

After the completion of blade construction, the main rotor blades must be painted before any static or dynamic blade balancing can be done.

Perform the static lead-lag and static weight as per the instructions in the RotorWay manuals and construction videos. Once the static balance is complete, install the elastomeric bearings and pitch links as per the manual and video instructions.

Set the negative pitch of the main rotor blades to 1.8 degrees. Positive pitch should work out to be at 9.5 to 10.5 degrees. Reference the manual for the procedure.

### **Normalize the reflex edges**

With the proper reflex edge tool, you must now normalize the reflex edges. The reflex edge or trailing edge is sensitive to pressure, always handle the MR blades by the leading edge or the ends. Never lift or handle a blade by the trailing edge. Panel numbers are 1 through 26 starting with 1 at the tip.

Use panel or pocket 20 as the reference and normalize or match all the panels to that panel + or – 0.002 of an inch. Once the panels are normalized, set the panel numbers 1-15 to a positive or up pitch of 0.015". This will set the collective pressure. Collective pressure should be about neutral or have a slight pull down while in a hover.

### **Tracking using tracking lights**

Start with a ground track at idle rotor rpm (approximately 230 MR rpm). Make adjustments necessary so the MR blades ground track is within 1/2 inch or less using the pitch link adjustments. Make notes as you make adjustments.

Now have the pilot increase the rotor rpm to 100% and have the pilot get the helicopter light but do not lift off the ground. This will cone the blades. Check the tracking and adjust as necessary to track the blades to match at 1/2 inch or less.

### **Hover track and balance using an electronic balancer**

Next hover the aircraft and measure the hover tracking. If the track is 1/2 inch or less, measure the lateral vibration. In a hover the goal is 0.20 IPS or less to start. This is accomplished with weight and lead-lag adjustments. See the attached polar charts.

For example if the reading is 0.415 IPS at 089 degrees, the correction will be to add weight to the tip of the master blade. Only make 1 correction at a time even if it calls for both a lead-lag and a weight adjustment. Follow the instruction in the videos for making lead lag adjustments. Remember to make notes as you go along. Once the hover adjustments are set, note new aircraft because of the centrifugal loads will take about 5 hours of hover time before the MR blades "set". Expect minor adjustments as the MR blades set.

## **Forward flight tracking adjustments**

First off we should understand there are no such things as perfect blades. So sometimes knife edge tracking will not yeild the smoothest disc. Sometimes the aircraft will have less vibration with tracking set with a slight gap. Each aircraft will be different.

At forward flight have the pilot fly at cruise altitude and measure tracking at 45 mph, 65 mph and 85 mph. Note the tracking and sample with the balancer at the 3 speeds

Make only a single move per run. If a blades are in track at hover and gradually out of track at mid speed and more out of track at the higher speed, then make a pitch link adjustment.

If the blades are in track at hover and mid-speed, but sharply moves up or down at high speed, make a panel (reflex edge) adjustment at panels 8 - 15 to correct the track. Bend the panel up to "fly" the lower blade up to match to the other blade. Make very small adjustments 0.002 to 0.003 " at a time and check the tracking again.

This does takes a great deal of practice and understanding to perform the proper tracking and blade balancing. Being able to analyze the vibration data and the tracking is the key to you finding the solution to smooth operating rotor system.