

VP Prop jig

by Bill Gowen (olbill)

This is an article that describes the usage of a device to measure the torque required for operation of a VP hub. (To see the article on construction of a VP hub, refer to the article "VP for Dummies" on indoornews.com)

I made this tool in 2005 to calibrate my VP hubs. The basic idea is pretty simple. Here are the functions needed:

1. A bearing to hold the hub in the same way it will be mounted on the airplane.
2. A torque meter to measure the torque applied to the hub.
3. A means of measuring the angular displacement of the spars.

VP Jig

Figure 1

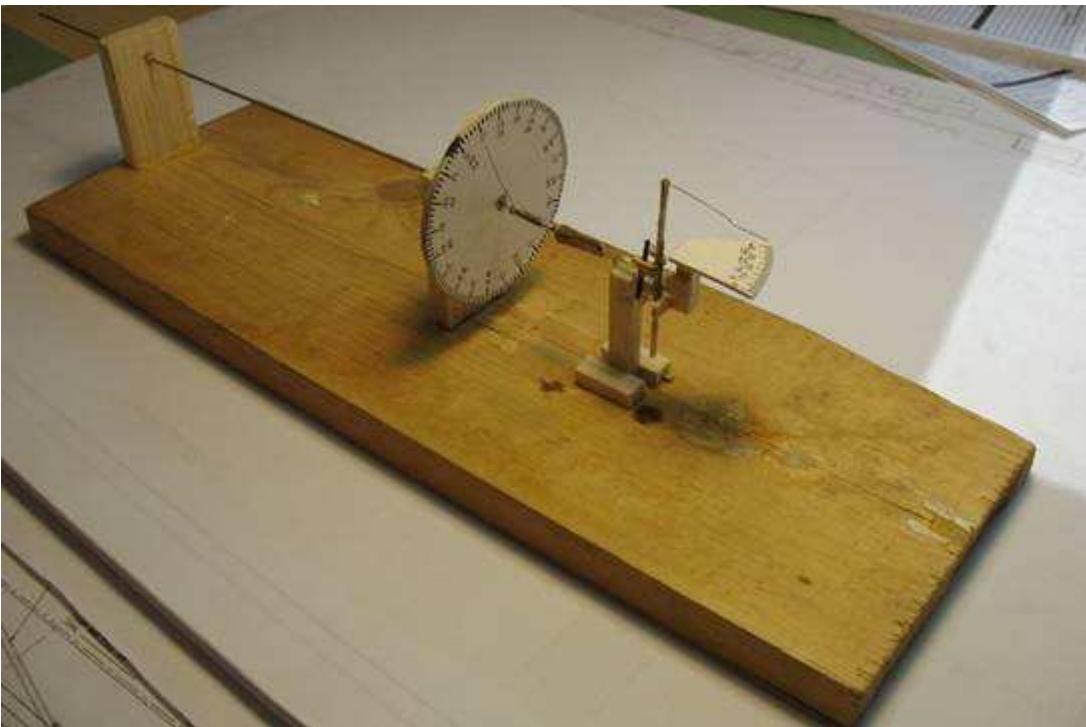
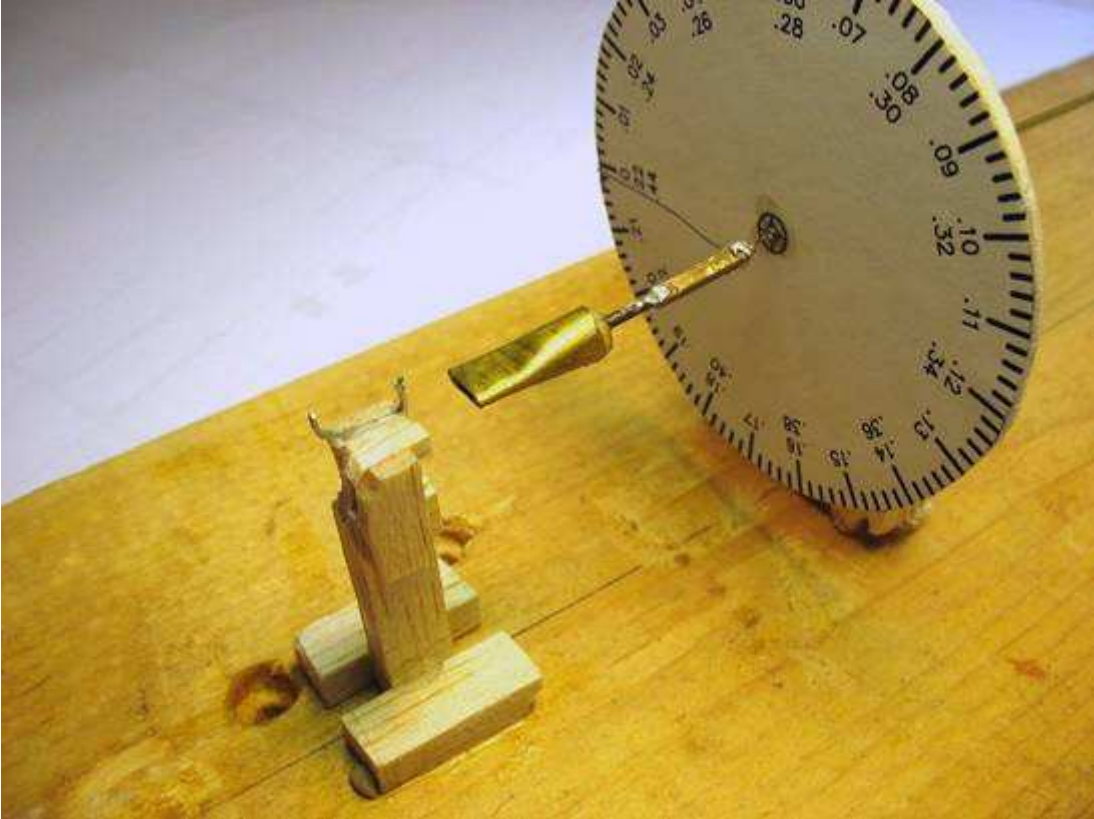


