

JEPP'S BRIEFING



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So far everything is going okay. Approach Control has cleared us for the approach, we are final approach fix (FAF) inbound, flaps are set, the gear's hanging, and the tower says, "cleared to land, RVR now 1800 feet." That statement usually makes us sit a little tighter in the seat. And, frequently, it means that the airport is below landing minimums for some operators.

About this time, our scan of the panel breaks a little longer than normal to look at those minimums again. Jeppesen's philosophy is "give the pilot all the minimums information needed on the applicable charts." This means that inoperative components don't send you digging into the FARs or a table to find out how much the minimums have gone up. Just move your eyes slightly to the right and the adjusted minimums are there.

Let's look at the minimums in the first illustration for ILS Runway 1 at Reagan National Airport in Washington, D.C. Notice that the lowest minimums are to the far left. As components or visual aids go inop, the minimums go higher to the right in the minimums box.

At the top of each minimums box is the statement which specifies the only runway where straight-in landing minimums apply. If straight-in landing minimums apply to any other runway, such as a side step runway, a separate column will be listed.

A block of minimums on the right side of the minimums box includes the circle-to-land minimums which apply to all runways other than the runway specified at the left in the minimums box. At some airports, straight-in landing minimums are not authorized since the final approach course is more than 30 degrees from the landing runway, or the airplane may not be in a position from which a normal landing can be made. Whenever the descent gradient from the

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final approach fix to the runway threshold exceeds 400 feet per nautical mile, straight-in landing minimums are not authorized.

The letters A, B, C and D at the left of the minimums box represent the aircraft categories. The aircraft categories are based on a speed equal to 1.3 times V_{SO} at the maximum certificated landing weight. When the TERPs criteria were first implemented in 1967, the aircraft weight was also used to determine the aircraft category, but the weight has now been eliminated. The aircraft categories are:

- Category A:** Speed less than 91 knots.
 - Category B:** Speed 91 knots or more but less than 121 knots.
 - Category C:** Speed 121 knots or more but less than 151 knots.
 - Category D:** Speed 141 knots or more but less than 166 knots.
 - Category E:** Speed 166 knots or more.
- (Category E pertains to a couple of military aircraft and is not included on Jeppesen approach charts.)

The aircraft categories apply to both straight-in landing and circle-to-land minimums. Since the categories are based on a computed number and not the actual approach speed, there are many who recommend using the category appropriate for the approach speed, not the stalling speed times 1.3. In some countries (not the USA), it is required that you use the actual approach speed rather than the computed value.

Minimum Altitudes

The minimum altitudes for landing are spread across the top of the minimums box and include altitudes labeled as DA, MDA, HAT and HAA. At Washington National, there are three main columns titled "ILS," "LOC (GS out)," and "CIRCLE-TO-LAND." The column to the farthest left under the ILS title is labeled as "FULL," which means the four components of a Category I ILS (localizer, glide slope, outer marker, and middle marker) and the associated visual aids. It is interesting that FAR 91.175 still lists the middle marker as a basic component of the ILS even though its loss has no effect on landing minimums. Since an MM that is inoperative no longer causes the landing minimums to be raised, many of the middle markers are being removed. Some countries still have a penalty for the MM out.

instead of DH since the minimum altitude of 215 feet is actually an *altitude* and not a *height*. The number in parentheses just to the right of the decision altitude is the height above touchdown zone (HAT). An HAT figure is used for straight-in landing minimums. The DA and HAT can be verified by cross checking the touchdown zone elevation of 15 feet next to the runway in the profile view.

If the touchdown zone (TDZ) lights or the centerline lights are not in service, refer to the next column to the right, and note that the visibility has increased from 1,800 feet RVR to 2,400 feet RVR.

If the glide slope is not used, the approach is no longer a precision approach and the minimum altitude becomes a minimum descent altitude (MDA) instead of a decision altitude. At Reagan National, when the glide slope is not used, the MDA becomes 480 feet. The number in parentheses to the right of the MDA is still a height above touchdown zone (HAT) even though the glide slope is inoperative. The number remains an HAT since the MDA is a specified altitude above the touchdown zone of the straight-in landing runway. Note that the MDAs are rounded to the higher 20-foot increment (10 feet in some countries) and the DAs are to the nearest foot.

All circle-to-land minimums are expressed as an MDA even though the glide slope may be used to descend to a circling MDA. The circle-to-land MDA is usually higher than the straight-in landing MDA. This is because the TERPs criteria specify that the lowest circle-to-land MDA will not be less than 350 feet above the airport, whereas the straight-in landing MDA can be as low as 250 feet above the landing touchdown zone elevation. The altitude in parentheses to the right of the circling MDA is expressed as the height above the airport (HAA). Since the circle-to-land minimums are not referenced to any one runway, the touchdown zone elevation is not applicable and the airport elevation is used. A cross-check of this can be verified by comparing the circle-to-land MDA and HAA with the airport elevation.

