Primer O-Rings

According to my notes from a previous post, there are 2 o-rings required, MS29513-012.

Rebuilding Primer

I recently had a problem with my fuel primer not working ...to make a long story short I found out that it was the o-rings on the fuel primer knob.

I located the right ones the number is MS29513-012 you will need two of them and they are kinda expensive at a dollar apiece but man I did not know that my fuel primer was suppose to work that well. Lubrication: A little Dow Corning silicone lube is fine. Impervious to almost anything and doesn't contaminate.

Bleeding Brakes

After I spent the better part of a day trying to bleed my brakes using the gravity and pressure methods, my A/P showed me the FAST way.

For those with toe brakes...

SLIGHTLY loosen the 9/16" hose fitting that goes to the blue AN fitting at the top of your toe brake cylinder. SLOWLY pull the hand brake handle until you get a little bubbling around the fitting. When the bubbling stops and you get straight fluid, release the handle. Then, SLOWLY depress the toe brake until you get no bubbles, just fluid. WITHOUT releasing pressure on the toe brake, tighten the fitting. (if you release the pedal before tightening the fitting, you let air back in) Voila! No air, firm brakes. Paper towels or shop rags will keep the fluid off your interior. The key is slow and easy pressure, or you'll have red fluid all over. Don't forget to check your reservoir level. Took about 2 minutes to do each side.

Brake bleeding brakes

I've tried just about every method and have found the following works best for me, and it only requires 1 person.

- put clear plastic tubing on the bleed valves of each main brake wheel cylinder

- put other ends of these tubes in the brake fluid reservoir, draping the hose up over the top of the engine cowling so you will be able to see the tube content from pilot's seat

- make sure the reservoir is near full

- crack open both wheel cyl bleed values

- climb in and begin pumping each toe brake while watching the content of the tubing for fluid.

- While pumping you will see fluid with air bubbles move toward the reservoir. Of course, when they reach the reservoir they will float to the top and into the surrounding air.

- periodically pump the hand brake also

- after a while jump out and add fluid to the reservoir

- jump back in and continue pumping toe brakes and hand brake until no more bubbles are seen in tubing.

- jump out and close both wheel cyl bleed valves.

Shoulder harnesses

A while back I put Piper retractable shoulder belts in my 1965 180C. I got the complete kit from Wentworth for about $600. Doublers had to be intalled in the roof behind the front seats for the retractor hardwhare. When finished it was exactly like original equipment for the later model cherokees. The installation took about 8 hours. Paper work required about 3-4 hours of hastle for my AI. get the paper work for Inertia Safety Shoulder Belt Intallation Kit # 764 981V and file the appropriate 337 -- you need to find an AI who knows what he is doing.

The shoulder belts look great and work fine without restricting movement

...and...

I just received two retractable shoulder harness kits from Kosola for the front seats of my 180. They were $710 each. I think the non-retractables were $480 each. I was told the install time should be 4 to 6 hours per side.

Kolola Shoulder Harness

I installed the Kosola shoulder harness for the front seats of our '65 140 last month. It's fairly labor-intensive but the results are good. The installation is similar to Piper's factory setup, with a skin doubler and support structure riveted into place above the rear window, and the inertia reel mounted to the new structure. Parts kit was around $700/seat including inertia reel, new lap belts, STC and drawings. They also sell a kit with adjustable strap and no inertia reel for a couple hundred $ less.

Removing Master Switch

You have to remove the complete switch cluster. All the switches, i.e. master, fuel pump, landing light, beacon/strobes, & pitot heat are mounted in one assembly. The good thing is that all go through a common connector. The best and ease of removal is to remove the radio or component above, loosen the radio or component rack and there will be three or four screw the hold the switch cluster in place. From the cockpit facing forward, on the left end just pass the nav light reostat switch there is a clear plastic connector. Unplug the connector and then remove the two counter sunk phillps head screws on each end of the cluster face. The complete assembly will then be able to move aft, rotate slightly, and be pulled out through the front of the panel. Then if you want to replace the switch, take it to the work bench, listen to some music, open a kool aid, and have fun. Of course the installation is just the reverse.

Bouncing Tachometers

For those with tachs which bounce around...its easy to slip the inner cable out of the outer casing...one end has a reraining clip...and the cable must be slid out this end....carefull cleaning of bot the cable and casing can be achieved in about 45 mins....repack with soft molybdenum grease. This will do wonders to the smoothness of the readout and the grease damps the cable...which in most cases is responsible for the bouncing needle!

Tachometer Flaws Due to Cable

Many times especially in the winter months I read how the tachs squeel and jump around and the question many time centers around lubrication.

What is many times overlooked is the cable itself. Guys and gals, the cables do wear out and when the do they will cause the tach to jump around and to some sounds like the squeel is coming from the tach head itself many times can be traced to a worn out cable. The way to check if your tach cable is worn out is to remove it from the engine by loosening the nut on the drive end on the accessory case and pulling the cable from the housing. Once you have the cable removed, clean it real good with solvent or thinner. Lay the cable on a bench or table and stretch it out straight. Hold the square end firmly on the table and with your other hand see if you can rotate the drive end of the cable ccw or cw. If you can twist it while holding the opposite end. the cable is worn out and should be replaced. Nearly ever town has a speedometer repair shop that makes tach cables. Like here in Okla. City, a new cable is $16.00. Another tip on tach cables is if the needle is unsteady at idle (jumps around) its a sure bet the cable is worn out. I personally ran into this just today. My tach needle has always been jumping around at idle but this morning, it was occilating at cruise. I removed the cable and did the test I just described and sure enough, you could twist it back and forth. I went to the speedometer shop and they made a new tach cable for me. I lubed it with a molybdenum grease and reinstalled it. When I started the engine it was rock steady throughout the entire RPM range.

Hole Finder

This is a tip for those redoing interior panels. A simple hole finder can be made up using two old (or new) hack saw blades. First inset an aircraft rivet through one of the holes in the end of the hack saw blade. The rivet should be a snug fit and stick through at least quarter of an inch. Firmly but gently seat the rivet with a hammer so it is tight but not badly dammaged. sharpen the protruding piece into a short stubby spike. Take the second blade and lay it over the first, so the end holes align. The spike you have made with the rivet must face away from the top blade. Join the blades with a rivet, screw etc using the two holes opposite the end where the spike is and make sure this joint is tight enough to ensure the blades remain perfectly aligned. If the lower blade is slipped behind the new panel and the spike moved around until the hidden hole is located, then the hole in the top blabe will be directly over the hidden hole and a mark can be made at the correct point on the new panel.

Repairing Interior Plastic

I have spent several months refurbishing my Warrior II. The interior was the easy part. First start with a container that can completely cover the trim pieces. Soak them overnight in a Spic-n-span solution. You will be amazed at how clean the will get. Next, repair any crack. BUT DO NOT USE FIBERGLASS. The fiberglass resin will cure hard and it will eventually crack. Instead use the fiberglass cloth and melt it into the plastic on the back side if the trim with plumbers PVC pipe cement. This is much cleaner and neater that trying to use fiberglass resin and the PVC cement will stay flexible. If you have any large gaps or pieces missing, Eastwood products make a plastic resin kit which allows you to fill in those areas and I think it works pretty well. Last, paint the part using the SEM paint that was mentioned in a previos thread. It is the highest quality product for this application. It goes on easy, dries VERY quickly and leaves the trim looking new.

Trim Jackscrew is Worn

June 3, 2004 5526

Eventually it will have to be rebuilt. I just did it, and can say that the job wasn't that difficult. You'll need a new trim barrel, and 2 new bearings, and possibly the shaft or "screw". Get the barrel and screw from these guys: http://www.mcfarlane-aviation.com/

I bought the aluminum barrel from Piper for $230, only to find out that McFarlane has it for around $70. The screw costs about the same, but because it's steel I opted not to replace it. The brass bearings (2) and cotter pin can be purchased from Spruce.

Once you have the tailcone off you'll see how it all comes apart. I worked with my mechanic and had the new parts ready. After cleaning it all up, we were able to clamp the cable, unwind and rewind it onto the new barrel, and install the screw in about 1.5 hrs. When done, there should be no play in the jackscrew. Be careful with the winding, it must be very precise, and by the book. We did not have to adjust the cable tension.

Sluggish electric trim - cold weather

Cold weather can do that. It usually means that the trim jackscrew in the tail needs cleaning and a new coat of lube. Piper calls for a special low-temp lube to keep the trim from getting sluggish in the cold. I don't have the mil-spec handy, but it is commonly known as Lubri-plate.

Lubricating Trim Jack Screw

Luberplate makes a special lube for the jack screw which they call " aero ". they supply it in a toothpaste size tube which will last for years. Every annual I take the screw out and repack it with the lube and the trim works great in cold as well as warm weather.

Trim Hard to Turn When Cold (at Altitude)

April 18, 2004 0468

Don't know how applicable a '78 T-Arrow is, but I think the mechanisms are similar w/most Cherokees.

