

The Government Approved List;

As the owner of small privately operated aircraft have you ever been tempted to work on your own airplane? Well you can!

Transport Canada re-wrote the rules in 2004 for Certified Aircraft and the new list is surprisingly realistic (as written). They list 29 items the private owner of Certified aircraft can do, or authorize someone else to do, so long as you enter it in your technical logs. They call these items “elementary work” and they are listed in [“The Canadian Aviation Regulations \(CARS\), Standard 625 APPENDIX A - ELEMENTARY WORK”](#).

For isolated locations up here this can be really important. The red numbered items below are TCs paraphrased words, and following are one Yukoners recommendations (mine) for when doing the work. If you have questions or need clarification I suggest you reference;

1. the above TC document,
2. your aircraft manuals sometimes have good detail,
3. check out AC.43.13, or
4. discuss it with your favorite AME.

(1) fabric patches measuring not more than 15 cm (6 in) in any direction and not requiring rib stitching or the removal of control surfaces or structural parts;

Small Fabric Patches are not as difficult as you might imagine. (Check out AC.47.13 from a friend, the library, or Amazon) Do them in the open on warm days.

For Butyrate/Nitrate dopes, Clean the area well using MEK (uck!) or failing that, Isopropyl Alcohol or in a pinch, white gas. Shrink your patch using an iron at about 250 to 300 F. Use pinking shears to cut your patch an inch or two bigger than your damage. If you use MEK no other prep is needed. If alcohol or gas then you might want to use Buto-Solv to soften the dope on the wing. Then place your pre-shrunk patch and work it down using a small brush or your fingers (uck!). Once it is set into place and bonded lightly, use coats of Butyrate dope with aluminum powder in it, or pigment that can block ultraviolet, and brush on until the finish is satisfactory. The result will be much more airworthy, and esthetically pleasing too.

For Poly-Fiber clean the area as above, pre-shrink your patch and use Poly-bond to glue it on. Finish with a coat of Poly-brush and a couple coats of Poly-Spray (thinned). Paint.

(2) removal and replacement of tires, wheels, landing skids or skid shoes, not requiring separation of any hydraulic lines;

For us, most of the time we can change tires / wheels without disconnecting any hydraulic lines. Biggest risk I have seen is from damage from trying to jack the aircraft up. Borrow or make proper jacks. Watch out when lifting, the c of g changes as the aircraft comes off the ground, many land on their nose.

Keep track of each bolt, nut, part as you remove it so you can put it back in the right place. If you need to replace tire and/or tube, take air out before unbolting wheel halves. Now is good time to clean out the bearings and put in new grease into the rollers. Don't put in extra grease. Use talcum powder on tubes and align the red "DOT" on tire with the stem of the tube. Re-inflate to recommended pressure after bolting together (For most of us thats about 25 psi).

(3) removal and replacement of skis on fixed landing gear, not requiring separation of any hydraulic lines;

As in number 2. (above), the caliper can be removed to get the wheels off providing the brakes are NOT APPLIED at any time in process. then put a soft (aluminum) spacer in to fill space of the disc and secure it. Now accidentally applying the brakes will not blow the pucks out of the calipers and you can replace your wheels by being careful in the reverse procedure.

But pay attention to your skis, cables, fittings and bungees. If they are worn, damaged, or look questionable stop and arrange for new parts. (Imagine the result of a failed safety cable?) Keep everything safety-wired together in a bundle if this is a seasonal change.

(4) repair of non-structural fairings, cover plates and cowlings;

This can be done with a little care and practice. But remember they repair must be to "CODE". Look at AC.43.13 for standards or check out on of the excellent home-builders sites for completely professional riveting and sheet metal work skills. But don't guess about rivet spacing and edge distances! Get the proper materials and rivets, borrow or buy the proper tools, and practice a bit first. Look at our article by Joe bachofen and John Rogers here on the web site, they guide you through the process.

(5) cleaning and replacement of spark plugs;

Do this once and you will be surprised by the ease and the improved performance. You need a 7/16" and a 3/4" wrench to remove the wire leads. they don't need much torque so be careful. Make a box with a hole for each plug marked to hold them safely as they are removed so you do not mix up where each plug came from. Don't drop these guys...ever!

Use a socket wrench to remove each plug. Inspect it (Gap should be uniform on each, and no bits of stuff between electrodes. Measure with a gauge and adjust gently but firmly.) Look for "clinkers" down inside that you can remove GENTLY with a steel pick. Do not scratch the electrodes. The top plugs should all be a uniform grey-brown color. The bottom plugs may be darker than the top and slightly oily. You can rotate top for

bottom in each cylinder, but not between cylinders. When you replace the plugs use new copper washers, or anneal the old ones. A very tiny bit of anti-seize lubricant on the threads is a good idea, until you get it on the electrode, then your plug is useless. Torque your plugs with a torque wrench. Re-attach the wires after checking each "cigarette" end is clean and intact. Don't tighten very tight. Test run it, then go.

