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SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
1st Review Date: 8/11/98
Authority: ADD
Name: R Kroner
2nd Review Date: 8/19/98
Authority: ADD
Name: W Layne
Determination (Circle Numbers):
1. Classification Retained
2. Classification Changed to: U
3. Contains No DOE Classified Information
4. Contains With:
5. Contains UCAI? NO
6. Comments:
DECLASSIFY

AUG 1 1956
Case No. 690.00
Ref. Sym: 1612 (356)
Project No. TM-422
File: TX-28, 3-2

MR. S. A. MOORE - 1224

Attn: Mr. L. M. Spivey - 1224

Re: Static Test of TX-28 (Internally Carried Version) Front Case and Fin

Summary of Results

The TX-28 front case and fin when tested to 150 per cent design limit load (2760 pounds) simulating air loads showed indication of local yielding around one mounting bracket but held the load without failure. The maximum deflection on the forward outboard edge of the fin was .578 inch and the permanent set was .167 inch. The maximum deflection on the rear outboard edge of the fin was .229 inch and the permanent set was .115 inch.

Object of Test

The object of this test was to test the strength adequacy of the TX-28 front case and attached internal version fin by statically applying simulated air loads on the fin.

Reason for Test

This test was authorized in a Work Order Authorization from Mr. J. H. Davis, 1224, to Mr. T. B. Morse, 1610, Attn: P. H. Adams, 1612, dated May 23, 1956.

Summary of Past Tests

One previous static test has been run on the TX-28 (Internally Carried Version) Front Case and Fin by 1612. This previous test was identical to the test reported in this report except the fin was of a different design and the twist in the case was not measured. The results of this test were published in a memo titled, Static Test of TX-28 (Internally Carried Version) Front Case and Fin from L. J. Woolrich, 1612, to Mr. S. A. Moore, 1224, dated April 18, 1956, Ref. Sym: 1612 (316), Project No. TM-382.

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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."

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CLASSIFICATION CHANGED TO: U
Emelda Selph 8/25/98
PERSON CHANGING MARKING & DATE
W C Layne 8/25/98
PERSON VERIFYING MARKING & DATE
AUTHORITY: W. C. Layne
RECORD ID: 98SN3757
DATED: 8/19/98

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

Setup for Test

I. Figures 1 and 2 are photographs of the test setup. Figure 3 is a sketch showing location of loading holes and dial indicators on the fin.

II. Items tested were one XMC-712, TX-28 forward case (Dwg. No. DS(1326)53282) and one TX-28 fin (Dwg. No. 5Y-117181).

III. The following equipment was used in the test:

1. One Simplex hydraulic jack, capacity 60 tons.
2. One calibrated pull rod, diameter 1 inch, sensitivity .1088 microinches/inch/pound. Serial Letter F.
3. One Baldwin SR-4 strain indicator, Serial No. J-59191.
4. Attaching bolts, plates, channels, and load pads.

IV. The following instrumentation was used:

1. Five Starrett dial indicators, least graduation, .001 inch, range 1.00 inch.
2. Stresscoat was used to detect and observe strain concentrations.

Procedure

The TX-28 front case and fin were mounted to the adapter plate and lock ring (supplied by the consultant) and then mounted to the static jig (Fig. 1). The fin was Stresscoated and dial indicators were mounted to measure deflection of the fin relative to the case at the locations shown in Figs. 1 and 3. The torsional deflection on the case was measured by attaching an aluminum angle to the front case at station 12.25 and placing two dial indicators equidistant from the axial line of the unit and one dial indicator at the center line of the unit to measure vertical deflection (See Fig. 2). These deflections were taken with respect to the floor.

Load was applied with a 60-ton hydraulic jack through a calibrated load cell to a load distribution plate which was connected to two pull bars which in turn were run through two holes drilled in the fins and fastened onto loading pads (Fig. 1). The pull rods were spaced equidistant from the main pull bar to enable equal loads to be placed on the forward and aft load pads.

The initial load was 400 pounds or 21.7 per cent design limit load and each increment of loading was 1.2 times the preceeding increment until 2760 pounds or 150 per cent design limit load was reached. At zero load, zero readings were taken on the dial indicators. Deflection was measured at

each increment of load and after each increment the load was released and zero readings taken. At each increment of load if any Stresscoat cracks appeared they were outlined and numbered to enable the growth of the strain patterns to be recorded.

Results

The TX-28 front case and fin was tested to 150 per cent design limit load (2760 pounds) without failure. Indication of local yielding around one mounting bracket was noted between 78 per cent and 93 per cent design limit load, as the Stresscoat began to flake off (Fig. 4). The permanent set on the forward outboard edge of the fin was .167 inch and the permanent set on the rear outboard edge of the fin was .115 inch.

Table I contains load deflection data for the fin and the front case. Figure 5 contains plots of load vs. deflection for the fin and Fig. 6 is a chart illustrating the twist on the front case. Figures 4 and 7 are photographs of Stresscoat patterns and Table II contains Load Stresscoat data.

