

KV/IRC/93

IRC : 35-1997



**CODE OF PRACTICE
FOR
ROAD MARKINGS
(FIRST REVISION)**

Published by

**THE INDIAN ROADS CONGRESS
Jamnagar House, Shahjahan Road,
New Delhi 110011
1997**

Price Rs. 160/-
(plus packing & postage)

IRC : 35 - 1997

First Published in October, 1970

Reprinted : August, 1988

Reprinted : March, 1992

First Revision : August, 1997

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**Printed at Sagar Printers & Publishers, New Delhi
(1000 copies)**

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CODE OF PRACTICE FOR ROAD MARKINGS

1. INTRODUCTION

1.1 "Code of Practice for Road Markings (with Paints)", IRC:35-1970 was published by the Indian Roads Congress (IRC) in 1970. Since this Code was brought out more than two decades ago, its revision and updation, commensurate with the current day traffic needs and incorporation of new concepts and materials for laying of road markings, has been a long felt need. The work of revision of this Code was accordingly taken up by the Traffic Engineering Committee of the IRC. The draft was discussed at length during various meetings held on 23.8.91, 2.12.91 and 31.8.92 (personnel given below) and approved for consideration by Highways Specifications & Standards Committee.

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The Council in its meeting held on 1.5.95 at Ooty considered the draft and approved for printing subject to modifications to be carried out by the Convenor, Highways Specifications & Standards Committee based on comments of members.

1.2. Road Markings perform an important function of guiding and controlling traffic on a highway. The markings serve as a psychological barrier and signify the delineation of traffic path and its lateral clearance from

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traffic hazards for safe movement of traffic. As the aid to pedestrians and cyclists, they channelise movement into safe location and in effect, provide for an extension of the side walk/cycle track across the roadway. Road markings are, therefore indispensable to ensure smooth and orderly flow of traffic and for promoting road safety.

1.3. Notwithstanding some limitations, such as obliteration by snow, poor visibility when dusty or wet and frequent renewals, painted road markings have the advantage of conveying the required information to the user without distracting his/her attention from the carriageway. They also have the advantage that they are not likely to be obscured, and can provide a continuous message.

2. SCOPE

2.1. The object of this Code of Practice is to establish a uniform system for road markings in India with paints/thermoplastic material. Markings with alternative materials such as strips of steel, rubber or plastic, reflective or non-reflective studs, permanently fixed white or coloured stone, in-laid concrete blocks or bricks etc. are dealt with briefly.

2.2. Recommendations of the Code are applicable to all categories of roads both in rural and urban areas. Pavement markings for grade separated interchanges are not covered in this Code.

3. DEFINITION

3.1. Road markings are defined as lines, patterns, words or other devices, except signs, set into applied or attached to the carriageway or kerbs or to objects within or adjacent to the carriageway, for controlling, warning, guiding and informing the users.

4. AUTHORITY

4.1. Markings, where used, shall be uniform in design, position and application so that they may be recognised and understood immediately. A uniform set of markings applicable throughout the country may, therefore, be as prescribed by the Indian Roads Congress or updated by the Ministry of Surface Transport from time to time.

4.2. The Authority to provide road markings on a particular stretch of public road should be decided by Road Authorities in consultation with Police, wherever felt necessary.

4.3. Pavement and kerb markings being exclusively within the boundaries of public road should never be installed except by public authority. Installation of delineators and markings of objects, as a warning of hazardous locations, should also be under the control and approval of the authorities.

5. MATERIALS

5.1. Paints used for road markings should conform to IS : 164-1981 (First Revision - Reaffirmed in 1986) "Specifications for ready mixed paints for road markings", with the proviso that these shall have a wear resistance of at least 4 hours under accelerated laboratory test. These paints are not very bright and as such fail to catch instantaneously the driver's eyes and also have a short service life. Hot applied thermoplastic paints should, therefore, be used instead of ordinary paints, wherever feasible for better visibility and longer service life. For specifications on road marking materials, including thermoplastic paints, reference may be made to Clause 803 of the Ministry of Surface Transport's (MOST's) "Specifications for Road and Bridge Works", published by IRC.

5.2. Improved night visibility is obtained by the use of minute glass beads embedded in the pavement marking materials to produce a retroreflective surface (i.e. which appears luminous at night under normal head lights) and the same are recommended for use in markings.

5.3. The use of reflective materials or thermoplastic paints is also recommended for construction zones where road or bridge works are under construction, for proper traffic guidance and safety.

5.4. Other Materials

5.4.1. In addition to the materials mentioned in the MOST's Specifications, pavement markings may also be in the form of pre-fabricated sheet materials (e.g. plastic sheets) which may be attached to or set into the pavement surface in such a way that their upper surfaces are flush with the pavement surface. Such materials should have good durability, uniform thickness and should neither spread nor peel off under the weight of heavy traffic.

5.4.2. Cold rolled or glue down plastic stripes which have an adhesive backing have primarily been used for cross walks and stop lines on bituminous pavements in high density urban areas. Their other applications include lane and centre line marking on bituminous pavements where the plastic stripes can be rolled into the bituminous surface during the process of its compaction. These, however, should be used in well lit areas so as to maintain the reflectivity of the markings at a desirable level.

5.4.3. Pre-fabricated tape markings with an adhesive backing can be used for temporary markings for guidance of traffic during construction and for semi-permanent markings, such as word messages/symbols, parking stalls and parking lot markings.

5.4.4. Reflectorised stripping powder can provide instant markings of cross walks, school zones and other legends. The materials has glass beads distributed throughout and is applied to the pavement by a special striper with a proper flame that melts the powder in air just above the surface and then binds it to the pavement surface.

5.4.5. Metal and plastic inserts and felt marker units in or on the pavement surface are used principally in urban areas where paint markings are rapidly worn out under heavy traffic volumes and frequent repainting is not only costly but causes undue traffic delays.

5.5. Non-reflecting road studs used for marking the limits of pedestrian crossings and approaches thereto and of parking bays, may be made of stainless steel or an appropriate form of plastic. Reflecting road studs may be either a reflex lens type or soild white beads. They may be unidirectional or bidirectional and the lenses may be of red or white colour according to the requirements. Solid reflecting studs may be either circular or rectangular in shape. These are made of either ABS (Acrylonitrile Butadiene Styrene) or die cast aluminium alloy.

6. COLOUR AND SIZE

6.1 Yellow (conforming to IS Colour No. 356) as given in IS: 164-1981 (revised in 1986), white and black colours are the standard colours used for markings. Use of these colours for specific marking applications has been indicated against respective items.

6.2. All the sketches in this Code indicate white colour only unless otherwise specified.

6.3. The dimensions shown in all the sketches in this code are in mm unless specified otherwise.

7. CLASSIFICATIONS OF MARKINGS

The road markings may be classified as:

7.1. Carriageway Markings

(i) Longitudinal markings

Centre lines

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- Traffic lanes
- No passing zones
- Warning lines
- Border or edge lines
- Bus lane markings
- Cycle lane markings

(ii) Markings on intersections

- Stop lines
- Give way lines
- Pedestrian Crossings
- Cyclist Crossings
- Marking on approaches to intersections
- Marking on speed change lanes
- Direction arrows
- Protected right turn lanes
- Marking on rotaries
- Box markings
- Continuity lines

(iii) Markings at hazardous locations

- Carriageway width transition
- Obstruction approaches
- Road-Rail level crossings
- Check Barriers

(iv) Markings for parking

- Parking space limits
- Parking restrictions
- Bus stops

(v) Word Messages

- Stop
- Slow
- Bus
- Keep Clear
- School
- Right Turn Only
- Exit Only
- Speed 25 (or other specified)

7.2. Object Markings

- (i) Objects within the carriageway
- (ii) Objects adjacent to the carriageway
- (iii) Marking on kerbs

8. LONGITUDINAL MARKINGS

8.1. General Considerations

8.1.1. Longitudinal pavement markings are lines placed along the direction of traffic for the purpose of indicating to a driver, his proper position on the roadway.

8.1.2. All longitudinal markings shall be white, except the following which shall be yellow:

- (i) Lines indicating parking restrictions

- (ii) Obstruction approach markings
- (iii) No overtaking zone markings
- (iv) Continuous centre line may optionally be yellow

8.1.3. Broken lines are permissive in character and may be crossed with discretion, if traffic permits.

8.1.4. Solid lines are restrictive in character and indicate that crossing is not permitted except for entry or exit from a premises or a side road or to avoid a stationary obstruction.

8.1.5. Double solid lines indicate maximum restrictions and are not to be crossed except in emergent usage.

8.1.6. Fig. 1 indicates the recommended size of the markings.

8.1.7. In a combination of broken and solid lines, a solid line may be crossed, with discretion, if the broken line of the combination is nearer to the direction of travel. Vehicles from the opposite directions are not permitted to cross the solid line.

8.2. Centre Line

8.2.1. On undivided two-way roads, centre line separates the opposing streams of traffic and facilitates their movements.

8.2.2. Under the following circumstances, centre lines may be located at off-centre position:

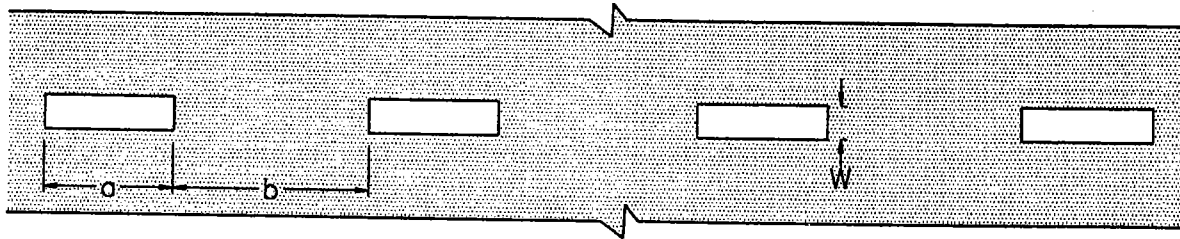
- (i) Carriageway width transitions;
- (ii) Additional turning lanes at intersections;
- (iii) Odd number of lanes on vertical or horizontal curves with limited sight distances;
- (iv) Urban roads with parking permitted on one side only;
- (v) Urban roads with an odd number of traffic lanes with extra lane allotted to the predominant direction of flow.
- (vi) On sharp curves with extra widenings.

8.2.3. On unimportant roads with less than 5 metres wide carriageway, centre lines are considered undesirable as these entail discomfort and hazard. In such cases, short sections of centre lines may be provided on approaches to busy intersections, pedestrian crossings, level crossings, horizontal and summit curves with restricted sight distance and on locations where driver's visibility is reduced e.g. by frequent fogs.

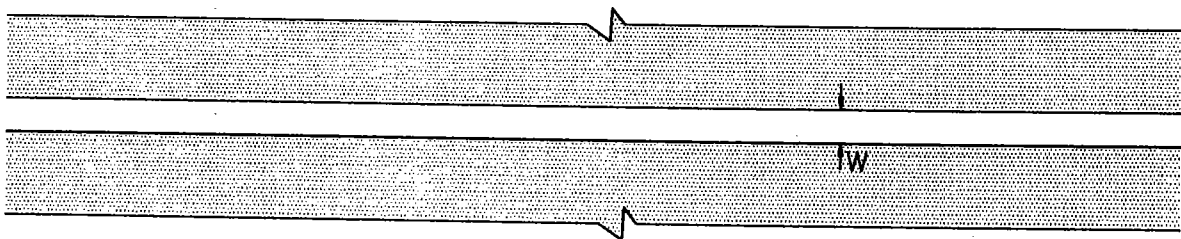
8.2.4. When the pavement is widened on curves, the centre line should be placed in such a manner that the width of the traffic lanes on both approaches of the curves will be maintained around the outside of the curve. This will necessitate the centre line marking being off centre as far as the total width of the pavement is concerned but at the same time it will give the traffic using the inside lane the needed advantage in manoeuvring width.

8.2.5. On urban roads with less than four lanes, or on those roads having four lanes and on which parking is permitted thus reducing the operational width, the centre lines shall consist of single broken line 150 mm wide of 3 m segments and 4.5 metres gaps. On curves and approaches to intersections, the gap shall be 3 metres as shown in Fig. 2.

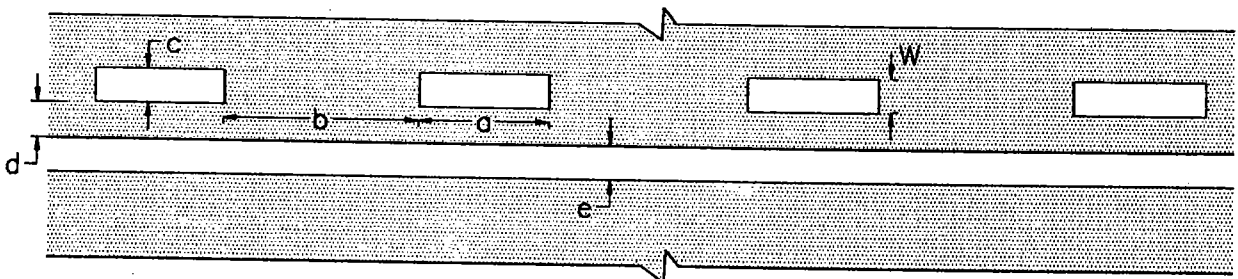
8.2.6. On undivided urban roads with at least two traffic lanes in each direction, the centre line marking shall consist of either a single solid line 150 mm wide or double solid 100 mm wide separated by a space of 100 mm as shown in Figs. 2. (c) and (d). Reference may also be made to para 8.4. "marking on no overtaking zones".



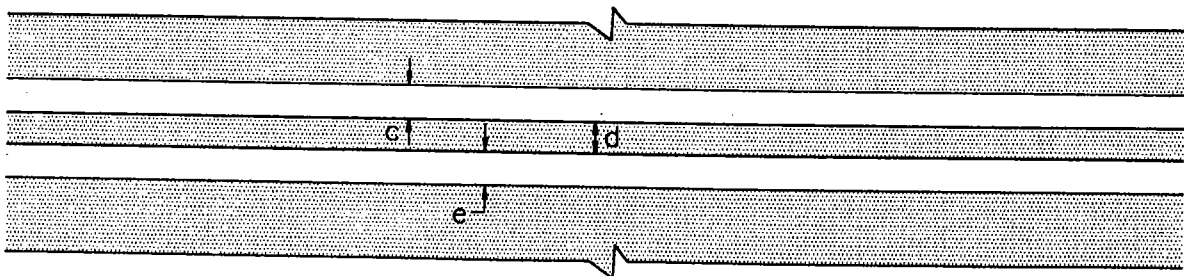
A. SINGLE BROKEN LINE



B. SINGLE SOLID LINE



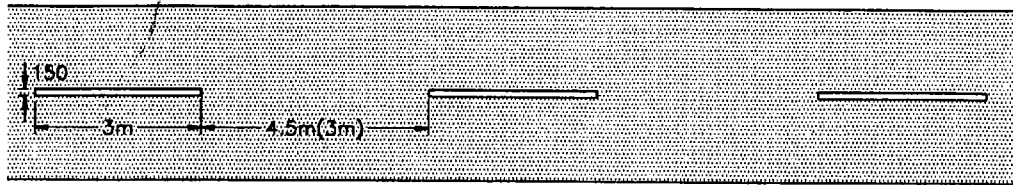
C. COMBINATION OF BROKEN & SOLID LINES



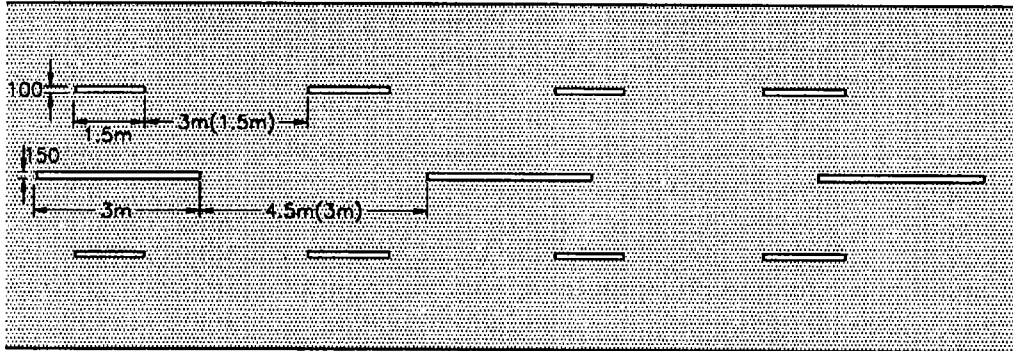
D. PAIR OF SOLID LINES

a AND b SHALL DEPEND UPON APPLICATION
 c, d AND e EACH EQUAL TO 100
 W=100 FOR RURAL AREAS W=150 URBAN AREAS

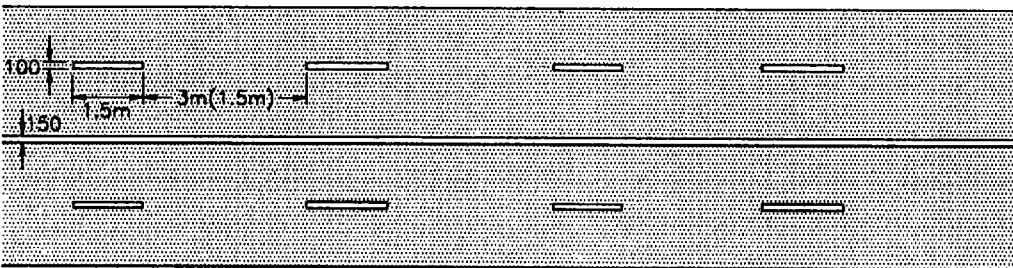
Fig. 1. Recommended Size of Longitudinal Marking (Ref. Para 8.1.6.)



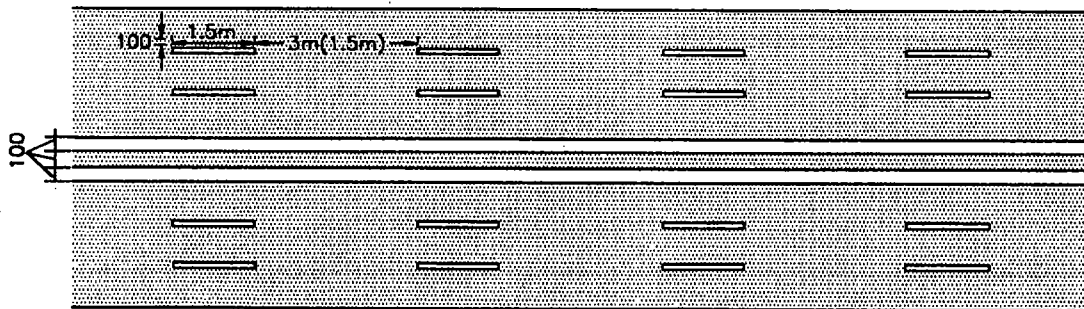
a) CENTRE LINE MARKING FOR A TWO LANE ROAD



b) LANE LINE AND BROKEN CENTRE LINE MARKING FOR A FOUR LANE ROAD



b) CENTRE BARRIER LINE MARKING FOR FOUR LANE ROAD



d) CENTRE BARRIER LINE MARKING FOR A SIX LANE ROAD

NOTE: FIGURES IN BRACKETS TO BE USED ON CURVES AND APPROACHES TO INTERSECTIONS

Fig. 2. Centre Line and Lane Line Marking for Urban Areas (Ref. Paras 8.2.5 & 8.3.5.)

8.2.7. A line marking the centre of a one-way street or highway is a lane line and shall be a broken line.

8.2.8. If the centre line is to be painted on the pavement on the approaches to a bridge, it shall be continued over the bridge provided that the width between the kerbs is 6 m or more otherwise the centre line marking on approaches should be discontinued at 30 to 35 m distance from each abutment of the bridge.

8.2.9. Centre line on rural roads shall be provided as per Table 1.

8.2.10. Double lines shall not be normally painted on a two lane bridge except where restricted visibility makes it hazardous to overtake.

8.2.11. Typical centre lines markings for rural roads are shown in Figs. 3 and 4.

8.3. Traffic Lane Lines

8.3.1. Further sub-division of wide carriageways into separate lanes on either side of the centre line helps to regulate traffic into proper lanes and curbs the meandering tendency of the drivers, thereby promoting safety and ensuring maximum capacity. At intersections and on approaches thereto, marking of traffic lanes eliminates confusion and facilitates through and turning movements. Traffic lanes should also be marked near pedestrian crossings, at other dangerous locations in rural and urban areas, in congested areas where the carriageway can accommodate more lanes, and on important one way streets. Since respect for road markings grows with proper usage, traffic lane should not be marked indiscriminately.

8.3.2. Traffic lane lines shall normally be single broken lines. Their width shall be 100 mm.

8.3.3. In urban areas, the length of line segments shall be 1.5 m. The gaps on straight reaches shall be 3 m long and gaps on curved reaches and approaches to intersections shall be 1.5 m long. In rural areas the line segment and gaps shall be twice the lengths mentioned above.

8.3.4. Solid lane lines can be used on approaches to intersections and in other areas, when lane changes are to be restricted.

8.3.5. Typical lane lines are shown in Figs. 2, 3 and 4.

8.4. Marking for No Overtaking Zones

8.4.1. No overtaking zones shall be established on summit curves, horizontal curves and elsewhere on two and three lane highways where overtaking manoeuvres must be prohibited because of restricted sight distances or other hazardous conditions.

8.4.2. On undivided highways with more than 3 lanes, there is hardly any need for vehicles to cross the centre lines for overtaking. The double solid centre line prescribed for such highways is to be regarded as continuous no-overtaking marking which is not to be crossed on either side.

8.4.3. A no-overtaking zone shall be marked by a solid yellow line along the centre. In case of double yellow lines the left hand element shall be a solid barrier line, the right hand element will be either a normal broken centre line or a solid barrier line governing the traffic from the opposite direction. Where a solid barrier line is to the right of broken line the passing restriction shall apply only to the opposing traffic.

8.4.4. The width of each line shall be 100 mm. These shall be separated by 100 mm (Fig. 1).

8.4.5. No-overtaking zone markings shall be marked when the sight distance available is less than the intermediate sight distances given in Table 2. Table 2 also indicates the minimum barrier line distances. The method of locating and setting out of the barrier lines is shown in Fig. 5. The steps involved are as follows:

- (i) Using the sighting poles 1.2m in height and a cord in length equal to the corresponding intermediate sight distance indicated in Table 2 establish points A_E and B_E where the sight distance for travel left to right first falls below the intermediate sight distance.

Table 1. Centre Lines (Direction Dividing lines) on Rural Roads
(Refer Para 8.2.9)

Serial Number	Number of traffic lanes	Width of carriageway	Average daily traffic volume in P.C.U. which warrants the centre line marking	Width of centre line in mm	Length of Line Segments		Length of Gap				Remarks
					On straight reaches in m	On curves and approaches to intersections in m	on NH & SH		on Other Roads		
1	2	3	4	5	6	7	8	9	10	11	12
1.	Two or Three	6 m & above	In excess of 2000	100	3.0	3.0	6.0	3.0	4.5	3.0	Single broken line
				100	3.0	3.0	6.0	3.0	4.5	3.0	Single broken line
2.	Four, Six & Eight lanes undivided			Two solid lines each 100 mm thick separated by 100 mm	-	-	-	-	-	-	

Weightage factor for conversion to PCU (Passenger Car Unit) as per IRC : 64 - 1990.

(i) Bicycle	0.5	(v) Bullock carts	8.0
(ii) Motor cycle	0.5	(vi) Tongas or victoria	4.0
(iii) Motor cars and light motor vehicle	1.0	(vii) Hand carts	3.0
(iv) Buses & Trucks	3.0		

Note: Stipulations made herein are valid only when at least 50 per cent of total traffic is fast traffic.

- (ii) From B_E measure back the corresponding Barrier Line Distance indicated in Table 2 to point C_E . The barrier line starts at this point.
- (iii) Establish points B_W and A_W where the sight distance is first regained and terminate the barrier line at point B_W .
- (iv) Establish the barrier line for the opposite direction of travel noting that points A_W and B_W have already been established leaving only C_W to be determined.

8.4.6. If the length of road with sight distance below the minimum sight distance is less than the minimum length of barrier line shown in Table 2, the additional length of marking shall be added to the beginning of the zone.

8.4.7. Where the distance between the end of one barrier line and the beginning of the next barrier line restricting travelling in the same direction is less than the minimum length of barrier line shown in the Table 2, the barrier lines shall be joined to form one continuous barrier line.

