

# Turn & Bank



OFFICIAL NEWSLETTER OF RAAC CHAPTER 85

July 2003

**Circuit Breakers  
Underwater Egress  
Lots of Important  
Notices!**



**Important notice:  
The July Meeting will be held  
WEDNESDAY July 2  
so as to avoid conflict with  
Canada Day celebrations**

# Inside



**On The Cover:**

It looks like a homebuilt Piper. Any ideas? Mark Munzel pic. Above: Everybody's Favourite Airport Dog, Jasper. Woof!

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The TURN AND BANK is the monthly publication of RAAC Chapter 85 and is intended to keep members informed as to the club's activities, and to promote safety and technical excellence in the field of sport aviation. No responsibility or liability is assumed, expressed or implied as to the content of articles contained in the Turn and Bank: the intention is to provide a forum for discussion and exchange of ideas.

Newsletter contributions should be mailed to George Gregory, 19470-88th Avenue, Surrey, B.C. V4N 3G5 no later than the 12th of each month. Business Fax is (604)-469-3495. Please remember to indicate "attention George Gregory" on your fax. George's email address is:

[gregdesign@telus.net](mailto:gregdesign@telus.net)

Enquiries to the Membership Chairman should be mailed to Rob Prior, 3032 Carina Place, Burnaby, B.C. V3J 1B5

For inspections of Amateur Built Aircraft Projects contact the MDRA Inspection Services , ph. 1-877-419-2111 fax 1-519-457-0980 email: [mdrainsp@on.aibn.com](mailto:mdrainsp@on.aibn.com)

Regular Meetings are held on the first Tues. of each month at 20:00 (8pm) in the clubhouse:  
 Delta Airpark, 4103-104th Street Delta, B.C. Clubhouse phone: 596-3644

Mailing Address: Chapter 85, RAAC  
 c/o Delta Heritage Airpark, 4103-104th St., RR#3, Delta, B.C. V4K-3N3

Executive meetings are on the third Tues. of each month at 19:30 (7:30 pm) in the clubhouse.

Chapter aircraft pilots, mail cheques (Payable to RAAC Chapter 85) to:  
 Tedd McHenry

RAAC National Homepage: <http://www.raa.ca>

RAA Chapter 85 Homepage: [http://www.b4.ca/raa\\_85](http://www.b4.ca/raa_85)

Delta Heritage Air Park Homepage: <http://home.istar.ca/~bb4>

Source for CARS and Chapter 549 Airworthiness Manual: <http://www.aerotraining.com>

RECREATIONAL AIRCRAFT ASSOCIATION CANADA  
 Delta Heritage Airpark  
 Vancouver, B.C.



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# Technical Guy

The Deliberately Weak Link in the Electrical Chain  
By Mike Murphy  
reprinted from the Recreational Flyer

Circuit breakers! They stare at you from panels at your knees, overhead, behind you or perhaps on the console between you and your crewmate. Occasionally, they trip. Just what do these humble yet hardworking devices do, what does it mean when they pop and, just as importantly, what do they not do?

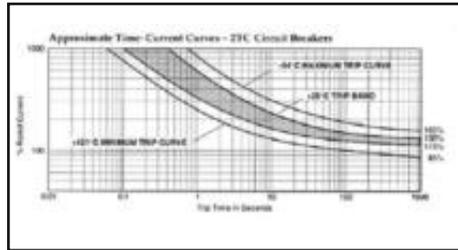


An Aviation Circuit Breaker  
Picture courtesy of Texas Instruments

Circuit breakers probably don't get the attention they deserve. However, several recent high-profile aircraft disasters have reminded us that assumptions, misunderstandings or neglect of critical components, even small ones, like circuit breakers, can have tragic consequences. The problem is even more acute as aircraft become increasingly dependent on highly integrated electronic systems for navigation, stability and control. Fly-by-wire aircraft are obviously totally dependent on electricity for safe operations.

