

# Attachment 7

To Operations/Human Performance Group Factual Report

DCA11IA040

Landing Performance Corrections

## APPROACH/LANDING CORRECTIONS FOR FAILURES

Follow this procedure when LAND DIST PROC . . . .APPLY displays on ECAM or in the Flight Manual. This procedure provides landing configuration, approach speed adjustments, and landing distance factor, which is used to obtain the landing distance from the Landing Distance Abnormal or Irregular Configuration table at the end of this section.

- Number of unrelated primary failures.....Determine  
Determine whether a single primary failure or multiple unrelated primary failures exist according to the following definitions:

**Single Primary Failure** A single failure that causes other failures (e.g., G + B hydraulic failure results in a direct law landing, slats at zero, etc.). The table entry for the single primary failure accounts for all associated secondary failures.

**Multiple Unrelated Primary Failures** More than one primary failure exists without a causal relationship (e.g., flap malfunction combined with an antiskid failure).

### If a single primary failure exists:

- Flaps lever position for landing .....Determine  
See Approach/Landing Corrections for Failures table.
- $\Delta V_{REF}$  .....Determine  
See Approach/Landing Corrections for Failures table.
- Approach speed.....Adjust  
Adjust  $V_{APP}$  on the PERF APPR page as follows:

**CAUTION:**  $V_{LS}$  on the PERF APPR page is based on the FMGC's predicted landing weight until the approach phase of flight is activated. Once the approach phase is active,  $V_{LS}$  is based on the current airplane weight. Prior to adjusting  $V_{APP}$  for malfunctions, ensure the flight plan route and destination are accurate or the approach phase is activated (if the approach will be flown without excessive delay).

$V_{APP} = V_{REF}$  (flaps Full  $V_{LS}$ ) +  $\Delta V_{REF}$  + 1/3 headwind component. If  $\Delta V_{REF}$  is:

- Less than 20 knots: Add 1/3 headwind component, however,  $V_{APP}$  must not exceed  $V_{REF}$  + 20 knots.
- Greater than 20 knots: Do not apply wind correction.

- CONF 3 (if not landing flaps Full).....Select

- Landing distance ..... Determine  
Enter the Landing Distance Abnormal or Irregular Configuration table with the landing distance factor, braking action, and gross weight to obtain landing distance. Apply adjustments, if applicable.

**If multiple unrelated primary failures exist:**

- Flaps lever position for landing ..... Determine  
Enter the Approach/Landing Corrections for Failures table with each primary failure and use the smallest flap lever position (least flaps).
- Approach speed ..... Determine  
Enter the Approach/Landing Corrections for Failures table with each primary failure to obtain the highest of the required approach speed adjustments ( $\Delta V_{REF}$ ). Use this  $\Delta V_{REF}$  to adjust  $V_{APP}$  as for single failures (see above).
- Landing distance ..... Determine  
From the Approach/Landing Corrections for Failures table, obtain the Landing Distance Factor for each primary failure:

**If all of the landing distance factors are shaded:**

Enter the Landing Distance Abnormal or Irregular Configuration table with the highest single landing distance factor to obtain landing distance. Apply adjustments, if applicable.

**Example (Dry braking action):**

| Failure                | Flap Lever Position for Ldg | $\Delta V_{REF}$ (knots) | Ldg Dist Factor    |
|------------------------|-----------------------------|--------------------------|--------------------|
| Flaps Fault (F=3, S=0) | 3                           | 25                       | 1.65               |
| L ELEV Fault           | 3                           | 10                       | 1.35               |
| <b>Total</b>           | 3                           | 25                       | (Use highest) 1.65 |

**If some or all of the landing distance factors are not shaded:**

Multiply all of the unshaded landing distance factors together with the highest shaded landing distance factor. Enter the Landing Distance Abnormal or Irregular Configuration table with the result to obtain landing distance. Apply adjustments, if applicable.

**Example (Good braking action):**

| Failure        | Flap Lever Position for Ldg | $\Delta V_{REF}$ (knots) | Ldg Dist Factor    |
|----------------|-----------------------------|--------------------------|--------------------|
| SEC 2 Fault    | Normal                      | 0                        | 1.20               |
| Antiskid Fault | Normal                      | 0                        | 1.30               |
| <b>Total</b>   | Full*                       | 0                        | 1.20 x 1.30 = 1.56 |

\* Flaps 3 is an option if needed for operational reasons. Add 6 knots to  $V_{APP}$ .  
The landing distance factor would be 1.56 x 1.10 = 1.72.

