NEVADA TRANSPORTATION T2 CENTER

StreetWise

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STOPPING SIGHT DISTANCE:

A SIMPLE ROAD SAFETY CHECK YOU CAN DO

Roads are safer when drivers can see as far ahead as it takes to stop their vehicles. The distance it takes to notice a problem, realize a stop is necessary, and come to a complete stop is called ***stopping sight distance***. It is important all along a road, and special attention is needed where drivers approach crosswalks, intersections, driveways and work zones.

The conventional procedure used in measuring stopping sight distance assumes that drivers' eyes are 42 inches above the pavement. The procedure also assumes that a driver must be able to detect an object that reaches 24 inches above the pavement on the road ahead.

These measurements correspond to the eye height of a small adult in a small car and the height of brake lights on a passenger car on the road ahead. Research suggests that a driver must be able to see ahead for the distance shown at the various speeds in Table 1 (located on page 3) if the driver is to be able to bring his vehicle to a stop before crashing into a vehicle stalled on the road.

It should be pointed out that trucks need more distance to stop than small cars. Although the driver's higher eye position in a truck allows for extra sight distance on hillcrests, it may not help the driver see around an obstruction on the inside of a curve. A roadway that carries heavy truck traffic may need to provide drivers with greater stopping sight distance that is shown in the table.

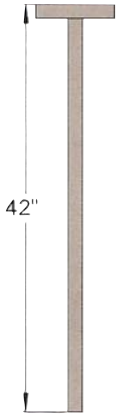
HOW TO MEASURE STOPPING SIGHT DISTANCE

Sight distance is measured along the travel path of vehicles. Therefore, measuring for stopping sight distance will require you to be in the travel lane with your back to traffic. Sometimes, measuring sight distance along the shoulder without standing in the travel lane will be adequate. But more often, for accuracy you and an assistant will stand in the travel lane.

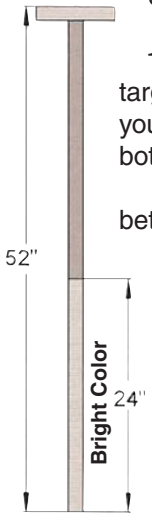
You may need extra people to watch for traffic. Establishing a very short-term work zone with flaggers will be safest. After all, you will be measuring a section of road that you suspect may not offer drivers adequate sight distance. Wear your safety vest and hard hat.

You and your assistant also will need:

- Sighting and target sticks. (See illustration on this page.) Paint the lower 24 inches of the target stick a bright color, such as fluorescent orange.
- Measuring wheel, long steel tape measure or surveyor's chain.



Sighting Sitck



Target Stick

To measure for stopping sight distance on hillcrests, kneel and guide your eyes to the proper height with the 42" sighting stick. (See Figure 1 on page 3.) Have your assistant move the target stick ahead of you in the travel lane until you cannot see any of the painted section at the bottom of the target stick.

Measure the distance in the travel lane between the two sticks, following the contour of the road. Compare the measurement to the distance in Table 1 that corresponds to the speed most vehicles travel at that location. Does that section of roadway provide a driver with sufficient stopping sight distance?

See Figure 2 (page 3) for taking measurements on horizontal curves. Note that the line of sight is shorter than the sight distance measurement. That is, you want to sight along a straight line between the two sticks, but you

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want to measure the distance between the two sticks in the curving travel lane.

Again, compare the measurement to the distance in Table 1. Does the horizontal curve provide a driver with sufficient stopping sight distance? If not, you may want to make some changes.

If taking your measurements in winter, keep in mind that the sight distance may be shorter in summer, when brush may encroach into the line of sight.

HOW MUCH IS ENOUGH?

As indicated in Table 1, the amount of stopping sight distance a driver needs will vary with vehicle speed, but also with roadway features and conditions the driver will encounter immediately following the measured section. Furthermore, with roads that carry fewer than 400 vehicles per day, the lesser sight distances shown in the table are acceptable. This is because the chances of a conflict are lower.

