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SANDIA SYSTEMATIC DECLASSIFICATION REVIEW DOWNGRADING OR DECLASSIFICATION STAMP	
CLASSIFICATION CHANGED TO: U	AUTHORITY: W.C. Payne
Emilda Selph 6/11/98 PERSON CHANGING MARKING & DATE	RECORD ID: 98SN2377
WC Payne 6-15-98 PERSON VERIFYING MARKING & DATE	DATED: 6/11/98

JUN 24 1958

Case No. 764.10
Ref. Sym: 1612 (658)
Project No, TM-707
File: XW-49, 3-2

MR. R. H. SCHULTZ - 1245

Attn: Mr. B. E. Martinez - 1245-1

Re: Static Test of XW-49 Adapter Cone

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW	
1st Review Date: 5/19/98	Designation (Circle Number):
R.B. Orsner DOC ADD	1. Classification Retained
2nd Review Date: 6/11/98	2. Classification Changed to: UNCL
Authority: ADD	3. Contains No DOE Classified Information
Name: WC Payne	4. Coordinate With:
	5. Contains UCNI?
	6. Comments: Releasable

Summary of Results

Four adapter cones, each of a different design in some respect, were statically tested for the Re-entry condition.

The first adapter cone (Dwg. No. 137793) was statically tested to a load of 103,400 pounds (110 per cent of a design ultimate load of 94,000 pounds) without producing damage.

The second cone, DS(1245)88958, was statically tested to a load of 47,000 pounds (50 per cent of a design ultimate load of 94,000 pounds) at which load the threaded end of the cone became disengaged from the mating threaded jig fixture because of slippage between the two threaded parts.

The third cone, DS(1245)88958 modified, was loaded to about 124,000 pounds (119 per cent of a limit load of 104,000 pounds) at which load failure occurred in the threaded portion of the cone.

The fourth cone (Dwg. No. 142550) was loaded to 177,000 pounds (170 per cent of a limit load of 104,000 pounds) without producing failure.

The second cone, when re-tested with a clamping ring on the threaded portion, failed at a load of 83,200 pounds (80 per cent of a limit load of 104,000 pounds).

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Object of Test

The object of the test on the first two cones was to proof load the cones prior to a test in Alabama in which these adapter cones were to be a part of a composite test unit.

After the second cone failed, the object of tests for the third and fourth cones was to check the re-designed adapter cones.

The re-test on the second cone was for general information only, since the fourth cone had previously been tested and proven.

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Table I shows the test conditions and loads.

Reason for Test

The test was performed as a result of the blanket Work Order Authorization dated February 4, 1957, from Department 1240 to Department 1610. This work order was supplemented by two memoranda, "Static Load Test on XW-35 Adapter Cone", dated October 16, 1957 and November 13, 1957 from Division 1245 to Division 1612. This cone was referred to as the XW-35 cone during the early part of the test. However, the cone has since been adapted to the XW-49 warhead.

Function of Object Tested

The adapter cone acts as a connector or support between the warhead and the case of the missile.

Summary of Past Tests

No previous tests have been run on this particular cone. However, a test was performed on a cone of a slightly different design, the results of which are given in the report, "Static Test of XW-35 Mounting Flange", Ref. Sym: 1612 (470), TM-533, dated October 22, 1957.

Setup for Test

Figures 1, 2, and 3 show the general setup for testing all of the cones. However, only cone No. 1 is shown in these three figures.

The drawing numbers of the cones in the sequence in which they were tested are: 137793, DS(1245)88958, DS(1245)88958 (modified), and 142550.

The following equipment was used:

1 - Miller hydraulic cylinder, 400,000 pounds capacity
1 - Hydraulic console
1 - Elliot load cell, No. 4304, capacity 400,000 pounds
1 - Baldwin strain indicator, Serial No. 175441

The following instrumentation was used:

4 - Starrett dial indicators, graduated to 0.001 inch and one-inch travel

Cone No. 1 - 8 - AX-7 biaxial strain gages, gage factor = 1.81 ± 2%, Res. = 120 ohms, Lot No. 232-11. Additional gages were mounted to the unit for use in the Alabama tests but these additional gages were not used in the current test.

Cone No. 2 (first test) - 12 - AX-5-1 biaxial strain gages, gage factor = 1.97 ± 1%, Res. = 120 ohms, Lot No. 232-11B-2Y. Additional gages were mounted but the additional gages were not used in this test.

Cone No. 3 - 31 - AX-5-1 biaxial strain gages, gage factor = 1.97 ± 1%, Res. = 120 ohms, Lot No. 232-11X.

Cone No. 4 - 12 - AX-5-1 biaxial strain gages, gage factor = 1.97 ± 1%, Res. = 120 ohms, Lot 232-11X.

Cone No. 2 (re-test) - 25 - AX-7 biaxial strain gages, gage factor = 1.88, Res. = 120 ohms.

8 - AX-7 biaxial strain gages, gage factor = 1.79, Res. = 120 ohms

2 - A-7 strain gages, gage factor = 1.97, Res. = 120 ohms

Procedure

The first cone was mounted to the centrifuge jig after which the centrifuge jig was mounted in the static jig as shown in Figs. 1, 2, and 3. The unit was tested to a simulated re-entry condition by applying a single longitudinal load on the loading plate attached to the face of the adapter cone. The cone was loaded in increments to 110 per cent of the design ultimate load. Strain readings for the eight biaxial gages (16 gages), Figs. 1 and 4, and deflection readings for the four dial indicators, Figs. 1 and 2, were taken after each increment of load.

During the course of the test, it was discovered that the tight fit on the circumference of the loading plate gave support to the loaded end of the cone. It appeared that this tight fit might be supporting the cone in a manner that it would not receive during the tests in Alabama. Consequently, a revised loading plate with a smaller circumference was mounted on the cone and the test was re-run with identical loads as were used in the initial test of the cone. The strain readings and dial indicator readings were taken at each increment of load as in the initial test.

The second cone, DS(1245)88958, was mounted similar to the first cone as shown in Figs. 1, 2, and 3. The one longitudinal load representing the simulated re-entry condition was applied in increments. Strain readings were taken at the 12 biaxial gages, Fig. 5, and deflection readings were taken at the two dial indicators, Dials 1 and 2 on Fig. 1, after each increment of load. At about 50 per cent of design ultimate load the threads on the cone became disengaged from the mating jig fixture. The unit and jig fixture were again engaged and the test was attempted again. During the second attempt, the threads became disengaged at 30 per cent

of design ultimate load after which the test was discontinued on the cone.

The third cone was similar to the second except a lip was fabricated onto the interior of the cone near the threaded portion, so that this lip, upon test assembly, fit into a groove on the mating threaded jig fixture. The cone was set up for the test similar to the setup shown in Figs. 1, 2, and 3. The one longitudinal load representing the simulated re-entry condition was applied in increments. Strain readings were taken at the 31 biaxial strain gages, Figs. 6 through 9, and deflection readings were taken at two dial indicators, Dials 1 and 2 in Fig. 1, after each load increment. At 119 per cent of limit load, the unit failed which prohibited additional loading.

The fourth cone, Dwg. No. 142550, was mounted in the jig similar to that shown in Figs. 1, 2, and 3. The unit was loaded for the re-entry condition to 170 per cent of limit load. Strain readings were taken from the 12 biaxial strain gages, Figs. 10, 11, and 12, and deflection readings were taken from the two dial indicators, Dials 1 and 2 in Fig. 1, after each increment of load.

The second cone, DS(1245)88958, was again mounted in the static jig similar to the setup shown in Figs. 1, 2, and 3.

For the re-test on the second cone, a clamping ring was mounted on the exterior of the cone to help keep the threads of the two mating parts engaged. The unit was loaded for the re-entry condition in increments to 83,000 pounds (80 per cent of a limit load of 104,000 pounds) at which load failure precluded additional loading. Strain readings were taken for the 30 biaxial strain gages and two uniaxial gages shown in Figs. 13, 14, 15, and 16.

Results

The first cone, Dwg. No. 137793, withstood a simulated re-entry load of 103,500 pounds (110 per cent of design ultimate) when tested with both the tight fitting and the loose fitting loading plate. The tight fitting loading plate was one which fit tight on the interior circumference of the loaded end of the cone such that "out-of-roundness" of the cone would be prevented during loading. The loose fitting loading plate had a space between it and the interior cone circumference as shown in Figs. 1 and 2 so that no restraint to "out-of-roundness" of the cone would be provided. The strain readings and the computed principal stresses which resulted when the unit was loaded with the tight fitting plate are shown on Table II. The maximum computed stress was 55,410 psi (compression) at biaxial gage (51,52) at the location shown on Fig. 4. All stresses for these tests are computed on the assumption that the biaxial gages are oriented in the direction of the principal stresses. The strain readings and the computed principal stresses when loaded with the loose fitting plate are

shown on Table III. The maximum computed stress was 43,130 psi (tension) at biaxial gage (55,56) at the location shown on Fig. 1.

The deflection readings for the first cone with the tight fitting loading plate are shown on Table IV. The deflection readings when the unit was tested with the loose fitting loading plate are given on Table V.

The threaded portion of the second cone, DS(1245)88958, became disengaged from the mating threaded jig fixture at about 50 per cent of ultimate load. The two parts were again engaged and the unit was loaded. However, the two parts became disengaged for the second time when 30 per cent of design ultimate load was reached. The strain readings and the computed principal stresses are shown on Table VI. The deflections for the second cone are shown in Table VII.

The third cone, DS(1245)88958 (modified), failed at a longitudinal load of 124,000 pounds (119 per cent of limit load). The failure occurred in the threaded portion of the jig fixture and the cone as shown in Figs. 17, 18, and 19. The strain readings and computed principal stresses are shown on Table VIII. The maximum computed stress was 29,790 psi (compression) at biaxial gage (27,28) at the location shown on Fig. 9. The deflections for the two dial indicators are shown on Table IX.

The fourth cone, Dwg. No. 142550, was loaded to a longitudinal load of 177,000 pounds (170 per cent of limit load) without failure. The strain readings and the computed principal stresses are given on Table X. The yield point stress of 55,000 psi for 14S-T6 aluminum was exceeded at 150 per cent of limit load at strain gage (9,10) at the location shown in Fig. 10. The yield point stress was also exceeded at 165 per cent of limit load at strain gage (7,8) shown on Fig. 11. The deflection readings for the fourth cone are given on Table XI.

A failure resulted when the second cone was re-tested with a clamp around the threaded end of the cone. The mating threaded jig fixture became disengaged from the threaded portion of the cone at a load of 83,000 pounds (80 per cent of limit load of 104,000 pounds). Part of the threaded fixture fractured as shown on Fig. 20. The strain readings and the computed principal stresses are given on Table XII for loads through 70 per cent of limit load. Failure occurred at 80 per cent of limit load before strain readings could be taken at that load. The largest computed stress at 70 per cent of limit load was 31,340 psi (compression) at strain gage (63,64) shown on Fig. 16.

Conclusions

It is concluded that the first cone, Dwg. No. 137793, has adequate strength for a longitudinal load of 103,500 pounds.

JUN 21 1958

Ref. Sym: 1612 (658)
Project No. TM-707

The second cone, DS(1245)88958, is inadequate because of the difficulty in keeping the threads engaged with the mating part during the application of the re-entry load.

The third cone, DS(1245)88958, with a tooth insert, is inadequate for the desired test load. However, it did exhibit adequate strength up to a longitudinal load of 119 per cent of limit load.

The fourth cone, Dwg. No. 142550, has adequate strength for the desired test loads.

The second cone with the clamping ring is inadequate because of the disengagement of the threaded portion of the cone under load. Damaged threads from the previous test may have contributed to some degree to the disengagement.

HARRY P. WHEELER - 1612-2

Approved by: PAUL H. ADAMS - 1612

HPW:1612-2:as

Copy to:
W. A. Gardner, 1610
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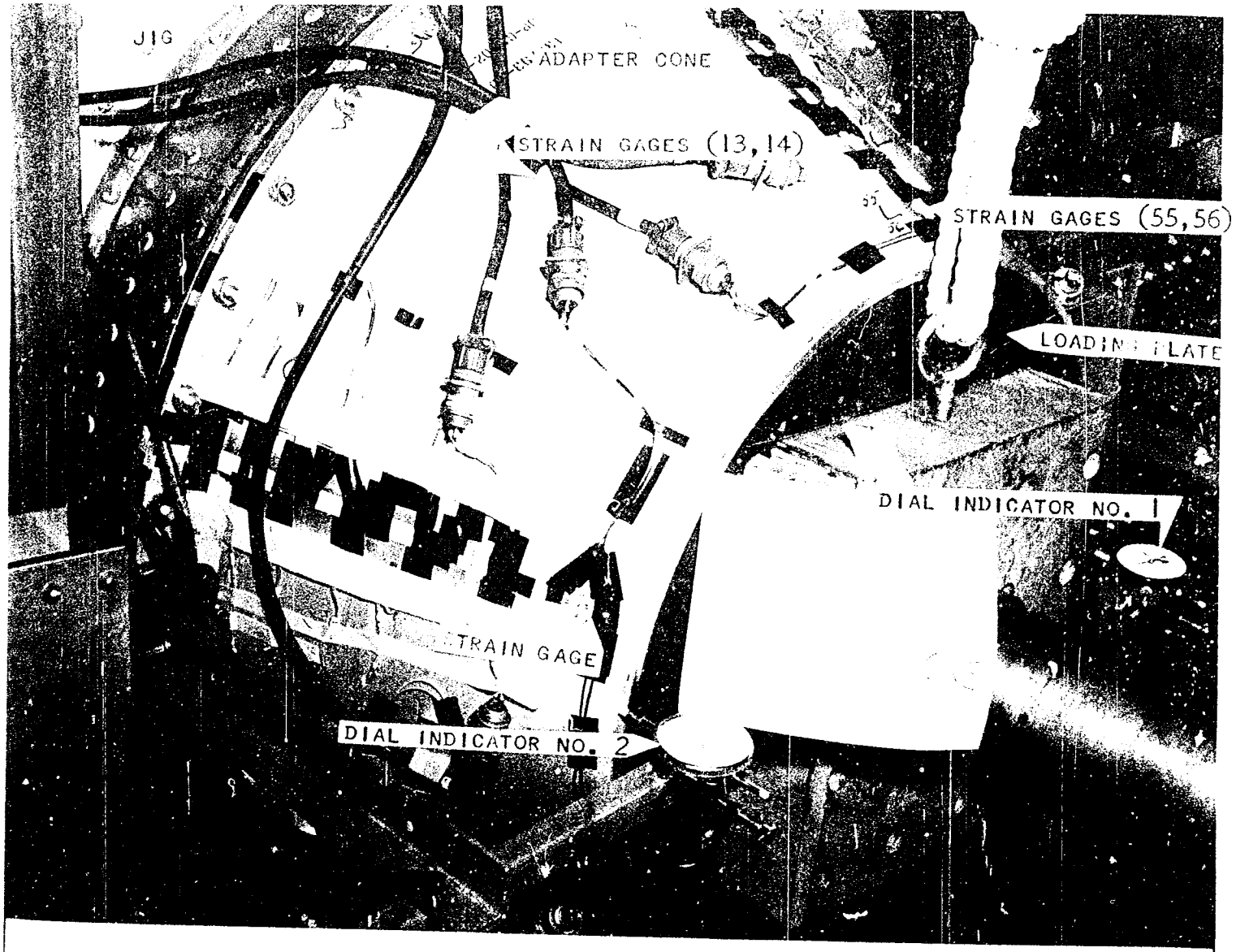

FIG. 1 -- SETUP FOR STATIC TEST OF XW-49 ADAPTER CONE.

