Bulletin 15-06

To: All Pilots

From: Greg Crum, Vice President of Flight Operations

Date: October 12, 2006

Subject: Operational Transition

This bulletin replaces several previously issued bulletin parts, so read the following posting instructions very closely.

This bulletin cancels and replaces Parts Four and Five of Bulletin 8-06 and Part Six of Bulletin 9-06. Remove and replace these affected bulletin parts with the applicable parts included in this bulletin.

Note: Bulletin 8-06, Bulletin 9-06, and their remaining, unaffected bulletin parts are still in effect.

If you have questions concerning this bulletin, please call the Flight Training Center at 800-447-9291, option 7.

This is a twelve-part bulletin consisting of four white pages (two sheets, front and back) and eleven yellow pages (ten sheets, front and back). Insert the white pages in the bulletin section of the *FOM*. Insert the yellow pages and replace the affected bulletin parts as follows:

- Part Two—next to 2.2.4
- Part Three (replaces Bulletin 9-06 Part Six)—next to 3.9.2
- Part Four—next to 3.9.3
- Part Five—next to 3.9.8
- Part Six (replaces Bulletin 8-06 Part Four)—next to 3.22.2
- Part Seven (replaces Bulletin 8-06 Part Five)—next to 3.22.3
- Part Eight—next to 3.23.3
- Part Nine—next to 3.23.4
- Part Ten—next to 3.23.6
- Part Eleven—next to 10.1.6
- Part Twelve—on top of 10.1.7

Operational Transition

The purpose of this bulletin is to outline our transition program to implement auto brakes, a 15 percent increase in landing data calculations, and other procedural changes.

Southwest Airlines
Flight Operations Manual

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Operational Transition

The purpose of this bulletin is to outline our transition program to implement auto brakes, a 15 percent increase in landing data calculations, and other procedural changes.

Background

Part 121 air carriers have been operating under federal regulations that required calculating planned landing performance prior to dispatch. The FAA is now directing that operators also implement procedures to calculate actual landing performance data that reflects runway conditions at the time of arrival. The FAA is further directing that operators add a 15 percent safety margin beyond the actual calculated landing distance.

OPC Update

On or about October 23, 2006, we will begin updating OPCs on all of our aircraft, which will take approximately 7 days. During this update period, follow the guidance provided by the OPC onboard that aircraft.

The OPC update makes the following changes:

- Increases the required landing distance
- In certain conditions, adds a statement requiring the use of auto brakes
- Increases all calculated landing distances by an additional 15 percent

If a runway has brackets and dashes ("[--------]") around all three stopping margins, the wind limits (crosswind or tailwind) have been exceeded. DO NOT LAND ON THAT RUNWAY.

Dispatch will begin using the new distances in SWIFT on or about October 17.

Auto Brakes

The Auto Brake Familiarization Program ends on October 22. If you have not turned in the Auto Brake Familiarization Completion form, please do so before October 17. **Effective October 23, as long as both Pilots have completed the familiarization program, auto brakes must be used as indicated by the OPC.**

The new FOM guidance states that there are two conditions that must be present to make auto brake use mandatory:

1. The computed Min(2) stopping margin is negative [bracketed], and
2. The runway is not dry.

Therefore, if Min(2) and Med(3) are bracketed but the runway is dry, auto brake use is at the Captain's discretion.

Auto brakes are a tool, and Pilots are encouraged to use them when conditions warrant. Use the lowest auto brake setting that results in a positive stopping margin. Level 1 is not authorized because there is no OPC data for this setting.

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Landing Rollout Procedure Changes

One significant procedural change is a 60-knot callout that replaces the 80-knot callout on the landing rollout. **Start using the 60-knot callout on the first flight of the day on October 23, 2006.** All Boeing landing data is based on the use of reverse thrust down to 60 knots, which necessitated changing the callout. Changing the callout from 80 to 60 knots does not change braking procedures. Continue to transition to manual braking at approximately 80 knots.

Thrust reverse selection is no longer based upon an N_1 value. It is now based on the positioning of the reverse thrust levers to either Detent 2 or maximum.

