



**B Team Racing at the Australian Nationals  
(John Halowell photo)**

**Torque Roll Issue #93  
October, 2010**



**National Control Line Racing Association  
456 Garvey Road S.W.  
Palm Bay, FL 32908**

**To:**

## PRESIDENTS' REPORT BOB WHITNEY

Greetings from the Prez,

Why is it my mind goes blank the minute I start this! We are getting close to the end of another year, went up to Huntsville N.C. last weekend for a stunt contest, the leaves have started turning color, what a beautiful sight.

The Nats date's and events are set. Dates will be someplace in the newsletter. Our circles are not available for use until Sunday after 5 pm.

As last year. We will need someone to run the races Tuesday and plenty of help the rest of the week. And timers for the trials if it happens.

Bill Lee should be putting out bids for the team trials. If no one comes forward the trials will probably be Fri & sat of Nats week.

We have a new Dist Rep in the southeast. Make Jim Bradley welcome. He is one of my oldest modeling friends; he is a top FF FAI tow line and rubber flyer coming back to controline. He has a lot of ideas and will probably fill us in on most of them.

Nats dates Monday, 15 Rat, Clown. Tuesday Fox & SS Rat combined with separate finals. Slow Rat. Wed Goodyear, Q-Rat. Thursday F2c, F2cn. Friday Mouse 1.

Need to check with Brenda to get the actual dates .

## NORTHWEST REPORT- LES AKRE



Like many of you in the North Central district may have discovered, if you want to compete year round, you eventually find yourself heading South. Such was the case for me as I made the the trip to El Monte CA, for the 24th Virgil Wilbur Memorial contest this past Oct. 16,17. Darrell Albert and crew put on a very good, although somewhat laid back contest. They went out of their way to make it a good contest experience for us out of town folks.

Local girl Krystina Kusik was lucky enough to have born close enough to the contest date that each year it is stopped for about half an hour to celebrate her Birthday. This year she was presented a Cox . 049 with a pink crankcase, virtually ensuring that her brother Kevin never borrows it! She had the top heat time in Mouse 1 until I accidentally bested it. Sorry Krystina, won't happen again, I forgot my place. It has been said that the local contests are where we develop the new, and or upcoming modelers. Let's hope this continues.

I believe now is the time to submit proposals for the F2C Team Trials location. Lately, it has been held in Muncie In., however it has been held in other ares of the country, so if you want a change, organize and put in a bid. There should be details on the procedure in this issue.

On a sad note, it is with heavy heart we mourn the passing of a member of the Wilk`s family. Steve`s Mother and Tom`s wife of 59 years, passed away on Oct 11.

Our best wishes go out to the Wilk Family.

`Till next issue.

## **SOUTHWEST REPORT-DAVE HULL**

**News Bits**—Still a bit more racing for 2010, so get your equipment ready and plan to join us for the annual Toys For Tots race on December 5<sup>th</sup>. Remember, your entry fee is a toy or two for a good cause, and sponsored by the United States Marine Corps. If you can't make the race, I hope you enjoy the holiday season, and get to spend some time dreaming up great ideas and building them for next year!

I haven't gotten any feedback on the Masters Class, so it may either take a while for folks to see any appeal in it---or it may just be an idea with no significant merit. One comparison comes to mind from the world of R/C Pylon racing: Jim Shinohara sponsored teams for years, and you could always see him in the photos in *Model Aviation* when "his" team won.

No solid rumors from the Arizona guys that came out to the last race regarding the site for the 2011 Cabin Fever. Recall that Ken Guiliford had been contacted by the folks at the raceway in Phoenix. In either location, Cabin Fever should be one of the best racing contests of the year, and you should plan on going.

The 2011 Nats schedule has firmed up and organizing continues. Plan to attend if you can. Plan to help if you attend. I'm sure most guys will help here and there—but committing early makes it a lot less stressful for the NCLRA leadership.

I'm realizing that I have not been doing enough to capture all of the racing here in the SW district. I think the guys in New Mexico put on a race and I only heard about it after the fact through the Delphi Racing Forum.

(<http://forums.delphiforums.com/CLRacing/start/> sponsored by Dave McDonald.) I will try harder, but if anyone is aware of racing events or other racers, just give me a call and let me know. More participation equals more fun!

### **SCAR Racing: 24<sup>th</sup> Annual Virgil Wilbur Memorial, October 18 & 19th**

The Southwest district held our biggest race of the year in honor of a dedicated Southland modeler—Virgil Wilbur. We had people join us from out of state and even an international visitor. These included Burt Brokaw, Steve Eichenberger, Steve Mills, and Dick Williams from Arizona; Dave Rolley from Colorado, Melvin Schuette from

Kansas, Les Akre from Edmonton; along with many of the regular SCAR gang. A lot of folks came to help out, to time and count laps, and to do some really fierce armchair racing. Not content to watch from an armchair, Jim Holland, who is still healing up from a bad motorcycle accident, wore a soft cast thru much of the day and pitted a bunch of entries. Melvin Schuette probably deserved the Tough Luck award. He flew in from Kansas, but was not allowed to bring his airplanes along by the airlines people. He had to leave them behind. It would sure be nice if the AMA could help us define a workable shipping policy that allowed practical transport of modeling equipment. I guess some guys know how to manage, but the rest of us sure might benefit. Other than these issues, it was an interesting and fun event. The weather almost became a factor, but the early morning and late Sunday drizzle held off just enough. No one had to run for cover...which is just as well since we would not have all fit into Don's contest headquarters and tabulation pavillion.

The event list was modified a bit a few weeks before the event. It was thought that F2C and F2CN could be substituted on Saturday for B-TR since we didn't think we would get any entries. Well, we were wrong...we did get two entries, so B-TR was held Sunday. However, we weren't quite prepared to hold the Orange Crate event this time, so that is now scheduled for the December race. We ultimately ran out of sunlight on Sunday, so SSR with three entries was dropped. I don't think anyone regretted the changes, at least that I heard. Believe me, there was a ton of racing, and most folks admitted to being pretty worn out.

