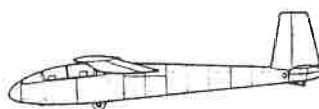




LZ
LETECKÉ ZÁVODY



MANDATORY BULLETIN

MB No: L 13/089a

Concerning: Manual for Operation and Maintenance of the L13 Sailplane without Overhaul (Do-L13-1131.3)

Reason: Prolongation of the periodical inspections time limits and time to overhaul for L 13 Sailplane.
This bulletin cancels inf. bulletin L 13/092b.

To be carried out at the latest by: Immediately after receiving this bulletin.

To be carried out by: Manual owner.

Costs to be covered by: No cost arise.

Necessary material to be supplied by: Revised pages are enclosed.

Bulletin becomes effective: Since receiving this bulletin.

Manhours required: -

Total number of pages: Tit. page and enclosure pages.

Manufacturer

Engineering data contained in this Bulletin is CAA Approved.

Date: 2001-05-31

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A marginal notation will be used to indicate those parts of the contents of a page that have been amended.

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1. INTRODUCTION

The operation of soaring glider L 13 Blaník can be realized by individual users in two ways:

- a) by operative and periodic maintenance with the highest type of maintenance being GR (general revision) with subsequent repair
- b) by operative and extended periodic maintenance without overhauls

With respect to long-term service experience with the L 13 soaring glider and manufacturer's experience from inspections of soaring gliders with extending the periods till GR, the present system of maintenance and repairs of soaring gliders is transformed into the system of maintenance without overhauls. This transition is also facilitated on the basis of some structural changes that were gradually introduced into individual series in the course of production.

The overhaulless system of maintenance can be applied to all soaring gliders being in good technical condition and in which all the mandatory bulletins were incorporated.

After the transition to the overhaulless system, the maintenance and inspections are performed only in accordance with this Manual.

The users are advised to go over to the maintenance without overhauls for those soaring gliders being in good technical condition.

When elaborating the Manual for overhaulless operation and technological documentation for the repairs, all the requirements of associated airworthiness, technical documentation of the aeroplane, applicable service standards bulletins, results of static and fatigue analyses and laboratory tests, experience from the operation in the Czech Republic and abroad, and also from repair shops in the Czech Republic performing the GRs of L 13 soaring gliders were respected.

The overhaulless operation applies to the airframe and its systems. Some instruments and sets have the periods till GR and lives determined by the certificates, quality certificates or the Specifications. These parts are not involved in the overhaulless system and operation periods specified in the documentation mentioned above hold good for them. In case of thorough inspections and after-tests, however, even for these parts, after this is agreed by the airworthiness authority, it is possible to go to on condition maintenance provided that time limits and extent of testing are determined.

For soaring gliders admitted to the overhaulless operation, the activities prescribed by GR are divided into two groups:

- operations and activities that, on the grounds of experience from the hitherto performed GRs and inspections, operation and analysis of faults, were omitted
- operations and activities that were in a full or simplified extent involved into the newly elaborated periodic maintenance of C type that may be carried out by the user himself. The cycle of new revisions was adapted and simplified, however, in such a way, the required level of safety of flight would not be reduced.

The overhaulless operation can gradually be realized, including the prospective inspections, up to the final values of service life mentioned in point 4 of this Manual.

2. SYSTEM OF INSPECTIONS AND REVISIONS

2.1 The description of existing condition and possibility to go to the maintenance without overhauls.

The current Operating and Maintenance Instructions for L 13 can be found in the following documents:

- Technical Manual of the L 13 Sailplane, 4th edition - February, 1977 -
- Information Bulletins No. L 13/030, L 13/034, L 13/042
- Overhaul Manual for L13, L 13 A Sailplane, revised edition, 1996

For the operation of soaring gliders with GR the intervals till the GR were determined as follows:

- Periodic inspection type A - after 50 ± 5 flying hours, 350 ± 30 take-offs or once a year from the beginning of operation or from the last periodic inspection, and/or from the GR performed.
- Periodic inspection type B - after 500 ± 30 flying hours or 3000 ± 180 take-offs or after 8 years that elapsed from the beginning of operation or from the last overhaul.
- Overhaul is performed after 1000 flying hours or 5000 take-offs or after 16 years from the date of manufacture of the soaring glider or from the preceding overhaul.

After reaching the above periods till GRs, the procedure according to below points is possible:

a) GR is performed on the soaring glider

b) The user applies the manufacturer for the extension of the interval till the GR.

The manufacturer, together with the CAA CZ (CAA of the Czech Republic), will send an inspection group to perform the inspection of the soaring glider. On the grounds of positive results of the inspection the interval till the GR may be prolonged, namely, to

- 1500 flying hours as a maximum
- 7500 take-offs as a maximum
- as to the years of operation, these can be gradually increased till 1500 flying hours or 7500 take-offs are reached.

This prolongation can only be realized for individual soaring gliders that are found to be in excellent condition. Beyond 1500 flying hours and 7500 take-offs the manufacturer is not willing to extend the interval till the GR because of a danger that some operations prescribed by GR or by inspection of C type might be omitted in the overhaulless operation, which would substantially reduce the level of safety of flight required by the Airworthiness Rules.

c) By transition to the overhaulless operation. For individual users the transition to overhaulless operation is possible under the following conditions:

- the user will elaborate the statistics involving all operated soaring gliders Blaník with the following mentioned:
 - registration marks
 - year of production
 - production numbers
 - number of flying hours
 - number of take-offs
 - number of GRs performed with the date of each GR, number of flying hours and take-offs at each GR
 - list of performed Bulletines.

the user will divide the soaring gliders according to flying hours into separate groups

- group I to 1000 flying hours
- group II to 2000 flying hours
- group III to 3000 flying hours
- group IV to 4000 flying hours

- for individual groups the inspection program is elaborated, the essence of which is the following procedure:

- in each group, according to the number of soaring gliders in the user's group, the adequate number of soaring gliders to be inspected is selected
- in the time when the GR is to be performed on the soaring gliders according to the number of hours or take-offs, the inspection is carried out. Part of the inspection is performed by the inspection group, while part of the inspections carried out by the user himself according to the inspection program.

