Transport Canada / Transports Canada
Aviation / Aviation

AMA: 525.933

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Airworthiness Manual Advisory (AMA)

Subject:

THRUST REVERSING SYSTEMS, TURBO-JET ENGINES

1. PURPOSE. This advisory information provides guidance material for acceptable means, but not the only means, of demonstrating compliance with the requirements of Chapter 525 of the Airworthiness Manual dealing with the operations of turbo-jet thrust reversing systems, following a decision to go-around after a landing touch down.

2. REFERENCE AIRWORTHINESS STANDARDS. Chapter 525, sections 525.143, 525.933, 525.1155 and 525.1581.

3. BACKGROUND AND DISCUSSION. Section 525.143 requires that the aeroplane be safely controllable and manoeuvrable during take-off and landing, and that it must be possible to make a smooth transition from one flight condition to any other flight condition without exceptional piloting skill, alertness, or strength under any probable operating condition, including configuration changes such as deployment or retraction of deceleration devices. DOT interpretation of the requirements of 525.143 includes go-around following landing touch down and thrust reverser deployment. This operating condition is not specifically addressed by Section 525.933.

4. APPLICABILITY. This advisory material is primarily intended for tubo-jet thrust reversing systems (such as translating sleeves, buckets, etc.). DOT should be contacted for advisory material appropriate to propeller reversing systems.

5. ACCEPTABLE MEANS OF COMPLIANCE. Compliance may be shown by acceptable analysis or a combination of acceptable analysis and test.

5.1 The following manoeuvres sequence should be considered:

(a) Normal landing touchdown;
(b) Deployment of thrust reversers;
(c) Application of reverse thrust with engine speed-up;
(d) Decision to go-around;
(e) Stow thrust reversers;
(f) Rapid application of thrust;
(g) Configuration changes as required; and
(h) Take-off; or
(i) Stop, if take-off is clearly not achievable.

5.2 The applicant shall demonstrate that there is no hazard or unsatisfactory handling characteristics such as:

(a) becoming airborne with an unlocked thrust reverser;

(b) any asymmetric control problems resulting from one engine developing forward thrust and the other reverse thrust;

(c) insufficient system capability to handle the peak system demands;

(d) power control anomalies which would allow the power levers to be pushed forward (i.e. apparent generation of forward thrust) before the thrust reversers were fully stowed and hence result in reverse thrust.

5.3 DOT would normally require flight test only if an assessment of the thrust reverser control operation is necessary or the analysis is inconclusive.

5.4 Analysis used in showing compliance should consider all the appropriate factors and operating conditions and not be confined to a verification that no hazard is involved with any proposed flight test.

5.5 An Aeroplane Flight Manual limitation prohibiting a go-around following thrust reverser deployment is required, but is not considered adequate to demonstrate compliance with the referenced regulations.

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