If landing on a runway with a very large stopping margin where the ability to stop the aircraft safely is never in question, reverse thrust does not need to be maintained at Detent 2 all the way to taxi speed.

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Bulletin 15-06 Part Two

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P Auto brakes, if operational, must be used when the MIN(2) stopping margin is negative [bracketed] and the reported or anticipated runway condition is not DRY. Auto brake use in all other situations is at the Pilot's discretion. When auto brakes are used, comply with the following:

- Use the lowest auto brake setting resulting in a positive stopping margin.
- Use of auto brake level 1 is not authorized.

Takeoff and Landing Considerations

Takeoff Is Not Authorized under the Following Conditions

L Weather conditions are below FAA established minima.

L Wind limitations are exceeded.

L Observations from the cockpit indicate that takeoff cannot be made by following approved procedures.

L During night operations, when the Captain cannot ensure that sufficient runway lighting exists to allow the takeoff to be completed safely. ❶

L Greater than 1/2 inch water or slush on the runway. ❷

L Greater than 1 inch of wet snow on the runway. ❷

L Greater than 4 inches of dry snow on the runway. ❷

L Braking action reported as NIL. ❸

L Greater than light freezing rain at the airport. ❹

L Ice pellets, snow pellets, or heavy snow at the airport. ❹

L Known or probable severe icing conditions. ❺ ❼ ❽

L Known or probable severe turbulence. ❺

L Frost, snow, or ice is adhering to the leading edge devices, any control surface, tab surface, upper wing surface, or balance cavity. However, frost up to 1/8 inch thick on the lower wing surfaces due to cold fuel is permissible. ❻

L Either thrust reverser is inoperative and the runway is contaminated with clutter or the braking action is less than GOOD.

Takeoff Is Not Recommended under the Following Conditions

R The plowed or usable runway width is less than 100 feet.

Notes:

❶ In all cases, FAA approved temporary lighting may be substituted for portions of normal lights, provided corresponding minima reductions are applied.

❷ See "Definitions" in this section.

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Bulletin 15-06 Part Three

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(PM) Copy the GATE REQ response.

(PM) Make an arrival PA to the passengers, if desired.

(PM) Delay routine service requests until parked at the gate.

OPC Programming for Landing

(PM) Evaluate landing performance on the OPC.

- **Select the Landing Performance module.**
- **Select the arrival airport.**

  The OPC will display a message if the selected airport is a Special Qualification Airport.

- **Select all available landing runways.**

  Do not select every runway, only the available runways (for example, if LAX is landing west, do not select 6R/L or 7R/L). By selecting the available runways, OPC landing data can be easily analyzed, and the best landing runway selected. Also, if ATC changes the runway assignment, the new landing data is readily available.

  It is company policy to avoid noise sensitive runways, except for operational necessity.

  Input NOTAM restrictions, if required.

- **Enter ATIS information.**

  Wind conditions reported as “light and variable” may be entered into the OPC as CALM.

- **Select the OPC Landing Input screen.**
- **Enter runway conditions.**

  If other than DRY, toggle to the reported runway condition. All selections are used only for braking action reports, if necessary.

  For a combination report, enter the lowest condition (for example, if conditions are FAIR to POOR, enter POOR).

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Bulletin 15-06 Part Four

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If rain (RA) is reported in the observation, and no other braking action reports are indicated, select WET-GOOD.

- **Select landing flaps.**

  Flaps 30 is the normal setting for landing, but Flaps 40 landings are strongly recommended in the following situations:

  - Negative OPC stopping margin under MIN(2) for Flaps 30.
  - Reported braking action is less than GOOD.
  - Weather is at or near minimums for the approach to be flown.

  Notes:

  - The Flightcrew may wish to modify the landing flap selection based on the stopping margin results of the Landing Output screen.
  - Landing performance limits or non-normal conditions may require the use of less than Flaps 30 or 40.

- **Select AIII, if required.**

  If planning to fly an approach to landing using HGS AIII guidance, select the AIII toggle. This applies for both required (low visibility) and practice approaches.

