



A. V. ROE CANADA LIMITED
MALTON - ONTARIO

TECHNICAL DEPARTMENT (Aircraft)

UNCLASSIFIED

AIRCRAFT: C105

REPORT NO. 7-0500-9

FILE NO. Classification cancelled/changed to.....

NO. OF SHEETS

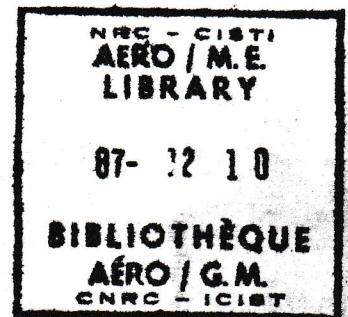
by authority of.....(date).....

TITLE: Signature.....Rank.....

SECTION 1

RESULTS FROM RT 08-265

STATIC & FATIGUE STRENGTHS
OF CUTT JOINTS



SECTION 2

RESULTS FROM RT-08-276

STATIC & FATIGUE STRENGTHS
OF SKIN SPLICES

PREPARED BY E.J. SMITH

NOV. 1965
DATE 8 APRIL '66

CHECKED BY

DATE

SUPERVISED BY

DATE

APPROVED BY

DATE

ISSUE NO.	REVISION NO.	REVISED BY	APPROVED BY	DATE	REMARKS

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AVRO AIRCRAFT LIMITED
MALTON - ONTARIO

TECHNICAL DEPARTMENT

REPORT No _____

SHEET No _____

PREPARED BY _____

E.J. SMITH

CHECKED BY _____

DATE _____

13 APRIL '56

DATE _____

AIRCRAFT:

C 105

RT-08-265

SECTION I

STATIC & FATIGUE STRENGTHS
OF BUTT JOINTS

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ASSEMBLY OF TEST PIECE

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1.4.0

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TECHNICAL DEPARTMENT (Aircraft)

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SHEET NO. 1.1.0

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AIRCRAFT:

C105

RT OK-265

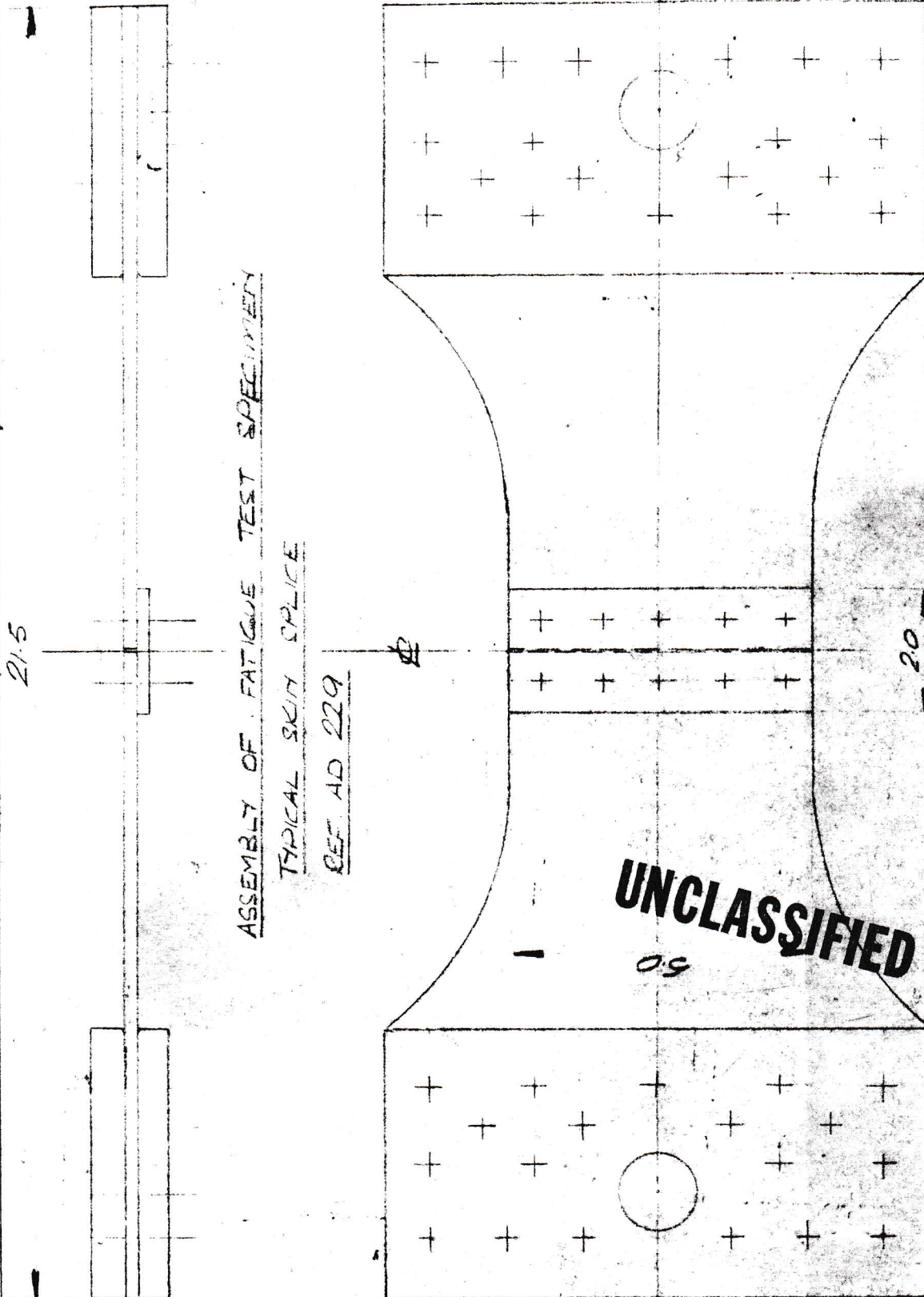
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TECHNICAL DEPARTMENT (Aircraft)

REPORT NO.

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1.2.0.

AIRCRAFT:

C 105

RT 08-26

PREPARED BY

DATE

F. T. SMITH

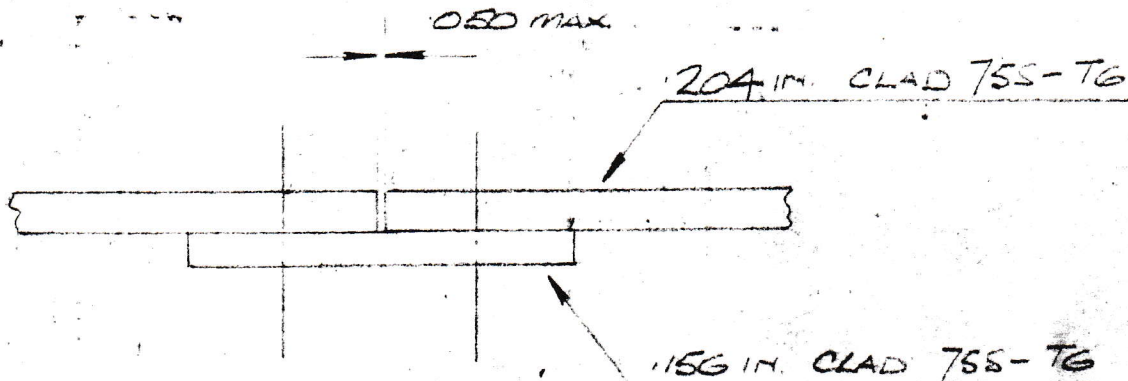
25 NOV '54

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DETAILS OF JOINT TESTED
FOR SPECIMENS 1 TO 45



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MALTON - ONTARIO

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REPORT NO. _____

SHEET NO. 1.2.1.

AIRCRAFT:

C105RT OR - 263

PREPARED BY

E.J. SMITH

DATE

25 NOV '55

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DATE

DETAILS OF JOINT TESTED
FOR SPECIMENS 1 TO 45SPECIMEN NO. 1-9NAS COUNTERSUNK BOLT, 1/4" DIA.
NAS 334 P AG-5SPECIMEN NO. 10-18HUCK COUNTERSUNK LOCK BOLT, 1/4" DIA.
IN ALUMINUM ALLOY (758).
ALP 509-H-EB-6SPECIMEN NO. 19-27HUCK COUNTERSUNK LOCK BOLT, 1/4" DIA.
IN STEEL
ALP 509-H-T8-6SPECIMEN NO. 28-36DEUTSCH STEEL DRIVE PIN COUNTERSUNK
BLIND RIVET, 1/4" DIA.
6950-S-08-6SPECIMEN NO. 37-45DEUTSCH STEEL DRIVE PIN COUNTERSUNK
BLIND RIVET, 1/4" DIA.
6950-S-08-5

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05 NOV. 54

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DATE

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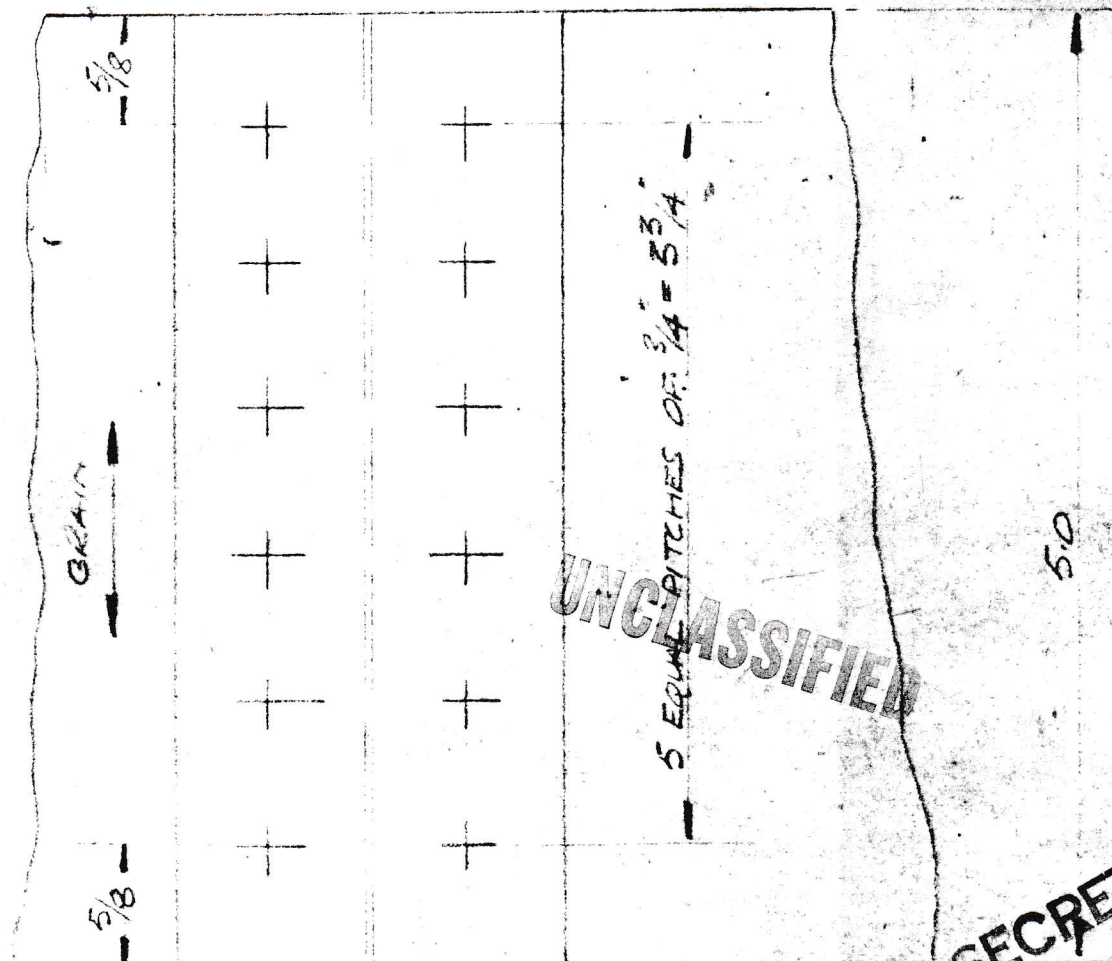
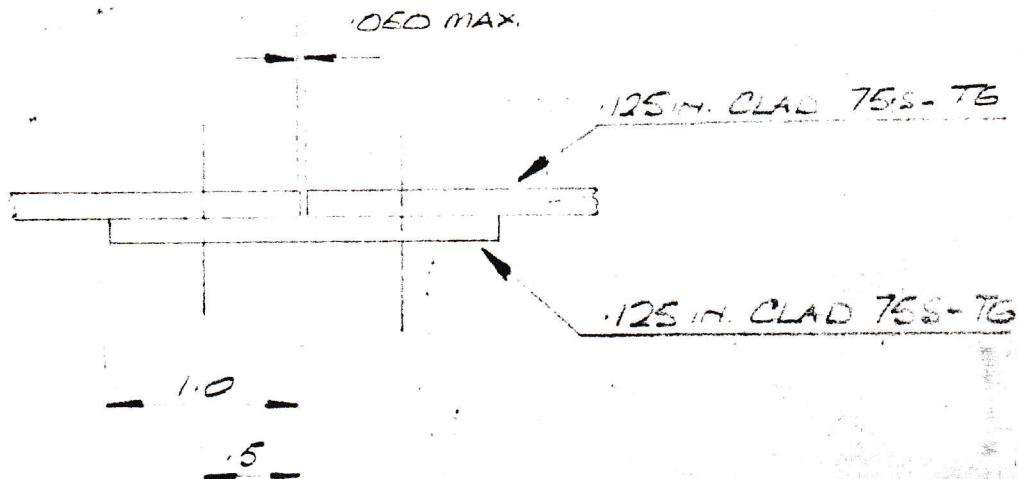
C 105

