



Fort Worth Thunderbirds Radio Control Association Inc. **The Pilot's Log**



Issue 4480 February 2021

Next club meeting: February 27th, 2021, 12PM (noon) at our Flying Field

Presidents Corner: *by James Meadows*

Welcome to February 2021, and it would appear that winter weather has finally appeared in force. Good time to stay indoors, read the latest version the AMA magazine, The Thunderbird newsletter, or complete another step in that build or repair that is sitting on the kitchen table or in the work shop. Your significant other is probably going to suggest the latter. If they do, I would take it and run with it! Beats shoveling snow or thawing pipes with your monocote heat gun. Been there really!

I would like to thank membership and guests who braved the wind and came out to the field for the general membership meeting in Jan. It was a little different in two distinct ways. One it was on a Saturday, and secondly it was during the day. It's important that we continue to come together, conduct business, and it all honestly have some social interaction, not involving a computer, smart phone, chat room etc. But we also need to do it as safe as possible. With the continued restrictions of the COVID pandemic and the nearly zero facilities able to accommodate our group size, we will continue to meet at the field as weather permits. Hopefully when daylight savings time arrives and the weather is more pleasant, we can return to our previous schedules. For now, the February meeting will be at the field and more than likely during the day on a Saturday. Please watch for updates in your email or on our social media sites. During the January meeting we

mentioned that we need some folks to consider being Contest Directors (CD) Event Mangers (EM) etc. But there are other ways to assist the club. During a recent board meeting, we came to a conclusion that we need some assistance as we move forward on many fronts. The best vehicle and as stated in our by-laws is the use of committees. In the next few weeks, months many of you may be asked, to assist the club by serving as a committee member. Each committee will have a specific task and a time limit. Not the type of person to be in the spot light, or sit on a committee? Consider some of the following ways to assist the club, grounds maintenance, flight training, ground training (flight), ground safety, First Aid, etc. If you have the skills, or desire to help, contact one of the board members.

As many of you are aware, the club is in the midst of renewing our lease with USACE, and I am happy to say it is moving along, slowly but it is moving! There was some clarification and determinations necessary on both sides that needed to be worked thru. The Lake manger has completed their review and sent the documents to HQ for their review, and signoff. Our yearly compliance inspection on the 1st of Feb went extremely well, and a big thanks to Ken Knotts for being the point on this, and to the members who curtailed they're flying, while we inspected the runway, and tree line.

Stay safe, stay warm, an keep them flying.

Vice Presidents Corner: *by Rob Lowe*

No Power, No Heat, No Article. Stay safe.

January Club Meeting Minutes: *by Mike Schroeder*

Club meeting minutes January 30, 2021

Meeting starts at 2:20 at the Thunderbird field

New Business

James welcomed everybody and asked if there are any new members or visitors. New members attending were Bud White and Ricky Allinen.

Monday February 1 is the field annual inspection by the CORP of Engineers so please if you see trash or something that needs to be addressed please take care of it. James is still finishing up the renewal of our lease and the club will have to pay for a survey this year.

Reports

Treasury Report by Chris Berardi

The club has one hundred and one members and two new members Ricky Allinen and Bud White.

Checking account is in good standing with just several small bills being paid this month.

Two big expenses coming are the lease and the survey that is required by the CORP to renew.

The club was able to make a donation for Cancer Awareness. There were no club funds used for the donation as all the raffle items were donated to the club for the fund raising raffle. Thanks to all for their donations and to all who braved the cold for the raffle.

Safety Report by Bill Lake

Please read the newsletter as there is good insight into safety. Murphy's Law says if something can go wrong it will go wrong. Everyone who is at the flying field is a safety officer and pay attention to your neighboring pilot at the field. Talk while in the pilots box and let your intentions be known call out, taxiing out, taking off, low pass, crossing the runway, landing on next go around, landing and clear of the runway. These simple things help others to be safe when in the pilot's box. This can help a lot if we just take a little effort to let our intentions known. Whenever working

on an plane the first thing that you should do is what? Take the prop off. Make it a habit on all planes. Last and for today is that if you are to make a low pass it is to be on the far side of the runway over the grass, the East side. Not the middle, not on the edge halfway but over the grass on the other side of the runway.

Be safe

Vice President by Rob Lowe

If you purchased a Christmas raffle ticket and have not picked up your prize please contact one of the board members next time you see one at the field.

All the comments to the FAA made a big difference as the FAA listened and took those comments into account when making their final decisions. On site sanction fields such as our field will not have to use remote id but off site like out in a park will have to have remote id. The club is working on trying to raise our ceiling height up from four hundred feet and we will let you know if this can be done for our field. Camp Joy for our float fly will be included in our flying area and will be a four hundred feet ceiling due to the base.

Secretary Report by Mike Schroeder

No minutes to report at this time as there was not a club meeting last month. Motion was made to read the non meeting minutes but there was not a second and the motion died.

Old business items

The kiosk at the front entrance is unmanned and it is on an honors system to pay. If you have an AMA card you are still allowed in and do not have to pay just like we always have done. You are only allowed to go to the flying field. You are not allowed to go to any other part of the park unless you pay at the kiosk. Park Rangers are doing random checks.