  This selection will decrease the stopping margin ("Approx Stop Margin") by 1150 feet.

- **Select RVR < 4000, if required.**

  If the RVR is less than 4000 feet or the visibility is below 3/4 mile, select the RVR < 4000 toggle. Do not make this selection if the visibility is 4000 RVR or greater or 3/4 of a mile or greater regardless of runway surface conditions.

  OpSpec: Pilots are not authorized to begin an approach to a runway with less than 3/4 mile or 4000 feet RVR if the actual landing weight is greater than the wet runway landing weight.

  There are two situations where the FARs require an additional 15 percent above the dry runway landing field length. One is when the destination runway is known or forecast to be wet. This will be checked by the Dispatcher and is a function of the OPC Dispatch Landing Performance module only. The second situation is when the RVR is less than 4000 feet or the visibility is less than 3/4 of a mile. In this case, the Flightcrew is responsible for determining that the required additional landing field length is available.

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Bulletin 15-06 Part Five

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- **Select auto brakes, as required.**

  If the Min(2) stopping margin for the selected runway is negative [bracketed] and the runway is not DRY, auto brakes, if operational, will be used. Determine the lowest auto brake level that results in a positive stopping margin (found in the Med(3) or Max(M) column), and then select the corresponding setting (3 or Max) on the auto brake select switch.

  In all other situations, auto brake use is at the Pilot's discretion. Auto brakes may be beneficial for the following conditions:

  - Landing in strong/gusty crosswinds or landing with a condition (such as one engine inoperative or a thrust reverser inoperative) where uniform brake application due to rudder inputs may be affected.
  - Landing from a Cat IIIA approach.
  - Non-normal landing configurations resulting in higher than normal approach speeds.

  If auto brakes are used at the Pilot's discretion, use the lowest auto brake setting that results in a positive stopping margin. Auto brake level 1 use is not authorized due to lack of OPC-computed stopping margin for this setting.

  Note: Auto brake level 2 equates to Min braking, level 3 to Med, and Max to Max.

OPC Inoperative Procedures

If the OPC is inoperative, use any of the following to determine landing data:

- The appropriate performance tables in the "Performance" chapter.
- The Dispatch Release computed landing limitations. The Dispatch Release does not consider crosswind limitations and will not provide "Approx Landing Dist" data.

  If the visibility is below 3/4 mile or the RVR is less than 4000 feet, the OpSpec requirement for increased landing field length will be met for a Flaps 30 or Flaps 40 maximum structural weight landing. This is true provided the runway length is 6500 feet or greater, all aircraft systems are operating normally, and no tailwind condition exists. In this case, no further calculations are required to meet the OpSpec requirement.

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Bulletin 15-06 Part Six

FYI—*The shaded information is not deleted with this bulletin. The information is only shaded to identify where the new information belongs.*

Holding the nose up after touchdown for aerodynamic braking is not an effective braking technique.

Caution: Do not use full forward control column pressure because this may exceed nose gear structural limits.

(PF) Initiate Reverse Thrust.

Raise the reverse thrust levers to the reverse idle interlocks. After the interlocks release, continue to raise the levers to detent 2. Initiating reverse thrust at touchdown is an important factor in achieving proper deceleration performance, minimizing brake temperatures, and minimizing brake and tire wear.

(PM) Monitor thrust reverser actuation and call out any failure to deploy by stating, "Reverser."

Maintain awareness of the remaining runway stopping distance.

Night Considerations—For runways with standard centerline lighting, the centerline lights alternate red and white starting at 3000 feet remaining and illuminate all red starting at 1000 feet remaining. The runway edge lights for all runways illuminate amber starting at 2000 feet remaining.

Rubber and oil deposits can make the last portion of the runway extremely slippery. Respect this hazard and slow to a safe taxi speed prior to reaching this portion of the runway.

Note: Whether auto or manual braking is used, anytime stopping distance becomes a concern maximum deceleration may be achieved by immediately applying maximum manual wheel braking and maximum reverse thrust.

(PM) Auto Brake Landing—Monitor the AUTO BRAKE DISARM light. When the AUTO BRAKE DISARM light illuminates, call, "Auto brake disarm."

