It's time for some **Propwash**

September 2011

Since 1978, the voice of the Imperial R/C Club

www.ImperialRCClub.com

CARTWHEELS

BY: LARRY LOUCKS, PRESIDENT

No Report

New Members

Proposed at the August Meeting

None Reported

Instructor Report

By: George Nauck

Young Christian Miguez soloed on Sunday, August 14th with his own .40 Stick. I wrote it on the back of his tee-shirt, and he won't allow his mom to wash it. He is very proud. His father Carlos posted a story on my website with a picture, and he was very complimentary of Imperial RC Club and all the helpful members. See the story at http://www.stories-and-memoirs.com/my-first-flight-summer-2011-imperial-rc-club.html

Our next club meeting is:
Thursday September 1st at FTE
Plan to attend and see what's new !!

Scale Plans Building for the Novice: Part 1

by Jerry Bates

A comprehensive article on selecting and building your first scale RC model airplane from plans.

Introduction

After 40 years of building model airplanes one acquires many skills and will take many aspects of hobby building for granted. In the past when I sold a plan I assumed the person who purchased it had the knowledge needed to put the model together with the aide of the construction manual. That, of course, is not always the case. There are often many general aspects of construction not covered in most manuals. Many of my plans, and those by other designers, are purchased by modelers that have not built a model from plans before.

Building from plans is a fun and exciting part of the hobby. It allows the builder to construct a model not often seen at the flying field. You are also not constrained by the liability aspects of most large kit manufactures such a size, weight, and construction techniques. Any level of finish from a casual fun-fly model to a model used in scale competition is possible. But, it can also be a nightmare for the first-time plans builder. In this article series we help explain the basic aspects involved in constructing your first plans-built model. We won't be able to cover every subject and surely will miss some aspects, or they may need further explanation. There is a one-stop shop for additional help though. Visit the R/C Scale Builder website at www.rcscalebuilder.com. If you cannot find help within their "tutorial" and posted "articles" you can always post your questions and receive help from the many members of this great website.

Let's start by explaining the difference between building from plans and scratch building. A "scratch builder" does not purchase engineered plans but uses a collection of data, scale drawings, etc., to develop his own outlines of the model to the scale he chooses. Or may just dream up a design and start cutting wood. He relies on his own skills to produce formers, ribs, and other parts to build the model. A scratch builder normally has been doing this long enough to have acquired the knowledge required to produce a structurally sound airframe without outside assistance.

A "plans builder" is one who buys plans for a model, then either buys a kit of parts or makes his own parts, to construct the model. Experienced designers engineer most plans offered. Much thought has gone into making certain the airframe is a safe and sound design. Of course, the airframe is only as good as the construction. Care must be taken by a builder to cut the parts to accurate size for a true fit and in using the appropriate adhesives to ensure a tight and secure joining of the parts.

Propwash is published monthly by the **Imperial Radio Control Club, Inc**.

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Courtesy and Common Sense Keeps R/C Modeling Fun for Everyone.

Selecting Your First Plan

If you are going to build from plans and have not built several kit planes first, it will be a good idea to reduce you choices of selection based on degree of construction difficulty involved and flying characteristics of the finished model.

A lot of us get into plans building because we want something cool—like a P-51 Mustang, for instance. That would not be a good choice for a novice kit builder or first time plans builder. Models of that degree of difficulty can pose many problems during construction and are considerably more difficult to fly than other available choices. By the same token, there is no sense plans building a non-scale trainer or Piper Cub. These types of models are available in kit form and as ARFs (Almost Ready to Fly) and will be a more economical choice than plans building. If you do not have field experience in the operation and flying of low-wing aircraft, and multiengine aircraft, they should be avoided for similar reasons.

The type of airplane you should be looking for is something with stable flying characteristics. Some of the clues will be a good degree of wing dihedral, positive wing root incidence accompanied by wing washout, and engine down thrust. Confused? Don't worry; this is not going to be a course in aerodynamics. The majority of plans designers have taken all these factors into account when designing the model. We are just going to give you an idea of some of the things to look for, and an explanation of the terms involved.

If you are looking into building a high-wing cabin airplane you have little to concern yourself with. Most of these factors are incorporated in their design simply because of the dynamics of the layout. If you are thinking about building a low-wing, model then you will want to consider these items. The following is a general explanation of some terms you will encounter and how they apply to you at this point.

Datum:

With regard to model plans and aircraft scale drawings, the datum, or datum line, is the line used to establish the level attitude of the airplane. Often it will be a line drawn from the center of the propeller to the tail of the airplane. We will assume the airplane is level with the datum line when discussing the following terms.

Wing Dihedral:

Look at an airplane from the front view. If the wings are level with the ground surface (most are not), then it has no dihedral. If the wing panels are angled up from the fuselage to each wing tip, then it has dihedral. If the wings are angled down from the fuselage to the wing tips, it has anhedral—stay away from those for the time being. Generally, the more wing dihedral, the more stable the model will be in flight.

Angle of Incidence:

Look at the airplane in side view where the wing meets the fuselage (wing root). If the front of the wing is angled upward, it has positive wing incidence. If the front of the wing is angled downward, it has negative wing incidence. We want positive incidence in our model; between 1.5 to 2.5° is the norm.

