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#413

UNCLASSIFIED

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW

1st Review Date: 8/26/98	Determination (Circle Numbers):
Authority: CADD ADD	1. Classification Retained
Name: R Bliamer	2. Classification Changed to: U
2nd Review Date: 9-9-98	3. Contains No DOE Classified Information
Authority: ADD	4. Coordinate With:
Name: W Layne	5. Contains UCAI? NO
	6. Comments: Declassify

MAR 15 1956
Case No. 702.00
Ref. Sym: 1612 (292)
Project No. TM-358
TX-39, 3-2

MR. R. L. BRIN - 1241

Attn: J. Herbolsheimer - 1241

Re: Static Test of TX-39 Fins

RECEIVED
MAR 1956
R & D FILES

Summary of Results

Two similar all-metal TX-39 fins were statically tested to 400 percent limit load simulating free fall. Neither fin failed but both showed considerable bending at 240 percent limit load and above.

Object of Test

The object of this test was to load statically two similar TX-39 fins to 400 percent design limit load simulating free fall at an angle of attack of 15 degrees, a speed of Mach 1.2 and at 5000 feet altitude and measure deflections at four points at various increments of load.

Reason for Test

The test was authorized in a Work Order Authorization from Mr. R. L. Brin, 1241, to Mr. T. B. Morse, 1610, Attn: Mr. P. H. Adams, 1612, dated November 22, 1955.

Function of Object Tested

The objects tested are to be used as stabilization fins on the TX-39 weapon.

Summary of Past Tests

The previous static tests have been performed on TX-15 fins which are similar to the TX-39 fins.

Seven TX-15 fins of various construction were tested statically and the results of this test are stated in a report from R. I. Butler, 1612 to R. L. Brin, 1241, dated January 7, 1955, Ref. Sym: 1612 (142), Project No. TM-225.

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
DOWNGRADING OR DECLASSIFICATION STAMP

CLASSIFICATION CHANGED TO: U	AUTHORITY: W.C. Layne
Emelda Selph 9/28/98	RECORD ID: 985N3912
PERSON CHANGING MARKING & DATE: Carmelita Gallegos	DATED: 9/9/98
PERSON VERIFYING MARKING & DATE: 9/25/98	

FILE No. TX-39 3-2

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Project No. TM-358

Following are the results of the test: Seven TX-15 double wedges, No. 6 (Bendix), No. 7 (Bendix), No. 8 (Tempco), No. 9 (Bendix), No. 14 (Bendix), No. 15 (Tempco), and No. 16 (Tempco), were statically tested simulating loads encountered during free fall. Numbers 6 and 15 withstood 400 percent design limit load (5865 pounds) without indication of failure. Numbers 9 and 14 were tested to 400 percent design limit load (5865 pounds), but post-test inspection revealed a crack in the mounting bracket of fin 14, and sheared bolts connecting the diaphragm to the rear of wedge No. 9. Wedge No. 7 failed at 260 percent design limit load (3810 pounds) and No. 8 failed at 390 percent design limit load (5275 pounds). Failure in each of the latter two cases was occasioned by separation of the bond between the plastic and the aluminum components of the wedge.

Wedge No. 16 was tested to 400 percent design limit load (5865 pounds) without external indication of failure. At a load of 310 percent design limit load (4556 pounds); however, a loud cracking noise was heard. Inspection revealed no external signs of failure so the test was continued to 400 percent without additional indication of failure except for excessive deflections.

Wedges Nos. 15 and 16, following the standard SCS-7 twenty days humidity cycle, were retested to 400 percent design limit load without indication of failure.

The TX-15 afterbody and double wedge fins were tested statically and the results of this test are stated in a report from H. P. Wheeler, 1612-2 to R. L. Brin, 1241, dated January 4, 1955, Case No. 635.00, Ref. Sym: 1612 (179), Project No. TM-260.

Following are the results of the test:

The TX-15 afterbody and double wedges withstood a vertical static load of 5860 pounds (400 percent of limit load) on each of two double wedges without showing any indication of failure.

The maximum vertical deflection on the outboard edge of the double wedge was 0.452 inch.

Setup for Test

I. Figures 1 and 2 are photographs of the test setup. Figure 3 is a sketch showing location of dial indicators. Figure 4 is a sketch showing location and fraction of load applied at each point. Figure 5 shows the load pad arrangement used in this test.

II. Items tested were two TX-39 double wedge fins, Drawing No. 110561 and MC-760.

III. The following equipment was used in the test:

1. One Simplex hydraulic jack, capacity 60 tons.

2. One Baldwin SR-4 strain indicator, Serial No. J-59191.

3. One Baldwin load cell, sensitivity 1.26 pounds/microinch/inch, capacity 10,000 pounds, Serial No. 658.

4. Attaching bolts, plates, channels, and rubber pads.

IV. The following instrumentation was used:

1. Four Starrett dial indicators graduated to .001 inch, range 1.0 inch.

Procedure

The TX-39 double wedge fins were bolted to a plate which was machined to the same radius as the TX-39 afterbody. This plate was attached to the static jig. Five holes were drilled through the fins at the locations shown in Fig. 4. Loading bars attached to the load pads were inserted through the holes and attached to the loading apparatus (Fig. 2). The loading bars were connected to the load pads with nuts and spherical washers which fit into spherical seats machined in the load pads (Fig. 5). The loading apparatus was then tied into a 60-ton hydraulic jack through a calibrated 10,000 pound load cell (Fig. 1). Loads were measured with a Baldwin SR-4 strain indicator. Four dial indicators were mounted as shown in Figs. 1 and 3.

The load was applied at various increments up to 100, 115, 150, 200, 300, and 400 percent limit load. Dial indicator readings were taken at each increment of load and permanent set was recorded at the end of each test run.

Results

Both fins withstood 400 percent design limit load without failure. Noticeable bending was observed at 240 percent design limit load and above. Tables I and II contain load deflection data and Figs. 6 through 11 are plots of load vs. deflection. No curves were plotted on gage 4 as deflections were too minute.

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Conclusions

Both the fins tested were structurally adequate to withstand 400 percent design limit load without failure.

L. J. Woolrich
L. J. WOOLRICH - 1612-2

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

LJW:1612-2:as

Copy to:
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W. A. Gardner, 1282
R. E. Fisher, 1621
C. L. Gomel, 5523
R. K. Smeltzer, 7222-2
K. M. Flood, 7222-3

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FIG. 1 TEST SETUP FOR STATIC TEST OF TX-39 DOUBLE WEDGE FINS.

