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TO

Tucson, Arizona Christopher Columbus Park

Torque Roll!!

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President's Column - Bill Lee

AMA Procedures and F2C Team Selection - Update: Unfortunately, there is nothing to report concerning AMA's new FAI Procedures document. If you would like to see what it contains, it can be found on the NCLRA website at:

http://www.NCLRA.org/FAIProcedures/AMA_FAI_Procedures11-05.pdf

There has been no additional information from AMA of which I am aware.

Bottom line: AMA is the 500 lb. gorilla, and we will simply have to deal with it.

With that in mind, the F2C Team Selection Committee (TSC) is now considering a Team Selection Program (TSP) that is based on the work that Dave Rolley put together. Dave's document could be better described as an "F2C Development Program", out of which the TSC must consider the portion for actually determining a team. Dave's document is lengthy, but can be found at

http://www.NCLRA.org/DaveRolley/

Basically, the proposed TSP consists of requirements for an F2C team to participate in local contests and to have valid race times submitted to the TSC. After a period when these times have been accumulated, teams will be invited to the Team Selections Finals, where the team will be selected based on head-to-head competition.

Yes, a lot of questions about how to get local contests to hold an F2C event, how to get valid races, etc. And the proposed TSP addresses them. As an example, it will be up to the aspiring F2C team to convince local folks to hold an event and to get their friends to compete.

As soon as the proposal is brought through the Team Selection Committee, it will be presented to the "participants" for acceptance. If accepted, qualifying contests starting with the recent Cabin Fever will be held. Late this year, a request for hosting a Finals contest will be issued, with a Finals site approved by the "participants" for sometime late in 2007, perhaps as early as just after the NATs, or as late as October.

When the TSP is finally approved, we will publish it, perhaps in a future *Torque Roll*, and certainly on the NCLRA website.

New Feature on NCLRA website: As has been mentioned before, there is a "Members Only" section to the NCLRA website. In order to access it, you must first use a temporary UserID, and then establish your own user name and password. If you haven't yet done this, your temporary UserID will be found in the upper right corner of the mailing label of this or recent issues of the *Torque Roll*. It's the 3 or 4 characters printed there.

For Members Only, a current roster of the NCLRA membership is available. When you view the roster, you will find a red dot beside your own listing. Clicking on that red dot will allow you to edit your own personal information, such as your name, address, e-mail address, etc. It is strongly suggested that you access the roster in this fashion if corrections are needed.

Due to a recent online forum discussion, it was recognized that some folks may not wish to have their personal information exposed, even if only to other members. We have added a switch that you can use when you edit your personal information that will hide that information to other members when they view the roster. Your information is still required, and is still accessible to "management", but you can hide it otherwise if you desire. If you don't have internet access and wish to have you personal information hidden, call me and I will set the switch for you.

B-TR Rules finalized: As was mentioned in the last *Torque Roll*, the B Team Race rules are now complete. They should be published elsewhere in this issue.

At CabinFever, we used the new rules, with the only real change being to .016" solids from the .015" stranded previously. Russ Green said he could not tell the difference at all. That was just about as expected.

Membership renewal time: Many of you have not renewed your NCLRA membership for 2006. As is normal, this will be the last issue of the *Torque Roll* you will receive. If the label on this issue is printed in **RED**, your membership has expired and you need to renew. Information for renewing is found elsewhere in this issue.

Cabin Fever: Well, Cabin Fever 2006 is history. And it proved to be one of the best racing contests around. A big thanks to the Central Arizona CL Club for sponsoring this event and the Cholla Choppers of Tucson who helped so much setting up the field and timing, and.... Names that need special recognition include:

F2C winners at Tucson (from left) Aaron Ascher, Leonard Ascher,Dick Lambert, Tom Fluker, Lari Dziak,Bob Oge.

Ken Gulliford, who was the primary ram-rod in getting the event scheduled and planned.

Chris Peter who was the CD and who ran all of the events on Saturday and Sunday.

George "Slugger" Brown who was the assistant CD and hovered a lot all weekend, helping where he could. Slugger also ran the 35 Proto event, an added attraction for the Fox 35 guys.

Burt Brokaw was instrumental in getting the circles painted, and made sure that the CC were happy adding an F2C circle to one of the pads.

George Brown & Burt Brokaw

Fuel was supplied by Mark Smith of Excalibur Model Fuels. It worked flawlessly.

I have to also mention a couple of the old guard that were there most of the weekend and actually flew a bit: Randy Cubberly and Robin Sizemore. You guys added a lot and should race more!

(My apologies to those I missed and may have failed to mention. There were a lot of folks out there helping, and I just can't remember everyone. If anybody sees a name that needs to be included, please let me know and I'll edit this message.)

Best of all was the chance to see so many of the first-line F2C guys gather together to race. We ran four rounds and just about wore the soles off the pilots. Some real good times turned, and it looks like all of the team has progressed since the Team Trials in September.

Results will probably be listed elsewhere in this issue.

The party Friday night at Chris Peter's home was great. Chris opens up his home to a bunch of lunatics and provides some of the greatest spaghetti that you'll ever want to eat. Not to mention a workshop for last-minute repairs. Thanks, Chris.

F2C action at Tucson (left to right) Jason Allen, Tom Fluker, Aaron Ascher.

Saturday night saw a great steak dinner at Daisy Mae's and then drinks and snacks at Keith Trostle's beautiful home. Keith has one of the greatest personal libraries I have ever seen, and if you're ever in the area, look him up.

TREASURERS' REPORT- TOM WILK

As of today March 15, 2006 we have 73 paid members.

Money held for deposit	$20.00
Money in pay-pal account	$82.50
Money in savings account	$98.48
Money in checking account	$10496.45
Total	$10697.43

NORTHEAST REPORT- JASON ALLEN

Not much has been happening here in the Northeast. Personally we've been getting ready for the upcoming F2C Year (which for us is going to be a busy one). Included in our ramp-up to the world champs in July, was the first contest of the season in sunny Tucson.

If you've never been to the Cabin Fever contest in Tucson, go. It is worth every second. The weather was gorgeous, the folks there are some of the best and the competition was great. I've included some photos, but neglected to get the results. I believe that they were recoded by Don Burke, so I hope the will appear elsewhere in this issue. I wish to thank Chris Peters and all the folks from Cholla Choppers club. You put on a world class contest.

