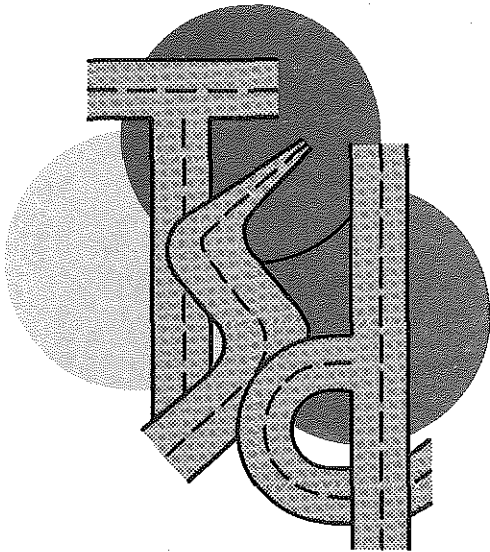


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PROCEDURES MANUAL FOR  
THE DETERMINATION AND ESTABLISHMENT OF  
NO-PASSING ZONES  
Supplement To TSD-TR-105-69



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MICHIGAN DEPARTMENT OF STATE HIGHWAYS

PROCEDURES MANUAL FOR  
THE DETERMINATION AND ESTABLISHMENT OF  
NO-PASSING ZONES  
Supplement To TSD-TR-105-69

By

Herbert R. Schoepke

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Conducted By

Traffic Research Section  
Traffic & Safety Division

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## INTRODUCTION

You are about to establish no-passing zones. Immediately some questions come to mind. What is a no-passing zone? Why is the establishment of a zone necessary? What requirements must be met before a zone is established? What procedure do I use to determine if these requirements are met? This manual is being prepared to answer these questions and any others which may arise during your determination and establishment of no-passing zones.

## THE LAW

The law requiring no-passing zones, Act 300, P.A. of 1949, Section 640 of the Michigan Vehicle Code entitled "No Passing Zones, Marking," reads as follows:

- "(a) The state highway commission and county road commissions, with respect to highway under their jurisdiction, are hereby authorized to determine those portions of any highway under their jurisdiction where overtaking and passing or driving to the left of the roadway would be especially hazardous, and shall by appropriate signs or markings on the roadway indicate the beginning and end of such zones in such a manner that an ordinary observant driver of a vehicle will be able to observe the directions thereof and

obey the same.

- (b) The no-passing zones provided for by this section shall be based upon a traffic survey and engineering study and all such traffic-control devices installed pursuant to this section shall conform to the state manual and specifications as provided for by section 608."

The Section 608 of the Michigan Vehicle Code referred to in the latter paragraph provides for the adoption of the Michigan Manual of Uniform Traffic Control Devices.

#### NO-PASSING ZONE REQUIREMENTS

There are five elements involved in the establishment of a no-passing zone. Each of these elements has a specified requirement stated in the Michigan Manual of Uniform Traffic Control Devices, and no numerical quantities will, therefore, be given in the following instructions. The purpose and use of the five elements are described as follows:

1. Minimum Sight Distance

This is the basic distance used in the establishment of a no-passing zone. If a driver's sight is restricted to less than the distance specified in the Michigan Manual of Uniform Traffic Control Devices, it is especially hazardous to drive on the left side of the roadway for passing other vehicles.

2. Target Height

This height as specified in the Michigan Manual is based on the eye height of the driver in a motor vehicle. The line of sight referred to in this manual is the straight line passing through two targets used in the survey.

3. Minimum Length of a No-Passing Zone

Any zone that is established must be of this specified minimum length. If the sight-restricted zone is shorter than the minimum length, the additional length shall be added to the beginning of the zone.

