

65-3304

NO - PASSING

ZONES

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Michigan
State Highway Department
G. Donald Kennedy
State Highway Commissioner

SIMPLE INSTRUCTIONS FOR THE ESTABLISHMENT OF NO PASSING ZONES

Planning & Traffic Division

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No Passing Zone signs should be used on both horizontal and vertical curves of two and three lane pavements where passing is prohibited due to the danger involved in such maneuvers because of restricted sight distances. An important phase in the establishment of these zones depends largely on the average speed of the road and the ability of the surveyor to estimate within a reasonable degree of accuracy the sight distances. Ordinarily average road speeds are obtained by taking speed observations on the various road sections in question. A suitable speed study Work Sheet is illustrated in Figure R-1, on which a typical example has been worked out. The site selected for such a speed study should be fairly free from both horizontal and vertical curves as well as excessive roadside developments. The length of the speed trap used in conjunction with the illustrated Work Sheet is 220 feet which is of sufficient length to enable fairly accurate observations to be made. To establish the trap, two lines should be marked or painted on the pavement 220 feet apart. The observer, with stop watch and Work Sheet, should be stationed so that he can easily see vehicles as they cross both the starting and finishing lines. The speed of each vehicle through the trap is recorded by placing a tally mark in the space provided according to the time taken to traverse the trap. One hundred observations should be taken during daylight when the roadway is dry and on a midweek day, preferably Tuesday, Wednesday, or Thursday. The number of vehicles multiplied by

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VEHICLE SPEED TALLY SHEET

County Ingham Township Lansing Location US-16 at W. Ingham Co. Line
 Date 2/24/42 Hours 9 to 12 AM Weather Clear Surface Dry
 Direction of travel West Baseline 220 Ft. Observer John Jones

Time	Speed	Observations	Time	Speed	Observations
2.	75.	/	4.9	30.6	
2.1	71.4	//	5.	30.	/
2.2	68.2	///	5.1	29.4	
2.3	65.2	//	5.2	28.8	/
2.4	62.5	/// IIII	5.3	28.3	
2.5	60.0	////	5.4	27.8	
2.6	57.7	////	5.5	27.3	
2.7	55.6	//	5.6	26.8	
2.8	53.6	/// IIII //	5.7	26.3	
2.9	51.7	///	5.8	25.9	
3.	50.	/// IIII IIII	5.9	25.4	
3.1	48.4	////	6.	25.	
3.2	46.9	/// IIII	6.1	24.6	
3.3	45.5	/	6.2	24.2	
3.4	44.1	///	6.3	23.8	
3.5	42.9	/	6.4	23.4	
3.6	41.7	////	6.5	23.1	
3.7	40.5	/	6.6	22.7	
3.8	39.5	///	6.7	22.4	
3.9	38.5	/	6.8	22.1	
4.	37.5	////	6.9	21.7	
4.1	36.6		7.	21.4	
4.2	35.7		7.1	21.1	
4.3	34.9		7.2	20.8	
4.4	34.1	///	7.3	20.5	
4.5	33.3		7.4	20.3	
4.6	32.6	/	7.5	20.0	
4.7	31.9		7.6	19.7	
4.8	31.3	/	7.7	19.5	

Number of vehicles 100
 Vehicle miles per hour 5100
 Average Speed 51 M.P.H.

the miles per hour will give the vehicle miles per hour for each time group. The sum of the vehicle miles per hour divided by the total number of observations will produce the average speed for the road.

It is generally found that when road widths, road surfaces or roadside developments change to any material extent, road speeds also change so that average speeds should be determined for every typical section of any given road.

From studies already made in various sections of this state on our rural trunk lines, we have estimated the average speed of our highways to be approximately 50 miles per hour and are using this speed in the establishment of No Passing Zones unless extensive speed studies are made or where traffic is controlled by a speed determination or Traffic Control Order.

- A. The surveyor should first check his eye height sitting in a normal position in his car. This should be $4\frac{1}{2}'$ above the pavement. This can very easily be done by the use of a hand level and level rod; all survey and construction crews are well supplied with these instruments and will be willing to loan them for a short period of time. Park on the pavement and sit in your car in a normal position with the hand level to the eye properly centered, and opposite your car have someone hold the level rod upon the road surface, thus reading $4\frac{1}{2}'$. If you fail to read this, re-adjust yourself accordingly.

