

Guidelines for the Application of
SPEED FEEDBACK TRAILERS
Iowa DOT
DRAFT August 1, 2017
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PURPOSE:

The purpose of this guideline is to provide direction and guidance for the installation of SPEED FEEDBACK TRAILER signs for:

- Work zones.
- Municipalities requesting their use for speed management.
- Collecting speed and volume information.

DESCRIPTION:

SPEED FEEDBACK TRAILER signs are changeable message signs that are activated by radar and then display, to approaching drivers, the speed at which they are traveling. They may be installed in conjunction with a regularly posted Speed Limit sign, or Work Zone Speed Limit sign. These signs are sometimes referred to as "speed display signs", "driver feedback signs" or "your speed is" signs.

DATA COLLECTION. If your speed feedback trailer has been equipped with optional data logger, it can be used to collect traffic information to conduct a pseudo speed study. Data obtained may be used to set a different speed limit, but can also be used to identify possible sections of roadway where a full traffic study should be completed by the Office of Traffic & Safety. When in data collection mode, the 'feedback display' portion of the sign unit should not be aimed towards traffic. To do so would skew the data.

EFFECTIVENESS:

Studies have shown that the SPEED FEEDBACK TRAILER signs cause reductions in travel speed, by drivers¹. These reductions in speed are beneficial especially when workers will be close to an open lane with high speed traffic or when drivers may not readily recognize the need to slow down, such as a curve or lane shift. The use of the SPEED FEEDBACK TRAILER signs are not limited to any certain speed limit value; however, they may have better utility in areas with higher speeds. While the signs do improve compliance to a lower speed, they have limitations and the typical practice of lowering speed limits by 10 or 15 MPH in a work zone should be followed. The following are some high-level considerations related to SPEED FEEDBACK TRAILERS:

- More effective if perception of regular enforcement (and threat of citation) exists at site.
- More effective if the sight distance to the treated condition is less than decision sight distance.
- More effective where only one lane exists per direction.
- More effective if used with other information "indicators" of a need to reduce speed.
- More effective if the SPEED FEEDBACK TRAILER is used to support a regulatory speed limit.
- More effective if the overall information system at the location does not overwhelm the speed display sign.

Overuse of the SPEED FEEDBACK TRAILER signs can reduce their effectiveness therefore rotating the sign to different work zones or more critical areas within a project is recommended. The signs should prove most effective during the initial stages of any long term project especially if law enforcement is utilized.

DISPLAY: The changeable message portion of the sign displays the speed of the approaching vehicle as “XX” in MPH. The speed limit supplemented by the speed feedback trailer is either a permanent or work zone regulatory speed.

When used to supplement a regulatory speed limit a black on white SPEED LIMIT XX sign and a black on white YOUR SPEED sign shall be installed immediately adjacent to the dynamic “XX” sign as shown below.



Include another photo here showing the speed feedback trailer immediately adjacent to an existing regulatory work zone speed limit sign.

Examples of Speed Feedback Trailer Displays

OPERATIONAL GUIDELINES: The SPEED FEEDBACK TRAILER shall be programmed to meet the following:

- The SPEED FEEDBACK TRAILER sign shall be blank when no vehicles are present.
- Threshold speed settings should be set at 30 mph over the speed limit
- For speeds measured over the speed threshold setting, the SPEED FEEDBACK TRAILER sign shall go blank.
- Only speed values that are constantly on shall be used to convey messages to drivers with these devices. No use of text, icons, strobe lights or flashing shall be used.
- SPEED FEEDBACK TRAILER signs should only operate for the time period that the regulatory speed limit is in effect and workers are present or roadway conditions warrant reduced speeds for traffic safety.
- No “countdown” function shall be used if the sign is so equipped.

LOCATION AND PLACEMENT:

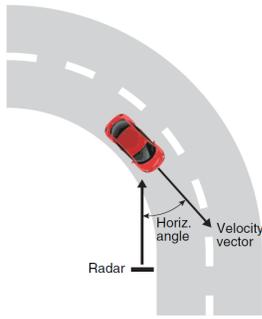
SPEED FEEDBACK TRAILER signs are used at the point of speed reduction, immediately adjacent to the workers and work activityⁱⁱ, or in advance of roadway conditions that require speed reduction.