(6) checking of cylinder compression;

*To do this right you need to borrow or buy a "leak-down" tester. This work is not difficult but can be dangerous if you lose control of the prop during the pressuring-up of each cylinder. Remove all bottom plugs before beginning. **MAGS OFF !***

*Screw in the adaptor hose to first cylinder but don't attach the gauge/valve yet. Rotate prop until you are coming onto compression on the cylinder you are testing. (Make sure you have at least 80 psi in your compressor.) Check the valve is **CLOSED**, on the gauge/valve and connect it to the adaptor. Take control of Propeller! (Hold it firmly with gloves). Have a helper slowly open the valve putting pressure into the cylinders, as you bring prop up to TDC. Have your helper feed 80 psi to the cylinder, read the residual pressure on the other gauge. Rock the prop back and forth a bit. Close the valve, disconnect the adaptor, then let go of the Prop. Repeat 4, or 6 times, unless its a radial.*

I prefer having an AME there when I do this because their experience in diagnosing the results are usually invaluable.

(7) cleaning or changing of fuel, oil, and air filters;

Find out what filters are on your airplane and where they are located. Most are safety-wired in place so have wire and pliers ready before you remove them. Fuel bowls are removed, emptied, examined, and replaced. If your aircraft has screens, locate them, remove safety-wire, and watch the location and sequence of washers or parts as you remove them. Clean them in a small tin bread pan in avgas and look in the residue for bits, colors, magnetic pieces, etc. You can dump the solvent on a clean piece of paper towel and allow to dry so you can take it to an expert if in doubt. Look at lines and fittings for leaks or damage too. Replace, torque, and safety-wire as original (see AC 43.13 for safety wire technique if your not sure.

(8) draining and replenishing engine oil;

This is the best insurance you can buy. (See above (7) for filters and screens) Drain all lines and coolers if possible. Collect oil in a container, it is likely toxic waste in most jurisdictions. Replace and safety-wire plugs or drains. Refill with seasonal oil, test run, and check for leaks and levels. Top up, and go.

(9) checking the electrolyte level and specific gravity of lead acid batteries;

Access your battery. Remove each cap and look with a light, fluid should be just below the bottom of the collars under each cap. If necessary top up to bottom of collar with

distilled water. Watch it for overflow the next few flights. If your battery is more than 3 years old, buy one of the new approved "gel-cell" type. They last years longer, maintain a charge better, are smaller and lighter (?? a W&B issue ??) And, they are same price and you can send them by mail.

(10) adjustment of generator or alternator drive belt tension;

There are usually at least two bolts to loosen, then a lever is needed to pull the belt tight, but not too tight, and hold it while you re-tighten the bolts. You should be able to deflect the middle of the belt about 1/4 to 1/2 inch by pushing very hard with your index finger. Too tight and you can take out the alternator bearing. Too loose can cause considerable vibrations, lack of charging, and undiagnosed electrical issues? The prop needs to be removed to replace belts, so consider buying two and safety-wiring the second in place out of harms way until needed next time its off?

(11) cleaning of balloon burner nozzles;

I need an expert here.

(12) removal and replacement of balloon baskets, burners and gas tanks that are designed for rapid change in service;

Here too!

(13) removal and replacement of glider wings and tail surfaces that are designed for quick assembly;

And here, but I would love to learn. I would hope TC would view the same procedures acceptable for powered aircraft with folding wing features, but is only that, hope?

(14) repair of upholstery, trim and cabin furnishings;

An issue close to my heart. For Certified Aircraft TC traditionally disallowed anything but original equipment, so most of us were sitting on rags and looking at exposed wires. These days TC seems to be more LITERAL in applying their own legislation, and that is good news! Basically if the material is far enough from the firewall that it will not catch fire then you may use whatever you need to (again some common sense here!) If you are close to the firewall I imagine that TC inspectors will still demand an FAA certificate of flame testing if you do very much here. One way around it might be to use leather...it is tough to flame test a cow. There are fire retardant sprays for fabric, but I anticipate TC would want a flame test after using it. (See my closing comments). In the mean time keep your carpet and upholstery as clean as possible, dirty material burns quicker.

(15) removal and replacement of role equipment designed for rapid removal and replacement;

This appears to be things like external antenaes for tracking, or brackets etc for approved STC's.

(16) removal and replacement of passenger seat belts and harnesses;

"Passenger" but NOT pilot for some reason, knock yourself out. Buy certified ones of course. I am sure your AME will look after the Pilots one?

(17) removal and replacement of fuses, light bulbs and reflectors;

Use the approved size and type and there is not much room to go wrong. Don't go "oversize" without fire insurance.

(18) removal and replacement of avionics components that are rack mounted or otherwise designed for rapid removal and replacement, where the work does not require testing other than an operational check;"

This appears to allow only removal of item from a tray, and not modification to the panel, rack or tray in any way. My comments here are similar to the upholstery comment.....a lack of technicians here in the North has resulted in a lot of old radios, poor quality radios, and even the odd non-functioning one. Fortunately they are still not mandatory, unless you are talking about ELTs, and I won't even start with that....

