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Multiengine Vmc Demonstration Procedure

Multiengine Flight Training involves flight operations at low airspeeds with asymmetrical thrust. Single engine flight has the highest risk factor due to that asymmetry. Several fatal accidents have occurred during Vmc training and checkrides. The following procedure is to insure a safe environment while conducting the Vmc Demonstration. **NOTE** This procedure will be used only during the Vmc Demonstration and at no other time during the flight.

During the Vmc Demonstration, I shall be limiting the rudder and aileron before the mechanical limits. Limiting the rudder and aileron travel simulates a lower Altitude, resulting in a "loss of directional control" (yaw/roll) towards the "dead" engine, which is what is supposed to be demonstrated per the ACS. This procedure in no way interferes with the Vmc demonstration and recovery. This is to provide a safe margin above the stall and avoid a single engine stall. As the applicant normally applies rudder, I shall declare "Max Rudder" to indicate that the rudder and aileron are simulated to be at "Full Deflection" and no further control movement should be anticipated by the applicant. This is to provide a safe margin above stall speed and the applicant will execute the Vmc recovery at THE FIRST indication of YAW, ROLL, or **ANY** indication of eminent STALL (stall horn/light or beginning of aerodynamic buffet).

Some guidance on Limiting the Rudder travel from the FAA Airplane Flying Handbook Ch 12;

"An actual demonstration of V_{MC} may not be possible under certain conditions of density altitude, or with airplanes whose V_{MC} is equal to or less than V_S. ***Under those circumstances, as a technique, a demonstration of V_{MC} may safely be conducted by artificially limiting rudder travel to simulate maximum available rudder****. A speed well above V_S (approximately 20 knots) is recommended when limiting rudder travel."* (By limiting the aileron we avoid increasing the AoA of the "dead engine" wing)

The FAA refers to "High Density Altitude" as "a density altitude of 5000". Our Density Altitude is often between 9,000 and 15,000. At these very High Density Altitudes, Vmc is well below Vs and, without limiting the controls, a Single Engine Stall WILL occur before any Yaw or Roll, and in the highest asymmetrical condition. A single engine stall is violent and very dangerous. The FAA chart 12-22 shows that we will be well in the "May Be Difficult to Recover". Having done ME Test Flight and single engine stalls, I can state for a fact that a single engine stall is very dangerous and a spin is likely.

From the FAA Airplane Flying Handbook Ch 12 "Transitioning to Multiengine Airplanes";

"While the V_{MC} demonstration shows the earliest onset of a loss of directional control when performed in accordance with the foregoing procedures, avoid a stalled condition. Avoid stalls with asymmetrical thrust, such that the V_{MC} demonstration does not degrade into a single-engine stall. ***A V_{MC} demonstration that is allowed to degrade into a single-engine stall with high asymmetrical thrust may result in an unrecoverable loss of control and a fatal accident."***

Continuing from the FAA Airplane Flying Handbook "Transitioning to Multiengine Airplanes";

"Should a stall occur while the airplane is under asymmetrical power ***a spin entry is likely****. The yawing moment induced from asymmetrical thrust is little different from that induced by full rudder in an intentional spin in the appropriate model of single-engine airplane. In this case, however, the airplane will depart controlled flight in the direction of the idle engine, not in the direction of applied rudder. Twins are not required to demonstrate recoveries from spins, and their spin recovery characteristics are generally very poor."*

This is meant to inform as to how I will be testing the Vmc Demonstration so that the applicant is aware when they appear for their Test, where this technique is referenced by the FAA and why.