## Example (Medium braking action):

| Failure                | Flap Lever Position for Ldg | $\Delta V_{REF}$ (knots) | Ldg Dist Factor    |
|------------------------|-----------------------------|--------------------------|--------------------|
| Flaps Fault (F=3, S=0) | 3                           | 25                       | 1.50               |
| L ELEV Fault           | 3                           | 10                       | 1.25               |
| Antiskid Fault         | Normal                      | 0                        | 1.10               |
| <b>Total</b>           | 3                           | 25                       | 1.50 x 1.10 = 1.65 |

## Approach/Landing Corrections for Failures Table

| Failure |                                                | Flap Lever Position for Ldg | $\Delta V_{REF}$ (knots) | Braking Action | Ldg Dist Factor |
|---------|------------------------------------------------|-----------------------------|--------------------------|----------------|-----------------|
| BLEED   | Wing anti-ice not available (with ice buildup) | Normal*                     | 10                       | Dry            | 1.30            |
|         |                                                |                             |                          | Good           | 1.30            |
|         |                                                |                             |                          | Medium         | 1.20            |
| BRK     | Antiskid Fault                                 | Normal*                     | 0                        | Dry            | 1.75            |
|         |                                                |                             |                          | Good           | 1.30            |
|         |                                                |                             |                          | Medium         | 1.10            |
|         | Auto Brk Fault                                 | Normal*                     | 0                        | Dry            | 1.40            |
|         |                                                |                             |                          | Good           | 1.25            |
|         |                                                |                             |                          | Medium         | 1.20            |
|         | One Brake Deactivated                          | Normal*                     | 0                        | **             |                 |
| ELEC    | AC Bus 1                                       | Normal*                     | 0                        | Dry            | 1.20            |
|         |                                                |                             |                          | Good           | 1.20            |
|         |                                                |                             |                          | Medium         | 1.10            |
|         | DC Bus 2                                       | Normal*                     | 0                        | Dry            | 1.25            |
|         |                                                |                             |                          | Good           | 1.35            |
|         |                                                |                             |                          | Medium         | 1.25            |
|         | DC ESS Bus (no ice buildup)                    | Normal*                     | 0                        | Dry            | 1.20            |
|         |                                                |                             |                          | Good           | 1.25            |
|         |                                                |                             |                          | Medium         | 1.20            |
|         | DC ESS Bus (with ice buildup)                  | Normal*                     | 10                       | Dry            | 1.35            |
|         |                                                |                             |                          | Good           | 1.40            |
|         |                                                |                             |                          | Medium         | 1.30            |

\*Landing configuration and approach speed are not affected unless there is ice buildup. Flaps full and flaps 3 are both acceptable choices because this failure affects rollout/stopping capability only. Flaps full is recommended, but flaps 3 may be chosen if needed for operational reasons, such as windshear precautions. If flaps 3 is used, add an additional 6 knots to  $V_{APP}$  and multiply the landing distance factor by 1.10.

\*\* When dispatched with a green or yellow brake deactivated and the respective normal or alternate brake system will be used, determine Required Landing Distance from the Normal Configuration tables, then increase that by another 20%. Landing is not authorized if braking action is less than Good.

