

Service Letter: 445
Date: September 12, 2017
Title: Aerobatic Maneuvering and Aileron Application
Models: 8KCAB all serial numbers
Description: This service letter discusses maneuver limits, limit loads factors, and proper use of controls. The conditions used for aileron design are also provided in an effort to assure proper application of controls.

Review of the AFM and POH indicate that adequate and appropriate operating procedures and limitations currently exist - this service letter does not modify or change the limitations already provided. The information contained in this service letter is generic in nature (airspeeds, etc., may vary). Consult the appropriate AFM or POH for information specific to an airplane.

Discussion:

Since introduced in 1970, the 8KCAB has slowly changed in design. The original 8KCAB was 150HP, used a fixed-pitch propeller, and had ailerons without spades. Level flight speed was slower than maneuvering speed and aileron stick forces were high. Full aileron deflection above maneuvering speed was difficult to impossible. Design changes and STCs have resulted in increased speeds and reduced aileron control force. Both increased speed and reduced control force may allow the pilot to approach or inadvertently exceed design limit loads.

The AFM and/or POH provide the following information:

- *Never Exceed Speed - 200 CAS (mph) - Do not exceed this speed in any operation*
- *Acrobatic Category Maneuvering Speed - 132 CAS (mph) - Do not make full or abrupt control movements above this speed*
- *Acrobatic Category limit load factors are +6g and -5g*
- *Maneuver Limits - Typical Entry and Exit Speeds of 140 IAS (mph) and acceleration of $\pm 4g$ are listed*
- *Slow or Barrel Roll - Entry Speed 130 IAS (mph) - Use Smooth Application of Controls, No Full or Abrupt Control Movements Above Maneuvering Speed*

The limit load factors of +6g and -5g are the maximum loads anticipated on the airplane during its lifetime of service. Early AFMs provided maneuver entry speeds; later AFMs provided both entry speeds and accelerations. While operation to the limit load factors is not restricted by the AFM - it is not considered a routine operating condition and will decrease airframe life. Pilots should make every effort to operate the airplane as described in the maneuver limits, *typically* $\pm 4g$. Excursions beyond $\pm 4g$ may occur but should not be routine.

Similar to the limit load factors - the ailerons are designed for specific conditions. Rolling conditions equivalent to those used for design are provided in Table I.

Table I: Aileron Design Speeds and Deflection

Speed	CAS (mph)	Deflection
Aerobatic Maneuvering, V_A	132	Full
Maximum Structural Cruising, V_{NO}	160	3/4
Never Exceed, V_{NE}	200	1/2

Pilots should again operate the airplane as described in the maneuver limits with regard to rolling maneuvers, *Entry Speed 130 IAS (mph), Smooth Application of Controls, No Full or Abrupt Control Movements Above Maneuvering Speed.* In effect - do not exceed the effort required to roll the airplane at V_A .