

## **4.0 GROUND MANEUVERING**

**4.1 General Information**

**4.2 Turning Radii, No Slip Angle**

**4.3 Minimum Turning Radii**

**4.4 Visibility from Cockpit**

**4.5 Runway and Taxiway Turn Paths**

**4.6 Runway Holding Bay (Apron)**

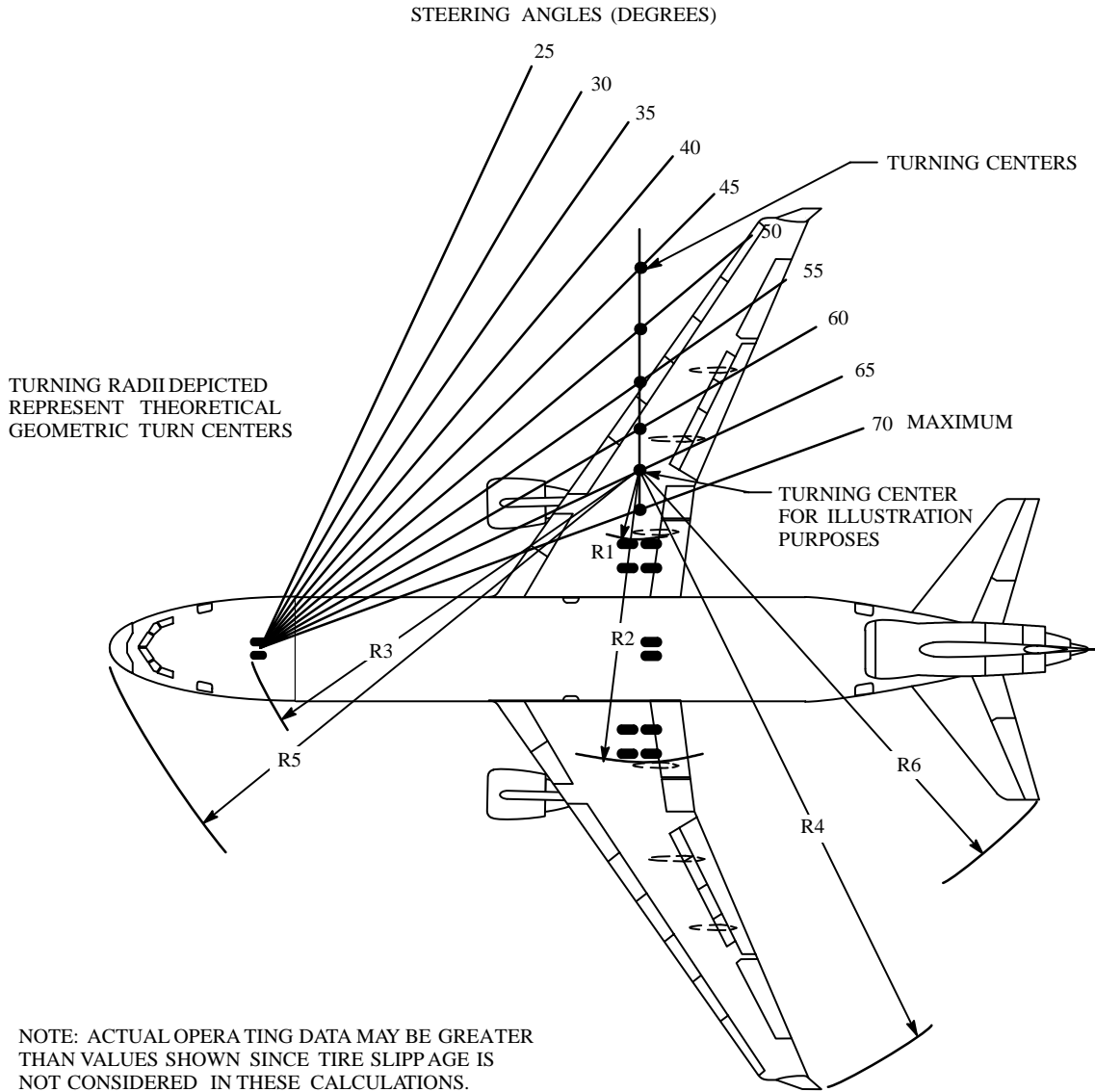
## **4.0 GROUND MANEUVERING**

### **4.1 General Information**

This section provides airplane turning capability and maneuvering characteristics.