## Approach/Landing Corrections for Failures Table

| Failure |                                     |                | Flap<br>Lever<br>Position<br>for Ldg | $\Delta V_{REF}$<br>(knots)    | Braking<br>Action | Ldg<br>Dist<br>Factor |
|---------|-------------------------------------|----------------|--------------------------------------|--------------------------------|-------------------|-----------------------|
| ELEC    | DC Emer Config                      |                | Normal*                              | 0                              | Dry               | 3.05                  |
|         |                                     |                |                                      |                                | Good              | 2.55                  |
|         |                                     |                |                                      |                                | Medium            | 2.25                  |
|         | DC Bus 1 + 2 (no ice buildup)       |                | Normal*                              | 0                              | Dry               | 1.95                  |
|         |                                     |                |                                      |                                | Good              | 1.65                  |
|         |                                     |                |                                      |                                | Medium            | 1.45                  |
|         | DC Bus 1 + 2 (with ice buildup)     |                | Normal*                              | 10                             | Dry               | 2.20                  |
|         |                                     |                |                                      |                                | Good              | 1.85                  |
|         |                                     |                |                                      |                                | Medium            | 1.65                  |
|         | Emergency Electrical Configuration  |                | 3                                    | 10                             | Dry               | 2.65                  |
|         |                                     |                |                                      |                                | Good              | 2.30                  |
|         |                                     |                |                                      |                                | Medium            | 2.15                  |
| ENG     | Rev Unlocked with Buffet            |                | 1***                                 | 55<br>(Appr)<br>40<br>(Thresh) | Dry               | 2.15                  |
|         |                                     |                |                                      |                                | Good              | 2.05                  |
|         |                                     |                |                                      |                                | Medium            | 2.05                  |
|         |                                     |                | 3***                                 | 10                             | Dry               | 1.35                  |
|         |                                     |                |                                      |                                | Good              | 1.40                  |
|         |                                     |                |                                      |                                | Medium            | 1.35                  |
|         | Reverser(s) inoperative or not used |                | Normal*                              | 0                              | Dry               | 1.00                  |
|         |                                     |                |                                      |                                | Good              | 1.15                  |
|         |                                     |                |                                      |                                | Medium            | 1.15                  |
| FLAPS   | Flaps & Slats at zero               |                | 1                                    | 60<br>(Appr)<br>50<br>(Thresh) | Dry               | 2.40                  |
|         |                                     |                |                                      |                                | Good              | 2.10                  |
|         |                                     |                |                                      |                                | Medium            | 2.10                  |
|         | Flaps < 1                           | Slats < 1      | 3                                    | 45                             | Dry               | 2.30                  |
|         |                                     |                |                                      |                                | Good              | 2.00                  |
|         |                                     |                |                                      |                                | Medium            | 2.00                  |
|         |                                     | Slats $\geq$ 1 | 3                                    | 25                             | Dry               | 1.95                  |
|         |                                     |                |                                      |                                | Good              | 1.60                  |
|         |                                     |                |                                      |                                | Medium            | 1.60                  |

\* Landing configuration and approach speed are not affected unless there is ice buildup. Flaps full and flaps 3 are both acceptable choices because this failure affects rollout/stopping capability only. Flaps full is recommended, but flaps 3 may be chosen if needed for operational reasons, such as windshear precautions. If flaps 3 is used, add an additional 6 knots to  $V_{APP}$  and multiply the landing distance factor by 1.10.

\*\*\* Use the flap setting displayed on the ECAM STATUS page.

## Approach/Landing Corrections for Failures Table

| Failure |                           |                              | Flap<br>Lever<br>Position<br>for Ldg | $\Delta V_{REF}$<br>(knots) | Braking<br>Action | Ldg<br>Dist<br>Factor |
|---------|---------------------------|------------------------------|--------------------------------------|-----------------------------|-------------------|-----------------------|
| FLAPS   | $1 \leq \text{Flaps} < 2$ | Slats $< 1$                  | 3                                    | 30                          | Dry               | 1.85                  |
|         |                           |                              |                                      |                             | Good              | 1.70                  |
|         |                           |                              |                                      |                             | Medium            | 1.60                  |
|         |                           | Slats $\geq 1$               | 3                                    | 15                          | Dry               | 1.50                  |
|         |                           |                              |                                      |                             | Good              | 1.45                  |
|         |                           |                              |                                      |                             | Medium            | 1.35                  |
|         | $2 \leq \text{Flaps} < 3$ | Slats $< 1$                  | 3                                    | 25                          | Dry               | 1.70                  |
|         |                           |                              |                                      |                             | Good              | 1.55                  |
|         |                           |                              |                                      |                             | Medium            | 1.50                  |
|         |                           | Slats $\geq 1$               | 3                                    | 10                          | Dry               | 1.40                  |
|         |                           |                              |                                      |                             | Good              | 1.35                  |
|         |                           |                              |                                      |                             | Medium            | 1.25                  |
|         | Flaps = 3                 | Slats $< 1$                  | 3                                    | 25                          | Dry               | 1.65                  |
|         |                           |                              |                                      |                             | Good              | 1.55                  |
|         |                           |                              |                                      |                             | Medium            | 1.50                  |
|         |                           | $1 \leq \text{Slats} \leq 3$ | 3                                    | 10                          | Dry               | 1.35                  |
|         |                           |                              |                                      |                             | Good              | 1.30                  |
|         |                           |                              |                                      |                             | Medium            | 1.25                  |
|         |                           | Slats $> 3$                  | 3                                    | 5                           | Dry               | 1.30                  |
|         |                           |                              |                                      |                             | Good              | 1.25                  |
|         |                           |                              |                                      |                             | Medium            | 1.20                  |
|         | Flaps $> 3$               | Slats $< 1$                  | Not authorized                       |                             |                   |                       |
|         |                           | $1 \leq \text{Slats} \leq 3$ | Full                                 | 10                          | Dry               | 1.30                  |
|         |                           |                              |                                      |                             | Good              | 1.30                  |
|         |                           |                              |                                      |                             | Medium            | 1.20                  |
|         |                           | Slats $> 3$                  | Full                                 | 5                           | Dry               | 1.25                  |
|         |                           |                              |                                      |                             | Good              | 1.25                  |
|         | Medium                    |                              |                                      |                             | 1.15              |                       |