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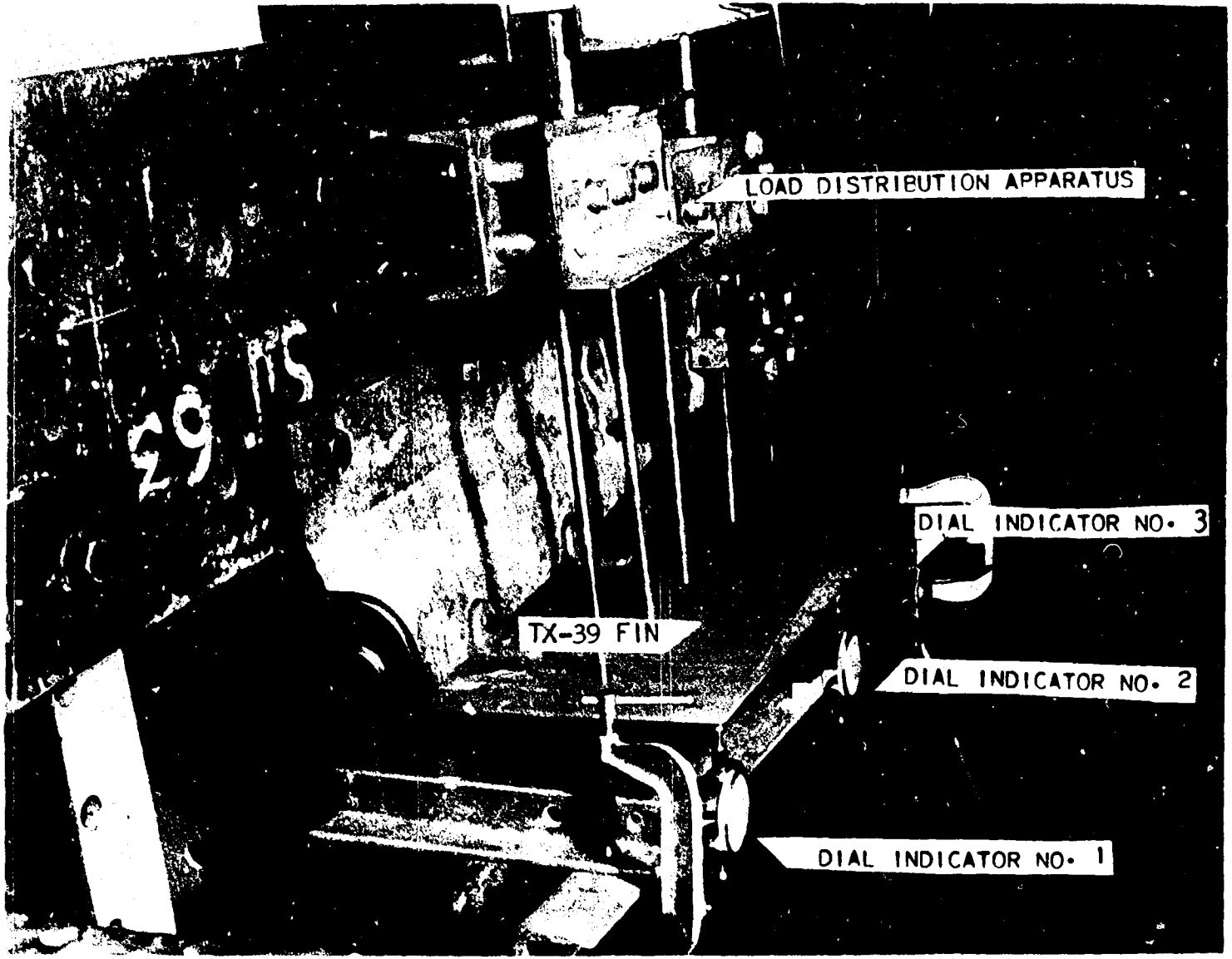

FIG. 2 TEST SETUP FOR STATIC TEST OF TX-39 DOUBLE WEDGE FINS

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TM-358
REF. SYM: 1612/292)

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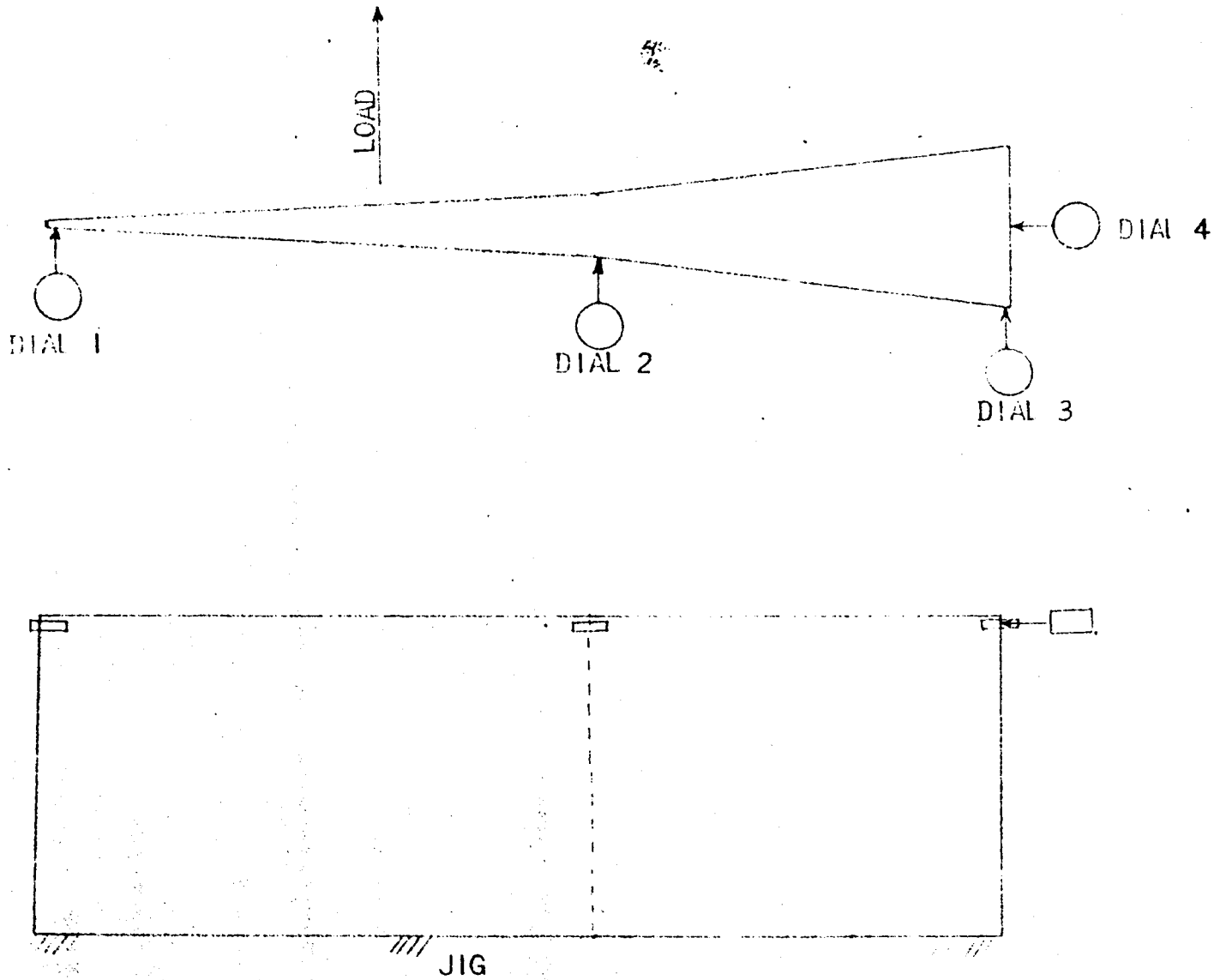