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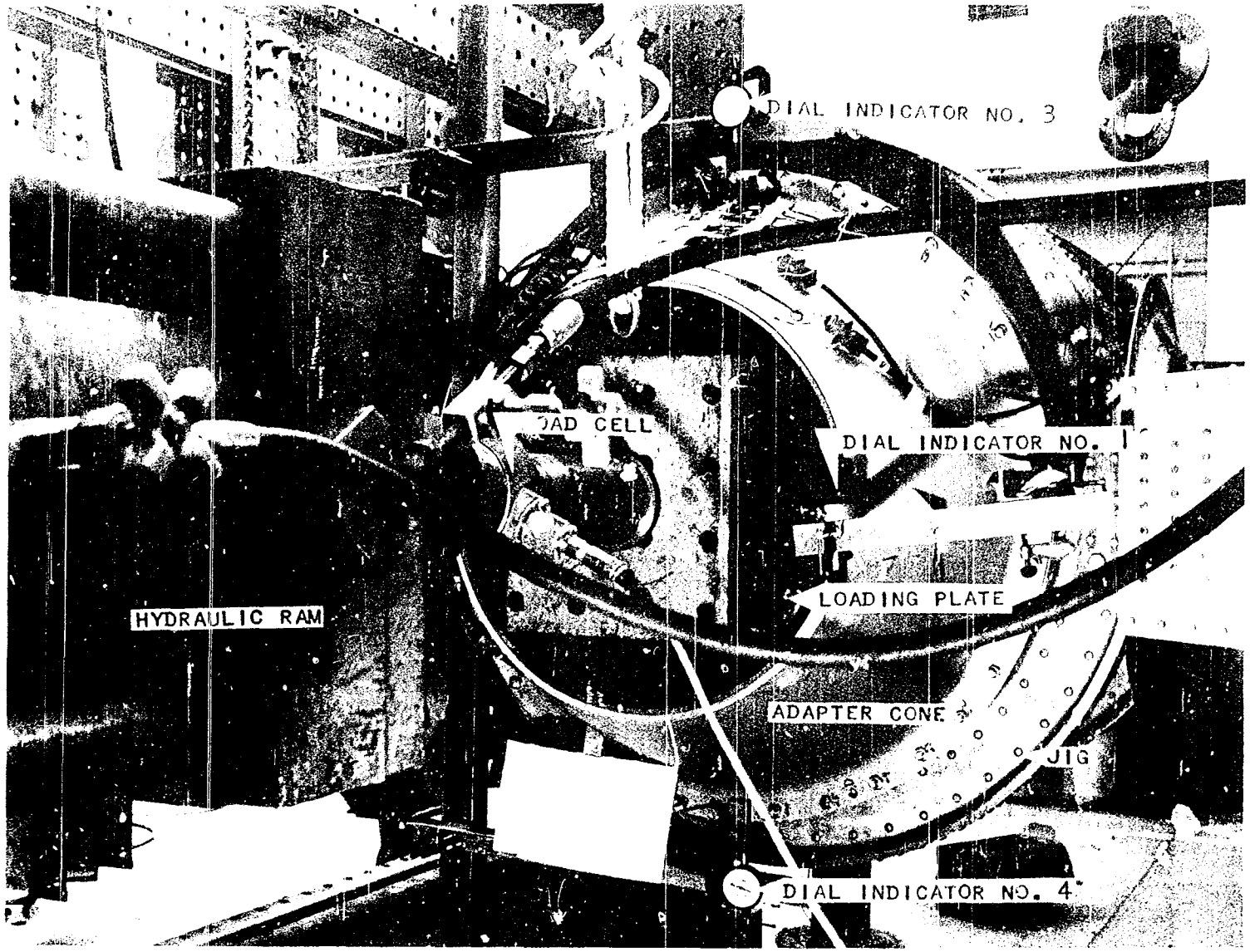

FIG. 2 -- SETUP FOR STATIC TEST OF XW-49 ADAPTER CONE.

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PROJECT NO. TN-707

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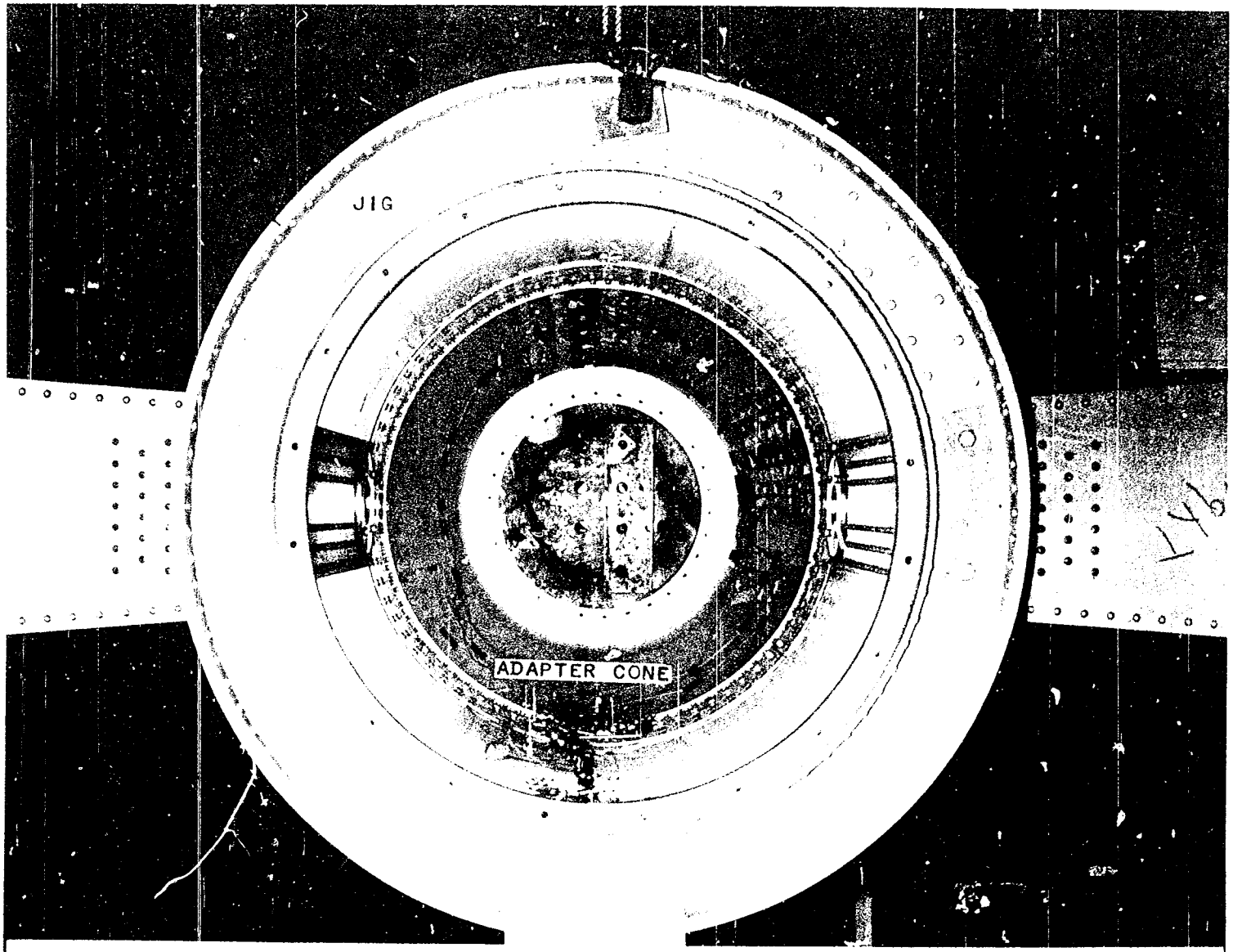

FIG. 3 -- SETUP FOR STATIC TEST OF XW-49 ADAPTER CONE.

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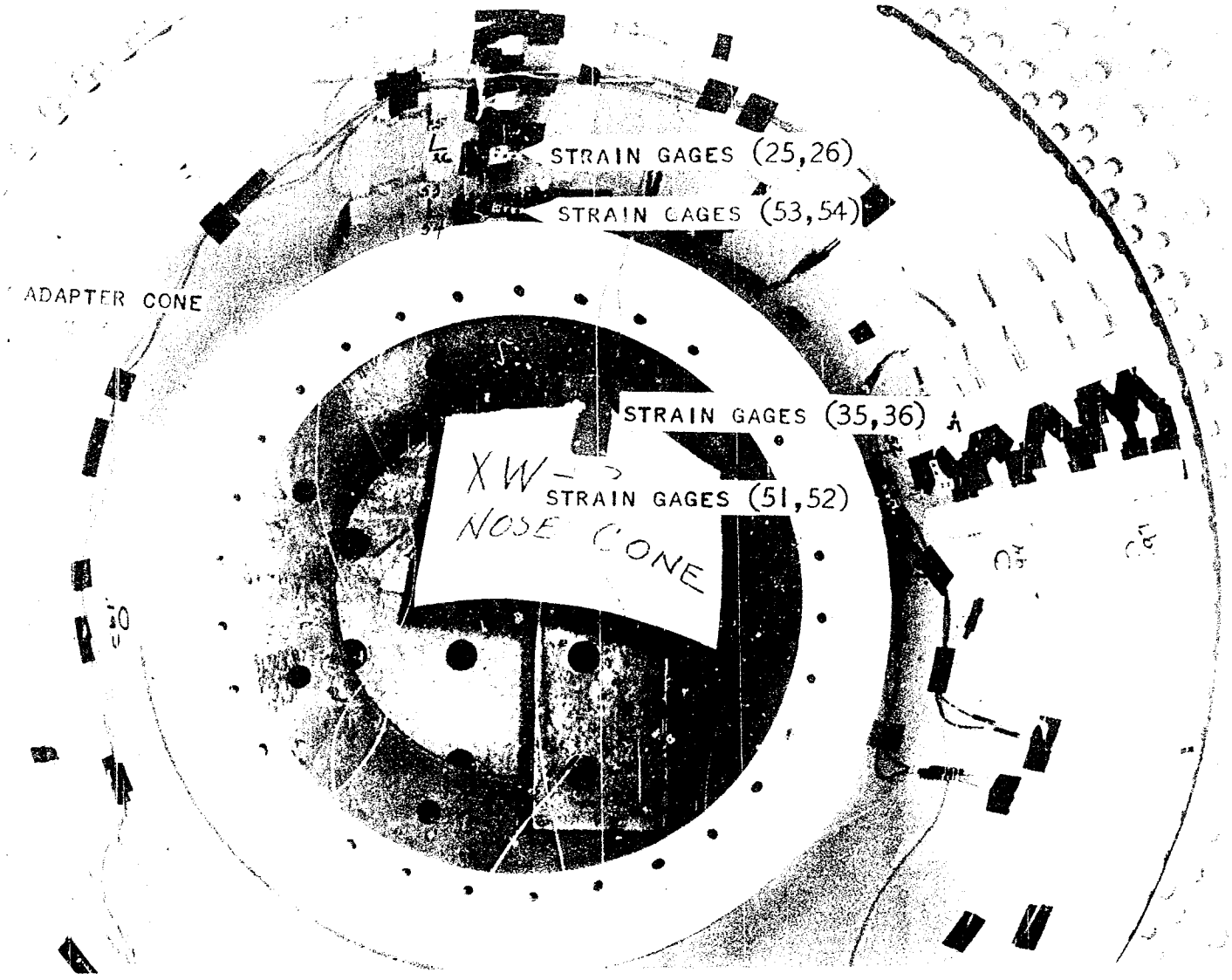

FIG. 4 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XW-49 ADAPTER CONE (CONE #1).

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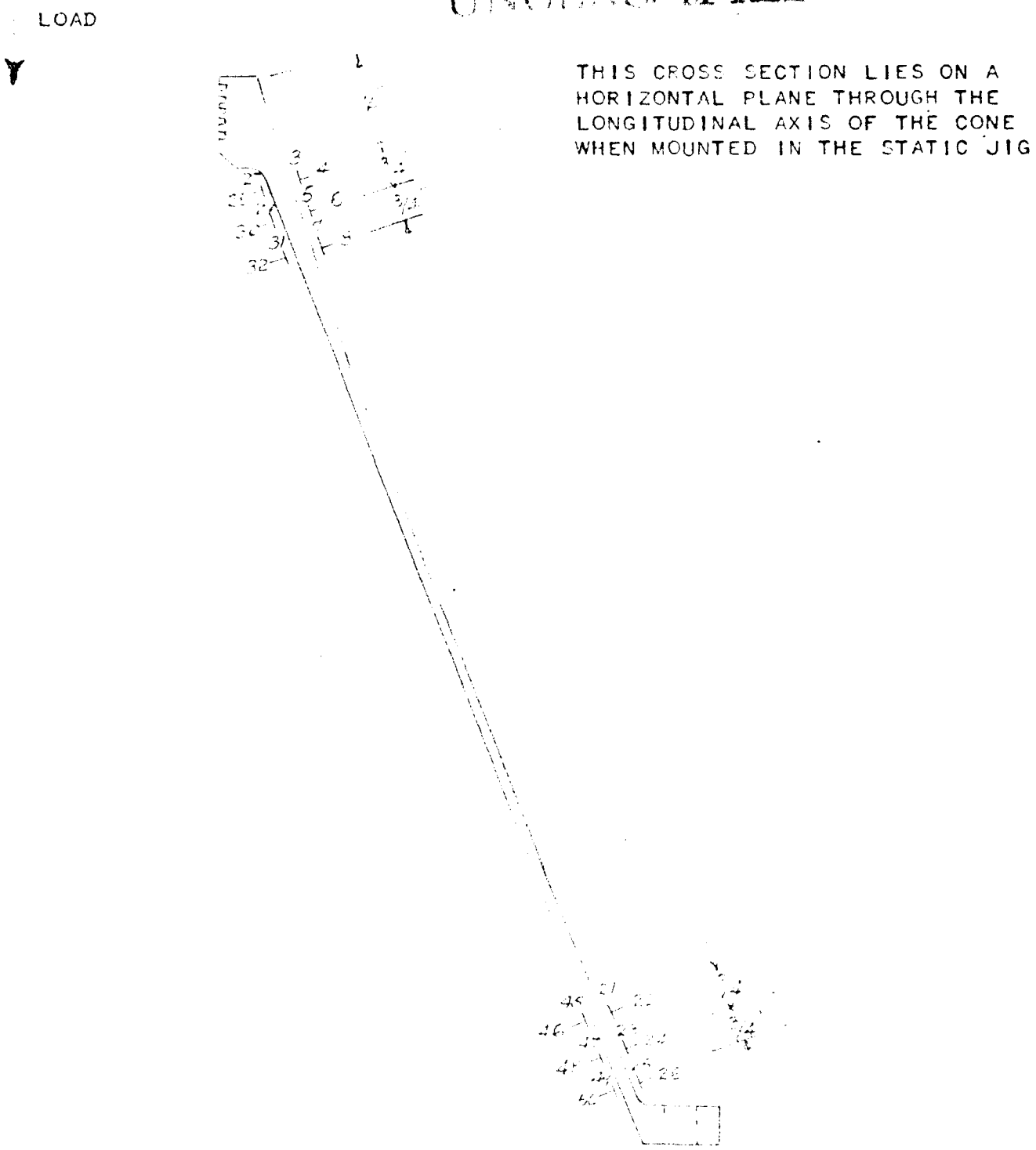

FIG. 5 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XW-49 ADAPTER CONE (FIRST TEST ON CONE #2).

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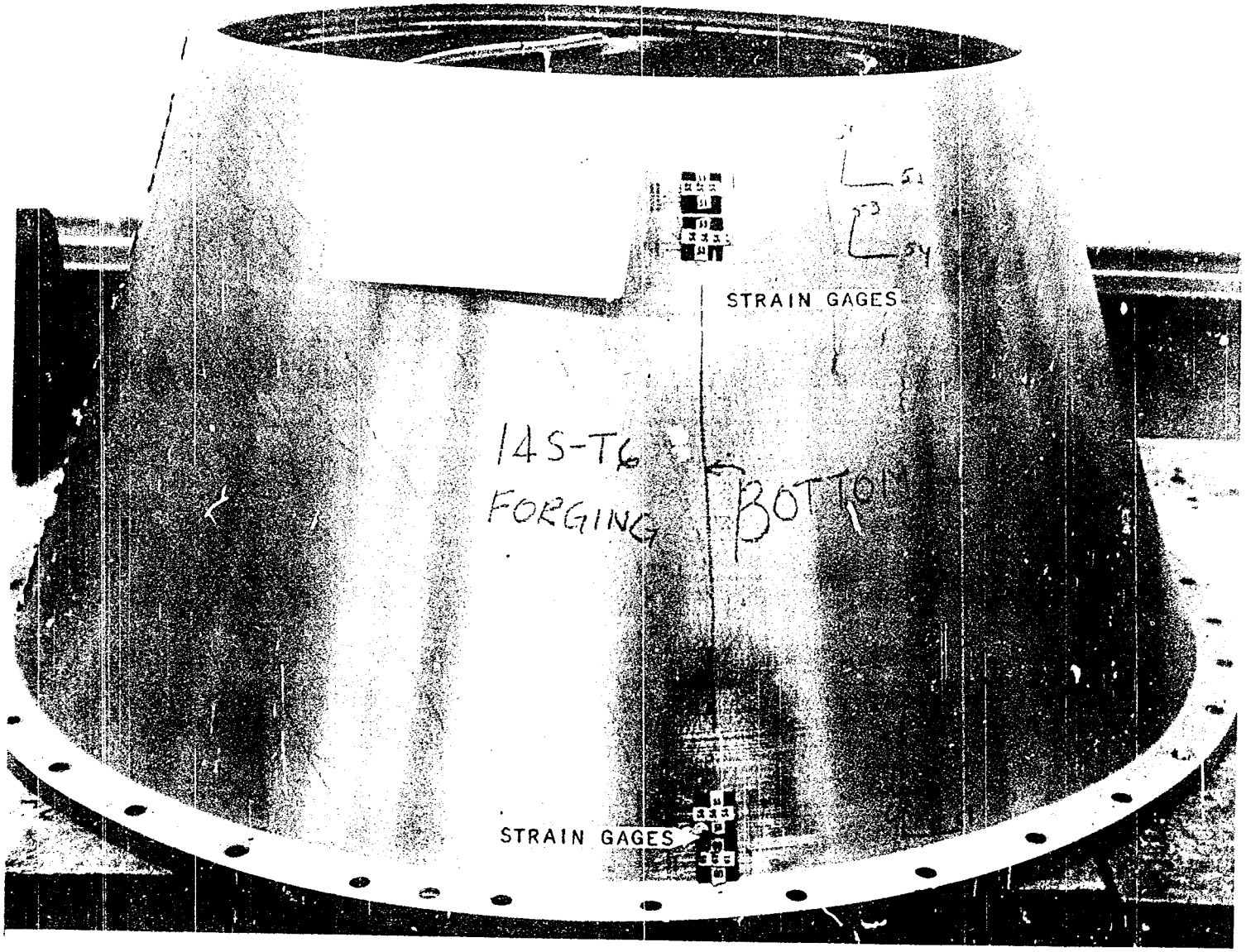

FIG. 6 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XW-49 ADAPTER CONE (CONE #3).