RT 08-065

DETAILS OF JOINT TESTED

FOR SPECIMENS 46-62

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AIRCRAFT:

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RT 08-265

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DETAILS OF JOINT TESTED
FOR SPECIMENS 46-63

SPECIMEN NO. 46-54

STEEL JO-BOLTS, COUNTERSUNK, $\frac{3}{16}$ " DIA.
F 200 - 4

SPECIMEN NO. 56-63

ALUMINUM JO-BOLTS, COUNTERSUNK, $\frac{3}{16}$ " DIA.
FA 200 - 4

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AIRCRAFT:

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RT-08-265

PREPARED BY

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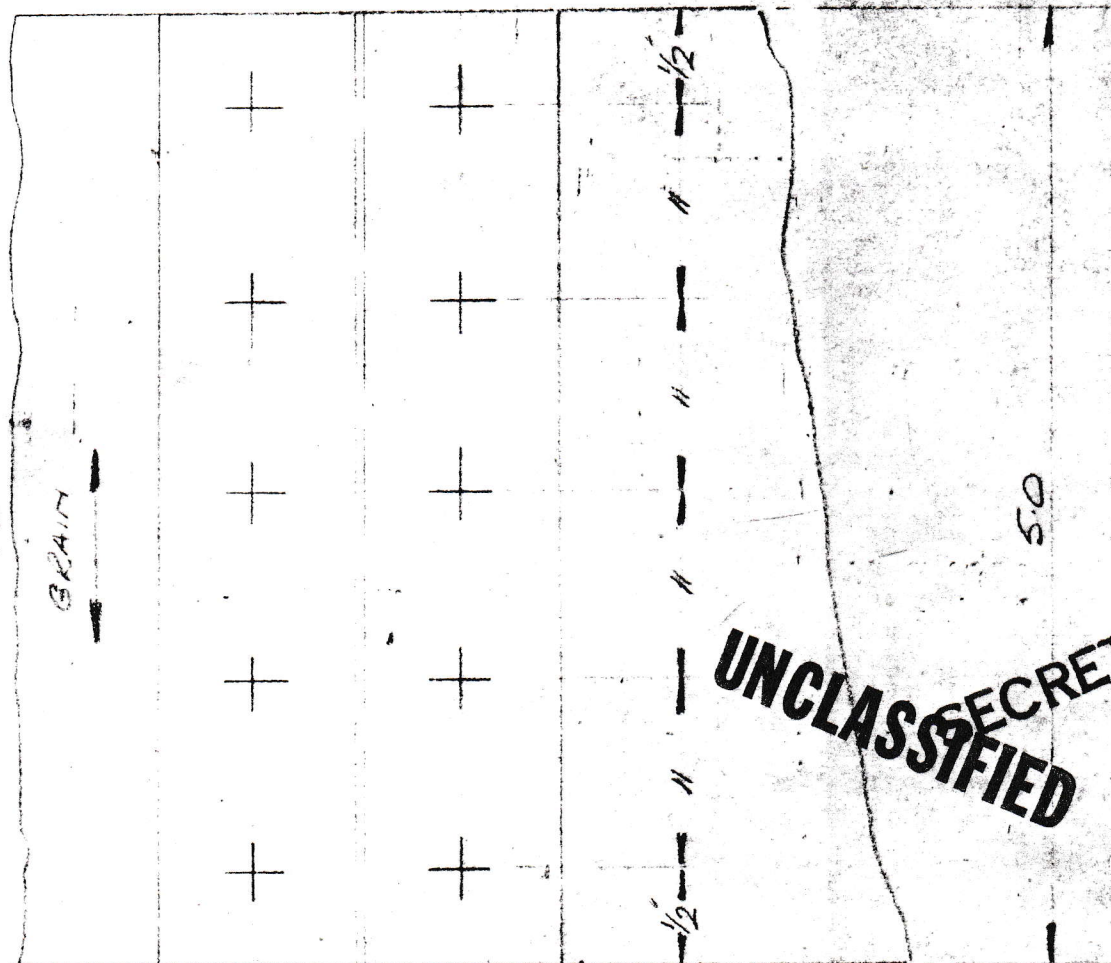
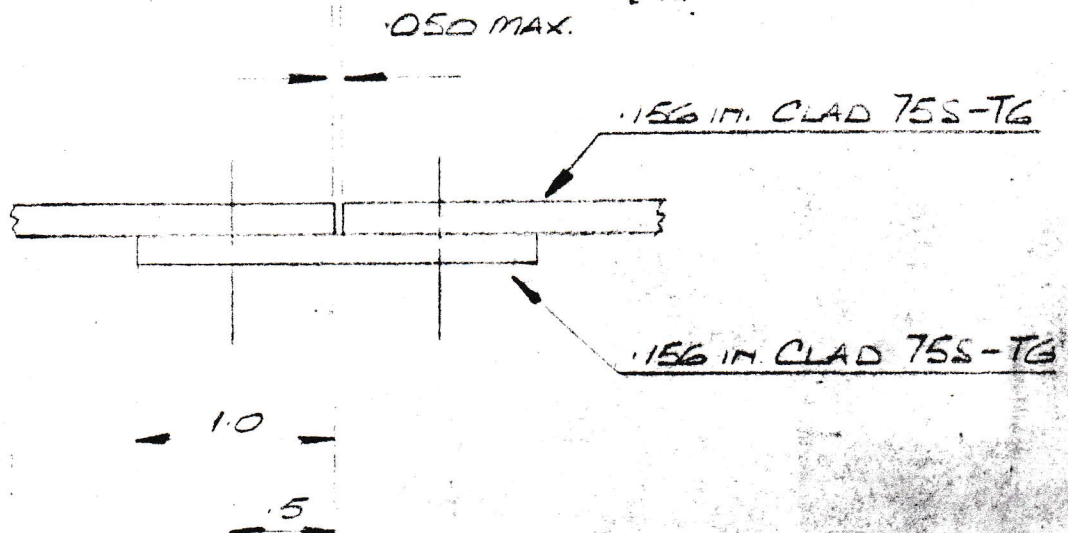
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DETAILS OF JOINT TESTED
FOR SPECIMENS 64-81



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25 NOV 55

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AIRCRAFT:

C105RT08-265DETAILS OF JOINT TESTED
FOR SPECIMENS 64-81SPECIMEN NO. 64-72STEEL JO-BOLTS, COUNTERSUNK, 1/4" DIA.
F 260 - 5SPECIMEN NO 73-81ALUMINUM JO-BOLTS, COUNTERSUNK, 1/4" DIA.
FA 260 - 5UNCLASSIFIED
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RT08-265

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DETAILS OF JOINT TESTED
SPECIMENS 82 - 90

ALL CONNECTIONS
BY 1/4 CSK. BOLT
NAS 334 P AG-5

032 CH. M. STEEL

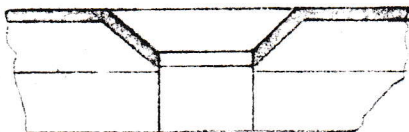
053 MAX.

QRS 685

HT TO 150000

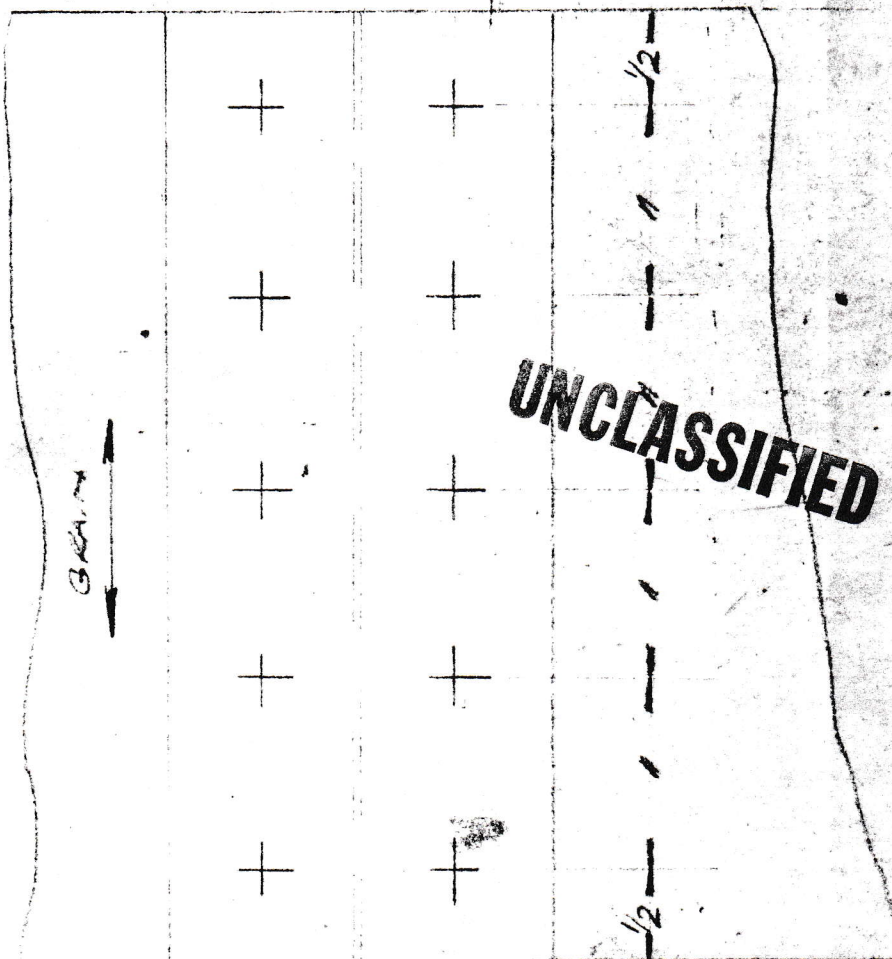
156 CLAD 75S-TG

156 CLAD 75S-TG



10

15



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28 NOV. '55

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AIRCRAFT:

C 105KT08-205DETAILS OF JOINT TESTED
FOR SPECIMENS 91-99

ALL CONNECTIONS

BY $\frac{1}{4}$ " CSK. BOLT

NAS 334 P AG-5

1050

MAX.

