

BOOKLET 9

GROUND SERVICING - MAINTENANCE .

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GROUND SERVICING . MAINTENANCE .

9.0. GENERAL .

This booklet deals with :

- handling ,
- tie down ,
- filling up with fuel and oil and draining ,
- maintenance checks ,
- repairs and changes of components (authorized in training) .

9.1. GENERAL SERVICING .9.1.1. Handling.9.1.1.1. Manœuvering by hand .

For any type of handling : a crew of two men .

Since the aircraft is so light there are no carrying handles .
Lift the tail by putting hands under the fuselage , just before the tail-plane .

9.1.1.2. Towing .

The aircraft being light , proceed with caution not to overturn it .
Push the aircraft by leaning on the leading edge of the lower wing near the fuselage or near the struts or by leaning on the air-frame struts at wing level . Proceed slowly across sharp rails (as in a hangar) not to burst the tyres .

Lifting the plane .

Prop up the tail either on the tail-wheel , or on the lower stay-plates of the stern-post with a block of hard wood .

N.B. Never leave the aircraft in this position without attaching a ballast to the tail .

9.1.2. Tie-down .

Tie the mooring cables to the eyelet-holes provided on the lower wings lower surface , to the feet of the forward struts and to the tail-wheel . Immobilize each control surface with 2 wooden blocks tied together and leaning on both sides of the control surface ribs and on the corresponding fixed surface near the trailing edge . Put on the brakes .

For outdoors tie-down , put protecting covers on engine and front and rear cockpits .

9.1.3. Fuel and oil .

9.1.3.1. Fuel .

Fuel : octane index 80 .

The tank is placed in the centre plane (upper wing) .

The filler cap is placed on the top of the tank .

9.1.3.2. Lubricant .

Nature : mineral oil : viscosity 1100 to 1120 .

The tank is placed on the left of the fuselage .

Capacity : 6 litres .

9.2. MAINTENANCE CHECKS .

9.2.0. Rigging (see drawing 1) .

- for the tension of the stays refer to drawing 4 , booklet 2 .
- place the aircraft in rigging position , the plane of the upper tail-booms of the fuselage, level .
- the engine axis (line of flight) is then raised by 2° .
- the wing incidence - measured by applying a straight batten to the wing lower surface - is $+4^{\circ}$ for the lower wing and $+3^{\circ}30'$ for the upper wing .
- the tail-plane incidence is $+4^{\circ}$.
- adjust the control surfaces with the control column and rudder bars at the neutral position .

- give approximately the same tension to all the control cables .

Necessary tools :

- 1 set of spanners from 4 to 12 mm .
- 1 set of flat spanners for the stays lock-nuts .
- 1 set of screwdrivers .
- 1 set of socket spanners from 5 to 12 mm .
- Drifts made of duralumin .
- Hammers .
- Pliers .
- Rulers .
- Tensiometres .

9.2.1. Before flight checks .

- Check that all bolts are correctly tightened and that their nuts are correctly stopped .
- Examine the tension rods to check that the threads are completely engaged and that the brake cable clamps each tension rod .
- Check the functioning of the controls .
- When the controls are correctly maintained , their movement is noiseless except for a slight friction of the cables on their fibre guides .
- check the proper functioning of the mechanisms for the adjustment of the elevator trim .
- Check the tyre pressure (about 1,5 kg / cm²) .
- Check the lubricating of the wheels , the landing gear and tail wheel joints , as well as the lubricating of control joints and hinges axis . Confer lubricating diagram , drawing 3 .
- Never lubricate the control cables at the guiding pulleys . This lubricating is superfluous and dangerous because when sand settles on the lubricant , it makes a paste similar to emery paper .
- Check the fastening of the cowlings and doors .
- Check that the fuel (90 litres) and oil (6 litres) tanks are full .

- The use of petrol with a minimum of 80 octane index is recommended for Renault engine .
- The oil to be used for the engine will be chosen amongst oils recommended by the engine maker .

IMPORTANT NOTE :

- When servicing the engine it is recommended only to pour oil in the caps of the rocker boxes up to half-way up the guiding casing of the cap securing screw .
- Drain periodically (25 hours) the caps of the rocker boxes to the level indicated above .

9.2.2. Periodic maintenance .

1) Airframe .

Every 5 flying hours .

- clean all accessible parts of the airframe .

Every 20 flying hours .