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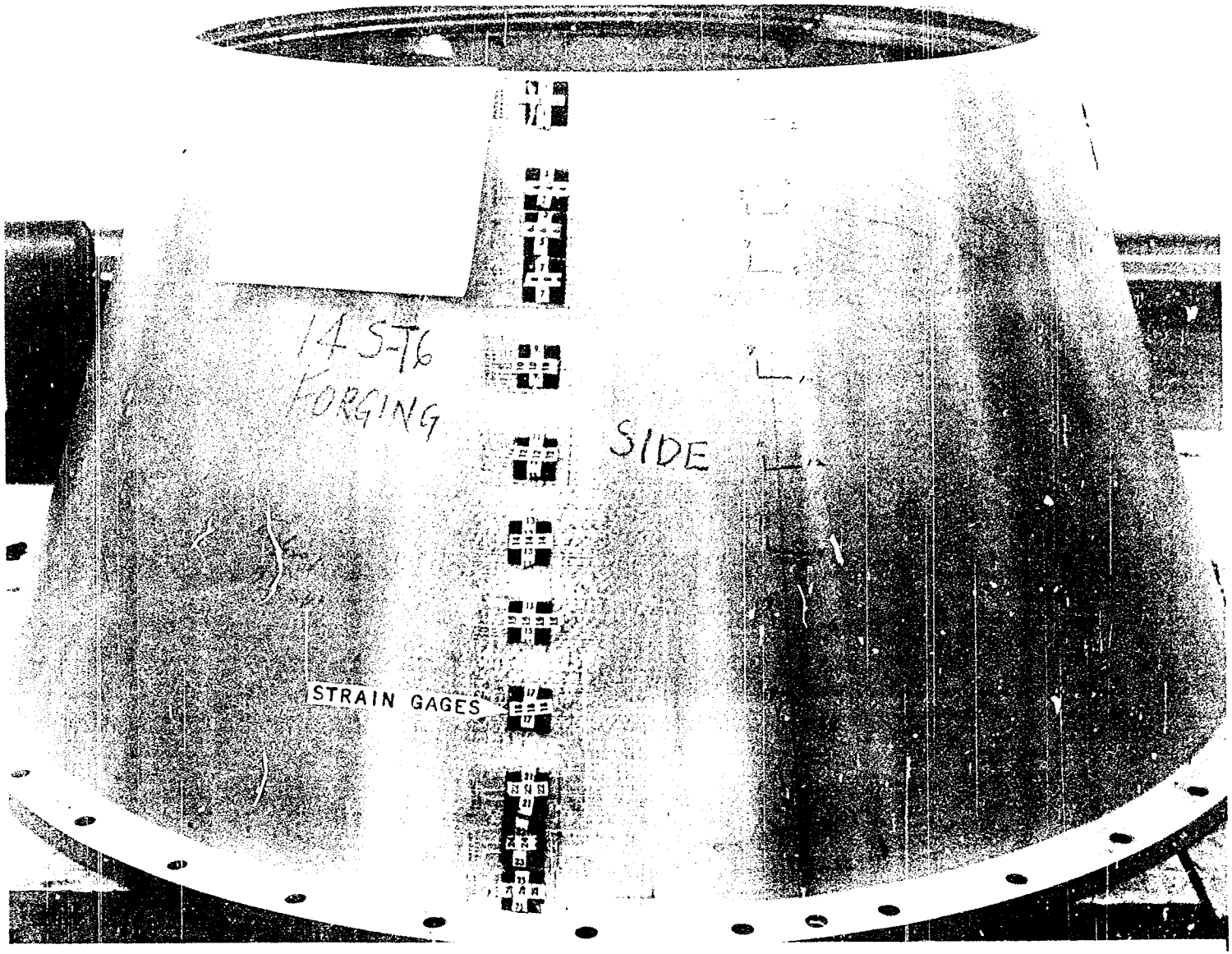

FIG. 7 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XW-49 ADAPTER CONE (CONE #3).

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PROJECT NO. TM-707

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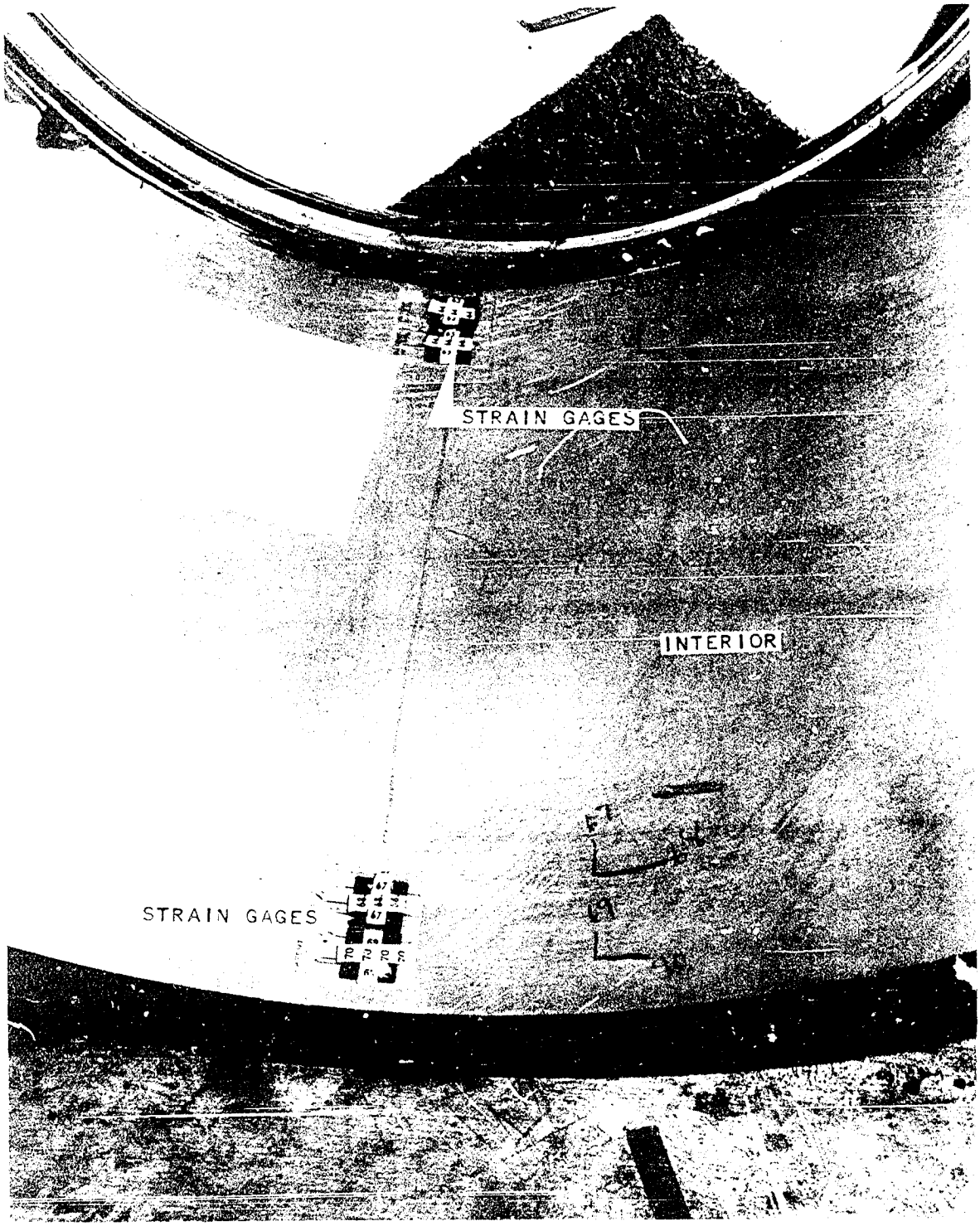

FIG. 8 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XV-49 AERIALTER CONE (CONE #3).

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PROJECT NO. [illegible]

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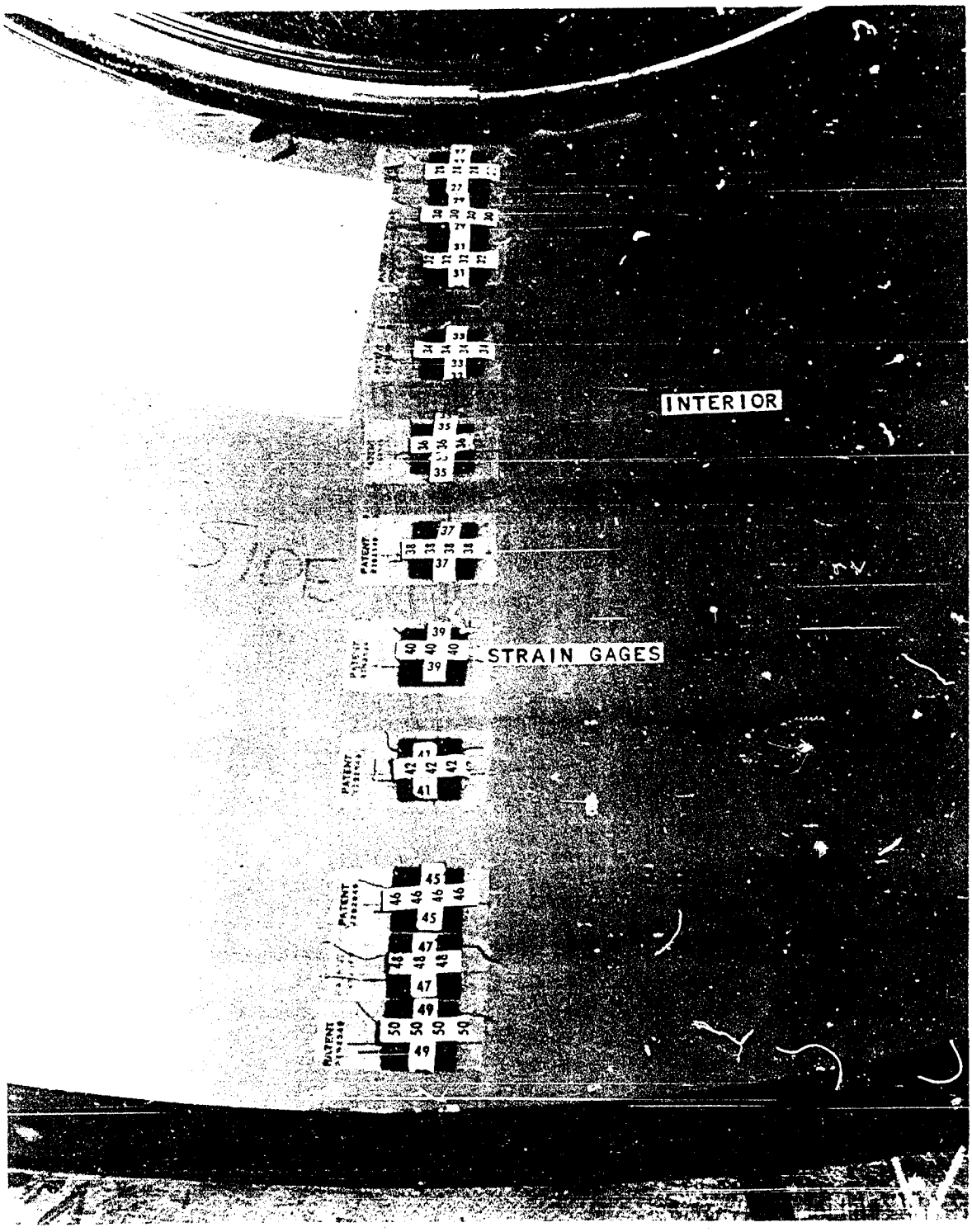

FIG. 9 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XW-49 ADAPTER CONE (CONE #3).

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PROJECT NO. TW-707

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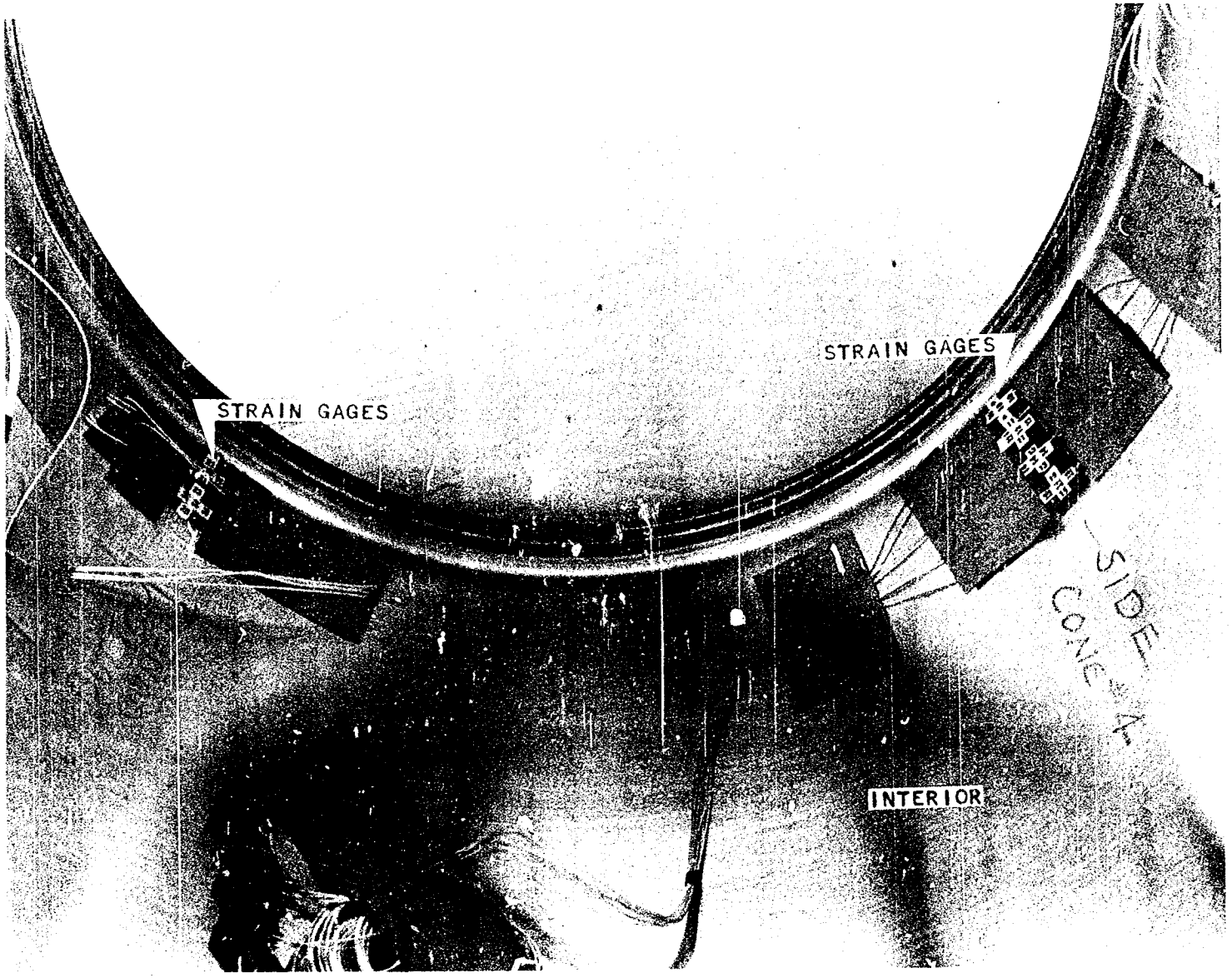

FIG. 10 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XW-49 ADAPTER CONE (CONE #4).

