

CHAPTER 7

TAIL UNIT

CHAP.
7

R E S T R I C T E D

Chapter 7

TAIL UNIT
(Completely revised)

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Description

1. The tail plane is an all metal single cantilever structure with front and rear spars, ribs and a stressed skin. The front spar is secured to the rear face of the aft bulkhead and the rear spar, by two struts, to fittings near the lower end. The fin is similarly all-metal construction with channel section spars and flanged ribs. The front spar is secured to the fuselage and the rear spar extending downwards reinforces the aft bulkhead to which it is secured with five nuts; this spar forms the rudder post. The rudder and elevators are fabric covered metal structures aerodynamically and mass balanced. Each elevator is mounted on the tail plane with two hinges and, at the root, by a ball

bearing bracket; the starboard elevator incorporates a cockpit controlled trim tab. The rudder is similarly fitted with a tab which, however, is adjustable only on the ground.

Definitions of negligible and repairable damage

2. Definitions of damage which can be treated as negligible and the limits of repairable damage with references to appropriate repair drawings are included in Table 1.

Fabric covering

3. The details of fabric covering for rudder and elevator are given in Fig. 7/7 and 7/8; For damage and repair methods refer to Chapter 8.

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TABLE 1

Definitions of repairable and negligible damage

Components	Negligible damage	Repairable damage	Repair fig. No.	Key diagram
FIN				7/1
Skin	Dents 0.1 in. deep, 2.0 in. dia., 12.0 in. apart	Damage up to 3.0 in. dia.	7/9	
Rib	Dents 0.1 in. deep, 2.0 in. dia., 8.0 in. apart	Damage in excess of 3.0 in. dia.	7/10	
Stringer	Dents 0.1 in. deep, 2.0 in. long	Damage to flange 0.75 in. x 0.5 in.	7/11	
RUDDER				7/2
Skin (nose and tip)	Dents 0.1 in. deep, 2.0 in. dia., 12.0 in. apart	Damage 2.0 in. dia.	7/9	
Rib	Dents 0.1 in. deep, 1.5 in. dia., 12.0 in. apart	Damage to flange 0.75 in. x 0.5 in.	7/11	
Trailing edge	Dents 0.05 in. deep, 1.0 in. dia., 18.0 in. apart	Damage up to 4.0 in. (patch)) Greater damage (insertion)) After any repair to this component re-balancing should be effected as shown in fig.7/13	7/12	
FIN and RUDDER SPARS				7/3
Fin rear)	Dents 0.5 in. deep, 2.0 in. dia., 12.0 in. apart			
Fin front)				
Rudder)				

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TABLE 1 - continued

Components	Negligible damage	Repairable damage	Repair fig. No.	Key diagram
TAIL PLANE				7/4
Skin	Dents 0.1 in. deep, 2.0 in. dia., 12.0 in. apart	Damage up to 3.0 in. dia.	7/9	
		Damage in excess of 3.0 in. dia.	7/10	
Ribs) Stringers)	Dents 0.1 in. deep, 2.0 in. dia., 8.0 in. apart	Damage to flange 0.75 in. x 0.5 in.	7/11	
ELEVATOR				7/5
Skin (nose and tip)	Dents 0.1 in. deep, 2.0 in. dia., 12.0 in. apart	Damage up to 2.0 in. dia.	7/9	
Ribs	Dents 0.1 in. deep, 1.5 in. dia., 12.0 in. apart	Damage to flange 0.75 in. x 0.5 in.	7/11	
Spar (auxiliary)	Dents 0.05 in. deep, 1.0 in. dia., 12.0 in. apart			
Trailing edge	Dents 0.05 in. deep, 1.0 in. dia., 18.0 in. apart	Damage up to 4.0 in. (patch) Damage exceeding 4.0(inserition)) After any repair to this component re-balancing should be effected as shown in fig.7/13	7/12	
Torque tube		Loosened rivets and pins	7/15	
TAIL PLANE and ELEVATOR SPARS FABRIC COVERING - Rudder and elevator	Dents 0.05 in. deep, 2.0 in. dia., 12.0 in. apart	For damage and methods of repair see Chapter 8		7/6 7/7 7/8

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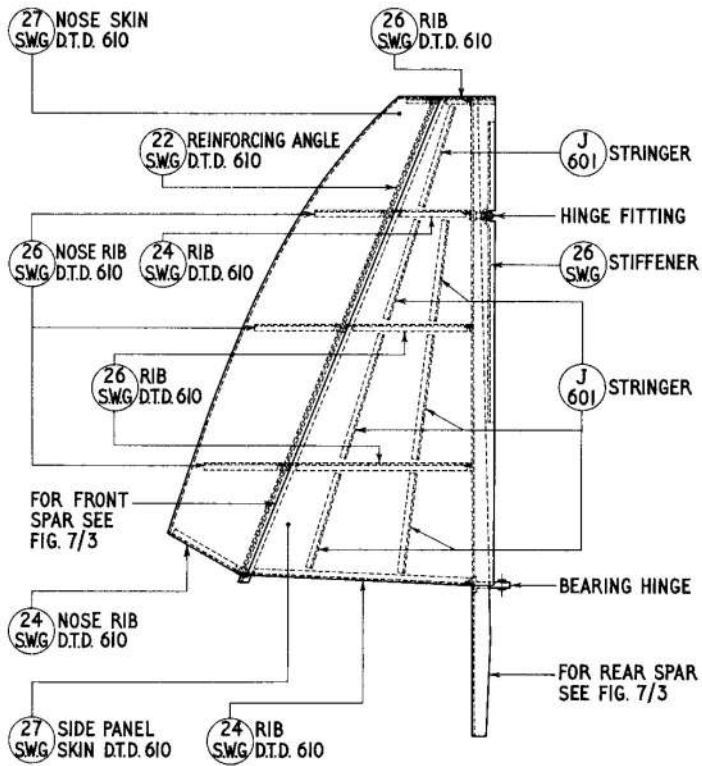