SOUTHEAST REPORT- BOB WHITNEY

I just got back from Tucson, had a great time, and ate too much ! The Tucson guys did a first class job of making everyone welcome I cant remember everyone so the only name I will use is Chris Peter, who opened his house Friday night for a great spaghetti dinner. Sat night they made arrangements at a great steak house, I think everyone showed up. Weather was beautiful.

I did not get any of the times as I was wrapped up in F2C... ,TQ,FOX,andCLOWN all had good entries. F2C had 6 teams show up for some 3 up practice LAMBERT and FLUKER are still at the top of the heap, ASHER& ASHER showed up to show us they still know how to do it. We did 4 heats each and flat wore out 6 pilots.

Things are really slow down here. The stunt guys had a contest at some fairground in the middle of the state; they said all went well, so we are looking into using the same site.
I am afraid if we don't get something going soon we will loose everybody.

Thought for the day, in a class like Clown or even Fox if you put the tank inside the needle valve it will richen up in flight [less laps]and will have to be lean on the ground. Now move the tank just outside of the needle valve and it will go lean so it will need to be opened up a bit which should make for easier starting and a better take off.

What can we do to pick up HAMSTER? There were 4 entries in Tucson, 2 real hamsters ,a Goodyear, and my F2C. The F2C won because it started and finished every race, so why so much trouble? Nobody seems to be taking the time to get them worked out. I know I will get blasted for this but my idea is to make hamster a suction only event, that way the venturis would have to be made smaller and the engines would run better. What are your thoughts?
BOB

NORTH CENTRAL REPORT-LES AKRE

A new flying season is upon us.
If you have forgotten, now is the time to renew your NCLRA membership.
Elections, Elections!!
Yes, it's that time again. Nominations for the Executive positions are being accepted up to April 30th. If you have someone in mind that you feel would do a great job in these positions, get your nominations in to our intrepid editor Tim Stone ASAP.

This year's Nationals.

Tim Stone has grabbed the reins and will be running this year's Nationals. Tim has asked that if you are planning to attend send him a note of confirmation at your earliest convenience.

NCLRA B Team Race.

The new rules are on the website, and should also be in this issue. My personal thanks to all of the committee members I worked with to bring about this new rule set.
There were no real drastic changes from the "Bob's rules" that everyone has been using these past few years, mainly clarifying each rule to meet our objective for this event. The biggest change is to the size of the flying lines, which are now .016" solids, or .018" braided.

Speaking of B Team Race, I will be running a demonstration race at the N.W. Regional control line championship at Eugene Oregon this May 26, 27, 28. It will likely take place on the Saturday after the days scheduled events are over.
The purpose of this demonstration race is to gauge the interest level of B Team Racing in the region, with the ultimate goal of having the B Team Race event added to the contest schedule in the future.
Anyone who shows up with a B Team Race model will be allowed to participate.
The response so far has been great, with six committed entries at this point.

Other ramblings.

Flash! F2C wins "Hamster" in Tucson.
Yes folks, it's true!
I suppose it was bound to happen sooner or later.
Southeast Rep Bob Whitney put a set of .014" 60' lines on an F2C model, and with 1 flip starts proceeded to win the "Rat" event with a time just over 6 minutes. This was apparently his 3rd string model.
Are the glows going to be outdone by these dastardly diesels? Will the guys running glows have anything to say about this? The heat and final records are currently held by a "Goodyear". Many of the purpose built Rat models are still getting sorted out at this point. I suspect that when all of the bugs are worked out, these models will take their rightful place at the top of the standings.

The new line sizes for B team race were also debuted at the "Cabin Fever" contest. Preliminary reports say there is no perceptible difference in speed from the old .015" braided, to the new .016 solids. Frankly I would have been surprised if there was!

Let's get those models ready!

After sitting over the winter months, fuel residue congeals in the tanks, controls can be stiff, and models get dusty. Take some time to look over the model closely for damage, flush the tank, and oil the control system (if possible). Paying attention to the little details goes a long way towards reducing the potential for problems during a race. Let's not forget the engine either. A good teardown inspection can reveal potential problems here as well.

Quote of the month.

"It's not the fast airplanes that win races, it's the quick ones".

Until next issue… keep your lines tight!

SOUTH CENTRAL REPORT-RUSS GREEN

Bill Lee, John McCollum and I made the long trip to Tucson to attend Cabin Fever 2006 in the Southwest district. The weather was good and the Central Arizona Control Line Club did a wonderful job of organizing and making sure we had a great time. I think it is important for the health of control line racing that we promote and support these contests that create a highly competitive racing environment by drawing people from far away.

Bill Lee pitting in Tucson

There are a lot of good racing contests coming up this year in the South Central district. Make sure to check out the contest calendar and attend as many as you can. Local racing rules can be found on the South Central page of the NCLRA web site (http://www.nclra.org/SouthCentral/index.html) if you need them. Hope to see you there.

EDITORS' COLUMN- TIM STONE

ELECTIONS FOR PRESIDENT, VICE PRESIDENT AND TREASURER

2006 Is an election year for the positions of NCLRA President, Vice President & Treasurer. These positions will be vacant with the retirement of Bill Lee, Steve Wilk & Tom Wilk. Here is the text from NCLRA bylaws concerning nominations & elections:

Election

Nominations are open, anyone wishing to hold office will submit their name to the President and Newsletter Editor between March 1 and April 30, for publication in the June Newsletter.

Ballots will be in the June Newsletter, and must be returned by July 1. The results will be announced at the annual meeting at the Nationals.

All open category members, who were members prior to March 1, shall have the right to vote.

District Representatives will be voted on by members of that district.

In the event of a vacancy the President shall appoint a member to fill the vacancy. Vacancies shall be filled only for the remainder of the un-expired term.

NEW B TEAM RACE RULES

From the NCLRA Web site:

These rules have been approved by the NCLRA Board and will go into effect 03/01/2006. Models which currently exist but which are not in compliance with these rules will be "grandfathered" for one year, i.e. until 03/01/2007.

For safety reasons, all models, grandfathered or otherwise, must immediately comply with the control line specifications in these rules.

.016" ASTM A228 steel wire is available at MSC, part number 00040162.

NCLRA B-Team Race

Objective:

It is the purpose of this event to promote the advancement of "Three up" flying of semi-scale, realistic looking B Team Race control line racing models, similar to and including those flown throughout the world in the 1940's, 50's and 60's. These airplanes shall be flown in direct competition through a series of heat races and a final.

