Understanding V_{APP} and V_{GA}

V_{MCA} – Minimum Control Speed in Air

It is the calibrated airspeed at which, when the critical engine is suddenly made inoperative, it is possible to maintain control of the airplane with that <u>engine still inoperative and maintain straight flight with an angle of bank of not more than 5 degrees</u>.

Taking into account some conditions like takeoff power/thrust, CG, takeoff weight, configuration, trim setting, ground effect and propeller wind milling or feathered as applicable, this speed <u>may not exceed 1.13 V_{SR}</u>.

The rudder forces required to maintain control at this speed may not exceed 150 pounds nor may it be necessary to reduce power or thrust of the operative engines. During recovery, the airplane may not assume any dangerous attitude or require exceptional piloting skill, alertness, or strength <u>to prevent a heading change of more than 20 degrees</u>.

V_{MCL} – Minimum Control Speed during Approach and Landing

The minimum control speed <u>during approach and landing</u> with all engines operating, is the calibrated airspeed at which, when the <u>critical engine is suddenly made inoperative, it is possible to</u> maintain control of the airplane with that engine still inoperative, and <u>maintain straight flight with an angle of bank of not more than 5 degrees</u>.

V_{MCL} is established with factors like aircraft configuration, CG, trim setting, weight, propeller if applicable, go around power/thrust,

The rudder forces required to maintain control may not exceed 150 pounds and the airplane may not exhibit hazardous flight characteristics or require exceptional piloting skill, alertness, or strength. Lateral <u>control must be sufficient to roll the airplane</u>, from an initial condition of steady flight, through an angle of <u>20 degrees</u> in the direction necessary to initiate a turn <u>away from the inoperative engine, in not more than 5 seconds</u>.

V_{REF} – Reference Speed

The horizontal distance necessary to land and to come to a complete stop (or to a speed of approximately 3 knots for water landings) from a point 50 feet above the landing surface must be determined by taking into account factors like temperatures, weight, altitude and wind. In determining this distance:

    (A) The airplane must be in the landing configuration.

    (B) A stabilized approach, with a CAS of not less than V_{REF}, must be maintained down to the 50-foot height.

In <u>non-icing conditions</u>, V_{REF} may not be less than:

    (A) 1.23 V_{SR0};

    (B) V_{MCL};

    (C) A speed that provides the maneuvering capability.

In <u>icing conditions</u>, V_{REF} may not be less than:

    (A) The speed determined in non icing conditions;

    (B) 1.23 V_{SR0} (with landing ice accretion), if that speed exceeds V_{REF} selected for non-icing conditions by more than 5 knots CAS;

    (C) A speed that provides the maneuvering capability (with landing ice accretion).

V_{REF} is the maximum of:

- V_{mHB} (Landing Flaps Configuration)
- V_{MCL}

V_{APP} – Approach Speed

This is the operational speed during landing, determined with flaps in landing configuration and landing gears extended. It is the reference speed increased by wind factor.

$V_{APP} = V_{REF}$ + Wind Factor

Wind Factor is the highest of:

- $1/3^{rd}$ of the head wind velocity
- Full gust

However maximum wind factor cannot be more than 15 knots.

V_{GA} – Go Around Speed

The go around speed is the high bank minimum manoeuver speed increased by 5 knots and must not be less than 1.1 V_{MCA}

V_{GA} is the maximum of:

- V_{mHB} (Landing Flaps Configuration) + 5 knots
- 1.1 V_{MCA}

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