M.I.C.M. - C.N.I.A.R.
INTREPRINDEREA DE CONSTRUCTII AERONAUTICE
2200 B R A S O V

MANDATORY SERVICE BULLETIN

IS-28B2/E0-10

Approved by: Department of Civil Aviation
with no. 22722/ 29.12.1980.

Product : IS-28B2 Glider

Object : Safe life increase to 8000 flight hours

Compliance : Report "The IS-28B2 glider safe life determination".

Date: The 15th of December 1980

1. PLANNING INFORMATION

A. Applicability

The modification shall be applied to all gliders IS-28B2:
- by the owner up to the serial no.290 until 01.03.1981;
- by the manufacturing plant, at delivery, for the serial no.291 and subs. and for those under construction.

B. Reason

Safe life extention from 4000 to 8000 hours.

C. Description

The service bulletin modify the safe life of the aircraft from 4000 to 8000 hours. It is in short presented the technical reasons which allowed the safe life extention and there are annexed the amended pages to the operating documentation.

D. Compliance

Report: "The IS-28B2 glider safe life determination".

E. Accomplishment

The service bulletin application, is done as follows:
(a) by the owner for the gliders in service up to the serial no.290;
(b) by the manufacturing plant for the serial no.291 and subs., for those under construction and for those in stock.

F. Material, costs and availability

None.

G. Tools

None.

H. Weight and Ballance

Not affected.

I. References

The main data on which safe life increase is based are given in the appnedix to this bulletin.
Supplementary informations are presented in the report "The IS-28B2 glider safe life determination", issued by the manufacturing plant.

Date: The 15th of December 1980

Flight and Maintenance Manuals (or Operating) are ammended by the present service bulletin. The others operating documents (technical specification, parts catalogue) will be modified at the new issue.

J. Affected documents

"The Flight and Maintenance Manual" the 3rd issue and "The Flight and Operating Manual", the 2nd issue will be amended with the annexed pages.

2. ACCOMPLISHMENT INSTRUCTIONS

A. Preparation of work

None.

B. Method

"The Flight and Maintenance Manual" the 3rd issue and "The Flight and Operating Manual", the 2nd issue will be amended.

C. Service instructions

The periodic inspections mentioned in "The Flight and Maintenance Manual", the 3rd issue chapter 6.4.1., for 100, 200 and 400 hours insure the find of possible damages and wears for all parts of the glider.

For the glider delivered with "The Flight and Operating Manual", the 2nd issue the periodic inspections table for 100, 200 and 400 hours, will be inserted in manual, as in the annex.

3. MATERIAL INFORMATION

A. Materials list

None.

B. Tools list

None.

C. Supply indications

None.

4. IDENTIFICATION

Application of this bulletin shall be noted on the glider log book.

Date: The 15th of December 1980

5. APPENDICES

- Amendment no.10 to the IS-28B2 glider Flight and Maintenance Manual, issue 3, page 03G and 6.10A for gliders with manuals issue 3 and amendment no.11 to the Flight and Operating Manual, issue 2, page 26.B for gliders with manual issue 2.
- Appendix 1 comprising the main data which allowed the safe life extension.

Date: The 15th of December 1980

THE IS-28B2 GLIDER SAFE LIFE DETERMINATION

1. Stresses on wing fuselage central area

Fatigue tests for wing joint and fuselage central area have been conducted up to 250.000 equivallent flight hours and no failure of structure occured, according to the spectrum made up of:

0.35 cycles $n = -0.5$ to $+3.0$ g

1.0556 cycles $n = 0$ to $+2.0$ g

(per 1 flight hour).

For safe life analysis 4 acceleration spectra in the C.G. have been studied:

1. Test spectrum applied to IS-28B2 fatigue tests, described above.
2. Blanik spectrum, measured in Australia - 104 hours.
3. Blanik spectrum, measured in Australia - 114 hours.
4. Blanik spectrum, combined, obtained from measurements in Australia - 218 hours.

Convertion of the 250.000 hours reached during the fatigue tests on basis of cumulated demages calculated by means of the recommended S/N in E-02-01 Data sheet for the most severe spectrum analysed (no.3) results in 69.020 hours demonstrated, with no failure occured.

Taking into account the above consideration, there can be afforded a 13.804 hours safe life with a dispersion factor of 5 (one tested specimen) for the wing-fuselage joining.

Studies on stresses reached in the wing structure show that the most stressed area is that of the wing joining.

The 13.804 hours safe life can thus be extended for the whole wing.

2. Stresses on the tail unit

Stress spectrum for the tail unit has been calculated starting from the accelerations spectrum in the CG (spectra 1 and 4), using the experimental data given in "A relation between measured CG vertical accelerations and the loads at the T-tail of a military airplane" by. O.Buxbaum.
The calculation results are in accordance with the measurements performed on the IS-28B2 glider determining forces which appear in flight on the tail planes.
Calculation of tail unit fatigue has been based on the spectrum derived from the accelerations spectrum in the CG no.4 and by using the stresses reached at the tail unit structure and the attachment fittings.
The cumulated damage has been determined by means of S/N curves given in the E-02-01 Data Sheet.
The resulting safe life for the tail unit, established by calculation with a dispersion factor of 10, is of 45.000 hours for the considered spectrum and of 30.000 hours for the most severe spectrum (derived from accelerations spectrum in the CG no.3).