I just got done with a similar problem. Cold temperatures plus air-loads made it very hard to move. My tech guy had it apart 3 time to no avail. Checked lube, cable rigging, tension, trim motor, clutches, blah, blah. Progressively got worse, until on a recent trip at 17,000 and -25C, I could hardly move it. Elec. trim was unable, also.

My situation:

The trim jack screw or trim barrel shaft in the tail-cone of the airplane is stationary, and around it revolves the trim jack screw barrel. Trim cable winds around the barrel and as it turns the barrel the whole apparatus moves the trim arm up or down. The barrel is made of softer material than the screw, and mine was worn out-of-round so that when a rotating moment was applied through cable tension, the barrel displaced against the trim rib support bracket, binding it and effectivley locking it up. The movement was almost a 1/4"!

I located a serviceable trim barrel replacement (PN 63530-000) at KRN Aviation, Chandler, AZ, 800-366-6462. $44.00, plus 4.5 hours of tech time to R & R, re-rig trim, etc. Works like new now.

Since this is in the tailcone, I suspect it may not have gotten adequate lubrication over the years, plus weather exposure. So, this'll get lots of attention in the future.

Note: The Piper service manual specifies rigging tension corrections for ambient temperature. I had to stick to my guns and convince my tech to follow the rigging procedure to the letter, as he was of the mind that the airframe shrinking was greater than the cable shrinkage due to temp. change, thus wanted to set tension much higher than book. This may also contribute to excessive wear, but I don't know for sure. Just overlook the wives tales and go by the book is my view.

...and...

April 18, 2004, 5929

We have a 180 that had similar conditions a few years ago. We added the tail cone and jack screw cleaning and lube to the annual inspection. This has eliminated the problem for us. We were using a high and low temperture grease for the lubrication until recently when we switched. I understand that Aero lube and lubriplate are what is reccomended.

Slipping Elevator Trim

First thing to check is lubrication of the jack screw, this is probably the most likely culprit. Second, check the cable to be sure it is NOT lubricated - it relies on friction to operate and if there is any lubrication on it you will get slippage. I don't know what would be the best thing to clean it with but I used a clean rag with a little paint thinner.

Lube the jack screw, not the cable barrel, tighten the trim cable at the turn buckle. Use a cable tension meter. 10lbs + or - 1 according to the Sevrice CD

Replacing tailcone jackscrew bushings

Steve Norman replaced the bushings on mine. He said it was a 2-man job. One guy holds the cable from unwinding. The other guy pulls the pin and inserts two new bushings and puts it back together. I think it only took 30 minutes.

Worn Trim Barrel and Bearings

Just completed my annual on my '68 180 and found the same problem. I ususally do a lot of the work on my Cherokee with the blessing of my IA but this is somthing I decided to take to the shop to be done. The parts are not expensive and the shop has told me 2 hours is typical. They quoted me about $400.00 including parts. You need to be very careful becuase the barrell can be replaced without unwinding the cable. However, if you slip it turns into an ugly event and a lot of work.

Slipping Electric Trim

Inside that box is an electric motor which turns in the direction commanded by the trim switch. At the same time a solenoid is pulled in which applies pressure to the disc cluth on the top of the unit where you see the cable wrapping around. If you have a lot of slippage it could be one or a couple of different things such as the clutch may be oily, worn, or out of adjustment, the cabling going to the trim jackscrew in the tail may be binding, or perhaps the jacksrew in the tail is in need

of service such as cleaning and lubricating. If you clean and lubricate all the moving parts properly you will probably find your problem goes away. If the problem is in the box you have a whole new ballgame since you need an experienced A&P to work there. I doubt that is the case anyhow, should just need the maintenance I described.

Yes, and the capstan has a cork-like material on that clutch that can wear out, causing slippage. It could be that simple - I just had mine replaced, along with the capstan itselfm, whose grooves had become worn so the cable didn't run through properly.

Electric Trim - Motor Turns, But Not Drum

July 8, 2004 4444

You can replace the clutch facings.. There are a couple of adjustments. Also, make sure that jack screw is clean and lubricated correctly!! Too much lube and it collects dirt.

Stabilator Trim Barrel Replacement

June 9, 2004, 0785

I purchased the trim barrel from Mc Farlane the bushings from piper (1.09 ea) can you believe? The machining on the barrel is first class, I would not set up a lathe and milling machine to produce a 58.00 part. my aircraft has 3350 TT the lower bushing was worn .030 the upper bushing .015, elongated from cable tension (electric trim). Interesting wrestling match wrapping the cable as specified by the shop manual. I used Lubriplate 105 for grease hopefully it will last another 35yrs with regular lubing.

Elevator Trim Barrel Parts

August 27, 2004 0785

I purchased the trim barrel from Mc Farlane 58.00 www.mcfarlane-aviation.com

bushings from Piper Yes Piper 1.09 ea you need two

they should have the washers. also. The machined 1/2-13 screw is 4130 steel running against the aluminum barrel. My jack screw was like new fit with the new barrel.

June 9, 2004 6088

I had to remove my stabilator for my last 100 hour and replace the bearings on both sides. To do this, I had to remove the barrel. I secured the windings with a wire tie around both trim cables. I got it as close to the barrel as I could and really tight. Worked like a charm.

Nosewheel Shimmy - Causes

Most probable culprit is the shimmy damper - replace the 'O' rings and re-service. Other things to consider: both main and nose wheel sissors bolts and bushings, all wheel bearing preloads. Warped brake disks, Wheel alignment, rudder control cable tension. and the nosewheel strut bearings. Pretty much in that order.

Rebuilding Shimmy Dampner

I've found I can rebuild mine. Here's the procedure I put together to do it.

Shimmy Dampener Rebuild Procedure

Nose wheel shimmy dampener:

Piper part number: PS-50152-7

Cleveland Wheels & Brakes

Aircraft Wheels & Brake Division

Parker Hannifin Corp.

Akron, Ohio 44011

Cleveland Model NR: 15-10

Ser Nr: 200

Manufactured: 04/90

O-rings used for rebuild:

MS28775-112 (qty = 2), use Spruce #AN6227B-10

MS28775-008 (qty = 1), use Spruce #AN6227B-3

MS28775-210 (qty = 1), use Spruce #AN6227B-15

Piston nylon ring generally doesn't need replacing. Just replace the above O-rings.

Note: There is a small piston in the rod that has an O-ring that needs to be replaced. Piston can be removed with a 4x40 screw threaded down its middle. The MS28775-008 goes on this piston. Note also, that the dampener has a fill hole accessable by removing the small plug. Fill dampener with MIL–0-5606 hydraulic fluid through fill hole. Be sure to purge all air from the unit, including the center of the control rod, before closing it up. Only fluid should exist on both sides of the control disk throughout the cylinder. Cleveland no longer manufactures this dampener, and Piper no longer supports this dampener. If dampener must be replaced it will have to be replaced with a different type unit, at $500 - $700 cost. Get replacement O-rings from Spruce or O-ring dealer. But, be sure they conform to MS28775

Interior Door Handles, Knobs

Look at the handle carefully for a part number. Some are Ford pick up truck (chrome lever) and some are Volkswagen, yes VW (small pull lever with plasctic inner cover)

Some of the round knobs are the same as the ash trays.

Installing Door Seal

A good trick for installing the door seal... Use 3M trim adhesive (Commonly called Gorrilla Snot)

put some in a small container and cut it with some Tolual, maybe 2 parts gorrilla snot 1 part Tolual. It should be about the consistancy of paint. Then just paint a thin coat carefully on to the door surface where the seal will go and also paint the seal surface that will glue to the door. Let these dry an hour or more. Now the trick part. Just paint on a little Tolual on the door or seal, small section at a time and set the seal in place. The seal will be down for good using this method but if you do need to move it just use a little Tolual. One reason this works so well is that the seal sticks immediatly, this lets you stretch the seal as you go by the hinge section of the door, at least on the Cherokee you may need to stretch it a little here to "thin" it out on this part of the door so it wont have the hinges in a bind when the door closes. you also need to adjust the upper door latch when you get done. We got our seal from Airtex.

Leaky Cabin Door

I have spent about $1000 on my silly door in the past year trying to fix the same problem on my 1962 160. Rebuilt the latches, new upper and lower hinges, three sets of rubber seals (including Piper hollow seals), etc., all for naught.

It is now perfect--closes with a satisfying thunk like a Mercedes, doesn't leak--air or water.

The fix? Two things--the restraint arm that prevents it from opening too wide (at the bottom of the door)was binding the last inch or so of closure. Also, the door itself was about 1/16" too wide for the opening, and was binding. It was obvious upon close inspection. Don't know if it was a replacement door or it simply "grew" over the years. We took about 1/32" or so off both sides of the door with a Dremel tool, then touched up the paint. It now fits exactly and works great.

Check the fit of the door and binding of the door restraint arm at the bottom.

Replacing Door Weather Strip

Replacing main door weather strip on PA28-180 (1973)

First I would like to thank everyone for their help on this project. I have now successfully replaced the weather strip on the main door. There is no longer water dripping on my wife and the noise level has dropped. I thought I would just write down what I did in case anyone missed previous discussions. I would also point out that I am far from an expert and these are just my experiences.

1 – Removed the door.