However, please note that the table shows stopping sight distances on level pavement for the various vehicle speeds, traffic volumes and immediately following roadway features. Drivers may need less sight distance where their lane is heading uphill. They may need as much as 20 percent more sight distance where their lane is on a steep downgrade. It is always better to provide a sight distance that is longer than the minimum shown in the table.

IF YOU DON'T HAVE ENOUGH

If less sight distance is available than Table 1 indicates and a driver needs to stop (particularly on the approach to crosswalks, intersections, driveways and work zones, and other higher risk locations) warn drivers with the appropriate advance warning sign. For example, where an intersection is hidden by a hillcrest or curve, install an intersection warning sign, with a speed advisory plaque if warranted.

However, improving sight distance may be necessary at places where inadequate sight distance has played a role in crashes. Improvements can be costly, but including them in other work planned for the location can make them more cost effective.

For example, you might eliminate a dip that limits sight distance during a culvert replacement, or lower a hillcrest during full-depth pavement repair. On the other hand, improving sight distance may simply be a matter of clearing brush and trimming trees.

Sight distance problems also are easier to avoid than fix. Work with your planning and zoning boards so new driveways, intersections or crosswalks are not constructed where driver sight distance to them will be limited. Many municipalities have ordinances prohibiting landowners from placing buildings or landscaping where they will limit sight distance.

Table 1.

Traffic Speed[1] (mph)	Stopping Sight Distance (feet)				
	0-100 vehicles/day	100-250 vehicles/day		250-400 vehicles/day	More than 400 vehicles/day
		Lower risk locations[2]	High risk locations[2]		
25	115	115	125	125	155
30	135	135	165	165	200
35	170	170	205	205	250
40	215	215	250	250	305
45	360	360	300	300	360
50	310	310	350	350	425
55	365	365	405	405	495
60	435	435	470	470	570

[1] Choose a speed that includes most traffic on the road. If known, use the 85th percentile speed. This is the speed that 85 percent of traffic is not exceeding and 15 percent are exceeding.

[2] Higher risk locations include intersections, narrow bridges, railroad grade crossings, sharp curves or steep downgrades. Lower risk locations are areas without such features.

Source: American Association of State Highway and Transportation Officials (AASHTO) Geometric Design of Very Low-Volume Local Roads and AASHTO's "Green Book."

Figure 1. Measuring stopping sight distance on hillcrests.

