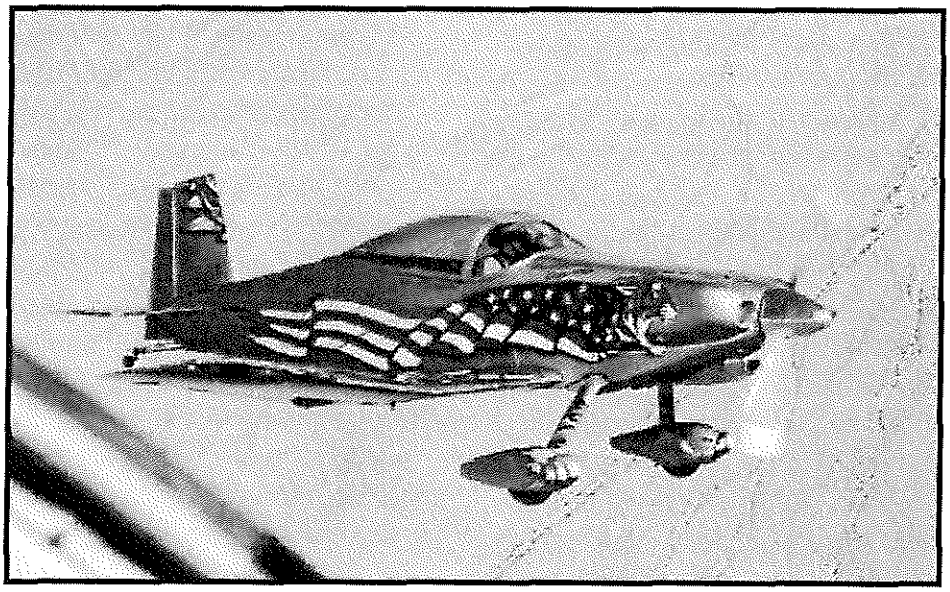
T-18 Newsletter

January 2004

Is This Your Last Issue ?
Has Your MAS Membership Expired ?

You Better Check Your Mailing Label On The Back Cover !



Jim Grahn's T-18 ~ N831GR ~ Las Vegas, NV.

IN THIS ISSUE:

Editors Notes

By: Roy Farris

I don't have much to say this time around, except that I wish my T-18 was completed. Its not, and I seem to find it more difficult than ever to work on it. Aviation here in South-central Illinois is all but dead, and there doesn't seem to be much hope of reviving it. Insurance costs, high fuel prices, and overall lack of interest by the airport managers has taken its toll here. My local FBO doesn't want me to do any more flight instruction using his airplanes because of outrageous insurance premiums. The legendary Frascia Field in Champain, Illinois(80 miles away) was closed this year by insurance premiums that were just to high to pay. Some of you may know Frascia Field because that is where SAA has been hosting its fly-in's. EAA and AOPA are so worried about TFR's and terrorists that they are overlooking the real threat to sport aviation ... insurance !! I have talked to both EAA and AOPA about this problem, and simply get the runaround, nothing is being done. What are we going to do ??

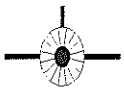
For those of you who monitor the ThorpList email group on the internet ... we have had a beehive of activity haven't we !! I just want to refresh everyone's memory in why the ThorpList was created and why we continue to have it .. "To provide a communications media for everyone interested in the Thorp designed airplanes, so they may ask any questions related to the construction, flying, or maintaining of said aircraft ... and to hopefully receive some answers to the questions, in a friendly and helpful manner ". I think we all understand what I am saying. Lets all try to be courteous and helpful, regardless of the question, and remember that many potential T-18 owners/ builders are monitoring our Email group, and that our good nature, helpfulness, and reputation is being judged.

Thorp Ambassadors

For those of you that follow the T-18 website you might want to check out the new Thorp Ambassadors page. Its completely new and I believe it is a definite step up. I am hoping to get at least one Ambassador in each state. Currently, several states lack Ambassadors ...

The Ambassador program was set up a few years ago and is source for first contacts by people interested in the T/S-18. Ambassadors answer general questions, questions about building, flying and maintaining the Thorp. Some Ambassadors offer introductory rides, and a few offer flight instruction, and T/S-18 check-outs. If you would be willing to be an Ambassador please contact me and I will get you on the list.

If you are already an Ambassador, please contact me and let me know what areas you are interested in helping out, i.e. .. General questions about the design, questions about building, flying, maintenance. Would you give some potential Thorper a ride ?? How about flight instruction in a Thorp, or a Thorp checkout for a new owner ? Let me know which of these areas you want to help in and I will note them on your T18.Net listing.



T18.Net

The T-18 website is sporting a few more new pages since the last issue. We now have a "Technical Info" page as well as a completely updated "About the T-18" page. Both of these came about by a lengthy discussion on the ThorpList Email Group. The Technical Info page lists all of the mandatory modifications (called SDR's) that should be performed on all T/S-18's. Please take the time to check out these new pages, I believe that they are an asset to the website, and shows teamwork within the Mutual Aid Society.

Van's Wheel Pants on a Thorp

(Yikes .. don't tell anyone)

By: Malcolm Bennett ~ Australia

A while ago I stated that I was about to fit a set of carbon fibre Vans style pants to my T-18C (VH-DTR). Well I'm finally doing it and have taken digital photos as I progressed ... so here goes.

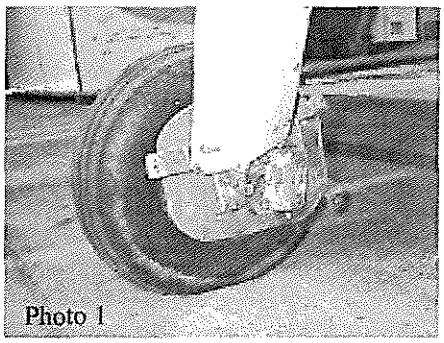


Photo 1

Photo's 1 and 2 ~ I manufactured these .080" 2024T3 brackets to support the rear half of the wheel pants. Although this is very tedious, I was able to get them reasonably close on the first attempt by using the old RV8 pant with the side cut out. The cut out allowed me to see inside. I made the first brackets out of easily bent .025" commercial grade AL because they are easy to bend. When I was satisfied I copied them out of the .080" material. They simply use the original wheel pant anchor nuts.

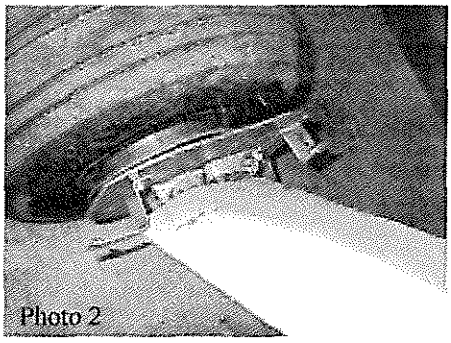


Photo 2

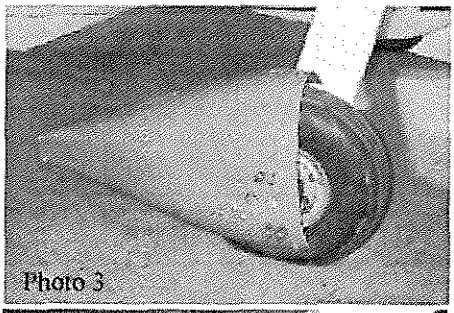


Photo 3

I was able to get my hands on an old set of RV8 pants that had seen better days. I cut a big hole in them so they would clear the T-18 legs. (Photo 3) I also wanted to check if the RV8 metal axle bracket would suit the 18. When I was happy with height and clearance, I made a template that covered the inside of the pant leaving a cut out for the gear leg. I then transposed that to my new pants and cut out the leg relief (Photo 4). Then I Made exact copies of the RV8 axle brackets (Photo 5). Photo 6 shows fitting the new back half to the scrap RV8 pant, and Photo 7 is showing the complete new wheelpant in place to check for proper alignment and the front bracket position.

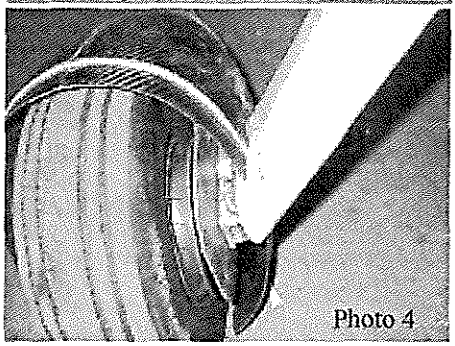


Photo 4

Photo's 8, 9, and 10 on the next page, was taken just prior to glassing the pants to gear leg fairing intersection. The blending was accomplished by using modeler's clay. I masked up around the area to contain the glass. I did not lay up the whole thing in one session. I masked off the back section and glassed the front. The next day I removed the front and tidied up the edges, then placed them back on. Then masked up the front section and glassed the back section. The reason I did it this way instead of laying up the lot and then cutting through the join line is that I was not able to cut through neatly on the upper side of the gear leg. After much application of dry micro and even more sanding, the pants are ready for painting. Following are some photos will be of the finished product.