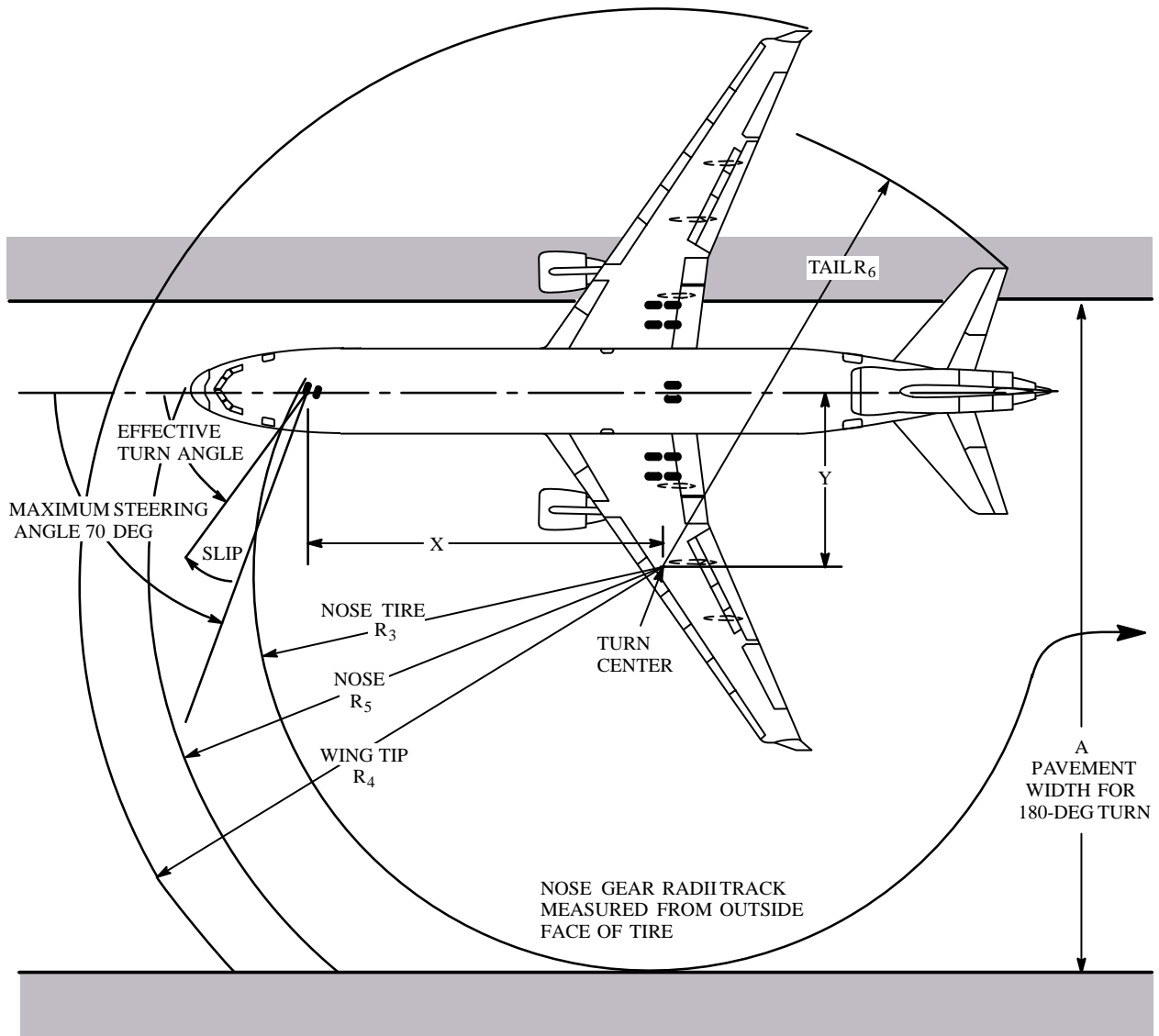
For ease of presentation, these data have been determined from the theoretical limits imposed by the geometry of the aircraft, and where noted, provide for a normal allowance for tire slippage. As such, they reflect the turning capability of the aircraft in favorable operating circumstances. The data should only be used as guidelines for determining such parameters and to obtain the maneuvering characteristics of this aircraft type.

In the ground operating mode, varying airline practices may demand that more conservative turning procedures be adopted. Airline operating techniques will vary in level of performance over a wide range of circumstances throughout the world. Variations from standard aircraft operating patterns may be necessary to satisfy physical constraints within the maneuvering area, such as adverse grades, limited space, or high risk of jet blast damage. For these reasons, ground maneuvering requirements should be coordinated with the using airlines prior to layout planning.



STEERING ANGLE (DEG)	R-1		R-2		R-3		R-4		R-5		R-6	
	FT	m	FT	m	FT	m	FT	m	FT	m	FT	m
25	153.7	46.8	194.9	59.4	194.0	59.1	262.6	80.0	205.7	62.7	220.2	67.1
30	120.2	36.6	161.4	49.2	164.3	50.1	229.5	70.0	178.2	54.3	189.5	57.8
35	95.5	29.1	136.7	41.7	143.5	43.7	205.2	62.5	159.4	48.6	167.7	51.1
40	76.3	23.3	117.5	35.8	128.2	39.1	186.4	56.8	145.9	44.5	151.3	46.1
45	60.7	18.5	101.9	31.1	116.6	35.5	171.2	52.2	136.1	41.5	138.5	42.2
50	47.6	14.5	88.8	27.1	107.8	32.9	158.5	48.3	128.7	39.2	128.3	39.1
55	36.3	11.1	77.5	23.6	100.9	30.8	147.6	45.0	123.1	37.5	119.9	36.5
60	26.3	8.0	67.6	20.6	95.6	29.1	138.0	42.1	118.8	36.2	112.9	34.4
65	17.3	5.3	58.5	17.8	91.4	27.9	129.4	39.4	115.6	35.2	107.0	32.6
70 MAXIMUM	9.0	2.7	50.2	15.3	88.2	26.9	121.5	37.0	113.8	34.7	102.0	31.1