During an HGS AIII landing, the FO must monitor ground roll steering in addition to the AUTO BRAKE DISARM light.

(PF) Auto Brake Landing—Transition to manual wheel braking at or before reaching a safe taxi speed.

Normally, the transition to manual wheel braking should be made at approximately 80 knots. Under adverse landing or runway conditions, the transition to manual wheel braking should be delayed until reaching a safe taxi speed.

Note: Anytime stopping distance becomes a concern, maximum deceleration may be achieved by immediately applying maximum manual wheel braking and maximum reverse thrust.

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Apply brake pedal pressure to override the auto brake system and achieve the same (or greater) deceleration rate. The higher the level of auto brake deceleration selected, the higher the level of brake pedal pressure required to maintain the desired deceleration rate during the transition to manual braking. Auto brake disarm is indicated by the illumination of the AUTO BRAKE DISARM light and the PM's "Auto brake disarm" callout. If the auto brakes do not disarm after attempting manual brake application, more brake pedal pressure is required.

Note: Illumination of the AUTO BRAKE DISARM light prior to manual wheel braking indicates a system malfunction. If this occurs, immediately transition to manual wheel braking to achieve the desired deceleration.

(PF) Manual Brake Landing—Begin manual wheel braking no later than 80 knots.

Anytime Min(2) stopping margin is negative [bracketed] on the OPC Landing Output screen, begin manual wheel braking immediately after nose-wheel touchdown.

Apply brake pedal pressure to override the auto brake system and achieve the same (or greater) deceleration rate. The higher the level of auto brake deceleration selected, the higher the level of brake pedal pressure required to maintain the desired deceleration rate during the transition to manual braking. Auto brake disarm is indicated by the illumination of the AUTO BRAKE DISARM light and the PM's "Auto brake disarm" callout. If the auto brakes do not disarm after attempting manual brake application, more brake pedal pressure is required.

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Bulletin 15-06 Part Seven

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(PM) At 60 knots, call, “60 knots.”

(PF) At 60 knots, gradually start reducing reverse thrust to achieve idle forward thrust by taxi speed at a rate commensurate with aircraft deceleration.

Stow the reversers at low engine speeds to prevent a surge of forward thrust.

CA Landing—Maintain the runway centerline between the two main gear assemblies until reaching taxi speed.

FO Landing—Maintain the runway centerline between the two main gear assemblies until the CA announces, “I have the aircraft.” The FO will reply, “You have the aircraft.”

(FO) Do not attempt to steer the aircraft toward the turnoff taxiway.

Normally, do not acknowledge ATC radio transmissions until reaching taxi speed.

Wait until slowing to taxi speed to reply to ATC calls.

Exiting the Runway

(CA) Exit the runway at a safe speed.

Avoid excessive braking or turning at higher speeds to make a turn-off taxiway. This often results in excessive side force loading on the nose wheel and an uncomfortable experience for the passengers.

The choice of an exit speed is dependent on conditions and taxiway configuration (high-speed versus 90 degree turn-off).

Normally, ATC expects an aircraft to exit at the first available taxiway after normal slowing. ATC may request that the aircraft exit at a particular taxiway. If able, comply with this request, but do not exceed normal braking.

Normally, do not advance thrust to expedite exiting the runway.

Do not exit a runway before reaching a safe taxi speed. Anticipate reduced braking effectiveness when approaching the far end of the runway, which may be very slippery due to the presence of heavy rubber, deice fluids, oil deposits, the absence of grooved pavement, and/or painted runway markings.

(FO) When directed by the Tower controller, change to Ground Control frequency. State the aircraft’s position, and obtain a taxi clearance.

The Tower will issue instructions, if required, to resolve potential conflicts with other ground traffic prior to advising the Pilot to contact Ground Control.

Do not exit the landing runway onto another active runway unless authorized by ATC.

3.22.3 Southwest Airlines
FAA Approved Flight Operations Manual Normal Operations

Bulletin 15-06 Part Seven

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(FO) When directed by the Tower controller, change to Ground Control frequency. State the aircraft’s position, and obtain a taxi clearance.