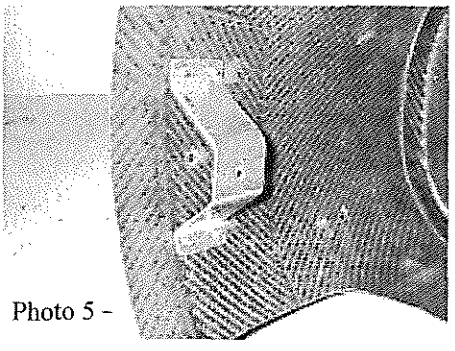


Photo 5 -

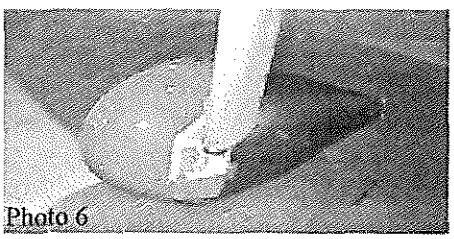


Photo 6

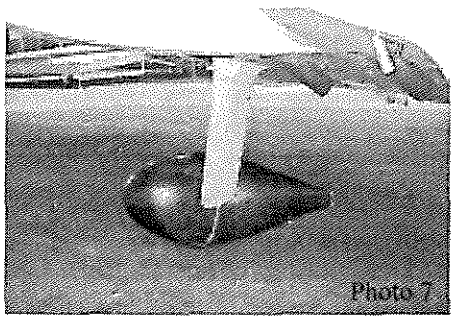


Photo 7

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Van's Wheel Pants on a Thorp, cont.

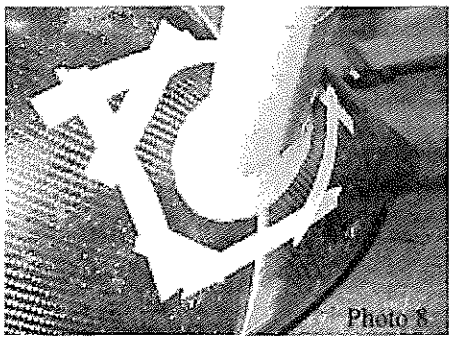


Photo 8

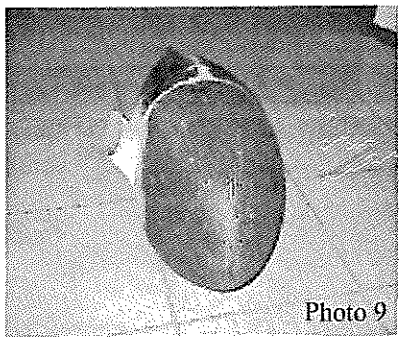


Photo 9

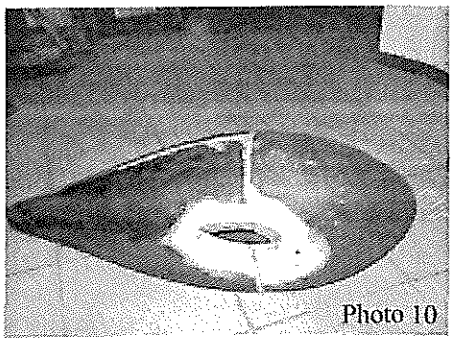


Photo 10

Glassing the gear leg fairing junction.

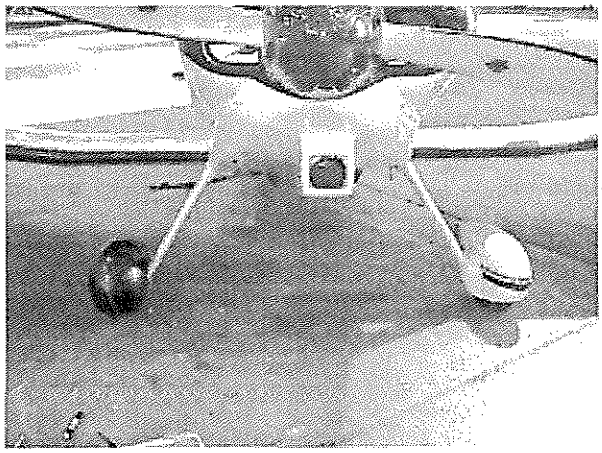
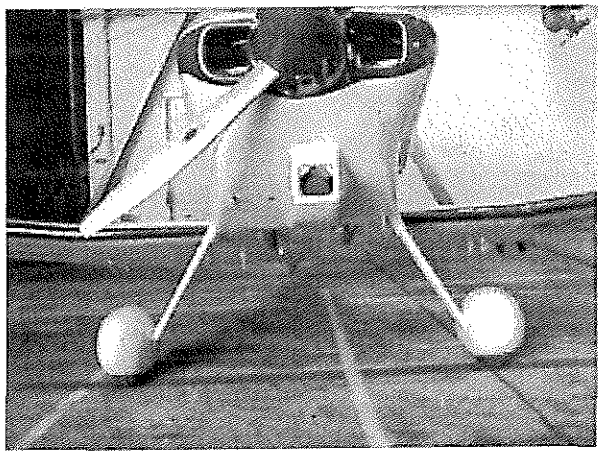
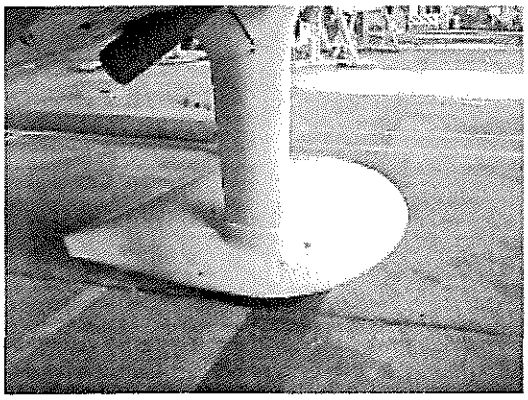
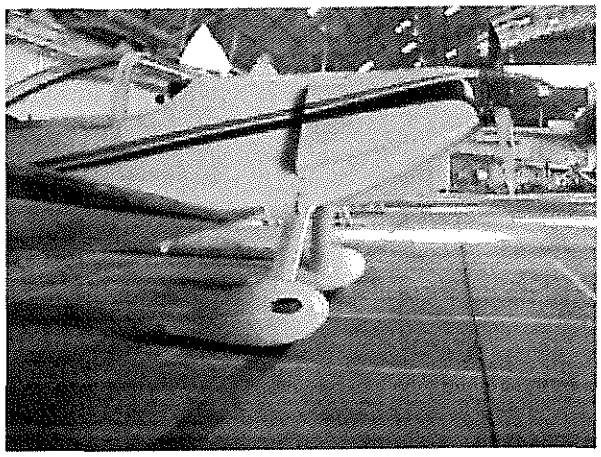
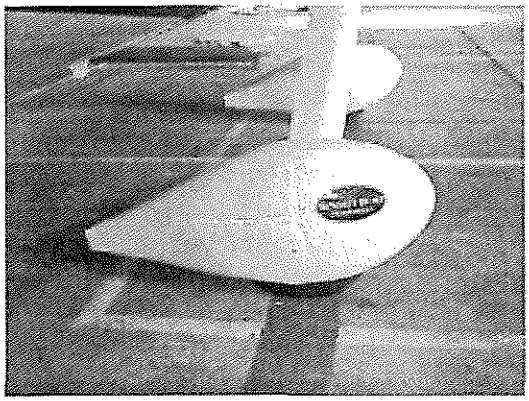


Photo comparing old and new wheel pants.


Both new wheel pants installed.







Well the big day has arrived. I flew DTR with its new wheel pants today for a short run down the coast of Adelaide (capital city of the state of South Australia). Initial results indicate about 3KIAS TAS increase for a comparable power setting. I will add however that the aeroplane has been polished as well.

