FIG. 3 -- TEST SETUP -- STATIC TEST OF TX-41 SHORT AFTERBODY.

D# 103968

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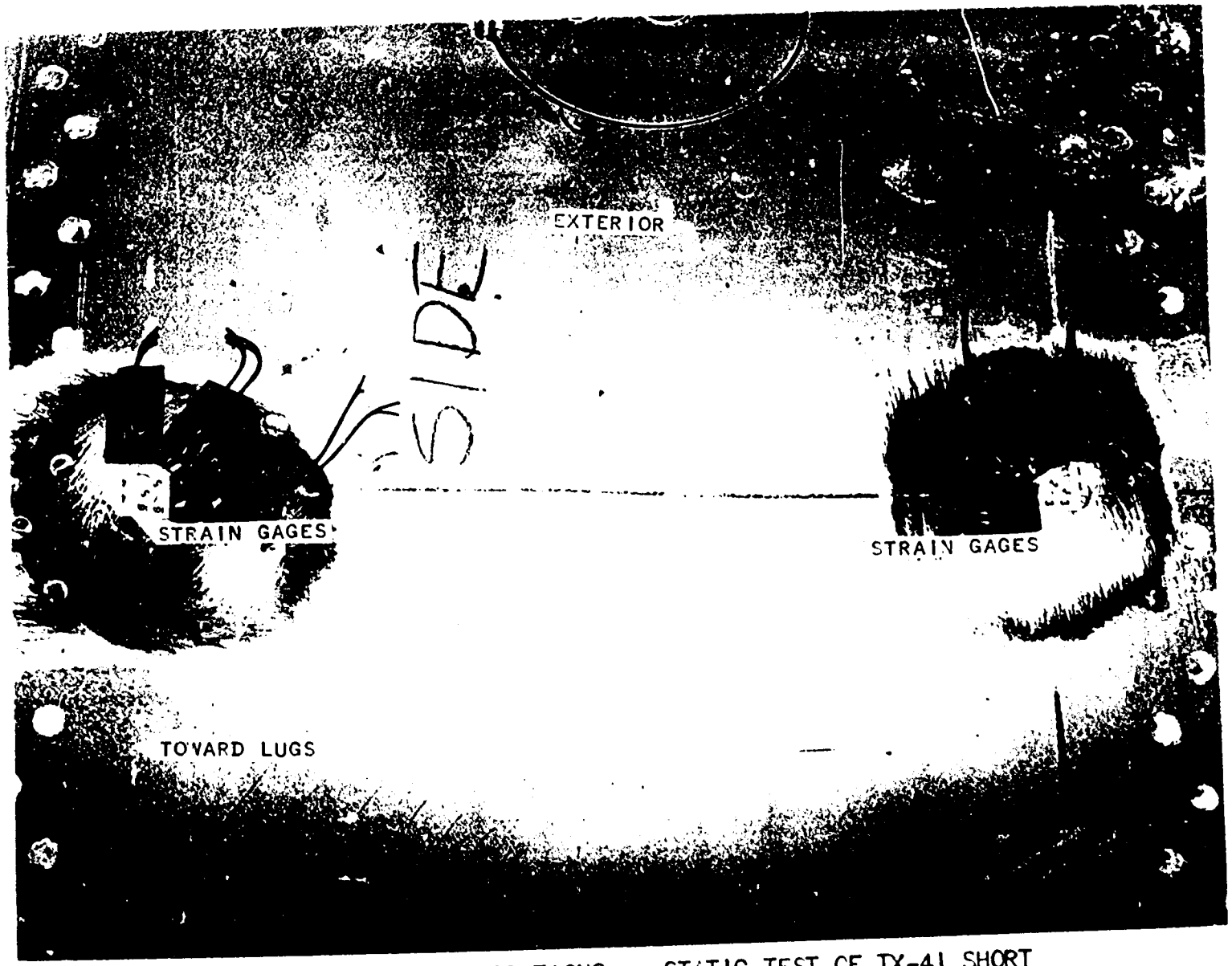

FIG. 4 -- STRAIN GAGE LOCATIONS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

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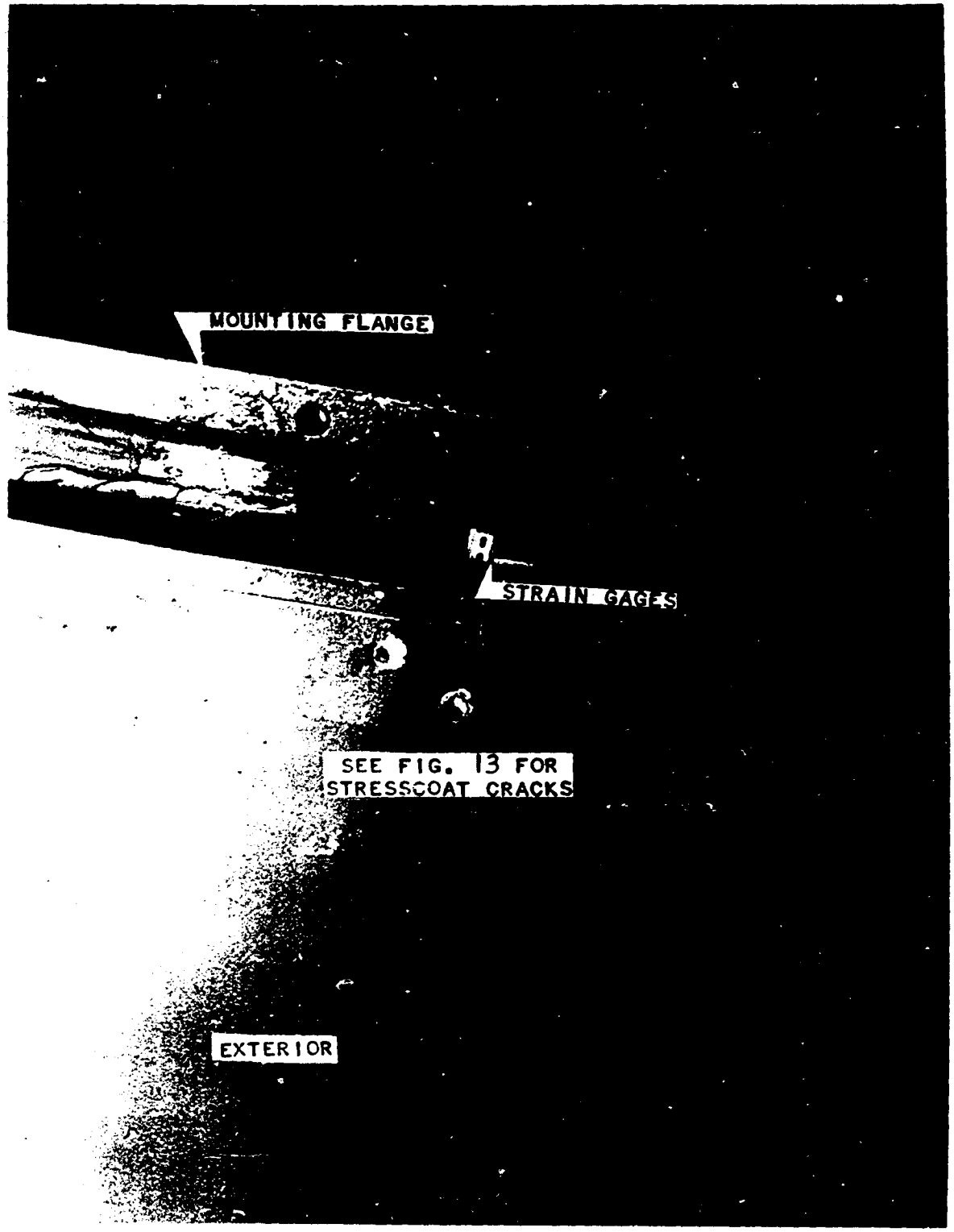

FIG. 5 -- STRAIN GAGE LOCATIONS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