Meeting adjourn at 2:45

Members in attendance

Chris Berardi
Bill Lake
Gary Alpin
Rob Lowe
Geoff Lowe
Bud White
Rex Owens

Ken Knotts
Woody Lake
Gary James
Mel Wells
James Meadows
Grant Schroeder
Ed Furche

Ricky Allinen
Pete Lucas
Kennth Kilgo
Robert
Mike Schroeder
Mark Elhers

From the Treasury: by *Chris Berardi*

Snake Oil

There are many topics that will spark animated conversation, not the least of which is our current political climate. Speaking of climate, global warming is another where vast numbers have strong but weakly substantiated opinions. But none of these has as much relevance to our hobby as the topic of lubrication; and this topic can get pilots pretty fired up based on years of misconceptions and perceptions.

It seems that everyone has an opinion on what the “best” lubricant is. At the most fundamental level the choice we make is between traditional “dino” (dinosaur) oils developed from multi-million-year-old heated and compressed fauna and flora; or, one of the modern “synthetics.” These are typically derived from a petroleum stock or other materials such as natural gas but in many cases they utilize crude oil as their base stock.

As a practical matter, the real performance of modern engine oils regardless of their labeling is due to the additive packages that characterize the oil for various purposes. There are multiple specialties with each manufacturer promoting their particular forte but essentially the base stocks are similar. You will see oils that are slated for high mileage, fuel economy, anti-foaming, anti-wear, corrosion resistance, high load or racing purposes. In almost every case, the additive determines that trait and all additive packages are volatile and subject to evaporation, thermal breakdown and simple mechanical destruction. Additives are complex chemicals that account for most of the cost of 2-stroke oil.

This distinction between the oil categories (petroleum v synthetic) is a point of conflict even between the producers: Mobil sued Castrol and Castrol prevailed in showing that their base stock ‘dino’ oil was changed enough to qualify as a full synthetic. Since then the American Petroleum Institute (API) has removed all references to synthetic in their documentation regarding standards. "Full synthetic" is marketing term and is not a measurable quality. As there is no universally accepted definition for synthetic oil each manufacturer is free to label their product as a synthetic by whatever rules they choose. This is not unlike the hawkish salesmen of centuries past with their patented minerals and liniments - there was and is now much deception involved in their product marketing.

There is also a third category, vegetable oil or castor bean oil. Model engines were created at a time when there wasn't a synthetic alternative to petroleum oil: Oils pardon the pun, were extremely crude. For the period there was suitable oil that matched the level of precision in manufacturing and machining processes and lubrication technology. That oil was castor oil; used in both full-size and model aviation engines.

When it comes to model engines there is still a perceived dichotomy between castor oil and synthetic oil. There are also nitro fuels that are a blend of synthetic and castor oils where the castor makes up a percentage of the total oil content. Modern blended fuels may render the dichotomy moot.

Which should you choose? Your choice may best be guided by the type of engine that you are running or your ability to tune it, so let's start with a typical 2-stroke glow engine. In the early days of control line and radio control, engines were made with cast iron pistons. Many manufacturers such as Fox and Johnson advertised “Meehanite®” pistons. As a kid, I certainly

enjoyed the thought of having such an advanced technology in my Fox 35. These engine brands and others of the ilk required the use of castor oil. Why was this? Take a look at the definition of Meehanite provided by meehanitemetal.com:

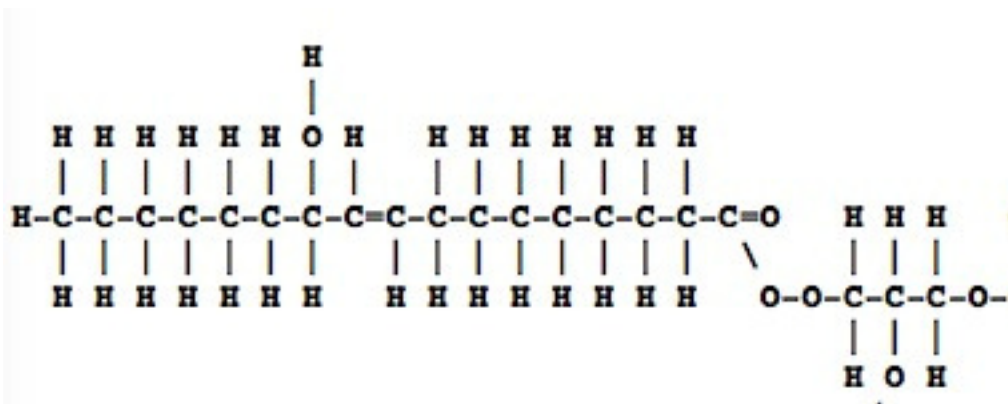
Meehanite® originated the very revolutionary discovery in 1927 of a way to modify graphite structures and control the properties of cast iron in relation to casting section. Meehanite® metallurgists found that by adding alkaline earth silicides to a low carbon iron in the ladle that carbides could be reduced and the iron could be made very machinable and with uniform strength properties.

It's the cast iron that drives the bean-oil requirement because of its porosity. If you have ever run an engine on a castor based fuel, you will have experienced the after-run cleanup and the baking of a thick carbon crust within and without the engine. An engine with a cast iron piston acquires a micro layer of protective semi-solids during the early break-in process that fills the pores of the cast iron and provides addition protection against lean runs and high loads. That protective layer has resisted evaporation at high temperatures building up over time causing the engine to "gum up."

At high temperature castor oil polymerizes rapidly to form ever-heavier ester rich oils that only begin to decompose above 650F. Castor oil forms huge molecular structures at these elevated temperatures so as the temperature climbs it responds by becoming an even better lubricant. Unfortunately, this process results in "varnish" and this is the material that gums up the engine. Varnish is actually unburnt oil that has not been consumed by the engine.

