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FEB 17 1960

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TX-43, 3-2
Project No. T-16331
Case No. 734.00

TO: DISTRIBUTION

Re: Static Tests of TX-43 Lugs, Inserts and Case Sections

Summary of Test

Four TX-43 suspension lugs attached to case sections were tested to 200% limit load or to destruction under two loading conditions. In each loading condition two loads were applied simultaneously to the lug, a longitudinal load and a transverse load. The longitudinal load PX and the transverse load PZ were the following when the lug and case section failed.

	PX(lbs)	PZ(lbs)
Lug and Case Section No. 1	28,000	38,860
Lug and Case Section No. 2	9,500	53,800
Lug and Case Section No. 3	28,000	36,900
Lug and Case Section No. 4	9,500	55,000

Object of Test

The object of this test was to determine if the suspension lugs of the TX-43 weapon would safely withstand the loads to which they would be subjected while the weapon is attached to an aircraft. Loads were to be applied to 200% of limit load or to failure. Load conditions were furnished by the consultant.

Authorization for Test

This test was authorized by a Work Order from Mr. George W. Randle, 1222-2, to A. W. Reger, 1613, dated April 30, 1959. The requesting organizations consultant was Mr. C. E. Miller.

Test Equipment and Instrumentation

The items tested were four aluminum case sections (Dwg. No. 142249 - test sections cut from case, impact extruded) with steel inserts (Dwg. No. 140969, Issue A, with 3.000 - 12 UN - 3A threads 0.0 and 2.500 -12 UN -38 threads 1.0). Two TX-43 standard lugs (Dwg. No. 125301) and two TX-43 long lugs, (Dwg. No. 146987).

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The equipment used in this test is listed below:

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2 - Simplex hydraulic rams - 60 ton capacity
2 - Calibrated load links
2 - Baldwin SR-4 load links

PROGRAM 04380 CATEGORY 30233 ORG. 000 DATE 6013

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
Determination (Circle Numbers)
1. Classification Retained
2. Class Section Changed to UNCL
3. Contains No DOE Classified Information
4. Coordinate With:
5. Contains UCAI?
Name: Release

1st Review Date: 6/10/98
Authority: RB Cramer
2nd Review Date: 6-16-98
Authority: WC Layne
Name:

CLASSIFICATION CHANGED TO: U
Emilda Selph 6/17/98
PERSON CHANGING MARKING & DATE
WC Layne 6/17/98
PERSON VERIFYING MARKING & DATE
W. C. Layne
RECORD ID: 98SN2422
DATED: 6/16/98

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The instrumentation used in this test is listed below:

Two Starrette Dial Indicators, least graduation .001 inch.

Procedure

The case section was attached to the static jig by means of a contoured adapter plate furnished by the consultant. A transverse load PZ and a longitudinal load PX were applied simultaneously to the lug as shown in Fig. 1. Four case sections and lugs were tested by loading in this manner. Two loading conditions were used and the loading sequence for each loading condition is listed in Tables I and II. Case section and lug 1 and 3 were tested under condition A and case section and lug 2 and 4 were tested under condition B. Two dial indicators were used to measure deflections in the tests of the third and fourth lug and case section. (See Fig. 1 for dial indicator locations). The case sections and lugs were loaded until 200% limit load was reached or failure occurred.

Results

The four TX-43 lug and case sections failed at the following loads when loaded under loading conditions A and B (See Tables I and II).

Lug and Case Section	PX(lbs)	PZ(lbs)	Condition
No. 1	28,000	38,860	A
No. 2	9,500	53,800	B
No. 3	28,000	36,900	A
* No. 4	9,500	55,000	B

* Long Lug.

Location of loading points and dial indicators are shown in Fig. 1. Tables III and IV are a list of loads vs. deflection for lugs and case section Nos. three and four. Figs. 2 and 3 are photographs of the failures in lug and case sections 1, 2, 3, and 4. Some tensile specimens were cut from the same case as the four case sections used in this test. Three specimens were cut from the case in the longitudinal direction and three were cut in the transverse direction. The results of the test on those tensile specimens are listed below.