D# 103966

REF. SYM: 1612 (698)
PROJECT NO. TM-747

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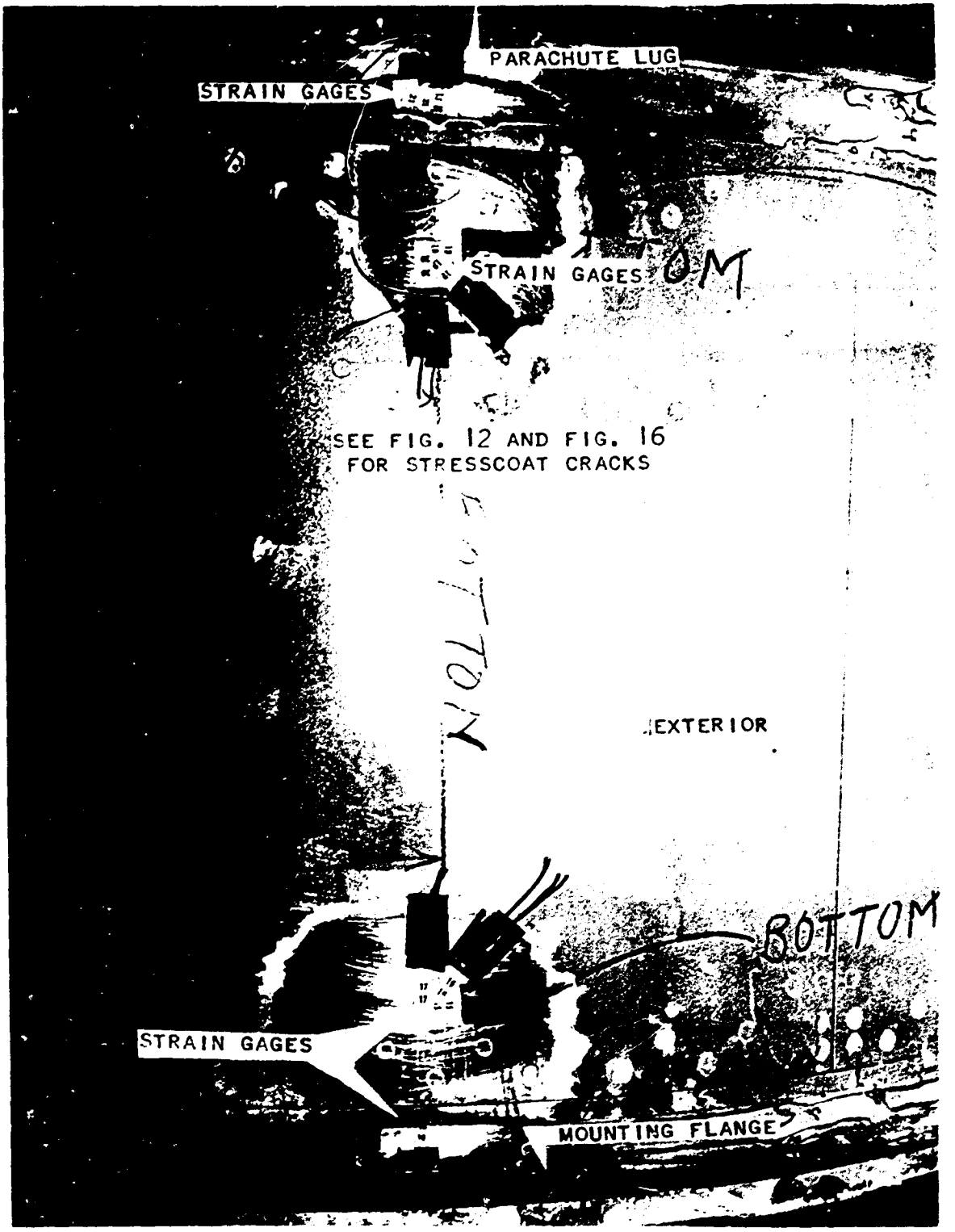

FIG. 6 -- STRAIN GAGE LOCATIONS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

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REF. SYM: 1612 (698)
PROJECT NO. TM-747

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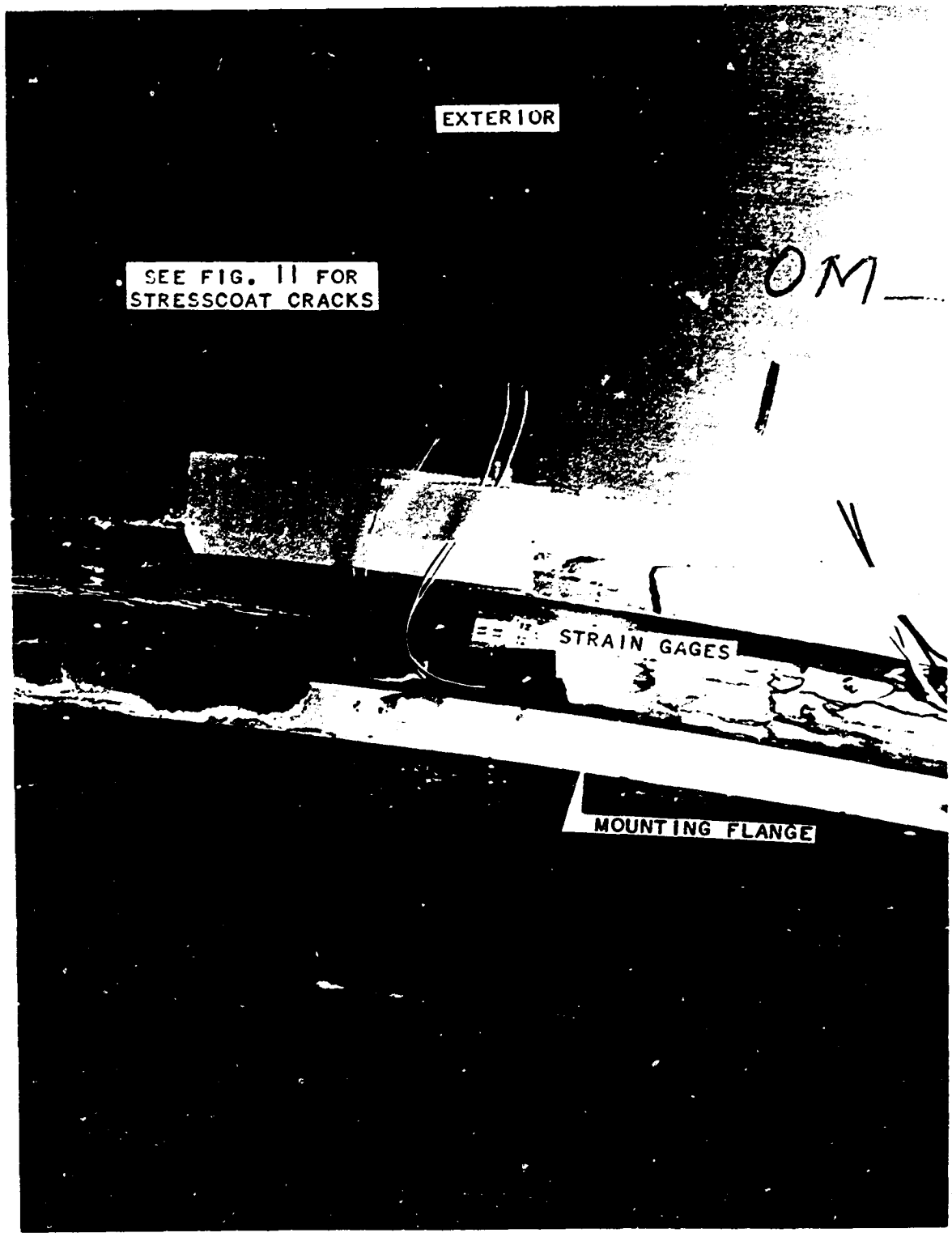

FIG. 7 -- STRAIN GAGE LOCATIONS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

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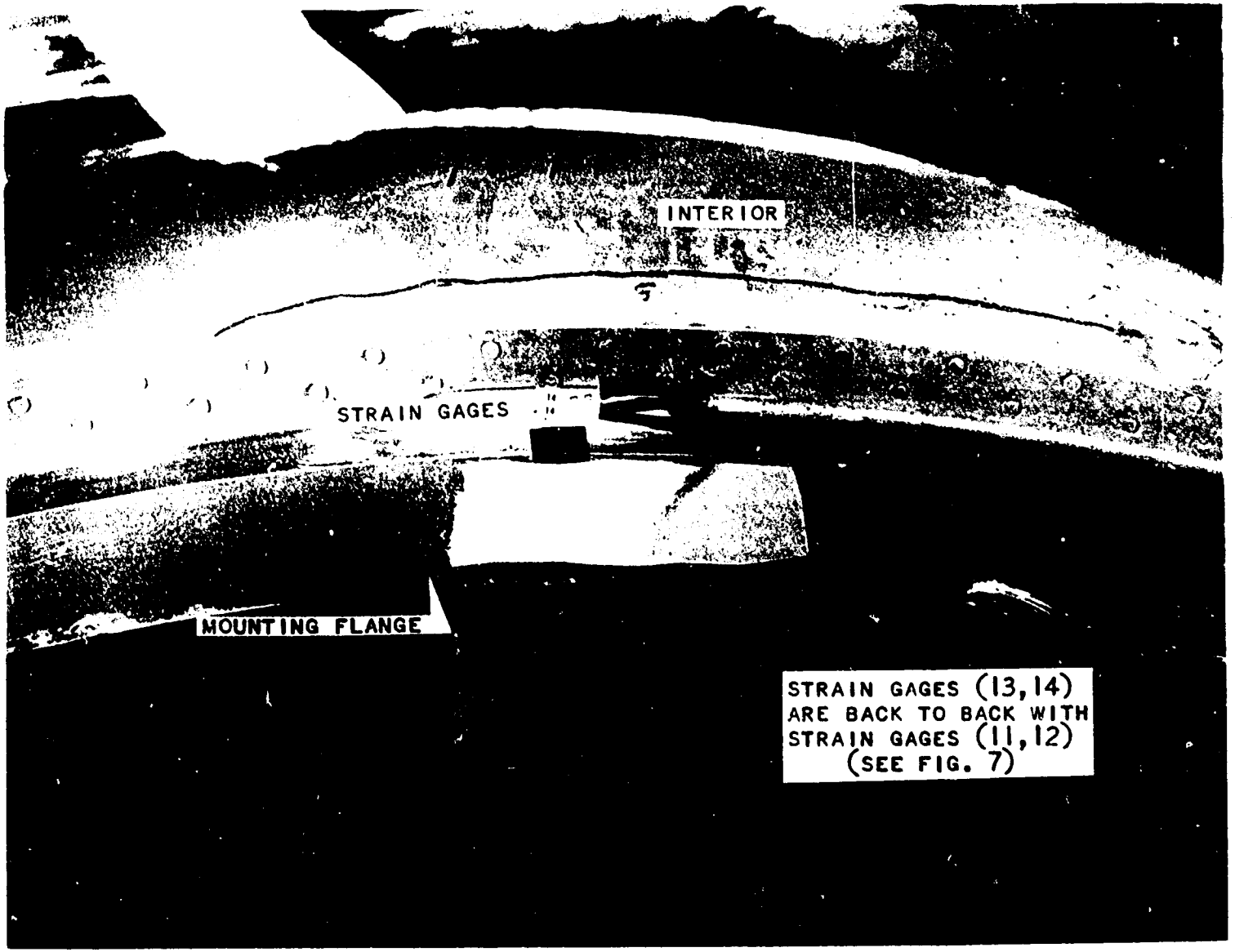

