Flight Operations Briefing Notes

Landing Techniques

Bounce Recovery - Rejected Landing

I Introduction

A rejected landing (also referred to as an aborted landing) is defined as a go-around maneuver initiated after touchdown of the main landing gear or after bouncing.

Although a rare occurrence, a rejected landing is a challenging maneuver decided and conducted in an unanticipated and unprepared manner.

The objective of this Briefing Note is to define:

- Applicable decision criteria for:
  - Full-stop landing; or,
  - Rejected landing and go-around; and,
- Procedures and techniques for bounce recovery, including:
  - Continued landing; or,
  - Rejected landing (i.e., go-around).

II Statistical Data

No global statistical data are available on rejected landing incidents or accidents but the following three events illustrate the circumstances that may lead a flight crew to reject the landing, and the possible consequences of such a maneuver:

- Tailstrike following a go-around initiated due to directional control difficulties after thrust reverser selection;
- Climb performance limitation following the undue selection of reverse thrust during a touch-and-go and failure of one reverser to stow; and,
- Loss of control following a go-around initiated after thrust reverser selection (because of a vehicle obstructing the runway) and failure of one reverser to stow.

III Touch-and-go (Training only)

Although a touch-and-go is essentially a training exercise, the conditions required for the safe conduct of this maneuver provide a valuable introduction to the discussion of rejected landings.

Preconditions

Prior to initiating a touch-and-go, the following preconditions must be observed:

- **No** autobrake:
  - autobrake must not be armed;
- **No** reverse:
  - thrust reversers must not be selected upon touchdown; and,
- **No** pedal braking:
  - pedal braking must not be used after touchdown.

Aircraft reconfiguration

After touchdown for a planned touch-and-go, the aircraft must be reconfigured to a takeoff configuration:

- Spoilers disarmed;
- Flaps reset to a takeoff configuration;
- Pitch trim reset (manually or automatically depending on aircraft type) within the takeoff trim setting range;
- Rudder trim reset (as applicable); and,
- Throttle/thrust levers standup, as required (for symmetrical engine acceleration).

Task sharing

Performing a planned touch-and-go is a dynamic and demanding maneuver in terms of task sharing:

- The PF (trainee) is responsible for:
  - Tracking the runway centerline;
  - Advancing the throttle/thrust levers slightly above idle.

- The PNF (instructor) is responsible for:
  - Reconfiguring the aircraft for takeoff;
  - Resetting systems, as required;
  - Monitoring engine parameters and flight modes annunciations;
  - Performing the takeoff callouts;
  - Deciding to abort the takeoff, if required; and,
  - Providing back-up to PF during rotation and initial climb.

Performing a rejected landing (i.e., a non-anticipated and non-prepared event) further amplifies the importance for the PF and PNF to strictly adhere to the defined task sharing and to concentrate on their respective duties.

IV Bouncing and Bounce Recovery

Bouncing at landing usually is the result of one or a combination of the following factors:

- Windshear;
- Thermal activity;
- Excessive sink rate;
- Late flare initiation;
- Incorrect flare technique;
- Excessive airspeed; and/or,
- Power-on touchdown (preventing the automatic extension of ground spoilers, as applicable).

The bounce recovery technique depends on the height reached during the bounce.

Recovery from a light bounce

In case of a light bounce, the following typical recovery technique can be applied:

- Maintain a normal landing pitch attitude:
  - Do not increase pitch attitude as this could cause a tailstrike; and,
  - Do not allow the pitch attitude to increase, particularly following a firm touchdown with a high pitch rate.

    Note:

    Spoiler extension may induce pitch up effect.

- Continue the landing;
- Keep thrust at idle; and,
- Be aware of the increased landing distance.

Recovery from a high bounce

In case of a more severe bounce, do not attempt to land, as the remaining runway length might not be sufficient to stop the aircraft.

The following generic go-around technique can be applied:

- Maintain a normal landing pitch attitude;
- Initiate a go-around by triggering go-around levers and/or advancing throttle/thrust levers to the go-around thrust position (depending on aircraft type);
- Ignore the takeoff configuration warning, if any;
- Maintain the landing gear and flaps configuration;
- Be ready for a possible second touchdown;
  - Do not try to avoid a second touchdown during the go-around. Should this happen, the second touchdown would be soft enough to prevent damage to the aircraft, if pitch attitude is maintained;
- When safely established in the go-around and no risk of further touchdown exists (i.e., with a steady positive climb), follow normal go-around procedures; and,
- Reengage automation, as desired, to reduce workload.

V Commitment for Full-stop Landing

Landing incidents and accidents clearly demonstrate that after the thrust reversers have been deployed (even at reverse idle), the landing must be completed to a full stop, as a successful go-around may not be possible.

The following occurrences have resulted in a significantly reduced rate of climb or in departure from controlled flight:

- Thrust asymmetry resulting from asymmetrical engine spool up (i.e., asymmetrical engine acceleration characteristics from a ground idle level);
- Thrust asymmetry resulting from one thrust reverser going to the stow position faster than the other one; and,
- Severe thrust asymmetry resulting from one thrust reverser failing to re-stow.

VI Commitment for Go-around

If a rejected landing is initiated, the flight crew must be committed to proceed with the intended maneuver and not retard the throttle/thrust levers in an ultimate decision to complete the landing.

Reversing a go-around decision usually is observed when the decision to reject the landing and to initiate a go-around is taken by the PF but is overridden by the other crewmember.

Runway overruns, impact with obstructions and major aircraft damage (or post impact fire) often are the consequences of reversing an already initiated rejected landing.

VII Summary of Key Points

Practical techniques for bounce recovery and SOPs should define the respective decision criteria for:

- Full-stop landing; or,
- Rejected landing and go-around.

After reverse thrust is selected, a full-stop landing must be completed.

VIII Associated Flight Operations Briefing Notes

The following Briefing Notes can be reviewed in association with the above information:

- **Being Prepared to Go-around**
- **Flying Stabilized Approaches**
- **Preventing Runway Excursions and Overruns at Landing**
- **Preventing Tailstrike at Landing**

IX Airbus References

- Flight Crew Operating Manual (FCOM) – Standard Operating Procedures (SOPs) – Landing
- A318/A319/A320/A321 & A330/A340 Flight Crew Training Manual (FCTM) – Normal Operations - Go Around – Rejected Landing
- A318/A319/A320/A321 & A330/A340 FCTM – Normal Operations - Landing – Tailstrike Avoidance – Bouncing at Touchdown
- A300/A300-600/A310 FCOM – Procedures and Techniques – Recommendations for Takeoff and Landing – Bouncing at Landing

X Additional Reading Material

The following events can be read to illustrate this Briefing Note:

- Flight Safety Foundation – Publications - Accident Prevention January 1999.
- Flight Safety Foundation – Publications - Accident Prevention June 2001.

Note:

These Flight Safety Foundation Publications are available on the Flight Safety Foundation website ***http://www.flightsafety.org/ap_home.html****.*

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