Longitudinal Cut Specimens

Specimen No.	Area (in^2)	Ultimate Strength (psi)	Yield Strength (psi)	% Elongation 2 inch gap length
1	.2	76,000	66,250	15.7
2	.2	75,000	66,250	15.0
3	.198	75,600	65,600	14.5

Transverse Cut Specimens

Specimen No.	Area (in^2)	Ultimate Strength (psi)	Yield Strength (psi)	% Elongation 2 inch gap length
1	.1	76,000	71,000	5.1
2	.1	76,000	71,000	4.0
3	.1	75,500	71,000	3.8

L. J. Woolrich
L. J. WOOLRICH - 1612-1

1613 Project Engineer: D. W. BAUDER - 1613-3

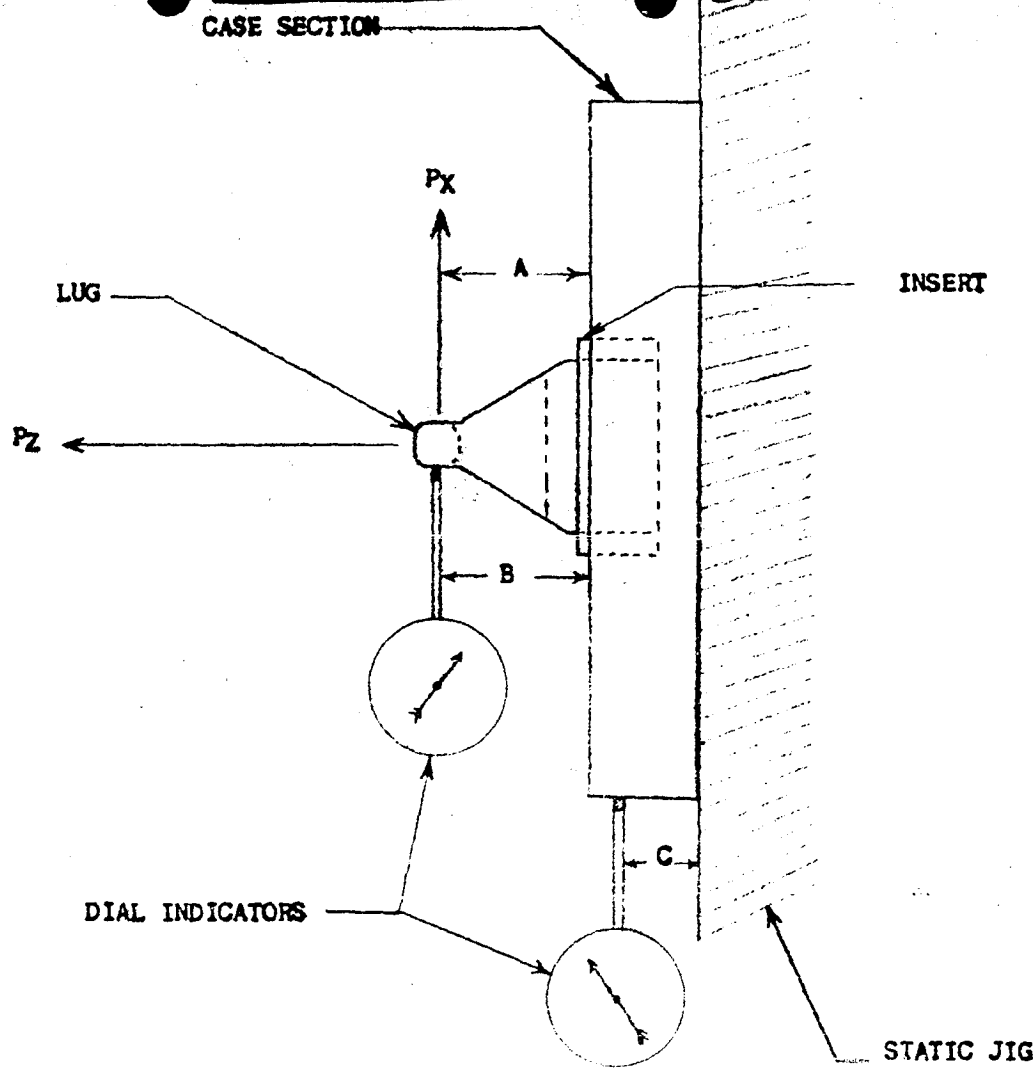
Approved by: R. S. HOOPER - 1613-3

LJW:1612-1:ec

Enc: Figures 1, 2, 3
Tables I thru IV

Copy to:

L. A. Dunn, 1222
Attn: C. E. Miller
W. A. Gardner, 1610
D. M. Bruce, 1282
J. M. Hiesen, 1592
J. R. Harrison, 5523
R. K. Smeltzer, 3421-3



LUG AND CASE SECTION	A(INCHES)	B(INCHES)	C(INCHES)
NO. 1	1 5/8		
NO. 2	1 5/8		
NO. 3	1 5/8	1 5/8	1/2
NO. 4	2 3/32	1 5/16	1/2

NOTE: NO DIAL INDICATORS WERE USED ON LUGS 1 & 2.