FIG. 8 -- STRAIN GAGE LOCATIONS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

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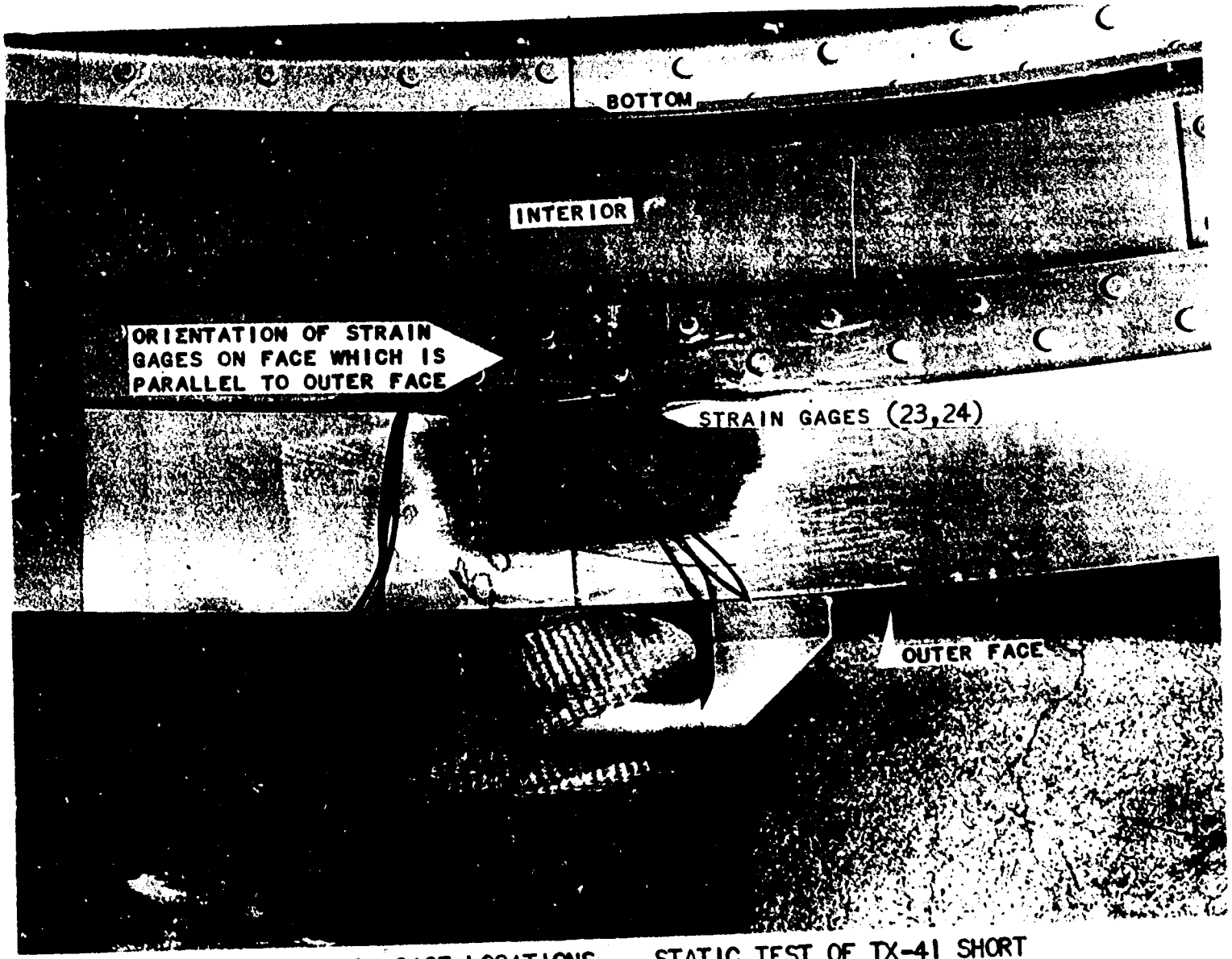

FIG. 9 -- STRAIN GAGE LOCATIONS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

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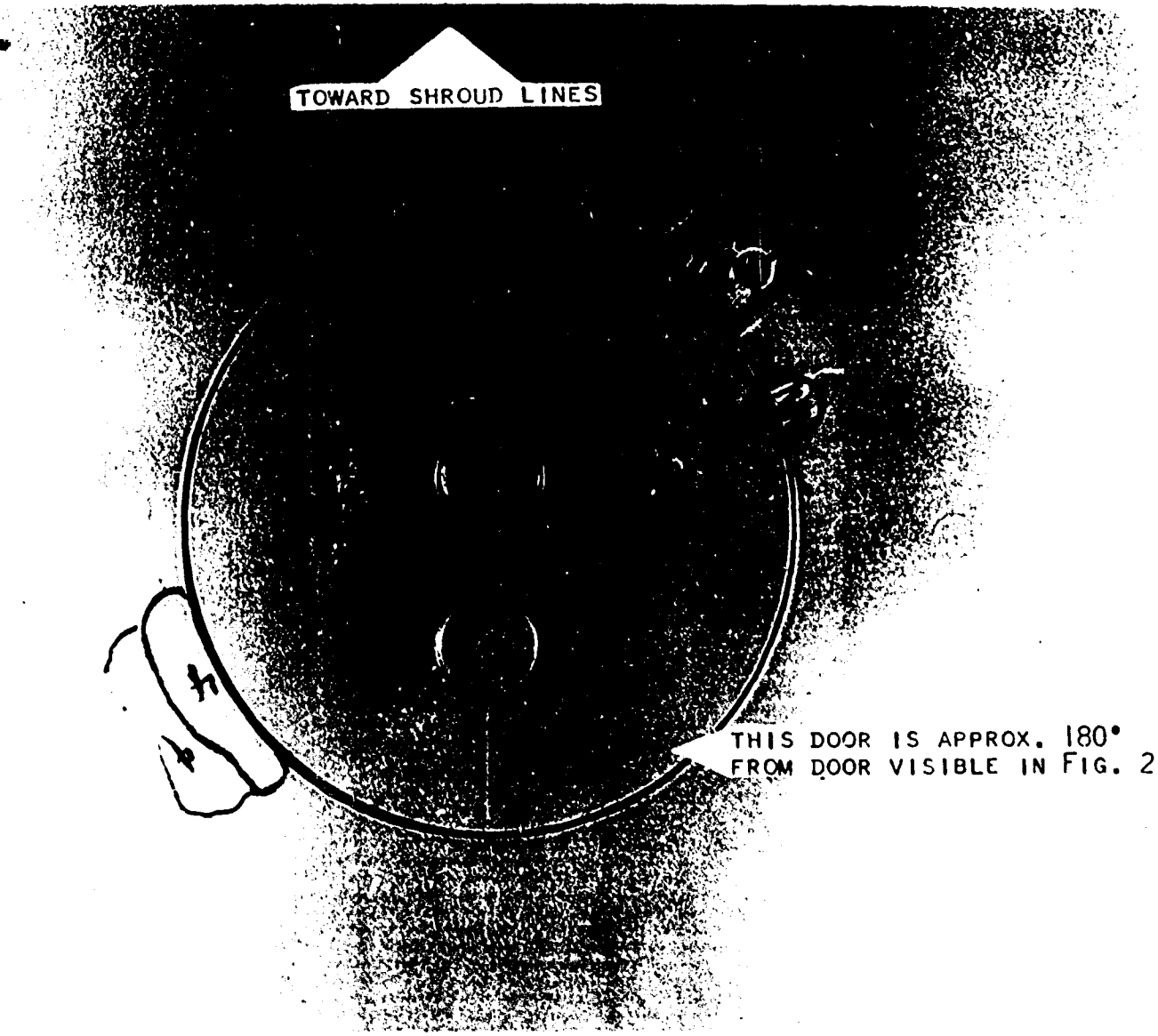