8.4.8. "No-overtaking" signs as per IRC : 67-1977 shall be used to emphasise the existence and extent of a no-overtaking zone.

8.4.9. The no-overtaking zone markings should preferably be laid with thermoplastic material.

8.4.10. The marking of the no-overtaking zone at horizontal and vertical curves shall be as shown in Fig. 5.

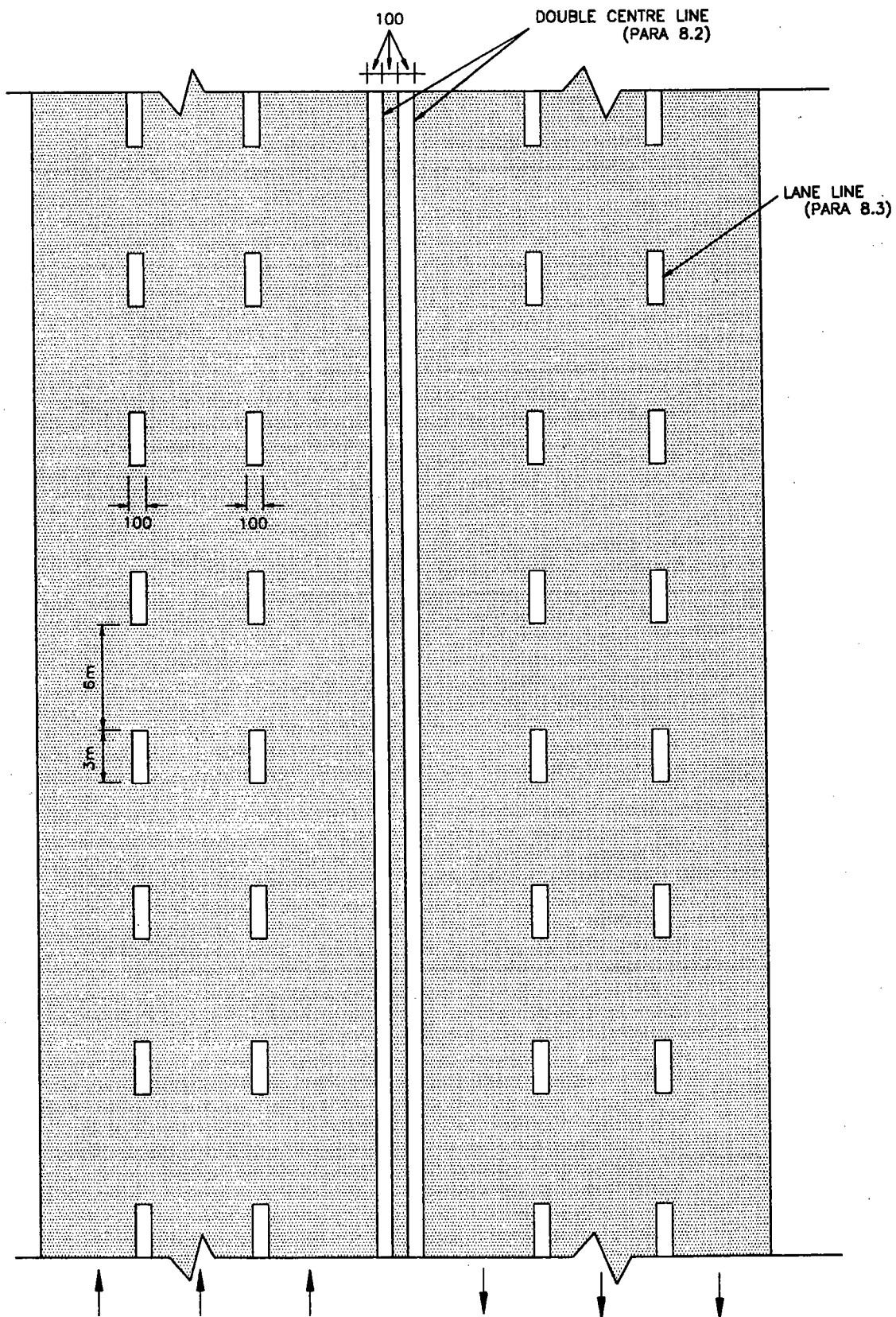


Fig. 3. Lane Lines on a Six Lane Rural Road Straight Stretch (Ref. Paras 8.2.11 & 8.3.5.)

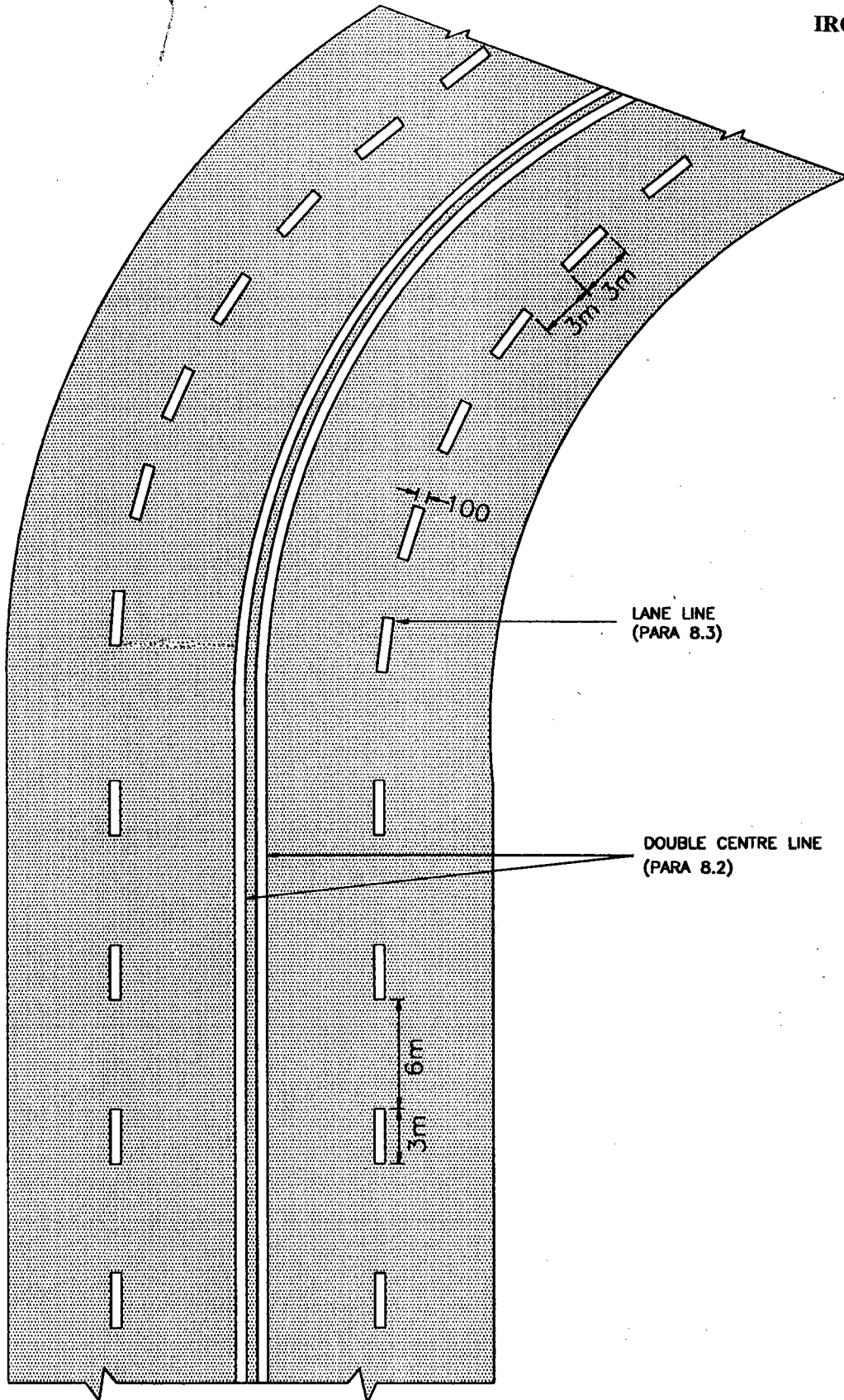
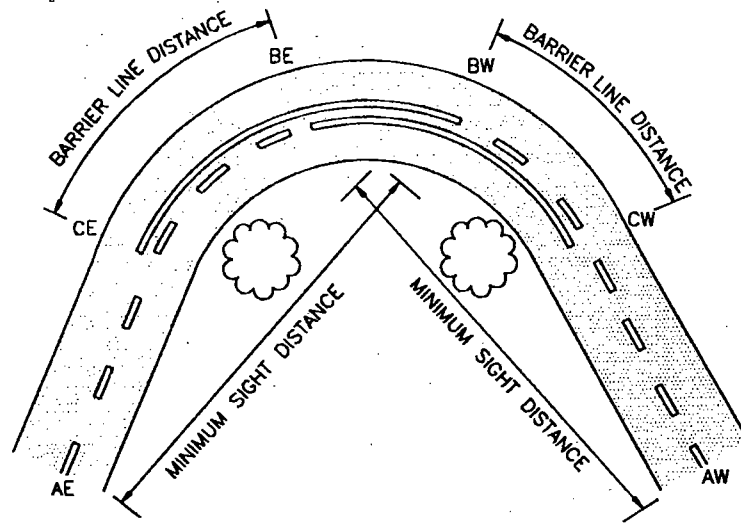
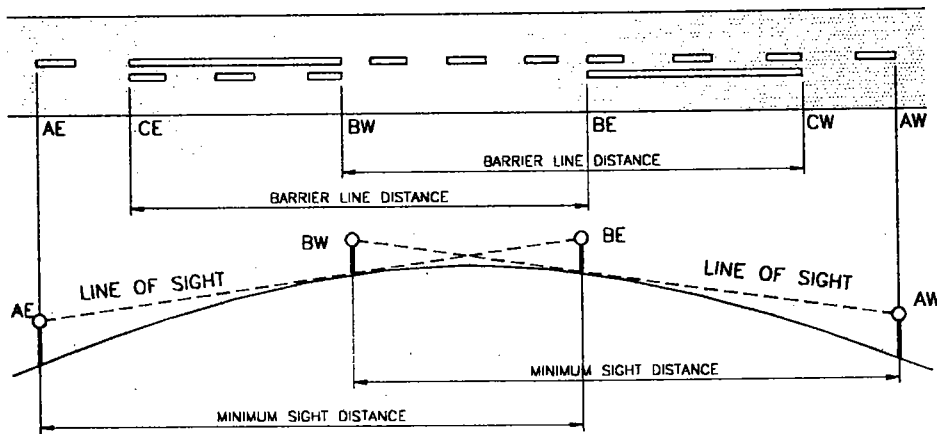


Fig. 4. Centre Line and Lane Markings at Curves on NH and SH in Rural Areas (Ref. Paras 8.2.11 & 8.3.5.)



(a) HORIZONTAL CURVE



(b) VERTICAL CURVE

AE-BE REPRESENT THE PORTION WHERE THE SIGHT DISTANCE STARTS FALLING BELOW THE MINIMUM PERMISSIBLE LIMITS.
 AW-BW REPRESENT THE PORTION WHERE THE SIGHT DISTANCE IS REGAINED.
 BARRIER DISTANCE AS PER TABLE 2

Fig. 5. Method of Locating No-Overtaking Zones on Isolated Curves (Ref. Paras 8.4.5 & 8.4.10.)

**Table 2. Barrier Line Distance on No-overtaking Zones
(Ref. Paras 8.4.5, 8.4.6 & 8.4.7)**

85th percentile speed (kph.)	Intermediate sight distance	Barrier line Distance (m)
Upto 45	120	75
46-55	150	100
56-65	180	120
66-75	210	145
76-85	240	170
86-95	270	190
96-105	300	215
More than 105	330	240

8.4.11. On sharp curves, where no-overtaking zone markings are required, they can also be splayed to form a shape of central island with an internal width of 600 mm provided there is ample room on either side to enable vehicles to negotiate the bend with reasonable comfort without crossing the lines. The area within the splay and parallel section must be hatched with inclined 150 mm thick lines at 2 m spacing as indicated in Figs. 6 and 7.

8.4.12. On horizontal curves where the carriageway has been widened, the centre line shall not be so marked as to equally divide the carriageway in all the cases. Where radius of a curve is below 60 m the placement of the centre line shall be as given in Table 3.

8.4.13. The no-overtaking zone lines should be marked with a single row of double sided reflecting studs spaced at 4 m intervals. They should be laid on the centre line except that when double lines are used or when the lines are splayed (Refer Fig. 7 para 8.4.11) to form a hatched area. Unidirectional studs may be laid symmetrically on each longitudinal line at 4 m intervals arranged so that only the studs nearest the driver reflect back.

8.5 Warning lines

8.5.1. Warning on lines are broken lines with line segments as long as the normal gaps and vice-versa. These are marked on horizontal and vertical curves where the visibility is greater than prohibitory criteria specified for no-overtaking zones but differing by upto 15 kph. Warning lines are also used in lieu of centre lines and lane lines at hazardous locations like approaches to intersections and sharp curves, obstruction approaches etc.

8.5.2. Warning lines are always single, they should never be used as part of a double line installation (no-overtaking zone). A minimum of 7 line segments shall be provided at all locations.

**Table 3. Ratios in which Carriageway should be Divided on either side of the
Centre Line at No-Overtaking Zones
(Ref. Para 8.4.12)**

Ri in metres	10 - 15	16 - 20	21 - 30	31 - 60	Over 60
ei/ea	1.4	1.3	1.2	1.1	1.0

Ri	=	Radius of inner edge of curve
(ei+ea)	=	Normal carriageway width plus extra widening required at curves as per IRC : 38-1988.
ei	=	Width of carriageway on inner side of the curve from the centre line
ea	=	Width of carriageway on outer side of the curve from the centre line

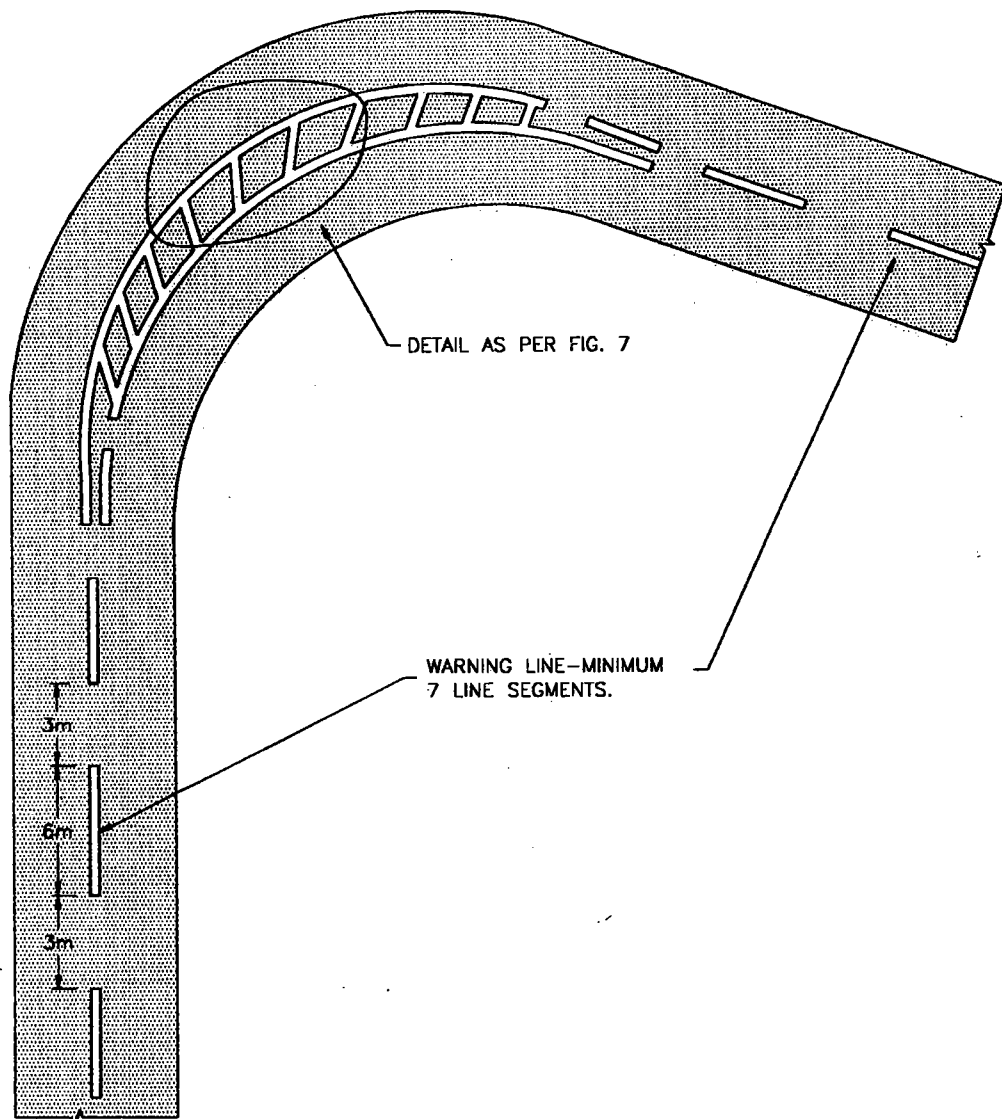


Fig. 6. Splayed Double Lines and Hatched Markings on Sharp Curve (Ref. Para 8.4.11.)

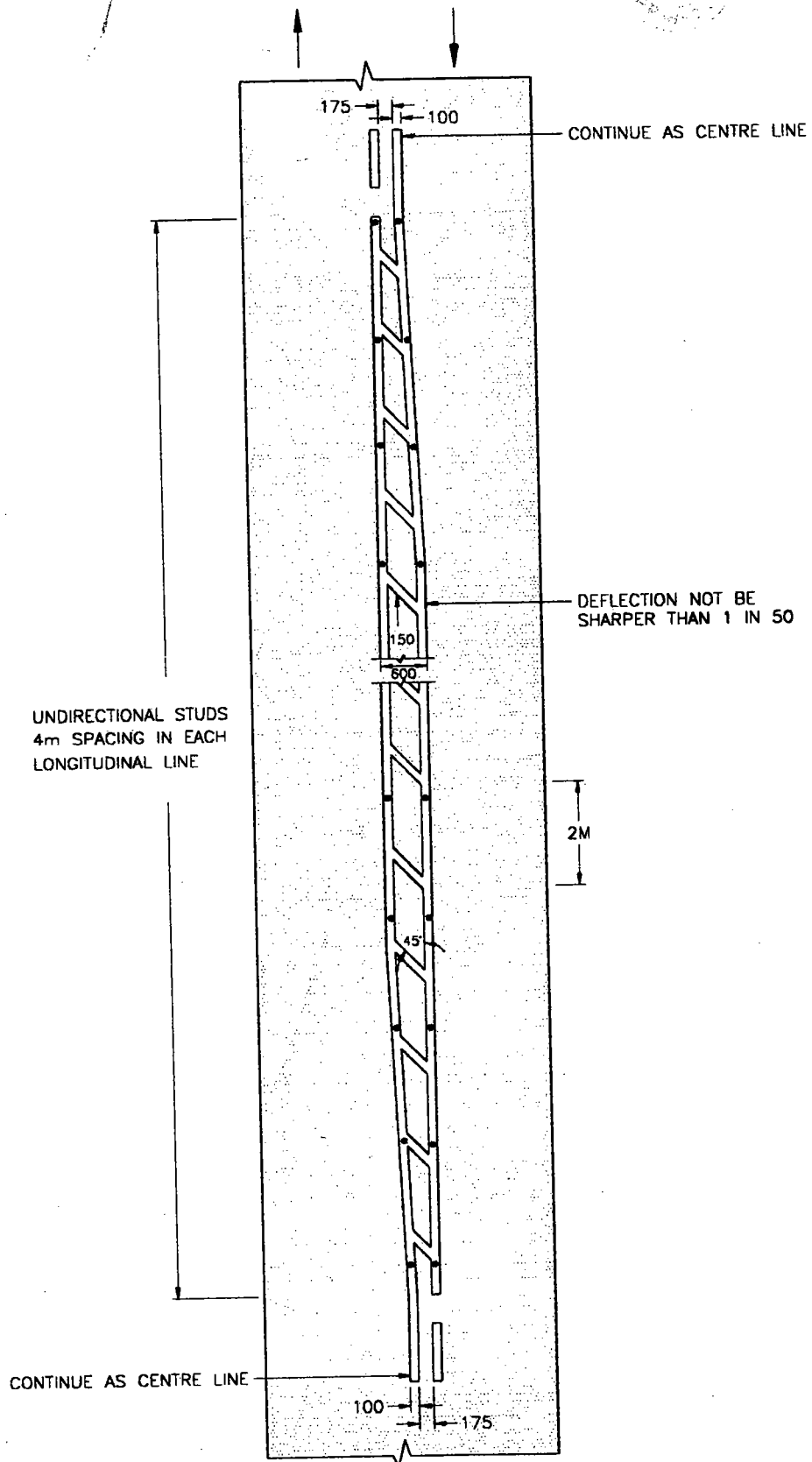


Fig. 7. Details of Splayed Double Lines and Hatched Markings on Sharp Curves (Ref. Para 8.4.11.)

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8.5.3. The width of the warning line should be equal to the width of centre line/traffic lane line immediately preceding it.

8.5.4. Some typical markings are shown in Fig. 6. The warning lines at signalised urban intersections are shown in Fig. 11.

8.6. Border or Edge Lines

8.6.1. These indicate carriageway edges of rural roads which have no kerbs to delineate the limits upto which driver can safely venture. This continuous guideline makes night driving comfortable particularly during inclement weather.

8.6.2. The pavement edge lines are desirable at the following locations:

- (i) Where the shoulder is paved and is of similar texture and colour to the main carriageway;
- (ii) In advance of and near narrow bridges and around sharp curves;
- (iii) Where obstructions on the shoulder are close enough to constitute a hazard to the motorist;
- (iv) On pavement width transitions;
- (v) On heavily trafficked two and three lane roads where head lamp dazzle is severe; and
- (vi) Along lengths which are prone to fog and mist.

8.6.3. Carriageway edge lines shall ordinarily be provided only on roads with more than two lanes. These shall be in the form of a single continuous white line placed on the carriageway 150 mm from the edge. On multi-lane road with central median the carriageway edge line shall be 150 mm wide and on multi-lane roads without medians the width may be 200 mm. Where flush kerbs are provided, the edge lines should be superimposed.

8.6.4. The border or edge line markings should not be carried across the mouths of side roads.

8.6.5. The markings should preferably be reflectorised or incorporate crushed calcined flint or other such reflecting materials.

8.7. Bus Lane Marking

8.7.1. The lanes reserved for the buses, without physical separation should be provided with white line as bus-lane markings on the carriageway (Fig. 8). Generally a basic width of 3 metres is required for a bus lane. The distance is measured from the edge of the kerb to the centre of the continuous white line of 250 mm min. width. A gap in this white line should be left, adjacent to each side road.

8.7.2. The legend BUS LANE should be marked on the carriageway across the lane at its commencement and repeated after each junction. Where junctions are more than 300 metres apart, this legend should be repeated between junctions at approximately 150 metres intervals.

8.7.3. A 250 mm wide broken line of 1000 mm length and 1000 mm gap should be laid from the kerb to the start of the full width lane to deflect other traffic from the bus lane. The taper of laying this broken line should not normally exceed 1:10.

8.7.4. Where a bus lane commences just beyond an intersection, adequate length should be left for the taper to commence at the intersection so that the inclined line does not extend across the intersection mouth. Similarly to allow traffic to position itself correctly on the carriageway, the continuous bus lane should end in advance of any intersection with major left-turning flow.



8.8. Bicycle Lane Marking

8.8.1. Bicycle lane markings should be provided when a portion of the carriageway, being used by motorised vehicles, is earmarked for exclusive use of cyclists.

8.8.2. The bicycle lane marking shall consist of a 150 mm thick solid white line parallel to the kerb of the carriageway. The width of the lane shall be determined by the number of bicycles using it and should be in accordance with IRC : 11-1962.

8.8.3. The cycle symbol shown in Fig 9(a) should be marked on cycle lanes. The size of the symbol can be either of the three sizes mentioned therein. The termination of a prescribed cycle lane should be indicated by an END marking on the carriageway, Fig. 9(b). This must always be used in conjunction with cycle symbol as illustrated in Fig. 9(c).

