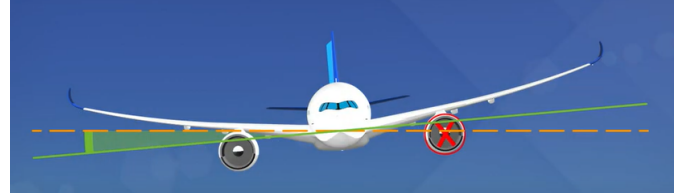


VMCA & VMCL TESTS



Definitions

When an engine fails in flight, the thrust asymmetry must be counteracted by flight control surfaces deflections, particularly the rudder. Since the flight control surface efficiency is a function of the speed, there is a speed below which, at maximum thrust on the live engine(s), the aircraft cannot be laterally controlled. This is the minimum control speed, called VMCA in take-off configurations, and VMCL in approach & landing configurations (and VMCL-2 for a quad engine aircraft in the case of dual engine failure on the same side).

Purpose of the Flight Tests

These tests determine the VMCA and VMCL in flight. VMCs are obtained in a static maneuver and must satisfy a dynamic criteria, at low altitude:

- With one engine shut down (or in a simulated shut down condition), maximum thrust on the live engine, a/c banked at 5° towards the live engine, the VMC is the minimum speed allowing constant heading.
- With the aircraft stabilized at VMC in climb, and with maximum thrust on all engines, a sudden reduction of thrust (slam) to idle is performed on one engine. A safe recovery must be demonstrated while keeping maximum thrust on the live engine(s).

Application to Line Operations

When flying at V_2 close to VMCA (light a/c) with one engine inoperative and the other one(s) at maximum thrust, the lateral maneuverability is very limited. Special care must be taken. An excursion below VMC in such configuration does not necessarily mean a loss of control but an immediate action is required applying forward stick input to quickly increase the speed, and possibly a thrust reduction to reduce thrust asymmetry.

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