Figure 1 shows the assembled device ready to perform the measurements with the hub from the “VP for Dummies” article.

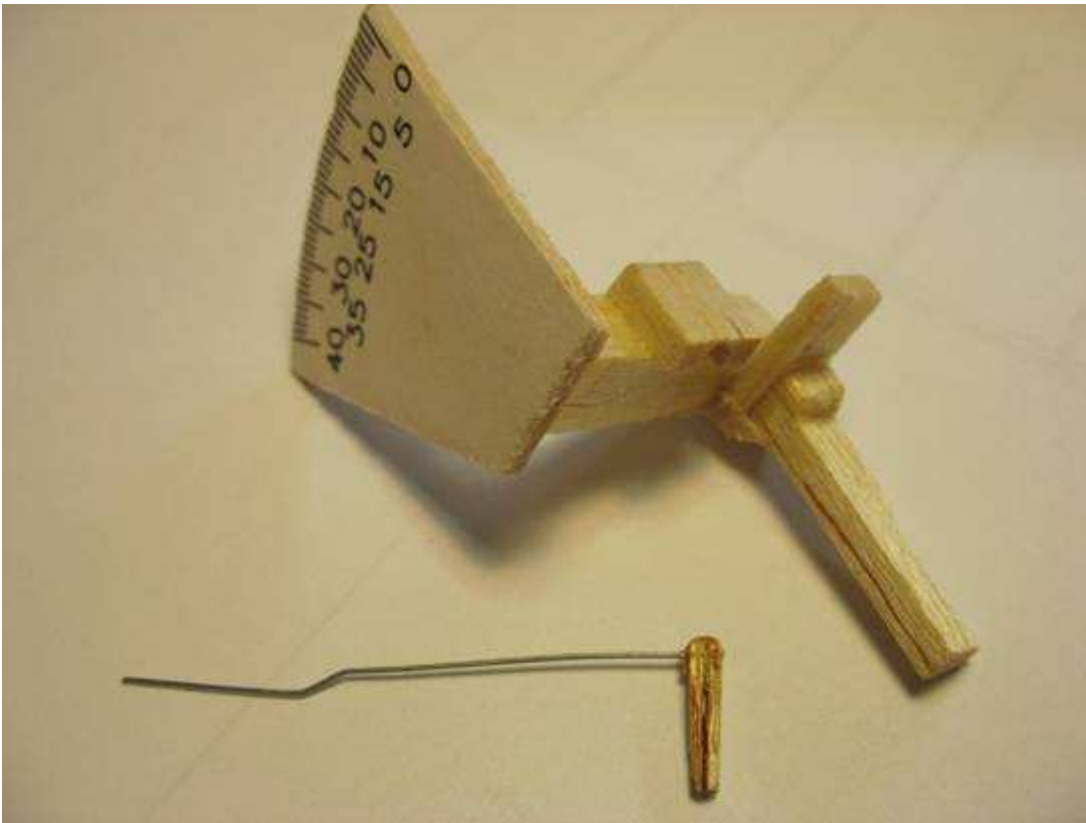
The following pictures will show the parts of the device and the method of assembly and testing.