## Approach/Landing Corrections for Failures Table

| Failure    |                      | Flap<br>Lever<br>Position<br>for Ldg | $\Delta V_{REF}$<br>(knots) | Braking<br>Action | Ldg<br>Dist<br>Factor |
|------------|----------------------|--------------------------------------|-----------------------------|-------------------|-----------------------|
| FLT<br>CTL | One SPLR Fault       | Normal*                              | 0                           | Dry               | 1.20                  |
|            |                      |                                      |                             | Good              | 1.20                  |
|            |                      |                                      |                             | Medium            | 1.10                  |
|            | Two SPLR Fault       | Normal*                              | 0                           | Dry               | 1.25                  |
|            |                      |                                      |                             | Good              | 1.25                  |
|            |                      |                                      |                             | Medium            | 1.15                  |
|            | Three SPLR Fault     | Normal*                              | 0                           | Dry               | 1.30                  |
|            |                      |                                      |                             | Good              | 1.25                  |
|            |                      |                                      |                             | Medium            | 1.20                  |
|            | All SPLR Fault       | Normal*                              | 0                           | Dry               | 1.50                  |
|            |                      |                                      |                             | Good              | 1.50                  |
|            |                      |                                      |                             | Medium            | 1.40                  |
|            | SEC 1 or SEC 3 Fault | Normal*                              | 0                           | Dry               | 1.25                  |
|            |                      |                                      |                             | Good              | 1.25                  |
|            |                      |                                      |                             | Medium            | 1.15                  |
|            | SEC 2 Fault          | Normal*                              | 0                           | Dry               | 1.20                  |
|            |                      |                                      |                             | Good              | 1.20                  |
|            |                      |                                      |                             | Medium            | 1.10                  |
|            | SEC 2 + 3 Fault      | Normal*                              | 0                           | Dry               | 1.25                  |
|            |                      |                                      |                             | Good              | 1.25                  |
|            |                      |                                      |                             | Medium            | 1.15                  |
|            | SEC 1 + 3 Fault      | Normal*                              | 0                           | Dry               | 1.35                  |
|            |                      |                                      |                             | Good              | 1.45                  |
|            |                      |                                      |                             | Medium            | 1.40                  |
|            | SEC 1 + 2 Fault      | Normal*                              | 0                           | Dry               | 1.25                  |
|            |                      |                                      |                             | Good              | 1.30                  |
|            |                      |                                      |                             | Medium            | 1.25                  |

\* Landing configuration and approach speed are not affected unless there is ice buildup. Flaps full and flaps 3 are both acceptable choices because this failure affects rollout/stopping capability only. Flaps full is recommended, but flaps 3 may be chosen if needed for operational reasons, such as windshear precautions. If flaps 3 is used, add an additional 6 knots to  $V_{APP}$  and multiply the landing distance factor by 1.10.