The Tower will issue instructions, if required, to resolve potential conflicts with other ground traffic prior to advising the Pilot to contact Ground Control.

Do not exit the landing runway onto another active runway unless authorized by ATC.

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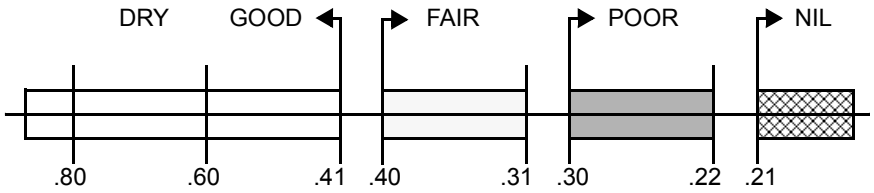
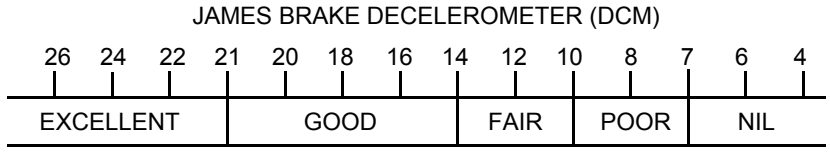
MU Meter Scale

The Tapley Meter, Bowmonk Meter, Saab Friction Tester, Runway Friction Tester, and Skiddometer all have scales similar to the MU Meter, and the numeric values may be used interchangeably.



James Brake Decelerometer—DCM

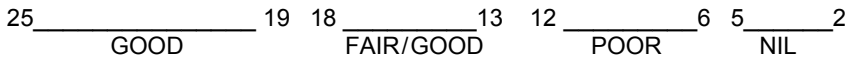
DCM readings in the United States are calibrated in terms of deceleration measured in feet per second squared. Maximum deceleration on the scale is 32 feet per second squared, the equivalent of one G.



Runway Friction Reports—Military RCR

Runway Condition Reading (RCR) values may be encountered at military alternates or on CAM charters.

RCR Scale



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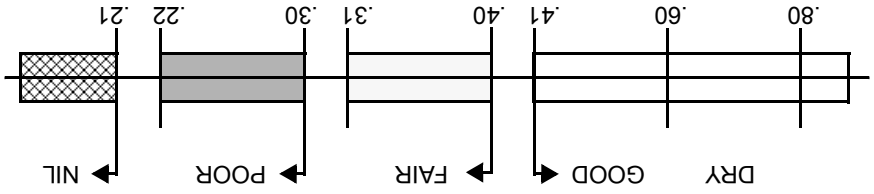

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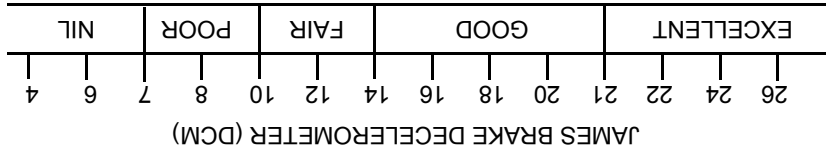

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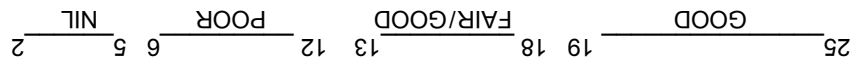

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Landings under FAIR to POOR Braking Advisories

Braking action reports less than GOOD are classified according to the most critical term (FAIR, POOR, or NIL). If a combination is given (e.g., FAIR to POOR), use the more restrictive of the two. Operations are prohibited on all surfaces classified as NIL.

Evaluate landing performance using the OPC. The OPC landing module computes a deceleration rate as a combination of reversers and brakes.

Under braking advisories less than GOOD, use Normal Landing procedures except for the following:

(PF) If conditions make hydroplaning a concern, make a firm touchdown.

A firm touchdown can prevent hydroplaning from developing and will also extend the flight and ground spoilers more quickly.