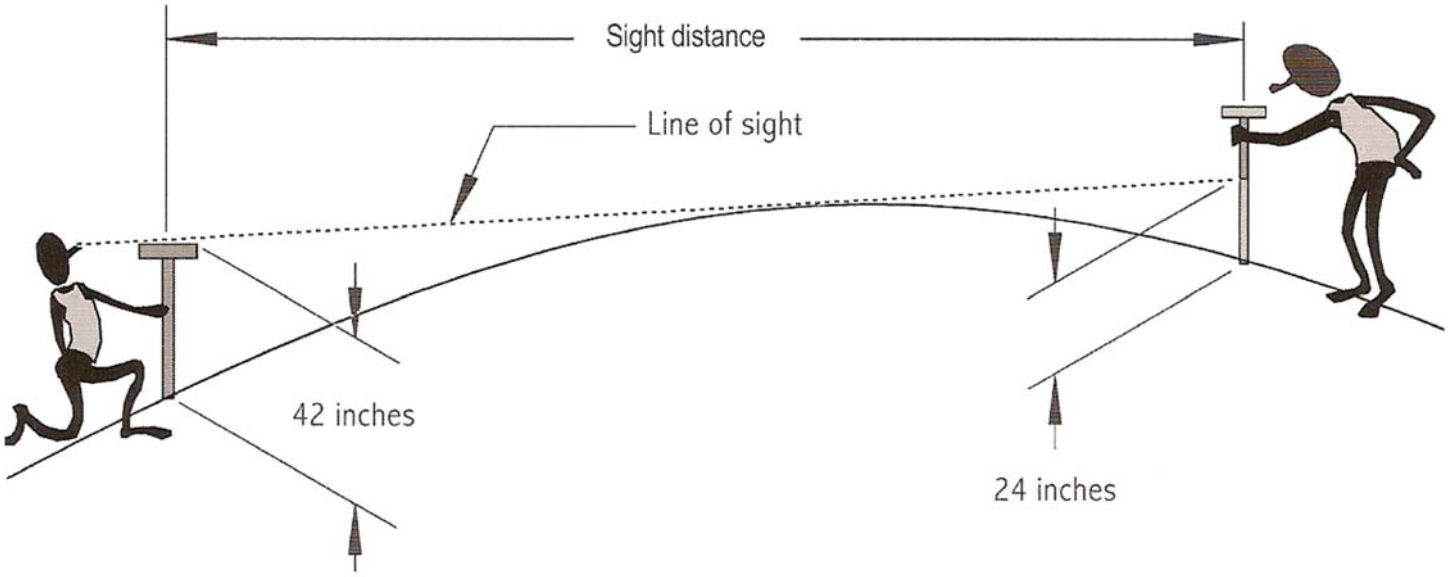
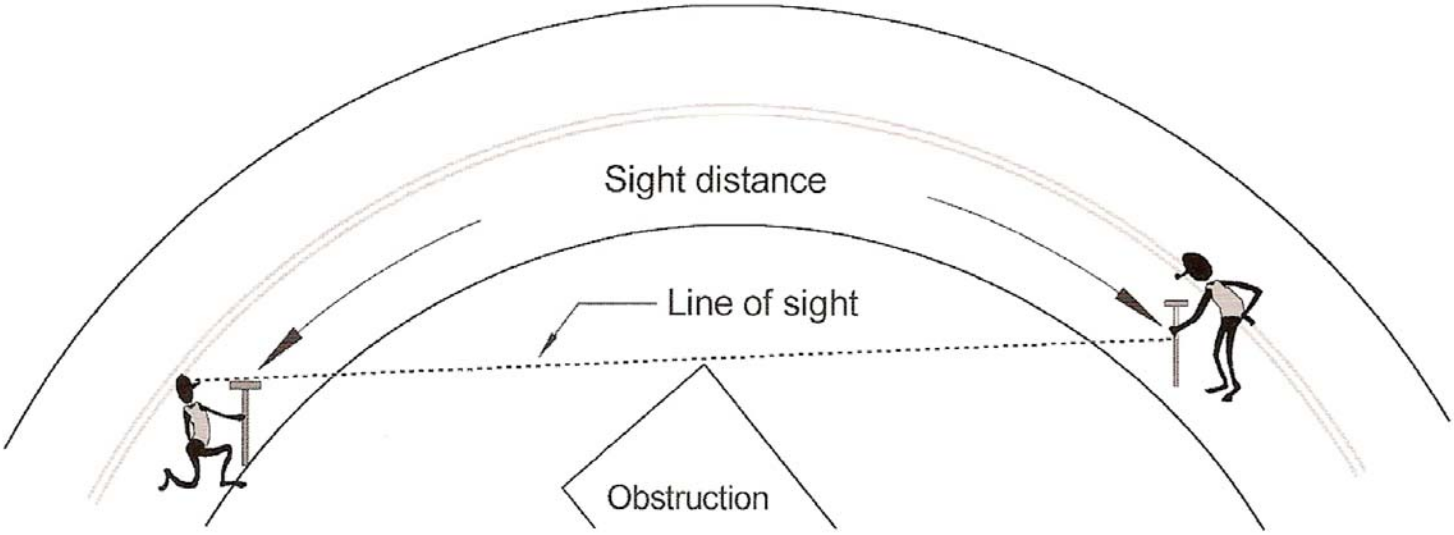


Figure 2. Measuring stopping sight distance on horizontal curves.



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For additional information, contact the Nevada T^2 Center at the address shown below.

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