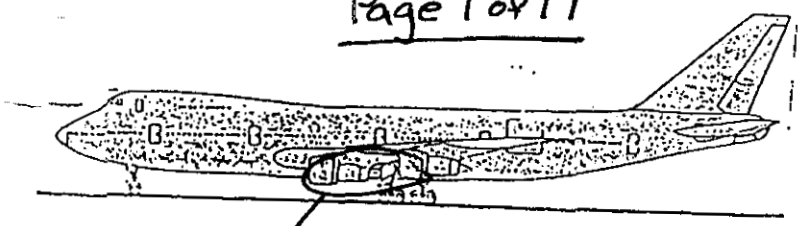


KEEL BEAM BOX
SEE SKETCH ON
NEXT PAGE

LOG # LF-14 Rev A SDG RTS 10.1.96 Pg 1-15

TARGET #

COORD: LAT

LONG

DEBRIS FIELD SEE BELOW

PART	DEBRIS FIELD
PART A	~~YELLOW~~ RED TAG # ~~BOGI~~ A-2048
B	GREEN
C	→ WHITE C061 D2133 Kurt 2/28/97
D	ASSOCIATED WITH GREEN TAG # C-109
	C-2440

Rev A added extra segments ~~deeper~~ of structure
now have Parts A, B, C & D
Added Pages 1a, 9 → 12
Revised Pages 1, 5, 6