.125 IN CLAD 755-T6

.072 CH IN STEEL

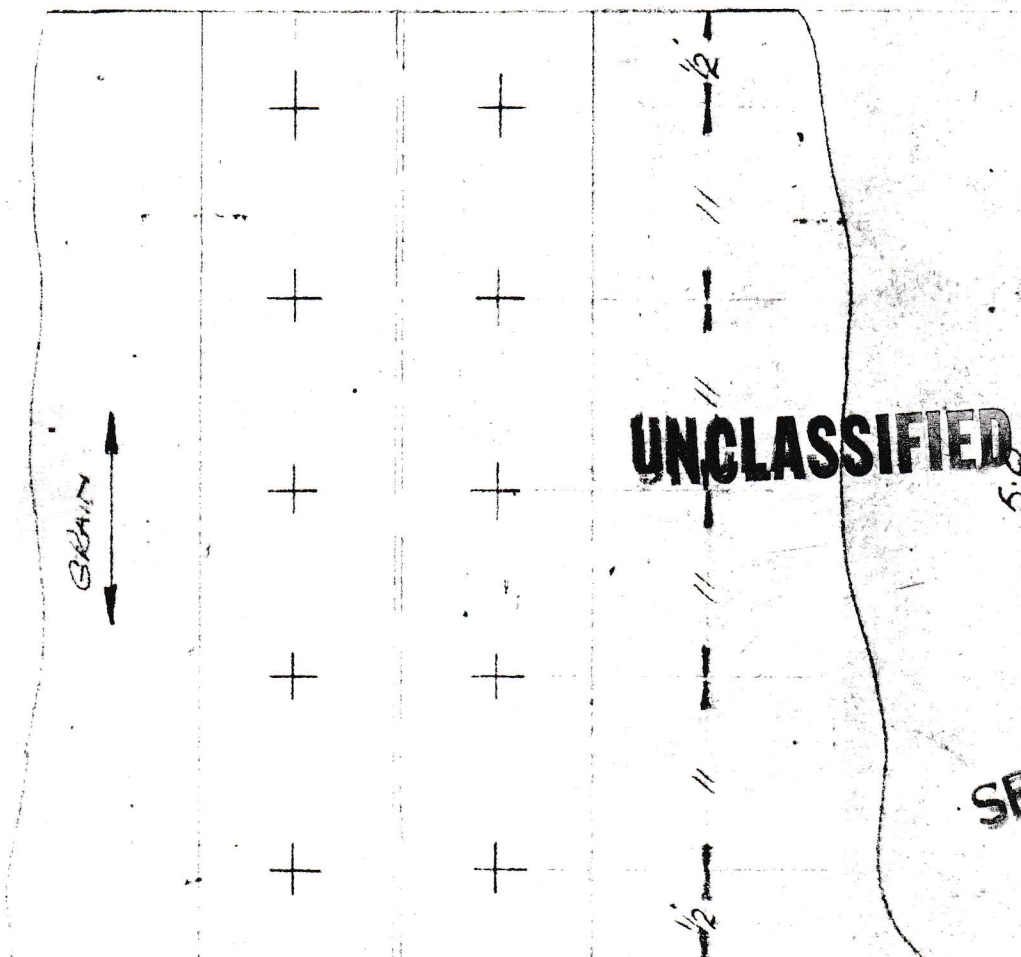
Q0 S 635

HT TO 1570°

.091 IN. CLAD 755-T6

10

5



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AIRCRAFT:

C105

RT DB-265

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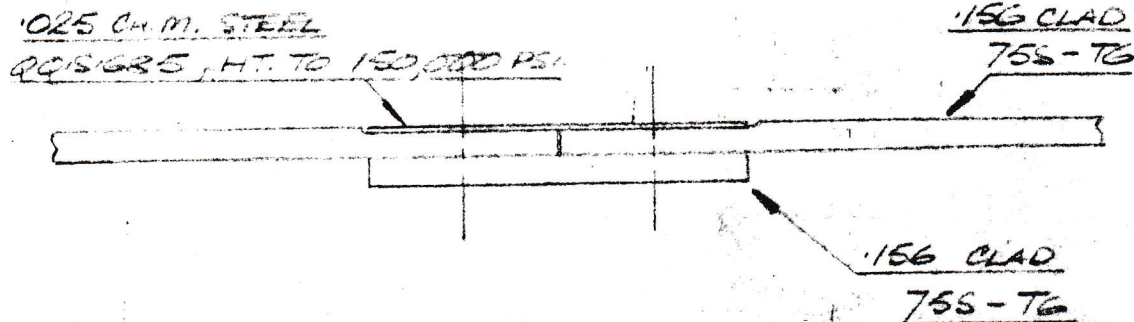
11 APRIL '64

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DATE

DETAILS OF JOINT TESTED

FOR SPECIMENS 108-110



ATTACHMENT IS MADE BY 5- $\frac{1}{4}$ " NAS
CSK. BOLTS ON EACH SIDE OF THE SPLICE.

THIS SPLICE IS IDENTICAL TO THAT FOR
SPECIMENS 82-90, EXCEPT FOR THE
THICKNESS OF THE STEEL STRAP.

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TECHNICAL DEPARTMENT (Aircraft)

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1.3.0.

AIRCRAFT:

C 105

RT 02-1255

PREPARED BY

E. J. SMITH

DATE

28 NOV '55

CHECKED BY

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TEST RESULTS

SPECIMEN NO.	FASTENERS	STATIC		FATIGUE		
		FAILING LOAD	MODE OF FAILURE	REPEATED LOAD	CYCLES TO FAILURE	MODE OF FAILURE
1	1/4" NAS BOLTS COUNTERSINKING	28000		3000	271000	HEAD OF BOLT PULLED OFF
2				5000	85000	
3				7500	42800	
4				2000	1492000	
5				1800	1510000	
6				1800	24080	
7				2000	952600	
8a						
10	1/4" CSK. HUCKS ALUMINUM ALLOY	12700		1800	288000	
11				2000	3003000	
12				3000	247000	
13				5000	80000	
14				7500	15000	
15				5000	53000	
16				2000	257000*	
17				5000	12500*	
18	1/4" CSK. HUCKS STEEL	28000		3000	300000	
19				5000	80000	
20				1800	3375000	
21				2000	8200000	
22				7500	31000	
23				10000	25310	
24				2000	444000*	
25				1800	2130*	
26	SEE OVER					
27						
28						
29						
30						
31						

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* 1/4" CSK. HUCKS AT 250°F

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TEST RESULTS (CONTD)

SPECIMEN NO.	FASTENERS	STATIC		FATIGUE		
		FAILING LOAD	MODE OF FAILURE	REPEATED LOAD	CYCLES TO FAILURE	MODE OF FAILURE
28	1/4" DEUTSCH STEEL RIVETS - CSK. LONG TAILS	19250		2000	131000*	
29						
30				2000	168500*	
31						
32				7500	13400	
33				2000	665000	
34				1800	2071000	
35				5000	40000	
36	1/4" DEUTSCH STEEL RIVETS - CSK SHORT TAILS	19500		3000	131300	
37						
38				1800	3765000	
39				3000	2800000	
40				3000	290000	
41				5000	47000	
42				7500	7750	
43				2000	332000*	
44	3/16" CSK. TD-BOLTS STEEL	16600		5000	13700*	
45				7500	6100	
46						
47				1800	819000	
48				2000	559000	
49				3000	150100	
50				5000	45600	
51				7500	9800	
52	SEE OVER			2000*	62500*	
53				5000*	16000*	
54						
55						
56						
57						
58						

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TEST RESULTS (CONT'D)

SPECIMEN NO.	FASTENERS	STATIC		FATIGUE		
		FAILING LOAD	MODE OF FAILURE	REPEATED LOAD	CYCLES TO FAILURE	MODE OF FAILURE
55	3/16 CSK. TD-BOLTS ALUMINUM ALLOY	13.80				
56				1800	7169000	
57				2000	804800	
58				3000	235500	
59				5000	38900	
60				7500	7200	
61						
62				2000*	317300*	
63				5000*	9100*	
64	1/4 CSK. TD-BOLTS STEEL	22950				
65						
66				2000	758100	
67				3000	230000	
68				5000	50000	
69				7500	11700	
70				10000	6400	
71				2000*	1124000*	
72				5000*	28900*	
73	1/4 CSK. TD-BOLTS ALUMINUM ALLOY	13250				
74				1800	2138800	
75				2000	1474000	
76				3000	351500	
77				5000	61700	
78				7500	9200	
79						
80				2000*	337000*	
81				5000*	12300*	

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MALTON - ONTARIO
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SHEET NO. 1.3.3.

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E.J. SMITH

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TEST RESULTS (CONTD)

SPECIMEN NO.	FASTENERS	STATIC		FATIGUE		
		FAILING LOAD	MODE OF FAILURE	REPEATED LOAD	CYCLES TO FAILURE	MODE OF FAILURE TENSION FAILURE OF SKIN
82	1/4 CSK NAS BOLTS	23100				
83				10000	135000	
84				7500	348000	
85				5000	5822000	
86				3000	10 ⁷ +	
87				2000	10 ⁷ +	
88				1800	10 ⁷ +	
89				5000*	548000*	
90	1/4 CSK NAS BOLTS	15350		2000*	10 ⁷ +	
91						
92						
93						
94				3000	10 ⁷ +	
95				5000	413700	
96				7500	26000	
97				10000	8900	
98	1/4 CSK NAS BOLTS			2000*	3561000*	
99				5000*	22900*	
108						
108a	1/4 NAS. CSK BOLTS			5000	1298000	
109				7500	309000	
110				10000	168000	

* AT 250°F

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12 APRIL '56

DATE

AIRCRAFT:

C105

RT-08-265

SUMMARY OF STATIC STRENGTHS

SPECIMEN NO.	DETAILS OF JOINT	STATIC STRENGTH LB/BOLT
1-9	1/4" NAS CSK. IN 204 SHANK IN .156	5600
10-18	1/4" AL. AL. HUCKS CSK. IN 204, SHANK IN .156	2540
19-27	1/4" STEEL HUCKS CSK. IN 204, SHANK IN .156	5600
28-36	1/4" STEEL BLIND RIVETS CSK. IN 204, SHANK IN .156	3850
37-45	1/4" STEEL BLIND RIVETS CSK. IN 204, SHANK IN .156	3900
46-54	3/16" STEEL JO'S, CSK. IN .125, SHANK IN .125	2770
55-63	3/16" AL. AL. JO'S, CSK. IN .125, SHANK IN .125	2170
64-72	1/4" STEEL JO'S, CSK. IN .156, SHANK IN .156	4590
73-81	1/4" AL. AL. JO'S, CSK. IN .156, SHANK IN .156	2650
82-90	1/4" NAS CSK. IN .156 & .032 STEEL DIMPLED STRAP, SHANK IN .156	4620
91-99	1/4" NAS CSK. IN .125, SHANK IN .072 STEEL STRAP & .0091 PLATE	3070
100-110	1/4" NAS CSK. IN .156 & .025 STEEL DIMPLED STRAP, SHANK IN .156	NO RESULTS

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MALTON - ONTARIO

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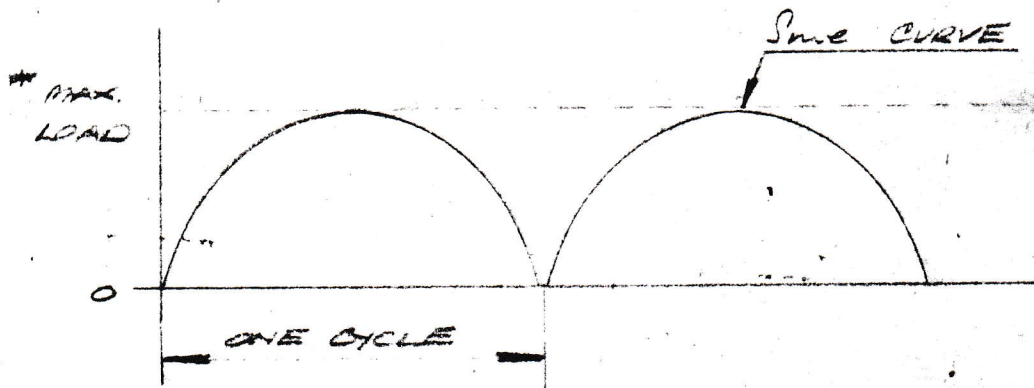
C105

RT-08-265

FATIGUE STRENGTHS

CURVES ARE PLOTTED ON THE FOLLOWING SHEETS OF REPEATED LOAD/BOLT AGAINST LOAD CYCLES.