FIG. 3 LOCATION OF DIAL INDICATORS IN STATIC TEST OF TX-39 DOUBLE WEDGE FINS

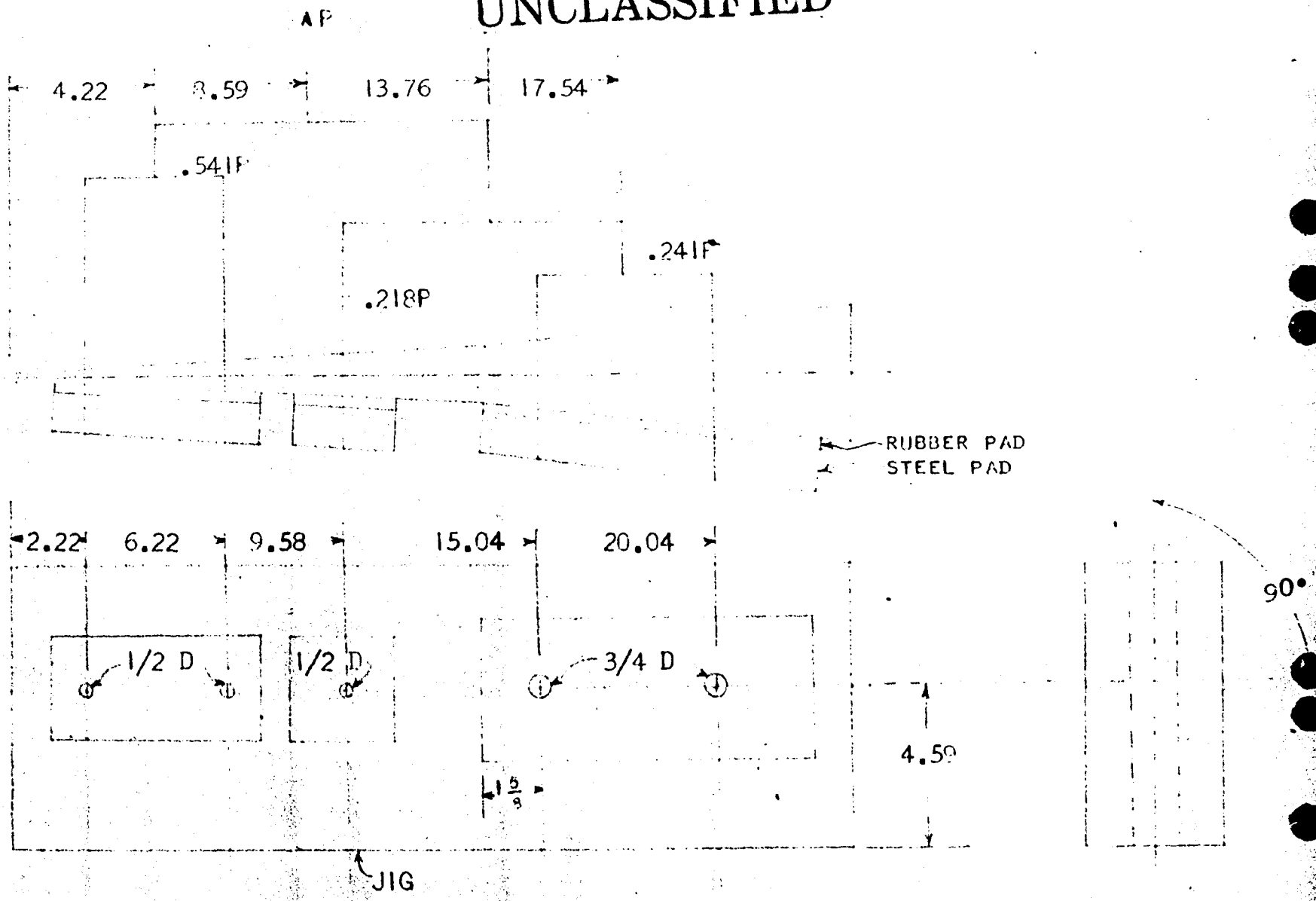

FIG. 4 LOAD DISTRIBUTION APPARATUS AND LOCATION OF LOADS IN STATIC TEST OF TX-39 DOUBLE WEDGE FINS.