Fig.7/1. Fin

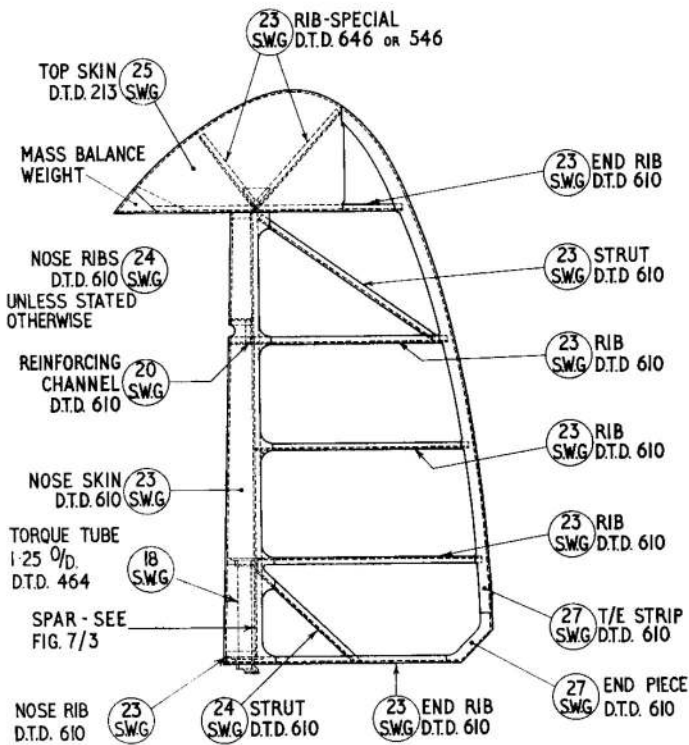


Fig.7/2. Rudder

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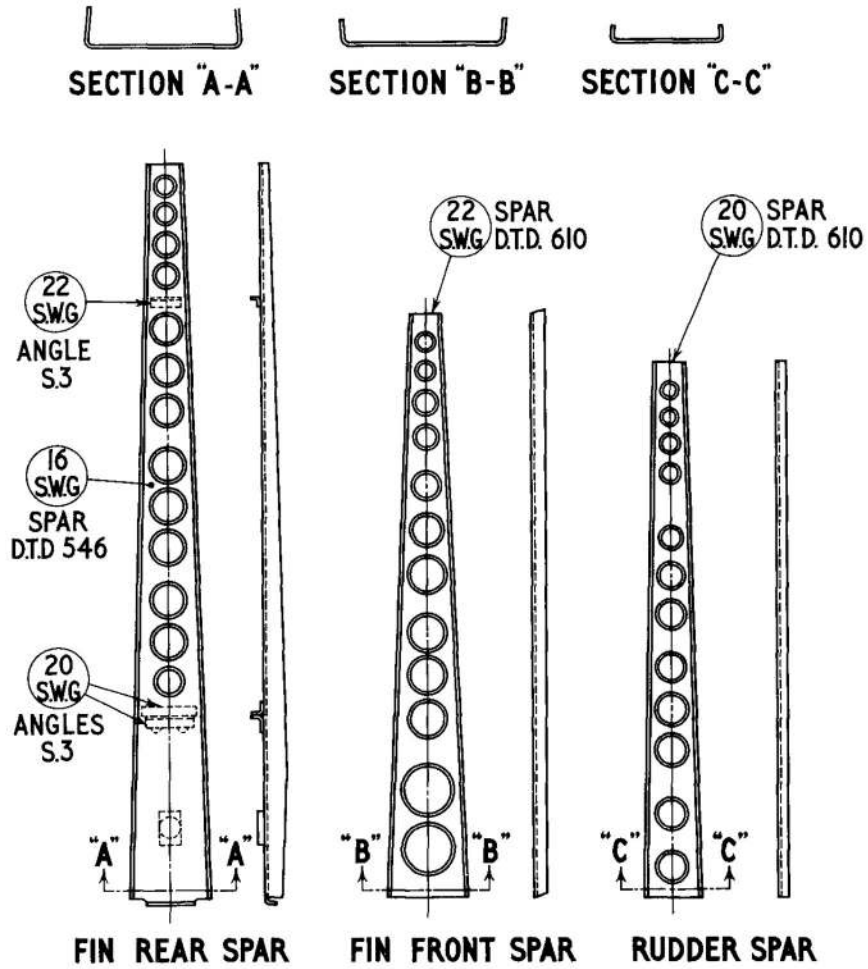


