SAAB

Modification Bulletin

Aircraft Type: 91 Safir

Reference: Airplane 91B, 91B-2 and 91C. Propeller Hartzell HC with plastic blade

Application of Rubber Lining

Date: Oct. 13, 1958

No: 91.6/15B

Saab Service Dept.: B Carlsson

Saab Design. Dept.: J Boklund

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Urgency: III At next propeller overhaul at the latest

Royal Swedish Board of Civil Aviation: S Fogelström

Marking: After this modification the propeller changes number to 6101715 and the blades to number 6101716.

Effect on weight distribution

Weight change Lbs	Station In.	Moment change Lbsin.
-	-	-

Time of delivery for necessary parts

1 month after order

K/K

Drawings: Not essential

Parts required per plane:

Item	Fig 1			
01	2	Rubber Lining	1038236ur	
02	2	Metal tipping	1038208 Stainless steel	Only for propeller without metal tipping
	14	Rivet	SFN 3x16 Copper	
	4	Test strip	Rubber neoprene 1x25x300 mm 8425-7	
	4	Test specimen	Plastic 5x25x200 mm 4124-5	

Parts effected:

Propeller SA 576270 Hartzell HC 12x20-8D

Propeller blade SA 576159 8428-6

		Storing time in refrigerator temperature	
Araldit	121 S	1 year	CIBA Aktiengesellschaft, Basel
Accelerator	951		
Alternative I			
Boscolite Primer	9247	3 months	Boston Blacking Chemical Company
Boscoprene Cement (Part I and Part II)	2413	3 months	
Alternative II			
Bostic	1007	4 months	Boston Blacking Chemical Company
Bostic	1008 A	3 months	
Bostic	1008 B		
Cement	EC 539	4 months	Minnesota Mining & Manufacturing Company
Accelerator	EC 566		
Cement	EC 776	6 months	

JN 341201. 11. 54. 3000.

Blade breakage has occurred due to the fatigue strength decrease which, according to tests, is owing to riveting of the blade lining in combination with soldering of the rivet heads. For that reason the inner section of the metal lining should be replaced by a cemented rubber lining.

Work procedure:

Propeller with Metal Lining

Drill out the rivets for the metal lining except seven rivets at the tip.
Carefully file off the metal lining at the slot appr. 160 mm from the tip and remove the inner section of the metal lining. Machine off the surface layer in and around the counterbores to a depth of max. 1.0 mm and examine for cracks in holes and counterbores.
Roughen the surface in the rivet holes and clean with methyl ethyl ketone.
Fill up the rivet holes with Araldite 121S + accelerator 951.
(Cf. "Mixing Procedure for Chemicals" below).
Drying time: 48 hours at +20°C.

Preparing of joint

Apply Araldite 121 S with accelerator 951 to the filed-off edge of the metal lining as to obtain an 8 - 10 mm wide smooth filling between metal lining and blade.
(Cf. "Mixing Procedure for Chemicals" below).
Trim with emery cloth No. 60-80.
Mark out the blade area to be covered with rubber lining and mask off the blade leaving the lining area and appr. 5 mm around this unmasked.
Roughen the area to be covered with rubber lining with emery cloth No. 60-80 and clean with methyl ethyl ketone.
Wind up the rubber lining spirally on a wooden roller (Ø 100 mm. L 300 mm) and fasten each end with tacks.
Roughen the rubber lining surface with emery cloth No. 60-80 and clean with methyl ethyl ketone at cementing according to alt. I and toluene at alt II.