4. Minimum Distance Between Zones

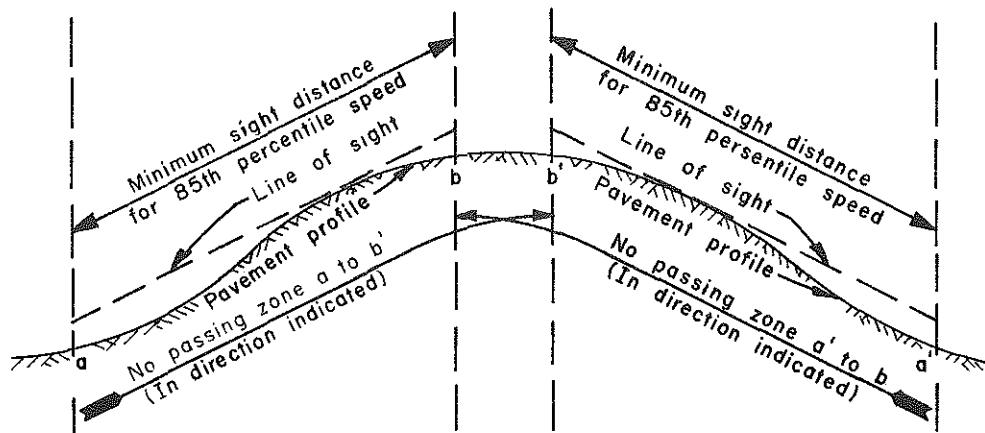
This distance is measured from the end of a no-passing zone to the beginning of the next zone, and is based on the minimum distance necessary to pass a slow moving vehicle. The distance specified in the Michigan Manual must be exceeded or a continuous no-passing zone is to be established.

5. Provision for Depression

While surveying a hill for a no-passing zone, care should be taken that a dip or depression within the specified minimum sight distance (Element 1) does not cause a sight restriction. The ending of the zone shall be extended, in such a case, so that the target may be visible at the line of sight throughout the dip or depression.

## VERTICAL CURVE

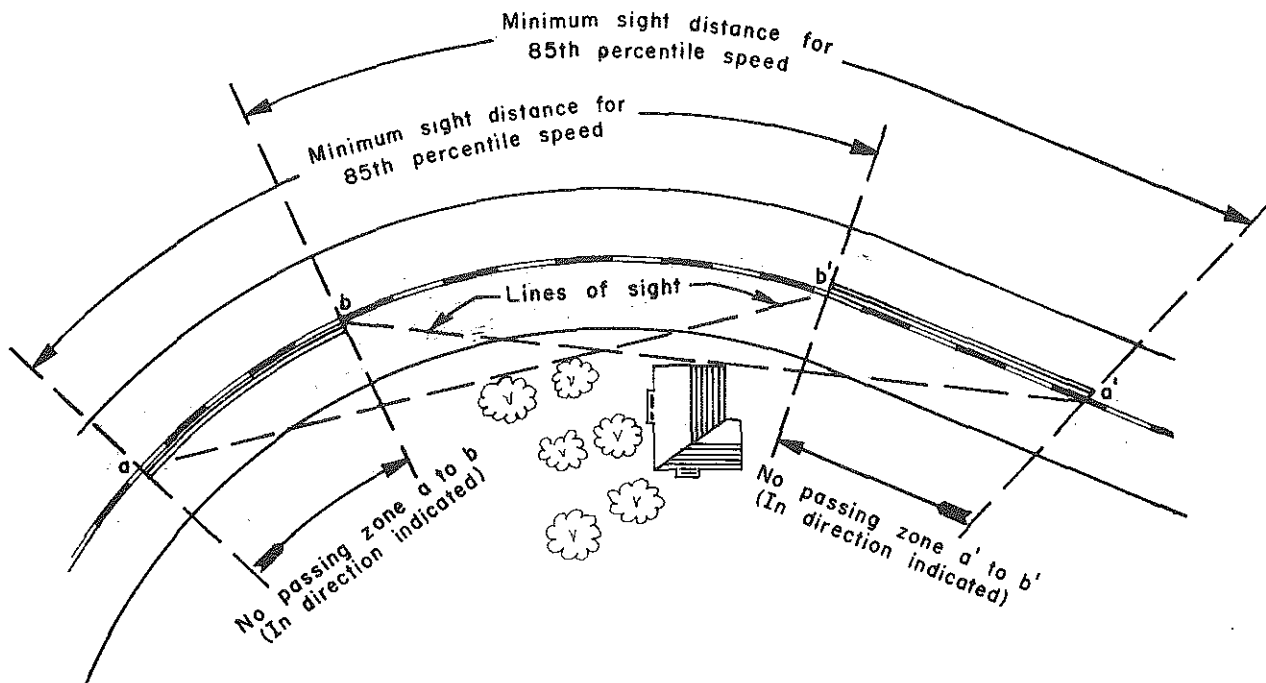
NOTE: No passing zones in opposite directions may or may not overlap, depending on alignment.