Fig. 7/3. Fin and rudder spars

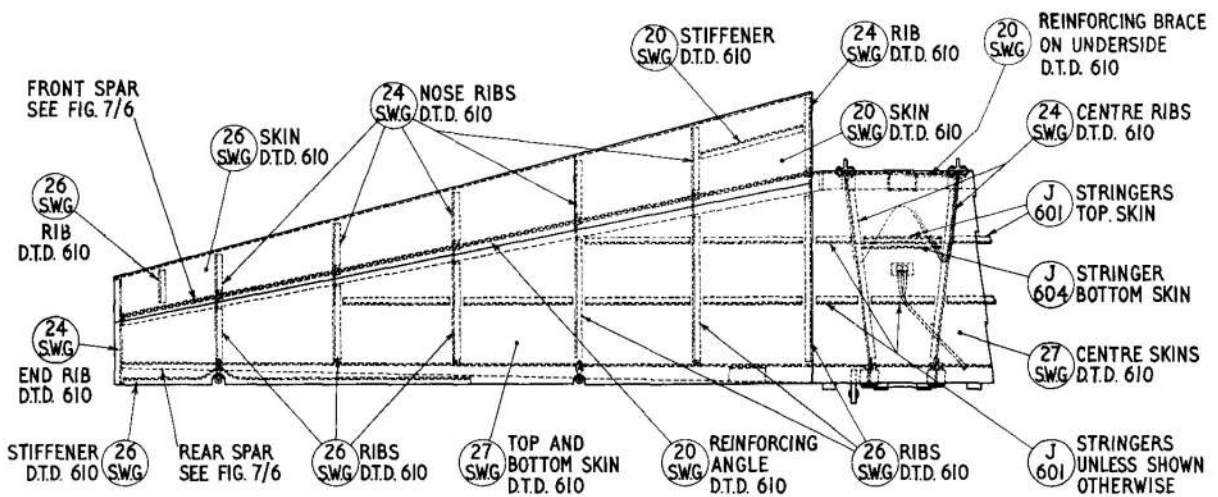


Fig. 7/4. Tail plane

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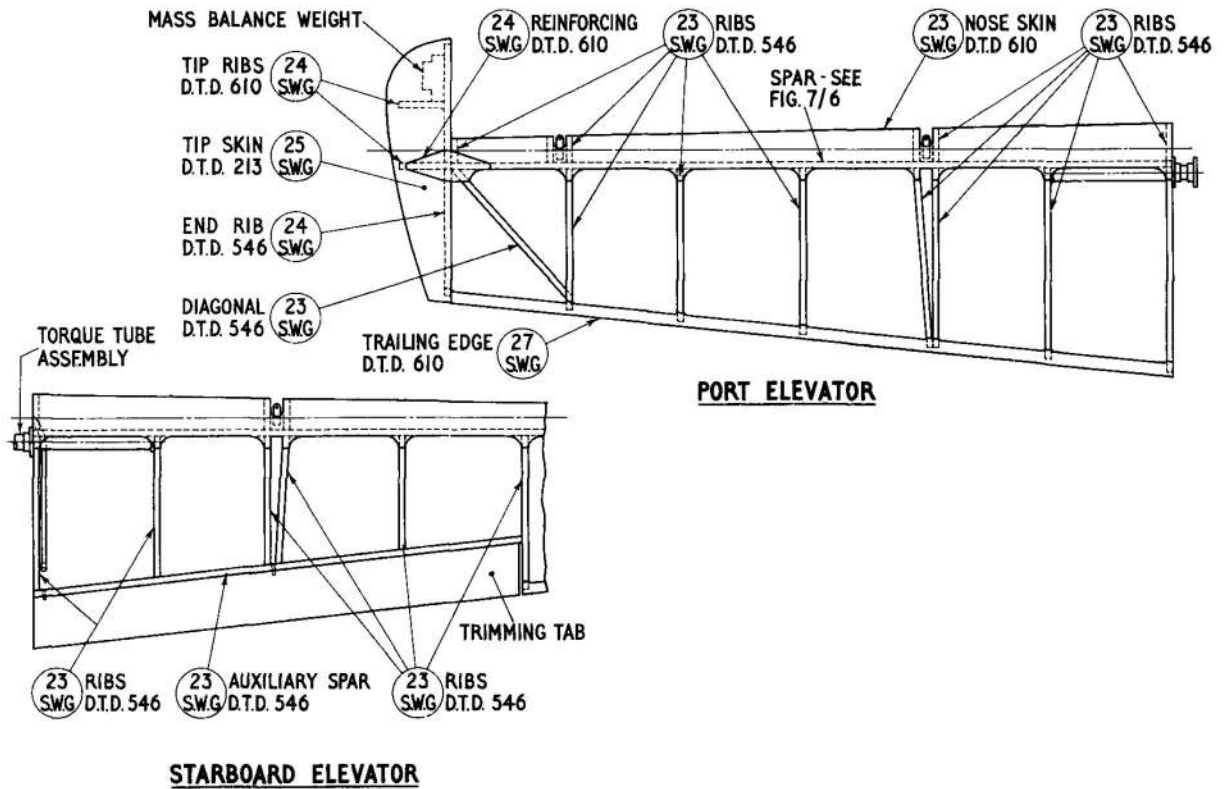