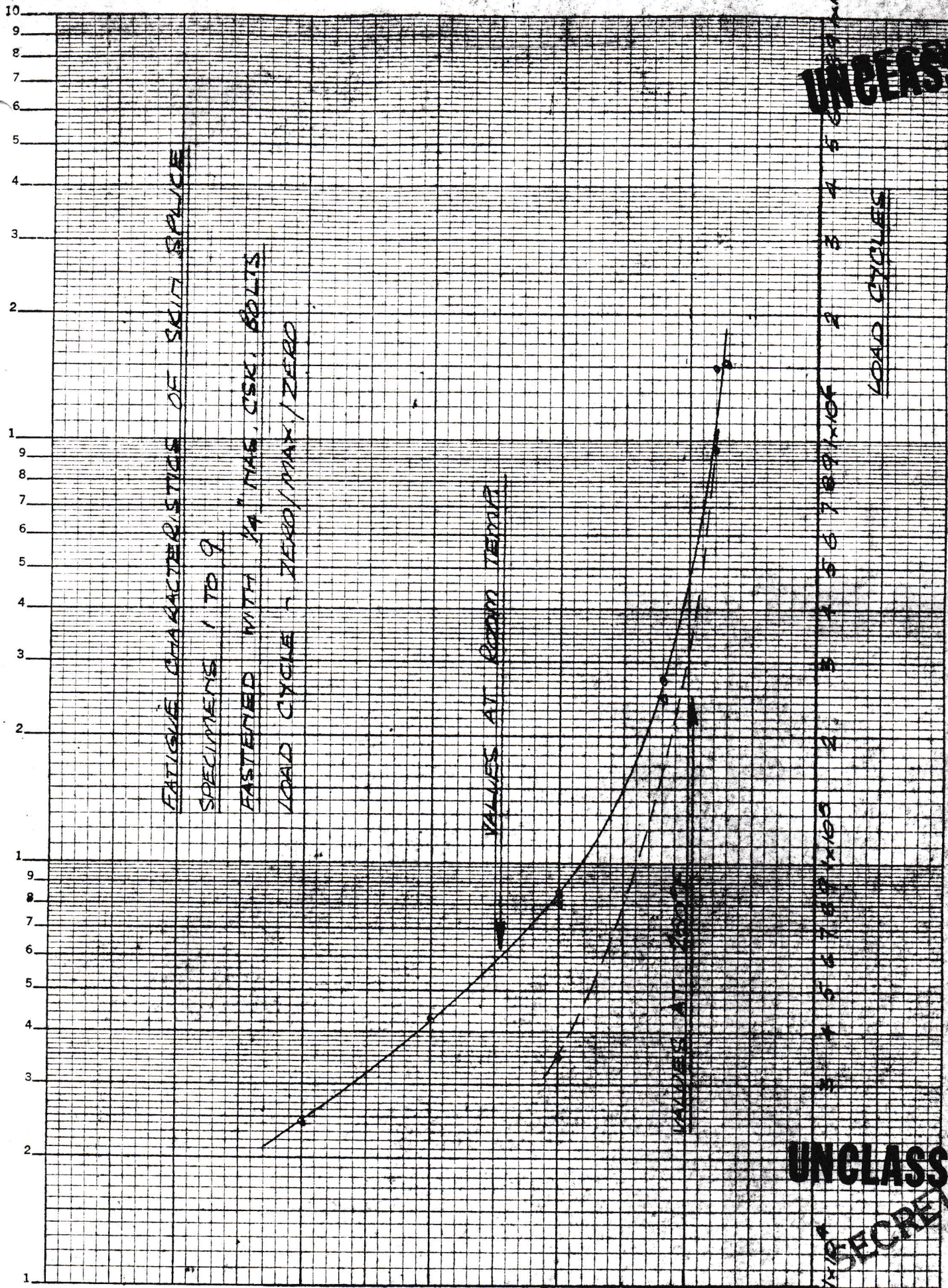
IN THIS TEST, THE LOAD CYCLE HAS BEEN DEFINED AS:



* VALUES GIVEN IN RESULTS & ON CURVES

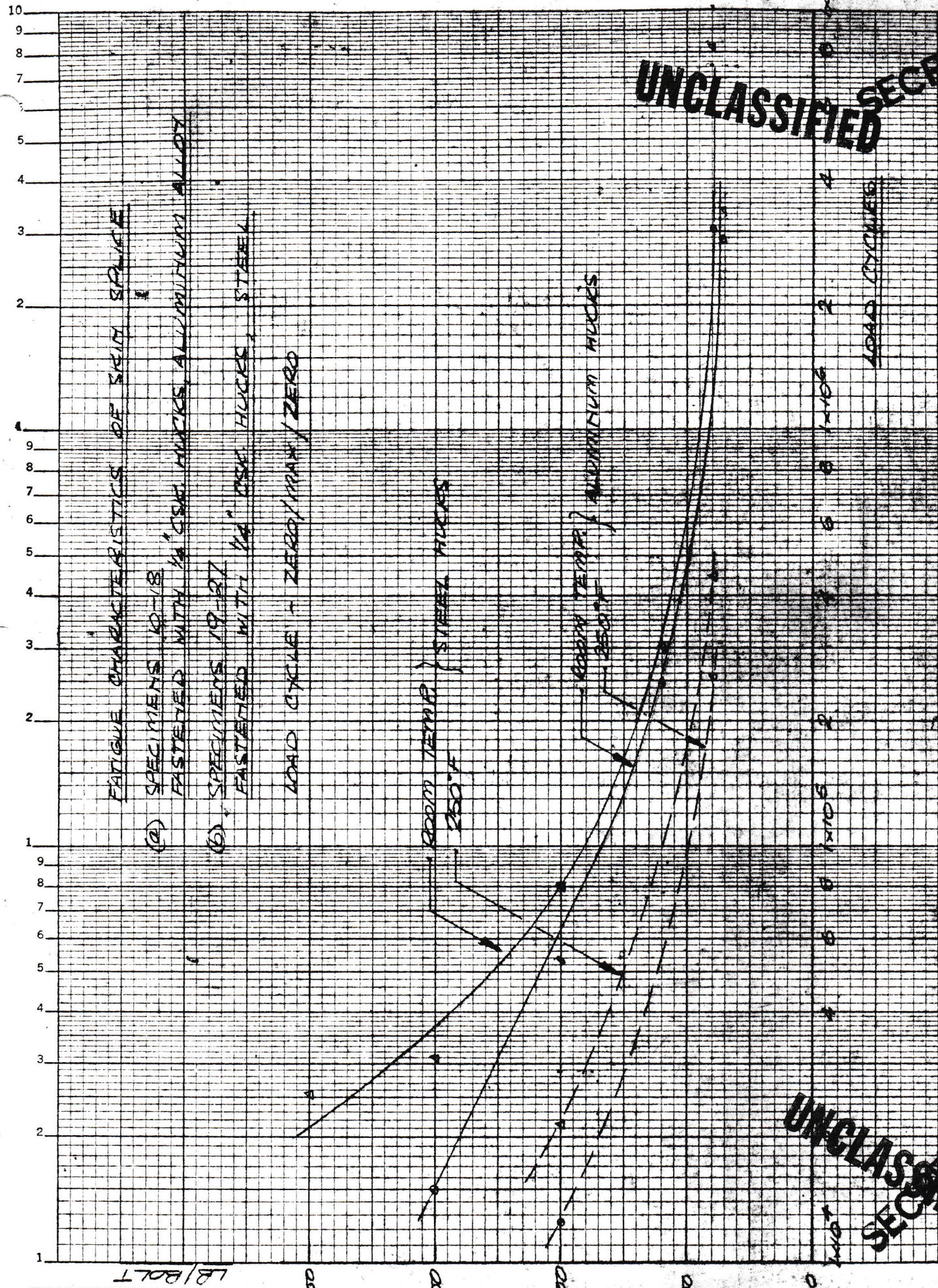
i.e. LOAD CYCLE IS ZERO - MAX. - ZERO.

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FATIGUE CHARACTERISTICS OF SKIN SPACER