The first thing is to remove the device the stops the door from blowing wide open. This is achieved by remove of the single pivot screw that holds the stop to the airframe. I then pushed this into its fully retracted position and taped it to the underside of the door.

The door will now swing completely open. Which is a good position for the next procedure, which is removal of the hinge pins.

This was simply achieved by removing the cotter pins from the underside of the top and bottom hinge. These should always be replaced with new ones, as the metal is not designed for repeated flexing.

To actually take of the door it's best to have a second person to help. One holds the door in place while the other pushes up the pins. There might be washers in the hinge so make sure you note where they come from and collect them. Once the pins are removed the door can be removed.

Note: make sure you don't position the door so that the window or paint will get scratched, put it on clean cardboard or a blanket.

2 – Removal of old weather strip.

This turned out to be really easy. I just grabbed one end of it and pulled it and off it came (this might be why it leaked like a sieve. It was not well stuck on and there was a lot of old adhesive on the door.

3 – Cleaning up the old adhesive

This tasked proved more difficult than I thought it would. This was mostly do to the fact that I am in France and it's difficult to get many of the products people talk about in this group. However I do work for 3M and they recommended that I use Toluene as a solvent to remove the adhesive. I initially tried to removed it be mechanical means and this was very in effective. The solvent worked like a charm. I applied a liberal coat to the side and left it to soak for 10 min. I then scraped the adhesive with a plastic scraper and it just came right off. Rubbing the surface with a rag and some more Toluene finished the cleaning. I finished the preparation off with a last wipe over with Methanol.

Note: If you use solvents like Toluene I strongly recommend the use of an organic respirator (the dust masks will do nothing to protect you). I also recommend that you are very careful to not allow any solvent to run onto the plastic window as this could cause is to craze (polymer term for going opaque)

4 – Application of new weather strip

I used the piper weather strip from Aircraft Spruce. This was chosen mostly because of limited access to other sources. However it seems to be a really nice weather strip.

With a nice clean surface I then took the adhesive (Neoprene) and dissolved it further in Toluene to make a medium viscosity liquid. This was thin enough to be painted on with a brush. I found that straight from the tube the viscosity was so high that it just formed lumps and did not spread evenly on the surface. It takes a little longer to go tack free but leaves a really nice thin film. I then coated a three-foot section of the weather strip in the same way. I left this for 10 minuets to form a tack free surface. I then positioned the weather strip on the door starting on the underside and positioned the first 3 feet in place. I then coated then next three feet. While this was drying I spent the time pushing the first three feet onto the door to make sure there was good contact over the whole coated area. I repeated the process around the door until I came to the start point. Here I just positioned the two ends of the weather strip on top of each other and cut through them with a sharp knife. I then applied adhesive to the two ends and they spliced together perfectly to give a seamless strip around the door.

Notes: I did not stretch the weather strip during application. I also had to trim a little off the flat side, as the door edge was a little narrow in places.

5 – Replacement of the door

I left the door in my garage for 1 day to let the adhesive cure and dry before returning the door to the aircraft.

Replacement is the reverse of taking it off, simplicity itself.

It took a little more time to make adjustments to the door latches, which can be moved. However once that was done I have a door that shuts easily and does not leak. I'm very pleased with the result and more to the point so is my wife.

Note: While the door was off I took the trim off and removed, cleaned, lubricated and replaced all the lock assemblies. This was also a benefit to smoother door operations.

Installing Door Seal - Eliminating Gaps

Went with the 1/4 round hollow seal for the door. Fit was just fine although it was important to strech the seal in places where the gap was a bit smaller. Used a few small blobs of modeling clay to check the clearances at different places to get an idea of where I had different amounts of clearances.

Modification of Dick Russ Door Seal

June 8, 2004, 5087

I have installed the new door seal and new hinge pins on my Arrow. After reading of the positives it looked like the answer, and it appears to be just that, a tight door seal. The one area of negatives appears to be the bottom where it can be damaged by heavy feet. I decided to modify it in this way:

I left the old door seal along the bottom from the door stop attach point to just above the rounded lower rear corner of the door. At the two points where the old and new seals meet I marked them and cut the new seal at a 60 degree angle with the new seal at full thickness right up to the old seal. After letting the door sit for 12 hours it is sealed tight! No leakage at each point where the old and new meet. Now the lower frame of the door is as it was and the areas of leakage are sealed tight. I should note that I have not had problems on the bottom area where I have left the old seal in and there is no way for water to enter there as the door lap sheds water away.

Sloppy Fitting Cherokee Doors

July 4, 2004 7231

Since we introduced the new doorseal the question keeps arising about the way the door fits or in some cases doesn't fit so well. I have yet to see a Cherokee that is a few years old that the door doesn't need new clevis pins and eyebolts. This is very easy to check on your plane by just lifting up on the rear of the door. If you have any movement up and down on the door, you can pretty much conclude the clevis pins and eyebolts are worn.

The eyebolts are very easy to change out as are the clevis pins and cost is minimal.

Now for the commercial: Do to many members requesting the clevis pins and Eyebolts I have decided to stock them. The clevis pin set is $5.80 which includes two pins, the proper washers (6, two cotter pins and the installation drawing. The eyebolts are $21.50 for a set of two which includes the installation instructions. Shipping costs are included for either set. Until we get the parts on the website,and if you find you need the hardware, you will need to call in the order at 405-755-2151.

Yoke Universal Replacement - removing taper pin

I replaced mine a few months ago, actually swaped pilot and copilot u joints...less slack in copilot side. Anyway after working all afternoon trying to hammer that thing out and fabricating a tool simular to a motorcycle chain breaker which did not work, my A/P walked over and handed me an air chisel with a blunt attachment and it popped out in seconds. Where was he 6 hours ago! A word of caution, each u joint is custom fit. The copilot u on the pilot side was fine but the pilot u on the copilot side when tightened would lock the yoke...ie real stiff ailerons. Had to pull that one back off and trim the length on the sprocket side. Air chisel was THE trick.

Lubricating Aileron Hinges

Don't lube the aileron hinges if they have a teflon insert. Some do some don't. You can easily tell by inspecting the hinge, the teflon insert is noticeable.

Repairing Leaky Compass

You are performing an illegal maint function - that everbody does. In other words, keep it to yourself and above all do not put anything in log book. According to the FAA it requires an instrument shop to do this! Aint that a b###h! Now,to fix it. You have a ruptured diaphram and it is leaking. They last about ten yrs. Rem compass, disassemble and instl repair kit. DO NOT TOUCH ADJ SCREWS. Fill compass with fluid by immersing and get all bubbles out. Put it back in airplane. Now if your swing was OK to begin with it will be fine. If you have to adj use a special brass (non magnetic) screw driver. And Oh yeah - the compass is req'd to make acft legal. Be certain sure you have a compass card in place too. The whole job is very easy to do.

New Style Fuel Selector - Shoulder Harnesses

Piper has a kit for the fuel selector. Cost is about $150 and will convert to the new style.

For the seat belts, you will find that the retractable types are very expensive. I have a 69 Cherokee, and I changed the front ones to the non-retractable, "Y" type. Got them from Aircraft Spruce, and they cost about $235 each. Plan on about 4 hours labor for each one. Wag Aero and Kosola also have some STC'd belts.

Improved 140 Fuel Selector Valve

The Piper supplied fuel valve cost me $385.00 (November 02 price) plus approx. 1.5 - 2 hrs. install time.

Much improved valve, smoother action with definite detents at all positions. Unless your valve is free of internal scoring,etc., I highly recommend the new valve.

New Style Fuel Selector Collar for Older Planes

I called the local Piper dealer, and he sold me the kit for about $140. Easy install.

www.kcac.com, if you can't find anything closer.

Brief Fuel Smell When Using Electric Fuel Pump

there is a short flex line just a bout 8 inches long on the left rear engine area. they crystalize with age and leak/break but seeps fuel when the pump is turned on. When the engine is on the fuel evaporates and blows out the bottom so you might not notice it as much unless your on the ground and thats when you'll smell some raw fuel. With the engine off, turn on the fuel pump and check just in front of the fuel strainer are for fuel. that should find it.

Replacing Fuel Valve O-Ring - Fuel Selector

Sounds like the o-ring to me too. It is either a 011 or 012, but go to a bearing and seal business and request a viton of each size. They'll hold up much better than the Buna-N ones you'll get at the hardware or plumbing shops

Fuel Selector Valve Rebuild

I had the same problem. The shop rebuilt the fuel selector valve and there has been no smell since. The parts were listed on the shop order as

MS29513-011 Seal

MS29513-018 O-Ring

They apparently used one of each for a total of 95 cents for the parts and $227 for 3.5 hours of labor. The tanks apparently had to be drained, which I guess accounted for a lot of the time

Lubration for Use in Fuel Systems

August 13, 2004 4142

Apparently Fuelube has been discontinued, but fortunately there is a substitute called "EZ turn", which is available from Spruce and Wick's . It is resistant to petroleum and is supposed to be equivalent to Fuelube.

Draining Fuel from Tanks

If you use the quick-drains, be sure to electrically connect your aiframe to the fuel container. The flowing fuel can build up a static charge that will want to jump the gap between the plane and the container.