Another interesting note about castor bean derived oil is that it has a flash point of only 445F but its fire point is about 840F. If you compare this to a synthetic Polyalkylene Glycol (PAG in industry parlance), they flash at about 350-400F and have a fire point of approximately 550F. A textual representative of castor oil is shown: Ricinoleic Acid Triglyceride, the major constituent of castor oil.

If we jump forward 50 years to modern 2-stroke glow engines the lubrication need is similar but different. Most importantly these engines are constructed of modern materials, especially the piston. Today these are typically constructed of high silicon content aluminum running in chromed brass liners. There are variations of these themes with coatings such as nickel based (Nikasil) or other proprietary coatings. These liners work in concert with the silicon-aluminum pistons and are thermally



highly stable. Of more consequence is the machining tolerance that is an order of magnitude higher than those older cast materials. Lastly, silicon-aluminum is barely or not porous at all.

Nikasil is short for Nickel Silicon Carbide. Silicon carbide is a very hard ceramic (much harder than steel) that can be dissolved in nickel. The nickel solution can then be electroplated onto the aluminum cylinder bore.

You can see where this is leading: A modern 2-stroke glow engine does not require a castor based lubricant. In fact, a 100% bean-oil lubricant will be detrimental due to varnish build up. Performance will decrease over time for a variety of reasons, the simplest of which is build up within the muffler as well as the inconvenience of gummed up carburetors and stiff bearings.

The finer tolerances of a modern engine are intolerant of varnish build-up; and anyway, who really wants to wipe thick congealed castor oil off their model?

Let's look at the properties of a synthetic lubricant in a model engine application. Earlier I wrote of the flash and fire point of a PAG versus castor oil.

The flash point is the lowest temperature, to which a lubricant must be heated before its vapor, when mixed with air, will ignite but not continue to burn. The fire point is the temperature at which lubricant combustion will be sustained.

The lower temperatures of synthetic oils have some interesting effects on performance and handling. The lower flash point means that depending on how the engine is being run, i.e., what temperature and load it is experiencing, synthetic oil may actually add to the consumable fuel. The end result is more power and this benefit is without any consideration of wetness, slipperiness or other qualities that are friction reducing: all of which lead to additional performance.

Nearly all of the common synthetics that we use burn in the combustion chamber if you run too lean. Castor oil does not because it is forming more complex polymers as the temperature increases. Most synthetics boil on the cylinder walls at temperatures slightly above their flash point. The same activity can take place in the wrist pin area depending on engine design but is generally not happening in the relatively cool environment of the big end. Here, the incoming charge bathes the main bearing and lower connecting rod in cool, fresh fuel (methanol or gasoline) and oil. Ever notice that some bearing retainers for our model engines are plastic (often replacing the brass colored metal ones that disintegrate and destroy the engine)? Those retainers are not subjected to high heat.

On the negative side synthetics will decompose once a critical temperature has been exceeded. The oil will rapidly breakdown into its formulaic components such as complex alcohols and ethylene oxide - these are not great lubricants. However, until this point is encountered, synthetic model engine fuels hold the advantage. Above these critical temperatures castor oil is generating complex esters and with great affinity is binding to the hottest engine parts thus protecting the engine - advantage castor.

With modern engines, the disadvantages of castor oil in the vast majority of cases preclude it from being the sole lubricant. This is particularly true of 4-stroke engines because of the fine tolerances of their additional components and higher exhaust temperatures. Saito Engines state that, "*Use of fuels composed of castor oil is not recommended. A mix of synthetic-castor oil is acceptable...*" This is from a recent manual but I believe that in an earlier manual they said that a castor based fuel would invalidate the manufacturer warranty.

So where does this lead us aeromodelers? What is the proper choice? If you are a reasonably experienced modeler who has the tools to tune an engine correctly, then you really should stick with a 100% synthetic oil based fuel. What tools do you need?

Well it isn't your ear - proper tuning of an engine must be initially done with a tachometer to determine the engine's peak. The needle should then be backed off (mixture richened) to allow for unloading in the air where more fuel and lubricant will be required. Once that point is determined, then a pinch test of the fuel line can be done while the engine is at full throttle. A momentary pinch should lean the engine resulting in it peaking. If the engine peaks you are set, if it sags then it requires a richer mixture. All of this is readily revealed using a tachometer - every pilot with a nitro engine should have one in their flight box.

If you feel the need to have that extra protection, or fear that you might not understand your engine well enough to be absolutely sure, then a blended fuel is for you. These blended fuels have up to 30% of castor oil added to the mix. For example, Morgan Fuels "Omega" 15% nitro synthetic-castor blend fuel is 17% oil in total. The ratio of castor to synthetic oils is 30%/70% to make up the total 21-³/₄ ounces of lubricant (6-¹/₂ ozs castor oil). Alternatively you can add 2-3 ounces of castor oil to a full gallon of model engine fuel to ease your mind. Be sure to use the correct product such as Klotz Benol or Blendzall Racing Castor: Do not use medicinal castor oil as it is not suitable for engine use.

In my 40+ years experience of running model engines I have used 100% synthetic for all my R/C engines regardless of whether they are 2-stroke, 4-stroke, nitro or gasoline. The only engines I run on castor are older control line engines or where the manufacturer states that a blend must be used such as some Rossi/NovaRossi engines.

Regardless of choice, the one thing that is literally burned in my memory from days past is the sweet smell of castor oil, screaming engines and yellow nylon propellers. The sight, sound and the smell coalesce into an ineradicable memory that will probably abide with me to the next life.

As for the snake oil salesmen, they are still out there - the method of delivery may have changed but the patter and banter are still the same.