All provisions of the AMA Control Line Unified Racing Rules apply except as listed below.

Allowable model designs. Any B team race airplane from the 1940's, '50's, and '60's may be used. Individual designs that are similar in appearance may also be used.

Single flying surfaces (ie. flying wing designs), "pod-and-boom" fuselages, and flush or prone canopies are prohibited. Model shall be attractively finished or covered, with no all clear finishes allowed. Model shall have racing numbers in proportion to the model affixed near the top inboard wing tip and both fueselage sides.

Fiberglass or carbon cloth may be used to strengthen, or cover over wood. No all composite models allowed.

-There will be an award for best appearance.

-In the interest of promoting attractively finished models, should the best appearing model qualify for the feature race, it shall be given the first choice of pitting segment.

-All aspects of model design, construction, and flying, shall be in keeping with the "Spirit of the event".

Model specifications.

Wing area shall be 125 sq. inches. minimum, excluding fillets and the area covered by the fuselage.

Models which appear to comply need not be further checked, except in the case of a dispute, where it shall be the contestants responsibility to provide proof of legality.

The fuselage shall measure 2" wide somewhere within a zone located 3/8" above and below the thrust line, and between the nose of the airplane and the trailing edge of the wing. However, in the interest of keeping the appearance of the models similar to those from the '40's, '50's, and '60's, it is recommended that at the pilots location, the fuselage measure no less than 2" wide within the area between the pilots shoulders and his hips.

Model shall have a cockpit or cabin containing a dummy pilot's head with both being in proportion to the model. Canopies must be clear from the back of the pilots head forward to the front of the canopy, so as to provide forward and lateral vision for the pilot. Canopies must protrude above the forward fuselage contour with a resemblance to the "bubble or turtle deck style canopies" employed on full scale racing aircraft. Open cockpits must have a windscreen.

At the pilot's location, the fuselage shall measure a mininum of 3 3/4" from the top of the canopy, or if open cockpit, from the top for the pilot's head, to the bottom of the fuselage.

The landing gear shall be of the 2 wheel side by side type (ie. separate struts exiting on either side of the fuselage centerline). Both wheels shall be no less than 1 1/2" in diameter.

The landing gear shall have a minimum lateral spread measured from the center of each wheel, of no less than 4".

Engines shall be fully cowled and be completely covered. Openings for the air intake, needle valve stem, fuel shutoff, engine exhaust, engine cooling ducts, and glow plug access are allowed. In keeping with the spirit of the event, no helmet cowls (ie. conventional speed model types) will be allowed. Side mounted engines using a "cheek cowl" to cover the engine, must have an identical cheek cowl on the opposite side of the fuselage. Maximum allowable model weight shall be 36oz.

Engines:

Any single bypass up to .29 cu. in., or any engine up to .28 cu. in. Full wave tuned pipes are prohibited. Mufflers, or exhaust extensions which do not increase engine performance will be allowed.

Fuel:

Fuel shall be the contestants choice. Any substance banned by the AMA will not be permitted.

Fuel Tank:

Fuel tank, including filler tubes or fill valves, vents, and fuel line from the tank to engine spraybar, shall hold no more than 30 cubic centimeters.

Multi-function valves and finger valves are prohibited.

Refueling shall be accomplished by "squash bottle" or "fuel bulb", using the squeezing pressure of the hand only.

Containers including "squash bottles" and "fuel bulbs" which are pressurised by the forced introduction of air, or any other type of substance artificially, are prohibited.

The 3 entrants that comprise the 140 lap feature race shall all have their fuel tank systems measured for capacity at the completion of the race. Any entrant found not to be in compliance with the listed maximum of 30 cubic centimeters, shall be disqualified.

Shutoffs:
Fuel shutoffs are mandatory.
Lines:
Two line control systems are required. Each line shall have a diameter of .016" if using single strand wire or .018" if using multi strand wire. Line length shall be a 60' + 2" - 0".
Internal line hookups are allowed.

Pull test shall be 40 lbs.

Races:
Each entrant shall compete in a 35 lap and a 70 lap heat. The resulting heat times shall be added together, and the 3 entrants with the lowest times shall comprise the 140 lap final.
All heat races and feature races shall be flown with 3 entries wherever possible. The only exception shall be if there are not enough entries to provide a 3-up format, then a 2-up format may be used.
-No pitstops are required.
Model Processing:
The method(s) used to determine the best appearing model, and the device used to measure the fuel tank capacity shall be at the discretion of the Event Director, or Contest Director.

3/12/2006 – Results – SCAR # 1 – Whittier Narrows- DON BURKE

Super Slow Rat
1) Duly/Burke 7:23.31
2) Hull/Patwell 7:34

Clown
1) Duly/Burke 118 153 286 laps
2) Patwell/Hull 119 184 266 laps
3) Burke/Duly DNF 107 DNS

This time it should be right after reading everything and comprehending this time.

The turnout was low, two teams, musta been the weather. Partly cloudy, COLD, and at one time random sprinkles, didn't affect anything. We all got tired after the heats and races back-to-back so didn't fly the other classes. T'was a good practice for Cabin Fever, found things that need to be attended to before then.

Clown winners at Tucson (left to right) Jim Holland, Bill Cave, Bill Lee, Russ Green, Ron Duly, Don Burke

2006 CABIN FEVER RESULTS

Mouse I
1) McCollom/Lee 4:54.39
2) Lee/Mccullom 5:02.2
3) Green/Lee 5:35.66

Mouse II
1) Holland/ Cave 9:01.76
2) Dawson/Hull 13:59.64

F2C
1) Tom Fluker/Dick Lambert 3:17.79
2) Leonard Ascher/Aaron Ascher 3:26.09
3) Larry Dziak/Bob Oge 3:26.78
4) Ricketts/Lee 3:28.94
5) Allen/Whitney 3:35.22
6) Rolley/Rolley 4:28.97

Flying Clown
1) Holland/Cave 301
2) Green/Lee 273
3) Duly/Burke 255

.35 Sport Speed
1) Bert Brokaw 90.57
2) George Brown 88.76
3) Bob Christ 84.91
4) Dave Hull 80.66
5) P. Brown 79.52
6) Smith 75.19
7) Wohlgast 64.26

