

Attachment Y

to Operations Group Chairman's Factual Report - 2

DCA94MA076

**Excerpts from Post-Accident
USAir Operations Publications**

(6 pages)

GENERAL**CREW COORDINATION**

Effective crew coordination enhances safety and is essential during flight operations. The following responsibilities shall be adhered to at all times:

CAPTAIN'S RESPONSIBILITIES:

- Ensure open communication with all crewmembers regarding any flight safety issues,
- Conduct a crew briefing prior to each trip.
- Assume command when the situation dictates and initiate any emergency procedures (e.g., engine shutdown, aborted takeoff, rejected landing, etc.).

NOTE: If the Captain is absent from the cockpit, then the First Officer is in command and must make the necessary decisions.

CREWMEMBER'S RESPONSIBILITIES:

- Understand the Captain is in complete command of the aircraft and obey the Captain's orders, even though they may differ with written instructions.
- Assist the Captain in monitoring and crosschecking flight instruments and flight control positions during all flight phases.
- Advise the Captain of any potential or actual emergency situation and provide input until the safety of flight issues are resolved.

TRANSFER OF AIRCRAFT CONTROL**COMMAND VERSUS CONTROL**

Taking command does *not* mean the Captain must physically take control of the aircraft. Some situations may warrant the pilot flying the aircraft to maintain control. In any case, the Captain must ensure either s/he or the F/O is flying the aircraft. The person flying the aircraft must *not* allow him/herself to become distracted and must maintain control of the aircraft at all times.

PROCEDURES

Whenever there is a transfer of aircraft control, the pilot *assuming* control will state "*I have the aircraft.*" The pilot *relinquishing* control will visually ensure the transfer and verbally acknowledge "*You have the aircraft.*"

UNCOMMANDED YAW OR ROLL

Accomplish this procedure if uncommanded yaw or roll occurs in flight.

AUTOPILOT (if engaged) DISENGAGE

Grasp and hold the yoke firmly and disengage the autopilot.

The pilot should be prepared to make control wheel corrections to return to wings level upon disengagement. The autopilot may be putting in an appropriate correction for an uncommanded yaw or roll. Allowing the control wheel to go to neutral after disengagement may allow the airplane to roll even more.

If yaw and/or roll forces continue:

YAW DAMPER SWITCH OFF

The YAW DAMPER light illuminates when the yaw damper is disengaged.

If it is confirmed that the autopilot is not the cause of the uncommanded yaw or roll, the autopilot may be reengaged at the pilot's discretion.

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MANEUVER SPEEDS

The Flap Maneuvering Speed Schedule provides the recommended maneuvering speeds for various flap settings. The schedule provides adequate buffet margin for an inadvertent 15° overshoot beyond the normal 30° bank, when recommended procedures are followed.

To simplify speeds, a Fixed Flap Maneuvering Speed Schedule is used.

FLAP POSITION	AT & BELOW 117,000 LBS	ABOVE 117,000 LBS TO 138,500 LBS	ABOVE 138,500 LBS
FLAPS UP	210	220	230
FLAPS 1	200	200	210
FLAPS 5	180	180	190
FLAPS 10	170	170	180
FLAPS 15	150	160	170
FLAPS 25	140	150	160

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NEW Revision of V-speed and Performance Charts

Recent findings from our joint flight tests with Boeing and the FAA indicate the need to further revise the simplified maneuvering speeds recently presented in the V-speed and Performance Flip Charts. As a result, pilots must immediately begin using the new maneuver speeds listed in the table below.

737-300/400 Maneuver Speeds

FLAP POSITION	AT & BELOW 117,000 LBS.	ABOVE 117,000 LBS. TO 138,500 LBS.	ABOVE 138,500 LBS.
FLAPS 0	210	220	230
FLAPS 1	200	200	210
FLAPS 5	180	180	190
FLAPS 10	170	170	180
FLAPS 15	150	160	170
FLAPS 25	140	150	160

Shaded area represents NEW Mandatory Maneuver Speeds

Background

During flight tests for 737-300 simulator validation data, prior to the Wake Turbulence tests at Atlantic City, some maneuvers were flown that showed greater rudder authority exists than was currently documented by Boeing. As almost all the conditions flown during these tests were for Flaps 1, the scope of the new data on rudder authority was limited. It did, however, set into motion a review of lateral versus directional controllability for the 737 which is still under analysis by Boeing, FAA and NTSB. The essence of the aerodynamics under review is as follows:

- In order to counter the roll from *Dihedral Effect* (roll due to yaw) that would be induced by a hardover rudder input, the lateral controls (aileron and spoilers) must have greater authority than the directional controls (rudder).
- "Cross over point" is the term being used to describe the condition where there is a static balance for lateral versus directional control.
- Factors affecting this "cross over point" are combinations of airspeed, flap configuration, and C.G. Though controllability is not a factor for Flaps 0, changes to the aerodynamics of the wing that occur with Flaps 1 through 10 greatly affect the airspeed at which this "cross over" occurs.

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- The conditions recently flown during the Simulator Validation Tests revealed that the "cross over point", at which ailerons and spoilers can maintain a balance (steady heading side-slip) with opposite full rudder, actually occurs at a slightly higher speed than was originally thought for Flaps 1, 5 and 10. This becomes a significant concern for aircraft operating at weights at or below 117,000 lbs. For example, the Flaps 1 "cross over point" occurs just below 190 kts; and Flaps 5 at approximately 170 kts. As speed decreases below the "cross over point" the authority of the lateral controls to counter a hardover rudder diminishes. As speed increases above these values, lateral control increases and is sufficient to counter the rudder input.

For Flaps 0, 15, 25, 30, and 40 this *static balance* or "cross over point" occurs at or close to stick shaker speed. Therefore maneuvering and reference speeds for these configurations will be unaffected.

Maneuvering Speed Increases

In order to restore the margin of controllability that was presumed to have existed, USAir, in cooperation with Boeing and FAA, is increasing the maneuvering speed 10 knots for weights 117,000 lbs. and below at Flaps 1, 5 and 10 degrees. As higher weights have negligible effect on this controllability issue it is not deemed necessary to further increase the speeds for flap settings above 117,000 lbs. as the 10 knot margin (20 knots for the -400 at weights of 139,000 and above) is already there.

While this initiative is being made operational prior to the final conclusions of Boeing and FAA with regard to the new rudder data, USAir believes it prudent to take advantage of the performance and controllability gains in this area immediately and has received Boeing and FAA approval to do so.

Implementation

- The New V-speed and Performance Flip Charts will be in the aircraft by early January.
- Until the new books are in the aircraft pilots must use the speeds in the table above.
- A Pilot Handbook revision updating the maneuver speeds will be issued in early December.

Use these new maneuvering speeds as you do with the present schedule. For example if you wish to slow to 190, extend Flaps 1 at 210 and slow to 200, then extend Flaps 5 and slow to 190. For a Flaps 5 takeoff, fly V₂ +15 to 25 to 1000' and while accelerating, select Flaps 1. At 200 select Flaps 0 and maneuver at 210 or higher airspeed. With this in mind, operating flaps



at higher airspeeds will require greater vigilance in the following areas:

- Maximum flap limiting speeds must be observed.
- A slight increase in fuel burn during approach vectoring can be expected.

(Maintenance schedules for inspecting flap components will be adjusted in anticipation of greater wear and tear.)

As was stated earlier, analysis of this problem is ongoing. This first step of increasing speeds is viewed by USAir as an interim solution and not the final fix.

In review:

- Until the cockpit Flip Charts are revised it will be necessary to add 10 knots to the current maneuver schedules for all weights at & below 117,000 lbs. at Flaps 1, 5, and 10 degrees only. These are the only configurations where there is inadequate controllability margin.
- V-speeds for takeoff are not affected.
- Continue to use the other procedures currently in place for Uncommanded Roll and Yaw. Any unapproved procedures are highly discouraged.
- In response to uncommanded roll remember that in order to achieve full control deflection, the control wheel must be rotated to at least 90 degrees of travel.
- Be synchronized with your automatic systems. The pilot should always be ready to disconnect the autopilot and assume manual control of the aircraft.
- Observe Flap Placard speeds and be aware of the slight increase in fuel burn.

For More Information

Look for addition information on this topic as it becomes available. The Fall issue of 737-300/400 News is devoted to Uncommanded Inflight Events.

Capt. Jim Gibbs
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