The inspection group consists of the representatives of the manufacturer and of the CAA CZ.

- on the grounds of positive results of the inspection in each group it is decided whether the soaring gliders inspected are admitted to the overhaulless operation after the maintenance of C-type is performed or if the partial or complete GR is to be carried out. The remainder of soaring gliders in the group is gradually shifted to the overhaulless operation after the limit number of flying hours has been covered (or the number of take-offs) already without inspections through a direct performance of the C-type maintenance.

- when shifting the soaring gliders in individual groups (I, II, etc.) into the overhaulless operation the inspection group states the instructions for the evaluation of the soaring glider conditions and criteria for the gliders over for the GR if necessary.

In case of need it determines also the operations and repairs that are to be performed additionally to the maintenance of C-type and these are entered into a special record.

- on soaring gliders, admitted in individual groups to the overhaulless operations, the periodic maintenance of A, B, C type is gradually performed.

- when the operation time is covered till the next inspection of C-type (namely after 1000 flying hours from the beginning of overhaulless operation) the inspection is performed on several selected soaring gliders and, according to the results, it is decided if they are admitted to further overhaulless operation like before the first maintenance of C-type. The purpose of these inspections is to evaluate the effect of overhaulless operation on the condition of soaring gliders and to decide about a further prospective operation without overhauls. On the grounds of good result of the inspection of selected soaring gliders prior to the second maintenance of C-type, after its performance, the operation until the third maintenance of C-type will be admitted for all soaring gliders in the given group.
- the choice of soaring gliders for the inspections will be solved in the inspection program.
- the maintenance between individual maintenance checks of C-type is performed in accordance with Chapters 3 and 6.

2.2 Inspection of soaring gliders and its range

The inspection relates only to the airframe and its systems. It does not relate to the instruments and parts of the soaring glider, the intervals of which till the GR are specified by certificates. By agreement with the airworthiness authority these instruments and parts can be changed over to on-condition maintenance through testing and maintenance as per Chapter 9.

In addition to inspections the soaring gliders are a subject of the so called additional tests performed by authorized bodies of the airworthiness authority. These tests are generally performed once a year.

Current faults detected during additional tests must be cleared immediately by the user's workers in compliance with Instructions for repairs given in this Manual. The faults of more severe character or break-down damage, whose repairs are not mentioned in this Manual, must be repaired by a special workshop, and/or after a consultation with the soaring glider manufacturer.

Current faults, for the repair of which the manufacturer's consent is not necessary :

- a) isolated released or torn off rivets along the whole structure - solved by tightening or replacement of rivets
- b) small cracks on the skin - solved by drilling holes
- c) larger cracks - solved by overlapping with eloxal coated sheet according to directions given in Chapter 8
- d) corrosion of sheets - solved by cleaning and spraying new paint (conformably to Chapter 8)
- e) local bulgings due to various impacts when the soaring glider is handled with (without cracks and further internal damages)
 - solved by hammering and/or with the aid of reinforcement by overlapping with eloxal coated covering having the same thickness as the damaged skin.
- f) cavities - removed by a reinforcement riveted to the skin; it is recommended the ends of reinforcements be joined to the rims of ribs or partitions.

The contents of inspection is given in Par.2.3. After finishing the inspection, the inspection group elaborates the record, in which the below items are mentioned :

- list of inspected soaring gliders with statistical data (number of flying hours, take-offs, number of GRs; in overhaulless operation the number and date of maintenance of type C, etc.)
- list of found defects and damages
- proposals for fault clearing and/or proposals for provisions to be taken in all other soaring gliders
- permission and conditions for the admission in further operation without overhauls because of C-type maintenance performed.

After the inspection the user performs the complete C-type maintenance and, when all detected faults have been cleared, the soaring glider is admitted into further operation.

Mar 27/00

2.3 Program of inspection check

1. Airframe documentation review

- number of flight hours
- number of take-offs
- inspection logbook entries
- instruments changes logbook records
- logbook records about General Overhauls (prior to commencing the overhaul-less maintenance schedule)
- major inspection logbook records (after the commencing of the overhaul-less maintenance schedule - which defects were detected and removed)
- logbook entries about the C type maintenance checks, tests and measurements prescribed by this manual
- instrument test records
- records of unusual events
- entries showing that mandatory bulletins were complied with
- entries showing additional repairs and maintenance not prescribed by this maintenance manual
- glider flight operations commencement date
- total flight hours as of inspection check date

2. Glider overall appearance

- paint condition
- corrosion onset potential
- local airframe deformations
- condition of screw heads of all access covers, glass, etc.