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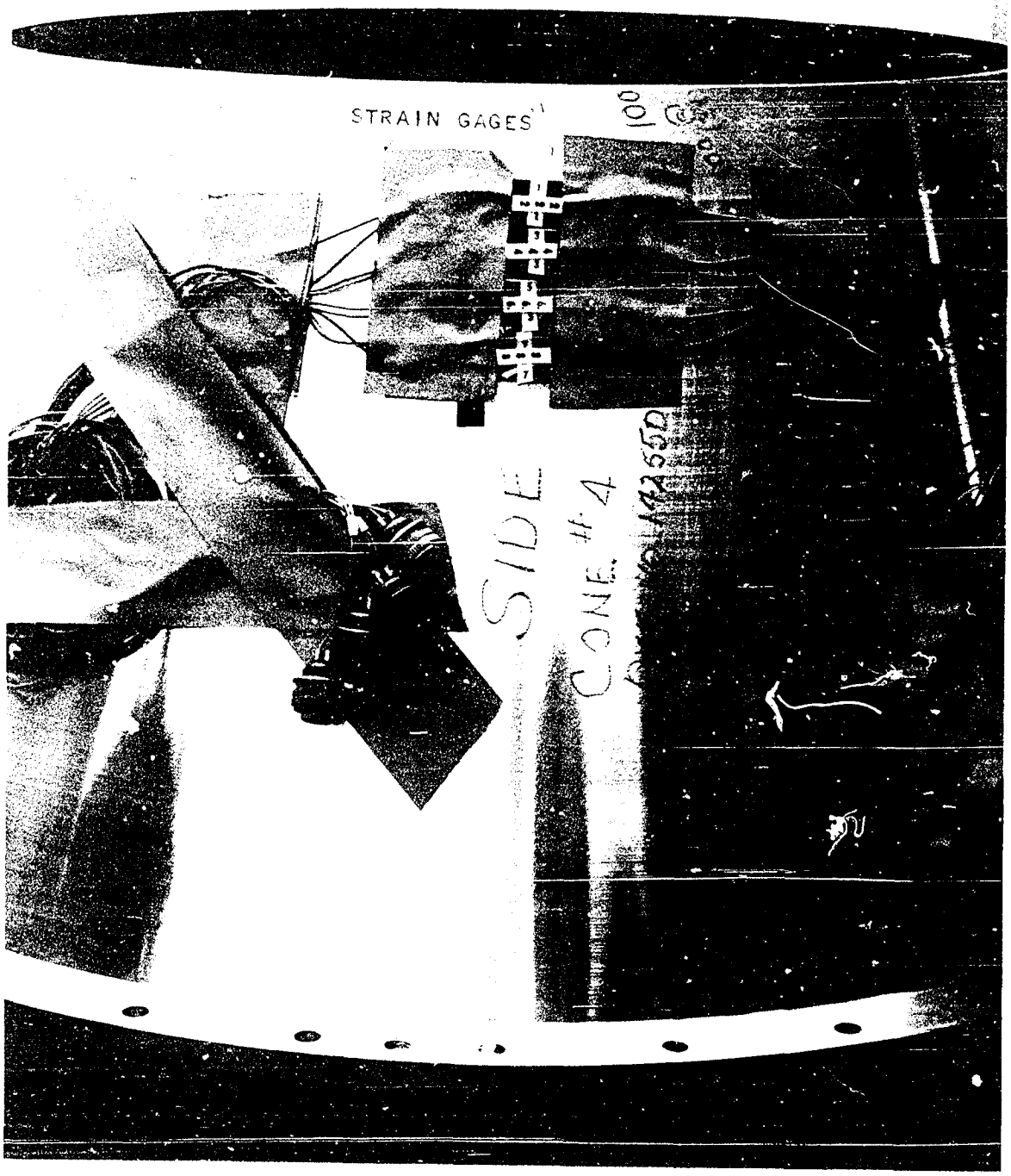

FIG. 11 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XF-49 AIRFRAME CONE (CONE #4).

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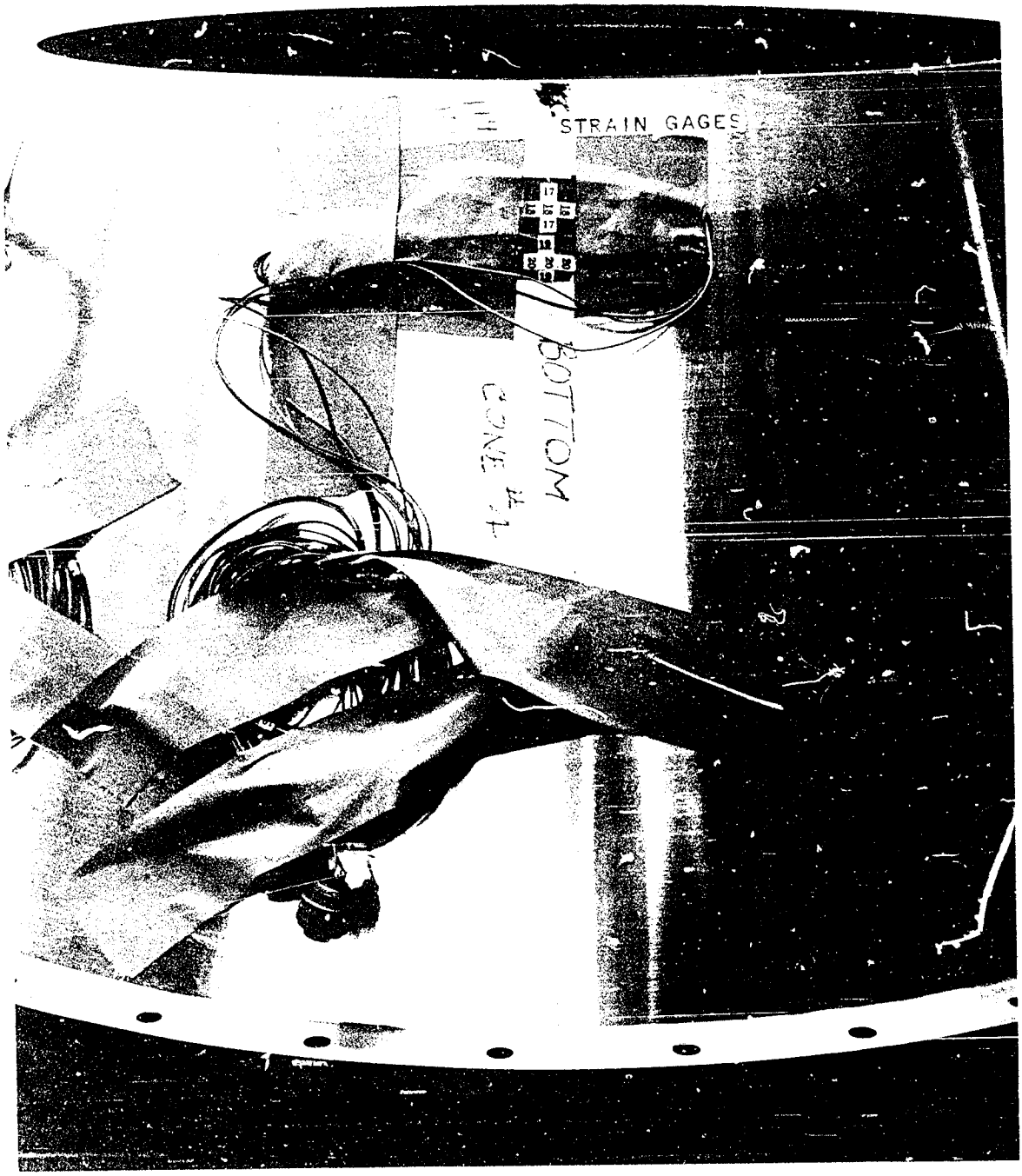

FIG. 12 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XB-49 WING TIP ZONE (CODE #4).

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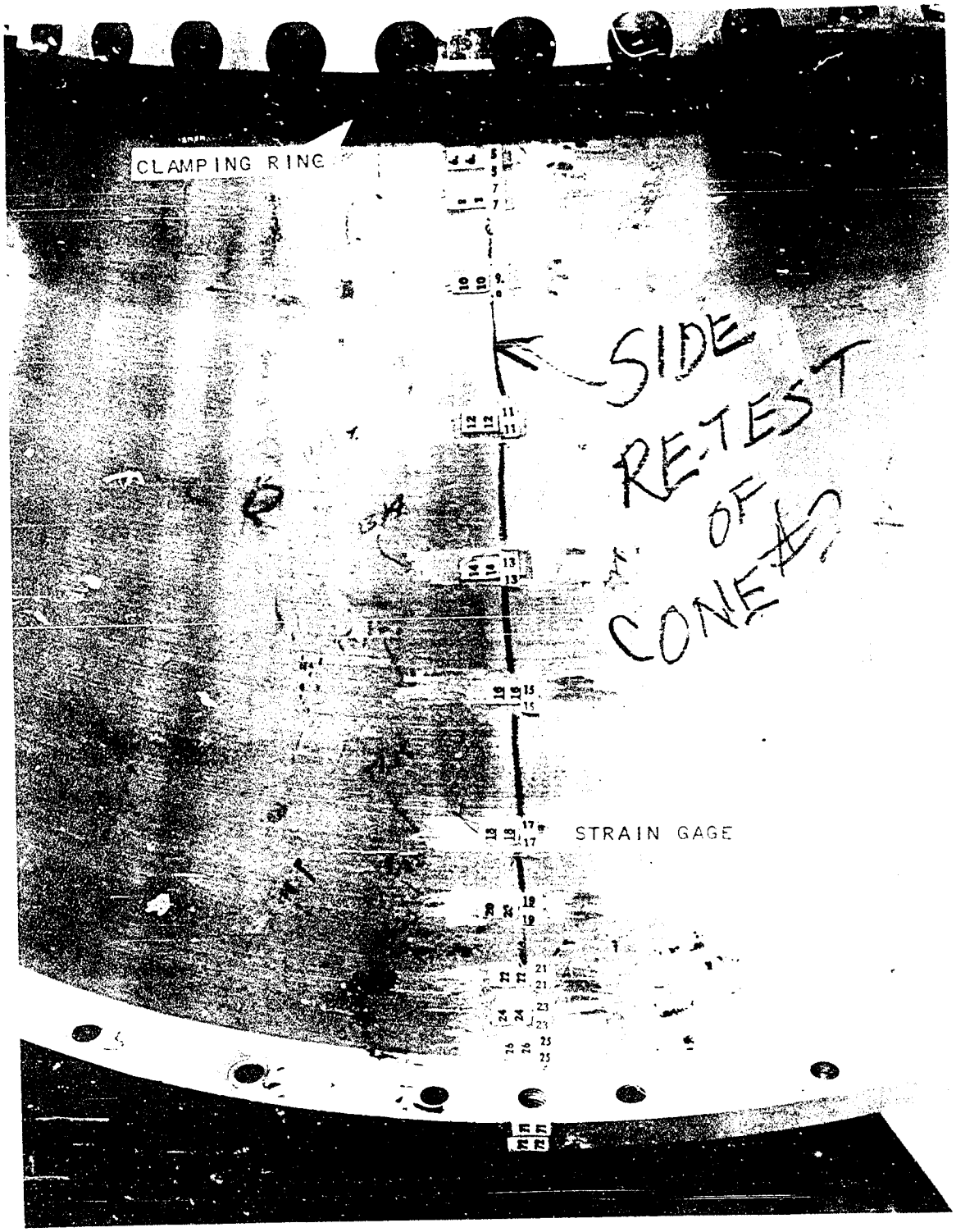

FIG. 13 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XW-49 ADAPTER CONE (SECOND TEST ON CONE #2).

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PROJECT NO. TM-707

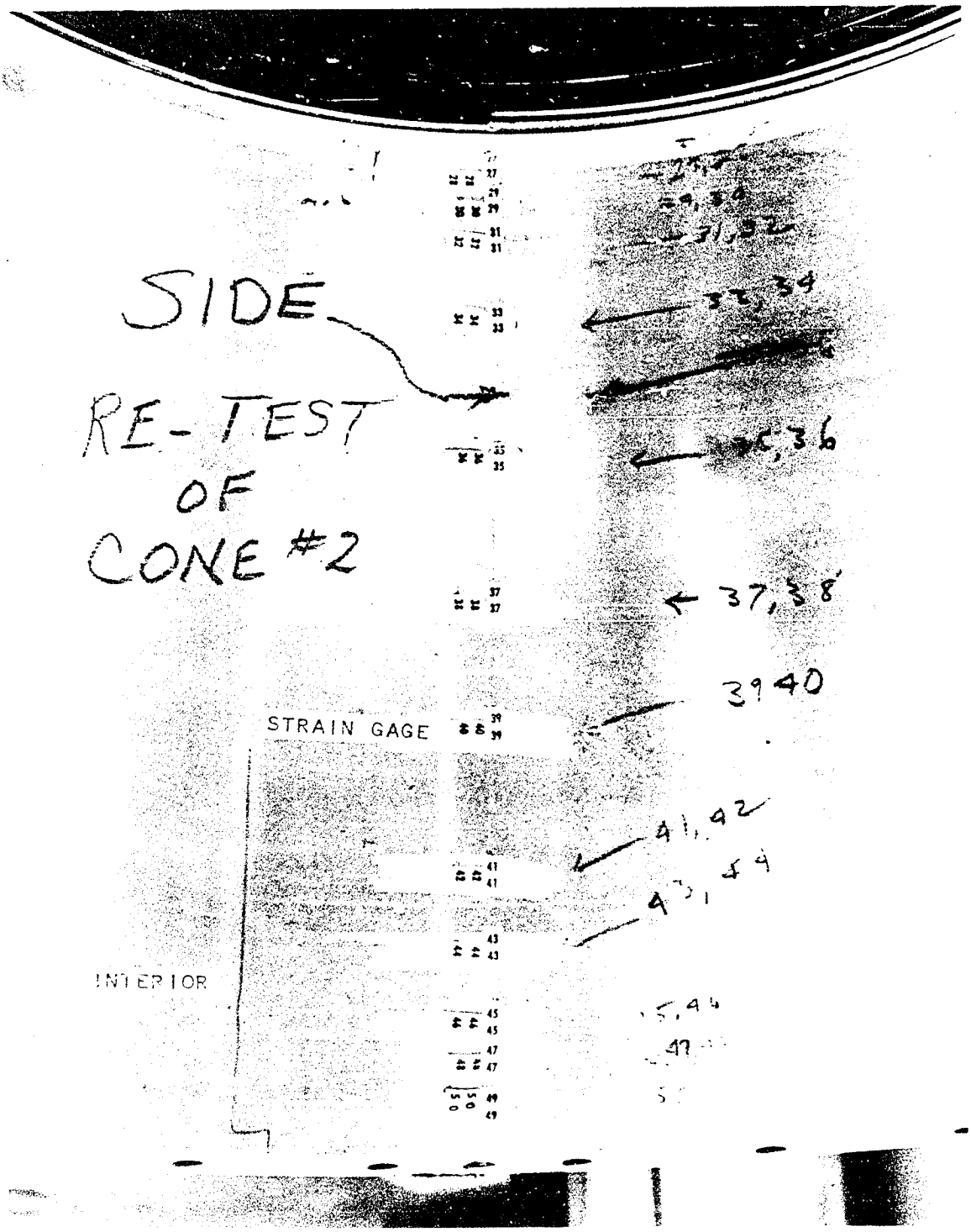

FIG. 14 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XW-40 ADAPTER CONE (SECOND TEST ON CONE #2).

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PROJECT NO. TM-[illegible]

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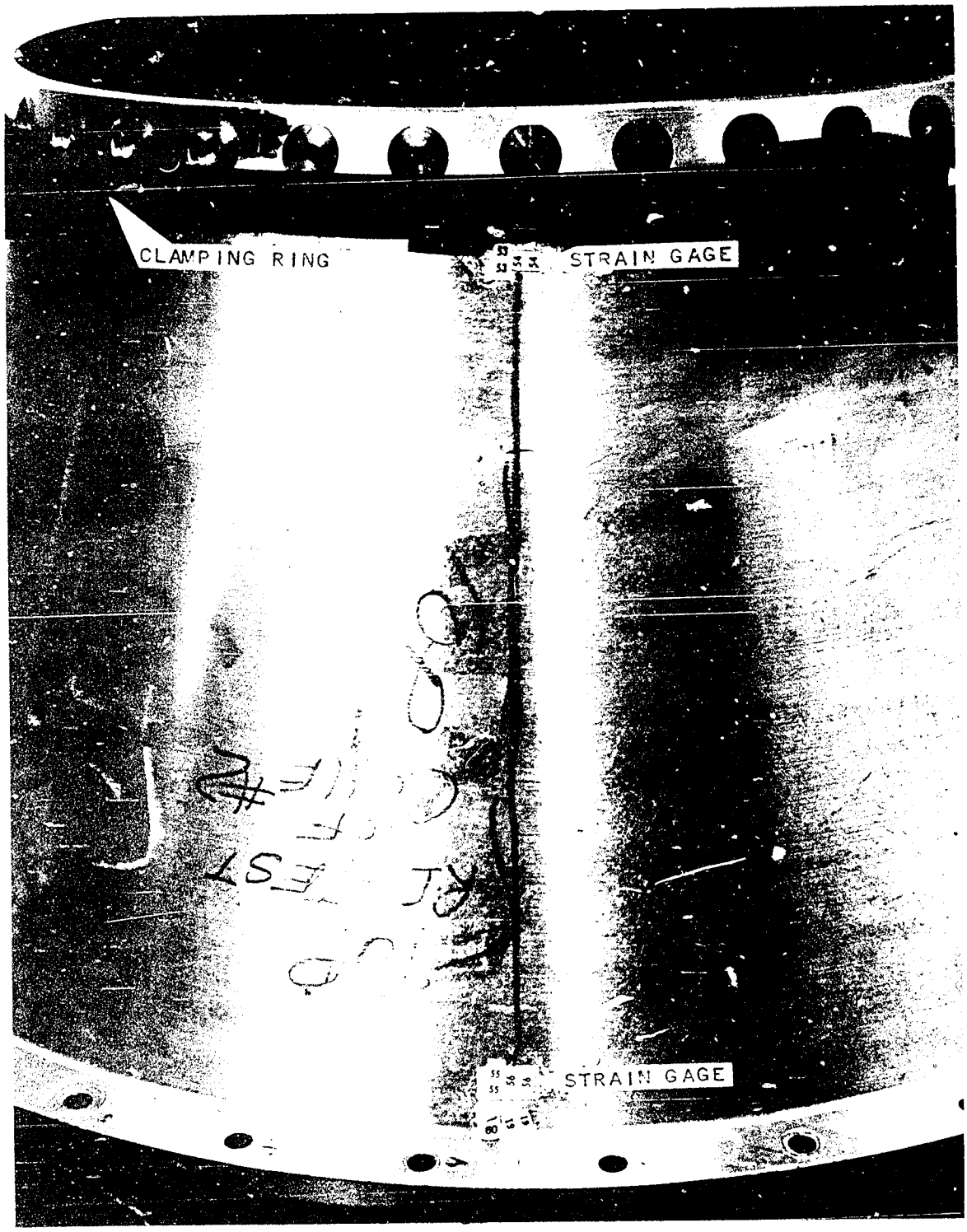

FIG. 15 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XN-49 ADAPTER CONE (SECOND TEST ON CONE #2).