TABLE I

<u>Speed of Road (M.P.H.)</u>	<u>Maximum Sight Distance Warranting "No Passing" signs</u>
30	475
35	602
40	735
45	870
50	1,000
55	1,135
60	1,260

TABLE II

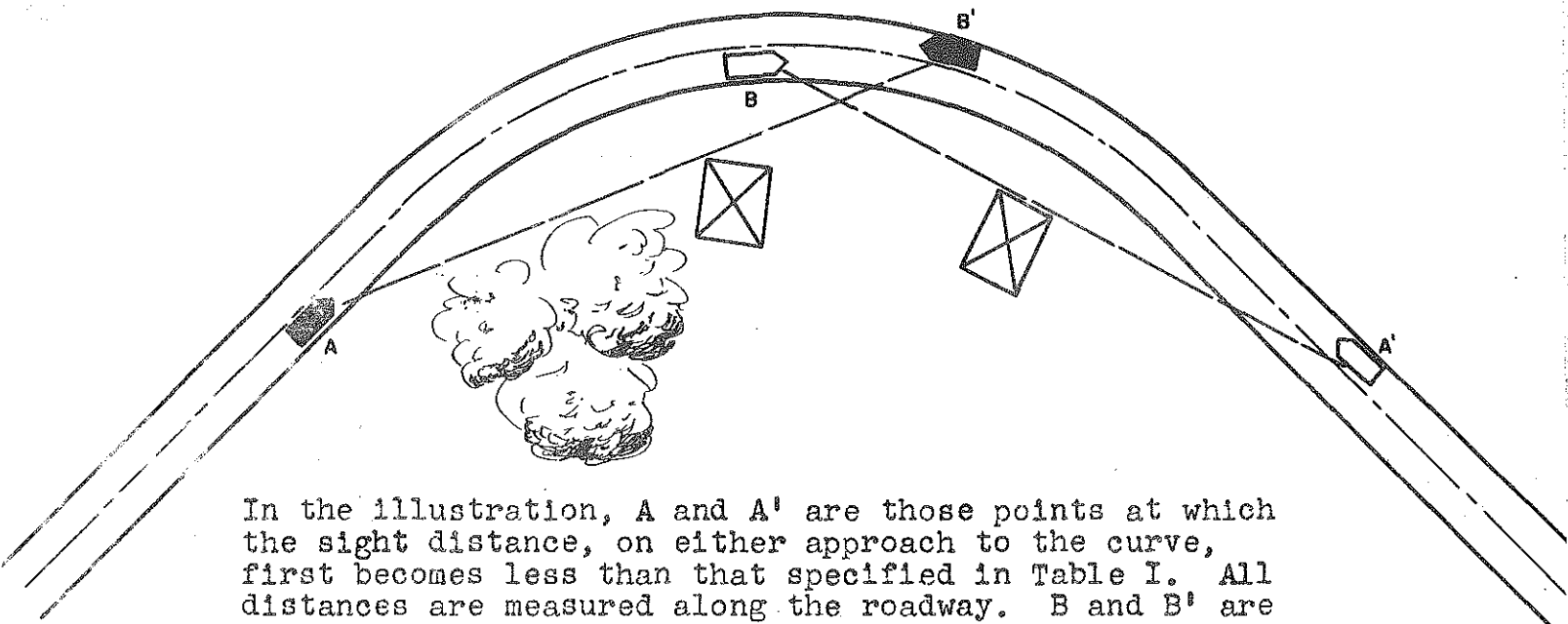
<u>Speed of Road (M.P.H.)</u>	<u>Minimum Distance Between Beginning & End of Zone</u>
30	238
35	301
40	368
45	435
50	500
55	568
60	630

TABLE III

<u>Speed of Road (M.P.H.)</u>	<u>Maximum Distance Between Overlapping Zones</u>
30	357
35	452
40	552
45	653
50	750
55	853
60	945

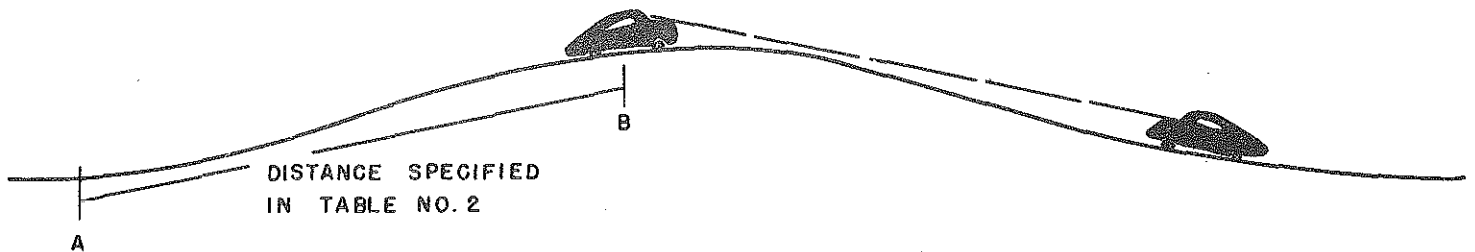
- B. Then from Table II, for an example, assuming that the average speed of the road to be surveyed for No Passing Zones is 50 miles per hour, you will note that the maximum sight distance required to warrant such a zone is 1,000' for both horizontal and vertical curves. (It is a wise practice for the surveyor to chain out 1,000' along the roadway occasionally in order to check himself on this matter of estimating distances.)
- C. Drive behind another car at the same speed and at an estimated distance of 1,000' apart, thus if this car should for any reason disappear from sight due to a hillcrest or road dip on a vertical curve, or a land obstruction, dirt road etc., on a horizontal curve, a zone is warranted.
- D. Having determined that a No Passing Zone is needed, the next operation is to locate the true end of the zone; this is accomplished on a vertical curve by driving up to a point in advance of the true hillcrest where your vision opens up for a distance of 1,000' and at all times a point approximately $4\frac{1}{2}$ ' (usually just above the bottom of the windshield) on the oncoming car can always be seen from this point hence, as shown by "B" in the vertical sketch in Figure R-2. On a horizontal curve the end is