## Approach/Landing Corrections for Failures Table

| Failure    |                                                                                         | Flap<br>Lever<br>Position<br>for Ldg | $\Delta V_{REF}$<br>(knots) | Braking<br>Action | Ldg<br>Dist<br>Factor |
|------------|-----------------------------------------------------------------------------------------|--------------------------------------|-----------------------------|-------------------|-----------------------|
| FLT<br>CTL | SEC 1 + 2 + 3 Fault                                                                     | 3                                    | 10                          | Dry               | 1.60                  |
|            |                                                                                         |                                      |                             | Good              | 2.20                  |
|            |                                                                                         |                                      |                             | Medium            | 2.25                  |
|            | L(R) ELEV Fault                                                                         | 3                                    | 10                          | Dry               | 1.35                  |
|            |                                                                                         |                                      |                             | Good              | 1.30                  |
|            |                                                                                         |                                      |                             | Medium            | 1.25                  |
|            | Alternate Law / Direct Law /<br>ELAC 1 + 2 Fault / L + R ELEV<br>Fault / Stabilizer Jam | 3                                    | 10                          | Dry               | 1.35                  |
|            |                                                                                         |                                      |                             | Good              | 1.30                  |
|            |                                                                                         |                                      |                             | Medium            | 1.25                  |
| HYD        | Green (G)                                                                               | Normal*                              | 0                           | Dry               | 1.30                  |
|            |                                                                                         |                                      |                             | Good              | 1.35                  |
|            |                                                                                         |                                      |                             | Medium            | 1.30                  |
|            | Blue (B)                                                                                | Normal*                              | 0                           | Dry               | 1.20                  |
|            |                                                                                         |                                      |                             | Good              | 1.20                  |
|            |                                                                                         |                                      |                             | Medium            | 1.10                  |
|            | Yellow (Y)                                                                              | Normal*                              | 0                           | Dry               | 1.25                  |
|            |                                                                                         |                                      |                             | Good              | 1.30                  |
|            |                                                                                         |                                      |                             | Medium            | 1.20                  |
|            | G + B                                                                                   | 3                                    | 25                          | Dry               | 1.80                  |
|            |                                                                                         |                                      |                             | Good              | 2.00                  |
|            |                                                                                         |                                      |                             | Medium            | 1.95                  |
|            | G + Y                                                                                   | 3                                    | 25                          | Dry               | 2.80                  |
|            |                                                                                         |                                      |                             | Good              | 2.45                  |
|            |                                                                                         |                                      |                             | Medium            | 2.45                  |
|            | B + Y                                                                                   | Normal*                              | 0                           | Dry               | 1.70                  |
|            |                                                                                         |                                      |                             | Good              | 1.90                  |
|            |                                                                                         |                                      |                             | Medium            | 1.85                  |

\* Landing configuration and approach speed are not affected unless there is ice buildup. Flaps full and flaps 3 are both acceptable choices because this failure affects rollout/stopping capability only. Flaps full is recommended, but flaps 3 may be chosen if needed for operational reasons, such as windshear precautions. If flaps 3 is used, add an additional 6 knots to  $V_{APP}$  and multiply the landing distance factor by 1.10.

Approach/Landing Corrections for Failures Table

| Failure |                                                         | Flap<br>Lever<br>Position<br>for Ldg | $\Delta V_{REF}$<br>(knots) | Braking<br>Action | Ldg<br>Dist<br>Factor |
|---------|---------------------------------------------------------|--------------------------------------|-----------------------------|-------------------|-----------------------|
| NAV     | Airspeed/Mach Unreliable                                | 3                                    | 15                          | Dry               | 1.45                  |
|         |                                                         |                                      |                             | Good              | 1.40                  |
|         |                                                         |                                      |                             | Medium            | 1.30                  |
|         | IR 1 + 2 + 3 Fault                                      | 3                                    | 10                          | Dry               | 2.60                  |
|         |                                                         |                                      |                             | Good              | 2.10                  |
|         |                                                         |                                      |                             | Medium            | 1.70                  |
|         | Dual IR Fault / Dual ADR Fault /<br>ADR 1 + 2 + 3 Fault | 3                                    | 10                          | Dry               | 1.35                  |
|         |                                                         |                                      |                             | Good              | 1.30                  |
|         |                                                         |                                      |                             | Medium            | 1.25                  |

**LANDING DISTANCE ABNORMAL OR IRREGULAR CONFIGURATION**
**Condition(s):**

- Sea level
- Zero wind
- Flaps Full
- Maximum manual braking
- Dry runway distances do not include use of reverse thrust
- Standard day
- 2% downhill slope
- Touchdown within first 1000 feet
- Ground spoilers operating
- Good and medium distances assume use of full reverse thrust

