

**CHAPTER**

**57**

**WINGS**



# CONTENT

Name of item	Chapter Section/Subsection Subject	Page
<b>GENERAL</b>	57-00-00	57-1
<b>WING STRUCTURE</b>	57-10-00	57-2
DESCRIPTION AND OPERATION		57-2
MAINTENANCE		57-3
REMOVAL / INSTALLATION		57-3
Removal of wings		57-3
Installation of wings		57-7
APPROVED REPAIRS		57-9
Repair of wings		57-9
Repair of mechanical defects of wing skin, ribs and longerons		57-10
<b>WING MOUNTS</b>	57-40-00	57-13
DESCRIPTION AND OPERATION		57-13
MAINTENANCE		57-14
INSPECTION / CHECK		57-14
Check of nut tightening the wing mount pins		57-14
APPROVED REPAIRS		57-15
Repair of wing mounts		57-15
Reaming of wing and fuselage mounts		57-16
<b>AILERONS AND WING FLAPS</b>	57-50-00	57-26
DESCRIPTION AND OPERATION		57-26
MAINTENANCE		57-33
REMOVAL / INSTALLATION		57-33
Removal of ailerons		57-33
Installation of ailerons		57-35
Removal of wing flaps		57-36
Installation of wing flaps		57-38
APPROVED REPAIRS		57-39
Repair of ailerons and wing flaps		57-39

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## GENERAL

The wings are of all metal structure with main and auxiliary spars. Each wing is joined to fuselage structure with three pins. The wing structure is at the fuselage divided. The wings are of rectangular shape. The wing skin is made from duralumin sheet. The all-metal single slotted ailerons and flaps are dimensionally the same. The ailerons are partially mass balanced and provided with fixed balance tabs.

**EFFECTIVITY:** All

**57-00-00**

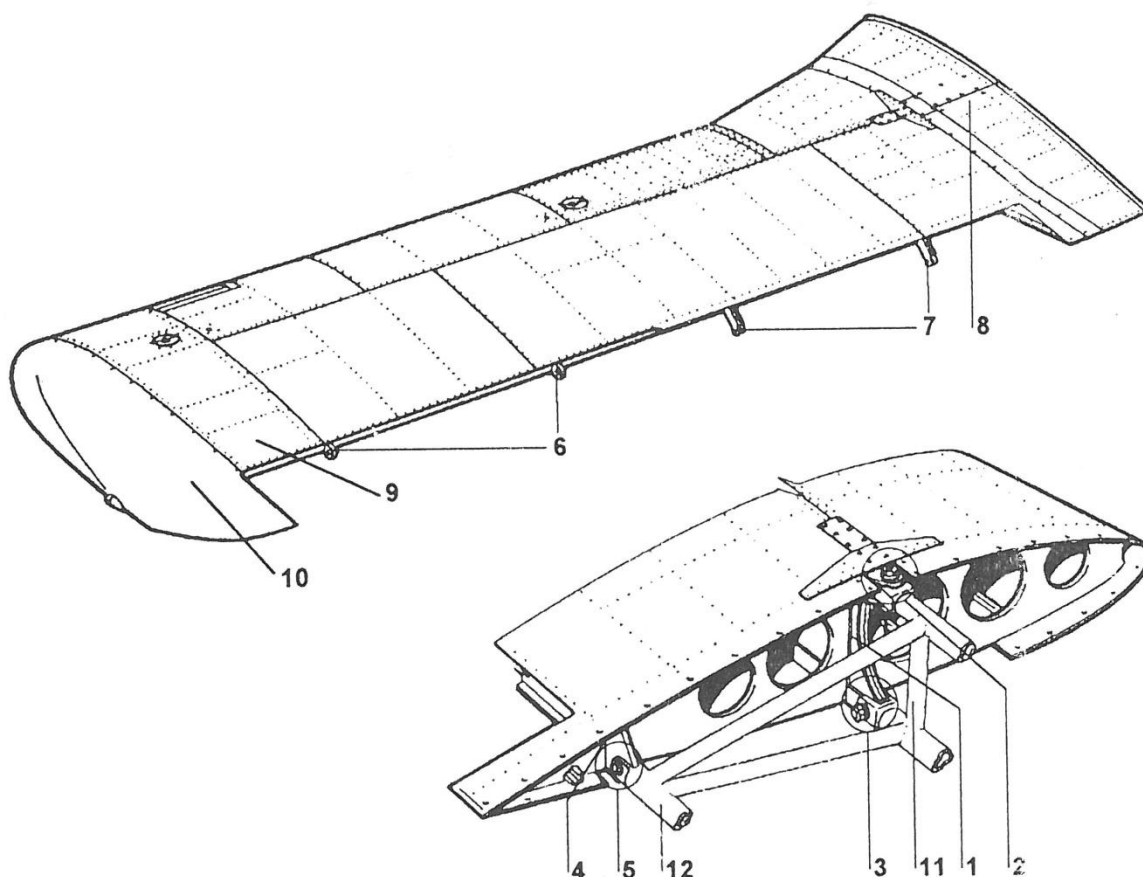
page 57 - 1  
2011-02-02

# WING STRUCTURE

## DESCRIPTION AND OPERATION

The main wing spar (Fig. 57-1, item 1) carries upper and bottom wing mounts (items 2, 3); the rear spar (4) carries rear wing mount (5) and wing flap (6) and aileron mounts and hinges (7).

Each wing tip rib carries screwed joints of auxiliary fuel tank (9) and wing tip (10).



- 1 ... main wing spar
- 2 ... upper wing mount
- 3 ... bottom wing mount
- 4 ... rear wing spar
- 5 ... rear wing mount
- 6 ... aileron hinges
- 7 ... flap suspensions
- 8 ... inboard wing section

- 9 ... auxiliary fuel tank
- 10 ... wing tip

For information only:

- 11 ... main fuselage spar
- 12 ... rear fuselage spar

### **NOTE**

The figure illustrates left wing.

*Fig. 57-1 Wing*

## **MAINTENANCE**

### **REMOVAL / INSTALLATION**

#### **REMOVAL OF WINGS**

##### **Preparatory works**

- a) Disconnect board battery from board electric network (subsection 24-32-00).
- b) Remove access port cover of upper wing mount (Fig. 52-5, item 15), wing center section (16), bottom fuselage panel (24), access port covers of bottom and rear wing mounts (32) and bottom panel of wing center section (33).
- c) Dump all the fuel from the airplane fuel system.
- d) Disconnect aileron pushrods (section 27-10-00) at the control sticks including all the bondings.
- e) Disconnect flap control cables (subsection 27-50-00) at the flap control lever.
- f) Disconnect connectors between fwd fuselage section and wings.
- g) Disconnect fuel plumbing between fwd fuselage section and wings.
- h) Disconnect pilot pressure and stall warning speed hoses (section 34-10-00) in left wing and plug them immediately.
- i) Disconnect removing cotter pin and pin the pushrod of weight-on-wheel micro-switch (Fig. 34-4, item 2) controlling stall warning speed system operation at the starboard main landing gear leg.
- j) Prepare stand for wing storage.

##### **Removal of wing**

#### **CAUTION**

REMOVE PINS AND BUSHINGS DURING WING REMOVAL IN FOLLOWING SEQUENCE ONLY:

- 1) PIN (Fig. 57-2, item. 1) FROM THE REAR WING MOUNT
  - 2) PIN (Fig. 57-3, item 1) FROM UPPER WING MOUNT
  - 3) PIN (Fig. 57-4, item 1) FROM BOTTOM WING MOUNT
  - 4) BUSHING (Fig. 57-3, item 2) FROM UPPER WING MOUNT
  - 5) BUSHING (Fig. 57-4, item 2) FROM BOTTOM WING MOUNT
- 
- a) Remove pin of rear wing mount as follows:
    - remove cotter pin (Fig. 57-2, item 7) and remove washer (6)
    - push the pin (1) from the wing mount.
  - b) Remove pin from the upper wing mount (Fig. 57-3, paragraph A):
    - unlock tab washer (6) and unscrew upper nut (5)
    - remove safety pin (8) from the mount pin and push the mount pin (1) from the mount.

**EFFECTIVITY: All**

### Recommendation

Provide the upper wing mount with the puller (9) and yoke (10) such a way that the support ring of puller bearing leans upon upper side of yoke. Clinch the yoke arms behind the lower edge of upper wing mount (3).

Hold the pin (9) of puller with the wrench to prevent revolving and simultaneously turn by means of other wrench with puller nut to push the wing mount pin (1) from the bushing (2) downwards. In case the resistance to turning increases, hammer the upper part of puller (9) with wooden mallet (11).

### NOTE

Remove, when no puller (9) and yoke (10) are at the disposal, the pin (1) with 50 mm (2,0 in) thick and 120 mm (5 in) long duralumin rod and 2,5 kg (5,5 lb) hammer.

- c) Remove pin of bottom wing mount (Fig. 57-4, view A) as follows:
- remove cotter pin and unscrew nut (5).

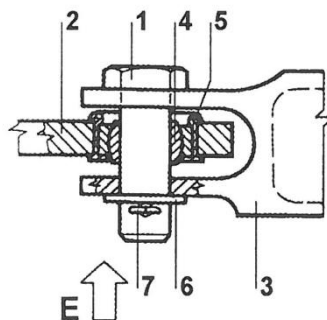
### Recommendation

Screw the puller (6) upon threaded end of pin (1) to have all the pin thread fully in the puller. Hold puller nut (9) with wrench to prevent revolving and turn the puller pin with the other wrench to pull the pin (1) from the bushing (2) forward in the direction of flight.

### NOTE

Remove, when no puller (9) and yoke (10) are at the disposal, the pin (1) with 30 mm (1,2 in) thick and 480 mm (19 in) long duralumin rod and 2,5 kg (5,5 lb) hammer. Screw the nut upon the other side of pin and tighten it gradually to simplify hammering the pin out.

- d) Remove bushing of upper wing mount (Fig. 57-3, view B):
- hammer the bushing (2) from the upper wing mount by means of duralumin mandrel (12) and hammer (13) swinging the wing lightly.
- e) Remove bushing of bottom wing mount (Fig. 57-4, view B):
- hammer the bushing (2) from the bottom wing mount by means of duralumin mandrel (11) and hammer (12) swinging the wing lightly.
- f) Remove wings and store it in stand.
- g) Plug uncoupled pipes.