3. Wing

- condition of the wing/centre-wing section connection (corrosion, free play)
- review of rivet connection condition especially where skin panels meet the wing spar at root, and at skin panels joints
- condition of skin in the vicinity of access holes
- inspection of wing interior
- condition of venting ahead of flaps

4. Tail surfaces

- skin condition (corrosion, cracks)
- inspection for loosened rivets

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- condition of stabilizer spar at the root section in the fuselage suspension
 - condition of fittings of the stabilizer attachment to the fuselage
 - clearance in stabilizer fittings and in joining node of the spar to partition No.15
 - check of fitting of the fin attachment (corrosion, clearance)
 - condition of the elevator and rudder
 - check of the skin in trailing part of the stabilizer for cracks and buckling
5. Control of all balancing surfaces
- condition of bearings (clearance, corrosion, lubrication)
 - condition of stranded wires, check of tensioning, check for smooth and easy movement
 - check of balancing tabs hinges
 - rotation or seizure of bearings in pull-rods
 - check of clearance in the controls
6. Control of elevator and ailerons
- condition of levers and brackets (corrosion)
 - condition of bearings and joints (clearance, tilting, corrosion, lubrication), pull rods and levers
7. Foot control
- condition of pedals (wear, adjustment, clearance, corrosion)
 - condition of stranded wires in bends on pulleys
 - condition of lubrication and tensioning of stranded wires
8. Wing flaps and brake flaps and their control
- condition of guides and their anchoring to the wing
 - condition of pull rods and levers of control (clearance, etc.)
 - condition of the skin and riveted joints
 - condition of bearings of control (tilting or seizure)
9. Fuselage
- condition of skins and riveted joints
 - condition of hinges of tiltable canopy and its locking
 - condition of floors
 - condition of the centre-section longeron
 - condition of the space for undercarriage
 - condition of partition No.15

- condition of the tail skid and its attachment
- condition of tow releases for aerotows
- 10. Undercarriage
 - condition of the undercarriage mounting
 - condition of the undercarriage shock absorber and its attachment
 - condition of wheel and tire
 - condition of the brake and its adjustment
- 11. Rubber parts
 - check of all accessible rubber parts
- 12. Soaring glider systems
 - check of condition of the pitot-static system
 - check for the condition of bundle and conductors of electrical installation
 - check of plug-socket connections
 - check of the instrument panel space
 - check of cockpit ventilation
- 13.-Glazing
 - check of the cockpit glazing and its mirroring
- 14. Interior of the soaring glider
 - check of seats, their attachment and belts
 - check of upholstery
 - check of inner equipment of pilots
 - condition of data plates
 - condition of inscriptions and descriptions

3. NEW GROUPING OF MAINTENANCE

3.1 Operative maintenance (daily inspection)

This maintenance is performed after the termination of each flying day. For the glider operation without overhauls it is important to follow thoroughly its technical condition and solve immediately its deterioration (according to the character) so that detected petty faults would not require later on more extensive repairs

3.1.1 Generally : on the fuselage, wing and tail surface :

- a) check the surface for prospective damage or deformation of the skin
- b) check to see that rivets are not released; in particular, focus your attention to the area of suspensions

of the wing -fuselage and the joint of the fin with the fuselage. When released rivets are detected, the glider may not be admitted to flights until the fault is cleared.

- c) check the proper closing of doors of mounting apertures.
- d) follow particularly with elevated care the joint gaps in skin sheets and in case of symptoms of corrosion origin, but not later than in three months, clean the corroded spot and apply colourless varnish. Similarly, follow the steel parts not protected by a paint. Not later than in three months, these should be cleaned with technical petrol and preserved with a preservation oil (e.g. KONKOR 101).

3.12 On the fuselage - check the plexiglas of the wind shield, the cockpit canopy. It is not allowed these parts be polluted. Remove dust or mud deposited on them using a soft cloth or buckskin. Use autopolish for cleaning. The use of varnish solvent, petrol, benzol, alcohol, turpentine and nitrovarnishes is prohibited. After cleaning, polish the glazing with clean flannel.

3.1.3 On the wing - check the movable parts of the wing to see that no foreign bodies are wedged between them and that the fastening pins are properly locked. Remove the cover of gap between the wing and fuselage and check the main pins and joints of control for securing. Reinstall the cover.

3.1.4 On the tail surfaces - make certain that the control and balancing surfaces move freely. For skins of control surfaces, pay attention above all to the skin cloth, whether it is not worn through or burst. Swing out the fuselage rear part and check the attachment pins of control surfaces and joining pin of horizontal tail surfaces for proper securing on the 15th partition.

3.1.5 In the control system - check to see that the control elements reach the end stop positions and whether undesirable clearances are not present. See that some part is not deformed.

3.1.8 Table of inspection intervals

INSPECTION INTERVALS

Item	Description	Model-designation	Owerhaul	Service life
A	<u>FLIGHT INSTRUMENT</u>			
1	Airspeed indicator	LUN 1106-8	-	on condition
2	Rate-of-climb indicator, 5m/s	LUN 1141	-	on condition
3	Rate-of-climb indicator, 30m/s	LUN 1147	-	on condition
4	T... - and - tank indicator	LUN 1211.1	-	on condition
5	Altimeter	LUN 1124.01	-	on condition
6	Liquid compass	LUN 1222.1	-	on condition
B	<u>LANDING GEAR</u>			
1	Wheel with brake	HP 4741-Z	-	on condition
2	Tyre with inner tube	350x135	-	on condition
3	Shock absorber	L13.501-17	-	on condition
	a) Shock absorber packing collars	-	-	2000 ± 100hr or 10000 ± 500 take-offs/16yr.
	b) Tail wheel (optional)	L13J.600-09.P5	-	on condition
C	<u>ELECTRICAL EQUIPMENT</u>			
1	Accumulator battery	12A10	-	on condition
2	Switch	V - 45	-	on condition
D	<u>COMMUNICATION EQUIPMENT</u>			
1	Transceiver (optional)	LS-5	-	on condition
E	<u>HOSES</u>			
1	Pitot - static system hoses	-	-	4000 hr/16yr.
F	<u>TOWING DEVICE</u>			
1	Safety tow release (applies to sailplanes on which it is installed)	EUROPA G 88	2000 take-offs	to be determined by original equipment manufacturer
2	Nose tow release (applies to sailplanes on which it is installed)	EUROPA E 85	2000 take-offs	to be determined by original equipment manufacturer
3	Tow cables	-	-	2000 ± 100hr or 10000 ± 500 take-offs/ 16yr.
G	<u>CONTROLS</u>			
1	Rudder control cables	-	-	2000 ± 100hr or 10000 ± 500 take-offs/16yr.

