PIK-20D Fatigue inspection program

This special inspection program for PIK-20D glider is to ensure that the structure is free of fatigue problems and the aircraft is safe to fly.

GENERAL INFORMATION

The PIK-20D glider does not have a life time limitation so this inspection is not needed to prolong the life time. However, if the inspection shows a fatigue problem it must be rectified before the next flight. For a normal condition aircraft the special inspections are started at 10000 FLH with an interval of 5000 FLH until 65000 FLH is reached, when the wing spar end main fitting brackets must be replaced as they are safe life parts. An inspection may be performed 200 FLH below the interval limit without changing the following inspection limits. Normal condition aircraft means an aircraft, which has been properly operated, stored and maintained. An aircraft of non-normal condition is one that shows signs of such a clearly deteriorated condition due to for example a water landing, bad repair after an accident or continuous storage outdoors, that a special inspection is warranted earlier. At 65000 FLH a renewed assessment will be made by the competent authority for PIK-20D design, to check if this original inspection program is sufficient or can be relaxed.

The inspection may be performed by a qualified person as allowed by the competent authority of the aircraft state of registry. For the support of the inspector the PIK-20D drawings are found on the CAA Finland homepage or may be obtained from the authority. Detailed descriptions on the structure stress levels and fatigue analysis are found in Trafi publication 7/2015 “PIK-20D Fatigue Evaluation”. The allowable values for the wing fitting slacknesses and control surface balancing are found in PIK-20D Service manual Chapter 4.5 and Repair manual Chapter 3.5 respectively.

The inspector shall sign the fatigue inspection program document PIK-20D-FIP Rev0, to be filed together with the aircraft technical documents, and also sign the result of the inspection in the technical documentation log or flight log of the aircraft. After an inspection, which has shown fatigue problems, and after the rectification of the problems, the inspector may decide to renew the inspection only on the failed issues. The inspection of a non-normal condition aircraft, performed before the nominal schedule, may be concentrated on the issues warranting the earlier inspection and leading to the next inspection according to the schedule.

If a fatigue problem is noticed it shall be reported together with the documentation (photographs etc) to the competent authority and CAA Finland. Notice, that wear or backlash in metal parts is not a fatigue problem and can be corrected in normal maintenance for example by replacing parts. The deficiencies in the condition of the aircraft may also be such, that there is no imminent flight safety risk but immediate action is needed to prevent the aircraft from enhanced exposure to fatigue. Examples for this are external paint falling of piecewise thus exposing the laminate for UV-radiation or corrosion in a rod end thread. The inspector may require the rectification of such an item before the next flight.

The inspection needs to be made with an attitude that it is done to detect a potential problem, not just to confirm that everything is ok. However, it is recommended to concentrate on flight safety issues and to use common sense.

The inspection form is detailed to help the inspector to perform the inspection without drawings. For reaching a long time usage of the glider, say 65000 FLH which could take over 500 years with an annual flight time of 100 FLH, it may help to inspect all items in the list. Most important is however, a good care of the glider, es-

pecially keeping the paint in good condition for UV and humidity protection and the metal parts without corrosion and storage in dry conditions. In a risk based manner a less thorough inspection is sufficient, when the glider is in good care.

The texts for the items, the failure of which would expose the glider for a flight safety risk, are written in **bold font** and those inspections are mandatory. The texts for less critical items are written in normal font and need to be checked only when the inspector considers this necessary.
In an inspection of a non-normal condition aircraft it may be necessary to also check items written in normal font. The inspector shall make the decision on every item.

INSPECTION METHODS

Inspection of painted surfaces is made visually to ensure that the laminate is protected against Ultra-Violet radiation and moisture. Harmless crazing and hair cracking may be allowed for example at the corners of the airbrake opening but shall be repaired for full protection against UV-radiation and moisture. The paint repair can be made in the next annual maintenance. However, if pieces of paint have fallen off exposing the laminate for direct sunlight, the repair of the paint needs to be done before the next flight.

Cracking in the paint is an indication of strains that could proceed into and damage the laminate. When in doubt the paint should be removed with a knife adjacent to the crack to inspect the laminate. Grinding the paint away could damage the laminate surface making it white and thus impair the detection of cracks.

Inspection of laminated surfaces is made visually to detect white and opaque fatigue cracks in the structure. When the paint is removed a crack may be seen or acetone could be used to detect a crack. As the acetone evaporates from the surface faster the crack may be detected as a wet area. Crazing or small hair cracks in the resin may be tolerated.

