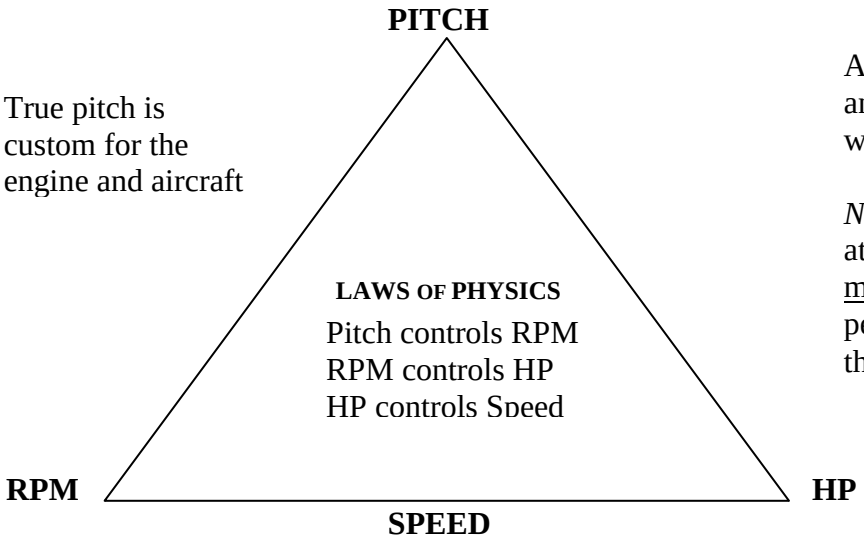
Propeller Parameters for Maximum Efficiency



Aircraft efficiency allows speed with any HP - which is controlled by pitch which controls RPM - then HP.

Note: Peak torque RPM must be attainable at the highest RPM for maximum horsepower, therefore, the percentage of RPM gain must be more than the percentage of torque lost.

HORSEPOWER FORMULAS:

$$\frac{HP \times 33{,}000}{RPM \times 2\ pi} = T$$

$$\frac{T \times 2\ pi \times RPM}{33{,}000} = HP$$

$$\frac{HP \times 33{,}000}{T \times 2\ pi} = RPM$$

Note:
33,000 x HP = T x 2pi x RPM

FORMULAS KEY:

P =	Pitch of propeller in feet
S =	Speed in miles per hour
T =	Torque in pounds per feet
2 pi (π) =	6.28318
HP =	Horsepower
88 =	A constant of 88 feet per second at 60 miles per hour
RPM =	Revolution Per Minute
33,000 =	1 horsepower raises 33,000 lbs one foot in one minute

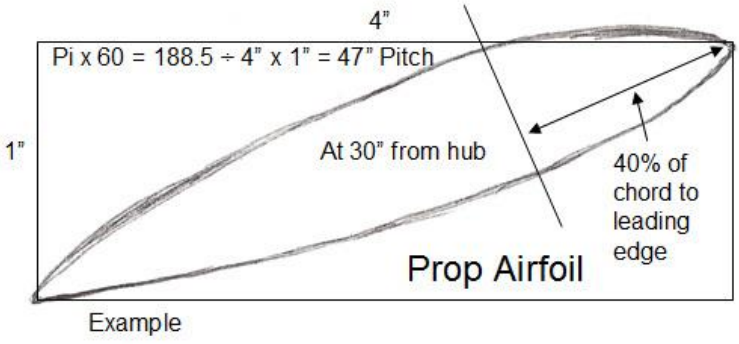
PITCH FORMULAS:

$$\frac{88 \times S}{RPM} = P$$

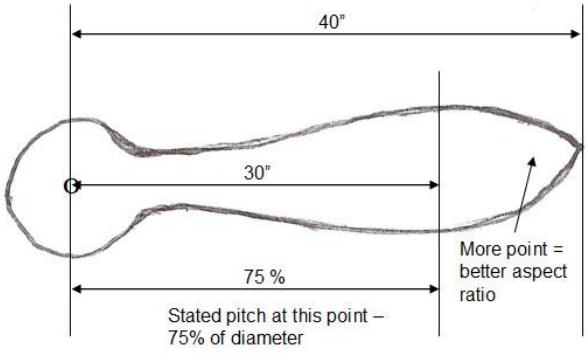
$$\frac{P \times RPM}{88} = S$$

$$\frac{88 \times S}{P} = RPM$$

Note:
88 x S = P x RPM



Note: Propeller airfoils are infinite as they are very thick at the hub and thin at the tip. 80% to 12%



ASPECT RATIO FORMULA: $\frac{SPAN^2}{\text{Wing Area}}$

PROP MATRIALS: Propeller lumber hardness and dryness should match (e.g. birch and walnut match well for color and hardness). Use glue that has working time.

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