Cementing of Rubber Lining

Alternative I
Apply a thin coat of Boscolite Primer No. 9247 to the propeller blade.
Note: Stir thoroughly Boscolite Primer No. 9247 before application.
Drying time: min. 1 hour.
Then apply a coat of Boscoprene Cement No. 2413 to the propeller blade
(Cf. "Mixing Procedure for Chemicals" below).
Drying time: appr. 45 min.
Apply another coat of Boscoprene Cement No. 2413 to the rubber lining.
Drying time: appr. 45 min.
Apply a coat of Boscoprene Cement No. 2413 to the rubber lining.
Drying time: appr. 45 min.
Apply another coat fo Boscoprene Cement No. 2413 to the rubber lining.
Drying time: 25 min.
The ends of the drying times for propeller blade and rubber lining shall coincide.
Apply rubber lining to the propeller blade leading edge by pressing it on heavily and loosen the rubber lining from one end of the wooden roller.
Ensure that the lining really adheres to the leading edge and side surfaces by using a hard rubber roller.
Air bubbles are not permitted under the rubber lining.
Measure off the length of the rubber lining according to figure 1 and cut it off from the wooden roller.
Cut the lining ends and trim with emery cloth No. 60-80 as to obtain a smooth chamfering to the blade according to figure 1.
Remove the masking tape from the blade.

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Alternative II
Apply a thin coat of cement EC 776 to the propeller blade and allow it to dry min. 1 hour at +20°C. The cement may be thinned with methyl ethyl ketone.
Apply a coat of Bostic 1007 to the propeller blade. Drying time: 1 hour at +20°C.
Bostic 1007 may be thinned with methyl ethyl ketone as to facilitate the applying.
Apply at the same time a coat of Bostic 1008 to the rubber lining.
(Cf. "Mixing Procedure for Chemicals" below).
Drying time before applying: 1 hour at +20° ± 2°C
Bostic 1008 may be thinned with toluene as to facilitate the applying.
Apply a thin coat Bostic 1008 to rubber lining and propeller blade.
(Cf. "Mixing Procedure for Chemicals" below).
Drying time before application of rubber lining: appr. 1 - 3 hours at +20°C.
Loosen one end of the rubber lining from the wooden roller and apply the lining to the propeller blade leading edge by pressing it on heavily. Be sure that the lining really adheres to the edge by rolling a rubber roller along the leading edge. Measure off the length of the lining according to figure 1 and cut it off from the wooden roller. Press the lining edges by hand and then by a rubber roller against the blade. Air bubbles are not permitted under the lining.
Wrap linen tape hard around the lining and blade and fasten the ends with a toothed plate (according to figure 2) and masking tape.
Drying time: 48 hours at +20°C.
Remove the linen tape and masking from the blade.
Cut the lining ends and trim with emery cloth No. 60-80 as to obtain a smooth chamfering to the blade according to figure 1. Clean with linen cloth slightly. moistered with methyl ethyl ketone. Apply masking tape around lining and blade appr. 5 mm from the lining edge. Apply cement EC 539 and accelerator EC 566 to the unmasked area (Cf. "Mixing Procedure for Chemicals" below) as to get a smooth filling between lining and blade, see section B-B. Remove the masking tape. Drying time: 5 days at +20°C as to obtain max strength.

Propeller without Metal Lining

Trim the metal tipping item 02 and brace it at the tip. Drill rivet holes in the blade after predrilled holes in the tipping. Countersink the holes according to figure 1, section A-A. Adjust the rivet length and rivet the tipping.
Jolt the rivet as to fill out the 6x90° countersinking.
Trim the rivet on both sides. As to cementing of rubber lining, cf. "Preparing of Joint" and "Cementing of Rubber Lining", alternative I or alternative II.

Mixing Procedure for Chemicals

	Drying temp. °C	Drying time
Araldite 100 parts by weight of Araldite 121 S 4-4,5 parts by weight of accelerator 951. Discard any of the mixture not used within 1-2 hours after mixing.	20 - 25	48 hours
Bostic 1008 8 parts by weight of 1008 A 1 part by weight of 1008B. Discard any of the mixture not used within four hours after mixing.	20	5 days
Boscoprene Cement 2413 10 parts by weight, Part I, 12 parts by weight, Part II. Discard any of the mixture not used within four hours after mixing.	20	2 days

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EC 539	Drying temp. °C	Drying time
10 parts by weight of EC 539. One part by weight of EC 566. Discard any of the mixture not used within 2 hours after mixing.	20	5 days

Note:

In order to obtain a good result it is important that the work is performed under clean conditions and with great care. For that reason it is recommended to perform the work in a propeller overhaul shop.
Cleaned surface must not be touched with the hands.