Membership Update

I'm not sure what happened to the membership count provided in last month's Pilot's Log. The total provided was obviously in error and probably the result of a misaligned cut and paste. This month the gremlins have been whipped and the numbers updated.

Here is our latest membership count as of 2/12/2021.

Membership Type	Count
Individual	127
Family	6
Associate	8
Life	14
Service & Gift	2
TOTAL	167

That's it for my report this month; stay safe and warm, I'll see you at the field.

	BOARD MEMBER	EMAIL
President	James Meadows	president@fwthunderbirds.org
Vice President	Rob Lowe	vicepresident@fwthunderbirds.org
Secretary	Mike Schroeder	secretary@fwthunderbirds.org
Treasurer	Chris Berardi	treasurer@fwthunderbirds.org
Safety Officer	Bill Lake	safety@fwthunderbirds.org

Safety Officer submission: by Bill Lake

WITH MY OWN EYES

Much of what we read in our various safety blogs are third person testimonials. Few experiences are as convincing and memorable as those seen with one's own eyes. In order to recruit a few (or more) believers, I shall share a few observations, seen with my own eyes.

1. Batteries (especially LiPo) get a lot of attention and we have all read numerous articles addressing the unique challenges, procedures, and risks associated with them. I witnessed an altogether different, but similar, mishap involving the recharging of batteries. The aircraft involved had a dual switch with two charging ports on the exterior of the fuselage, making servicing of the batteries much more convenient than locating and accessing leads inside the aircraft. The receiver battery was a 2000 mAh NiMH and the ignition battery was a 6.6V LiFe. The ground servicing agent, who will remain anonymous, carelessly placed the charging lead in the wrong charging port, thus applying NiMH charging amperage to the LiFe battery. This did not go well. The good news was that the airplane was clear of other equipment and the ground crew

was present when, moments later, a strange and unfamiliar noise caught his attention. Upon turning around to the airplane, almost immediately he observed flames rising from the fuselage, easily two feet in the air. One's first reaction might be to swat the fire with an available cloth or to blow on it (surely eliminating eyebrows and other follicles along the way). Fortunately, the individual present elected not to do so, and instead grabbed the fire extinguisher mounted to the wall and quickly put out the fire. Post mishap summary yields the following:

a. What was the cause of the mishap?

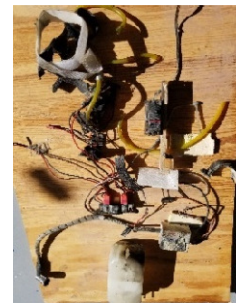
Answer – carelessness and lack of attention to detail. Pure and simple, operator error.

b. What corrective action might preclude a repeat of this event?

Answer – (1) label the charging ports in a way that reminds the ground crew of the battery & associated parameters for charging; or (2) remove batteries from the aircraft before charging (highly recommended for LiPo batteries; and (3) avoid becoming complacent or lackadaisical when it comes to charging any type of battery.

c. What went right?

Answer – (1) the charging process was not left unattended; (2) the airplane was not being charged in a confined or cluttered space; (3) the aircraft wings were not installed, making the fuselage contents (and source of fire) accessible; (4) a serviceable fire extinguisher was readily available; (5) ground crew was familiar with proper and timely procedures for employing the fire extinguisher; (6) fire was quickly contained preventing total loss of the aircraft.



2. Not unrelated to the almost tragic experience addressed above, it is worth reiterating the seriousness of batteries, particularly LiPos. Recently I observed a pilot preparing his rather expensive turbine powered jet prior to flight. What caught my attention was that he brought his charger over to the airplane and hooked it up to the batteries, already installed within the aircraft. Subsequently, I read an article on battery safety and it strongly recommended to never charge LiPo batteries while installed in the aircraft. Ah, what could go wrong? Is a battery puffing in there? Is heat not dissipating effectively? What will be the first indication of a malfunction? Arcing? Shorting? Smell? Smoke? Flames? Explosive burst? Point being ... earlier detection is preferable. Are conditions favorable or otherwise? Is convenience worth the cost of a rather expensive airplane? Pay your money, take your chances? I am now evaluating and considering my practice of leaving my batteries (NiMH) fastened in the airplanes. Fortunately, another cardinal rule WAS complied with and the charging process took place BEFORE the airplane was fueled.

3. Repeated from the AMA Safety Handbook, because it is so important and pertinent to our sport and our safety and well-being –

Batteries: Lithium batteries have become extremely popular for powering control and power systems in models because of their high energy density compared with earlier battery technologies. With high energy comes increased risk in use. The principle risk is fire, which can result from improper charging, crash damage, or shorting the batteries.

All lithium battery vendors warn customers of this danger and recommend extreme caution in their use. However, many fires have resulted from the misuse of Lithium Polymer (LiPo) batteries, leading to the loss of models and automobiles. Other property, such as homes, garages, and workshops, have also burned. A lithium battery fire burns explosively at several thousand degrees and is an excellent initiator for ancillary fires. Fire is caused by contact between lithium and oxygen in the air. It needs no other source of ignition or fuel to start.