- Check all the bolts , axes , tension rods of the engine mounting frame , of the landing gear , of the tail-skid , of the airframe , of the rudders and of the controls .
- Lubricate the joints as shown in the diagram , drawing 4 .
- Check the functioning of the brakes .
- Check the rigging of the airplane , drawing 1 .
- Check the brazed-joint joining the landing-gear leg ~~at the fixing~~ ~~fixing~~ to the fuselage at the fixing point .

Every 100 flying hours and every 6 months .

. Control surfaces .

- Check there is no pronounced wear of the axes and of the bronze-rings at the control surfaces hinges .
- check that the alignment of the axes of all control surfaces remains correct .
- check that the ^{attachment} bolts at the hinges have not loosened because of shrinking of the wood of the spars . If required tighten these bolts with a screwdriver .

All these bolts screw into nuts riveted to the fixed plywood and

are provided with fibre rings ensuring locking of the bolts . Examine the flying control cables .

. Main landing gear .

- Check that there is no wear of the axes and bronze rings at the pivoting points .

- Check the play on the wheels .

- Check the play of the shock-absorber piston in its guide . If required take off an adjusting layer in front or at the back , or on both sides , reassemble and fully tighten bolts .

- Ensure that the settling of the shock-absorber blocks is not excessive . If necessary add a layer or change the blocks .

- Check the state of the outer covers and inner tubes of the tyres .

. Tail-wheel .

- Check the play of axes and bronze rings of the wheel .

- Check the play of the shock-absorber piston in its guide . If necessary , tighten the big nut at the bottom of the shock-absorber cylinder which tightens the split-ring shaped guide .

- Put back the brake cable .

Every 400 flying hours or every two years .

- Send the aircraft back to the central workshop for a general check . The overhaul is completed according to the building plans .

2) Engine .

Every 20 flying hours .

- Drain oil from tank , clean oil filters and drain rocker caps .

- Clean the petrol filters .

- Check the varnish of the propeller leading edges . If necessary , add a new layer of varnish (this happens when the aircraft has been flying in the rain .) .

Every 100 flying hours .

- Carry out a general inspection of piping and of the oil and petrol cocks and of engine controls .

- Comply with the servicing and engine-overhaul booklet edited by Renault for the Renault engine and by de Havilland for the Gipsy.

9.2.3. Special checks . (Protection of engines)

9.2.3.1. Possible deterioration .

Oxydation and attack of metal components caused by :

- a) additive put in the petrol to increase its anti-knock quality .
- b) organic acidity of oils .
- c) dampness which accelerates the above-mentioned problems .

Oil deterioration following prolonged storage causes the piston-rings to stick and clogging of narrow-diameter oil pipes .

These deteriorations increase rapidly with temperature and humidity . Salt-laden atmosphere is the most dangerous .

9.2.3.2. Protective products .

White petrol (containing no ethyl) .

Internal protecting oil .

External protecting products .

Fitting of oil spraying (compressor , silicagel air-dryer , gun)

NOTA BENE .

EG 174 oil made of triethanol and heavy oil must never be used as lubricant oil and cannot dissolve either in petrol nor in oil .

9.2.3.3. Engines on aircraft at a standstill for less than 7 days .

- Start the engine every 2 days so that the oil reaches normal functioning temperature .
- Cover carefully with waterproof covers .

9.2.3.4. Engines on aircraft at a standstill for 7 to 30 days .

Two days after final shut down - at the latest - :

- Put aircraft in a covered hangar .
- Carefully drain petrol tank and feed pipes .
- Use white petrol (lead free) to run the engine for 15 mn at 40% of nominal power .

During the last few minutes of running , inject with a syringe 200cc to 1 litre (according to engine size) of EG 174 oil through the compressor

air intake or the carburettor valve .

N.B. In any case , stop engine as soon as exhaust gaz takes on a dark colour .

This allows the parts in contact with inlet gas to be covered with protecting oil . Disassemble filters, clean and put them back . Drain engine oil while warm . If the rockers are lubricated with grease , open them carefully wipe off the grease and cover them liberally with new engine oil .

9.2.3.5. Engines on aircraft at a stand still for more than 30 days .
2 days at the latest after engine stop :

- Put aircraft in a covered hangar .
- Drain engine oil and fill up with new normal oil .
- Drain - in the case of indirect cooling engines - the cooling liquid and fill up with pure water .
- Drain petrol tank and feed pipes carefully .
- Use white petrol (lead free) to run the engine for 15 mn at 40% of nominal power .
- During the last few minutes of running , inject with a syringe 200cc to 1 litre (according to engine size) of EG 174 oil through the compressor air intake or the carburettor valve .