3.1.6 Undercarriage - keep the area around it clean. Wash dust and mud with water. Check the brake and shock absorbers for proper function. Check the pressure in the wheel tyre and, if need be, inflate it to 0.25 MPa (2.6 kp/cm²). After 30 or more take-offs from the last replenishing of lubricators on the undercarriage shock absorber and in the axis of the fuselage fork rotation, lubricate these grease cups (lubricating points 19, 20, 21 - see the lubrication chart).

3.1.7 Equipment - check the instrument boards and medicine chest for proper fixing. See that the board instruments are not damaged.

If the glider is equipped with electrical installation, inspect the environment of storage battery, namely, whether it is not polluted with acid. Wash the polluted parts with soda solution and dry them up. Make the battery charged in the charging station.

3.2 Periodic maintenance

The periodic maintenance of the whole glider is divided into maintenances of A, B, C - types depending on the number of take-offs, flying hours and time of operation. That is why precise record about all take-offs and number of flying hours is to be kept in the airframe log-book.

Type A - performed after each 50 ± 5 hrs or 350 ± 30 take-offs or once a year from the beginning of operation or from the last inspection

Type B - performed after each 500 ± 30 hrs or 3000 ± 180 take-offs, but at most after 8 years from the beginning of operation or from the last inspection of B or C -type.

Type C - performed after each 1000 ± 50 hrs or 5000 ± 250 take-offs, but at most after 16 years from the beginning of operation or from the last inspection of C -type.

It is also performed after the glider crash.

The range of operations for individual types of periodic maintenance is given in Chapter 6. The performance of all periodic operations is entered into the airframe log-book.

3.3 Lubrication

The airframe lubrication is a prerequisite for the glider operation without overhauls in the course of the whole technical life and time of use. Particular emphasis is laid on the lubrication of grease cups on the undercarriage shock absorber and in the axis of the undercarriage fork rotation (lubricating points 19,20,21 of lubricating chart) after 30 or more take-offs from the last lubrication. Otherwise, the lubrication procedure follows the lubricating chart and must be performed not later than during the inspection of A-type, namely, after each 50+5 hrs or 350+30 take-offs.

For the lubrication of airframe aircraft grease Ciatim 201 or an equivalent grease as per Enclosure 11.4 is used.

The lubrication of parts into which grease in normal state could not be forced may be performed with the grease diluted with technical petrol.

For better orientation the corresponding points on the airframe to be lubricated are shown on the lubricating chart (see Figs.3.1, 3.2). Before the lubrication proper, clean these points from dust and grease using technical petrol.

Survey of lubricating points (serial numbers correspond with the positions in Figs. 3.1, 3.2) :

- (1) Joint of pull rods of the tow rope suspension with the countershaft on the 1st partition
- (2) Joint of the tow rope front suspension lever with the pull rod
- (3) Front suspension of the tow rope
- (4) Joint of pull rods and stranded wires with double-arm lever of foot control in front pedals

- that the instrument is switched on after the take-off and switched off before landing, lest the multiples during landing and take-off and taxiing should be involved

For gliders with service life prolonged on the basis of analysis of operating conditions data provided by the user the B-type inspection is extended by the following activity:

Inspect the critical spots on the lower flange plate of the wing up to about 500 mm far from the axis of suspension and the whole lower flange plates of the centre-section from the inner part of structure partly through apertures in the edge rib of the wing and partly in the centre-section web to detect fatigue cracks if any.

All the mentioned service lives hold good under the condition the given average operating conditions are adhered to and provided that all modifications were thoroughly performed and inspections carried out in accordance with issued Mandatory and Information Bulletins related to certain number of hours. In Enclosure 11.6 the list of all Bulletins issued to the date of edition of this Manual is therefore presented. Given separately (see book 2) are the selected Bulletins that relate to modifications effecting the service life and also the Bulletins relating to the life and terms of operation of the glider airframe

The above service lives are valid only for the wing unit, longeron of the centre-section in fuselage and suspensions of the stabilizer on the fuselage. In other structural parts the service life was not determined and tested. Their service life is determined by following up the condition in operation, during inspection checks and inspections of C -type that substitute the general revisions.

The increasing number of faults in some parts with increasing number of flying hours indicates that their service life has been reached. Consequently, these sections should be replaced or repaired in the gliders beforehand. During inspections the originating faults can be judged from the following viewpoints :

- 1) Faults of current character (mechanical wear and damage) occurring averagely like in other types of metallic gliders

or light aircraft. These faults do not effect the service life

- 2) Faults due to variable load in operation (releasing of riveted joints, cracks in secondary parts of glider). These faults are corrected after having been detected during inspections or revisions in the course of C - type maintenance substituting the GR, by re-tightening the rivets, replacement of fittings, etc., as far as they occur in a tolerable number (statistical) and do not increase significantly with increasing number of flying hours.
- 3) Faults due to variable loads in operation affecting the service life (cracks in the fin and stabilizer skin, in fittings of the suspension, etc.). These faults detected during inspections and maintenance of C - type indicate a lower service life than that corresponding with the wing life. These cases should be solved by a repair or replacement of the part and prescription of special operations during the C - type maintenance if necessary.

