

**CHAPTER 4**

**TAIL UNIT**

CHAP.

4

## CHAPTER 4 TAIL UNIT

### LIST OF CONTENTS

	Para.
General ...	1
Repair prohibitions ...	2

TAIL PLANE	
General ...	3
Negligible damage	
Skin and stringers ...	4
Spars and ribs ...	5
Repairs ...	6

	Fig.
Location diagram for tail unit ...	1
Key diagram of tail plane ...	2
Key diagram of fin ...	3
Key diagram of elevator ...	4
Key diagram of rudder ...	5
Non-repairable areas - tail unit ...	6

#### General

1. The tail unit consists of the tail plane, the upper portion of the fin, the elevators, rudder, and the bullet fairing. The lower portion of the fin, being integral with the rear fuselage, is dealt with in Chap.2.

#### Repair prohibitions

2. User Unit repairs to the tail plane and fin are not permitted in the areas shown shaded in fig.6. The bullet fairing is not repairable. Restrictions on repair of the rudder and elevators are given in the relevant text.

### TAIL PLANE

#### General

3. The electrically-operated, variable-incidence, swept-back tail plane is of one-piece cantilever construction, consisting of two main spars joined by a heavy central rib. A 10 s.w.g. light alloy skin to Specification L.73 covers the majority of the component, but the nosing forward of the

	Para.
UPPER PORTION OF FIN	
General ...	7
Negligible damage ...	8
Repairs ...	9
Skin riveting ...	10

	Para.
ELEVATORS	
General ...	11
Repair prohibitions ...	12

### LIST OF ILLUSTRATIONS

	Fig.
Repair to 10 s.w.g. tail plane skin ...	7
Repair to tail plane nosing and rib ...	8
Flush repair to skin of fin ...	9
Flush repair to skin and rib of fin ...	10
Flush repair to rudder and elevator Skin ...	11

main spar is covered with a 16 s.w.g. skin to Specification L.72. The main skin is reinforced with extruded T-section stringers. The tail plane is attached to, and pivots about, a fitting built in to frame No.55 on the rear fuselage; this fitting also carries the rear attachments of the upper portion of the fin.

#### Negligible damage

##### Skin and stringers

4. Smooth, isolated dents in free areas of the skin may be neglected provided they are not deeper than 0.015 in.

##### Spars and ribs

5. Negligible damage to spar webs and all flanged plate members is restricted to smooth, isolated dents, free from cracks and abrasions, not exceeding 0.020 in. deep. Slight deformation of the plate flanges may be neglected provided there are no cracks and adjacent fixings have not been strained.

	Para.
Negligible damage ...	13
Repairs ...	14
Mass balance ...	15

	Para.
RUDDER	
General ...	16
Repair prohibitions ...	17
Negligible damage ...	18
Repairs ...	19
Mass balance ...	20

	Fig.
Flush repair to elevator skin and stringer ...	12
Restoration of elevator mass balance	13
Flush repair to skin and stiffener of rudder ...	14
Flush repair to skin and rib of rudder	15
Restoration of rudder mass balance ...	16

#### Repairs

6. Cracks, perforations or other damage greater than negligible to the 10 s.w.g. skin may be repaired as shown in fig.7. Damage to the 16 s.w.g. nosing skin and rib should be repaired as shown in fig.8.

### UPPER PORTION OF FIN

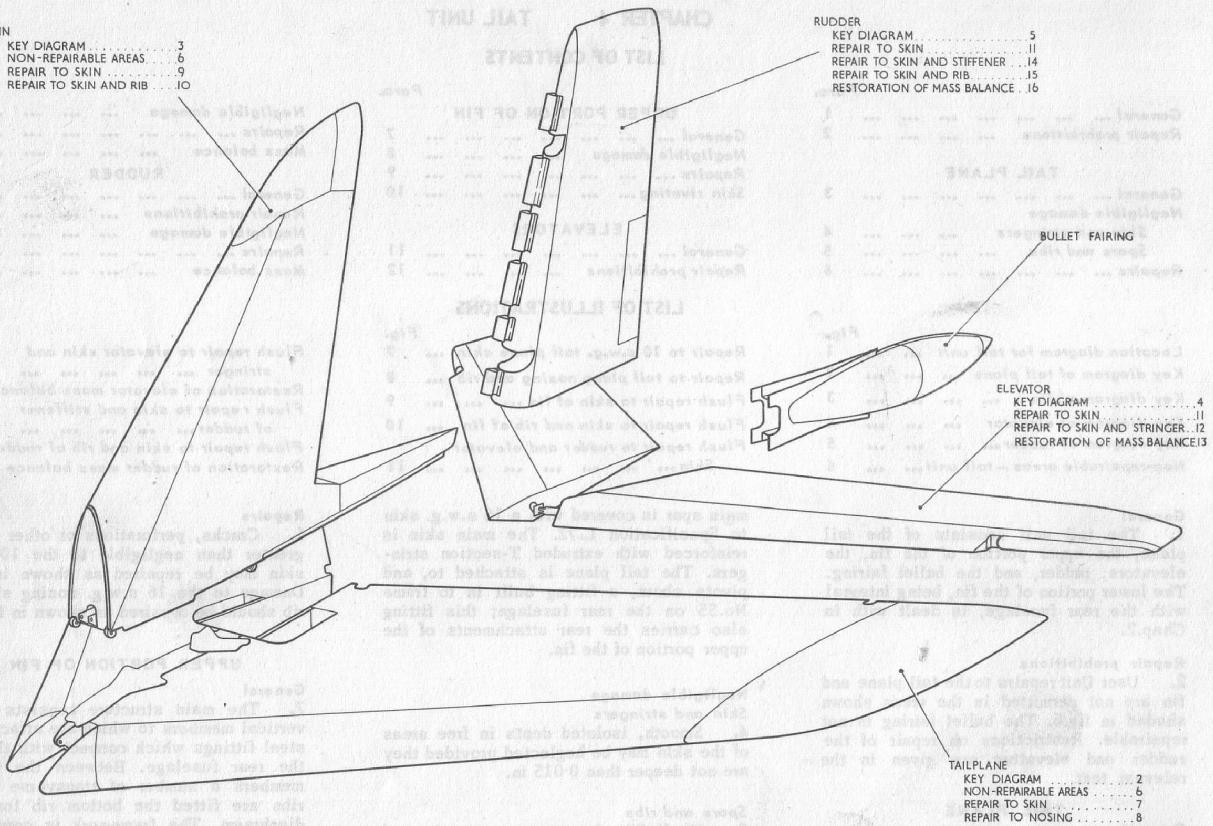
#### General

7. The main structure consists of two vertical members to which are attached the steel fittings which connect with those on the rear fuselage. Between the vertical members a number of transverse flanged ribs are fitted the bottom rib forming a diaphragm. The framework is covered by light alloy sheets joined at the forward vertical member.

#### Negligible damage

8. Smooth isolated dents in the skin, free from cracks and sharp corners, may be neglected provided they are not deeper than

FIN	
KEY DIAGRAM . . . . .	3
NON-REPAIRABLE AREAS . . . . .	6
REPAIR TO SKIN . . . . .	9
REPAIR TO SKIN AND RIB . . . . .	10



UNLESS OTHERWISE STATED NUMBERS SHOWN  
ARE FIGURE NUMBERS OF THIS CHAPTER

FIG. 1. LOCATION DIAGRAM FOR TAIL UNIT

RESTRICTED

0.020 in. Negligible damage to members is as defined in para.5.

#### Repairs

9. The upper portion of the fin is a reasonably small and easily detachable component so that complete renewal may be preferable to repair. User unit repairs are confined to those shown in fig.9 and 10.

#### Skin riveting

10. Should the existing 1/8 in. dia. skin rivets at the base of the fin show signs of lifting they should be replaced by 5/32 in. dia. A.G.S.2051 pop rivets countersunk flush.

## ELEVATORS

#### General

11. Each elevator consists of a channel-section spar, nose ribs, flanged plate main ribs, and a skin covering of 26 s.w.g. light alloy sheet (24 s.w.g. on bottom skin - Post Mod.708) stiffened by channel section stringers.

#### Repair prohibitions

12. The mass balance weight is in the nosing, which is of mild steel plate, and any damage in this area will necessitate complete renewal of the nosing. The trim tabs are also non-repairable.

#### Negligible damage

13. Smooth, isolated dents in the skin and stringers may be neglected provided they are in free areas and do not exceed 0.015 in. deep.

#### Repairs

14. Repairs to skin are shown in fig.11, and to both skin and stringers in fig.12. Not more than two such repairs may be made to one elevator, and they must not be on

adjacent panels in any one skin. More extensive damage will entail renewal of the elevator.

#### Mass balance (fig.13)

15. Repairs forward of the hinge centre-line will not necessitate any adjustment of the mass balance. Aft of the hinge centre-line one repair may be made without adjustment of mass balance provided that the product of the weight added by the repair and the distance "B" does not exceed 8 oz. in. The weight added by the repair and the arm "B" should, however, be recorded on the serial number plate with a note to the effect that the elevator has not been re-balanced. If the product of the first repair made aft of the hinge centre-line exceeds 8 oz. in., or when a second repair is made, it will be necessary to adjust the mass balance weight. In the latter instance the weight added by the first repair must also be taken into account when making the adjustment. The method of fitting the additional weight is shown in fig.13.

## RUDDER

#### General

16. The rudder is of light alloy with a 26 s.w.g. skin covering aft of the front spar and mass balance weights forward of the spar. A light alloy trim tab is inset in the trailing edge.