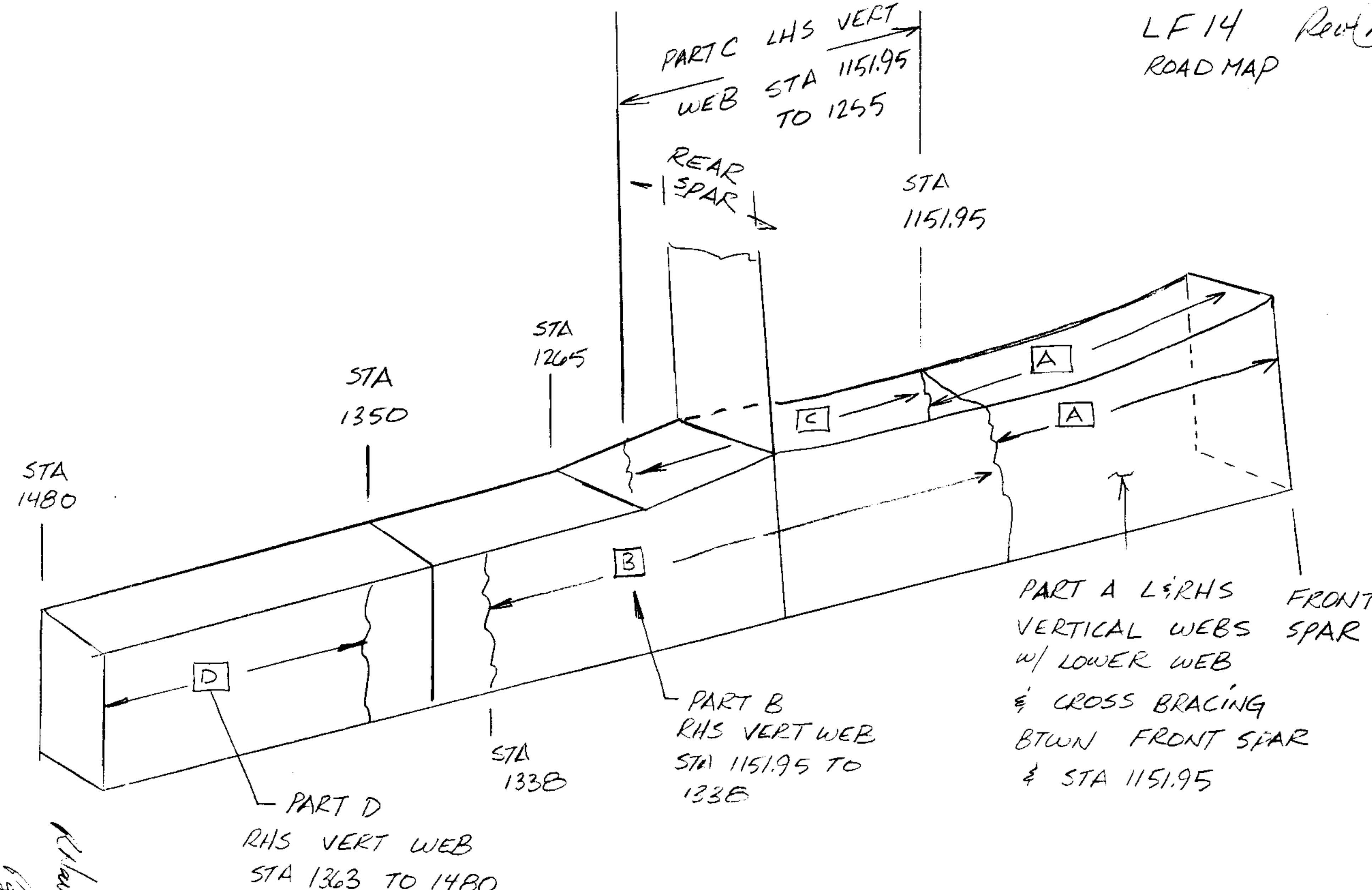
REFER METALLURGY GROUP NOTES

TMC 10-1-96
TWA
K. Brackett JHM 10-24-96

Pg 1

R Hanover 11/11/96
Stephen F. Klapach Jr. FAA 10-21-96

LF14 Rev (A)
ROAD MAP

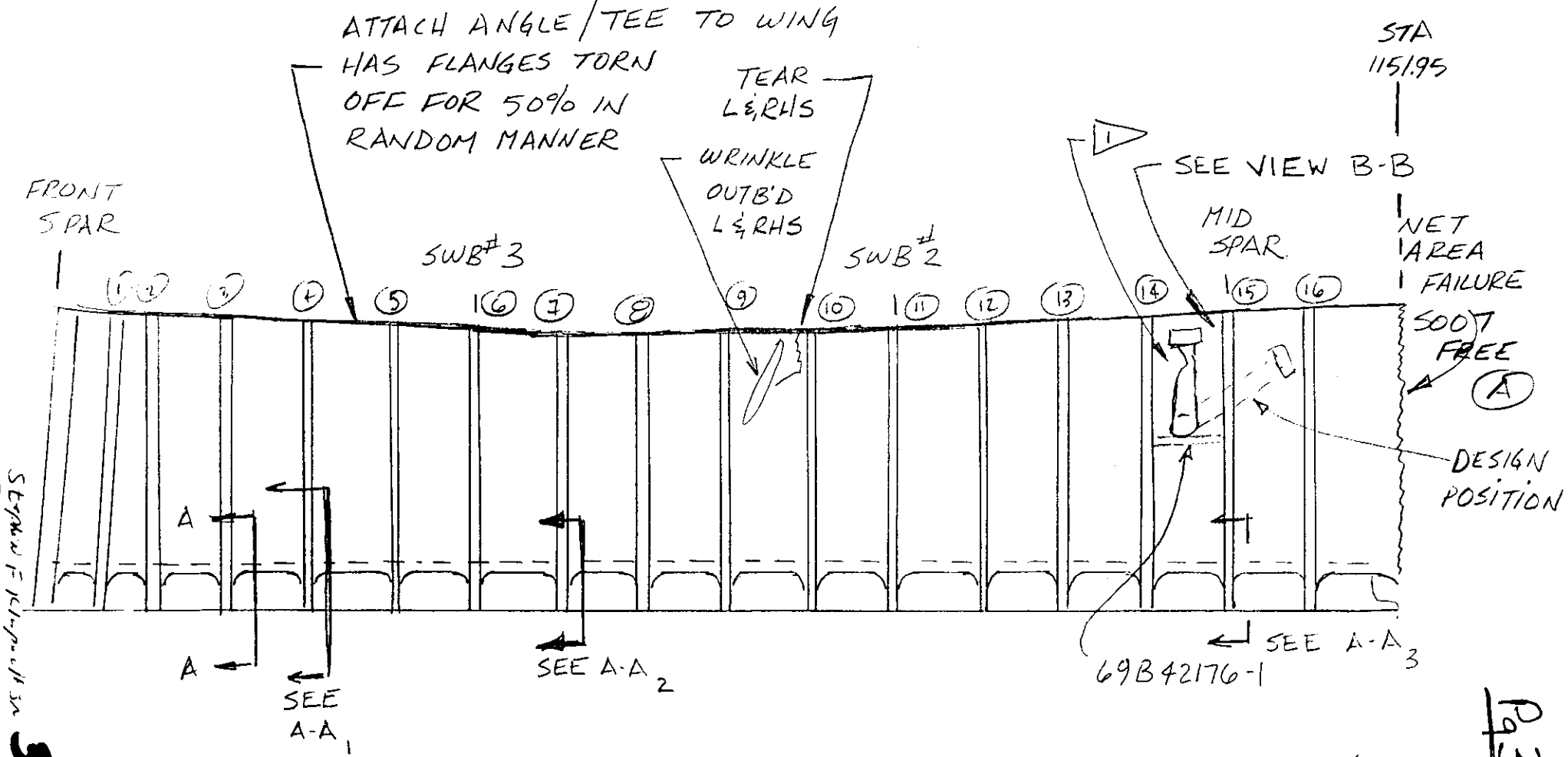


- THE LOWER HORIZONTAL WEB BETWEEN KEEL CHORD= AFT OF STA 1144 IS MISSING.

K Navarro 8/11/96
Pg 1a
2
Stephen F. Klupacll SR FAA 10-21-96

LF14A

SIDE VIEW OF BOX (LHS)



SEE Pg 7 FOR FLAGNOTES

LF14 PART A **file, 'winword,keelbeam ' on pc against far wall in command post**

Duct is crumpled, and rotated fwd roughly 60 degrees

General Notes;
The upper chord of the keel beam box is buckled in the following manner;

LHS

Starting at the front spar location and moving aft, midway between Keel Beam Stiffeners(KBS) 2 & 3, there is an inward buckle, horizontal flange of upper inb'd chord is fractured. Just behind KBS 3 there is an outward buckle. Between KBS 4 &5, there is an inward buckle. At KBS 5 there is outward buckle. 2 ½ forward of KBS 10 there is an outward deformation and at KBS 10 a minor inward deformation.

RHS

In between the front spar and KBS 1 an inward buckle, just behind KBS 3 an outward buckle. 2 " KBS 4 the start of an inward buckle which turns outward between KBS 5 & 6, coming to an apex at KBS 7. There is an inward buckle at KBS 8 with a major outward buckle at KBS 9.

The KBB cross bracing at SWB 2 & 3 and the Mid Spar bulkhead remained intact

Bolts that connect the upper chord of box to the wing

@Stiffener #1, on each side one bolt broke at the thread root, the other bolt still has threads , so the nut failed. Note 2 bolts per side.

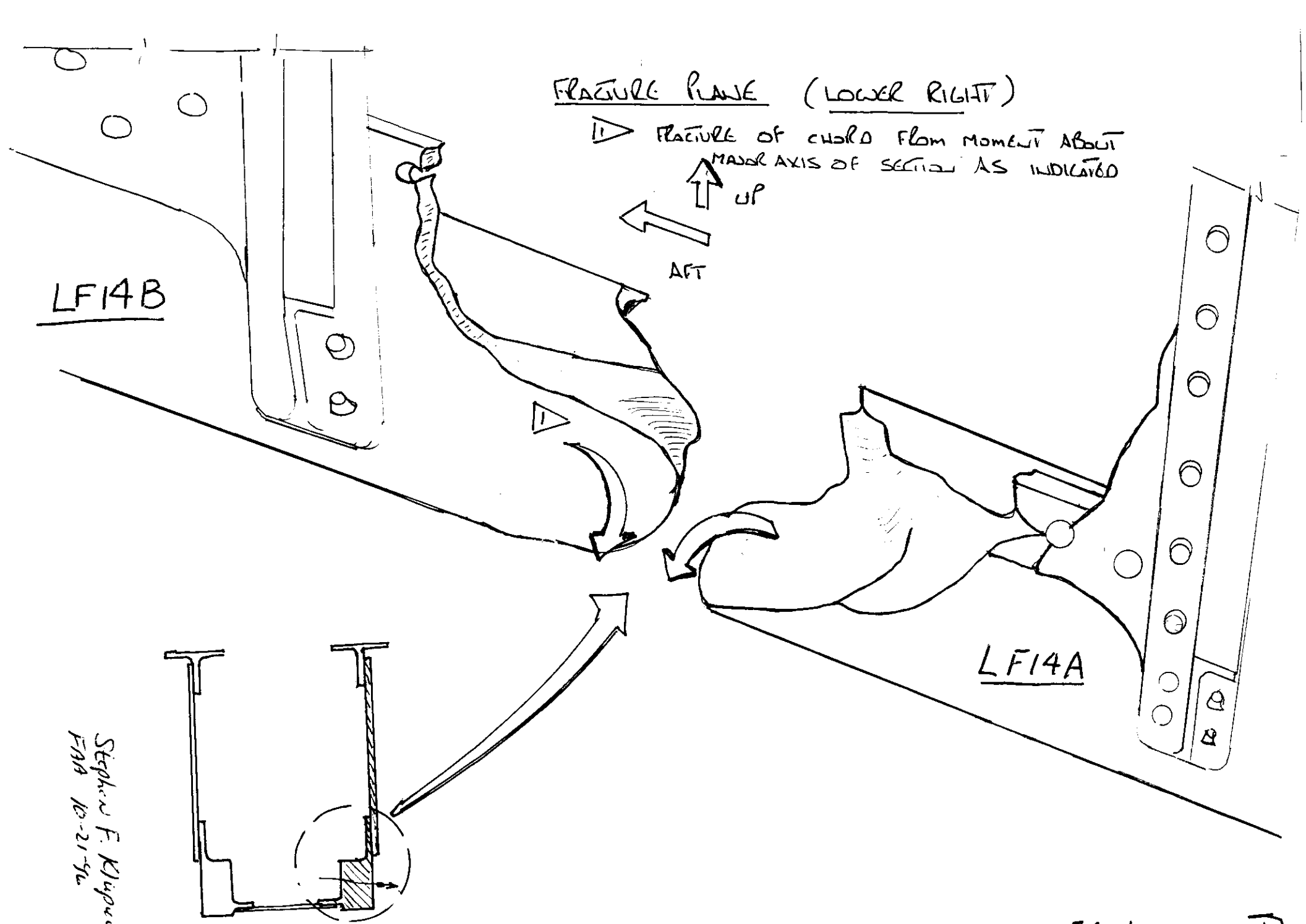
Soot on bottom of Section 42 skin just forward of keel beam box (KBB)did not come through the KBB- box is clean of soot

Outer surfaces of box are lightly sooted, except for the right side outer surface , centered at Sta 1129 approx, exhibited evidence of sooting in an upward/forward and aft direction. This sooting is moderate. There is light sooting on the most aft 8" of the RHS vertical web.

There is also light to moderate sooting between Keel Beam Stiffener (KBS) 11 and 10, halfway up from the bottom of the keel beam.