9. MARKINGS AT INTERSECTIONS

9.1. General Considerations

9.1.1. Carriageway markings within and in the neighbourhood of an intersection ensure orderly movement of traffic. Markings are resorted to even at unimportant intersections. The type of carriageway marking for a particular intersection is the function of several variables such as speed characteristics of traffic, availability of space, etc. The Engineer should choose the layout for a particular location depending upon the conditions at site. The markings for the various intersection types illustrated in this section are typical only. The precise layout may be adjusted to suit the design of intersection under consideration. The details of various intersection markings are described in the following paras. Markings on approaches to channelizing islands in the intersections shall follow the pattern of markings dealt with in Para 10.2 under the "Obstruction Approach Markings".

9.2. Types of Markings

9.2.1. Depending on the merits of each case, additional markings at intersection may consist of one or more of the following:

(1) Markings on approaches to intersections

- Stop line
- Give way lines
- Pedestrian crossing
- Cyclist crossing
- Markings on speed change lane
- Direction arrows
- Protected right turn lanes

(2) Markings in intersection area

- Marking at rotaries
- Box markings
- Continuity lines

9.3. Stop Line

9.3.1. Stop line indicates the position beyond which the vehicles should not proceed when required to stop by

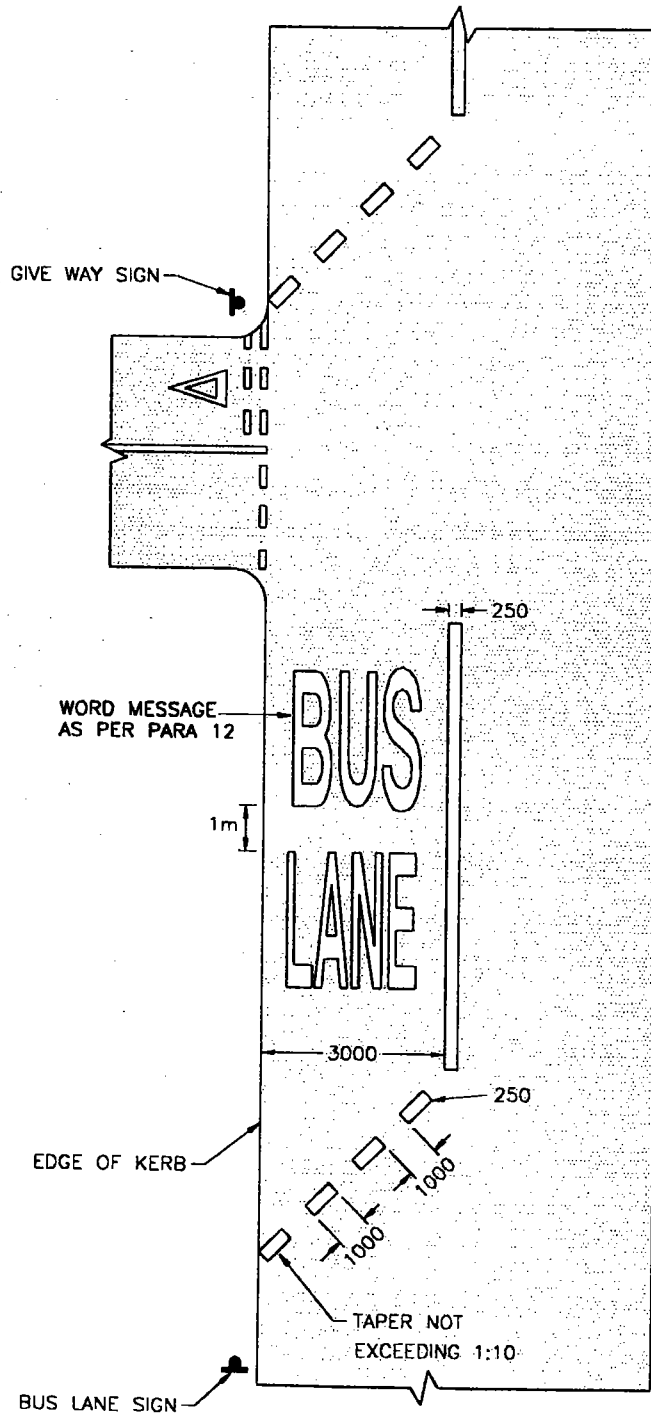


Fig. 8. Bus Lane Markings (Ref. Para 8.7.1.)

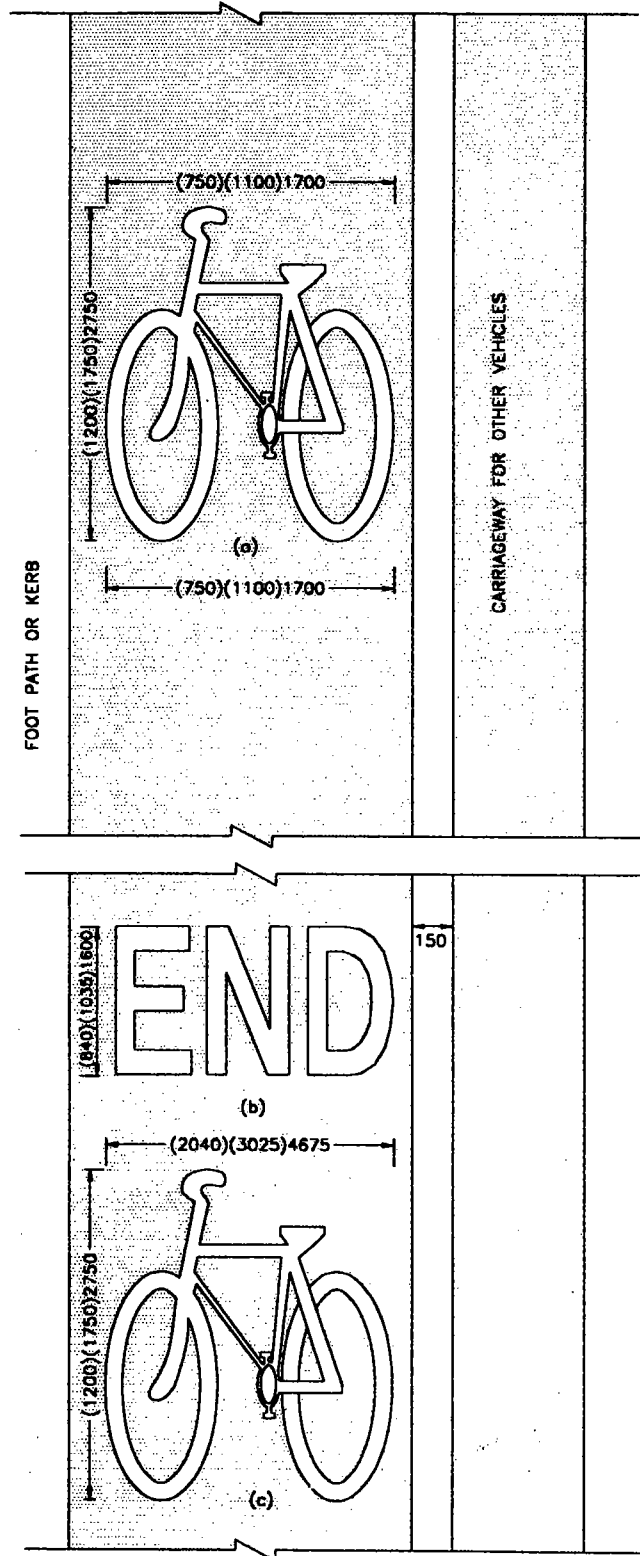


Fig. 9. Bicycle Lane Markings (All dimensions are in mm) (Ref. Para 8.8.3.)

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traffic police, traffic signals or other traffic control devices. Stop lines shall not be used unless traffic control by any one of these means exist. Stop lines should either be parallel to the intersecting roadway or at right angles to the direction of approaching vehicles.

9.3.2. Two patterns are prescribed:

- (i) Single stop line
- (ii) Double stop line

9.3.3. Single stop line shall be solid white transverse line 200 mm wide on urban roads and 300 mm wide on rural roads.

9.3.4. Double stop lines shall consist of two continuous lines each 200 mm wide spaced 300 mm apart and supplemented by a stop sign in accordance with IRC : 67-1977 and a word message "STOP" marking on the carriageway in accordance with Para 12. A typical layout is shown in Fig. 10.

9.3.5. The single Stop lines shall ordinarily be located not less than 2 metres nor more than 3 metres in advance and parallel to the nearest boundary of the pedestrian crossing marking. Where there is no pedestrian crossing, the single stop line shall be placed not less than 1.25 metres and not more than 9 metres from the nearest carriageway edge of the intersecting road and shall extend across all approach lanes, usually to the centre line or in the case of one way streets to the right kerb or pavement edge. At traffic signals, the line is normally located 1 m before the nearest primary signals, (Fig. 11). Typical usage of stop line is shown in Figs. 12 & 14.

9.3.6. As far as possible, stop lines at intersection shall be equidistant from the centre of the intersection.

9.3.7. The double line is used exclusively at junctions controlled by "STOP" signs and in no circumstances should be used merely to give warning of the approach to a major road for which the "GIVE WAY" marking is appropriate.

9.3.8. The "STOP" sign supplemented by the double line requires that (i) every vehicle shall, before entering the major road, stop at the transverse lines and (ii) no vehicle shall proceed past these transverse lines in such a manner or at such a time as it is likely to necessitate any vehicle on the other road to change its speed or course in order to avoid collision with the first mentioned vehicle.

9.4. Give Way Lines

9.4.1. The prescribed marking consists of two broken lines laid side by side, each comprising 600 mm line segments and 300 mm gaps. The lines are 200 mm wide and are spaced 300 mm apart. The marking is laid across, the minor roads at intersections which are not controlled by stop signs, traffic signals or the police.

9.4.2. The Give way lines shall be supplemented by the hollow triangular Give Way approach marking and a Give Way road side signs. The hollow triangular marking should not be used elsewhere. The marking should normally be located with its base 2.0 to 2.5 m from the transverse marking.

9.4.3. Details of GIVE WAY lines are shown in Fig. 13.

9.4.4. Typical usage of GIVE WAY lines are shown in Figs. 14 & 15.

9.4.5. At intersections involving a minor and major road, if the continuity of the kerb line of the major road needs special emphasis, the GIVE WAY and STOP markings may be extended across the entry half width of

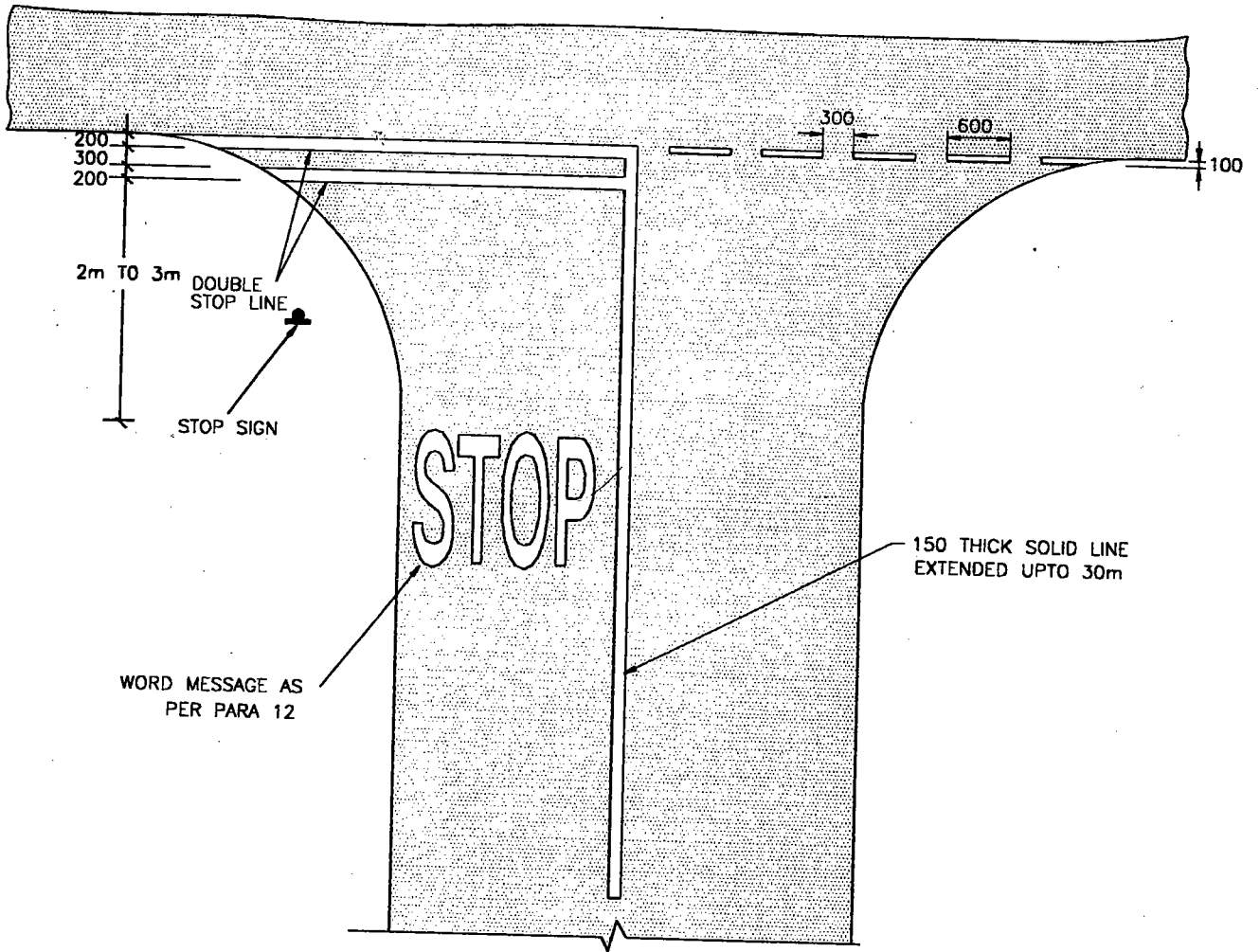


Fig. 10. Stop Line Markings for use with Stop Sign (Ref. Para 9.3.4.)

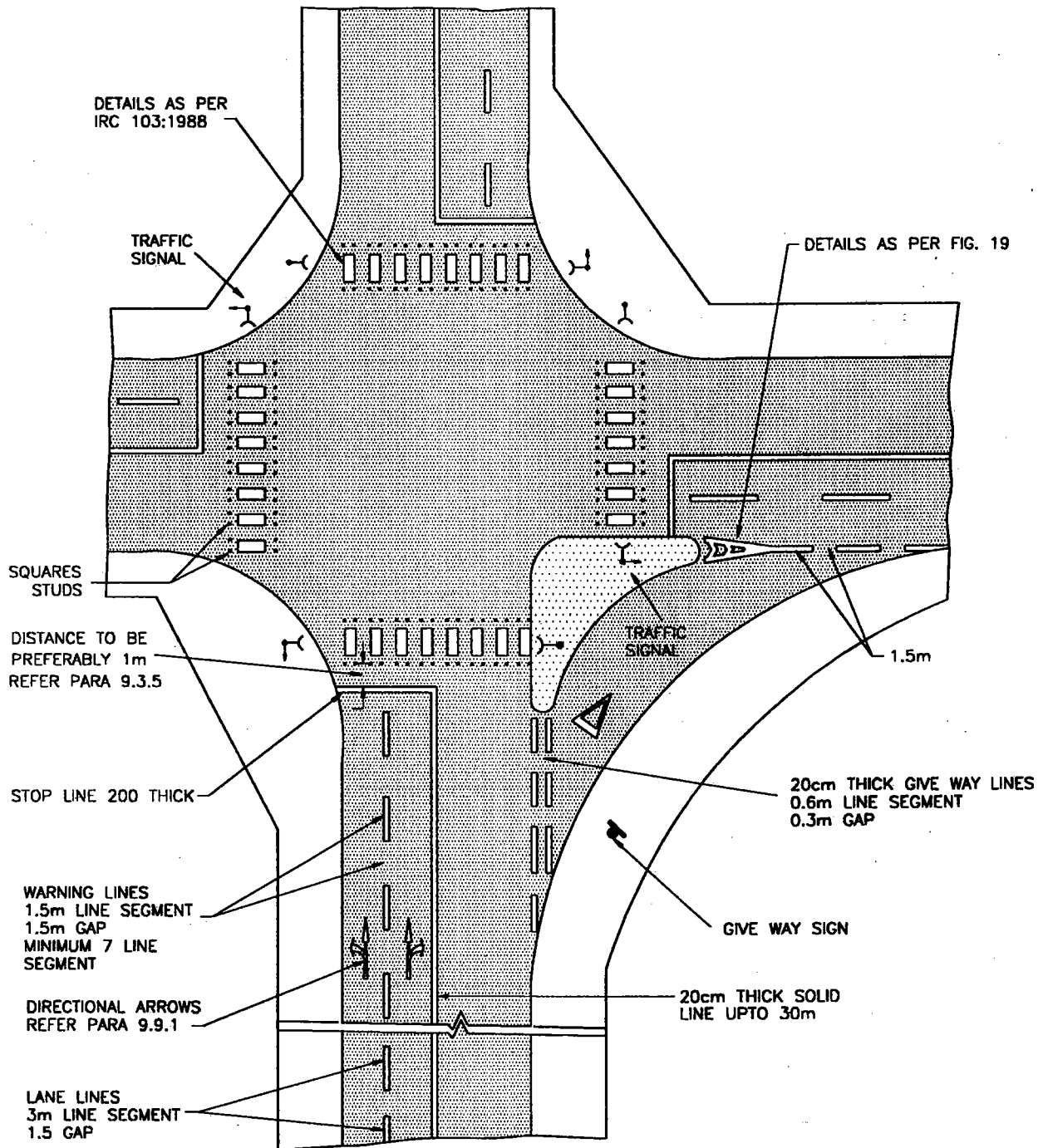
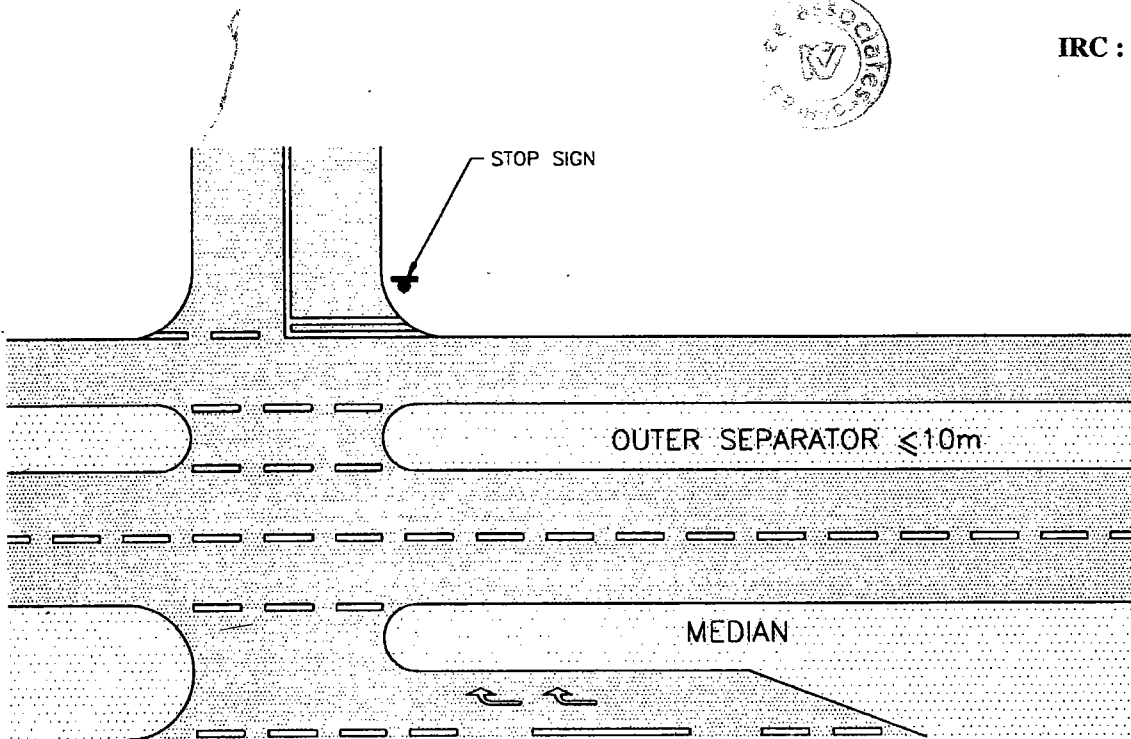
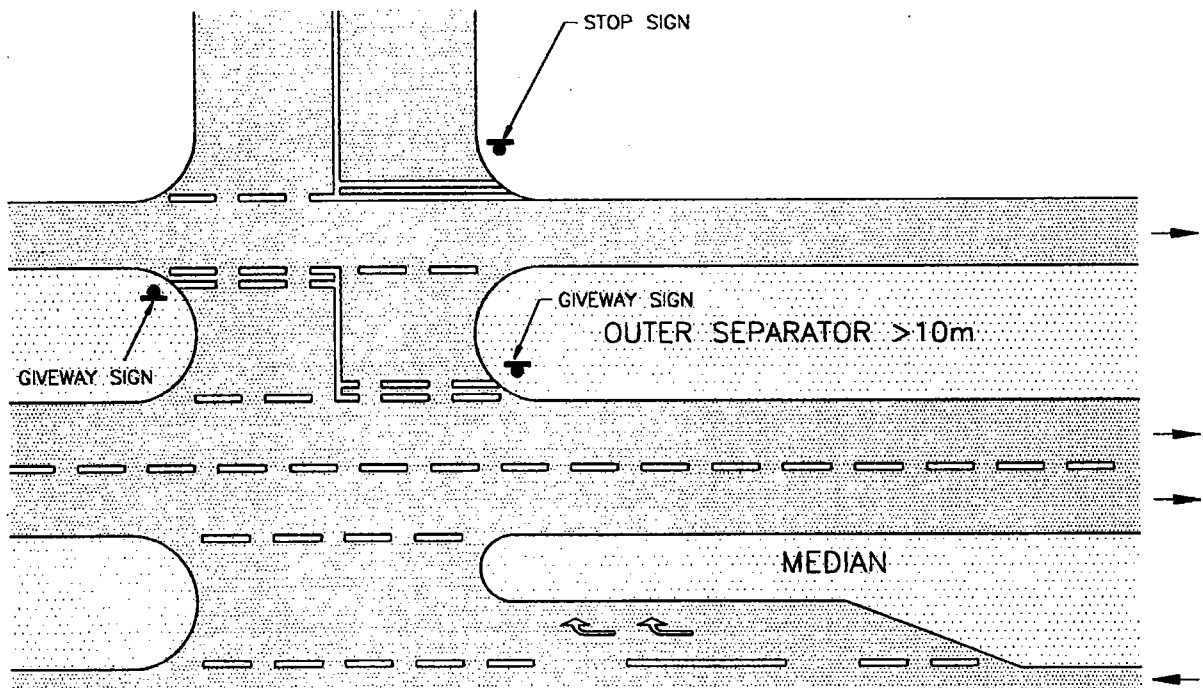


Fig. 11. Markings at Signal Controlled Urban Intersections (Ref. Paras 8.5.4, 9.3.5 & 9.9.2.)



(a) OUTER SEPARATOR UPTO 10m WIDTH



(b) OUTER SEPARATOR WIDER THAN 10m.

Fig. 12. Stop Line with Priority to Service Road (Ref. Paras 9.3.5 & 9.5.2.)