A delamination in the laminate may be detected by tapping with a coin on a thin laminate. On a thicker laminate or a bonding a heavier object, weighing about 20 to 40 grams such as a blunt door handle, may be used. Delaminations of maximum about 25 mm diameter (about 1 inch) may be tolerated without repair on sandwich and solid laminate fields, not in the vicinity of concentrated loads such as brackets or bondings. If delaminations shall be repaired it is said in the text under the item in question.

Tapping may be used to check a debonding in a bonded joint such as between the wing skin and root rib. All debondings shall be repaired; maximum about 25 mm diameter (about 1 inch) debondings may be repaired by resin injection.

Visual inspection of internal structure may be performed using a mirror and a light in areas where access is good. In areas where access and visibility is limited, such as at the joint of the root rib to the wing skin and wing spar web, a web camera, endoscope or similar device shall be used. It is acknowledged that even these methods possibly may not detect smaller defects and one needs to limit the inspection to what is possible in practice. Making holes in the structure is not normally needed, but if a problem is suspected this may be necessary.

The metal parts are mostly made of AISI 4130 alloy steel with stress relieve tempering on welded parts for avoidance of residual stresses and a passivation and cadmium plating surface treatment. The standard push rod ends are made of free-cutting steel AISI 1213 or alloy steel 4130 with a zinc surface passivation treatment. The push rods are either of aluminum with anodic treatment (elevator) or St 35 steel with a yellow passivation and a cadmium plating (flaperons, air brakes). Some small push rods are made of AISI 4130 alloy steel with cadmium plating. The sliding push rods with the inner rods in the cockpit are made of St 35 steel with chrome plating (flaps, airbrakes, landing gear).

When checking a control system or line the entire area of the control system shall be covered including the lever arms, push rod roller holders, push rods, bolts, nuts, rod ends and rod end threads. If the roller holders press too heavily against a push

rod they may cause friction in the system. It is possible to adjust the roller position using a long special tool without cutting a hole in the structure. Also it is possible to change a push rod in the wing with special tools without hole cutting. Measuring control system backlash or L'Hotellier quick connectors is not a central task in this fatigue inspection as they are checked in annual inspections. However, if there is a motivation to suspect something of concern, the inspector may require the aircraft to be rigged for further inspection (for example to check that a L'Hotellier connector functions properly in practice). It is suggested to use common sense to concentrate the inspection emphasis on the details relevant for flight safety.

Inspection of metal parts may be performed visually with a magnifying glass with at least a magnification factor of 10. Also an appropriate nondestructive testing method, such as penetrant fluid of magnetic particle inspection, may be used.

FILLING IN THE FORM

AIRCRAFT IDENTIFICATION

Under the title fill in the required identification data. Tick one of the alternatives for Aircraft condition, normal or non-normal.
In the case of a nominal schedule inspection, either normal or non-normal condition, all items indicated with a letter and text in bold font, such as

a) **Check visually…**

shall be inspected. It is under the inspector's consideration which items with the text in normal font, such as

a) Check visually…

need to be inspected.
In the case of an extra unscheduled inspection it is under the inspector's consideration which items, with the text in either bold or normal font, need to be inspected.

INSPECTION AREAS

When items indicated with a letter, such as **a**) Check visually…, **b)** Check visually… and **c)** Check visually… are clearly in good condition, it is sufficient to notify under **Result** for example

a) … **c)** OK

When the condition is not so good but acceptable, please notify under **Result,** for example

e) acceptable; Wing spar end main fitting pin somewhat worn out, see attachment

and attach a photograph to the inspection form for feedback to the owner and the next inspection.

When an item cannot be accepted, please notify under **Result** with a descriptive text, for example

e) not accepted; Fatigue crack suspected in the wing main fitting pin, penetrant fluid inspection required
or
e) not accepted; Fatigue crack in the wing main fitting pin, see attachment

and attach a photograph to the inspection form for objective evidence

INSPECTION RESULT

At the end of the form please fill in the items which shall be completed in the next annual inspection, such as the repair of hair cracks in the paint or small improvements in paint for corrosion protection. Please fill in the area number and item letter together with a descriptive text, for example

3. b) Repair of hair cracks in the paint at the right wing airbrake opening corners

or draw a line – if there are none. Also please fill in the fatigue problem items, which must be rectified before the next flight. Please fill in the area number and

item letter together with a descriptive text, for example

1. e) Fatigue crack in the right wing main fitting pin
3. b) Paint on right wing upper surface falling of piecewise

or draw a line – if there are none. Tick one of the following alternatives and fill in the number of the items to be completed in the next annual inspection

☐ The aircraft has passed the fatigue inspection program with ___ items to be completed in the next annual inspection

☐ The aircraft has not passed the fatigue inspection program, the fatigue problems must be rectified before the next flight

and attest with a date and signature. If there are any items in the list to be rectified before the next flight, only the not passed alternative is possible.