E ... direction of flight

1 ... pin

2 ... forging of rear wing spar

3 ... mounts upon fwd fuselage structure

4 ... articulated bearing

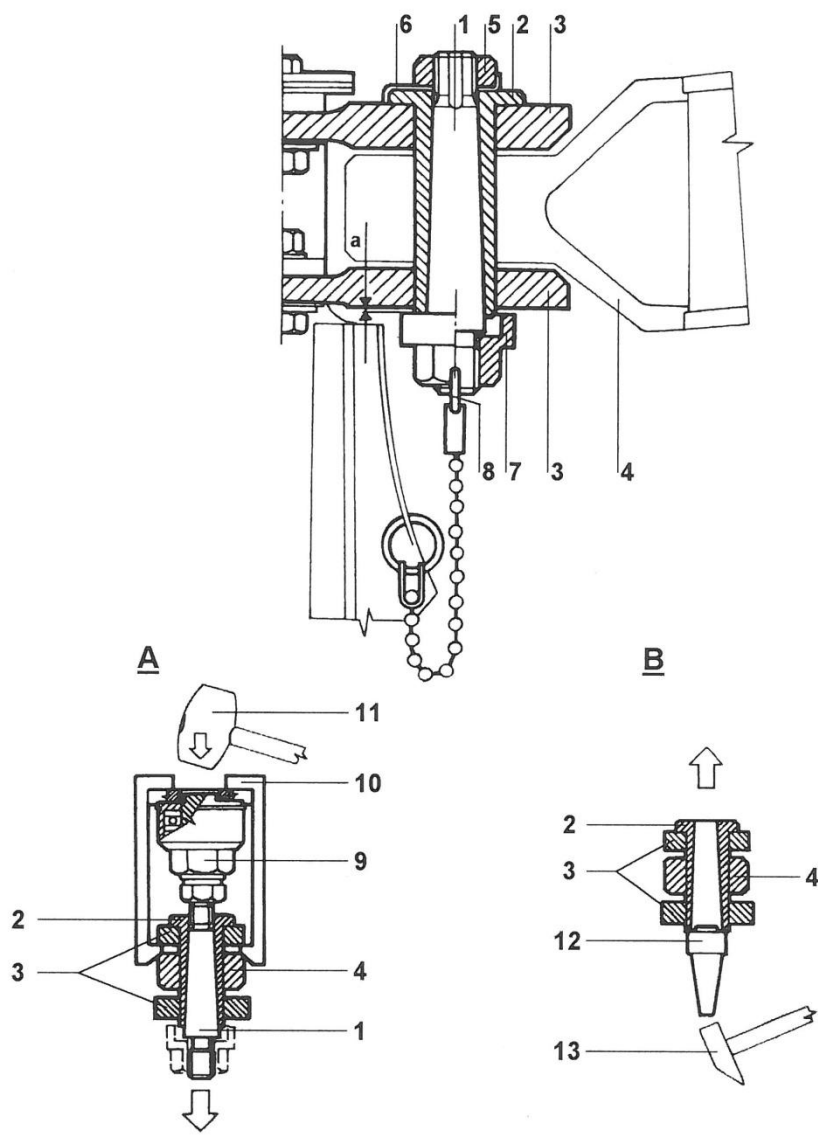
5 ... border bushing

6 ... washer

7 ... cotter pin

*Fig. 57-2 Rear wing mount*





A ... removal of pin (1) of upper wing mount

B ... removal of bushing (2) of upper wing mount

a ... play between upper wing mount and nut (7)

a = 0,5 to 1 mm (0,02 to 0,04 in)

1 ... pin

2 ... bushing

3 ... upper mount in wing

4 ... upper mount in fuselage structure

5 ... upper nut

6 ... tab washer

7 ... bottom nut

8 ... safety pin

Recommended fixtures:

9 ... Z 42.9511 puller

10 ... Z 42.9512 yoke

For information only:

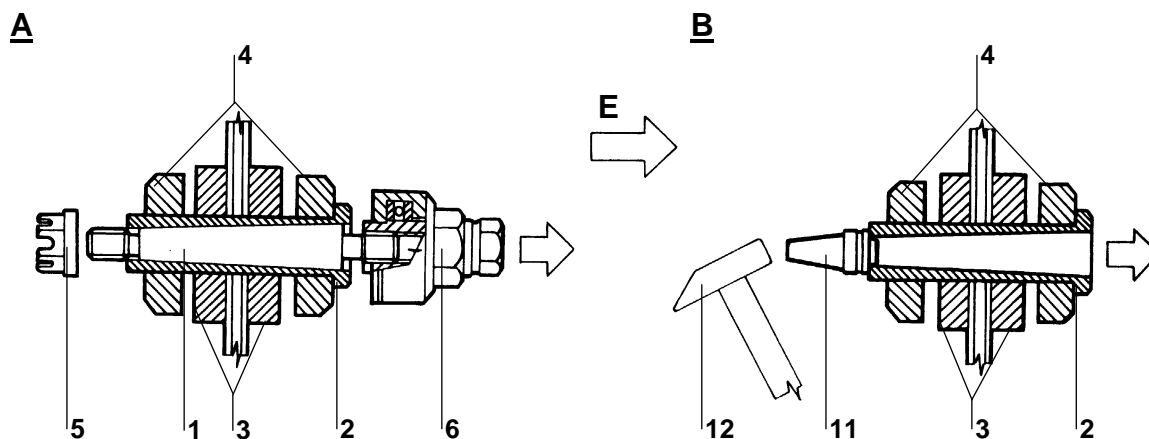
11 ... wooden mallet

12 ... duralumin mandrel

13 ... hammer

Fig. 57-3 Upper wing mount

EFFECTIVITY: All



A ... removal of pin (1) of bottom wing mount  
 B ... removal of bushing (2) of bottom wing mount  
 E ... direction of flight

1 ... pin  
 2 ... bushing  
 3 ... bottom mounts upon main wing spar  
 4 ... bottom mount upon fuselage structure  
 5 ... nut

Recommended fixture:  
 6 ... Z 42.9511 puller

For information only:  
 11 ... duralumin mandrel  
 12 ... hammer

*Fig. 57-4 Bottom wing mount*

### INSTALLATION OF WING

#### CAUTION

DURING WING INSTALLATION IT IS PROHIBITED:

- INTERCHANGE THE PINS AND BUSHINGS BETWEEN WINGS
- INSTALL ONLY NEW PIN WITH ORIGINAL BUSHING OR VICE VERSA. REPLACE ONLY COMPLETE PIN ASSEMBLY, I.E. NEW PIN WITH NEW PERTINENT BUSHING.

#### NOTE

Install pins during with installation in following sequence:

- 1) pin a bushing (Fig. 57-4, item 2; 1) of bottom wing mount
  - 2) pin and bushing (Fig. 57-3, item 2; 1) of upper wing mount
  - 3) pin (Fig. 57-2, item 1) of rear wing mount.
- a) Grease the bushings and pins of upper and bottom wing mounts and bearings and pins of rear wing mounts with graphite containing grease as LOCTITE 767 or MOLYKA G paste.
  - b) Place the wing to the fuselage and fit the wing mounts to fuselage wing mount.
  - c) Install pin and bushing into the bottom wing mount (Fig. 57-4) as follows:
    - turn the bushing (2) with its cut side downward and insert it from outside into the bottom wing mount. Hammer the bushing in if necessary by duralumin or wooden mallet.
    - insert pin (1) from outside into the bushing
    - screw the nut (5) upon the pin without tightening it.
  - d) Install pin and bushing into the upper wing mount (Fig. 57-3) as follows:
    - turn bushing (2) with its cut side forward in the direction of flight and insert it from upwards into the upper wing mount while lightly swinging with the wing. Do not push the bushing fully in but make the 5 mm (0,2 in) distance between bushing recess and upper mount.
    - insert pin (1) into the bushing from downwards
    - provide upper side of pin with tab washer (6) and screw nut (7) upon pin with two or three threads only
    - hammer the bushing (2) in and the pin (1) into the bushing with duralumin or wooden mallet and duralumin mandrel.
  - e) Instal pin of rear wing mount (Fig. 57-2) as follows:
    - insert pin (1) into the rear wig mount front fwd side
    - provide pin with washer (6) and lock the joint with cotter pin (7).
  - f) Tighten and lock the pin nuts as follows:
    - tighten the nut (Fig. 57-4, item 5) of bottom wing mount pin with  $25 \pm 2$  Nm (17 to 20 lbft) torque and lock it with cotter pina zajištěte
    - tighten the upper nut (Fig. 57-3, item 5) of the upper wing mount pin with  $25 \pm 2$  Nm (17 to 20 lbft) torque and lock it with tab washer (6)
    - screw the bottom nut (7) of upper wing mount pin to maintain 0,5 to 1 mm (0,02 to 0,04 in) clearance between nut and upper wing mount and lock the nut with safety pin (8).

#### NOTE

Tighten the nuts with torque spanner supplied with airplane tool kit.

#### Recommendation

It is recommended the wings should be fit to fuselage latticework mounts by three men, from which two are at the wing root and one at the wing tip.

**EFFECTIVITY:** All

**57-10-00**

page 57 - 7  
2011-02-02

### Final works

- a) Remove plugs from the fuel pipes, couple the pertinent pipe couplings and lock them with safety wire. Check the coupling tightness after the system refueling.
- b) Remove plugs and couple pertinent couplings of pitot and stall warning speed pressure pipes (section 34-10-00) in port wing. Make tightness check of pitot-static system.
- c) Connect electric-connectors between wings and fwd fuselage section.
- d) Join the pushrods of aileron control (section 27-10-00) to control sticks including bondings. Check correct aileron control and aileron deflection.
- e) Join flap control cables (section 27-50-00) to the flap control lever. Check correct control as well as the flap deflection.
- f) Join pushrod (Fig. 34-4, item 2) by pin provided with washer and locked with cotter pin of weight-on-wheel switch upon starboard main landing gear leg controlling the stall warning speed system.
- g) Preserve wing mounts (subsection 05-21-00).
- h) Connect board battery (subsection 24-32-00) to board electric network and check:
  - serviceability of tank float units
  - heating of pitot and stall warning speed probes
  - serviceability of position lights
  - serviceability of taxi and landing lights in port wing
  - serviceability of weight-on-wheels switch controlling the stall warning speed system in starboard wing.
- i) Install access port cover of upper wing mount (Fig. 52-5, item 15), wing center section panel (16), bottom fuselage panel (24), access port covers of bottom and rear wing mounts (32) and bottom wing center section cover (33).

## **APPROVED REPAIRS**

### **REPAIR OF WINGS**

#### **CAUTION**

THE REPAIR OF MAIN WING SPAR EXHIBITING CRACKS OF WEB PLATE MAY BE CARRIED OUT BY EITHER MANUFACTURER OR MANUFACTURER CERTIFIED REPAIR SHOP. MANUFACTURER SHOULD APPROVED THE WAY OF MAIN WING SPAR.

IT STRICTLY PROHIBITED TO REPAIR DEFORMED MAIN WING SPAR OR THE SPAR WITH CRACK(S) IN ANY SPAR FLANGE PLATE. IN CASE THE WING REPLACEMENT IS THE ONLY REPAIR.

#### **NOTE**

The check of wing main spar web plate and flange plates should be made using the mirror and lamp or other suitable equipment.