Fig.7/5. Elevator

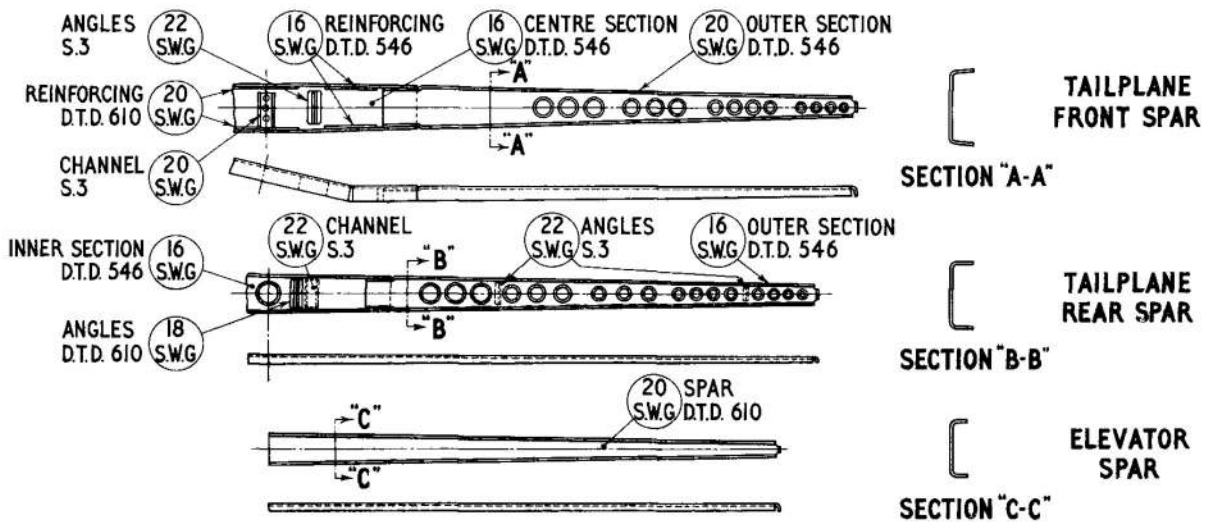


Fig.7/6. Tail plane and elevator spars

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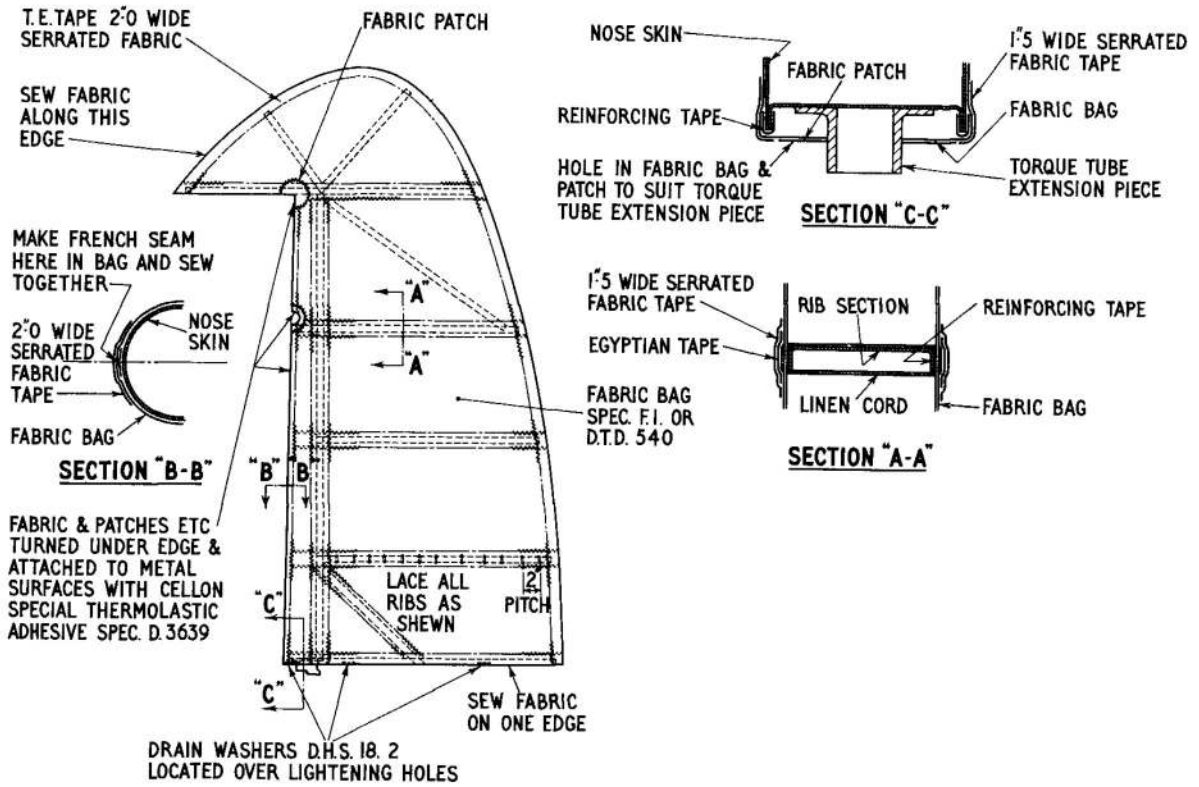