**Step 1 - Obtain Actual Landing Distance**

| Landing Distance Factor | Braking Action | Gross Weight (1000 pounds) |       |       |       |       |       |       |        |
|-------------------------|----------------|----------------------------|-------|-------|-------|-------|-------|-------|--------|
|                         |                | 100.0                      | 110.0 | 120.0 | 130.0 | 140.0 | 150.0 | 160.0 | 170.0  |
|                         |                | Landing Distance (feet)    |       |       |       |       |       |       |        |
| 1.0                     | Dry            | 2250                       | 2370  | 2490  | 2620  | 2770  | 3060  | 3390  | 3700   |
|                         | Good           | 2550                       | 2750  | 2950  | 3170  | 3390  | 3620  | 3850  | 4060   |
|                         | Medium         | 3180                       | 3430  | 3680  | 3930  | 4190  | 4440  | 4690  | 4900   |
| 1.1                     | Dry            | 2470                       | 2600  | 2740  | 2880  | 3050  | 3370  | 3730  | 4060   |
|                         | Good           | 2800                       | 3020  | 3250  | 3480  | 3730  | 3980  | 4240  | 4460   |
|                         | Medium         | 3500                       | 3770  | 4050  | 4330  | 4610  | 4880  | 5160  | 5390   |
| 1.2                     | Dry            | 2690                       | 2840  | 2990  | 3140  | 3330  | 3670  | 4070  | 4430   |
|                         | Good           | 3060                       | 3300  | 3540  | 3800  | 4070  | 4340  | 4620  | 4870   |
|                         | Medium         | 3820                       | 4120  | 4420  | 4720  | 5020  | 5330  | 5630  | 5880   |
| 1.3                     | Dry            | 2920                       | 3080  | 3230  | 3400  | 3600  | 3980  | 4410  | 4800   |
|                         | Good           | 3310                       | 3570  | 3840  | 4120  | 4400  | 4700  | 5010  | 5280   |
|                         | Medium         | 4140                       | 4460  | 4780  | 5110  | 5440  | 5770  | 6100  | 6370   |
| 1.4                     | Dry            | 3140                       | 3310  | 3480  | 3660  | 3880  | 4280  | 4740  | 5170   |
|                         | Good           | 3570                       | 3840  | 4130  | 4430  | 4740  | 5060  | 5390  | 5680   |
|                         | Medium         | 4460                       | 4800  | 5150  | 5510  | 5860  | 6210  | 6570  | 6860   |
| 1.5                     | Dry            | 3370                       | 3550  | 3730  | 3920  | 4160  | 4590  | 5080  | 5540   |
|                         | Good           | 3820                       | 4120  | 4430  | 4750  | 5080  | 5420  | 5780  | 6090   |
|                         | Medium         | 4770                       | 5140  | 5520  | 5900  | 6280  | 6660  | 7040  | 7350   |
| 1.6                     | Dry            | 3590                       | 3790  | 3980  | 4180  | 4430  | 4890  | 5420  | 5910   |
|                         | Good           | 4080                       | 4390  | 4720  | 5070  | 5420  | 5790  | 6160  | 6490   |
|                         | Medium         | 5090                       | 5490  | 5890  | 6290  | 6700  | 7100  | 7500  | 7840   |
| 1.7                     | Dry            | 3810                       | 4020  | 4230  | 4440  | 4710  | 5200  | 5760  | 6280   |
|                         | Good           | 4330                       | 4670  | 5020  | 5380  | 5760  | 6150  | 6550  | 6900   |
|                         | Medium         | 5410                       | 5830  | 6250  | 6690  | 7120  | 7540  | 7970  | 8330   |
| 1.8                     | Dry            | 4040                       | 4260  | 4480  | 4700  | 4990  | 5500  | 6100  | 6650   |
|                         | Good           | 4590                       | 4940  | 5310  | 5700  | 6100  | 6510  | 6930  | 7300   |
|                         | Medium         | 5730                       | 6170  | 6620  | 7080  | 7530  | 7990  | 8440  | 8820   |
| 1.9                     | Dry            | 4260                       | 4490  | 4730  | 4960  | 5260  | 5810  | 6440  | 7020   |
|                         | Good           | 4840                       | 5220  | 5610  | 6010  | 6430  | 6870  | 7320  | 7710   |
|                         | Medium         | 6050                       | 6520  | 6990  | 7470  | 7950  | 8430  | 8910  | 9310   |
| 2.0                     | Dry            | 4490                       | 4730  | 4970  | 5230  | 5540  | 6110  | 6780  | 7390   |
|                         | Good           | 5090                       | 5490  | 5900  | 6330  | 6770  | 7230  | 7700  | 8110   |
|                         | Medium         | 6360                       | 6860  | 7360  | 7860  | 8370  | 8880  | 9380  | 9800   |
| 2.1                     | Dry            | 4710                       | 4970  | 5220  | 5490  | 5820  | 6420  | 7110  | 7750   |
|                         | Good           | 5350                       | 5760  | 6190  | 6650  | 7110  | 7590  | 8080  | 8520   |
|                         | Medium         | 6680                       | 7200  | 7720  | 8260  | 8790  | 9320  | 9850  | 10,290 |