Please attest in the logbooks a certificate of release to service in a manner specified by the competent authority of the aircraft state of registry.

If the inspector chooses to perform a renewed inspection on the items, which did not pass in the first inspection, he/she can use the last part of the form under the title **Renewed inspection result**. Please fill in this part in the same way as under **Inspection result**.

FATIGUE INSPECTION FORM

AIRCRAFT IDENTIFICATION

Registration number:

Year of manufacture:

Serial number:

Flight hours:

Flights:

Aircraft condition: ☐ normal ☐ non-normal

INSPECTION AREAS

RIGHT WING

1. Wing spar root

a) Check visually and if a defect is suspected also by tapping the wing spar external laminate inboard of the root rib for damage, fatigue cracks and delaminations especially
- around the spar end main fitting
- around the main wing pin bushing
- around the joint of the web to the root rib
Delaminations shall be repaired.

b) Check visually within 30 cm from the wing root the wing external surface at the wing spars for damage, fatigue cracks or delaminations. Use tapping to check areas with hair cracks for delamination. Hair cracks in the paint shall be repaired. Delaminations shall be repaired.

c) Check visually using a web camera, endoscope or similar device the internal laminate within 30 cm from the root rib for damage, fatigue cracks and delaminations at the
- wing spar caps
- wing spar web laminates (forward and aft side of the sandwich)
- joints of the wing spar webs to the root rib and the upper spar cap
- bondings of the wing spar webs to the lower spar cap
Delaminations shall be repaired.

d) Check that the wing spar end main fitting has been replaced before 65000 FLH.
Check that the wing spar end main fitting is firmly attached to the spar without backlash.
Check visually the wing spar end main fitting for damage, fatigue cracks, wear and corrosion, especially the pin, so that the maximum allowed slackness is not exceeded.

e) Check that the main wing pin bronze bush is firmly attached to the wing spar without backlash.

f) Check visually the main wing pin for damage, fatigue cracks, wear and corrosion.

Result:

2. Root rib

a) Check visually and if a defect is suspected also by tapping the external laminate for damage, fatigue cracks and delaminations especially
- around the openings
- around the wing bevel pins
- at the joints of the rib to the wing skins
- at the joints of the rib to the wing spar web laminates (wing spar forward and aft sides)
Delaminations shall be repaired.
Check by tapping the bonding of the root rib to the wing skin.

b) Check visually using a web camera, endoscope or similar device the root rib internal laminate, in front of and aft of the main wing spar, for damage, fatigue cracks and delaminations especially
– around the openings
- at the joint of the root rib to the wing spar web laminates (forward and aft side of the sandwich)
- joints of the root rib to the wing skins
- joint of the root rib to the rear spar
Delaminations shall be repaired.

c) Check visually using a web camera, endoscope or similar device the forward auxiliary spar inside the wing at the forward bevel pin for damage, fatigue cracks and delaminations. Delaminations shall be repaired.

d) Check that the wing bevel pins are firmly attached to the root rib without backlash.
Check visually the wing bevel pins for damage, fatigue cracks, wear and corrosion, so that the maximum allowed slackness is not exceeded.

Result:

3. Wing external surface

a) Check by tapping the bondings of the wing skins at the leading edge, wing spar and the rear spar. Delaminations shall be repaired.

b) Check visually the external laminate for damage, fatigue cracks and delaminations.

c) Check by tapping the areas with hair cracks for possible delaminations. Hair cracks in the paint shall be repaired.

Result:

4. Wing internal structure and systems

Use a web camera, endoscope or similar device for the visual checks

a) Check visually the internal laminate structure for damage, fatigue cracks and delaminations at the
- wing shells
- **main wing spar caps**
- **main wing spar web laminates (forward and aft side of the sandwich)**
- **joint of the web laminates to the lower spar cap**
- air brake box webs

Check visually that there is no damage or fungus in the laminate due to frozen water that may have leaked from the water bag.

b) Check visually the bondings at the
- **wing main web laminates and upper spar cap**
- **air brake box and wing shells**

c) Check visually the flaperon control system for damage, loose rivets, fatigue cracks, wear and corrosion.
Check visually that the flaperon control system moves freely.
Check visually that the lever arm brackets for the flaperon control system are firmly attached to the main web without backlash.
Check visually that the plywood reinforcements in the main web for the lever arm brackets are protected against fungus and rotting.

d) Check visually the airbrake control system for damage, loose rivets, fatigue cracks, wear and corrosion.
Check visually that the air brake control system moves freely.

e) Check visually the PVC-foam web, holding the water bag in place, for damage and the bondings to the inner skins. Debondings shall be repaired if the water ballast is to be used.

f) Check visually that the inside of the wing is free of any loose objects.