Conclusions and Recommendations

The TX-28 front case and fin was structurally adequate to withstand 150 per cent design limit load. This fin was constructed by modifying another type of fin and as a result a sharp corner was left on the outer skin (Fig. 4). This condition is conductive to stress concentrations and this is the location where local yielding occurred.

L. J. WOOLRICH - 1612-2

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

LJW:1612-2:as

Copy to:
T. B. Morse, 1610
W. A. Gardner, 1282
R. E. Fisher, 1621
C. L. Gomel, 5523
R. K. Smeltzer, 7222-2
K. M. Sadler, 7222-3

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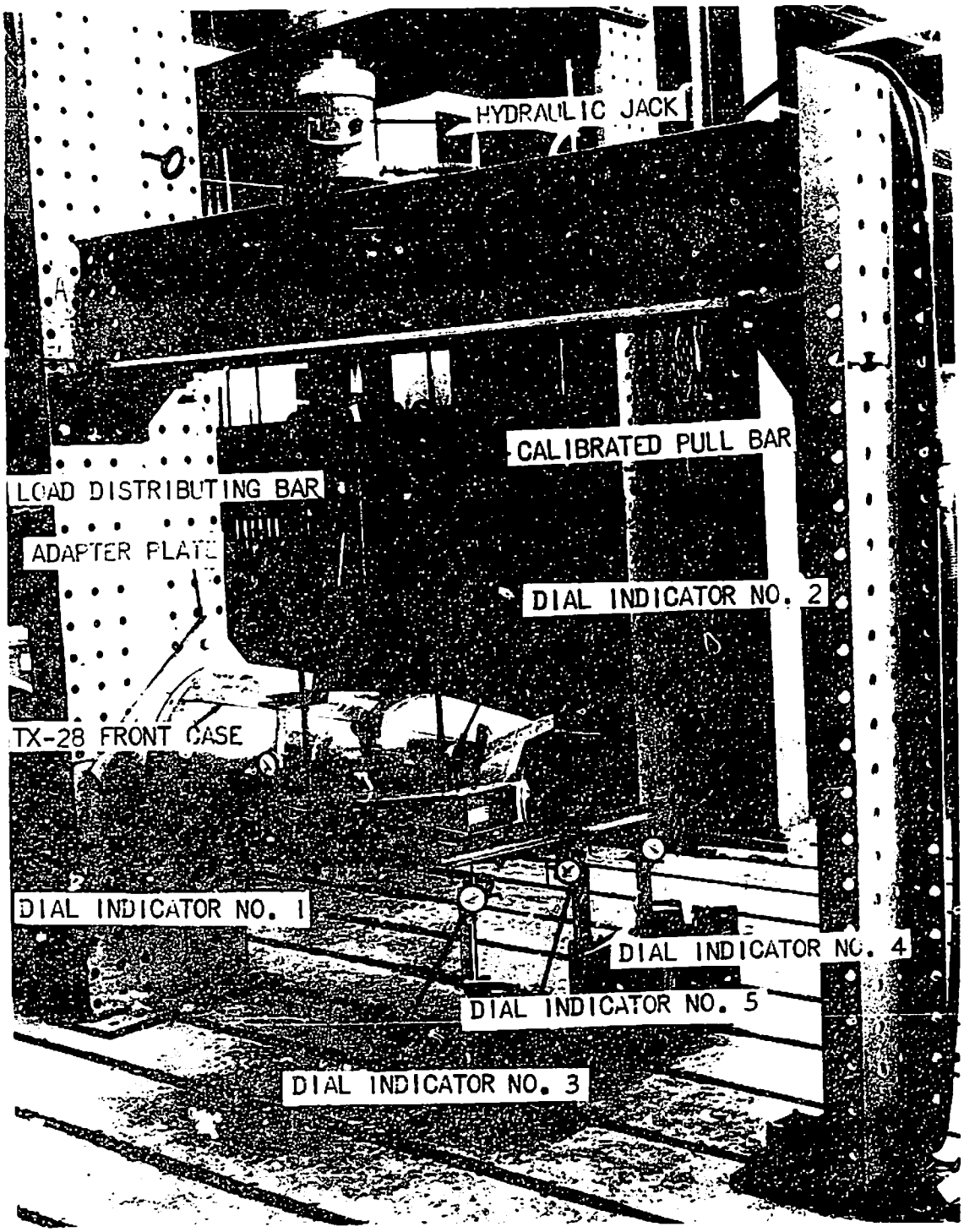