Aircraft circuit breakers are designed to interrupt the flow of electrical current when specific conditions are reached. Those conditions of time and current, generate heat. Circuit breakers are designed to trip (open the circuit) before this heat damages either wiring or connectors. A specification might be for a breaker to trip under a massive short jolt (e.g. 10 times the rated load of the circuit-breaker for between .5 to 1.4 seconds) or a longer, less intense overload (e.g. twice the rated amperage for 3-130 seconds, depending on the type of circuit breaker). If the designed overload conditions are not exceeded, the circuit breaker will not trip. Some breakers are temperature sensitive and will trip earlier

when warm than cold. See the attached Trip Curve.



Typical Trip Curve  
Courtesy of Texas Instruments

This highlights one of the limitations of circuit breaker design. The very tolerances that must be built into a circuit breaker to prevent nuisance tripping, such the high transient current that flows when a motor or component is started, means some glitches may not trip the breaker. Ticking faults and arc-tracking are examples. Ticking faults occur when tiny bolts of electricity intermittently arc from exposed wire conductor. On wires covered with aromatic polyimide wrap, installed in many aircraft built since 1970, this can burn the thin insulation, converting it into carbon, which is an excellent conductor - a nasty case of the insulator turning into the conductor! This can in turn lead to very short bursts (micro-seconds) of violent arcing where localized temperatures can reach extremely hot temperatures (well in excess of 1,000°C) capable of igniting nearby flammable material. Nevertheless, short, violent bursts of arc tracking will not necessarily trip breakers, which are comparatively slow-acting devices. Special arc fault circuit interruption devices, still a few years away from widespread use in aviation, are needed to deal this type of situation. If your aircraft has aromatic polyimide wire, there are very good reasons not to be in a rush to reset any tripped circuit breaker. The results could be catastrophic.

Circuit breakers are not intended to protect the electrical equipment, which may have its own built-in protection or mitigation system, but the wiring and connectors, which would otherwise have no such protection. Aging, vibration, excessive bending, improper installation, heat, moisture, friction, wind blast, chemicals such as de-icing fluid, toilet fluid, hydraulic fluid, oil and fuel can damage the insulation on the wire, if not the conductor itself and any connectors. In addition to disabling the circuit and any associated component, this could also create a fire

hazard, possibly in an area where it could be impossible to use extinguishers and that could easily threaten the safety of the flight. With any in-flight fire, especially one in an inaccessible location or close to critical components, an immediate landing becomes a very high priority. Because such an option may not always be readily available (e.g. in mountainous, arctic or oceanic areas) adequate circuit protection and a good knowledge of what it can and cannot do, is essential.

Circuit breakers, are thermal-mechanical in nature. Bimetallic elements, with one metal expanding more under heat than the other, pop the breaker open. This also enables them to be reset, albeit only after they have cooled down. However, there are good reasons why it MAY NOT BE ADVISABLE to do so, as we will soon see.

On many light aircraft, the circuit breakers are mounted along the bottom of the instrument panel. Many are flush fit and cannot be manually tripped or pulled. On larger aircraft, they are usually grouped in panels placed around the cockpit in locations were they would not be displacing vital instruments, switches or controls, and most can be manually tripped or pulled. Having them within sight and reach, although a necessity is both a blessing and a curse. A blessing because they can be seen and, IF NEED BE reset. A curse, because it is tempting to use them for a purpose they were never intended (i.e. as a switch) and to reset them when they should not be reset.

The electro-mechanical construction of a circuit breaker was not designed for use as a switch, and using it for this purpose causes premature wear and the risk of failure. When a circuit breaker fails, it will take down a system, which may be needed for the safe operation of the aircraft; or it will leave on line a circuit that should be de-energized. Both alternatives are unattractive, and both are capable of inflicting catastrophic consequences.

It is wise to think twice before resetting any circuit breaker in flight. It is telling you something is wrong - that there has been a serious electrical event. This danger signal must be interpreted with extreme caution. The old rule of thumb to automatically allow one reset is not prudent. Safety-conscious airlines are now telling their crews not to reset any breakers unless they are essential to safety and then to do so only once. Wherever possible, this should be done only after consulting

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# Bulletin Board

Last I heard, Norm Helmer is looking for someone to help or take over his Paradyne project. The Paradyne is a cutting edge new concept in STOL aircraft that shows promise. He's now residing at the George Kerby Centre in Burnaby. His phone number is (604) 527-8970.