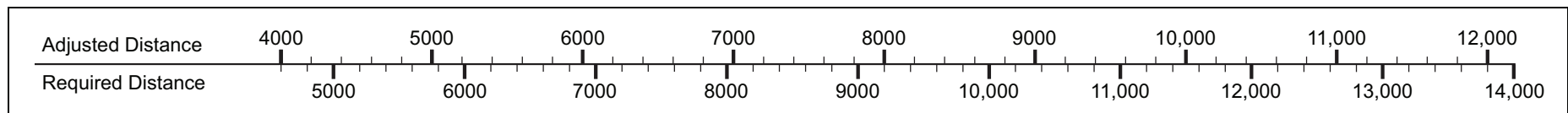
Landing Distance Abnormal or Irregular Configuration Table

| Landing Distance Factor | Braking ActionL | Gross Weight (1000 pounds) |        |        |        |        |        |        |        |
|-------------------------|-----------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|
|                         |                 | 100.0                      | 110.0  | 120.0  | 130.0  | 140.0  | 150.0  | 160.0  | 170.0  |
|                         |                 | Landing Distance (feet)    |        |        |        |        |        |        |        |
| 2.2                     | Dry             | 4930                       | 5200   | 5470   | 5750   | 6090   | 6730   | 7450   | 8120   |
|                         | Good            | 5600                       | 6040   | 6490   | 6960   | 7450   | 7950   | 8470   | 8920   |
|                         | Medium          | 7000                       | 7540   | 8090   | 8650   | 9210   | 9760   | 10,320 | 10,780 |
| 2.3                     | Dry             | 5160                       | 5440   | 5720   | 6010   | 6370   | 7030   | 7790   | 8490   |
|                         | Good            | 5860                       | 6310   | 6780   | 7280   | 7790   | 8310   | 8850   | 9330   |
|                         | Medium          | 7320                       | 7890   | 8460   | 9040   | 9620   | 10,210 | 10,790 | 11,270 |
| 2.4                     | Dry             | 5380                       | 5680   | 5970   | 6270   | 6650   | 7340   | 8130   | 8860   |
|                         | Good            | 6110                       | 6590   | 7080   | 7600   | 8130   | 8680   | 9240   | 9740   |
|                         | Medium          | 7630                       | 8230   | 8830   | 9440   | 10,040 | 10,650 | 11,250 | 11,760 |
| 2.5                     | Dry             | 5610                       | 5910   | 6220   | 6530   | 6920   | 7640   | 8470   | 9230   |
|                         | Good            | 6370                       | 6860   | 7370   | 7910   | 8460   | 9040   | 9620   | 10,140 |
|                         | Medium          | 7950                       | 8570   | 9190   | 9830   | 10,460 | 11,090 | 11,720 | 12,250 |
| 2.6                     | Dry             | 5830                       | 6150   | 6460   | 6790   | 7200   | 7950   | 8810   | 9600   |
|                         | Good            | 6620                       | 7140   | 7670   | 8230   | 8800   | 9400   | 10,010 | 10,550 |
|                         | Medium          | 8270                       | 8910   | 9560   | 10,220 | 10,880 | 11,540 | 12,190 | 12,740 |
| 2.7                     | Dry             | 6050                       | 6380   | 6710   | 7050   | 7480   | 8250   | 9150   | 9970   |
|                         | Good            | 6880                       | 7410   | 7960   | 8540   | 9140   | 9760   | 10,390 | 10,950 |
|                         | Medium          | 8590                       | 9260   | 9930   | 10,620 | 11,300 | 11,980 | 12,660 | 13,230 |
| 2.8                     | Dry             | 6280                       | 6620   | 6960   | 7310   | 7750   | 8560   | 9480   | 10,340 |
|                         | Good            | 7130                       | 7680   | 8260   | 8860   | 9480   | 10,120 | 10,780 | 11,360 |
|                         | Medium          | 8910                       | 9600   | 10,300 | 11,010 | 11,720 | 12,420 | 13,130 | 13,720 |
| 2.9                     | Dry             | 6500                       | 6860   | 7210   | 7570   | 8030   | 8860   | 9820   | 10,710 |
|                         | Good            | 7390                       | 7960   | 8550   | 9180   | 9820   | 10,480 | 11,160 | 11,760 |
|                         | Medium          | 9220                       | 9940   | 10,660 | 11,400 | 12,130 | 12,870 | 13,600 | 14,210 |
| 3.0                     | Dry             | 6730                       | 7090   | 7460   | 7840   | 8310   | 9170   | 10,160 | 11,080 |
|                         | Good            | 7640                       | 8230   | 8850   | 9490   | 10,160 | 10,840 | 11,550 | 12,170 |
|                         | Medium          | 9540                       | 10,280 | 11,030 | 11,790 | 12,550 | 13,310 | 14,070 | 14,700 |
| 3.1*                    | Dry             | 6950                       | 7330   | 7710   | 8100   | 8580   | 9480   | 10,500 | 11,440 |
|                         | Good            | 7890                       | 8510   | 9140   | 9810   | 10,490 | 11,200 | 11,930 | 12,570 |
|                         | Medium          | 9860                       | 10,630 | 11,400 | 12,190 | 12,970 | 13,750 | 14,530 | 15,190 |

\* If landing distance factor is greater than 3.1, landing distance is obtained by multiplying the landing distance factor by the 1.0 landing distance.