FIG. 1 -- TEST SETUP FOR STATIC TEST OF TX-28 FRONT CASE AND FIN

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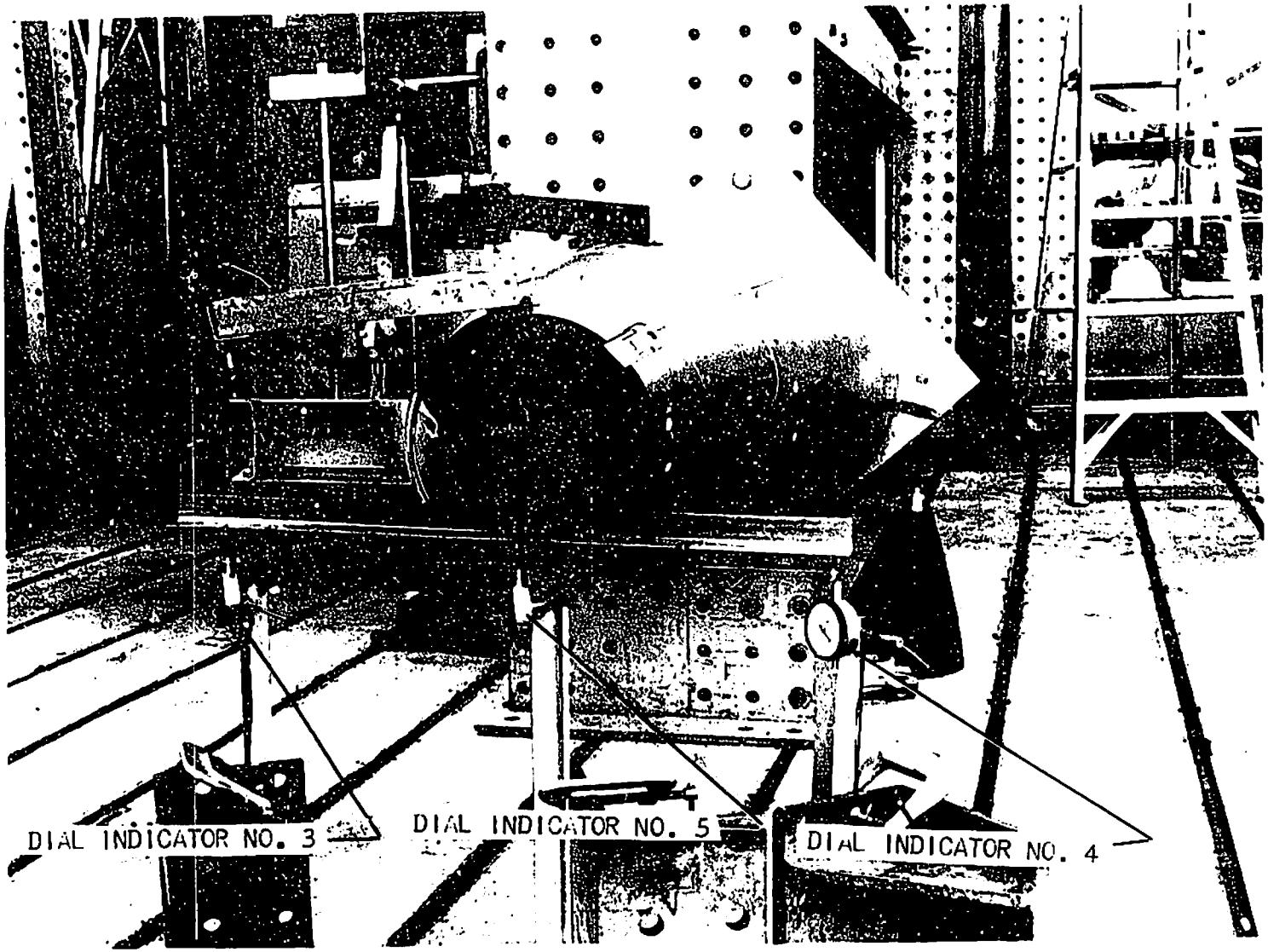