RHS ATTACHMENTS

@ Stiff # 3, duct supports bent forward located in bottom half of stiffener
@ Stiffener #4 & #5, standoffs at top of stiffeners bent aft.
@ Stiffener #7, standoff 6" from the bottom is broken off.
@ Stiffener # 9, standoff 6" from the bottom is bent forward
@ Stiffener # 10, bracket near top bent forward
@ Stiffener # 11, standoff near bottom bent forward
@ Stiffener # 13, has 3 standoffs near bottom, top bent upwards, bottom one has bolt/nut gone, and middle one looks OK
@ Stiffener # 14, Duct bracket bent forward
@ Stiffener #15, standoffs(2) near bottom bent forward
@ Stiffener # 16, standoff 6" above keel chord bent aft



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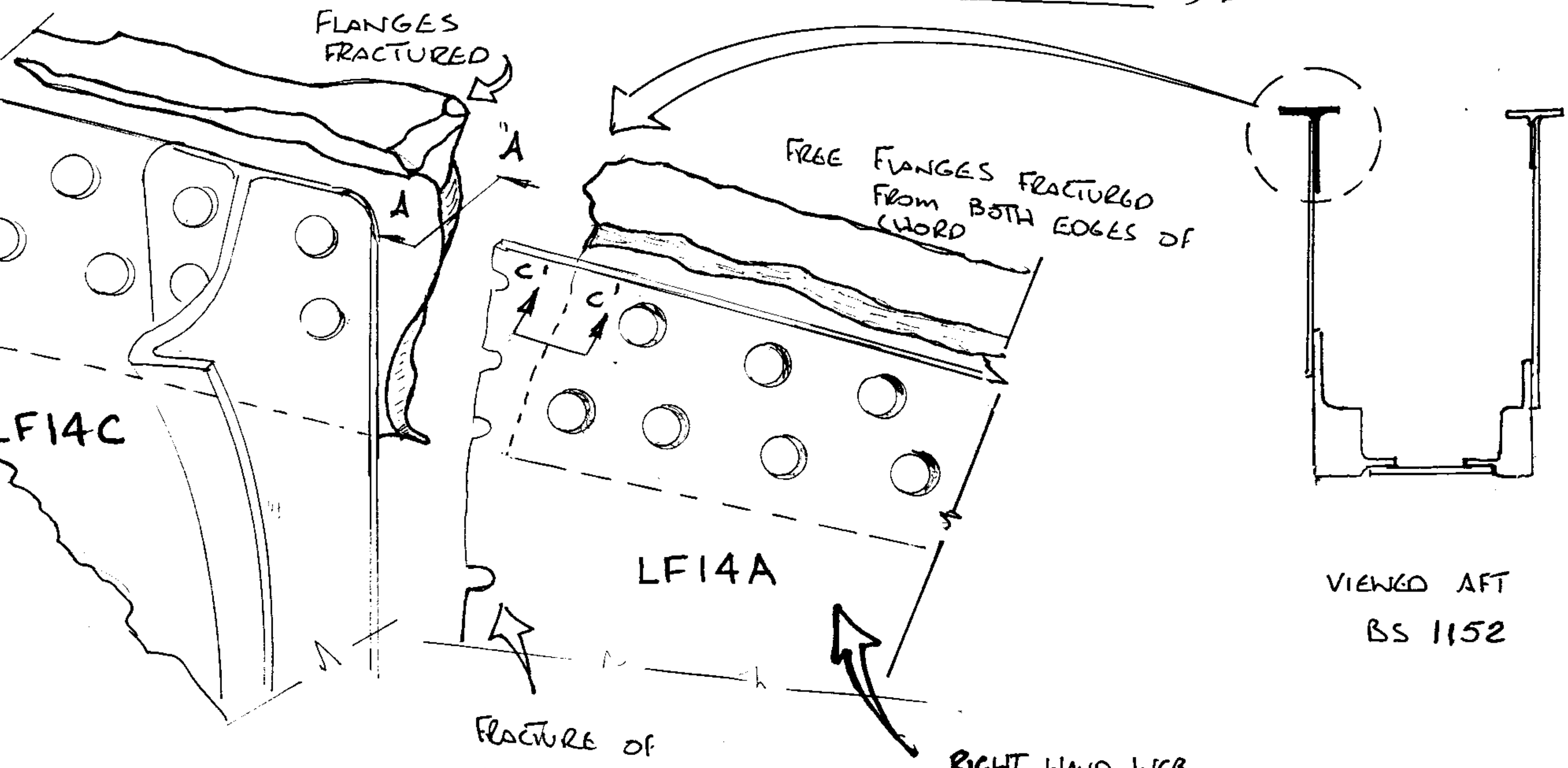
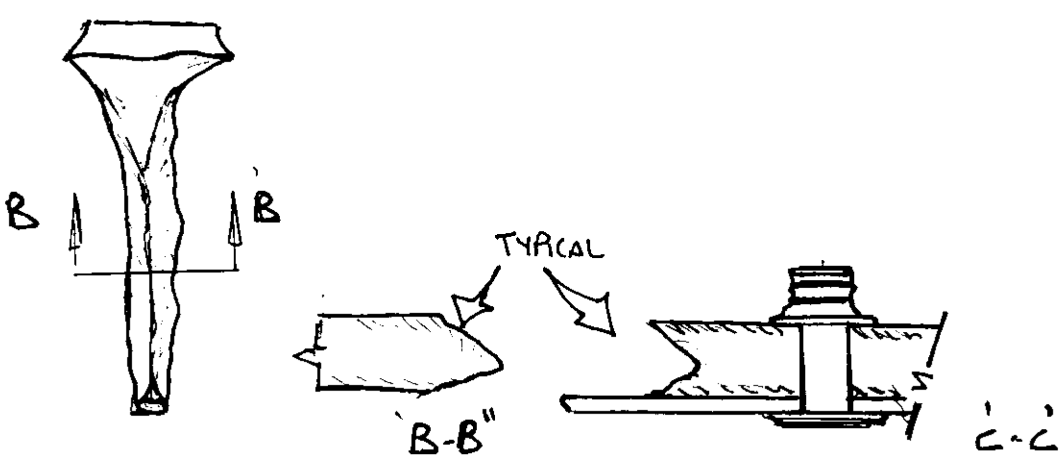
LF-14

FIG 1
KD 9.12.96
DEAN

FRACTURE PLANE (UPPER RIGHT CHORD) ▷1





LF-14

FIG 2
KD 9.17.96
DEAN

▷1 (LEFT UPPER CHORD) SIMILAR

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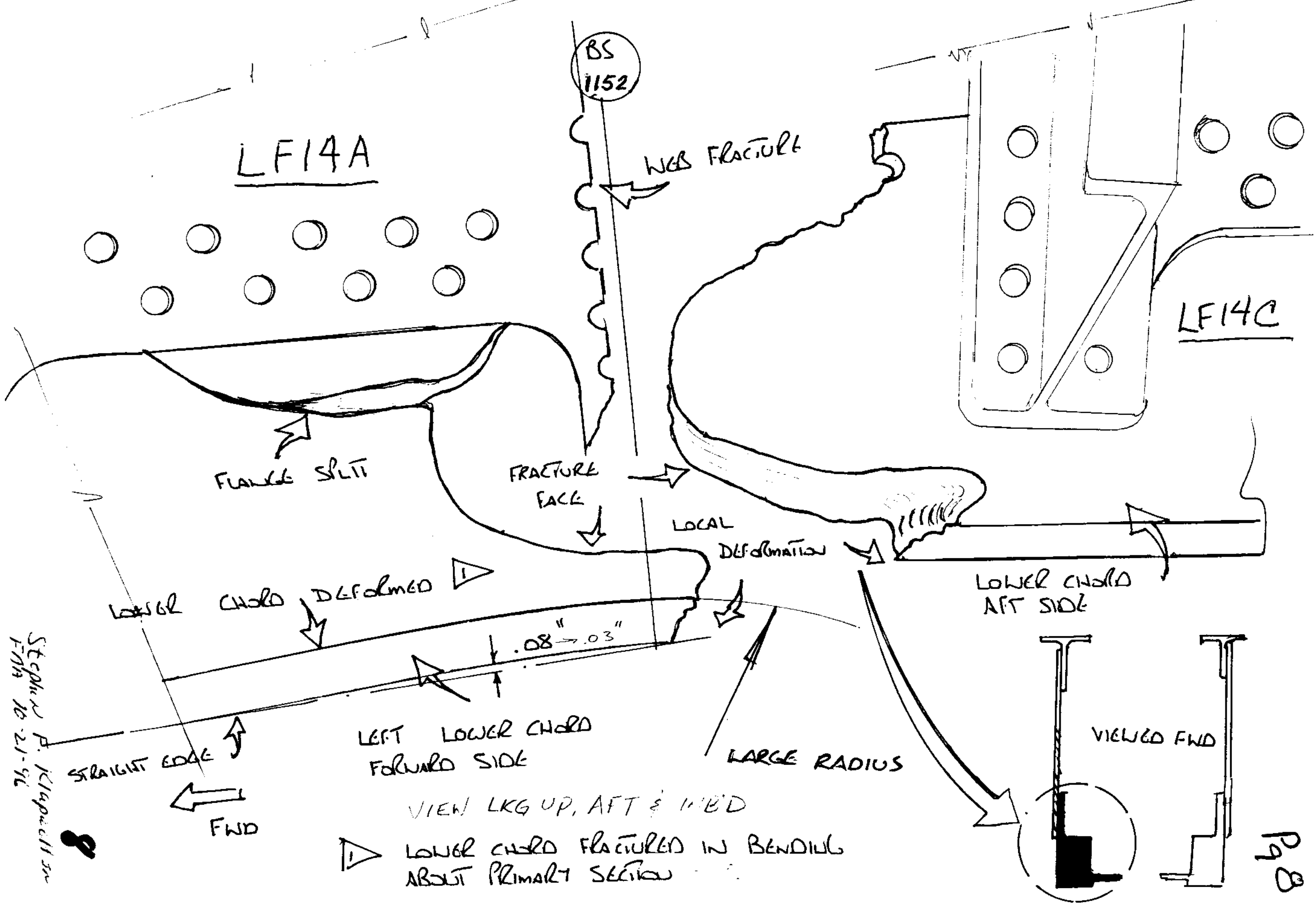
KEEL BEAM (LEFT SIDE) LF-14
LOWER CHORD FRACTURE