Due to July 1st, Canada Day, being a Tuesday, THE JULY MEETING WILL BE HELD ON WEDNESDAY JULY 2.

Don't miss the **CHAPTER FLY-IN, SLATED FOR JULY 5**. It's going to be great!

And speaking of Arlington, the EAA NorthWest Fly-In begins July 9, and runs through to Sunday, July 13. Maybe there'll be a Tailwind there this year...

## RAA Homebuilders Meetings

Chapter 85 of the RAA is offering members a chance to visit interesting projects which are underway in the Lower Mainland. These visits will be part of our educational/entertainment activities. They will be scheduled on the second Wednesday of the month. Date and times to be announced in the Turn and Bank Newsletter.

In addition if there are members who would like to extend an invitation to others to meet, view and discuss a project concerned with amateur built aircraft they are encouraged to contact John Macready or Tim Baker to make arrangements.

The first project will be hosted by Terry Wilshire at Industrial Laser Cutting on Wednesday July 15 at 7:30 PM. The address is #7 -7504 Vantage Place, Delta, BC. It is situated near 76 St and River Road. The phone Number is 604-946-4152. Please check at the July General meeting to make sure this event is on.

Terry has a replica Spitfire near completion and he will be willing to discuss the manufacturing and production processes he uses to make this aircraft

## New Rate for Turbi

Tedd McHenry, Aircraft Chairman

The Chapter Executive has decided to raise the hourly rate for the Turbi, and to change the rate structure. The Turbi isn't raising enough revenue to cover its costs. We hope to raise a bit more money with the new rate, and we also hope to discourage extremely short flights with the new rate structure.

The new rate will be 60 dollars per hour, wet. There will be a 30 dollar minimum charge, per use. "Per use" means that you can do

a short out-and-back with each leg less than 0.5 hours and only pay the minimum charge once, not on each leg. But if you make a single flight of less than 0.5 hours you pay 30 dollars.

The new rate will take effect after the July general meeting.

## Remembrance Day Formation

Tedd McHenry

The Remembrance Day formation will be organized a little differently this year from the past few years. If you want to participate, it's essential that you let me know as soon as possible, because there will be a limit on the number of aircraft, and we will start the practices earlier than in previous years. We're going to establish a minimum number of required practices, and you will have to meet that requirement to be eligible to fly on Remembrance Day.

Eric Munzer has volunteered to lead this year's formation.

As in previous years, the formation will be built from three-plane elements. But this year I'm going to identify specific pilots and give them additional training as element leads, well in advance of Remembrance Day. Regular formation members (wingmen) will practice first with an element lead, as a three-plane formation, before we attempt to put together the full formation. Wingmen will simply position themselves relative to their element lead, and will not have to spend as much time watching the planes ahead of them as in previous years.

The objective is to create a more uniform and safer formation by putting the primary responsibility for spacing on the element leads. The element structure will also allow a more orderly and efficient break-up of the formation at the end of the flight. A third benefit is more orderly handling of emergencies. If an airplane has an emergency, the entire element can separate from the formation and the other two airplanes in the element can, where possible, help the airplane with the emergency.

Three pilots have volunteered to be element leads: Hammy McClymont, Donn Hubble, and Bob Solway. Along with Eric, that makes four 3-ship elements for a formation of 12 airplanes. That will be the maximum. However, to allow for unservicable airplanes or pilots I would like to have a couple of back-up element leads as well. If you would like to be trained as an element lead, please contact me (604-574-4764 or tedd@mchenry.ca).

## Minutes Jim Hunter

### Minutes of the General Meeting, 3 June, 2003

Call to order: 8:00 pm by President Tim Baker.

Hunter/Walker: that the Minutes of the General Meeting of 6 May, 2003 be adopted as printed in the Turn and Bank. Discussion carried.

Correspondence: none received.

### Committee Reports:

Treasury: Don Souter: Verbal report by Don.

Membership: Rob Prior: We have 118 regular members. A total of 138 of all types.