FIG. 2 -- TEST SETUP FOR STATIC TEST OF TX-28 FRONT CASE AND FIN

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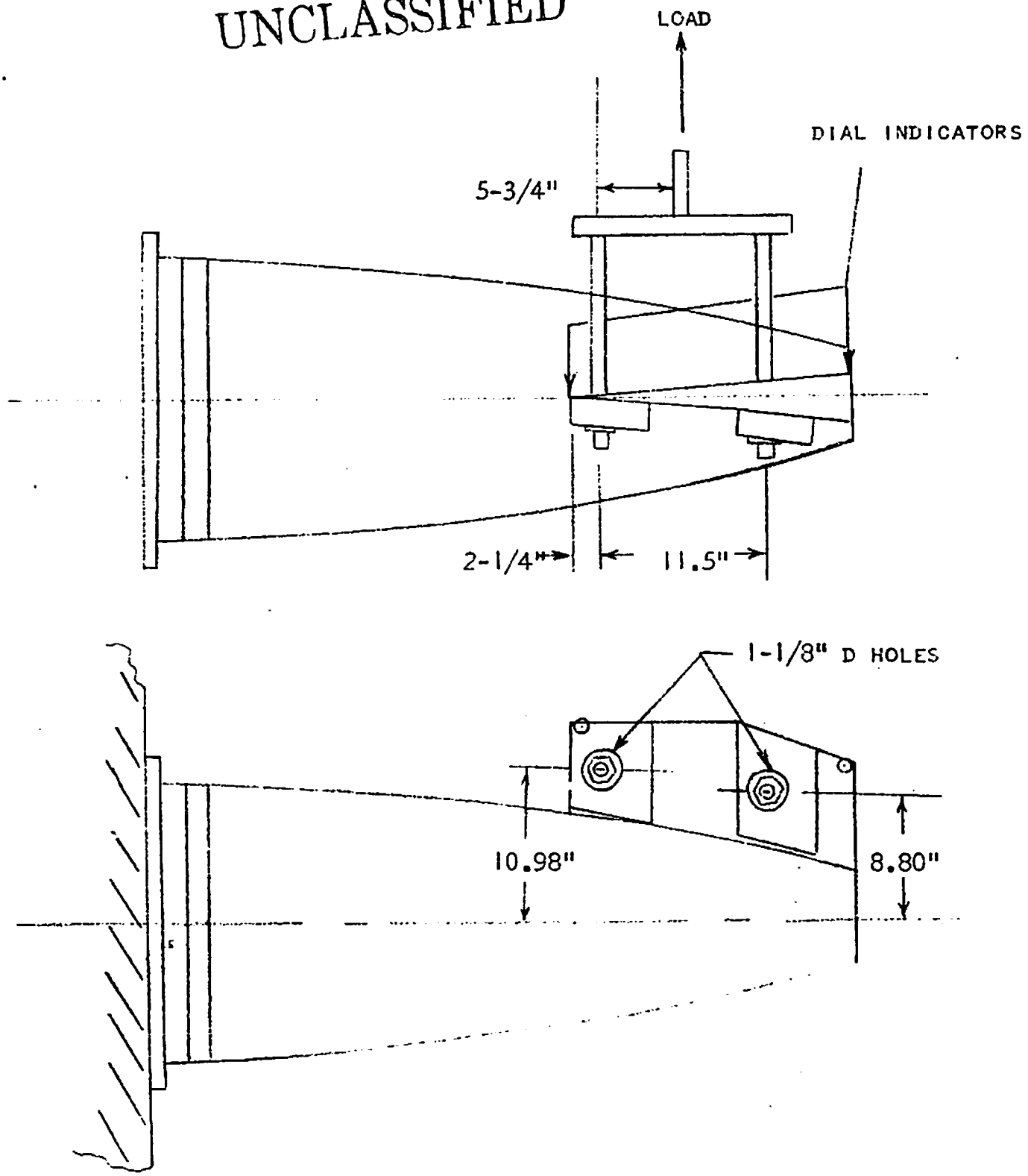

FIG. 3 -- LOCATION OF LOADING APPARATUS AND DRILLED HOLES IN STATIC TEST OF TX-28 FRONT CASE AND FIN

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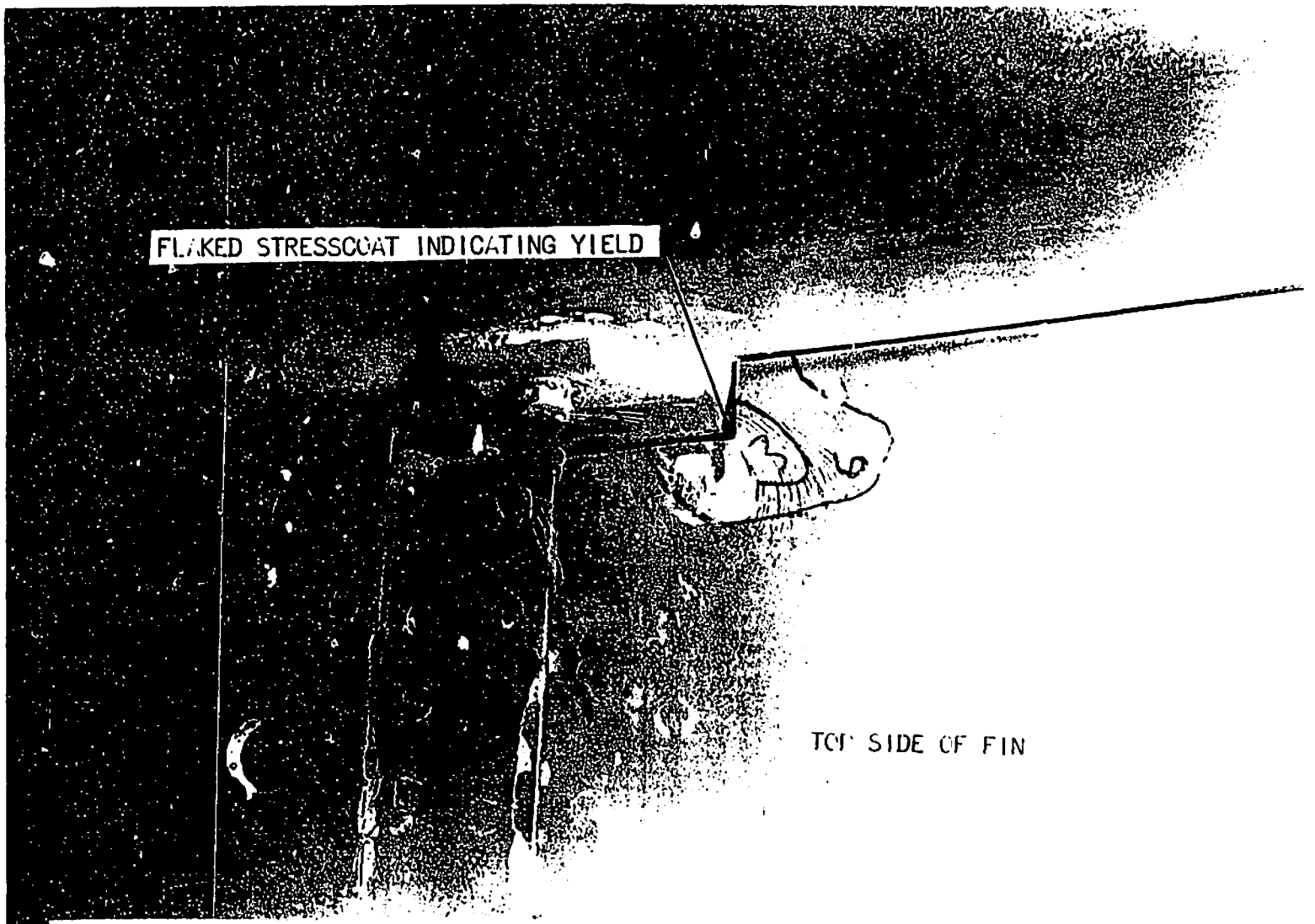