N.B. In any case stop engine as soon as exhaust gas takes on a dark colour . This allows the parts in contact with inlet gas to be covered with protecting oil .

- Drain engine oil while warm in a clean container (it can be used several times) .
- Disassemble filters , clean them and put them back .
- open the rocker boxes , carefully wipe free of grease if necessary , and grease them with new engine oil , close them up again .
- Carburettor . Unfasten the pipes and seal as hermetically as possible . Remove the drain cock and put in 1100 engine oil in the carburettor with a small funnel . Proceed until the oil coming out of the carburettor has the same viscosity as the oil being poured in .

- Do not leave too much oil . Close up drain hole .
- Drain cooling circuit water in the case of indirect cooling engines and dry the system by blowing compressed air .
- Plug up carefully .

9.2.3.6. Engine having cooled down .

- Take ~~off~~^{out} all the sparkplugs .
 - Spray EG 174 oil in the cylinders as follows : turn engine slowly by hand and as the piston is in bottom dead centre introduce , in each cylinder , the end of the spray gun as far as possible ; spray oil at the ratio of 20 cc per litre of cubic capacity of the cylinder . Seal the plugholes that are not used by hand , so that the oil cloud saturates the seatings of the valves and the valves themselves . When each cylinder has been so treated , stop turning the engine and spray each cylinder in turn with about 10 cc of EG 174 oil .
- N.B. The air used for spraying must be very dry . Place a silicagel drying agent in the compressed-air pipe . Put the plugs back and connect the wires .

9.2.3.7 Clean the outside of the engine with a white petrol soaked cloth ,

taking care of the magnetos and apply (either with a gun or a brush) AR1 paste or Ipro 93 liquid (preferably) .

Before use , AR1 paste must be dissolved in white petrol as follows :

- 20% AR1 paste ,
- 80% white petrol .

Ipro 93 liquid is used directly . Dry as much as possible by compressed air .

- Remove the plugs and replace them with the special silicagel cocks made of transparent plastic . Attach the wires to the caps .
- Insert silicagel bags in the inlet and exhaust pipes and close as hermetically as possible .
- Cover engine with the covers ; as these covers tend to condense humidity it is necessary to take them off often but only when the air is very dry .

9.2.3.8. Control and maintenance .

A card will be tied to the engine , summing up all protecting actions taken and indicating the position of the silicagel bags .

Every week , rotate propeller by hand 3 or 4 times , dust and check dehydrating caps . As soon as the silicagel colour changes (compare with check card) change caps .

Every 3 months , run the engine for 15 mn with white petrol .

All previous operations must be repeated (engine oil can be used several times) .

9.2.3.9. Readying For use .

- Clean the outside of the engine with a petrol-soaked cloth and then with a dry cloth .

- Remove the dehydrating caps .

- With a syringe remove any oil excess in the cylinders .

- Put on the normal sparkplugs .

- Fill up with cooling liquid - when it's used .

- Grease - if necessary - the rocker boxes .

- Fill up with oil and petrol .

- Run engine for 15 mn at low speed .

- Stop and drain oil while still warm .

- Disassemble , clean and assemble filters , put them back into place .

Fill up with new oil .

- The engine is ready .

9.2.3.10. Engine being examined in factory .

a) the engine works .

Follow all the indications of the previous paragraph , in any case follow instructions as though the aeroplane was not going to fly for the next 30 days .

b) the engine is not serviceable .

Two days at the latest after the engine stops , proceed as follows :

- Take the engine down and place it on a dismantling bench .

- Drain Oil . Remove all trace of petrol from feed pipes . Drain the

cooling liquid when used . Fill up with water , drain . Dry water circulation with compressed air . Plug up carefully .

- Open rocker boxes (remove grease if needed) and grease them with new engine oil , close them up again .

- Remove all sparkplugs . Spray EG 174 oil in each cylinder , at the ratio of 30 cc per litre of cubic capacity of the cylinder . Turn shaft while doing this . Put sparkplugs into place .

- Dismantle the exhaust manifold in order to spray EG 174 liquid on the corresponding valves . Reassemble .

- Clean the outside of the engine with a white-petrol soaked cloth , avoiding the magnetos , and apply either with a gun or a brush AR1 paste or Ipro 93 . Dry by compressed air .

- Replace sparkplugs with the special silicagel dehydrating caps , attach wires to the caps .