Test:

Cement 4 test strips of neoprene rubber to test specimens of plastic with the same mixtures and at the same time as in the procedure above alternative I or alternative II. Peel off the neoprene strips after a drying time of 2 days for alternative I and 5 days for alternative II. The force required whould be uniform and appr. 5 kp for a 25 mm wide strip when peeled in 180°.
Check by inspecting of the cemented surface that the adhesion is satisfactory. Approved cementing of the blade lining should be entered in the propeller journal.

Balancing:

Balance the propeller according to the Hartzell Hydro-Selective Propeller Manual section VII, item E.

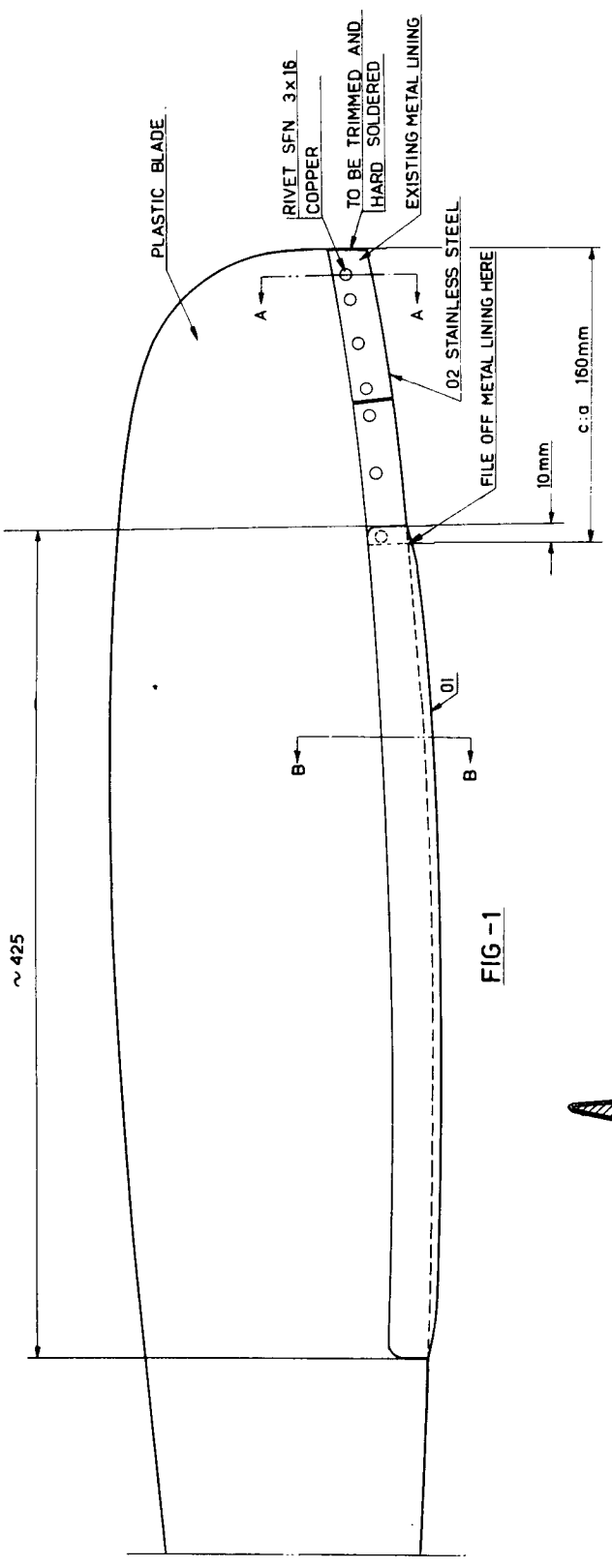
PLASTIC BLADE
RIVET SFN 3x16
COPPER
TO BE TRIMMED AND
HARD SOLDERED
EXISTING METAL LINING
02 STAINLESS STEEL
FILE OFF METAL LINING HERE
10mm
c:a 160mm
A
A
B
B
01
~425