FIG 3
KD 9.11.96
DGAN



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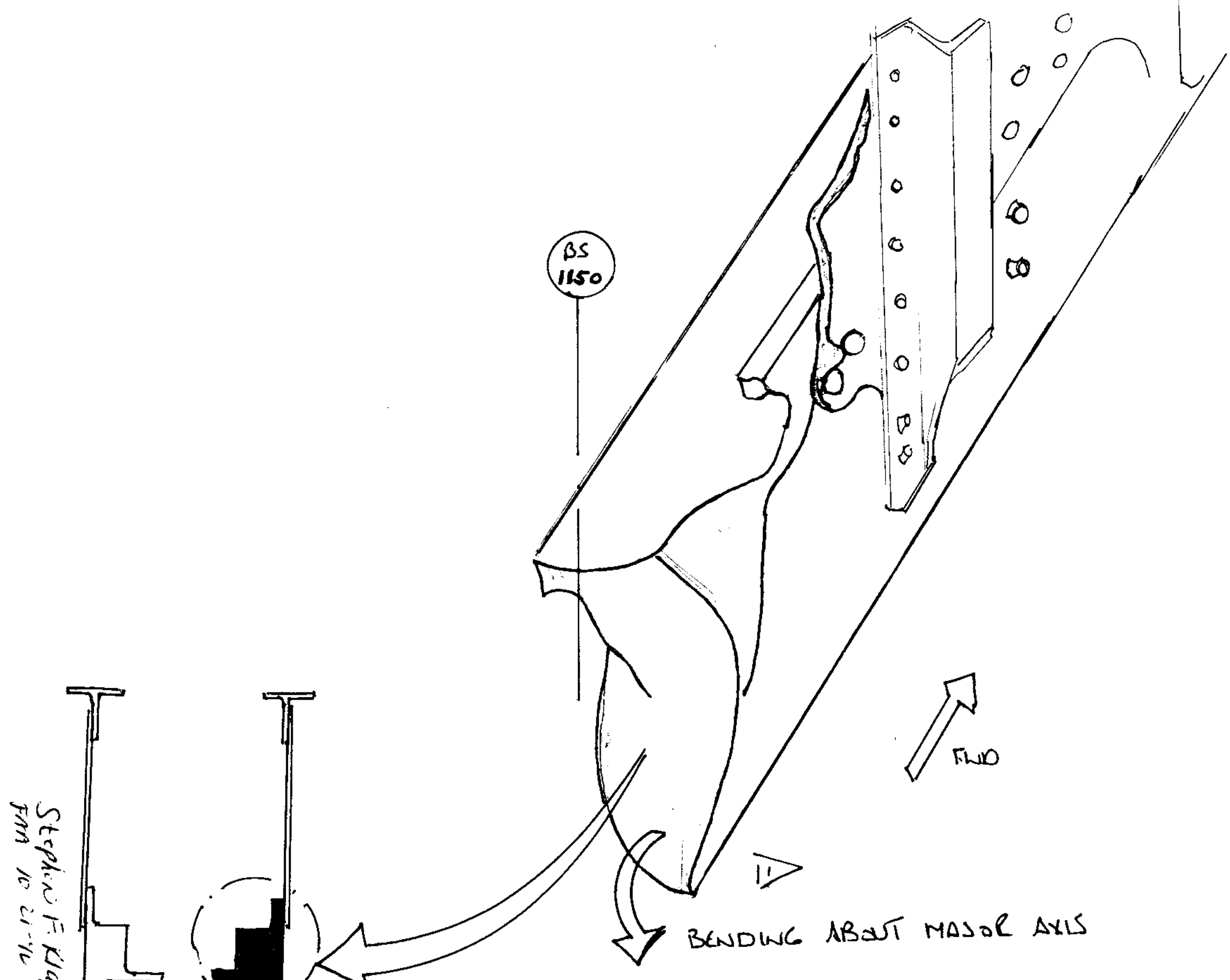

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VIEWED FORWARD

FRACTURE PLANE LF-14A

LOWER CHORD (**RIGHT** SIDE)

1 ▷ SAME AS FIG 1 EXCEPT FRACTURE VIEWED FWD

FIG 4.