I knew a pilot that burned down his plane and hangar that way. He noticed a faint blue glow around the stream of gas, and a few seconds later the whole place was on fire.

Rebuilding Artificial Horizon (Attitude Indicator)

I sent mine out last year about this time to Century Instruments in Wichita,Kansas. It was an Edo-aire autopilot gyro. They rebuilt it for $255. Check with them beforehand as not all gyros are rebuildable (according to them) Their #is 316-683-7571

Removing Side Panel - Routing Battery Cable

The side panel is in two parts. There should be a set of finishing screws with cup washers along the bottom edge of the larger front panel, as well as one set of screws common to both parts that goes from floor to top, about where the left rear passenger's shoulder is. The final set of screws for the rear (smaller) panel is along the rear edge. Remove all the screws, and the hardware for the seat belt, the vent cups, and the fuel selector cover. Then the panel should slide up. You have to coax it a bit by pulling it out, so it'll clear the seatbelt bracket and the fuel selector. The tops are secured with clips that you have to disengage the top plastic pieces of the side panel from.

Removing Rear Bench Seat

I've found that if I remove the window trim near the back seat first then the seat can be lifted up and forward to remove much easier.

Crawling into Tail Section of Plane

I have been in my Cherokee 180 tail section fairly regularly on 100 hr inspections to check stabilator and rigging. The skin obviously won't support your weight. The stiffeners are also very fragile and apt to bend if you say put your knee on them. The best is to get a sheet of ply wood or even a plank etc and lay it over several at a time and spread the load. I saw a stiffner which had been buckled, it wasn't pretty and very difficult/expensive to fix

Checking Valve Clearance

First off you MUST bleed down lifters. I find the only reliable way is to remove and disassemble lifter assy. Easy to do on Lyc. Drain all oil from lifter by twisting and rem plunger. Suggest do one at a time as parts are mate fitted. Reinstl totally dry and insert push rod. Now you can check for clearance. Push rods are of a fixed length and one must have the corrcst one in place. A range of lengths are avail. This is a MUST and correct clearance achieved. Go no further until all eight valve train clearances are achieved. Push rods may not be changed in length. Suggest preoil before starting eng as lifters need oil to perform properly.
Bled down they should .o28 to .080, ideal .050 to .060. You need longer pushrods, They're in the parts list.

Exhaust Leaks at Joints at Muffler

Remove them and reassemble with fibre wheel bearing grease. It'll make a carbon seal. Do not use stove pipe cement.

Removing the exhaust system is part of an annual. You most likely have a crossover system, if so, check it carefully for broken internal baffles, and that the end cap in the internal baffle is intact. Use blo proof gaskets with anti sieze compound, and the fiber wheel bearing in the slip joints. It'll be messsy after you start it up, but cleaning after it cools donw will stay that way after words. Tighten all parts in sequence.

Check Muffler For Loose Baffles

Take that muffler off and check it out!!

We had an exaust pipe split and burn a hole in the carb heat muff during a 15 min flight. After we took off the old pipe and ordered a new one we decided to take off the muffler and check it. Had a loose chunk of steel rattleing around in the

muffler and a solid piece blocking about half of the opening to the tail pipe. Replacing the exaust pipe without thoroughly checking the muffler would have caused the same exaust problem all over again. To say nothing of maybe burning a valve, loss of some power and so on. Bad things could have happened.

Electric Fuel Pump Troubleshooting

1. If pump is making noise (clicking) and no fuel, then start by removing the housing end and cleaning the fuel filter.

2. If no pump noise, with the pump switch on, measure the "hot" terminal on the fuel pump to the frame with a multimeter and see if you have a nominal 12 volts. If no voltage, there's a wiring/breaker/switch problem.

3. If no pump voltage, then with all switches off in the plane, try the following:

*** Make sure there's no fuel leaks around the pump ***

a. Use an external 12 volt battery source

b. Use 2 jumper wires, at least 4' long.

c. Connect a jumper wire FIRST from the outside of the pump housing to the battery (-) terminal.

d. Connect a second jumper wire to the HOT terminal of the pump.

e. Now, touch the wire from (d) above to the battery (+) terminal and see if there's any pump action. You do not want to be introducing an arc (spark) near the fuel pump area. Make the final connection at the battery end, not at the fuel pump, when you apply power

f. If nothing, then pump is dead. If it works, there's a wiring/switch problem back to the panel.

High Ammeter Reading - Piper's Shunt

A shunt across an ammeter is normally a resistor from one post of the ammeter to the other that protects the ammeter from high power.

Piper issued the service bulletin and in their wisdom went the cheap route. What they call a shunt is a length of heavy wire on the input side of the ammeter. The main power wire comes to the back of the instrument panel on the left side. It has an eye crimped to it and a length of the same size wire is bolted to it via another crimped terminal. From that crimp a smaller wire goes off to the ammeter and another small wire leaves the ammeter at the other side.

The length of wire that is bolted to the input wire is Pipers idea of a shunt (resistance). I checked

several Cherokes and Arrows and found several ways of doing it ranging from a straight wire to a coil and a curly wire like a 'phone cord.

I found that my problem was an out of calibration ammeter and once that was adjusted all is well.

I was helped in my search by George from Lock Haven Air Parts who is a wealth of knowledge and told me how Piper had gone the cheap route.

Engine Hesitation Accelerating Through 1300 RPM

My O360-A4A has always had that symptom. I've flown several other PA28s with A4A and A4M engines that exhibit a slight rough spot around 1300 rpm. It has been explained to me that this range is where the carb is shifting from the idle circuit to the normal jet. Sounds plausible. The fact that I've experienced this in so many other similar planes leads me to believe it's true.

Engine Stumble Around 1500 RPM

July 27, 2004 5200

I had an engine stumble in my '69 140; it happened between 1300-1500. According to Lycoming, the idle circuit for the carb stops somewhere between 1200 and 1600 RPM. If you get a stumble after that when advancing the throttle, your mixture is too rich. This sure sounds like your problem, especially if leaning helps. You can incrementally adjust the mixture screw. You will know if it's too lean as it will want to keep running when you shut it down.

Latch on Oil Filler Door

The latch is stainless and very seldom wears. The wear is inevitibly on the striker plate. This consists of two pieces of alluminum rivited through the fibreglass of the cowling. If these are replaced the problem goes away. I solved the problem by inserting a sliver of brass between the two layers of aluminum and pressing them together to hold the brass in place. The latch positively locks the brass in and this has worked perfectly for several hundred hours. If the hinge is worn it must be replaced as any vibration will eat away anything one puts in as a striker plate. Regarding a seal to prevent any further flutter in the door, do as follows. Get a match of other suitable spacer which just prevents the door from fully latching. Carefully smear the door with a thin layer of vaseline where it contacts the cowling (all the way round) put a thin bead of silicone sealer around the seating edge on the cowling and carefully close the door with the match in place next to the latch such that the door is kept a tad open. leave for 24 hours...clean off the vaseline and presto you will have a snug fitting door with a custom seal.

Autopilot Adjustment (Autocontrol IIIB)

April 18, 2004 5257

As parts age their electrical value often changes. These changes can cause autopilots to become out of adjustment. Here is a post I saved that explains how to adjust a Century IIIB. I know it's not the same as yours, but may you can get some ideas that could help you.

Autopilot adjustments
I've learned there are many possible causes for autopilots to
oscillate, ranging from bad attitude indicators to loose cabling, but
I thought I would share my recent experience getting the oscillations
out of my Piper Autocontrol IIIB - via adjustments only.

Problems:

1) The autopilot activated in heading or VOR track mode would cause the plane to continuously roll back and forth between ~8 degree banks. The overall direction was maintained, but the plane was oscillating.
2) The autopilot would overshoot when turning to a new heading (set by moving the heading bug while in heading track mode). There was over 10 degrees of overshoot, followed by the usual oscillations about the new heading.
3) During autopilot-controlled turns, the bank was excessive, reaching 28 to 30 degrees.

The Expert Advice:

When the experts at Autopilots Central heard the description of the problem, they suggested autopilot adjustments I should make before considering equipment external to the autopilot control head. In fact, they guessed (correctly) that after adjustments the oscillation would be gone.
The biggest indicator they picked up on was the amount of bank in turns. The bank angle during a autopilot heading controlled turn should be approximately 20 degrees, not the 28-30 degrees I was experiencing.

