PROPELLER TIP SPEED CALCULATIONS:

Formula

Let:

TS: Tip Speed in feet per second.
E: Engine Speed in revolutions per second.
P: Propeller Diameter in feet.
F: Aircraft Forward Velocity in feet per second.

TSMPH: Tip Speed in miles per hour.

Then:

$$TS = \sqrt{[E \times (P\pi)]^2 + [F]^2}$$

and

$$TSMPH = (TS \times 3600) \div 5280$$

Sample Problem

E = 1850 RPM ÷ 60 = 30.83334 RPS.
P = 9 x π = 28.274334 ft.
F = 118 MPH x 5280 ÷ 3600 = 173.066667 feet per second.

$$TS = \sqrt{[30.83334 \times 28.274334]^2 + [173.066667]^2}$$

$$= \sqrt{[871.792153]^2 + [173.066667]^2}$$

$$= \sqrt{789973.63}$$

TS= 888.8046 feet per second.

and

TSMPH = 888.8046 x 3600 ÷ 5280 = 606.00314 miles per hour.

File: B-15-03171997