

OMAS Newsletter

November 2010 OMAS Newsletter

Date 11/2010 — Issue #5

Dear OMAS Club Members,

Issue number 5 is now on deck. With the winter weather setting in we are having less flying days but maybe more building days for those projects you want to fly next spring. We had a great fun fly on October 17 with some taxi races down the runway. Yours truly won first place using an Eflite Pitts Special with a time of 18.1 seconds. Nate 2nd place at 21.4s, Stan third 24.0s, Chuck 28.3s and Kevin at 31.1s. All members that participated received a cool prize. If you missed the general club meeting we had on the 2nd of November you missed some great pizza and socializing. Don't worry...we will have more of them!

Well on to the rest of the news letter. I try to include some articles of interest each month with some helpful information. If anyone has any ideas or comments please let me know!

Best wishes,
Jay

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1. Feature Article: Mechanics-Control Linkage and Hinges

From *Buzzard Droppings*, Barnyard Buzzards RC Club, Duvall, Washington

Mechanics-Control Linkage and Hinges

The purpose of control linkage is to take the motion generated by the radio control servos and transfer it to the airplane's control surfaces and other control devices. Since this motion is mechanical, there are considerations for choosing one technique over another.

In its simplest terms, a control linkage will include a servo control arm, push rod, control horn, and a way to attach the push rod to the servo control arm and control horn, some way to adjust the position, distance of movement, and the controlled device itself. This is obvious to those of us who have been around the RC circuit for a

while, but for the newcomer, this is a challenging topic.

Always plan ahead and avoid mechanical interferences between the moving parts. Engine vibration, inertia, and G-forces will cause our control linkages to behave erratically. These forces introduce stress and must be considered, even in a docile trainer.

Cost

The real cost of the control linkage is the price of the entire model if it were to fail doing its job! If we take into consideration the initial cost of the hardware, the time it takes to install, adjust, and lock, special tools, as well as any maintenance during the life of a model, we might want to consider using the higher initial price of carbon fiber push rods (titanium ends give you special bragging rights!), nylon brushed control horns, ball/stud clevises, etc.

The old adage, “you get what you pay for,” comes into play here, especially for the Giant Scale and Speed models. Often, we use parts because they are part of a kit. We forget that the kit manufacturer makes choices based on cost—many times providing parts that “will do” as opposed to those best for the application. Some don’t even provide these parts, leaving the choice to the preference of the model builder.

Precision and Strength

The important measurement for the control surface is whether it will provide the proper movement, with no slop, exact mechanical repeatability, no wear, and no maintenance. It must tolerate the stress placed on it during normal, reasonable flight. It should tolerate changes in temperature, and wear slowly. Parts that have been problematic over time are:

- Threaded metal clevises that can split apart and/or become stripped by vibration (Sullivan provides an interlocking design that is good).
- Nylon parts that are too soft or too brittle.
- Wooden dowels that twist and warp from moisture.
- Incorrect application or numbers of supports.
- Incorrect application (i.e. braided wire for elevators ... yikes)!

Size and Space

These seem obvious until you consider that each model has many moving parts that may interfere with each other as they move. Some planning for the elevator and rudder push rods is required, even on ARF aircraft, or problems will occur.

Some problems occur with the aileron movement, noticed only when the wing is mounted to the fuselage (parts hit items mounted in the fuselage). Sometimes the needed supports cannot be installed because the construction has already progressed past the point of making this easy (think of an ARF fuselage).

Mechanical gain and differential

Many times the control horn and servo arm have different locations for installing the push rod. If the push rods (or pull-pull cables) are installed at the same distance from the pivot center, the travel is linear.

Some modelers will install the push rods so they are in a mounting hole farther from the pivot center in the servo and closer to the pivot center at the control surface. This will increase the travel. For precision, moving the push rod to the innermost hole on the servo arm and farthest from the pivot point in the controlled surface provides the

greatest precision but the lowest possible movement.

Some vendors provide longer servo arms to help get the amount of travel a control surface needs.

Wear

Providing free movement for our control linkages is one of the goals. Checking that wear has not created slop is one of the routine inspections we should make. Those nylon parts will wear oval holes where they were once round. This introduces a great amount of slop. Check and replace these as needed. Make sure the parts aren't too tight. This speeds up the wear and causes repeatability problems.

Weight

Although not usually a primary factor, weight in some of the lighter models is a big thing. Building with components that add unnecessary weight is poor practice. Using composite materials such as carbon fiber rather than wooden dowels or threaded steel rods makes a difference in both weight and precision.

Usually the choice of materials is dependent on several of the factors already mentioned. A good scale (digital or otherwise) is a wise investment for the builder. Choosing parts that perform identically based on their weight is the right way to build. If a model needs additional weight for balance, why not choose the parts that will help balance the model rather than installing dead weight (i.e. lead) later.

Coolness

Advertisers being good at what they do, the neatest products might not be what you want in your model. Sometimes the simplest, tried-and-true parts are the ones to stay with.

Ask your fellow modelers if they've used the new products. You might save yourself some headaches.

You may want to avoid:

- Clevises that have multiple parts that could get lost.
- Plastic stuff that can wear (due to vibration).
- 2-56 linkages.
- Parts that require a special tool to adjust might not be field-friendly.

You do want to avoid metal-to-metal connections.

Ease of use

Using parts in control linkage that make adjustments easy to do and will hold those adjustments from outside the model is a huge plus. Also, make sure the adjustable bits can be locked in place and unlocked for later adjustments. Some modelers CA their threaded parts; others use lock nuts. Some use thread locker; some use safety wire. Many use a combination of these.