(A) SPECIMENS 10-18

FASTENED WITH 1/4" DIA HOOKS, ALUMINUM ALLOY

(B) SPECIMENS 19-27

FASTENED WITH 1/4" DIA HOOKS, STEEL

LOAD CYCLE - ZERO/MAX/ZERO

ROOM TEMP / STEEL HOOKS
250°F

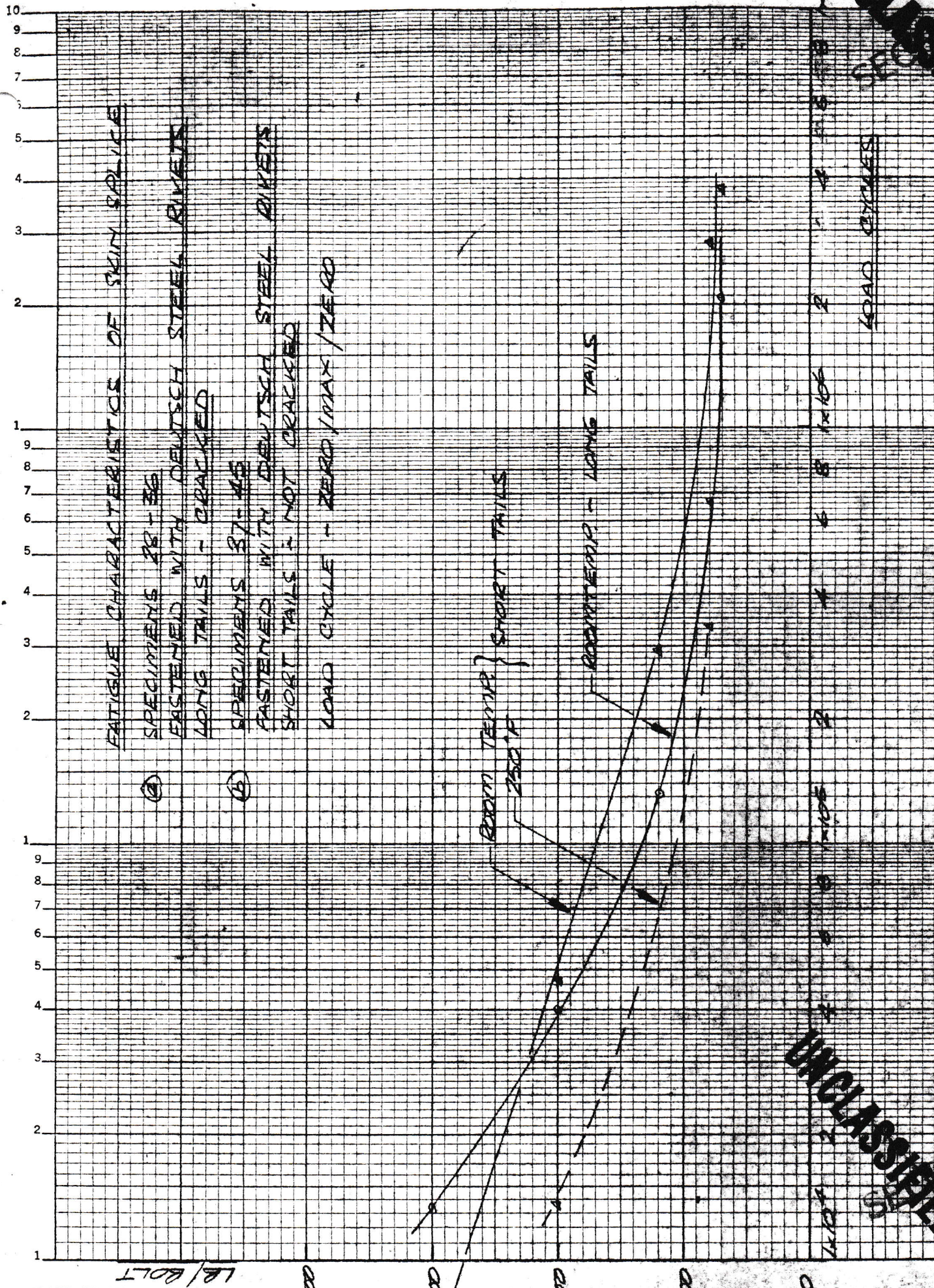
ROOM TEMP / ALUMINUM HOOKS
250°F

LOAD CYCLES

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14.3



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LB/BOLT

FATIGUE CHARACTERISTICS OF SKIN SPLICE

(a) SPECIMENS 46-54
FASTENED WITH 3/4" DIA. ID-BOLTS STEEL

(b) SPECIMENS 55-63
FASTENED WITH 3/4" DIA. ID-BOLTS, ALUMINUM

LOAD CYCLE = ZERO/MAX/ZERO

ROOM TEMP } STEEL ID-BOLTS
250°F

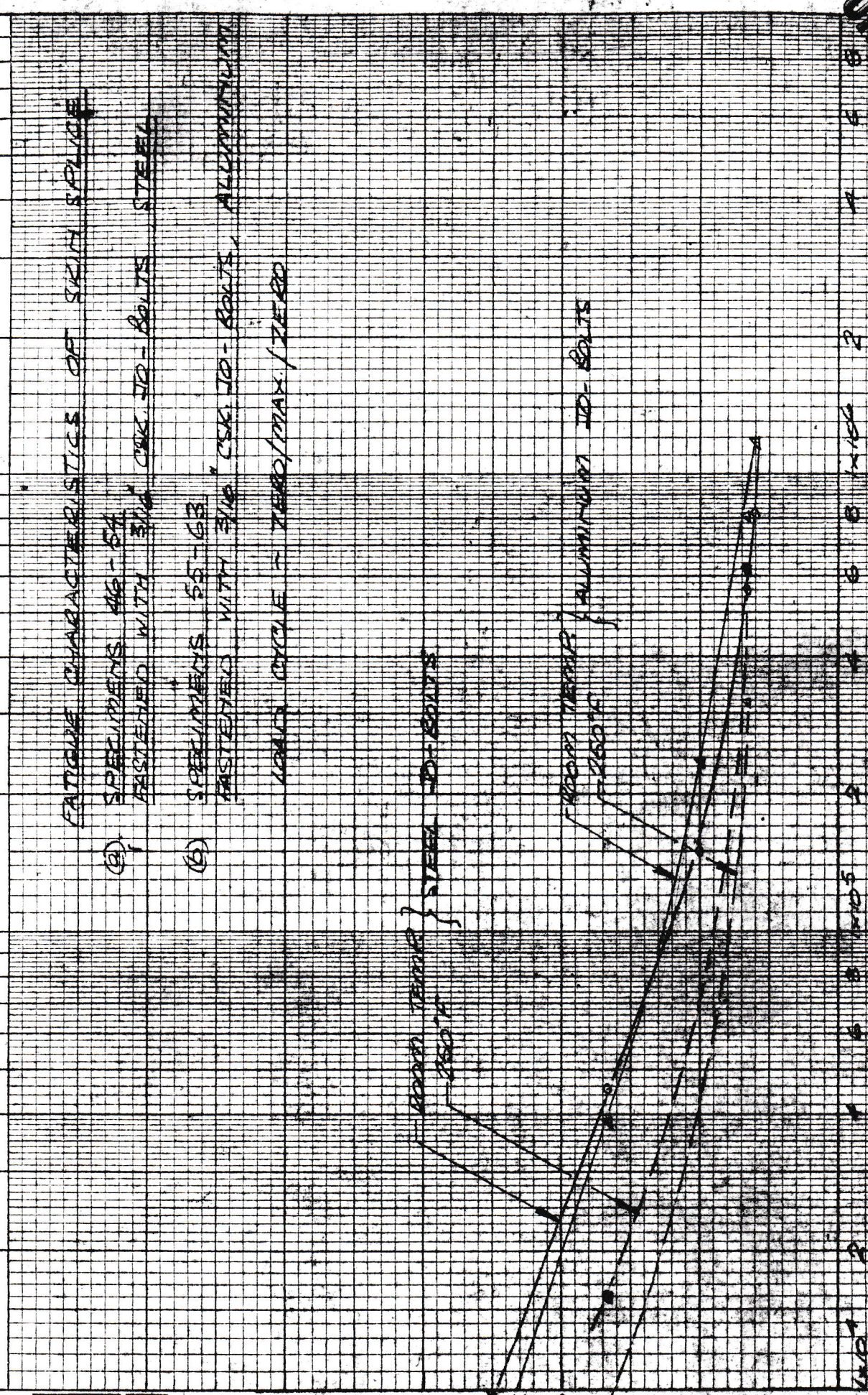
ROOM TEMP } ALUMINUM ID-BOLTS
250°F

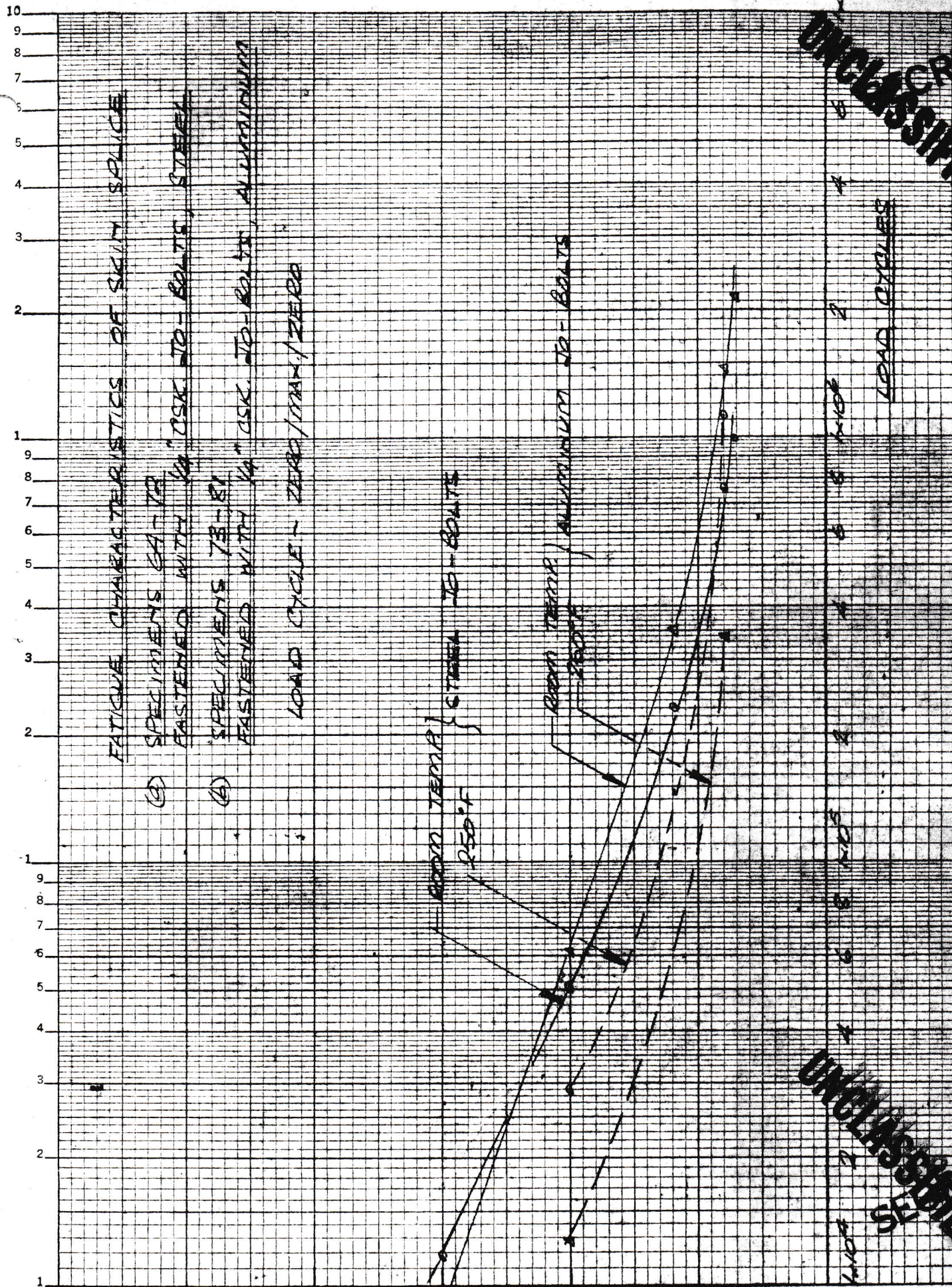
LOAD CYCLE

1.45

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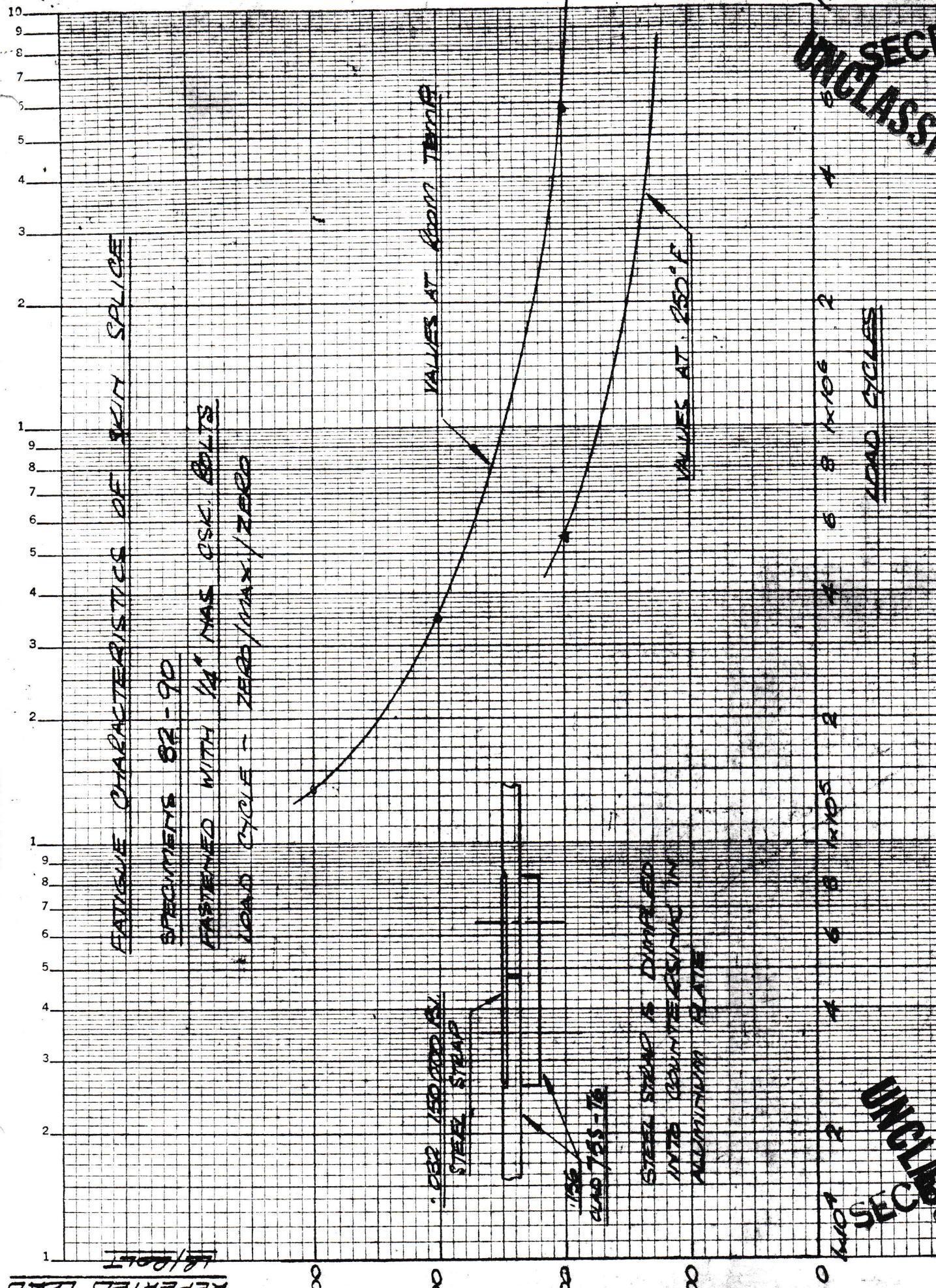
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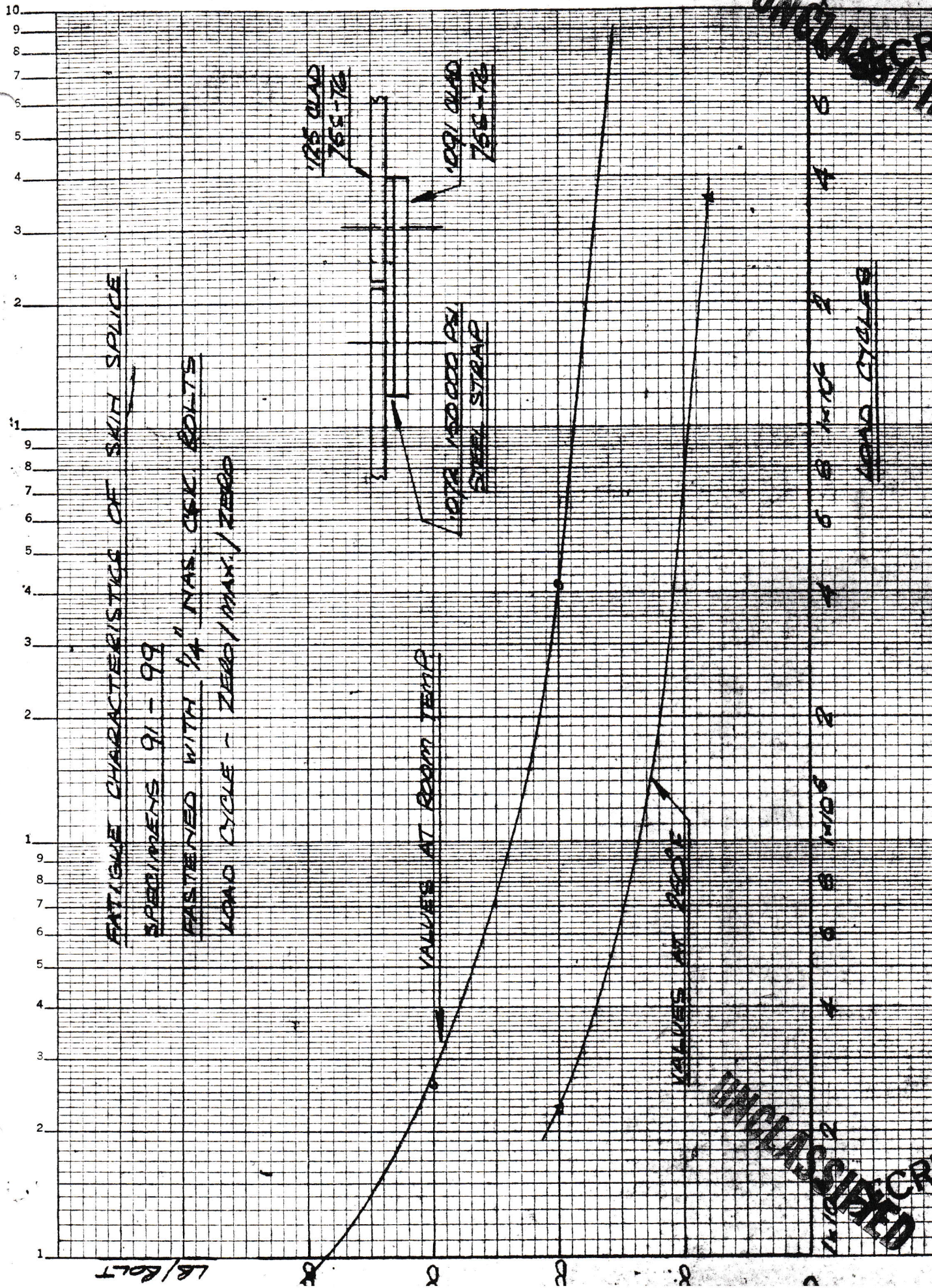
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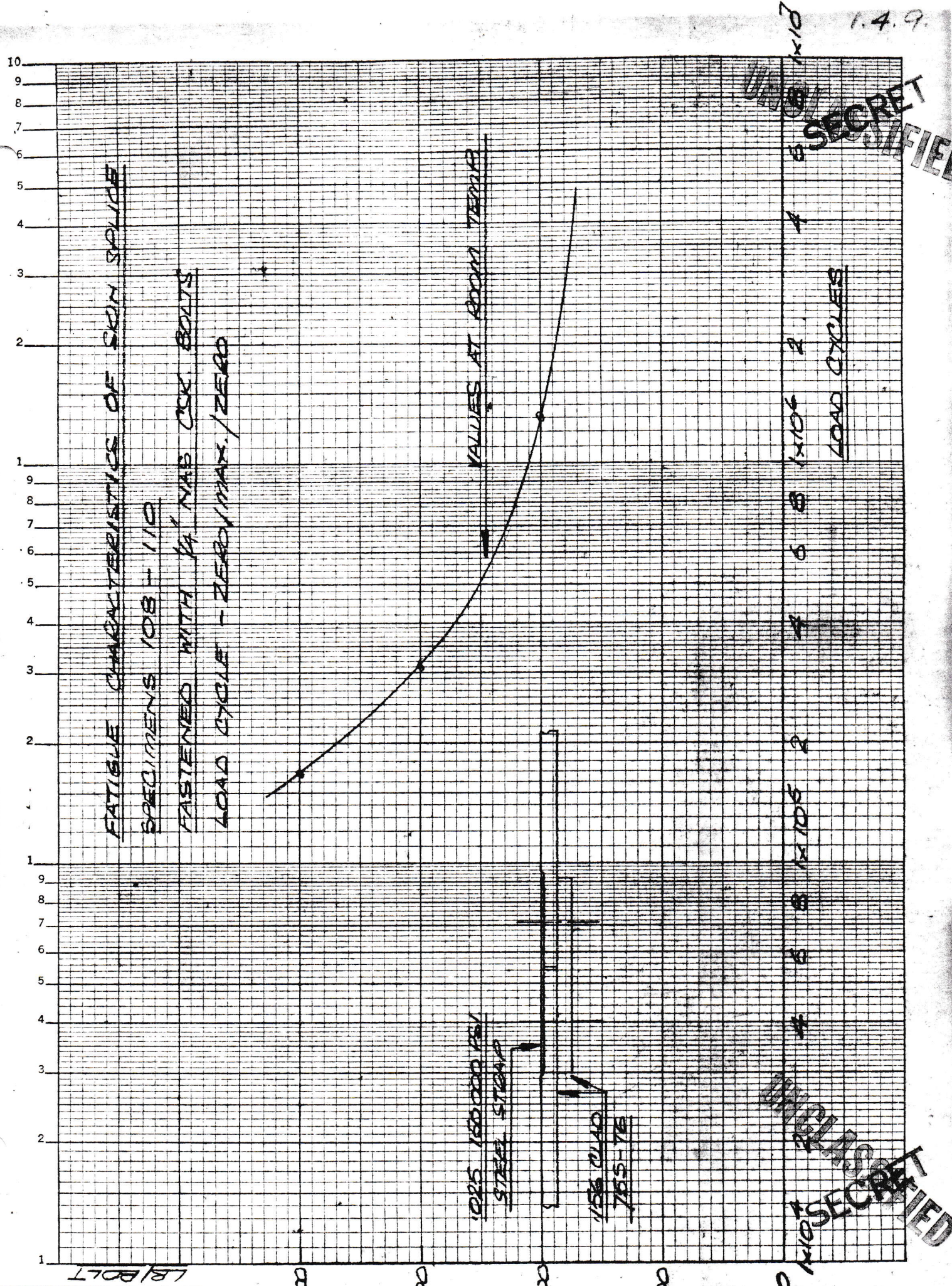
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1.4.7.



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MALTON - ONTARIO

TECHNICAL DEPARTMENT

REPORT NO.

SHEET NO.

PREP

E. J. SMITH

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AIRCRAFT:

C 105

RT-08-276

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SECTION 2

STATIC & FATIGUE STRENGTHS
OF SKIN SPLICES

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ASSEMBLY OF TEST PIECE	2.1.0.
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TEST RESULTS	2.3.0
SUMMARY OF STATIC STRENGTHS	2.4.0
FATIGUE CHARACTERISTICS	2.4.1 & 2.4.2.

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A. V. ROE CANADA LIMITED
MALTON - ONTARIO
TECHNICAL DEPARTMENT (Aircraft)

REPORT No.

SHEET NO.

2.1.0

PREPARED BY

E. J. SMITH

CHECKED BY

DATE

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AIRCRAFT:

C 105

RT 08-276

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THE SPLICE JOINTS ARE ASSEMBLED
FOR LOADING IN A STRUCTURE SIMILAR
TO THAT USED FOR RT 08-265.