FIGURE 1 - LOCATION OF DIAL INDICATORS AND LOADS IN STATIC TEST OF TX-43 LUGS, INSERTS AND CASE SECTIONS.

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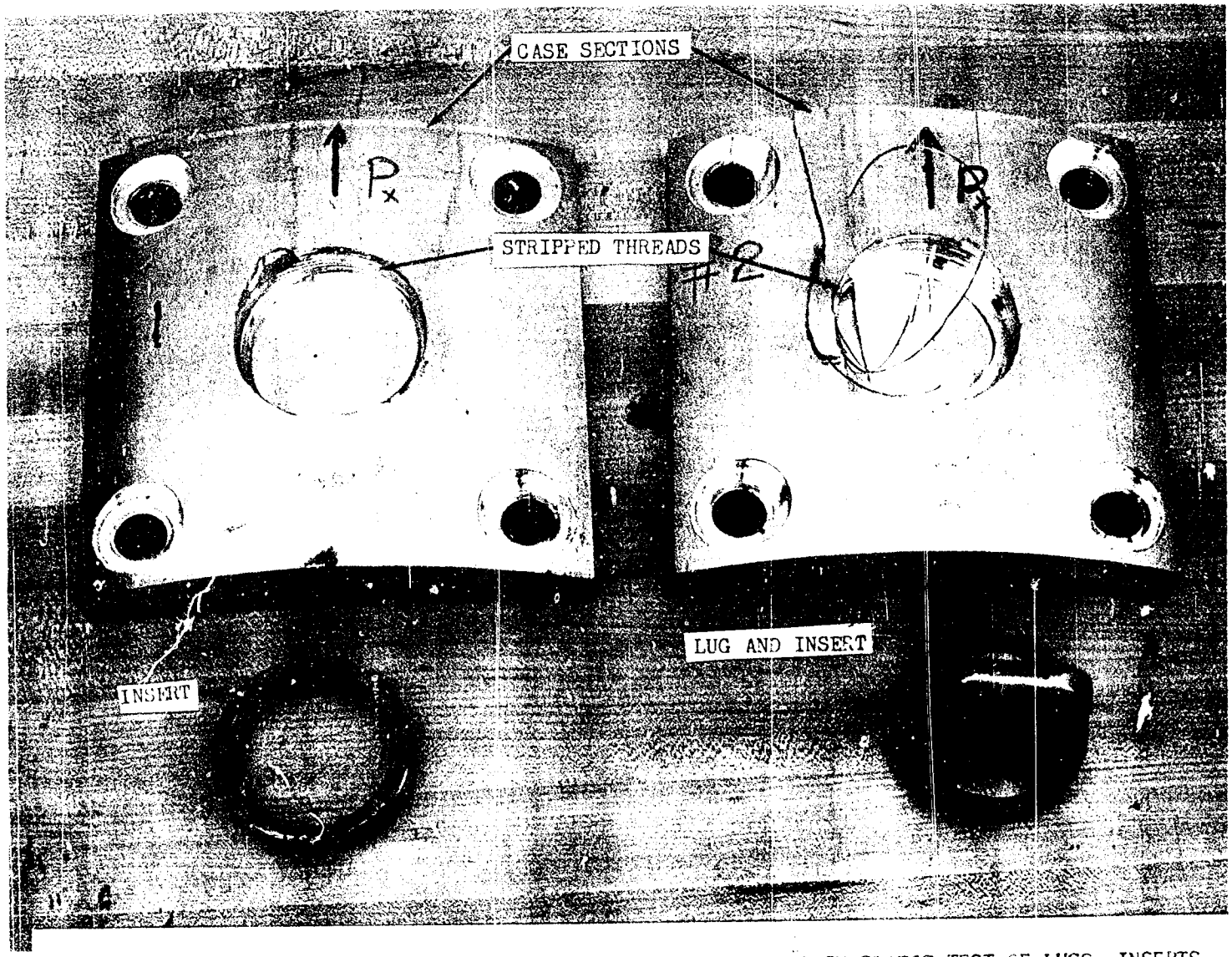