Buildings: David Bell: Some wood is being built into the base of each of the 22 segments that make up the walls of the building. This is to remove the rotting portions down there. Building should now last us another twenty optimistic years. From Dan Weinkam: Going well. Shop has been rented for the last week.

Library: John Macready: Going OK. John looks for ways of getting long overdues back. He will start breaking legs soon. Avoid this

cruel fate by returning overdues. You know who you are and so do we!

Vice President: Gerrard Van Dijk: OK Gerrard ran a successful 50/50 draw tonight.

Newsletter; George Gregory: No problems. The usual plaintive plea.

Program: Tonight, Tedd McHenry will meet with all members contemplating being in on the Remembrance Day Fly By.

RAAC: Rob Prior: Got a Rotax? Need a Service Bulletin? See Rob.

-The strip at Nelson apparently under threat of closure by locals. See Rob for info on how to oppose this. Nelson a perfect stop over if

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# WENT SWIMMING TODAY - AGAIN

## UNDERWATER SAFETY AWARENESS TRAINING

by Ken Armstrong

*reprinted from the July 2001 issue of the  
Recreational Flyer*

It was only a positioning flight from a grassy open area that would have me climb over a row of 30 foot tall willows along the shoreline and I would only pass over the edge of the lake for less than 20 seconds to go around the 150 foot Douglas Fir trees. Nonetheless, I decided to don my "Bone Dome" (helmet) and personal floatation device just in case. I'm sure the observers thought I was overly cautious until the engine quit just as I cleared the willows and the CH 701 aircraft plunged into what I thought was shallow water.

I didn't have time to plan the impact, open doors, remove my headset or prepare for my egress in the milky water that had only just shed it's icy cover. To be succinct, I wasn't mentally prepared for sudden submersion. The next thing I knew, I was trapped in the cockpit - that is until I realized I needed to undo my seat belt!

I was lucky to escape the quickly sinking ship and after inflating my PFD for the short swim to shore I was rendered useless by hypothermia. However, there are hundreds of aviators who pay the ultimate price when they are unable to exit an aircraft because they become confused and shocked by the sudden impact and cold water. It doesn't have to be that way.

My concerns about my less than perfect handling of my own ditching situation motivated me to contact Underwater Egress Ltd. of Victoria, B.C. Canada so I could greatly increase the safety margins on my numerous overwater flights and the likelihood of a successful escape from more challenging conditions that might be part of my future Karma. Company president and commercial pilot, Bryan Webster, recently opened his training facility on this western edge of Canada to augment another company's east coast train-

ing facility in Dartmouth, Nova Scotia.

Similar to this author, Bryan has ridden a few aircraft down for unscheduled landings and has become acutely aware of the challenges associated with survival during the first few seconds after impact. My interest in ditching was greatly augmented by my own experience and reading articles on the topic led me to believe I was quite knowledgeable. However, I found the five hour classroom and pool course much more comprehensive than anticipated and garnered a tremendous number of tips - any one of which could save the lives of my passengers and self in the future.

The first question Bryan asks his trainees is; "How many of you wear a life jacket when flying over water?" Apparently, I am the only client who has ever raised his hand. Some may think I'm a woose, but let me explain my policy. If I will be flying alone and beyond gliding distance from land, I know I will not have the opportunity to don a vest after an engine or control problem develops - so it must be donned before take off. If I will be at altitudes that allow me to glide to a safe landing spot or there is another pilot who can take the controls, I will have the PFD within reach. Of course, various problems could arise that would dictate the life jacket should be worn at all times and I certainly respect anyone who chooses to constantly wear one over the water - and laud him if he insists passengers do too.

Before taking the course, I anticipated a ride in the cockpit simulator dunk apparatus and that would be it. However, the pool portion of the training is much more comprehensive. One takes a minimum of six dunks with ever increasing complexity in two different cockpit styles. It should be noted that a broad spectrum of safety procedures eliminate all risk - in fact some previous trainees couldn't even swim! All scenarios have been thoroughly practiced allowing the students to concentrate on procedures without fear.