FIG. 10 -- AREAS OF STRESSCOAT CRACKS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

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REF. SYM: 1612 (698)
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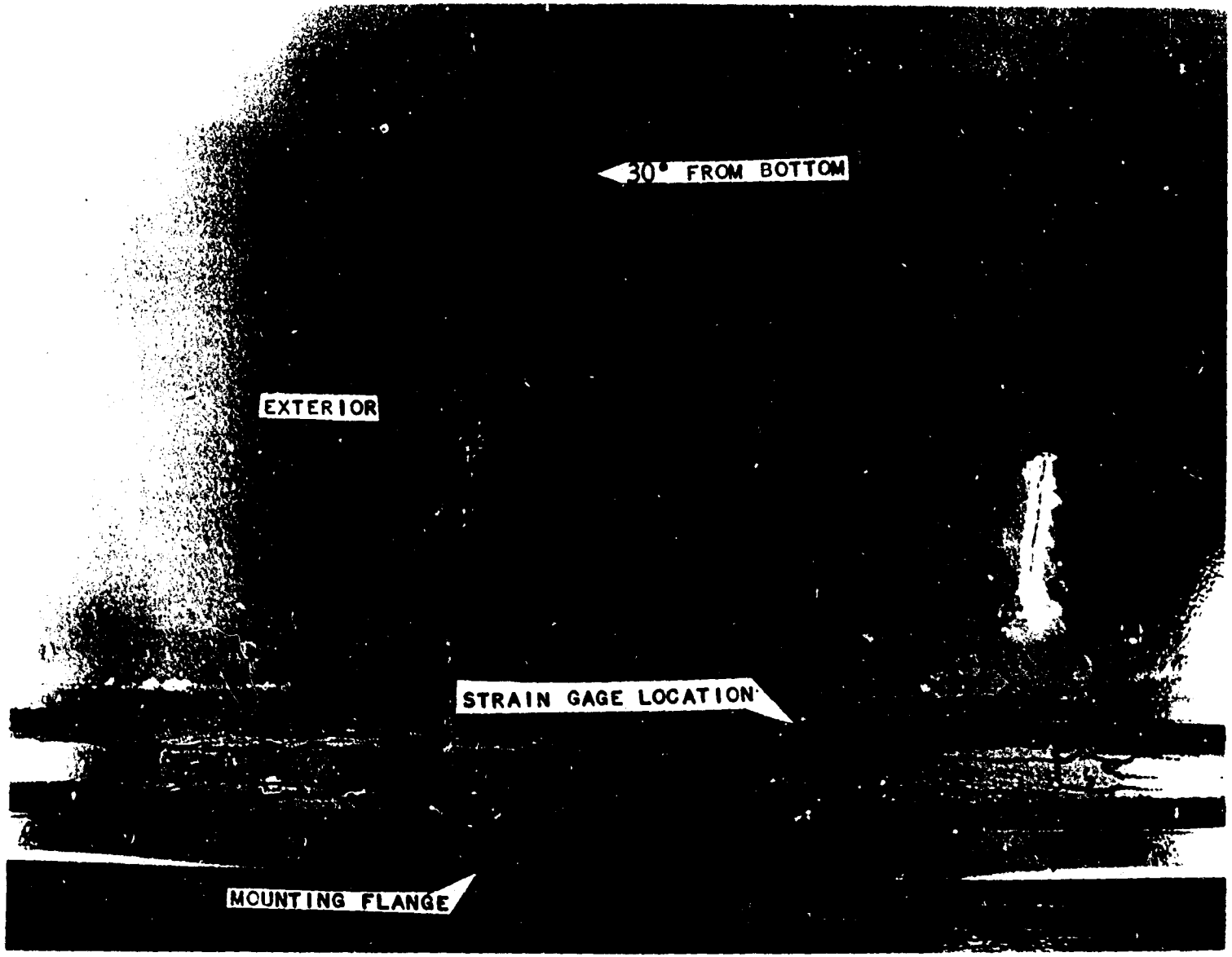

FIG. 11 -- AREAS OF STRESSCOAT CRACKS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

D# 103963

REF. SYM: 1612 (698)
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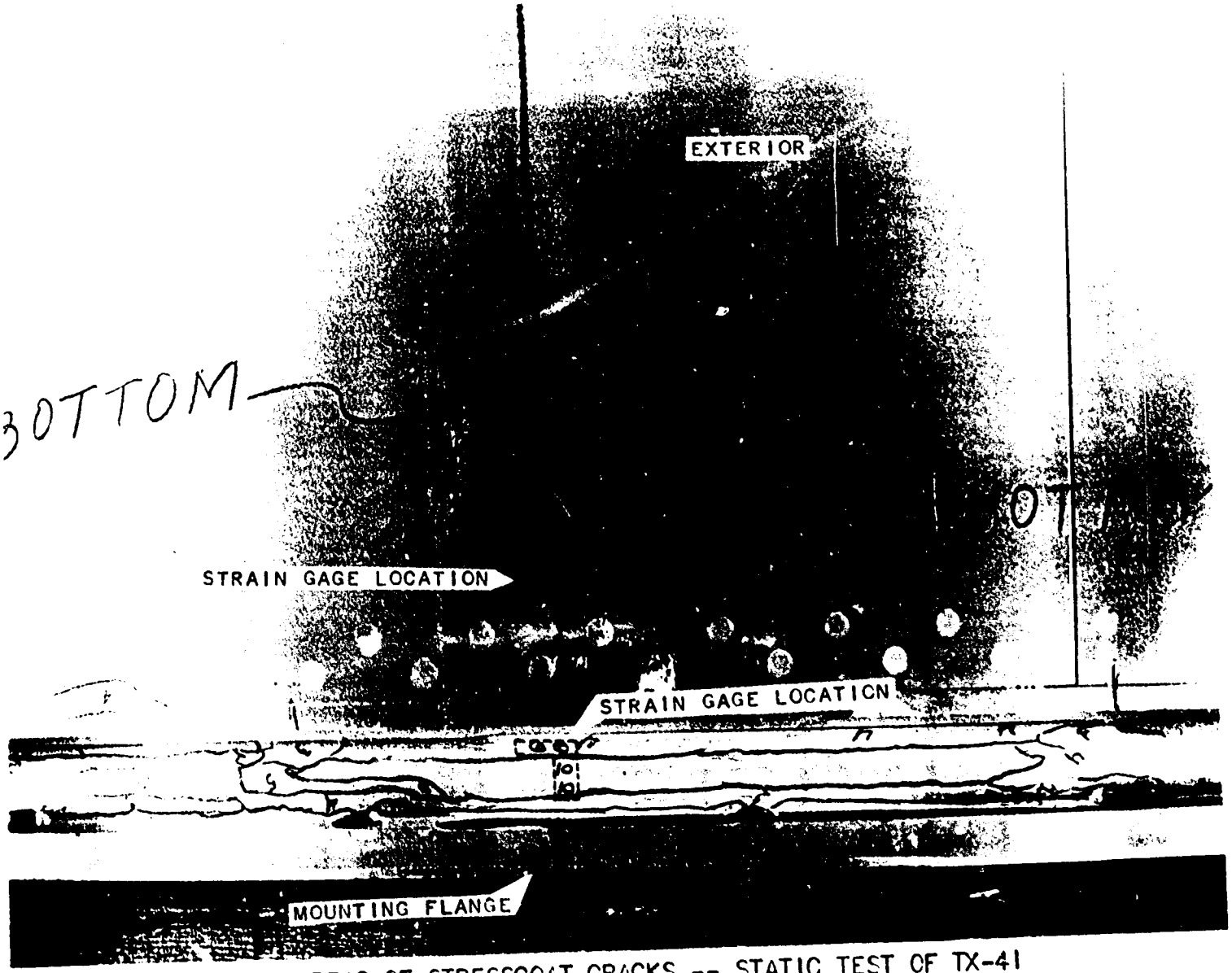

FIG. 12 -- AREAS OF STRESSCOAT CRACKS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

