THE FLYER

The MITRE Corporation

Jan. 2010

PT-17 Instrument Panel.

I thought someone might be working on a Scale PT-17 as a Winter project and need an instrument panel?

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President's Message, *by **Don Fitzreiter***

Greetings all.

Happy New Year!

Don't forget our Christmas party ... ***Annual Holiday Party is Saturday January 9th*** Join us at **The Great Wall Restaurant** in Bedford. $20.00/person covers all-you-can-eat buffet (with soup and dessert) plus tax and tip - pay when you get there. Beverages not included.

Drawings for door prizes. Spouse/ significant-other/ guest welcome! Plan to arrive between 6:30 and 7:00 p.m.

Please send email to the club email address (or contact Don Fitzreiter) if you intend to be there, for planning purposes (it's not a commitment!)

For information on the restaurant, including directions, visit the Great Wall website at www.greatwallbedford.com

Our next meeting is Jan 13th. We need to get Auction Planning underway.

Thanks!
Don Fitzreiter

News From the Flight Line *by Jim Orsborn*

No News

Okay, so this has got to be the coldest start to a Winter in a number of years. I've seen a few die-hards at the field, but it seems like the weather has been too cold, wet or windy almost every day.

Pull-Pull Rigging

So now that we've established that there is nothing new at the field, how about having a discussion about How To Setup Pull-Pull Rigging on your winter project.

What and Why

So the first question is what exactly is a Pull-Pull Setup and why should it be considered.

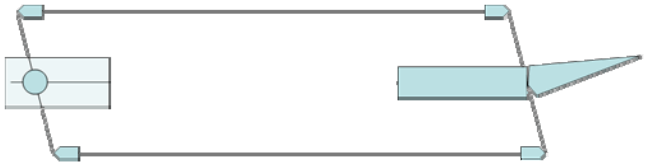
Well anyone who has set up a Trainer is familiar with a standard push rod control linkage from your servo to the control surfaces. Well technically this is called a Push-Pull setup, because the rod will push the control surface in one direction and then pull the surface in the opposite direction.

One major disadvantage of a push rod is that even a very stiff rod needs to be carefully braced or else it will bend when it is pushing on the control surface. Any noticeable bend in the control rod will result in limited deflection of the control surface. This is probably not a problem on a trainer, but it is less than desirable on a real performance airplane.

So a Pull-Pull setup overcomes the bent rod problem by using a pull action to move the control surface in both directions.

Simple Example

The following drawing shows a very simple Pull-Pull setup. The diagram shows two control horns (one on each side of the control surface) and a pull cable from the control surface to opposite sides of the servo control horn.



Simple Pull-Pull Setup

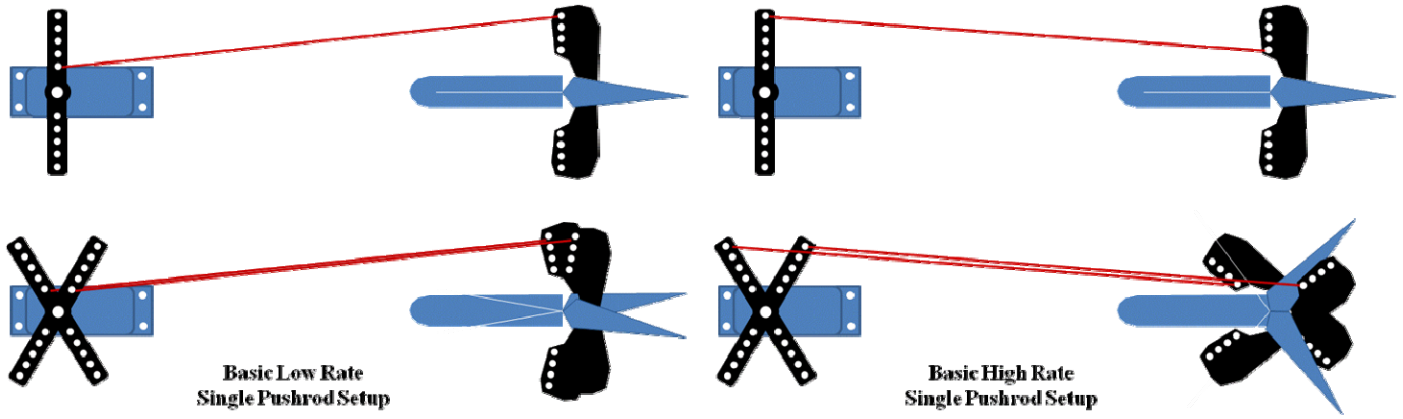
So using this configuration, one side of the servo will pull the elevator surface up, while the other side of the servo horn will pull the elevator surface down — That's Pull Up and Pull Down. Sounds pretty easy; so what are the problems and why are Pull-Pull setups hard to do correctly?

Pull-Pull Geometry

I don't want to make the discussion too complicated, but the key to a working Pull-Pull setup is a good understanding of the geometry involved.

When the servo control horn moves, the increased tension on the pull side should cause the control surface to follow. Wind over the control surface will keep the pull line tight, but problems will arise if the second line gets too tight (and causes binding) or becomes slack and is not ready to pull the surface back to a neutral position.

Looking at the diagram above, there will be no problems with the setup as long as both pull lines are the same length, and the servo arm and control horns are the same width — a parallelogram.



Single Pushrod Setups

Introduction

Let's start with a review of the basic single pushrod setup shown at the top of the page. A couple fine points to consider.

Futaba servo contol arms have an odd number of spines so the angle of the arm can be changed by simply flipping it 180 degrees on the servo. Pick the one that makes the arm perpendicular to the servo. Then use the radio sub trim to set the neutral position.

At the control surface, make sure that the linkage point is on the hinge line.

Control Movement

The left side of the drawing shows how the servo linkage should be set up for low rate control movement. By using an inside hole at the servo, there is very little movement as the servo rotates around the neutral position. This limited movement is even further advanced by using an outside hole at the control surface. In this diagram, the control surface appears to move only about half as much as the servo.

On the right side of the drawing, the servo connection has been moved to the far outside hole. Looking at the movement example, one can see that the control rod will have a much greater movement over the same rotation of the servo arm. At the control surface, the attachment is made at the inside hole, again causing a greater movement of the surface for the same displacement of the control rod. So the net effect is that the same rotation of the servo control horn will result in a much greater movement of the control surface.

Most radio systems suggest that their servos operate at maximum efficiency if they travel approximately plus and minus 60 degrees around the neutral point. They also suggest that the specified torque is measured at a point about 1 inch out from the servo spine.

From these numbers, it is easy to see where a trainer will always be using a low rate setup to try and utilize the full 60 degree movement while keeping the control surface movement down to maybe 10 to 15 degrees.

Suggestion:

Don't use a high rate setup and then try to use your radio's end point adjustment to tame the flight characteristics.

Official Publication of the Middlesex County R-C Fliers, Inc.

The FLYER is the official publication of the Middlesex County R-C Fliers, Inc., a non-profit organization chartered for the promotion of radio controlled model aircraft building and flying. The club operates a flying field located on Treble Cove Road, Billerica, MA. The club offers free flight instruction to any member provided they have a current membership with the Academy of Model Aeronautics. Contact any club member for details. Meetings are held on the second Wednesday of every month between September and June in the Billerica Recreation Dept building at 248 Boston Road in Billerica, starting at 7:30 PM.

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7:30 PM
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