FIG-1

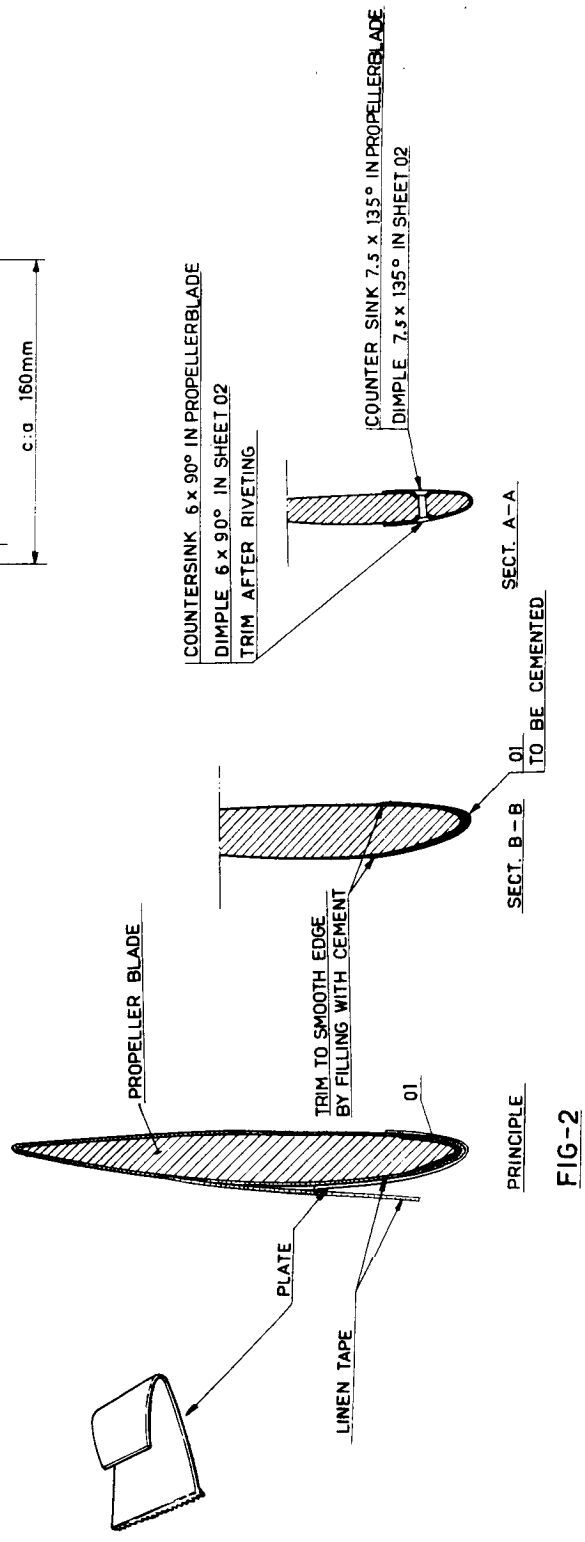
COUNTERSINK 6x90° IN PROPELLERBLADE
DIMPLE 6x90° IN SHEET 02
TRIM AFTER RIVETING
COUNTER SINK 7.5x135° IN PROPELLERBLADE
DIMPLE 7.5x135° IN SHEET 02
SECT. A-A
01
TO BE CEMENTED
SECT. B-B
PROPELLER BLADE
TRIM TO SMOOTH EDGE
BY FILLING WITH CEMENT
01
PRINCIPLE
PLATE
LINEN TAPE

FIG-2