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REF. SYM: 1612 (698)
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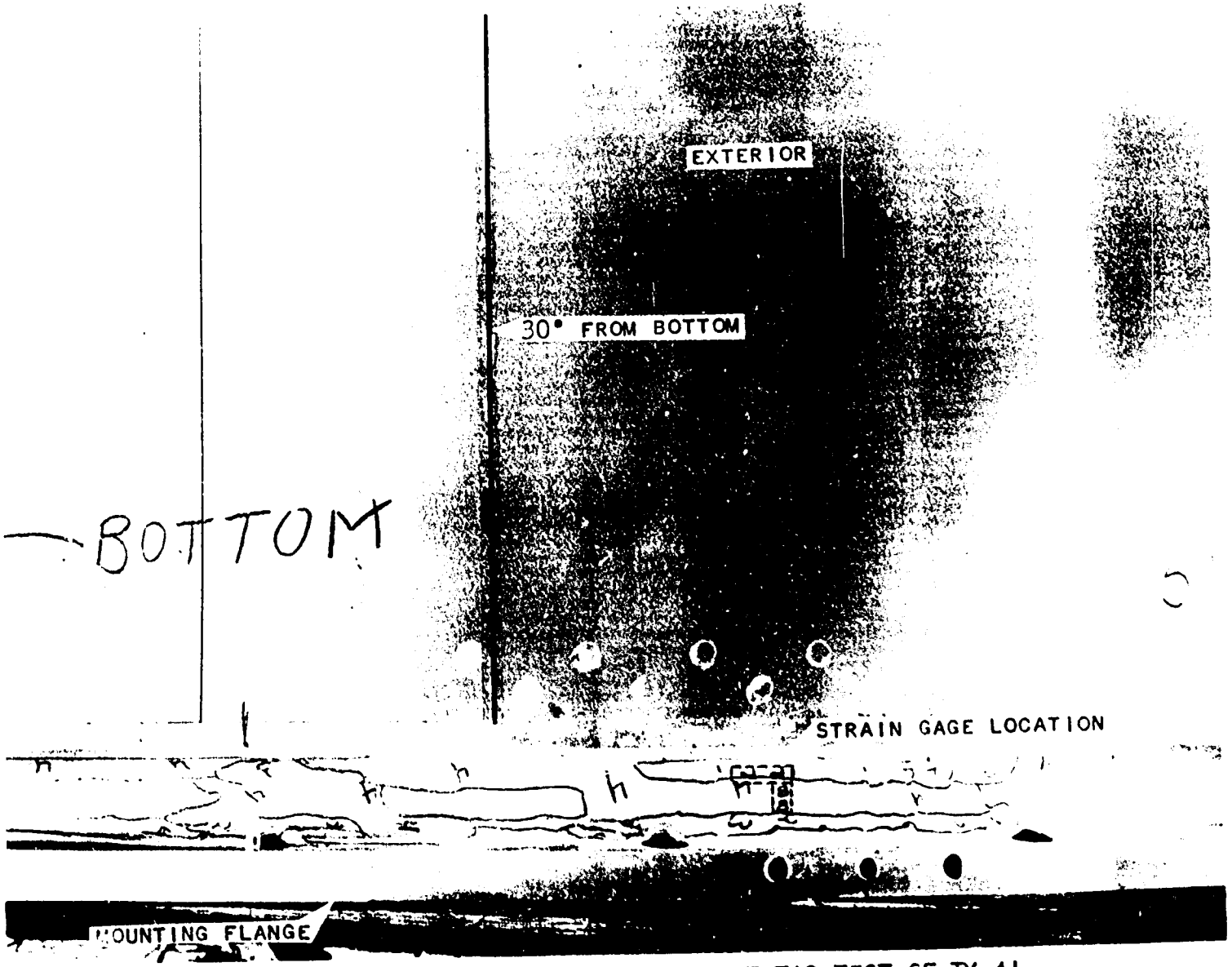

FIG. 13 -- AREAS OF STRESSCOAT CRACKS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

D #103973

REF. SYM: 1612 (698)
PROJECT NO. TM-747

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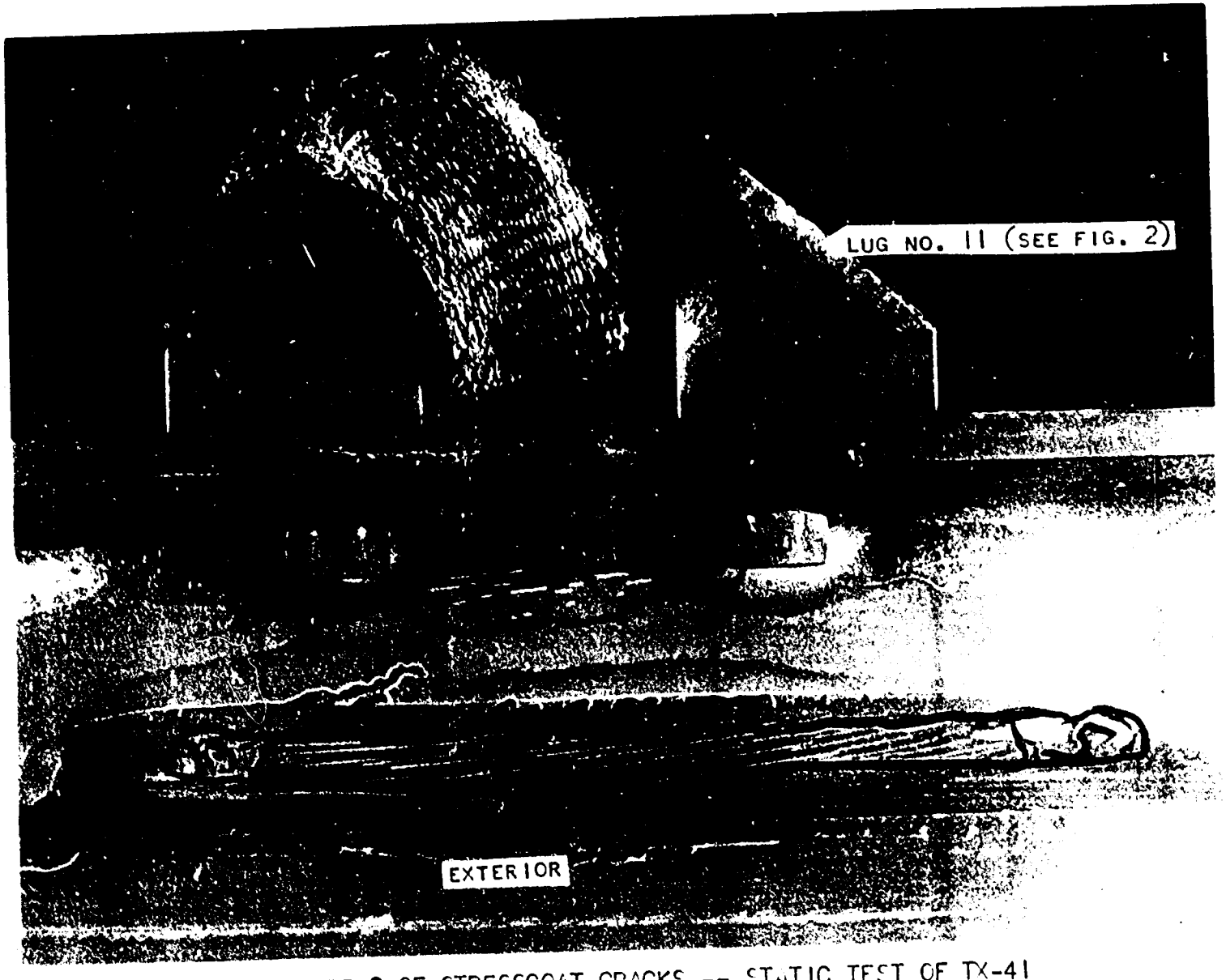

FIG. 14 -- AREAS OF STRESSCOAT CRACKS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

D# 103965

REF. SYM: 1612 (698)
PROJECT NO. TM-747

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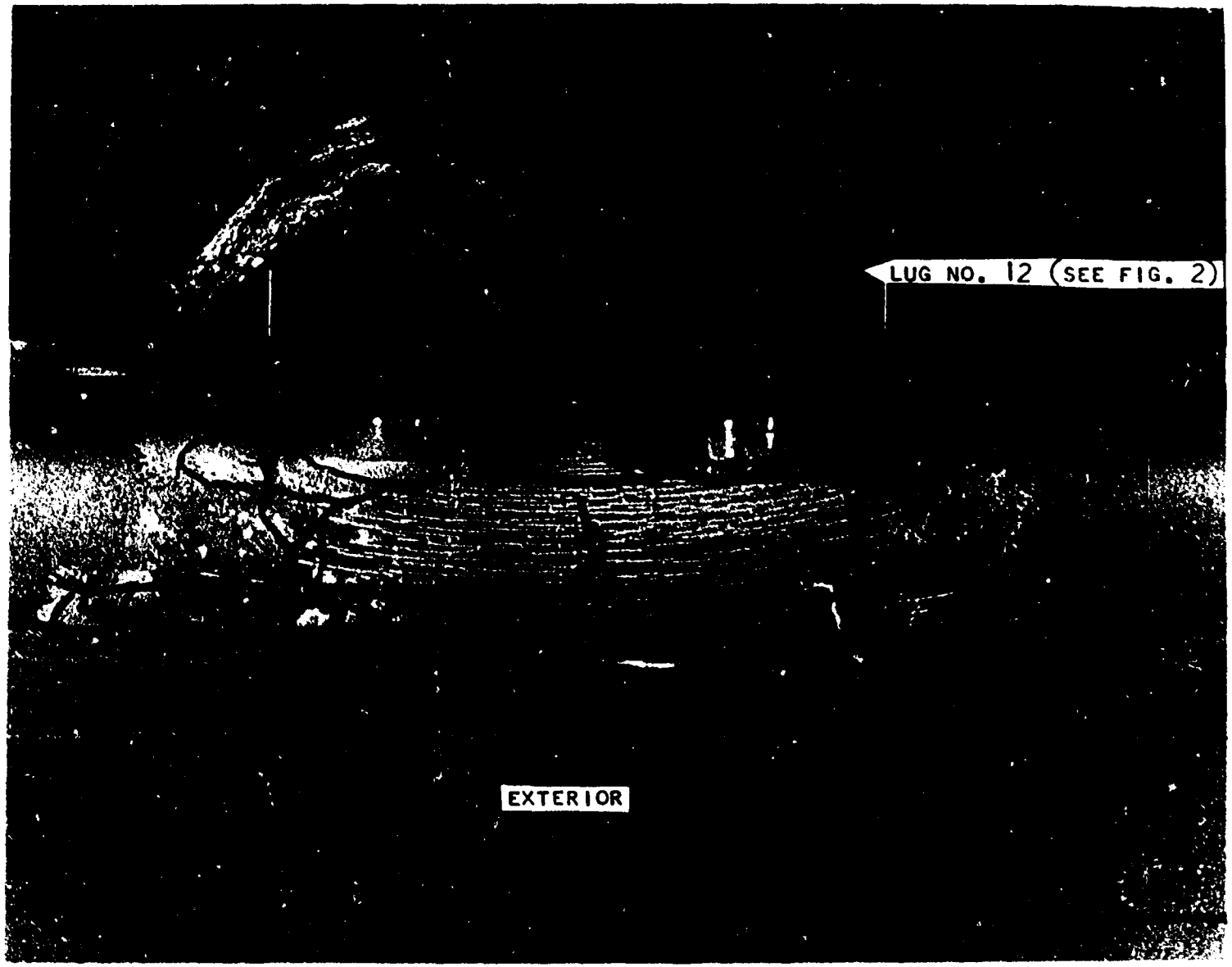