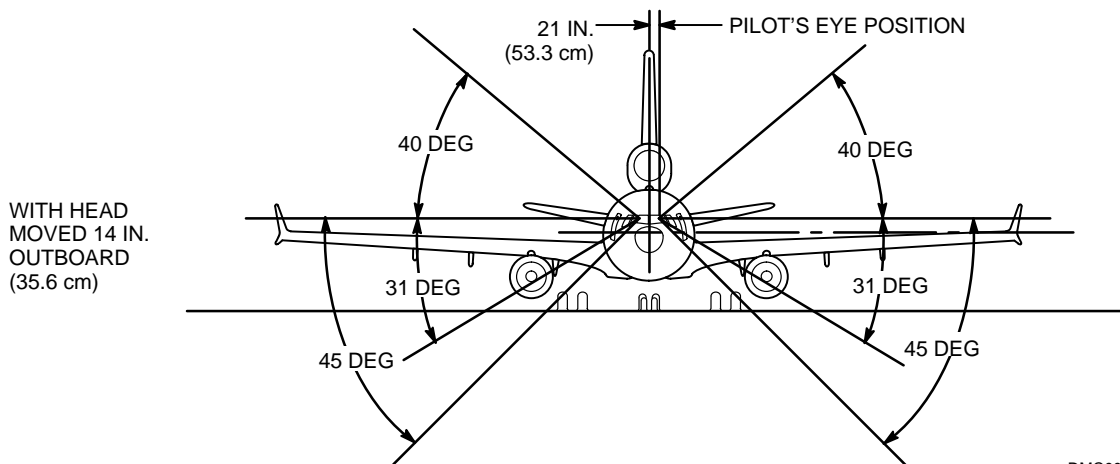
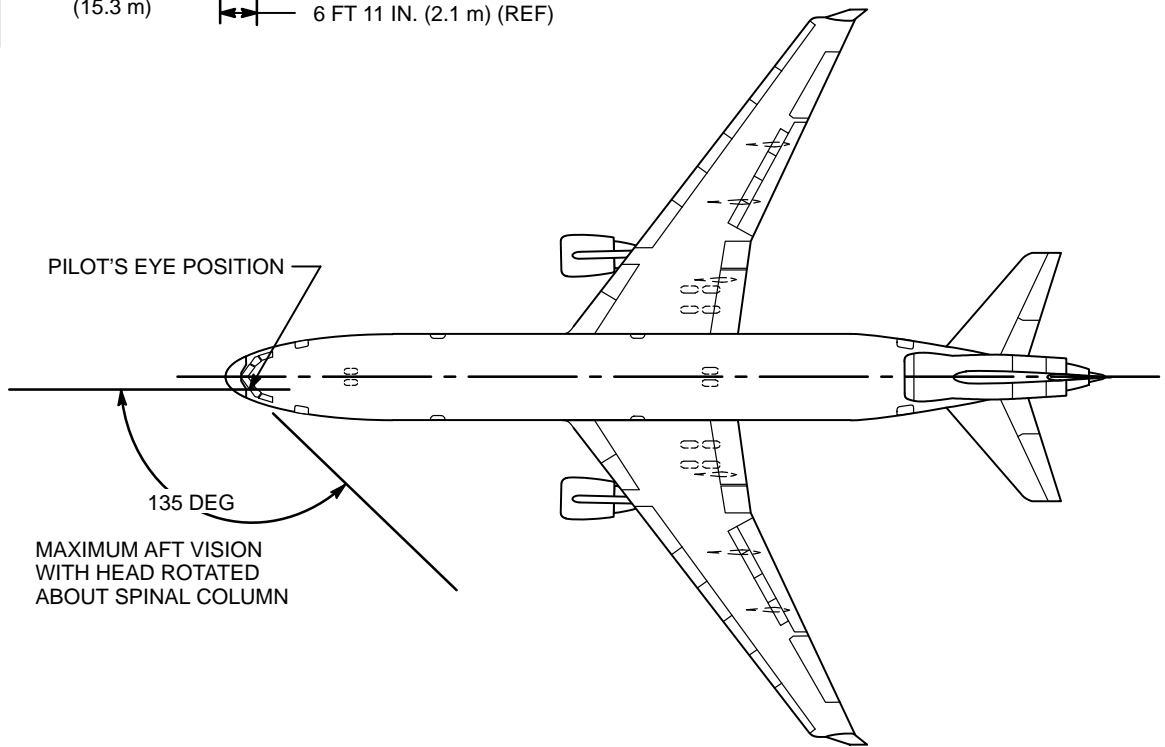
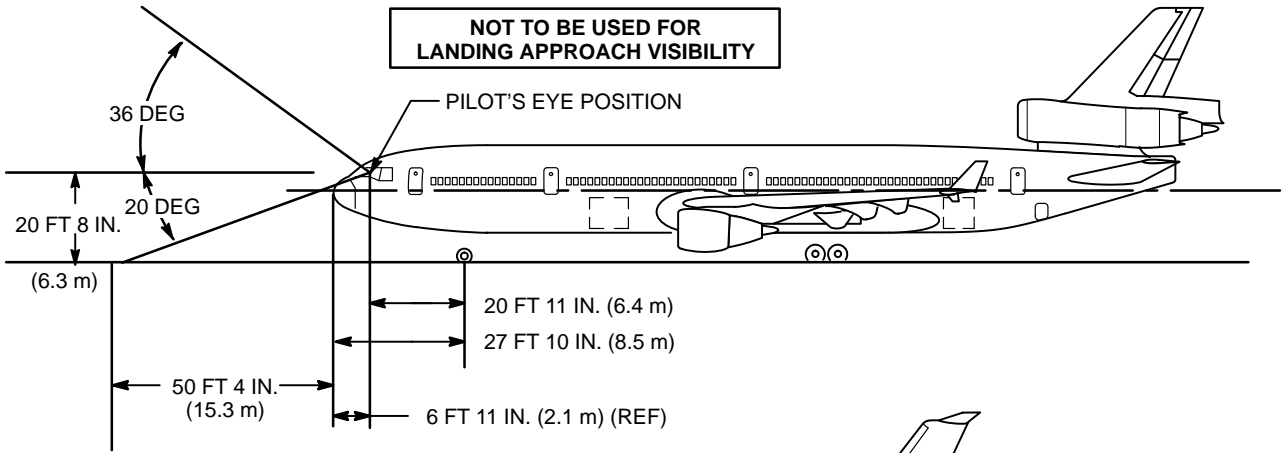
**4.2 TURNING RADII, NO SLIP ANGLE  
MODEL MD-11**