FIGURE 2 - FAILURE FOR LUG AND CASE SECTIONS NOS. 1 AND NO. 2 IN STATIC TEST OF LUGS, INSERTS AND CASE SECTIONS

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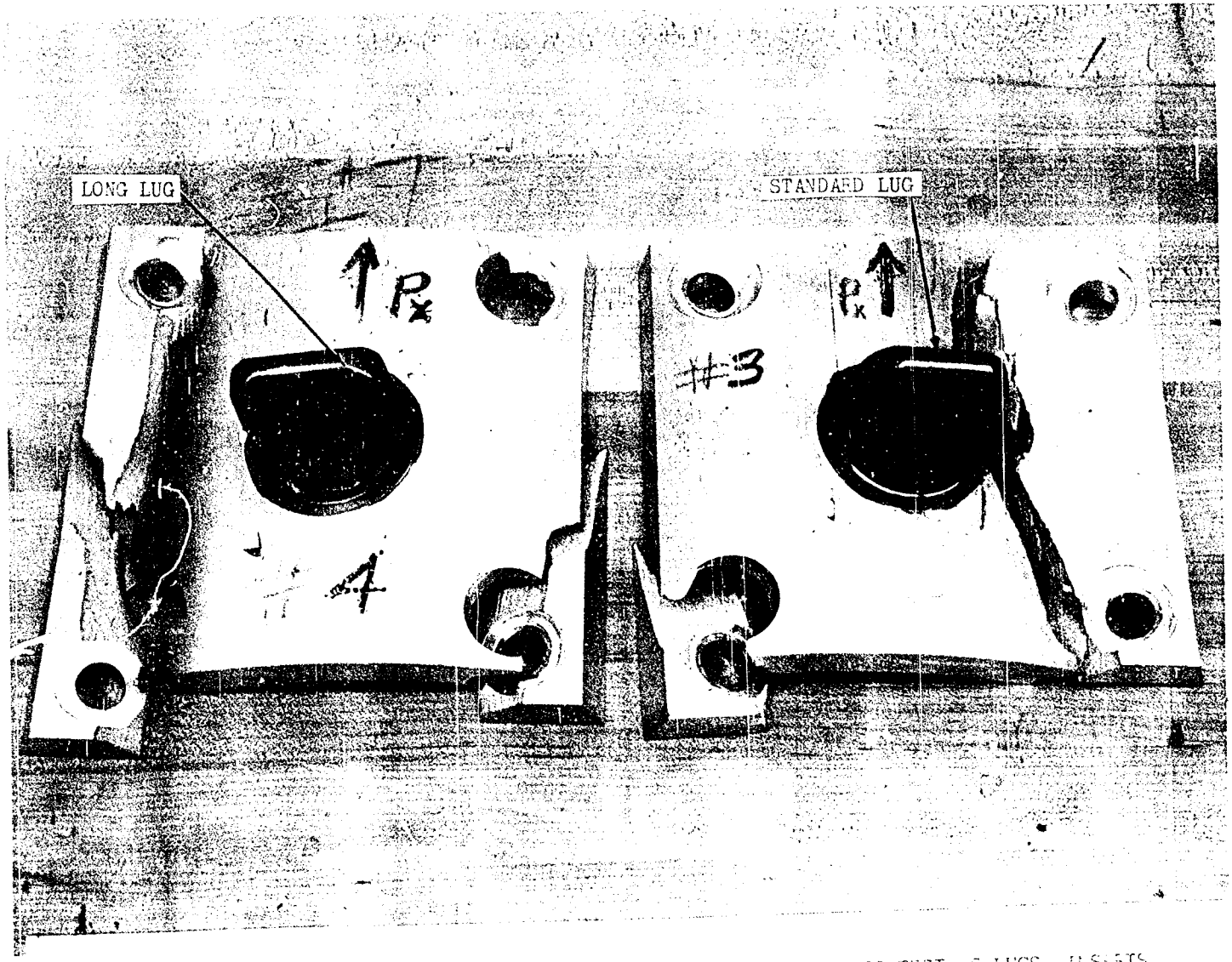