Making the Adjustments:

The adjustments required access to 4 potentiometers located on the front of the autopilot, behind the faceplate. Removal of the faceplate required two tools. One Allan wrench to first remove the roll knob, and a small screwdriver for the faceplate screws. The roll knob screw is on the bottom of the knob, and the two faceplate screws are visible after the roll knob is off.
The potentiometers are quite small, arranged horizontally, and are found directly under the right rocker switch. These pots will not be visible if you are of normal height and are sitting up in the pilot seat. A small jeweler-type flat screwdriver is required to adjust these pots. The pots are 20 turns for full range.
From left to right, the potentiometers adjust the following functions: gain/threshold, left roll, heading bug centering, right roll.
I was advised to adjust the left roll, then the right roll, then the bug centering, then test the bank angles and repeat the process as necessary to get everything correct. Evidently there is interplay between the adjustments.
After some experimenting I found that counter clockwise turns on the roll pots reduced the amount of bank angle in the turns. I had to turn each of the pots about 8 full turns to reduce the bank angles to 20 degrees. I also used the turn coordinator to help achieve the correct standard rate.
The heading bug center adjustment took no adjustment in my case so I don't know what direction to turn that pot for left/right bug adjustment. I will pass along that I was told to ignore the TC ball when making this adjustment, and to just adjust the rudder trim to make sure the DG was stable before adjusting the heading bug.
So far, the adjustments had cut the oscillations down to about 3 degrees of bank right and left. However, the overshoot on autopilot

controlled turns was still there and caused the oscillations to start out at about 8 degree banks, slowly reducing down to ~3 degrees. Again, after some experimenting, I found that clockwise turns on the gain/threshold pot resulted in decreased oscillations. I would make a few turns on the pot, then test both straight flight and turns with the autopilot, adding more clockwise turns until the oscillations and overshoot were gone.
I have NO MORE autopilot induced oscillations

FLAP RIGGING CHECK

1. Set flaps fully retracted.

2. Match the button (Spacer or bolt) up with the rear spar (back of the wing portion) and the short end pointing to the flap. The long end will be forward (I find it easiest to lay on a creeper and slide under the wing to hold the tool in place).

3. Verify that no portion of the tool is on rivet heads or screws.

4. Put a slight amount of upward pressure on the flap while holding the tool in place. You should see one of the following:

· Proper Neutral Rig- Button touches rear spar and flap end of tool touches the flap with no spaces between either.

· Flap Set to Low- Flap end of tool touches flap and there is a space between the rear spar and button. Have flap adjusted up to neutral.

· Flap Set to High- Button touches the rear spar, flap end of tool does not touch the flap. Have flap adjusted down to neutral.

5. Repeat steps 2 through 4 on the other side.

6. Fly the airplane in level flight at cruise, noting proper loading and fuel. There may be a slightly heavy left wing with the pilot only, this is normal. If it is excessive adjust the left flap down ½ turn and repeat. If more that 2 turns of adjustment are needed then consult an A & P to look for other items. Set Ailerons before any adjustment from neutral are made to the flaps.

Aileron Rigging Check

This will give you a hint as to how far out of rig you are. There is a stop tool that should be manufactured to properly rig per the Manual.

2 PERSON METHOD WITH FLAPS RIGGED NEUTRAL

This accurately represents the position of the ailerons in flight and takes out any play in the cables.

1. Set bottom of aileron with the bottom of the flap visually

2. While one person holds 1 aileron in place using upward pressure the other person applies upward pressure on the second aileron.

3. Check the height of the Aileron with one held flush. One of the following should be seen:

· Proper Neutral Rig- Both ailerons line up with the bottom of the flaps when upward pressure is applied.

· Ailerons set to Low- With one aileron lined up with the flap and upward pressure applied to both, the opposite aileron is below the flap.

· Aileron Set to high- With one aileron lined up with the flap and upward pressure applied to both the other aileron is above the flap.

4. Aileron should be flush. If not have A&P adjust ailerons per the Service Manual. The manual will show him how to determine which one to adjust. Cable play at different temperatures will change this slightly

Piper Parts

February 1, 2004, 5929

If you need to get any parts from Piper give Sandy a call and tell her your a cherokee club member and you will get a discount on parts.See attached.

Rock Hill SC, PIPER DEALER Sky Tech South

803 366-5108 / 888-386-3596 Parts Talk to Sandy McCray she 10% to 30% off parts for Club members.

Converting Rear Bench Seat to Buckets

February 7, 2004, : 4935

I have done this mod in other piper aircraft. You need the same parts as in the one which is similar to that one which has those seats and platform. An IA will need to submit this to the FAA for a field approval.

Checking For Corrosion

Corrosion needs to be an ongoing inspection. Make sure you have the extra inspection access panels afforded by service bulletins (I don't have the numbers handy, one I think was in the 700's and one in the 900's. The earlier one adds inspection panels to the bottom of the wing on the inboard rib box to gain access to the rear spar (also to the main spar, but the purported reason is the rear spar). The later one is for inspection of the rear spar attach fittings and has you add inspection ports in the baggage compartment in a PA28 as I recall. In the Six, that one is just an inspection as the rear attach fittings are under the center seat box.

SB1006 addresses spar corrosion, which would be the one most likely to ground the airplane. There is also an SB for stabilator attach fitting corrosion, and one for balance weight tube corrosion for both the stabilator and the aileron counterweights.

So far, these are all relatively easy to inspect, and the inspections are described in the pertinent SBs. Check also around the step, especially on the inside. The step doubler is steel and it is touching aluminum. A little bit of water sets up dissimilar metals corrosion which can lead to needing a peice of the belly skin replaced (I found out the hard way). The other area of concern is the hat section structural rails on the bottom of the fuselage. Look at the seam between them and the skin very carefully. If you see any bulging due to exfoliation, you probably should have the rails pulled off and cleaned up before it gets worse. The insides of the rails and skin under them was not originally painted. If some moisture gets in, combined with the exhaust gasses, you can get corrosion. Mine had popped 3 or 4 of the hat section rivet heads.

Wing Spar Corrosion Checking

The inspection hole kit (piper p/n 765-106v) is to install access plates in the lower wing skin to facilitate inspection on the rear spar at the attach fittings as spelled out in SB 789a.

The requirement to remove the fuel tank is to inspect the main spar cap and adjacent area for corrosion as spelled out in SB 1006. This area is not visible from the inspection plates added in paragragh above.

A third corrosion inspection area is the rear spar attach fittings inside the fusalage which is what Buddy is talking about. It is spelled out in SB 977 and requires inspection holes be cut in the rear baggage floor (these can be field fabricated), insulation cut away and removed within 6 inches of the attach fittings, side windows sealed if there is evidence of water leaks, and drain holes drilled in the floor.

March 2, 2004, 8770

I have a 140 also and you can inspect both sides of the rear spar area by lifting up the rear floor for the forward view and through the rear compartment access in the hat rack for the aft side. If you check the bulletin, for aircraft not needing the access holes installed, all you have to do is drill two small holes (one on each side of the aircraft) to allow drainage of water in the area. The bulletin gives you the measurements of the hole size and the correct location of where to put the holes.

Service Bulletin 1006

Mike, the service bulletin deals with Spar inspection behind the fuel tanks due to exfoliation of the spar caps and corrosion in the surrounding structure. It also deals with corrosion of the forward and aft wing attach fittings. There have been cases that when the tanks were removed for inspection, the spar caps were found so corroded the wings had to be replaced or repaired with new spars. On the last 10 or so Cherokees that I have inspected, I found only one that the wings were unairworthy. If your plane has not had the inspection done,I would certainly suggest you have the tanks removed for inspection. In addition to the inspection,it also recommends that the fuel tank main fuel supply flex hose and vent lines be inspected for age and deterioration. The hoses should be replaced at least every 8 years. I have had to replace the hoses on every cherokee I have worked on due to age hardening or split vent hoses. Unfortunately, many owners and shops just didn't replace them like they should. My personal opinion is the is a safety of flight item, but since its a service bulletin, it is not a mandatory inspection. I would suggest you check your log book and if it hasn't been done I would look into having the inspection done.

Water Drain Holes for Rear Spar Area

Piper service bulletin 977 has instructions for drilling two drain holes in the belly around the rear spar. Its applicable to most Piper's including the PA-32's.

You can get a copy of the S.B. from Dave Wheeler's web site:

http://www.northwestschoolofaviation.com/sb.htm

Carburetor Ice

May 14, 2004 4657

I've noticed a few discussions on this board regarding the use of Carb heat in the Cherokees. A number of pilot report that they "never" need it. It is also "common knowledge" around the airports that Cherokees don't need it except in extreme emergencies due to the relationship of the carburetor to the oil sump.

There may be some climates where that is true, however I'd suggest that you keep a more suspicious lookout for carb ice.

I took off this morning, temp 11C dewpoint 8. There was visible moisture in the air (about 20 miles in light haze) Shortly after Leveling off at 2,000 feet and turning 2500 RPM in a 140 I noticed after a few minutes that the tach was down to 2400.

Instead of adding throttle I applied Carb heat for about 30 seconds. RPM dropped to 2300, and then when I shut the heat off it returned to 2500.

At no time did the engine run rough. There was no sign of "trouble"

This is actually quite common under these conditions. I'm at a small airport with virtually no ground delays, so this all took place within about 5 minutes of starting the plane, before it had time to warm up.

I suspect that if I had not applied heat, the engine would eventually have warmed up enough to melt the ice anyway. In other words, NO PROBLEM. I would never have suspected that I had encountered carb ice.

I guess that the point I'm trying to make is that we should consider carb heat to be a useful tool under normal circumstances, not just an emergency device.

If you find yourself needing to make throttle adjustments for no apparent reason, suspect carb ice as being at least equally as likely as the throttle slipping.

I don't have a carb ice detector, but I suspect that anyone who does will be able to tell us that carb ice is NOT all that uncommon.

