From the Mooney List December 2, 2005 by Bob Kromer

Slipping a Mooney

During development and certification on the M20K 252 at the factory, I encountered the aerodynamic buffeting while slipping on approach as described by Dan Eldridge in his posting on slips in his M20K 231. Obviously, this gets a test pilot's attention and we began an investigation. Thought you might be interested in what we found. For our slip tests, we flew the M20K, the M20J and the Mooney/Porsche engineering prototypes that were at the factory at the time. This gave us a good cross section of different aircraft configurations (short/long fuselage, different pitch trim requirements on approach, etc.) What we found was 1) All airplanes were fine above 85 KIAS in full rudder deflection forward slips, flaps up and flaps down. 2) But somewhere between 80-85 KIAS and lower, AERODYNAMIC BUFFETING FROM THE HORIZONTAL TAIL/ELEVATOR occurred in the M20K and the Mooney/Porsche airframes ALONG WITH A SLIGHT LOSS OF ELEVATOR EFFECTIVENESS AND A SLIGHT NOSE DOWN PITCHING MOMENT. These conditions were worsened with flaps down compared to the flaps up. Aerodynamic tufting of the horizontal tail revealed what was happening. In the M20K and the Mooney/Porsche with their more forward CGs, almost full nose up pitch trim is required for a "hands off" approach at the target approach airspeed. This puts the horizontal stabilizer of the Mooney tail at a high negative angle of attack (to keep the nose up). With the horizontal tail at this high negative angle of attack and especially with flaps full down, the local airflow over the horizontal tail is getting pretty close to max alpha, the angle of attack where the tail will stall. I want to emphasize that IN NORMAL FLYING, THERE IS PLENTY OF MARGIN - no need to worry about the tail stalling in your M20K or long body Mooney. But start slipping the airplane at 85 KIAS and below or have a little ice on that stabilizer leading edge and those margins can get mighty thin. Combine a slip maneuver with some pretty good yanking on the control wheel in turbulence and you might get a partial tail stall. We did in flight test - in the M20K the result was buffeting felt in the control wheel and the slight nose down pitching moment. So my advice from the test pilot's seat is don't go there - especially if you fly a Mooney model that requires lots of nose up pitch trim on the approach. An aggressive forward slip in those airplanes with the speed low and the flaps down puts the tail in an extreme airflow condition. The airplane will warn you with buffeting and a slight pitch down, but who knows - add some ice and look out. This is not the way to fly your Mooney. My bottom line opinion - keep the ball near center on the approach and you're flying the Mooney design correctly and safely with the safety margins it was meant to have.

Best Regards;

Bob Kromer

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