Horizontal Curve



In the illustration, A and A' are those points at which the sight distance, on either approach to the curve, first becomes less than that specified in Table I. All distances are measured along the roadway. B and B' are those points at which the sight distance again becomes greater than the minimum allowable. AB and A'B' are the no passing zones and shall not be less than specified in Table II.

Vertical Curve



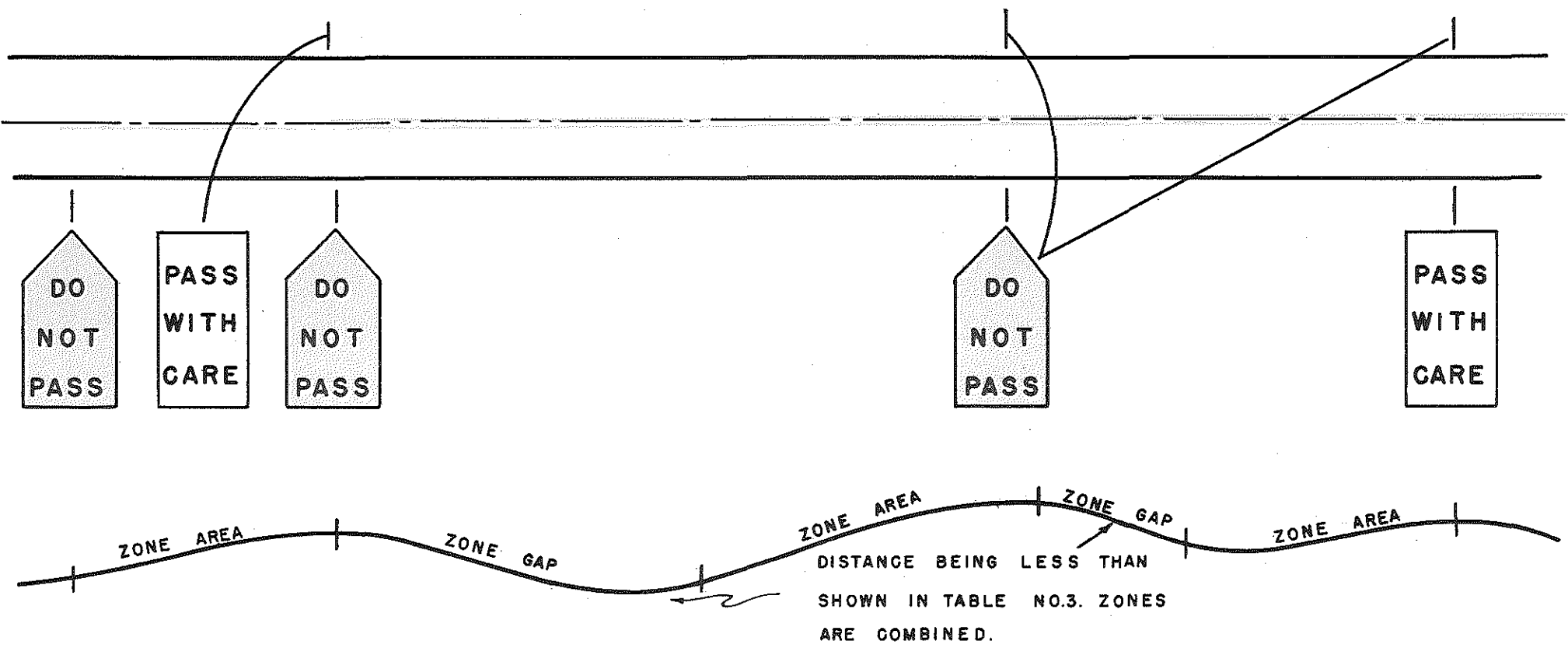
The above figure illustrates a method of determining the point B on a vertical curve; it is that point where on the approach to the crest, the sight distance becomes unlimited. AB is the no passing zone and A is in advance of B a distance equal to that specified in Table II.