Left and Right Hand Rudder Pedals Not In Agreement

May 18, 2004 7231

The sequence to align the pedals is not hard but it is involved. You need to disconnect the nose steering rods from the bellcrank on top of the nose strut. You then need to clamp a short piece of angle iron to the pedals which will keep them aligned during rigging. Apply pressure to the center of the angle iron and have someone at the rudder verify the rudder is properly aligned. If not, the rudder cable turn barrels need to be adjusted accordingly. Assuming the rudder is in alignment then all that is remaining is to adjust the rod end bearings until they are lined up with the nose gear bellcrank with the nose wheel straight. This is a job for an A&P mechanic but that is how you adjust the pedals and nose steering.

Oil Screen Needs to be Cleaned

September 30, 2004 1517

The oil pressure screen is located on the accessory case between the two magnetos. It's in the housing with the oil temperature sensor. It's held on by four screws. You'll need a gasket (about $0.99 from most places) and 4 new lock washers. You can take the wire off the sensor or just leave it on, just don't dangle the screen housing by the wire. The screen is inside the housing.

When you take it off, it will make a mess. Stuff an oil rag underneath it to capture as much oil as you can.

There's also a suction screen, in the sump, under a large hex-head plug that faces the firewall. It's safety-wired on. You'll need to re-safety it and replace the washer underneath, AN-900-16.

The gascolator on the left side should also be cleaned periodically, again, safety wire and another inexpensive gasket. The lower cowl has to come off for that one

Fuel Selector Getting Stiff

Dismantle the selector, put a tiny quantity of very fine grinding paste on the tapered plug and carefully lap it in. Do not lubricate it, this just washes off and leaves it worse than before. The above method is described in a Piper SB. My plane(65 Cherokee 180) was so stiff I had to use both hands to turn it. I was present when my mechanic carried out the work. The selector is velvet smooth two years later. Be sure and get off all the grinding paste....incidentally it only takes a couple of turns to lap in as the material is fairly soft brass.

and

I just did mine today. You have to take the top off, be careful not to drop the inner parts, apply fuel lube grease very lightly to the plug valve, the part shaped like a cone. Also under the top piece there is an "o" ring grease it too. Reassemble in the same position as removed. It's not hard, except getting under the panel, I am a big guy. If you’re smaller it should be easy.

Fuel selector valve

At 2921 tach hrs my A&P son and I followed the instructions in the Piper Cherokee Service Manual Ch 9 sections 17 thru 23 and successfully svcd the fuel selector valve at the cost of 4 hrs labor and a few cents worth of valve grinding compound and an 'O' ring or two. I can't imagine a certified shop having a problem reassembling the valve

Fuel Smell in Cabin

I to had a fuel smell, found that the stem of my feul selector valve was leaking, it needed a new "o" ring. I then greased the plug valve and "o" ring before assembly

and

I had the same problem on my 1966 180. Turned out there was a leak in the left tank overflow line. Not enough fuel was leaking to cause stains but enough to cause smell. Pulled tank and replaced all hoses and smell went away.

And

One other thing. I forgot to mention that if the fule bowl at the aux pump is leaking the smell will make its way into the cabin. Check the washer and make sure the bowl is tight. You will see a fuel stain if it has been leaking.

And

I was having a fuel smell in my 140. Had my AP check fuel selector no leak. Turned out to be a leak in the line to the primer.

SB 1006 - Fuel Vent Lines

Air Ward (http://www.airward.com/) at Novato airport in northern California sells a very convenient kit to comply with Piper SB1006. The kit contains all the necessary hardware, including the vent lines. My mechanic and I pulled my main tanks (Cherokee 235) and did the service bulletin at my last annual. The kit contains the Dinitrol compound that you paint on the wing spar behind the tanks, and the structural stainless steel screws that attach the tank to the wing. You'd probably spend more money than the price of the kit assembling all the necessary hardware separately.

My "flexible" fuel hoses (dating from 1969) were anything but flexible, and my original fuel vent hoses had completely decayed. That's why I occasionally smelled fuel in the cabin, especially when the tanks were full. But not any more, since I replaced the vent hoses. Sure gives me peace of mind to have complied with SB1006. Good luck!

Engine Hesitates When Throttle Advanced

your problem is in the idle circuit in the carburetor. There are three holes along one wall of the throat, close to where the butterfly closes. All three must be clean... and you probably have an obstruction in one or more of them.

These holes provide gas until about 1400 RPM when the main jet takes over. If you have the passages to them cleaned out your hesitation will disappear

Noise Insulation

PepBoys has a roll of insulation for about $20. I doubled it with the foil facing out and the other facing in (yes, it is FAR A&B approved). I used it all around the cabin, even in the roof - we can talk without headphones.

Spark Plug Washers

I did a little research in my "Light Plane Maintenance" library, and found that the rounded side should be towards the spark plug, as during torque crush the rounded side will conform to the underside of the spark plug. The underside of the spark plug has a 2 degree angle to provide a controlled crush of the gasket. The side towards the plug will actually become concaved as it conforms to the 2 deg angle of the plug. Setting the rounded side of the gasket towards the plug renders the gasket more conducive to reshaping to mate with the plug. Reuse of gaskets isn't recommend, as it isn't likely the gasket's concaved surface will exactly mate with the plug again due to relative rotation of the gasket/plug. A reused gasket won't crush like a new one because the copper has becomed hardened. If you anneal (apply heat with a torch until the gasket is red hot) the gasket can be reused. Annealing provides stress-relief of the copper, rendering if "soft" again, and thereby adaptable to a new crush. I've gotten where I just always put new ones on. I bought a large box of them

Electric Fuel Pump Rebuilding Service

Contact Pifers Airmotive, 1660 Airport Rd, Waterford, MI 48327
248-674-0909 or 800-878-0909

Fuel Dipstick

We have a 1972 cherokee 180. A few years ago I drained one of our tanks and refilled it slowly. We only use this as a guide for approx. fuel quanity. Standing in front of the wing we lower the dip stick into the tank along the rear edge of the filler. Hope this helps.

FUEL GAGE

1”=5 GAL
2’=9 GAL
3”=12 GAL
4”-15 GAL
5”=18 GAL
6”=21 GAL
7”=24 GAL

Here's the sounding table I developed for my '79 archer. I put the stick straight down in the center of the opening

Inches/ Gallons
1/ 6
2/ 8.5
3/ 12
4/ 14
5/ 18
6/ 21
7/ 23
Topped Off 24.5

OIL SUCTION SCREEN

Many times the question regarding oil changes comes up and one that gets overlooked from time to time is the OIL SUCTION SCREEN. Several times the screen has been discussed and its was described as a fitting on the lower right side of the accessory housing. I have also referred to it as being there. In reality, it is actually located in the engine sump on the lower Right side of the engine. It has a 3/4" hex head plug that has a copper crush gasket and is safety wired to the the case. The screen should be pulled each time you change oil to inspect the screen for contamination or metal. This screen picks up the larger particles in the oil as the oil is being drawn into the oil pickup tube by the oil pump. The gasket (crush washer) P/N is MS35769-21 or AN900-16 and is available from Wicks or Aircraft Spruce. The crush washer is installed with the asbestos side towards the engine. Turn(CW)the hex plug or flange until the sealing surfaces are in contact and then tighten 180 degrees further and safety wire

Soundproofing Material

May 19, 2004 7650

Go to supersoundproofing.org and check out their section on soundproofing small aircraft. I bought a 1/2 roll of the stuff and have been adding it as I go to reduce cockpit noise. Most effective was when I put 1/2" of it under the carpet on the floor. Haven't gotten around to doing the side panels and doors yet. It's the same thing that spruce carrys, spruce may be cheaper for small quantities though.

Nosegear Shimmy Caused by Main Landing Gear

May 9, 2004 7231

The problem of nose wheel shimmy keeps popping up from time to time. I would like to share an experience that I hope will be helpful. When I restored my 180 two years ago I replaced every nut and bolt and bushing in the nose strut, balanced the tire and had an absolutely shimmy free airplane until recently. I suspected the shimmy may be caused by the shimmy damper and since I had a answer for that I serviced it and in my own mind the problem would be solved. The next flight out the shimmy was still there and maybe worse. I concluded it must be the nose tire balance and since the tire was worn I would just by a new tire and while at it install the new leak proof tube. With that said and done when the new tire and tube arrived I installed the new tire and tube, balanced the tire, made sure it had the propper pressure and reinstalled it with the confidence that the problem will be gone. The next flight on landing I didn't notice a shimmy and concluded the problem as suspected was the old tire. Last week on landing, the shimmy was back and worse rather than better. I did notice one thing out of the corner of my eye. It appeared the left wheel paint was vibrating excessively. This past weekend I jacked the plane up and pulled the wheel pants and tires to inspect the gear. During the inspection I noticed a slight movement from side to side of the gear torque links, not much but a little. I pulled the cotter pins from the upper and lower nuts and found I could tighten them a couple of turns. When I did this there was no side movement of the gear. I did the same for the other gear and found the same condition which I also corrected. With the plane back together, I took it on a flight yesterday and found that there was no tendency for the plane to shimmy and what I thought was nose gear shimmy turned out to be caused by the main gear. I flew the plane again today and tried landing fast as well as slow and you couldn't get a shimmy if you wanted it.