Ideally we want our adjustments to stay forever; however, if we've selected less-than-ideal components, parts with a different coefficient of expansion (the ratio of change in length or volume of a body to the original length or volume for a unit change in temperature), or incorrectly installed our components, the model may have very different flying characteristics from one day to the next.

A few tips:

- Keep the control linkage as short as possible.
- Use mechanical adjustment to set end points and center rather than relying on a computer radio.
- Use silver solder on these types of joints. 60/40 rosin core solder (electrical) should not be used! Make sure to use flux when soldering. Clean the flux off; it is usually an acid.
- Coreless digital servos are expensive for a reason: They are fast, precise, repeatable, and strong.
- Control systems always fail at the weakest point. If you use balsa servo mounts or thin light plywood, guess where the weak link is ...
- Providing bearings for push rods and attachment points for the plastic sleeve is a good thing. Depending on the load and power requirements, you may need to put one every six inches or less.
- Bending the control wires to reach the attachments points weakens the system.
- Slop causes flutter. Slop occurs in the servo output spline, control horn holes, hinges, and push rod itself. Installing the control rods so they run straight between the servo and the control horn is best but not always possible.
- Counter balancing control surfaces (equal weight on both sides of the hinge), usually prevents flutter.
- Some ARF vendors supply 2-56 or 2 mm metric parts. Sometimes the threads are rolled; sometimes they are cut. Metric and standard (SAE) are not exactly compatible or interchangeable. Close is not good enough. Check your parts and make sure they fit correctly.

Hinges

Another area that brings modelers' opinions to the forefront is hinges. Many use the hinging techniques that become familiar. This is all right if you are building models in the same class (size, weight, power, capability, etc.).

When you migrate from Peanut or .40-size Sport Scale to other types of models, different choices must be made.

Many kit manufacturers include or at least recommend the type and number of hinges to use. Lately, the larger 3-D type ARC/ARF kits do not include any reference to hinging (or control linkages). They leave it up to the modeler to use the components he or she likes.

There are several new tools available to make hinging easier. The idea is to provide a strong connection between parts that have no slop, small or no air gap, no friction or binding, and are simple and repeatable in use.

CA: Many vendors make these glues, but they are not all equal. I have seen many hinges installed with CA fail. When they do, it is tough to fix, often involving cutting the control surface off and re-hinge. Still, some modelers swear by them and not at them.

Non-CA: Most hinges are installed with epoxy or white glue. If you use the hinges with a metal hinge pin, before gluing these in, it is a good idea to put oil or Vaseline on the hinge-pin area to prevent glue from migrating to these areas. Pinning the hinge is a very good idea and may save your model someday. □

Tips & Tricks:

Don't cut that wire!

When your cell count gets too high for your speed control's BEC and you want to disable it, cut the positive (red) wire that runs from the speed control to the receiver. If you cringe at the thought of cutting the wire on your expensive speed control, here is a simple solution: buy a short servo extension and cut its positive wire. Plug the servo extension between the speed control and the receiver; now, if you want to use the BEC in another installation, just omit the extension!

Plugged CA Applicators

The long, thin CA applicator tips work great, except when they're clogged or gummed up with dried glue. After you've finished using them, soak them in acetone; they will be clean and will last forever. This will even work for tips that have dried CA on them, and it works great on spray-can nozzles too.

Prop Balancing

I just read in a post about how a propeller was balanced by removing some of the tip of a blade. The better way to balance a propeller is by sanding the back (flat side) of the heavy side near the tip. You can also balance by applying clear dope, colored dope, or CA to the lighter blade. The CA can be sanded for smoothness.

Quick First Aid

If you cut yourself in the workshop with an X-Acto or a razor blade, use CA to close the cut. (You should have a first-aid kit in the shop anyway.)

Tech Ed writes: As an explanation, model lore has this bit about "invented for medical use;" not so. It was invented in 1942 (Eastman 910) in the Kodak labs when they were looking for a new, clear, and stable substance for gun sights (WW II ref.) Medical use came later. It is dangerous to use this for cuts, rather use it as a cover to seal tissue.

—the above tips are from the newsletter of the Rogue Eagles R.C. Club, Medford,

Up Coming Events:

- Combat Fun Fly: date not yet set-weather dependent
- November 16th OMAS board meeting at Bartlett Engineering

Club Information:

- Check out our web page. Kelvin is working hard to get some new information out. There are some videos on the home page and he is creating a "members only" section where you can view important club documents and member roster.
- Is your email and address correct in the club roster? Maybe your Verizon.net email is not frontier.com? Send Kelvin and email and let him know about the change.

Final Thoughts:

I hope you enjoyed this edition of the news letter? I included a couple of good articles with good information in this issue. In the past few weeks I see more people out on the weekend and even on Wednesdays at the field when I go out to fly. It is fun to fly and check out all the other planes on the tarmac but I believe the social aspect of the club is just as important.

Happy flying',

Jay

2. Recommended Resources

Check out our local hobby shops and vendors to support our hobby.

www.keleo-creations.com

www.hillsborohobbyshop.com

www.molrca.com

www.tammieshobbies.com

list of Oregon RC clubs:

<http://www.dustersrcclub.com/page9.html>

3. Quote of the Week

The propeller is just a big fan in the front of the plane to keep the pilot cool. Want proof? Make it stop; then watch the pilot break out into a sweat.

4. Contact the Editor

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