- Place small silicagel bags in the inlet and exhaust pipes and close as hermetically as possible .

- Attach to the engine a card summing up all the servicing done to the engine .

9.3. Repairs and changes of parts .

9.3.1. Authorized works .

9.3.1.1. General repair method .

Consult the appropriate section of the instructions before starting any repair . Particular attention must be paid to the protecting of parts against corrosion .

General replacement of parts : refer to the list of spare parts .

9.3.1.2. Locking of nuts and bolts .

After replacing parts , taking up play or any disassembling , check the good working of nuts .

The different locking methods are as follows :

a) locking by means of centre punch - usually for small bolts .

b) locking by means of split-pin - use the split-pin corresponding

to the castelleted-nut .

c) locking by means of a zinc or brass wire going through 2 or more bolt heads or tied from a head to a fixed part .

- locking by Grower ring .

- self-locking of nuts , equipped with fiber set rings .

- self-locking of the bolts screwed in threaded nuts equipped with fiber rings , those nuts being fixed on parts that do not rotate .

In particular , this system is used to self-lock the fixing bolts of the hinges of the control surfaces .

9.3.1.3. Riveting . (See drawing 6)

Ordinary rivets .

Riveting is achieved by universally accepted methods . The length of the rivet must be such that the length of the end used for forming the 2nd head is $1 \frac{1}{2}$ times the diameter , for thicknesses to rivet smaller or equal to the diameter of the rivet , - twice the diameter for thicknesses equal or larger than $2 \frac{1}{2}$ times the diameter of the rivet , - intermediate for intermediate thicknesses .

Cone-shaped full pins .

Burr the end , hammering with a light hammer .

Tubular rivets .

The length of the end for forming the 2nd head is half the diameter of the rivet , i.e. for a $6,3 \text{ mm}$ rivet , $2,5 \text{ mm}$ for a $4,7 \text{ mm}$ rivet .

Daude rivets .

Used in particular for sheathing the sheet-metal edges and the webbing with cotton strips .

Use special pliers or rivet with a hammer using riveting dolly , see drawing 6 .

N.B. The rivet holes must be drilled to size . The holes for the cone-shaped pins must be bored with a cone-shaped reamer .

Some spare parts , having to be bolted or riveted , are delivered with holes drilled or bored to size , others with diameter-reduced holes or without holes . In this way , it is always easy on assembling to obtain the corresponding hole .

9.3.1.4. Taking up of slack on assembling the fittings on the wooden spars .

The slack occurring through natural working of the wood is taken up by tightening the nuts or the bolts . This especially applies to the hinges of the control surfaces . The self-locking of those bolts allows tightening without precaution .

9.3.1.5. Taking up of slack of metal ~~fixxx~~ joints .

Fixed joints .

In a very strained joint - i.e the engine bearer , the under-carriage or the tail-skid , a radial slack is taken up with the use of a standard repair bolt .

All the fittings are designed to allow for enlarging the bolt holes by 15% without weakening the sections .

Pivoting joints .

This type of joint is found in the landing-gear , the control-surfaces and different controls . Bronze rings are always provided for these joints .

In the case of pins and of simple non-greased bolts , the use of pins and of standard repair bolts is allowed .

All the bronze rings are designed to allow a re-boring , up to a diameter 0,5 mm larger than the initial diameter .

However it is always advisable to use pins and bolts with a nominal diameter when replacing the rings ,

This type of repair is the only one allowed in the case of greased bolts especially at the under-carriage . The radial play is taken up as well by replacing the rings but never by putting washers .

9.3.1.6. Straightening the fittings .

No straightening can be done on dented fittings , whether made of steel or duralumin .

9.3.1.7. Metal-sheet work .

As all the plates of the cowling or the fairing as well as the gantry are made of duralumin or semi-hard aluminium , universal methods for working on these materials are applicable .

Panel beating .

Lightly hit with a wooden hammer , the sheet-metal resting on a plate of appropriate strength. See that the sheet-metal does not lengthen or shrink , especially at the external edges .

Tear repairs (see drawing 6) .

Stop the tear with drilled holes . Line the damaged area with a sheet metal piece at least as thick as the damaged one . Rivet the stiffening plate with at least 4 three mm (\emptyset) aluminium rivets (standard size for all sheet-metal) .

Replacing ready-made parts .

Parts such as locks , hinges , accessory securing stay-plates , etc... may be replaced in using the original rivet holes . It is recommended to add a few more rivets when the old holes seem faulty .