Dynamic hydroplaning can occur at groundspeeds above 110 knots and, once started, may continue to significantly lower speeds. If the main wheels are not aligned straight while on the runway, the aircraft will continue to hydroplane to a lower speed.

(PF) When landing in crosswind conditions combined with reduced braking action (FAIR down to POOR), maintain the crab angle all the way through touchdown.

Allowing the aircraft to touch down without removing the crab angle will eliminate drift toward the downwind side of the runway.

(PF) After nose wheel touchdown, apply the brakes smoothly, symmetrically, and with moderate to firm pedal pressure.

Do not cycle or pump the brakes. Hold moderate brake pressure until a safe stop is assured.

(PF) Brakes and thrust reversers should be applied together.

Brakes are effective 3 to 5 seconds before the thrust reversers reach desired N_1.

- Use maximum reverse thrust.

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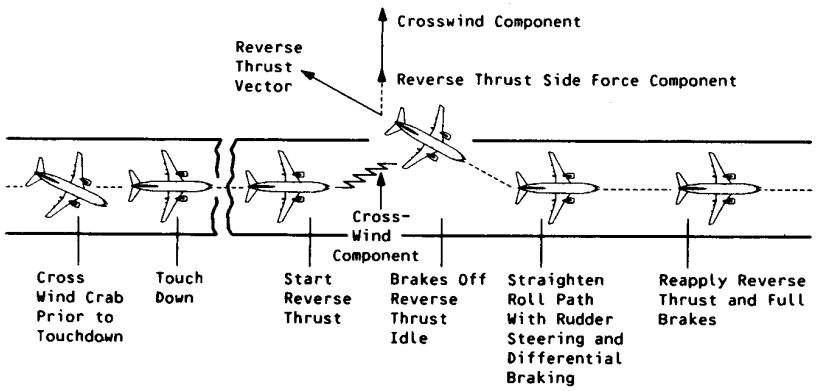

Maximum Effort Stop

Use this technique under adverse landing conditions or whenever stopping margin is limited. A go-around is possible until the thrust reverse levers are raised. When landing with a small stopping margin and conditions are unfavorable, execute a go-around.

- Use Flaps 40.
- Maintain a stabilized approach, and touchdown at V_{REF} as close as possible to 1000 feet from the usable end of the runway.
- Verify speedbrake extension. Manually raise the speedbrakes if they do not extend automatically.
- Use MAX(M) auto brakes.
- Use maximum reverse thrust (past detent 2) if required.

Note: If at anytime during landing rollout stopping distance is not assured, immediately apply maximum manual wheel braking to assure deceleration to a safe taxi speed within the remaining runway. Maintain maximum reverse thrust to assure deceleration to a safe taxi speed within the remaining runway.

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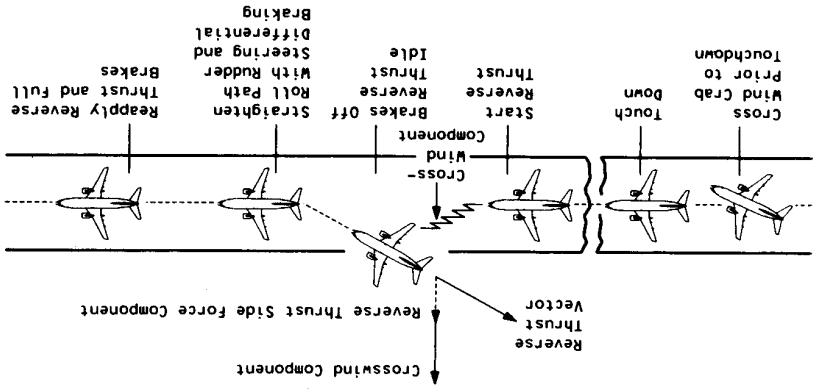

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Overweight Landing

Landing the aircraft in excess of the maximum structural landing weight is not permitted unless there is an abnormal or emergency situation where the Captain exercises command (emergency) authority. The declaration of an emergency is not required solely for an overweight landing, but the situation that caused the overweight landing may necessitate a declaration. There are no adverse handling characteristics associated with overweight landings.