Washout:

This is the difference between the incidence of the wing root and the wing tip in a positive manner. If you have 2.5° of positive incidence at the wing root and 0° incidence at the wing tip, you have 2.5° of washout. Washout is incorporated into a wing to help prevent wing tip stall. Imagine your model during landing approach. You have lined it up with the runway and reduced the speed in anticipation of a smooth touch down. As you begin to flare out for touch down, the nose of the model comes up. The positive incidence of the wing increases to the point that the wing root area stalls, or no longer provides lift, and the model loses altitude. That is a good attribute during the landing mode. The wing washout will allow the wing tips, and much of the outer wing panels, to continue to provide lift thus allowing you to maintain control of the model until touch down. If you did not have wing washout, the entire wing would stall. What normally occurs without washout is one wing panel stalls before the other (tip stall) and the model falls off to that side and crashes, or spins into the ground.

Downthrust:

Downthrust is the negative angle between the engine centerline and the datum line. Downthrust is often used to maintain level flight of a model with a high-lift wing across the range of engine power settings from low speed to high speed. Downthrust is normally incorporated into high wing cabin models that use "flat bottom" or high-lift airfoils. Without downthrust, the model would climb while trying to maintain level flight at a faster rate the faster it was going. Downthrust can also have a positive effect on models during landings. Using

The IRCC monthly club meeting will be held at FTE near the Lakeland Airport. The next meeting will be on Thursday September 1st and starts promptly at 7:30pm. Remember to bring a chair if you want to have a seat.

the landing scenario in the washout definition above, suppose you need to increase speed just before touch down. If you applied power without engine downthrust the model would jump skyward. That would further increase wing incidence during that low-speed condition making the entire wing stall out and causing loss of control of the model. Engine downthrust would allow the model to move forward and help you maintain control.

Airfoils:

An airfoil is the shape of the wing in cross-section. Much like the wing rib. The shape of the airfoil and the wing attitude in relation to its forward movement (incidence) at speed is what generates the lift for the model. There are literally thousands of differently shaped airfoils. We will only be discussing four generic types as used for our models. Of course, there are hundreds of different shapes within these types but we are concerned just with the general flight characteristics of each. In discussing airfoils you will need to be made aware of another term in order to explain how they work. Mean aerodynamic chord, or MAD is simply a line drawn from the center of the leading edge of the airfoil to the center of the trailing edge of the airfoil. We will just call it the "chord line".

Under-Chambered Airfoils:

This type of airfoil is considered a very high lift airfoil and used for slow flying aircraft. It is curved upward on the top surface and on the bottom surface. These types of airfoils were most generally used on early pioneering airplanes and WW I aircraft. Models using this type airfoil are usually a bit difficult to build and require a lot of attention to details and relationships between wing(s) incidence(s), datum lines, and thrust lines.

Flat-Bottomed Airfoils:

This type of airfoil is curved upward on the top surface and is flat, or a straight line, on the bottom surface. Most are not actually flat along the entire length on the bottom surface. Generally the front portion of the lower leading edge curves upward to meet the curve of the top surface. These can be classified as high-lift airfoils and are used on aircraft of moderate speed capabilities.

The most notable of these is the Clark "Y" airfoil as used on the Piper Cub and many other general aviation airplanes. Usually the flat portion of the lower wing surface is in alignment with the datum line of the airplane where the wing meets the fuselage. That installation provides positive incidence because the leading edge of the chord line will be angled upward in relationship to the datum line. The wing should have washout at the tip to equal that angle in order to maintain good flight characteristics. Models built using this airfoil are most often the easiest to build and fly.

Semisymmetrical Airfoils:

These airfoils are curved upward on the top surface and curved downward (to a lesser degree) on the bottom surface. We will call these general airfoils or high-speed airfoils. Most of the military and commercial aircraft used this type airfoil. They are normally installed with positive incidence at the root rib and have washout in the wings. Some civil aircraft from the Golden Age use these airfoils including the Taylorcraft, Aeronca, and Interstate Cadet. Most modern civil aircraft use it as well. With the exception of the Golden Age aircraft, most models built using this airfoil will require a higher degree of building and flying skill. Most will have retractable landing gear, flaps and other operating features not found on entry-level models.

Fully Symmetrical Airfoils:

These airfoils are curved on the top surfaces and the bottom surfaces to the same degree. They provide no lift when the chord line is parallel to the datum line. These airfoils a generally used for stabilizer/elevators, and fin/rudders of scale models.

Now you may think we have limited your choices to trainers or Cub's. Not so. If your liking is for civil-aviation aircraft your choices are many. There is even a couple of low-wing aircraft for you to consider. One is the Ercoupe. The Ercoupe makes a good flying model with good ground handling characteristics as well. High-wing cabin airplanes from the Golden Age to the present make very good choices. Don't worry about whether the airplane has tricycle landing gear or is a tail-dragger. There really is little advantage or disadvantage of either type model at this point.