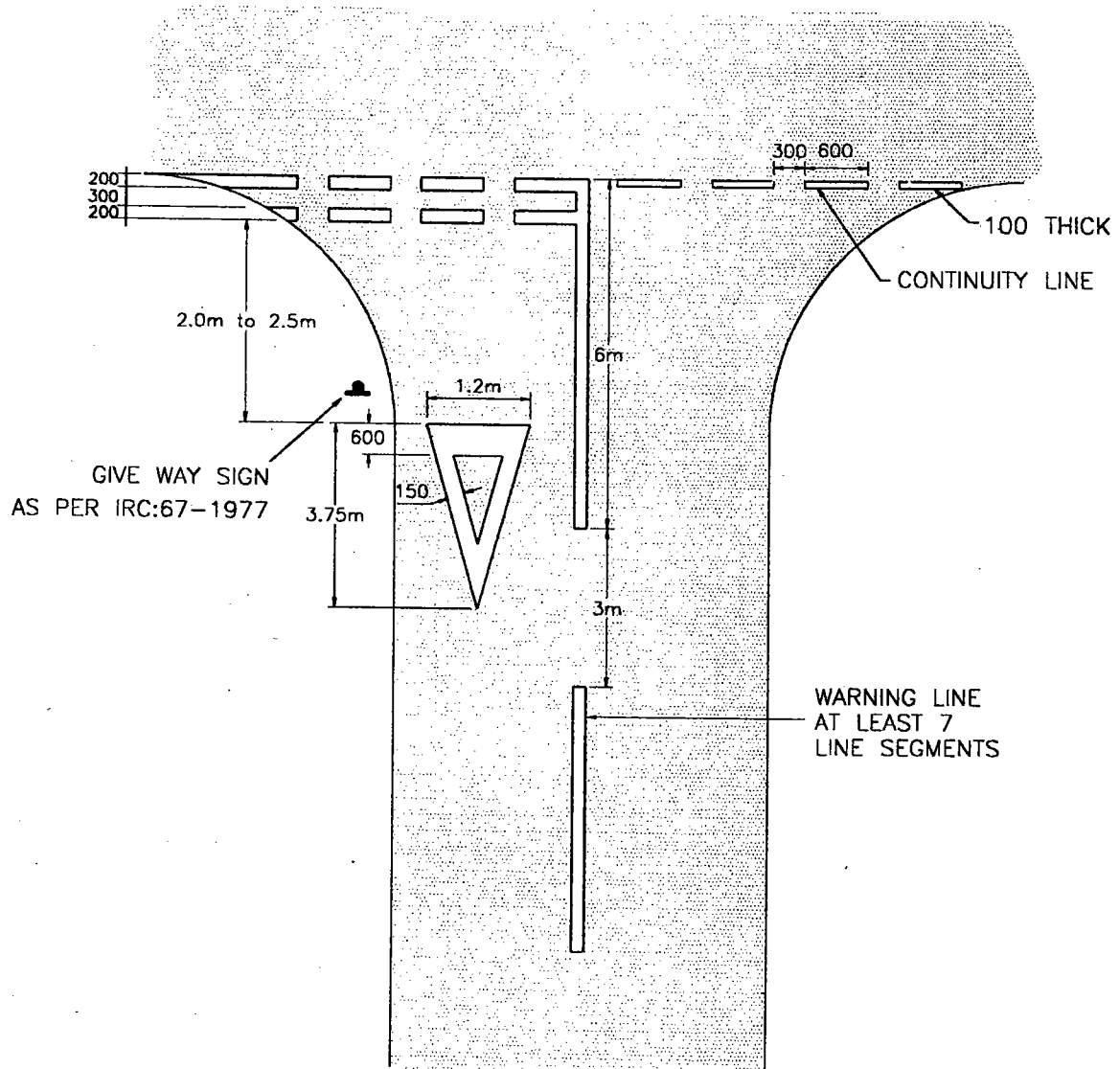


Fig. 13. Markings for Give Way Lines (Ref. Para 9.4.3 & 9.5.3.)

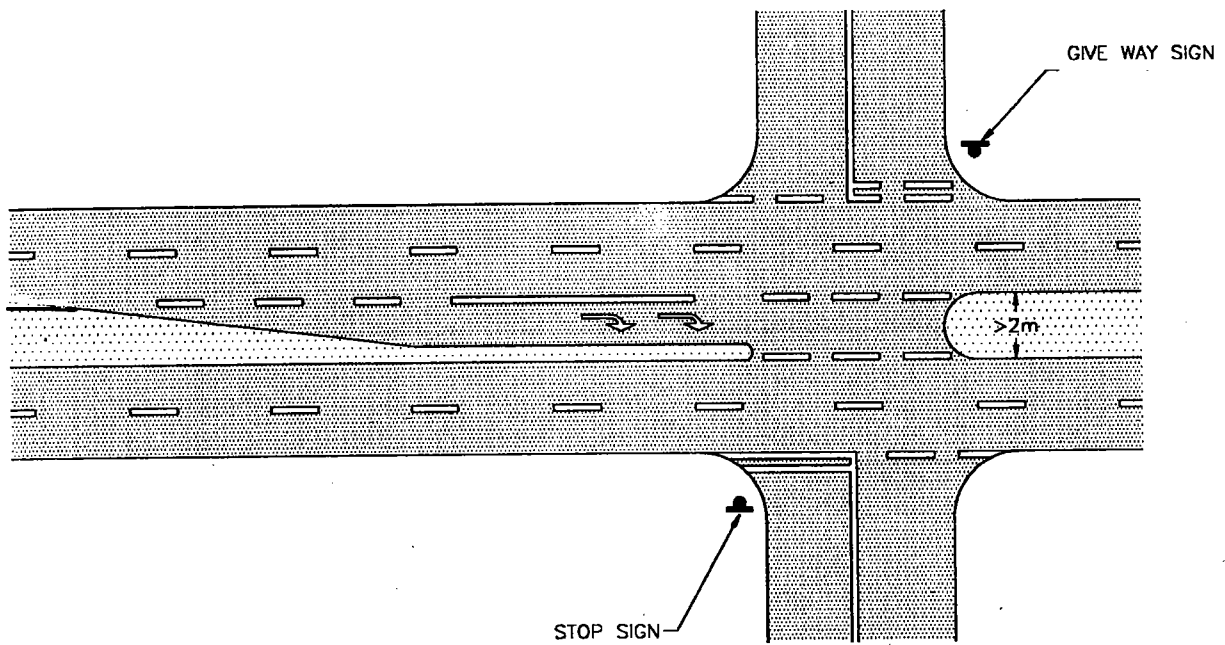


Fig. 14. Typical usage of Give Way & Stop Lines (Ref. Paras 9.3.5 & 9.4.4.)

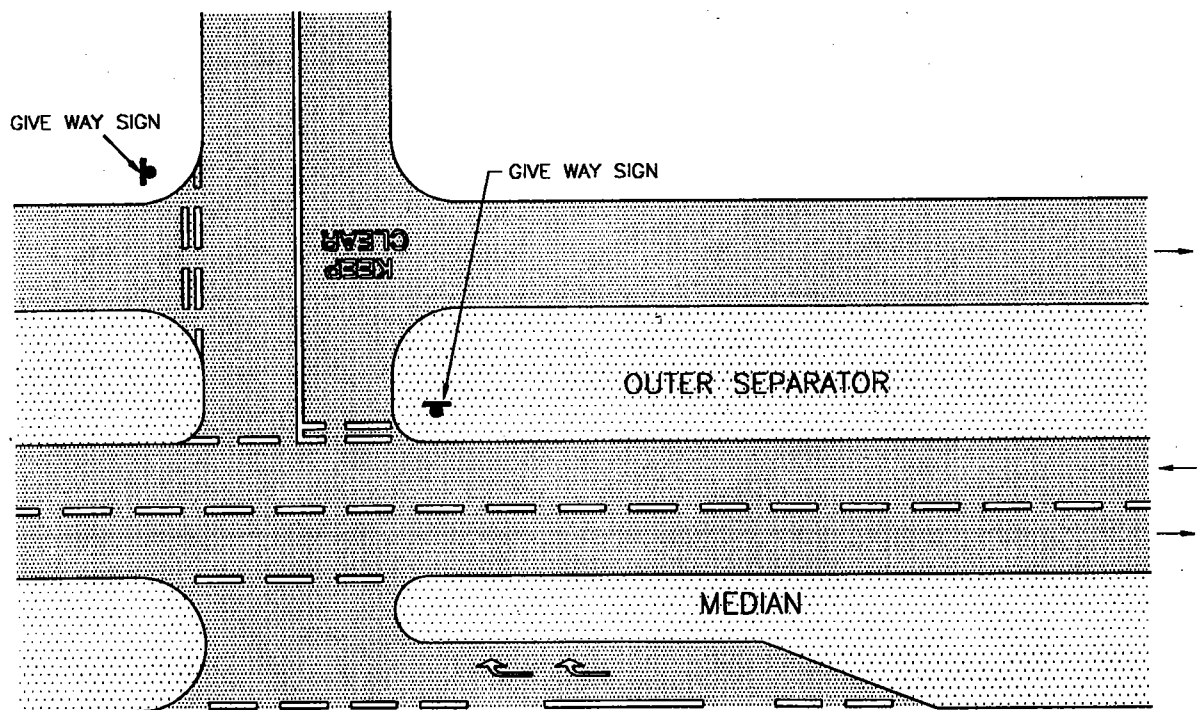


Fig. 15. Give Way and Stop Markings (Ref. Para 9.4.5.)

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the minor road by means of a continuity line in accordance with Para 9.5 (600 mm) line segment (300 mm gap), (Fig. 15).

9.5. Continuity Lines

9.5.1. Continuity of centre lines and traffic lane lines

(a) Urban intersection and signalised intersections.

At urban and signalised intersections lane lines and centre line shall end at the stop line and shall not be continued.

(b) Rural Intersections

Centre line shall not be continued for intersections on National Highways and State Highways, except that the same may be continued through intersections of relative unimportance (e.g. low volume roads). Lane line may be continued through an intersection where road designs or reduced visibility make it desirable to define the vehicular path (e.g. alignment, intersection width, offset, skewed, complex multi-legged intersections or where multiple turn lanes are used). The continuity of the lane marking and centre line markings through the intersection areas as discussed above, shall be of the same size and pattern as the markings on approach to the intersections.

9.5.2. Continuity lines for medians and islands : At intersections where guidance through channelizers is warranted, broken line markings in continuation of the outer edges of the central channelizers or separators, etc. may be provided to help the vehicles in negotiating the area safely. Typical markings are shown in Figs. 12, 14 & 15. The lines shall be 100 mm wide, white in colour, with 600 mm line segment and 300 mm gap.

9.5.3. Continuity lines for stop and give way lines : Continuity lines for stop and give way lines shall be in the form of a single broken line 100 mm wide with 600 mm line segment and 300 mm gap in continuity with the outer lines of a double line installation and in continuity with the line, where only single stop is used. Typical markings are shown in Figs. 10 and 13.

9.5.4. Continuity lines for turn markings : Markings to guide right turning traffic which has to cross two or more lanes may be provided in the form of 100 mm wide broken white line with 500 mm line segment and 500 mm gap for both rural and urban intersections.

9.6. Pedestrian Crossings

9.6.1. Crossing of the carriageway by pedestrians, only at the authorised places minimises the confusion. As a result of this, the number of pedestrian casualties is reduced and the tendency to jay walk is curbed. The success of pedestrian crossings in controlling both vehicular and pedestrian traffic depends to a greater extent on where and how they are marked.

9.6.2. Pedestrian crossings shall be provided at important intersections where conflict exists between vehicular and pedestrian movements. The site should be so selected that the pedestrians are subjected to minimum inconvenience and the vehicular traffic too is not interrupted very often.

9.6.3. The location of pedestrian crossing at intersections should fulfil the following conditions to ensure safety of traffic.

- (a) Adequate visibility so that the driver of approaching vehicle has clear view of the persons on the pedestrian crossing and on the pedestrian footpath;

- (b) Sufficient space on the footpath for the pedestrians to wait; and
- (c) Freedom from obstruction such as trees, sign posts, lamp posts, etc., in the path of pedestrians at either end of the pedestrian crossing.

9.6.4. For dimensions and positioning of pedestrian crossings, IRC : 103-1988 "Guidelines for Pedestrian Facilities", may be referred.

9.6.5. At intersections, the pedestrian crossings should invariably be preceded by a stop line at a distance of 2 m to 3 m for unsignalized intersections and at a distance of 1 m for signalized intersection.

9.6.6. The width of the pedestrian crossing is governed by the pedestrian volumes crossing the road and by local requirements but in no case should it be less than the width of footpath subject to a minimum of 1.5 m. The width of the crossing generally lies between 2 m and 4 m.

9.6.7. Marking for pedestrian crossing mostly used is the Zebra pattern consisting of equally spaced white stripes generally 500 mm wide in accordance with IRC : 103 - 1988 and they should be marked as shown in Plate 1. A warning sign as per IRC : 67 - 1977 to indicate that the pedestrian crossing is ahead should also be installed.

9.6.8. At mid-block pedestrian crossing in urban areas, it may be advantageous to install flashing signals alongwith the markings, so that the drivers receive advance warning about the presence of the crossing.

9.7. Cycle Track Crossings

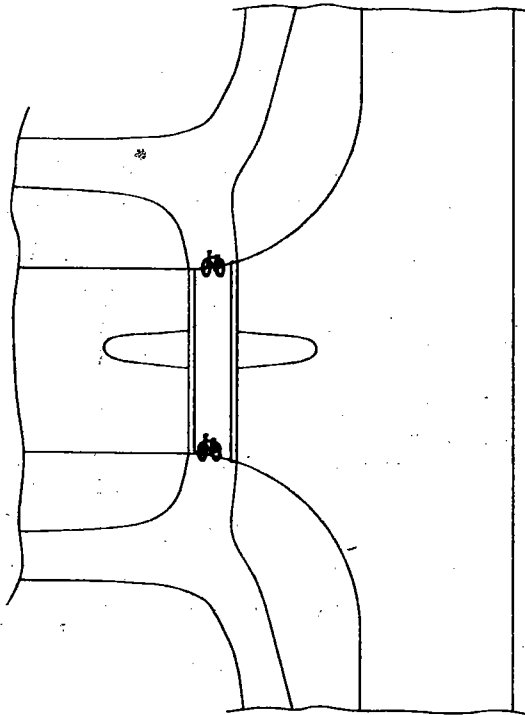
9.7.1. The crossing of the carriageway by cyclists shall be provided at carefully designated locations. Markings for cyclist crossing should be provided wherever a cycle track crosses a road. The cycle track crossing should preferably be adjacent to a pedestrian crossing when such a crossing is also provided. The width of cyclist crossing should be the same as that of cycle track.

9.7.2. The marking for cycle track crossing would comprise two white continuous lines across the carriageway to be crossed. These lines would be 100 mm wide, at the spacing equal to the width of the cycle track (1 m to 3m). Some typical markings are shown in Fig. 16.

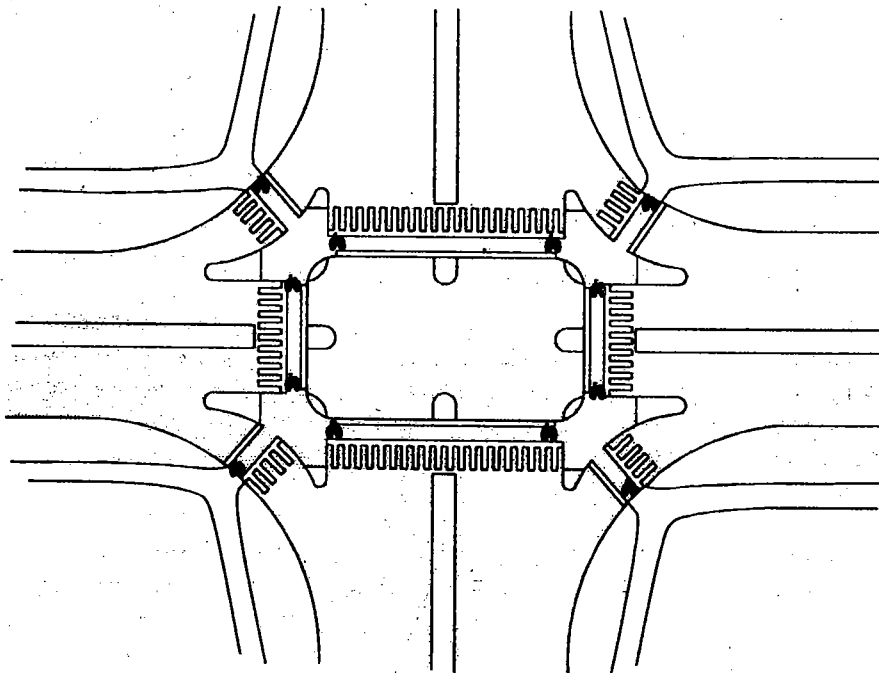
9.8. Markings on Speed Change Lanes

9.8.1. Channelizing lines are utilised to demarcate a neutral area at the nose of a channelizing island to reduce the probability of collision with kerb nose. They direct the entering and exit traffic into the proper angle for smooth movements of divergence and convergence. These markings provide for proper and safe use of acceleration and deceleration lanes. The basic function is to inform the driver about the area which is set aside for exclusive use of traffic on main highway and to enable him to adequately distinguish between through traffic lanes and the acceleration and deceleration lanes specially designed for his use.

9.8.2. A solid white line 150 mm wide, shall be placed along the sides of the triangular neutral area adjacent to the speed change lane and the main highway. A broken white warning line 100 mm thick shall be placed from the apex of the triangular area for the full length of the speed change lane. Additional emphasis can be provided by means of chevron markings within the neutral area. Fig. 17 shows typical markings for acceleration lanes. Fig. 18 shows typical markings for deceleration lanes. Details of chevron/diagonal markings are given in Fig. 19.



A) CYCLE TRACK CROSSING AT THE ROAD WITH CENTRAL CHANNELISER

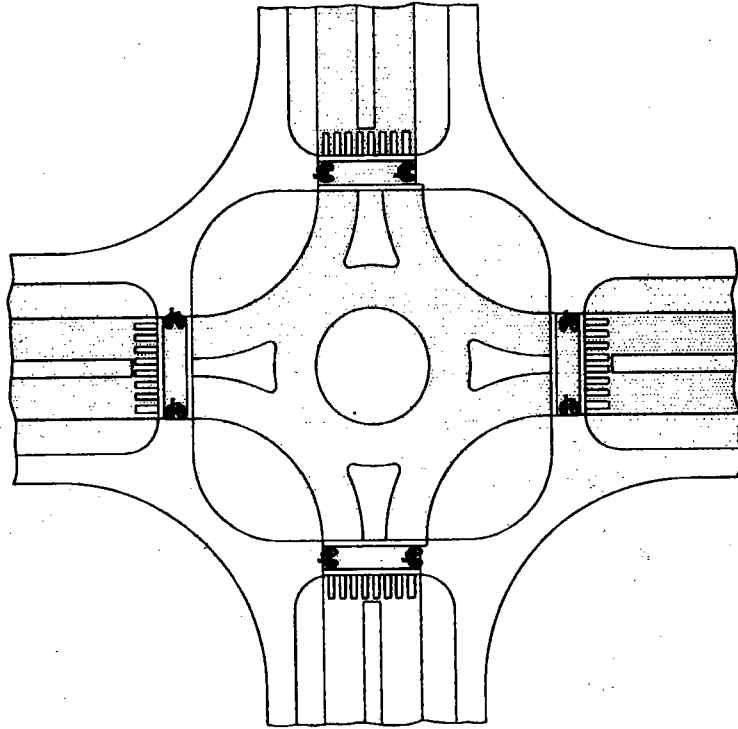


B) CYCLE TRACK CROSSINGS AT INTERSECTION WITH ROADS OF DIVIDED CARRIAGEWAY

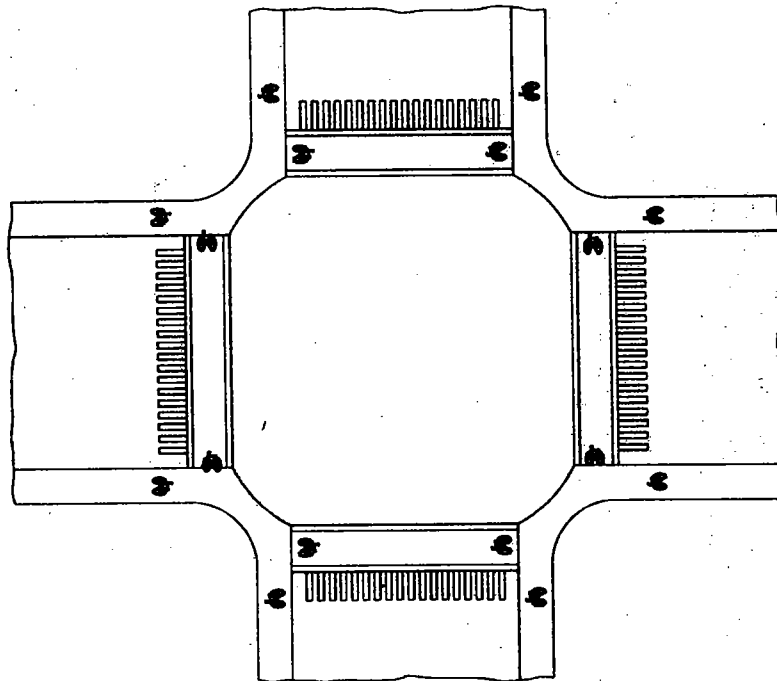
Fig. 16. Markings for Cycle Track Crossings (Ref. Para 9.7.2)

(Contd.)

Fig. 16 (Contd.)

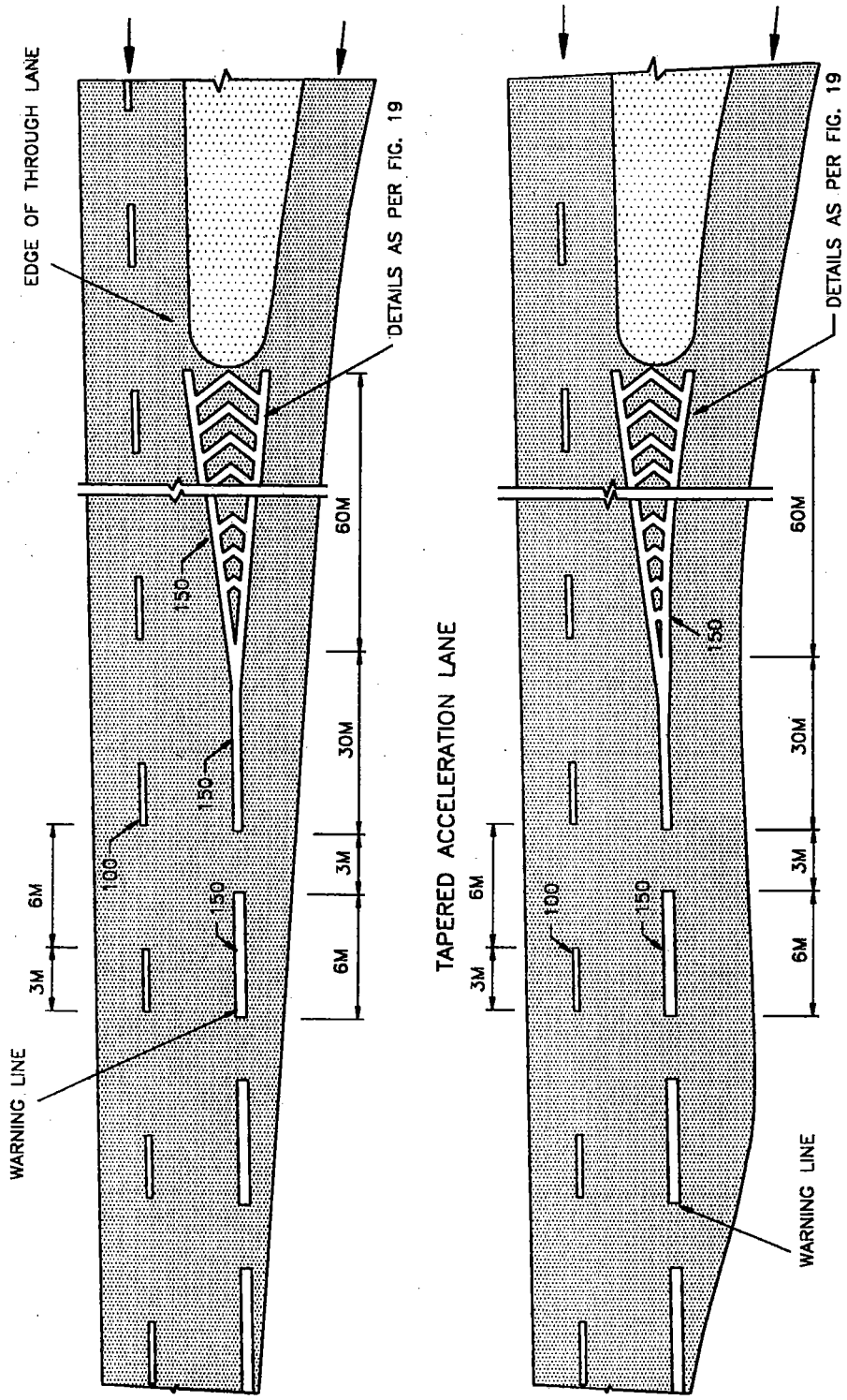


C) CYCLE TRACK CROSSINGS AT ROUNDABOUT



D) CYCLE TRACK CROSSING AT 4-ARM INTERSECTION

Fig. 16. Markings for Cycle Track Crossings (Ref. Para 9.7.2.)