5. CRITICAL SPOTS ON THE AIRFRAME

The critical spots followed from the static and fatigue tests and troubleshooting and wear found during inspections in GR and in the course of operation. These spots require maximum attention both during inspection checks and in inspections and maintenance of C - type. The spots should be inspected with the aid of a lens with minimum magnification 5:1. During inspections and maintenance of C - type the critical spots are checked with disjoined parts of the structure.

The faults are repaired in accordance with this Manual. Cracks and faults of larger extent that are not described in this Manual are to be discussed with the manufacturer.

List of critical spots according to structural groups:

a) Wing

- the web of the main spar between ribs Nos. 1 and 2
- lower suspension of the main spar
- lower flange strap of the main spar, dwg.No. L13.201-21.12 and angle iron of lower flange plate, dwg.No. L13.201-21.02 of the main spar 400 mm far from the

rib No.1

- releasing of rivets on the main spar in the area of main spar. Released rivets should be replaced
- releasing of rivets on ribs Nos.13, 19, 25 up and down from the main spar at the trailing edge
- the skin in the environment of inspection caps
- the holes for bolts in the joint :wing-fuselage (to be checked for ovality)

b) Fuselage

- lower flange plate of centre-section, dwg.No. L13.101-06.02
- holes for the joint :wing-fuselage (to be checked for ovality)
- suspension fittings for tail surfaces
- bulkhead No. 15 in the spot of clamping the tail skid suspension
- the skin in the area of joining the tail surfaces
- the grillage for the main undercarriage fitting

c) Tail surfaces

- stabilizer suspensions
- elevator drive (disconnecting element behind the last pull rod of the elevator)
- upper suspension of the rudder on the last rib of fin

d) Undercarriage mounting

- undercarriage shock absorber suspensions
- undercarriage suspensions
- apertures for the undercarriage fork (to be checked for ovality)

6. CONTENTS OF PERIODIC INSPECTIONS

6.1 General notes

- Before starting each type of maintenance, the soaring glider is to be cleaned in conformity with Par. 7.1
- The repair should be carried out in keeping with this Manual . The workshop must be equipped so that all the requirements for the prescribed range of maintenance are secured
- Before approaching to each type of maintenance, it is necessary to verify the soaring glider documentation

and certificates of its instruments and sets.

- If the data regarding maintenance, time between overhaul and service life as shown in the certificate of an instrument or set differs from that shown in this Manual, the data shown in this Manual is applicable.
- The results of checks of individual types of maintenance, measuring records and other important data should be stored for each soaring glider for the period of its service life. This documentation serves for the investigation of occurrence of faults in the next type of maintenance and inspection checks.

6.2 Contents of maintenance of A-type

6.2.1 Preparatory activities

- Wash and clean the soaring glider
- Remove the: wing-fuselage fairing, and open the front and rear tiltable fuselage coverings.

6.2.2 Inspection:

6.2.2.1 Fuselage

Check the intactness of surface and fuselage structure from the viewpoint of damage, intactness of riveted joints, cracks and corrosion.

- Perform the check of emergency cockpit canopy release on the ground as follows:
 - Turn the lever of emergency release (located on the r.h. side of the canopy in the front cockpit space) through 180° in the direction of the arrow marked on the canopy. Shear the lock in the first phase of the lever movement (binding wire o 0,5 mm with a seal and aluminium shear pin o 2 mm in the rear suspension), that is why an increased resistance against the lever turning is to be accounted for.
 - With simultaneous holding the lever of emergency release in end position press with your hand against the cockpit canopy close to the r.h. side upwards. However, before releasing the canopy hinges, it is necessary the assistant would grasp the canopy for the outer side (r.h.) of glider, thereby preventing its damage.
- After removing the canopy, check to see that the functional parts are not affected by corrosion. When corrosion is present, clean it, using emery paper, from all the parts. In either events, clean

6.3 Contents of B-type maintenance

6.3.1 Perform the maintenance of A-type according to Par.6.2

6.3.2 Perform the check of released rivets on the wing ribs Nos. 13, 19, 25 up and down between the spar and trailing edge. If the number of released rivet is higher than 25% of the whole number of rivets in the given area of individual ribs or 4 rivets are released one behind the other, replace them by using rivets of bigger diameter.

6.3.3 Check the stranded wires of rudder. When broken wire is found (namely in the spot of bend over the pulleys) replace the stranded wire.

6.3.4 Check the tensioning of rudder stranded wires

The stranded wires of rudder control must be tightened to the below values :

- older stranded wires that were in operation - 441 ± 49 N
- new stranded wire that has not yet been in operation (in case of replacement) to the value 441 ± 96 N / 45 ± 20 kp/
- perform the first tensioning to the upper limit of tolerance.

6.3.5 When a forcible damage to the skin of the lower fuselage part has been detected between the 1st-6th bulkhead, perform the inspection of bulkheads and fuselage structure under the floors.

6.3.6 Check the bulkhead No.15 for possible cracks in the spot of mounting of the tail undercarriage suspension. When cracks have been detected in the spot of mounting, the operation may be allowed with two cracks of max. length 10 mm (the ends of cracks should be drilled with \varnothing 2.1 drill) . In case of bigger cracks, replace the bulkhead. Dismount the electric horizon LUN 1202 (if used) and check it in the laboratory according to the data from Chapter 9.1. Enter the testing and repairs, if any, into the certificate of the instrument.

6.3.7 Do the leak test of the static and dynamic pressure system after a time period not exceeding 24 months.

6.4 Contents of C-type maintenance

6.4.1 Perform the maintenance of A-type according to Par 6.2 and B-type maintenance according to 6.3.

6.4.2 Check the landing gear

- Remove the landing gear shock absorber. Replace the packing collars and other parts as necessary. (See Par. 8.5.)
- Check the clearance in the landing wheel fork and in the suspension
- Check, using the lens magnifying 6x, the suspension cabane for cracks. When cracks are detected, have it repaired in special workshop.
- Clean and lubricate the wheel bearings with fresh grease.