Result:

5. Rear spar

With removed flaperons

a) Check visually using a web camera, endoscope or similar device the bondings at the rear spar upper and lower flange laminates and the wing skins.

b) Check that the flaperon brackets are firmly attached to the rear spar without backlash.
Check visually the flaperon brackets for damage, fatigue cracks, wear and corrosion, especially the most outboard bracket of the inner flaperon as it is loaded highest due to the flaperon axial movement.

c) Check visually the external web laminate and the laminated joints to the wing skins for damage, fatigue cracks and delaminations. Delaminations shall be repaired.

d) Check visually using a web camera, endoscope or similar device the rear spar laminate inside the wing for fatigue cracks and delaminations especially in the vicinity of the flaperon brackets. Delaminations shall be repaired.

Result:

6. Inner flaperon

With removed flaperon

a) Check by tapping the bondings at the flaperon spar, actuator and end ribs and trailing edge for debondings.

b) Check that the flaperon brackets are firmly attached to the structure without backlash.
Check visually the flaperon brackets for damage, fatigue cracks, wear and corrosion, especially the most outboard bracket of the inner flaperon as it is loaded highest due to the flaperon axial movement.

c) Check that the balancing of the flaperon has not changed for example due to repainting.

d) Check visually the external laminate for damage, fatigue cracks and delaminations.

e) Check by tapping the areas with hair cracks for possible delaminations. Hair cracks in the paint shall be repaired.

Result:

7. Outer flaperon

With removed flaperon

a) Check by tapping the the bondings at the flaperon spar, actuator and end ribs and trailing edge for debondings.

b) Check that the flaperon brackets are firmly attached to the structure without backlash.
Check visually the flaperon brackets for damage, fatigue cracks, wear and corrosion.

c) Check that the balancing of the flaperon has not changed for example due to repainting.

d) Check visually the external laminate for damage, fatigue cracks and delaminations.

e) Check by tapping the areas with hair cracks for possible delaminations. Hair cracks in the paint shall be repaired.

Result:

8. Air brake

a) Check visually the metal parts for damage, fatigue cracks, wear and corrosion.

b) Check visually that there has not been chafing between the metal lever arm tubes and the brake box web laminate.
Check visually that the hole in the laminate around the lever arm axles is not worn out.

Result:

LEFT WING

9. Wing spar root

a) Check visually and if a defect is suspected also by tapping the wing spar external laminate inboard of the root rib for damage, fatigue cracks and delaminations especially
- around the spar end main fitting
- around the main wing pin bushing
- around the joint of the web to the root rib
Delaminations shall be repaired.

b) Check visually within 30 cm from the wing root the wing external surface at the wing spars for damage, fatigue cracks or delaminations. Use tapping to check areas with hair cracks for delamination. Hair cracks in the paint shall be repaired. Delaminations shall be repaired.

c) Check visually using a web camera, endoscope or similar device the internal laminate within 30 cm from the root rib for damage, fatigue cracks and delaminations at the
- wing spar caps
- wing spar web laminates (forward and aft side of the sandwich)
- joints of the wing spar webs to the root rib and the upper spa cap
- bondings of the wing spar webs to the lower spar cap
Delaminations shall be repaired.

d) Check that the wing spar end main fitting has been replaced before 65000 FLH.
Check that the wing spar end main fitting is firmly attached to the spar without backlash.
Check visually the wing spar end main fitting for damage, fatigue cracks, wear and corrosion, especially the pin, so that the maximum allowed slackness is not exceeded.

e) Check that the main wing pin bronze bush is firmly attached to the wing spar without backlash.

Result:

10. Root rib

a) Check visually and if a defect is suspected also by tapping the external laminate for damage, fatigue cracks and delaminations especially
- around the openings
- around the wing bevel pins
- at the joints of the rib to the wing skins
- at the joints of the rib to the wing spar web laminates (wing spar forward and aft sides)
Delaminations shall be repaired.
Check by tapping the bonding of the root rib to the wing skin.

b) Check visually using a web camera, endoscope or similar device the root rib internal laminate, in front of and aft of the main wing spar, for damage, fatigue cracks and delaminations especially
– around the openings
- at the joint of the root rib to the wing spar web laminates (forward and aft side of the sandwich)
- joints of the root rib to the wing skins
- joint of the root rib to the rear spar
Delaminations shall be repaired.

c) Check visually using a web camera, endoscope or similar device the forward auxiliary spar inside the wing at the forward bevel pin for damage, fatigue cracks and delaminations. Delaminations shall be repaired.

d) Check that the wing bevel pins are firmly attached to the root rib without backlash.
Check visually the wing bevel pins for damage, fatigue cracks, wear and corrosion, so that the maximum allowed slackness is not exceeded.