- 1 **NORMAL TURNS**  
 SYMMETRICAL THRUST AND NO DIFFERENTIAL BRAKING. SLOW CONTINUOUS TURN. AFT CENTER OF GRAVITY AT MAX RAMP WEIGHT
- 2 **LIGHTLY BRAKED TURN**  
 UNSYMMETRICAL THRUST AND LIGHT DIFFERENTIAL BRAKING. SLOW CONTINUOUS TURN. AFT CENTER OF GRAVITY AT MAX RAMP WEIGHT
- 3 **MINIMUM RECOMMENDED RADIUS TO AVOID EXCESSIVE TIRE WEAR. LIMITED BY 8-DEG MAINGEAR TIRE SCRUB**

TYPE TURN	EFFECTIVE TURN ANGLE	TIRE SLIP ANGLE	X FT/m	Y FT/m	A FT/m	R <sub>3</sub> FT/m	R <sub>4</sub> FT/m	R <sub>5</sub> FT/m	R <sub>6</sub> FT/m
1	60.8 DEG	9.2 DEG	81.2	45.3	160.6	94.7	136.4	118.1	111.9
			24.7	13.8	49.0	28.9	41.6	36.0	34.1
2	72.0 DEG	-2.0 DEG	81.6	26.5	134.6	87.5	118.5	112.6	100.0
			24.9	8.1	41.0	26.7	36.1	34.3	30.5
3	-	-	81.2	42.1	155.8	93.1	133.4	116.9	109.8
			24.7	12.8	47.5	28.4	40.7	35.6	33.5

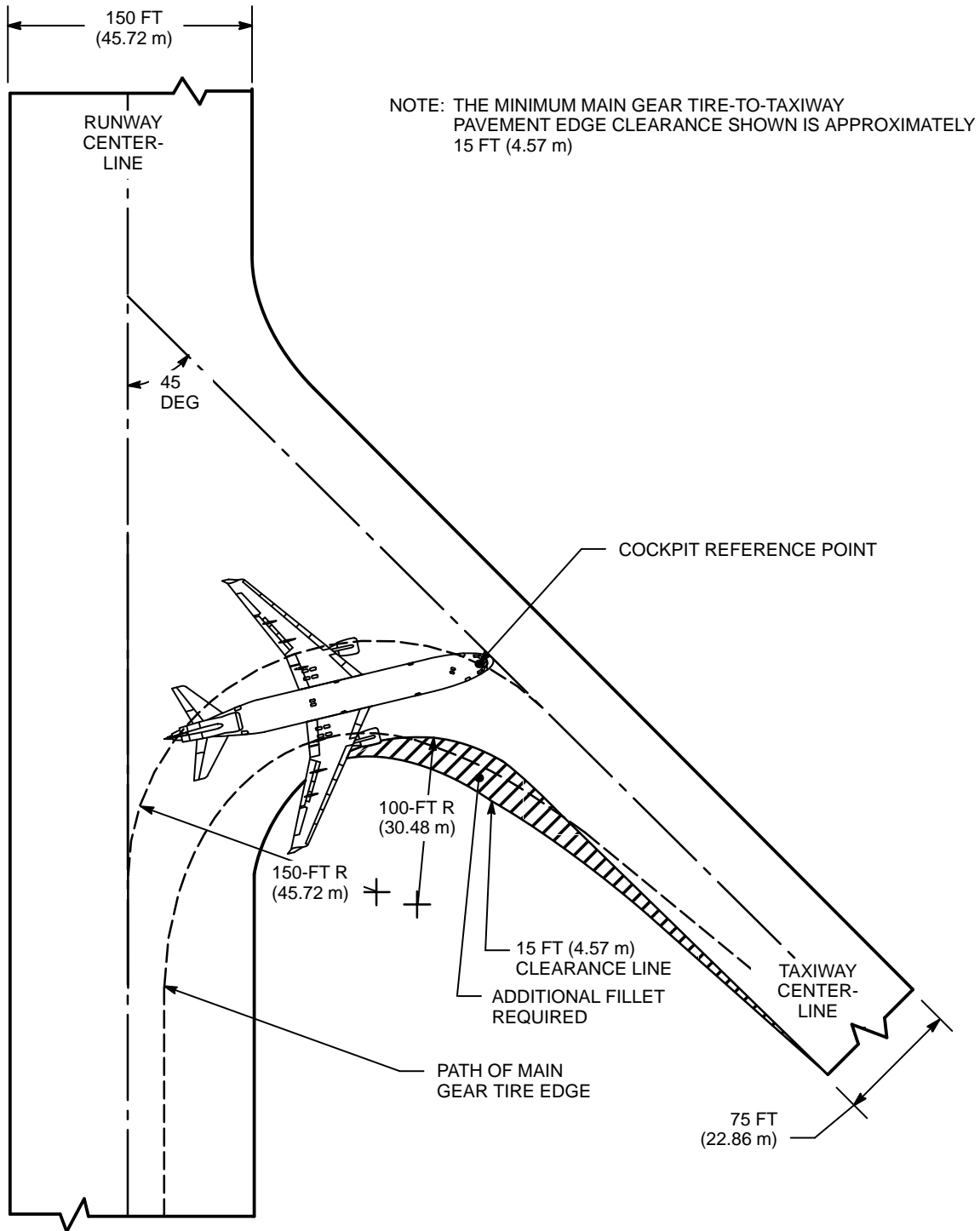
### 4.3 MINIMUM TURNING RADII MODEL MD-11