#### Repair prohibitions

17. No repairs to the trim tab are permitted. The tab must be renewed if damaged in any way.

#### Negligible damage

18. (1) Skin and stringers - Smooth, isolated dents in free areas may

be neglected provided they are not deeper than 0.015 in.

(2) Nosing, spars and ribs. - Smooth isolated dents in plate flanges and booms of the webs may be neglected provided they are not deeper than 0.020 in. Slight deformations of the plate flanges may be neglected provided there are no cracks and adjacent fixings have not been strained.

#### Repairs

19. Repairs to the skin are given in fig.11, to skin and stiffener in fig.14, and to skin and rib in fig.15. Not more than two such repairs may be made to one rudder, and they must not be in adjacent panels in any one skin. More extensive damage will entail renewal of the rudder.

#### Mass balance (fig.16)

20. Repairs forward of the hinge centre-line will not necessitate adjustment of the mass balance. Aft of the hinge centre-line, one repair may be made without adjustment of the mass balance provided the product of the weight added by the repair and the distance "B" does not exceed 8 oz. in. The weight of the repair and the arm "B" should, however, be recorded on the serial number plate together with a note to the effect that the rudder has not been rebalanced. If the product of the first repair made aft of the hinge centre-line exceeds 8 oz. in. or when a second repair is made, it will be necessary to adjust the mass balance weight. In the latter instance the weight added by the first repair must also be taken into account when making the adjustment. The method of fitting the additional weights is shown in fig.16.

Key No.	Part No.	Description
<b>Nose ribs</b>		
1	B.211558	Nose rib seal, port
	B.185499	Nose rib seal, starboard
2	B.211557	Skin joint nose rib port
	B.184715	Skin joint nose rib starboard
3	B.184703	Nose rib OA
4	B.184704	Nose rib A
5	B.184705	Nose rib AB
6	B.184706	Nose rib B
7	B.211556	Nose rib BC port
	B.184707	Nose rib BC starboard
8	B.184708	Nose rib C
9	B.184709	Nose rib CD
10	B.184710	Nose rib D
11	B.184711	Nose rib DE
12	B.184712	Nose rib E
13	A.184716	Outer nose rib
<b>Inter-spar ribs</b>		
14	D.185657	Centre-line rib
15	D.185662	Hinge rib
16	B.185021	Inter-spar rib A port
	B.185022	Inter-spar rib A starboard
17	B.185023	Inter-spar rib B, port
	B.185024	Inter-spar rib B, starboard
18	B.185025	Inter-spar rib C
19	B.185026	Inter-spar rib D
20	B.185027	Inter-spar rib E
<b>Ribs aft of rear spar</b>		
21	C.185668	Inboard rib, port
	C.185669	Inboard rib, starboard

### KEY TO FIG. 2

(Key diagram of tail plane)

Key No.	Part No.	Description
22	B.185570	Rib A
23	B.185571	Rib B
24	B.185572	Rib C
25	B.185573	Rib D
26	B.185574	Rib E
<b>Structure at elevator hinges</b>		
27	B.185565	Inner hinge rib
28	C.185554	Inner hinge rib
29	B.185560	Inner hinge rib
30	D.215687	Outer hinge rib
<b>Spars</b>		
31	C.185624	Front spar - Centre portion
32	D.185797	Front spar
33	D.185779	Rear spar
<b>Tail plane tip</b>		
34	C.185054	Front former
35	C.185055	Centre former
36	C.185056	Rear former
37	A.185057	Nose rib
38	B.185058	Front intermediate rib
39	B.185059	Rear intermediate rib
40	B.185060	Rear rib
41	C.185061	Shroud member
<b>Miscellaneous</b>		
42	B.170899	Diaphragm
43	A.185802	Diaphragm
44	C.185820	Shroud

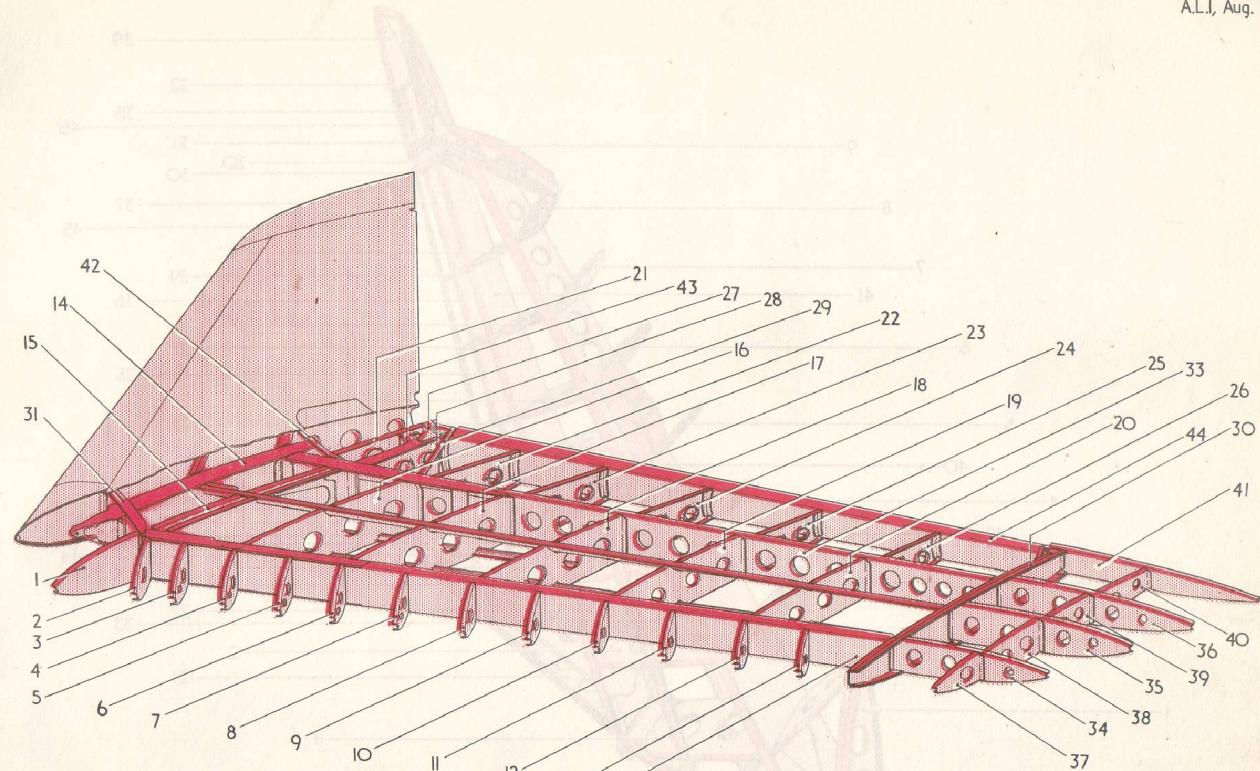


FIG. 2. KEY DIAGRAM OF TAILPLANE

RESTRICTED

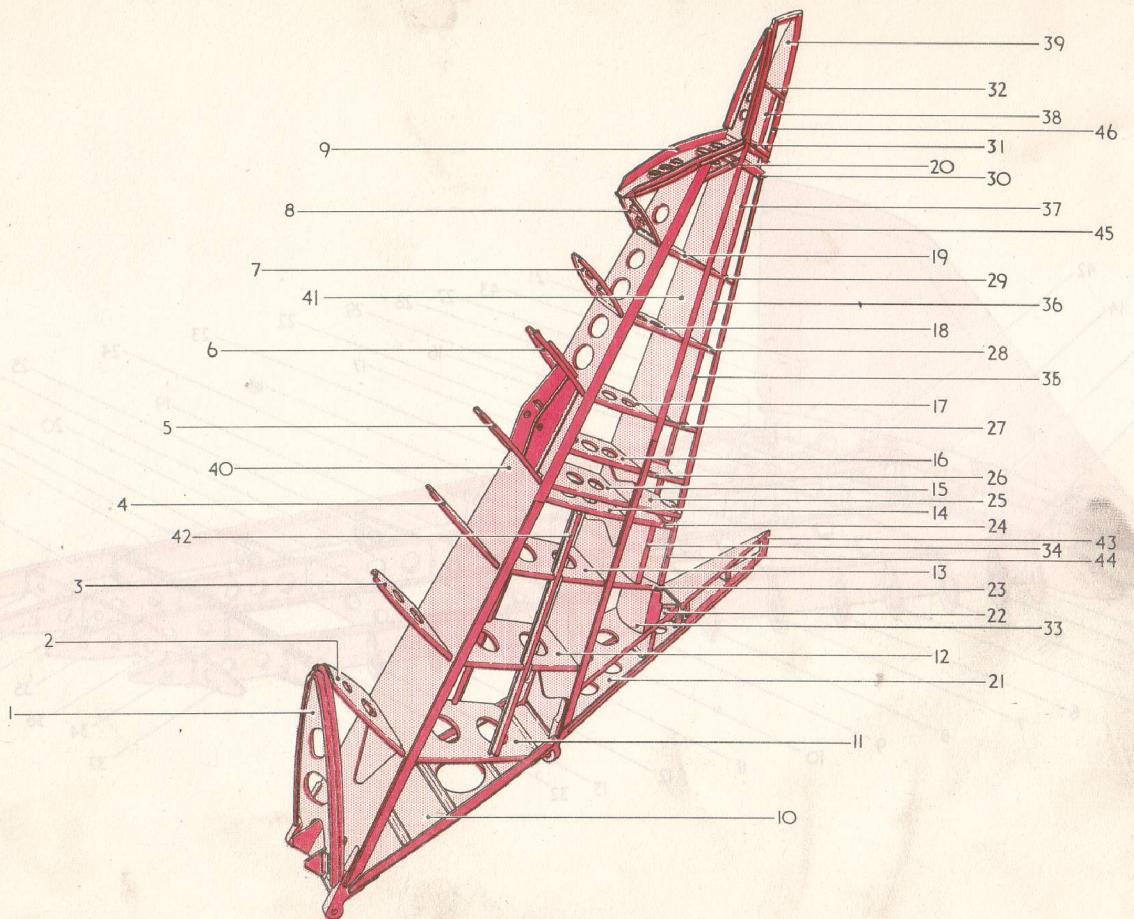


FIG.3. KEY DIAGRAM OF FIN

RESTRICTED

**KEY TO FIG. 3**

(Key diagram of fin)