Figure 2



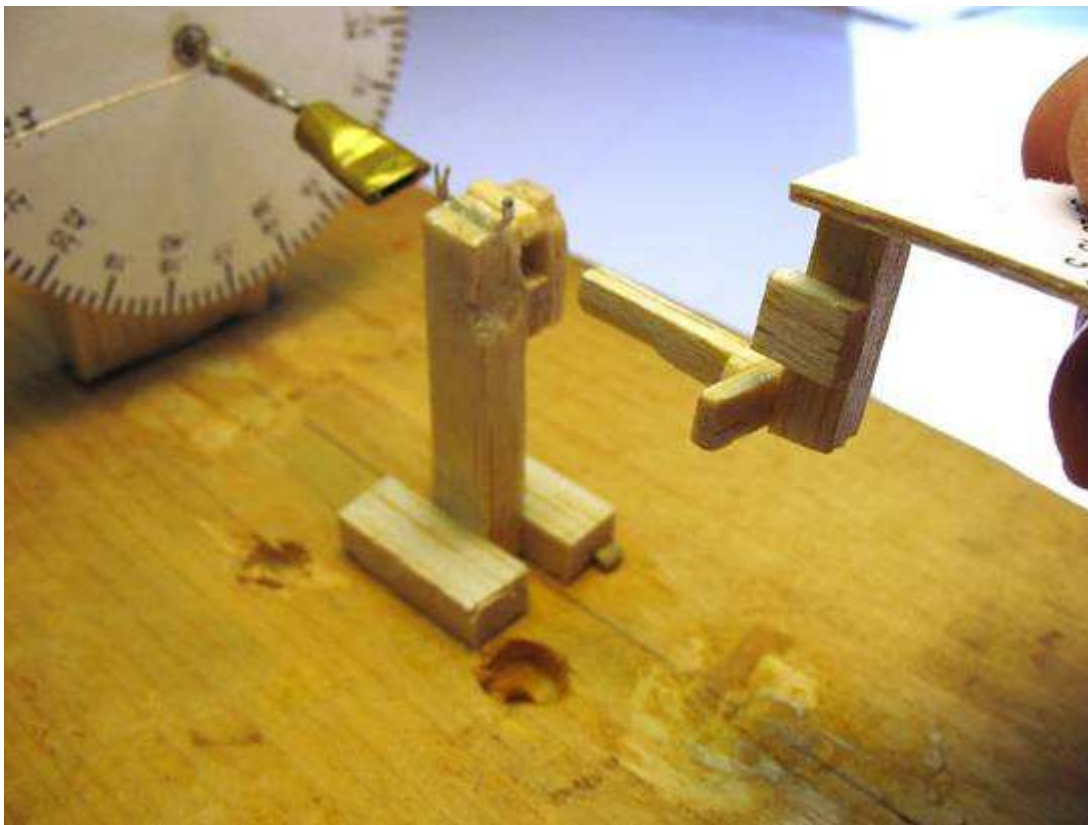
This picture shows the jig ready for installation of the hub to be tested.