Fig.7/7. Rudder, fabric covering

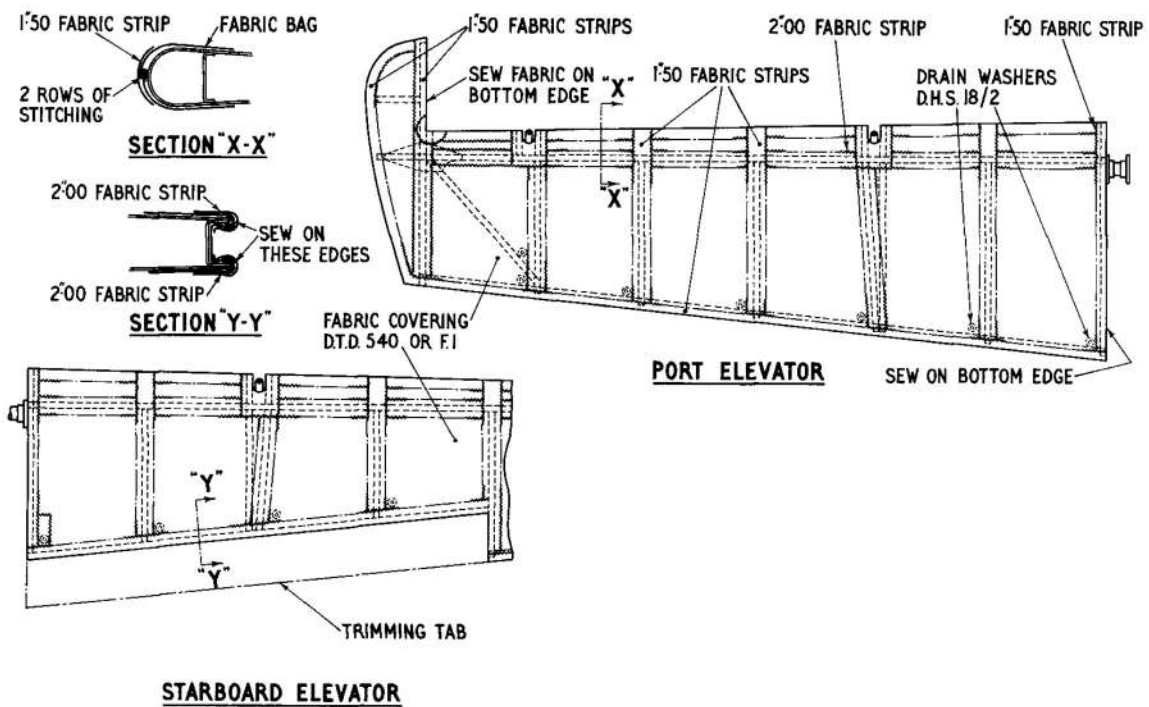


Fig.7/8. Elevator, fabric covering

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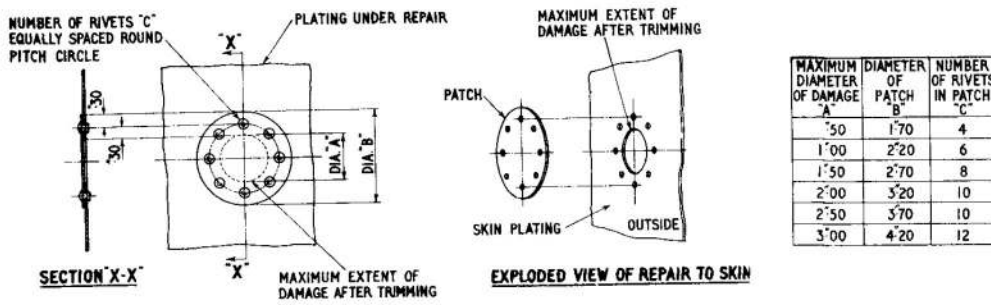


Fig. 7/9. Patch repairs

Patch repairs

4. All patch material must be similar in gauge and specification to the material under repair. 3/32 in. dia. mushroom head solid rivets should be used where possible otherwise 1/8 in. dia. blind rivets (Chap. 1, para. 11) should be used.