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PROJECT NO. TN-707

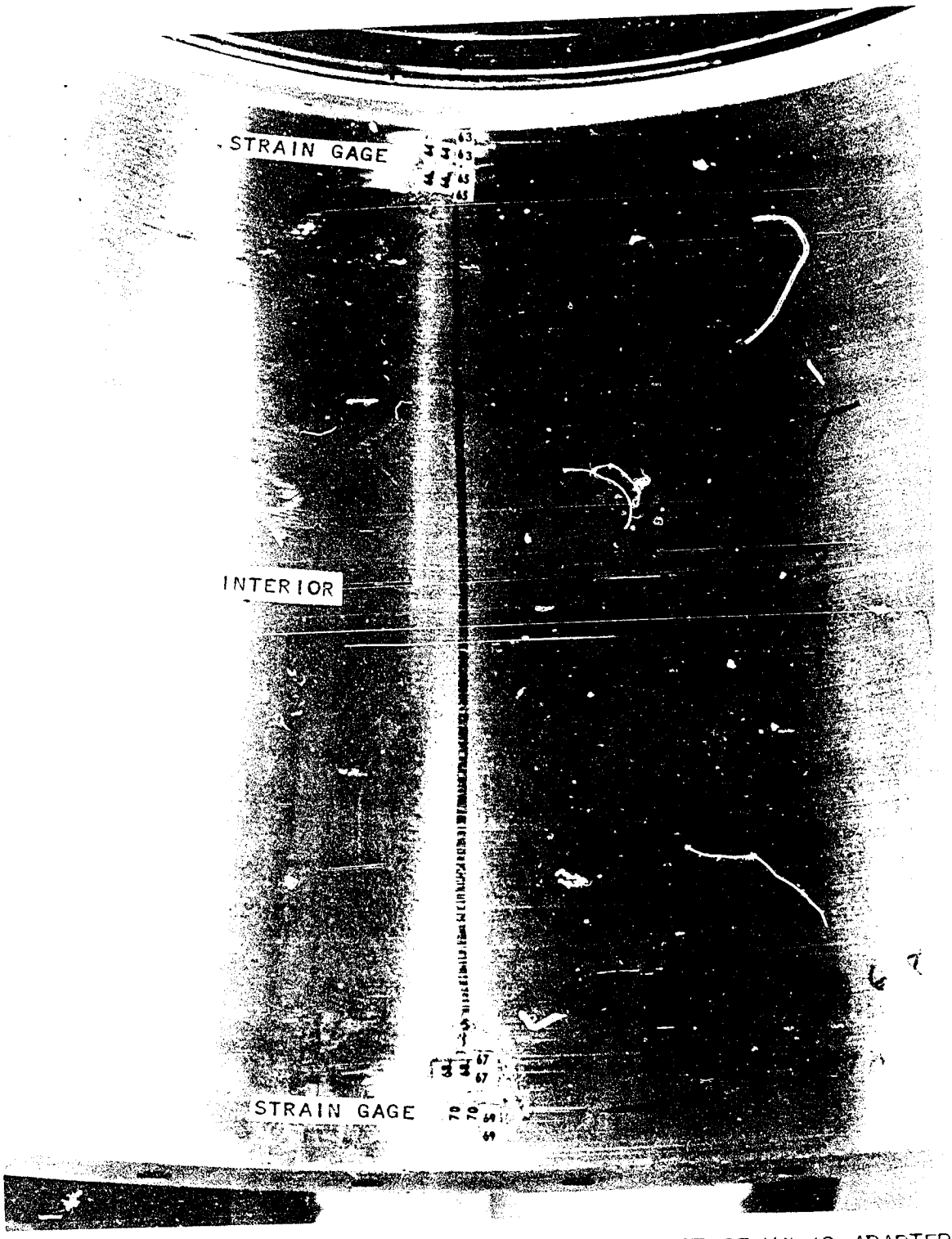

FIG. 16 -- STRAIN GAGE LOCATIONS FOR STATIC TEST OF XN-49 ADAPTER CONE (SECOND TEST ON CONE #2).

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PROJECT NO. TM-707

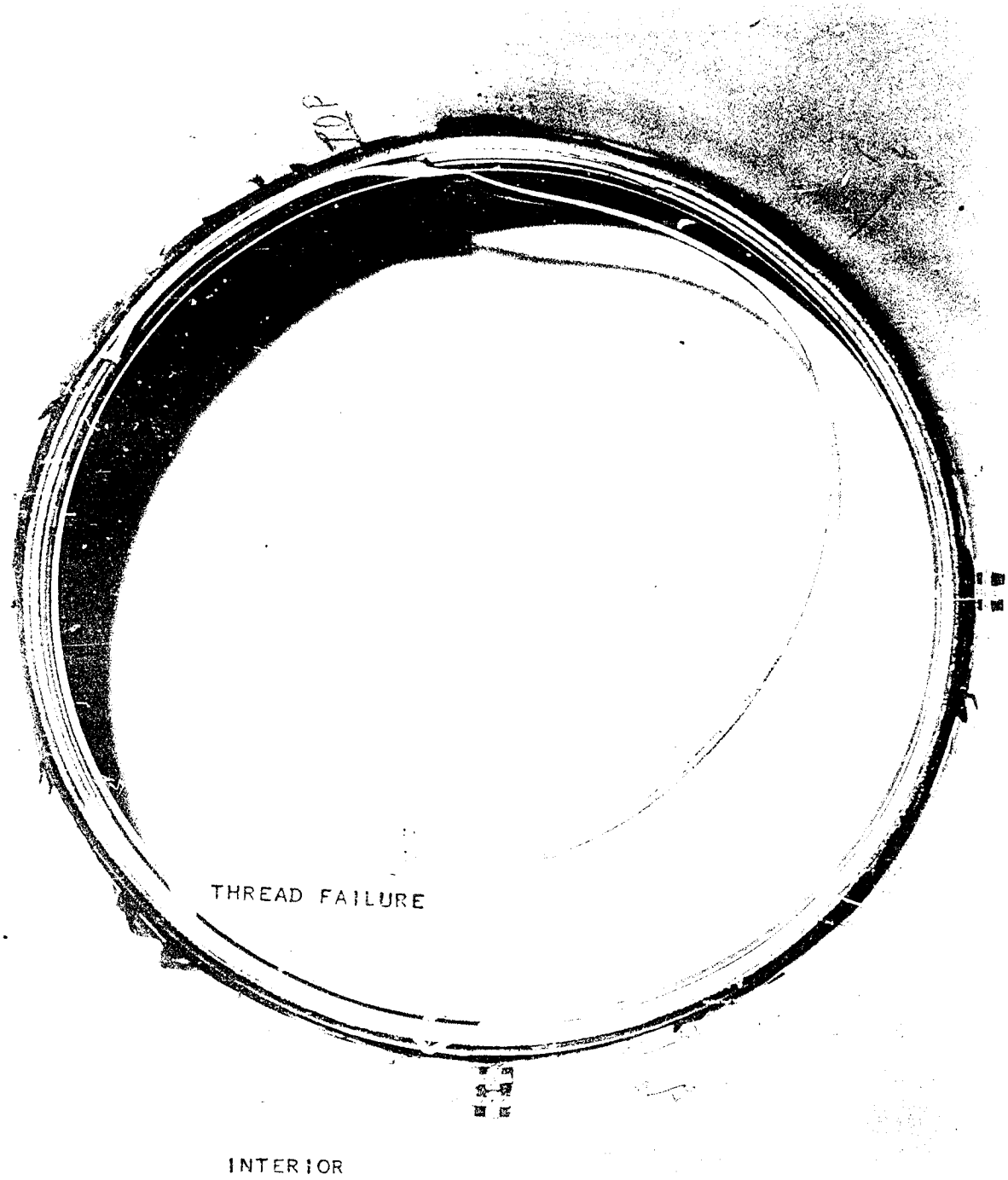

FIG. 17 -- FAILURE OF CONE #3 -- STATIC TEST OF XW-49 ADAPTER CONE.

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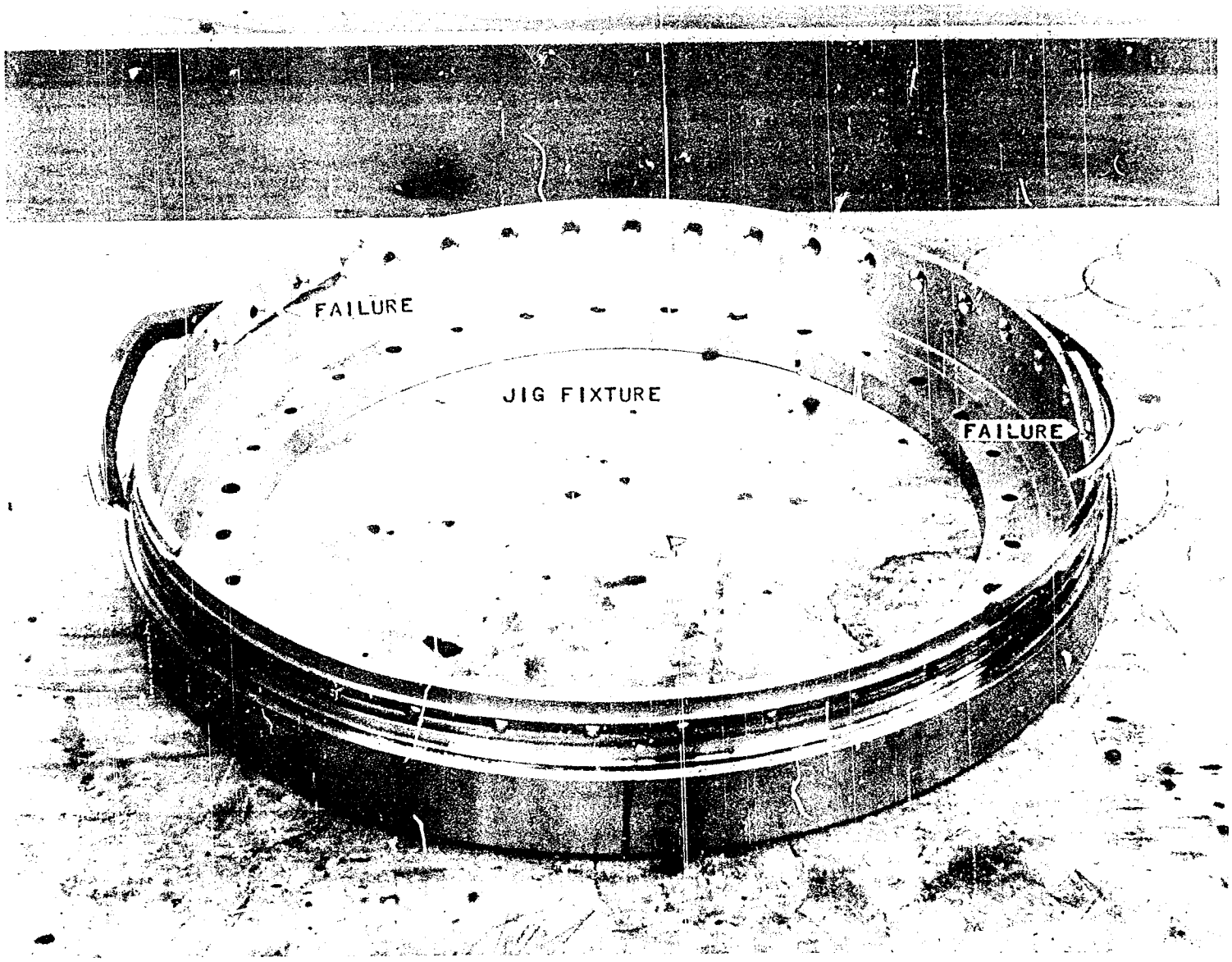

FIG. 18 -- FAILURE OF JIG FIXTURE USED ON CONE #3 -- STATIC TEST OF XW-49 ADAPTER CONE.

REF. SYM: 1612 (658)
PROJECT NO. TM-707

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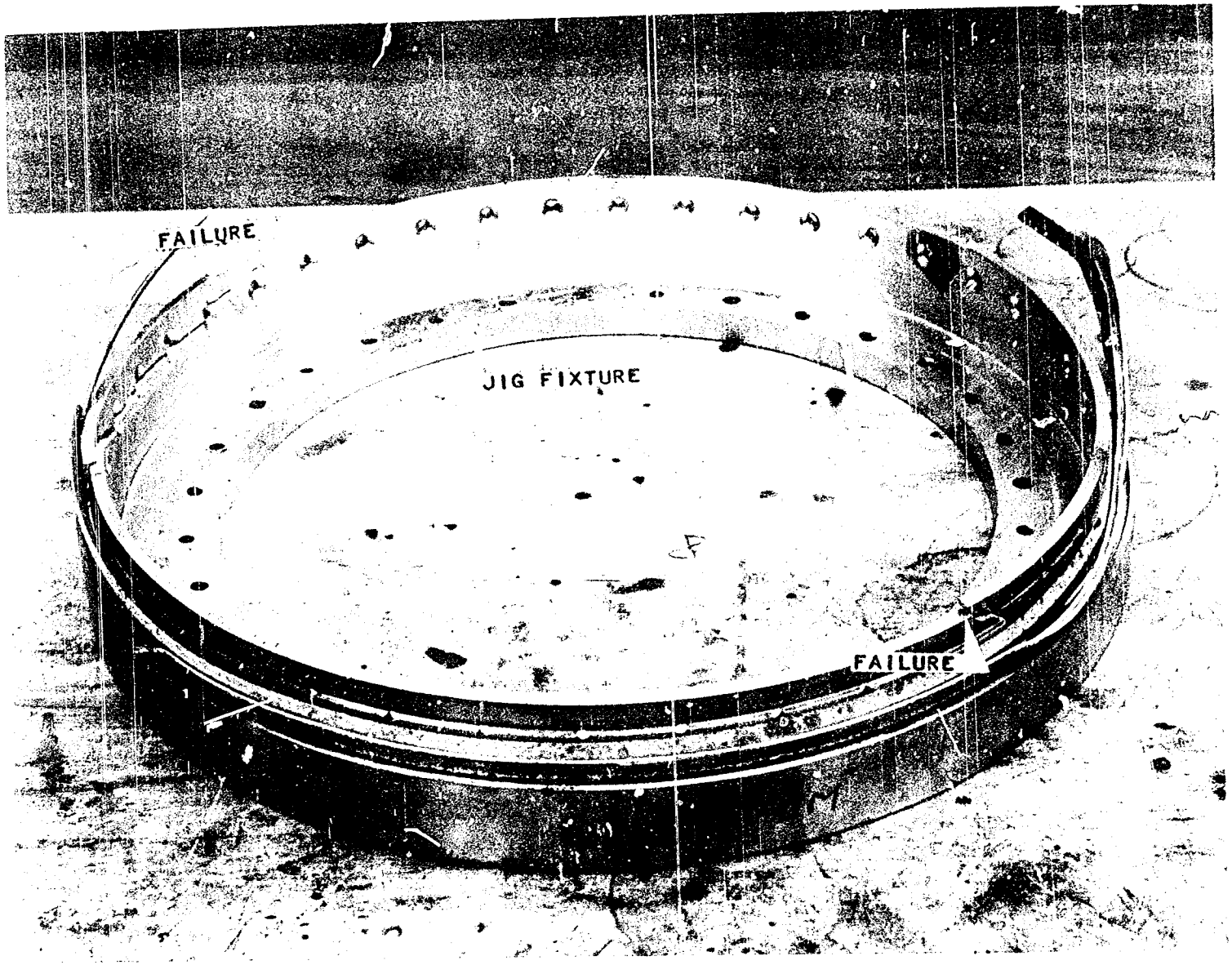

FIG. 19 -- FAILURE OF JIG FIXTURE USED ON CONE #3 -- STATIC TEST OF XN-49 ADAPTER CONE.