...and...

Had a problem with the left main gear shimmy. My shimmy would come and go. When I had my annual done, told them to really check the left main gear. They said, all was fine, the IA flew over to my airport to pick me up, and we fly back to his airport. On landing at his airport there was the shimmy. We check the torque links, and sure enough they had lots of play.

I order the shims called for in the parts manual, and when they came in, went to put them in, only to find no play. Flew the plane a few for hours and there was play again.... did not seem to matter weather it was hot or cold, the play came and went. I wrote Piper about it, only to have them give me the name of a Piper dealer. I was concern about putting stress on the hosing, since it is cast type. My guess is that all the cracked housing you here about on the cast type, are caused by not properly shimmed, and over-tightened bolts.

I finally installed two .002 shims in the top and bottom, when it was lose, and have not had any more problems.

...and...

Replacemnt of the shimmy damper is #1. The new Cleveland type run about $600 from Spruce. Considering that many are 40+ yrs old, they are well worth the money.

The Piper service manual states that side play on the main gear torque links should be .005-.007, using a feeler gauge. They should not be tight! some side play is essential, or they will snap, especially the dog-bone type. Maintain per the manual, and there's never any shimmy problem.

Decal Source

March 26, 2004, 7071

You can get any decal you need for our Pipers at Moody Aerographics in Bellview , FL . They advertise in TAP

Fuel Tank & Misc. Decals, Fuel Tank Placard

When my '73-180 came out of the paint shop in February, I replaced all the exterior placards. Check www.arrow4graphics.com. Product #705 ($6.65 for a set of 2) is the rectangular 100LL placard that says, 25 gallons, 18 gallons to tab. The 17 gal/18 gal to tabs confusion comes from the useable fuel - 25 gallons total, 24 useable tank capacity; 18 gallons total, 17 useable to neck indicator tab. I put the large round blue 100LL decals around the filler opening, and the rectangular 100LL capacity placards just outboard the filler caps. Arrow has a set that includes a lot of the exterior decals. Also, you might try www.aerographics.com, in Colorado, I found replacement PIPER decals from them.

Side Panel Backing Material - Interior Renovation

March 19, 2004, 7231

I would not recommend ABS for the side panels. It's heavy and not approved for use in the interior (as I'm informed by the interior shop). I would recommend a 1/8' plastic honey comb material called "Cortex". It comes in 4'X 8' sheets and is available from plexiglas distribution outlets like Regal Plastics. The coretex sell for less than $10.00 per sheet. I've used it for years, it's very light, very strong and cuts easy with a Stanley Knife and it meets the flame tests required by the FAA..

Replacing Fuses with Circuit Breakers

March 19, 2004, 7231

I replaced the fuse holders with circuit breakers on every Cherokee we refurbished. It's not a real difficult task only time consuming. I would recommend to save cost buying used circuit breakers from Preferred Air Parts (800-433-0814). I have never had a problem with the used ones and the last time I bought them they were $7.00 each.The ones you want are the small Klixon. You will need to submit to your local FSDO a 337 describing the change. Some times they like to have a 337 showing the alteration has been previously approved and then the can approve based on prior approval.

Circuit Breaker Panel Overlay

February 18, 2004,: 7071

If you are talking about the colored panel on the lower right on a 1968 or newer Cherokee then

go to www.arrow4graphics.com for a new overlay panel

High Oil Consumption - Puddles of Oil Beneath the Breather

March 18, 2004, 7782

I was using about a qt. every 5 hours and read that if the oil breather is not properly vented or if it slips downward through its rubber mounted bracket, that a little oil will be sucked out and what is dripping is the oil remaining in the breather after being sucked out during flight. I checked my breather and while it was vented and the vents were unobstructed, it had slipped downward and was protruding from the bottom of the fuselage into the slip stream a little. It was raised and the clamp re-tightened. My oil consumption decreased and no more little puddles of oil.

Valve Lifter Bleed Down

Lifter bleed down clearance is easy to check with straight valve Lycoming, and a little more tedious with angle head. Since most of us fly straight valve, there are two methods. The first one as the book recommends (and it's a very brief explanation) is to have the cylinder on TDC and simply remove the rocker arm, push rod and tube. Remove the lifter, and bleed all the oil out of it, and clean it while at it. Reassemble, and check the clearance with a feeler gauge like any other rocker arm. Lycomings require a minimum of .028 and max of .080. 320s like .050 +- .008. and 360s like .060 +- .008. The trick is to keep then all identical. If the engine is tired and ready for OH, let it fall within the min/max. If that is not the case, and there is also a performance issue, then keep them close. The .050/.060 is near the max scale. Remember that the lifter was designed in the mid 30s for a side valve, water cooled engine of low compression. We use OHV, expands all over the place, and poor cooling. Also there's the question of valve float, and large clearances uses on guides as well as rocker angularity. Keep it on the loose end and as evenly as possible. Four different lengths of push rods for each engine are available, and in increments of .017.

To come closer, rocker arms can be swapped. Int for Int, Ex. for Ex. There are no two alike even when new. All that close AC inspection we read about. The exhaust have rotators, and they too vary just a tad. I have hand lapped them to keep it close.

The second method of bleed down is a simple homemade tool. Bolt it in, and use a wide blade screw driver to force the oil out of the lifter. measure and replace as above. Sounds barbaric, but then again you're working on a dinosaur, and no need to go through all the work.

Bleed down clearance has little direct effect on oil consumption unless you have a loose seat with it. Too much clearance doesn't help either, but the oil usage part would be little.

Still, I would say that the majority of AC engines never have it checked, and 500 hr interval checking is not a bad idea. A lot of cracked heads or valve burning we read about especially a cylinder that was replaced, can be attributed to just that.

Checking Valve Clearance

First off you MUST bleed down lifters. I find the only reliable way is to remove and disassemble lifter assy. Easy to do on Lyc. Drain all oil from lifter by twisting and rem plunger. Suggest do one at a time as parts are mate fitted. Reinstl totally dry and insert push rod. Now you can check for clearance. Push rods are of a fixed length and one must have the corrcst one in place. A range of lengths are avail. This is a MUST and correct clearance achieved. Go no further until all eight valve train clearances are achieved. Push rods may not be changed in length. Suggest preoil before starting eng as lifters need oil to perform properly.

...and...

Bled down they should .o28 to .080, ideal .050 to .060. You need longer pushrods, They're in the parts list.

Nose Scissors Bushings and Bolts

Several chat members have requested the part numbers and I have always been happy to help. If you do not have access to this information you might like to write it down. 6ea. bushing P/N 452-766 2ea bolt P/N AN5-31A 1ea bolt P/N AN5-20A The bushings are cheap and available from KCAC 1-800-475-5222, bolts are common aircraft.

ADLog Listing Of AD's

I recommend ADLog. They provide a binder with a separate sheet for each AD along with a summary sheet of the ADs for your airplane. As new ADs are issued, they send you the new pages, and I usually get them before I get the AD note from the feds. The ADs are color coded red for recurring and green for one time, and put into separate sections for those permanently complied with. Each sheet has a sign off section for the AD sign offs, so your A&P can review the ADs very quickly. There is a one time setup charge (can't remember how much it was) and a yearly subscription of less $20. It pays for itself in time you don't pay the A&P to research your ADs each year. Probably one of the better investments I've made in my airplane. (Aerotech Publications, P O Box 1859, Southold, Long Island, NY 11971, www.adlog.com)

Mimimizing Tire Wear

Tire wear facts. Pressure, alignment, condition of struts, landing techniques.

Pressure (lack of) will accelerate tire wear. Less pressure, more wear, and cord break down from excess heat and is accelerated. All tires are not truly concentric, and one side may wear more than another, due to nmanufacturering process.

Alignment causes wear, usually scalloping from toe out. It will also cause one side to wear more than another. On fixed gear Cherokees, toe in can be corrected. Camber is not moveable due to the construction. Camber will geberally cause wear on ine side. 99% of all

Cherokees as well as other brands have uncorrectable camber. Camber wear will be minmized with proper toe in and air pressure. Camber wear can also be caused by improperly loaded wheel bearings. Worn links components will also cause shimmy, usually if toed out. Shimmy from alignment or balance is a tire wear component.

Strut condition is another cause of tire wear. First sign of strut induced wear is the sticking strut. For the most part, sticking is a result of worn seals and wipers, improper fluid level, use or plain old air, incorrect travel distance, and lastly worn bushings. Note the bushings are last on the list.

Landing technique, self explanatory.

As to shop's calling it to your attention, if you don't ask, they rarely look, despite that it is on the list of items to check.

Expensive tires wear just as fast as cheap tires.

Let no one tell you that tire A will wear longer than tire B. No two pilots drive alike, lads vary dractically. Constant airport hpiing VS long flights will take it's toll on rubber.