RPM - 2450
ALT - 1000'
QNH - 1010
OAT - 34C
IAS - 149KT TAS (from whiz wheel) - 158 KIAS

A T-18 GOES FASTER ON LESS FUEL WITH VORTELATORS

BY: RICHARD JIMENEZ EAA 8535

I am in the process of increasing both certified and homebuilt aircraft speeds with modification kits consisting mainly of vortelators. This is the story on how the Thorp T-18 was modified to increase its speed. This story starts out by my attempting to find a Thorp T-18 in the St. Louis area that can be used to develop the kit. To my surprise I only found one T-18 in the St. Louis area and it was not air worthy because some modifications were in the process of being made to the aircraft. However, I did ask Mr. Kim Nack the owner of the airplane if I could use his T-18 to develop this kit after the modifications were completed. He agreed that his airplane could be used to develop the kit. His aircraft has a Lycoming 0-320B2B engine of 160 HP with a Sensenich WL66-78 propeller. Since he is still a student pilot he preferred that Mr. Albert Donaldson fly his aircraft since Albert was the test pilot that tested his aircraft and was most familiar with the flying qualities of his T-18 plus his insurance would not cover me. I found out that Albert was an ex air force pilot with over 7,000 hours flying time, and at one time flew the slot position on an air force acrobatic team. figure 1 is a picture of Kim's T-18 and figure 2 is a picture of Kim (left seat) and Al (right seat) in the T-18.

Fig. 1

Fig. 2

The first flight test that was conducted was a flight test to determine the calibrated air speed of his aircraft. And the calibrated air speed for all practical purposes is the same as equivalent air speed for the altitude and airspeeds that these flight tests were conducted at. The equivalent airspeed is the calibrated airspeed corrected for compressibility effects. And as just mentioned for the altitude and airspeed that these tests were conducted at, the compressibility effects are negligible. The equivalent airspeed is the airspeed that is equivalent to what the airspeed indicator would read on a standard day at sea level. Stating it another way the airspeed indicator are calibrated to read the correct airspeed only on a standard day at sea level. At any other conditions the airspeed indicator is giving an incorrect reading. That's why I determine equivalent air speed for the first flight tests. I needed to know the equivalent air speed prior to the development of the kit so as to make a comparison to the equivalent air speed after the kit is installed. In flight testing that I had done earlier in my carrier I used the method of determining the calibrated air speed as described in the book "Flight Testing Conventional and Jet-Propelled Airplanes". One method described in this book is to fly between parallel objects like parallel roads that are a measured distance apart. The flight is made at a distance no lower than one wing span above the ground. While flying over the course the time to fly the course is measured. From this procedure the ground speed can be determined and through a series of mathematical equations the calibrated air speed can be computed.. In this part of Missouri locating two parallel objects about one or more miles apart without breaking FAA regulations regarding low flying aircraft with respect to people or man made objects is impossible. I now use an alternate method that has the same or better accuracy as the method described above. What has made the alternate method possible is the use of a hand held Garmin eMap. The procedure I use now is to fly a square pattern and read the ground speed from the eMap three times for each of the four legs. The miles per hour of ground speed can be read to one tenth of a mile per hour with the eMap. Then I use the average of the three readings for each leg. This pattern is repeatedly flown at different pressure altitudes. From the readings of miles per hour for the four different directions a close approximation of the wind velocity and direction for each altitude can be made. Then from a chart I developed by using standard triangulation methods, the wind effect for each altitude

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VORTELATORS, cont.

can be closely approximated and accounted for. With the same mathematical equations that were used for the old method, the calibrated air speed can be determined thus the equivalent air speed. The results theoretically should show that the equivalent airspeed should be nearly identical for each of the pressure altitudes flown. This gives a double check of the test results for that day. When I get an opportunity I repeat this procedure on three separate days with different atmospheric conditions. I then take the average of all the tests as the aircraft's equivalent speed. I believe that this procedure is more accurate that the old speed course method that I used in the past. Our tests on the T-18 were done at normal cruising speed with 2,300 RPM. Our calibrated air speed calculated to 136.9 MPH. Our spread on the average speed of all our readings was plus or minus 1.16 MPH. I consider these results exceptionally close, usually my spread is more than that. Consider this if the old method of parallel roads were used and the roads were one mile apart, a one second error in timing would result in an error of 5.84 MPH. And for those that might be interested our average true airspeed was 146.7 MPH.

Before we get into the discussion of the air flow tests and how to interpret them let me do some explaining. To study the air flow on the surface of the aircraft, old black motor oil is used. The black motor oil is applied to the surface being studied with a paint brush. The oil is applied just ahead of the vortelator. Then the aircraft is flown. From the shape of the oil patterns, the flow of the air on the surface being studied can be determined. Figure 3 is a photograph of a typical lift strut. A short strip of vortelator was attached to the lift strut. The photograph shows the oil pattern on the lift strut during a flight. Notice that behind the vortelator mini vortices are created as can be seen by the lines of oil that form behind the vortelator. The mini vortices sweep the oil to a point in between the mini vortices, and that's how the oil lines are formed. Whenever one sees these characteristic oil lines forming behind the vortelator one knows the vortelator is working. The vortelator allows the air flow to stay attached to this lift strut for approximately 80% of the lift strut's chord. In the area where there is no vortelator the air flow separates from the lift strut at approximately 40% of the lift strut's chord, as can be seen from the pile up of oil at the 40% chord position.

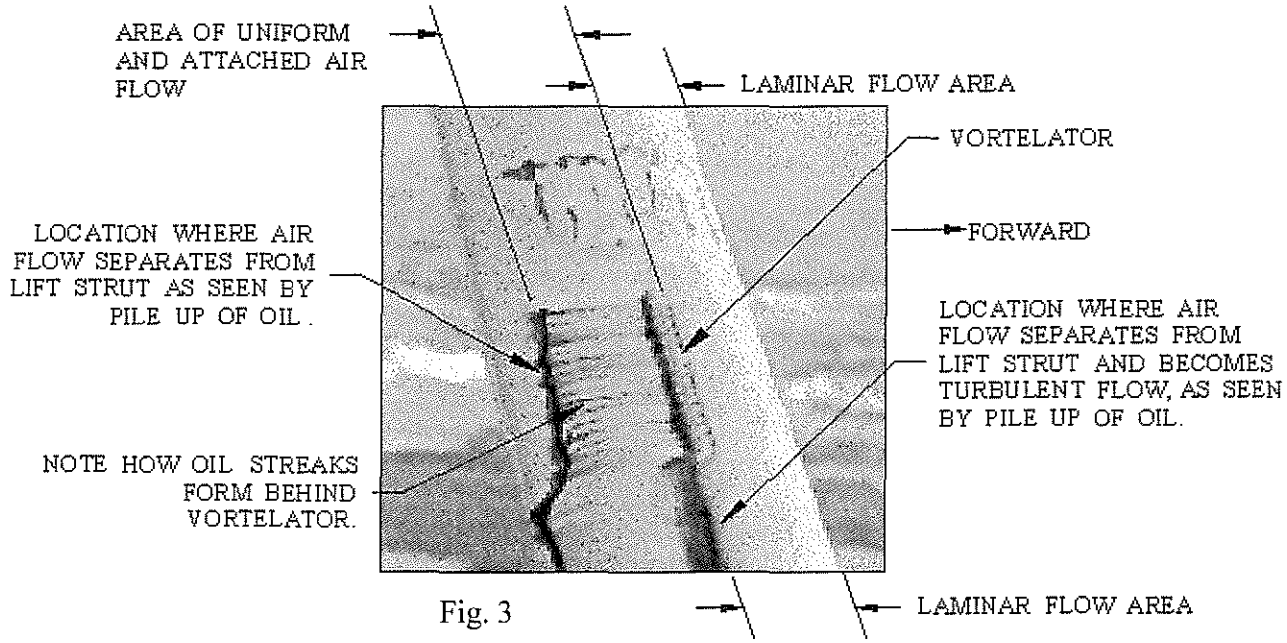

Fig. 3

At the 40% chord position this lift strut is 2.01" thick, and at the 80% chord position the lift strut is 1.18" thick. That means the wake coming off the lift strut is only 59% as thick with the vortelator attached as without the vortelator attached. That also means with a narrower wake behind the lift strut less horsepower is required to propel the lift strut through the air. That is the basic concept of the vortelators, keep the wake behind the aircraft smaller, and less horsepower will be used to propel the aircraft through the air. What the vortelators do is create a series of mini vortices on the surface of the aircraft. These mini vortices are the boundary layer.. The mini vortices not only have the ability to stay attached to the aircraft surface for a grater distance, they also thicken up at a slower rate than the normal boundary layer. These two actions reduce the profile

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VORTELATORS, cont.

drag and skin friction drag portion of the parasite drag. For those that say use tufts instead of oil to visualize the airflow and eliminate a messy oil cleanup. The tufts will show gross airflow patterns, however, they will not show the subtleties of the boundary layer airflow.