There is always too much to see and report on at a race for one person to do it justice, especially when you are flying double entries, but here are some notes of things that I saw.

**Mouse I**—There were five entries, and all were competitive. That meant that *how* each race unfolded ended up making the difference in the results. There was plane and engine swapping between the heats for several contestants. I believe that Jim Holland swapped planes (or was it engines?), as did Dave Hull. McSlow started with a Gibeault Special, but went back to "Old Unreliable" after the Gib-Special was found to suffer from the dreaded go-fast-then-go-slow motor runs. The Kusik entry, as usual, was really fast. I think Jed must have a secret parts bin that I would sure like to

dip into. That means the rest of the contestants were up against what we have faced for the last year. Bill Cave had a plane that was really turning up nice and sounded super steady. Something must have let go somewhere along the way, because he was forced to retire at 11 laps. After two heats, everybody that could get their equipment sorted out did, and that put Les Akre, Krystina Kusik, and Dave Hull into the final. That meant that the CanAm team of Akre/Hull had to split up. Les picked up Dave Braun to fly his entry, and Hull co-opted Lenard Ascher to flip his prop. (It's like riding a bike, Len!) The race was fast and furious until some kind of pitting entanglement occurred between Braun and Kusik getting in and out of the pits. By the time this was sorted out, Hull/Ascher had gotten back enough laps to hold on to the end. Probably the first time McSlow has bested Krystina in over a year—which might be eight races or more. (I think that Krystina's model suffered a busted crank in the finals incident. But for her birthday, which she traditionally celebrates at this contest, she received a *very* bright pink Cox .049, brand new from the factory, from Ron Duly. Just what a racing girl could use!)

engine.) Cave/Holland put up a record beating heat time, but only managed 92 laps in the final, leaving Les Akre with the win. From a pilot's perspective, I can say that Les' airplane handles really nice, except it is a bit bouncy on landing.



Intense concentration as Les Akre prepares his winning F2CN entry. Note the recycled F2C wing, F2C wheel, and the big chunk of lead in the tail. The Clown racer in the foreground was no slouch, either. Black paint seems to make his planes go just a bit faster. Photo: Melvin Schuette

**F2C**—Three teams showed for this tough event, which was scheduled after the previously planned events. Cave/Holland brought what looked like Bondarenko/Mazniak equipment. Schuette/Rolley were either running Profi or Mazniak gear, and Hull/Ascher used Profi/Bondarenko setups. All the teams struggled a bit trying to shake off a little rust and remember the techniques and tricks. Hull/Ascher put up the first tuning flights during the Saturday lunch break. They initially had some starting issues with the pressure system but Lenard got that worked out before going onto the circle. Cave/Holland had some setting issues and perhaps an engine problem or two. They were fast, but the setting didn't hold up during 2-up racing, going over before the first pit. Ascher missed the setting as well and 4 pitted the first round with two compression adjustments. Hull/Ascher were very short on laps and planned to 3 pit. Schuette/Rolley had the toughest time working on aircraft trim and takeoffs. They worked on team coordination, takeoffs and pilot technique. The best time was put up by Hull/Ascher at 3:44 which was a 3 stop with one balked start and a glide lap due to a pilot shutdown error. Oops! Everyone was glad for the practice, and while doing it in a contest setting is



Bill Cave and Jim Holland talk thru their strategy during Mouse racing. I'd bet they agreed to go fast and keep turning left! Note the well-traveled custom model box in the background. A great way for models to arrive safely. Photo: Melvin Schuette

**F2CN**—There were just enough National Class entries to call it a race. Both Holland and Akre ran Nelsons. I don't recall the particular variant. (The Kusik F2CN showed up in Cal 15 sporting a glow

unforgiving, it makes you realize a lot of things that you need to work on that you might gloss over if just practicing by yourself.



Hull/Ascher goes 2-up with Cave/Holland. The H/A plane is just a blur..... Photo: Melvin Schuette



Hull/Ascher setting up to pass Cave/Holland. The cooler weather made it much easier on the pilots, except for the excessive humidity! Photo: Melvin Schuette



Jim Holland's follow-thru after pitting his F2C entry. Lots of concentration and intensity! Note the dual container fueler and the large, in-line filter. Photo: Melvin Schuette



Lenard Ascher pitting in F2C. Note that the plane is outside the circle, and behind the mark as the FAI rules require. Lenard brought a glove, but again pitted barehanded, despite the dings he got at the team trials. Photo: Melvin Schuette

**SCAR Goodyear**—There were eight entries in Goodyear, but Johnson/Eichenberger had a mishap during their needle flight. The plane torque rolled and free-flighted across the circle and twanged the lines on the far side. Fortunately, this was the side away from the pits and people. The plane was not badly damaged, but the lines were nowhere to be found. They weren't attached to the handle; they weren't attached to the bellcrank. A walkdown of the circle yielded nothing. Wandering around in the

grass was no joy. On a side note, some of the contestants were running .014" solids instead of the .012" minimum required size for a bit more safety margin.

The racing itself was some of the best of the day. Cave/Holland had their bright yellow Ginny that is always fast. The Kusiks brought out a brand new Lil' Quickie in yellow and red that was so shiny, it looked like the paint was still drying. After a few test flights, they declared they were ready. Krystina was flying her tried and true green 'string. DeAngelo entered GY for the first time and flew the Nemesis that Kevin has campaigned the last couple of years. He flew well, staying out of trouble, finishing all the laps, and getting a time for a complete race! McSlow brought out the "wandering" Buster. The latest mods didn't seem to help a bit.... (New elevators, bushed bellcrank, more nose weight.) Les Akre brought down a pretty Ohm Special in black. He scrounged hard in practice to hit the magic 50 laps/tank, and that cut his pits down. Darrell decided to take four to the final and split it into two races, sort of a Gold and a Silver. That let Hull/Akre fly both the Ohm and the Buster. The Ohm against Cave/Holland in the Gold, and the Buster against Kevin and Jed's Lil' Quickie in the Silver. Both were good races, and the final order was Ohm/Moki, Buster/OS-CVA, Ginny/Moki, and Lil' Quickie/OS.