Fox Race/SSR Race
1) Bob Christ 6:04.33
2) Don Burke 6:28.12
3) Dave Dawson 7:00.88

BTR
1) Russ Green 7:32.71
2) Bob Christ 8:43.44
3) Don Burke 56 Laps

.15 Rat/Hamster
1) Bob Whitney 6:13.34
2) Bill Cave 7:11.79
3) Steve Eichenberger 34 Laps

SWCLA Formula Unlimited
1) Bill Lee 6:49.09 (record)
2) Jim Holland 7:35.21
3) Dave Dawson 8:44.08

NCLRA Quickie Rat
1) John McCollom 6:10.66
2) Jim Holland 6:21.37
3) Russ Green 8:21.27

CONSTRUCTION OF 'NEMESIS" B-TR BY DON BURKE

I thought this would be a timely article for "Torque Roll". Along with coinciding with the release of the official NCLRA B-Team Racing rules. I think it will give someone enough time to build something to compete with at this year's NATS.

A little history. NEMESIS is my third BTR design. The first, VEEBEE, was flown in 1965 by Danny Jones and Roger Theobald. I still have the engine. STG21/29, Pomadi pan and landing gear from that one. The second was the GRMZPF-BTR built in 2002 (only a 37 year gap!) and flown by Ron Duly and Jim Holland. Using it, Jim and I got 2nd at the 2003 NATS. NEMESIS was built in 11 days in March of 2004 and was flown for the first time at Cabin Fever in Tucson. We subsequently used it to win the NATS in 2004, and currently have the BTR 140 lap record. SPRNTR was built in October/November of 2004 for the 2005 season. It incorporates a lot of lessons learned from building the other two. Ron and I used it to set 35 and 70 lap heat records at the 2005 NATS, but didn't use it in the final due to tank problems. We instead chose to fly the final with NEMESIS. Unfortunately I messed up a pit stop and broke a prop, finishing second. On a good note, we were beaten by Russ Green/John McCollum. Russ used his variation of NEMESIS built from my plans.

CONSTRUCTION OF NEMESIS & SPRNTR
Construction – The wing and stabilizer/elevator should be built first. Select the proper sizes of straight "quarter grain" balsa and straight pieces of basswood as required for the edges.

Wing –
The spar for SPRNTR is made first. Glue the carbon fiber strips and 1/32 balsa to the top and bottom of the spruce material using 30-minute epoxy. NEMESIS doesn't use a spar.
Cut all the various pieces to shape. Then edge glue them and the spar together on a flat surface. Trim the edges straight prior to gluing so as to not impart a twist to the wing.

Edges – The outboard leading edge of NEMESIS is basswood to help withstand "pit stop shock". A CFstrip of .019 x .118 (.021 X .25 is just as good) from CTS is inlet into the LE and TE. It provides a lot of stiffness and helps to keep the wing from warping.

Outboard panel –NEMESIS - The forward outboard panel just behind the LE is made from three laminations of 1/8 balsa. The top and bottom are 4-6 lb c-grain, the center lam is hard balsa with the grain running fore and aft. This should eliminate the wing crush we experienced at the 2005 NATS.

SPRNTR – The LE forward of the spar is three balsa laminations – 1/16 core, grain fore & aft outboard – 3/32 top & bottom grain spanwise.

Leadout channels and tip weight. The leadout channels are formed within the laminations. In the outboard side install a ½ ounce tip weight in the center lamination. The pockets for the bellcrank and leadout connections are cut after pressing the glued up and shaped wing with fiberglass cloth.

The wind is ready for sanding to it's symmetrical airfoil shape. Leave the center section flat to help final incidence alignment. A razor plane is really handy to get the basic airfoil. Then sand to close to final with 80 grit and finish sand with 220 then 400grit.

Covering – In the past I had tried several methods of adding glass cloth to wings with not much success. After reading Wayne Trivin's description of using a wing press I decided to try it. The procedure turned out to be one of the most satisfying things I've done. The press insures several things, the wing comes out straight, some of the excess resin is squeezed out, and the final finish is much smoother and very easy to finish eliminating several hours of tedious sanding. I think this one step contributed greatly to the rapid construction of these airplanes.

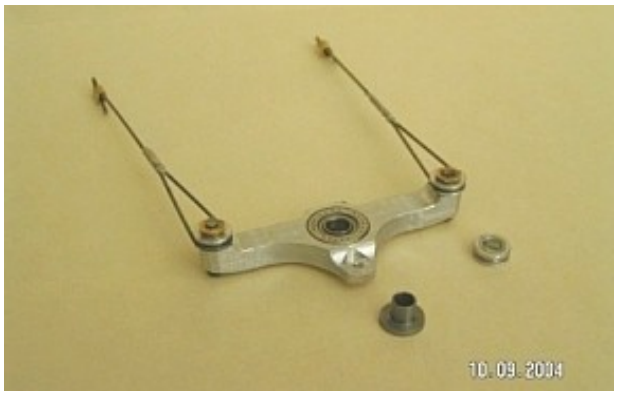
Wing press – The press is made of two ¾" thick melamine faced shelf boards. A series of 6" long ¼" threaded rods 6" apart are installed on the perimeter of the boards, then two inch thick polyurethane foam is glued to each board. A short afternoon spent building the press yields something to be added to your shop inventory. I made two presses, one 40" long for wings and a shorter one 18" long for stabilizers. I cover the surface of the foam with wax paper to help prevent any excess epoxy sticking to the foam.

Use of the press – Both the wing and stabilizer/elevator use the same procedure. After final shaping and sanding of the surface I cover it using materials and procedures of "How to Vacuum Bag Foam Core Wings" downloaded from the CTS website. . I don't have a vacuum bag setup but using one would give even better finish results than I get without it. I do use the Nylon bag and parting wax as recommended. The wing and tail assembly are covered with 1-1/2 – 2oz fiberglass cloth and West Systems 105 epoxy resin and 206 hardener from CST. After layup the bagged assembly is put into the press and the bolts around the edge tightened down. Initial pressure to allow pulling down the bolts is applied by a 200 pound weight, me, kneeling on the press while installing the securing nuts and washers. After an overnight cure the assembly is removed from the press and is ready for trimming & final sanding without the lumps and bumps associated with not using the press technique, a real time saver.

