Stability, Control Power and Climb Performance

The flight stability and control power of the LMH-100 are affected by the rotational speed of the main rotor. At high rotor speeds, the main rotor blades generate high gyroscopic forces that stabilize the main rotor, and minimize the effects of disturbance such as wind gusts. At high speeds, the rotor blades can also generate the high aerodynamic (air) forces needed to forcefully push the LMH-100 around when the pilot moves the controls. On fixed-pitch helicopters such as the LMH-100, the pitch of the main rotor blades determines the operating speed of the main rotor, and so directly affects stability, control power, and climb performance.

Generally, high blade pitch improves climb performance, but reduces stability and control power in hover. This is because rotor blades operating at a high pitch angle produce high lift at a relative low rotor speed. At the low speeds needed to hover, the rotor blades do not generated the gyroscopic forces needed for solid stability, of the aerodynamic forces needed for snappy control. Low blade pitch, on the other hand, increases rotor speed and stability, but hurts climb performance.

The LMH-100 climbs best with plus-six blade grips. Plus-six blade grips increase natural blade pitch by six degrees, and are identified by six raised dots on the top of the grips. The LMH-100 is generally more stable with the blades pitched to five degrees. To pitch the blades to five degrees, replace ONE plus-six grip with a plus-four grip, and re-track the rotor blades (as described in the LMH-100 Operator's Guide) so that both blades are pitched to five degrees.

When flying at low elevations (especially near sea level) with plus six grips, the LMH-100 may leave the ground with out adequate rotor speed for acceptable stability and control power. The common solution to this problem involves reducing blade pitch to increase rotor speed. To avoid over-speeding the engine, the nitromethane content of the fuel is normally reduced along with the blade pitch. Alternately, weight may be added to keep the LMH-100 on the ground at low rotor speeds (although it seems odd to purposefully add weight to a flying machine).

If, after adjusting the blade pitch, you would like even more control power, try moving the Z-links in the rotor head to the alternate (inner-most) holes on the pitch plate and mixing arms. This will reduce the stabilizing input of the Arlton Subrotor and increase the control input of the swashplate to the main rotors (thereby decreasing stability and increasing control power). By adjusting the blade pitch and Z-link position, you should be able to tune the flying qualities of your LMH-100 to some satisfactory point.

WARNING!

BE CAREFUL NOT TO REDUCE BLADE PITCH SO MUCH THAT THE MAIN ROTOR EXCEEDS ITS MAXIMUM RATED SPEED SINCE EXCESSIVE SPEED COULD DAMAGE THE ENGINE. WHEN FLYING AT LOW ELEVATIONS (NEAR SEA LEVEL), OR WHEN USING LOW BLADE PITCH (SUCH AS TWO PLUS-FOUR GRIPS), USE A FUEL CONTAINING LESS (20%-25%)NITROMETHANE TO REDUCE THE LOAD ON THE ENGINE.