Figure 4 is a picture of the oil pattern on the upper surface of the wing. This view is in front of the wing looking back. The picture shows a portion of the wing with a short strip of the vortelator. Oil was brushed ahead of the vortelator, and ahead and to the left of the vortelator. The aircraft was flown around the pattern. This picture was then taken. It shows that where the vortelator is, the boundary layer stays uniform and attached all the way to the leading edge of the flap. Where there is no vortelator it can be seen that the oil flow thickens and the oil pattern becomes disorganized and non-uniform in nature. What this oil pattern shows is that in the area where the oil thickens and becomes non-uniform, is the location where the laminar flow creates a separation bubble. This separation bubble is the transition point where the boundary layer turns from laminar to turbulent flow. Aft of this point the boundary layer quickly thickens. This oil pattern shows that the vortelators must be placed on the wing slightly ahead of where the oil thickens and becomes non-uniform. The T-18 has a NACA 63-412 laminar flow airfoil which means that if you imagine you are inside the wing there is a concave surface on the upper and lower surface of the wing. For this reason this airfoil will benefit from vortelators being placed on both the upper and lower surfaces of the wing. As an interesting piece of information if the wing had been tufted, the tufts would all be laying approach to a flat on the surface of the wing. At the point where the airflow started separating from the wing, as in the stall, the tufts would have shown the airflow separating from the wing. The tufts would not show the location of the boundary layer transition point at cursing speed.

This T-18 had doublers at certain locations on the upper surface of the wing. It is my understanding that these doublers are not common on T-18's. Mr. Kim Nack is a structures engineer at Boeing Aircraft St. Louis and has designed these doublers into the wing as well as added structure at the location where the main wing spar attaches to the fuselage. It is my understanding that it is common for wrinkles to form where the main wing spar attaches to the fuselage. Kim also tells me that before he put the doublers on the wing he could press his knee against the leading edge of the wing and wing skin wrinkles would form just ahead of the main wing spar. This is the area where the flange of the nose rib ends and there is no support for the wing skin from there back to the main wing spar cap. Kim thought it was important to publish some information about his redesigned areas. So he wrote about his design changes and they appeared in the T-18 newsletter number 106. He said he did not get much of a response from his published information. It may be advisable to go back and review that newsletter and reevaluate if the modification Kim developed should be incorporated into your aircraft. In any event figures 5 and 6 below show a vortelator ahead of the wing doubler. This picture was taken in front of the wing looking back. As can be seen from the blur of oil behind the doubler the airflow is very turbulent behind the doubler. Figure 6 below shows a vortelator behind the wing doubler. This picture was taken behind the wing looking forward. As can be seen placing the vortelator aft of the doubler reattaches the airflow as can be seen by the oil lines behind the doubler.

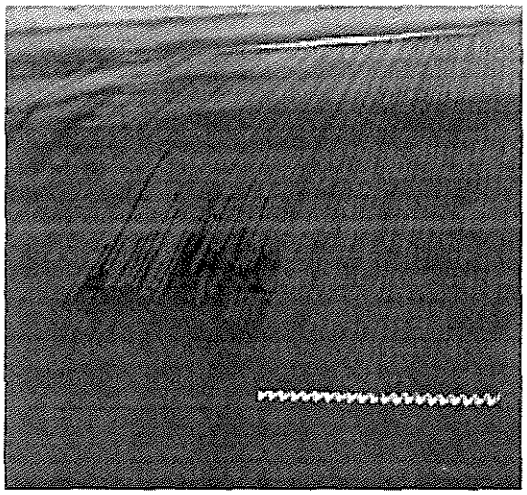

Fig. 4

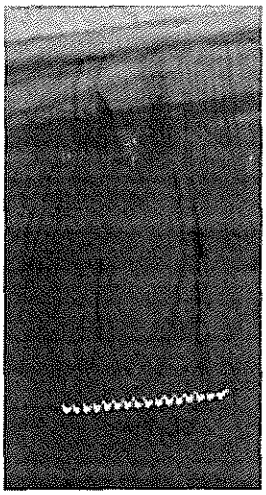

Fig. 5

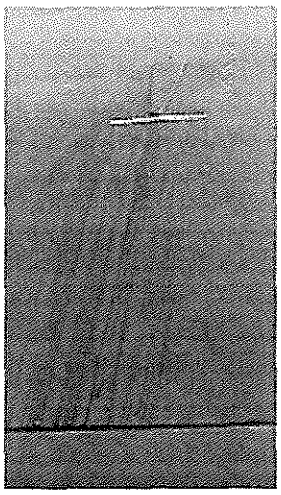

Fig. 6

The test procedure that was used for determining the location of the vortelators for the wing was also used for locating the vortelators for the empennage. In the empennage testing I would like to point out

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VORTELATORS, cont.

something interesting about the vertical tail. Figure 7 below is a picture of the left side of the vertical tail. As can be seen from the oil pattern the airflow was uniform from the vortelator until the oil reached the trailing edge of the vertical fin. At which point the oil pattern goes wild, indicating the airflow becomes very turbulent from the trailing edge of the vertical tail aft. Figure 8 below is a picture of the right side of the vertical tail and on this side a vortelator was placed at the widest part of the front end of the rudder. The vortelator did manage to make the airflow more or less uniform and attached to the rudder. I say more or less because the oil streams are less uniform than was seen at other locations on the aircraft. However, compared to the oil pattern on the right side of the rudder there is a vast improvement in the oil pattern and the airflow. Vortelators were placed at similar locations, on the flap, aileron, and anti-servo tab, as they were on the rudder, however, the airflow did not appear to be significantly improved at those locations. I believe the airflow was improved on the vertical fin rudder combination because of the shape of the rudder and that this combination of surfaces are flying at a zero or near zero angle of attack, whereas the other surfaces are flying at a given angle of attack.

Fig. 7

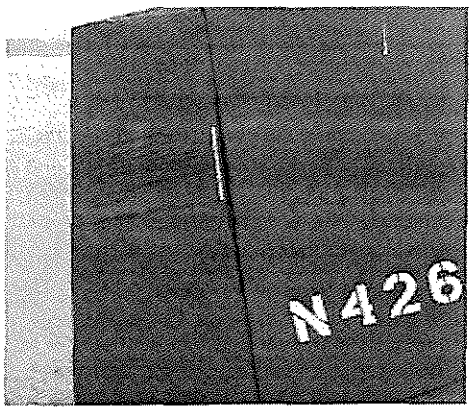
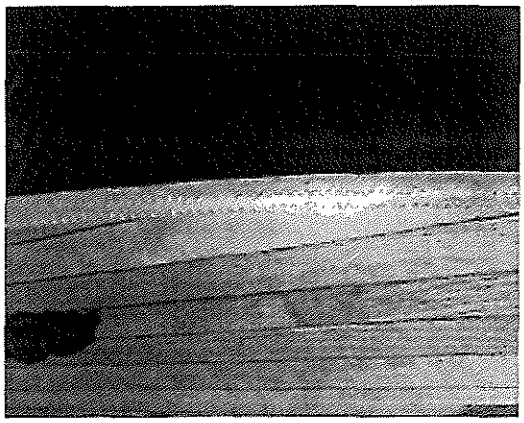


Fig. 8

Figure 9 is a picture of vortelators on Kim's propeller. Vortelators on propellers are also beneficial. Because of the results obtained from vortelating propellers on homebuilt aircraft I am currently working on obtaining a FAA STC for vortelating the propellers of certified aircraft. From installing vortelators on a variety of different homebuilt aircraft with different make and model propellers it has been established that vortelating propellers will increase the RPM by 20 to 50 and airspeeds by 2 to 4 MPH at full throttle level flight. These vortelators work on propellers be they metal, composite, or wood. These results are just from vortelating the propeller and are in addition to the performance increase gained by vortelating the airframe. The vortelators are placed on the portion of the propeller that gives the least thrust and the most drag. The vortelators can decrease the drag of the inboard portion of the propeller by a factor of ten. It even amazed me that two short strips of vortelators could do so much good.



After studying the results shown by figure 4 for some time the question gradually built up in my mind, would the vortelators on the wing lower the stall speed of the aircraft. In the vortelator kits I was developing for Cessna aircraft I submitted a report to the FAA that stated the vortelators would not effect the stall speed. Subsequent FAA flight tests proved that statement to be true. However, the Cessna aircraft do not have laminar flow airfoils, therefore laminar flow over the wings ends a short distance back from the leading edge of the wing. The Thorp has a laminar flow airfoil, therefore the air flow is laminar much further back from the leading edge than the Cessna airfoil. Figure 4 shows the laminar flow to go to approximately the 30% chord position. The question than becomes, does this then allow the vortelators to influence the stall speed in a similar way that vortex generators do. To find that out a flight test was conducted with tuffs on the wing to see what happens to the airflow during a stall in relation to the vortelators. Figure 10 below is a picture of the tuffs in slow flight.

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VORTELATORS, cont.