The Kusik's new Lil' Quickie SCAR Goodyear. It has an aluminum pushrod and a new style "push-to-shut-off" Dirty D shutoff. The whole works is powered by an OS .15 with a modified head. Photo: Melvin Schuette

**Clown**—Lots of Clowns on the field and at least half of them had wings. CD Darrell held a pilot's meeting before hand to work out a round robin

schedule, and everyone was hoping to put up a very good 7-1/2 minute time on their first try to avoid running another mini-marathon. Krystina and DeAngelo both entered Clown for the first time, flying a loaner plane provided by Bill Cave. This plane was a past Nats winner, I believe! Moki powered, it moved along smartly. She had a little trouble during a 2-up with McSlow when her prop self destructed in flight, shedding both blades after completing 84 laps. It is always disconcerting to fly a plane when the engine speeds up to a scream while the airspeed bleeds off to nothing. She handled it just fine. Two teams stood to improve their time after the first heat: Cave/Holland and Hull/Akre. Hull's second heat performance got them into the finals. Duly/Burke stood on their time which was good enough to tie them for the third spot in the final, but they dropped so Ron could go pick up lunch for everyone! That let Cave/Holland in. Hull dropped to fly for Akre, so that let Kevin Kusik in. So with the field set, some serious racing started. I think everyone involved worked *hard*. I know the pilots didn't give up anything. There were at least three sticky situations during the race including the usual cutout during a pass, but the pilots did some good flying and nothing got bent or broken. All three teams were in the air to the end. There were no free laps or two ups. In the end, Les' consistency and mileage (laps per tank) made the decisive difference. Jim's setup ran a bit faster than Les' at the beginning of the tank, and a bit slower at the end. Kevin and Jed were right there ready to take advantage of anyone else's mistakes.... Some good racing!

**B-TR**—Burt Brokaw and Steve Mills brought a Veco Redskin from Arizona, so Ron went back home to get his plane. (This was not the superlightweight giant-killer that was reported in the last issue of the Torque Roll but his more conventional model.) These machines have a reputation as being finicky sometimes, not to mention blowing up, so the spectators look forward to that little extra entertainment. Well, these two ran a clean race. No explosions, no torque rolls—I don't even recall any missed pits! Steve and Ron battled it out in the middle. Burt had some excellent pits and Don Burke made the flipping look easy--he had it tuned for superior airspeed. So what you really had was a modern B-TR up against a Vintage B-TR with a sleeper motor. As such, they both did well.

Duly/Burke's 35-lap time was only a half second off the record time; their 70-lap time was less than 2-1/2 seconds off; their 140-lap time was about 10 seconds off.

**Formula Unlimited**—Three teams entered to fly these big boys, and all were powered by HB .40 PDPs. Steve Eichenberger was flying a new gold-winged job piloted by Charlie Johnson. Eichenberger was assisted in the pits by pilot-turned-batteryman Steve Mills, who claims to be more pitman than pilot. I know, I was confused too. I thought Steve was in the Racing Pilot's Union.... Cave/Holland campaigned a purple plane that really moves out. Hull/Akre seemed to be using a strategy of winning at the slowest possible speed during the heat races. Both other entries were faster. Still, one of the hecklers pointed out that weighted wearing apparel was needed by certain pilots. The final turned into a two up all the way. Hull/Akre made the compound error of (a) not checking the plug after the heat race, and (b) not putting a spare plug into the pit box. That made the piloting for the final, much, much easier on everyone—especially the guy sitting just outside of the pilot circle. So the Arizona boys, with a little help from Sandy Yego, pulled off a decisive win.



Steve Eichenberger catches his "Goldwing" in the first heat of Formula Unlimited. His batteryman, Steve Mills rushes in to help. Les Akre waits in the far pit for his tank to run out, fuel bottle in hand. CD Darrell Albert in foreground; Don Burke and Dave Braun on the stopwatches. Photo: Melvin Schuette



The pilots gut it out in 3-up Formula Unlimited. Bill Cave about to be "hung out" as he easily passes Dave Hull, who is blocked by Charlie Johnson. Bill and Charlie had the best airspeed. Photo: Melvin Schuette

**Cal 15**—I'd tell you all about Cal 15, but I don't remember a darn thing! Well, I think that Team Kusik converted their F2CN by switching to glow, as did Don Burke. I don't recall if anyone switched lines on their SCAR Goodyears to have an entry—Akre and Hull did not. Folks are still sorting out equipment for this one.

**NCLRA Quicky Rat/Cal 36**—The weekend concluded with the traditional "big motor on a toothpick" event. Two of the six entries were running to the Cal 36 rules. And they finished 1-2. But they weren't really close to the NCLRA QR record times, so equipment parity is still an open question. But it probably takes a good to very good reworked K&B to beat a stock OS 35AX. Or maybe not. Has anyone got times for a stock K&B in QR? One of the factors at this contest was that three of the entries had trouble with surging engines. They ran fine at times and poorly at others. For a while we wondered if the fuel was causing it, but that wasn't clearly the case.

**Final touches**—Darrell presented the SCAR Clown Of The Year award to Ron Duly for having put in the most total Clown laps over the one year period starting and ending in September. He probably wore out a pair of his special racing shoes doing it! For

his effort he received a styling custom trophy. The normal event trophies this time included some recycled vintage ones that had some special history, coming from a former racer's collection. One contestant commented that "...these must be real trophies made from solid hardwood and brass statues—because they weigh a ton!"