FULL DETAILS ARE SHOWN ON
DRAWING NO. AD 247

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A. V. ROE CANADA LIMITED
MALTON - ONTARIO
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E. J. SMITH

7 DEC '55

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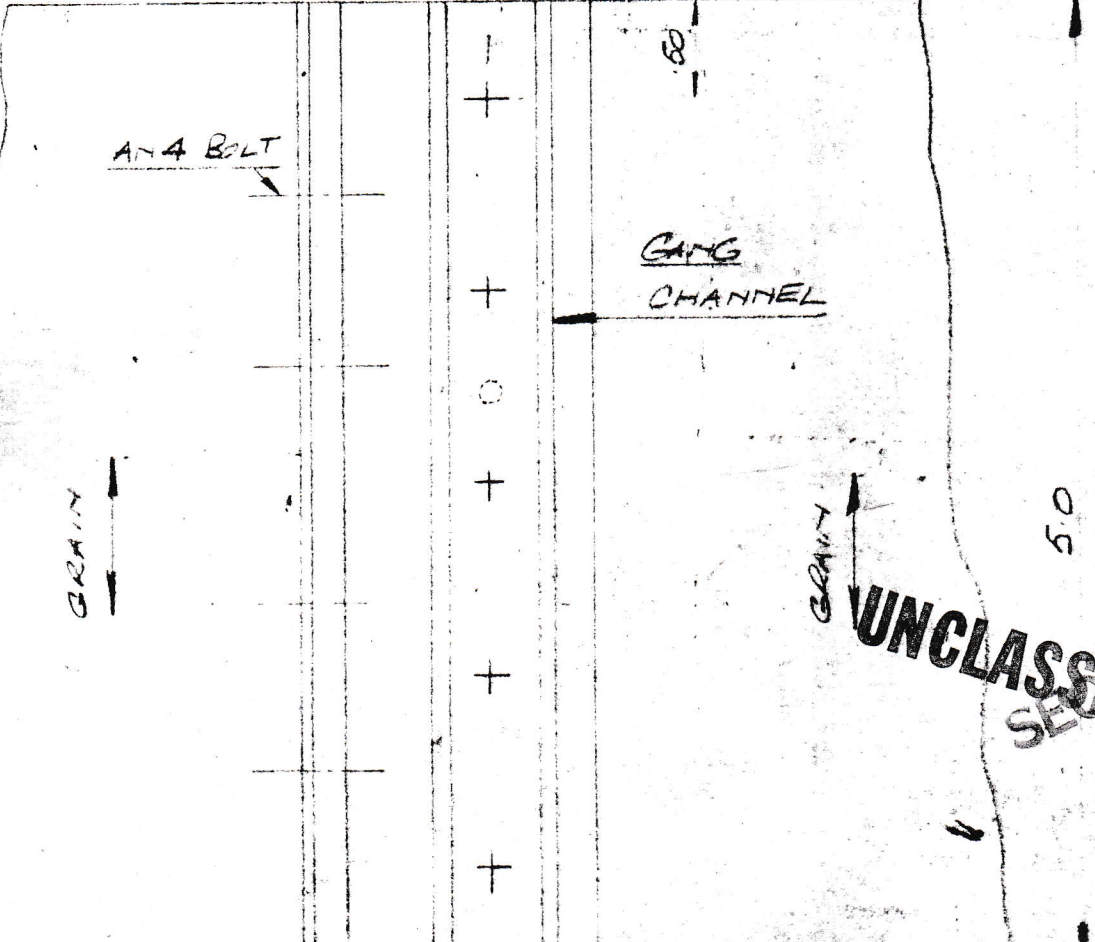
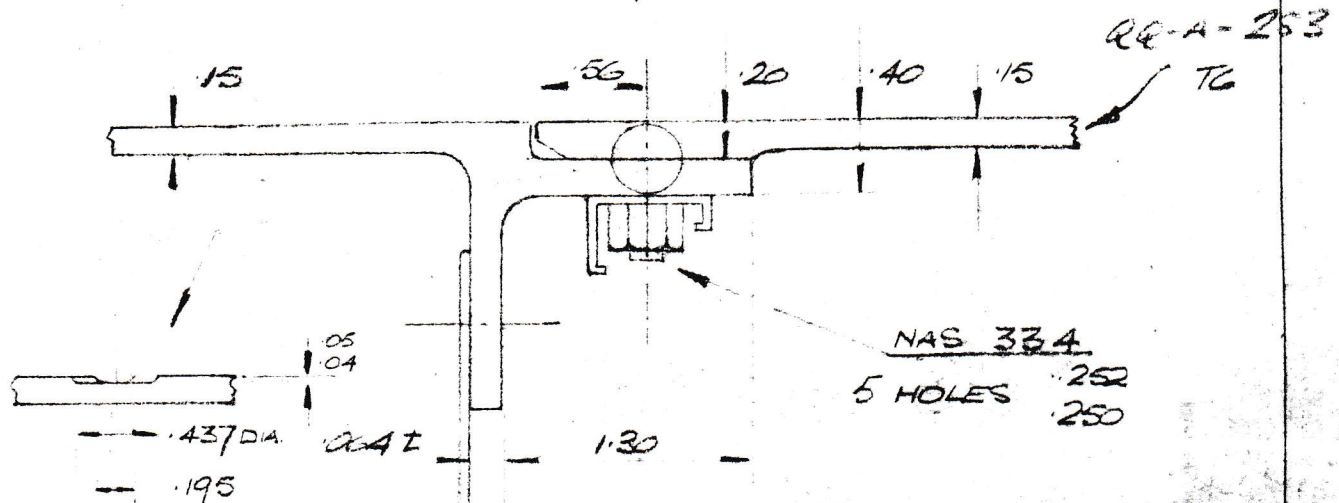
AIRCRAFT:

C105

RT08-276

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DETAILS OF SPACE TESTED
FOR SPECIMENS 102-103



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REPORT

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19 DEC '55

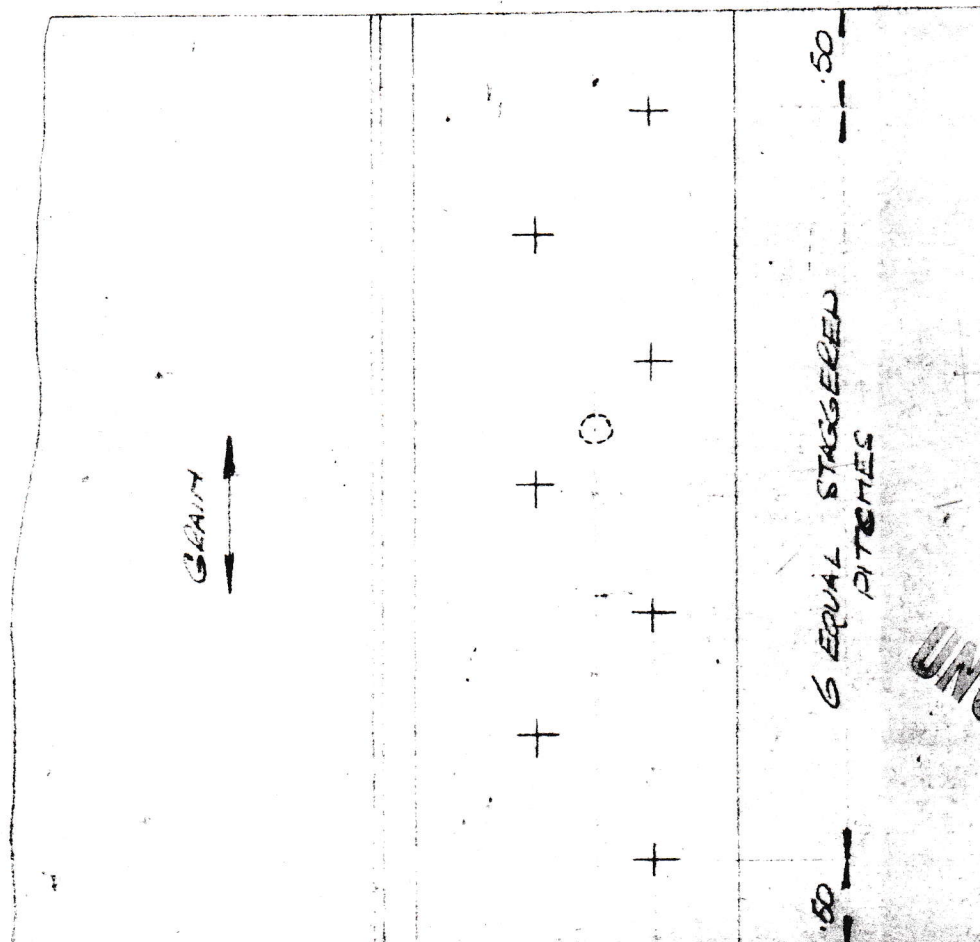
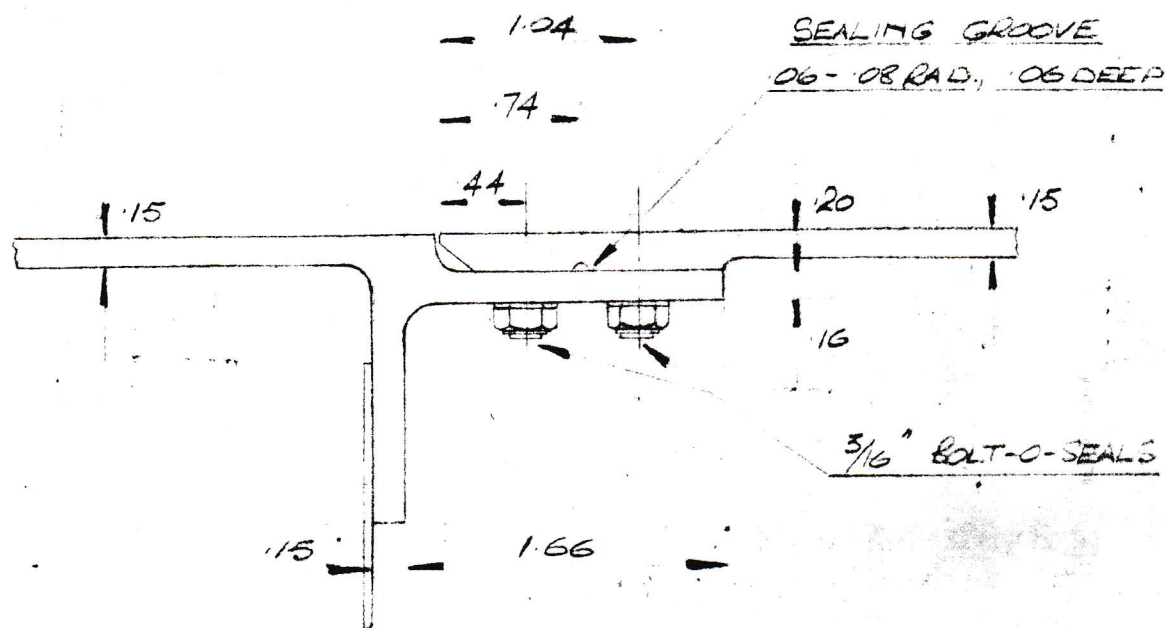
DATE

AIRCRAFT:

C 105

RT 08-276

DETAILS OF SPLICE TESTED
FOR SPECIMENS 104-107



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A. V. ROE CANADA LIMITED
MALTON - ONTARIO
TECHNICAL DEPARTMENT (Aircraft)

REPORT NO.

SHEET NO.