Result:

11. Wing external surface

a) Check by tapping the bondings of the wing skins at the leading edge, wing spar and the rear spar. Delaminations shall be repaired.

b) Check visually the external laminate for damage, fatigue cracks and delaminations.

c) Check by tapping the areas with hair cracks for possible delaminations. Hair cracks in the paint shall be repaired.

Result:

12. Wing internal structure and systems

Use a web camera, endoscope or similar device for the visual checks

a) Check visually the internal laminate structure for damage, fatigue cracks and delaminations at the
- wing shells
- **main wing spar caps**
- **main wing spar web laminates (forward and aft side of the sandwich)**
- **joint of the web laminates to the upper spar cap**
- air brake box webs

Check visually that there is no damage or fungus in the laminate due to frozen water that may have leaked from the water bag.

b) Check visually the bondings at the
- wing main web laminates and lower spar cap
- air brake box and lower wing shell

c) Check visually the flaperon control system for damage, loose rivets, fatigue cracks, wear and corrosion.
Check visually that the flaperon control system moves freely.
Check visually that the lever arm brackets for the flaperon control system are firmly attached to the main web without backlash.
Check visually that the plywood reinforcements in the main web for the lever arm brackets are protected against fungus and rotting.

d) Check visually the airbrake control system for damage, loose rivets, fatigue cracks, wear and corrosion.
Check visually that the air brake control system moves freely.

e) Check visually the PVC-foam web, holding the water bag in place, for damage and the bondings to the inner skins. Debondings shall be repaired if the water ballast is to be used.

f) Check visually that the inside of the wing is free of any loose objects.

Result:

13. Rear spar

With removed flaperons

a) Check visually using a web camera, endoscope or similar device the bondings at the rear spar upper and lower flange laminates and the wing skins.

b) Check that the flaperon brackets are firmly attached to the rear spar without backlash.
Check visually the flaperon brackets for damage, fatigue cracks, wear and corrosion, especially the most outboard bracket of the inner flaperon as it is loaded highest due to the flaperon axial movement.

c) Check visually the external web laminate and the laminated joints to the wing skins for damage, fatigue cracks and delaminations. Delaminations shall be repaired.

d) Check visually using a web camera, endoscope or similar device the rear spar laminate inside the wing for fatigue cracks and delaminations especially in the vicinity of the flaperon brackets. Delaminations shall be repaired.

Result:

14. Inner flaperon

With removed flaperon

a) Check by tapping the bondings at the flaperon spar, actuator and end ribs and trailing edge for debondings.

b) Check that the flaperon brackets are firmly attached to the structure without backlash.
Check visually the flaperon brackets for damage, fatigue cracks, wear and corrosion, especially the most outboard bracket of the inner flaperon as it is loaded highest due to the flaperon axial movement.

c) Check that the balancing of the flaperon has not changed for example due to repainting.

d) Check visually the external laminate for damage, fatigue cracks and delaminations.

e) Check by tapping the areas with hair cracks for possible delaminations. Hair cracks in the paint shall be repaired.

Result:

15. Outer flaperon

With removed flaperon

a) Check by tapping the the bondings at the flaperon spar, actuator and end ribs and trailing edge for debondings.

b) Check that the flaperon brackets are firmly attached to the structure without backlash.
Check visually the flaperon brackets for damage, fatigue cracks, wear and corrosion.

c) Check that the balancing of the flaperon has not changed for example due to repainting.

d) Check visually the external laminate for damage, fatigue cracks and delaminations.

e) Check by tapping the areas with hair cracks for possible delaminations. Hair cracks in the paint shall be repaired.

Result:

16. Air brake

a) Check visually the metal parts for damage, fatigue cracks, wear and corrosion.

b) Check visually that there has not been chafing between the metal lever arm tubes and the brake box web laminate.
Check visually that the hole in the laminate around the lever arm axles is not worn out.