9.3.1.8. Tube and pipe repairs .

All the hard pipes are made of copper or of aluminium alloy ; the flexible pipes are made by " Superflexit " .

Usually a dented pipe should be completely replaced , however the following repairs are allowed :

- bending of pipes : straightening or bending pipes is easily done as long as the internal cross section stays constant .
- fixing of ends on copper piping : (see drawing 6) in case of a break at the soldering point or when a dented pipe is replaced by a new pipe , solder the ends with silver - taking all the usual precautions .
- fixing of ends on flexible piping : (see drawing 6) when replacing a flexible pipe by using a new pipe and the ends of the dented pipe , dismantle very carefully the ends taking care not to damage them . Cut the pipe to length , file down the external protecting wire , fix the end on the pipe using shellack and fully screw the knob inside the pipe .

9.3.1.9. Replacement of the various control cables .

For spares only use finished cables with their crimping ends . See drawing 6 for repairing " Bowden " cables .

9.3.1.10. Replacement of ignition wiring .

See drawing 6

9.3.1.11. Repairing wooden parts .

All repairs on wooden parts must conform to the rules governing the manufacturing of such parts . It is especially necessary to observe

the following regulations :

- . material : the wood must be faultless and of the same specification as the part to be replaced .

- . gluing : use only " Certus " cold glue .

Clean up carefully the surfaces to be glued , taking care to completely remove all paint and varnish soaked fibres .

Fix the pieces to be glued by either applying clamps or by putting either nails or wood screws in sufficient numbers .

Let the glue dry for 24 hours before applying paint or varnish .

9.3.1.12. Fabric repair .

- . Small hole : a tear in the fabric covering the wings , the fuselage or the tail fin or a cut made for checking or repairing , is mended by gluing a piece of notched edged fabric .

The fabric must meet the specification of the linen cloth Aviation type M (R = 2000 kg) .

The piece to be glued is fixed with a coating of colourless glue .

- . Minor fabric repairs : when the removal of the fabric necessitates the cutting of some threads in the stitching , as when repairing a rib , the fabric must be stretched by applying on the inside the special dope and the seam must then be stitched by hand .(see drawing 7) .

Then the stitching must be effected using a thread meeting the specification of the linen cloth , R = 1450 , and making stitching knots according to instructions on drawing 6 .

After the first application of red nitro-cellulosic coating , place the notched strip of cloth protecting the stitching thread by applying the special dope on the inside of the strip and by gluing the strip with a coating of colourless glue .

If a new piece of notched strip is used , it is directly fixed by using the colourless coating .

- . Taping repair : some parts of the plywood profiling of the fuselage are covered with a light muslin fabric fixed by a coating of colourless glue applied to the first layer of red nitro-cellulosic coating .

If this taping is locally damaged , glue a piece of notched muslin fabric using the method mentioned above .

9.3.1.13. Protection of parts against corrosion .

During repairs the following protective procedures must be used :

- . steel : The bared surfaces of enamelled parts must be repainted with a black paint for metal .

Zinc parts are touched up with a colourless varnish for metal .

Steel cables are covered with grease .

- . duralumin : Enamelled sheet metal is touched up with a black paint for metal .

The painted sheets will first be covered with a coat of primer for metal , then with a coat of the appropriate paint . Put a coat of primer for metal on the duralumin parts which must be coated at the same time as the covering fabric .

. wood : the surfaces in contact with fabric as well as some other surfaces are covered with green or red nitro-cellulosic coating . The surfaces which stay uncoloured are covered with a coat of ordinary coating for wood .

. fabric : each glued piece must be covered with one or two layers of red nitro-cellulosic coating , a coat of orange paint and a coat of colourless finishing gloss . Use an acetone based paint for insignias and inscriptions .

The following precautions are particularly important :

The surfaces of metal parts in contact with different metals must be protected before assembling .

One must make sure that the paint on glued wooden parts must not be applied while the glue is still wet - as it would desintegrate the glue

The use of oil based paint for any parts , especially the fabric , is absolutely forbidden , as the initial acetone based paint could break up

When repairing fabric or touching up paint , one must check that the aeration eyelets stay clear .

9.3.2. Authorized repairs with statutory tools .

9.3.2.1. Wings .

- Replacement of the lower and upper wings , the ailerons , the struts and the airframe stays and in general of any partial assembly which is part of the final assembling of the aircraft .

This replacement is achieved following the instructions given above on assembling and disassembling .