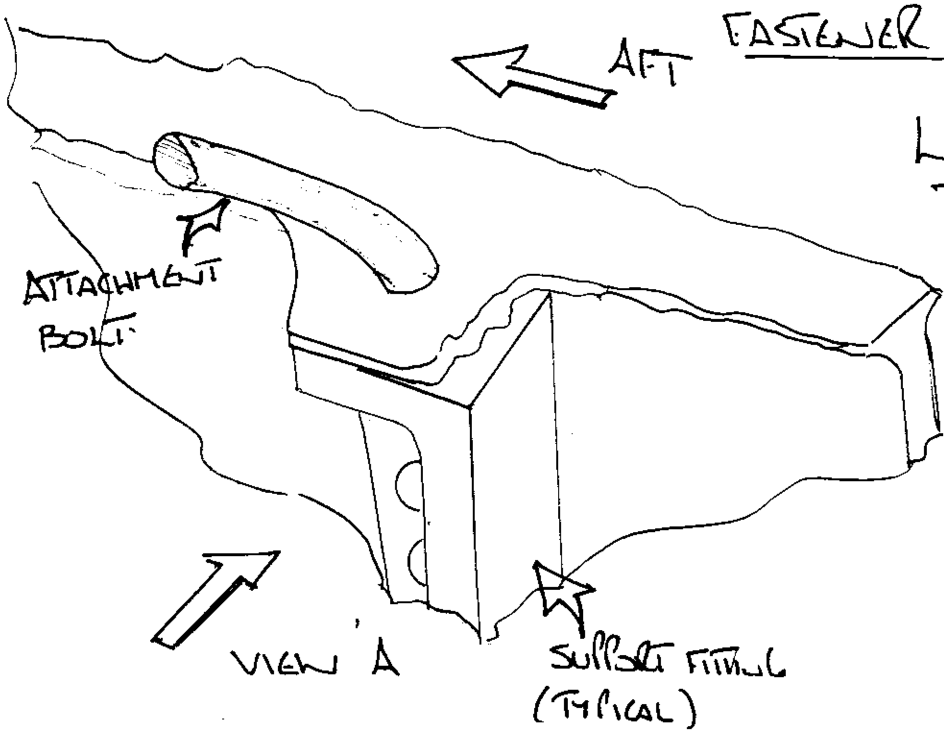
KO 9/12/96
DEAN

Pg 10

KEEL BEAM TO SPANWISE BEAM ATTACHMENT FASTENER CONDITION

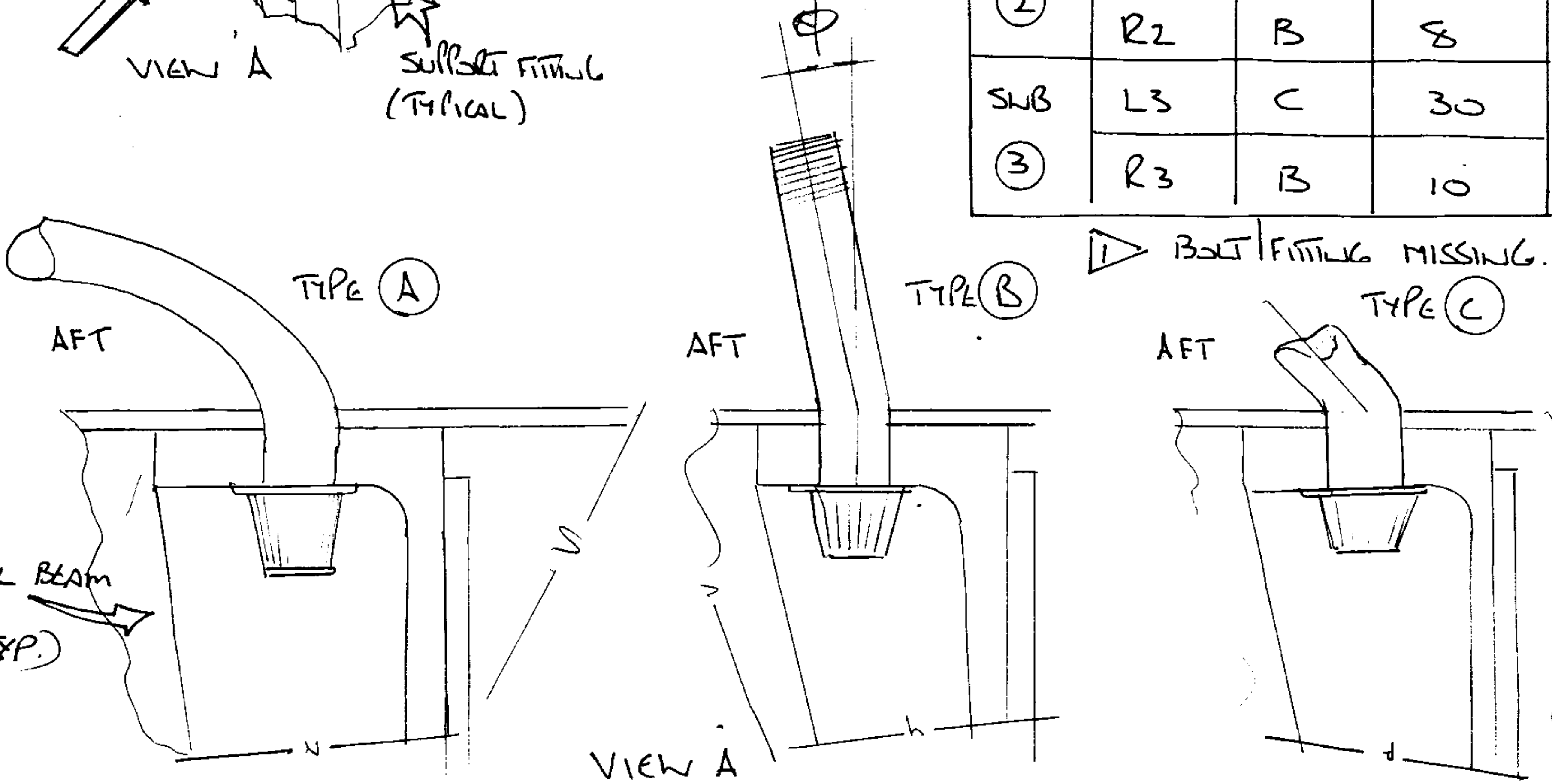
FI' 5
KD 9.12.96
DEAN

LF-14A



STN	ATTACHMENT POSITION	BOLT CONDITION TYPE	BOLT CONDITION ϕ°
SWB ①	L1	⚠1	—
	R1	B	0
MID SPAR	LEFT	A	60
	RIGHT	A	60
SWB ②	L2	B	8
	R2	B	8
SWB ③	L3	C	30
	R3	B	10

⚠1 BOLT/FITTING MISSING.



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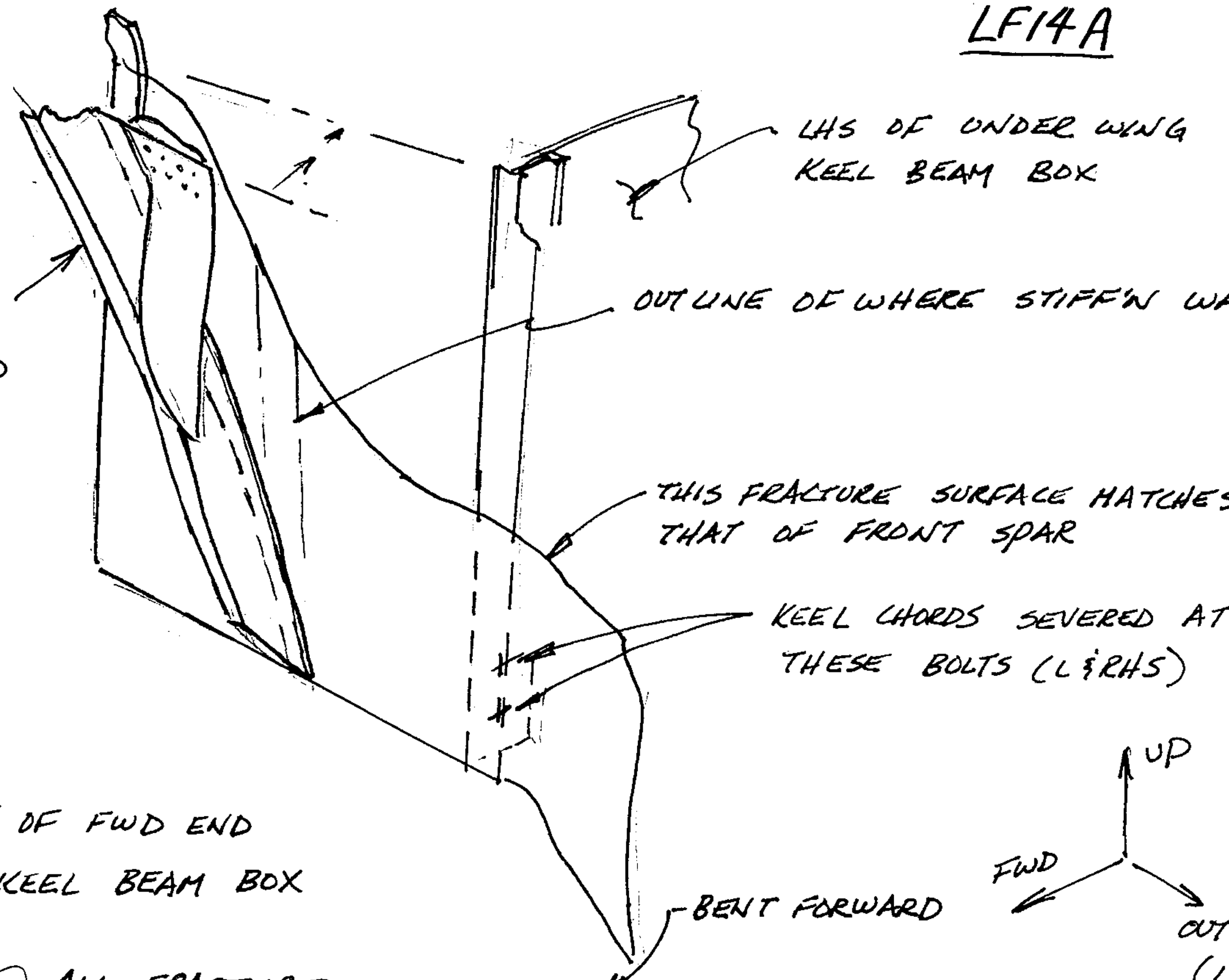
10