FIG. 15 -- AREAS OF STRESSCOAT CRACKS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

D# 103960

REF. SYM: 1612 (698)
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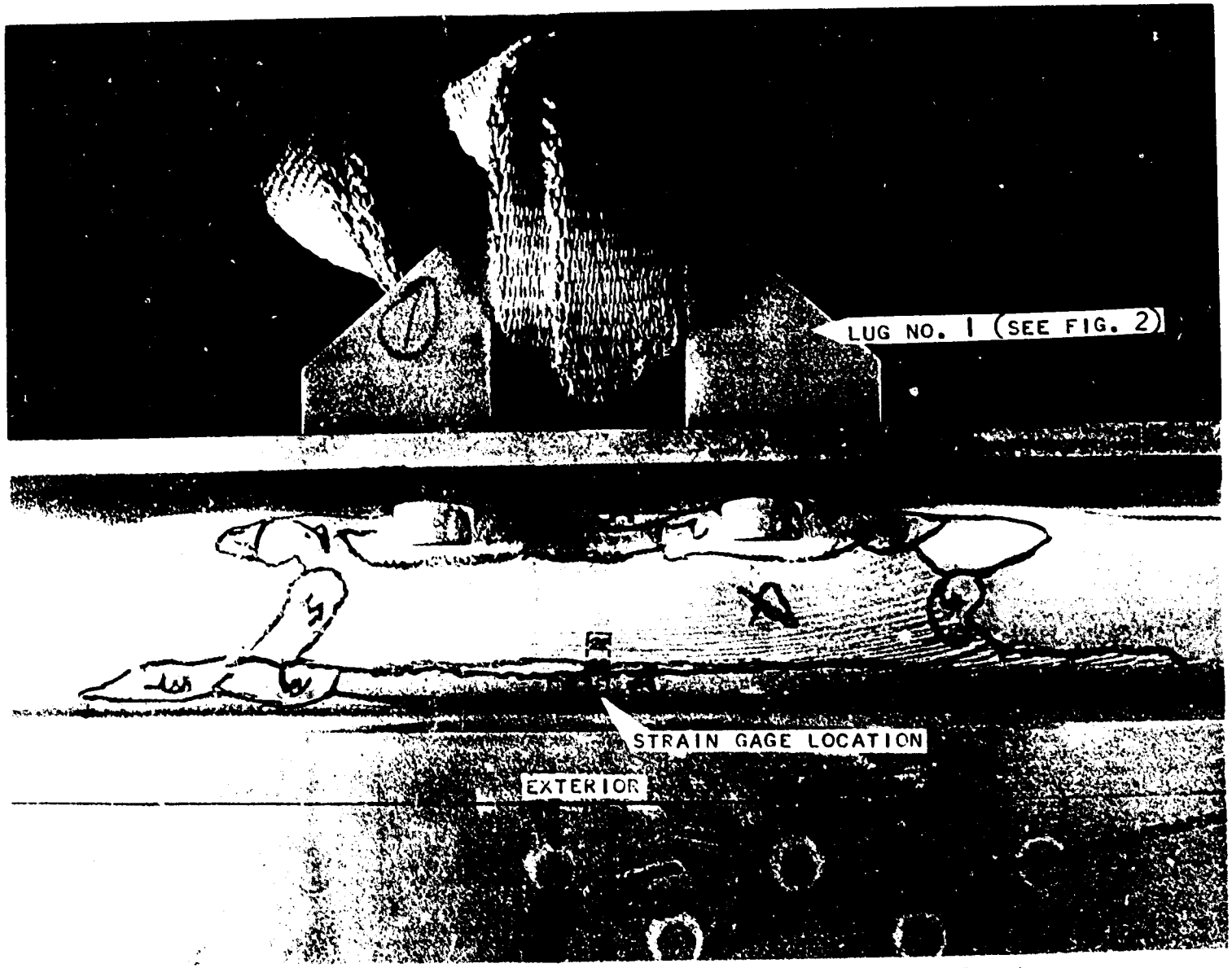

FIG. 16 -- AREAS OF STRESSCOAT CRACKS -- STATIC TEST OF TX-41 SHORT AFTERBODY

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REF. SYM: 1612 (698)
PROJECT NO. TM-747

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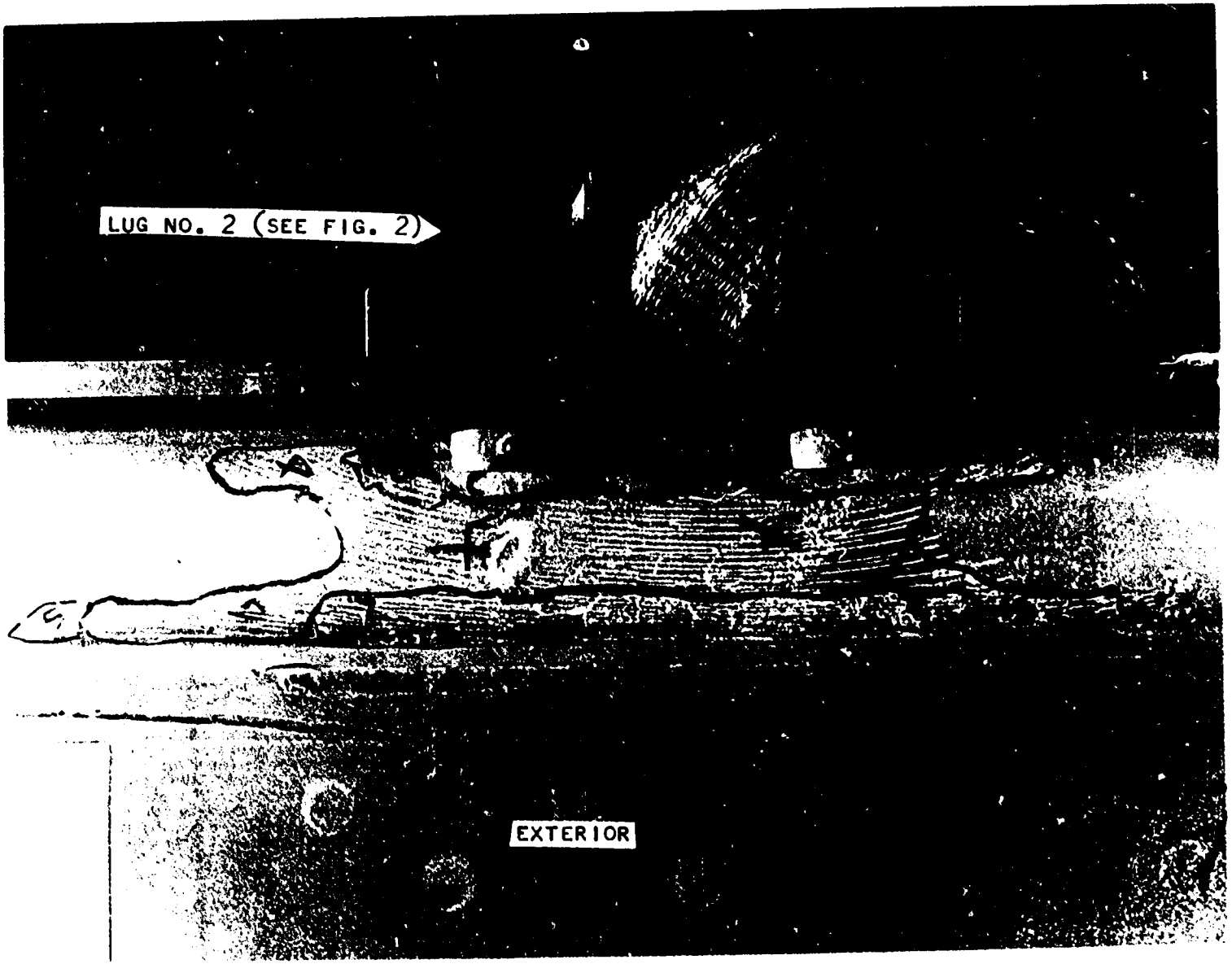