a & a' - Begin no passing zone  
Sight distance becomes less than minimum at points a & a' when measured at a specified distance above the pavement.

b & b' - End no passing zone  
Sight distance again exceeds minimum at points b & b'.

## HORIZONTAL CURVE



a & a' - Begin no passing zone  
Sight distance, measured along center line (or right-hand lane line on three lane road), becomes less than minimum.

b & b' - End no passing zone  
Sight distance again exceeds minimum at points b & b'.

NOTE: No passing zones in opposite directions may or may not overlap, depending on alignment.

**Method of locating and determining the limits of no passing zones at vertical and horizontal curves.**

Figure I.

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## FIELD PROCEDURE

Figure I shows the method of locating and determining the limits of no-passing zones at vertical and horizontal curves. Using Figure I, the following is a detailed description of the survey procedure for a vertical curve. This survey requires a crew of two men. To simplify this description, the forward man of the crew will be referred to as the frontman. The trailing man of the crew will be referred to as the rearman. The crew is assumed to be traveling from left to right in Figure I. Each man is equipped with a device for measuring road length, a target at the specified height for line of sight, and a means of voice communication. In this procedure, the frontman will always be establishing zones which affect traffic in the direction opposite to the travel of the crew, and the rearman will establish zones which affect traffic in the same direction that they travel.

Selecting a point in advance of the vertical curve, the frontman advances the specified minimum sight distance (Element 1). At this point both men reset the measuring devices to zero. From now on, as long as the readings on the measuring devices are the same, the two men will be the specified minimum sight distance apart. The two men then proceed up the vertical curve keeping the measuring device readings the same. The rearman will make frequent sightings from his target height to insure



the frontman's target is always visible. When the frontman's target begins to disappear from view, both men will stop and insure the readings on the measuring devices are the same and that they are the minimum sight distance apart. Adjustments are then made until both men viewing from the line of sight height can see one half of the other man's target. The rearman is now at the beginning of his no-passing zone (Point a in Figure I). The rearman marks this point as the beginning of a no-passing zone. The frontman makes a temporary mark at his point. The rearman then proceeds into the vertical curve while the frontman, sighting from his target height, insures he can see the target throughout minimum sight distance. If the rearman's target does not disappear, the point where the frontman is becomes the end of his no-passing zone. If the rearman's target does begin to disappear, the frontman makes adjustments enabling him to see the target all the way through the dip or depression (Element 5). The point where he ends becomes the ending of the frontman's no-passing zone (Point b in Figure I). The frontman then marks the point.

Both men then return to their original relative position where they are the specified minimum sight distance apart. Both men reset the measuring device readouts to zero, then move on into the vertical curve keeping pace with each other. While moving on into the vertical curve, they insure that the zone must be at least as long as the minimum length of a

no-passing zone (Element 3). Additional length will be added to the beginning of a zone to obtain this minimum.