FIG. 4 -- STRESSCOAT PATTERN AND INDICATION OF YIELD AT FIN STATION
TEST OF TX-2 FRONT CASE AND FIN

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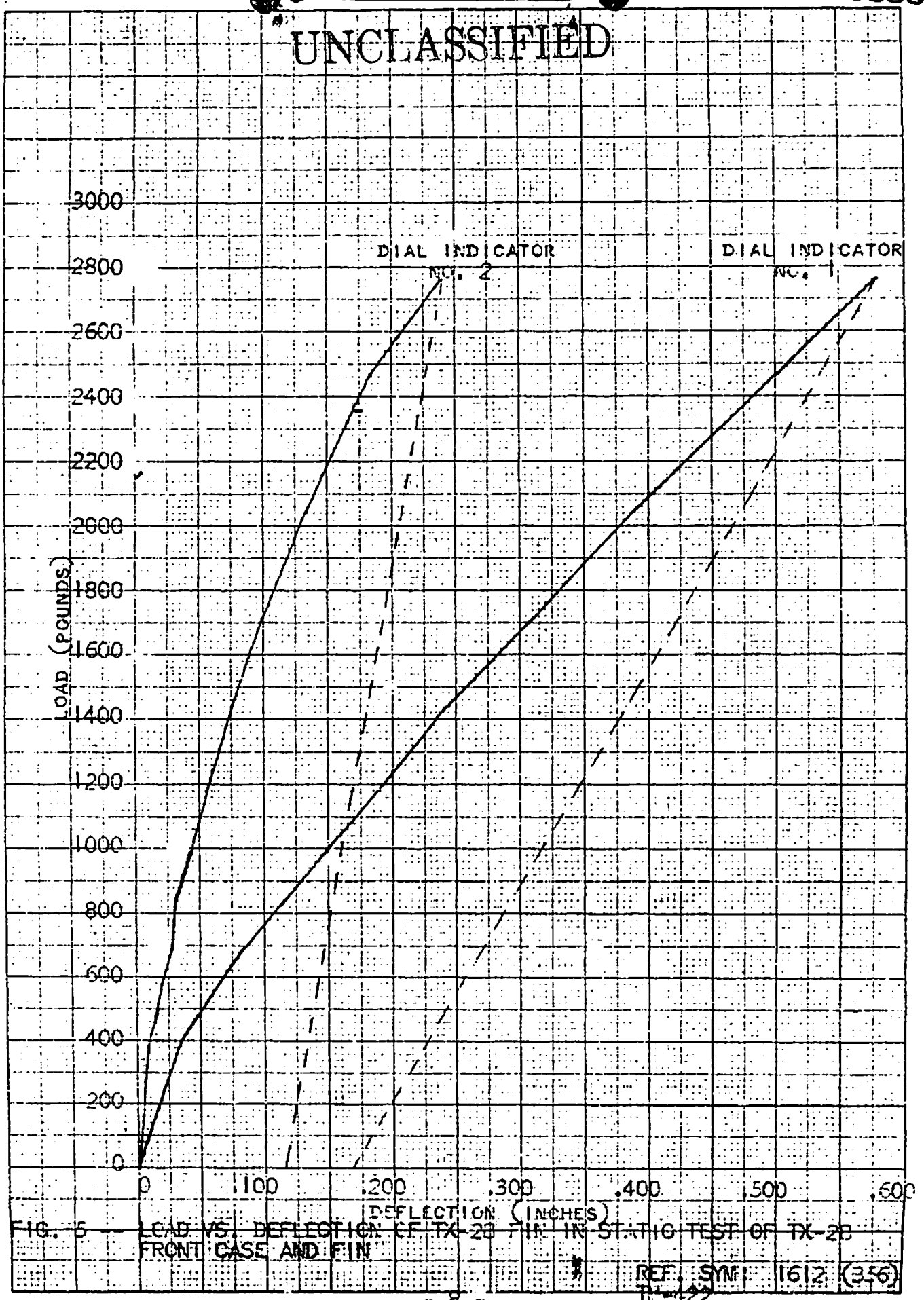