Figure 3



These are the other two parts of the device – the angular measurement scale and the pointer needle.

Figure 4



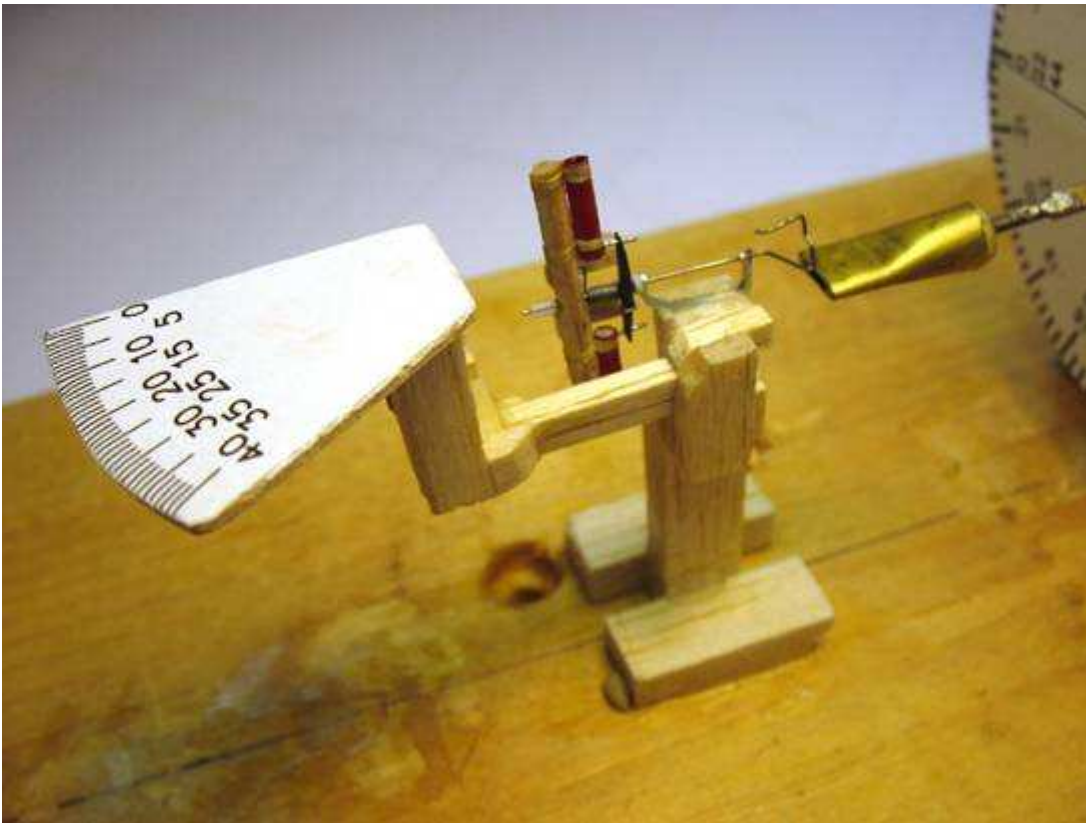
This picture shows how the angular scale will be installed in a later step.