LF14A



VIEW OF FWD END
OF KEEL BEAM BOX

Rev (A) ALL FRACTURE SURFACES
FREE OF SOOT

Rev(A) RH 8/11

LF-14

Pg 11

RHansen 8/9/96

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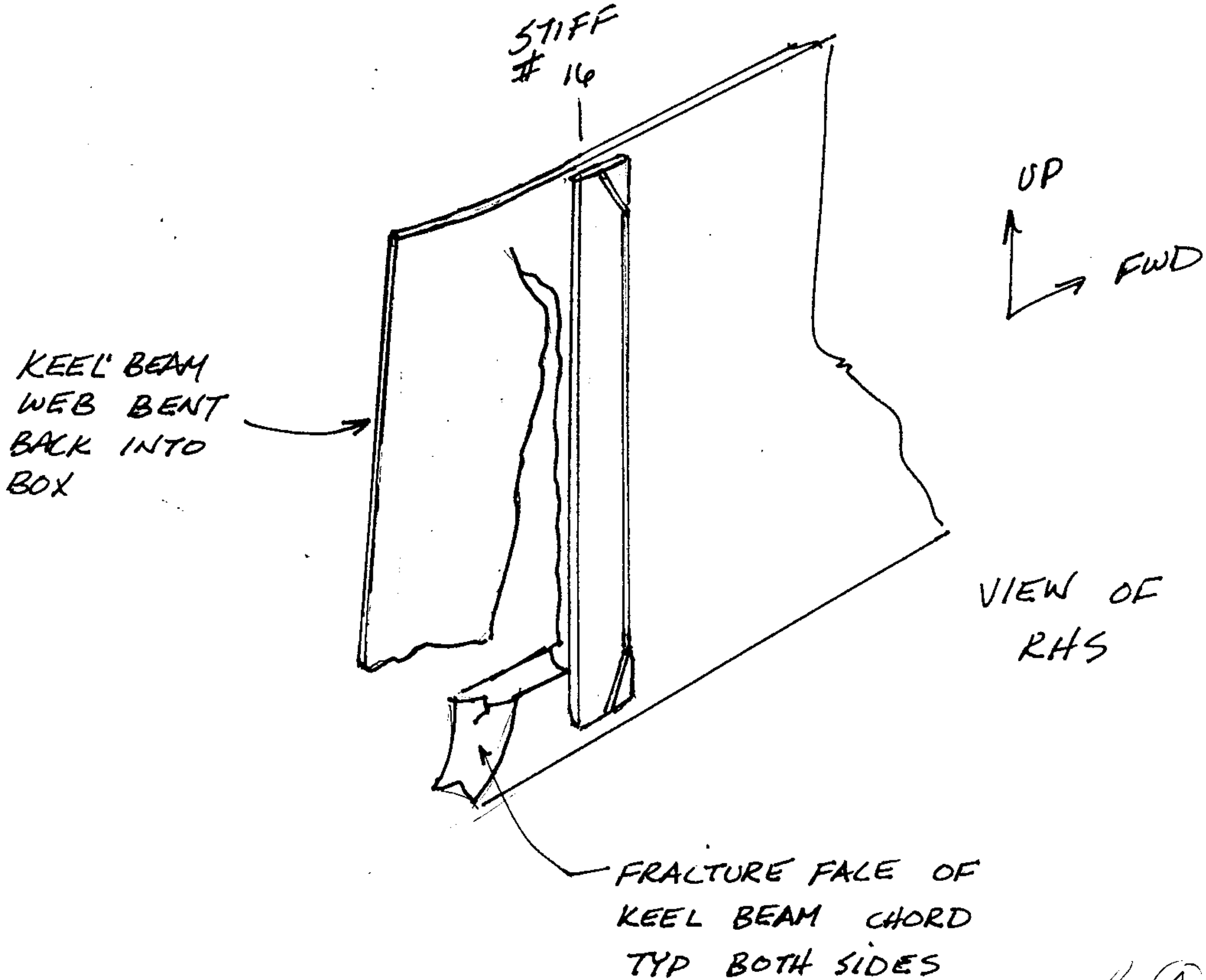
FAA - 10-26-96

11

LF14A



REV (A) → BOTH SURFACES FREE OF SOOT

Rev (A) RH 8/11
LF-14
RH 8/8/

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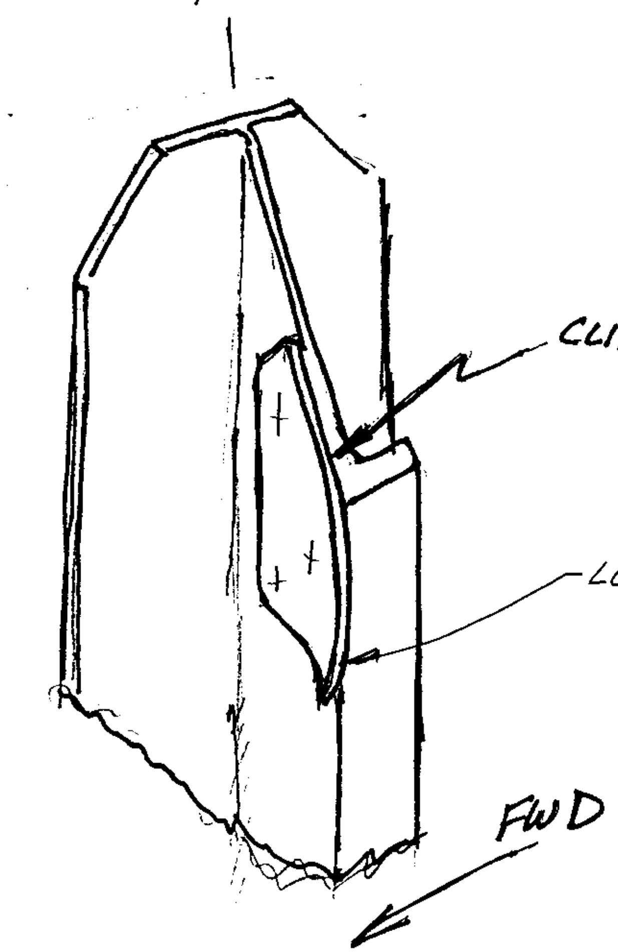
LF14A



VIEW B-B

R Hanauer 8/8/96

LF-14 Pg 13

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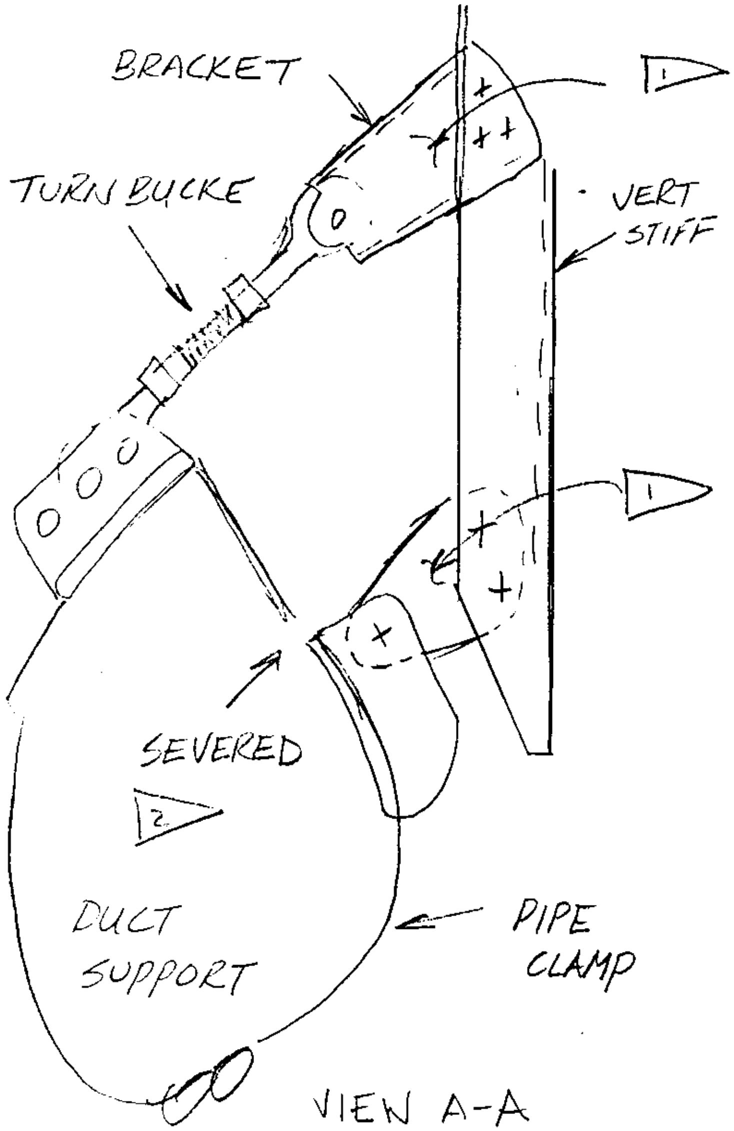
13