The following is recommended for lithium batteries to preclude ancillary fires:

- Store and charge in a fireproof container—never in your model
- Charge in a protected area that is devoid of combustibles.
- In the event of damage from crashes, etc., carefully move the battery pack to a safe place for at least a half hour to observe. Physically damaged cells can erupt into flames. After sufficient time to ensure safety, the cells should be discarded in accordance with the instructions that come with the batteries. Never attempt to charge a cell with physical damage, regardless of how slight.
- Always use chargers designed for the specific purpose; it's preferable to have a fixed setting for your particular pack. Many fires occur while using selectable/adjustable chargers that are improperly set. Never attempt to charge lithium cells with a charger that is not specifically designed for lithium cells! Never use chargers that are specifically designed for NiCd batteries.
- It is strongly recommended that you use charging systems that monitor, control, and balance the charge state of each cell in the pack. Unbalanced cells can lead to disaster if the system permits a single cell in the pack to be overcharged. This means that the charging system must provide charge cessation as each cell reaches the proper voltage. If the batteries show any sign of swelling, discontinue charging and move them to a safe place—outside. They could erupt into flames.
- Never plug in a battery and leave it to charge unattended; serious fires have resulted from this practice.
- Do not attempt to make your own battery packs from individual cells. Use only professionally packaged and labeled units that contain safer charging features.



In Memoriam Tom Beneke

"This is Tom Beneke's daughter Ginna. I wasn't really sure who to contact, but I wanted to let you guys know that my dad passed away last night. I also wanted to express my gratitude to everyone in the club. I really appreciate how all of you guys welcomed him in and helped him out. He really loved being a member. I think in a lot of ways you all were so instrumental in helping him get through my mom's passing in 2017. He always looked so forward to going out to the field and just hanging out with you guys and watching the planes even if he didn't actually fly. I am really so grateful for all of you!

Details of the memorial service will be shared with those of you who knew him.

Thank you!

Ginna Beneke"

Tom was a regular fixture at our Thursday afternoon training sessions. Many of our instructors flew with Tom in his quest to attain his longing of flight. He will be missed by many.

Blue skies and gentle breezes my friend.



Super-Scale Beechcraft Staggerwing: *By Model Airplane News Magazine*



There are few 1/4-scale models of the Beechcraft Staggerwing, and the most popular RC design is the one from Nick Zirolì. Its outline is very close to scale and it produces a great looking scale airplane. When it comes to making them look real, you need to use some scale parts and techniques. Here are a few close up pix of this impressive example.

Painting your model is the last bit of finishing and it's the part most noticed. For great results use the same paint as used on full size airplanes. stits.com is the place to get the stuff. Poly Tone paint works great and is designed to work with the heat shrinkable Poly Fiber covering.



That big radial engine cowling really benefits from a dummy engine installation. If you don't have the cash for a Robart 4-stroke 7-cylinder radial engine, there are plenty of resin cast dummy engines that will help cover up your RC gas engine. And the finer details like proper color, lifter rod tubes and spark plugs and wiring all add to the appearance.



So, you do have to get inside the airplane to work with and maintain the radio gear and linkages, so why not add functional cabin doors. These work great and give easy access to the internal parts. A removable cabin interior helps hide the RC hardware.



For the various RC radio gear and engine ignition switches placing them in a secluded area like here between the fuselage firewall and the engine cowling, greatly improves the model's looks. They are just as accessible as they would be if you had just cut holes in the side of the fuselage and installed there. Of course that ruins the scale looks of any airplane.



As with most Ziroli designs, the Staggerwing is designed to use the custom made Robart Staggerwing gear. Besides saving a ton of time and effort, the Robart gear work great and are very scale in appearance.

Those wheel also look great and are machined from aluminum.

Easy Scratch-built Skis (fly off the snow!): By Model Airplane News



Now that many flying fields parts of the country are covered in snow, it's the perfect time to add skis to your favorite flier! This classic how-to from our good friend Roy Vaillancourt provides a great project that will not only use up some of those leftover pieces of wood in your workshop and but also let you enjoy some winter flying. Enjoy!

While reading through an old issue of *Model Airplane News*, I came across an article about float-flying off water. It started me thinking about how much fun it would be to fly off snow with skis. First on my agenda was to pick some suitable subjects to modify for ski installation. That was the easy part, because my Stinson L-5 Sentinel and Cessna L-19 Bird Dog were just begging to get out of winter storage and be drafted back into service. They are both 1/4-scale tail-draggers and are very suitable for trudging through snow. After working out a few logistics, I cleared a spot on the drafting table and got started. My intent was to come up with a ski design that was simple, easy to build and

would use up some of that "leftover" material we all seem to have lying around the shop.

SKI DESIGN

To get a better feel for the design requirements for skis; I took a quick look through some full-size aviation magazines for possible articles on winter flying. I came across an issue of the EAA magazine *Sport Aviation*. This particular issue had a short article about winter flying with skis. The article contained some neat color photos of two Piper J-3 Cubs on a snow-covered runway at a grass field. The J-3 is probably the most common aircraft that's outfitted with different brands of skis, and this supplied me with a few ideas on designing a simple, yet effective, set of skis for my own 1/4-scale models.

After measuring the skis and fuselages of the Cubs in the photos, I calculated their comparative lengths, and used these figures to plan the dimensions of my skis. I then generated a rough draft of the full-size drawings for the 1/4-scale skis following the tried-and-true "That looks-about-right" formula (here's to good old eyeball engineering!). The length of the skis would be approximately 50 percent of the fuselage length, and the axle pivot point would be at 30 to 40 percent of the ski length aft of the ski nose. For the width, I just picked a number that felt right.