Figure 5



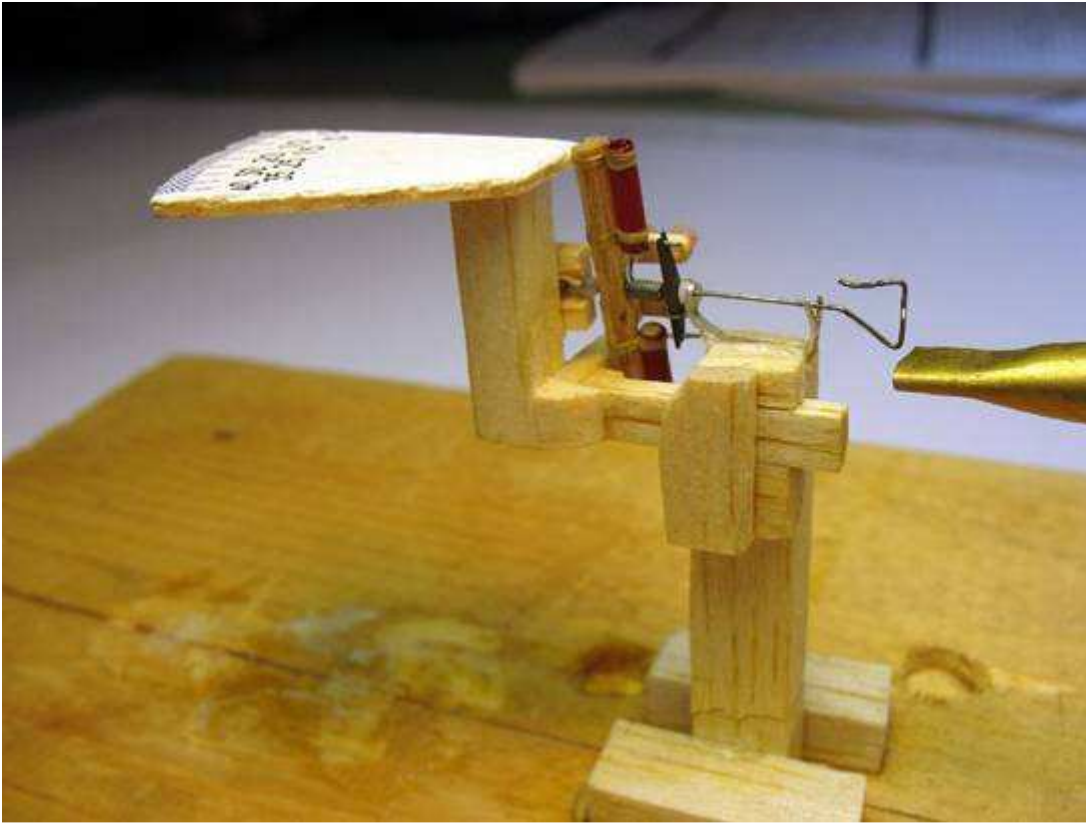
The hub to be tested is installed into the inverted Harlan bearing.