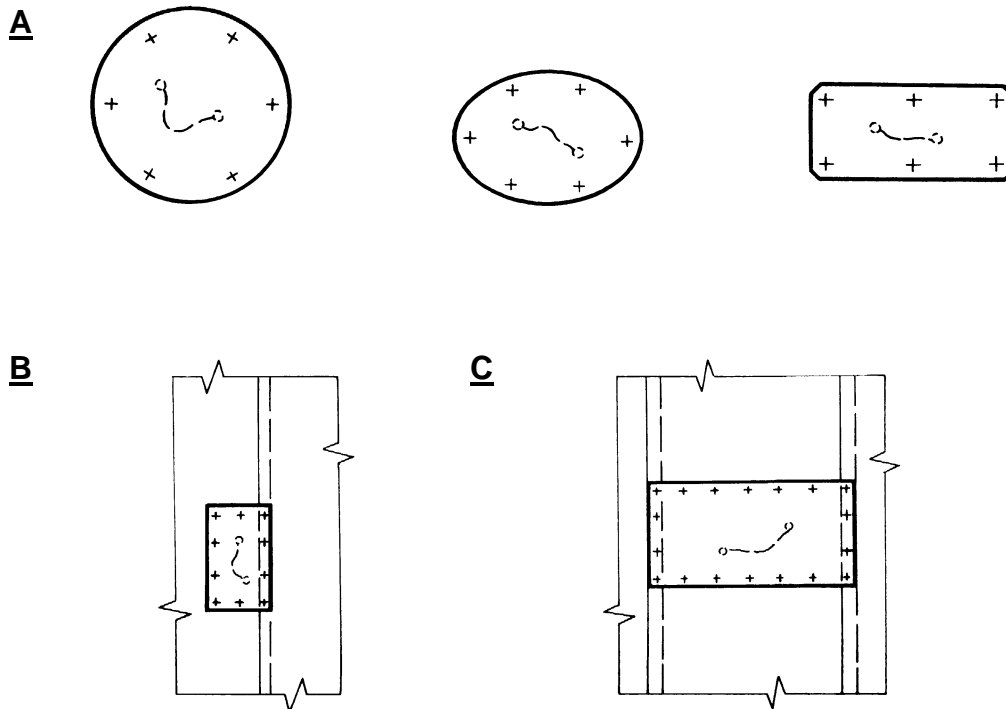
Fault	Remedy
1) Skin with cracks deformations and/or punctures 2) Ribs and longerons with cracks.	According to section „Repair of mechanical defects of wing skin, ribs and longerons“
3) Faults of main wing spar: a) cracks in web and flange plates b) cracks in web plate between bulkhead No. 1 and No. 2 c) deformed main wing spar (unacceptable results of airplane leveling)	Replace wing if any of above defects is detected.
4) Faulty anti-skid stripe at the wing root.	Tear the faulty stripe off the wing, clean the surface in the spot of stripe thoroughly, cut new anti-skid stripe, remove protection foil from the new stripe and fit and fix thoroughly with, e.g. rubber roller.

**EFFECTIVITY:** All

## **REPAIR OF MECHANICAL DEFECTS OF WING SKIN, RIBS AND LONGERONS**

### Repair of wing skin

1. Level the deformed skin by means of rubber or wooden mallet and suitable shims. When leveling the leading edge use the wooden rod with round ends that is inserted through the lightening holes in wing structure to the repaired spot.
2. Repair of cracks in wing skin:
  - a) Drill off the ends of crack with 1,5 mm (0,06 in) drill.
  - b) Make the overlapping sheet patch of following features:
    - the sheet thickness should be the same as that of repaired skin
    - the shape and dimension of sheet patch should correspond to length and position of crack (Fig. 57-5, view A; B; C)
    - the patch edge should be at least 20 mm (0,8 in) from the end of crack.
  - c) Rivet overlapping patch sheet to the repaired spot. Rivet pitch, shape and dimensions should be chosen in accordance with the rivets in the very vicinity of repaired spot. The rivet tensile strength is issued in subsection 51-71-00).
  - d) Repair paint (see subsection 51-72-00).



A ... repair of cracks less than 25 mm (1 in) long

repair of cracks longer than 25 mm (1 in) up to 1/3 of rib pitch:

B ... joining the overlapping patch to one rib

C ... joining the overlapping patch to two rib

*Fig 57-5 Repair of cracks in wing skin*

3. Repair of punctured skin:

**CAUTION**

THE PUNCTURED SKIN MAY BE REPAIRED EITHER BY MANUFACTURER OR AUTHORIZED REPAIR SHOP.

- a) Cut the faulty spot to circular shape of 135 mm (5,32 in) diameter (Fig. 57-6, view A). Chamfer the edges of hole.
- b) Make out the frame (2) made from 1 mm (0,04 in) Z 42.4400 sheet and anodize it. Provide frame with riveted nuts (3).
- c) Make out the lid (1) from the 0,8 mm (0,03 in) anodized D 16 ATV sheet.

**NOTE**

Shape the frame (2) and lid (1) to be flush with wing surface.

- d) Insert the frame (2) into the wing and fix it in place with suitable clips. Drill the skin together with frame with 2,7 mm drill (0,104 in), chamfer the drilled holes and rivet the frame to the wing skin.
- e) Screw the lid (1) to the frame (2) by means of screws (6).
- f) Repair paint (subsection 51-72-00).

4. Skin replacement

**CAUTION**

THE SKIN REPLACEMENT MAY BE CARRIED OUT EITHER BY MANUFACTURER OR BY AUTHORIZED REPAIR SHOP USING THE ASSEMBLY FIXTURE PREVENTING WING DEFORMATION.

Replace the skin panel in following cases:

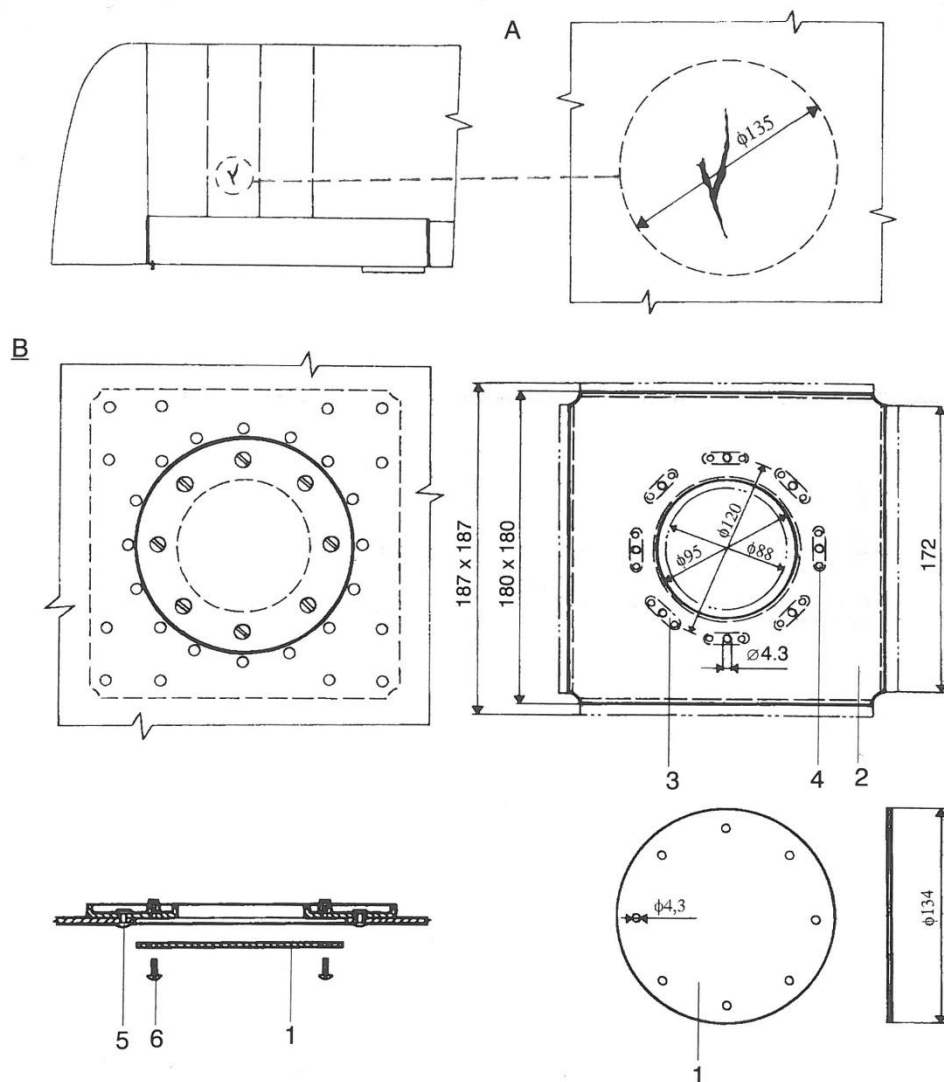
- the crack or defect exceeds 1/3 of rib pitch
- the faulty skin panels was already repaired twice by overlapping patches (Fig. 57-5) once repaired using frame and lid (Fig. 57-6).

The wing skin is made from D 16 ATV clad duralumin sheet.

Repair of wing, ribs and longerons

1. The parts looking like skin, as the rib webs, should be repaired according to procedure for repair of cracks in skin by drilling the crack ends off and riveting the overlapping patch over the crack (Fig. 57-7).
2. The parts looking like longerons should be in case of crack occurrence or deformation replaced.

**EFFECTIVITY: All**



A ... cutting of defective area

B ... use of frame (2) and lid (1)

1 ... lid

2 ... frame

3 ... riveted nut

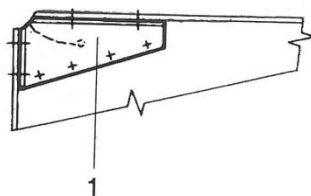
(M4 LDN 3244)

4 ... countersunk head rivet 2,6 x 8 mm (0,1 x 0,3 in)

5 ... oval or button head rivet (2,6 x 6 mm (0,1 x 0,24 in))

6 ... screw (M4 x 10 ONL 3117)

*Fig. 57-6 Repair of punctured wing skin*



1 ... reinforcement

*Fig. 57-10 Repair of crack in rib web plate*



# WING MOUNTS

## DESCRIPTION AND OPERATION

The wing is joined to the fuselage structure by upper wing mount (Fig. 57-1, item 1) and bottom wing mount (3), that are upon main wing spar (1) and rear wing mount (5), that is upon rear wing spar (4). The upper and bottom wing mounts use conical pins with cut taper sleeves (Fig. 57-3, items 1, 2 and Fig. 57-4, items 1; 2). The rear wing mount is provided with rolled-in articulated bearing (Fig. 57-2, item 4).

### Pin positioning:

- the upper wing mount: pin is in vertical position, the sleeve is recessed at its upper part (Fig. 57-3)
- the bottom wing mount: pin is in horizontal position, the sleeve is recessed in the direction of flight (Fig. 57-4)
- the rear wing mount: pin is in horizontal position, the pin head is in the direction of flight (Fig. 57-2)

## **MAINTENANCE**

### **INSPECTION / CHECK**

#### **CHECK OF NUT TIGHTENING THE WING MOUNT PINS**

1. Nut of upper wing mount (Fig. 57-3)
  - a) Unlock tab washer (6), unscrew upper nut (5) and remove tab washer from the pin (1).
  - b) Provide pin with new tab washer and tighten the nut (5) with  $25 \pm 2$  Nm (17 to 20 lbft) torque. Lock the nut with tab washer.
2. Nut of bottom wing mount (Fig. 57-4)
  - a) remove cotter pin from the nut (5) and release the nut for two threads.
  - b) tighten the nut with  $25 \pm 2$  Nm (17 to 20 lbft) torque and lock it with cotter pin.
3. Preserve the wing mounts with pin by preservation agent as WD 40 (spray).

