

# Operating Principles of Constant Speed Propellers For Large Piston Engines

- Propeller Governors
- Hydraulic Constant Speed Propellers
  - Hamilton-Standard Hydromatic
  - Rotol
  - de Havilland contra-prop
  - Junkers
  - Escher-Wyss
  - Aeroproducts
- Electric Constant Speed Propellers
  - Curtiss (standard and hollow-shafted)
  - German VDM



**Tom Fey**

Constant speed props maintain a constant, pilot-selected engine/propeller speed by altering the pitch of the propeller blades to maintain rpm regardless of power setting.

Why constant speed?

- Reduces pilot workload
- Prevents dangerous engine overspeed in take-off or diving situations.
- Provides efficiency and smoothness to engine operation.

# The Propeller Operating Environment

Below sea level to 40,000+ ft

-67° to +120° F

Airspeeds from 0 to 550 mph

Airframe g loading's from -5 to +8 g

RPM's up to 1800 (30 rotations/sec)

Blade g loadings up to 2200 x g at tip

Blade root loadings up to 80 tons per blade

Blade power loadings up to 1800 hp/blade

Blade rotational tip speeds up to 1100 fpm

Powerful, innate tendency for blade to move to low pitch

Diameters up to 19 feet (Convair B-36)

Blade tracking to under  $\pm 0.1$  inch at tip

Blade pitch accuracy to  $\pm 0.2^\circ$  at any station

Impact with rain, hail, rocks, bullets, and Mother Earth

# The Keeper of Constant Speed: The Propeller Governor