Stabilizer - Cut the panels to size then edge glue per the plans on a flat surface. Tack glue the basswood strips on the hinge line. Once the basswood outlines are installed the stabilizer is ready for sanding to it's symmetrical airfoil shape. Leave the center section flat to help final incidence alignment. A razor plane is really handy to get the basic airfoil then sand to close to final with 80 grit and finish sand with 220 then 400grit. After the sanding is complete, separate the elevator in one piece from the stabilizer then radius the hinge line. The sanded elev and stab are then covered with 1-1/2 oz cloth using the wing press technique. Fabricate the horn from .063 wire, solder the bushing into the eye. After removal from the press trim the cloth and sand. Drill the elevator and notch it's leading edge for the horn. Use slow set epoxy glue to secure the horn to the elevator. The center piece will be cut out after installation in the fuselage. The sewn figure 8 hinges will also be done after full assembly. Set the stab/elevator aside until completion of the wing.

Bellcrank installation – NEMESIS - When the wing assembly is removed from the press and the excess glass trimmed off, the wing is ready for installation of the bellcrank, leadouts, and leadout guide. Cutout the 1/16 "plywood bellcrank plates. Trace around their outlines in the proper location on the top and bottom of the wing, then rout a 1/16 deep pocket for the plates. Rout the bellcrank clearance pocket completely through the wing. Rout the cutouts for line connection in the inboard lower surface of the wing.

The bellcrank in STPRNTR is mounted below the wing. The bellcrank's leadout standoffs move them to align with the center of the wing.



Bellcrank preparation - Bend up the leadout extensions from .032 wire using round nose pliers. Avoid any sharp bends in the leadouts. The line connectors are part of the leadouts, eliminating putting something else inside the wing. I haven't had any problems with leadout failure using this system on several airplanes. I pull tested a typical assembly using control line wire with AMA recommended wire end construction. I added weight till failure. The line broke before there was any indication of yielding in the leadout. Using an R/C E-Z pushrod connector drilled out for 3/32" dia wire install it in the inner hole on the bellcrank then shorten the pushrod arm of the bellcrank. The connector will protrude from the bottom of the wing and allow attachment of the pushrod after the wing is in the airplane. The pushrod will be soldered to the connector after installation in the fuselage and the bellcrank and elevator are aligned to neutral.

Leadout guide – The leadout guide is made to allow installation of lines with their ends finished. It incorporates a "grouper". Two pieces of 3/32" alum are bolted together with button head allen screws then the assembly is drilled and tapped 2-56 on the parting line. Rout a pocket in the inboard tip of the wing for the guide, then epoxy glue one half in place. Reinforce the cutout in the wing surface with a piece of .007 x .5 CF strip cutout for the other half of the guide. Rout a slot in the inboard wing tip to allow the lines to pass through. The ½" long grouper spring is made by winding .015 diameter music wire on a .032 diameter mandrel. The control lines are passed through the spring before the end grommets are installed. After the lines are installed in the wing the two halves of the guide are bolted together retaining the spring. Don't forget the CF reinforcement. Although the flight loads are very low, a pit stop catch can rip the guide out of the wing, I did it once! The grouper spring should be installed with the inboard end flush with the guide plates. The lines separate at this point and will bind up if the spring protrudes into the wing any farther.

Fuselage- The fuselage construction takes a little more time to accomplish, but it yields the benefit of being able to control it's thickness (weight).

Sides & doublers Start with a piece of A-grain 1/16th balsa, lay out the two sides per the view shown on the drawing, then cut them out. Two things to note. The sides are left long on the bottom side to allow wrapping around the bulkheads and the lower edge of this extension is parallel to the edge (grain) of the balsa to help keep the sides from splitting when they are wrapped around the bulkhead. They are also left long so the bottom surface can be sanded flat for the fuselage bottom sheet. Add the CF reinforcement with slow set epoxy, being careful to make a left and a right. This surface will be the INSIDE of the fuselage sides. Add the 1/32 plywood doublers and set aside for later.

Crutch - The basswood crutch is formed from three thickness' of ¼" basswood. Cutout the pieces to the length shown, then bond together with slow-set epoxy. After the glue is dried rout out the interior shape. I do this on my mini-mill so I can accurately locate the insert holes, but it can be done by hand. If done carefully, the engine will drop right through. Cut the outline to shape, I use a bandsaw.

Speaking of the inserts. I use brass threaded inserts from DU_BRO or Microfasteners, 4-40 for the engine, and 2-56 for the tank. I install the inserts using an allen screw and nut. Note that the slot in the insert is for cutting the threads in the wood, not a screw slot for installation. Coat the insert with slow set epoxy prior to final installation. I have not had an insert back out in any of my current models when installed with this method. As an alternate, blind mounting nuts may be used, but I have found they tend to crush the basswood material when tightening mounting screws. I think BMNs use should be restricted to hardwood installations where inserts DO tend to back out.

Bulkheads – Cut the bulkheads out of 1/16" balsa and 1/8" plywood as shown on the plans.

Tailskid mount – The tailskid is retained in a 1/16" plywood sandwich.

Assembly of the crutch and sides. This step will start the alignment process of the fuselage and wing, so take your time. Clamp the crutch to a flat surface with the engine mount surface against the flat. . I use a large flat piece of ¾" melamine faced board. Make sure there is a centerline drawn on the surface for reference. Clamp and glue the two fuselage sides to the crutch, making sure the slots for the wing and stab are parallel to the surface.

The wing must be installed now. Once the sides are glued together at the rear the wing will not fit through it's slot due to the bellcrank connector.

Alignment of the wing/fuselage/horizontal stabilizer will make or break the performance of the airplane. The wing and stabilizer chord lines must be lined up parallel with the horizontal thrust line or some sort of control input will be required to keep the airplane flying level. That means preventable drag and slower times. The wing must also be installed perpendicular to the fuselage centerline. With the wing centerline aligned with the crutch CL measure from the nose CL to a point equidistant from the CL on the trailing edge. This will ensure planform alignment. Don't use the wingtips as a reference, the inboard and outboard spans are different. Make sure the wing is at zero spanwise tilt. Use slow set epoxy and take a lot of time lining up the wing and it will pay off in performance.