PARALLEL ACCELERATION LANE

Fig. 17. Markings for Acceleration Lane (Ref. Para 9.8.2)

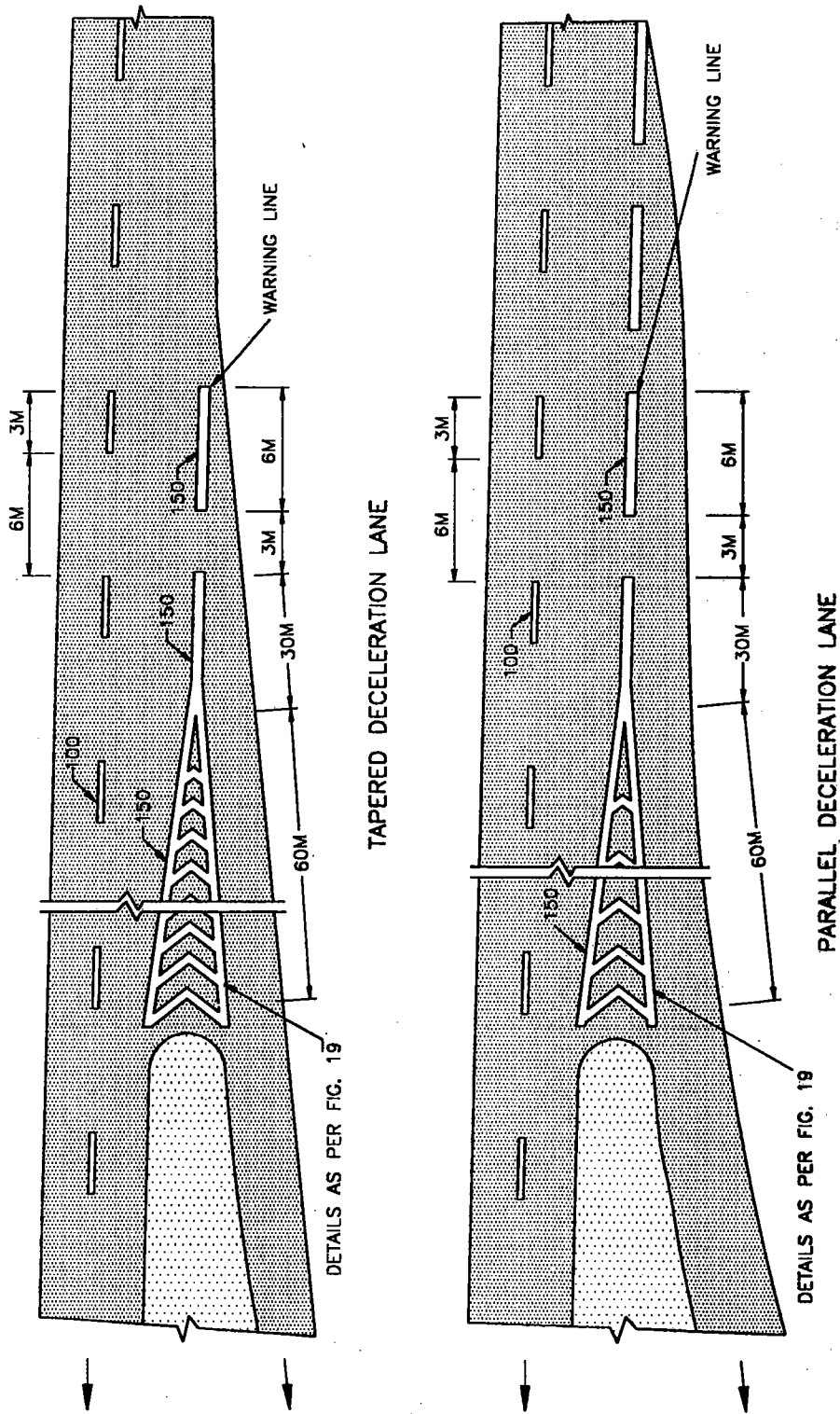


Fig. 18. Markings for Deceleration Lane (Ref. Para 9.8.2)

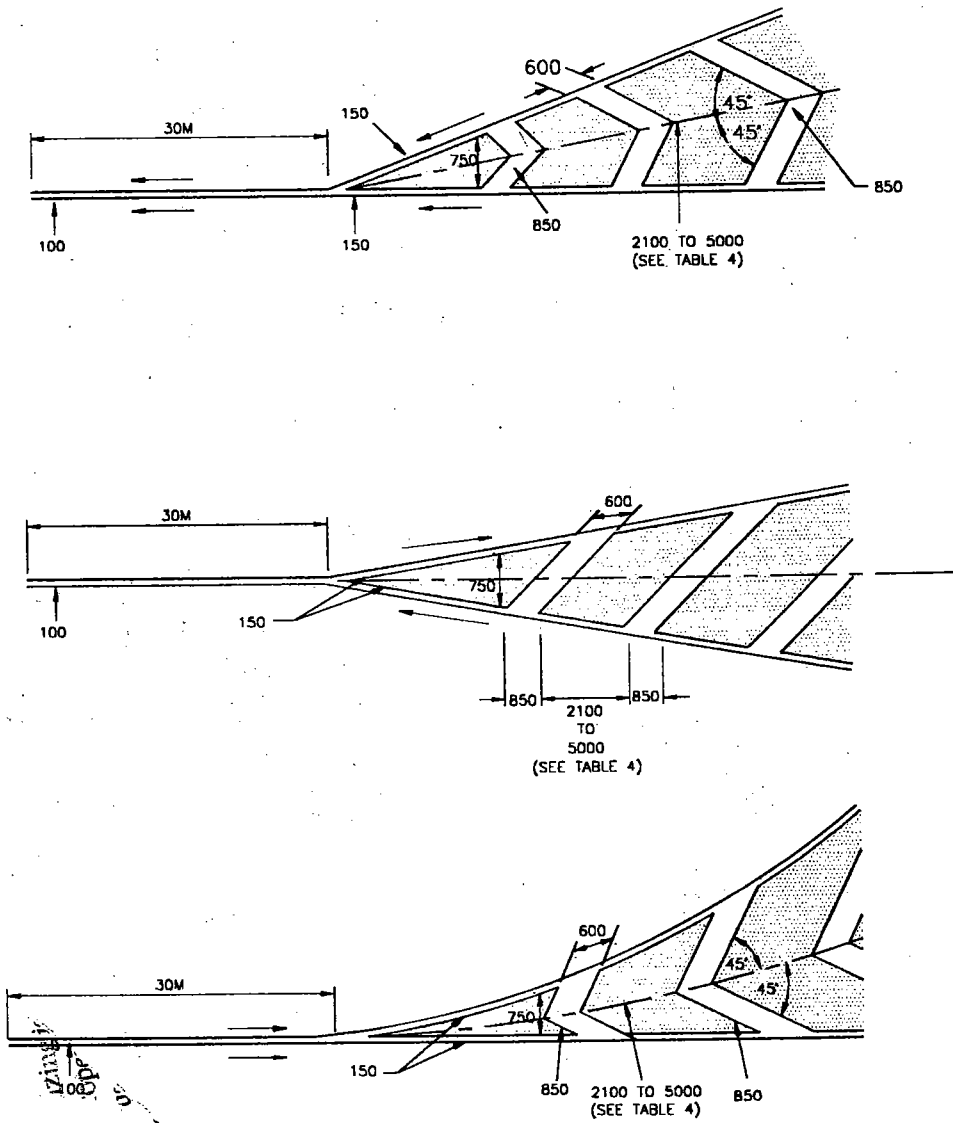


Fig. 19. Details of Diagonal and Chevron Markings (Ref. Para 9.8.2)

hall - govindaf. u. 1. 1. 1. id
 3230 pi
 ich 21
 100 ft
 100 ft
 100 ft

32
 32
 32

**Table 4 : Spacing between Diagonals/Chevrons
(Ref : Fig. 19, Para 9.8.2)**

Total length of marking (m)	Clear spacing between diagonals or chevrons (mm)	
	Speed (<75 km/h)	Speed (>75 km/h)
<6	2100	-
6 to 22	3500	-
>22	5000	-
<10	-	4000
>10	-	6000

- Note:
1. All lengths and spacings in the table are measured parallel to road centre lane
 2. First diagonal or chevron is to be so located that its length is at least equal to its width
 3. Width of all diagonals/chevrons measured at right angles to the diagonals or chevrons is 600 mm

9.9. Directional Arrows

9.9.1. In addition to the warning lines on approaches to intersections, directional arrows should be used to guide drivers in advance over the correct lane to be taken when approaching busy intersections whether signal controlled or not. Because, of the low angle at which such markings are viewed, these must be elongated in the direction of the traffic flow to provide adequate legibility. For speeds upto 50 kms per hour the arrows should be 3.5 m in length. For higher speeds, the length should be 5 m. Normally two arrows should be used in sequence in each lane, occasionally three. The direction arrow nearest to the intersection, should be 15 m from the stop line or the entrance to the junction. The second arrow should be placed 30 m before the first arrow and the third arrow, if used, should be placed 30 m before the second arrow.

9.9.2. Recommended designs of arrow are shown in Figs.20 and 21. Typical application is indicated in Fig. 11.

9.9.3. On two lane approaches to an intersection, the arrangement of arrows indicating the lanes for (a) straight ahead, (b) left turn, and (c) right turn will depend on the relative turning volumes and on the site conditions, where for instance, there is a very heavy right turn movement, the straight ahead and left turn arrow should be combined in the left side lane. Similarly, where there is a left filter lane, the same should be marked with left arrow marking alone, in order to exclude non filtering traffic.

9.10. Markings on Protected Right Turn Lanes

At intersections having a separate right filter lane, and where there is an apprehension of the following vehicles hitting the vehicles waiting in that lane, the flow at approaches to the intersection may be controlled by providing a protected area marking which diverts the entire flow towards left. Right turning vehicles then filter out into the right filter lane. Typical markings are shown in Fig. 22. The actual size of the marking shall depend upon the volume of right turning traffic, speed and space available for the marking. These markings should be enclosed by a solid line to restrict vehicular flow through the markings.

9.11. Markings at Rotaries

9.11.1. Kerbs of the central and channelizing islands should be painted with vertical black and yellow stripes, each 500 mm wide, to improve visibility. The road side kerbs, should be painted with vertical black and white stripes, each 500 mm wide. All pedestrian and cyclist crossings should be provided with suitable pavement markings.

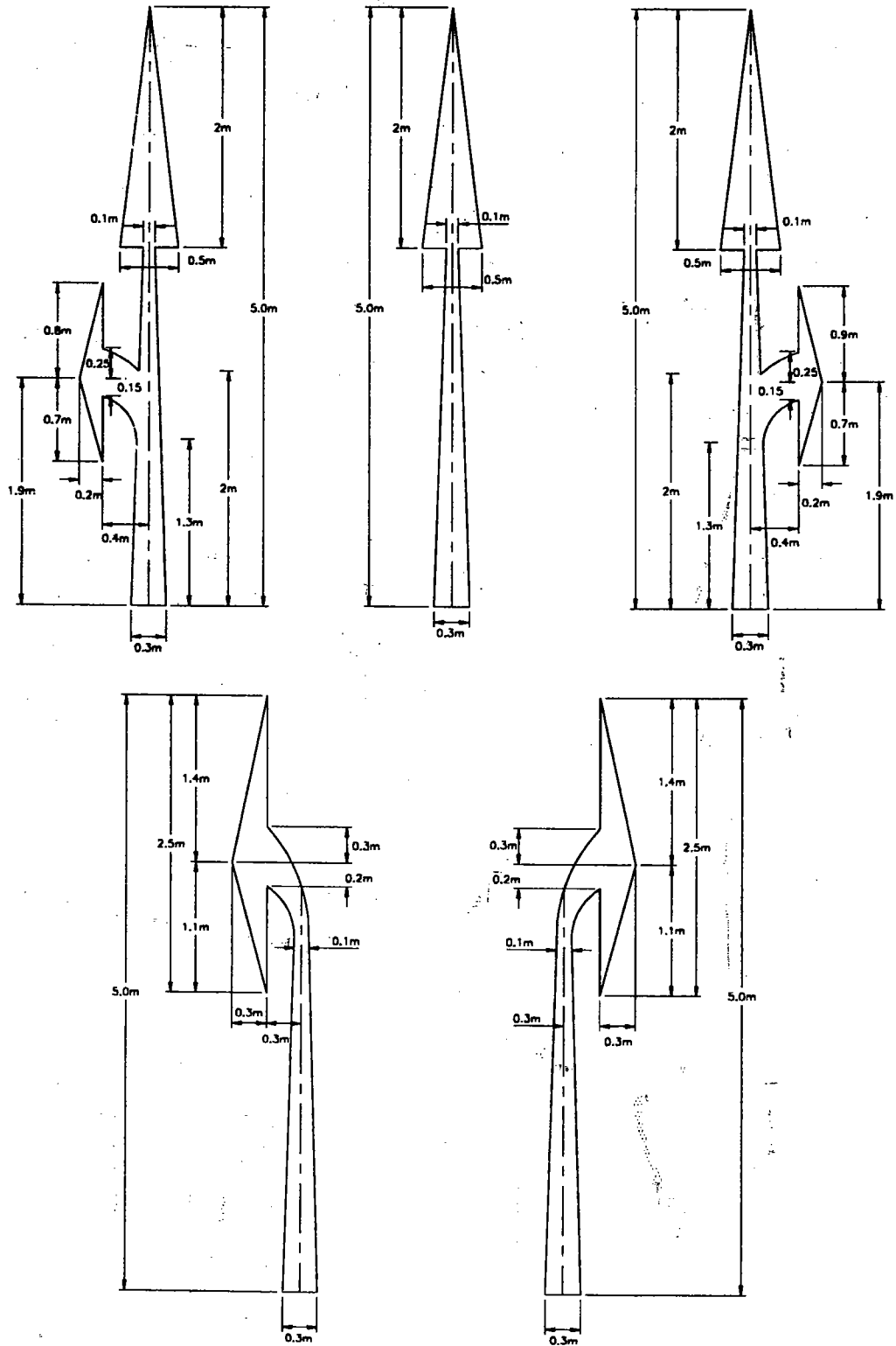


Fig. 20. Arrow Markings for Route Direction for Design Speed more than 50 km/hr. (Ref. Para 9.9.2.)

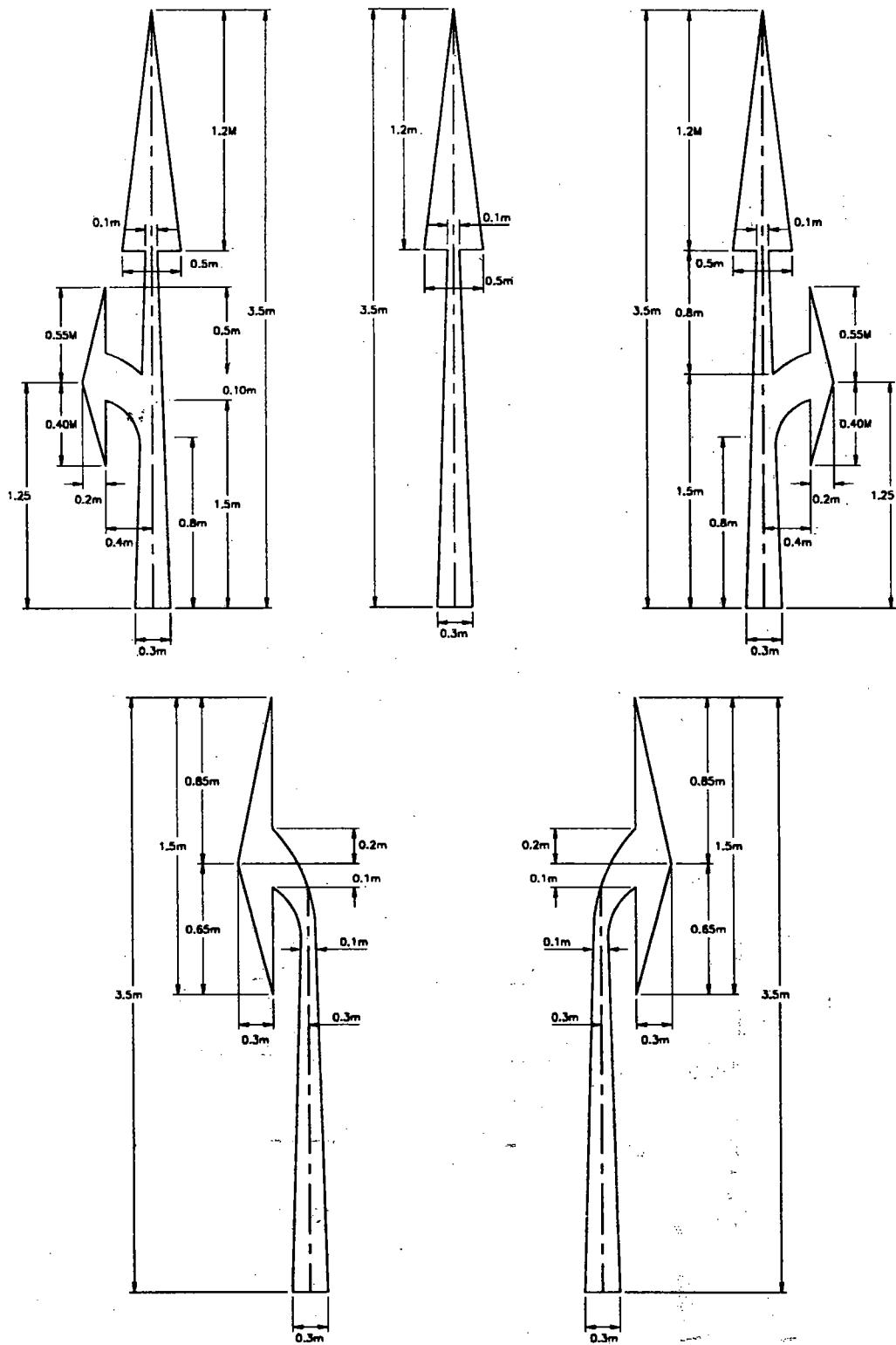
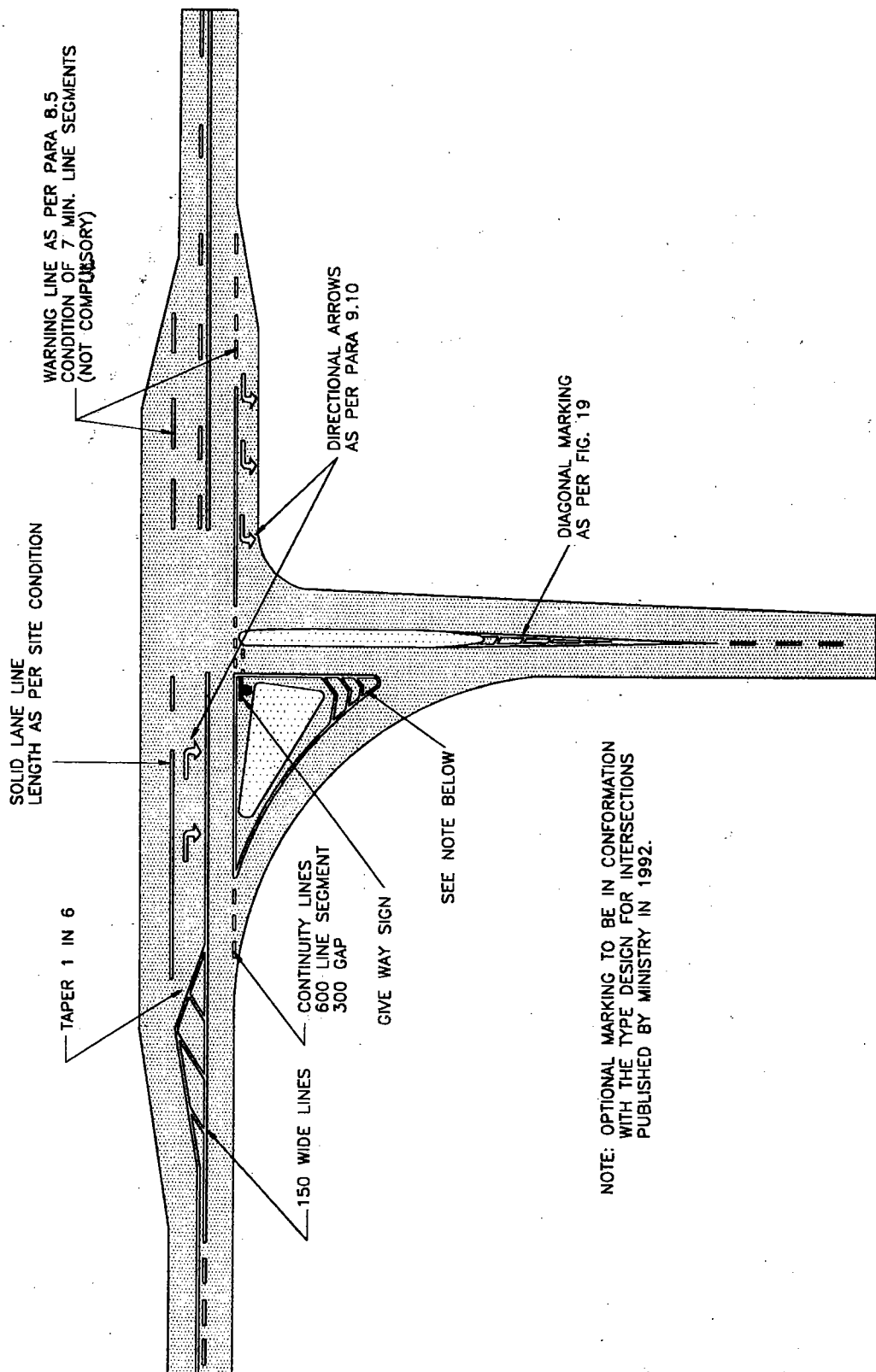


Fig. 21. Arrow Markings for Route Direction for Design Speed of 50 km/hr. or Less (Ref. Para 9.9.2.)



NOTE: OPTIONAL MARKING TO BE IN CONFORMATION WITH THE TYPE DESIGN FOR INTERSECTIONS PUBLISHED BY MINISTRY IN 1992.

Fig. 22. Protected Right Turn Lane (Ref. Para 9.10)

9.11.2. Exit roads at rotaries should be indicated by signs and directional arrows placed both at the edge of central island and the directional islands or in the absence of the latter, at the corner of the exit roads and facing the approaching vehicles.

9.11.3. Typical road markings at rotaries are shown in Fig. 23.

9.12. Box Markings

9.12.1. Critical intersection areas are marked with yellow crossed diagonal lines in the form of a box to indicate the areas where vehicle must not become stationary even for a short while. Drivers are prohibited from entering such areas even if the signal light is green but the area cannot be crossed. This is to ensure that the junction is not choked in the event of heavy traffic. Typical box junction markings are shown in Fig. 24.

9.12.2. These markings should be used sparingly and only at places where locking of traffic stream is anticipated. For example, a situation will arise when two road intersections are too close and the waiting vehicles at red signal extend their length upto the road crossing in-question. This marking indicates that the area is not to be used as storage by any vehicle in the queue. The marking may be replaced by "KEEP CLEAR" word message for intersection of minor significance.

10. MARKINGS ON HAZARDOUS LOCATIONS

10.1. Carriageway Width Transition Markings

10.1.1. Where possible, changes in the width of carriageway should be avoided. If this is inescapable, the driver shall be apprised of the change in the width by suitable carriageway markings and road signs.

10.1.2. There are a number of possible solutions depending on the lanes which must be off-set or cut out to change their widths. If one or more lanes are to be discontinued, the centre and the lane lines should be connected in such a way as to merge traffic into the reduced number of lanes.

10.1.3. Line markings at carriageway width transition shall be 100 mm wide and of standard centre line or lane line design. Converging lines shall be 150 mm wide and shall have a taper length of not less than twenty times the off-set distance. These shall be supplemented with edge lines as per Para 8.6 wherever necessary.

10.1.4. Throughout the transition area the line separating the opposing direction of traffic shall be no-overtaking zone pattern. It should be borne in mind that these lines, in themselves, are not considered to be sufficient warning at such locations. They should always be used to supplement the standard warning signs.