3. Conclusions

- The analysis and the fatigue tests performed demonstrate a sure safe life of 13.804 hours for the IS-28B2 glider, for the most severe spectrum considered.
- Calculation shows an increased endurance (minimum 300.000 hours, i.e. 30.000 hours safe life) for the tail unit. Behaviour of tailplanes and the attachment fittings shall be demonstrated by fatigue tests, the calculation results enabling to establish safe life until their accomplishment.
- Inspections prescribed in the Flight and Maintenance Manual at 100, 200 and 400 flight hours for periodical inspection comprise checking of the most stressed parts (wing to fuselage joining, stabilizer - to - fin joining and landing gear).

INDEX OF ENTERED CHANGES

Those paragraphs of the text where changes, have been made are to be marked by a vertical line and the corresponding number of alteration alongside.

Item Number	Pages containing alterations	Nature of alteration	Date		Signature
			approved	Changing the affected pages	
1.	18.A	Trim cable tension	10.11.1976		
2.	3A; 35A;	Braunschweig System Capability	04.05.1977		
3.	4A; 5A; 6A; 16A; 32A1;	Lower Airbrake and Wheelbrake linked	01.02.1977		
4.	first page	Avaibility Domain	01.02.1977		
5.	19A;	Equipament Specification	01.02.1977		
6.	7A.1; 9A;7A;	Ballast mounting	01.02.1977		
7.	6B; 16B;	Maximum aerobatic weight	04.05.1977		
8.	7B; 9B; 16C, 17B.	Balance range extention	28.06.1978		
9.	26 A;	Total life	28.06.1978		
10.	7B1.9C	Indications for light pilots	31.01.80		
11.	26B;36;37	Increased safe life	05.12.80		

7.5. INSPECTION AND REVISIONS SUCCESSION

The Maintenance works and the glider revisions have the following periodicity :

C = inspection after 100 flight hours
R = revision after 200 flight hours or after a year of operation
RK = overhaul after 400 flight hours or after four years of operation

During inspection after 100 hours execute a minute inspection of glider and greasing to the points indicated in this manual.

During revision after 200 hours or a year of operation execute all the operations as for 100 hours and measure the control surfaces deflections and controls clearances. 9

The overhaul is executed by the mamufacturing plant or by a specialized and autherized workshop, according to the approved Repair Manual.

The glider safe life provisionally indicated is of 8000 flight hours (25000 landings). 11

The only assemblies included in the glider construction, which have a limited safe life are the releases.

According to TOST specifications, the releases are dismounted and sent to revision after 2000 starts and 3 years of operation. For aircraft instruments produced by PZL company no total life is indicated.

7.6. AIR SUPPLY THE SHOCK-ABSORBER

If shock absorber losses liquid it must be sent to a specialised workroom for revision.

When shock absorber has located air and doesn't work right it could be air supplied as follows :

- ensure shock absorber full extension (suspended sail plane) ;
- unscrew the cover located inside cockpit under the backsedt; (wheel cover).

WARNING : Do not use oxygen supply.
When filling it may blow-up.

11 MAINTENANCE WORKS PERIODICITY

	According to the indications	After every 400 hours	After every 200 hours	After every 100 hours
LANDING GEAR				
1. Visual inspection to landing gear holder and structure riveting.				×
2. Visual inspection to wheel fork (distorsions, cracks, corrosions).				×
3. Visual inspection to shock absorber condition, greasing.				×
4. Wheels (main wheel and tail skid), bearings, tyres, inspection, greasing.				×
5. Wheel brake, control travel, brake shoes.				×
6. Inspection to wheel fork - landing gear holder joint by dismounting.			×	
7. Inspection to wheel fork-shock absorber and shock absorber fork joint, by dismounting and chek.			×	
8. Inspection to wheel hub braking surface, adjustments.		×		
AIRCRAFT				
1. Visual inspection to glider outside.				×
2. Visual inspection to glider structure condition.		×		
3. Visual control to wing and fuselage skin attachment areas.			×	
4. Visual inspection to wing junction, greasing.		×		
5. Wear check to wing-fuselage junction bolts.			×	
6. Visual inspection to tails junction, greasing.		×		
7. Wing junction fittings cleaning with abrasive paper, greasing with vaseline.			×	
8. Plexiglass canopy, (visual inspection).				×
9. Canopy hinges inspection and greasing.		×		
10. Wear inspection to horizontal tail fixing bolt.			×	
11. Seat, upholstery, adjustment, fixing, harnesses.		×		
12. Control surfaces dismounting, hinge clearance inspection.			×	
13. Visual inspection to instrument panel shock absorbers instruments, marking, labels.		×		
14. Instrument panel shock-absorber replacement.			×	
15. Compass trim.				3
16. Rubber or plastic pipes check, and replacement if need be.			×	
17. Air scoops, pipes sealing, wiring.		×		
18. Rubber elements replacement to Braunschweig system.			×	
19. Water settler (Braunschweig) drainage.		×		
20. Radio, antenna, wiring (if provided).		×		
21. Instruments check inside the work-shop.				5