MATERIALS

The materials I used for the skis are well-known by all modelers and, depending on the weight of your model, the skis can be made of 1/18, 3/16 or 1/4-inch-thick lite-ply or luane (the plywood material used to skin interior household doors). For models that weigh up to about 15 pounds, use 1/8-inch thick material. For models of 25 pounds or more, I recommend 1/4-inch-thick material (both the L-5 and L-19 are in the lower 20s, so I chose to use 1/4-inch thick lite-ply). I've found that metal skis generally mean trouble because snow really likes to stick to cold metal. Wooden skis seem to work better; but just be sure you sand the bottoms silky smooth, seal them well with polyester resin, polyurethane, or epoxy and then apply a good grade of wax. We've successfully used beeswax, as well as high-grade automotive paste wax. The wax will prevent the snow from sticking and also will allow the model to really slide across the snow.

Lay out the patterns on a flat piece of material and cut the outlines to shape. To get the nose of the ski to bend up and match the curve of the stiffener, a series of cuts is made across the skis top surface. These cuts are only 1/2 the material thickness deep and are only required in the nose area that needs to bend. This process is called "kerfing," and I simply used a utility knife to score these cuts. Just prior to bending this kerfed area, I also fill the cuts with glue so that when all the glue sets, this area will be nice and strong. The center stiffener and the two axle mounts are made of various types of plywood. For 1/4-scale models, the center stiffener is 1/2-inch thick, exterior grade, house-construction plywood, and the two axle mounts are 1/4-inch thick, aircraft plywood. I also like to add spacers to each side of the axle supports so that the final thickness is the same as the wheels that I use on that model. This makes the process of switching from wheels to skis and back again, very easy and fast.

The entire assembly is glued together with 20-minute epoxy and clamped in place to cure. After curing, all the areas are sanded and then coated with epoxy and sanded again. Next, they are painted with a couple of coats of paint and topped off with some clear polyurethane or epoxy.

FUSELAGE

CONSIDERATIONS: One of the neatest things about this design is the ease with which you can switch from wheels to skis. This is very important when you get that unexpected snowfall and last-minute calls from your flying buddies to meet them at the field. It will take only a few minutes to change from wheels to skis.

There is only one modification needed for the fuselage; two pairs of eyehooks need to be installed to act as attachment points for the cables. Install two in front of the landing gear, one on each side. Attach the skis, nose bungee and safety cable (more on these later) to these eyehooks ahead of the landing gear. The other two

eyehooks go aft of the landing gear, (again, one on each side of the fuselage), the rear-extension limiting cables will be attached to these. To make these attachments sturdy, I simply epoxy some hardwood blocks inside the fuselage and permanently screw the eyehooks into place (see photos). I leave these in place all year long, so I do not have to make any changes when the weather makes an unexpected turn. I painted these eyehooks to match the fuselage and this way, they just get camouflaged and disappear very nicely.

SKI

SETUP: To set up your skis properly, there are two basic, yet very important alignments to maintain.

Toe-in: The skis must be parallel to each other, as well as to the fuselage centerline (a function of the landing gear-axle toe-in adjustment).

Angle of attack: The skis' angle of attack must be approximately 10 degrees positive while the aircraft is in flight (a function of the bungee and aft limiting-cable adjustments).

The nose bungee is big rubber bands that lift the tips of the skis. To limit how high the ski noses rise, you have to adjust the lengths of the rear-limiting cables. I like to make these adjustments on the workbench with the skis mounted on the axles (held in place with wheel collars) and the airplane's tail propped up. To get the required 10 degrees of ski nose-up attitude, I keep the skis flat on the bench and then raise the tails that the plane's nose is set at a flight attitude of negative 10 degrees. A stack of paint cans works very well here! If you've set everything up properly, when you lift the model off the bench, the bungee cords will lift the noses of the skis and make the aft limiting cable taut. When the model is placed on the ground, the aft cables should slacken and the skis should lie flat. It's important that they also be able to pivot freely on the axles. As an added safety measure, I suggest you run a safety cable alongside the nose bungee. This cable is adjusted when the model is sitting on the ground in the normal "at rest" attitude. The safety cable is attached at the same spots as the bungee, yet at this attitude, this cable should be taut. The idea here is that in the event of a bungee failing, you do not want the ski to turn nose-down on you in flight as it makes for a very messy landing. To make it easy to attach the bungee cords and cables, I install line connectors or some other form of "quick-disconnect" device at the fuselage attachment points. Old control-line connectors work well and you might also find similar connectors in a fishing-tackle store.

To make it easier to remove the wheels from my models, I replace the usual wheel collars with cotter pins that go into small holes drilled through the end of the axles.

TIPS ON SNOW FLYING

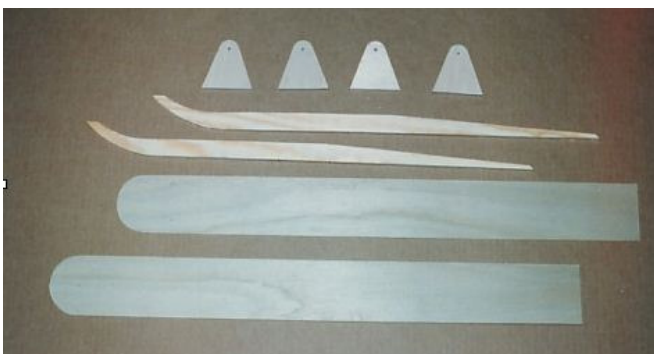
With all the shop work finished, now it's time to head to the field. The toughest part is waiting for the snow and then having it arrive at just the right time, like on a Friday night so that Saturday can be a day at the field with nice fresh snow. I live on Long Island, NY, and we don't usually get much snow, but last winter we had so much snow that it was difficult to get to the field!