## **APPROVED REPAIRS**

### **REPAIR OF WING MOUNTS**

#### **CAUTION**

THE WING MOUNTS MAY BE REPLACED BY AIRPLANE MANUFACTURER OR BY AUTHORIZED REPAIR SHOP.

Fault	Remedy
Faulty wing mounts: a) local corrosion up to 0,1 mm (0,004 in) depth b) cracks and corrosion deeper than 0,1 mm (0,004 in) c) lose bordering bearing of rear wing mount d) dented holes of wing fuselage and wing mounts as detected after micrometer measurement e) dented hole in the rear wing fuselage and wing mounts as detected by micrometer measurement	Remove corrosion with fine emery paper. Replace cracked or excessively corroded mounts (see CAUTION).  According to subsection "Reaming of wing mount holes".

**EFFECTIVITY:** All

### REAMING OF WING AND FUSELAGE MOUNTS

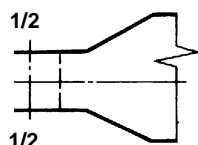
#### CAUTION

CHECK WING POSITIONING AFTER WING MOUNT HOLE REAMING (subsection 08-20-00).

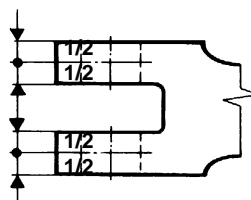
General inspection for hole reaming are issued in subsection 20-21-00.

Measure the fuselage main spar wing mounts to detect hole denting by means of three-point micrometer in the middle of mount thickness according to figure below:

a) upper wing mount



b) bottom wing mount



Upper wing mount

Hole in mount (Fig. 57-8, item 1; 3)		Recommended fixtures		Recommended reamers		Recommended calipers
		mount in wing	mount in fuselage	mount in wing	mount in fuselage	
Original dimension	Ø 20 H6	-----	-----	-----	-----	-----
Dimension after repair	Ø 20,1 H6	reaming fixture (L; R) 500-529-0174	reaming fixture 500-529-0170	set of reamers 003-241-0949	set of reamers 003-224-0950	set of calipers 34-F526-401
	Ø 20,2 H6	reamer adapter 32-Z42-1887	set of centering mandrels 500-240-0171	(Ø 20,1 H6; Ø 20,2 H6; Ø 20,3 H6;	(Ø 20,1 H6; Ø 20,2 H6; Ø 20,3 H6;	(Ø 20,1 H6; Ø 20,2 H6; Ø 20,3 H6;
	Ø 20,3 H6		reamer adapter 500-240-0173	Ø 20,4 H6)	Ø 20,4 H6)	Ø 20,4 H6)
	Ø 20,4 H6		counterbore 32-Z42-1850			

Mount pin (Fig. 57-8, item 2)		Number of pin
Original dimension	Ø 20 h6	Z 42.2181-00.00
Dimension after repair	Ø 20,1 h6	Z 42.2182-00.00
	Ø 20,2 h6	Z 42.2183-00.00
	Ø 20,3 h6	Z 42.2184-00.00
	Ø 20,4 h6	Z 42.2185-00.00

EFFECTIVITY: All

### Bottom wing mount

Hole in mount (Fig. 57-8, item 4; 6)		Recommended fixtures		Recommended reamers		Recommended calipers
		mount in wing	mount in fuselage	mount in wing	mount in fuselage	
Original dimension	Ø 20 H6	-----	-----	-----	-----	-----
Dimension after repair	Ø 20,1 H6	reaming fixture 500-529-0174  reamer adapter 32-Z42-1887  counterbore 32-Z42-1850	reamer guide bushings 500-240-0172	set of reamers 003-241-0949 (Ø 20,1 H6; Ø 20,2 H6; Ø 20,3 H6; Ø 20,4 H6)	set of reamers 003-224-0950 (Ø 20,1 H6; Ø 20,2 H6; Ø 20,3 H6; Ø 20,4 H6)	set of calipers 34-F526-401 (Ø 20,1 H6; Ø 20,2 H6; Ø 20,3 H6; Ø 20,4 H6)
	Ø 20,2 H6		set of centering mandrels 500-240-0171			
	Ø 20,3 H6		reamer adapter 500-240-0173			
	Ø 20,4 H6					

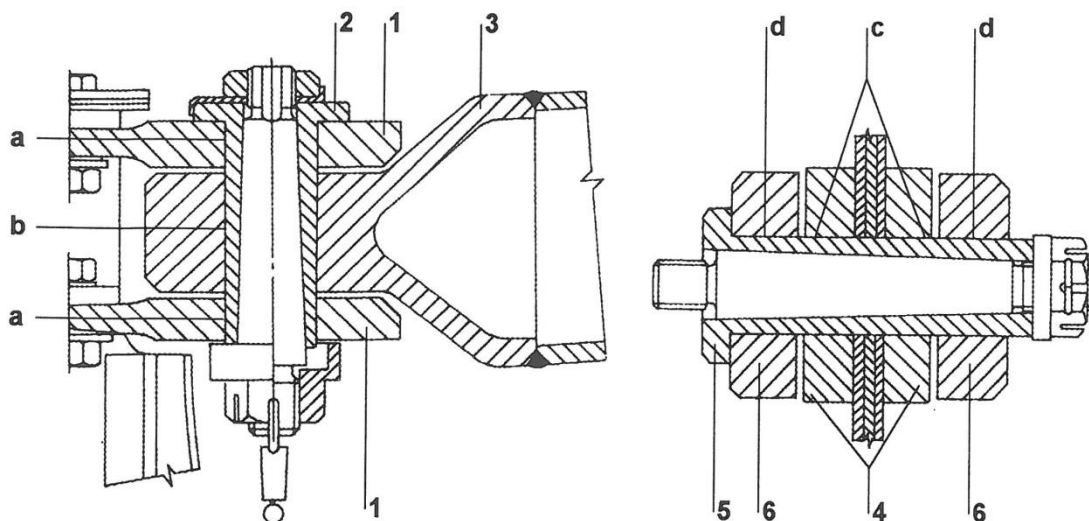
Mount pin (Fig. 57-8, item 5)		Number of pin
Original dimension	Ø 20 h6	Z 42.2191-00.00
Dimension after repair	Ø 20,1 h6	Z 42.2192-00.00
	Ø 20,2 h6	Z 42.2193-00.00
	Ø 20,3 h6	Z 42.2194-00.00
	Ø 20,4 h6	Z 42.2195-00.00

**EFFECTIVITY:** All

### Rear wing mount

Hole in mount (Fig. 57-8, item 7)		Recommended reamer	Recommended caliper
Original dimension	Ø 12 H7	-----	-----
Dimension after repair	Ø 12,1 H7	Ø 12,1 H7 000-224-5013	Ø 12,1 H7 000-511-1016
	Ø 12,2 H7	Ø 12,2 H7 000-224-5014	Ø 12,2 H7 000-511-1017
	Ø 12,3 H7	Ø 12,3 H7 000-224-5015	Ø 12,3 H7 000-511-1018
	Ø 12,4 H7	Ø 12,4 H7 000-224-5043	-----

Mount pin (Fig. 57-8, item 8)		Number of pin
Original dimension	Ø 12 <sup>-0,005 -0,015</sup>	Z 42.2100-00.22
Dimension after repair	Ø 12,1 <sup>-0,005 -0,015</sup>	Z 42.2100-00.23
	Ø 12,2 <sup>-0,005 -0,015</sup>	Z 42.2100-00.24
	Ø 12,3 <sup>-0,005 -0,015</sup>	Z 42.2100-00.25
	Ø 12,4 <sup>-0,005 -0,015</sup>	Z 42.2100-00.28



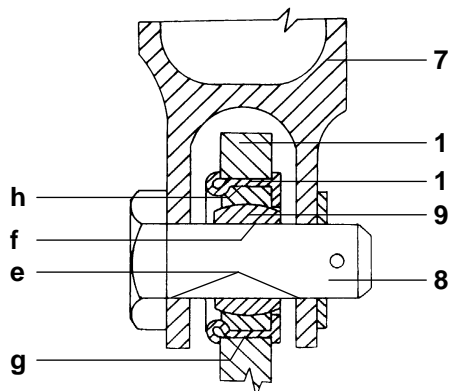
Joint	Item	Name	Dimensions (mm)						
			Original			Operation T2 max.	Repair		
			D1	T1	V min./max.		D2 max.	K min.	M min.
a	1	Mount in wing	∅ 20 H6	0 + 0,013	0 0,026	+ 0,050	∅ 20,4 H6	15,8	16,3
	2	Vertical pin	∅ 20 h6	0 - 0,013		- 0,020	∅ 20,4 h6		
b	3	Mount in main fuselage spar	∅ 20 H6	0 + 0,013	0 0,026	+ 0,050	∅ 20,4 H6	12,85	10,85
	2	Vertical pin	∅ 20 h6	0 - 0,013		- 0,020	∅ 20,4 h6		
c	4	Mount upon main wing spar	∅ 20 H6	0 + 0,013	0 0,026	+ 0,050	∅ 20,4 H6	13,8	13,8
	5	Horizontal pin	∅ 20 h6	0 - 0,013		- 0,020	∅ 20,4 h6		
d	6	Mount upon fuselage main spar	∅ 20 H6	0 + 0,013	0 0,026	+ 0,050	∅ 20,4 H6	12,85	12,05
	5	Horizontal pin	∅ 20 h6	0 - 0,013		- 0,020	∅ 20,4 h6		

Fig. 57-8 Dimensions, allowances and plays in wing-fuselage mounts  
(page 1 of 2)

EFFECTIVITY: All

57-40-00

page 57 - 19  
2011-02-02



Joint	Item	Name	Dimensions (mm)						
			Original			Operation	Repair		
			D1	T1	V min./max.		D2 max.	K min.	M min.
e	7	Mount upon rear fuselage spar	Ø 12 H7	0 + 0,018	<u>0,005</u> 0,033	+ 0,025	Ø 12,4 H7	7,8	6,9
	8	Pin	Ø 12 <sup>- 0,005 - 0,015</sup>	- 0,005 - 0,015		- 0,050	Ø 12,4 <sup>- 0,005 - 0,015</sup>		
f	9	Articulated bearing	Ø 12 J8	0 + 0,008	<u>0,005</u> 0,023	+ 0,010	Ø 12,4 J8		
	8	Pin	Ø 12 <sup>- 0,005 - 0,015</sup>	- 0,005 - 0,015		- 0,050	Ø 12,4 <sup>- 0,005 - 0,015</sup>		
g	10	Forging upon rear wing spar	Ø 23 H7	0 + 0,021	R				
	11	Border bushing	Ø 23 h8	0 - 0,033					
h	11	Border bushing	Ø 22 K6	+ 0,020 - 0,011	R				
	9	Articulated bearing	Ø 22	0 - 0,009					