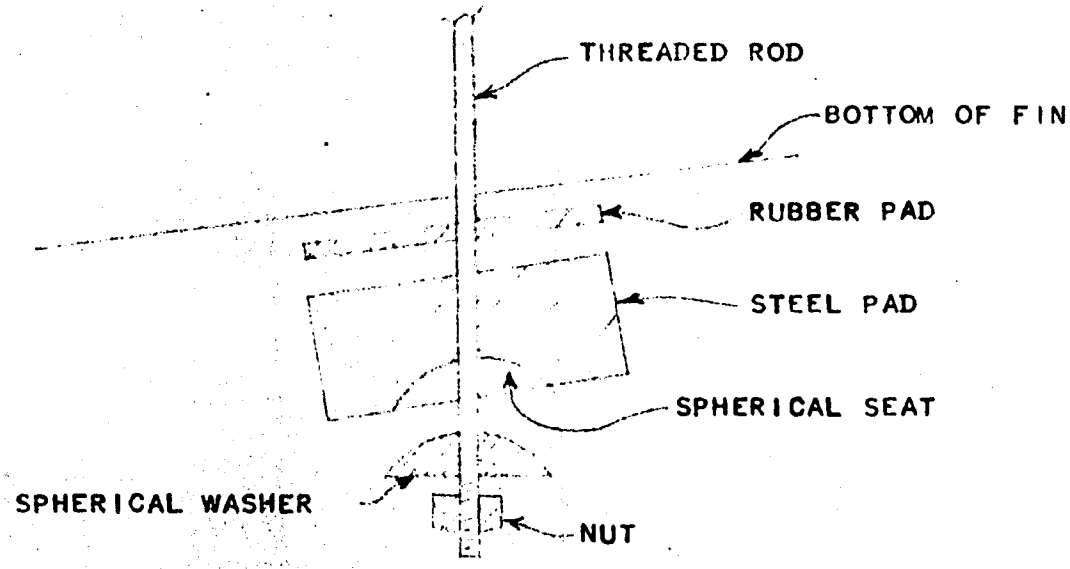

FIG. 5 EXPLODED VIEW OF LOAD PAD ARRANGEMENT IN STATIC TEST OF TX-39 DOUBLE WEDGE FINS

[redacted]

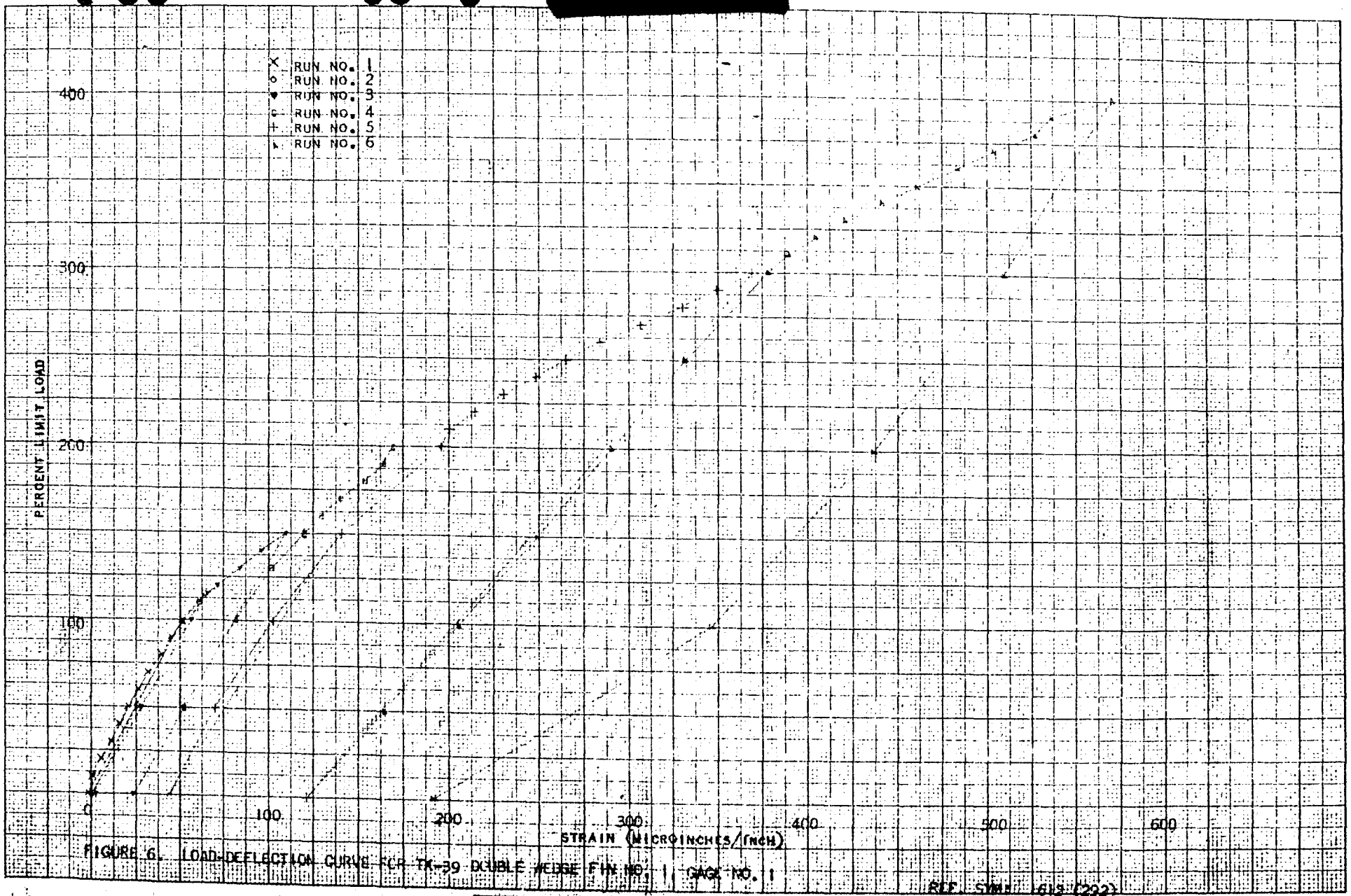

FIGURE 6. LOAD-DEFLECTION CURVE FOR TX-39 DOUBLE WEDGE FIN NO. 1 GAGE NO. 1

REF. SYMB. 613 (292)

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10 X 10 TO THE ½ INCH 359-11L KEUFFEL & ESSER CO.