(19) removal and replacement of aircraft batteries;

Check out my comments in number 9, above, get a GEL-CELL.

(20) removal and replacement of co-pilot control levers, wheels, pedals and pedal guard plates that are designed for rapid removal and replacement;

A few aircraft have co-pilot controls "designed for rapid removal and replacement". (My own co-pilot does not come with any levers, wheels or pedals, but she would be hard to replace in any event.)

(21) opening and closing of non-structural access panels

They are there to allow inspection a/o service. My advice is to use a good quality tool, if you strip a fastener replace it, and keep track of location and orientation of each panel you remove. If you have had any panels off, your next pre-flight should be very diligent.

(22) removal and replacement of cabin doors on unpressurized aircraft, where the door is designed for rapid removal and replacement;

If you have doors "...designed for rapid removal and replacement..." it should be obvious, but it may not be clear cut. (Check out my closing remarks for explanation.) I would pull a pin, or key, but I would be reluctant (legally) to start removing any bolt or nuts. This is not about flight with the doors removed, that is not always allowed.

(23) removal, replacement and repositioning of non structural partitions in the passenger cabin;

Most of us private guys don't have these, if you do, here you go, you are legal to move them.

(24) inspection and continuity checking of self-sealing chip detectors;

Since pulling the PT-6 out of my Aeronca Champ I have not been bothered by nuisance chip-lights. If you have one, it should be straight forward.

(25) removal and replacement of induction system anti-icing baffles, scoops and deflectors that are designed for rapid removal and replacement;

It would be nice to believe this includes winterization kits, it must, but it doesn't say this exactly.

(26) removal, cleaning, replacement and adjustment of external components of chemical dispersal systems that are designed for rapid removal and replacement;

Agriculture types, or perhaps private Fire Bombers would benefit from this.

(27) deactivating or securing inoperative systems in accordance with sections 605.09 or 605.10 of the CARs, including the installation of devices specifically intended for system deactivation, where the work does not involve disassembly, the installation of parts, or testing other than operational checks;

If you have a system that fails (avionics, fuel pumps, etc.) you may pull a breaker or switch....Duhh !...or maybe install a lock-out (?) device if supplied, this is likely for more complex and commercial guys.

(28) checking and adjusting air pressure in helicopter floats, and aircraft tires having an operating pressure below 100 psi, except on aircraft operated under CAR 704 and CAR 705.

Here too, common sense, most mains on private aircraft run around 25 pounds, tailwheels are much higher (60 ?) and of course large tundra or bush tires are much lower (5 ?).

(29) ...repetitive visual inspections or operational checks (including inspections and tests required by airworthiness directives) not involving disassembly or the use of visual aids, performed out of phase with the aircraft's scheduled check cycle at intervals of less than 100 hours air time, provided the tasks are also included in the most frequent scheduled maintenance check.

This wasn't written by a lawyer, nor anyone with a high school education. I called the local TC inspector to ask what this meant, but unfortunately their answer was long, confusing, and contradictory, so now we're both not sure. My guess is that at any time you want you may do inspections of your aircraft, or you may verify compliance with an AD, providing you take nothing apart (?) and don't wear your glasses (?). It seems they want it redone during the next scheduled inspection.

REMEMBER TO ENTER ANY WORK YOU DO INTO YOUR LOG BOOKS:

Enter:

Date..... List the Work Done (quote manufacturer's document or reference), then write; "**The described maintenance has been performed in accordance with the applicable airworthiness requirements (REF CAR 571.10(2))**or..... CARS 625, APP "A"etc, then print your **Name...Signature....Date.....**and your **Licence Number** ...(even your pilots licence number)

and....

If the work is of a nature that it needs a test flight to verify the repairs conduct the test flight and enter the flight and add; "**Test flight conducted to confirm airworthiness of work described.**" and again; Date, Sign and enter your pilots licence number.

Don't forget...This is where they will focus their attention *.

** I base this statement on the fact that Transport Canada trained me to enforce the Canadian Air Regulations a few years ago. (The irony of that won't be lost on those of you who know me.) Following this training they even provided me, and selected RCMP officers, with certification of this fact. At that course the TC instructors made jokes about what issues were to be pursued and that they weren't to be any controversial ones. Their approach is one of using confusing policy and intimidation and not one of applying clear laws. The difference between policy and law is fundamental in Canadian Jurisprudence, but is lost on most Transport Canada officials I greatly fear.*

SAFETY OVER ABSURDITY: As with any situation the government inspector you encounter might be having a bad day, so I urge common sense, applied at the time, in your location, and perhaps not widely announced. My test might be; "Would I take my daughter for a ride in this aircraft, as it now is?" **NOT** "What would the Transport Canada Inspector say?".

If you believe that Transport Canada should have clear laws and policies available, in language a person of reasonable intelligence can read and understand, please make this point to the [Minister of Transport](#).