*Fig. 57-8 Dimensions, allowances and plays in wing-fuselage mounts  
(page 2 of 2)*



**A. REAMING OF HOLES IN UPPER WING MOUNT**

**1. Reaming of wing mount in wing**

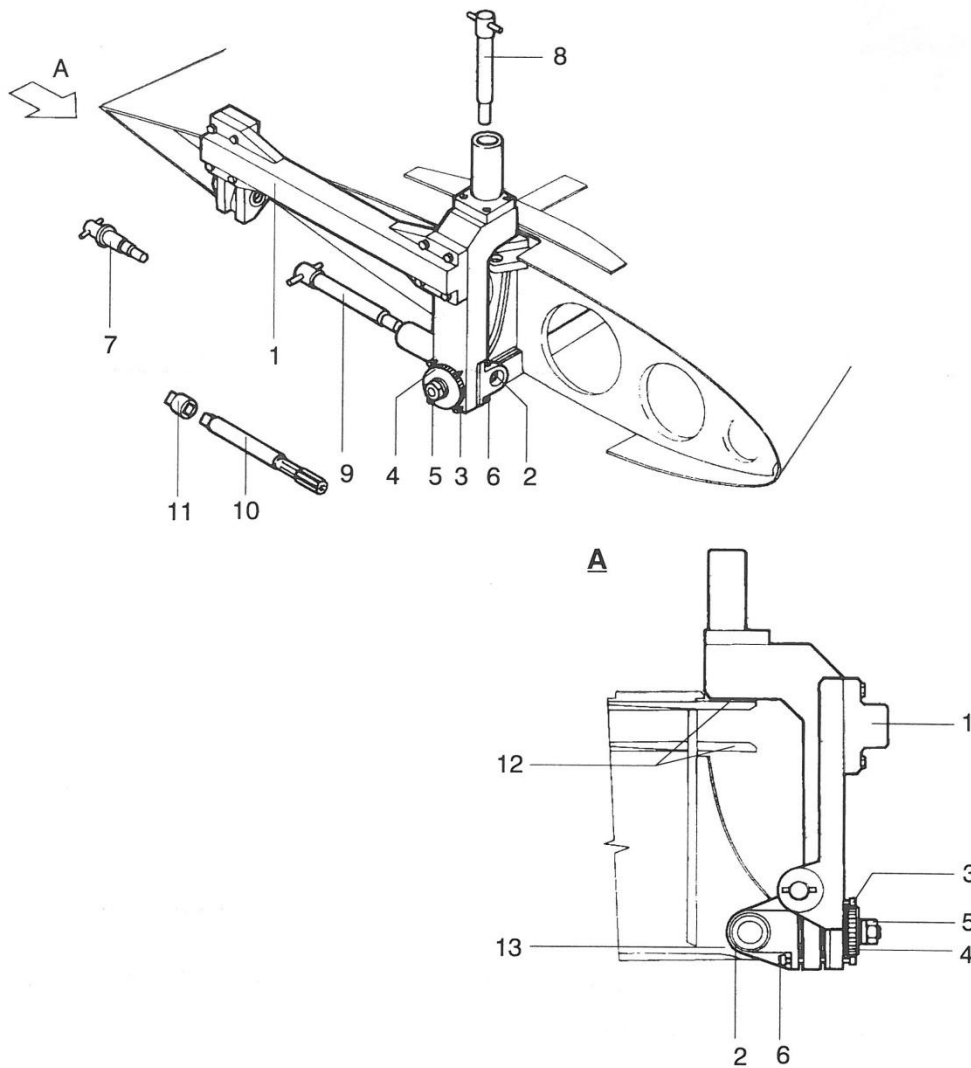
**CAUTION**

THE REAMER FIXTURE (Fig. 57-9) SHOULD BE CENTERED IN REAMING TWO MOUNTS BY MEANS OF CENTERING MANDRELS (ITEMS 7; 9).

- a) Clean the holes in wing mount and in reamer fixture.
- b) Install the reaming fixture as follows:
  - release drilling block (2) by knob (4), nut (5), four screws (3) and four screws (6)
  - fit the web plate of reaming fixture with its arms (1) upon the wing mounts and lock it in place with centering mandrel (7) inserted into the rear wing mount and centering mandrel (8) inserted into the upper wing mount, using the mandrels of pertinent diameter according to holes in mounts
  - insert centering mandrel (9) into the upper mount (13) and position the drilling block (2) to simplify insertion of centering pin (9)
  - as soon as the drilling block (2) is set fix it in place by screws (3, 6), nut (5) and knob (4)
  - make sure the drilling block (2) is set correctly by removing and insertion of centering mandrel (9).
- c) Ream the upper wing mount (12) as follows:
  - remove centering pin (8) from the upper mount
  - insert reamer (10) of required diameter into the reamer guide of fixture and ream using the adapter (11) and ratchet lever with hole for 13 mm (0,52 in) wrench the upper mount hole.
- d) Remove centering mandrels (7; 9) from the mounts and reaming fixture from the wing.

**2. Reaming of wing mount in fuselage structure**

- a) Clean the holes in wing mount and in reamer fixture.
- b) Install the reaming fixture as follows:
  - fit the body of reaming fixture (Fig. 57-10, item 1) upon the upper mount (8)
  - insert the centering mandrel (5) into the reaming fixture using mandrel of pertinent diameter and check fitting of centering bushing (3) upon the upper wing mount (8). The fixture should lean with its whole surface. Remove possible clearance with filler gauge.
  - fix the reaming fixture by tightening the bushing (2)
  - make sure the reaming fixture is fit properly by removing and inserting the centering mandrel (5).
- c) Ream the upper mount hole in fuselage structure (8) as follows:
  - remove centering mandrel (5) from the reaming fixture
  - insert reamer (6) of pertinent diameter into the bushing (2) and using the shorter adapter piece (7) ream the hole of upper wing mount.
- d) Release bushing (2) and remove reaming fixture from the mount.



A ... installation of reaming fixture upon wing mounts

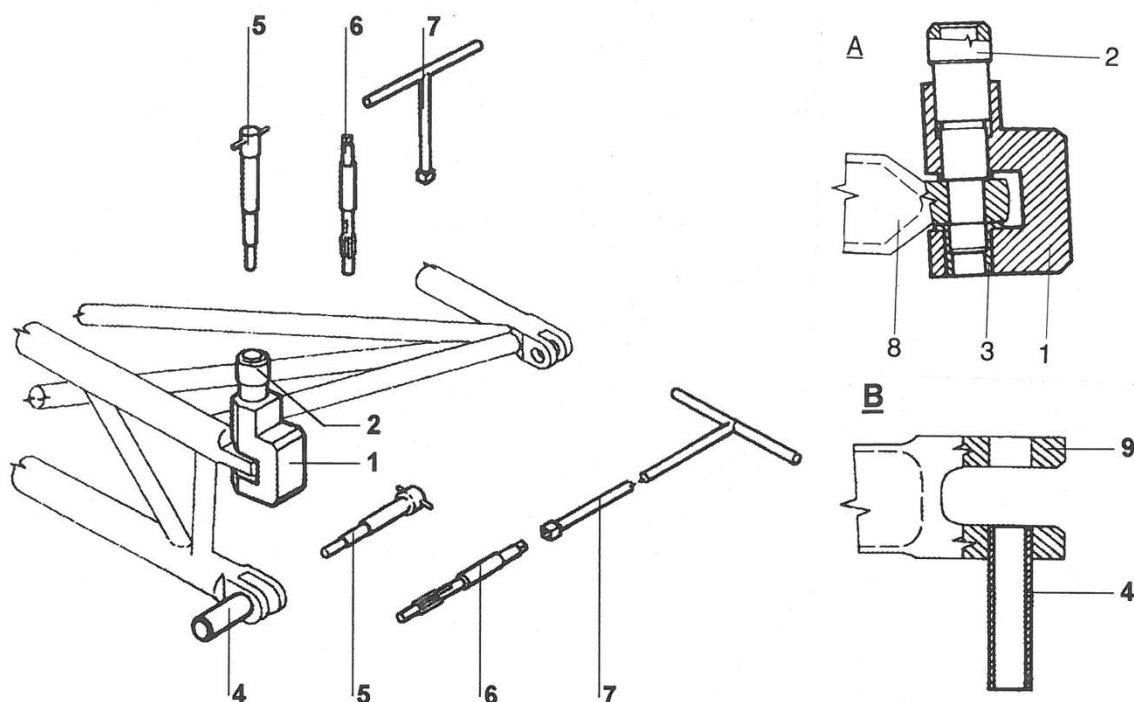
- |   |  |
|---|--|
| 1 ... web plate of reaming fixture with arms                      | } 500-529-0174<br>L, R reaming fixture |
| 2 ... drilling block  |  |
| 3 ... screw   |  |
| 4 ... knob  |  |
| 5 ... nut   |  |
| 6 ... screw   |  |
| 7 ... centering mandrel of rear wing mount                        |  |
| 8 ... 240 mm (9,5 in) long centering mandrel of upper mount       |  |
| 9 ... 233 mm (9,2 in) long centering mandrel of bottom wing mount |  |
| 10 ... reamer from 003-241-0949 set                               |  |
| 11 ... 32-Z42-1887 reamer adapter piece                           |  |
| 12 ... upper mount in wing  |  |
| 13 ... bottom mount in wing                                       |  |

## **NOTE**

The figure illustrates mount of left wing.

*Fig. 57-9 Reaming of holes of mounts in wing*

**EFFECTIVITY: All**



A ... installation of guide fixture upon upper mount

B ... installation of guide bushing into the bottom mount

- |  |   |                              |
|--|---|------------------------------|
| 1 ... body of reaming fixture  | } | 500-529-0170 reaming fixture |
| 2 ... bushing  |   |                              |
| 3 ... centering bushing  |   |                              |
| 4 ... guide bushing of 500-240-0172 bushing set                            |   |                              |
| 5 ... centering mandrel of 500-240-0171 mandrel set                        |   |                              |
| 6 ... reamer of 003-224-0950 reamer set                                    |   |                              |
| 7 ... 500-240-0173 reamer adapters of 380 mm (15 in) and 1250 mm (49,2 in) |   |                              |
| 8 ... upper mount in fuselage structure                                    |   |                              |
| 9 ... bottom mount in fuselage structure                                   |   |                              |

### **NOTE**

The figure illustrates mount of left wing.

*Fig. 57-10 Reaming of mount holes upon fuselage structure*

**EFFECTIVITY:** All

## **B. REAMING OF HOLES OF BOTTOM WING MOUNTS**

### **1. Reaming of mount holes in mounts of wing**

#### **CAUTION**

THE REAMING FIXTURE (Fig. 57-9) SHOULD BE DURING REAMING FIXED BY CENTERING MANDRELS (items 7; 8) IN THE REMAINING TWO MOUNTS.