DMC005-42

**4.4 VISIBILITY FROM COCKPIT IN STATIC POSITION  
MODEL MD-11**

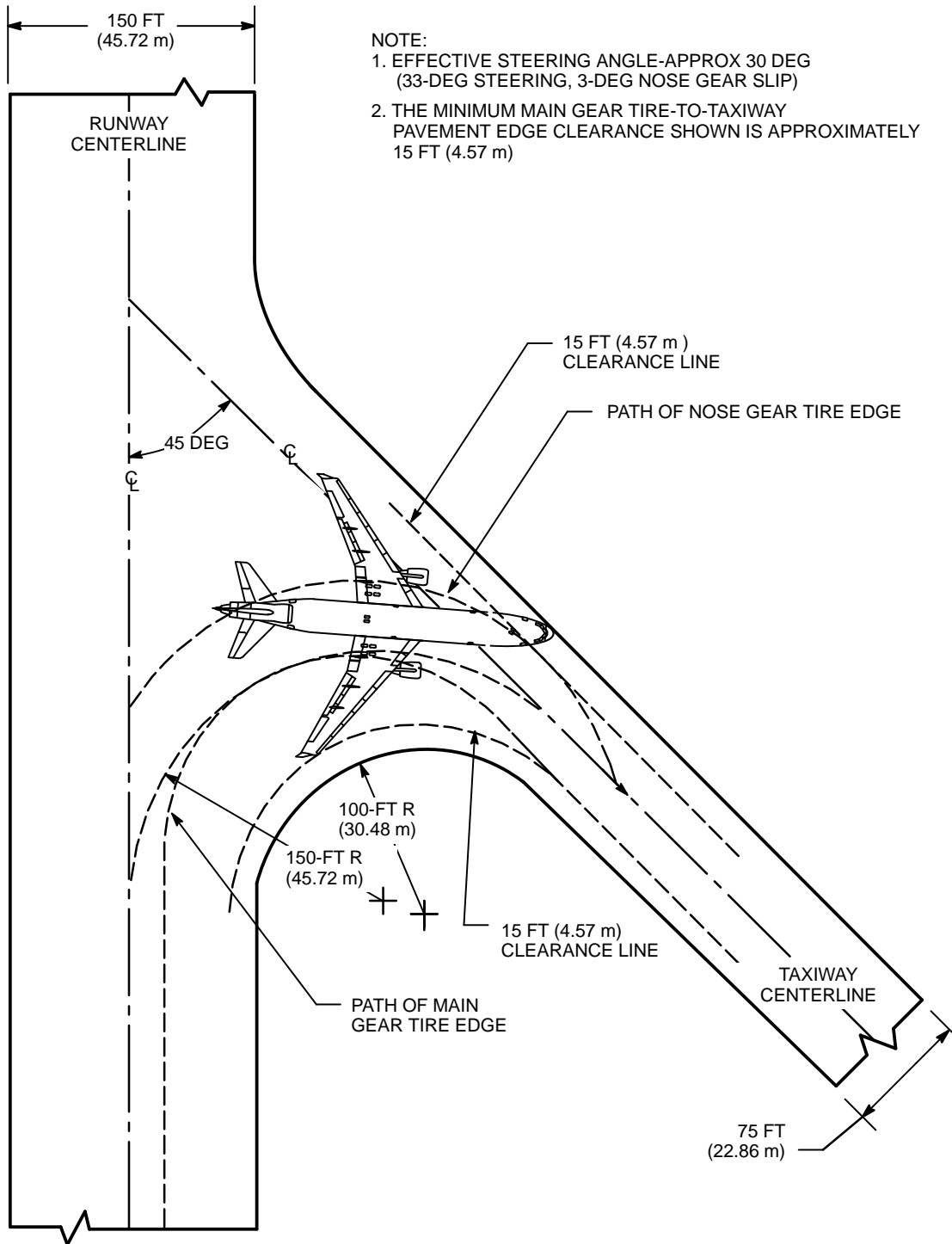
REV B



DMC005-89

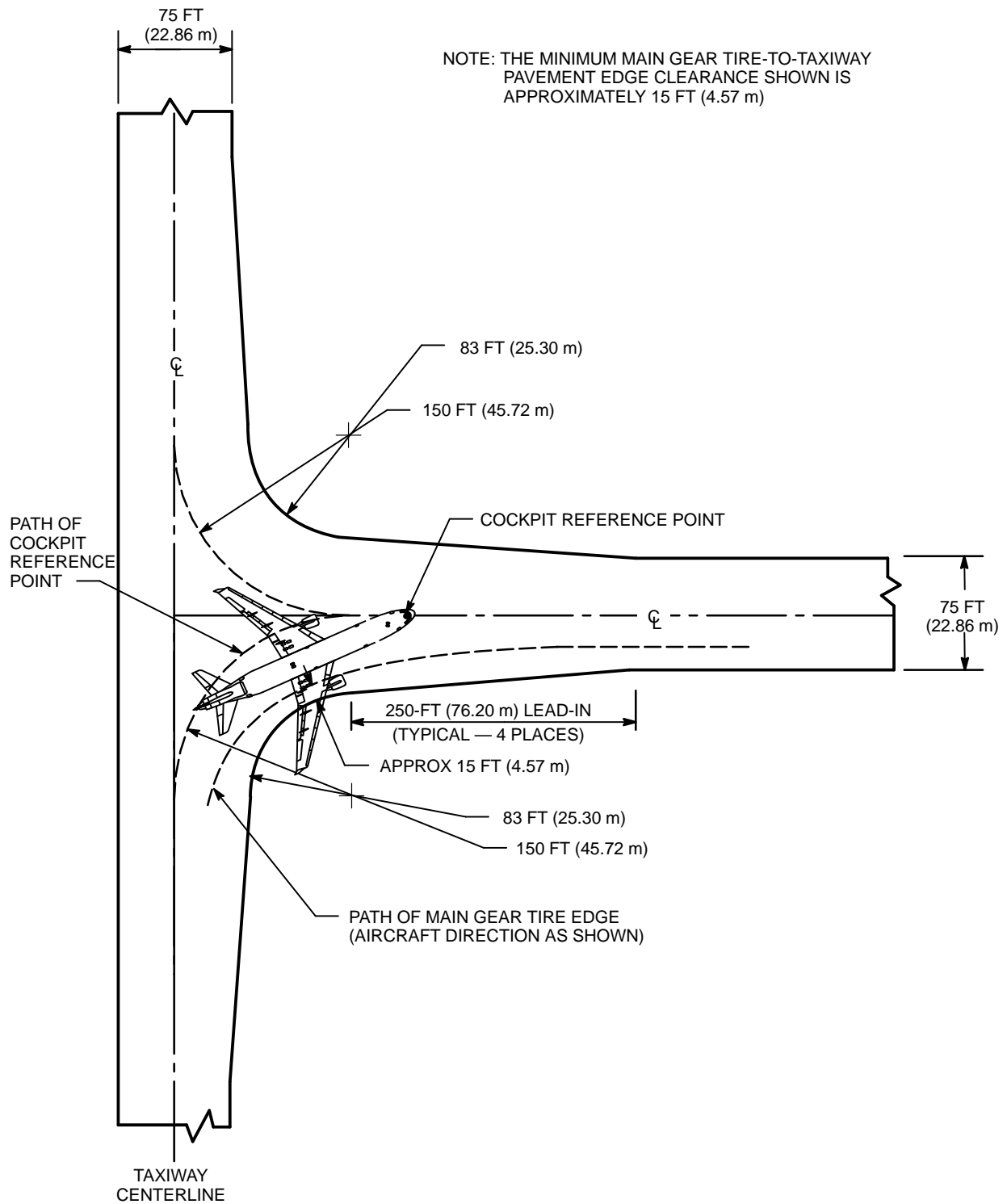
**4.5 RUNWAY AND TAXIWAY TURN PATHS**  
**4.5.1 MORE THAN 90-DEG TURN – RUNWAY TO