6.4.3 Check the skin in the spots of cut-outs for various fittings for cracks. When cracks are detected, drill their ends with \varnothing 2.1 mm drill.

When larger cracks than 40 mm in length are detected, repair them by overlapping or replace a part of the skin.

6.4.4 Measure the sizes of the holes and pins of the wing/fuselage suspensions and of the tail unit suspensions. The glider may only be released for further operation if the sizes of these holes and pins agree with those shown in column „O“ of the Table on page 38. If the values measured are not in conformity with those in the Table, the holes in the suspensions may be reamed to the sizes shown in columns I and II or, as a last resort, to the sizes shown in the columns III and IV of the Table (page 38). New pins of corresponding sizes must be used for the holes having been reamed.

6.4.5 Check the following parts of controls:

- Replace the rudder cables by new ones (see Par. 8.7.1.)
- Max. admissible clearance at the ends of foot control pedals is 3 mm. If the clearance is bigger, replace the whole block of control.
- Check the hub of the elevator for cracks using the lens with 6 x magnification
- Check the clearance in the elevator attachment. No clearance is allowed between the left and right elevator (in the countershaft). Remove the clearance, if any, closing the countershaft arms.
- Dismount the elevator drive, wash it thoroughly in technical petrol and check it for cracks. The drive must be free from rough mechanical damages. Sporadic cracks, if any, can be repaired by drilling their ends with \varnothing 2.1 mm drill. When the drive is damaged or severely cracked, replace it for new one.
- Check integrity of whole control route of the elevator trim tabs.

	"0"	I	II	III	IV
Front pin of wing	Ø12-0.016 -0.034	Ø12.1-0.016 -0.034	Ø12.2-0.016 - 0.034	Ø12.3-0.016 -0.034	Ø12.4-0.016 -0.034
Hole of the front suspension of wing	Ø12+0.027 -0.00	Ø12.1+0.027 -0.00	Ø12.2-0.027 -0.00	Ø12.3+0.027 -0.00	Ø12.4+0.027 -0.00
Main pin of wing diameter - upper lower	Ø22 } -0.020 Ø20 } -0.033	Ø22.1 } -0.020 Ø20.1 } -0.033	Ø22.2 } -0.020 Ø20.2 } -0.033	Ø22.3 } -0.020 Ø20.3 } -0.033	Ø22.4 } -0.020 Ø20.4 } -0.033
Hole of the suspension of wing, upper, lower	Ø22 +0.033 Ø20-0.00	Ø22.1 +0.033 Ø20.1 -0.00	Ø22.2 +0.033 Ø20.2 -0.00	Ø22.3 +0.033 Ø20.3 -0.00	Ø22.4 +0.033 Ø20.4 -0.00
Joining pin of horizontal tail surfaces	Ø10-0.005 -0.014	Ø10.1-0.006 -0.017	Ø10.2-0.006 -0.017	Ø10.3-0.006 -0.017	-
Hole for the joining pin of horiz.tail surfaces	Ø10+0.015 -0.00	Ø10.1+0.018 -0.00	Ø10.2+0.018 -0.00	Ø10.3+0.018 -0.00	-

- 6.4.5.1 The adjustment of the elevator control must be done so:
- that the double-arm lever would not bump into the fuselage bulkhead No. 14
 - that sufficient clearance is secured between the control lever handle and the rear instrument board
 - max. clearance at the end of control levers (with blocked control surfaces) is max. 2 mm.

- 6.4.5.2 Check the intactness of stranded wires of the elevator control. If a wire is broken, replace the whole wire strand.

- 6.4.5.3 Check the tension of the elevator stranded wires
- the upper wire must be tensioned to the following value:
older stranded wires that have been already in operation
- to $392 + 49$ N ($40 + 5$ kp)
 - new stranded wires that have not yet been in operation (in case of replacement) - to $392 + 196$ N ($40 + 20$ kp).
- The first tensioning should principally be performed to the upper limit of tolerance.

- 6.4.6 Check the whole line of ailerons control for intactness
- Check the hubs of ailerons control on the 1st rib for cracks and release of joints.

- 6.4.7 Check the control of wing and brake flaps.
- Check to see that the surface of pull rods of brake and wing flaps in the fuselage is free from mechanical damages and that pull rods do not seize in their guides on the left side of the fuselage. Replace the faulty guides for new ones. The pull rods must move smoothly along the whole length of their travel (provided that the final assembly of the soaring glider has not yet been performed).
- Check the connecting tie rods going from the flap to the front position. In operation the tie rods are buckling stressed and therefore, check above all their straightness

during revisions. Put out of service the tie rods with evident and permanent deformations or scuffed apertures in forks and replace them for new ones.

Check to see that the control of wing and brake flaps is thoroughly overbridged in all the prescribed spots.

Remove shortcommings, if any, following the instructions of Par. 8.9

Check the ball journals with pins and runner-type carriers on the countershaft and their opposite members on the double shaft in the wing. Replace deformed or damaged parts. When doing this it is generally necessary the countershaft be dismantled from the fuselage. It is not recommended to dismount the double shaft from the wing, since its refitting into the wing is connected with big troubles.

After the check and replacement of faulty parts, if any, clean thoroughly all the movable joints and lubricate them with Ciatim 201 grease.