Key No.	Part No.	Description
<b>Nose ribs</b>		
1	C.172170	Former
2	B.183579	Nose rib B
3	B.183580	Nose rib C
4	B.183581	Nose rib D
5	B.183582	Nose rib E
6	B.183583	Nose rib F
7	B.183584	Nose rib G
8	B.183148	Nose rib H
9	C.183034	Top rib
<b>Inter-spar ribs</b>		
10	D.222456	Rib A
11	B.183362	Rib B
12	B.183363	Rib C
13	B.183364	Rib D
14	B.183365	Rib D.1
15	B.183366	Rib E
16	B.222455	Rib E.1
17	F.222454	Rib F
18	B.183369	Rib G
19	B.183370	Rib H
20	B.183035	Top inter-spar rib
<b>Tail ribs</b>		
21	C.185845	Bottom rib
22	B.185416	Rib
23	B.182978	Tail rib D
24	B.182990	Tail rib D.1
25	B.183260	Tail rib E

Key No.	Part No.	Description
<b>Shrouds</b>		
26	B.222453	Tail rib E.1
27	B.222460	Tail rib F
28	B.182998	Tail rib G
29	B.182999	Tail rib H
30	B.183143	Bracket, upper
31	B.183142	Bracket, lower
32	A.183037	Tail rib J
<b>Spar</b>		
33	B.183216	Shroud
34	B.183040	Shroud
35	B.183042	Shroud
36	B.183043	Shroud
37	B.183044	Shroud
38	B.183045	Shroud
39	B.183229	Top shroud
<b>Miscellaneous</b>		
40	D.183316	Front spar
41	D.183317	Rear spar
42	F.183835	Stiffener
43	C.186356	Detachable rear portion
44	F.183820	Skin stiffener
45	A.183823	Skin stiffener, port
46	A.222457	Skin stiffener, starboard
	F.183821	Skin stiffener

KEY TO FIG. 4

(Key diagram of elevator)

Key No.	Part No.		Description
	Port	Starboard	
<b>Nose ribs</b>			
1	A.185088	A.185089	Nose rib A
2	A.185090	A.185091	Nose rib B
3	A.185092	A.185093	Nose rib C
4	A.185094	A.185095	Nose rib D
5	A.185096	A.185097	Nose rib E
6	A.185098	A.185099	Nose rib F
7	A.185100	A.185101	Nose rib G
8	A.185102	A.185103	Nose rib H
9	—	F.185208	Nose rib J.1
10	—	F.185209	Nose rib K
11	—	F.173708	Nose rib L
12	—	F.185210	Nose rib M
<b>Inter-spar ribs</b>			
13	A.185421	A.185422	Inter-spar rib A.1
14	B.185423	B.185424	Inter-spar rib A
15	B.185425	B.185426	Inter-spar rib B
16	B.185427	B.185428	Inter-spar rib C
17	B.185429	B.185430	Inter-spar rib D
18	B.185431	B.185432	Inter-spar rib E
19	B.185433	B.185434	Inter-spar rib F
20	B.185435	B.185436	Inter-spar rib G
21	A.185437	A.185438	Inter-spar rib H
22	A.185439	A.185440	Inter-spar rib J
23	A.185441	A.185442	Inter-spar rib K
24	A.185443	A.185444	Inter-spar rib L
25	A.185445	A.185446	Inter-spar rib M
<b>Tail ribs</b>			
26	B.191873	B.191874	Tail rib A.1
27	B.192023	B.192024	Tail rib A
28	C.185110	C.185111	Tail rib B
29	C.185112	C.185113	Tail rib C
30	C.185114	C.185115	Tail rib D
31	C.185116	C.185117	Tail rib E

Key No.	Part No.		Description
	Port	Starboard	
<b>Spars and stiffeners</b>			
32	C.185118	C.185119	Tail rib F
33	C.185120	C.185121	Tail rib G
34	C.185122	C.185123	Tail rib H
35	C.185124	C.185125	Tail rib J
36	C.185126	C.185127	Tail rib K
37	C.185128	C.185129	Tail rib L
38	C.185130	C.185131	Tail rib M
<b>Miscellaneous</b>			
39	—	D.171571	Main spar
40	B.171747	B.171748	Sub-spar
41	D.184987	D.184988	Sub-spar
42	B.184991	B.184992	Skin stiffener, top
	B.184993	B.184994	Skin stiffener, bottom
43	E.227099/4	E.227100/4	Skin stiffener, bottom
44	E.227099/5	E.227100/5	Skin stiffener, bottom
45	E.227099/6	E.227100/6	Skin stiffener, bottom
46	E.227099/7	E.227100/7	Skin stiffener, bottom
47	E.227099/8	E.227100/8	Skin stiffener, bottom
48	B.190154	B.190155	Trailing edge
49	—	B.190156	Edge member
50	B.191927	B.191928	Hinge spool rib
51	A.185317	A.185318	Inboard end rib, forward portion
52	C.191889	C.191890	Inboard end rib, aft portion
53	C.185034	C.185035	Assembly of nosing
54	B.185581	B.185582	Reinforcing, top
	B.185583	B.185584	Reinforcing, bottom
55	—	B.184989	Packing, top
	—	B.184990	Packing, bottom
56	—	A.185603	Access door
57	B.186412	B.186413	Fork end
58	B.186414	B.186415	Split lever