**Step 2 - Obtain Adjusted Landing Distance****Adjustment(s):**

|                                      |     |
|--------------------------------------|-----|
| For each 1000 feet above SL          | +4% |
| For each knot of tailwind            | +2% |
| For each knot above V <sub>APP</sub> | +2% |

**Step 3 - Obtain Required Landing Distance using scale (15% safety margin)**

## LANDING REFERENCE SPEEDS

| Gross Weight<br>(1000 pounds) | Speed (knots) |     |     |                        |                                              |
|-------------------------------|---------------|-----|-----|------------------------|----------------------------------------------|
|                               | Green Dot     | S   | F   | V <sub>LS</sub> Conf 3 | V <sub>REF</sub> (V <sub>LS</sub> Conf Full) |
| 170.0                         | 234           | 210 | 162 | 151                    | 147                                          |
| 168.0                         | 232           | 209 | 161 | 150                    | 146                                          |
| 166.0                         | 231           | 208 | 160 | 149                    | 145                                          |
| 164.0                         | 229           | 206 | 159 | 148                    | 144                                          |
| 162.0                         | 227           | 205 | 158 | 147                    | 143                                          |
| 160.0                         | 225           | 204 | 157 | 146                    | 142                                          |
| 158.0                         | 223           | 203 | 156 | 145                    | 141                                          |
| 156.0                         | 222           | 201 | 155 | 144                    | 141                                          |
| 154.0                         | 220           | 200 | 154 | 143                    | 140                                          |
| 152.0                         | 218           | 199 | 153 | 142                    | 139                                          |
| 150.0                         | 216           | 197 | 152 | 141                    | 138                                          |
| 148.0                         | 214           | 196 | 151 | 140                    | 137                                          |
| 146.0                         | 212           | 195 | 150 | 140                    | 136                                          |
| 144.0                         | 211           | 193 | 149 | 139                    | 135                                          |
| 142.0                         | 209           | 192 | 148 | 138                    | 134                                          |
| 140.0                         | 207           | 191 | 147 | 137                    | 133                                          |
| 138.0                         | 205           | 189 | 146 | 136                    | 132                                          |
| 136.0                         | 203           | 188 | 145 | 135                    | 131                                          |
| 134.0                         | 202           | 186 | 144 | 134                    | 130                                          |
| 132.0                         | 200           | 185 | 143 | 133                    | 129                                          |
| 130.0                         | 198           | 184 | 142 | 132                    | 128                                          |
| 128.0                         | 196           | 182 | 141 | 131                    | 127                                          |
| 126.0                         | 194           | 181 | 140 | 130                    | 126                                          |
| 124.0                         | 192           | 179 | 138 | 129                    | 125                                          |
| 122.0                         | 191           | 178 | 137 | 128                    | 124                                          |
| 120.0                         | 189           | 177 | 136 | 127                    | 123                                          |
| 118.0                         | 187           | 175 | 135 | 126                    | 122                                          |
| 116.0                         | 185           | 173 | 134 | 125                    | 121                                          |
| 114.0                         | 183           | 172 | 133 | 124                    | 120                                          |
| 112.0                         | 182           | 171 | 132 | 122                    | 119                                          |
| 110.0                         | 180           | 169 | 130 | 121                    | 118                                          |
| 108.0                         | 178           | 167 | 129 | 120                    | 117                                          |
| 106.0                         | 176           | 166 | 128 | 119                    | 116                                          |
| 104.0                         | 174           | 164 | 127 | 118                    | 115                                          |
| 102.0                         | 173           | 163 | 125 | 117                    | 114                                          |
| 100.0                         | 171           | 161 | 124 | 116                    | 113                                          |

## Adjustment(s):

|                                                 |                        |
|-------------------------------------------------|------------------------|
| Green dot (above FL 200)                        | + 1 knot per 1000 feet |
| V <sub>APP</sub> for forward CG (less than 25%) | + 2 knots              |