# Blown Away: How Motor Speed Relates to Optimum Propeller Pitch

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The correct propeller is essential to optimum brushless motor performance. Propeller pitch is the distance the propeller would move forward if turned one revolution. Higher pitched propellers induce more drag and put more load on a motor. The purpose of this study was to discover the relationship between motor speed and optimum propeller pitch. The hypothesis was that faster motors perform better with smaller pitched propellers, because faster motors generally have less torque. To determine the most effective propeller, a device was built that was capable of measuring thrust generated by motors with 9 inch propellers. This device directed the forward force of the motors' thrust downward onto a scale, using a lever. Five propellers, with different pitches, were tested on three different motors. The fastest motor was the most efficient with the lowest pitched propeller. The medium speed motor had optimum performance with an intermediate propeller pitch. The slowest motor performed had the most thrust with a higher pitch propeller. As the propeller pitch increased past each motor's optimum point, the thrust decreased by at least 20 grams. As the motor speed increases, optimum propeller pitch decreases. This data can be used to determine the optimum propeller pitch based on the speed of the motor.

**Awards Won:**