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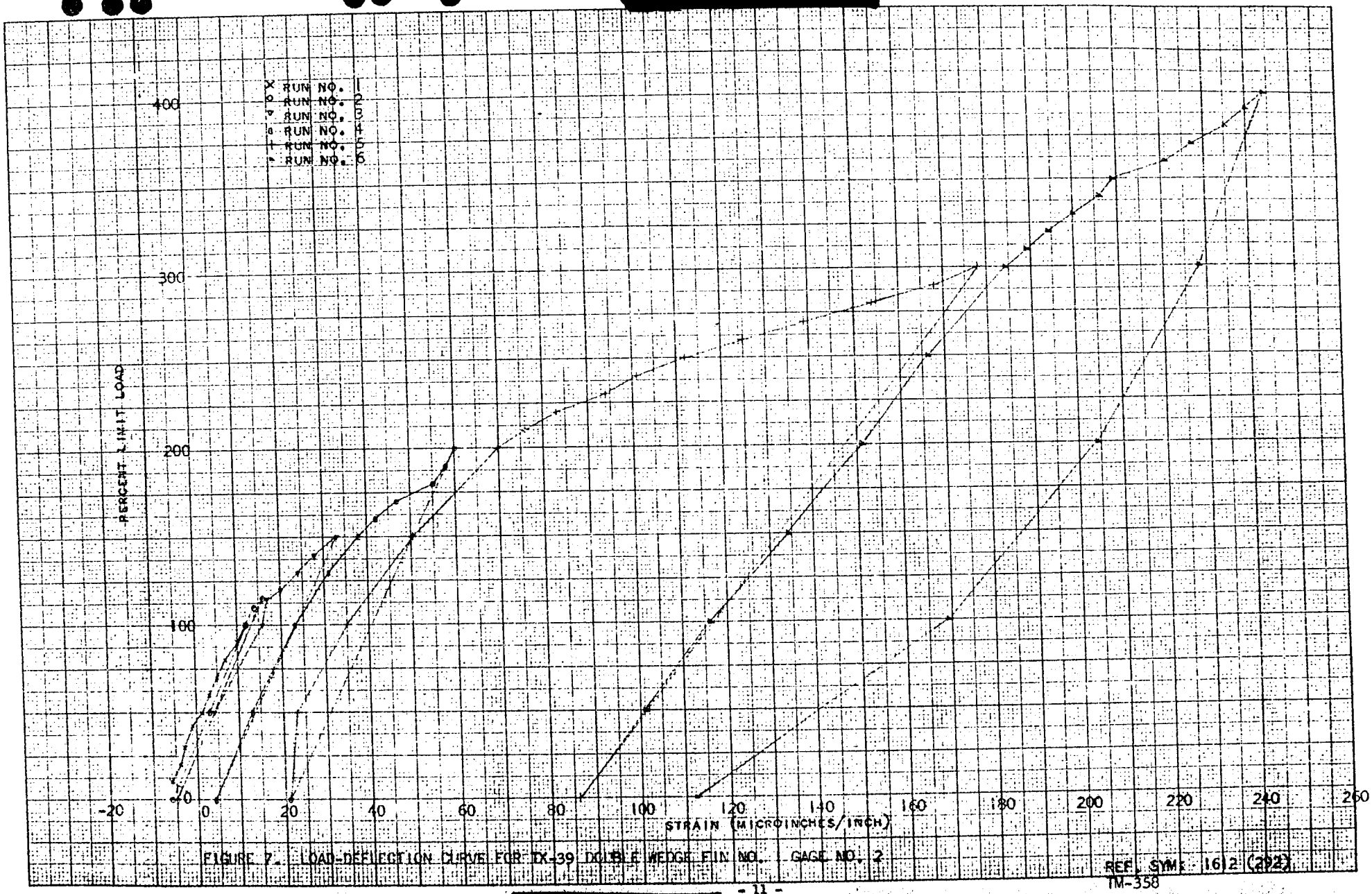

FIGURE 7. LOAD-DEFLECTION CURVE FOR TX-39 DOUBLE WEDGE FIN NO. GAGE NO. 2

REF. SYM: 16.2 (292)
TM-358

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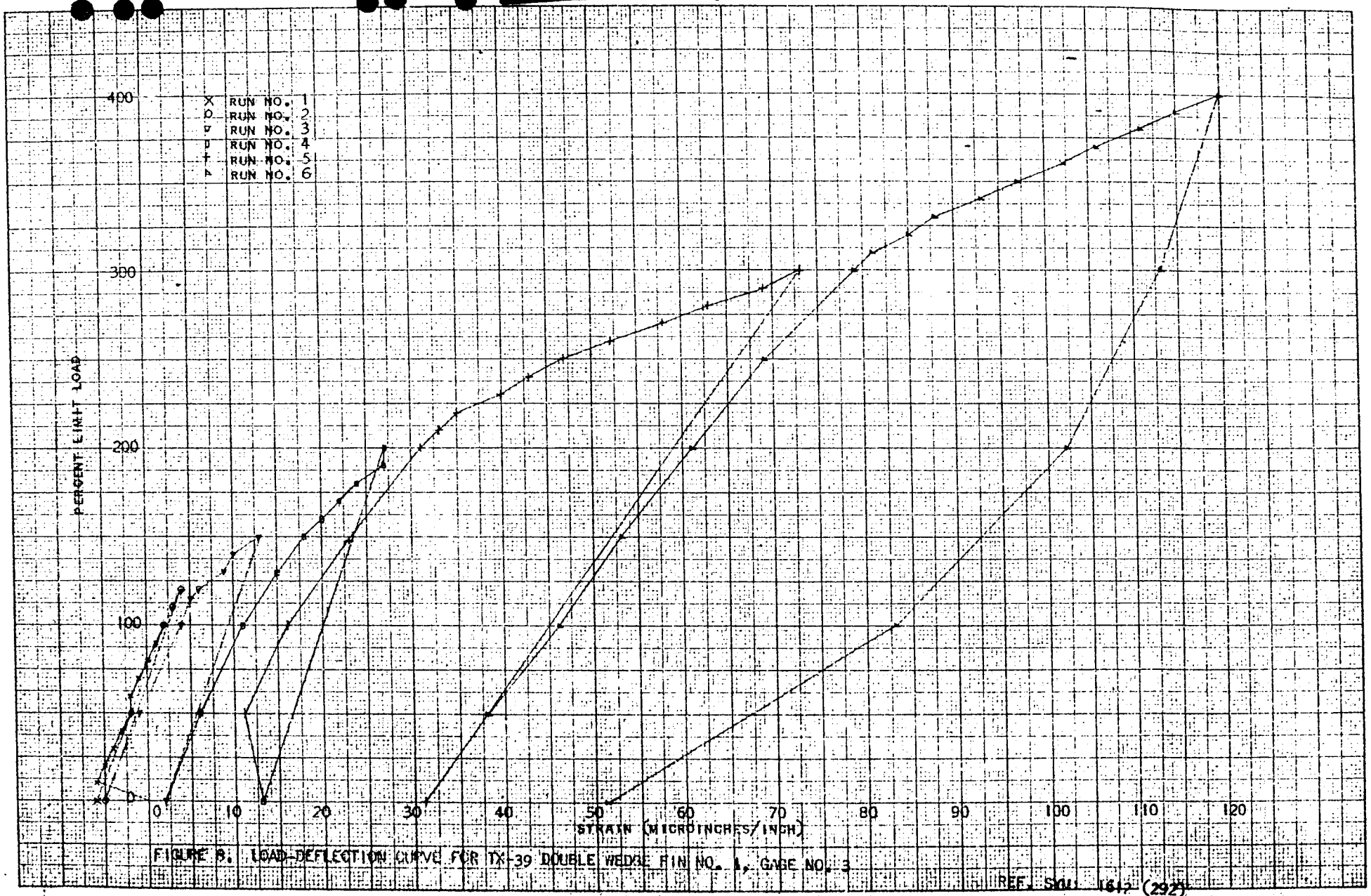