FIGURE 3 - FAILURE FOR LUG AND CASE SECTION NO. 3 AND NO. 4 IN STATIC TEST OF LUGS, INSERTS AND CASE SECTIONS

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TABLE I - LOADING INCREMENTS FOR CONDITION A IN STATIC TEST OF TX-43 LUGS, INSERTS AND CASE SECTIONS

LOADING CONDITION A

% LIMIT LOAD		LOAD IN LBS.	
P_Z	P_X	P_Z	P_X
50	33	9715	9335
0	0	0	0
100	62	19431	14000
0	0	0	0
100	100	19431	18671
110	100	21375	18670
120	100	23320	18670
0	0	0	0
130	100	25260	18670
140	100	27200	18670
150	100	29150	18670
0	0	0	0
150	110	29150	20540
150	120	29150	22405
0	0	0	0
150	130	29150	24270
150	140	29150	26140
150	150	29150	28000
0	0	0	0
160	150	31090	28000
170	150	33030	28000
0	0	0	0
180	150	34975	28000
190	150	36920	28000
200	150	38860	28000
0	0	0	0
200	160	38860	29870
200	170	38860	31740
200	180	38860	33600
0	0	0	0
200	190	38860	35470
200	200	38860	37340
0	0	0	0

TABLE II-LOADING INCREMENTS FOR CONDITION B IN STATIC TEST OF TX-43 LUGS, INSERTS AND CASE SECTIONS

LOADING CONDITION B

% LIMIT LOAD	LOAD IN LBS.	
$P_Z = P_X$	P_Z	P_X
50	18,690	3165
0	0	0
100	37,384	6329
0	0	0
120	44,860	7595
0	0	0
130	48,600	8230
140	52,340	8860
150	56,080	9495
0	0	0
160	59,810	10,125
170	63,550	10.760
0	0	0
180	67,290	11,390
190	71,030	12,025
200	74,770	12,660
0	0	0

TABLE III - LOAD DEFLECTION DATA FOR THE TEST OF LUG AND CASE SECTION NO. 3 IN STATIC TEST OF TX-43 LUGS, INSERTS AND CASE SECTIONS

LOAD CONDITION A

LOAD Pz	% LIMIT LOAD Px	LOAD (LBS) Pz	LOAD (LBS) Px	Deflection (inches) 1	See Figure for Dial Indicator Locations 2
0	0	1500	500	.000	.000
50	33	9700	9300	.153	.119
100	62	19,400	14,000	.214	.137
0	0	1500	500	.079	.082
100	100	19,400	18,700	.214	.148
110	100	21,400	18,700	.214	.148
120	100	23,300	18,700	.214	.148
0	0	1500	500	.087	.086
130	100	25,300	18,700	.214	.148
140	100	27,200	18,700	.214	.149
150	100	29,200	18,700	.214	.149
0	0	1500	500	.000	.091
150	110	29,200	20.500	.182	.149
150	120	29,200	22,400	.192	.153
150	130	29,200	24,200	.203	.156
150	140	29,200	26,100	.214	.159
150	150	29,200	28,000	.227	.163
0	0	1500	500	.018	.095
160	150	31,100	28,000	.254	.169
170	150	33,000	28,000	.265	.170
0	0	1500	500	.038	.100
180	150	35,000	28,000	.274	.171
190	150	36,900	28,000	.287	.173

NOTE: Zero readings were taken with a PX load of 500 lbs. and a PZ load of 1500 lbs. in order to eliminate the free play in the loading and measuring arrangement.

TABLE IV - LOAD DEFLECTION DATA FOR THE TEST OF LUG AND CASE SECTION NO. 4 IN STATIC TEST OF TX-43 LUGS, INSERTS AND CASE SECTIONS

LOAD CONDITION B

% LIMIT LOAD PZ	% LIMIT LOAD PX	LOAD (LBS) PZ	LOAD (LBS) PX		Deflection (inches) 1	See Figure for Dial Indicator Locations 2
0	0	1500	500		.000	.000
50	50	18,700	3200		.093	.091
100	100	37,400	6300		.129	.141
0	0	1500	500		.084	.077
120	120	44,900	7600		.123	.176
130	130	48,600	8200		.126	.178
0	0	1500	500		.093	.086
140	140	52,300	8900		.141	.175
147	150	55,000	9500	Failure	.151	.176

NOTE: Zero readings were taken with a PX load of 500 lbs. and a PZ load of 1500 lbs. in order to eliminate the free play in the loading and measuring arrangement.

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