Items that are not "handed" are shown in the centre column

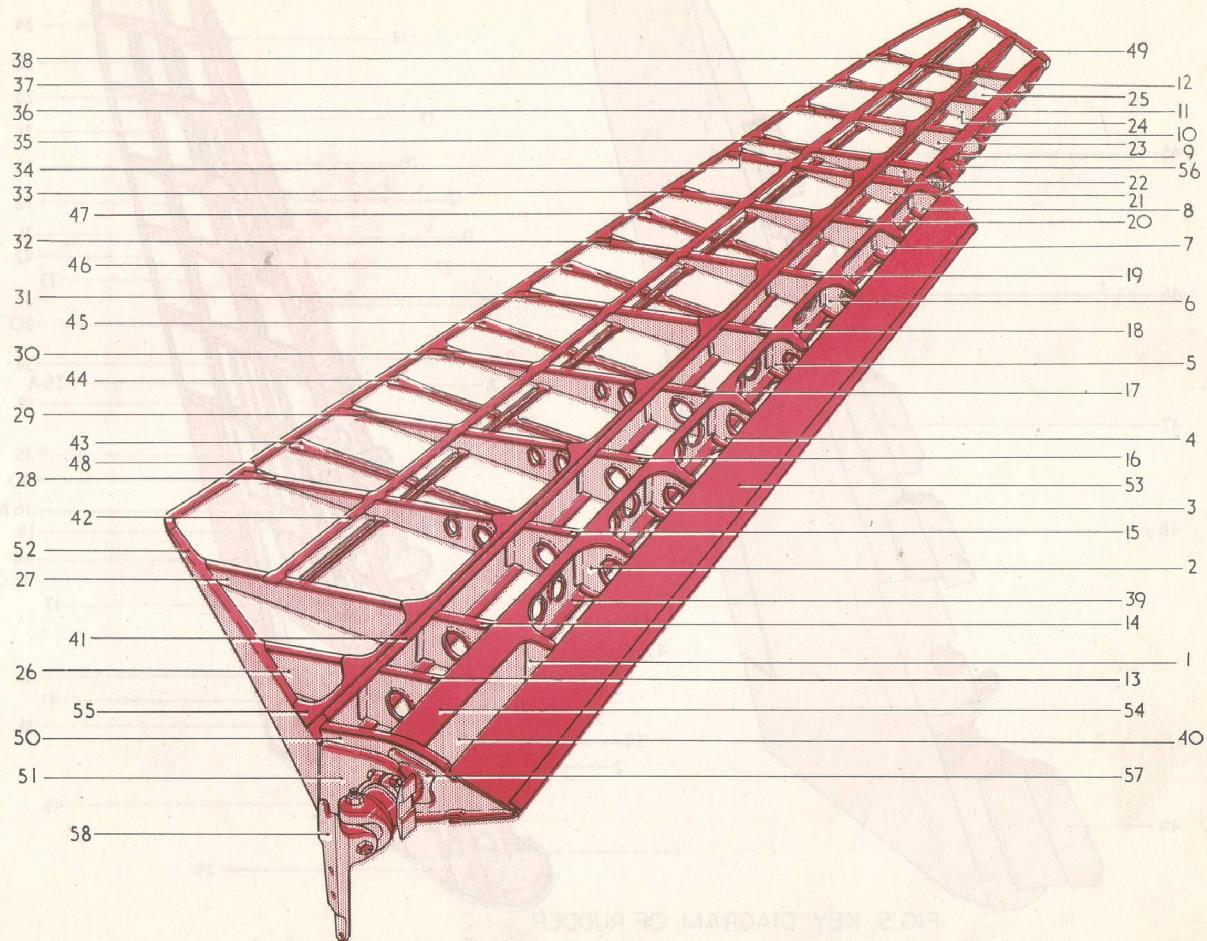


FIG. 4. KEY DIAGRAM OF ELEVATOR  
RESTRICTED

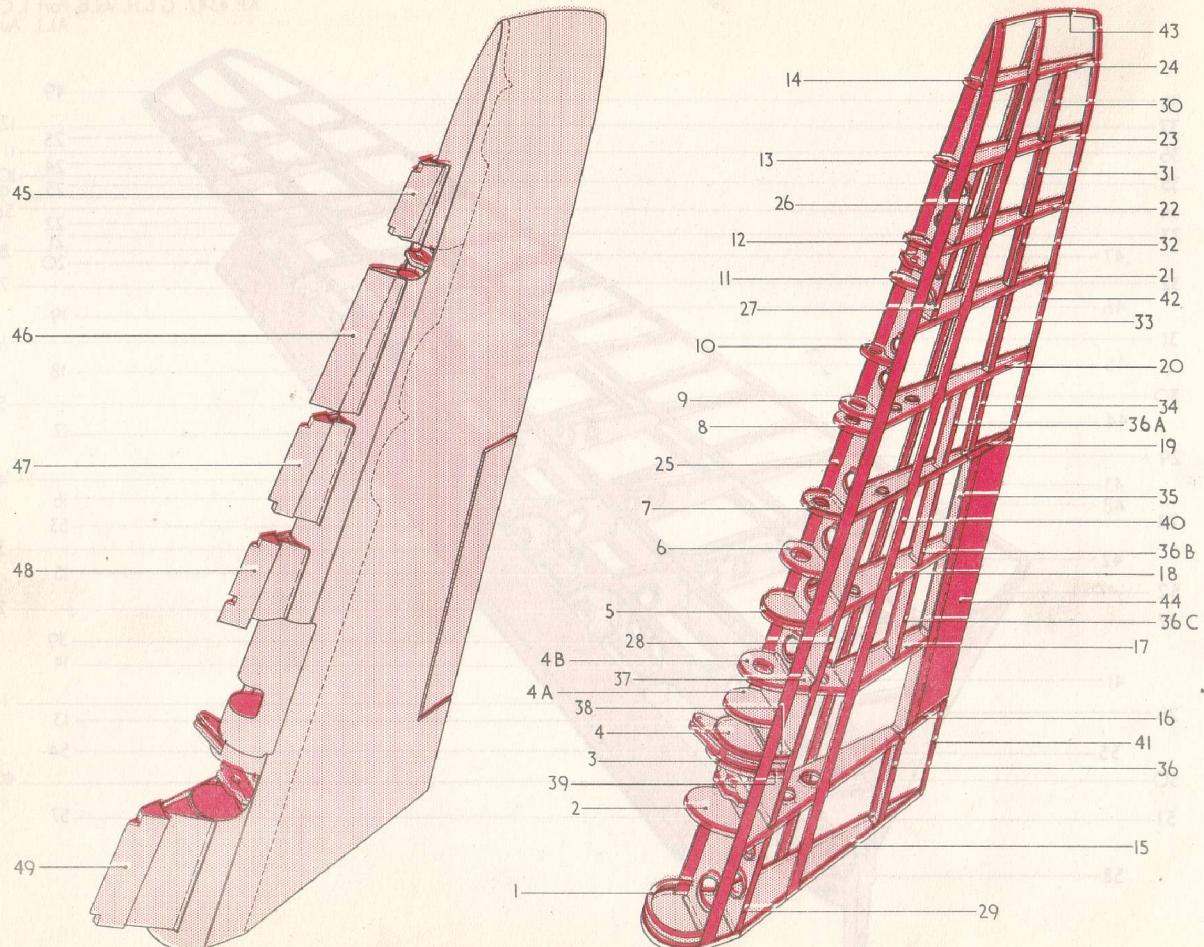
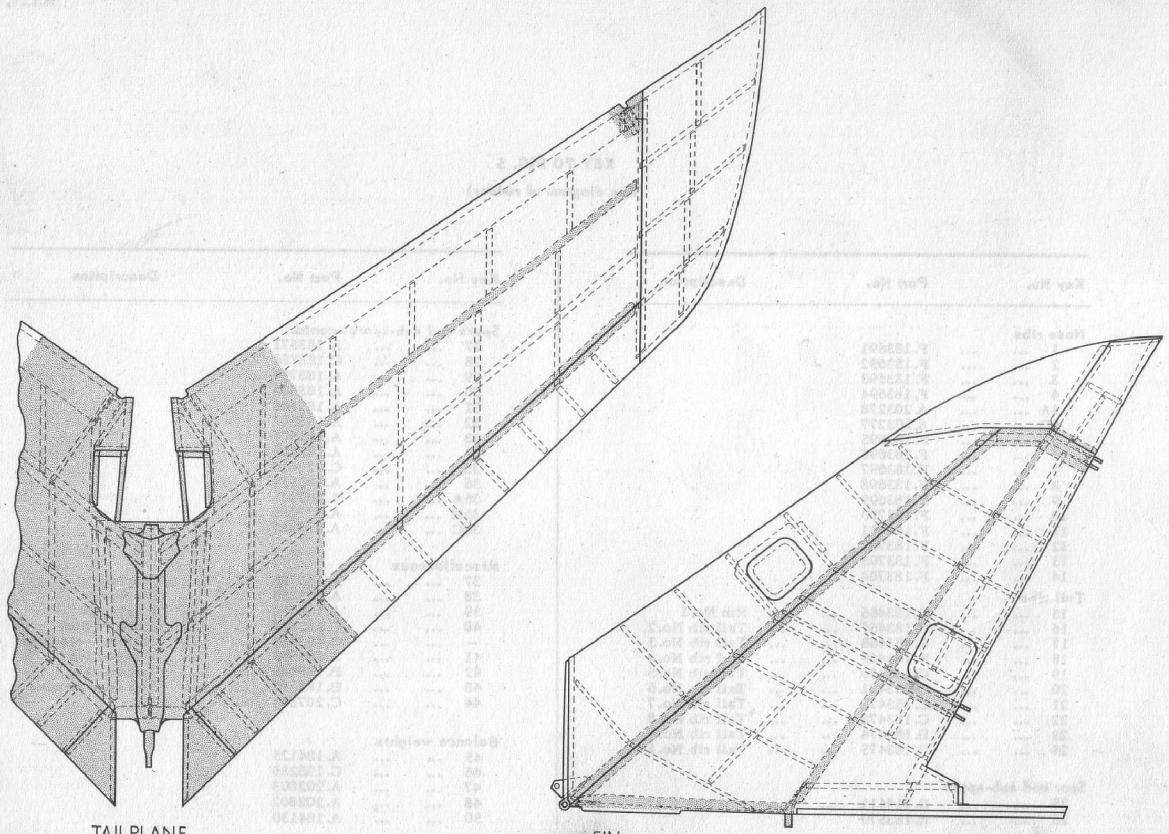


FIG. 5. KEY DIAGRAM OF RUDDER

RESTRICTED

KEY TO FIG. 5  
(Key diagram of rudder)

Key No.	Part No.	Description	Key No.	Part No.	Description
<b>Nose ribs</b>					
1	...	F.183691	27	...	A.183571
2	...	F.183692	28	...	C.183756
3	...	F.183693	29	...	A.183577
4	...	F.183694	30	...	A.183505
4A	...	A.203278	31	...	A.183506
4B	...	A.203277	32	...	A.183507
5	...	F.183695	33	...	A.183508
6	...	F.183696	34	...	A.183509
7	...	F.183697	35	...	C.214410
8	...	F.183698	36	...	A.183511
9	...	F.183699	36A	...	A.207365
10	...	F.183700	36B	...	A.207366
11	...	F.183701	36C	...	A.207367
12	...	F.183702			
13	...	F.183703			
14	...	F.183704			
<b>Tail ribs</b>					
15	...	C.183466	37	...	F.183758
16	...	C.183467	38	...	A.183759
17	...	B.183468	39	...	A.183760
18	...	B.183469	40	...	C.183884
19	...	C.183470	—	...	C.183885
20	...	C.183471	41	...	A.183568
21	...	C.183472	42	...	B.183569
22	...	C.183473	43	...	B.183591
23	...	B.183474	44	...	C.207584
24	...	B.183475	...	...	...
<b>Spar and sub-spars</b>					
25	...	D.214411	45	...	A.184125
26	...	A.183570	46	...	C.198285
<b>Spars and sub-spars--contd.</b>					
<b>Miscellaneous</b>					
<b>Balance weights</b>					