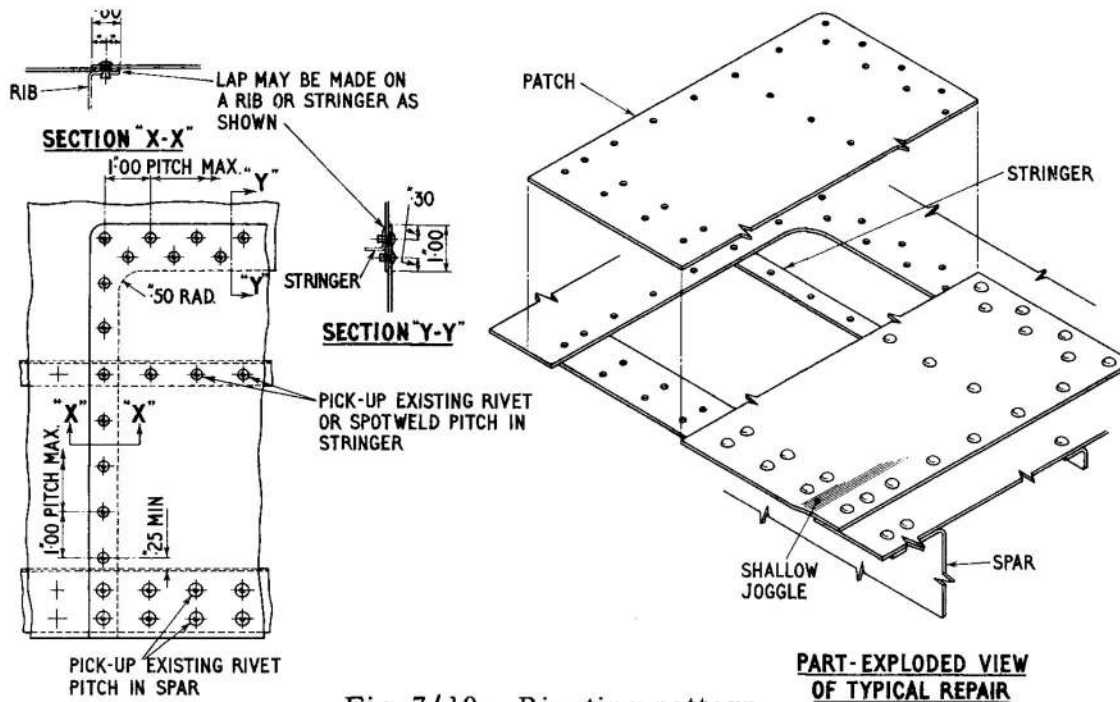


Fig. 7/10. Riveting pattern for skin repairs

Skin repairs

5. Repair patch must be same gauge and specification as skin. Rivets 3/32 in. dia. AS. 2228/303 or where these cannot be used 1/8 in. dia. blind rivets (Chap. 1, para. 11) are substituted. Rivets in the tailplane in the area 18.0 in. each side of the centre line of the aircraft must be 1/8 in. solid rivets to AS. 2228/404 or 1/8 in. dia. Chobert steel rivets, TK 3 SS in nose skin and elsewhere 1/8 in. dia. breakstem monel pop rivets to A.G.S. 2050. When holes have become enlarged rivets 1/32 in. oversize should be used.

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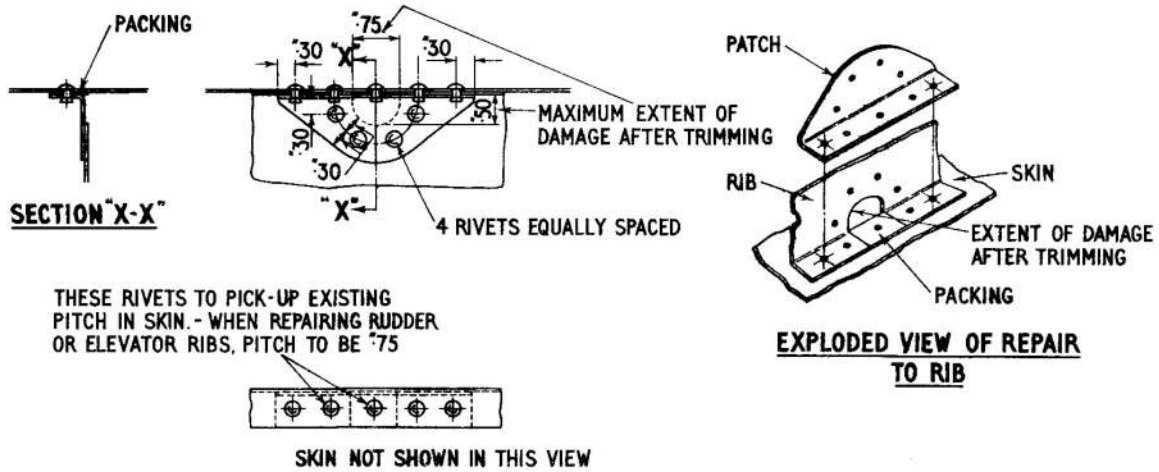


Fig. 7/11. Flange repair

Flange repair

6. Damage which may be repaired in accordance with fig. 7/11 includes penetration into the web to a depth of 0.5 in. Mushroom head rivets to AS.2228/303 should be used generally, picking up existing rivet holes, and 1/8 in. monel dome head pop rivets to A.G.S.2050 (Chap. 1, para. 11) in positions where solid riveting is not possible. Patch to be same gauge and specification as flange being repaired.