**First, There is Always Ground School**

Bryan teaches attendees the basics of cockpit egress, life preservers and orientation. It's amazing how many die because they become disoriented in the cabin. Often, they find the door handle and then break it off trying to turn it in the wrong direction! Others get out of the cabin with their PFD's but their cold wet hands are unable to tear open the sealed plastic containers that hold the vest. (Cut a notch in your plasticized PFD storage container with scissors so they can be torn open during an emergency.)

I was reminded that any time one carries an inflatable life raft, one must carry a heavy knife adjacent to the flight controls. If a raft ever inflated accidentally in the cockpit it will expand against the instrument panel filling all space and jamming the control column into a full nose down attitude!

We learned that the front windshield/bubble often "explodes" off the aircraft during impact and the pilots are met by a wall of water. This can not only knock the crew unconscious and disorient them, but it also has a tendency to turn headsets into weapons as Bryan learned when he swallowed a microphone during a crash. As a result they should be removed and stowed prior to impact. Also avoid headset jack installations that go up into the panel rather than horizontally into the plug as they will not pull out if you try to exit with the headset on. Bryan learned this the hard way too as he was trapped in the sinking cockpit for a few extra seconds before he was able to untangle the cord that wrapped around his leg during the contortions associated with impact.

A few other tips include: 1) Tuck the seat and shoulder harness loose ends under the strap as they also have a tendency to wrap around and snag occupants after violent impacts, 2) Dress to avoid hypothermia as average water temperatures of 4 degrees in our climate are not supportive of

survival, 3) Pop the cabin doors open slightly on short final so they do not twist and jam on water contact, 4) secure all cargo before flight so it doesn't become a phalanx of weapons and so they don't jam occupants in the cabin. These are a small sampling of the tips provided by Underwater Egress Ltd. It's important to note that ditching aircraft occupants have a 250% greater chance of surviving after egress training than the untrained general public. Last week a Beaver floatplane overturned in gusty winds near Seattle and the two occupants attributed their successful escape to Bryan's training a month

previously.

A film of an actual crash showed me how little floatation was provided by airline-like seat cushions. Don't plan on surviving post-crash using a cushion in anything but smooth water - unless you weigh less than 100 pounds as much of your head will be under water due to the marginal floatation. I suppose aircraft designers reckon an airliner break-up in the water will not

be survivable, so why take floatation seriously...

### **The 30 Second Conversion to a Floundering Idiot**

Ground School stressed it's extremely important for pilots to learn the procedures that will automatically save themselves and their passengers because once an individual's face is immersed in the frigid, murky water, they will become "a floundering idiot within thirty seconds. While these words were poignant in class, my pool experiences really reinforced the verity of this statement.

#### **Come Plunge to the Depths With Me**

During my first plunge, I didn't stabilize my position in the cockpit by holding a firm object after water impact and I released my seatbelt before the "aircraft" motion ceased. The gushing water filling the cabin pushed me out of position jamming me in the rear of cockpit and I became disoriented. In no time at all, I could feel the rush of panic beginning and it was only my knowledge that the staff could immediately extricate me from the cylinder (if I failed) that allowed calm to be restored so I could figure out my escape. As complications were added to each successive dive, memorization of the procedures allowed our class to easily overcome any

complexity and the confidence gained allows subjects to carry out the necessary procedures with cool aplomb.

### **What are the Secrets?**

The course is so intensive, it would be impossible for me to teach readers all they need to know in the scope of this article. But a few suggestions are in order. Prior to impact, doff your headset, crack the doors open, take a deep breath and hold on (while protecting yourself from any controls that may try to impale you).

It is quite possible that the aircraft will become inverted after impact so it is very important to orient yourself and not release your seatbelt until the cockpit has stabilized. Also, hold onto a structural member in case your seat breaks off the tracks and you might rotate relative to the cockpit escape routes. If in doubt which way is up, you can release a little of your breath for a bubbly indication of the direction to the surface. And, don't forget your passengers. Rescuing our simulated passengers was one of the greatest challenges of our training. We were reminded that any loose objects and unbelted passengers during a crash become projectiles!