Regardless of how much snow we get, when we get an opportunity like this, the "Snow Bird Squadron" gets together and makes it to the field for some really great, off-ski flights.

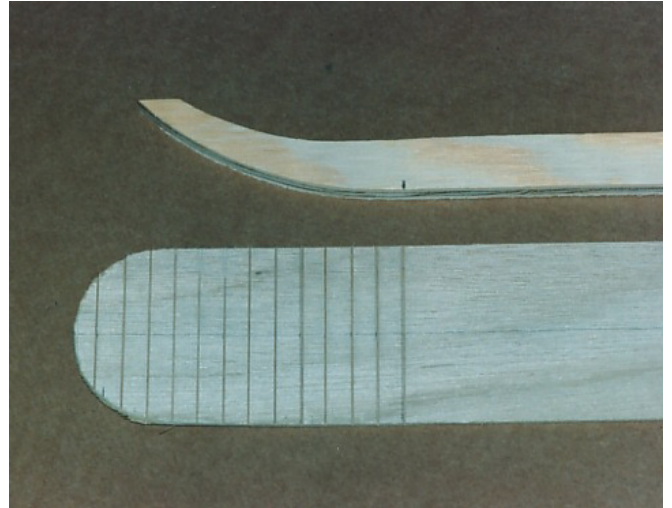
When flying off snow, remember these tips:

- You'll need to apply slightly more power to taxi. If you have no ski attached to the tail wheel, the rudder will also need a blast of power for turning.
- You'll need more power for takeoff, and the skis will have to "plane" on the snow before you'll be able to build up air speed. To overcome torque, apply the throttle gradually and smoothly and feed in the rudder as required (just as if you were flying off a green runway). You may need a bit more elevator to prevent the model from attempting to nose over, but once the speed builds up and the skis are "on plane" you'll be able to release the elevator. When it's equipped with skis, your model will not fly as fast because skis increase drag. When flying with wheels, don't expect to pull up as steeply.
- Increase power during landings and use a slightly nose-high, three-point, or wheel-landing approach to keep the tips of the skis up. For short-field operations with my L-5, I particularly like the "I have arrived, three-point, plop-type" of landing. The fun part for me is just shooting touch-and-go's one after another.

Using scale-snow skis is a really easy way to extend your flying season. Before heading out, make sure all your radio gear is up to snuff. Cold weather wreaks havoc with batteries, as well as people. Just dress warmly, you don't want frostbitten ears, toes or flying thumbs and be sure to take along some hot coffee or hot chocolate. Oh yes, and sunglasses are definitely in order. Enjoy!



Here are all the wooden parts cut out for one set of skis (see text for details).



Close-up view of the kerf cuts and how they help to bend the nose up to match the curve of the center support.



All the parts glued and clamped in place to cure. Lead bars and clamps (and anything else that is heavy) aid the process.



Another means of "clamping" the assembly is to use anything from around the shop that is heavy such as a can of Bondo or old car parts.



Close up of the axle attachment area with filler pieces between the uprights and on the outsides to make the attachment area the same width as the wheel originally used. Note the cotter pin and washer. Very easy installation.

With fuselage propped up so the nose is slightly down you can see the rear attachment cable is taught and the front bungee stretched.



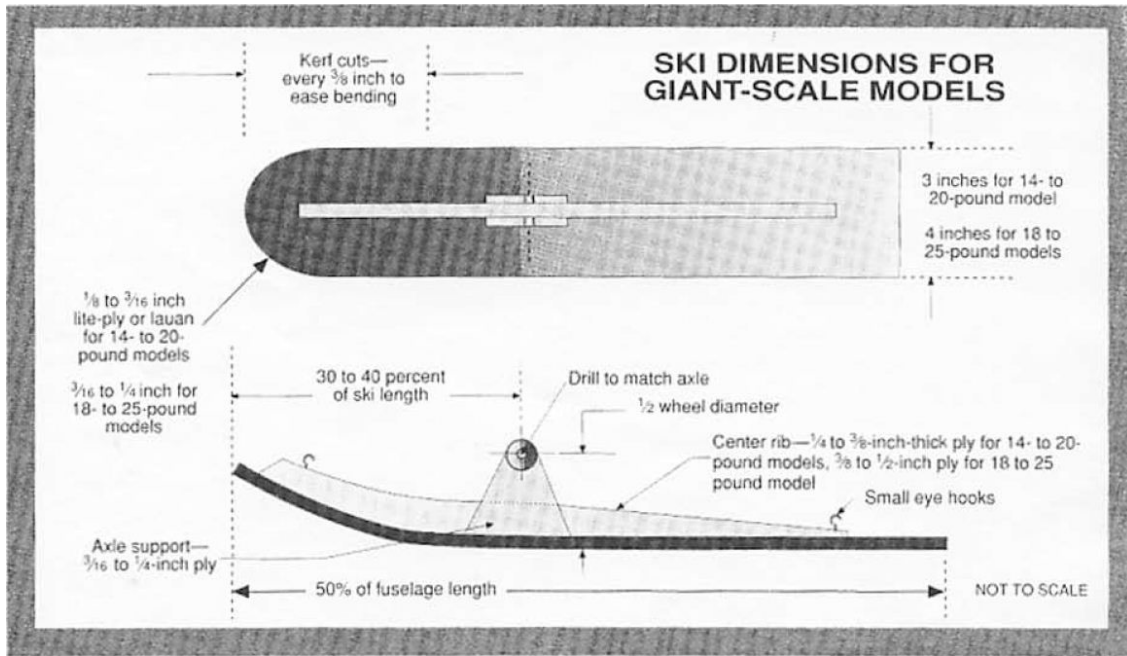
Same as photo 6 but fuselage attachment points can also be seen.