- Small repairs to fabric :

to be carried out following general methods specified above .

- Repair of access-panels :

follow general methods for metal work specified above .

9.3.2.2. Fuselage .

- Repair of the longitudinal battens not needing important removal of fabric .

This repair is identical to the repair of the sills of the rib(see drawing 6) .

- Small repairs of fabric covering and taping :

to be done following general methods mentioned above .

- Repair of profiling sheet metal used for joining - at the wings and

tail fins - and of access panels (panel beating , repairs of tears to be done following general methods mentioned above .

9.3.2.3. Engine mounting (drawing 5 - booklet 2) .

- Replacement of the rubber suspension blocks .

Replacement of the sides , of the bracing stays , of the rear housing and of the housing covers .

Taking up of slack .

If slack greater than 0,15mm is noticed anywhere , replace the used bolt or if necessary use a standard repair bolt , increasing the diameter by 12,5% maximum .

9.3.2.4. Tail fin assembly .

- Replacement of the fixed plane
 - of the fin
 - of the elevators
 - of the rudder
 - of the stays .

Follow instructions given above for assembling and disassembling .

- Replacement of the hinges , of the hinges tubing and hinges axes .

Follow instructions given for periodic checks .

Observe general methods .

9.3.2.5. Flying controls - including parts in the wings .

- Replacement of all parts of the flying controls and of accessible assembly .

As the mounting of all these parts requires only metal assembling , the general methods specified above apply .

Check or re-adjust according to instructions given in the appropriate chapter .

- Taking up of slack : follow general methods mentioned above .

9.3.2.6. Landing gear including braking system .

- Replacement of the whole main landing gear .

Replacement of the partial assemblies , especially the flexible legs struts , tripod and bracing stays and cranked axles (see drawing 3 booklet 10) .

Replacement of the wheels .

Replacement of the bolts and external axles .

Replacement of the whole tail-wheel .

Replacement of the whole shock-absorber , of the fork , of the wheel of the axles and external bolts (booklet 10 , drawing 4) .

Follow instructions given for assembling and disassembling (booklet

All this work is purely mechanical .

- Taking up of slack : follow methods and instructions given above for periodic checks .

- Replacement of tyres and inner tubes : follow methods recommended the makers .

9.3.2.7. Fittings - Engine .

- Replacement of the oil and petrol tanks .
Replacement of the tanks accessories .
Replacement of oil and petrol pipes and taps .
Follow general methods specified above when using new tubes .
- Replacement of all the components of engine controls or of partial assemblies .
The mounting of all these components only involves mechanical work follow general methods mentioned above .
- Taking up of slack in engine controls : follow general instructions specified above .
- Adjusting the flexible drive of tachometre .
Replacement of cowling components : follow instructions specified above .

9.3.2.8. Fittings - Cockpits .

- Replacement of front and rear seats .
Replacement of all mechanical fittings of the seats and their supports
Replacement of seat-belts (riveted to the seats) .
Replacement of foot-rest .
Replacement of the parts of the canopy .
- Pilot and observer seats repair .
Repair of foot-rest .
Panel beating - repair of tears .
Follow general methods used for metal work mentioned above .
- Repair of wind-screen - replacement of frame and plexiglas .
- Renewing of footboard on the right wing .
Glue back cork chippings on footboard .

9.3.2.9. Equipment .

- Replacement of all parts or partial assembly of equipment that can be removed by unscrewing nuts or bolts and not needing any removal of fabric - especially instrument panel , rear-view mirror , radios , voice-pipe and feed pipes of the flying controls .
Follow instructions given above for equipment fitting as well as general methods .

9.3.2.10. Repairs authorized to Group workshops .

- Use construction plans .
Observe all indications in these plans , especially for specification of material , manufacturer tolerances and assembling tolerances , use of adjusting and assembling gauges , finishing .
When possible use spare parts for replacing dented parts .

When repairing parts , observe general methods specified above .
Besides work authorized to squadrons , the following repairs are allowed to Group workshops :

- Repair of wooden sills of rib (see drawing 6) .
- Repair of trailing edge , wings and ailerons (see drawing 6) .
- Replacement or repair of wing tips , of leading edge , of rear box , of wing ribs .
- Replacement of struts , diagonals , stays and fuselage stay-plates needing any important removal of fabric , fuselage adjusting .
- Replacement or repair of any part of the fixed plane , of the fin , the elevators and rudder .
- Replacement of control box .
- Repairs needing important riveting of different components for fitting and equipment .