FIG. 17 -- AREAS OF STRESSCOAT CRACKS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

D# 103958

REF. SYM: 1612 (698)
PROJECT NO. TM-747

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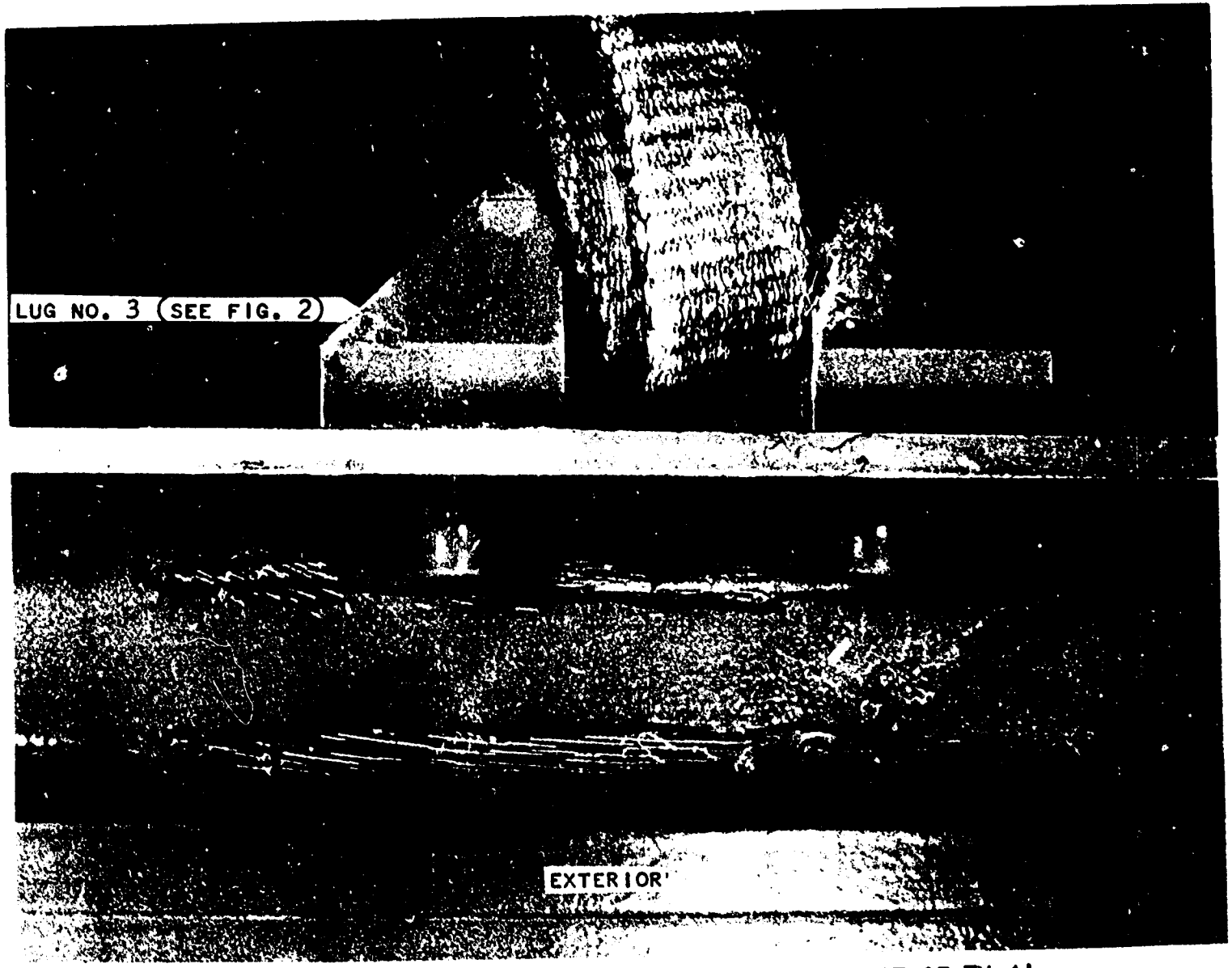

FIG. 18 -- AREAS OF STRESSCOAT CRACKS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

D #103961

REF. SYM: 1612 (698)
PROJECT NO. TM-747

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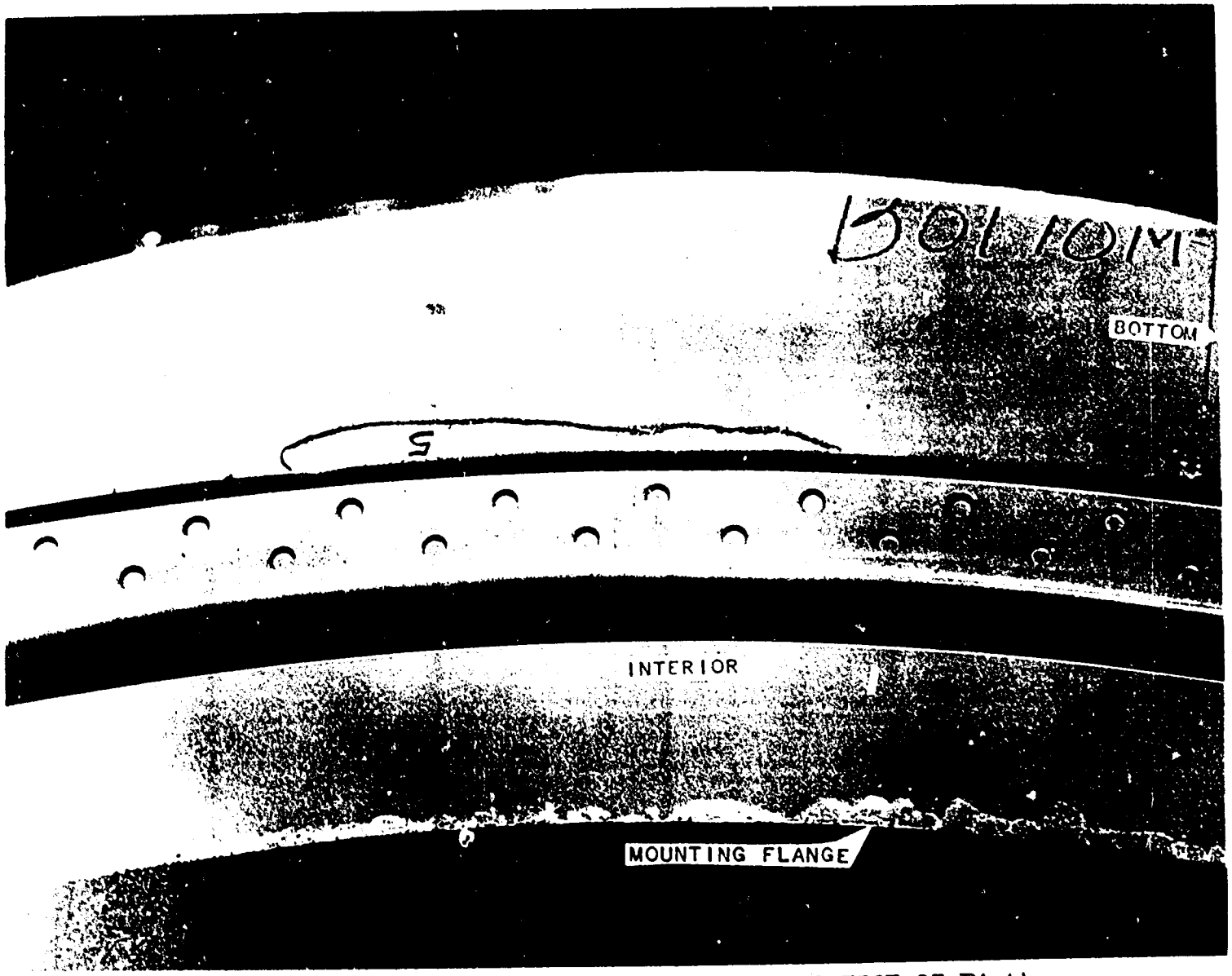

FIG. 19 -- AREAS OF STRESSCOAT CRACKS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