The air is flowing from right to left in the picture. The white color is a short strip of the vortelator located in the correct wing chord position to reduce the wing drag in cruse flight. Notice that the tuffs not only cover the vortelator but go outboard on the wing beyond the vortelator. This arrangement will show the airflow both over the vortelator and over the wing without the effects of the vortelator. Figure 11 below is a picture of the tuffs just as the nose of the aircraft is getting ready to pitch down from a stall. From figure 11 it is obvious that the airflow is separated from the wing well ahead of the vortelator so there is no way that the vortelator will help in reducing the stall speed.

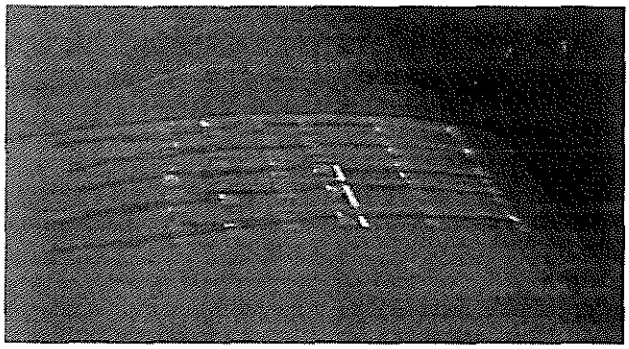


Fig. 10

Fig. 11

From all of this testing it was possible to determine where the vortelators should be placed to reduce the drag of this T-18. This allowed me to develop a vortelator kit for the T-18. Installation of the vortelator kit is a very simple procedure. I have developed an installation manual that is very simple to follow. The actual installation of the vortelators consists of cleaning the surface to which the vortelator is going to be placed. The vortelator is manufactured from a clear plastic material that has a pressure sensitive adhesive backing with a protective liner. Note that in the pictures the vortelators appear white. The vortelators in the pictures were painted white for better picture contrast. The protective liner is removed from the vortelator and the vortelator is adhered to the cleaned surface. Once the vortelator is installed it is difficult to see because its clear color takes on the color of the surface to which it is attached. To install the kit took about 8 man hours, a good portion of which was used just cleaning the surface to which the vortelators are to be applied.

After the vortelators were installed a flight test program was conducted that was identical to the flight tests described earlier in this article for obtaining the equivalent air speed. Naturally the question has to be what did the vortelators do for the T-18? It increased the speed of this particular T-18 by 4.6 MPH at the cruise power setting of 2,300 RPM's. Because of differences in construction and configuration of homebuilt T-18's it cannot be said that these modifications would increase the speed of any T-18's by 4.6 MPH. However, it would increase the speed of any T-18 by approximately the same speed as this particular T-18 within a narrow plus or minus range. I did not run my speed calibration tests at top speed, but rather at cruising speed because it was not my main goal to increase the T-18's speed. The increase in speed is a side benefit of my goal. My main goal is to make a more fuel efficient airplane. This kit gives one that opportunity with one of the following methods. One can continue to cruise at the same power setting he use too and save fuel by arriving at one's destination a little sooner. Or one can save even more fuel by throttling back to his old cruising speed and arrive at his destination in the same time he use too. I believe that the cost of fuel will only continue to increase, and that aviation gas will even escalate at a faster rate than auto gas in the years to come. As part of my efforts to further help alleviate the cost of fuel I have written a booklet on how to fly to use less fuel. This booklet explains the working speeds of an aircraft such as: speed for most miles per gallon of fuel, speed for most time per gallon of fuel, speed for best rate of climb, etc. This booklet explains these speeds with graphics rather than complex mathematical equations. Then this booklet shows you how to determine these speeds for your particular airplane by using simple multiplication factors based on the cruising speed of the aircraft. This booklet also gives procedures on how to fly and use less fuel. Included with this booklet is an adhesive backed aluminum placard with a table for listing your aircraft working speeds.

For those of you that might be interested in getting involved with vortelators I have done the following. Created a propeller vortelator kit with enough vortelator material to vortelate a propeller with up to three blades. The kit cost $25.00, ask for homebuilt propeller vortelator kit 259-200. Created an airplane vortelator kit which includes a 100 foot roll of vortelator material, more than enough to vortelate your T-18. This kit has enough material to also vortelate your propeller.

cont. next pg.

VORTELATORS, cont.

So with this kit it is not necessary to purchase a propeller kit. The kit cost $250.00, ask for kit 254-2 with addendum 254T-18. The booklet 120-1 "Fly to Use Less Fuel" and the placard that comes with the booklet are available for $20.00. All these items will help you reduce your fuel costs and help pay for the kits. There is also a handling and shipping charge of $7.50.00.

I would like to let you know that I am introducing these kits with the publishing of this news letter. As a special introductory offer, any purchase of kits made within one month of the publishing of this news letter will have 10% of the purchase price of the kit sent to the club treasury in your name

One additional thought, because there are just to many different homebuilt aircraft models out in the field to develop kits for, I have prepared a document that details how to go about testing an aircraft to develop a vortelator kit. For those reading this article that knows of someone who might be interested in developing a vortelator kit for a less popular aircraft, kit 254-2 with addendum 254-AD is available for the same price. However, if it is a more popular aircraft, one that I am interested in developing a kit for, I am prepared to work with that individual. By working with that individual means using his airplane to develop a vortelator kit for which he will receive a free vortelator kit.
These kits are available from:

Aircraft Development
1220 Red Oak CT.
Troy, MO 63379
(636)528-4967

TailWheel Chatter

A number of builders and pilots are choosing to update or change their tailwheel assembly. This seems to have escalated since Ken Brocks accident. Most seem to favor the Lyle Trusty tailspring, and many are choosing to use the tailwheel assembly manufactured by Aviation Products and available through Aircraft Spruce. Only time will tell if this is a better setup than the original flat tail spring and Maule set up, but so far nearly all that have the new Trusty spring with the A/P tailwheel combination seems to like it. Following are a few comments that were posted on the Thorp

cont

TailWheel Chatter, cont.

Email Group.

I have been running an Aviation Products tailwheel for a couple of years now. Mine is the 6" dual fork model. I have had absolutely no problems with it. The machine work on it is of high quality. I know of no reason to have to modify it. Like all tailwheels on T-18's, one must keep the tension on the connecting cables and springs tight.

Gary Green

I have several hundred hours on the aircraft products tailwheel on my T-18, have never had it unlock uncommanded, always perfectly behaved. My neighbor with two Eagles has had the same experience.

Tom Kerns
N10TK

The following are my comments on the Aviation Products Tailwheel assembly:

1. The wheel bearings as supplied won't last long. Luckily, the typical bearing house will have better ones. Part of the reason these tailwheels aren't (too) expensive is (I think at least for the 3.5" wheels) the wheel/tire assembly is sold in McMaster-Carr for use under low-speed material handling carts.
2. Put a spacer in between the inner races, so the axle bolt can be torqued properly.
3. The tailwheel unlocks at about the 45-degree point of travel from center. If you apply large rudder deflection with the tailwheel off the ground (like when landing too fast on a rough runway, and it bounces off the ground), when recontacting the ground with that much rudder deflection in, the tailwheel will unlock and then there are more problems.

cont. next pg.

TailWheel Chatter, cont.

Take it apart and remove some material off the "dog ramps" so it unlocks at the point of maximum rudder deflection = no more unintentional wheel unlocking.

Ed Pernic
N137EP

More Tail-End Information

I was reading an e-mail posted by Mick O'Brien(?) regarding the fracturing of the Tail Gear Spring Supports. I too am concerned about the problem many have encountered and I think there may be a good solution to the problem.

My belief is that the anchoring of the tail spring to the fuselage is not being stressed by the weight of the aircraft at that point. My airplane is still under construction and cannot really say for sure the weight has nothing to do with it; however, I did notice something which I think everyone needs to look at, sort of a "Service Bulletin" in my opinion, to be on the sure side. As I was attaching the tail spring to the fuselage on my airplane, I noticed a .10 inch gap between the leaf spring and the plate at the bottom of the fuselage after the bolts were ran-up to the fittings nutplates by hand. After a careful look and quick study (5 minutes) on the situation, I noticed a slight curvature in the area where the spring came into contact with the 1/4" spacer plate at the fuselage. This area of the spring leaf assembly should be just as flat as the spacer plate and the lower fuselage. Failing to have this required flatness will place lots of stress on the bolts, fittings and fuselage supporting structure when the bolts are torqued to the required values. Add the weight, vibration, bouncing and twisting the tail gear goes through when taxi, take-off and landing. Sure, you will eventually have a failure.

My suggestion? Go through a little trouble; take your gear loose from the fuselage, and put a straight edge

cont.

More Tail-End Information, cont.

on the spring in the area in question and check it out. I believe that when the springs leaf assemblies were fabricated, the curvature came back as a natural spring-back, considering the assembly was possibly cut from regular spring leafs, which might have had a slight curvature in that area to begin with.