	According to the indications	After every 400 hours	After every 200 hours	After every 100 hours
CONTROLS				
1. Visual inspection to cables, pulleys, bearing, greasing.			×	
2. Visual inspection to control column and travel under floor area; greasing.			×	
3. Visual inspection to trim tab condition and control travel greasing.			×	
4. Visual inspection to hinge joints, greasing.			×	
5. Visual inspection to rudder bar assembly, greasing.			×	
6. Visual inspection to control surface skin and structure.			×	
7. Visual inspection to releases, greasing.		×		4
8. Structure controls dismounting, worn elements, replacement, greasing and inspection.			×	
9. Control surface fabric check and replacement if need be.			×	

1. The works provided in this column shall be executed after every 200 flight hours or at least once a year, preferably at flight seasons beginning (column "According to the indication").

2. The landing gear shall be also checked after an abnormal landing on a rough ground (according to A.2).

3. Trim is executed after every 1000 hours or when new instruments have been installed on the instrument panel, especially those creating electromagnetic, (according to B.14).

4. The works shall be executed in compliance with the maintenance and servicing instructions for TOST type releases E-72 and E-73.

5. Check shall be carried out at the 200 hours revision.

N O T E: After accomplishing the operations indicated in this schedule (400 hours), the cycle is taken again up to reaching the safe life specified by the manufacturer.

Part no.	Amended page	Revision nature	DATA of approval	DATA of insertion	Signature
8.	0.3.F; 2.4.A	Equipment for flights in "aerobatic" category	08.10.1980		
9.	A.3.1 to A.3.6	Oxygen system (optional)	04.11.1980		
10.	0.3.G; 6.10.A	Increased safe life	04.11.1980.		
11.	A.4.1; A.4.2.	Double brake wheel(optional)			

VALID PAGES LIST

Page no.	Issue
0.1	3rd ISSUE : APRIL 1978
0.2 and 0.3	3rdD ISSUE : NOVEMBER 1979
1.0A	3rdA ISSUE : FEBRUARY 1980
1.1 to 1.8	3rd ISSUE : APRIL 1978
1.5A	3rdA ISSUE : FEBRUARY 1980
2.0	3rdA ISSUE : DECEMBER 1978
2.1A	3rdA ISSUE : MAY 1979
2.2	3rd ISSUE : APRIL 1978
2.3A	3rdA ISSUE : NOVEMBER 1979
2.4A	3rdA ISSUE : OCTOBER 1980
2.5A	3rdA ISSUE : NOVEMBER 1979
2.6	3rd ISSUE : APRIL 1978
2.7A	3rdA ISSUE : NOVEMBER 1979
2.8 to 2.10	3rd ISSUE : APRIL 1978
2.11A	3rdA ISSUE : DECEMBER 1978
3.0 to 3.1	3rd ISSUE : APRIL 1978
4.0 to 4.12	3rd ISSUE : APRIL 1978
5.0 to 5.4	3rd ISSUE : APRIL 1978
5.5A	3rdA ISSUE : MAY 1979
6.0 to 6.4	3rd ISSUE : APRIL 1978
6.4.1A	3rdA ISSUE : DECEMBER 1978
6.5 to 6.6	3rd ISSUE : APRIL 1978
6.6.1A	3rdA ISSUE : NOVEMBER 1978
6.7 to 6.9	3rd ISSUE : APRIL 1978
6.10A	3rdA ISSUE : NOVEMBER 1980
6.11 to 6.13	3rd ISSUE : APRIL 1978
6.14A and 6.15A	3rdA ISSUE : MAY 1979
6.16 to 6.45	3rd ISSUE : APRIL 1978
6.46B	3rdB ISSUE : NOVEMBER 1979
6.47A and 6.48A	3rdA ISSUE : MAY 1979
6.49	3rd ISSUE : APRIL 1978

During inspection after 100 hours execute a minute inspection of glider and greasing to the points indicated in this chapter diagrams.

During revision after 200 hours or a year of operation execute all the operations as for 100 hours and measure the control surfaces deflections and controls clearances.

The overhaul is executed by the manufacturing plant or by a specialized and authorized workshop, according to the approved Repair Manual.

10 The glider safe life provisionally indicated is of 8000 flight hours (25000 landings).

The only assemblies included in the glider construction, which have a limited safe life are the releases.

According to TOST specifications, the releases are dismounted and sent to revision after 2000 starts and 3 years of operation. For aircraft instruments produced by PZL company no total life is indicated.

6.3.3. ADJUSTMENT

The adjustments executed by the manufacturing plant shall be checked at yearly revisions (or 200 flight hours).

The control surfaces deflections shall be measured in order to check the values indicated in paragraph 6.5.1. If these do not meet the tolerances, execute the adjustments again.

The total control clearances shall be less than the following values : - to control column (measured at end) for; elevator control - 4 mm ; ailerons control - 4 mm ;
- to rudder bar pedals 5 mm.

To measure the clearances, lock the control surfaces and measure the control lever extremity removal, in the direction of control movement.