On single lane sections the speed feedback trailers can be placed on either side of the open lane adjacent to or opposite of the work zone speed limit sign. When more than one lane is open to traffic and an adjacent lane(s) is closed, the speed feedback trailers should be placed in the closed lane(s) adjacent to the work zone speed limit sign.

Speed feedback trailer signs should not be more than one mile in advance of active work activity or roadway condition that warrants the use of reduced speeds.

Add a nice diagram (MUTCD Looking) here showing trailer placed on a tangent before the work zone

GOOD PLACEMENT: Studies have shown that the optimum distance for speed reduction is 1000 feetⁱⁱⁱ. It is advisable to place the SPEED FEEDBACK TRAILER sign on a tangent section of roadway between 500 and 2500 feet of the workers or hazardous condition. If used on a longer construction project, involving miles of lane closure or two-way traffic, the SPEED FEEDBACK TRAILER sign should be relocated several times nearer the active work area to improve its effectiveness and should be adjacent to a regulatory speed limit sign.

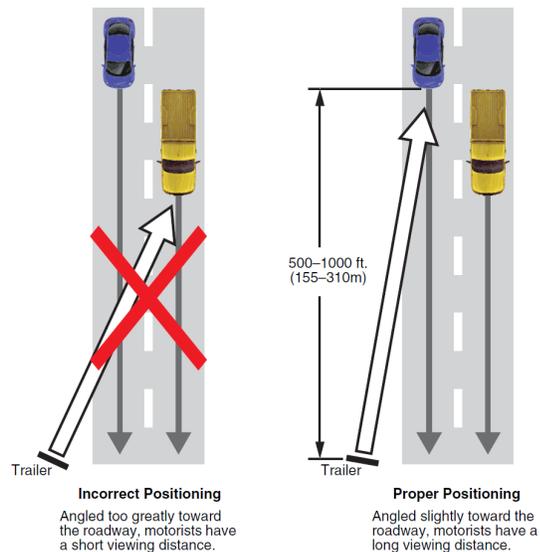


BAD PLACEMENT: Do not install near a curve to prevent the sign's radar from incorrectly detecting an approaching vehicle's speed. This condition is known as the 'cosine effect'. This occurs when the target vehicle's path is at an angle to the radar, including conditions such as the vehicle traveling on a curve or hill. As the angle between the radar beam and the target vehicle increases, the displayed speed decreases. Ideally, an angle of zero degrees is preferable (i.e., the vehicle is traveling directly at the radar beam), because the displayed speed is the actual target vehicle speed. In all applications, however, the radar device is generally at a slight angle to the target vehicle.

SETUP AND AIMING:

The angle of the speed display to the roadway is important for viewing by motorists. Proper positioning ensures motorists have the best chance of seeing and reacting to the display. Optimal positioning provides the radar with a line-of-sight from 500 to 1000 feet, which allows ample time for the speed to appear on the display and for motorists to read and react to it.

- Position the trailer so it faces the near lane of oncoming traffic.
- Angle the trailer slightly toward the roadway, as indicated in Figure to the right.
 - Too great an angle creates a short viewing distance, and does not allow motorists enough time to see the speed display.
 - A slight angle provides a long viewing distance, and gives motorists plenty of time to see the speed display.
 - For nighttime operations ensure this angle does not cause glare for approaching drivers.



ⁱ McCoy, P.T., J.A. Bonneson, J.A. Kollbaum. Speed Reduction Effects of Speed Monitoring Displays with Radar in Work Zones on Interstate Highways. In Transportation Research Record 1509. TRB, National Research Council, Washington, D.C., 1995.

Effective Deployment of Radar Speed Signs, A Project Conducted Under California and Oregon Advanced Transportation Systems (COATS) Phase IV, Final Report, Prepared by David Veneziano, Ph.D., and Larry Hayden, and Jared Ye, Ph.D., Western Transportation Institute, December, 2010.

ⁱⁱ Fontaine, M.D., and P.J. Carlson. Evaluation of Speed Displays and Rumble Strips at Rural-Maintenance Work Zones. In Transportation Research Record 1745. TRB, National Research Council, Washington, D.C., 2001.

ⁱⁱⁱ EVALUATION OF TRAFFIC CONTROL DEVICES FOR RURAL HIGH-SPEED MAINTENANCE WORK ZONES, October 2000, Paul J. Carlson, Michael D. Fontaine, and H. Gene Hawkins, Jr., Texas Transportation Institute