How to cure the problem? Place the springleaf assembly on an anvil and smack it down with a small sledge hammer until it is flat. There shouldn't be a need to reheat to obtain the 186,000 hardness since the steel is extremely hard to begin with. Or, you can measure the gap at both—fwd and aft areas near the bolt and saddle retainer and insert a tapered shim to fill the gaps and replacing the bolts with the next required length for sufficient threads protrusion and ultimately torquing the bolts to the required values.

Don Doubleday

My T-18 has about1,300 hours on it, a lot of grass field operation, but NEVER a hard landing .... About 500 hours in I replaced the steel fitting witch attaches the tailwheel front bolt due to fatigue cracks. I used heavier steel on the new part. The front bolt is larger than what the plans show, I have seen these fail in other planes. At about 1,100 hours I preflighted my airplane and found that the tailwheel spring would rock from side to side: the AFT steel attach fittings were cracked! I replaced with one size thicker back there. There is no slop in my mounting brackets: damage is due to simple operational fatigue.

Tom Kerns
N10TK

As a follow up to an earlier post about tail wheel maintenance, I talked to Tom Felianco the T-18er who departed the runway at Harris Ranch, turned

cont. next pg.

More Tail-End Information, cont.

upside down. He said to tell you that a broken neck and a wrecked airplane is the result of ignoring your tail wheel. Tom said that prior to the accident, he thought his lack of directional control was due to him. He was having to control his direction on roll out with his brakes. Since he was using a 150ft. wide runway, that worked. Apparently the tail wheel was in a failure mode prior to the "final" accident. Tom said he had about a year ago taken the Aviation Products tail wheel apart and checked it and lubed it, and it locked fine then. However, in the last year he didn't pay much attention to it. He is expected to make a full recovery. The airplane is totaled. He will be selling parts that are good. This will not be until March at the earliest. I am going to help him disassemble the airplane and part it out. The engine is a low time since major 0-290D. Both blades of his wooden prop were broken so the crank will need to be dialed.
Tom said to tell you to pay attention to your tail wheel. And if you sense that you don't have good directional control on landing, don't assume it is your lack of pilot skills that is causing it!

Tom Hunter
N19XT

When I purchased my plane in the late 70's, it had a Maul tailwheel. I experienced cracking in the yoke adjacent to the axle shaft. I replaced it with a Lang tailwheel which has a very robust yoke and handles well. I have had no problems with the yoke, but I did develop cracks in the arm which is almost as serious. The arm is plated and appears to be heat treated. I personally believe the cracks were the result of hydrogen embrittlement from improper plating/heat treatment. I have had no subsequent problems with the replacement arm.

Hank Beamer
199MP

More Tail-End Information, cont.

Howdy Folks,

Yet another question. My tailwheel is wearing more on one side than the other. Standing behind the airplane you can see pad that attaches the tailwheel to the fuselage is twisted to one side. It's flat against the fuselage but still not level, I have no idea why. Crooked fuselage??? Everything looks straight up until that point. My A&P wants to put a shim under one side of the pad so the tailwheel will wear evenly. Is that a good idea? Seems like it will cause an area of stress concentration and who knows what else. This might be part of the same problem. While taxiing, my plane wants to pull to the left. The tailwheel is wearing on the right side. Any correlation there?

Eric Teder

What kind of wheel do you have? I bet it is a Maule. They are all twisted. I shimmed mine to a level situation and had straight wear afterward. I went to a spring shop and got caster shims for an auto or truck straight axle an cut them to fit. Simple fix and worked great for 1000 hrs. I now have the rod spring by Lyle Trusty. The only reason I changed was for lower drag.

Gary Cotner
N157GC

I had exactly the same problem on my plane. The tail wheel was a Maule unit and after reading about the problem from another Thorp owner, took their advise and switched to a Lang tail wheel and the problem was solved. There seemed to be some play in the lateral movement so I added washers to the compression spring assembly on the yoke of my tail wheel and now have positive control with no "slop."

Lane Olson

cont. next pg.

More Tail-End Information, cont.

I had the same condition you do with your tail wheel being out of vertical. I measured the out of vertical angle then ended up making a new bolster plate out of thicker material and milling the angle off the plate appropriately. Now the tail wheel sits nice and is wearing evenly.

Bob Pernic

I had a Maule SFSA tailwheel that did the same thing. The wheel puts a twisting force on the tailwheel spring because the axle is only supported from one side. I'm sure this imparts more load on one side of the mount than the other. The axle gets slop between it and the fork and pretty soon the tire is all crooked. I think they make a good paper weight. I wanted to replace it, and what made my decision final, was that I lost the wheel and axle upon touchdown. The clip that retains the axle is very light and that is all that keeps the wheel and axle from falling off. Luckily, steering with the brakes was no problem.
I replaced it with a double fork model that bolts right on the leaf spring. It is a little lighter and has much less slop in the steering mechanism than the Maule. Rudder movement is much less when taxiing now. The part is sold by Aircraft Spruce and is on page 217 of their 2002 catalog. The part number is 6122. The two things I had to change is to put 3/16" eye bolts on the new tailwheel as the eye bolts on the Maule were 1/4". I also replaced the bearings with much better quality ones from a local bearing shop (5 bucks each). Spruce sells these on the same page for about $12 each (takes 2).

Bernie Fried

I give up. What's the accepted way to compress the tailwheel springs so that I can shorten my chains? Any help appreciated.

Eric Teder

More Tail-End Information, cont.

Put the aircraft up on a box, unbolt the tailwheel from the support spring and do whatever you want to the steering springs and chains. Don't make it too tight though, you'll simply wear out the rudder busings and the tailwheel steering parts and you will not improve steering.

Joe Gauthier
N22607

With the tailwheel cocked one way, push the rudder in the opposite direction with your knee to put slack in the spring you want to work with. You should not need a lot of tension, just enough to keep them from going slack across most of the steering range.

Tom Kerns
N10TK

I simply unbolted the tiller arm, attached my springs, then pulled the whole tiller back onto the wheel. Be careful with tension. I found that too much tension made my tailwheel turn too far and it castored. I have since limited my rudder travel.

Jim Grahn
N831GR

Failed Rudder Pedals

A year ago, I suffered a broken rudder pedal in my T-18 (1,300 hours and 20 years). The pedal cracked where the vertical tube joins the horizontal cross tube. The crack was in the heat effected zone alongside the weld at that corner. Bad news is I failed to see it until it actually failed and the pedal went forward to the firewall. Good news is it failed while holding brakes on engine start. Scary news is my son was flying with my daughter as a passenger. The welds look fine,

cont. next pg.

Failed Rudder Pedals,cont.

but they were done 25 years ago by a friend who may not have known to normalize the 4130. Even if it was NOT normalized, I decided I wanted more margin. I built new pedals with 0.032" sheet metal reinforcements wrapped around the four lower corner joints. I did not reinforce the upper welds as they see less load and are not as critical (you can fly with one broken). I also painted the pedals white to make it easier to spot cracks down there (they were a tasteful black).

Has anyone else failed a rudder pedal?

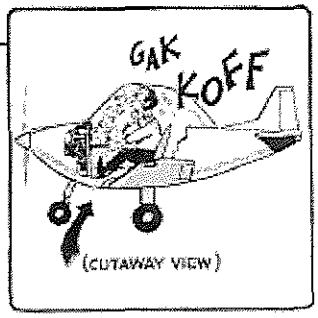
Tom Kerns
N10TK

Yes I did ....the reason N432YP has been down since the morning of 17 July 02. Broke exactly where you explained after landing @ AUN. Ended up in the ditch. My beauty Warnke prop splintered in bits... ugh ;(Harvey M. helped me take it apart afters. It happens real fast. Wished I'd shut the mags down... but good news. Shes' back on the straightend tho' half-as-strong right gear leg and GPU re-hung. Wing repaired and flap from Eklund painted and ready.
I repaied the pedals like you described with a toe-weld and reinforced half moon rectangled pieces over the chrome moly tube and made new center posts to the rudder cables. May be overkill and heavier but it looks much stronger! I'm determined to fly down to Spring training in Phx Az. and see some games with Harvey and Steph in March.

Stretch

Aviation Terminolgy

Firewall - Section of aircraft especially designed to allow heat and smoke to fill the cockpit.



TailWheel Vibration

I've started to develop a tailwheel vibration that lasts for a few seconds after touchdown. I can feel it in the rudder pedals and I think I can hear it too. Anyone got any ideas on how to troubleshoot this? My A&P thinks the rudder cables need tensioning. What would be a good tension for the rudder cables?

