Design vehicle type	P		SU		A-bus		Bus		WB-40		WB-50		WB-60	
Minimum turning radius [ft (m)]	24	(7.3)	42	(12.8)	38	(11.6)	42	(12.8)	40	(12.2)	45	(13.7)	45	(14.7)
Minimum inside radius [ft (m)]	14.9	(4.7)	27.8	(2.7)	21	(6.4)	24.0	(7.1)	17.7	(6.1)	16.6	(6.0)	21.4	(6.9)

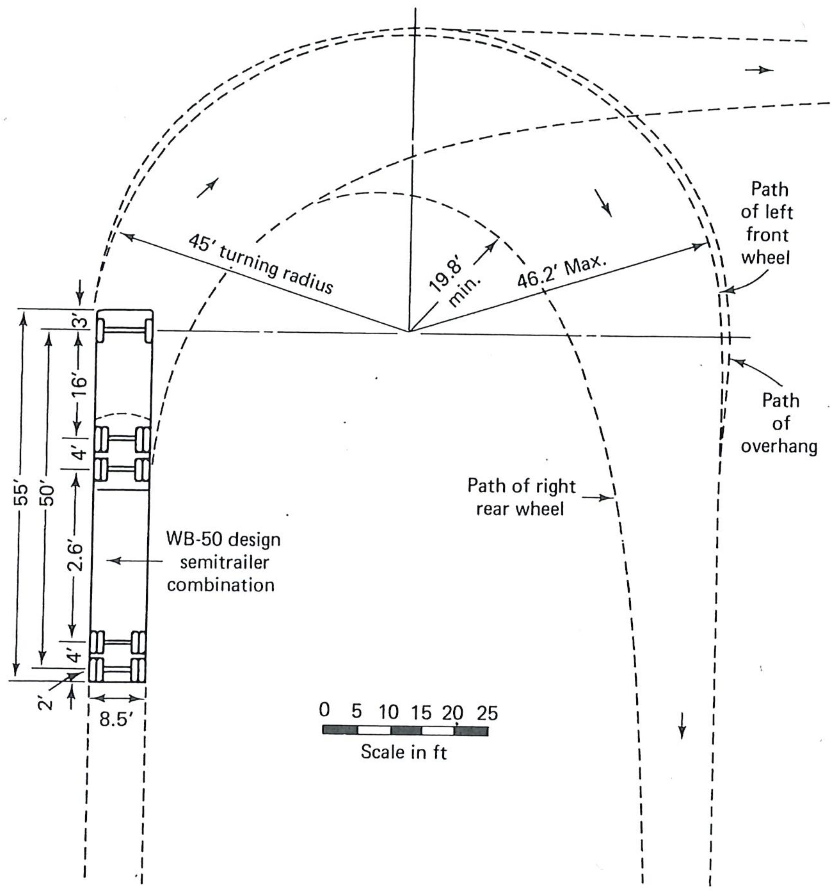

Figure 19.1. Minimum design path of typical design truck (WB-50 design vehicle). (Metric conversion factor: multiply value by 0.305 m/ft.) SOURCE: *A Policy on Geometric Design of Rural Highways*, Washington, D.C.: American Association of State Highway Officials, 1965, p. 84.

Sight distance

Stopping sight distance. Sight distance is the length of highway visible to the driver. Sight distance everywhere along a highway should be adequate for all but a few of the fastest drivers to come to a safe stop before reaching an object. Stopping sight distance used for design is the sum of two distances: (1) the distance a vehicle travels after the driver sights an object and begins braking and (2) the distance it travels during braking.

The stopping sight distance (SSD) in feet is determined from the formula

$$SSD = 1.47PV + \frac{V^2}{30(f \pm g)} \qquad (19.1)$$

where V = speed from which stop is made, mph
P = perception-reaction time, s
f = coefficient of friction (for wet pavement used for design)
g = percent of grade divided by 100 (added for upgrade and subtracted for downgrade)

If vehicle speed is in km/h, the stopping sight distance in meters is

$$SSD = 0.278PV + \frac{V^2}{225(f \pm g)} \qquad (19.2)$$

The range of minimum stopping sight distances for highways having various design speeds is shown in Table 19-5. Minimum distances assume that the vehicle is traveling at less than the design speed (the assumed speeds on which the minimum stopping distances are based). Longer distances assume that the vehicle is traveling at the design speed.

Stopping sight distance is measured from a "seeing" height of 3.5 ft (1.05 m) to an object height of 0.5 ft (15 cm). Desirable stopping sight distance values should be used for design whenever possible. Stopping sight distance values less than the minimum should never be considered.

