

Kind : Maintenance instruction.

Effectivity : All ASW 20s and ASW 20 Ls.

Accomplishment : Only if backlash in control circuits exceeds tolerances or if high frequency oscillations of aileron control circuit are observed.

Reason : After some time in service high frequency oscillations (buzz of 40 cycles per second) are observed in the aileron and flap control circuit. The buzz is found at speeds above 220 km/h and disappears below approximately 210 km/h.

Such oscillations must have at least two conditions to become effective, i.e. a strong enough incitation and a wide enough play (backlash) of the control in question.

The following circumstances have been noticed as incitation of the oscillation :

- A) High frequency turbulence in wind shear layers.
- B) Strong turbulence.
- C) Shaking of the control stick by the pilot or blows with the hand to the side of the stick.
- D) Airbrake cover plates being not completely closed.
- E) Fluttering tape (lower wing surface). Apparently this may happen if the tape - over a greater part of the wingspan - is no longer folding inwards into the control gap but if it is folding to the outside; then it has the same effect as an airbrake which is a little extended. The folding of the tape to the outside also causes considerable losses in performance, especially in flap position 1 (-11°).

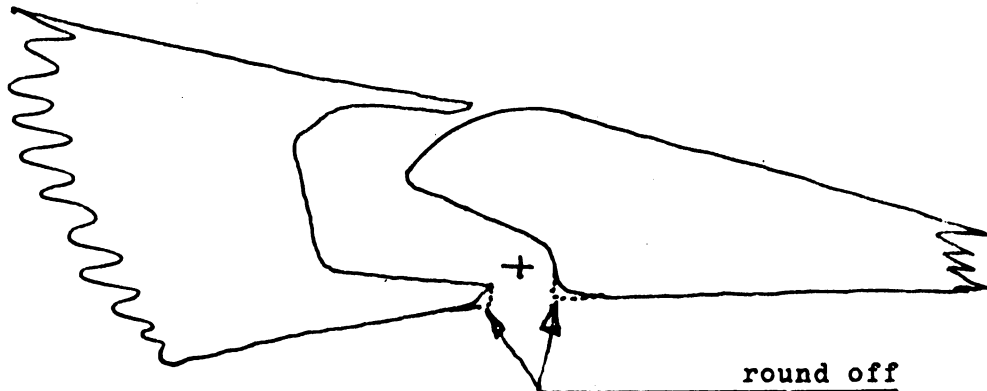
The following possible sources of trouble for play (backlash) have been found so far :

- A) Play in the spheric links actuating the control surfaces.
- B) Tangential play in the wing to fuselage connection.
- C) Play in the control circuits; this is most likely in the flap control inside the wing.

So far it has been ascertained that there is no buzz as long as the play measured at the control surfaces does not exceed the tolerances given in the Flight Manual of the ASW 20 on page 46 (ASW 20 L Flight Manual on page 50).

Instructions :

1. The airbrake over center lock is tightened according to Maintenance Instruction C for ASW 19 and ASW 20. The notes given in the ASW 20 Operations Manual on page 39 (ASW 20 L; page 43) must be observed.
2. Fluttering tape as well as any tape folding to the outside between the control hinges is replaced by new tape. For serial production 38mm tape is now used. It has been found that it pays if the edges of the wing and the controls are carefully rounded off so that the tape folds more easily to the inside of the gap.



When applying the tape, you must take care that the tape is not tightened too much when the flap is full up (see ASW 20 Flight Manual page 42, for ASW 20 L see page 46), i.e. a deflection of 49mm measured at the trailing edge of the flap root rib, or when the aileron is full up, i.e. a deflection of 32mm measured on the outboard end of the trailing edge. As the tape may shrink a bit with moisture (it is made of cotton), it must not be too tight in these configurations otherwise full aileron deflections in flap position 1 are no longer possible.

3. If play in the spheric ball joints at the control actuator is found, please check first of all whether the play does not result from the ball to fitting connection. If so, the rivet or bolt must be tightened or must be replaced by a correct size bolt. If these measures do not help, the ball joints must be replaced by tighter ones.
4. Play (tangential) between wing and fuselage is critical in so far as it usually will not be noticed during a control check on ground. The weight of the wing lying on the 4 pins is too high to overcome the friction between wing bushings and fuselage pins by the control force only.

The check for the tangential play of the wing to fuselage connection is part of the annual inspection and should be done also after ground loop landings, etc. The measures to remove this play are described in the ASW 20 Manual on page 39 (ASW 20 L see page 43).

5. If the measures according to instructions 3 and 4 do not reduce to tolerable limits, a very careful check for play in the whole control circuit is necessary. For this purpose ailerons and flaps are connected to the control system individually and then are blocked against the wing. Actuate the stick and look for those connections showing the most of play. From general engineering it is known that little backlash and low friction are contradictory as long as all other circumstances remain the same. This means that control circuits with low backlash will be somewhat stiffer to actuate. For this reason an absolute absence of play is not required.

If the play cannot be reduced by simple maintenance means (e.g. if it is found in the mixer, etc.), the manufacturer should be consulted.

The flap control circuit is most likely subject to play. This is because of the great deflections of this control and the high loads resulting therefrom, on the one hand, and because of the restricted kinematics of the narrow wing on the other hand. These result in high forces in this control circuit which in turn help to increase the play with increased flying time.

Play has been found because of bad rigging/derigging (controls not disconnected) or because of bad trailering of wings which were not properly fixed so that the pushrods were loaded. Despite the fact that stops are provided inside the wing, it could not be avoided that the pushrod ball bearing guides were bent wider thus causing play.

It is relatively easy to eliminate this kind of defect though the bearings are inside the wing. For this purpose the flaps must be disconnected from the wing.

According to the drawing 200.51.S.1 with amendment note WA D the measures for this job are explained.

Sheet 4

Number of sheets : 4

ASW 20
Maintenance Instruction
D

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Material : See instructions.

Weight and balance : No influence.

Notes : The work according to this maintenance instruction may be done by the owner of the aircraft, however, if permanent control circuit connections are disconnected, an authorized person (approved repair expert or aircraft inspector) must check the components involved for airworthiness and must certify the correct job in the log.

Drawings : For this maintenance instruction D the drawing 200.51. S.1 was supplemented with the note WA D.

Poppenhausen, June 25, 1979

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