Eric Teder

Pedal return spring tension will have no effect on tailwheel shimmy, the weight of your feet alone is much more force than the springs. Tension of the springs from the tailwheel to the rudder are a player; tight springs add mass of the rudder to the system. Tighter is probably better but not necessarily: loosening can also de-tune the system. Some folks advocate using a stiffer spring on one side than the other to de-tune the rudder to tailwheel response some. If you do this, put the stiffer spring on the right side to keep margins for P-factor! If this is a new shimmy, changes in tire condition could be a factor, more likely it is the pivot bearings. The Maule tailwheel on my old Cessna was fine unless someone greased the pivot bearing: it needed a little friction for dampening. Loose and sloppy bearings could contribute to shimmy also. A loose steering arm on the tailwheel shaft will contribute to shimmy. The camber angle of the pivot is a big player, if your spring is bent, this could cause the change.

Tom Kerns
N10TK

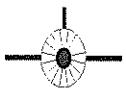
I have read all the other comments but I notice one is missing and this is the condition of the rubber tire especially if it is of the solid type and is well worn. The grease from the wheel bearing can soften the rubber and if the steel bearing support insert is becoming dis-bonded from it

cont. next pg.

TailWheel Vibration, cont.

then on touch down and spin up the tire grows, this can be uneven and will cause a real vibration that disappears as you slow down. When you look at the wheel you wont figure out what has caused it! Take the wheel off, clean out grease and see if the bonded tube is coming away from rubber. If it has come away completely you will already know about it!

Tony Schischka
ZK-VMS



Why Do We Do It ?

I remember being a 22 year old flight instructor at Buchanan Field, Concord, California, and there was this fella in town who had spent 6 years building a Thorp T-18. Since I was 22 and knew absolutely everything, I saw no sense in spending 6 years building a single engine airplane, when you could just go out and buy a manufactured one. Instant gratification. Well, the fella brought the T-18 to the airport, assembled it, and started taxi tests and all that. Several weeks went by. Then one summer evening, about 7pm, the weather was gorgeous, wind blowing 2 and gusting to 3. He taxied to the run-up pad. I'm going around and around practicing landings with a student and noticed the T-18 had spent about 15 minutes doing the run-up. I told the student to keep an eye on him because we just might get to witness a first flight of a brand new airplane. The T-18 was absolutely beautiful. The builder was a perfectionist and it showed. Finally, the T-18 called Buchanan Tower and stated he was ready for takeoff. The tower said, "Cleared for takeoff". The T-18 taxied onto the numbers and lined up on the centerline. He added power and the airplane accelerated right down the centerline. It lifted gracefully into the air and started climbing.

cont.

Why Do We Do It ?, cont.

Then suddenly, when the T-18 got to about 600 feet, we heard the sound of a mic button being pushed. The pilot used no words I had ever heard on an aircraft radio before. He did NOT say, "Buchanan Tower". He did NOT say his N-number, but there was absolutely no doubt about who it was. Because we heard the mic click and then, "IT FLYYYYYYYYS!!!!!!" It was the most excited voice I have ever heard. He flew for about a half hour before returning, and the airplane performed flawlessly. He really was a craftsman. When he got back, he could hardly talk. All of a sudden I realized why someone would spend 6 years building an airplane.

-- Author Unknown --

For Sale

Engine

I live in Boise Idaho and have a Lycoming O320 E2D with 450 Total hours
since factory new. It was taken out of a C172 back in early 70's for a T-18
project. Was pickeled very well I must say. I've had her checked and she's
fine. Accessories old and need rebuilt but it's all there. First 6K buys it
and no I will not take less. You must make arrangements for delivery. Will
be back from Thanksgiving on Monday
Richard Bouge
208-424-2234

T18 C

T-18C Serial Number 1166-99 Flown 700 hours and then damaged in an accident. It needs right wing, prop, and some paint. All new glass awaiting installation. Engine is a O-290. Daughter is selling the airplane for me. Asking about $9000.00 Contact Patty at 874-394-9456

cont. pg 17

Lets Remember

Kathryn Rowland Thorp

Born May 14, 1911 in Catheys Valley California
Passed away December 18, 2003
Laid to rest beside John Thorp in the Locke Cemetery, Lockeford California. Memorial services January 17, 2004 at the Locke House Chet Locke has arranged for the headstone to have Kay and John's picture (below) as well as a depiction of the T-18 placed on the stone.

Carl and Sue Daughters

A longtime Grover Beach kindergarten teacher and his wife, a registered nurse, were found dead Wednesday, November 13 - 2003, in the wreckage of their homebuilt plane after it crashed near the California-Arizona boarder. Carl and his wife Sue of Arroyo Grande were in a homebuilt T-18 single-engine airplane when it crashed Tuesday near Needles. The plane was reported missing after it left Glendale, Ariz., but never arrived at Santa Maria Public Airport.

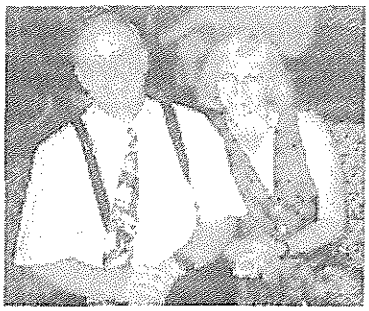
The Civil Air Patrol conducted a search and notified the San Bernardino County Sheriff's Department early Wednesday that the wreckage had been spotted in the eastern Mojave Desert, west of Lake Havasu, Ariz.

The NTSB, which is investigating the crash, could not say immediately what might have caused the accident. They stated that the weather along the flight path Tuesday,

cont.

Lets Remember

included 10-mile visibility. The pilot received a weather briefing at 8:24 a.m. and apparently left less than two hours later.



Carl and Sue Daughters

Carl Daughters, 56, taught kindergarten at Grover Beach Elementary School for 20 years. He also taught at various other schools in the Lucia Mar Unified School District for nine more years, according to his daughter, Anna Daughters of Grover Beach. "He was a very happy person" she said, adding that he always had a smile. Sue Daughters, 44 worked for the San Luis Obispo County Mental Health Dept. She was very organized and kept Carl on track, their daughter added "She was kind of his anchor" "They were always flying, even if it was a short trip," Anna Daughters said. He was a member of EAA's San Luis Obispo Chapter and an avid supporter of the Young Eagles program. The chapters Web site refers to him as "Mr. Young Eagle" for spearheading the local members' efforts to fly 1,000 youth.

Carl Daughters was a familiar figure around the Santa Maria airfield, where he housed his plane. "It's always difficult to loose a member of the airport family," said Gary Rice, Santa Maria Public Airport general manager.

Roy Medan

1/23/04 The pilot of a single-engine plane was fatally injured when the aircraft crashed at Compton Municipal Airport after nearly colliding with a helicopter that made an emergency landing, authorities said. The accident occurred about 10 a.m. in the 900 block of W. Alondra Boulevard, said Deputy David Cervantes of the Sheriff's Headquarters Bureau. The man, whose name was not immediately released, died at a hospital.

cont. pg 19

For Sale, cont.

I have two projects complete with plans for sale. Location is on Aero Country Airport at McKinney Texas. Major details are listd below:

N7JA my personal T-18, flown 900hr on a IO290G, wrecked in '89. Rebuild center wing and partial outer panels. Poor health prevented completing the rebuild.
Purchased Bob Roper's project, one of seven started in the Dallas airplane factory. Fuselage on the gear, C. wing panels finished, outer panels ready to rivet, really nice panel, GeeBee canopy still in crate, Mustang style cowl to be fitted; lots of work to be done. Have IO320 B engine disassembled, cam yellow tagged, cylinders mic like new, crank ok, pistons, rods, other small parts to be replaced.
Both projects have a full set of plans from John Thorp. Prefer email contact, but also can be reached by phone.

John Austin
john.austin@ntpcug.org
972.347.2030

T-18

All important 'mods' have been done. N97SE was finished in 1997 by Steve Erving, airport manager at Fox Field in Lancaster, CA.
Empty weight is 975lbs. 30 gal. Fuel usable. Lyc. 0-320 with high compression pistions. Estimated HP at 170. Sensenich metal propeller 70CM series with 77 pitch. Less that 25 hours since new! Also M76EMM-68-76 propeller cut down to 68inch dia. Harmonically tested for operation to 2,795RPM. Quad CHT and EGT gauges (Westach). Oil pressure, oil temp, volt meter, charging gauge, full night VFR panel. Analog gas gauge as well as TRU-FLOW digital fuel computer. Night lighting (instruments), strobes, landing light, nav lights. Narco VOR G/S LOC (UGR-3 receiver) not installed but operational when removed, antenna for Narco (not installed). Garmin GNC 250XL

cont.

For Sale, cont.