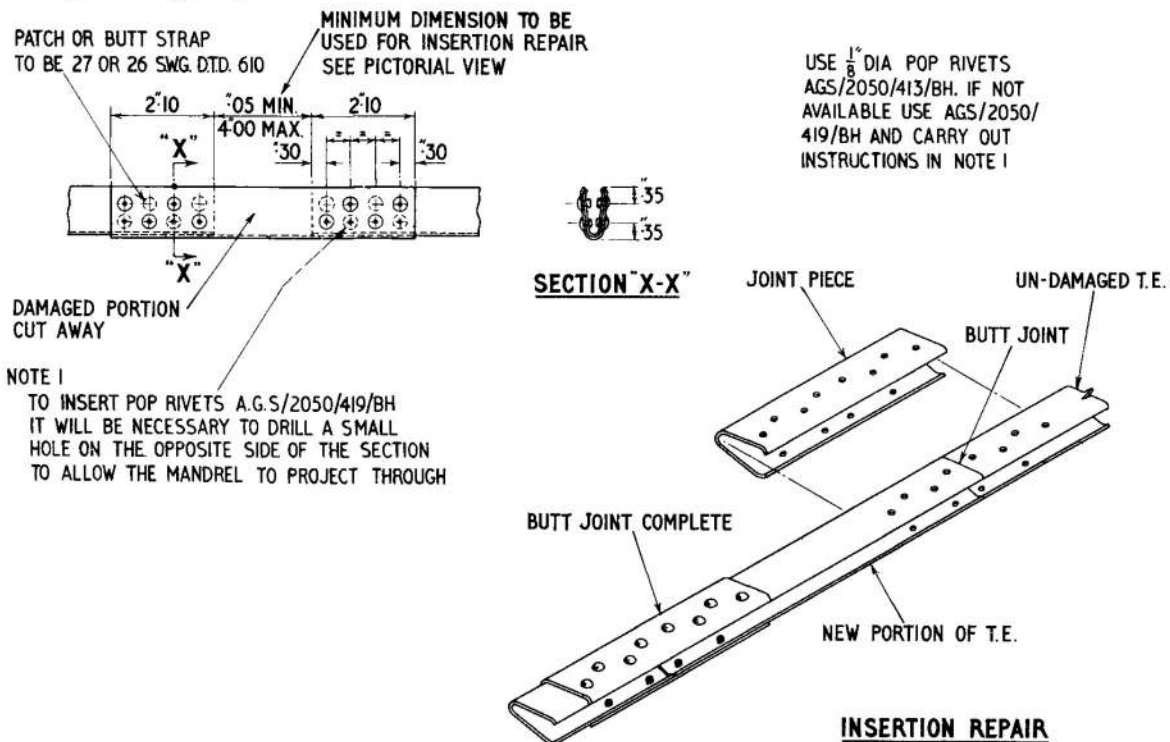
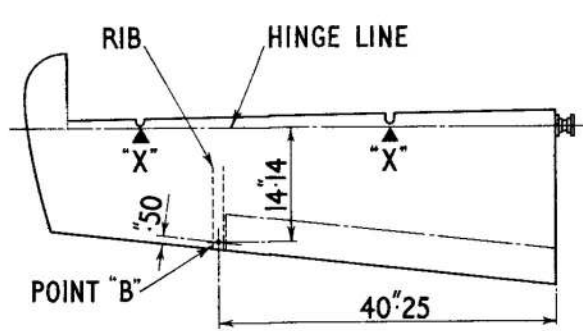


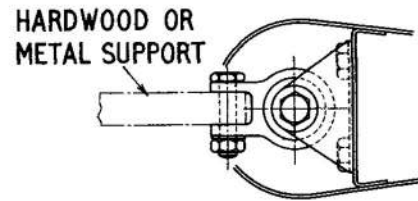
Fig. 7/12. Trailing edge repair

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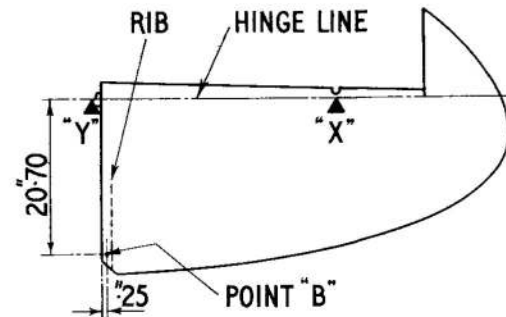
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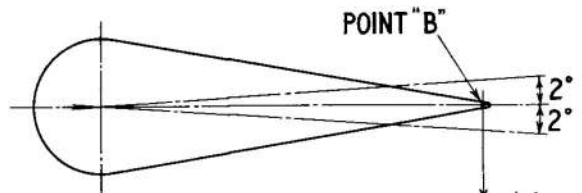
ELEVATOR



TYPICAL METHOD OF SUPPORTING AEROFOILS AT POINTS "X"

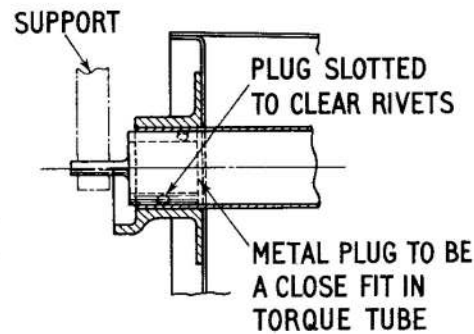


RUDDER

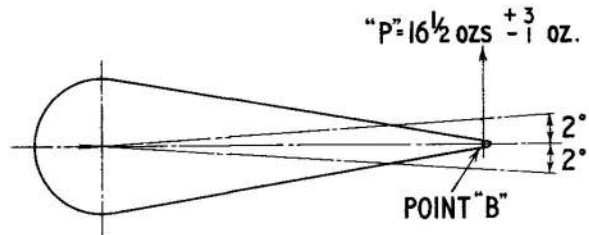
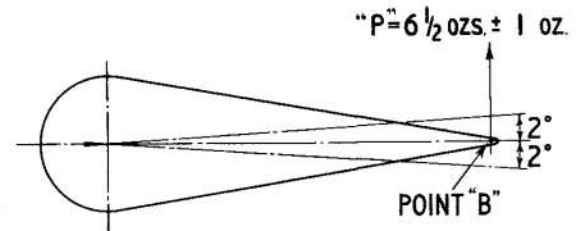


PORT ELEVATOR

"P" = $6\frac{1}{2}$ ozs \pm 1 oz.



TYPICAL METHOD OF SUPPORTING RUDDER AT POINT "Y"



STARBOARD ELEVATOR

"P" = $16\frac{1}{2}$ ozs \pm 3 oz.

ALL REPAIRS TO THESE COMPONENTS NECESSITATE REBALANCING CHECKS

Fig. 7/13. Rebalancing of rudder and elevator

Check for loose rivets and pins :

(1) Through lever and torque tube and through flange fitting and torque tube, locations A.

(2) Through flange fitting and torque tube, location B. Through flange fitting and torque tube, location B1. Through flanges of fittings and ribs.