Roy Vaillancourt designed and built this 1/4-scale Stinson L-5. It weighs 21 pounds and is powered by a US-41 engine. Latex paint (but of course).



Roy Vaillancourt designed and built this 1/4-scale Stinson L-5. It weighs 21 pounds and is powered by a US-41 engine. Latex paint (but of course).



THUNDERBIRD 2021 CALENDAR

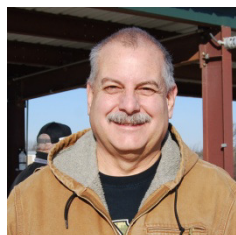
<u>DATE</u>	<u>EVENT</u>	<u>POINT OF CONTACT</u>
24 April	SPA Contest	Gary Alphin
15 May	SPA Contest	Pat Ensign (Texas Wings Field)
11-12 June	Warbirds Over Dallas	Ed Kettler
19 June	SPA Contest	Frank Cox (Golden Triangle Field)
4 July	Independence Day	Club Officers
23 October	SPA West Championship	Todd Blose

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VP: Rob Lowe



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Safety: Bill Lake



Treas: Chris Berardi

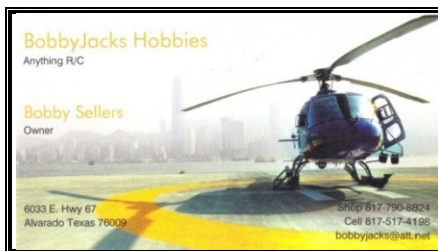
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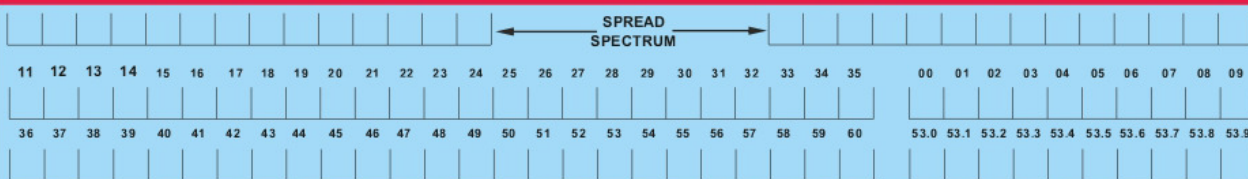
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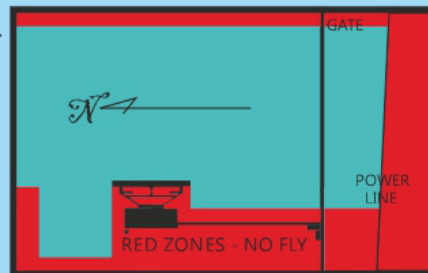
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THE FORT WORTH THUNDERBIRDS RADIO CONTROL ASSOCIATION
 ALL AMA, CORPS OF ENGINEERS AND THE FOLLOWING RULES APPLY TO EVERYONE FLYING HERE.

1. Neither the Thunderbirds nor the Corps of Engineers is responsible for accident or injury.
2. Place your AMA card in the proper slot above before turning transmitter on.
3. All engines must have effective mufflers.
5. Fly from the station nearest the downwind end of the runway. In case of a crosswind the first pilot to fly will select the station.
6. Aircraft must follow the takeoff and landing pattern in effect.
7. Landing aircraft have the right-of-way over aircraft taking off.
8. Running aircraft shall not be left unattended.
9. No more than 5 pilots shall fly in each designated zone at one time.
10. LMA rules are posted in the bulletin board



**Academy of Model Aeronautics
National Model Aircraft Safety Code**

Effective January 1, 2018

A model aircraft is a non-human-carrying device capable of sustained flight within visual line of sight of the pilot or spotter(s). It may not exceed limitations of this code and is intended exclusively for sport, recreation, education and/or competition. All model flights must be conducted in accordance with this safety code and related AMA guidelines, any additional rules specific to the flying site, as well as all applicable laws and regulations.

As an AMA member I agree:

- I will not fly a model aircraft in a careless or reckless manner.
- I will not interfere with and will yield the right of way to all human-carrying aircraft using AMA's *See and Avoid Guidance* and a spotter when appropriate.
- I will not operate any model aircraft while I am under the influence of alcohol or any drug that could adversely affect my ability to safely control the model.
- I will avoid flying directly over unprotected people, moving vehicles, and occupied structures.
- I will fly Free Flight (FF) and Control Line (CL) models in compliance with AMA's safety programming.
- I will maintain visual contact of an RC model aircraft without enhancement other than corrective lenses prescribed to me. When using an advanced flight system, such as an autopilot, or flying First-Person View (FPV), I will comply with AMA's Advanced Flight System programming.
- I will only fly models weighing more than 55 pounds, including fuel, if certified through AMA's Large Model Airplane Program.
- I will only fly a turbine-powered model aircraft in compliance with AMA's Gas Turbine Program.
- I will not fly a powered model outdoors closer than 25 feet to any individual, except for myself or my helper(s) located at the flightline, unless I am taking off and landing, or as otherwise provided in AMA's *Competition Regulation*.
- I will use an established safety line to separate all model aircraft operations from spectators and bystanders.

For a complete copy of AMA's Safety Handbook please visit:
www.modelaircraft.org/files/100.pdf

HUMOR



We're gonna need a bigger boat



Here 'Kitty Kitty'



To Infinity and Beyond