FIGURE 8. LOAD-DEFLECTION CURVE FOR TX-39 DOUBLE WEDGE FIN NO. 1, GAGE NO. 3

REF. SKU 1612 (292)

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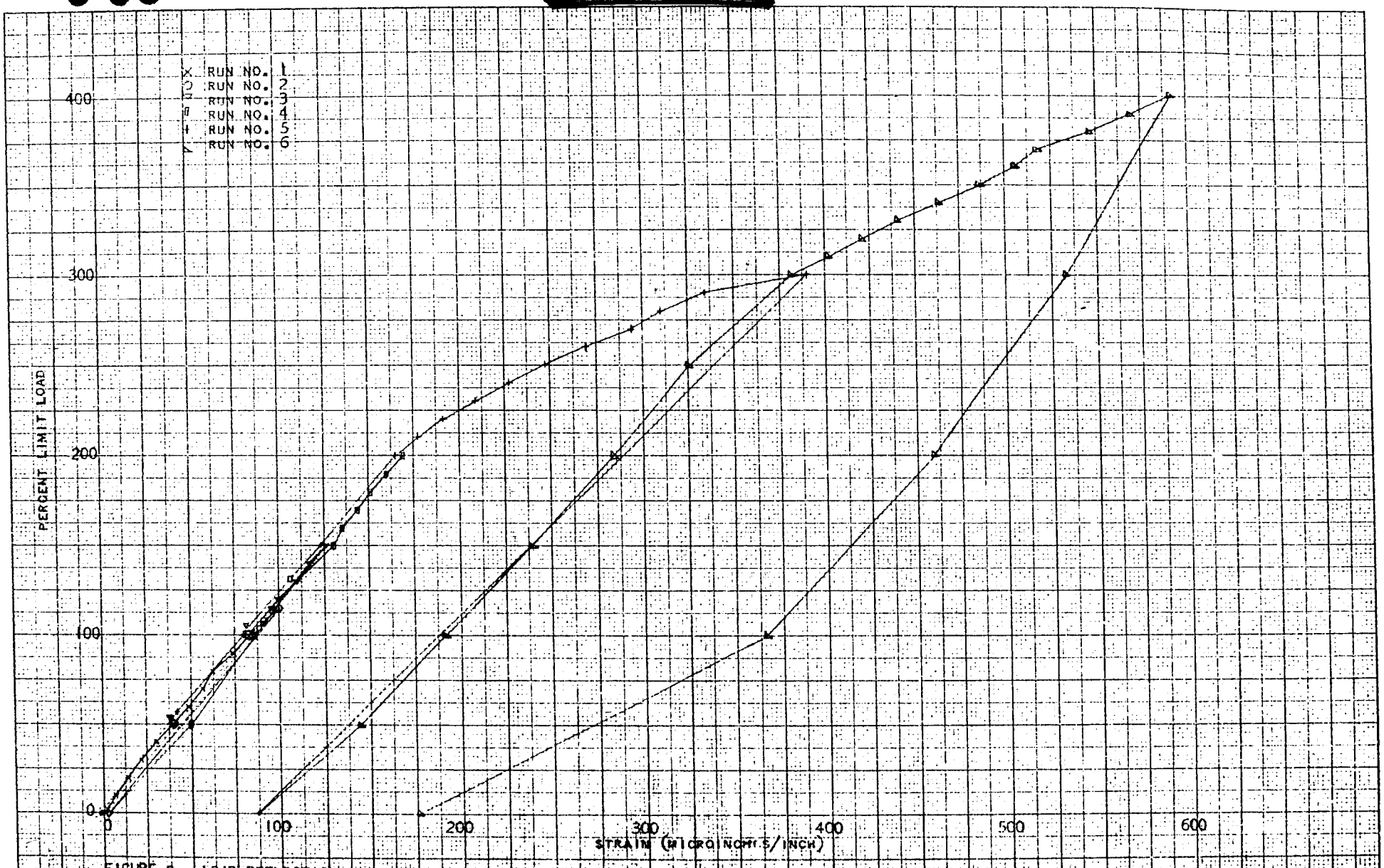

FIGURE 9. LOAD-DEFLECTION CURVE FOR TX-39 DOUBLE WEDGE FIN NO. 2, GAGE NO. 1

REF. SYM: 612 (292)