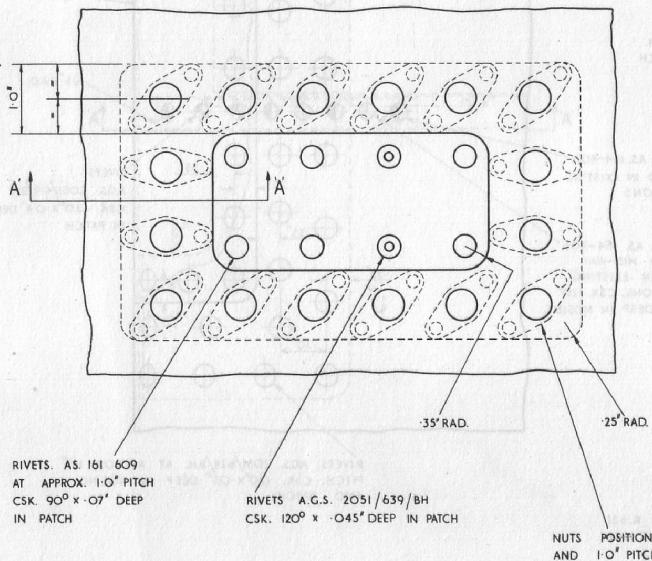
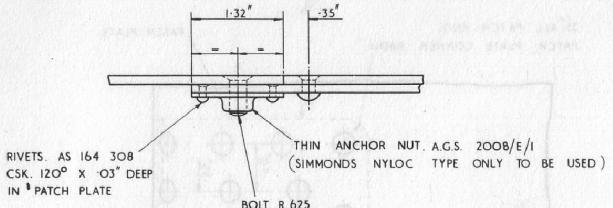
TAILPLANE

FIN

USER UNIT REPAIRS ARE NOT PERMITTED TO THE TAILPLANE  
AND FIN IN THE AREAS SHOWN SHADED

FIG.6. NON-REPAIRABLE AREAS - TAIL UNIT

**RESTRICTED**



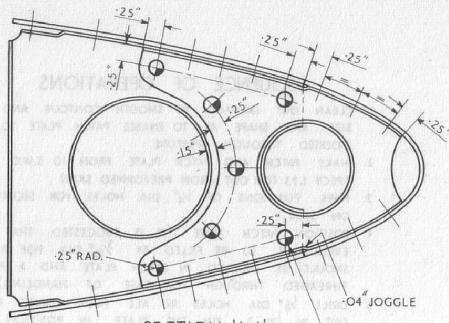
### SEQUENCE OF OPERATIONS.

- CLEAN OUT DAMAGE TO SMOOTH CONTOUR AND TO SUCH A SIZE AND SHAPE AS TO ENABLE PATCH PLATE TO BE INSERTED THROUGH APERTURE.
- MAKE PATCH AND PATCH PLATE FROM 10 S.W.G. L.A. SHEET TO SPEC'D L73 (OR CUT FROM PREFORMED SKIN)
- MARK POSITIONS OF  $\frac{1}{4}$ " DIA. HOLES FOR SECURING BOLTS ON SKIN.
- POSITION PATCH PLATE (IT IS SUGGESTED THAT TWO HOLES EVENTUALLY TO BE FILLED BY  $\frac{3}{16}$ " DIA. POP RIVETS SHOULD BE DRILLED IN PATCH PLATE AND A PIECE OF WIRE THREADED THROUGH FOR EASE OF HANDLING.)
- DRILL  $\frac{1}{8}$ " DIA. HOLES IN ALL FOUR CORNER POSITIONS MARKED OUT IN OP. 3. PIN THE PLATE IN POSITION.
- DRILL AND REAM  $\frac{1}{4}$ " DIA. NEWALL "B" FIT HOLES IN REMAINING POSITIONS MARKED OUT IN OP. 3.
- SECURE PLATE BY MEANS OF SOME OF THE  $\frac{1}{4}$ " DIA. HOLES. REMOVE PINS AND DRILL AND REAM HOLES AT ALL FOUR CORNERS.
- POSITION PATCH AND DRILL  $\frac{3}{16}$ " DIA. HOLES IN PATCH AND PATCH PLATE FOR  $\frac{3}{16}$ " DIA. SOLID RIVETS.
- REMOVE PATCH AND PATCH PLATE AND RIVET ANCHOR NUTS TO PATCH PLATE AS SHOWN. (TO OBTAIN EXACT ALIGNMENT IT WILL BE FOUND ADVISABLE TO POSITION NUTS WITH THE AID OF A BOLT BEFORE RIVETING.)
- RIVET PATCH TO PATCH PLATE. DRILL TWO HOLES IN PATCH TO MATCH  $\frac{3}{16}$ " DIA. POP RIVET HOLES IN PATCH PLATE.
- CAREFULLY COUNTERSINK  $\frac{1}{4}$ " DIA. HOLES IN SKIN .06" DEEP AT 120°
- INSERT PATCH AND PATCH PLATE AND BOLT IN POSITION ENSURING THAT ALL BOLTS ARE FULLY TIGHTENED.
- INSERT  $\frac{3}{16}$ " DIA. POP RIVETS IN VACANT HOLES IN PATCH.
- FINISH PROTRUDING HEADS OF BOLTS OFF FLUSH WITH SKIN.
- APPLY SUITABLE PROTECTIVE COATING TO PREVENT CORROSION AS SOON AS REPAIR IS COMPLETED.

### NOTE:-

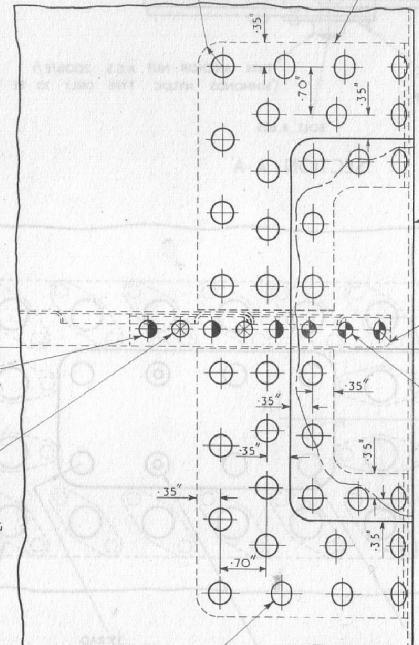
IT IS IMPORTANT THAT THE SKIN CONTOUR SHOULD BE ACCURATELY MAINTAINED WHEN EFFECTING PATCH REPAIRS

FIG. 7. REPAIR TO 10 S.W.G. TAILPLANE SKIN

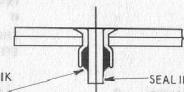


SECTION 'A-A'