Figure 6



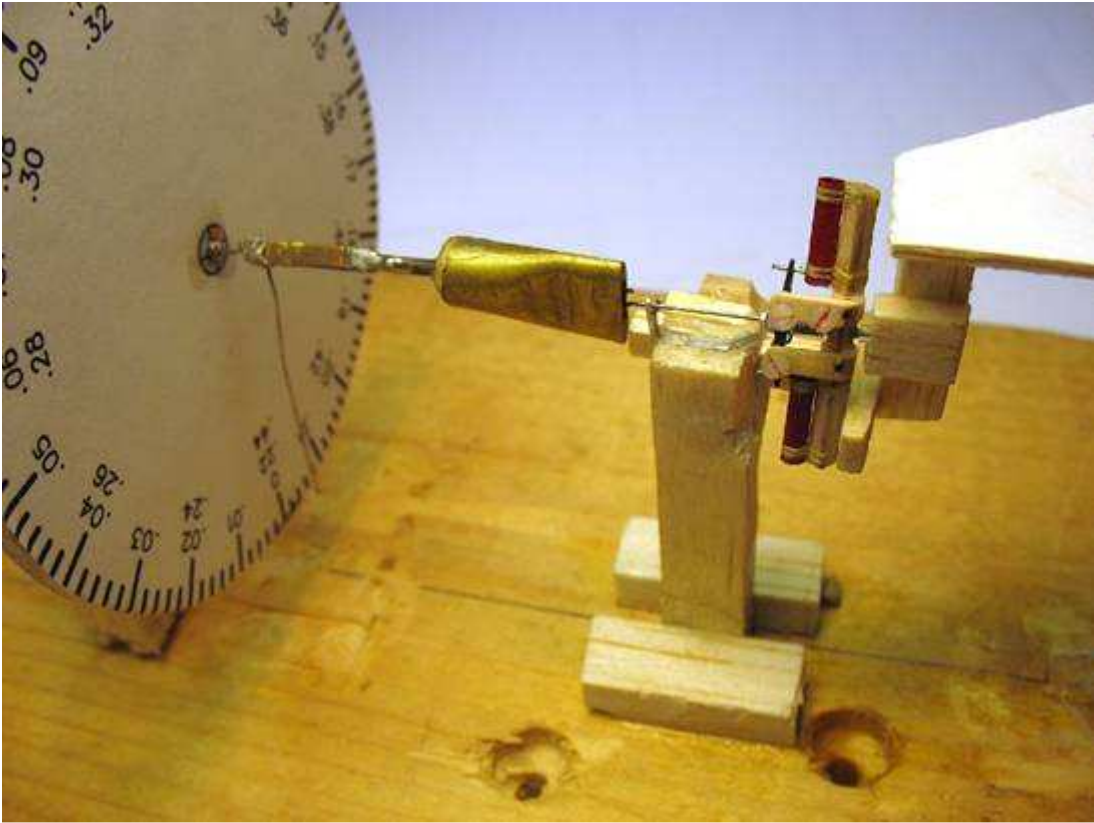
Here the angular scale is being installed into the slot in the post.

Figure 7



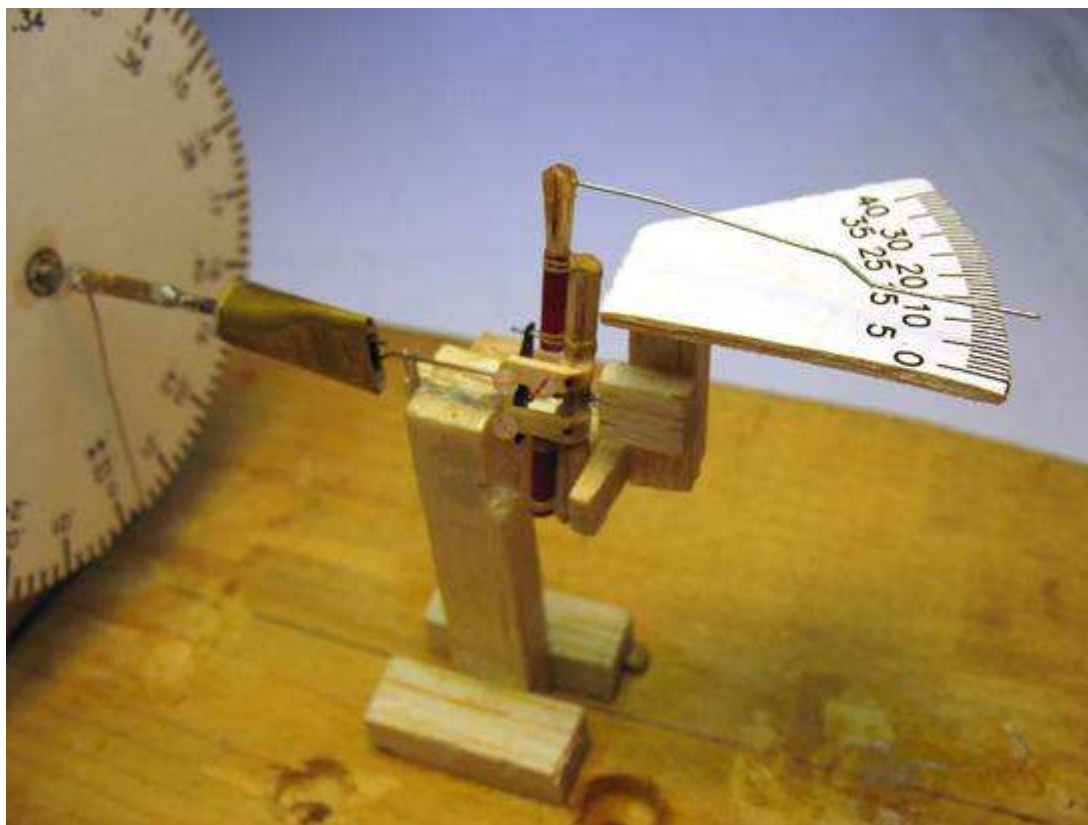
When the scale is pushed all the way in, the front of the bearing is supported by a hole in the block of balsa on the vertical member of the scale.