FIG. 6 — LOAD VS. DEFLECTION OF TX-28 FIN IN STATIC TEST OF TX-28 FRONT CASE AND FIN

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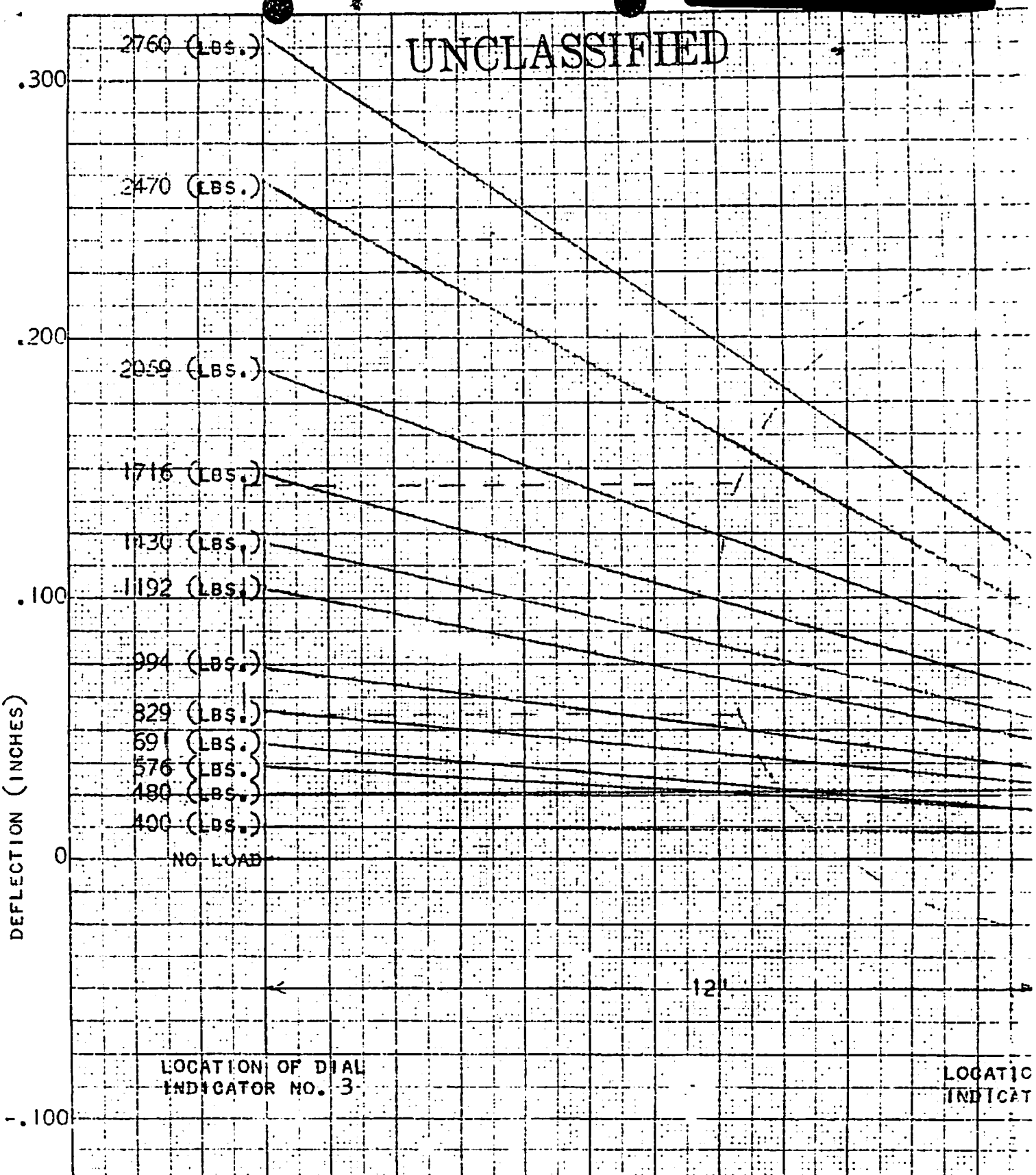

