The Dead Stick Flyer

Newsletter of Swan Harbor RC

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Tech Talk – Servo Setups

- ***Steve's servo discussion:*** ***At the meeting, Steve led a discussion on how to set up servos, the importance of proper linkage installations, and using a Servo Tester. Steve talked about topics relative to the right sizing, installation and resolution of servos and control surfaces (ex. Elevator, Ailerons, Rudder, Throttle).***

  - ***A recommended first step in the right sizing of servos for each control surface would be to fill in the Excel spreadsheet "Servo Torque Calculator" (shown below). The servo torque calculations derived with this spreadsheet will help you determine how many ounces of torque each servo needs to be. You do not want to undersize a servo and cause the control surface to flutter and not perform as you intended. Additionally, you may not want to oversize the servo needlessly and spend more money than you have to. To complete the spreadsheet, you need to measure each control surface's dimensions, control arm lengths and key them in the appropriate cell. The last step would be to determine which type of aircraft and type of flying you do from the chart below the spreadsheet and key that component in the Airspeed Factor cell. The result will be the servo torque needed in ounces.***

This spreadsheet can be downloaded from the SHRC website in the Tech Section under Servo Setups.

Servo Torque Calculator

Right Elevator Half	Only Change Blue
Span	1
Root Cord	1
Tip Cord	1
Servo Arm	1
Control Arm	1
Airspeed Factor	1.25
Torque	0

Left Elevator Half	Only Change Blue
Span	1
Root Cord	1
Tip Cord	1
Servo Arm	1
Control Arm	1
Airspeed Factor	1.25
Torque	0

Rudder	Only Change Blue
Span	1
Root Cord	1
Tip Cord	1
Servo Arm	1
Control Arm	1
Airspeed Factor	1.25
Torque	0

All Units in Inches
Torque in Ounces
Airspeed Factors in chart below

Right Aileron	Only Change Blue
Span	1
Root Cord	1
Tip Cord	1
Servo Arm	1
Control Arm	1
Airspeed Factor	1.25
Torque	0

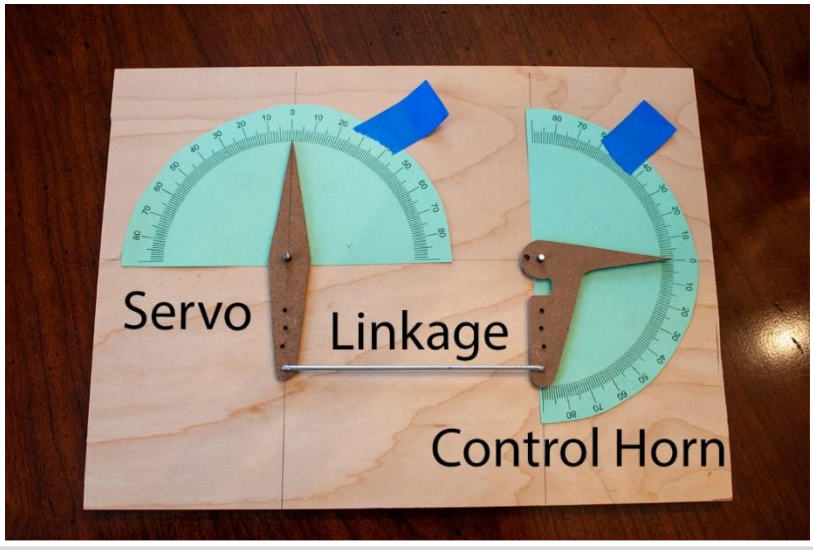
Left Aileron	Only Change Blue
Span	1
Root Cord	1
Tip Cord	1
Servo Arm	1
Control Arm	1
Airspeed Factor	1.25
Torque	0

Right Flap	Only Change Blue
Span	1
Root Cord	1
Tip Cord	1
Servo Arm	1
Control Arm	1
Airspeed Factor	1.25
Torque	0

Left Flap	Only Change Blue
Span	1
Root Cord	1
Tip Cord	1
Servo Arm	1
Control Arm	1
Airspeed Factor	1.25
Torque	0