Visibilities

The normal Category I ILS straight-in landing minimum visibility is one-half statute mile. If touchdown zone lights and centerline lights are available, this minimum visibility can be as low as an RVR of 1,800 feet. At Reagan National, the landing visibility is an RVR of 1,800 feet or 1/2 mile of meteorological observed visibility when all the lights are working. The RVR is applicable only to Runway 1 and cannot be used to determine the visibility for landing on another runway.

When some of the components or visual aids are not available, the landing visibility may be adversely affected. When the approach light system (ALS) is out, the visibility is increased to an RVR of 4,000 feet or 3/4 mile.

At Reagan National, the full ILS authorizes you to descend to 215 feet as the decision altitude. You will notice that all precision landing minimums are labeled as DA(H)

| Gnd speed-Kts | 70 | 90 | 100 | 120 | 140 | 160 | ALSF-TI | 500' | 2000' | DCA |
|---|---------------|---------------|---------------------------|------|------|-----------------------|---------|------|------------|-------------------------------|
| GS | 3.00 | 377 | 485 | 538 | 646 | 754 | | | | 111.0 |
| MAP at D1.0 IDCA or | | | | | | | | | | R-325 |
| OXONN to MAP | 4.6 | 3:57 | 3:04 | 2:46 | 2:18 | 1:58 | | | | |
| STRAIGHT-IN LANDING RWY 1 | | | | | | | | | | |
| ILS | | | LOC (GS out) | | | CIRCLE-TO-LAND | | | | |
| DA(H) 215' (200') | | | MDA(H) 480' (465') | | | | | | | |
| FULL | | | TDZ or CL out | | | ALS out | | | Max Kts | |
| A | | | | | | | | | 90 | MDA(H) 620' (604') - 1 |
| B | | | | | | | | | 120 | 660' (644') - 1 |
| C | RVR 18 or 1/2 | RVR 24 or 1/2 | RVR 40 or 3/4 | | | | | | 140 | 660' (644') - 1 1/4 |
| D | | | | | | | | | 165 | 700' (684') - 2 1/4 |
| Not authorized Northeast of Rwy 15/33. | | | | | | | | | | |

CHANGES: Rwy number, chart reindexed.

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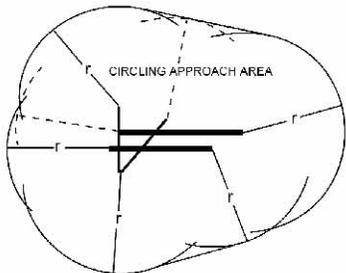
FAR 91.175 "Takeoff and Landing under IFR" states that "a compass locator or precision radar may be substituted for the outer or middle marker." It also states that "DME, VOR, or nondirectional beacon fixes authorized in the standard instrument approach procedure or surveillance radar may be substituted for the outer marker." This authorization was very important when penalties were required with the loss of the marker beacons, but the substitution is not as relevant today. Part 91 pilots still must receive the OM or an authorized substitute.

If the glide slope is out, the authorized visibility minimums are increased for aircraft categories A, B, C, and D. If the glide slope and Approach Lighting System (ALS) is also out, the visibilities are increased even more. Note that the visibility for category D aircraft with the GS and ALS out is expressed in miles only since 1-1/2 miles are beyond the range of the RVR.

The circle-to-land MDA and minimum visibility are usually different for every aircraft category. Category A Airplanes have an MDA of 620 feet and a visibility of one mile. The MDA for Category B airplanes is increased 40 feet to 660 feet and the Category C circle-to-land visibility is increased to 1 3/4 statute miles. Category D airplanes have the highest MDA of 700 feet with a visibility of 2 1/4 miles.

Note the restriction to circling for Category C and D aircraft shown below the circling minimums. Circling is not authorized Northeast of runways 15/33 for the larger airplanes. Since the Washington National airport is so close to downtown Washington, D.C., circling northeast of the airport could easily stray into P-56, the prohibited area over the White House.

It can easily be seen why the circling approaches should be kept in close to the airport since the protected areas do not have that large of a margin. A minimum of 300 feet above all obstacles is provided for all aircraft categories within the respective areas. The areas become significantly larger for high-speed airplanes. The radii and lowest MDAs for circling to land are specified in the table below.



| Approach Category | Radius (R) in Miles |
|-------------------|---------------------|
| A | 1.3 |
| B | 1.5 |
| C | 1.7 |
| D | 2.3 |
| E | 4.5 |

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| Lowest Standard Circling Minimums | | | | |
|-----------------------------------|-----|-----|-------|-----|
| Approach Category | A | B | C | D |
| HAA in feet | 350 | 450 | 450 | 550 |
| Visibility in miles | 1 | 1 | 1-1/2 | 2 |



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