TAXIWAY**  
**MANEUVERING METHOD – COCKPIT OVER CENTERLINE**  
**MODEL MD-11**

REV B



DMC005-88

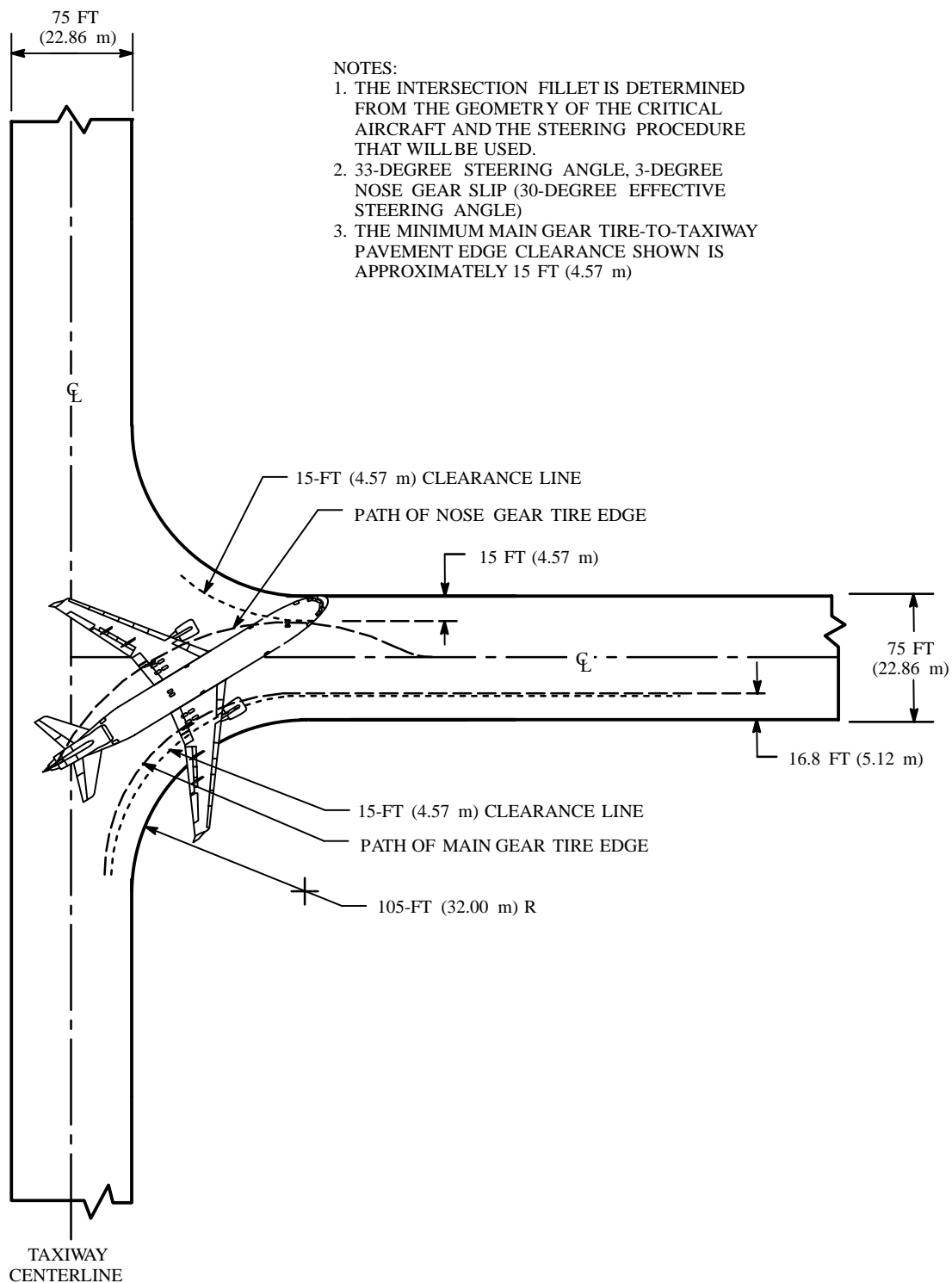
**4.5.2 MORE THAN 90-DEGREE TURN – RUNWAY TO TAXIWAY  
 MANEUVERING METHOD – JUDGMENTAL OVERSTEERING  
 MODEL MD-11**