Result:

HORIZONTAL TAIL

17. Tailplane
With removed elevator

a) Check by tapping the bondings of the tailplane shells at the
- leading edge
- tips
- rear spar
- root rib

b) Check that the forward tailplane bracket for the rod end is firmly attached to the structure without backlash.
Loosen the locking nut and the forward tailplane bracket rod end and check the rod end, especially the first thread in contact with the external bracket close to the locking nut, for damage, fatigue cracks, wear and corrosion. If there is any sign of corrosion replace the rod end with a new one in AISI 4130 or similar strength material.

c) Check that the tailplane aft brackets are firmly attached to the rear spar without backlash.
Check visually the tailplane aft bushes and bearings in the rear spar for damage, fatigue cracks, wear and corrosion.

d) Check that the laminated elevator hinge brackets are firmly attached to the rear spar without backlash.
Check visually the laminated elevator hinge brackets on the rear spar for damage, fatigue cracks and delaminations. Delaminations shall be repaired.
Check visually the elevator hinge bracket rod ends on the rear spar for damage, fatigue cracks, wear and corrosion.

e) Check visually the tailplane external laminate for damage, fatigue cracks and delaminations.

f) Check by tapping the areas with hair cracks for possible delaminations. Hair cracks in the paint shall be repaired.

g) Check visually the rear spar web for damage, fatigue cracks and delaminations. Delaminations shall be repaired.
Check visually that the plywood reinforcement in the rear spar web for the brackets is protected against fungus and rotting.

Result:

18. Elevator

With removed elevator

a) Check by tapping the bondings of the elevator skins at the
- spars
- tip
- aluminum root rib
- leading edges
- trailing edge

b) Check that the elevator hinge pins are firmly attached to the spar without backlash.
Check visually the elevator hinge pins on the web for damage, fatigue cracks, wear and corrosion.

c) Check visually the elevator steel actuator bracket on the aluminum root rib for damage, fatigue cracks, wear and corrosion. If there is any sign of galvanic corrosion replace the parts.
Check that the elevator actuator bracket is firmly attached to the root rib without backlash.

d) Check that the balancing of the elevator has not changed for example due to repainting or fracture of balance weights.

e) Check visually the elevator external laminate for damage, fatigue cracks and delaminations.

f) Check by tapping the areas with hair cracks for possible delaminations. Hair cracks in the paint shall be repaired.

g) Check visually the laminated elevator webs in the vicinity of the hinge pins for damage, fatigue cracks and delaminations. Delaminations shall be repaired.

h) Check visually that the plywood reinforcements in the spar web and at the hinge pins are protected against fungus and rotting.

Result:

FUSELAGE

19. Cockpit structures

a) Check by tapping the bondings of the
- **floor for the pedals, instrument panel and the control stick**
- nose ventilation wall

b) Check visually the seat harness textiles and stitching for damage, wear and degradation such as fungus due to humidity.
Check visually the seat harness metal parts for damage, fatigue cracks, corrosion and wear.

c) Check visually the internal laminate and laminated joints for damage, fatigue cracks and delaminations, especially at the
- nose ventilation wall
- floor for the pedals, instrument panel and the control stick
- fuselage skin under the seat
- seat supports at the fuselage sides
- seat and backrest
- seat harness fitting laminated supports

- auxiliary frame for tow hook
- fuselage structure around the canopy opening

d) Check visually that the plywood reinforcements in the
- floor for pedals, instrument panel and control stick (three places)
- towing hook auxiliary frame
- auxiliary frames in the luggage compartment
- root ribs around the holes for the air brake and flaperon push rods

are protected against fungus and rotting.

e) Check visually the canopy frame laminate for damage, fatigue cracks and delaminations.

f) Check visually the metal parts of the
- canopy hinges
- locking mechanism
- emergency release mechanism

for damage, fatigue cracks, wear and corrosion and proper functioning.

Result:

20. Cockpit systems

a) Check that the tow hook assembly is firmly attached to the fuselage without backlash.
Check visually the tow hook assembly including the cable for damage, fatigue cracks, wear and corrosion and proper functioning.

b) Check visually that the control stick assembly is firmly attached to the fuselage without backlash.
Check visually the control stick assembly and the elevator control line for damage, fatigue cracks, corrosion and wear.

c) Check visually the aileron control line for damage, fatigue cracks, corrosion and wear.

d) Check visually the flap control system with the flap handle, the plates with the flap position slots, the sliding push rod and the inner rod for damage, fatigue cracks, corrosion and wear.

e) Check visually the air brake control system with the sliding push rod and the inner rod for damage, fatigue cracks, corrosion and wear.

f) Check visually that the pedals are firmly attached to the fuselage floor without backlash.
Check visually the pedal parts and the rudder cables for damage, fatigue cracks, corrosion and wear.

g) Check visually the landing gear control system with the sliding push rod and the inner rod for damage, fatigue cracks, corrosion and wear.

h) Check visually the electrical system so that there is no risk for a short circuit, for example due to ageing hardening of the insulation or chafing of the battery wires, which could produce a fire and toxic gases.