The bulkheads can be trial fit and/or glued in place at this time. The tailskid block is glued between the sides under the stabilizer, on NEMESIS. The tailskid is a part of the lower vertical tail on SPRNTR. Do not glue the fuselage sides together above the stab slot, closest to the surface. Installation of the stab and elevator requires this to be open for the control horn. After the bulkheads are in place the reinforcing diagonals can be added in the bays between the wing and stab. These contribute greatly to the torsional stiffness of the fuselage and make the top and bottom blocks less critical for strength of the aft fuselage. Side to side whipping of the fuselage occurs during a pit stop catch. If there is not enough aft fuselage strength the tail may break off right at the trailing edge of the wing. This was a common occurrence in the past.

The stab/elevator are installed next. With wing/crutch assembly clamped to a stiff board, align and glue the stab in place. Again shim the stab so that the chord is parallel to the thrust line, the hinge line perpendicular to the CL, and the stab at zero spanwise tilt.

Vertical stab - This is a piece of 1/16 ply. Sand the TE to a sharp edge and round the LE.

Assembly
Pushrod and shutoff trip – The pushrod is made from 3/32 diameter music wire. It has an R/C type clevis with retainer on the elevator horn and is soldered after final control surface alignment to the pushrod connector on the bellcrank. I solder a small loop of 1/32 wire to the pushrod at the leading edge of the stabilizer. I then connect a piece of nylon coated 27# test fishing leader with a crimp sleeve. This leads forward into the tank compartment through a 1/16" diameter brass tube protruding about ¼" into the compartment. I finish this with a fishing tackle loop crimped on the end that attaches to the shutoff.

Landing gear & mount–
The landing gear strut is made from .080 thick Titanium sheet. A real pain to cut out but stronger and lighter than a comparable size aluminum strut. Just take your time with a hacksaw then finish with a file and belt sander. A very slow metal cutting bandsaw with the blade in backwards will work wonders with this job. If you have access to one try this trick, it's amazing. I bend the gear in a bench vise using a small bending fixture I fabricated from 3/8" diameter steel rods. Be careful to make the bends parallel to each other and to the centerline of the strut, any skew here will cause toe-in or toe-out of the wheels. Do not put a sharp bend in the gear. Titanium doesn't like sharp bends. I recommend using Glenn Lee flush hub wheels, although NEMESIS as built has the bushing type for axles. I used what I had due to the short building time available. The required two-wheel landing gear is to me an albatross around the neck, but at least all the competitors have the same albatross. With two wheels ANY misalignment of the gear means the dreaded "pilot looking at the crankshaft" syndrome occurs or a dragging wheel happens that turns the airplane into the circle on landing, or prevents the pilot from reaching his pit area. So be very careful about keeping the gear aligned with the fuselage centerline on final assembly. The bends in the gear also help alleviate this problem, the outboard strut is bent so the axle is ¼-1/2" higher off the ground. The landing gear plate is attached to support bulkhead then filled in around with balsa blocks that will be sanded to shape. Install 3- 4-40 BMNs on the plate to hold the gear before gluing it in place.

Cooling ducts and engine cowling - The lower engine cowling and cooling ducts are made by building up the thickness with sheet balsa cut to outline with the engine in place. Tape up the intake and exhaust to keep sawdust out. I build up with balsa to the 1/32 plywood that forms the top of the cooling duct. Glue together a pair of 3/8" sheets of balsa, layout the cooling ducts, then cut out the ducts shapes on a bandsaw. Coat the inside of the cooling ducts with a couple of coats of CA glue, sanded between coats. Then glue in place, keeping about 1/32" clearance around the crankcase fins. This makes a smooth fuel-proof finish. Add the 1/16" plywood cap.

Fuselage top and bottom - The fuselage bottom is ¼" soft balsa glued to the sanded edge of the fuselage sides.

Engine cover and canopy – The engine cover/canopy is made from three layers of ¼ balsa with a 1/16 plywood bulkhead to support the aft end of the canopy. I assemble this tack glued to the crutch, with the engine out. After carving the outside shape and fitting the canopy, remove it and relieve the inside to clear the engine and tank. Glue on the pilot's head and canopy with RC_56 or similar adhesive, then cover the canopy with masking tape to prevent scratching.

The fuselage top is soft balsa added after the canopy/engine cover and is sanded to match their contour. It has a 1/16 plywood bulkhead with plywood tongue to retain the aft end of the engine cover. I cut the slot for the plywood tongue last to insure a snug fit of the engine cover. Tack the balsa in place then carve and sand to shape, they can then be removed and hollowed out.

Fuel tank – The uni-flow tank is bent up out of K&S easy-solder tin plate. The fuel pickup tube and vent are located in the wedge on the outboard side of the tank, the vent at the top corner and the pickup at the bottom. Although NEMESIS as built has the fastfill on the top of tank, I have found since that angling the fastfill inboard at 45 degrees makes it easier to get to it in a pit stop. We are experimenting with using just a 1/8 dia vent tube for filling. So far it appears that not using a fast fill doesn't have a significant time penalty, and it eliminates a potential problem area.

Glo-plug hookups – The plug hookups have to be setup so that the pitman can get to them while he is refueling. There is a danger however, once the plug is lit, excess fuel flying around can be ignited causing a pit fire, embarrassing at the least. I have tried the "wing root" contacts as currently popular in TQR, but have found them to more often than not cause the airplane to yaw into the circle when releasing it for takeoff, this is not greatly appreciated by the pilot or the other pilots. I have had good luck using the shutoff end or the needle valve end as the ground with a braided wire from a contact on the outboard side of the fuselage attached to the plug with a wire clip.

Finishing - One of the advantages of using the press is that the wing and stab are almost all ready done. All they need is finish sanding, final color, decorations, and clear coat. The fuselage gets a layer of 1-1/2 oz cloth and epoxy resin all over with an extra layer around the engine cowl. The engine cover gets two layers of 1-1/2 oz cloth and resin.

Painting and finishing are not my forte'. I have figured out more ways to mess up a finish job than just about anyone on the planet. The appearance of NEMESIS and SPRNTR are completely due to the efforts of Ron Duly.

Our engine is a Webra 28 formerly owned by Vic Garner, nuff said! So far we have not used anything other than "contest fuel" 10/20. Our experiments with funny fuel have not been anything encouraging as far as reliability and restarts. There is a lot of experimentation necessary to get a venturi size and prop combination to get the desired results. We use a remote needle valve with Nelson 15 Rear Rotor venturis. Other setups can be made to work just as well. I like the quick change feature of the Nelson inserts. As far as props go, I use APCs. Size? I have to have some speed secrets, don't I?