6.4.8 Check the towing equipment

Clean the side towing suspensions, wash them with petrol and lubricate with CIATIM 201 grease. After the check and repair, perform the test of synchronization of release of the locks:

- they must unlock simultaneously
- when retracted, the locking pins must be "burried" under the level of lock
- in normal position the locking pins must 5 mm extend a minimum
- they must automatically and easily return to initial position
- the lever of automatic release may not seize during the travel to the "OFF" position.

Check the rear pull rod on the front towing suspension to see that it is not damaged. Replace the damaged pull rod. It can be made according to drawing L13.807-06 (see Par.11.2).

6.4.9 On the instruments and electrical installation

- Replace the rubber hoses the static and dynamic pressure system by new ones.
- After the replacement check the tightness of static and dynamic pressure system in accordance with Par. 8.8. Otherwise do the check after a time period not exceeding 24 months.
- Check to see that the bundle of conductors, when passing the bulkheads Nos. 2 and 3, is protected by rubber bushing. If need be, complete or replace the bushing.
- Check the bundle of conductors at the spot of passage through the 5th bulkhead (cut out for stringer) to see that it is protected with plastic leather and, if need be, repair it.
- Dismantle the board instruments and check them in laboratory in accordance with Par. 9.1 of this Manual. Enter the tests and repairs , if any, into the Certificates of instruments.

6.4.10 Replace the strings operating the side tow releases (wire dia. 1 mm, material 12090 or OVS).

6.4.11 Check the condition of the cockpit interior. Replace the upholstering that is damaged to a larger extent.

6.4.12 Repair damaged ornamentations and paints.

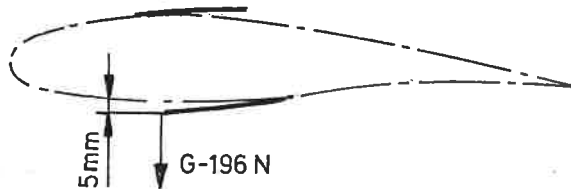
- 6.4.13 Check the critical spots on the lower flange plate of wing up to the distance 500 mm from the suspension axis and the whole flange plate of the centre section from the structure inner part. The inspection is performed through the apertures in the end ribs of the wing and through holes in the centre-section web (6th partition)

During the inspection, check to see that fatigue cracks are not present.

The fatigue cracks are inadmissible.

- 6.4.14 Check the rigidity of the lower brake flap as follows :
Load the front edge of brake flap with 196 N. With this load applied, the flap may extend 5 mm at maximum.

Notice: The end of spring-scale or other testing device is to be adapted so lest a damage or deformation of the flap leading edge should occur. Sufficient for this purpose is a suitable selected angle iron 200 mm in length fixed to the flap leading edge and only after this the testing device is connected.



- 6.4.15 Check the condition of the undercarriage wheel bearings.
Clean them in petrol and apply fresh grease (Par. 3.3)
- 6.4.16 Replace the brake lining. (As far as this was not carried out before) (Follow Par. 8.5.1.1).
- 6.4.17 Dismount the instrument panel, replace faulty shock absorbers.

6.4.18 Check the condition of electrical installation:

- harness clamping
- check the ends of conductors and cable eyes for wear (see Par.8.9)
- check the socket-plug connections for corrosion and damage
- check the screening of screened bundles and repair damaged spots (See Par.8.9).
- check the insulation of conductors. Replace faulty conductors. Adhere to numerical labelling !
- check the condition of position lights (if in the soaring glider equipment).

6.4.19 Perform the check and polishing of the cockpit glazing.

6.4.20 Perform the levelling of soaring glider in accord with Par. 8.11. Elaborate the record.

6.4.21 When the maintenance operations are completed perform a flight (see Chapter 10).

7. DESCRIPTION OF THE DISMANTLING AND REFITTING OF INDIVIDUAL GROUPS

7.1 Preparatory operations and soaring glider cleaning

Before starting the repair operations, clean thoroughly individual parts of the glider from dust, mud and impurities.

Wash the coarse impurities, dust and mud with 1% aqueous solution of soap.

Wash the fatty stains and spots where lubricants have accumulated with non-ethylized petrol (Soviet designation B-70) and wipe them dry. It is inadmissible to use other organic solvents (nitrosolvents, chlorohydrocarbons, as e.g. RDV, SD or R5). The cleaning methods described relate also to the linen skins of control surfaces.

Wash the free metallic assembly parts (bolts, pins, nuts, washers, dismantled pull rods, levers, countershafts, stranded wires, etc.) also with non-ethylized petrol and wipe them dry.

optimum attention should be paid to its repair. The repair must be inspected and approved by the commission under the presence of supervisory office of respective state observer. The repair of more severe failures of the main and auxiliary front spar is to be consulted with the manufacturer. In the main spar the serious defects are altogether solved by the replacement of wing.

In flange plate of auxiliary spar the crack is not stopped by drilling its ends. The damaged spot should be replaced by new strong piece. Fit into the cut out spot an insert and overlap it with reinforcing angle iron of the same or larger cross section than is the weakened point in the flange plate.

Damaged webs of the main and auxiliary spar to 30% of the spar height can be repaired by a patch of D 16 ATV of the same thickness as the web. Use the same diameter of rivets as employed in riveting the web to the flange plate in the vicinity of damaged spot. All repairs of spars must be substantiated by calculation which is submitted to the manufacturer for approval. Any repair of the spar must be entered into the aircraft logbook.

8.3.3 Repair of wing suspensions

In the revision of C type the thorough inspection of all suspensions and joining pins is imperative. Scuffed and corroded pins must be replaced. Check also the conditions of holes in which the faulty pin was placed. The suspensions can be divided into three groups.