Note :

If no loose rivets are evident at check 2 then check 3 may be disregarded.

(3) (Only if loose rivets are evident at check 2 - obtain access by cutting fabric open). Through flange fitting and torque tube, location C, also through flange of fitting and rib.

Repair where loose rivets are suspected : locations A, B and C.

Remove loose rivets, open out holes with 7/32 in. diameter drill (fitting to tube) or No.21 drill (fitting flange to rib) and fit snap head rivets AS.2227/707 or AS.2227/506 respectively.

Note :

To rivet fitting to tube at location C it is necessary to detach fittings from both ribs and move tube assembly clear of rib. Re-attach fittings to rib as above. Finally repair fabric.

Repair where loose pins are suspected : location B1.

Remove pins, ream out holes $\frac{1}{4}$ in. diameter for light drive fit. Insert pins and spread ends to 0.3 in. diameter approximately.

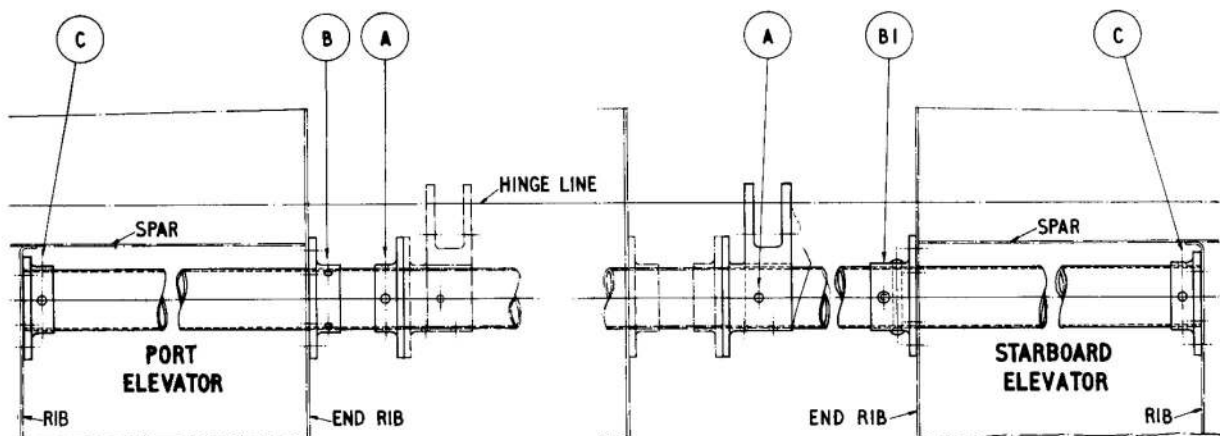
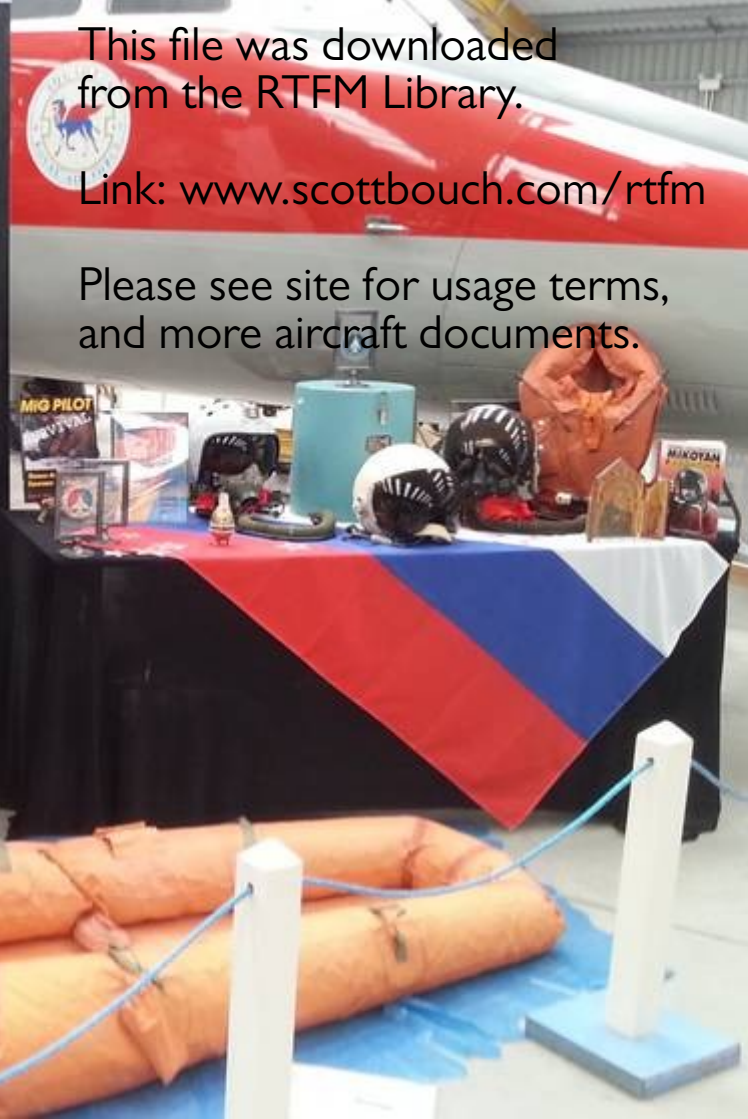


Fig.7/15. Elevator torque tube repairs

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