PREPARED BY

EJ. SMITH

CHECKED BY

DATE

19 DEC. '55

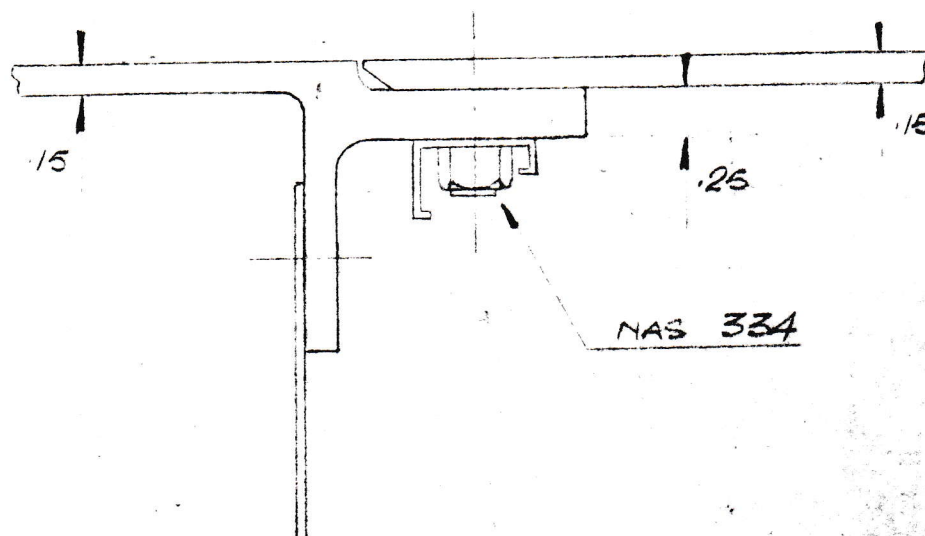
DATE

AIRCRAFT:

C105

RT DR-276

DETAILS OF SPLICE TESTED
FOR SPECIMENS 111 - 114



IDENTICAL IN ALL OTHER RESPECTS
TO 100-103, AD 247.

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A. V. ROE CANADA LIMITED
MALTON - ONTARIO
TECHNICAL DEPARTMENT (Aircraft)

REPORT NO.

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DATE

E. J. SMITH

19 DEC. 52

CHECKED BY

DATE

AIRCRAFT:

C 105

RT 08-276

TEST RESULTS

SPECIMEN NO.	FASTENERS	STATIC		FATIGUE		
		FAILING LOAD	MODE OF FAILURE	REPEATED LOAD	CYCLES TO FAILURE	MODE OF FAILURE
100	1/4" NAS BOLTS COUNTERSUNK	17500				
101				2500	182000	
102				1500	2500000	NONE
103				2000	2500000	NONE
104	3/16" BOLT SEALS COUNTERSUNK	16600				
105				2500	425700	
106				1800	2500000	NONE
107				2150	509500	
111	1/4" NAS BOLTS COUNTERSUNK	26850				
112				2500	2.5 x 10 ⁶	NONE
113				3500	1,027,000	
114				3000	1,675,000	

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AVRO AIRCRAFT LIMITED
MALTON - ONTARIO

TECHNICAL DEPARTMENT

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CHECKED BY

SECRET

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13 APRIL '56

DATE

AIRCRAFT:

C105

RT-08-265

SUMMARY OF STATIC STRENGTHS

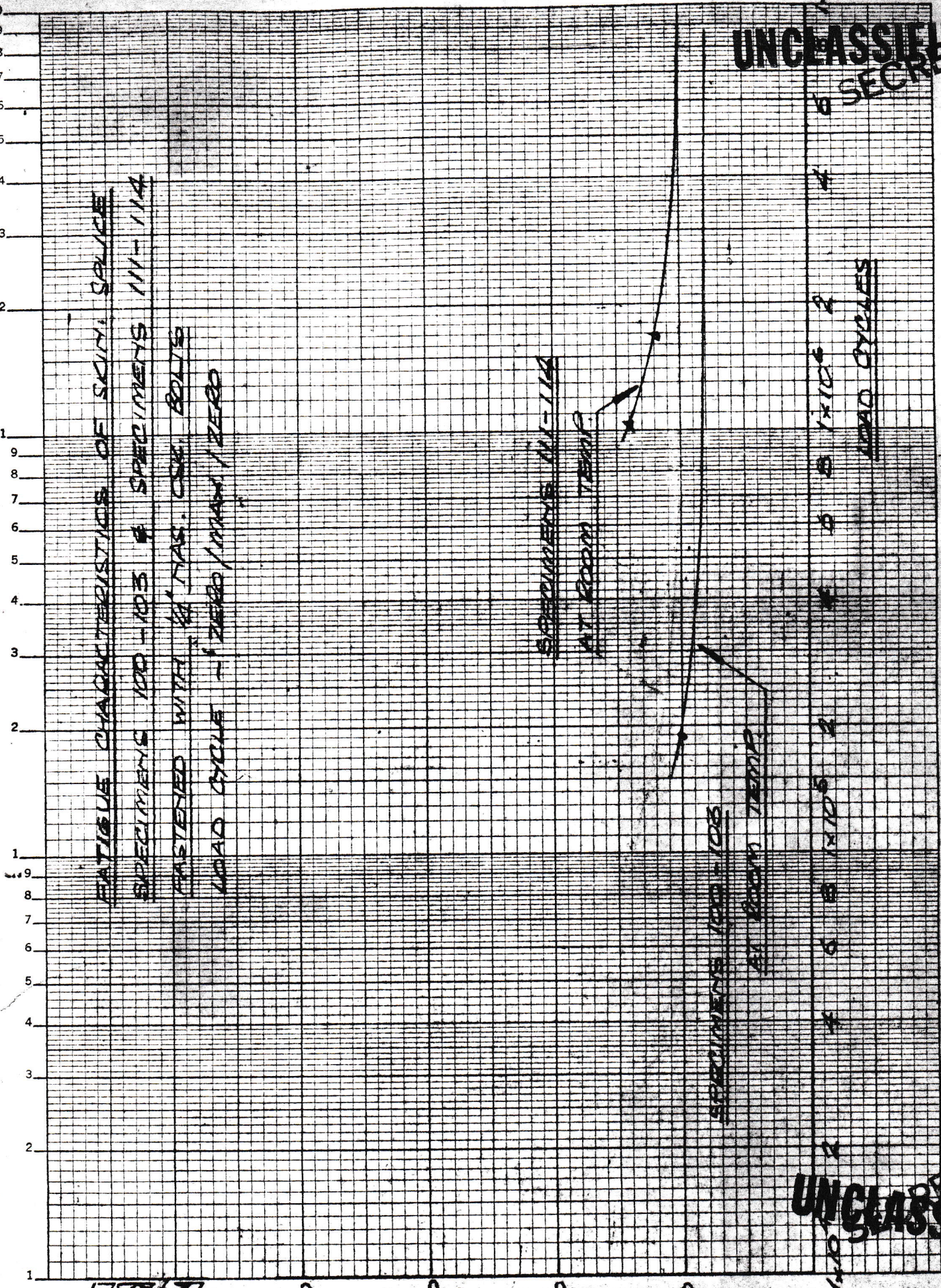
SPECIMEN NO.	DETAILS OF JOINT	STATIC STRENGTH LB/BOLT
100-103	1/4" HAS CSK. IN .20 SHANK IN .20 LESS .04 .05 SEALING GROOVE	3500
104-107	2 ROWS OF 3/16" BOLT-O- SEALS IN .20 (SEALING GROOVE BETWEEN ROWS) SHANK IN .16	2370
111-114	1/4" HAS CSK. IN .16 SHANK IN .25 LESS .04 .05 SEALING GROOVE	5370

FATIGUE STRENGTHS

CURVES ARE PLOTTED ON THE FOLLOWING
SHEETS OF REPEATED LOAD/BOLT AGAINST
LOAD CYCLES.

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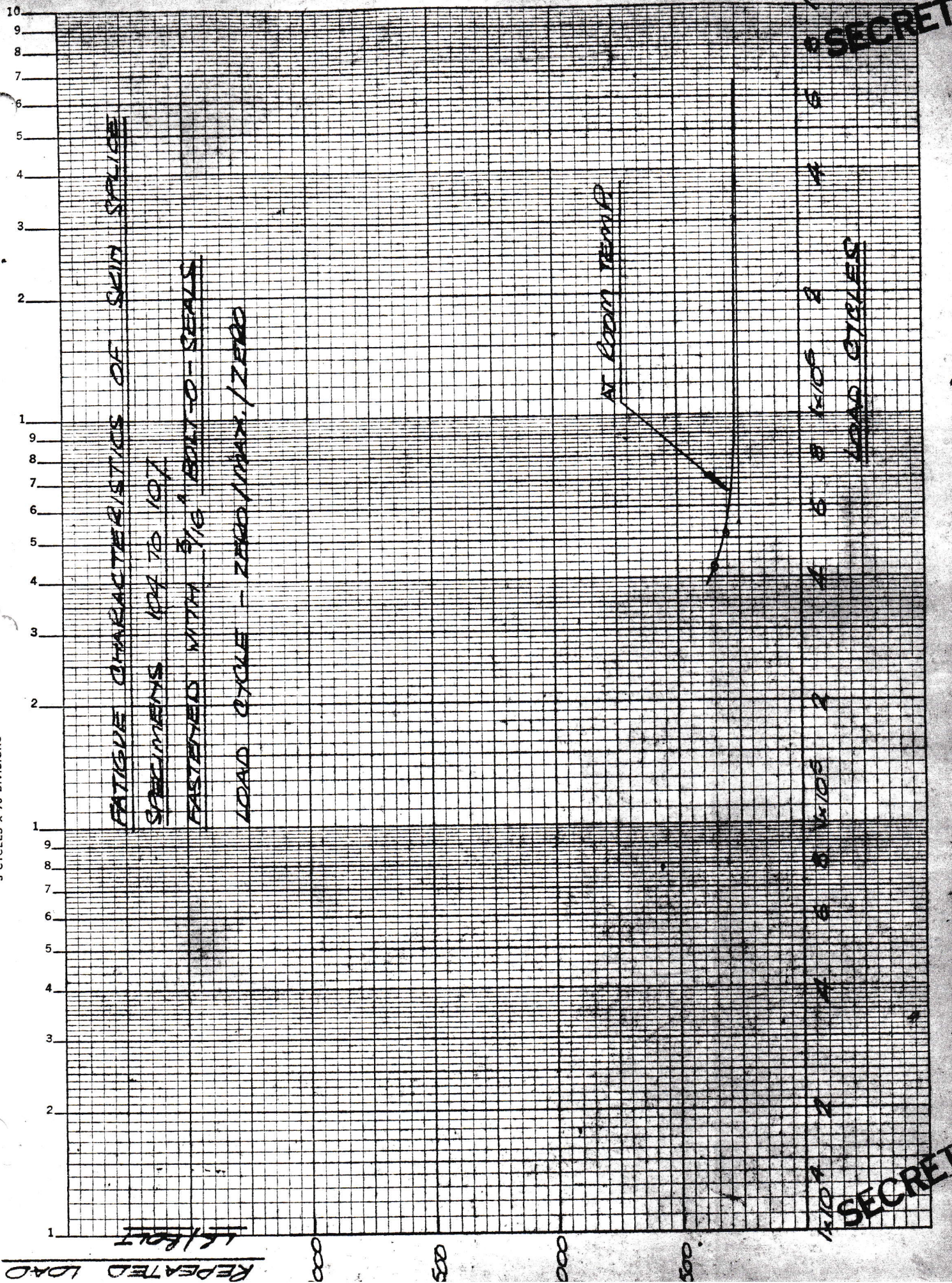
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SEMI-LOGARITHMIC 359-71
KEUFFEL & ESSER CO. MADE IN U.S.A.
3 CYCLES X 70 DIVISIONS



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