LF14A



VIEW A-A

VIEW LKG FWD

1 Pushed Fwd

2 - LOOKS LIKE DUCT WAS PUSHED DOWN & FWD

FOR OTHER VIEWS

$A\text{-}A_1$ HAS ONLY 1 UPR BRACKET WITH 2 TURN BUCKLES, UPR TURN BUCKLE IS SEVERED, LWR TURN BUCKLE IS STILL ATTACHED TO PIPE CLAMP. BRACKET ATTACHED TO STIFF HAS BEEN PUSHED FWD. PIPE CLAMP IS SEVERED

$A\text{-}A_2$ 1 UPR BRACKET W/ 1 TURNBUCKLE ATTACHED TO SEVERED PIPE CLAMP BRACKET PUSHED AFT

$A\text{-}A_3$ SIMILAR DESIGN TO A-A
LWR BRACKET PUSHED FWD
UPR BRACKET TWISTED ABOUT 10° CLOCKWISE

R Hauswer LF-14 8/8/96

Pg 14

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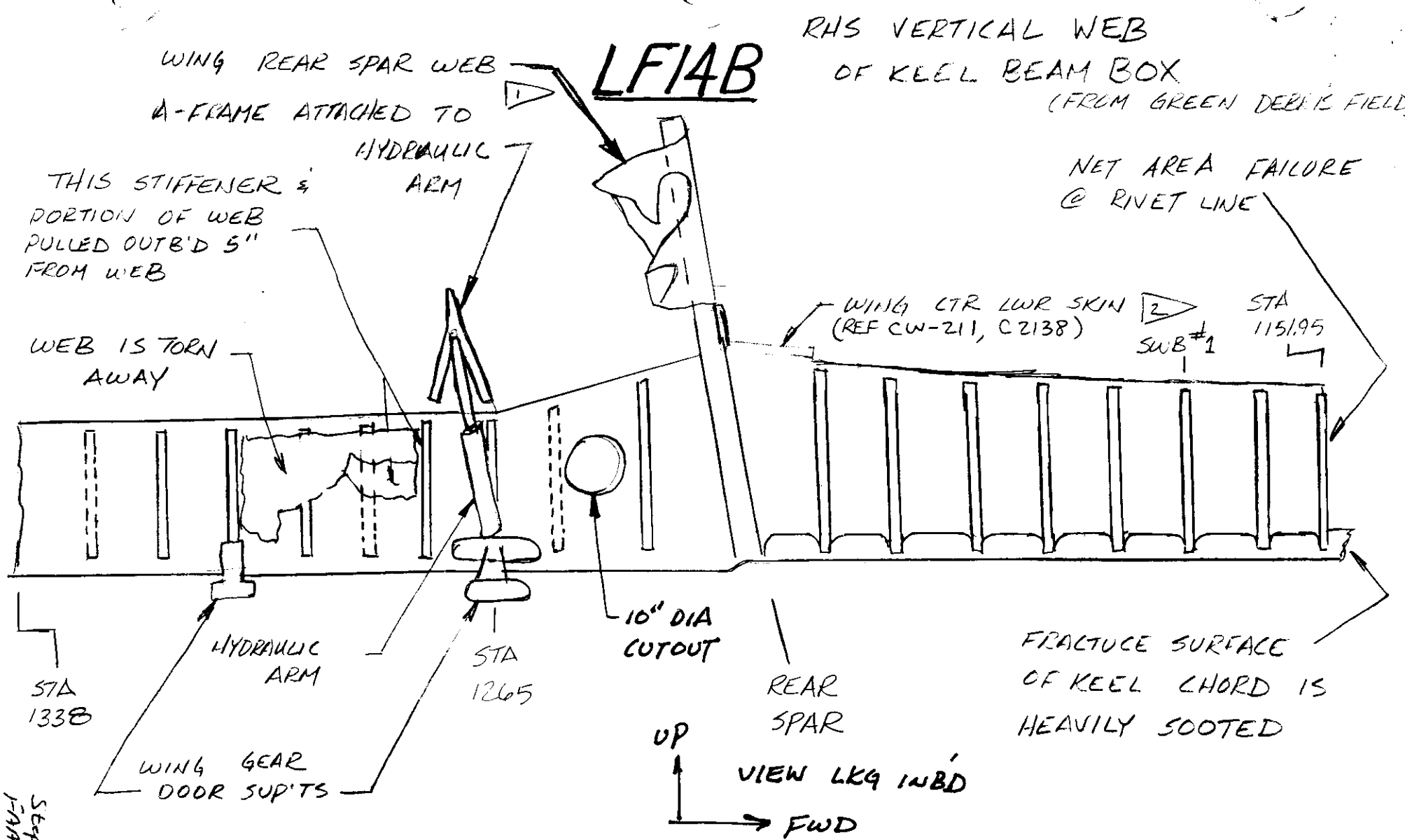
FAA-10-21-96

LF14B



RECEIVED THIS KEEL BEAM BOX IN 2 PIECES, RHS VERTICAL WEB SHOWN ABOVE

Stephen F. Klapp, III
FAA - 10-21-96

15

Pg 15

Pg 9

R Hanover 8/11/96

NOTES

- OUTB'D SURFACE OF RHS KEEL BEAM BOX VERTICAL WEB IS HEAVILY SOOTED FROM REAR SPAR FWD, SOOTING FROM STA 1265 – R/S IS MEDIUM. SOOTING FROM STA 1265 AFT TO END OF PART IS LIGHT

1 FRACTURE SURFACE OF WEB IS SOOTED

2 FRACTURE SURFACE OF VERTICAL LEG OF R/S CHORD IS SOOTED AT LBL 7. FRACTURE SURFACE OF R/S CHORD AT RBL 9 & CENTER BOX LWR SKIN IS NOT SOOTED

- THE INBD SURFACE OF THE RHS KEEL BEAM BOX VERTICAL WEB EXHIBITS THE SAME SOOTING TREND AS OOT'D SURFACE BUT TO A LESSER DEGREE. NOTE, THAT FROM STA 1265 TO AFT END OF PART THERE IS ONLY SLIGHT SOOTING – THE GREEN PRIMER IS PREDOMINATE