Sticking Struts and Improper Filling

when reading the maintenance manual I found a section relating to filling the struts. They say that when a strut has been fully emptied as in a a seal replacement, the strut must be extended to 10 inches whilst filling, this is to allow fluid to fill the "outer chamber". I had a problem with some sticking after a complete rebuild and decided to try this out. It involves releasing the torque links in order to get the extension, so great care is needed, but it fixed the problem! The reference is in the first section of the manual close to the checklist for the 100 hour inspection.

Strut Servicing

How long has it been since new o'rings were installed on the struts ? If you have oil coming out the bottom of the struts you need new o'rings. Best left to a mechanic as the pilot or owner is not qualified to do it. You have to jack the plane up, remove the struts , install new o'rings and put in new oil and air or nitrogen. I don't know where you got the instuctions to use a squirt can to fill. To do it properly you have to remove the valve stem from the outlet at top where you put air in. Put a 1/4 inch ID hose on the the top and dip the other in a can of hyd. fluid and exercise the strut up and down until you have no bubbles. Then compress the strut and leave a 3/4 inch gap before it bottoms out. If you loose the air the fluid will keep it from bottoming out metal to metal.

Strut Inflation system

I purchased a paintball cylinder and a stainless steel braided hose for it. I got the connector for the schrader valve on the strut from Spruce. The paintball cylinder comes with a regulator fixed at about 800 psi. The main wheel struts will need around 300-400 psi and the nose wheel about 100-150. I installed a valve between the hose and the schrader connector and use this valve to "puff" the 800 psi into the strut. This method duplicates the operation of a strut pump, and you do not need to try to charge with a certain pressure setting. Just puff and rock the wings until you get the proper strut extension.

This rig cost me about $110 and can be refilled for about $3. I have used this method since about 1985. Of course, then, in my former life, I had access to all kinds of cylinders, valves and gasses.

You might check ebay for cylinders, may be able to get a better deal there, just get a regulator capable of at least 500 psi. The size of the cylinder is not critical, just get one that is easy to tote around. My cylinder is 47 cu in.

Piper Service Bulletin 1131

My Serial# is on the list and it looks like every PA-28 before the Warrior III (one Warrior III serial # isd affected, see below)& Archer III is on the list. The Warrior & Archer IIIs had forged, rather than cast main strut cylinders and are exempt. By the way, if yours are cracked and need to be replaced, that will remove your plane from the list and if your main strut cylinders have been replaced with forged in the past, it is also exempt. The aircraft affected are:

Model Serial #

140 28-20001 thru 28-7725290

150/160 28-1 thru 28-4377 and 28-1760A

151 Warrior 28-7415001 thru 28-7715314

161 WarriorII 28-7716001 thru 2816109

161 WarriorIII 2816110

161 Cadet 2884001 thru 2841365

180 28-3 thru 28-7205318

180 Archer 28-E13, 28-7305001 thru 28-7505259

235 Pathfinder28-10001 thru 28-7710089 & 28-E11

260 Six 32-1 thru 32-7800008

The gist of the SB is that aircraft with cast rather than forged main strut cylinders might have cracks in torque link attach lugs. The inspection procedure calls for removal of the strut fairing and removal of the paint around the attach lugs, inspect visually with a 10X power magnifying glass. If no visible crack, liquid penetrant per AC43.13-1B must be performed. If crack is found by either inspection method, the strut cylinder(s) must be replaced before flight with forged cylinders. If no cracks are found, it becomes a 100-hour repetitive inspection. For most, that might mean an additional inspection at each annual but for those like me, who fly more than 100 hours a year, maybe at periodic oil changes as well. The SB says "Piper condisers compliance mandatory." In my mind, that means the FAA will probably issue an AD eventually, a'la the oil hoses AD.

Muffler Rebuilding

I sent my old mufflers and stacks (PA28-161) to Dawley, www.dawley.net or 262-763-3113 and told them to do whatever was necessary. They came back, with all the paperwork, either new (mufflers and one stack) or looking like new (3 stacks). Price as I recall was about $550.

Alternator Belts

As many of you know me from Aircraft door seals and those who don't I would like to pass along a little information. Along with being an Aeronautical Engineer, A&P IA, I also have been involved with restoring and refurbishing Cherokees for over 40 years and am always happy to share my experience with the Cherokee's with members of the Cherokee Pilots Association, and especially friends I have met through the Chat or our Annual Fly-in.
For years I have heard complaints (including from myself) about the alternator belts (Gates Green Stripe) and the problems with having to purchase the same belt from Piper (to be legal)that you can buy from from the auto parts suppliers.
I contacted Gates Rubber and had the opportunity to visit with the project engineer about the difference between the belt that Piper sells and the Green stripe of the same part number that you can buy for less than than $15.00. As you can imagine he wouldn't discuss the situation between the two but passed along some great information. It seems that Gates has been developing a new belt that will last ten times as long as the belt in question and meets exactly the same specs as the belt called out for the Cherokees. I ask if he would send me the engineering data on the new belt and he was happy to as long as I agreed to keep it confidential which I assured him I would. Upon receiving the data and one of the new belts, I must admit as an engineer I was impressed. So much I submitted a 337 to the FAA for approval for installing it on my 180.
I just received a call from the FAA stating that my 337 for the new belt has been approved for installation of the new belt on my plane. The only stipulation that the FAA Aircraft Certification Office made was that each installation will need a field approval. What this means is you can now have a new and superior alternator belt for your plane at a fraction of the cost of the original. The only stipulation being you will need to have your mechanic submit a 337 for field approval to install the new belt using my 337 as substantiation.
As a Christmas gift, I will be happy to provide anyone who wishes, a copy of the FAA Field approval(337) for installation of the new belt.
All I need is for you to send a self addressed stamped envelope to Aircraft door seals, 7100 NW 63rd Street,Hangar 1002, Bethany, OK 73008

Merry Christmas,
DR

Guys and Gals, the new Gates belt is P/N 9335HD Green Stripe. I checked with O'Reilly Auto Parts here in Oklahoma City and the price is $15.99.
I suspect other Gates dealers throughout the country will have a similar price.
DR

Door Locks

I was quite surprised when I arrived at the office to check for messages. I had a dozen or more requesting additional information regarding the alternate door lock. For those who requested the information as well as for those looking for a replacement door lock I would like to provide the following. The lock is available at LOWE'S home supply as well as from the supplier Belwith International. The have offices in Grandville,MI, City of Industry,CA, and Tampa, FL. The lock is brand name "First Watch". The part number is 1358 and is a direct replacement for the locks on the Piper entry door and Baggage door. It come with two locking arms. and if they don't exactly fit the way you want, you can also install the piper locking arm. It fits it also.
The locking mechanism is superior to the original lock on the Cherokee's and as a bonus, most packages are coded with the key number so you can have one for each door with a matching key. The best part is at LOWE'S, they are less than $4.00. They can be found in the hardware dept in the door locks and cabinet lock area.
Hope this is helpful. I have installed these in more than a dozen Cherokee's and they work great.
DR

Installing Windshield

Bill, I would take that foam tape and throw it as far away from your plane as you can.If I might make a suggestion which has worked for me on over a dozen windshield installations.

Remove all the adhesive, tape and anything else that is around the windshield channel and support structure. The windshield should be pre-fitted to insure it will actually fit. This is easily accomplished by fitting each windshield into position. This may require sanding the windshield edges until you have a good flush fit all around. When this is finished, remove the windshields from the fuselage.Using the Polyseamseal in a caulking gun, fill the upper channel (across the top of the fuselage) with the Polyseamseal.Run a heavy bead on the inside vertical retainer on the side of the fuselage. Next run a double bead of the sealer around the retainer that is riveted to the glareshield and then run a heavy bead up the center post. Install the windshield inplace making sure to have it firmly pushed back on the top and side until the sealant is forced out around the edges. Next run a fillet bead around the exposed edges (glareshield) and up the center post. Finally apply additional polyseamseal on top of the lower edge approximately the width of the lower trim piece and install the lower the lower trim. Repeat the above for the other side.With both windshields in place , fill the center section with the polyseamseal making sure to seak all the edges before installing the center close out strip. Clean up all the extra residue of sealant with a soft sponge and clean water. Don't allow the sealant to dry until you have removed all the extra sealant.

Panel Lighting Dimmer Parts Cross Reference

The dimmer in 1968 used two antique PNP Germanium transistors, a 2N669 driver and 2N443 final, connected as a Darlington pair. Your final might be blown, or both. You can still get them from Piper (maybe): I see DMFS has the driver for a mere $15, but the final is "not in stock" for $42.

If you can't get them from your Piper distributor, take the A&P out of the loop and find an electronics inclined friend to install an NTE105 (final) and NTE121 (driver) in their place. Mouser has the NTE121 driver for $23, and the NTE105 final for $25. They are available from other sources, too.

They are probably not strictly legal from an FAA perspective, but what can you do? If you scrounge, you can find them on eBay (although you might have to buy four or something). There are also distributors catering to desperate military stock types, and which require a minimum order of 50 parts, etc.

So, to summarize:

Driver: Piper# 489-385 Original Part # 2N669 NTE replacement # NTE121
Final: Piper# 489-384 Origial Part # 2N443 NTE replacement # NTE105