Figure 8



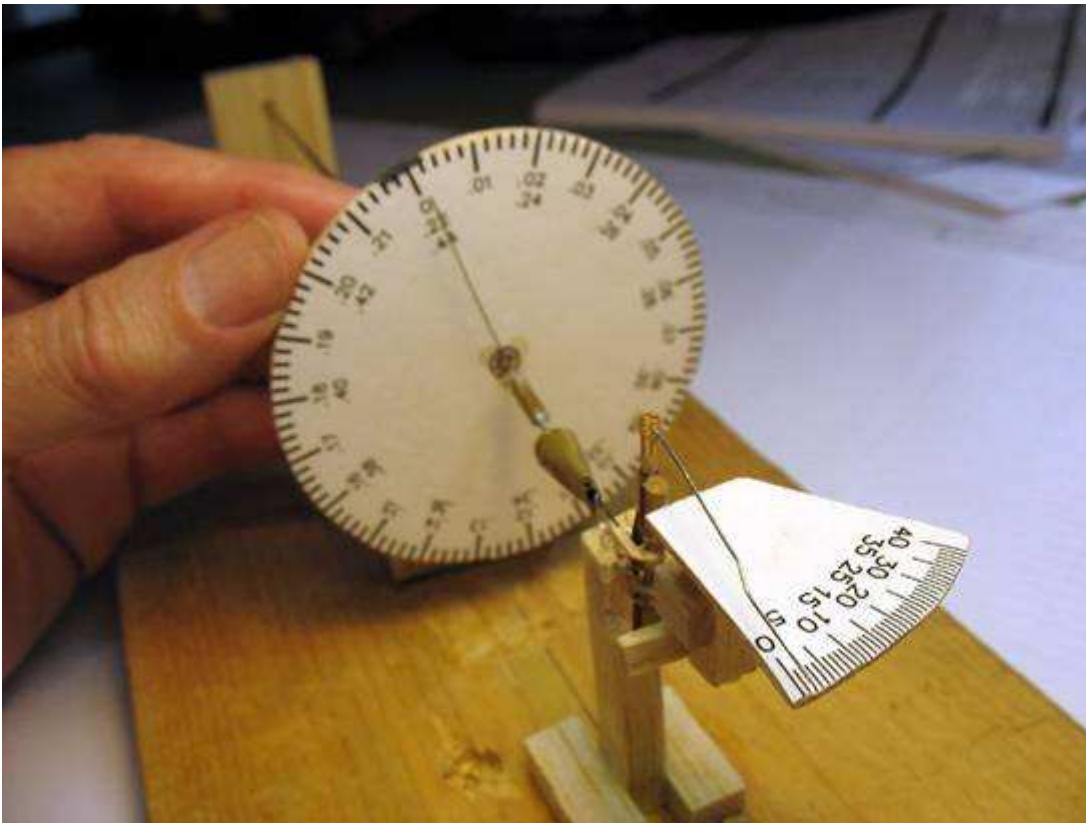
Here the prop hook has been engaged in the flattened tube on the shaft of the torque meter.