While the doors and windshield may pop off the airframe when it "meets" the water, they may not. To rescue your passengers you may have to go through a side window - we practiced for this worst case scenario. If the doors have not been jettisoned or opened prior to impact, they may twist and jam. You may be able to kick out or shatter a window with your foot or with a heavy

duty knife. In the pool, we used a window with non-standard latches that we needed to pull two passengers through. We were very challenged as the gulp of air we

hastily gasped from the surface was precious little to squeeze through the window into the cabin where we had to unbuckle our flailing passengers and pull them to the surface. Believe me the physical exertion was immense! However, you've got to try to save your passengers as most of us could never live with ourselves if we didn't do our level best to save those lives. So it's a hard won skill we had to learn. Remember also, do not inflate your PFD till you reach the surface lest the buoyancy pins you under some structure.

### **Get Wet, Save Lives**

Water egress training is somewhat similar to engine failure and forced landing practice. There are a number of skills involved, technical analysis of the situation, ground school information and hands on practice. Also similar to an engine failure, if you fly long enough you will likely have an unplanned splashdown in frigid, turgid water. When it happens, will you and your passengers live to tell the tale?

Having learned the complexities and skills associated with the successful escape and then rescuing simulated passengers from a cabin I can heartily recommend this training for anyone who may venture over the water. At only \$350, the course is one quarter the price of competitors that cater to professional pilots and possibly the best insurance premium you will ever pay as an investment in safety. For more information, contact Aviation Egress Systems at 200 Hart Road, Victoria, B.C., Canada or phone (250) 704-6401. Remember, the life you save might be your own.

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### **Minutes** *continued on page 8*

you are flying thru the Rocks.

-The Kitchener (and Waterloo?) chapter has a "Test Fixture" available to use. It is for testing the strength of aircraft structures. There is to be an article on this in the next "Recreational Flyer".

Aircraft: Tedd McHenry: Turbi flew 26.6 hours in May (Excellent WX helps!) But, members taking the airplane away on long or even over night trips, please write up your intentions on the black-board - a consideration for other members wanting the airplane!

Airpark Committee (DHAPCOM): Terry

Wilshire: On Wednesday, June 11 starting about 3:00 pm, there is to be a gathering of about 50 parks officials from all over North America and even beyond brought to DHAP by GVRD Parks folk. They are here to see how the unlikely pairing of a working airfield and a nature park can be made to work as it does here. It's unique; there is no other similar facility anywhere in the world.

The GVRD people would like to see a representation of various types of aircraft on the field. if you can help, be there! (Grub is offered).

Old Business:

Fly-In July 5. We have lots of aircraft par-

ticipation lined up, but if you know of any antique ground transport that would like to show itself, see Tim Baker. Things like antique farm machines, old cars, cottin gins on wheels etc would be welcome.

New Business/Announcements:

RV Fly-In - Langley, Saturday June 7

Friday, July 4 Annual Chapter 85 Major Clean up. come and get dirty whilst cleaning up. a remote possibility of free beer.

Prior 2/Nicholas: that we adjourn and it being a reasonable idea, we did.

Jim Hunter, Secretary.

# CLASSIFIED ADVERTISEMENTS



## DEMEL AIRCRAFT CORPORATION

### Parts and Supplies

Brackett Air Filters  
Gill Batteries  
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Champion Oil Filters  
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Classified Ads are free (within reason) to members. Display Ad rates are:

Business Card:\$25 per year

1/4 page:.....\$10/month.....\$100/yr

1/2 page.....\$15/month.....\$150/yr

1 page:.....\$25/month.....\$250/yr

Ads that have been in for more than 6 months are subject to removal if space is required for other stuff. Please contact George the editor if you want it kept in.

For Sale: SIROCCO PROJECT

*Notice: The author of the following advertisement having returned to his right mind has come to realize that saying \$15,000 firm and etc. in the ad was a decidedly unbright thing to say. Therefore, being anxious to sell and unable to work on it himself, he is now willing to (Saints Preserve Us!) NEGOTI-ATE. Please read on - and call!*

Fuselage, canopy, tail group complete. Air frame control components done except for cable. Main-wheel gear, wheels and brakes done. Tail-spring and wheel included. Panel made, no instruments. Lycoming 0-290 GPU Zero-timed. Will Neubert stainless cross-over exhaust with stainless muffler/shrouds. Bendix PSC5 carb. Bendix mags with

non-shielded leads. no starter, starter ring or alternator. Weldtech engine mount. McCauley prop.