Your choices are a bit more limited on the Warbird scene. Don't think that because the full-scale airplane was a trainer the model will be a good choice. Most of the single-engine primary and advanced trainers built during Word War II for the American services were much more difficult to fly than the fighters the pilots graduated to. That was done for a purpose—to wash out the pilots who didn't have the skills to perform the required additional workload when piloting frontline aircraft. Similarly, an AT-6 Texan, or at PT-19 Kadet does not make a good first-time model. I would suggest building a model of an aircraft used for Liaison duties like the Taylorcraft L-2, Aeronca L-3, Piper L-4, Stinson L-5, and the Interstate L-6 instead.

On the other hand, trainers built for service in the United Kingdom often make great first-time models. Their logic was that the pilot would advance from one airplane to the next as their skills were acquired. They also did not have the population to afford early washouts. Two of the best UK trainers are the deHavilland Tiger Moth and the deHavilland Moth Minor. The Moth Minor is a low-wing, open-cockpit, tail dragger. The Tiger Moth is an open cockpit, biplane, tail dragger. Both models fly and handle extremely well. I would suggest the Moth Minor over the Tiger Moth because it is much easier to build. If you have some low-wing flying experience, there are several single-engined military aircraft I can recommend.

- Hawker Hurricane
- Early Supermarine Spitfire
- Curtiss P-40 Warhawk
- Vultee BT-13 Valiant
- Mitsubishi A6M5 Zero
- Grumman F6F Hellcat (don't bother with the wing fold or scale flaps at this stage)

Wood Kits and Accessories

Many plans designers offer “short kits” and “full wood kits” for their plans. These items may be available from the designer or from a designated kit cutter. Some designers and accessory manufacturers offer items such as fiberglass fuselages and foam wings for the plans. A short kit consists of all the parts that require cutting out such as the ribs and formers and other parts detailed on the plans. The builder furnishes the needed stick wood for stringers, spars, etc. and the sheet wood for covering the fuselage and wings. A full wood kit comes with all the wood materials required for construction. In either case, the builder normally buys the hardware needed for completion.

Other items of interest designed specifically for many plans are fiberglass, resin cast, and vacuum formed parts such as cowlings, canopies, exhaust stacks, cockpit interiors, and other small parts to help detail a model to your desired level of completion. These items will be available from the plans designer or an accessory manufacturer and may be noted on the plans or in a construction manual.

See Part 2 next month in your issue of Propwash

IRCC Meeting Minutes

August 4, 2011

Minutes recorded by:
George Nauck, Secretary

George was not present at the August meeting.

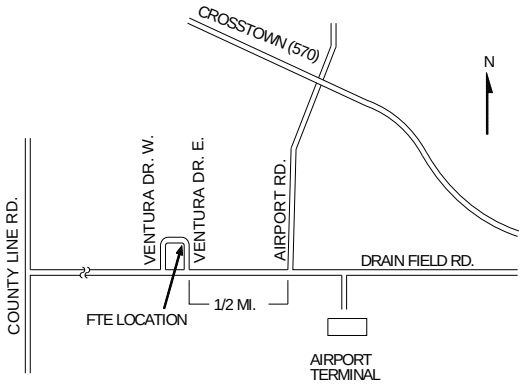
No report, No Meeting, No Articles. Not sure what is going on.

Coming Area Events

Aug 20 Club 40 Pylon Race Southern Eagles Lady Lake
Sep 3 OFMC Club Members Picnic O.F.M.C. Ocala
Sep 10 Club 40 Pylon Race O.F.M.C. Ocala
Sep 10 Fun Fly H.A.M. Brooksville
Sep 17~18 16 End of Summer Fly-In O.F.M.C. Ocala
Sep 24 11 Chuck Yeager Fly-In Tri County R/C Dunnellon
Sep 24 Golden Era Fly-In Bay City Flyers Land ‘O Lakes
Sep 29~Oct 1 Inaugural Electric Fly-In Triple Tree Aerodro
Woodruff SC
Oct 8 Club 40 Pylon Race Flying Gators Gainesville
Oct 13~15 Monster Planes USA FTE Lakeland
Oct 15 Tailgate Swap Meet Tri-County R/C DunnellonOc 1
Oct 21~23 Zephyr All Electric Can-Am Flyers Zephyrhills
Oct 22~23 9th IMAC Scale Aerobatics O.F.M.C. Ocala
Oct 29 Big Bird Fly-In H.A.M. Brooksville
Oct 30 Halloween Fun Fly Sky Pirates Belleview
Nov 5 11th OTOW Open Fly-In O.T.O.W. Flyers Ocala
Nov 12 8th Fighter Town Fly-In Bay City Flyers Land ‘O Lak
Nov 12~13 11 Salute to Vets O.F.M.C. Ocala
Nov 19 Club 40 Pylon Race Tri-County R/C Dunnellon
Dec 3 13th Santa Fly-In Tri County R/C Dunnellon
Dec 9~11 12 O’clock High FTE Lakeland
Dec 17 Tailgate Swap Meet H.A.M. Brooksville

Here is where we meet each month.

Please *DO NOT PARK ON THE GRASS*
at FTE or his neighbors.



OUR NEXT MEETING IS: Thursday September 1st