D #103971

REF. SYM: 1612 (698)
PROJECT NO. TM-747

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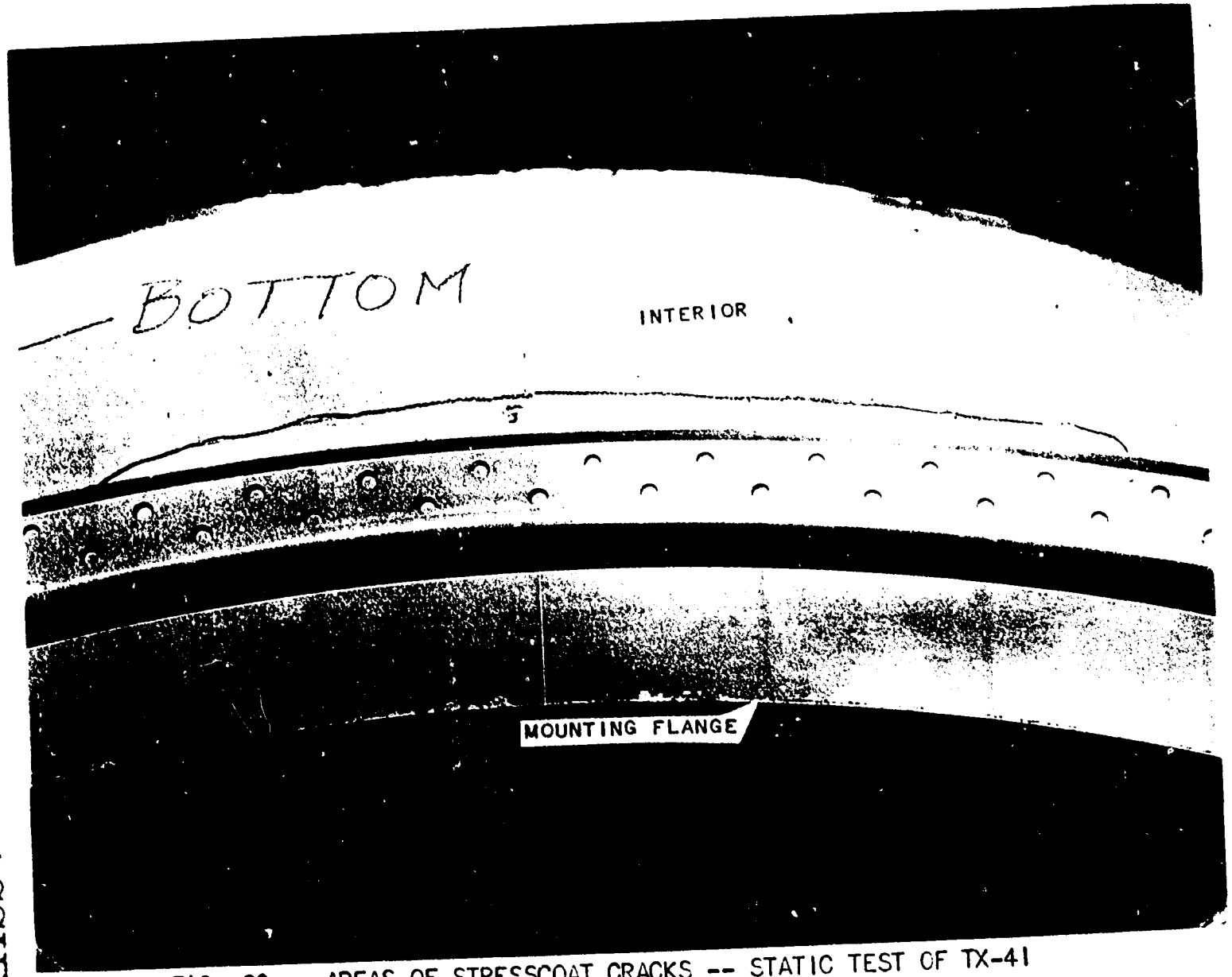

FIG. 20 -- AREAS OF STRESSCOAT CRACKS -- STATIC TEST OF TX-41 SHORT AFTERBODY.

D # 103962

REF. SYM: 1612 (698)
PROJECT NO. TM-747

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Ref. Sym: 1612 (698)
Project No. TX-747

TABLE I

STRESSCOAT DATA -- STATIC TEST OF TX-41 SHORT AFTERBODY

Load in Pounds	Per Cent of Limit Load	Stresscoat No. Figs. 10 thru 20	Sensitivity of Stresscoat Microinches per Inch
10,000	20	--	
12,000	24	--	
14,400	28.8	--	
17,400	34.8	--	
20,900	41.8	1	700
25,100	50.2	2	700
30,200	60.5	3	700
36,200	70.5	4	700
43,500	87	5	700

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TABLE II

STRAIN READINGS AND COMPUTED PRINCIPAL STRESSES -- STATIC TEST OF TX-41 SHORT AFTERBODY

Per Cent of Limit Load	Strain Readings at the Following Gages - Microinches per Inch																							
	1 - 2 - 3			4 - 5 - 6			7 - 8		9 - 10		11 - 12		13 - 14		15 - 16 - 17			18 - 19 - 20			21 - 22		23 - 24	
20	-43	64	39	-57	-59	56	-21	400	10	168	-12	332	-59	35	-74	7	67	-35	3	59	-1	289	-9	-28
40	-80E	135	86	-110E	-115E	116	-38	784	35	340E	-18	791	-99	68	-142	18E	145	-64	6	104	-8	542	-21	-49
60	-120	200	130	-160	-170	170	-50	1150	70	510	-20	1190	-140	90	-210	30	230	-90	10	160	-10	810	-30	-60
80	-140	280	180	-210	-230	230	-50	1500	100	690	-30	1560	-180	100	-280	50	310	-120	20	210	-20	1080	-40	-80
100	-160	350	210	-260	-280	290	-30	1930	160	840	-20	1860	-230	150	-340	470	410	-140	30	270	-20	1360	-60	-90
0	15	-18	-43	-20	3	4	11	128	56	-86	-20	-89	12	-16	-54	8	-5	-14	-15	-8	-11	-28	-9	-3
100	-160	340	200	-260	-280	280	-40	1950	150	820	-20	1850	-240	150	-340	90	390	-150	20	270	-20	1360	-60	-90
110	-190	370	220	-280	-310	310	-20	2130	160	850	10	1990	-270	190	-360	100	420	-170	20	290	-20	1490	-70	-90
120	-210	420	240	-310	-330	330	-10	2320	160	860	60	2160	-320	250	-380	110	450	-180	20	320	-20	1620	-80	-90
125	-220	430	260	-320	-350	350	0	2410	160	860	80	2250	-330	280	-400	120	470	-190	20	330	-20	1690	-80	-100
0	15	-30	-64	-19	5	-5	43	301	35	340	89	74	-22	86	-34	16	-40	-18	-45	-21	-13	-62	-11	-3
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
137.5	-280	570	380	-360	-430	410	-20	2510	140	1230	60	2760	-400	290	-400	140	580	-190	80	420	-10	2050	-80	-90
0	19	-9	-16	10	2	-3	15	206	-5	-821	81	156	-24	73	35	28	-37	0	-16	-4	3	-30	6	13

Per Cent of Limit Load	Maximum and Minimum Principal Stresses - psi																							
	1 - 2 - 3		4 - 5 - 6		7 - 8		9 - 10		11 - 12		13 - 14		15 - 16 - 17		18 - 19 - 20		21 - 22		23 - 24	
	S_u	S_v	S_u	S_v	S_u	S_v	S_u	S_v	S_u	S_v	S_u	S_v	S_u	S_v	S_u	S_v	S_u	S_v	S_u	S_v
20	580	-640	630	-640	4660	1370	2030	800	4600	1450	180	-560	500	-610	560	-180	3420	1160	-220	-370
40	1270	-1170	1320	-1230	9140	2730	4170	1790	9300	3000	400	-900	1150	-1110	980	-350	6391	2100	-450	-670
60	1890	-1730	1960	-1800	13430	4070	6330	2900	14020	4590	500	-1290	1890	-1570	1550	-440	9560	3170	-600	-830
80	2700	-2070	2700	-2390	17580	5490	8580	3980	18370	5970	460	-1730	2560	-2080	2020	-590	12720	4140	-800	-1110
100	3320	-2530	3390	-2920	22750	7470	10600	5300	21960	7310	850	-2120	5040	-3940	2654	-600	16040	5280	-1080	-1310
0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
100	3190	-2550	3260	-2940	22950	7430	10330	5100	21850	7270	800	-2240	3290	-2500	2620	-720	16040	5280	-1080	-1310
110	3440	-2970	3670	-3190	25160	8400	10720	5340	23630	8190	1160	-2430	3570	-2620	2770	-880	17580	5810	-1200	-1350
120	3860	-3380	3810	-3490	27460	9290	10840	5380	25840	9470	1670	-2780	3850	-2740	3100	-890	19120	6330	-1310	-1390
125	4030	-3400	4110	-3640	28560	9770	10840	5380	26990	10070	1980	-2780	4020	-2910	3180	-960	19950	6620	-1350	-1510
0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
137.5	5640	-3980	5050	-4260	29670	9940	15150	6650	32960	11910	1820	-3570	5270	-2430	4220	-580	24260	8200	-1310	-1390
0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

S_u = Maximum principal stress (largest algebraic value).
S_v = Minimum principal stress (smallest algebraic value).

Gages 1 thru 6 and 15 thru 20 are on 24S-T3 aluminum.
All other gages are on 14S-T6 aluminum forging.