Use the following procedures and techniques when landing overweight.

Note: Use of flaps 30 rather than flaps 40 is recommended to provide increased margin to flap placard speed.

Observe FOM flap maneuvering speeds during flap extension.

Use the longest available runway, and consider wind and slope effects (OPC). Where possible avoid landing in tailwinds, on runways with negative slope, or on runways with less than good braking conditions. Do not carry excess airspeed on final. This is especially important when landing during an engine inoperative or other non-normal condition. At weights above the maximum landing weight, the final approach maximum wind correction may be limited by the flap placards and load relief system.

Fly a normal profile. Ensure that a higher than normal rate of descent does not develop. Do not hold the airplane off waiting for a smooth landing. Fly the airplane onto the runway at the normal touchdown point. If a long landing is likely to occur, go-around. After touchdown, immediately apply maximum reverse thrust using all of the available runway for stopping to minimize brake temperatures. Do not attempt to make an early runway turnoff.

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OPC Normal Landing Overview

The OPC will compare the actual weight entered against the maximum approach climb limit weight and the maximum structural landing weight. If the actual weight is greater than either of these two values, an "OVERWGT" indication will appear and LANDING IS NOT AUTHORIZED except in an emergency. If an "OVERWGT" indication is shown, the Pilot may try a different flap and/or bleed setting to find a valid landing configuration.

If the RVR is less than 4000, the Landing Module can be used to determine whether or not the low visibility landing requirements can be satisfied for a particular runway. The "RVR<4000" button must be selected on the Landing Input screen. If performance is limited by low visibility requirements, a code of "RWY" will appear for those runways on which you cannot land.

If the AIII mode of the HGS will be used for landing, the AIII button must be selected on the Landing Input screen. This will decrease the stopping margin by 1150 feet.

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Bulletin 15-06 Part Twelve

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Approximate Stopping Margins

The "Approx Stop Margin" calculated by the OPC is based on three different levels of deceleration as defined by the auto brake system and is based on touching down 1500 feet from the threshold. The Min(2), Med(3), and Max(M) values are calculated using the deceleration rates for auto brake settings 2, 3, and Max, respectively. The stopping margins for all aircraft models include the effects of reverse thrust as follows:

- At the Detent 2 position for normal configuration landings.
- At maximum reverse for non-normal landing configurations.
- No reverse thrust if REVERSERS ONE OR BOTH INOPERATIVE has been selected.

When not using auto brakes, Min braking can be approximated by accomplishing a normal landing using spoilers and reverse thrust with light manual braking initiated at approximately 80 knots. Med braking can be approximated during a normal landing by initiating manual braking at approximately 100-110 knots. Max braking can be obtained by smoothly applying full brake pedal pressure immediately after main gear touchdown.

If a runway has brackets ("[ ]") displayed around the Max stopping margin, the required stopping distance for the selected flap setting exceeds the available runway length. DO NOT ATTEMPT TO LAND ON THAT RUNWAY. Use of more flaps may allow landing on the desired runway.

If a runway has brackets and dashes ("[--------]") around all three stopping margins, the wind limits (crosswind or tailwind) have been exceeded. DO NOT LAND ON THAT RUNWAY.

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Dispatch Landing Limitation Codes

The following codes may display when a Dispatch landing weight is calculated:

Code	Definition
AIOAT	Anti-ice operation not allowed for the entered OAT
BRAKE	Maximum quick turnaround limit
CLIMB	Approach climb limit
FLP40	Flaps 40 landing not allowed
MFAVR	Limited by most favorable runway in still air
MNOAT	Entered OAT is below the minimum certified temperature
MXOAT	Entered OAT is above the maximum certified temperature
PRALT	Calculated pressure altitude exceeds the certified environmental envelope
RUNWY	Landing runway limit
STRUC	Structural limit
TWIND	Tailwind limit exceeded
XWIND	Crosswind limit exceeded

Off-line Airport Data

The program database stores airport and runway data including all line stations and many charter and alternate airports. If operations are required at an airport not in the current database, enter the data using the Offline Airport Data option. Dispatch will provide all required information.

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