- a) Clean the mounts in wing and in the reaming fixture.
- b) Install reaming fixture as follows:
  - release drilling block (2) by knob (4), nut (5), four screws (3) and four screws (6).
  - install web plate of reaming fixture with arms (1) upon the mounts in wing and lock them in place by inserting the centering pin (7) into the rear mount and centering pin (8) of pertinent diameter into the upper mount
  - insert pin (9) into the bottom mount (13) and set position of drilling block (2) to make moving of centering pin (9) simple
  - tighten the screws (3, 6), nut (5) and knob (4) as soon as the drilling block (2) is set to position
  - make sure the drilling block (2) is set properly by removing and inserting the centering mandrel (9).
- c) Ream the bottom mount (13) in wing as follows:
  - remove centering pin (9) from the bottom mount
  - insert reamer (10) of pertinent diameter into the guide bushing of the fixture and ream the bottom hole using adaptation pieces (11) and ratched lever with hole for 13 mm (0,52 in) wrench.
- d) Remove centering mandrels (7, 8) from the mounts and reaming fixture from the wing.

### **2. Reaming of wing mounts upon fuselage structure**

- a) Clean the holes in mount in fuselage structure and guide bushing (Fig. 57-10, item 4).
- b) Insert guide bushing (4) into one eye of bottom mount with external diameter corresponding to hole in bottom eye.
- c) Check axial alignment of holes in bottom mount as follows:
  - insert centering pin (5) into the free eye of bottom mount with the external diameter corresponding to diameters of hole in bottom mount and in guide bushing (4)
  - remove centering mandrel (5) from the mount.
- d) Ream one eye of bottom mount in fuselage structure (9) as follows:
  - insert the reamer (6) of pertinent diameter centered by centering bushing (4) into the free eye of bottom mount
  - ream the hole using longer adaptation piece (7).
- e) Remove guide-bushing (4) from the eye of bottom mount and clean thoroughly the holes in bottom wing mount.
- f) Insert guide-bushing (4) with diameter equal to newly reamed hole in bottom mount (9).
- g) Check axial alignment of holes in bottom mount and ream the second eye of this mount according to paragraphs c) through e) of this subsection.
- h) Check axial alignment of reamed holes of bottom wing mount by centering mandrel (5).

**EFFECTIVITY: All**

**C. REPAIR OF REAR WING MOUNT**

**1. Reaming of wing mount in fuselage structure**

Ream the rear wing mount in fuselage structure according to general instructions issued in subsection 20-21-00.

**2. Repair of wing mount in wing**

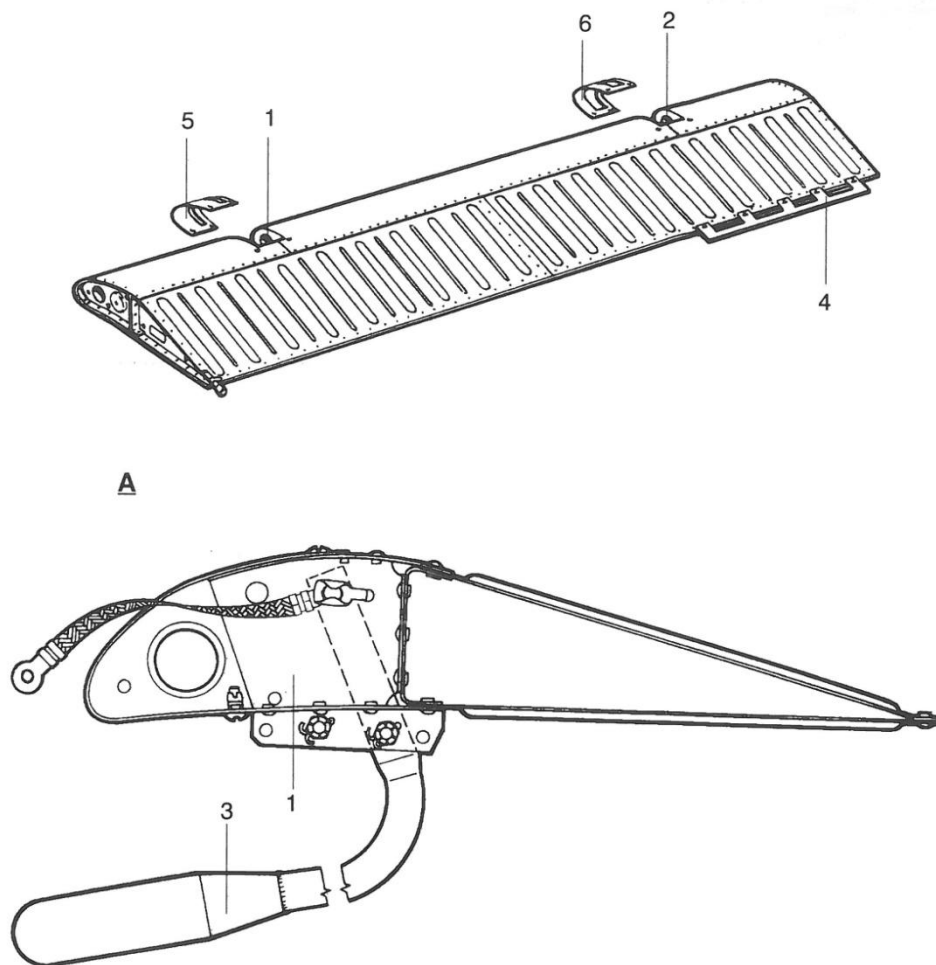
- a) Grind the hole of internal ring of articulated bearing (Fig. 57-8, page 2 of 2, item 9):
  - turn the internal ring of articulated bearing to suitable position perpendicular to external ring and remove it
  - grind the hole of internal ring of articulated bearing to the same diameter as that reamed to rear wing mount in fuselage structure
  - clean the internal ring, grease it and insert it into the external ring of articulated bearing.
- b) Replace pressed in bordering bushing (Fig. 57-8, page 2 of 2, item 11) including articulated bearing (9) in case the radial play is detected in bushing fitting:
  - the instructions for replacement of articulated bearing with bordering bushing are issued in subsection 20-22-00.

# **AILERONS AND WING FLAPS**

## **DESCRIPTION AND OPERATION**

The aileron is hinged in outboard (Fig. 57-11, item 1) and inboard (2) hinges to wing. The aileron control pushrod is joined to inboard aileron hinge (2). The aileron mass balance (3) is joined to outboard aileron hinge (1). The aileron is provided with fixed balance tab (4).

The wing flap is suspended to outboard (Fig. 57-12, item 1) and inboard (2) suspension in wing. The flap pushrod is joined to inboard suspension (2).



A ... outboard aileron hinge (view from wingtip)

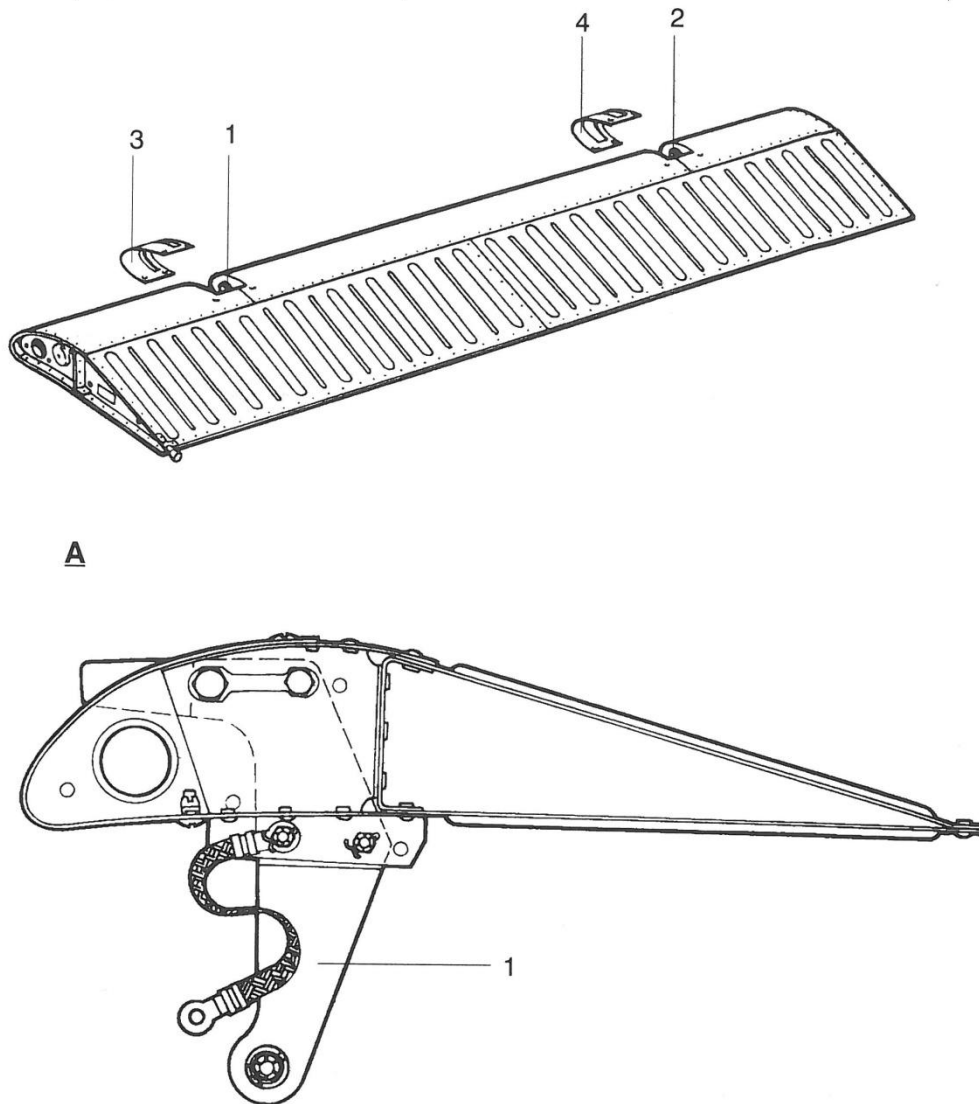
- 1 ... outboard aileron hinge
- 2 ... inboard aileron hinge
- 3 ... mass balance
- 4 ... balance tab
- 5 ... outboard cover
- 6 ... inboard cover

**NOTE**

The figure illustrates left wing.