Result:

21. Central fuselage internal structure

Use web camera, endoscope or similar device for visual checks where access or visibility is limited

a) Check visually and if a defect is suspected also by tapping the forward main frame laminated joint to the fuselage especially at the vertical part in the vicinity of the wing shear bush for damage, fatigue cracks and delaminations. Delaminations shall be repaired.

b) Check visually that the plywood parts in the forward main frame are protected against fungus and rotting.
Check visually and if a defect is suspected also by tapping the forward main frame reinforcement laminates for damage, fatigue cracks and delaminations. Small hair cracks in paint may be tolerated. Delaminations shall be repaired.

c) Check visually and if a defect is suspected also by tapping the aft main frame laminated joint to the fuselage especially at the vertical part in the vicinity of the wing shear bush for damage, fatigue cracks and delaminations. Delaminations shall be repaired.

d) Check visually that the plywood parts in the aft main frame are protected against fungus and rotting.
Check visually and if a defect is suspected also by tapping the aft main frame reinforcement laminates for damage, fatigue cracks and delaminations. Small hair cracks in paint may be tolerated. Delaminations shall be repaired.
Check that the two 4130 alloy steel rods on the aft main frame are firmly attached to the frame without backlash.
Check visually the aft main frame two 4130 alloy steel rods for damage, fatigue cracks, wear and corrosion.

e) Check visually the two horizontal 4130 alloy steel tubes at the wing shear bushes on the fuselage main frames for damage, fatigue cracks, wear and corrosion.

f) Check that the four wing shear bushes are firmly attached to the horizontal steel tubes without backlash.
Check visually the four wing shear bushes on the horizontal steel tubes for damage, fatigue cracks, wear and corrosion, so that the maximum allowed slackness is not exceeded

g) Check visually and if a defect is suspected also by tapping the internal fuselage skin laminates and laminated joints for damage, fatigue cracks and delaminations.

h) Check visually and if a defect is suspected also by tapping the wheel well laminates for damage, fatigue cracks and delaminations.

i) Check visually the wheel well laminated joints to the fuselage and fuselage main frames for damage, fatigue cracks and delaminations. Delaminations shall be repaired.

j) Check visually that the inside of the fuselage between the main frames is free of any loose objects, for example a pop rivet shank.

Result:

22. Central fuselage systems

Use a web camera, endoscope or similar device for visual checks where access or visibility is limited

a) Check visually the elevator control line for damage, loose rivets, fatigue cracks, wear and corrosion.

b) Check visually that the elevator control system moves freely.

c) Check visually the aileron control push rod and lever arm for damage, loose rivets, fatigue cracks, wear and corrosion.

d) Check visually that the aileron control system moves freely.

e) Check visually the flap control push rod and lever arm for damage, loose rivets, fatigue cracks, wear and corrosion.

f) Check visually that the flap control system moves freely.

g) Check visually the central mechanism for flaperons for damage, fatigue cracks, wear and corrosion.

h) Check visually that the central mechanism for flaperons is firmly attached to the aft main frame without backlash.

i) Check visually that the landing gear retraction system moves freely.

j) Check visually the landing gear retraction push rod and lever arm for damage, loose rivets, fatigue cracks, wear and corrosion.

k) Check visually the laminated landing gear push rod support on the fuselage side wall under the rod for damage, fatigue cracks and delaminations. (The push rod touches the support only under extreme loading.)

l) Check visually the landing gear
- truss
- wheel axle
- whell rim

for damage, fatigue cracks, wear and corrosion.

Result:

23. Fuselage external surface

a) Check by tapping the bondings of the fuselage skins at the
- fuselage symmetry plane
- nose ventilation wall
- floor for pedals, instrument panel and the control stick
- main frames
- two auxiliary frames aft of the main frames
- upper auxiliary frame between the main frames
- asymmetric auxiliary frame in the middle of the tail boom
- fin leading edge
- fin root rib
- fin rear spar
Delaminations shall be repaired.

b) Check visually the external laminate especially
- around the canopy opening
- under the forward fuselage (possible ground contact)
- around the wheel well

- aft of the wheel under the fuselage and tail boom
  (possible impact area for stones)
- at the junction of the tail boom and fin (possible high loading
  in a ground loop)
- around the tail wheel

for damage, fatigue cracks and delaminations.

c) Check by tapping the areas with hair cracks for possible delaminations. Hair cracks in the paint shall be repaired.