**Off the Racecourse Activities**—There was other interesting stuff to see at the race, too. Dave Braun had a set of castings to make a vintage, rear rotor ignition engine. Castings for the bottom case, the cylinder, the backplate, the rotor, and the venturi. Lots of machining! Stan McCarver had a partially completed AMA scale racer. His Shoestring used a laminated, solid wing with cross-grained construction. He had it covered with one layer of glass cloth for stiffness and durability. The fuselage was similar, with a ¼" balsa core, and diagonal grained outer balsa sheathing (alternating 45 degrees from side to side) for stiffness. Stan was setting it up for a Nelson engine. Hope to see this one flying next year! Dale was selling his usual shutoffs, thin-walled tubing, and lots of sanding blocks. One of his new, "push to trip" shutoffs was seen on a new Kusik SCAR Goodyear model. The paint on that one was hardly even dry before the contest. It flew fine, and after test flying, was entered. Melvin Schuette flew out to visit and brought a few items. I know I nabbed a 1000 ml graduated cylinder for mixing fuel. He also has some good thin walled silicone tubing that is great for shutoff lines. Darrell had a table full of racing goodies. I noticed some original Don's rat tanks. I had never even seen one before! Steve Eichenberger showed off various carbon props for AMA Scale. He also had some really nice looking carbon shells for a Formula 40 speed plane. This was a three piece set that matched up to a Nelson aluminum pan. Steve says he now has multiple vacuum bag setups and can produce better parts faster.

That about wraps up this report from the SW district. Remember guys, send me info on your upcoming races, progress on that latest project, any rules discussions, or other racing activities so we can share it. Stay safe, double check your equipment, and go fast!

McSlow

## TREASURERS' REPORT- DAVE MACDONALD

9/16/2010 - 10/20/2010

Amount

Balance

Opening Balance as of 9/16/2010

10,971.94

9/16/2010 Deposit

1,758.16

12,730.10

Final Funding Rolly

9/20/2010 Transfer from PayPal

87.99

12,818.09

There were no expenses for the time reported.  
The PayPal account now has a zero balance.



A pair of GO .25 truck motor conversions from Raul Diaz. Supertigre needle valves, Novarossi thrust washers & custom head, spinner nut & venturis.



# 2012 F2C Team Selection

## Finals Hosting Bids

The F2C Team Selection Program for the 2012 World Championships is underway. The program requires prospective teams to participate in “local” contests over the approximate 18-20 month period preceding the Team Selection Finals. In order to fly at the Finals, a Team must have participated in a number of local contests and have turned race times. The F2C team is selected, however, solely by their performance at the Finals contest.

The finals must be run by the fall of 2011. There is no set date for the finals but depend instead upon the availability of a club or individuals to host the contest. This note is being published here and will later be on the various internet CL forums to ask for any interested clubs or individuals to put in an offer to host the Finals

There are requirements that a hosting offer must meet.

1. The site must be specified. A site for the F2C Finals must have one circle adequate for flying F2C. It must be at least 150' in diameter, paved and smooth. Circles appropriate for the F2C event must be painted on the pavement. (This is often done by members in the F2C community and need not be of concern to the host.) If a temporary paved area is utilized, adequate temporary circle markings are allowed. A second circle for practice flights must be available and must be nearby. It, too, must be paved and smooth.
2. Dates for holding the contest must be specified. They must be no earlier than the conclusion of the U.S. CL NATs nor later than mid-October.
3. The Contest Director must be named. The source of helpers (timers, pit boss, etc.) must be identified.
4. Description of local community infrastructure must be provided, I.e., motels, restaurants, RV camping, etc.

If more than one offer is made, the site will be selected by the F2C Team Selection Committee. The contest director of the selected offer will work closely with the Team Selection Committee chairman to define the F2C Panel of Judges and the single FAI Jurist. All Finals hosting offers should be sent to the F2C Team Selection Committee Chairman by December 15, 2010:

Bill Lee  
601 VZ County Road 4815  
Chandler, TX 75758  
[Bill@WRLee.com](mailto:Bill@WRLee.com)  
903-852-5599  
903-288-6029(cell)

*(Editor's note: this is a column lifted from the July 1978 issue of Model Aviation.)*

**Control Line Racing**  
**Special Interest Column**  
**July 1978 – Model Aviation**

**Bill Lee**

It seems that there are many areas in construction and competition that can be best classified as black magic. It seems that every flier has his own way of doing something that is undoubtedly the "best" and the "only" way to do it. Well, I want to talk about a little theory and give some equations about fuel tanks, their shape, placement, and why they act the way they do when in flight. I hope that this will dispel some of the myth that surrounds this topic.

First of all, some basic facts. The weight of water is very near 1 oz. per fluid ounce. This converts to .0346 pounds per cu. in. since one fluid ounce is 1.804 cu. in. O.K., so who's worried about the weight of water? Certainly, we use very little of it in flying model airplanes. Well, as it turns out, fuel is very near water in weight, .96 ounce per fluid ounce, So if we want to understand what goes on with a fuel system, we can investigate using water and know that we are in the ballpark for fuel. Listed below are some densities for various fluids.

	<b>Ounces/ fl.oz.</b>	<b>Lbs./ cu.in.</b>	<b>Specific Gravity</b>
<b>Water</b>	<b>1.0</b>	<b>.0346</b>	<b>1.0</b>
<b>Methanol</b>	<b>.81</b>	<b>.0281</b>	<b>.81</b>
<b>Ucon LB625</b>	<b>.96</b>	<b>.0332</b>	<b>.96</b>
<b>Nitromethane</b>	<b>1.06</b>	<b>.0368</b>	<b>1.06</b>
<b>Fuel (50% nitro)</b>	<b>.96</b>	<b>.0332</b>	<b>.96</b>

As can be seen from the table, alcohol is lighter than water, nitro is heavier, while oil is only slightly lighter. When you combine these components to make fuel, the result is only slightly lighter than water, about the same as the density of oil.