Wings: ribs and minor spars done. Spar diaphragms done. Two spar-grade spruce planks. No other wing parts.

Jim Hunter 576-2678

FOR SALE:

1957 Tripacer Wings uncovered, all reworked. New leading edge. New ash tip. All Zinc Chromate ready to fabric. Included: 2-18 gal. gas tank, 2 - gas tank cover, landing light, aileron and flap, front and rear struts. Asking \$4000 Canadian.

Roger Gauthier (Kelowna) (250)-763-1529 (250) 212-0832 (cel)

Wanted: PA 18 or PA 20/22 Wings. Some damage OK 946-5881

FOR SALE: One set of 1500 Murphy floats ready to go.

Ole #45-3931 198 st. Langley BC 514-1280

FOR SALE: 6 Factory new Franklin 180 hp cylinders includes installed valves \$300 each, will not part out.

Tim Novak 271-8586

FOR SALE: Softcom 2 place Intercom ATC-2Y, with accessories \$110.

Stuart Gear (604) 941-9402

E-mail:sgear@infoserve.net

FOR SALE: 4130 Annealed Gauge Plate now in stock, .025 to .375. We will sell you the plate or laser cut the parts Industrial Laser Cutting Ltd.

(604) 946-4152, Fax: (604) 946-4153

E-mail: tmw@industriallaser.com

FOR SALE: 1- Miller 200 amp ac/dc H.F. Tig/stick welding machine - 220V 1 ph. \$1200. 1- Miller 120 amp MIG (wire) welding machine, 110 volt. Portable sheet metal type, c/w gas kit (almost new) - \$800.

Pat O'Donnell 533-1839

FOR SALE: Zenith 250 plans and parts, wing rib moulds \$360. Christavia Mk IV project, 4130 steel tube, wing ribs, flaps ailerons, gear legs, wheels and brakes, tail stab and rudder, \$3600.

Paul Trudel 532-8570

FOR SALE: Murphy type floats 1500's. \$9600 CDN. New, complete with rudders.

Harold Schapansky (604) 826-5068

*Circuit Breakers continued on page 8*

the relevant resources (e.g. the Quick Reference Handbook, the MEL, Aircraft Flight Manual, Company Operations Manual, and/or maintenance.) This approach might suggest that the reset be delayed until the service is needed. There is no need to reset a landing gear circuit breaker that trips after take off until one is committed to landing.

Unless your organization already has a comprehensive policy on circuit breakers, it is time that Flight Ops and Engineering/Maintenance develop one. Even if you have one, don't assume that everyone is aware of it, understands it and is using it. Better to be surprised by finding out now that they are not than to learn about it after a tragic event. Being at altitude with a deteriorating situation on your hands is no time to develop a good policy. In the meantime, logging any circuit breaker anomalies gives maintenance a much more accurate picture of the nature of the problem.

Circuit breakers: a willing friend, ready to save you from harm's way, provided you understand and respect their limitations.

*Mike Murphy, former ATPL pilot and ex-TC executive, now chair of the Air Passenger Safety Group, thanks Mark Van Berkel at Transport Canada Aircraft Services for his insights into this important topic, Texas Instruments (Klixon Circuit Breakers) for permission to use the above graphics, and a group of his former colleagues for vigorous peer review of this article.*



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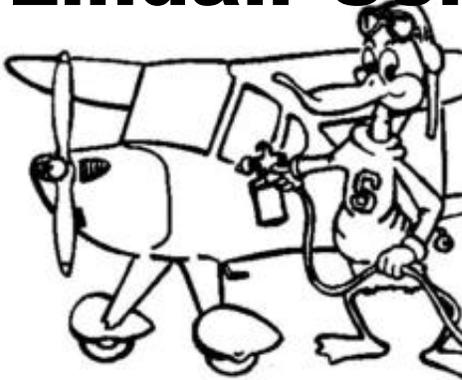
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