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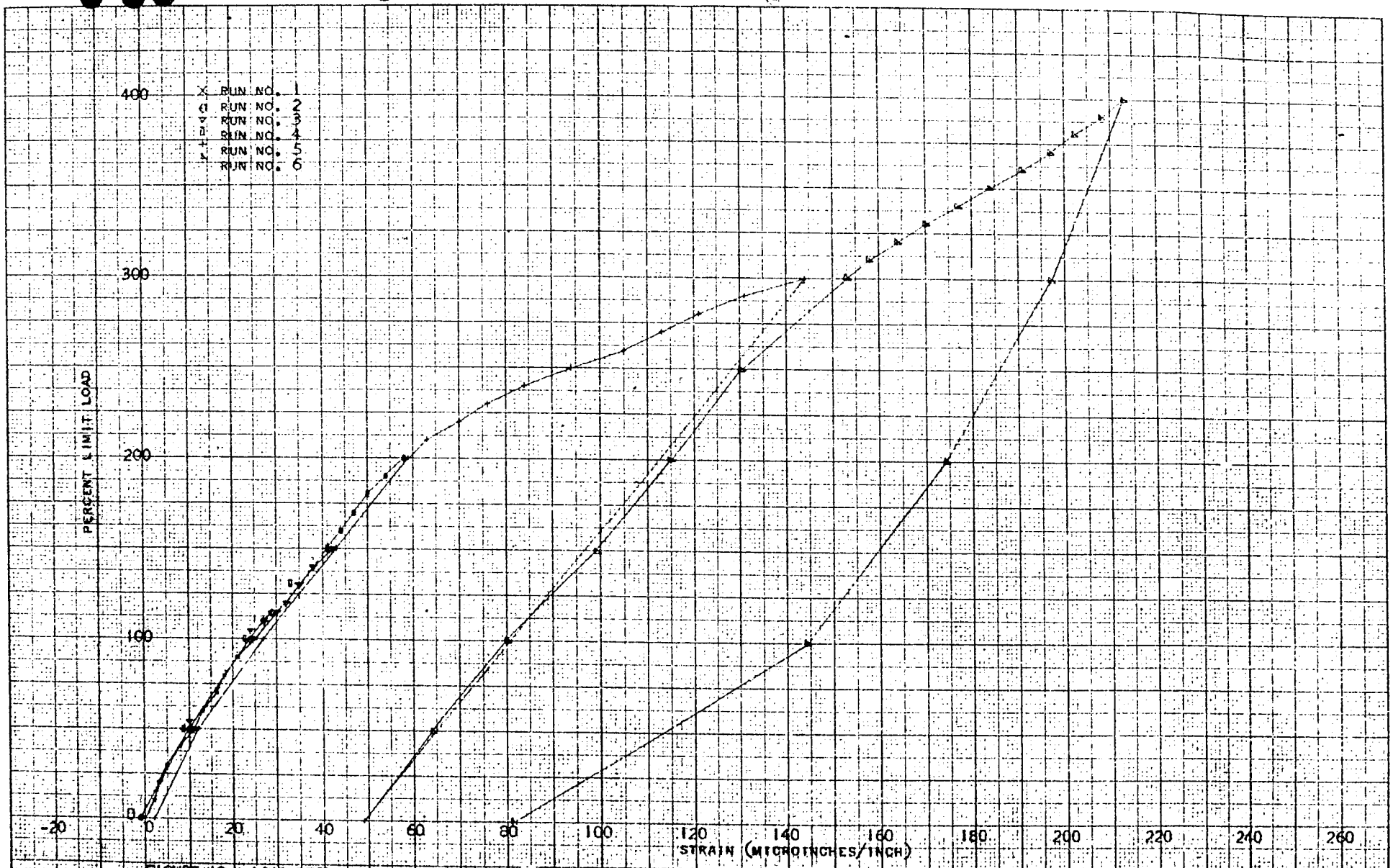

FIGURE 10. LOAD-DEFLECTION CURVE FOR TX-39 DOUBLE WEDGE FIN NO. 2, GAGE NO. 2

REF. SYM. 1812 (292)
TM 958

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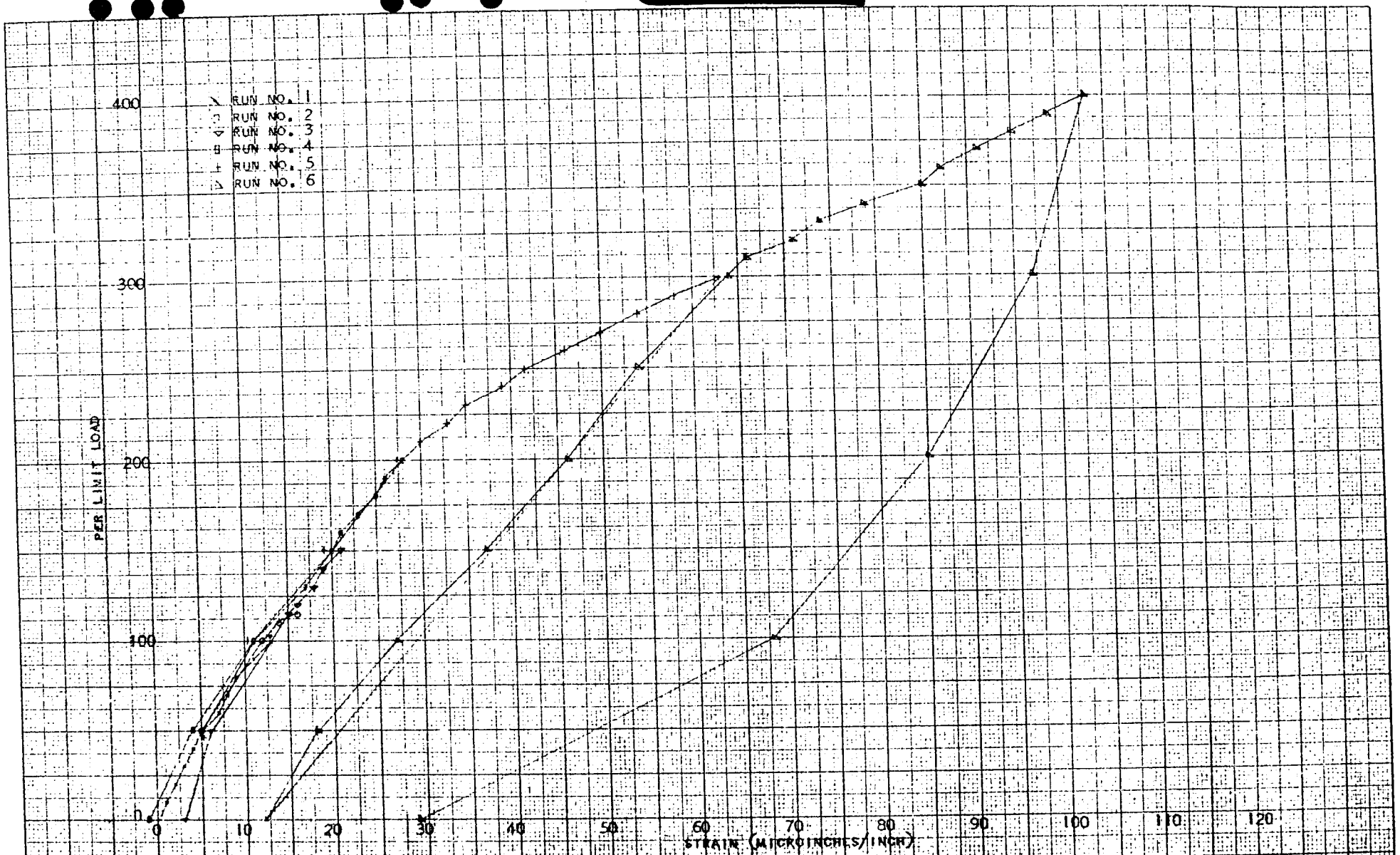