Now how do we apply these numbers? A few principles of physics can help us answer this question. Any quantity of a fluid subjected to force will exhibit some fixed characteristics. The one most important to us is the pressure gradient within the fluid which is a function of how much fluid is piled above. This pressure can be simply

expressed by the formula  $P = G \cdot L \cdot D$ . That is, the product of G, L, and D where:

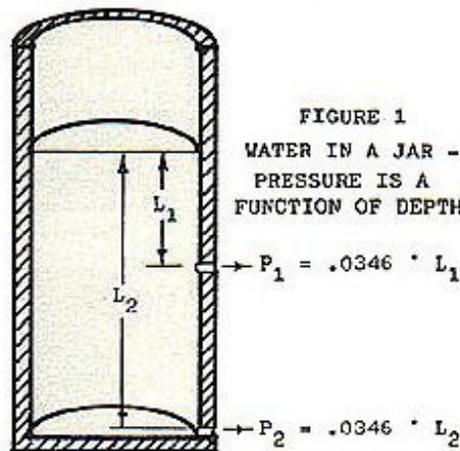
G --The acceleration in affect measured in units of acceleration due to gravity.

L--Distance measured in inches from the free surface of the fluid to the point where the pressure is being measured, measured in the direction of the force which is causing the acceleration.

D-The density of the fluid measured in pounds per cubic inch.

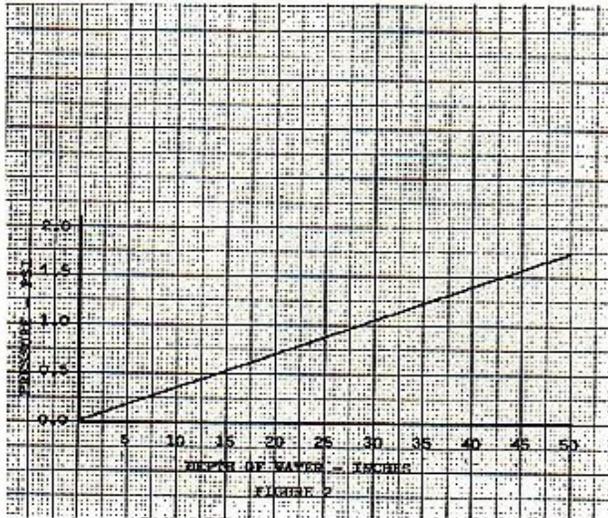
What this formula tells us is, that as you pile up more and more fluid on top, the pressure we feel is correspondingly higher. In a model airplane these three variables are: G-loading due to centrifugal force as the plane flies in a circle; the density is that of fuel carried in the tank; and the distance, L, is the distance from the free surface of the fuel to the hole in the needle valve measured perpendicular to the line of flight.

Fig. 1 illustrates this pressure as if we had a jar of water and we were measuring the pressure in the water at various levels in the jar. Note that the pressure exhibited is independent of the shape of the container, only on the three variables, G, L, and D.



A couple of interesting numbers can be calculated from this formula, First of all, what kind of pressure change would we see as the variable L is reduced from some value to some other value? Fig. 2 is a graph that shows the pressure change for water under the normal force of gravity as a

function of the depth of the water: that is, how much water is above the point in the water where the pressure is being measured.



As can be seen, the pressure changes by about .0346 psi/in. of water or about 1/3 psi in 10 inches.

In order to verify this number, I built a simple test apparatus that consisted of 104" of large diameter plastic tubing with a pressure gauge attachment that enabled me to read pressures at various places in the column. Much to my relief, the theoretical values were supported in reality as I measured 3.6 psi at the bottom of the column. 104 inches of water under 1-G acceleration results in 3.6 psi.

O.K., so much for water in a jar, how about fuel in a fuel tank? First off you have to measure the G Force on the model and, hence, on the tank and fuel in it. The G loading can be calculated if you know the line length and the speed which the plane is flying.

$$G = (1.467 \times \text{MPH}) / (32.2 \times \text{line length})$$

A few representative values of G are listed below.

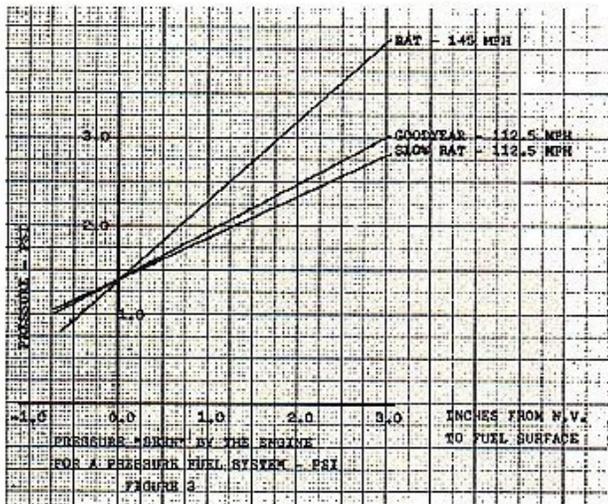
MPH	G's at 52.5'	G's at 60'
100	12.73	11.14
105	14.04	12.28
110	15.40	13.49
115	16.84	14.73
120	18.33	16.04
125	19.89	17.40
130	21.51	18.82
135	23.20	20.30
140	24.95	21.83

145	26.76	22.42
150	28.64	25.06

A 16.0-flat Goodyear will be pulling at 16.11 G's, while a Slow Rat at 16.0 flat is pulling at 14.09 G's. Now, if you crank these G-values into the first equation, along with the density of fuel at .0332 lbs/cu. in., you find that the pressure variation for our 112.5-mph Goodyear is over 1/2 psi per in., and only slightly less than 1/2 psi per in. For the Slow Rat. That is, if the tank is one-inch wide, the pressure variation as the fuel level changes from full to empty, will be in the neighborhood of 1/2 psi. And this pressure variation will occur regardless of whether or not you are using a pressure fuel system. Of course, in Slow Rat, only suction systems are allowed, but that 1/2 psi variation will be there for the pressure system on the Goodyear, too. And it's pretty obvious that a wider tank will result in a greater variation. The general rule, then, is to keep the fuel tank as narrow as possible. Tall and long, O.K., but narrow as possible to keep the pressure change to a minimum.