10.1.5. Typical carriageway markings showing transition from wider to narrower section and vice-versa recommended for adoption for different situations are shown in Figs. 25 to 27.

10.2. Median Width Transition Markings

10.2.1. The changes in the width of median on a dual carriageway road/highway should be avoided, as far as possible. Sometimes, due to non-availability of required land width or other unavoidable reasons the median width may need to be changed. At such locations, the driver should be properly guided with suitable carriageway markings and signs.

10.2.2. The transition zone of the change in median width shall be provided with diagonal markings. Typical carriageway markings recommended for adoption, in such zone of widening of median and vice versa are shown in Fig. 28.

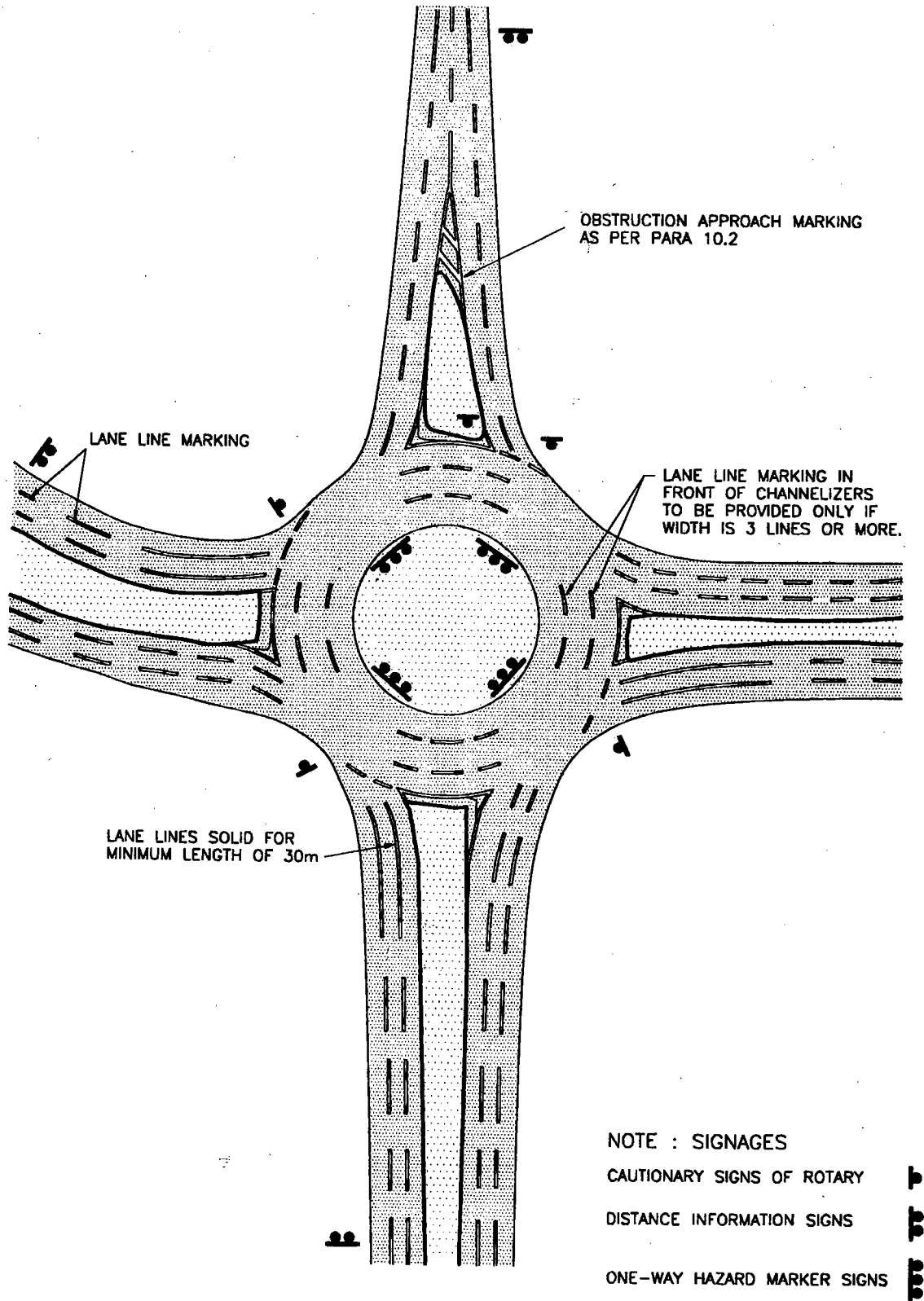
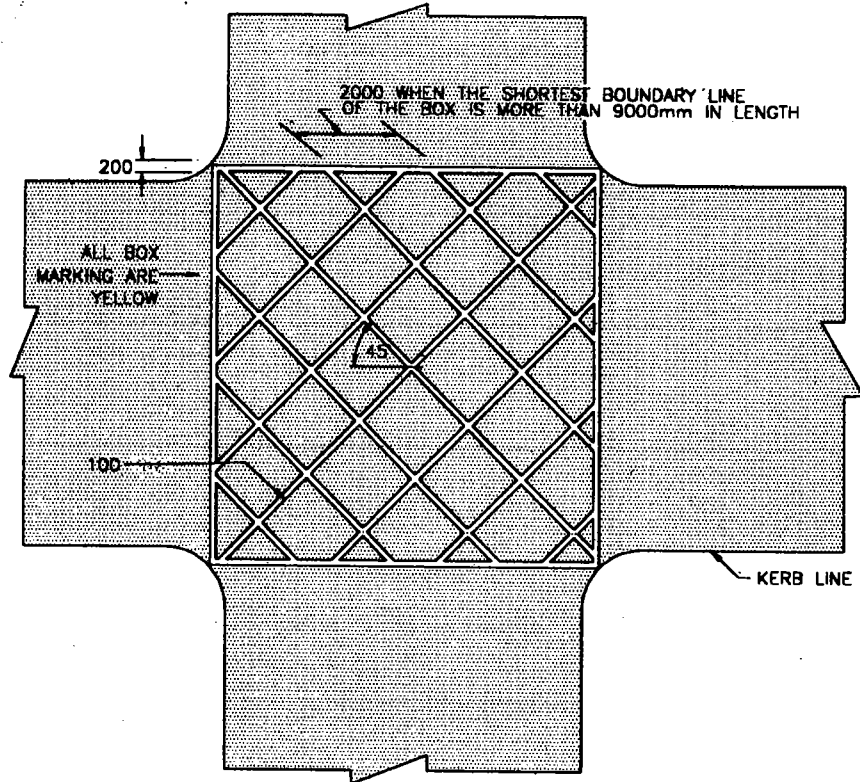
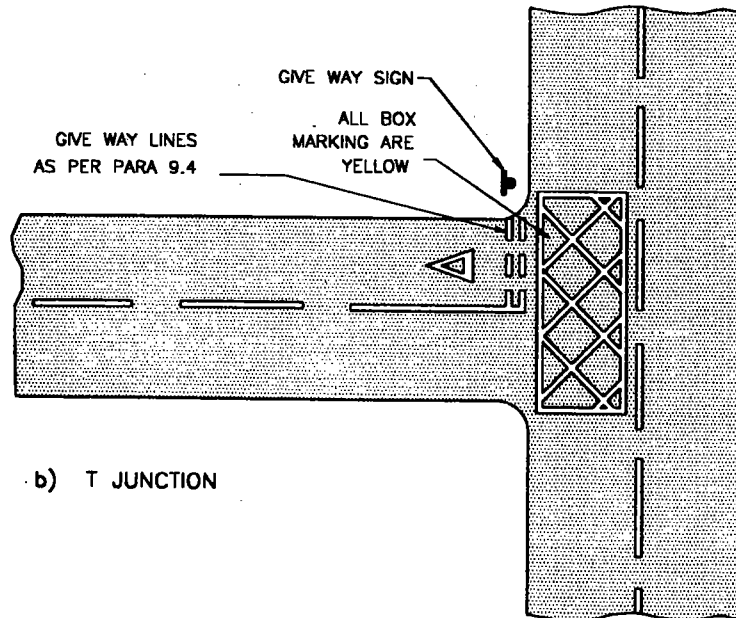


Fig. 23. Typical Road Markings at Rotaries (Ref. Para 9.11.3)

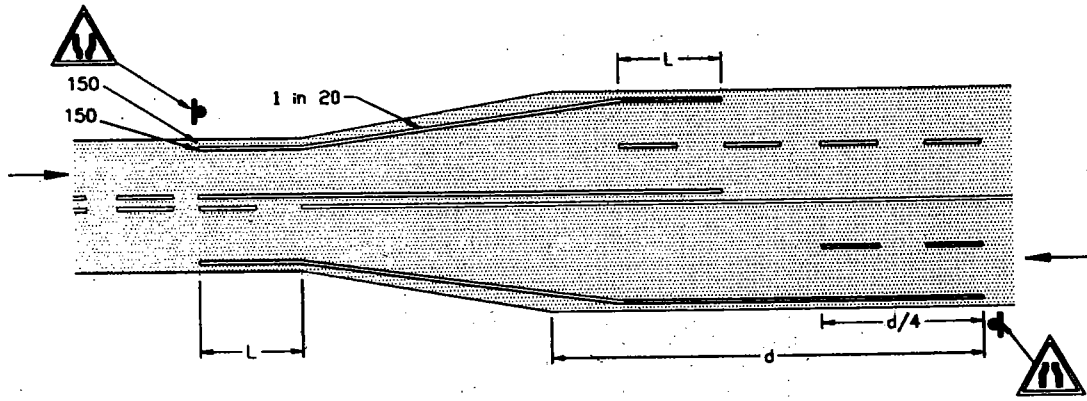


a) FOUR ARMED INTERSECTION

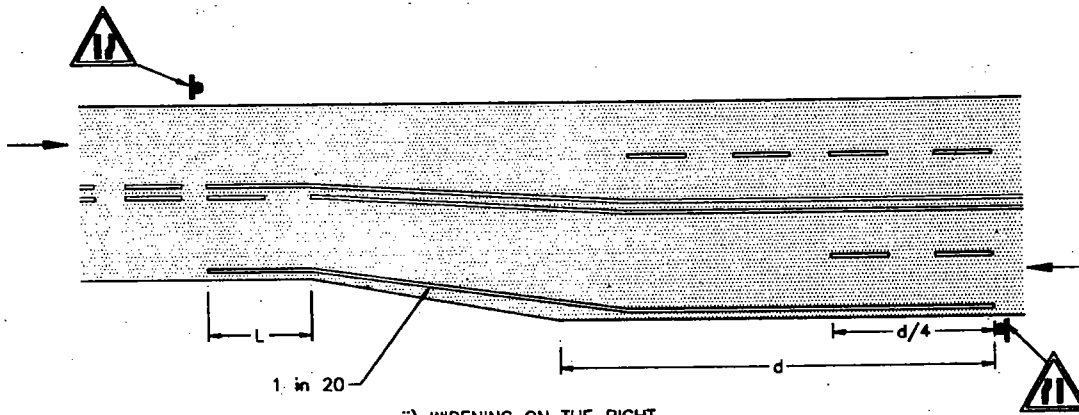


b) T JUNCTION

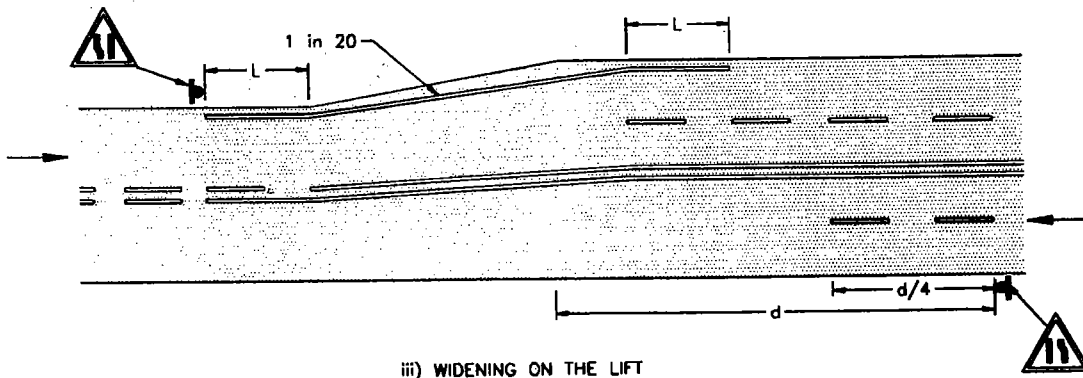
Fig. 24. Typical Box Junction (Keep Clear) Markings (Ref. Para 9.12.1)



i) CENTRE LINE OF THE ROAD MAINTAINED



ii) WIDENING ON THE RIGHT



iii) WIDENING ON THE LEFT

(a) WIDENING OF TWO LANES TO FOUR LANES

$L = 45\text{m}$ for N.H. and S.H. and 22.5m for other Roads.

$d = 120\text{m}$ for N.H. and S.H. and 60m for other Roads.

Fig. 25. Carriageway Transition Markings (Ref. Para 10.1.5)

(Contd.)

(Fig. 25 (Contd.))

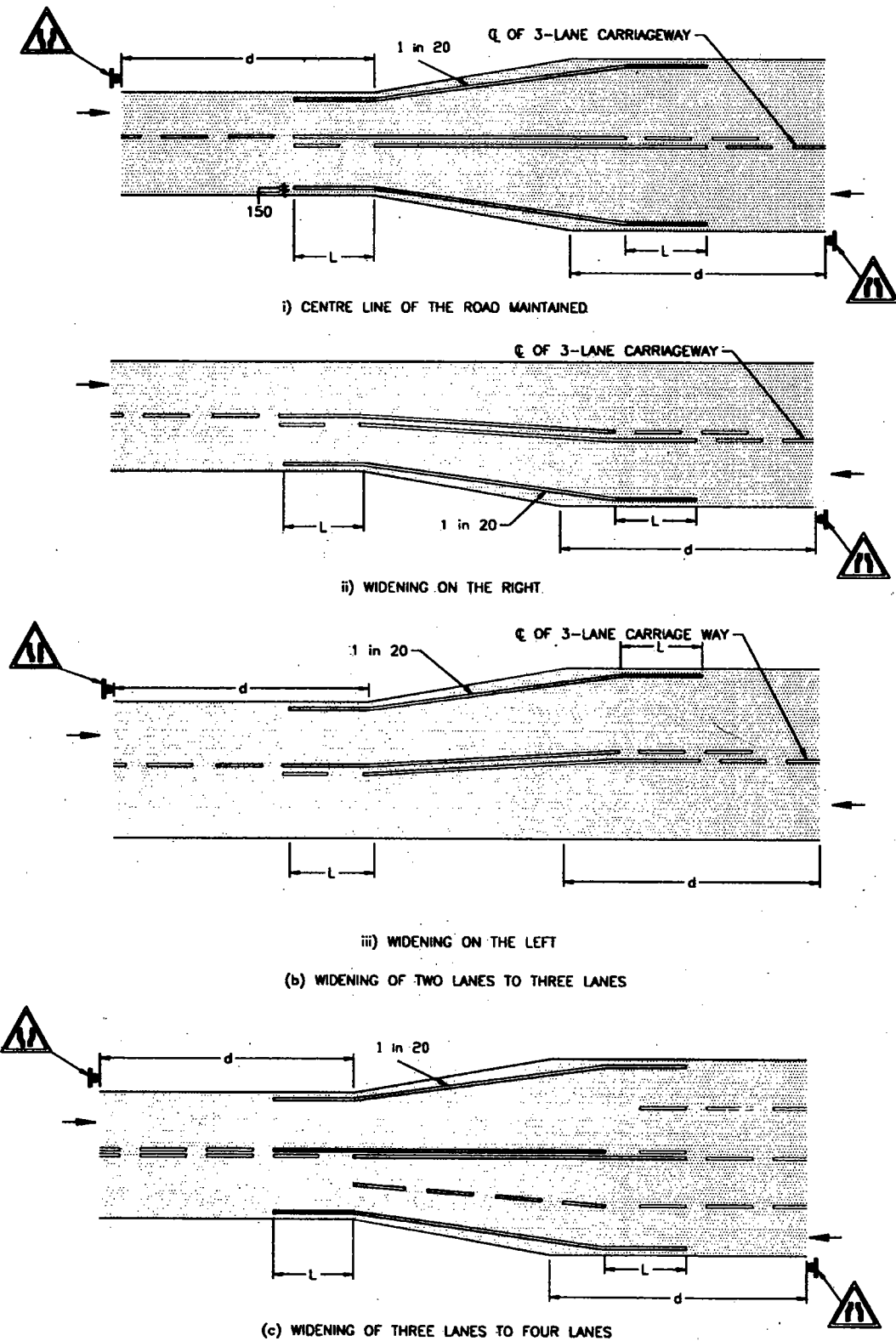


Fig. 25. Carriageway Transition Markings (Ref. Para 10.1.5)

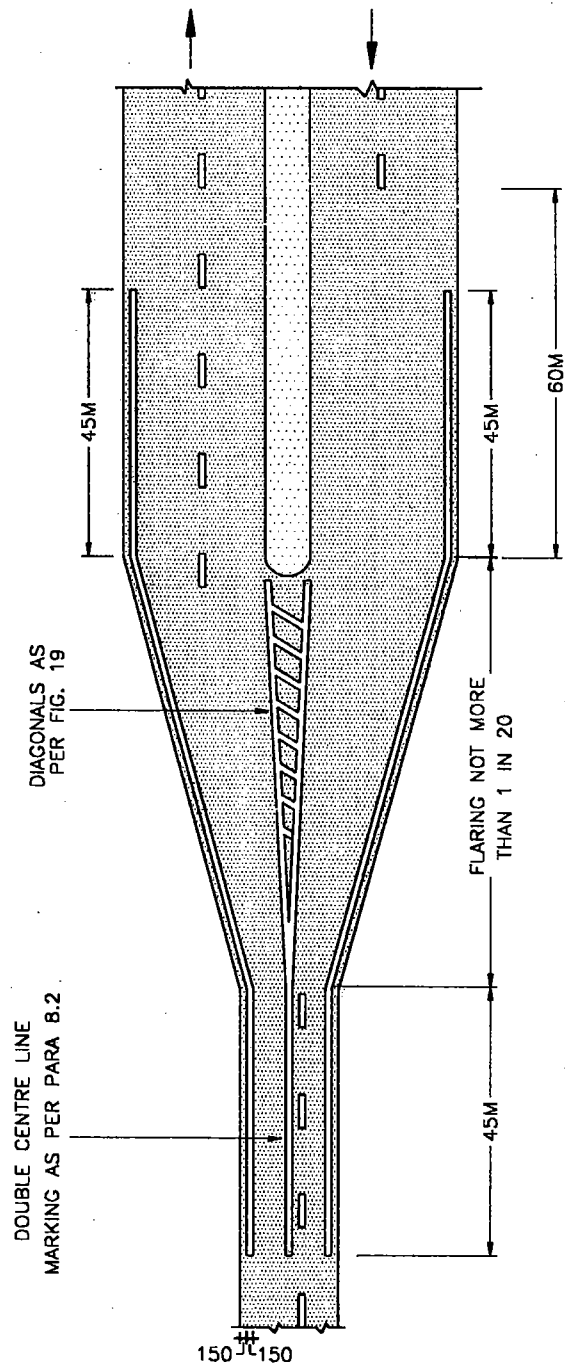


Fig. 26. Markings on Transition from 2-Lane Undivided to 4-Lane Undivided Carriageway (No Shift in Centre Line) (Ref. Para 10.1.5)

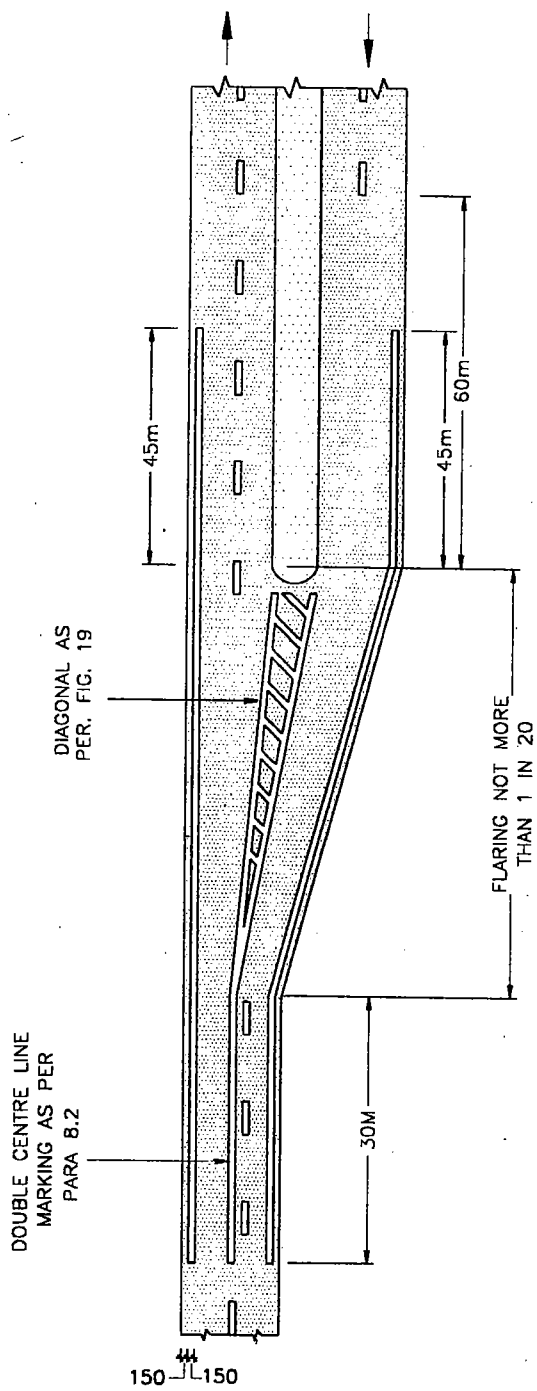
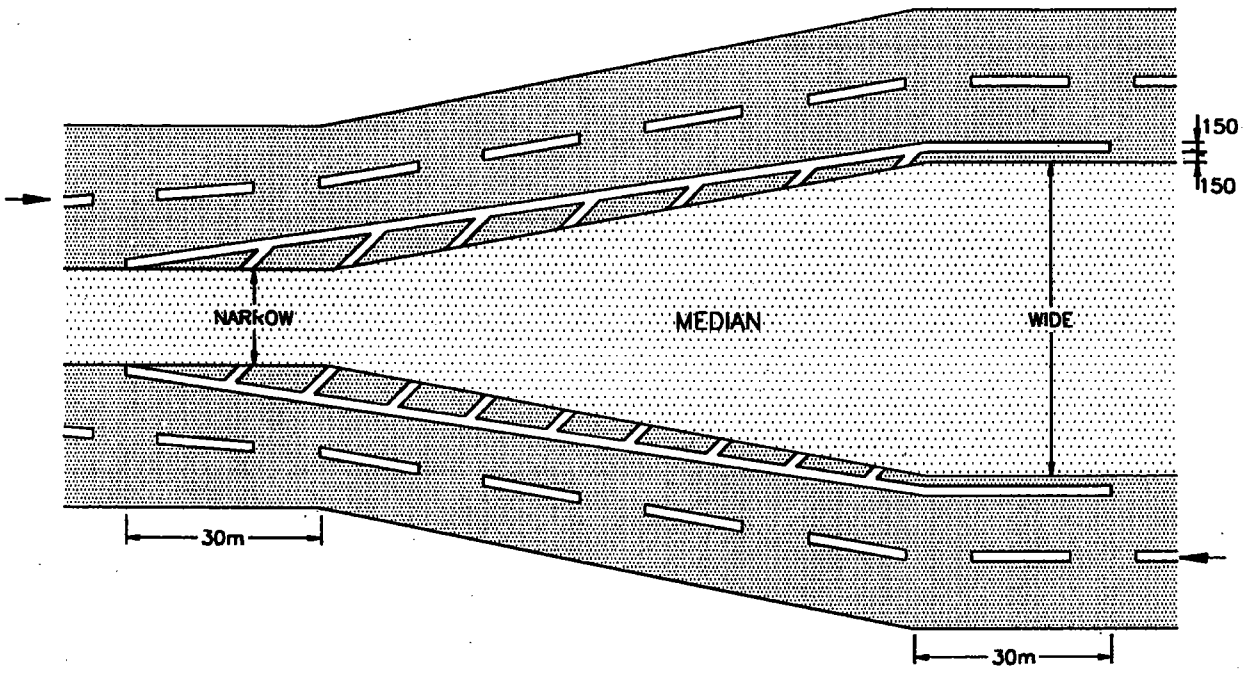
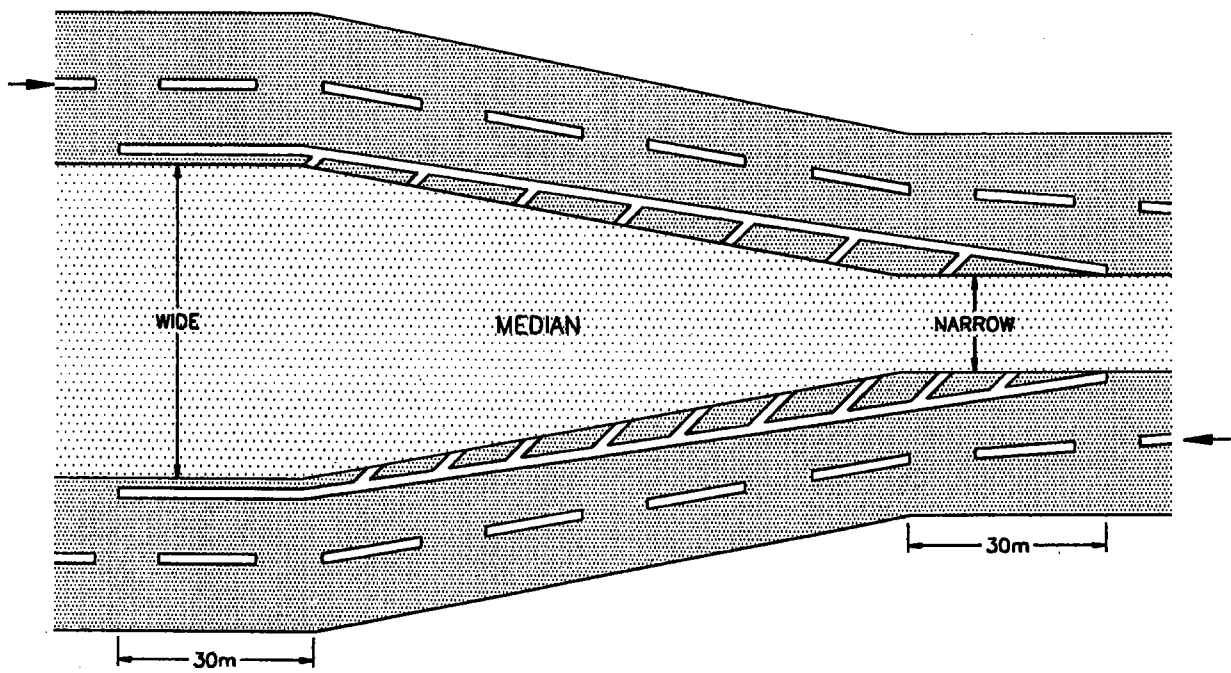


Fig. 27. Markings on Transition from 2-Lane Undivided to 4-Lane Divided Carriageway (Centre Line Shifted) (Ref. Para 10.1.5)

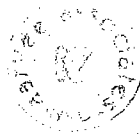


(a) WIDENING OF MEDIAN WIDTH



(b) NARROWING OF MEDIAN WIDTH

Fig. 28. Marking in Transition of Median Width (Ref. Para 10.2.2.)