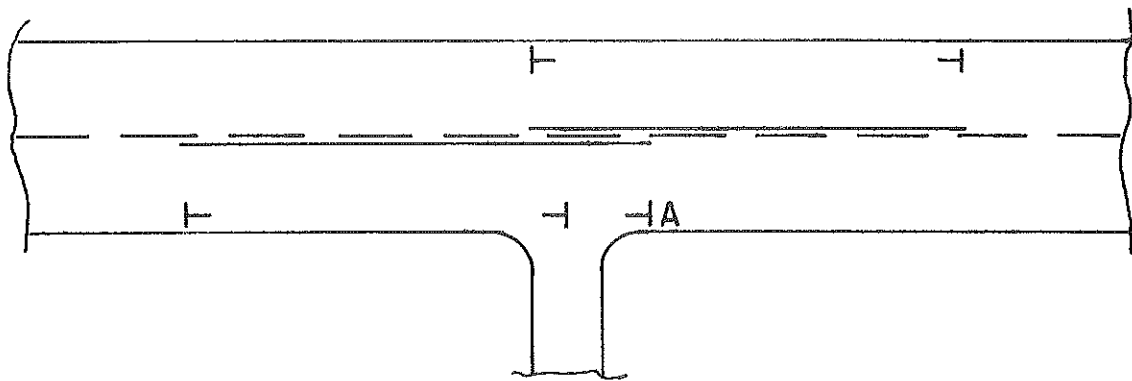
As the two men proceed over the hill, the rearman will make frequent sightings from his target height until the frontman's target appears into view. Both men will then stop and insure the readings on the measuring devices are the same and that they are the minimum sight distance apart. Adjustments are made until both men viewing from the line of sight height can see one half of the other man's target. The frontman is now at the beginning of his no-passing zone and shall mark this point properly. (This is point  $a^1$  in Figure I). The frontman then moves toward the rearman so he may check for a dip or depression and make any necessary adjustments. When this is done the rearman is at the ending of his zone, or point  $b^1$  in Figure I. The no-passing zones for this vertical curve are not established. Both men will position themselves so that they are the minimum sight distance apart again, and proceed to the next horizontal or vertical curve and repeat the process.

The procedure is the same for a horizontal curve, except that no check is necessary for a dip or depression, but care must be taken that during certain seasons of the year, foliage will not cause a sight restriction.

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## FIELD ADJUSTMENTS

Due to unavailability of a convenient sign-placement location, adjustments in the limits of a no-passing zone sometimes become necessary. The lack of a sign placement location is usually caused by a driveway, crossroad, culvert, etc. The survey crew shall make these adjustments in the following manner. If an adjustment is necessary in the ending of a zone, the length of the line will always be extended. If an adjustment is necessary in the beginning of a zone, the length of the line may either be shortened or extended, whichever involves the shortest change in distance. If a line is shortening, it shall not be shortened more than fifty feet.



Typical Marking of No Passing Zones for Paint Crews.

Figure II

## FIELD MARKING

The limits of a no-passing zone are marked in the field with a T using the trailing edge of the T to denote the direction the paint should be applied. This method of marking is shown in Figure II. If a field adjustment is made in any zone limit, a large A will be placed beside the adjusted T that is painted after the zone limits have been marked and then reviewed by the District Traffic Engineer or his representative. Any marks that are not to be used as a zone limit are to be eradicated. (Note: The mark located in the driveway in Figure II would be eradicated.)

## RECORDING OF NO-PASSING ZONES

The location and limits of all no-passing zones will be recorded immediately after being reviewed with the District Traffic Engineer. The points will be located by measuring the distance from the beginning of the control section to that point. This should be done with an accurate measuring device which measures in feet. If any field adjustments are made, both points will be recorded and the reason for the adjustment stated. A sample field data form is presented in Figure III. Most of the columns in Figure III are self explanatory. The mark type column will have a group of codes describing the various marks. The zone number column is numbered consecutively from the beginning of the control section.



## EQUIPMENT RECOMMENDATION

Each crew should have two passenger vehicles, and each vehicle should have a permanent mount attached to receive a fifth-wheel-type measuring device. This device is accurate to + or - two feet in one mile. A digital readout must show five digits or more and should be of the electronic Nixie tube type. Mechanical counters have been tried but have questionable durability.

Each vehicle must have a voice communication system with a range of one mile. They should not be required to get clearance each time they communicate.

A target of about 18" in diameter must be mounted at the front of one vehicle and the rear of another vehicle. The target on each vehicle must be adjustable so the required target height may be maintained. The target should have a small high intensity light in the center of the target to assist personnel in sighting at long distances. The target should also have a horizontal opening 3/4" x 6" to be used to view through.

The Safety Section should be consulted as to the safety equipment necessary for the vehicles.