FIGURE 11. LOAD-DEFLECTION CURVE FOR TX-39 DOUBLE WEDGE FIN NO. 7, GAGE NO. 3

REF. SYW: 1612 (292)
EM-558

TABLE I

LOAD-DEFLECTION DATA FOR STATIC TEST OF TX-39 DOUBLE WEDGE FIN NO. 1

Percent Limit Load*	Deflection (Millinches) Dial No. 1	2	3	4
Run No. 1				
0	000	000	000	000
10	001	-006	-006	001
20	006	-004	-005	001
30	011	-003	-004	002
40	016	-001	-003	002
50	021	001	-002	002
60	027	003	-002	002
70	033	005	-001	002
80	039	007	000	002
90	045	010	001	003
100	051	012	002	003
0	-002	-006	-006	001
Run No. 2				
0	-002	-006	-006	001
50	025	003	-002	002
100	052	012	002	003
110	061	014	003	003
115	063	016	004	003
0	001	-005	-005	001
Run No. 3				
0	001	-005	-005	001
50	027	-004	-001	002
100	056	016	004	003
115	065	017	005	003
120	072	020	006	003
130	084	024	009	004
140	096	028	010	004
150	109	033	013	004
0	023	004	002	002
Run No. 4				
0	023	004	002	002
50	052	013	006	004
100	081	023	011	004
130	101	031	015	005
150	120	038	018	006
160	128	042	020	007
170	140	047	022	007
180	153	055	024	008
190	164	058	027	008
200	168	060	027	009
0	044	021	013	003

Percent Limit Load*	Deflection (Millinches) Dial No. 1	2	3	4
Run No. 5				
0	044	021	013	003
50	070	023	011	005
100	102	035	016	006
150	142	050	023	008
200	196	070	031	009
210	200	076	033	011
220	214	083	036	011
230	231	094	040	012
240	248	101	043	013
250	265	112	047	014
260	284	125	052	015
270	307	139	058	016
280	330	154	063	017
290	349	168	068	019
300	369	178	073	020
0	121	086	031	012
Run No. 6				
0	121	086	031	012
50	164	101	038	012
100	205	116	046	014
150	249	134	048	015
200	290	151	061	017
250	331	166	069	019
300	377	184	079	021
310	389	189	081	021
320	404	194	085	022
330	421	200	088	022
340	442	206	093	023
350	461	209	097	023
360	483	221	102	024
370	503	227	106	024
380	527	235	111	025
390	536	240	115	025
400	571	244	120	026
300	509	228	113	024
200	436	204	102	021
100	346	169	083	016
0	192	112	051	011

NOTE: Dial Indicators 1, 2, and 3 positive numbers are deflections upward. Dial Indicator 4 positive numbers are deflections toward forward end.

* 100 percent limit load = 1465 lbs.

TABLE II

LOAD-DEFLECTION DATA FOR STATIC TEST OF TX-39 DOUBLE WEDGE FIN NO. 2

Percent Limit Load*	Deflection (Millinches) Dial No. 1	2	3	4
Run No. 1				
0	000	000	000	000
10	006	002	001	000
20	013	003	002	000
30	021	005	003	000
40	030	008	004	000
50	040	011	005	000
60	048	013	007	001
70	056	016	008	001
80	065	018	009	001
90	074	021	011	001
100	082	025	013	002
0	000	-001	000	000
Run No. 2				
0	000	-001	000	000
50	039	010	005	000
100	083	024	012	002
110	091	027	014	002
115	095	029	016	002
0	002	002	003	-004
Run No. 3				
0	002	002	003	-004
50	040	011	006	-004
100	084	025	013	-003
115	096	030	015	-003
120	100	032	016	-002
130	110	035	018	-002
140	117	038	019	-002
150	126	042	021	-002
0	002	000	-001	-005
Run No. 4				
0	002	000	-001	-005
50	049	010	004	-004
100	085	025	011	-003
130	110	035	017	-003
150	127	041	020	-003
160	135	044	021	-002
170	144	047	023	-002
180	151	050	025	-002
190	160	054	026	-002
200	169	058	028	-002
0	-001	002	-001	-005

Percent Limit Load*	Deflection (Millinches) Dial No. 1	2	3	4
Run No. 5				
0	-001	002	-001	-005
50	038	012	005	-005
100	080	027	011	-003
150	124	043	020	-003
200	165	059	028	-002
210	177	063	030	-002
220	192	070	033	-002
230	208	076	035	-002
240	227	084	039	-002
250	248	094	043	-002
260	268	105	046	-002
270	289	113	050	-002
280	310	121	054	-002
290	334	131	058	-002
300	389	144	063	-002
0	086	049	012	-007
Run No. 6				
0	086	049	012	-007
50	144	064	018	-006
100	192	080	027	-005
150	239	099	037	-003
200	283	115	046	-002
250	325	130	054	-001
300	382	153	064	001
310	402	158	066	001
320	421	164	071	001
330	441	170	074	002
340	463	177	079	002
350	486	184	085	002
360	506	191	087	002
370	518	197	091	002
380	546	202	095	003
390	570	208	099	003
400	591	213	103	003
300	533	197	097	001
200	459	174	095	-002
100	365	144	068	-005
0	176	081	029	-008

NOTE: Dial Indicators 1, 2, and 3 positive numbers are deflections upward. Dial Indicator 4 positive numbers are deflections toward forward end.

* 100 percent limit load = 1465 lbs.