Figure 9



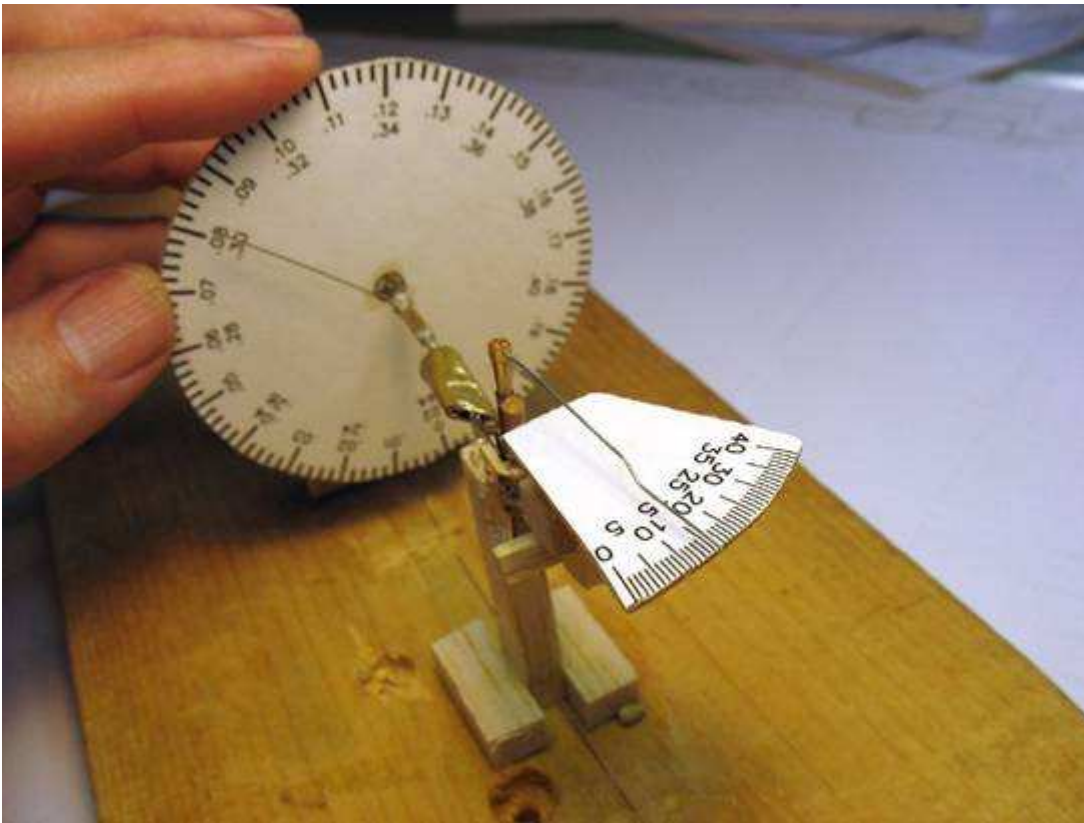
The pointer has been installed in the upper tissue tube of the hub.

Figure 10



The meter and the pointer are set to zero.

Figure 11



Torque is applied by rotating the face of the torque meter until the desired angular displacement has been reached. In this case the torque meter is in its second revolution and the torque required to reach 15 degrees of displacement is .30 in-ozs.

To determine the point at which low pitch is reached, wind the meter until the hub reaches the high pitch stop. Then unwind the meter while watching the needle carefully. When the needle reaches zero, note the torque reading on the meter. A couple of quick tests will prove to you that finding this number by winding the torque meter up from zero to the point where the needle starts to move will give you completely different results from the method described here.

In my humble opinion, this number should be equal to the lowest torque at which your model can be made to maintain level flight. As usual in indoor flying, others may disagree!