- ***The next step would be to securely mount the servo and choose an appropriately sized servo arm, control horn, and a strong linkage rod and clevis to connect each control surface to the servo.***

- ***The final step would be to evaluate and verify that you have installed the optimal size servo arm and control horn that will generate full servo resolution without any binding with a servo tester.***
    - ***The goal would be to match the size and resolution (throw) of the servo arm to the control horn's size and resolution (deflection) of the control surface.***
    - ***Obtaining full resolution of the servo arm and full deflection of the control surface is desirable but it may require changing the size of the servo arm and/or control horn to get the desired result.***
    - ***The servo tester would be used to individually move each servo through its full range of motion until you achieve the best resolution for both arms and resulting surface deflection.***
    - ***Digital servos operated with a digital servo tester can correctly determine and adjust the center point of each servo and ensure you are getting the full resolution of the servo.***
    - ***When all surfaces are fully evaluated you can then adjust the Dual Rates and Exponential functions on the transmitter to give you the desired performance you want for your plane.***
    - ***For demonstration purposes, Steve put together a servo/control horn model to show the effects on the range of motion for the servo/arm and control horn.***

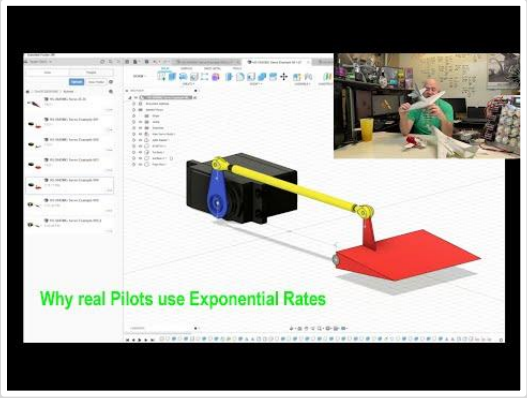


- ***DAG214.com:*** ***In this next section, we will provide several videos that pertain to servo setups, from an expert modeler found on YouTube under the name DAG214. The modeler's name is Damon G. Atwood (DAG, for short) and has been a long time giant scale modeler who designs and builds all his own giant scale electric RC aircraft. His passion is to teach and demonstrate better RC designs and setups to all modelers through his videos found on his website. Even though DAG discusses topics in terms of giant scale planes, the theory applies to all RC aircraft sizes. Click on each video to watch his presentation.***

  - ***DAG's first video on "Servos 101"*** ***DAG discusses the selection of servos, their resolution and why it is important to correctly match the servo arm resolution to the control surface deflection. He also discusses what problems users get into if they over deflect the control surface and then how they try to correct the issue by adjusting transmitter settings. It is more difficult to make counteracting adjustments on a poor servo and control horn setup with the transmitter than it would be to design it more effectively at the start with a better servo arm and control horn size relationship. This video should really help you understand the importance of servo installations with good control linkage set ups.***

  - ***DAG's second video on "What Servo Size Do I Need?"*** ***DAG discusses how do you know what servo size you need for your airplane. He talks about how to calculate the servo size in terms of "ounces of torque" needed for each control surface. He uses a simple spreadsheet calculator (reference the "Servo Torque Calculator above) to determine the size of the servo needed for each of his control surfaces. If you use this calculator you will find that you can better match the size of the servo needed for your plane.***

- ***DAG's third video on "Exponential Rates" DAG discusses what transmitter Expo (Exponential) is, what it does, and how you can set up your transmitter to get better control of your airplane.***



- ***DAG's fourth video on "Taming Adverse Yaw" DAG discusses what Adverse Yaw is, how the plane's set up causes it, and what changes to make to reduce or eliminate it. Depending on how your plane's servos and control linkages are setup, it will determine the way you need to fix or reduce the effects of Adverse Yaw. This situation can be deadly for some high wing and larger scale planes if not corrected.***

In summary, we hope you enjoyed this "Tech Talk" segment about how to set up servos and linkages for better and more enjoyable flying.

See you at the field!