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PROJECT NO. TM-707

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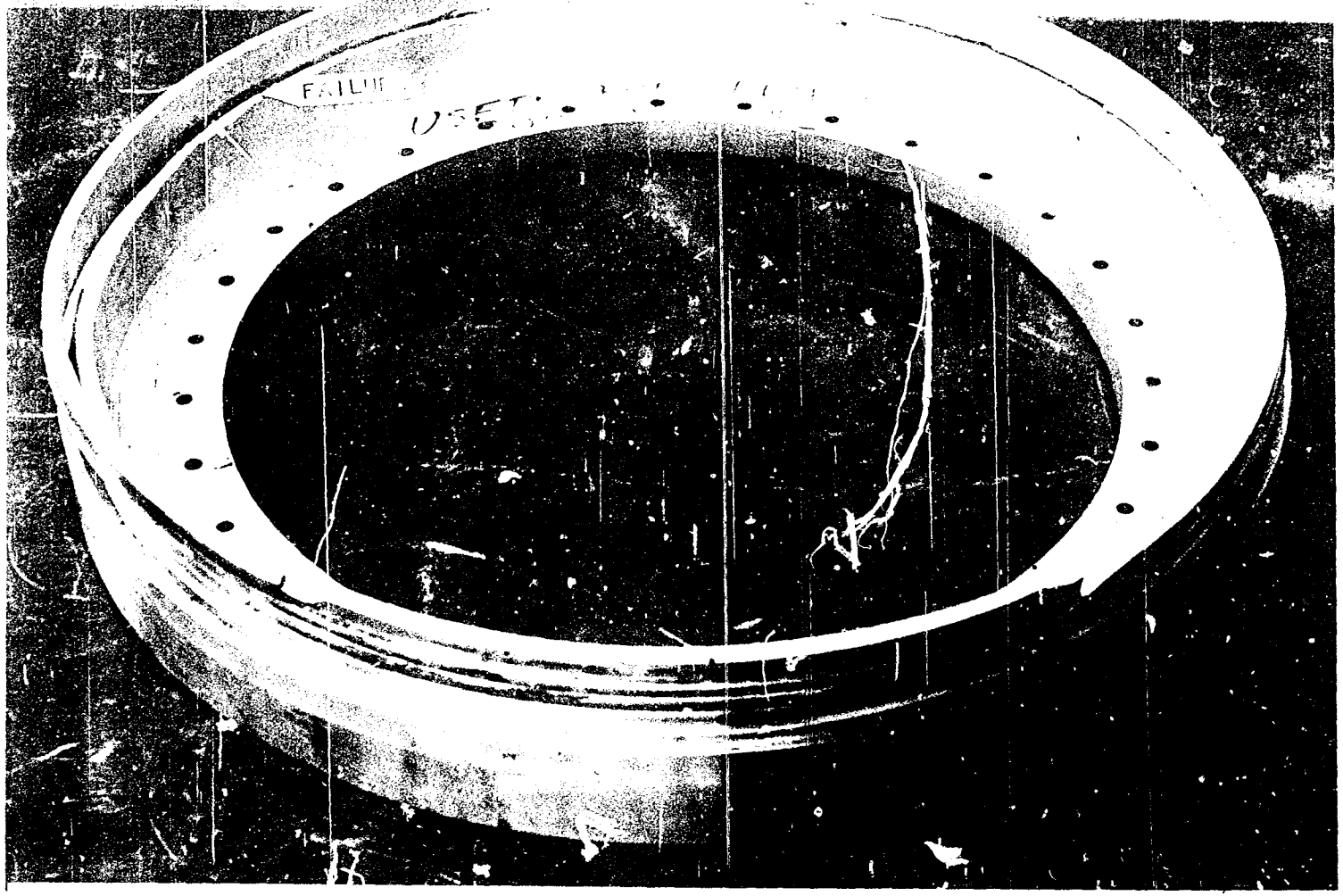

FIG. 20 -- FAILURE OF JIG FIXTURE USED ON SECOND TEST OF CONE #2 -- STATIC TEST OF XM-49 ADAPTER CONE.

REF. SYM: 1612 (658)
PROJECT NO. TM-707

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TABLE I

LOADS FOR STATIC TEST OF XW-49 ADAPTER CONES

Sequence of Testing	Drawing No.	Test Condition	Design Loads Limit	Design Loads Ultimate	Desired Max. Test Load
Cone #1	137793	Re-entry		94,000*	110% Ult.
Cone #2	DS(1245)88958	Re-entry		94,000*	110% Ult.
Cone #3	DS(1245)88958 (with addition of tooth insert)	Re-entry	104,000**		138% Limit
Cone #4	142550	Re-entry	104,000**		138% Limit
Cone #2	DS(1245)88958 (with addition of clamp)	Re-entry	104,000**		138% Limit

* This is the maximum load to be used in the Alabama tests (Jupiter only).

** This maximum limit load is based on an envelope curve of loads for all applications of this cone.

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TABLE II

STRAIN READINGS AND COMPUTED PRINCIPAL STRESSES (CONE #1 WITH TIGHT FITTING LOADING CONE) -- STATIC TEST OF XW-49 ADAPTER CONE

Per Cent of Ultimate Load	Strain Readings for the Following Gages - Microinches per Inch															
	1 - 2		13 - 14		25 - 26		35 - 36		49 - 50		51 - 52		53 - 54		55 - 56	
10	-123	41	-182	5	-67	5	-71	44	173	60	84	-303	-105	36	40	-53
20	-235	77	-142	31	-94	9	-123	78	339	123	171	-620	-187	54	170	21
30	-406	130	-194	46	-114	10	-210	132	520	286	320	-1,050	-270	77	305	104
40	-570	180	-260	60	-140	20	-280	180	770	520	520	-1,590	-380	140	460	160
50	-710	240	-320	80	-160	20	-320	210	1,020	700	660	-2,030	-480	180	600	210
60	-870	270	-380	100	-190	40	-370	250	1,280	890	840	-2,510	-590	240	750	270
70	-1,040	330	-450	110	-220	60	-410	290	1,560	1,130	1,030	-3,060	-680	270	900	300
80	-1,240	380	-520	130	-250	60	-480	320	1,890	1,330	1,240	-3,690	-770	310	1,040	330
90	-1,430	420	-590	150	-290	70	-540	360	2,170	1,590	1,440	-4,330	-860	370	1,200	360
95	-1,490	440	-620	150	-300	70	-580	380	2,240	1,650	1,500	-4,530	-890	380	1,250	380
100	-1,540	450	-650	150E	-320	80	-610	390	2,350	1,720	1,570	-4,760	-920	410	1,310	410
105	-1,630	460	-700	160	-340	80	-630	400	2,440	1,790	1,650	-5,040	-980	420	1,370	450
110	-1,680	470	-740	180	-350	80	-660	420	2,520	1,860	1,720	-5,270	-1,030	460	1,450	430
0	-10	-25	-2	-45	-25	-43	14	-24	319	130	116	-792	-104	-9	-54	-76

Per Cent of Ultimate Load	Maximum and Minimum Principal Stresses - psi															
	1 - 2		13 - 14		25 - 26		35 - 36		49 - 50		51 - 52		53 - 54		55 - 56	
	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv
10	-10	-1,290	-680	-2,130	-210	-770	230	-660	2,290	1,410	-230	-3,250	0	-1,100	+260	-470
20	-40	-2,470	-210	-1,560	-270	-1,020	430	-1,140	4,510	2,830	-490	-6,650	-120	-1,990	2,100	940
30	-100	-4,280	-240	-2,110	-340	-1,310	710	-1,950	7,310	5,490	-460	-11,130	-180	-2,880	4,030	2,470
40	-180	-6,020	-340	-2,830	-330	-1,580	1,000	-2,590	11,220	9,270	-400	-16,750	+120	-3,930	6,090	3,760
50	-30	-7,430	-350	-3,460	-410	-1,810	1,190	-2,940	14,910	12,410	-400	-21,350	+190	-4,950	7,950	4,910
60	-320	-9,200	-350	-4,090	-180	-2,050	1,460	-3,370	18,750	15,710	-220	-26,310	+450	-6,010	9,970	6,230
70	-300	-10,973	-520	-4,880	-180	-2,360	1,770	-3,680	23,040	19,690	-190	-32,050	+440	-6,960	11,870	7,190
80	-520	-13,140	-570	-5,630	-300	-2,720	1,840	-4,390	27,950	23,980	-260	-38,650	+550	-7,860	13,640	8,110
90	-820	-15,220	-610	-6,330	-350	-3,150	2,080	-4,930	30,120	27,600	-480	-45,420	+900	-8,680	15,660	9,120
95	-820	-16,850	-730	-6,730	-390	-3,270	2,150	-5,330	33,190	28,590	-580	-47,540	+900	-9,000	16,330	9,560
100	-910	-16,410	-860	-7,090	-350	-3,460	2,150	-5,640	34,770	29,870	-680	-49,980	+1,130	-9,230	17,160	10,150
105	-1,150	-17,430	-940	-7,640	-430	-3,730	2,180	-5,840	36,120	31,060	-870	-52,970	+1,000	-9,900	18,040	10,870
110	-1,240	-17,980	-860	-8,030	-470	-3,820	2,300	-6,110	37,350	32,210	-970	-55,410	+1,280	-10,330	19,100	11,550

Gages are mounted on 14S-T6 aluminum.
Su = Maximum principal stress (largest algebraic value) based on assumption gages are mounted in direction of principal stresses.
Sv = Minimum principal stress (smallest algebraic value) based on assumption gages are mounted in direction of principal stresses.
Plus indicates tensile strains and stresses.
Minus indicates compressive strains and stresses.

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TABLE III

STRAIN READINGS AND COMPUTED PRINCIPAL STRESSES (CONE #1 WITH LOOSE FITTING LOADING PLATE) -- STATIC TEST OF XW-49 ADAPTER CONE

Strain Readings for the Following Gages - Microinches per Inch

Per Cent of Ultimate Load	1 - 2		13 - 14		25 - 26		35 - 36		49 - 50		51 - 52		53 - 54		55 - 56	
10	-96	21	-167	20	-88	-13	-52	31	147	45	76	-251	-283	96	379	106
20	-205	50	-288	49	-137	4	-103	74	349	123	135	-568	-452	185	658	177
30	-330	80	-420	80	-180	20	-160	130	570	200	340	-920	-630	270	950	260
40	-440	110	-530	120	-220	30	-210	170	760	280	450	-1,220	-790	350	1,230	460
50	-550	130	-630	140	-260	60	-260	220	940	360	560	-1,520	-910	420	1,510	460
60	-660	160	-730	170	-280	60	-310	270	1,100	420	670	-1,820	-1,030	490	1,770	580
70	-770	180	-830	190	-310	70	-360	300	1,290	510	790	-2,120	-1,130	560	2,060	700
80	-890	220	-940	220	-330	70	-420	340	1,500	600	920	-2,450	-1,210	630	2,360	840
90	-1,010	250	-1,040	250	-350	80	-460	370	1,670	680	1,040	-2,740	-1,360	730	2,630	960
95	-1,070	260	-1,070	270	-360	80	-480	400	1,760	720	1,080	-2,890	-1,410	730	2,760	1,040
100	-1,130	270	-1,130	280	-370	80	-510	410	1,850	750	1,140	-3,030	-1,450	750	2,900	1,100
105	-1,200	290	-1,170	290	-380	80	-530	430	1,960	820	1,210	-3,2[illegible]	-1,520	810	3,100	1,200
110	-1,250	310	-1,230	310	-380	80	-550	450	2,060	860	1,270	-3,3[illegible]	-1,570	830	3,210	1,270

Maximum and Minimum Principal Stresses - psi

Per Cent of Ultimate Load	1 - 2		13 - 14		25 - 26		35 - 36		49 - 50		51 - 52		53 - 54		55 - 56	
	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv
10	-140	-1,050	-440	-1,900	-510	-1,090	+160	-490	1,920	1,130	-120	-2,660	-0	-2,960	4,910	2,790
20	-240	-2,220	-590	-3,210	-510	-1,610	460	-920	4,630	2,870	-700	-6,180	+360	-4,600	8,500	4,760
30	-390	-3,580	-750	-4,650	-490	-2,050	890	-1,370	7,560	4,670	+300	-9,510	+650	-6,360	12,330	6,920
40	-480	-4,760	-720	-5,790	-540	-2,430	1,160	-1,800	10,130	6,390	+390	-12,620	+990	-7,820	16,420	10,420
50	-690	-5,980	-890	-6,890	-340	-2,830	1,550	-2,190	12,580	8,070	+480	-15,720	+1,290	-9,070	19,730	11,560
60	-780	-7,160	-940	-7,950	-420	-3,070	1,940	-2,580	14,728	9,420	+560	-18,830	+1,630	-10,210	23,300	14,030
70	-920	-8,280	-1,110	-9,050	-430	-3,390	2,090	-3,050	17,330	11,260	+770	-21,890	+2,050	-11,110	27,210	16,620
80	-1,000	-9,640	-1,200	-10,230	-510	-3,620	2,320	-3,510	20,180	13,170	+970	-25,270	+2,560	-11,770	31,330	19,490
90	-1,130	-10,940	-1,250	-11,300	-470	-3,820	2,520	-3,950	22,520	14,810	+1,220	-28,220	+2,780	-13,260	35,010	22,010
95	-1,250	-11,610	-1,140	-11,570	-510	-3,940	2,790	-4,060	23,740	15,640	+1,090	-29,330	+2,930	-13,730	36,880	23,480
100	-1,380	-12,280	-1,260	-12,240	-550	-4,060	2,790	-4,380	24,930	16,360	+1,230	-31,250	+3,010	-14,130	38,770	24,760
105	-1,420	-13,030	-1,300	-12,670	-590	-4,170	2,940	-4,530	26,520	17,640	+1,210	-33,450	+3,430	-14,710	41,550	26,750
110	-1,330	-13,540	-1,310	-13,300	-590	-4,170	3,100	-4,690	27,860	18,520	+1,390	-34,750	+3,470	-15,220	43,130	28,020

Gages are mounted on 14S-T6 aluminum.
Su = Maximum principal stress (largest algebraic value) based on assumption that gages are oriented in direction of principal stresses.
Sv = Minimum principal stress (smallest algebraic value) based on assumption that gages are oriented in direction of principal stresses.
Plus indicates tensile strain and stresses.
Minus indicates compressive strains and stresses.

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TABLE IV

DEFLECTIONS (CONE #1 WITH TIGHT LOADING PLATE)
STATIC TEST OF XM-49 ADAPTER CONE

Per Cent of Design Ultimate Load	Deflections in Inches			
	No. 1	No. 2	No. 3	No. 4
10	-.009	0	-.003	.004
20	-.016	-.005	-.009	.015
30	-.025	-.010	-.025	.040
40	-.031	-.016	-.044	.069
50	-.034	-.021	-.076	.099
60	-.035	-.027	-.088	.114
70	-.044	-.035	-.096	.125
80	-.054	-.041	-.100	.133
90	-.064	-.052	-.102	.138
95	-.070	-.056	-.102	.141
100 (94,000 lbs.)	-.075	-.059	-.104	.144
105	-.081	-.060	-.107	.146
110	-.087	-.059	-.107	.149
0	+.007	+.002	-.128	.131

Plus deflection for dial indicators 1 and 2 means an increase in length of the cone.

Plus deflection for dial indicators 3 and 4 means a movement radially away from center of cone.

Dial indicators 1 and 2 are mounted to the cone flange.

Dial indicators 3 and 4 are supported on the floor.

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TABLE V

DEFLECTIONS (CONE #1 WITH LOOSE LOADING PLATE)
STATIC TEST OF XW-49 ADAPTER CONE

Per Cent of Design Ultimate Load	Deflection in Inches			
	No. 1	No. 2	No. 3	No. 4
10	-.010	-.006	.018	-.010
20	-.018	-.013	.022	-.009
30	-.026	-.020	.013	+.006
40	-.035	-.028	.014	.011
50	-.042	-.035	.016	.014
60	-.051	-.042	.021	.015
70	-.060	-.050	.024	.018
80	-.069	-.057	.028	.020
90	-.076	-.064	.031	.023
95	-.081	-.068	.033	.025
100 (94,000 lbs.)	-.086	-.072	.033	.027
105	-.091	-.077	.029	.035
110	-.096	-.081	.026	.040
0	-.001	-.001	-.007	.011

Plus deflection for dial indicators 1 and 2 means an increase in length of the cone.

Plus deflection for dial indicators 3 and 4 means a movement radically away from center of cone.

Dial indicators 1 and 2 are mounted o the cone flange.

Dial indicators 3 and 4 are supported on the floor.