10.3. Obstruction Approach Markings

10.3.1. Physical obstructions within the carriageway, such as monuments, transmission poles or towers, trees etc. which constitute a serious hazard to traffic, should not be allowed except under compelling circumstances. But if unavoidable, all possible measures should be taken to prevent vehicles from colliding with the obstructions.

10.3.2. The approach marking to obstructions shall be so designed as to deflect the traffic away from the obstruction by diagonal lines or chevron markings.

10.3.3. Typical obstruction approach markings shall be as shown in Fig. 29.

10.3.4. The immediate approach to channelizing and central median islands may be marked by diagonal/chevron marking described in Fig. 19. When traffic flow on the two sides of these markings is in opposite directions, diagonal markings should be used. When the traffic flow on the two sides of markings is in the same direction, chevron marking is appropriate. The colour of these markings shall be yellow. The total length of marking at channelizing islands shall be variable as per site conditions but the length should be sufficient to include at least two chevron/diagonals.

10.3.5. Painted channelization can be used to increase efficiency and safety and has the advantage of easy modifications, when warranted by the driver behaviour. If a more permanent barrier is required, kerbs and islands may be constructed but the painted channelization will serve initially to establish the best layout arrangement before permanent construction is established.

10.4. Road-Rail Level Crossing

10.4.1. **Markings:** Markings at road-rail level crossing shall consist of:

- (i) No-overtaking zone marking for roads 2 lane or more wide (yellow)
- (ii) A stop line (white)

10.4.2. **Applications:** The markings shall be placed at all road-rail level crossings having significant vehicle/rail conflict. At unimportant crossings or in urban areas, where other devices provide suitable control, these markings may be omitted. IRC:39-1986 deals with standards for road-rail level crossings extensively. Typical markings are shown in Fig. 30.

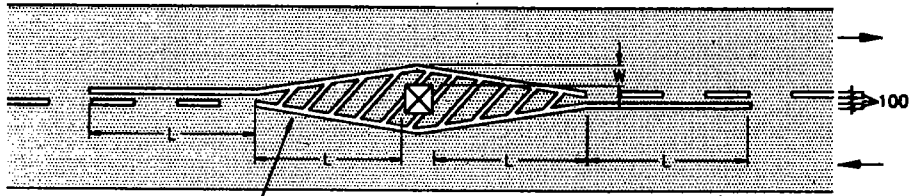
11. MARKINGS FOR PARKING

11.1. Parking Spaces

11.1.1. The marking of the parking space limits on urban roads promotes more efficient use of the parking spaces and tends to prevent encroachment on fire hydrant zones, bus stops, loading/unloading zones and other such locations where parking of vehicle will be undesirable. Such parking space limits should be indicated in the carriageway by typical markings as shown in Fig. 31. The markings shall be solid white lines 100 mm wide.

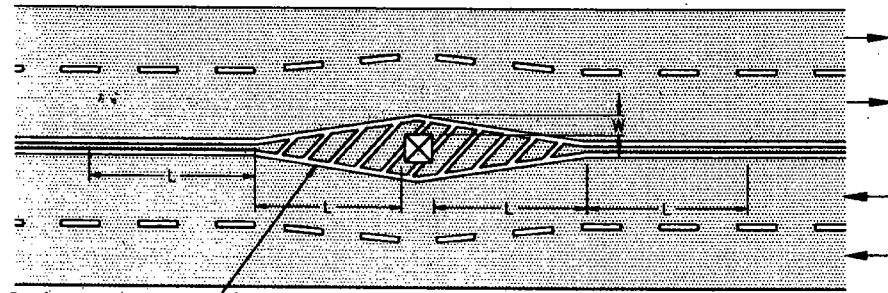
11.1.2. The limits of the designated parking places should also be indicated by informatary parking signs mounted on the kerb side in accordance with IRC:67-1977.

11.1.3. The word TAXI, CARS, SCOOTERS, AUTO-RICKSHAWS, etc. may also be written if the parking area is specific for any particular type of vehicle. These words should also be indicated on the supplementary plate of the Parking sign.



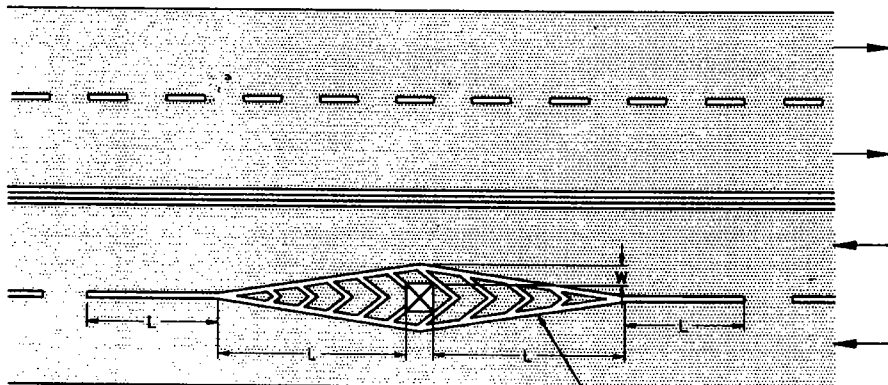
Details as per Fig. 19

a) CENTRE OF TWO LANE ROAD



Details as per Fig. 19

b) CENTRE OF FOUR LANE ROAD

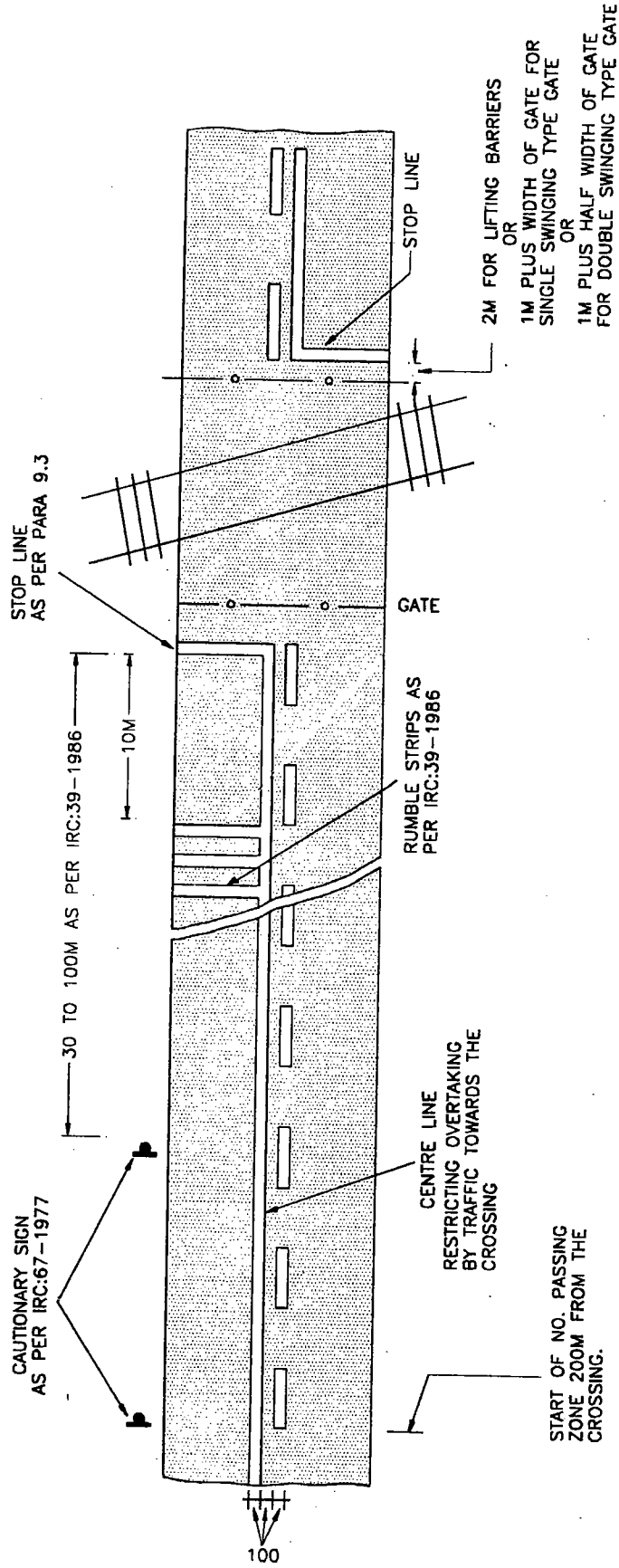


Details as per Fig. 19

c) TRAFFIC PASSING ON BOTH SIDES OF OBSTRUCTION

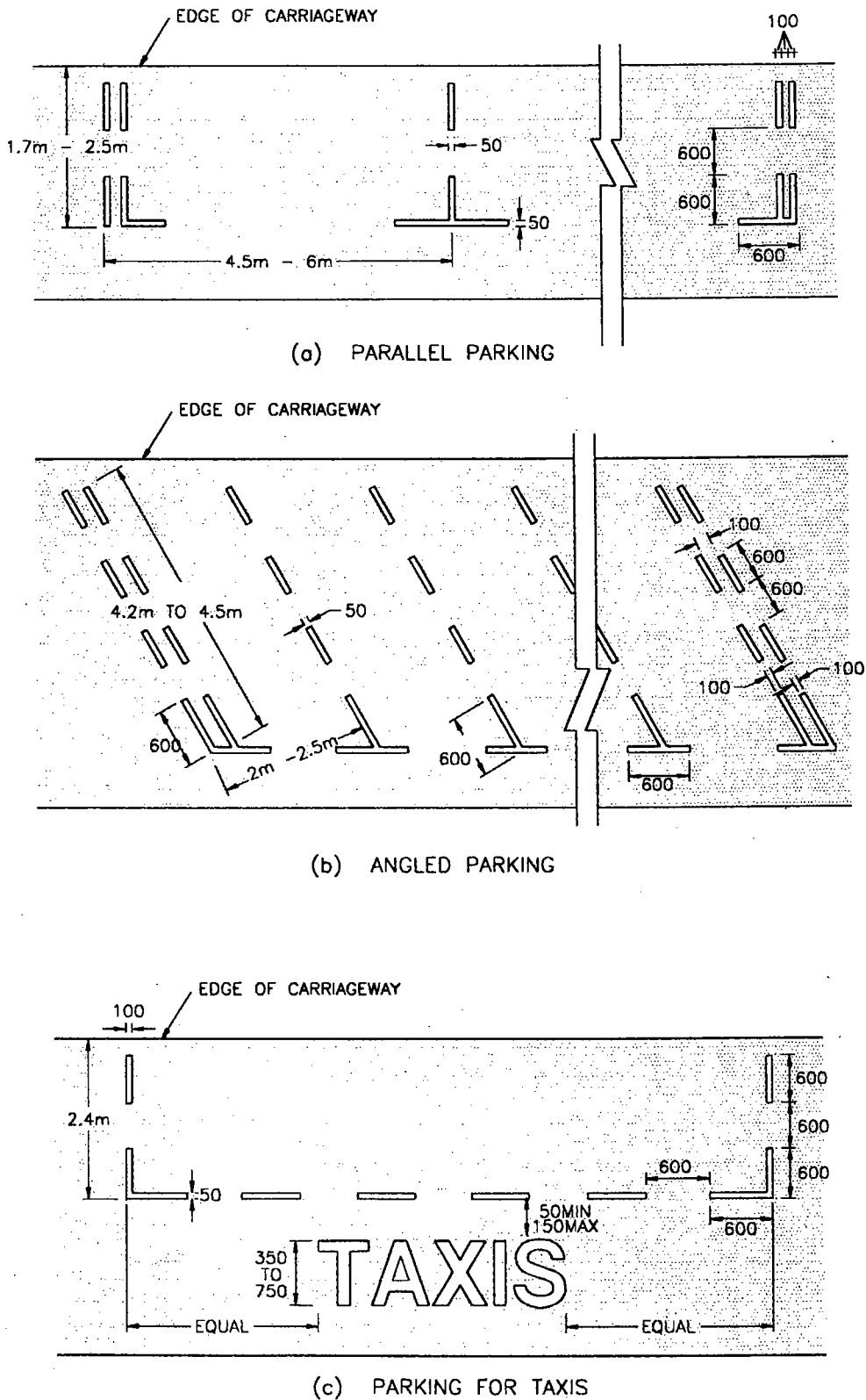
- Notes:
- i) Obstruction shown as \boxtimes
 - ii) For speeds more than 60 kph, $L = 0.63 \times S \times W$
 - iii) For speeds 60 kph or less; $L = \frac{WS^2}{150}$
- Where S = 85m percentile speed in kph
 W = offset distance in m
- Minimum length of
 L = 30m in Urban Area
 = 60m in Rural Area
- Length 'L' should be extended as required by sign distance considerations.

Fig. 29. Typical Approach Markings for Obstructions in the Roadway (Ref. Para 10.3.3)



NOTE : SIMILAR MARKINGS TO BE PROVIDED ON THE OTHER SIDE OF THE CROSSING

Fig. 30. Typical Pavement Markings at Road-Rail Level Crossings (Ref. Para 10.4.2)



Note: Width of Bay shall change as per site requirements and type of vehicles

Fig. 31. Typical Markings for Parking Spaces (Ref. Para 11.1.1)

11.2. Marking indicating Parking Restrictions

Kerb or carriageway marking shall be used to show where parking is prohibited. The marking should be continuous yellow line 100 mm wide covering the top of the kerb or the carriageway close to it. The face of the kerb may also be painted similarly.

11.3. Bus Stops

11.3.1. Pavement markings at the bus stops should be provided with the word BUS STOP written prominently on the pavement in accordance with the provisions of Para 12. Pedestrian crossings should be marked slightly behind the standing position of buses in order to avoid conflicts. Moreover, the kerbs should be marked with continuous yellow line to indicate no parking. This marking should be used only to supplement a road side bus stop sign and has no mandatory significance for drivers of other vehicles, unless yellow waiting restrictions marking is provided on kerbs.

11.3.2. The length of the bay for bus stops shall be 15 m at the minimum. It may be increased in stages of 2 m upto a maximum of 40 m. The word message "BUS STOP" should be repeated if the bay is over 30 m in length. The line marking for bay shall be white and 100 mm wide. Typical markings are shown in Fig. 32.

11.3.3. The layout and general marking of kerb loading bus stops in urban areas, and pick up bus stops on rural (non-urban) highways shall be as per IRC: 70-1977 "Guidelines on Regulation and Control of Mixed Traffic in Urban Areas" and IRC : 80-1981 "Type Designs for Pick-up Bus Stops on Rural (i.e., Non-Urban) Highways".

12. WORD MESSAGES

12.1. General Considerations

12.1.1. Information to guide, warn or regulate traffic may also be conveyed by inscription of word message on road surface. Some of these augment kerbside signs, others indicate the areas of the carriageway intended for a particular function (e.g. Bus Stop) or meant to be kept clear (e.g. School).

12.1.2. The basic characters for word Messages are the capitals. Numerals and the apostrophe and the words are formed in the same manner as for any worded sign, leaving a minimum of 0.3m clear at either side of the lane/ carriageway and in between the letters. The size of basic alphabets and numerals is shown in Plates 2 and 3.

12.1.3. The legends should be as brief as possible and shall consist of not more than three words, for any one message.

12.1.4. Because of the necessity for brevity, the following typical legends are recommended : STOP, SLOW, BUS, BUS LANE, KEEP CLEAR, SCHOOL, RIGHT TURN ONLY, EXIT ONLY, SPEED-25. The message should be marked in advance, in case visibility is restricted.

12.1.5. Legends RIGHT TURN ONLY, EXIT ONLY should be used to supplement the directional arrows and should not be used without them. The legends SCHOOL, SLOW and STOP should be used only in support of standard signs. The word STOP shall not be painted unless every vehicle is required to stop at all times.

12.1.6. All these legends shall be white and except on well-lighted roads, shall be reflectorised where night time visibility is restricted.

12.1.7. For reasons already explained, the letters should be elongated in the direction of traffic. The method of achieving this is illustrated in Plates II and III. Letters 1.25 m high in the direction of travel should be adopted for speeds upto 50 kms per hour and 2.5 m high for speeds above that.

12.1.8. As at higher speeds, it is difficult to read and understand more than one line message, the use of such messages is depreciated. If the message consists of more than one line, it should be so written that for speeds more

than 50 kms per hour, the driver reads the first word first. The space between lines, in such a case, should be 2.5 m.

12.1.9. For speeds upto 50 kms. per hour the message should be arranged to read downwards, i.e. with the first word farthest from the driver. The space between lines in this case should be 1.25 m.

12.2. Stop

12.2.1. This word message must be used to supplement a "STOP" sign and stop line and may not be used in any other circumstances. The marking should normally be located so that the top of the word is 2 m to 3 m from the nearest part of the double stop line.

12.2.2. The word STOP shall be marked on the carriageway before the stop line for the approaching vehicle and at the centre of each lane if it is more than 2 lanes wide so that users of all lanes are able to see the marking at all times. Otherwise one STOP word is sufficient which shall be marked at the centre of the carriageway.

12.3. Slow

12.3.1. This word message may be used to supplement any warning sign on the approach to hazard or a road intersection including the advance signs giving warning of STOP or GIVE WAY. It should not be used to supplement the roadside GIVE WAY sign alone for which the hollow triangular marking has been prescribed.

12.4. Bus

12.4.1. The word message BUS STOP delineates the limits of carriageway reserved for stopping by buses only and for boarding and alighting of passengers. Yellow waiting restriction marking along the edge of the kerb is necessary if waiting by other vehicles is to be restricted, Fig. 32.

12.5. Keep Clear

This word message indicates to drivers that the part of the carriageway at the road intersections which should be left clear of stationary vehicles so as to permit the passage of vehicles into or out of the intersection (Fig. 33).

13. OBJECT MARKINGS

13.1. General Considerations

13.1.1. Physical obstructions in or near a carriageway including installations designed for the control of traffic constitute a serious hazard and shall be adequately marked. Typical obstructions of this type are, underpasses, piers and abutments, monuments, traffic islands, median, channeliser ends, signs, signal supports, posts of narrow bridges, subway piers and abutments, culvert head walls, poles, trees and structures having restricted vertical clearance.

13.1.2. Judgement may be exercised in the marking of objects adjacent to the carriageway. It may, however, be noted that even where they are theoretically at a safe distance from the carriageway, marking them may prevent serious accidents and facilitate night driving.

13.2. Objects within the Carriageway

13.2.1. Obstructions in the carriageway shall be marked by not less than five alternating black and yellow stripes. The stripes shall slope downwards at an angle of 45° towards the side of the obstruction on which traffic passes. The alternating stripes shall be uniform and not less than 100 mm in width. These shall be wide enough to provide sufficient visibility depending on the size of the object and speed of approaching traffic. Typical markings are illustrated in Fig. 34.