FIG. 6 -- LOAD-DEFLECTION DIAGRAM SHOWING TORSION IN TX-28 FRONT CAS

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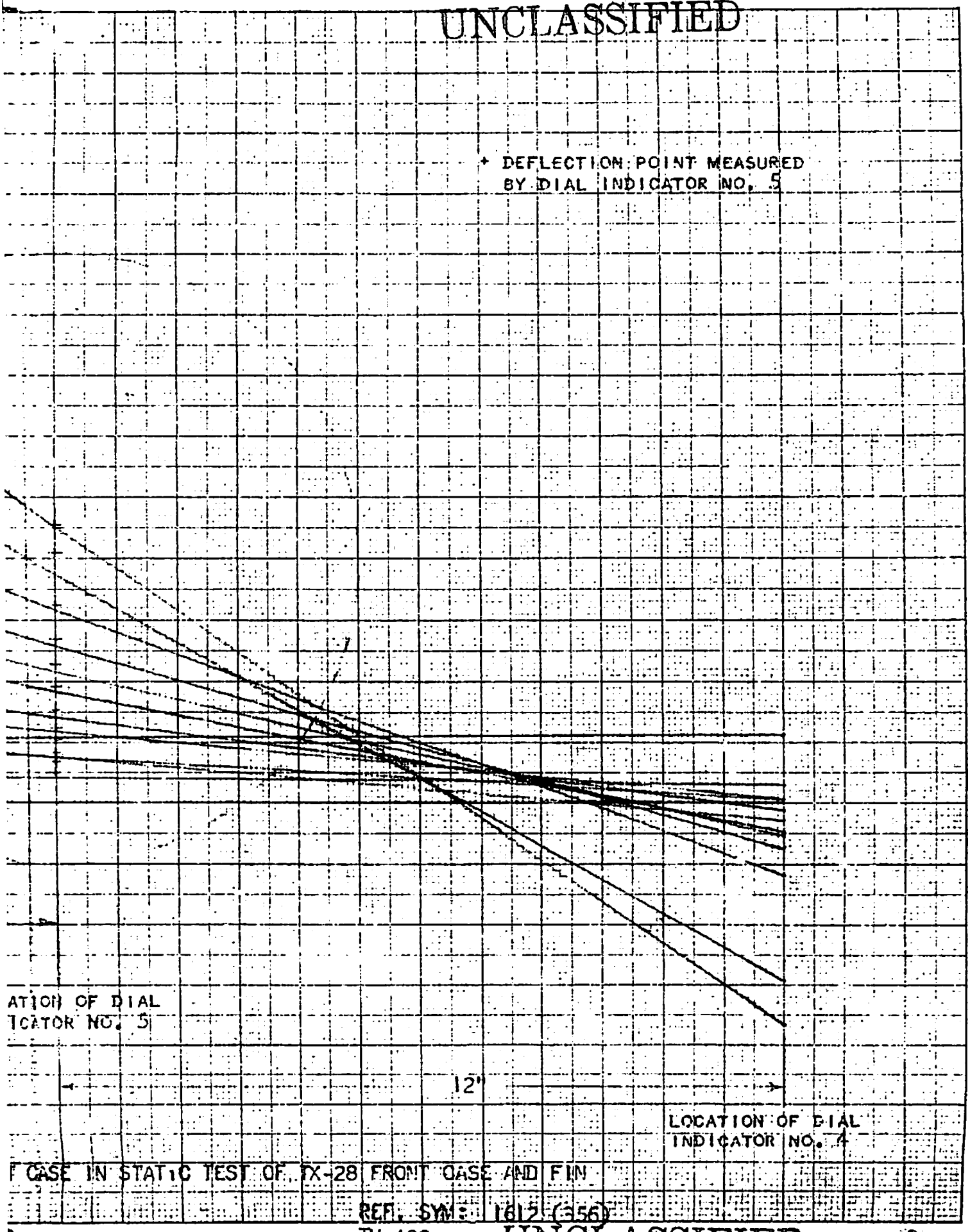