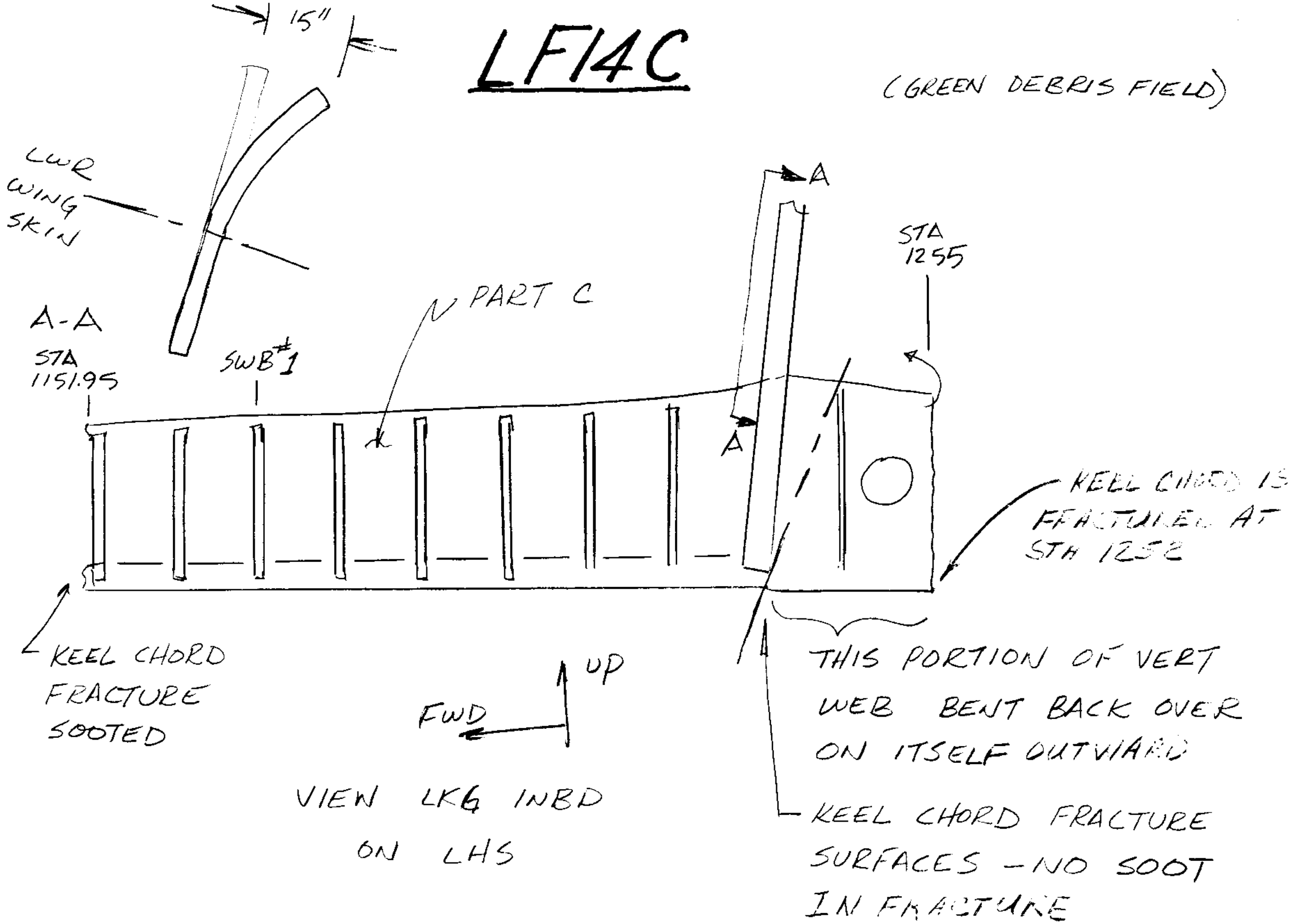
- THE KEEL BEAM BOX INNER CROSS BRACING STRUCTURE AT STA 1265 & 1330 SEPARATED FROM THE LHS KEEL STRUCTURE.

-

Pg 10
8/11/96 14

Stephen F. Klupchak FAA 10-21-96 [signature]

LF14C



R. Hancauer 8/11
Stephen F. Klupacit Jr.
FAA - 10-21-96

NOTES

LF14 PART C

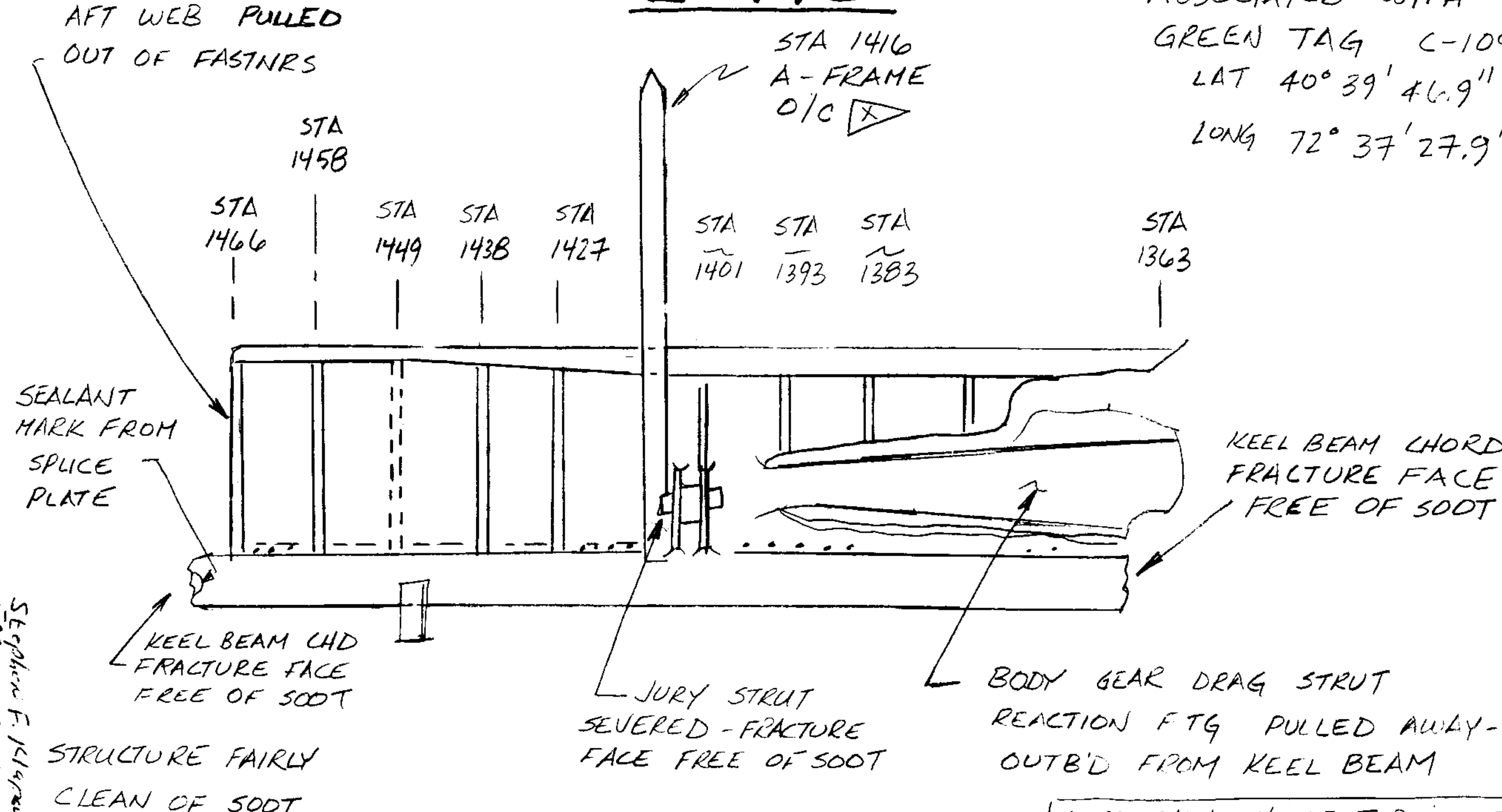
THE RECEIVED PORTION OF THE LHS VERTICAL WEB EXTENDS 8 BAYS FWD OF R/S (SAME AS PIECE FROM RHS) AND 2 BAYS AFT OF R/S. LAST-AFT BAY INCLUDES 10" DIA. CUTOUT

- INB'D SURFACE OF LHS VERTICAL WEB IS SOOTED IN SIMILAR MANNER TO THE INBD SURFACE OF RHS VERTICAL WEB
- THE OUTB'D SURFACE OF VERTICAL WEB (LHS) HAS GREY COLOR - MEDIUM SOOTING
- THE FRACTURE SURFACE OF FWD END OF KEEL BEAM CHORD AT FWD END OF THIS SEGMENT IS SOOTED. THIS LHS KEEL CHORD IS FRACTURED AT R/S & JUST FWD OF STA 1265 - NEITHER OF THOSE 2 SURFACES EXHIBIT SOOTING

Stephen F. Kilpatrick
FAA - 10-21-96

LF14D

ASSOCIATED WITH
GREEN TAG C-109
LAT 40° 39' 46.9"
LONG 72° 37' 27.9"



VIEW LOOKING INB'D
ON RHS KEEL BEAM BOX

LESS THAN 10% OF TOP & LWR PANELS ARE STILL ATTACHED
Pg 12 RHanscom 8/11/96

△x CHORD EXTENDS TO END OF OUTB'D FLANGE WHERE IT THEN IS SEVERED IN A DOWN & INBD DIRECTION ACROSS A FRAME CHD & WEB. ATTACH ANGLE/TEE IS SEVERED AT BL 0 THE ATTACH ANGLE/TEE FRACTURE IS SOOT FREE.

Stephen F. Klapmuts
FAA - 10-21-96

Pg 13

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