Decision sight distance. Where conditions encountered by the driver are complex, there is often a need to provide sufficient space for a driver to do more than come to a stop. This space, termed decision sight distance, is defined as the

TABLE 19–5
Minimum Stopping Sight Distance on Wet Pavements*

Design Speed		Assumed Speed for Condition	Brake Reaction		Coefficient of Friction,	Braking Distance on Level	Stopping Sight Distance (ft)	
			Time	Distance			Computed	Rounded for Design
mph	km/h	mph (km/h)	(s)	(ft)	f	(ft)	(ft)	(ft)
20	30	20 (30)	2.5	73	0.40	33	106	120
30	50	28 (45)–30 (50)	2.5	103–110	0.35	75–86	178–196	200–200
40	65	36 (55)–40 (65)	2.5	132–147	0.32	135–167	267–314	275–325
50	80	44 (70)–50 (80)	2.5	161–183	0.30	215–278	376–461	375–475
60	95	52 (85)–60 (95)	2.5	191–220	0.29	311–414	502–634	525–650
65	105	55 (90)–65 (105)	2.5	202–238	0.29	348–486	550–724	550–725
70	115	58 (95)–70 (115)	2.5	213–257	0.28	400–583	613–840	625–850
75	120	61 (100)–75 (120)	2.5	224–275	0.28	443–670	667–945	675–950
80	130	64 (105)–80 (130)	2.5	235–293	0.27	506–790	741–1083	750–1100

Metric conversion factor: multiply value by 0.305 m/ft.

TABLE 19–6
Decision Sight Distance*

Design Speed		Times (s)				Decision Sight Distance (ft)	
		Premaneuver					
mph	km/h	Detection and Recognition	Decision and Response Initiation	Maneuver (lane change)	Summation	Computed	Rounded for Design
30	50	1.5–3	4.2–6.5	4.5	10.2–14	449–616	450–625
40	65	1.5–3	4.2–6.5	4.5	10.2–14	598–821	600–825
50	80	1.5–3	4.2–6.5	4.5	10.2–14	748–1027	750–1025
60	95	2–3	4.7–7.0	4.5	11.2–14.5	986–1276	1000–1275
70	115	2–3	4.7–7.0	4.0	10.7–14	1098–1437	1100–1450
80	130	2–3	4.7–7.0	4.0	10.7–14	1255–1643	1250–1650

*Metric conversion factor: multiply value by 0.305 m/ft.

SOURCE: McGee, H. W., Moore, W., Knapp, B. G., and Sanders, J. H. *Decision Sight Distance for Highway Design and Traffic Requirements*, U.S. Department of Transportation, FHWA, Washington, D.C. 1978.

distance at which drivers can detect a signal or hazard in a cluttered or visually noisy roadway environment, recognize it, and perform the required actions safely. Its values are substantially longer than those for stopping sight distance.

Locations where it is desirable to provide decision sight distance are: (1) complex interchanges and intersections; (2) any locations where unusual or unexpected maneuvers are required; (3) any variation in cross sections, such as toll plazas and lane drops; (4) where roadway elements, traffic and signs, signals, and other traffic control devices compete; and (5) areas where an unexpected maneuver may be required.

Table 19-6 shows a range of decision sight distances based on most complex situations. In measuring decision sight distance, the 3.5-ft (1.05-m) seated eye height criterion used to measure stopping sight distance is retained. However, the 6-in. (15 cm) object height is not retained and a zero height of object is adopted. Table 19-6 also shows the factors used to compute decision sight distances.

Passing sight distance. Passing sight distance is applicable only on two-lane, two-way highways. Passing sight distance is the length of highway ahead necessary for one vehicle to pass another before meeting an opposing vehicle which might appear after the pass began. Passing sight distances used for design, given in Table 19-7, are based on various traffic behavior assumptions.[13]

TABLE 19–7
Minimum Passing Sight Distances

Used for Design				Used for Pavement Marking			
Design Speed		Minimum Passing Sight Distance		85th Percentile Speed		Minimum Passing Sight Distance	
mph	km/h	ft	m	mph	km/h	ft	m
20	30	800	245	—	—	—	—
30	50	1100	335	30	48	500	152
40	64	1500	457	40	64	600	183
50	80	1800	549	50	80	800	244
60	97	2100	640	60	97	1000	305
65	105	2300	701	—	—	—	—
70	113	2500	762	70	113	1200	366
75	121	2600	793	—	—	—	—
80	129	2700	823	—	—	—	—

Passing sight distances for purposes of pavement marking are also given in Table 19-7. No-passing zone markings, given in the *Manual on Uniform Traffic Control Devices,*[14]

[13] "A Policy on Design of Rural Highways." pp. 140–145. Also refer to the new AASHTO policy on rural and urban highways when it is published.

[14] FEDERAL HIGHWAY ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION, *Manual on Uniform Traffic Control Devices for Streets and Highways*, (Washington, D.C.: Government Printing Office, 1978), p. 3B-8.