A good question to ask here is, "How much does this pressure change affect the total pressure in a pressure system?" In order to find an answer to this, you have to know the pressure that is created in the tank by using crankcase pressure. I set up a test stand to measure this and found that the tank pressure from an untimed crankcase tap is about 1.4 psi, or about 1.6 psi if a ball-check is used in the pressure line.

In order to find the pressure that your engine "sees" when you are in the air, you have to add the pressure due to centrifugal force, that can be calculated above, to the pressure placed in the tank by the pressure line. Fig. 3 illustrates the pressure at the needle valve as a function of the distance from the needle valve to the free surface of the fuel. The basic assumption here is that crankcase pressure results in 1.4 psi. Given that 1/2 psi variation per in., the pressure change as the fuel level changes is significant even in a pressure fuel system.

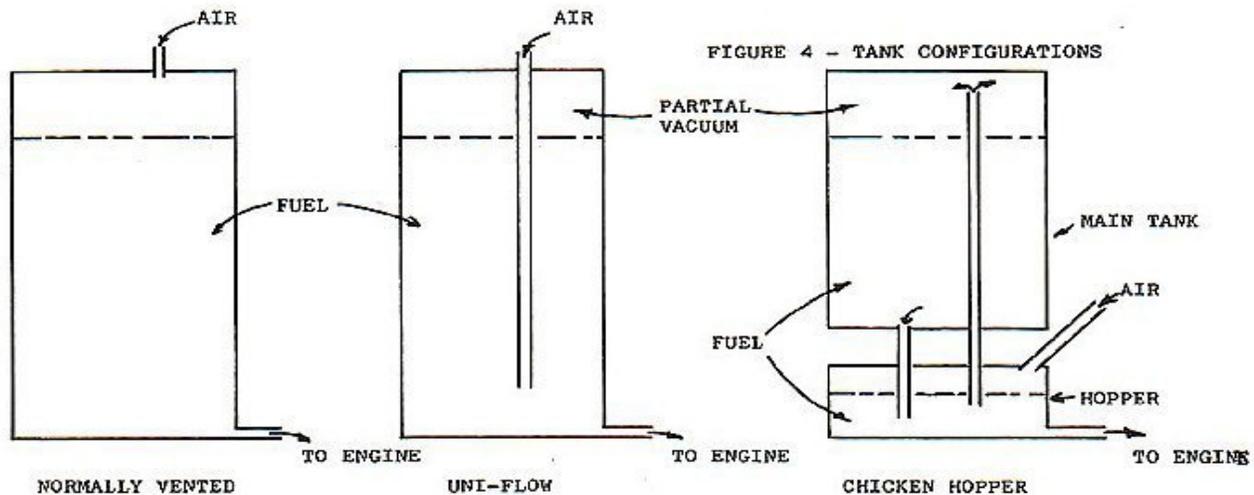


"seen" by the engine will be equal to the pressure as if the free surface of the fuel was always at the level of the air bleed as long as the actual free surface is above the bleed. When the air bleed is above the free surface of the fuel, the pressure will change continuously, since the tank has become a normally vented tank with the bleed out of the fuel. One aspect of the uni-flow tank that will cause problems is the need for the tank to be airtight after the fuel has been put in, so that the air bleed can work properly. If the tank is not sealed, it will act just like a normally vented tank since that is precisely what it has become.

The chicken-hopper tank uses a "demand and feed" principle. The tank is really two tanks, one that is sealed and large, the other that is a normally vented tank and is small. The engine draws fuel from the small tank, drawing the fuel level down until the vent to the large tank is uncovered. This allows a bubble of air to get into the large tank and a corresponding quantity of fuel to now flow back into the small hopper tank. This process repeats as the engine uses the fuel out of the small tank. The chicken hopper has several notable characteristics. First, since the hopper tank is usually small, the pressure variation it develops as fuel is used is normally quite small, a desirable attribute. Second, this tank set-up usually exhibits a tendency to run rich for a short while until the pressure in the main tank decreases to the point that the vent from

There are three basic, non-pressure tank setups in general use today: the normally vented tank, the uni-flow tank, and the chicken hopper. Each of these tank designs has different but very predictable pressure characteristics that a modeler has to either use or allow for in his design. Fig. 4 shows the three types of tanks as if they were gravity feed. This is intended to help you visualize the effect of centrifugal force by thinking of the effect of gravity. Note that the normally vented tank will cause the pressure to vary continuously as the level of the fuel in the tank changes from full to empty. This obviously is the reason this kind of tank causes the rich-to-lean needle setting that we all have encountered.

In the case of the uni-flow tank, the placement of the air bleed line is all important. The pressure

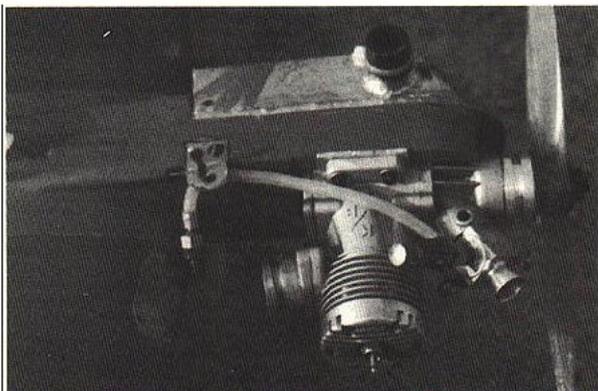


hopper tank starts to work. Third, the main tank *must* be airtight. The chicken hopper tank usually results in a large amount of "plumbing" to install.

***(Editor's note: Remember, this was written in 1978 for the Slow Rat rules in effect then. Slow Rat has changed now!)***

There is one thing in common to all three of these fuel tank set-ups: they require the fuel to be drawn to the engine by the venturi action of the engine itself. This is the fact that causes you to use pressure fuel feed systems in those events where they are allowed. But in events like Slow Rat or Slow Combat, pressure systems are not allowed. And it's here that a properly built and installed fuel tank will make or break an entry. Here in Texas, the dominant fuel tank set-up is somewhat different from any I've described above. Look at the picture that accompanies this column as you read this description.