I have the construction plans including the machined parts drawings available for both NEMESIS and SPRNTR. They are in .dxf format, $5 ea on 3.5" floppy, or they can be forwarded by e-mail upon receipt of the $5. They are the working drawings I use to build and as such are not the "usual" thing you would see in a magazine. I rarely ever print anything full size. I prefer to work using dimensioned drawings, the only exception is the bulkheads, those I print out full scale then cutout and glue to the wood.

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2006 Contest Calendar

NOTE!! ***Confirm dates, locations & events with the CD or contact listed below. NCLRA cannot be held responsible for changes, errors, omissions, etc.***

Portland, OregonApril 22 & 23- Jim Walker Memorial
Racing TBD. CD Scott Riese 503-246-4631

APR 23--Dallas, TX (AA) DMAA Spring Warm-up Site: Hobby Park, Dallas, TX. Events: Slow Rat, Mouse I, Texas Quickie Rat, Sportsman Goodyear (JSO) CD: Patrick Hempel, 304 Becky, Rockwall, TX 75087. Phone: 972-231-2185(day) 972-841-8766(eve) E-Mail: phempel@dataconninc.com WebSite: www.DMAA-1902.org Helmets required for all racing pit crews.

MIDWEST SPEED & RACING CHAMPIONSHIP
SATURDAY & SUNDAY MAY 20 & 21, 2006
BUDER PARK FLYING FIELD in VALLEY PARK, MO.
I-44 at Mo. 141, west of St. Louis. From I-270 take I-44 west to Valley Park exit #272, Buder Park is to right (northeast side of I-44)
CONTEST DIRECTOR
John Moll, 7315 Elm Grove Ct. , Hazelwood, Mo. 63042
Ph# 314-831-4001 E-Mail….JL172@sbcglobal.net
317 SCALE RACING (JSO)
FOX 35 RACE (JSO) NCLRA 318 F2C TEAM RACE (JSO)
TEXAS QUICKIE RAT(JSO) NCLRA
PERKY OLD TIME SPEED (JSO)LOCAL RULES
F2C Team Race to be held on Saturday.
All other racing to be flown on Sunday starting at 9:30 a.m. Speed events to be flown both days. AMA rules apply for all events. Awards to be presented thru 3rd place in each event. Registration opens at 8:30 on Saturday and Sunday. Speed flying starts at 9:00 both days. JETS AFTER 10:00
PLEASE. Buder Park floods in extremely wet weather. If there has been a lot of rain, call or e-mail CD before driving to St. Louis. If entering Jet Speed events, contact C.D. about supplying fuel.
ENTERY FEES (OPEN) $10.00 FIRST EVENT, $5.00 EACH ADDITONAL. JUNIORS & SENIORS ARE "FREE"

The Northwest Control-Line Regionals will be held in Eugene, Ore., on May 26-27-28, 2006.
Racing: Mouse I, Mouse II, .15 Rat, Goodyear, NW Sport, NW Super Sport, Clown, Quickie Rat
Speed: 1/2-A, 1/2-A Proto, A, B, D, FAI, Jet, Formula 40, .21 Sport, .21 Proto, NW Sport Jet
Junior/Senior events: Class I Mouse Race and Northwest Sport Race A flyer with complete details is posted on the Regionals website,http://groups.yahoo.com/group/NWCLregionals/
For information, contact John Thompson, johnt4051@aol.com

South El Monte, CA, WhitterNarrows Park June 3th and 4th 2006-Dale Kirn Contest Knights of the Round Table
CD: Mike Fox 714-913-9487
Speed ED: Howard Doering 714-638-4937
Registration 8:00; Events 8:30
Saturday: AMA Mouse I, Clown, Fox Race, Quickie Rat.

JUN 17-18--Dallas, TX (AAA) Dallas Aero Summer Heat Site: Hobby Park, Dallas, TX. Events: Mouse I, Sportsman Goodyear,

Texas Quickie Rat, Goldberg Race CD: Terry Kirby, 13639 Charcoal Ln., Dallas, TX 75234. Phone: 214-637-4361(day) 972-247-4241(eve) E-Mail: texas_flyer2001@sbcglobal.net WebSite: www.DMAA-1902.org

Merced or Stockton??? CA June 18 2006
SCAR RACE #4 Pre-NATS Warm-Up
CD: Jim Holland (209) 726-0357 jgmholland1959@yahoo.com
Sunday: Mouse 1&2,AMA Scale Race, NCLRA B Team Race, NCLRA Clown Race, NCLRA Quickie Rat, LA Fox Race (Time Permitting)

AMA Nationals 2006-MUNCIE, INDIANA
CL Racing July 9 to 14
Sun-NCLRA Fox/ LA Fox
Mon-F2C, F2CN
Tues-B TR,Goodyear
Weds-Slow Rat, NCLRA Clown
Thurs- .15 Rat, NCLRA TQR
Fri-Mouse1, Mouse 2
Event Director-Tim Stone 815-344-5728

F2C World Championships July 16th. - 24th., Valladolid, Spain.

SCAR Race #5: August 5-6 2006 Location NAS Alameda, CA
The Second Annual Northern California Control Line Racing Championships
Saturday Events: AMA Goodyear, Clown Race, SCAR Formula Unlimited, NCLRA SS Rat/Fox -combined Sunday Events: 15 Rat, B Team Race, SCAR Goodyear, Texas Quickie Rat
CD: Jim Persson 925-846-3999; Asst.CD: Randy Bush rbush88@juno.com

Albuquerque, New Mexico Aug 19-20
Foxberg- CD Richard Perry email rperry@comcast.net

Denver, CO – September 2rd and 3th, 2006
30th Annual Rocky Mountain Control Line Championships-Rocky Mountain Aeromodelers & Front Range Airport
CD Chris Jacobson, CJRJFlyer@aol.com 9961 West 86th Place Arvada, CO 80005, 1-303-420-3346
Saturday: Mouse I, NCLRA Foxberg

Van Nuys, CA Sepulveda Basin-Sept 10, 2006
SCAR RACE #6 – September Bash (Provisional)
CD: Jim Holland jgmholland1959@yahoo.com (209) 726-0357
Sunday: Events: AMA Mouse I, NCLRA Flying Clown, NCLRA Fox Race/Super Slow Rat, SCAR Goodyear, NCLRA Quickie Rat

Tucson, AZ Sept. 16th and 17th , 2006
Karl Marschinke Memorial Cholla Choppers
Christopher Columbus Park 4600 N. Silverbell Rd $10 first then $5 CD: Glen Allison 1484 W. Oak Shadows; Tucson AZ 85737 520-575-0359 Mail Only
Saturday ½ A Mouse II, Fox Race, Texas Quickie, Formula Unlimited, Clown Race.