- a) Suspensions, in which the repair is possible by reaming them to larger diameter and by using new pins with correspondingly larger nominal diameter (suspensions for the wing join to the fuselage). In Enclosure 11.1 are the tables with permissible reaming.
- b) Suspensions of aileron, in which the repair by reaming or bushing is not possible. The damaged suspensions should be replaced by new ones ordered at the manufacturer or manufactured in accord with original documentation (the drawings should be ordered).

8.11 Soaring glider levelling

Performed after the maintenance of C type, emergency cases of flight and/or in case of landing in a terrain when a permanent deformation of airframe could be supposed.

8.11.1 Measurement of the glider - levelling is performed to determine mutual positions of the fuselage, wings and tail surfaces with the aid of measurement of levelling points. Position the glider into horizontal position (longitudinal and lateral axes) with the aid of two jacks under the left and right wing and the jack placed under the rear part of the fuselage.

The coordinates of levelling points and their permissible deviations are prescribed by the Levelling drawing (see Figs. 8.20, 8.21 and 8.22).

The tables with summarized values for the procedure of levelling are given in the next points.

8.11.2 Vertical measurements

Table 11-1 gives the values that express the distances of levelling points from the fuselage levelling plane. This plane is interlaced 90 mm under the basic plane of fuselage and goes through levelling points Nos. 2,3,4 along the left and right sides of fuselage. The admissible difference in height between levelling points Nos. 2,3,4 on the left side nad leveling points Nos.2,3,4 on the r.h. side is 1 mm. The vertical measures specified in the table are without deflection due to own mass.

9. INSTRUCTIONS FOR TESTING AND MAINTENANCE OF THE INSTRUMENTS

9.1 Testing of instruments

In view of the fact that the defect of any of the instruments has no bearing at all on the safety of flight and on its completion, all of them undergo maintenance according to their concrete state. It is namely up to the pilot to evaluate the actual state and functioning of the instruments. All instruments are tested and treated in a way described in Revision C, as indicated below in this chapter.

The instruments should be tested in authorized testing laboratories or testing shops. Repairs, if any, should be realized in special repair shops.

9.1.1 LUN 1211.1 turn indicator

9.1.1.1 Testing

During operation we concentrate on testing the turn indicator's accuracy, sensitivity and equilibration. We attach the turn indicator to a special swivel base on a rotating table; the swivel base can be inclined by 90° to the left and to the right along the longitudinal axis of the instrument. The turn indicator is attached to the swivel plate in horizontal position, the same as in the aircraft, so that the ball of the inclinometer be between the zero marks. Connect the source of 4.5Vdc current. Following the gyroscope's start to rotate, and when the rotation becomes steady, i.e. after some five minutes, the check-up may start.

Set the rotating speed of the swivel plate at $4^\circ/\text{s}$ and switch on rotation. At this speed the left edge of the pointer covers the right edge of the zero mark with an accuracy of $\pm 0,5 \text{ mm}$. At an angular speed of $12^\circ/\text{s}$ the right edge of the pointer covers the internal edge of the last mark of the scale

Disconnect instrument from power source, clean it with the brush and blow off all impurities with a rubber baloon or pump. On polishing and cleaning the collector it is recommended not to take out the spring Pos. /6/. After completing the work put on the cover again, screw on the holding nut and secure it with grub screw and with cement.

Note: Removing the cement from the grub screw does not affect the guarantee for the instrument.

10. TEST FLYING OF THE GLIDER

After periodical revisions of types "C" follow test flyings; the same applies for the replacement of important assemblies of the aircraft that might have impact on their flying properties.

10.1 Conditions for the test flying

1. Determine the weight and centre of gravity of the glider according to Chapter 8.10.
2. All flights should take place in line with the Flight Manual of the L 13 glider.
3. The crew for test flying - 2 people
4. Atmospheric conditions
 - cloudy - up to 8/8
 - the altitude of the bottom limit of cloudiness - 1000 m above the ground
 - horizontal visibility - min. 3 km

10.2 Aerotow (1st flight)

- /1/ Climb to the altitude of 700 + 1200 m above the ground and checking the behaviour of the glider during start and tow.
- /2/ Checking the functioning of the instruments and comparison of the data in both cockpits
- /3/ Checking the tow release mechanism with load

Instrumentation panel with accessories (front and rear cockpit panel, cabin venting, seats and other devices)	L 13.802
Control coverings	
Upholstering	L 13.805
Side suspensions with controls	.806
Glider outfit	.807
	.810

A more detailed grouping of the above mentioned groups and all details can be found by the user in the Spare Parts Catalogue of the GLIDER L 13 BLANIK, which can be ordered in Czech, German and English at the Product Support Department of the Letecke zavody a.s. KUNOVICE, CZ.

As the glider coverings need to be repaired more frequently (due to the forced damage), the catalogue items are described in more details in the chapter 8.17 together with the recommended repair procedures.

- 11.3 List of components subjected to the color crack detection. The color crack detection is carried out:
- a) on components, on which damage in the form of a crack is detected during the inspection and when the crack cannot be identified uniquely by the magnifying glass.
 - b) during the C revision on components listed in the following review. The crack detection is carried out without any dismantling from the glider or after the dismantling when the place to be inspected is not accessible.

<u>Name</u>	<u>Drawing number</u>
1. Undercarriage suspension (cabane)	L 13.101-16 P2
2. Elevator suspension	L 13.301-01 P2
3. Elevator drive	L 13.401-04
4. Mounting	L 13.401-25 P1
5. Pedal arm	L 13.402-02 P1
6. Pedal	L 13.402-02 P2
7. Lever	L 13.402-04 P1
8. Foot control box	L 13.402-31
9. Pedal	L 13.402-32 P1
10. Expanding journal of the main suspension of the wing (to the 25th series)	L 13-100-01.41