Fig. R-2

determined by driving around the curve to a point where the vision opens up to 1,000', as shown by "B" in the horizontal sketch in Figure R-2. In the case of a horizontal or vertical curve, this is the true end of the No Passing Zone.

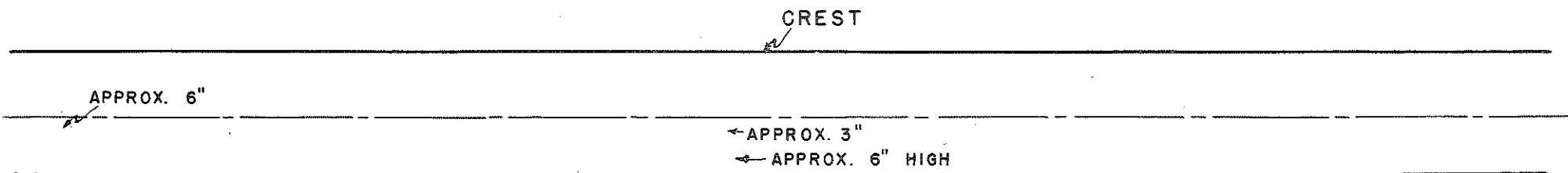
- E. In establishing the length of a No Passing Zone on a vertical curve from Table II you will note that the minimum distance is 500'; thus measure from the true end of a zone back a distance of 500'. If this point falls upon the upgrade at a point you deem as being an insufficient distance to give proper advance warning of a hazardous vertical curve, its length may be increased by as much as 50 percent -- thus for a 50 mile per hour zone, giving you a maximum of 750' of zone. From past experience we have found that there have been very few vertical curves that necessitate the use of a zone extending the entire maximum distance.

In the case of the horizontal curve, the length is established by locating the point where the sight distance becomes less than shown in Table I (1000') -- (See "A" in the horizontal sketch in Figure R-2). This would normally be the beginning of the No Passing Zone, but should the surveyor deem this as giving unnecessary zone length, he may shorten the distance "A" - "B" by moving point "A" toward point



Having accurately located the controlling points of a combined zone it should be signed and painted in the above manner.

Fig. R-3



The above set of symbols are to be used in the surveying of No Passing Zones using an "S" at the beginning and an "E" at the end of each zone in order to aid the paint crew at the time of application.

Fig. R-4

- "B", but under no circumstances shall this zone length be less than stated in Table II (500').
- F. It will often be found that two or more zones overlap and perhaps two or more successive zones, while not overlapping, will not be of a sufficient distance apart to permit a passing maneuver. In such case it will be necessary to combine the group into one continuous zone as shown in Table III. In this particular case, using a 50 mile per hour speed, if the true end of a zone, "A" should be within 750' of the beginning of zone "B" etc., the entire series would be combined into one zone as shown in Figure R-3.
- G. It is also a policy of this Division that if the true end of a No Passing Zone should fall within 100' of an intersecting road or a driveway adjacent to this point, the end should be carried forward to a point just beyond the intersection.
- H. It is also anticipated by this Division that at some time in the future all No Passing Zones on the principal highways throughout this state will be signed with No Passing Zone signs, thus having a sign reading: "Do Not Pass", erected at the beginning of a zone on both horizontal and vertical curves and in the event of a combined zone a series of "Do

Not Pass" signs will be erected at vital locations in order to give advance warning to the motorist along with the yellow barrier line; at the end of these zones there will be a sign reading: "Pass With Care".

- I. Figure R-4 shows the method a surveyor should use to mark the pavement at the time of establishing a No Passing Zone -- a "T" symbol that is marked in the center of the existing pavement is meant to show the direction of the painted line, as indicated by the tail of the letter "T"; this is visible ordinarily only to the driver of the truck who in turn usually has some method of informing the painter standing on the paint platform at the rear of the truck that they are about to approach a No Passing Zone. The large letters painted on the edge of the pavement are an aid to the painter at the rear of the truck inasmuch as they are far more visible to him when marked on the edge of the pavement. The letter "S" has been adopted to indicate "Start" of No Passing Zone, while the letter "E" has been adopted to indicate the "End" of a No Passing Zone.
- J. All No Passing Zone signs shall be placed in rural areas so that no part is less than 10' nor more than 14' from the edge of the roadway and the lowest point shall not be less than 3' above the edge of the roadway.