To my knowledge this design was first used by Larry Miller and Larry Hoffman from Corpus Christi, Texas, about two years ago. The general idea is to mount the fuel tank on the inboard side of the nose of the plane. This causes, as we have seen above, a significant amount of pressure to be "seen" by the engine due to the centrifugal force and the tank placement. In fact, on my plane which is in the pictures, the fuel free surface varies from three inches to two inches as the engine draws fuel from the tank. This translates into a pressure (at 16.0 flat) of 1.4 psi, when the tank is full, to .94 psi when it is absolutely empty.



This installation of K&B and tank in Bill's Slow Rat follows the findings of his test program.

Now, my tank is just about half empty after 35 laps, and this means that the pressure my engine "sees" is

about 1.2 to 1.4 psi. This is very nearly what a pressure system would yield if using untimed crankcase pressure. The real key to the system's operation is to use a carburetor that has a very large hole for air and is arranged to be closed on the ground when there is no pressure in the tank due to centrifugal force, but open in the air to take advantage of the tank pressure due to centrifugal force.

We have been using the old pylon carb that K/B once supplied for the old Series 71 rear-rotor 40. We put a big blob of solder on the throttle arm so that, not only does the centrifugal force supply the pressure to the fuel, but it causes the carburetor to open to take advantage of the pressure. The carb has to be used, we've found, in order to get the airplane into the air, and until the centrifugal force builds up. We've also found that you must set the needle valve in the air, since there is no reliable way to set the needle on the ground and have it right in the air. This tank set-up, while it looks rather weird, does work very well and results in the ability to use a venturi as large as is used in any pressure system with the corresponding increase in engine performance.

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Just for comparison, here's a MODERN Slow Rat Tank set-up:



## 63<sup>rd</sup> AUSTRALIAN NATS CLASSIC B T/R

John Hallowell

AUS 1984

At the 2009/10 Albury Nats nine teams were lined up and ready for the action in Classic B team race. The big question this year was how would the new ball race engines fare? The variety of engines now in Classic B allows for most interesting and innovative racing. The first five places all used different engines... Enya PB 25, LA PB 25, Irvine .25 BR, OSFX 25 BR and PB Brodak B25R. And



check out the amazingly close times... the three fastest teams in the heats were all within 31/100ths of a second! Just like last year, there's something about Classic B and split second times!

The first round saw a Queensland blitz and a smokin' 2.57.69 heat time to the Macca's. Trent and Mark looked the goods with the OS 25FP own design racer. With John Taylor doing a great job on battery, they were favourites after the first round. Especially as Fitz and Paul had a most unusual slow stop when the Enya momentarily refused to fire up. However, true to form, these talented two got their act together in the second round with a FTD of 2.59.60.

Harry Bailey and Steve Walton started slowly with the Irvine .25 Galaxie and then got their magic act together in the second round with a brilliant 2.57.91. It was a fantastic effort for the Irvine's first race.

Hallowell/Baker had lost the edge in pace with the FX that was always there in practice back in Melbourne. They had much work to do in the second round. Using the B25R, they missed a first

flicker at the start, losing 5 or 6 seconds and were never going to make up that extra time. So it was a best of 3.07.50 and for the first time since Classic B became a Nats event in 2002, there was not going to be a JH racer in the final...

G.Wilson/Ellins were slick as usual but despite two very smart and consistent times, lacked the extra grunt to shave those 2 or 3 laps off their heat time. Jim and Colin Ray had the new FX bolted into their Crescendo and were timed at 15.4/7 in solo practice. Their best heat time of 3.04.75 and a fourth place would no doubt give this very determined team high hopes for the Vic. State Champs.

Was great to see Mark Godfrey team up with Duncan Bainbridge and throw his hat and 'one big arm' into the circle! The FX engine in the Swooper was on the new side and will perform even better with more running. Bottom line is they both thoroughly enjoyed themselves.

Last year's winner Murray Wilson (with Lance Smith) had Bryce Young doing handle duties this time. They had a very disappointing day with fuel feed problems with the B25R that just wouldn't go away and derailed Murray's efforts for back to back titles. The Dream Team of John and Ken Hunting were using an FX and will improve dramatically on their best heat of 3.15.41 in the not too distant future.

It was time for the final. At Contest Director Keith Baddock's signal, all teams were quickly away. It was a really good race with little between the models in airspeed. Harry's BR Irvine was up against Paul's PB Enya & Maccas OS LA. There were two Rockets vs a Galaxie. As usual, landings and restarts were going to play a big part in the result. A second here, a second there...it's all about saving precious time.



It looked like Paul & Fitz had a very slight edge in speed. Just enough over the 140 laps to make a

difference and grab their first win in Classic B at the Nats. The way that Enya goes, it's unlikely to be the last. The Supermacs were not far behind with Mark McDermott wowing the spectators with some amazing 'mid air slips catches'. Harry and Steve were just a few laps further back.

A good crowd was watching and they burst into spontaneous applause at the finish to acknowledge some really clean flying and excellent pit work. Young Trent McDermott flew extremely well against very experienced opposition. He will be even better on his home turf next year. Roll on Dalby!

### **Results of Classic B**

Teams	Rd.1	Rd.2	FINAL
1. Fitzgerald/Stein	3.29.38	2.57.60	6.03.82
2. McDermott/McDermott	2.57.69	3.24.94	6.11.13
3. Bailey/Walton	3.20.28	2.57.91	6.17.22
4. C.Ray/J.Ray	4.08.34	3.04.75	
5. G.Wilson/.Ellins	3.05.47	3.06.50	
6. Hallowell/Baker	3.11.41	3.07.50	
7. K.Hunting/J. Hunting	4.04.31	3.15.41	
8. Bainbridge/Godfrey	DNF 49		3.30.60
9. Young/M.Wilson	DNF 17		DNF 21

### **CONTEST CALENDAR**

NOTE! Confirm all contest details with Contest Director! NCLRA cannot be held responsible for errors or omissions! This calendar is compiled from data collected at the NCLRA website nclra.org. Members can log in there and submit contest details. All contest information must first be posted to the web site.