TABLE VI

STRAIN READINGS AND COMPUTED PRINCIPAL STRESSES (CONE #2) -- STATIC TEST OF XW-49 ADAPTER CONE

Per Cent of Ultimate Load	Strain Readings for the Following Gages - Microinches per Inch																							
	3 - 4		5 - 6		7 - 8		21 - 22		23 - 24		25 - 26		27 - 28		29 - 30		31 - 32		45 - 46		47 - 48		49 - 50	
10	160	51	50	93	7	108	-28	3	-29	16	-43	25	11	49	-233	109	-177	116	-7	3	-10	-248	-4	5
20	320	220	183	264	-7	260	-83	4	-101	16	-134	32	-1	96	-460	193	-328	198	-22	-8	-9	-502	27	16
30	517	374	128	445	-9	437	-158	21	-180	34	-220	75	15	174	-753	334	-533	332	-42	-1	-11	-812	40	35
40	761	646	164	720	-40	685	-240	21	-289	44	-360	94	6	260	-1080	475	-752	458	-62	-9	-9	-1150	81	36
Reload after threads became disengaged																								
10	130	50	30	80	0	90	-45	10	-55	10	-65	10	10	50	-200	100	-145	100	-20	0	0	-190	15	20
20	350	190	70	260	-10	265	-100	10	-135	20	-155	30	0	125	-510	230	-365	230	-40	0	-5	-510	30	30
30	570	350	110	450	-40	455	-170	15	-220	35	-260	50	0	240	-885	420	Thread became disengaged							

Per Cent of Ultimate Load	Maximum and Minimum Principal Stresses - psi																							
	3 - 4		5 - 6		7 - 8		21 - 22		23 - 24		25 - 26		27 - 28		29 - 30		31 - 32		45 - 46		47 - 48		49 - 50	
	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv
10	2090	1240	1300	910	1300	520	-80	-320	70	-280	120	-410	620	330	350	-2310	660	-1620	10	-70	-1110	-2970	40	-30
20	4660	3880	3450	2040	3640	960	-290	-960	-220	-1130	-160	-1450	1130	370	430	-4650	1020	-3080	-180	-290	-2120	-5960	380	230
30	7600	6490	5770	3300	5120	1650	-390	-1780	-320	-1990	-10	-2320	2110	880	920	-7550	1780	-4960	-180	-500	-3390	-9630	610	570
40	11570	10680	9150	4820	7920	2280	-720	-2750	-640	-3230	-340	-3870	3090	1110	1270	-10840	2390	-7040	-360	-770	-4720	-13610	1100	750
Reload after threads became disengaged																								
10	1740	1110	1060	680	1060	360	-60	-490	-100	-610	-140	-730	630	320	380	-1960	600	-1310	-80	-240	-760	-2240	300	260
20	4890	3650	3350	1870	3090	950	-280	-1140	-310	-1510	-270	-1710	1480	500	670	-5100	1250	-3380	-160	-470	-2110	-6040	470	470
30	8130	6420	5750	3100	5210	1350	-510	-1950	-470	-2460	-450	-2870	2830	960	1410	-8760	Thread became disengaged.							

All gages are mounted on 14S-T6 aluminum.
Su = Maximum principal stress (largest algebraic value) based on assumption that gages are oriented in direction of principal stresses.
Sv = Minimum principal stress (smallest algebraic value) based on assumption that gages are oriented in direction of principal stresses.
Plus indicates tensile strains and stresses.
Minus indicates compressive strains and stresses.

TABLE VII

DEFLECTIONS (CONE #2) -- STATIC TEST OF XW-49 ADAPTER CONE

Per Cent of Ultimate Load	Dial Indicator (Deflection in Inches) No. 1	No. 2
10	-.010	-.017
20	-.030	-.032
30	-.080	-.045
40	-.420	-.035
50	Threads between fixture and cone became disengaged at about 50 per cent of ultimate load.	

Plus deflection means an increase in the length of the cone.

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TABLE VIII

STRAIN READINGS AND COMPUTED PRINCIPAL STRESSES (CONE #3, WITH GROOVE AND LIP FOR MATING PARTS) -- STATIC TEST OF XW-49 ADAPTER CONE

Per Cent of Limit Load	Strain Readings for the Following Gages - Microinches per Inch																					
	1 - 2		3 - 4		5 - 6		7 - 8		9 - 10		11 - 12		13 - 14		15 - 16		17 - 18		21 - 22		23 - 24	
10	0	0	55	90	-20	70	-90	40	-110	35	-135	40	-120	30	-125	30	20	-150	-135	30	-150	20
20	40	-220	150	190	-55	165	-220	100	-280	60	-300	80	-290	70	-280	60	40	-320	-280	55	-300	50
30	70	-370	230	280	-80	260	-330	150	-425	80	-430	110	-425	110	-410	100	70	-450	-390	70	-430	80
40	90	-510	310	370	-110	360	-440	210	-580	110	-580	150	-580	150	-550	140	90	-600	-520	100	-570	110
50	110	-660	390	455	-130	430	-560	270	-730	140	-720	190	-720	190	-690	170	110	-750	-640	120	-700	130
60	140	-790	470	540	-170	540	-680	320	-880	150	-860	230	-870	230	-820	210	130	-890	-750	130	-840	150
80	220	-1030	610	720	-200	730	-870	440	-1140	210	-1100	310	-1110	320	-1050	290	180	-1120	-950	170	-1060	180
90	230	-1160	680	810	-230	820	-970	490	-1270	220	-1220	360	-1240	360	-1170	320	190	-1260	-1060	180	-1190	200
100	270	-1280	760	900	-270	920	-1070	550	-1410	250	-1350	400	-1380	400	-1290	360	210	-1390	-1170	190	-1310	230
0	0	0	0	5	+10	0	0	0	0	0	0	0	0	0	0	0	0	0	-5	0	0	0
100	280	-1110	810	1000	-210	970	-1090	550	-1450	250	-1420	420	-1470	420	-1390	360	220	-1550	-1330	230	-1420	320
110	310	-1270	890	1110	-250	-1070	-1210	620	-1620	270	-1580	470	-1640	470	-1550	430	240	-1720	-1480	250	-1580	360

Per Cent of Limit Load	Computed Maximum and Minimum Principal Stresses - psi																					
	1 - 2		3 - 4		5 - 6		7 - 8		9 - 10		11 - 12		13 - 14		15 - 16		17 - 18		21 - 22		23 - 24	
	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv
10	0	0	1250	970	750	20	150	-910	20	-1160	-20	-1440	-80	-1300	-100	-1050	-300	-1680	-130	-1470	3000	-1680
20	-320	-2430	2760	2440	1730	-50	380	-2210	-300	-3060	-140	-3220	-220	-3140	-300	-3060	-680	-3600	-360	-3080	-490	-3330
30	-510	-4080	4100	3690	2750	0	570	-3320	-590	-4680	-250	-4630	-240	-4580	-300	-4440	-790	-5010	-580	-4310	-610	-4740
40	-780	-5640	5440	4950	3820	0	880	-4390	-790	-6330	-320	-6250	-320	-6250	-330	-5930	-1100	-6690	-690	-5720	-760	-6270
50	-1080	-7320	6720	6190	4560	20	1150	-5580	-980	-8040	-360	-7740	-360	-7740	-480	-7450	-1400	-8380	-890	-7050	-990	-7720
60	-1190	-8740	8000	7430	5710	-50	1310	-6610	-1400	-9750	-390	-9230	-430	-9350	-430	-8840	-1670	-9940	-1170	-8310	-1260	-9280
80	-1120	-11260	10610	9710	7820	280	2030	-8600	-1630	-12580	-320	-11750	-240	-11830	-370	-11240	-1910	-12450	-1420	-10500	-1690	-11750
90	-1470	-12740	11910	10860	8770	250	2260	-9590	-1980	-14060	-160	-12980	-130	-13210	-450	-12540	-2290	-14050	-1690	-11750	-1930	-13200
100	-1430	-14000	13250	12110	9790	140	2600	-10540	-2130	-15590	-160	-14350	-270	-14710	-410	-13800	-2530	-15500	-1970	-13000	-2000	-14500
0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
100	-700	-11980	14600	13060	10590	1020	2530	-10780	-2270	-16060	-180	-15100	-360	-15690	-770	-14970	-2980	-17340	-2080	-14730	-1350	-15460
110	-930	-13740	16170	14390	11620	910	2920	-11930	-2650	-17980	-170	-16790	-380	-17500	-530	-16590	-3360	-19250	-2380	-16410	-1451	-17190

All gages are mounted on 14S-T6 aluminum.
Su = Maximum principal stress (largest algebraic value) based on assumption that gages are oriented in direction of principal stresses.
Sv = Minimum principal stress (smallest algebraic value) based on assumption that gages are oriented in direction of principal stresses.
Plus indicates tensile strains and stresses.
Minus indicates compressive strains and stresses.

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TABLE VIII (Continued)

STRAIN READINGS AND COMPUTED PRINCIPAL STRESSES (CONE #3, WITH GROOVE AND LIP FOR MATING PARTS) -- STATIC TEST OF XW-49 ADAPTER CONE

Per Cent of Limit Load	Strain Readings for the Following Gages - Microinches per Inch																			
	25 - 26		27 - 28		29 - 30		31 - 32		33 - 34		35 - 36		37 - 38		39 - 40		41 - 42		45 - 46	
10	-150	40	-190	55	-120	55	-90	30	-110	20	-110	20	-130	20	-140	40	-120	20	Gage Out	Gage Out
20	-290	90	-520	200	-340	190	-240	120	-260	70	-290	80	-290	80	-300	90	-270	60		
30	-420	140	-790	290	-520	280	-370	180	-370	100	-430	120	-430	120	-450	130	-380	80	--	--
40	-570	190	-1050	390	-700	380	-500	250	-530	120	-580	170	-580	170	-600	170	-510	110	--	--
50	-710	230	-1320	480	-890	480	-640	310	-670	160	-730	210	-720	210	-750	220	-630	140	--	--
60	-850	270	-1580	580	-1070	570	-780	370	-800	185	-880	250	-860	250	-890	260	-750	160	--	--
80	-1090	350	-2060	750	-1410	740	-1020	490	-1020	230	-1140	330	-1100	340	-1140	330	-960	210	--	--
90	-1220	390	-2310	840	-1580	840	-1150	590	-1140	260	-1280	380	-1230	380	-1280	380	-1070	240	--	--
100	-1350	430	-2550	930	-1745	930	-1260	610	-1250	280	-1410	420	-1350	420	-1400	410	-1170	260	--	--
0	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--
100	-1350	570	-2610	1045	-1730	980	-1230	620	-1270	300	-1480	460	-1440	470	-1520	460	-1240	290	--	--
110	-1490	630	-2900	1150	-1910	1090	-1390	700	-1420	330	-1650	520	-1600	530	-1690	510	-1380	320	--	--

Per Cent of Limit Load	Computed Maximum and Minimum Principal Stresses - psi																			
	25 - 26		27 - 28		29 - 30		31 - 32		33 - 34		35 - 36		37 - 38		39 - 40		41 - 42		45 - 46	
	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv
10	-70	-1610	-40	-2030	210	-1210	30	-990	-160	-1520	-160	-1220	-230	-1450	-30	-1490	-200	-1330	--	--
20	10	-3070	480	-5360	1000	-3300	540	-2380	-110	-2790	-100	-3110	-100	-3110	-20	-3190	-270	-2940	--	--
30	130	-4410	560	-8200	1410	-5080	780	-3680	-230	-4200	-140	-4600	-140	-4600	-90	-4800	-430	-4160	--	--
40	180	-5990	800	-10880	1940	-6820	1130	-4950	-500	-5770	-90	-6170	-90	-6170	-160	-6410	-540	-5570	--	--
50	150	-7480	880	-13720	2420	-8690	1330	-6370	-530	-7260	-160	-7780	-120	-7670	-120	-7980	-620	-6870	--	--
60	110	-8970	1120	-16400	2830	-10470	1530	-7800	-700	-8690	-230	-9400	-160	-9160	-150	-9480	-820	-8200	--	--
80	190	-11490	1390	-21400	3600	-13840	2080	-10170	-970	-11100	-230	-12150	40	-11650	-230	-12150	-980	-10470	--	--
90	190	-12870	1550	-24000	4160	-15470	2780	-11330	-1040	-12400	-140	-13610	40	-13020	-140	-13610	-1030	-11650	--	--
100	190	-14250	1740	-26490	4620	-17070	2620	-12550	-1200	-13620	-140	-14980	70	-14280	-220	-14900	-1150	-12750	--	--
0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
100	1830	-13750	2870	-26780	5260	-16720	2840	-12160	-1040	-13780	80	-15660	340	-15160	-70	-16130	-1050	-13460	--	--
110	2030	-15170	3060	-29790	5900	-18430	3210	-13750	-1230	-15420	170	-17430	470	-16810	-90	-17940	-1200	-14[illegible]	--	--

All gages mounted on 14S-T6 aluminum.
Su = Maximum principal stress (largest algebraic value) based on assumption that gages are oriented in direction of principal stresses.
Sv = Minimum principal stress (smallest algebraic value) based on assumption that gages are oriented in direction of principal stresses.
Plus indicates tensile strains and stresses.
Minus indicates compressive strains and stresses.

TABLE VIII (Continued)

STRAIN READINGS AND COMPUTED PRINCIPAL STRESSES (CONE #3, WITH GROOVE AND LIP FOR MATING PARTS) -- STATIC TEST OF XW-49 ADAPTER CONE

Per Cent of Limit Load	Strain Readings for the Following Gages - Microinches per Inch																			
	47 - 48		49 - 50		51 - 52		53 - 54		55 - 56		60 - 61		63 - 64		65 - 66		67 - 68		69 - 70	
10	-50	0	Gage	40	40	70	-40	40	-30	0	-100	10	-150	40	-90	40	-10	0	10	0
20	-120	50	Out	110	80	110	-70	100	-150	0	-180	30	-320	120	-210	120	-30	10	0	20
30	-190	80	--	170	100	140	-100	130	-220	10	-260	50	-410	170	-290	170	-60	20	-10	40
40	-240	110	--	220	120	160	-120	170	-300	20	-350	70	-520	210	-360	210	-90	50	-30	80
50	-300	140	--	290	160	210	-150	210	-380	40	-440	100	-650	250	-460	260	-110	60	-70	110
60	-350	170	--	330	180	260	-180	270	-470	50	-530	120	-800	310	-570	310	-140	80	-80	150
80	-430	210	--	420	260	330	-250	390	-650	70	-720	180	-1140	450	-820	460	-210	120	-150	240
90	-480	240	--	470	310	360	-290	470	-750	90	-830	220	-1330	540	-990	550	-250	150	-190	280
100	-520	260	--	530	360	530	-330	540	-840	100	-920	250	-1570	620	-1125	620	-280	170	-220	320
0	0	30	--	-20	-10	-10	-10	-5	-5	0	-20	-10	10	0	0	0	0	5	5	5
100	-660	390	--	710	370	550	-320	560	-660	50	-780	160	-1570	630	-1110	630	-170	80	-50	200
110	-730	440	--	780	420	640	-380	660	-740	60	-880	180	-1820	720	-1280	720	-190	100	-60	230

Per Cent of Limit Load	Computed Maximum and Minimum Principal Stresses - psi																			
	47 - 48		49 - 50		51 - 52		53 - 54		55 - 56		60 - 61		63 - 64		65 - 66		67 - 68		69 - 70	
	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv
10	-180	-590	--	--	960	720	320	-320	-290	-940	-240	-1130	-70	-1610	150	-910	-40	-120	40	120
20	160	-1220	--	--	1570	1330	[illegible]	-460	-540	-1750	-290	-2000	260	-3310	650	-2030	10	-320	230	70
30	260	-1940	--	--	2000	1670	1160	-700	-670	-2540	-350	-2860	520	-4190	950	-2780	20	-630	430	30
40	430	-2410	--	--	2300	1980	1560	-790	-840	-3440	-440	-3840	590	-5230	1170	-3460	260	-870	830	-60
50	560	-3010	--	--	3030	2620	1920	-1000	-890	-4300	-410	-4790	600	-6710	1330	-4450	310	-1070	1040	-420
60	730	-3480	--	--	3690	3040	2510	-1140	-1100	-5320	-590	-5770	760	-8250	1580	-5560	430	-1350	1470	-400
80	920	-4280	--	--	5380	4400	3670	-1530	-1[illegible]	-7350	-480	-7780	1180	-11720	2440	-7940	650	-2030	2270	-890
90	1090	-4750	--	--	6490	5270	4460	-1710	-1640	-8450	-400	-8920	1330	-14200	2830	-9610	860	-2390	2590	-1220
100	1180	-5150	--	--	7430	6110	5130	-1920	-1840	-9470	-370	-9360	1630	-16140	3220	-10940	990	-2670	2950	-1430
0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
100	2200	-6320	--	--	7760	6300	5400	-1740	-1780	-7540	-920	-8550	1740	-16100	3390	-10720	330	-1700	2160	150
110	2530	-6960	--	--	8390	7210	6360	-2030	-1950	-8240	-1050	-9650	1900	-18700	3830	-12330	400	-1860	2480	120

All gages are mounted on 14S-T6 aluminum.
Su = Maximum principal stress (largest algebraic value) based on assumption that gages are oriented in direction of principal stresses.
Sv = Minimum principal stress (smallest algebraic value) based on assumption that gages are oriented in direction of principal stresses.
Plus indicates tensile strains and stresses.
Minus indicates compressive strains and stresses.