-35° ALL PATCH AND  
PATCH PLATE CORNER RADII



RIVETS AS. 2051/419/BH. AT APPROX. 10°  
PITCH. CSK. 120° X-0.4" DEEP IN NOSING  
AND PATCH

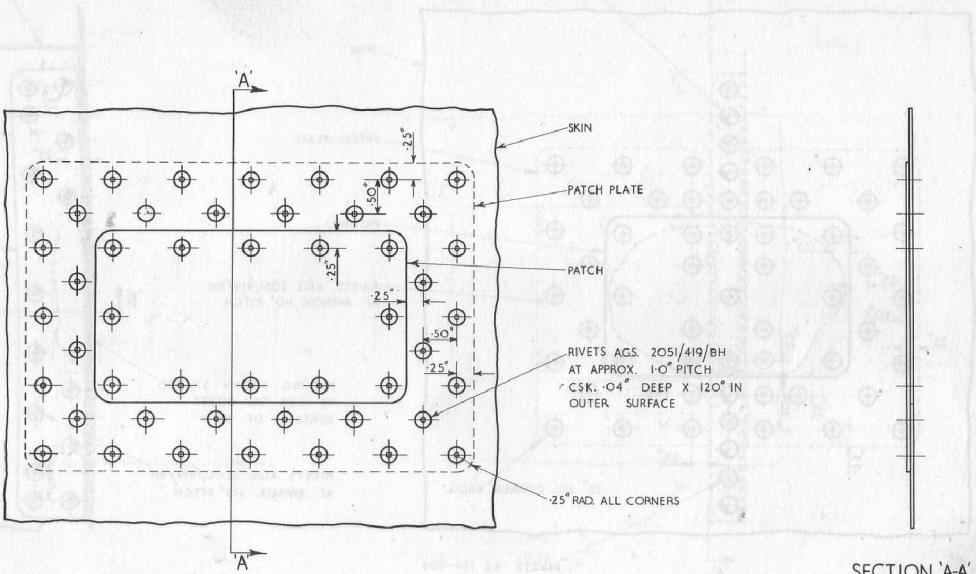


MANDREL HOLES IN RIVETS  
TO BE FILLED WITH BOSTIK  
BEFORE SEALING PINS ARE  
INSERTED

SEALING FOR 3/16" DIA. POP RIVETS

FIG. 8. REPAIR TO TAILPLANE NOSING AND RIB

RESTRICTED



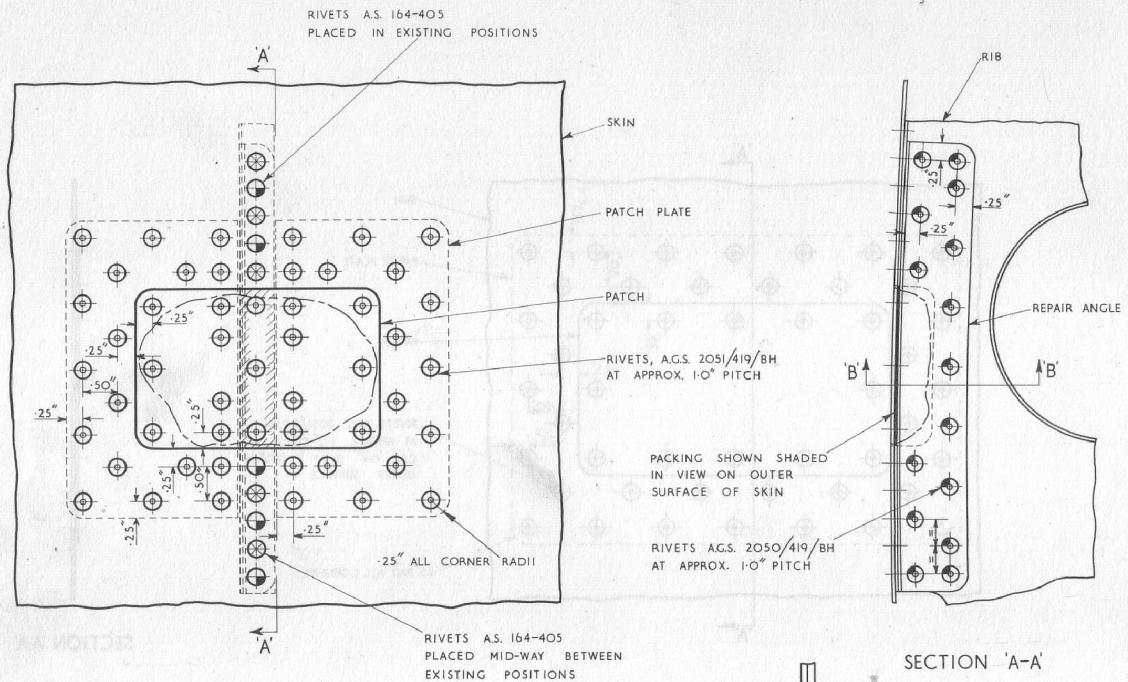
SECTION 'A-A'

SEQUENCE OF OPERATIONS

1. CLEAN OUT DAMAGE IN SKIN TO SMOOTH CONTOUR.  
SIZE AND SHAPE OF APERTURE SHOULD BE SUCH AS  
TO ALLOW PATCH PLATE TO BE INSERTED THROUGH IT.
2. FROM 1B SWG. LA. PLATE TO SPECY L.72 MAKE  
PATCH AND PATCH PLATE.
3. FIT PATCH PLATE, DRILL, AND RIVET IN POSITION.
4. FIT PATCH, DRILL, AND RIVET IN POSITION.

FIG. 9. FLUSH REPAIR TO SKIN OF FIN

RESTRICTED



#### SEQUENCE OF OPERATIONS

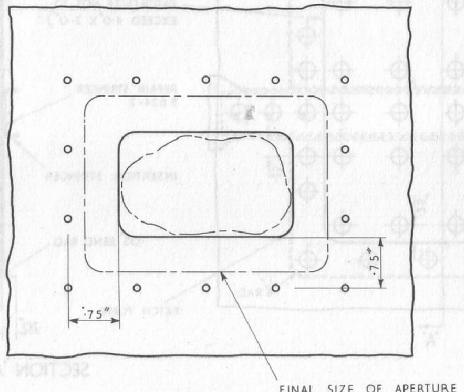
- CLEAN OUT DAMAGE IN SKIN AND RIB TO SMOOTH CONTOUR. SIZE AND SHAPE OF APERTURE SHOULD BE SUCH AS TO ALLOW REPAIR ANGLE AND PATCH PLATES TO BE INSERTED THROUGH IT.
- FROM 20 SWG. LA. TO SPEC. L.72 MAKE REPAIR ANGLE.
- INSERT AND FIT REPAIR ANGLE, DRILL AND RIVET IN POSITION.
- FROM 18 SWG. LA. TO SPEC. L.72 MAKE PACKING PATCH AND PATCH PLATES.
- INSERT AND FIT PATCH PLATES, DRILL, AND RIVET IN POSITION.
- FIT PACKING AND PATCH, DRILL, AND RIVET IN POSITION.

FIG. 10. FLUSH REPAIR TO SKIN AND RIB OF FIN

RESTRICTED

## NOTES

1. SIZE OF PATCH MUST NOT EXCEED 4.0" X 3.0"
2. NOT MORE THAN TWO PATCH REPAIRS ARE TO BE CARRIED OUT ON ONE RUDDER OR ELEVATOR.
3. FOR DETAILS OF ADJUSTMENT TO MASS BALANCE SEE FIG. 13 AND 16.
4. SIZE AND SHAPE OF CLEANED OUT APERTURE TO BE SUCH AS TO ALLOW PATCH PLATE TO BE INSERTED THROUGH IT.

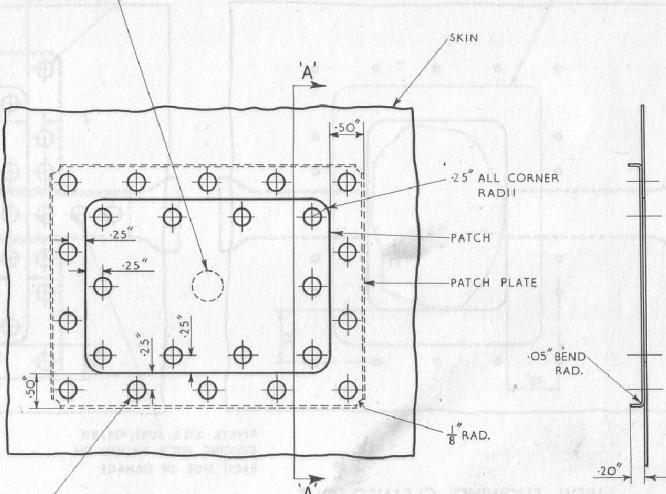


VIEW SHOWING CLEANED-OUT  
DAMAGE PRIOR TO DIMPLING

## SEQUENCE OF OPERATIONS

1. CLEAN OUT DAMAGE TO SMOOTH CONTOUR.
2. FROM 24 SWG. L.A. PLATE TO SPECN. L72 MAKE PATCH PLATE. TEMPORARILY OMITTING TO FLANGE EDGES.
3. MARK POSITION OF RIVET HOLES ON PATCH PLATE.
4. ON OUTSIDE SKIN MARK OUTLINE OF PATCH PLATE IN ITS CORRECT POSITION RELATIVE TO CLEANED-OUT DAMAGE.
5. POSITION PATCH PLATE ON OUTSIDE OF SKIN, DRILL RIVET HOLES IN PATCH PLATE AND SKIN.
6. REMOVE PATCH PLATE, DIMPLE HOLES DRILLED IN PATCH PLATE AND SKIN AS SHOWN IN CHAP I, FIG. I.

HOLE  $\frac{1}{2}$  DIA. MAY BE DRILLED  
IN PATCH PLATE TO FACILITATE  
POSITIONING



VIEW SHOWING COMPLETED REPAIR

RIVETS A.G.S. 2051/419/B.H.  
AT APPROX. 1·0" PITCH

### SECTION 'A-A'

7. ENLARGE HOLE IN SKIN BY .50" ON EACH SIDE GIVING A MINIMUM LANDING OF 25".
8. FIT PATCH PLATE AND PIN IN POSITION.
9. FROM 26 SWG. L.A. PLATE TO SPECN. L72.(24. S.W.G. ON ELEVATOR BOTTOM SKIN -POST MOD. 708.) MAKE PATCH.
10. FIT PATCH, DRILL RIVET HOLES IN PATCH AND PATCH PLATE.
11. REMOVE PATCH AND PATCH PLATE, DIMPLE HOLES, AND FLANGE EDGES OF PATCH PLATE.
12. FIT PATCH PLATE AND RIVET IN POSITION.
13. FIT PATCH AND RIVET IN POSITION.

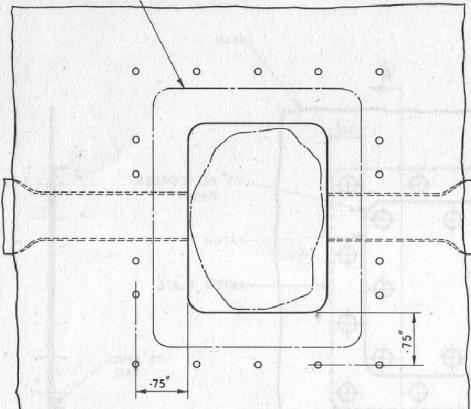
FIG. II. FLUSH REPAIR TO RUDDER AND ELEVATOR SKIN

RESTRICTED

FINAL SIZE AND SHAPE OF CLEANED-OUT  
APERTURE MUST BE SUCH AS TO ALLOW  
PATCH PLATES TO BE INSERTED THROUGH  
IT WITH REPAIR STRINGER IN POSITION

RIVETS. A.G.S. 2051/419/BH  
AT APPROX. 10° PITCH

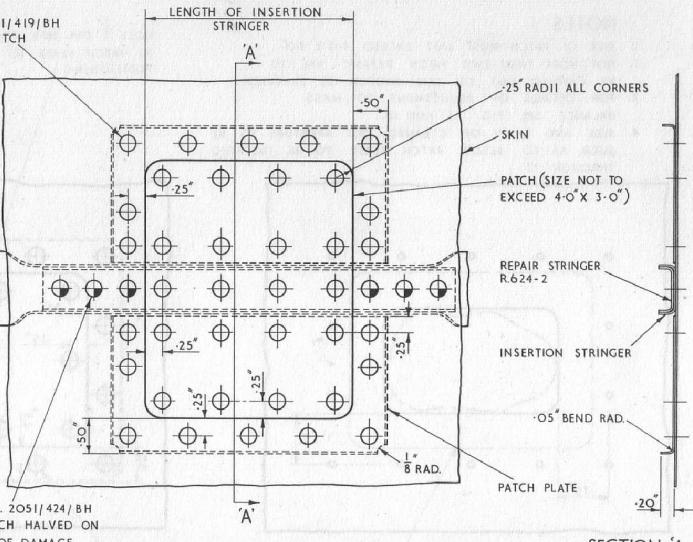
LENGTH OF INSERTION  
STRINGER



VIEW SHOWING CLEANED-OUT  
DAMAGE PRIOR TO DIMPLING

RIVETS. A.G.S. 2051/424/BH  
EXISTING PITCH HALVED  
ON EACH SIDE OF DAMAGE

VIEW SHOWING COMPLETED REPAIR



SECTION 'A-A'