*Fig. 57-11 Aileron*

**EFFECTIVITY: All**



A ... outboard flap suspension (view from wingtip)

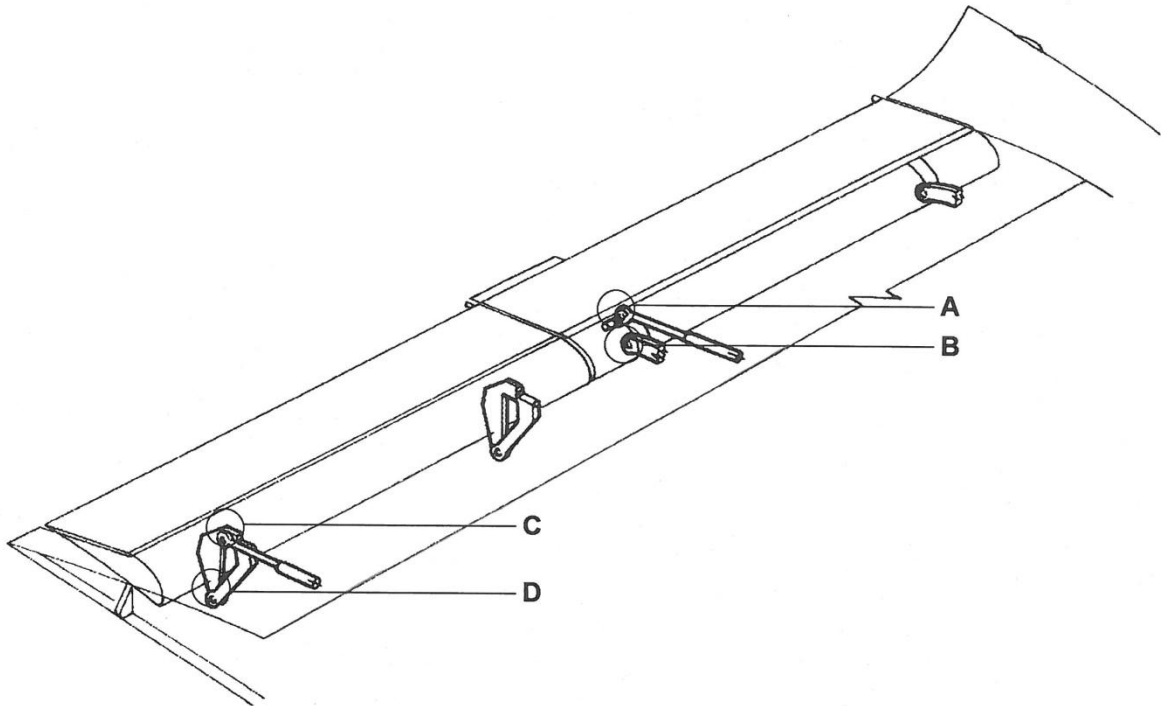
- 1 ... outboard flap suspension
- 2 ... onboard flap suspension
- 3 ... outboard cover
- 4 ... inboard cover

**NOTE**

The figure illustrates left wing flap.

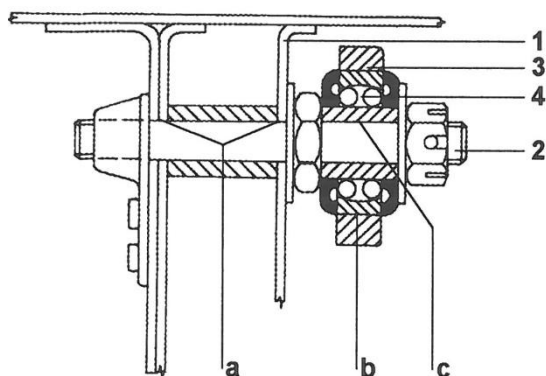
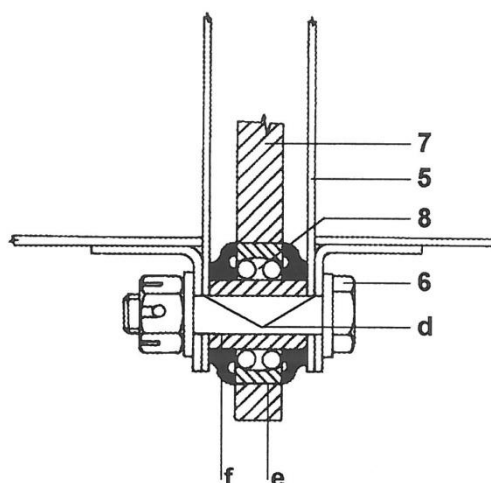
*Fig. 57-12 Wing flap*





- A ... joint of pushrod and aileron hinge
- B ... joining of aileron to wing hinges
- C ... joint of pushrod and flap suspension
- D ... joining the wing flaps to wing suspension

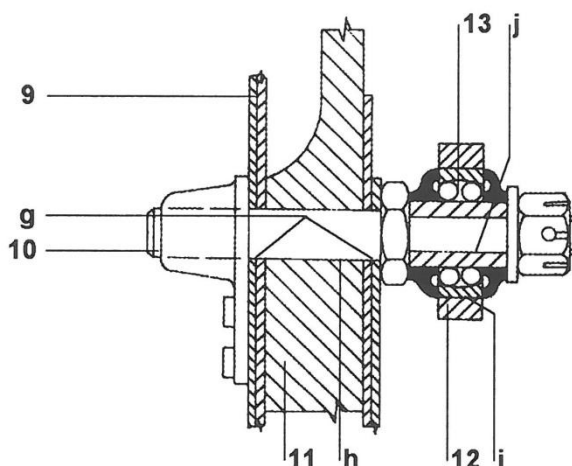
*Fig. 57-13 Dimensions, allowances and plays in aileron hinges and flap suspensions  
(page 1 of 4)*

**A**

**B**


Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
a	1	Console (L; R)	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	2	Screw	Ø 6 f8	- 0,010 - 0,028		- 0,035
b	3	Eye	Ø 19 K6	+ 0,002 - 0,011	R	
	4	Bearing	Ø 19	+ 0,002 - 0,011		
c	4	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	2	Screw	Ø 6 f8	- 0,010 - 0,028		- 0,035
d	5	Console (L; R)	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	6	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
e	7	Hinge in wing (L; R)	Ø 19 K6	+ 0,002 - 0,010	R	
	8	Bearing	Ø 19	+ 0,002 - 0,011		
f	8	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	6	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035

Fig. 57-13 Dimensions, allowances and plays in aileron hinges and flap suspensions  
(page 2 of 4)

**C**



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
g	9	Console (L; R)	Ø 8 H8	+ 0,022 0	$\frac{0,013}{0,057}$	+ 0,035
	10	Screw	Ø 8 f8	- 0,013 - 0,035		- 0,045
h	11	Hinge (L; R)	Ø 8 H8	+ 0,022 0	$\frac{0,013}{0,057}$	+ 0,035
	10	Screw	Ø 8 f8	- 0,013 - 0,035		- 0,045
i	12	Eye	Ø 19 K6	+ 0,002 - 0,010	R	
	13	Bearing	Ø 19	+ 0,002 - 0,011		
j	13	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,046}$	+ 0,005
	10	Screw	Ø 6 f8	- 0,010 - 0,028		- 0,035

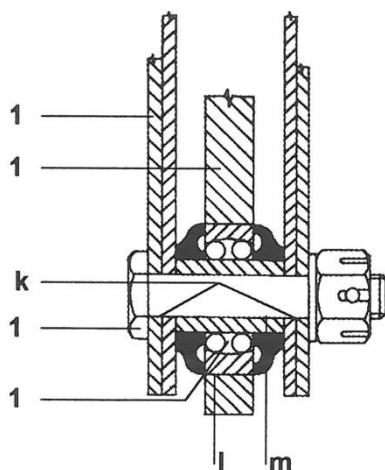
Fig. 57-13 Dimensions, allowances and plays in aileron hinges and flap suspensions  
(page 3 of 4)

**EFFECTIVITY:** All

**57-50-00**

page 57 - 31  
2011-02-02

**D**



Joint	Item	Name	Dimensions (mm)			
			Original			Operation
			D1	T1	V min./max.	T2 max.
k	14	Suspension in wing	Ø 6 H8	+ 0,018 0	$\frac{0,010}{0,046}$	+ 0,025
	15	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035
l	11	Hinge (L; R)	Ø 19 K6	+ 0,002 - 0,010	R	
	16	Bearing	Ø 19	+ 0,002 - 0,011		
m	16	Bearing	Ø 6	+ 0,002 - 0,010	$\frac{0}{0,030}$	+ 0,005
	15	Fitted bolt	Ø 6 f8	- 0,010 - 0,028		- 0,035

*Fig. 57-13 Dimensions, allowances and plays in aileron hinges and flap suspensions  
(page 4 of 4)*

## **MAINTENANCE**

### **REMOVAL / INSTALLATION**

#### **REMOVAL OF AILERON**

##### **CAUTION**

BE CAREFUL DURING AILERON REMOVAL TO PREVENT RELEASING OF BEARINGS FROM THE EYE OF AILERON CONTROL PUSHROD (Fig. 57-14, item 22).

NEVER SUPPORT TOOL AGAINST HINGE CONSOLE DURING AILERON PUSHROD (22) REMOVAL.

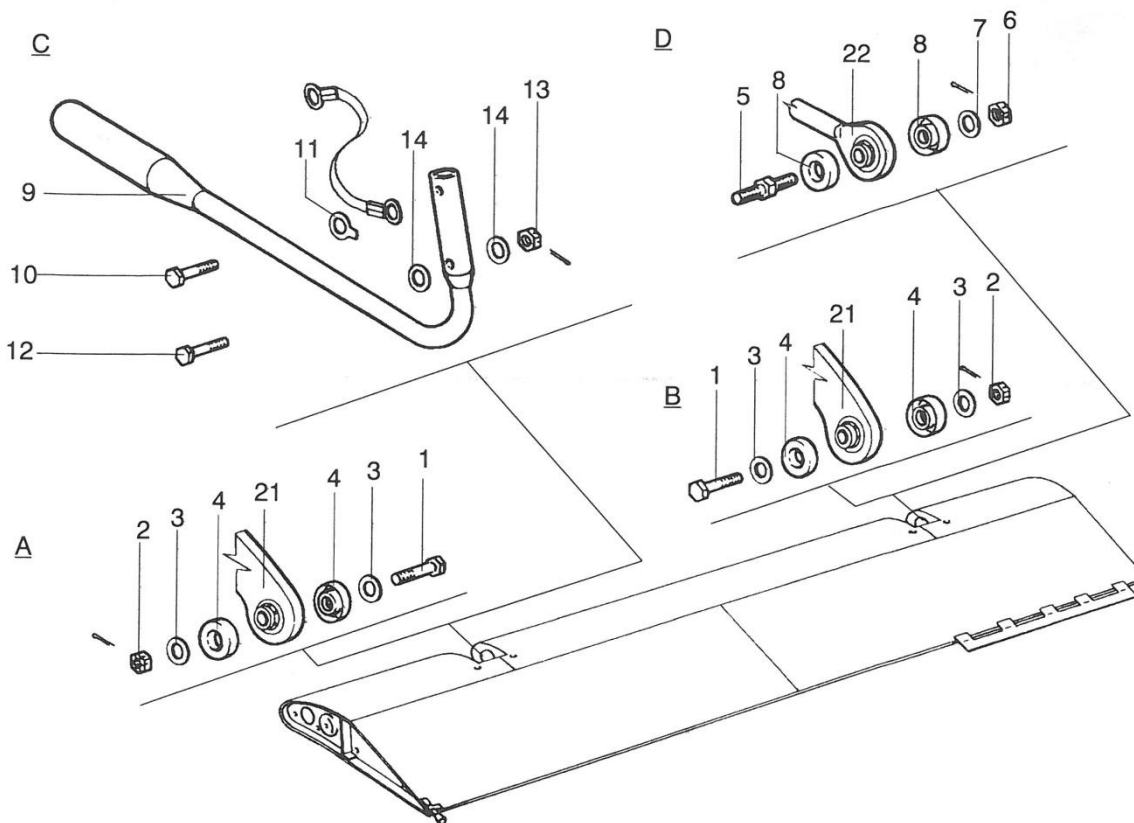
##### **NOTE**

Procedure of removal of port and starboard ailerons is the same.