TABLE IX

DEFLECTIONS (CONE #3 WITH LIP AND GROOVE)
STATIC TEST OF XW-49 ADAPTER CONE

Per Cent of Limit Load	Dial Indicators No. 1	Dial Indicators No. 2
10	-.011	-.005
20	-.020	-.014
30	-.032	-.022
40	-.043	-.029
50	-.052	-.036
60	-.060	-.044
70	--	--
80	-.078	-.056
90	-.086	-.062
100 (104,000 lbs.)	-.093	-.069
0	-.004	0
100	-.090	-.065
110	-.097	-.072
120	Failed at 119 Per Cent of Limit Load	

Plus deflection means an increase in length of cone.

Dial indicators are mounted from loading plate with magnetic block and points of dial indicators are on flange of cone.

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Ref. Sym: 1612 (658)
Project No. TM-707

TABLE X

STRAIN READINGS AND COMPUTED PRINCIPAL STRESSES (CONE #2)
STATIC TEST OF XW-40 ADAPTER CONE

Per Cent of Limit Load	Strain Readings for 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	300	290	-70	320	-310	180	-570	50	-910	360	-580	350	-360	230	-180	110	90	140	-50	115	-510	155	-325	195
40	530	510	-110	580	-570	350	-1080	100	-1640	480	-1110	590	-720	400	-330	200	220	230	-70	250	-810	180	-515	260
60	750	700	-140	810	-800	500	-1560	150	-2280	640	-1590	820	-1060	560	-550	260	250	300	-80	320	-1075	185	-740	320
80	960	900	-160	1040	-1020	650	-2060	180	-2970	790	-2090	1040	-1420	720	-720	320	270	360	-80	370	-1280	170	-910	360
90	1075	1000	-170	1170	-1120	725	-2320	190	-3320	870	-2360	1160	-1610	800	-800	350	280	400	-90	400	-1410	170	-1030	400
100	1180	1090	-170	1280	-1220	800	-2580	210	-3640	940	-2590	1270	-1780	870	-860	370	290	440	-90	440	-1560	160	-1170	430
0	40	35	-15	5	0	0	-20	-20	-110	10	15	10	15	0	20	0	20	15	-5	10	-30	20	0	0
100	1200	1110	-170	1290	-1220	800	-2570	210	-3640	945	-2590	1270	-1780	870	-850	370	300	435	-100	450	-1555	180	-1155	440
110	1280	1180	-170	1390	-1310	855	-2830	210	-3950	1000	-2820	1360	-1950	930	-910	390	340	480	-110	510	-1730	200	-1300	490
120	1385	1250	-175	1500	-1390	920	-3110	200	-4260	1060	-3040	1460	-2120	1010	-960	410	390	540	-140	590	-1980	230	-1490	560
125	1425	1285	-170	1540	-1420	945	-3250	200	-4400	1080	-3170	1510	-2210	1040	-970	410	410	565	-160	630	-2090	240	-1580	590
130	1460	1310	-170	1570	-1450	970	-3380	190	-4530	1100	-3280	1550	-2285	1060	-990	410	420	580	-160	660	-2180	250	-1650	620
138	1540	1370	-150	1665	-1500	1020	-3685	165	-4805	1135	-3500	1630	-2440	1120	-990	420	470	630	-180	720	-2320	275	-1800	670
0	165	110	0	70	0	0	-245	-75	-440	60	-70	65	40	10	120	-10	50	30	-10	30	-70	40	-10	20
138	1545	1360	-155	1660	-1500	1020	-3670	170	-4790	1130	-3490	1620	-2425	1115	-990	420	490	625	-190	740	-2410	300	-1810	690
145	1600	1410	-140	1730	-1530	1050	-3920	150	-4990	1170	-3670	1690	-2550	1160	-1000	420	520	660	-200	795	-2550	310	-1930	730
150	1640	1440	-120	1780	-1560	1080	-4100	120	-5150	1190	-3810	1740	-2645	1190	-980	410	530	680	-210	820	-2640	310	-2010	750
155	1690	1480	-100	1850	-1590	1100	-433	30	-5310	1190	-3960	1730	-2720	1180	-930	360	490	640	-200	810	-2730	270	-2090	730
160	1690	1530	-60	1870	-1585	1070	-4610	0	-5510	1190	-4160	1820	-2835	1250	-900	350	520	670	-210	840	-2840	280	-2180	760
165	1750	1580	-30	1930	-1600	1110	-4940	-55	-5740	1240	-4400	1890	-2950	1260	-845	330	540	690	-220	870	-2940	280	-2290	800
167	1790	1590	-20	2030	-1600	1180	-5070	-10	-5830	1320	-4490	1990	-3010	1350	-840	400	620	770	-230	890	-3010	280	-2340	810
170	1810	1620	0	2070	-1610	1190	-5230	-40	-5930	1345	-4600	2030	-3080	1370	-800	320	550	720	-240	910	-3060	290	-2370	830
0	300	270	80	250	50	40	-945	-200	-990	185	-490	250	0	100	340	60	100	65	-10	70	-160	90	-50	70

Plus indicates tensile strains and stresses.
Minus indicates compressive strains and stresses.

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Ref. Sym: 1612 (658)
Project No. TM-707

TABLE X (Continued)

STRAIN READINGS AND COMPUTED PRINCIPAL STRESSES (CONE #4)
STATIC TEST OF XW-49 ADAPTER CONE

Per Cent of Limit Load	Computed 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	
	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv
20	4550	4470	3490	330	990	-2980	-1460	-6490	250	-9570	2020	-5530	1400	-3390	640	-1710	1960	1550	1170	-170	-20	-5410	1120	-3100
40	8030	7860	6390	790	2050	-5410	-2700	-12270	-260	-17460	2920	-10870	2100	-6990	980	-3730	3480	3400	2670	80	-800	-8830	1200	-5090
60	11280	10870	8970	1270	2980	-7560	-3840	-17710	-690	-24370	3890	-15660	2750	-10390	1070	-5500	4400	4000	3460	210	-1690	-11910	1090	-7510
80	14450	13970	11590	1860	3950	-9600	-5280	-23450	-1400	-31900	4670	-20720	3330	-14030	1160	-7270	5180	4450	4040	390	-2600	-14360	950	-9350
90	16160	15550	13070	2200	4470	-10500	-6090	-26450	-1720	-35710	5110	-23440	3590	-15960	1230	-8100	5680	4710	4360	380	-3060	-15880	990	-10610
100	17710	16980	14360	2600	4980	-11400	-6790	-29420	-2050	-39200	5570	-25740	3800	-17700	1250	-8730	6190	4970	4820	520	-3720	-17670	840	-12140
0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
100	18010	17280	14480	2630	4980	-11400	-6750	-29300	-1990	-39180	5570	-25740	3800	-17700	1280	-8610	6160	5070	4900	440	-3470	-17540	1010	-11930
110	19200	18390	15650	2990	5310	-12260	-7680	-32340	-2460	-42610	5800	-28110	3890	-19470	1300	-9240	6830	5700	5570	540	-3860	-19520	1070	-13450
120	20680	19580	16920	3330	5780	-12960	-8810	-35650	-2870	-46020	6180	-30320	4220	-21170	1360	-9760	7710	6500	6400	480	-4410	-22330	1210	-15420
125	21270	20130	17400	3530	5960	-13220	-9310	-37290	-3140	-47590	6300	-31660	4240	-22120	1320	-9870	8080	6820	6790	390	-4680	-23580	1240	-16360
130	21770	20550	17750	3640	6150	-13480	-9890	-38850	-3370	-49030	6370	-32800	4210	-22930	1250	-10110	8290	6990	7150	490	-4890	-24600	1340	-17070
138	22920	21540	18930	4210	6550	-13890	-11270	-42500	-3940	-52130	6520	-35090	4360	-24520	1360	-10070	9050	7750	7780	480	-5310	-26850	1390	-18650
0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
138	22940	21440	18860	4140	6550	-13890	-11160	-42310	-3950	-51970	6440	-35010	4350	-24360	1360	-10070	9070	7970	7970	430	-5130	-27110	1530	-18690
145	23760	22220	19730	4560	6800	-14130	-12290	-45300	-4200	-54160	6610	-36860	4430	-25660	1330	-10190	9580	8450	8580	510	-5510	-28710	1620	-19950
150	24340	22720	20390	4980	7040	-14370	-13290	-47520		*	6700	-38320	4440	-26670	1280	-9990	9850	8640	8840	480	-5830	-29760	1570	-20820
155	25070	23360	21280	5460	7170	-14650	-15160	-50530			6040	-40110	4050	-27580	880	-9590	9240	8020	8760	560	-6620	-30960	1050	-21830
160	25250	23950	21650	6000	6830	-14700	-16520	-53910			6380	-42130	4460	-28630	870	-9270	9700	8480	9070	550	-6900	-32210	1030	-22770
165	26130	24750	22460	6570	7250	-14730		*			6340	-44680	4170	-29980	830	-8700	10000	8790	9390	550	-7260	-33380	1150	-23910
167	26630	25010	23670	7040	8070	-14480					7180	-45380	5000	-30360	1670	-8390	11230	10010	9580	500	-7510	-34200	1090	-24460
170	26970	25430	24210	7420	8150	-14560					7260	-46520	4990	-31110	880	-8210	10390	9010	9780	450	-7570	-34750	1210	-24741
0	--	--	--	--	--	--					--	--	--	--	--	--	--	--	--	--	--	--	--	--

* The stresses are beyond the yield point of 14S-T6 aluminum.

Su = Maximum principal stress (largest algebraic value) based on assumption gages are mounted in direction of principal stresses.
Sv = Minimum principal stress (smallest algebraic value) based on assumption gages are mounted in direction of principal stresses.

Plus indicates tensile strains and stresses.
Minus indicates compressive strains and stresses.

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TABLE XI

DEFLECTIONS (CONE #4) — STATIC TEST OF XW-49 ADAPTER CONE

Per Cent of Limit Load	Dial Indicators No. 1	Dial Indicators No. 2
20	-.009	-.012
40	-.024	-.024
60	-.038	-.034
80	-.052	-.044
90	-.058	-.050
100	-.064	-.055
0	.001	-.001
100	-.064	-.055
110	-.069	-.060
120	-.075	-.066
125	-.077	-.068
130	-.080	-.070
138	-.084	-.075
0	-.002	-.001
138	-.086	-.075
145	-.091	-.079
150	-.093	-.081
155	-.097	-.083
160	-.100	-.086
165	-.104	-.089
167	-.105	-.090
170	-.107	-.091
0	-.007	-.004

Plus deflection means an increase in length of cone.

Dial indicators are mounted from loading plate with magnetic block and points of dial indicators are on flange of cone.

TABLE XII

STRAIN READINGS AND COMPUTED PRINCIPAL STRESSES (CONE #2 WITH SLAPPING RING) -- STATIC TEST OF XW-49 ADAPTER CONE

Strain Readings for the Following Gages - Microinches per Inch

Per Cent of Limit Load	5 - 6		7 - 8		9 - 10		11 - 12		13 - 14		15 - 16		17 - 18		19 - 20		21 - 22		23 - 24		25 - 26	
20	58	43	-13	55	-73	42	-211	45	-123	40	-143	53	-176	36	-172	34	-190	42	-235	60	-230E	82
40	120	160	-55	180	-260	120	-300	110	-350	120	-340	130	-410	90	-400	80	-450	110	-450	150	-380	220
50	150	230	-75	250	-360	170	-410	140	-460	170	-450	170	-530	110	-500	110	-570	150	-570	200	-420E	280
60	190	300	-105	320	-450	210	-470E	170E	-560E	200	-540	210	-640	130	-610	120	-680	160	-680	240	-590	340
70	230	370	-125	390	-550	240	-570	210	-660	240	-640	250	-760	150	-710	140	-800	200	-800	280	-690	420

Computed Maximum and Minimum Principal Stresses - psi

Per Cent of Limit Load	5 - 6		7 - 8		9 - 10		11 - 12		13 - 14		15 - 16		17 - 18		19 - 20		21 - 22		23 - 24		25 - 26	
	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv
20	860	750	600	70	180	-766	80	-1130	60	-1260	50	-1480	-290	-1940	-300	-1900	-310	-2170	-110	-2160	-160	-2990
40	2380	2070	1910	80	370	-2600	90	-3110	0	-3660	160	-3500	-600	-4490	-670	-4420	-520	-4890	-50	-4730	1070	-3610
50	3330	2710	2660	130	560	-3580	40	-4170	150	-4760	190	-4640	-850	-5840	-720	-5480	-530	-6150	60	-5940	1330	-4670
60	4330	3470	3370	50	660	-4480	30	-5120	100	-5830	300	-5550	-1060	-7060	-1050	-6740	-860	-7410	90	-7090	1640	-5610
70	5320	4230	4120	100	610	-5550	180	-5900	170	-6850	370	-6570	-1300	-8400	-1220	-7850	-870	-8670	70	-8350	1940	-6560

Strain Readings for the Following Gages - Microinches per Inch

Per Cent of Limit Load	27 - 28		29 - 30		31 - 32		33 - 34		35 - 36		37 - 38		39 - 40		41 - 42		43 - 44		45 - 46		47 - 48	
20	-127	32	-148	62	-109	61	-78	29	-122	41	-124	60	-129	70	-155	51	-128	46	-78	57	-70	74
40	-460	120	-460	210	-370	210	-220	110	-330	120	-320	160	-310	170	-360	120	-290	120	-180	160	-190	210
50	-660	170	-640	390	-500	280	-290	140	-420	150	-410	200	-400	210E	-450	150	-360	140	-230	180	-250	250
60	-850	220	-820	370	-640	360	-370	170	-520	180	-500	240	-480	250	-530	170	-440	170	-280	220	-300	300
70	-1050	280	-930	450	-770	440	-440	200	-630	210	-590	280	-580	300E	-640	200	-530	190	-330	260	-370	360

Computed Maximum and Minimum Principal Stresses - psi

Per Cent of Limit Load	27 - 28		29 - 30		31 - 32		33 - 34		35 - 36		37 - 38		39 - 40		41 - 42		43 - 44		45 - 46		47 - 48	
	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv
20	-140	-1380	140	-1500	280	-1040	30	-810	-10	-1280	210	-1230	310	-1250	-20	-1630	30	-1330	380	-630	590	-530
40	-440	-4970	620	-4600	990	-3530	440	-2160	80	-3420	600	-3140	760	-2990	-40	-3780	250	-2950	1170	-1480	1720	-1400
50	-660	-7130	2190	-5530	1290	-4790	480	-2870	70	-4370	710	-4050	870	-3890	-50	-4730	200	-3700	1200	-2000	1950	-1950
60	-840	-9180	1060	-8220	1670	-6130	510	-3700	20	-5430	820	-4950	1020	-4680	-140	-5590	230	-4530	1470	-2430	2340	-2540
70	-940	-11310	1320	-9910	2090	-7340	590	-4400	-70	-6620	930	-5860	1200	-5660	-230	-6770	100	-5510	1740	-2860	2770	-2930

Strain Readings for the Following Gages - Microinches per Inch

Per Cent of Limit Load	49 - 50		53 - 54		55 - 56		60 - 61		63 - 64		65 - 66		67 - 68		69 - 70		71	72
20	-64	95	145	338	-208	24	-201	43	-323	170	-713	301	-24	13	20	37	66	61
40	-210	250	260	750	-420	30	-490	70	-1760	350	-1320	530	-10	10	30	60	140	120
50	-270	310	300	9008	-480	40	-560	90	-2110	450	-1680	670	-10	20	90	70	170	150
60	-330	380	360	1050	-580	50	-670	110	-2500	560	-1870	830	-20	20	100	100	210	190
70	-410	460	420	1220	-670	70	-780	120	-2880	690	-2160	970	-20	20	120	100	260	220

Computed Maximum and Minimum Principal Stresses - psi

Per Cent of Limit Load	49 - 50		53 - 54		55 - 56		60 - 61		63 - 64		65 - 66		67 - 68		69 - 70		71	72
	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv	Su	Sv		
20	870	-370	450	3370	-560	-2370	-310	-2210	-1730	-10250	680	-7430	60	-230	520	330	--	--
40	2110	-1490	9940	6120	-1350	-4860	-1160	-3620	-2990	-13440	930	-13500	80	-80	1040	1130	--	--
50	2620	-1040	11880	7120	-1470	-5530	-1200	-4270	-3020	-23130	1530	-16010	200	-40	1200	1350	--	--
60	3170	-2370	13900	8530	-1760	-6470	-1410	-7500	-3270	-27210	2250	-18300	160	-160	1390	1590	--	--
70	3720	-2990	16160	9930	-1890	-7660	-1740	-8760	-3530	-33340	2740	-21670	160	-160	1670	1830	--	--

Plus indicates tensile strains and stresses.

Minus indicates compressive strains and stresses.

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Su = Maximum principal stress (largest algebraic value) based on assumption gages are mounted in direction of principal stresses.
Sv = Minimum principal stress (smallest algebraic value) based on assumption gages are mounted in direction of principal stresses.

[redacted]