Result:

24. Aft fuselage internal structure and systems

Use a web camera, endoscope or similar device for the visual checks

a) Check visually the bondings at the aft fuselage symmetry plane.

b) Check visually the elevator control line for damage, loose rivets, fatigue cracks, wear and corrosion.

c) Check visually the aft fuselage skin and rib laminate structure for damage, fatigue cracks and delaminations.

d) Check visually the bondings of the three auxiliary frames to the skin.

e) Check visually that the elevator control system moves freely.

f) Check visually that the inside of the aft fuselage is free of any loose objects.

Result:

25. Fin brackets and rear spar

Use a web camera, endoscope or similar device for visual checks where access or visibility is limited. With removed rudder

a) Check that the forward bracket for the tailplane is firmly attached to the auxiliary web without backlash.
Check visually the forward bracket for the tailplane including the moving pin for damage, fatigue cracks, wear and corrosion.

b) Check that the aft bracket for the tailplane is firmly attached to the rear spar without backlash.
Check visually the aft bracket for the tailplane on the rear spar for damage, fatigue cracks, wear and corrosion. A buckled flange just under the welding is a sign for high loadings in a ground loop and the junction of the tail boom and the fin shall then be checked for damage.

c) Check visually the rear spar bondings inside the fin.

d) Check that the rudder hinge brackets are firmly attached to the rear spar without backlash.
Check visually the rudder hinge brackets for damage, fatigue cracks, wear and corrosion.

e) Check visually that the plywood reinforcement at the tailplane forward bracket is protected against fungus and rotting.

f) Check visually the rear spar external laminate for damage, fatigue cracks and delaminations. Delaminations shall be repaired.

g) Check visually that the plywood reinforcement at the tailplane aft bracket is protected against fungus and rotting.

h) Check visually the rear spar laminate inside the fin for fatigue cracks and delaminations especially in the vicinity of the rudder brackets. Delaminations shall be repaired.

i) Check visually that the plywood reinforcements at the rear spar hinge brackets are protected against fungus and rotting.

Result:

26. Fin internal structure and systems

Use a web camera, endoscope or similar device for the visual checks

a) Check visually the bondings at the root rib and fin leading edge.

b) Check visually the elevator control system for damage, loose rivets, fatigue cracks, wear and corrosion.

c) Check visually that the elevator control system moves freely.

d) Check visually the laminate at the
- skin shells
- root rib

for damage, fatigue cracks and delaminations.

e) Check visually that the plywood reinforcements in the fin root rib forward area are protected against fungus and rotting.

f) Check visually that the lever arm bracket for the elevator control is firmly attached to the fin root rib without backlash.

g) Check visually that the inside of the fin is free of any loose objects.

Result:

27. Rudder

With removed rudder

a) Check by tapping the bondings of the rudder skins at the
- **root**
- **root rib**
- **leading edges**
- **upper bracket webs**
- **tip**
- **trailing edge**

b) Check that the rudder hinge pins are firmly attached to the root rib and web without backlash.

Check visually the two rudder hinge pins for damage, fatigue cracks, wear and corrosion.
Check visually the rudder actuator bracket for damage, fatigue cracks, wear and corrosion.

c) Check that the balancing of the rudder has not changed for example due to repainting or fracture of balance weights.

d) Check visually the external laminate for damage, fatigue cracks and delaminations.

e) Check by tapping the areas with hair cracks for possible delaminations. Hair cracks in the paint shall be repaired.

f) Check visually the
- root rib laminate
- laminated elevator webs in the vicinity of the upper hinge bracket
for damage, fatigue cracks and delaminations. Delaminations shall be repaired.

g) Check visually that the plywood reinforcements in the
- root rib
- upper hinge bracket webs
are protected against fungus and rotting.

Result:

OTHER

28. Supplementary issues

a) Is there anything else in the aircraft condition, not covered by this list, which impairs flight safety for example due to a repair

Result:

INSPECTION RESULT

Items which shall be completed in the next annual inspection:

Items which must be rectified before the next flight:

☐ The aircraft has passed the fatigue inspection program with ___ items to be completed in the next annual inspection.

☐ The aircraft has not passed the fatigue inspection program, the fatigue problems must be rectified before the next flight

Date: _____ Signature: _____

RENEWED INSPECTION RESULT

Items which shall be completed in the next annual inspection:

Items which must be rectified before the next flight:

☐ The aircraft has passed the fatigue inspection program with ___ items to be completed in the next annual inspection

☐ The aircraft has not passed the fatigue inspection program, the fatigue problems must be rectified before the next flight

Date: _____ Signature: _____