FERMILAB-BATAVIA IL Oct 1 JERRY 'WHO' MEMORIAL 350 LAP FOX RACE
CD-Glen Lee

Salem Oregon, October 7th and 8th , 2006
Fall Follies Bill Riegel Model Air Park Western Oregon CL Flyers
John Thompson, 2456 Quince Street, Eugene, OR 97404 541-689-5553 JohnT4051@aol.com
NW Sport Race, Flying Clown Race, NW Super Sport Race, Sunday: Racing events TBA.

South El Monte, Whitter Narrows CA October 21th and 22th 2006 -Virgil Wilber Memorial Control Line Contest
CD: Joe Brownlee 714-895-1857 12101 Stonegate Lane, Garden Grove, CA 92845
SCAR Race #6 ED: Jim Holland 209-726-0357 jgmholland1959@yahoo.com $20-$25
Saturday: All speed classes; AMA Scale Race, SCAR Formula Unlimited, AMA .15 Rat, NCLRA Clown Race, NCLRA B Team Race
Sunday: All speed classes; AMA Mouse I, NCLRA Fox Race/Super Slow Rat, SCAR Goodyear, NCLRA Quickie Rat (AMA Mouse II if enough entries)

South El Monte, CA, Whitter Narrows Park ,Dec 2rd and 3th 2006-TOYS FOR TOTS
CD Joe Brownlee 714-895-1857
Racing ED: Jim Holland 209-726-0357 jgmholland1959@yahoo.com
Saturday All speed classes
Sunday, NCLRA Fox Race, SCAR Goodyear, SCAR Formula Unlimited; NCLRA Quickie Rat - All speed classes; Bring Toy For Tots

NATIONAL RECORDS

SLOW RAT

JR	(70 LAP) 5:16.20	SCOTT MATSON	7/10/00
	(140 LAP) 6:47.37	SCOTT MATSON	7/10/00
SR	(70 LAP) 4:29.63	HOWELL PUGH	7/20/94
	(140 LAP) 10:58.47	DOUG SHORT	7/10/00
OP	(70 LAP) 2:36.31	BOB OGE	7/18/91
	(140 LAP) 5:24.94	MIKE GREB	7/19/90

½ A MOUSE 1

JR	(50 LAP) 2:37.57	SCOTT MATSON	7/15/99
	(100 LAP) 5:17.68	SCOTT MATSON	7/17/99
SR	(50 LAP) 2:44.68	DAVE ROLLEY JR	7/15/99
	(100 LAP) 5:20.11	D.J. PARR	7/16/98
OP	(50 LAP) 2:12.3	JIM HOLLAND	7/16/04
	(100 LAP) 4:22	RYAN&GIBEAULT	7/15/99

½ A MOUSE 2

OP	(70 LAPS) 3:01.24	MACCARTHY/KERR	7/11/03
	(140 LAP) 7:16.03	WHITNEY/HALLAS	7/11/03

SCALE RACING

JR	(70 LAP) 2:50.65	BOB FOGG III	7/16/91
	(140 LAP) 6:08.55	BOB FOGG III	6/23/92
SR	(70 LAP) 3:15.12	DOUG SHORT	7/11/00
	(140 LAP) 5:40.05	BOB FOGG III	7/11/95
OP	(70 LAP) 2:39.38	WILLOUGHBY/OGE	7/15/97
	(140 LAP) 5:33.04	BOB FOGG SR	7/16/91

F2C TEAM RACING

OP	(100 LAP) 3:15.46	LAMBERT/FLUKER	9/04/05
	(200 LAP) 6:57.36	LAMBERT/BALLARD	7/15/98

F2CN (NCLRA RULES)
100 LAPS JULIO ISIDRO 7/11/05
200 LAPS BOB WHITNEY & DAVE HALLAS 7/11/05

'B" TEAM RACING
OP (35 LAPS) 1:24.34 BURKE/DULY 7/12/05
(70 LAPS) 3:11.51 BURKE/DULY 7/12/05
(35+70 LAPS) 4:35.85 BURKE/DULY 7/12/05
(140 LAPS) 6:45.1 BURKE/DULY 7/13/04

RAT RACING (.15 RULE)
OP (70 LAP) 2:44.6 JIM HOLLAND 7/15/04
(140 LAP) 5:33.1 JIM HOLLAND 7/15/04
JR-SR NO RECORD ESTABLISHED

NCLRA FOX
JR (100 LAP) 5:57.11 SCOTT MATSON 7/11/99
SR (100 LAP) 5:28.09 SCOTT MATSON 7/16/02
OP (100 LAP) 5:32.55 TIM STONE & BOB OGE 7/10/05

NCLRA CLOWN
OP (15 MINUTES) 313 LAPS DAVE HALLAS & BOB WHITNEY 7/13/05
OP (7 ½ MINUTES) 160 LAPS DON BURKE & RON DULY 7/13/05

NCLRA TEXAS QUICKIE RAT
SR (70 LAPS) 3:04.22 SCOTT MATSON 7/12/01
SR (140 LAPS) 6:20.20 SCOTT MATSON 7/12/01
OP (70 LAPS) 3:04.28 JIM HOLLAND/BILL CAVE 7/14/05 (140 LAPS) 6:07.01 JOHN MCCULLOM & BILL LEE 7/14/05
NCLRA SUPER SLOW RAT
(100 LAPS) 6:27.59 DON BURKE & RON DULY 7/10/05

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Torque Roll is the official publication of the NCLRA. Published bi-monthly. All submissions are valuable & will be considered for publication subject to editing. Preferred format for publication is as a MS Word document using 10 point New Times Roman font. Any photos should be sent as a separate jpeg file, medium res. Email all as an attachment to Tim Stone At the address given on this page. While this is preferred format,we will take submissions in just about any format, they can be written,typed or mailed to Tim Stone.

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