#### SEQUENCE OF OPERATIONS

- CLEAN OUT DAMAGE IN SKIN AND STIFFENER TO SMOOTH CONTOUR.
- FROM 24 SWG. L.A. PLATE TO SPECN L.72 MAKE PATCH.  
PLATES TEMPORARILY OMITTING TO FLANGE EDGES.
- MARK POSITIONS OF RIVET HOLES ON PATCH PLATES.
- ON OUTSIDE OF SKIN MARK OUTLINES OF PATCH PLATES IN THEIR  
CORRECT POSITIONS RELATIVE TO CLEANED-OUT DAMAGE.
- POSITION PATCH PLATES ON OUTSIDE OF SKIN, DRILL HOLES IN 35. HOLE  
PITCH PLATES AND SKIN.
- REMOVE PATCH PLATES, DIMPLE HOLES IN PATCH PLATES AND SKIN  
AS SHOWN IN CHAP I, FIG. I.
- ENLARGE HOLE IN SKIN BY 50° ON EACH SIDE GIVING A MINIMUM  
LANDING OF 25°. CUT BACK DAMAGED STIFFENER FLUSH WITH  
EDGES OF HOLE.
- FROM 22 SWG. L.A. PLATE TO SPECN L.72 MAKE INSERTION  
STRINGER.
- FROM REPAIR STRINGER SECTION R.624-2 CUT REPAIR STRINGER.

- FIT REPAIR STRINGER, DRILL HOLES.
- REMOVE REPAIR STRINGER AND DIMPLE HOLES.
- FIT REPAIR STRINGER, RIVET IN POSITION.
- FIT PATCH PLATES AND PIN IN POSITION.
- FIT INSERTION STRINGER.
- FROM 26 SWG. L.A. PLATE TO SPECN L.72. (24 SWG. ON BOTTOM  
SKIN - POST MOD. 708) MAKE PATCH.
- FIT PATCH, DRILL HOLES IN PATCH, PATCH PLATES, INSERTION STRINGER  
AND REPAIR STRINGER.
- REMOVE PATCH, PATCH PLATES AND INSERTION STRINGER, DIMPLE  
HOLES AND FLANGE EDGES OF PATCH PLATES.
- FIT PATCH PLATES, RIVET IN POSITION.
- FIT INSERTION STRINGER AND PATCH, RIVET IN POSITION.

#### NOTE

- NOT MORE THAN TWO PATCH REPAIRS ARE TO BE CARRIED OUT  
ON ONE ELEVATOR.
- FOR DETAILS OF ADJUSTMENT TO MASS BALANCE SEE FIG. I.3.

FIG. I2. FLUSH REPAIR TO ELEVATOR SKIN AND STRINGER

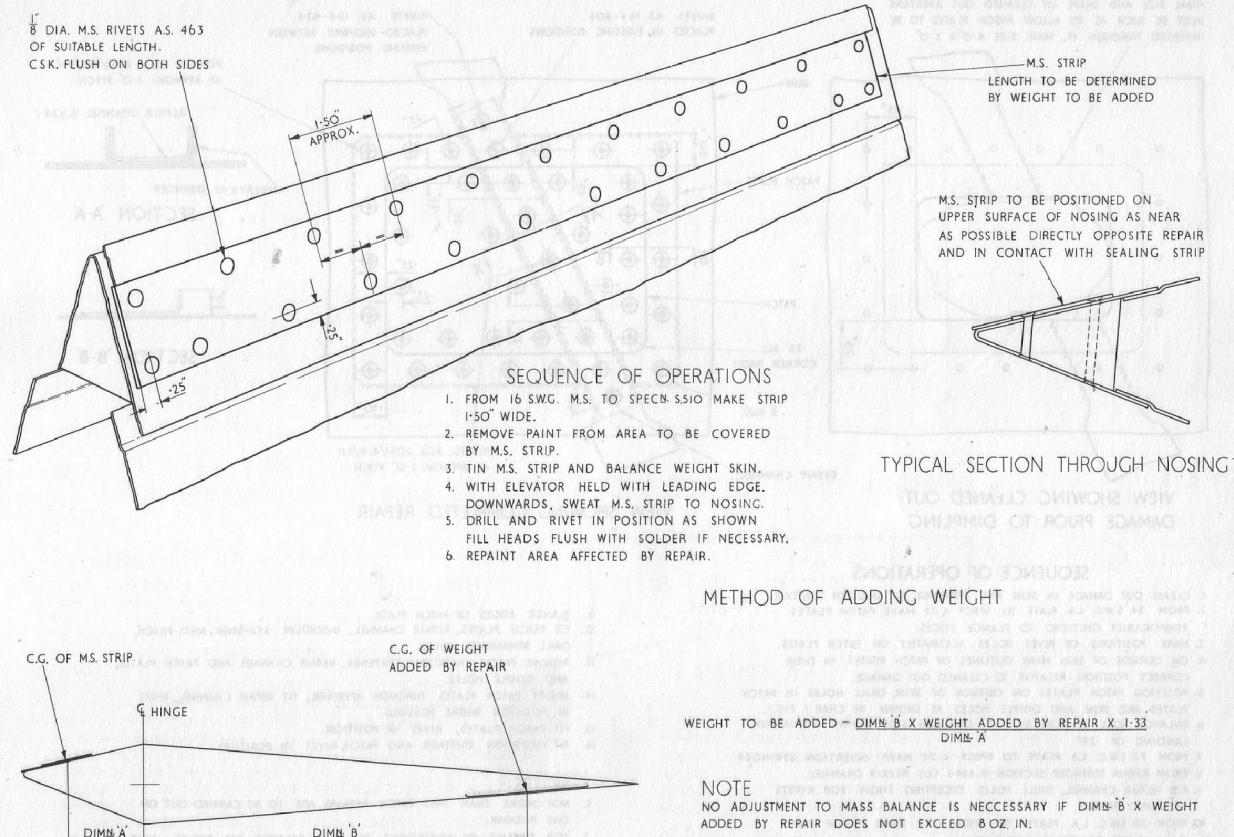
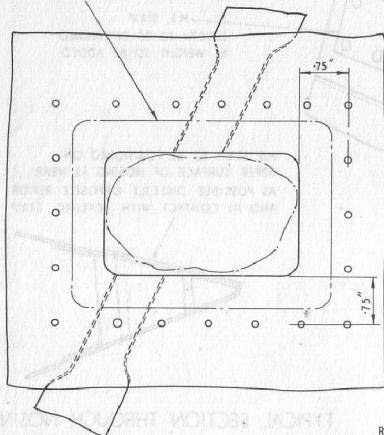


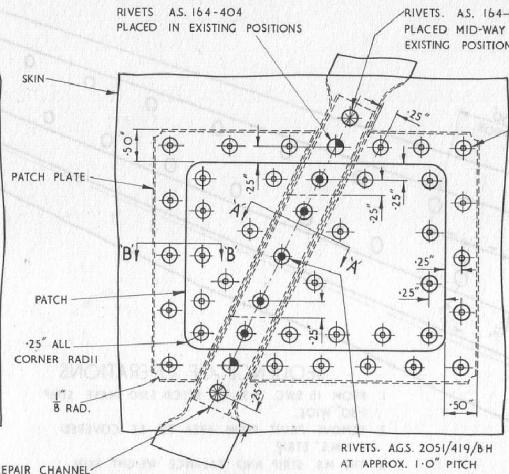
FIG. 13. RESTORATION OF ELEVATOR MASS BALANCE

FINAL SIZE AND SHAPE OF CLEANED OUT APERTURE  
MUST BE SUCH AS TO ALLOW PATCH PLATES TO BE  
INSERTED THROUGH IT. MAX. SIZE 4'-0" X 3'-0"



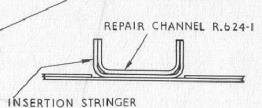
VIEW SHOWING CLEANED OUT  
DAMAGE PRIOR TO DIMPLING

RIVETS AS. 164-404  
PLACED IN EXISTING POSITIONS



VIEW SHOWING COMPLETED REPAIR

RIVETS. AS. 205/413/8 H.  
AT APPROX. 1-0" PITCH



SECTION 'A-A'



SECTION 'B-B'