#### **Aileron removal**

- a) Disconnect aileron hinge bonding from the wing.
- b) Remove screws from the outboard (Fig. 57-11, item 5) and inboard (6) access port covers of aileron hinges.
- c) Disconnect aileron control pushrod (Fig. 57-14, item 22) from the inboard aileron hinge (detail D):
  - remove cotter pin and unscrew nut (6)
  - remove washer (7) and aileron control pushrod (22) with dust covers (8) from the bolt (5).
- d) Release the aileron from the hinges in wing (detail A; B) as follows:
  - remove cotter pins and unscrew nuts (2)
  - remove fitted bolts (1), washers (3) and dust covers (4).
- e) Remove aileron from the wing and place it to stand.
- f) Remove if necessary the mass balance (detail C):
  - unlock tab washer (11) and unscrew screw (10)
  - remove cotter pin and unscrew nut (13)
  - remove bolt (12) and washers (14).

**EFFECTIVITY: All**



- A ... joining the outboard aileron hinge  
B ... joining the inboard aileron hinge  
C ... joining the mass balance  
D ... joining the aileron control pushrod

- 1 ... fitted bolt  
2 ... nut  
3 ... washer  
4 ... dust cover  
5 ... screw  
6 ... nut  
7 ... washer  
8 ... dust cover  
9 ... mass balance

- 10 ... screw  
11 ... tab washer  
12 ... bolt  
13 ... nut  
14 ... washer

- For information only:  
21 ... hinge in wing  
22 ... aileron control pushrod

## **NOTE**

The figure illustrates left aileron.

*Fig. 57-14 Aileron suspension*

### **INSTALLATION OF AILERONS**

- a) Install the mass balance (Fig. 57-14, item 9) to aileron:
  - insert tab washer (11) and bonding upon screw (10)
  - screw the screw (10) in and lock it with tab washer (11)
  - insert the bolt (12) with washers (14) in and fix it with nut (13)
  - lock the nut (13) after its tightening with 9,5 to 11,5 Nm (7,0 to 8,5 lbft) torque by cotter pin.
- b) Grease bearings in wing hinges (21) and bearing in aileron control pushrod (22) and install dust covers (4; 8).
- c) Fit the aileron into the hinges (21) in wing (detail A; B):
  - insert fitted bolts (1) with washers (3) and tighten them with nuts (2)
  - lock the nuts (2) after their tightening with 9,5 to 11,5 Nm (7,0 to 8,5 lbft) torque by cotter pins.
- d) Join aileron control pushrod (22) to inboard aileron hinge (detail D):
  - insert aileron pushrod (22), dust covers (8) and washer (7) upon screw (5)
  - screw the nut (6) in and lock it after tightening by cotter pin.
- e) Provide aileron and fix there the outboard (Fig. 57-11, item 5) and inboard (6) access port covers of aileron hinges.
- f) Connect aileron hinge bondings to wing.

### **Final works**

- a) Check correct aileron operation and deflection. Adjust, if necessary, the aileron neutral position by shifting the resettable eye of aileron pushrod (Fig. 57-14, item 22).

**REMOVAL OF WING FLAPS****CAUTION**

BE CAREFUL DURING WING FLAP REMOVAL TO PREVENT RELEASING OF BEARING FROM THE EYE OF WING FLAP CONTROL PUSHROD (Fig. 57-15, item 21).

NEVER SUPPORT TOOLS UPON WING FLAP SUSPENSION CONSOLE WHEN REMOVING FLAP CONTROL PUSHROD (21).

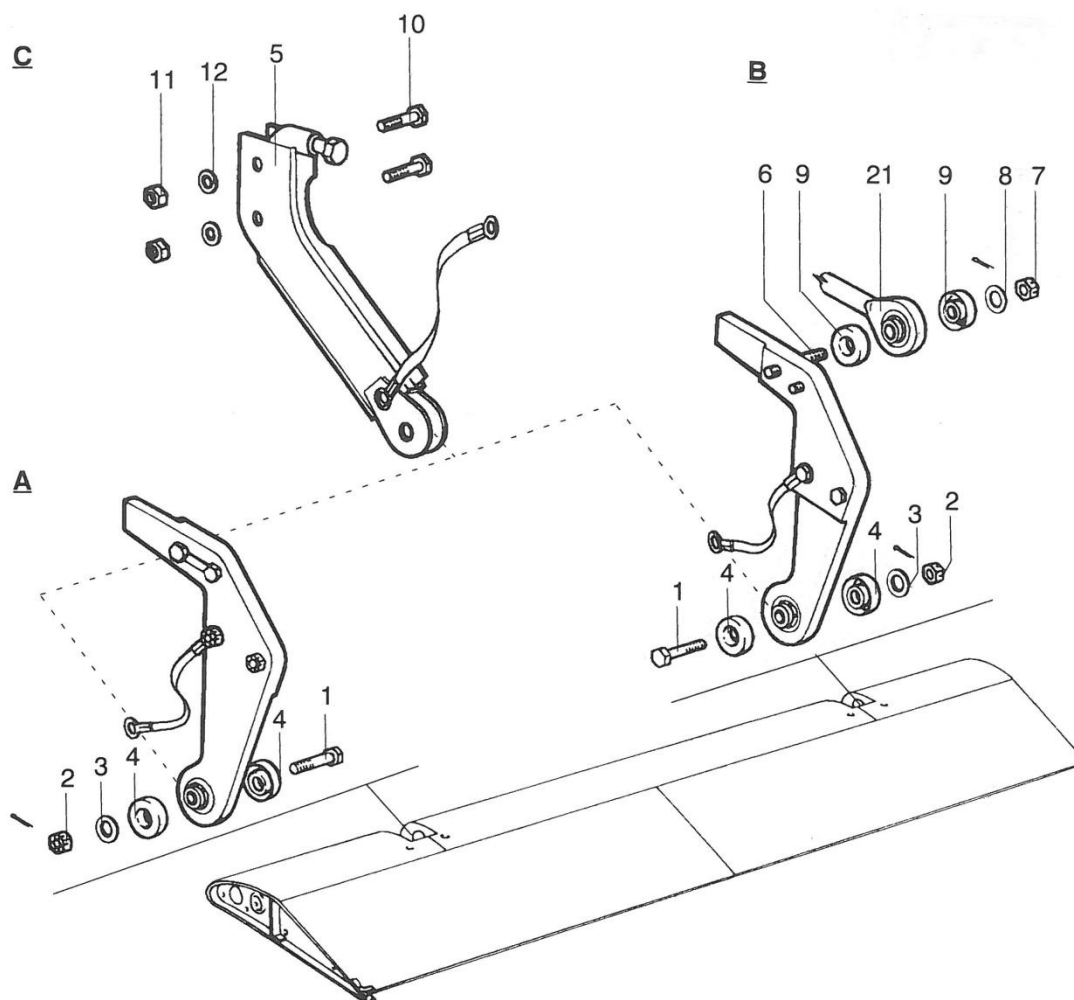
**NOTE**

Procedure of removal of port and starboard flaps is the same.

**Removal of wing flaps**

- a) Disconnect flap bondings at the flap suspensions in wing.
- b) Remove screws of inboard access port cover (Fig. 57-12, item 4) of wing flap suspension.
- c) Disconnect flap control pushrod (Fig. 57-15, item 21) from the inboard flap suspension (detail B):
  - remove cotter pin and unscrew nut (7)
  - remove washer (8) and flap control pushrod (21) with dust covers (9) from screw (6)
- d) Remove wing flap from the flap suspensions (details A; B):
  - remove cotter pin and unscrew nut (2)
  - remove fitted bolts (1), washers (3) and dust covers (4).
- e) Remove flap from the wing and place it to stand.
- f) Remove if necessary the flap suspensions (detail C):
  - unscrew nuts (11)
  - remove bolts (10) and washers (12).





A ... joining the outboard flap suspension

B ... joining the inboard flap suspension and flap control pushrod

C ... joining the flap suspension

1 ... fitted bolt

2 ... nut

3 ... washer

4 ... dust cover

5 ... flap suspension

6 ... screw

7 ... nut

8 ... washer

9 ... dust cover

10 ... bolt

11 ... nut

12 ... washer

For information only:

21 ... flap control pushrod

### **NOTE**

The figure illustrates left wing flap.

*Fig. 57-15 Flap suspension*

**EFFECTIVITY: All**

**57-50-00**

page 57 - 37  
2011-02-02

**INSTALLATION OF WING FLAPS**

- a) Install flap suspension (Fig. 57-15, detail C):
  - join flap suspensions (5) to rear wing spar by means of screws (10), washers (12) and nuts (11)
  - lock nuts (11) after tightening along the periphery with three 0,5 to 0,8 mm (0,02 to 0,03 in) deep center punches.
- b) Grease bearings of inboard and outboard suspensions (details A; B) and bearing of flap control pushrod (21) and provide them with dust covers (4; 9).
- c) Fit the flap into the flap suspension (details A; B):
  - insert fitted bolts (1) with washers (3) in and screw the nut (2) on
  - lock the nut (2) after tightening with 9,5 to 11,5 Nm (7,0 to 8,5 lbft) torque by cotter pins.
- d) Join flap control pushrod (21) to inboard flap suspension (detail B):
  - insert flap control pushrod (21) with dust covers (9) and washer (8) upon screw (6)
  - screw the nut (7) upon screw and lock it with cotter pin.
- e) Fit and fix the inboard access port cover (Fig. 57-12, item 4) of flap suspension.
- f) Connect bonding of flap suspension to wing.

**Final works**

- a) Check correct operation and deflection of wing flap in all positions. The flap adjustment if necessary is made when flaps are retracted by adjustable eye of flap control pushrod (Fig. 57-15, poz. 21).

## APPROVED REPAIRS

### REPAIR OF AILERONS AND WING FLAPS

Fault	Remedy
1) Faulty skin with cracks, deformations and/or punctured skin.	Repair faulty skin according to instructions issued in section 57-10-00, „Repair of mechanical defects of wing skin, ribs and longerons“.
2) Aileron hinges and flap suspensions: a) cracks in hinges/suspensions  b) loose external bearing rings  c) faulty bearings.	Replace cracked hinges/suspensions.  Roll the loose rings in.  Replace faulty bearings.
3) Cracks in welds of aileron mass balance.	Grind the cracks and weld them with TIG method (section 53-10-00 APPROVED REPAIRS); repair paint.

### NOTE

In operation the mass balance need not be anyhow reset or its mass checked.

**EFFECTIVITY:** All

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