GPS and Comm.(updated data base) Left ignition is a Bendix Mag. Right ignition is electronic. Softcom 2 place intercom. King KT76 transponder w/AR-180 Altitude Reporter (Narco). AK 450 ELT. AUX fuel pump (electric). Vacuum pump. Cabin heater. Mentor audio panel M/N APM-1 (Not installed)
Total time on engine is approx. 4420
SMOH (Mattituck!) 1280
STOH (high compression) 370
TTAF 370
Prop since new 25

HONEST 161K cruise at 8500MSL.(A little faster with the other propeller, includes spacer)
$36k OBO

Bob Johnson
badbob007@rtinet.com
541-369-2777

T-18

1982 T-18 for sale. O-360 w/cs prop. 1100 tta, 1100 smoh. Skytracker Color gps, Intercom, Ky-97a, CHT, EGT. Night VFR equipped. Very nice airplane. Based at CCB. $34.5k obo.

pngreenfield@earthlink.net

T-18

1980 T-18 for sale. O-320, 1010 TT, 1010 SMOH.Second of 3 T-18s built by Ken Patsch. Very nicely built airplane. Listed in TAP with pictures. Compression ratios in mid 70s on last 4 annuals. Oil analysis done on most oil changes. New seals installed 2 annuals ago. Miminal to no oil leaks/ excessive oil burning. Basic VFR. Comm and encoding altimeter. Landing lite. Remote oil filter installed. 8-9 exterior. 7-8 interior.

cont. next pg.

For Sale, cont.

Hangered last 4 years. Located at Winston-Salem AP, NC. $25,500. Will deliver for costs; gas, motel if needed and airfare back to Greensboro AP

Tom King
waldoking@aol.com
336-416-5184

T-18

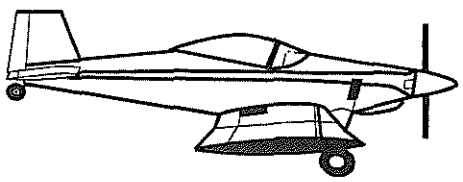
MY T-18 IS FOR SALE, IF YOU KNOW OF ANYONE INTERESTED.

JERRY TINDELL
334-899-5971
jerrylinda@graceba.net

S-18

551 CM is a wide body with folding wings. After a prop strike, and an insurance settlement, Performance Aero pulled the crankshaft and magnafluxed it for cracks. New biscuits were installed in the engine mount and also 2 new Hartzell constant speed prop blades. Like new engine just broken in. Features include JP instruments with fuel flow, GPS flip-flop radio, battery charger, a Sky Tech starter which is 8.5 pounds lighter and starts on the first prop revolution. Includes many innovations too numerous to mention.
This award winning plane (Ladies' Choice) was built with the technical advise of Ken Knowles. Comes with custom covers. Hangered at Chino Airport - Chino, CA. 106.2 TT on the airframe.

Mel Clark
714-897-3370



cont.

For Sale, cont.

Project

80% complete T-18 project, 0 time 0-360 engine, Good workmanship. Death forces sale.

Marilyn Roberts
909-599-9560
San Dimias, CA.

Stuff

I have the following items for sale:

Cowl, Baffling w/ landing light $500.00
Cross over exhaust (Dean Cockran ?) w/ carb and cabin heat boxes, plus Carb Airbox.$500.00
Prop and Spinner $1050.00
Above as removed from John Walton's 0-320 powered T-18 with 700 total time. Cowl is a Fiberglas copy of John Thorp's metal cowl. Baffling is believed to be complete but was removed from engine when I bought firewall forward. The oil cooler was not included but had been mounted behind the left cylinder. Landing light in the cowl inlet. I believe the carb airbox to be one made by George Leader (sp?) As I remember my conversations with John, the prop had been checked by Santa Monica Propeller. The polished spinner I believe from Ken Brock.

Wally Hunt
815-262-3153
t18wgh@aol.com

Engine Mount

I have a new (never used) engine mount for the T-18. It is a dyna-focal type 2, which means it only fits the IO-320 series engine. I believe it was built by Ken Knowells. It is in very good condition, and I'd take $150 or best offer.

Dean Houseman 573-576-1208

Lets Remember, cont.

The circumstances of the crash are under investigation. (Above reprinted from local new report)

The T-18 ran off the runway and flipped over. Witnesses say that the plane was just landing and while rolling out, a helicopter descended over it. It is thought that the 'copter's downwash caused the pilot, Roy Medan, to lose directional control. The plane went over on its back next to the runway. I would have thought that the plane would stay upright and roll as it was already on the ground. Maybe the rotor downwash caused it to flip.

Email From T-18'er Jack Kenton

Lets Remember, cont.

We have lost some wonderful people in the last few months. No-one yet seems to know the circumstances of these accidents. Lets all take a moment to remember our fellow aviators, and above all else .... be Very Careful out there.

Aviation Quote

If you can't afford to do something right, then be darn sure you can afford to do it wrong.

Charlie Nelson

2004 EVENTS

April 13-19 ~ Sun 'n Fun Fly-In - Lakeland, FL. We are planning a dinner-forum at Bill's at Dranefield Deli 3043 Dranefield Rd. It is located across from the airport at the approach end of Rwy 23. Date is 16 APRIL 2004. More details to follow..
Bill Williams ~ n360ww@yahoo.com

May 14-16 ~ These are the dates of the new Mid-Atlantic Fly-In and Aviation Convention to be held at the Lumberton Airport in Lumberton N. C. While the full schedule has yet to be determined, I have met with the organizers and have been assured that there will be a lot of flying, an air show, forums, vendors, camping and all the other good stuff that goes with an old time regional fly in. Lumberton has over 1600 rooms. If the interest is there, I will scout out a good motel and set up a deal for us T-18ers. This part of N. C. is known for great bar-b-que and I'm sure we can find a place to hold a dinner on Saturday night.
Please let me know the interest via email and I'll carry on accordingly.
Bob Highley ~ 813-646-3466 ~ n711sh@aol.com

July 27 - Aug 2 ~ EAA Airventure - Oshkosh, WI.

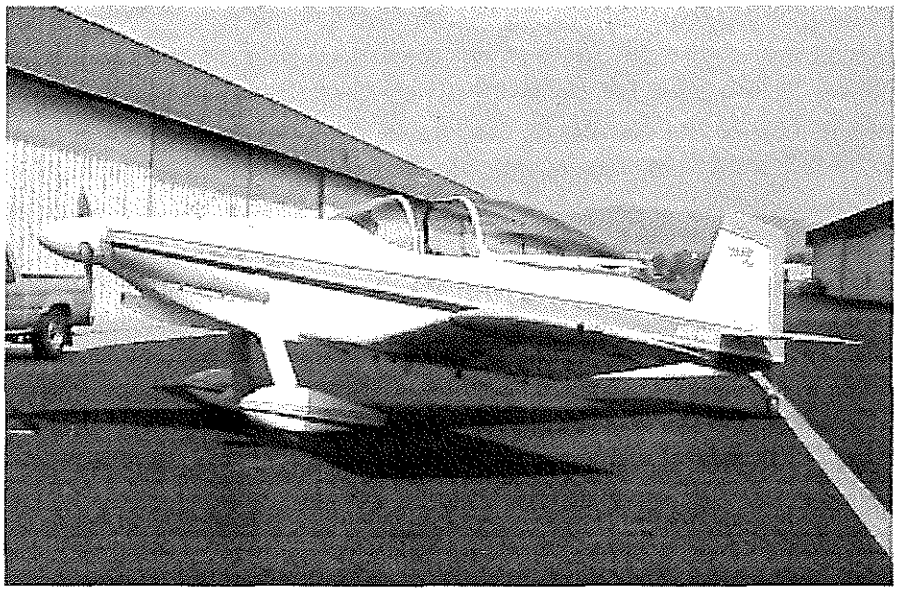
October 8 -10 ~ Annual Kentucky Dam Get-Together - Gilbertsville, KY. For more information contact Teresa Scola at: btscola@aol.com or 847-437-7153

T-18/S-18 Thorp Newsletter
Roy Farris
P.O. Box 182
Noble, IL. 62868
Phone: (618)723-2594
email: rfarris@shawneelink.com

Janurary 2004

IS THIS YOUR LAST ISSUE OF THE T-18 NEWSLETTER ?

Please take a look at your mailing label above. Look at the line just above your name. If you see "Membership Expires Dec. 2004 (or higher) then you are ok. I am mailing this first 2004 issue to everyone on the mailing list. If you have not paid your T-18 Mutual Aid Society membership dues, then you will see "Membership Expired Dec. 2003" on the label. Your MAS membership has expired, you will not receive any further newsletters, and all T18.Net website access will be terminated. If you have simply forgotten ... don't panic ... just send me your dues now and your membership, and your newsletters will not be interrupted.



Randy Noyes's T-18 ~ N964RN ~ Torrance, CA.