#### SEQUENCE OF OPERATIONS

1. CLEAN OUT DAMAGE IN SKIN AND STIFFENER TO SMOOTH CONTOUR.
2. FROM 24 SWG. LA. PLATE TO SPEC<sup>6</sup> L.72. MAKE PATCH PLATES.  
TEMPORARILY OMITTING TO FLANGE EDGES.
3. MARK POSITIONS OF RIVET HOLES ACCURATELY ON PATCH PLATES.
4. ON OUTSIDE OF SKIN MARK OUTLINES OF PATCH PLATES IN THEIR  
CORRECT POSITION RELATIVE TO CLEANED OUT DAMAGE.
5. POSITION PATCH PLATES ON OUTSIDE OF SKIN, DRILL HOLES IN PATCH  
PLATES AND SKIN AND DIMPLE HOLES AS SHOWN IN CHAP I. FIG. I.
6. ENLARGE HOLE IN SKIN BY .50" ON EACH SIDE GIVING A MINIMUM  
LANDING OF .25".
7. FROM 22 SWG. LA. PLATE TO SPEC<sup>6</sup> L.72. MAKE INSERTION STRINGER.
8. FROM REPAIR STRINGER SECTION R.624-1 CUT REPAIR CHANNEL.
9. FIT REPAIR CHANNEL, DRILL HOLES EXCEPTING THOSE FOR RIVETS  
SECURING PATCH.
10. FROM 26 SWG. LA. PLATE TO SPEC<sup>6</sup> L.72. MAKE PATCH AND  
MARK RIVET POSITIONS ACCURATELY.
11. FLANGE EDGES OF PATCH PLATE.
12. FIT PATCH PLATES, REPAIR CHANNEL, INSERTION STIFFENER, AND PATCH,  
DRILL REMAINING HOLES.
13. REMOVE PATCH, INSERTION STIFFENER, REPAIR CHANNEL AND PATCH PLATES,  
AND DIMPLE HOLES.
14. INSERT PATCH PLATES THROUGH APERTURE, FIT REPAIR CHANNEL, RIVET  
IN POSITION WHERE POSSIBLE.
15. FIT PATCH PLATES, RIVET IN POSITION.
16. FIT INSERTION STIFFENER AND PATCH, RIVET IN POSITION.

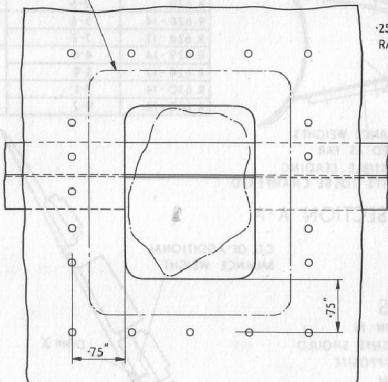
#### NOTES:-

1. NOT MORE THAN TWO PATCH REPAIRS ARE TO BE CARRIED OUT ON  
ONE RUDDER.
2. FOR DETAILS OF ADJUSTMENT TO MASS BALANCE SEE FIG. 16.

FIG. 14. FLUSH REPAIR TO SKIN AND STIFFENER OF RUDDER

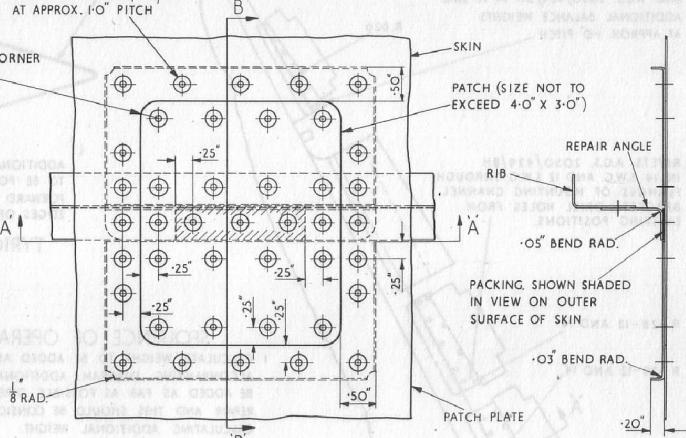
RESTRICTED

FINAL SIZE AND SHAPE OF CLEANED-OUT APERTURE  
MUST BE SUCH AS TO ALLOW PATCH PLATES TO BE  
INSERTED THROUGH IT WITH REPAIR ANGLE IN POSITION



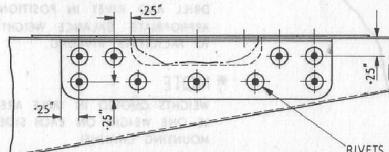
VIEW SHOWING CLEANED-OUT  
DAMAGE PRIOR TO DIMPLING

RIVETS. A.G.S. 2050/413/BH  
AT APPROX. 1'-0" PITCH



SECTION B-B

VIEW SHOWING COMPLETED REPAIR



SECTION A-A

RIVETS A.G.S. 2050/419/B.H.

11. FLANGE EDGES OF PATCH PLATES.
12. FIT PATCH PLATES, PACKING, AND PATCH AND DRILL HOLES.
13. REMOVE PATCH, PACKING AND PATCH PLATES, AND DIMPLE HOLES.
14. REPLACE PATCH PLATES, RIVET IN POSITION.
15. REPLACE PACKING AND PATCH, RIVET IN POSITION.

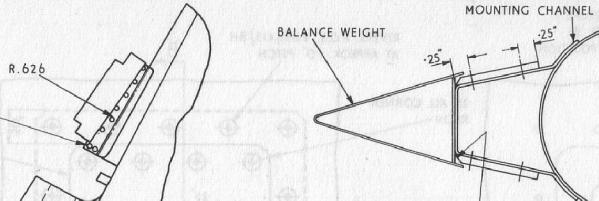
NOTES 1. NOT MORE THAN TWO PATCH REPAIRS ARE TO BE CARRIED OUT ON ONE RUDDER.  
2. FOR DETAILS OF ADJUSTMENT TO MASS BALANCE SEE FIG.16.

FIG.15. FLUSH REPAIR TO SKIN AND RIB OF RUDDER

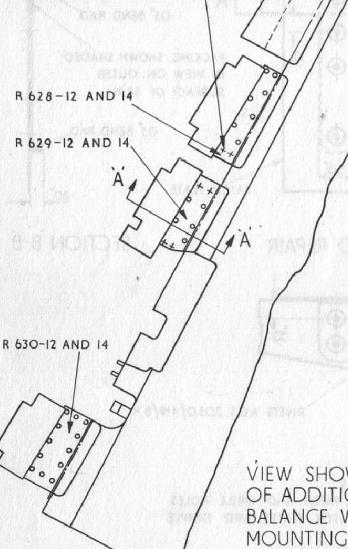
RESTRICTED

FS/II

RIVETS. A.G.S. 2050/424/BH IN 14 SWG.  
AND A.G.S. 2050/429/BH IN 12 SWG.  
ADDITIONAL BALANCE WEIGHTS  
AT APPROX. 10° PITCH



RIVETS A.G.S. 2050/429/BH  
IN 14 SWG. AND 12 SWG. THROUGH  
FLANGES OF MOUNTING CHANNEL  
BRACKETS. DRILL HOLES FROM  
EXISTING POSITIONS.

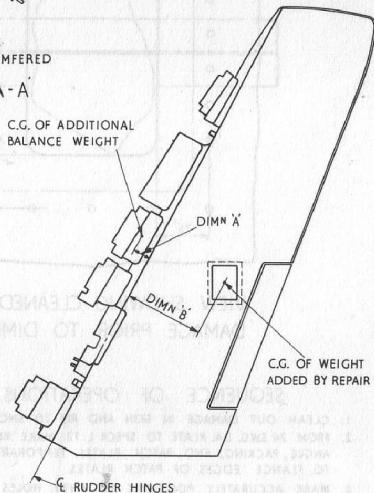


POSITION OF RIVETS IN EACH ADDITIONAL WEIGHT

VIEW SHOWING LOCATION  
OF ADDITIONAL MASS  
BALANCE WEIGHTS ON  
MOUNTING CHANNELS AND  
NUMBER AND APPROXIMATE  
POSITION OF RIVETS IN EACH ADDITIONAL WEIGHT

ADDITIONAL BALANCE WEIGHTS  
TO BE POSITIONED AS FAR  
FORWARD AS POSSIBLE. LEADING  
EDGES OF WEIGHTS TO BE CHAMFERED

#### TYPICAL SECTION 'A-A'



#### SEQUENCE OF OPERATIONS

- 1 CALCULATE WEIGHT TO BE ADDED AS SHOWN IN ACCOMPANYING DIAGRAM. ADDITIONAL WEIGHTS SHOULD BE ADDED AS FAR AS POSSIBLE DIRECTLY OPPOSITE REPAIR AND THIS SHOULD BE CONSIDERED IN CALCULATING ADDITIONAL WEIGHT.
- 2 IF NECESSARY, FILE ADDITIONAL BALANCE WEIGHTS TO ATTAIN REQUIRED WEIGHT.
- 3 POSITION ADDITIONAL BALANCE WEIGHTS AS SHOWN, DRILL AND RIVET IN POSITION. IF NECESSARY THE APPROPRIATE BALANCE WEIGHT MAY BE REMOVED TO FACILITATE RIVETING.

#### \* NOTE

WEIGHTS QUOTED IN TABLE ARE FOR 2 OFF  
I.E. ONE WEIGHT ON EACH SIDE OF  
MOUNTING CHANNEL

$$\text{WEIGHTS TO BE ADDED} = \frac{\text{DIMN } B \times \text{WEIGHT ADDED BY REPAIR} \times 1.22}{\text{DIMN } A}$$

NO ADJUSTMENT TO MASS BALANCE IS NECESSARY  
IF  $\text{DIMN } B \times \text{WEIGHT ADDED BY REPAIR}$  DOES  
NOT EXCEED 8 OZ. IN.

FIG.16 RESTORATION OF RUDDER MASS BALANCE

RESTRICTED

This file was downloaded  
from the RTFM Library.

Link: [www.scottbouch.com/rtfm](http://www.scottbouch.com/rtfm)

Please see site for usage terms,  
and more aircraft documents.