DMC005-90

**4.5.3 90-DEGREE TURN – TAXIWAY TO TAXIWAY  
MANEUVERING METHOD — COCKPIT OVER CENTERLINE  
MODEL MD-11**

REV D

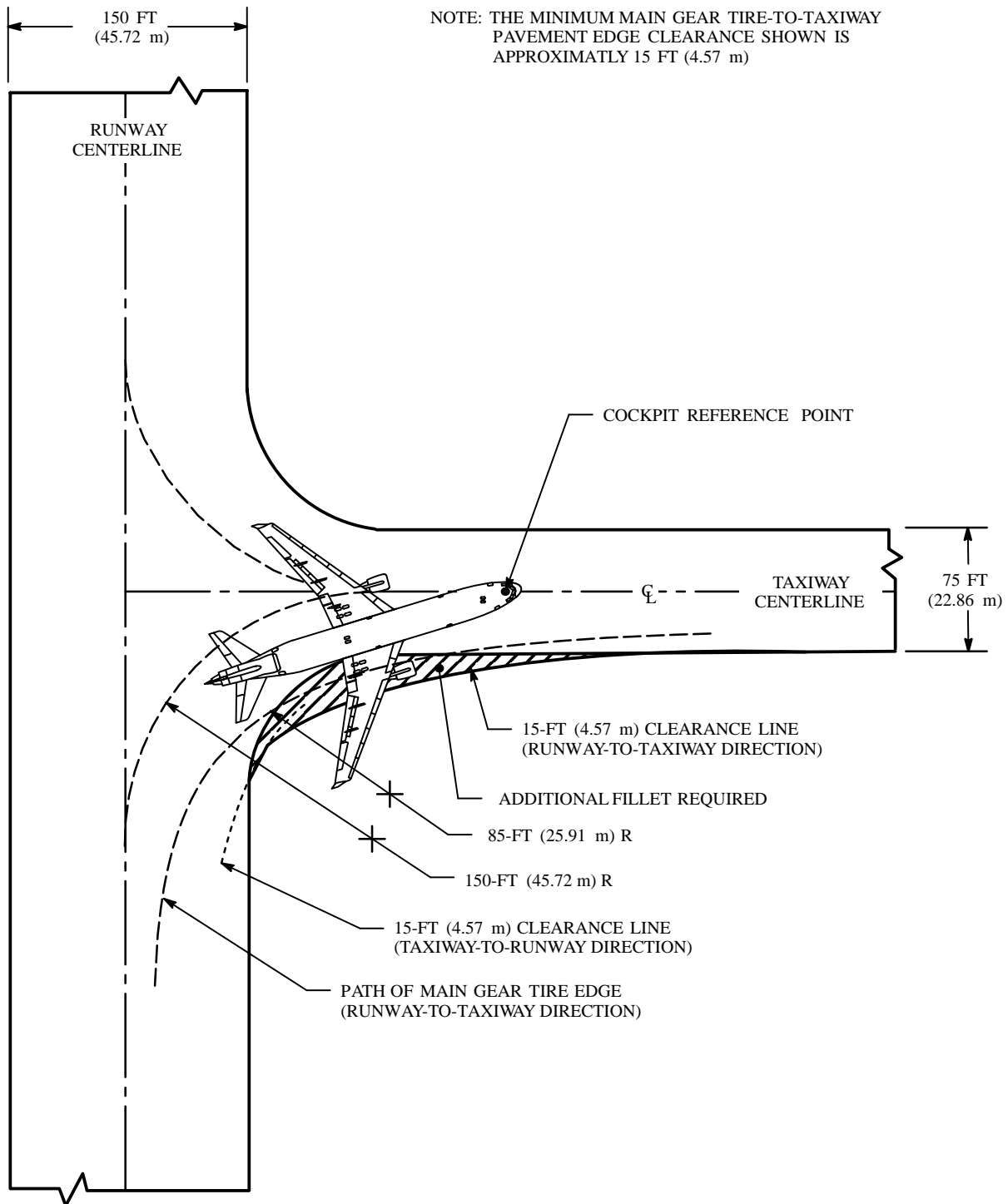


NOTES:

1. THE INTERSECTION FILLET IS DETERMINED FROM THE GEOMETRY OF THE CRITICAL AIRCRAFT AND THE STEERING PROCEDURE THAT WILL BE USED.
2. 33-DEGREE STEERING ANGLE, 3-DEGREE NOSE GEAR SLIP (30-DEGREE EFFECTIVE STEERING ANGLE)
3. THE MINIMUM MAIN GEAR TIRE-TO-TAXIWAY PAVEMENT EDGE CLEARANCE SHOWN IS APPROXIMATELY 15 FT (4.57 m)

**4.5.4 90-DEGREE TURN – TAXIWAY TO TAXIWAY  
MANEUVERING METHOD – JUDGMENTAL OVERSTEERING  
MODEL MD-11**

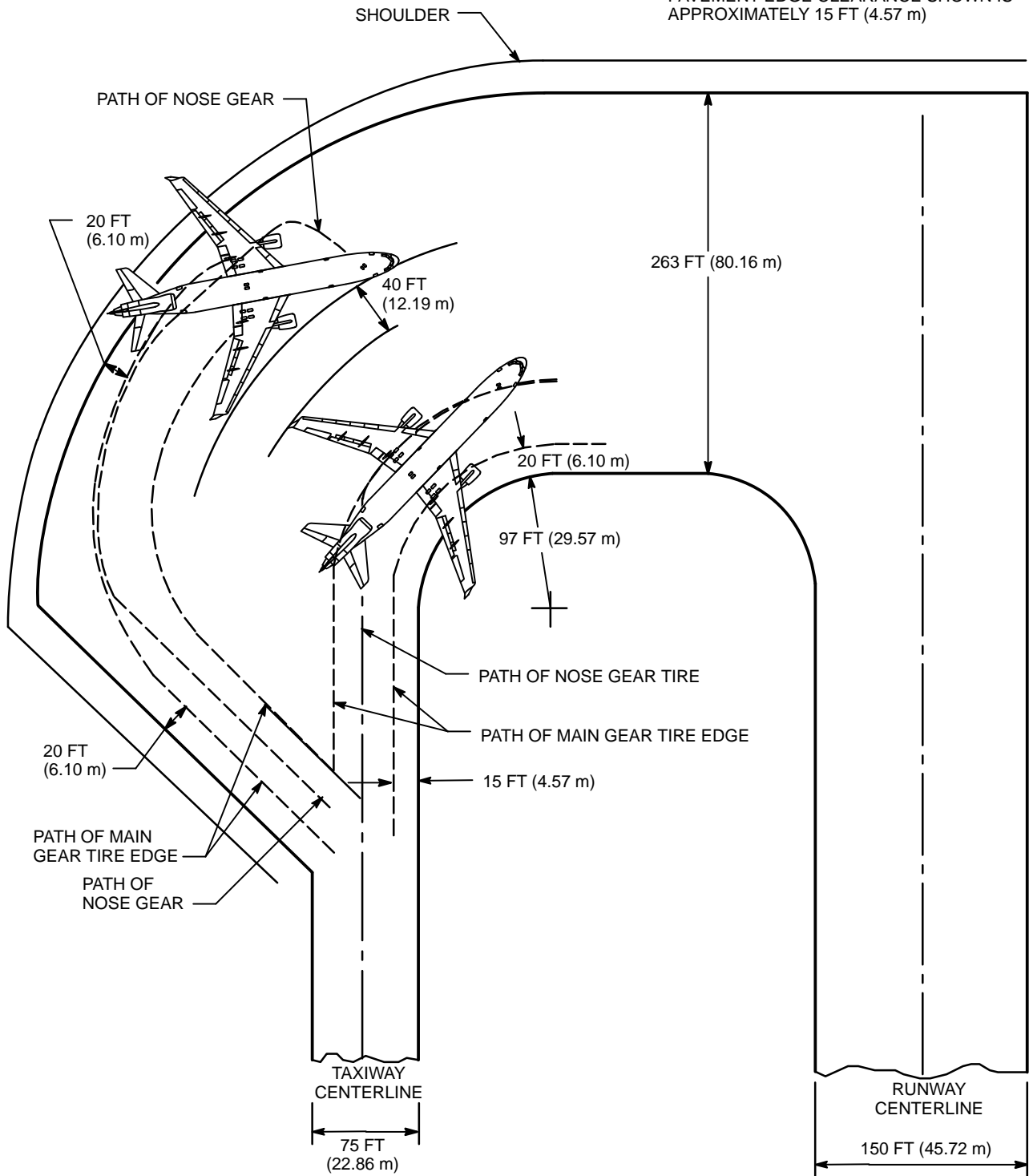
REV E



**4.5.5 90-DEGREE TURN – RUNWAY TO TAXIWAY  
 MANEUVERING METHOD – COCKPIT OVER CENTERLINE  
 MODEL MD-11**

REV E

NOTE: THE MINIMUM MAIN GEAR TIRE-TO-PAVEMENT EDGE CLEARANCE SHOWN IS APPROXIMATELY 15 FT (4.57 m)



DMC005-93

#### 4.6 RUNWAY HOLDING BAY (APRON) MODEL MD-11