F CASE IN STATIC TEST OF TX-28 FRONT CASE AND FIN

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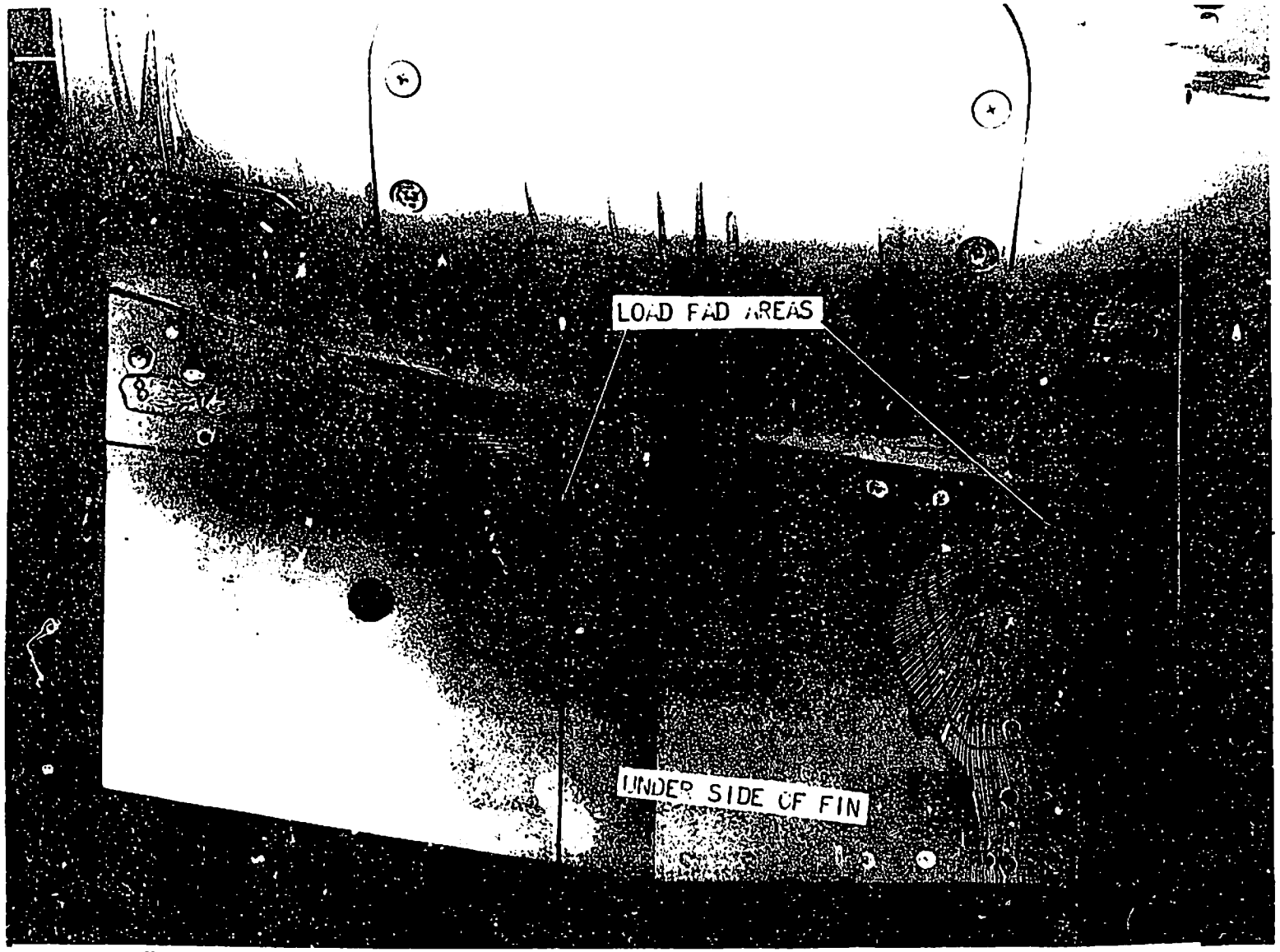

FIG. 7 -- STRESSCOAT PATTERNS AND LOAD PAD AREAS IN STATIC TEST OF TIP FROM WING AND FIN

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TABLE I

LOAD-DEFLECTION DATA IN STATIC TEST OF TX-28 FRONT CASE AND FIN

Deflection (Inches)

Load (Pounds)	Dial Indicator No. 1	2	3	4	5
0	0	0	0	0	0
400	.035	.008	.013	.007	- .012
0	.004	.002	.001	-.001	.002
480	.049	.013	.026	.028	.016
0	.007	.002	.009	.007	.003
576	.065	.018	.037	.001	.021
0	.009	.004	.013	-.012	.003
691	.085	.026	.045	-.007	.026
0	.014	.006	.016	-.013	.003
829	.114	.032	.057	.001	.031
0	.022	.009	.019	-.015	.004
994	.149	.043	.074	-.003	.038
0	.027	.011	.026	-.020	.005
1192	.191	.057	.104	-.012	.048
0	.039	.016	.044	-.032	.007
1430	.246	.076	.122	-.013	.057
0	.051	.023	.051	-.037	.009
1716	.311	.099	.148	-.018	.068
0	.065	.031	.065	-.045	.010
2059	.391	.135	.188	-.029	.082
0	.080	.046	.083	-.062	.012
2470	.510	.184	.265	-.073	.102
0	.122	.072	.147	-.113	.018
2760	.578	.229	.317	-.091	.114
0	.167	.115	.200	-.153	.041

NOTE: Positive numbers indicate upward deflection.
Negative numbers indicate downward deflection.

TABLE II

LOAD STRESSCOAT PATTERN DATA IN STATIC TEST OF TX-28 FRONT CASE AND FIN

Percentage of Design Limit Load	Stresscoat Patterns (Figs 4 and 7)
0	No Cracks
21.7	No Cracks
26.1	No Cracks
31.3	Cracks enclosed in outline No. 1
37.6	Cracks enclosed in outline No. 2
45.1	Cracks enclosed in outline No. 3
54.0	Cracks enclosed in outline No. 4
64.8	Cracks enclosed in outline No. 5
77.7	Cracks enclosed in outline No. 6
93.2	Cracks enclosed in outline No. 7
112.0	Cracks enclosed in outline No. 8
134.2	Cracks enclosed in outline No. 9
150.0	Cracks not enclosed in outlines

NOTE: Threshhold sensitivity or sensitivity at which Stresscoat will crack was 1100 microinches per inch up to 45.1 per cent design limit load and 1200 microinches per inch thereafter.