NORTHWEST DISTRICT -none

SOUTHWEST DISTRICT

DEC 04-05--El Monte, CA (AA) Toys for Tots Site: Whittier Narrows. Events: Both days: Speed as % of record; Sunday: AMA Mouse I(Cox Engines), NCLRA Clown, NCLRA S/S Rat, SCAR Q Rat. Sponsor: SCAR #4641. CD: Darrell Albert, 572 Begonia St., Escondido, CA 92027. Phone: 760-741-2505(day) E-Mail: SCAR4641@AOL.COM WebSite: WWW.FAICLSOCAL.INFO/SCARRules for SCAR Q Rat can be found on the SCAR website.

NORTH CENTRAL DISTRICT - none

SOUTH CENTRAL DISTRICT - none

MIDWEST DISTRICT - none

NORTHEAST DISTRICT

NJ

OCT 31--Middlesex, NJ (A) October Contest Site: Mountain View Park. Events: 2 OZ Big Goodyear, Warbird, Slow Rat - New .25 . CD: Phil Valente, 1523 Ulster Way, West Chester, PA 19380. Phone: 610-692-6469(day)

NJ

NOV 14--Middlesex, NJ (A) November Contest Site: Mountain View Park. Events: Fox Race, Warbird, Slow Rat - New .25 . CD: Phil Valente, 1523 Ulster Way, West Chester, PA 19380. Phone: 610-692-6469(day)

NJ

DEC 05--Middlesex, NJ (C) December Contest Site: Mountain View Park. Events: Clown Race - NCLRA, Clown Race - Sportsman, 2 OZ Big Goodyear . CD: Phil Valente, 1523 Ulster Way, West Chester, PA 19380. Phone: 610-692-6469(day)

SOUTHEAST DISTRICT

FL

NOV 13-14--Starke. FL (AA) Rebel Rally 2010. Site: Bradford County Fairgrounds, Starke Florida. Events: Saturday: Fox Race & Super Slow Rat, Slow Rat, Clown Racing; Sunday: Texas Quickie Rat, F2CN, F2C Sponsor: Jacksonville Flying Rebels #4423. CD: Mike Schmieder, 5390 Emerald Reef Court, Jacksonville, FL 32277 . Phone: 904-357-4814(day) 904-371-4995(eve) 904-703-8104(other) E-Mail: mas23@comcast.net All events will be conducted according to the most current edition of the appropriate rules (i.e. AMA, FAI, NCLRA). Cash awards 1st, 2nd and 3rd place to be 50%, 35% and 15% respectively times 65% of each event's entry amount. (Will begin TQR on Saturday if time permits with adequate daylight remaining following completion of "Clown Racing" )

## NATIONAL RECORDS

### **SLOW RAT (.25 engine)**

Op (70 laps) 3:02.92 Tim Stone/Bob Oge 7/13/10  
(140 laps) 6:17.59 Russ Green/ Bill Lee 7/07/09  
(no Jr or Sr record)

### **½ A MOUSE 1**

Jr (50 Laps) 2:37.57 Scott Matson 7/15/99  
(100 Laps) 5:17.68 Scott Matson 7/17/99  
Sr (50 Laps) 2:44.68 Dave Rolley Jr 7/15/99  
(100 Laps) 5:20.11 D.J. Parr 7/16/98  
Op (50 Laps) 2:12.3 Jim Holland 7/16/04  
(100 Laps) 4:22 Ryan&Gibeault 7/15/99

### **½ A MOUSE 2**

Op (70 Laps) 3:01.24 MacCarthy/Kerr 7/11/03  
(140 Laps) 6:18.13 Whitney/Hallas 7/10/09

### **SCALE RACING**

Jr (70 Laps) 2:50.65 Bob Fogg III 7/16/91  
(140 Laps) 6:08.55 Bob Fogg III 6/23/92  
Sr (70 Laps) 3:15.12 Doug Short 7/11/00  
(140 Laps) 5:40.05 Bob Fogg III 7/11/95  
Op (70 Laps) 2:39.38 Willoughby/Oge 7/15/97  
(140 Laps) 5:33.04 Bob Fogg Sr 7/16/91

### **F2C TEAM RACING**

Op (100 Laps) 3:16.47 Lambert/Fluker 7/07/09  
(200 Laps) 6:56.61 Fluker/Lambert 7/08/09

### **F2CN (NCLRA RULES)**

100 Laps 4:49.99 Bill Lee/ Russ Green 7/08/09  
200 Laps -No record established since line diameter change

### **'B' TEAM RACING**

Op (35 Laps) 1:24.34 Burke/Duly 7/12/05  
(70 Laps) 3:05.73 Green/Lee 7/10/09  
(35+70 Laps) 4:33.91 Green/Lee 7/10/09  
(140 Laps) 6:08.80 Green/Lee 7/10/09

### **RAT RACING (.15 RULE)**

Op (70 Laps) 2:44.6 Jim Holland 7/15/04  
(140 Laps) 5:33.1 Jim Holland 7/15/04  
Jr-Sr No record established

### **NCLRA FOX**

Jr (100 Laps) 5:57.11 Scott Matson 7/11/99  
Sr (100 Laps) 5:28.09 Scott Matson 7/16/02  
Op (100 Laps) 5:32.55 Tim Stone/Bob Oge 7/10/05

### **NCLRA CLOWN**

Op (15 Min.) 344 Laps Les Akre/Andrew Robinson  
07/14/10  
Op (7 ½ Min.) 165 Laps Al/Pat Ferraro/ John Ross  
7/14/08

### **NCLRA TEXAS QUICKIE RAT**

Op (70 Laps) 3:04.28 Jim Holland/Bill Cave 7/14/05  
(140 Laps) 6:07.01 John McCollum/Bill Lee 7/14/05

### **NCLRA SUPER SLOW RAT**

(100 Laps) 5:14.30 Bill Lee/Russ Green 7/05/09

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