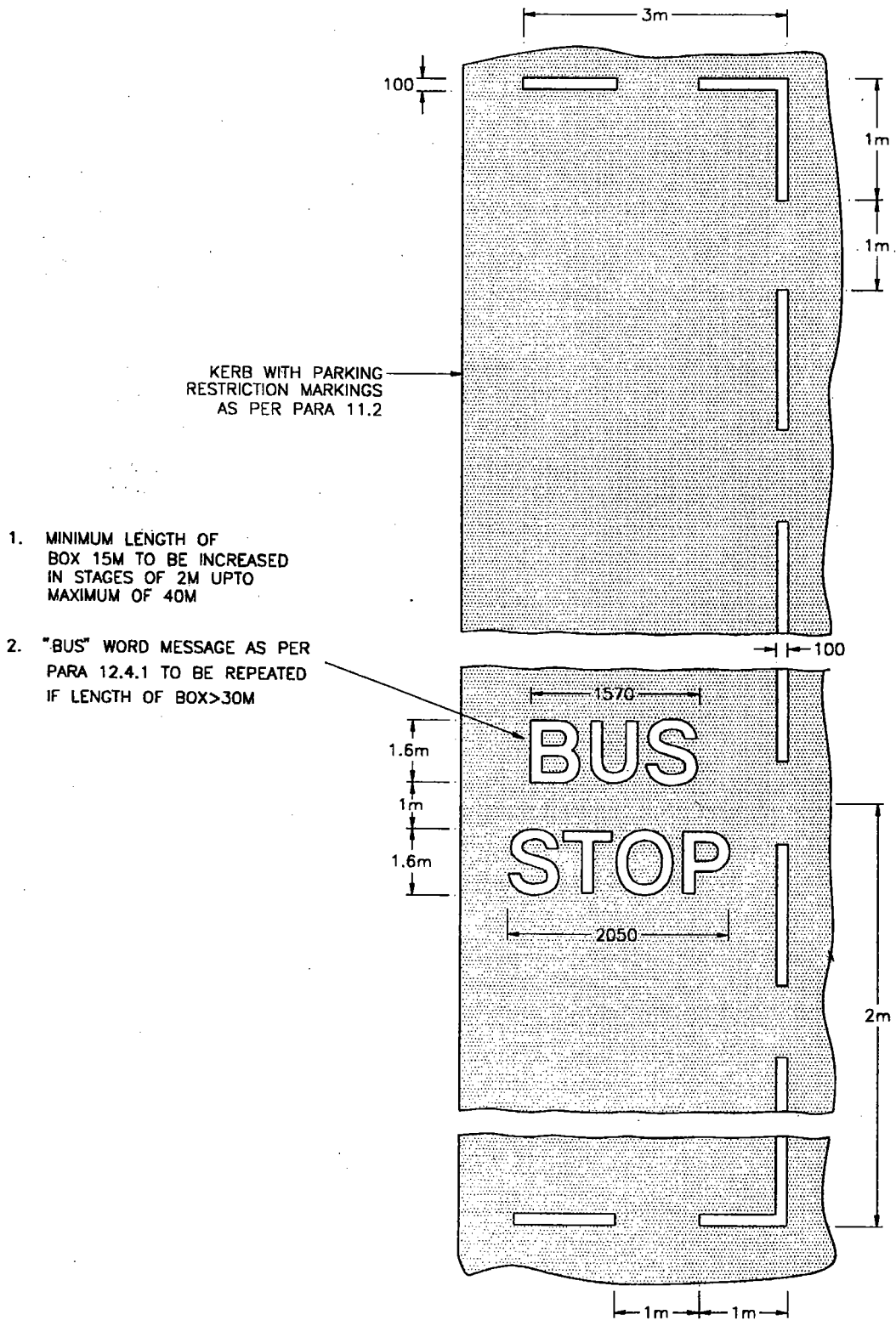


Fig. 32. Markings at Bus Stop (Ref. Paras 11.3.2. & 12.4.1)

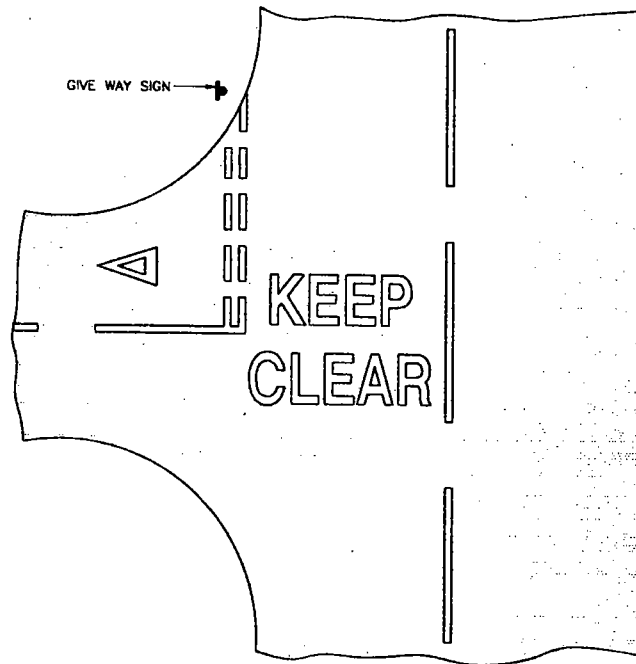


Fig. 33. Keep Clear Word Message (Ref. Para 12.5)

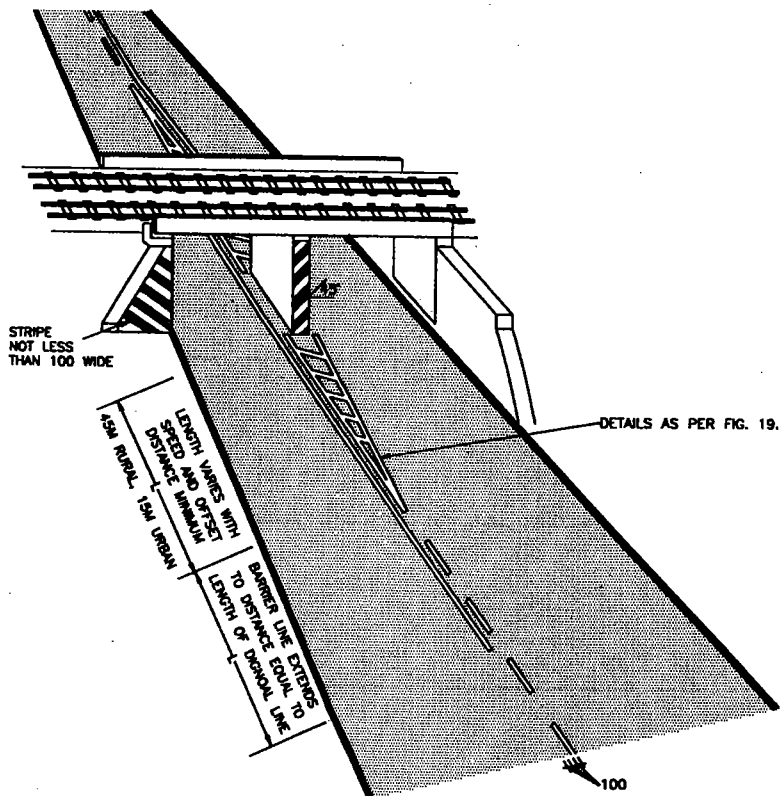


Fig. 34. Typical Markings on Objects in and Adjacent to the Roadway (Ref. Para 13.2.1)



13.2.2. On structures with restricted vertical clearances, if the obstructing object does not easily lend itself to paint the markings, the markings may be placed on an independent surface attached to or mounted immediately in front of the object.

13.3. Objects Adjacent to Carriageway

13.3.1. In some cases, object may not be actually within the carriageway, but may be so close to the edge as to constitute a hazard. This includes such encroachments as subway piers and abutments and culvert head walls. Such objects shall be marked with not less than five alternating black and white stripes at an angle of 45° towards the side of the obstruction on which the traffic passes.

13.3.2. All objects located within 1.5 m beyond the formation width of the road shall be painted.

13.3.3. Poles close to the carriageway shall be marked with alternate black and white horizontal stripes upto a height of 1.25 m above the road level. The stripes shall be uniform and each not less than 100 mm wide.

13.3.4. Other objects adjacent to carriageway such as guard rails, guard stones or drums and trees that are not likely to be hit unless a vehicle runs off the carriageway, shall be painted solid white. In case of trees, marking shall be upto a height of 1.25 m above the road level with a 300 mm bend in black paint in the middle of this height for enhanced visibility.

13.3.5. Kerbs of all islands located in the line of traffic flow shall be painted with either alternating black and white stripes 500 mm wide or a chequered black and white design of the same width. The two designs are illustrated in Fig. 35. The markings should also be done on kerbs directly ahead of traffic at "T" and staggered intersections and those on sharp curves and at carriageway width transitions.

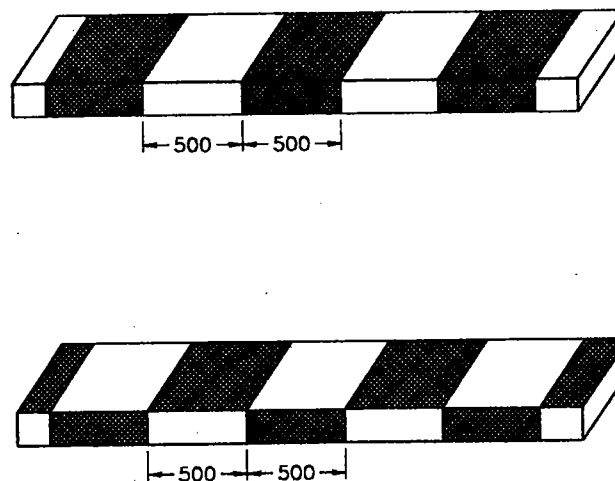
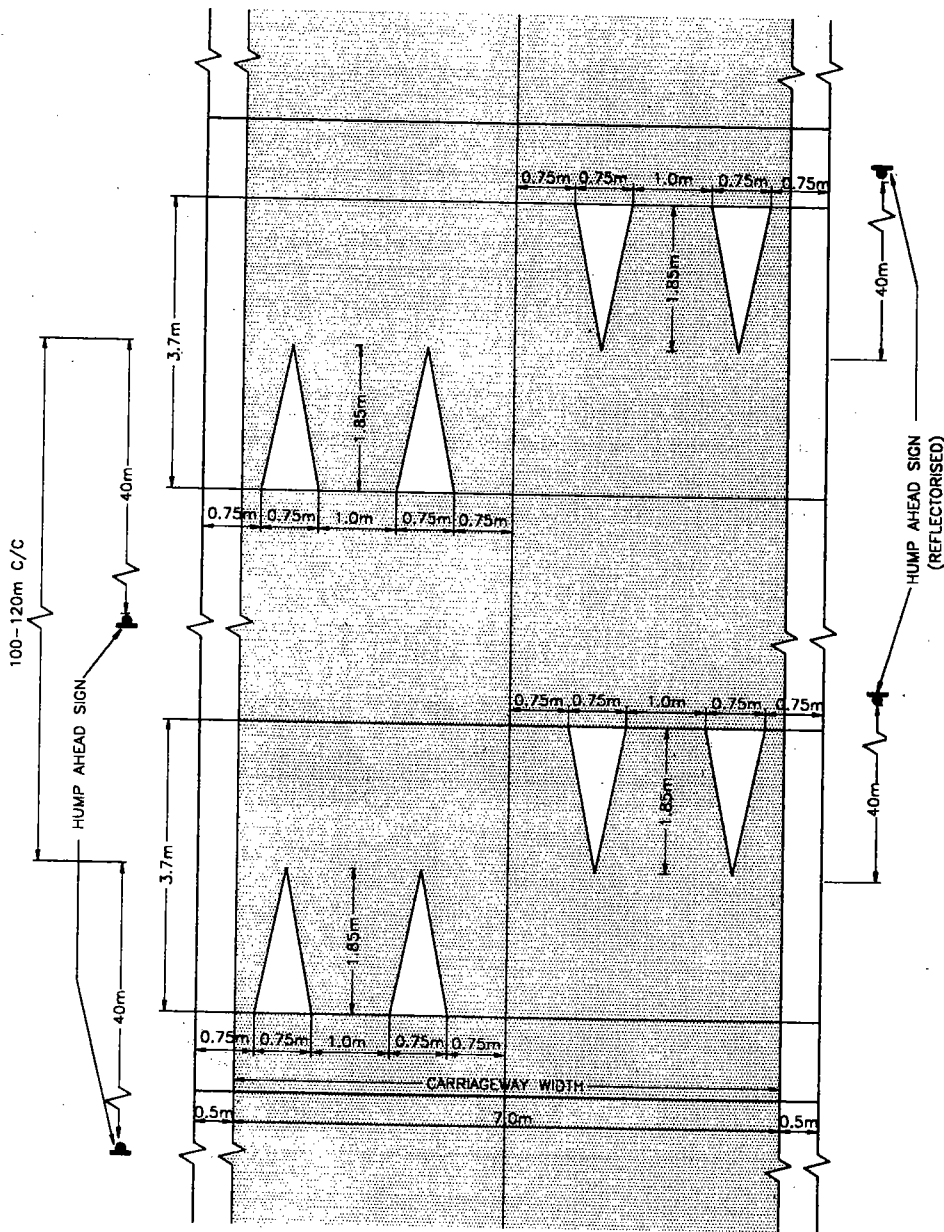


Fig. 35. KERB Markings (Ref. para 13.3.5)

13.4. Speed Breakers

Details of design specifications and placement of speed breakers are available in IRC:99-1988 "Tentative Guidelines on the Provision of Speed Breakers for Control of Vehicular Speeds on Minor Roads". These should however, be provided only where warranted and with utmost discretion. Drivers should be warned of the presence of speed breakers by posting suitable advance warning signs on the road side located 40 m in advance of the first speed breaker. Speed breakers should be painted with white paint to give additional visual warning. Fig. 36 shows typical speed breaker markings.



SCALE : 2cm = 1m

Fig. 36. Markings on Speed Breakers (Ref. Para 13.4)

14. TOLERANCES

14.1. The prescribed markings for carriageway should not normally exceed the following tolerances:

Specified Dimension	Tolerance
for 3 m and more	± 5%
for 0.30 m to 3.0 m	± 10%
Less than 0.30 m	- 10% to + 20%

14.2. The following maximum projections above the level of the carriageway surface are prescribed for carriageway markings:

Line markings	:	Road Studs	6 mm
Non reflective	:	Centre of Stud	15 mm
		Edge of Stud	6 mm
With reflector	:	Centre of Stud	25 mm
		Edge of Stud	6 mm

15. MAINTENANCE

15.1. All markings shall be maintained in effective condition at all times. Obsolete markings or markings which are not sufficiently visible, thereby causing confusion, should be removed.

15.2. The markings should always be renewed or relaid immediately after resurfacing or on the completion of road works which may have interfered with them. The immediate restoration of permanent markings should be made obligatory under the terms of contract for road works.

16. SUMMARY

Summary of markings showing the types, colour and sizes of various markings used in this Code is placed at *Appendix-1*.

SUMMARY OF MARKING

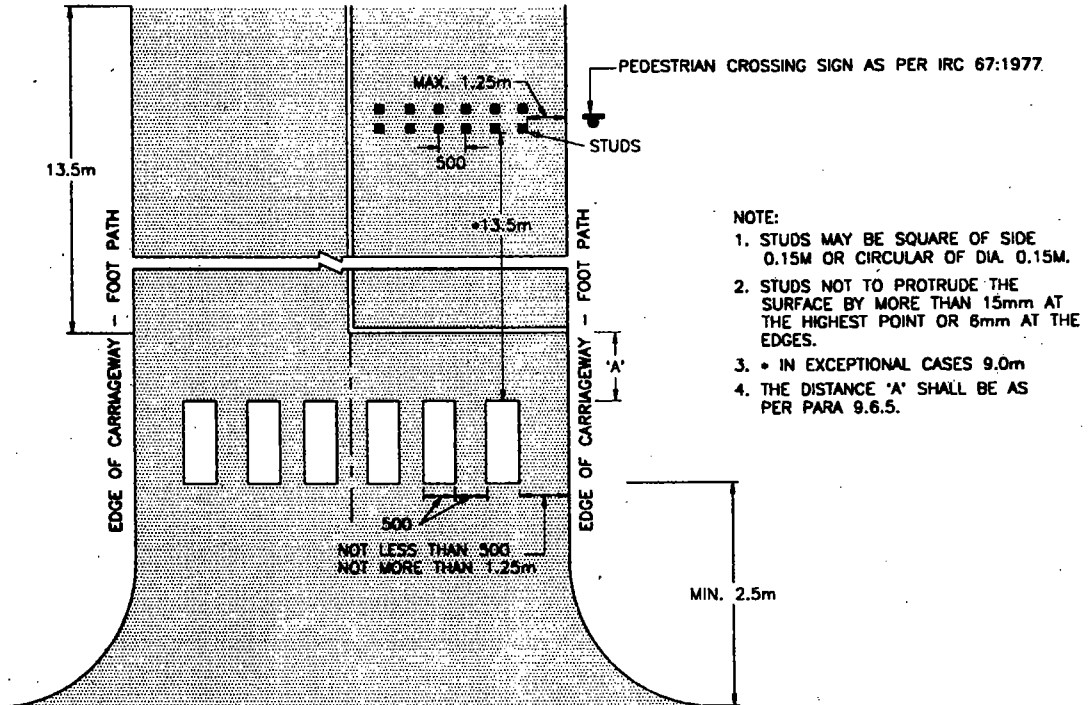
Sl No.	Description	Location	Colour	Type	Width cm	Length of line segment m	Length of gap m	Para No.
1	2	3	4	5	6	7	8	9
A. LINE MARKINGS								
1.	Centre Line	(a) Rural						
		(i) Straight reaches						
		-NH/SH	White	Broken single	10	3.0	6.0	8.2.9
		-Others	White	-do-	10	3.0	4.5	8.2.9
		(ii) Curves and approaches to intersections.						
		-NH/SH	White	-do-	10	3.0	3.0	8.2.9
		-Others	White	-do-	10	3.0	3.0	8.2.9
		(b) Urban						
		(i) Less than 4 lanes						
		-Straight reaches	White	-do-	15	3.0	4.5	8.2.5
		-Curves and approaches to intersections	White	-do-	15	3.0	3.0	8.2.5
		(ii) Four lanes or more undivided	White (optionally yellow)	Solid single or double	15 10+10	- -	- -	8.2.6 8.2.6
2.	Traffic lane line	(a) Rural						
		(i) Straight reaches	White	Broken single	10	3	6	8.3.3
		(ii) Curves and approaches to intersections	White	Broken single (Exceptionally solid) refer Para 8.3.4	10	3	3	8.3.3
		(b) Urban						
		(i) Straight reaches	White	As above	10	1.5	3	8.3.3
		(ii) Curves and approaches to intersections	White	As above	10	1.5	1.5	8.3.3

(Contd...)

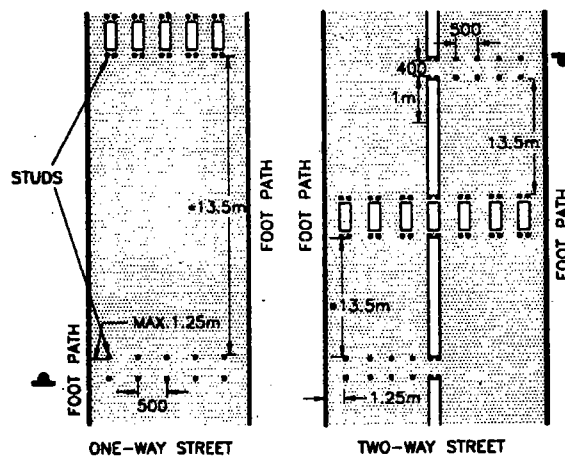
IRC : 35-1997

1	2	3	4	5	6	7	8	9
3.	No overtaking zone		Yellow	Solid single or Solid double or solid and broken	10		As for center line	8.4.5
4.	Warning line	All locations	White	Broken single	Equal to the normal preceding lines		Lengths of line segments and gaps of normal lines are interchanged. Minimum seven line segments at each location	8.5.1
5.	Border or Edge line	All locations	White	Solid	15 or 20	-	-	8.6.3
6.	Bus lane	All locations	White	Solid	25	-	-	8.7.1
7.	Bicycle lane	All locations	White	Solid	15	-	-	8.8.2
8.	Stop line	(a) Rural	White	Transverse solid single or double	- 30 or 20 + 20	-	-	9.3.3
		(b) Urban	-do-	-do-	20 or 20 + 20	-	-	9.3.3
9.	Give way lines	All locations	White	Transverse broken	20 + 20	0.60	0.30	9.4.1
10.	Continuity lines	(a) Centre line & lane lines	White	Transverse broken	as on approaches to intersections			9.5.1
		(b) Median and Island line	White	Broken single	10	0.60	0.30	9.5.2
11.		(c) Stop line and give way line	White	Transverse broken single	10	0.60	0.30	9.5.3
		(d) Turn markings	White	Broken single	10	0.50	0.50	9.5.4
B. OTHER MARKINGS								
1.	Pedestrian crossing	All locations	White	Zebra Stripes	50 cm wide Stripes 50 cm apart 2 m to 4 m long			9.6.6
2.	Cycle Track crossings	All locations	White	Solid	10 cm			9.7.2
3.	Speed change lane	All locations	White	Solid lines with diagonals/ chevrons	60 cm wide diagonals/chevrons 15 cm wide lines			9.8.2
4.	Directional arrows	All locations	White	Arrows	3.5 cm or 5m long			9.9.1
5.	Protected right turn lanes	All locations	Yellow	Diagonals enclosed by solid lines	15	Size variable as per site conditions		9.10
6.	Markings at rotaries	All locations	White/ Yellow	Broken/ solid	Size variable as per site conditions			9.11.3

1	2	3	4	5	6	7	8	9
7.	Box marking	All locations	Yellow	Crossed diagonals enclosed by solid lines.	10		Size variable as per site conditions	9.12.1
8.	Carriageway Width Transition	All locations	White	Solid single	15	-		10.1.3
9.	Obstruction Approach Marking	All locations	Yellow	Diagonals/ Chevrons enclosed by solid lines	15			10.2.3
10.	Road Rail level crossing	All locations	White/ Yellow	Combination of stop line, Centre line and lane lines		-		10.3.3
11.	Parking Spaces	All locations	White	Broken	10/5	-	-	11.1.1
12.	Parking Restrictions	All locations	Yellow	Solid	10	-	-	11.2
13.	Bus Stops	All locations	White	Broken	10	1m	1m	11.3.2
14.	Word Messages	All locations	White	Alphabets, numerals and apostrophe-size as per Plates II and III.				12
15.	Object Markings	All locations	Black and White or Black and Yellow	Alternate stripes widths varying for different usages				13.3
16.	Speed Breakers	All locations	White	Elongated Triangles				13.4



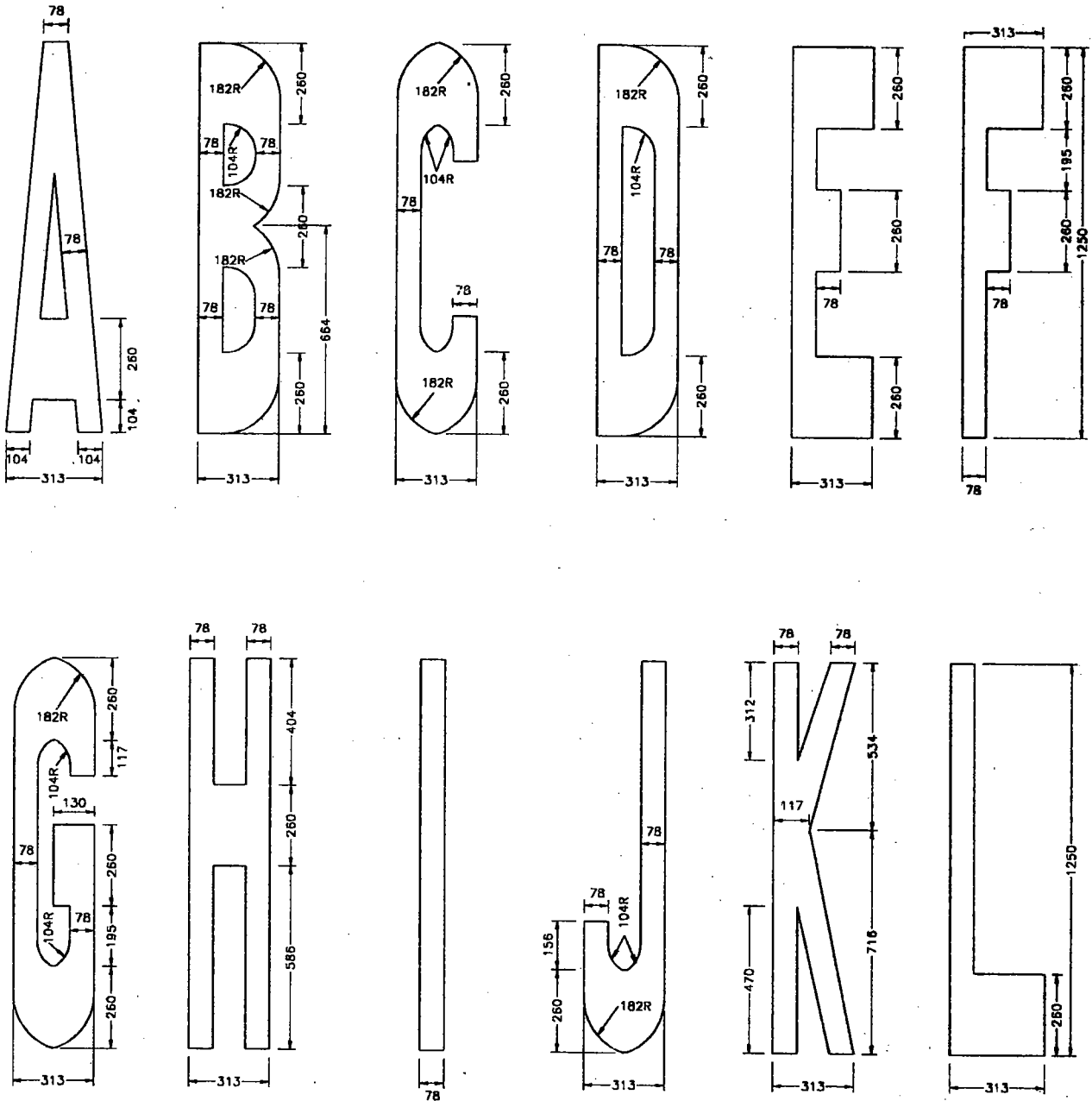
(a) PEDESTRIAN CROSSING AT AN UNSIGNALISED INTERSECTION



(b) PEDESTRIAN CROSSING AND APPROACHES THERETO FOR LOCATIONS OTHER THAN INTERSECTIONS

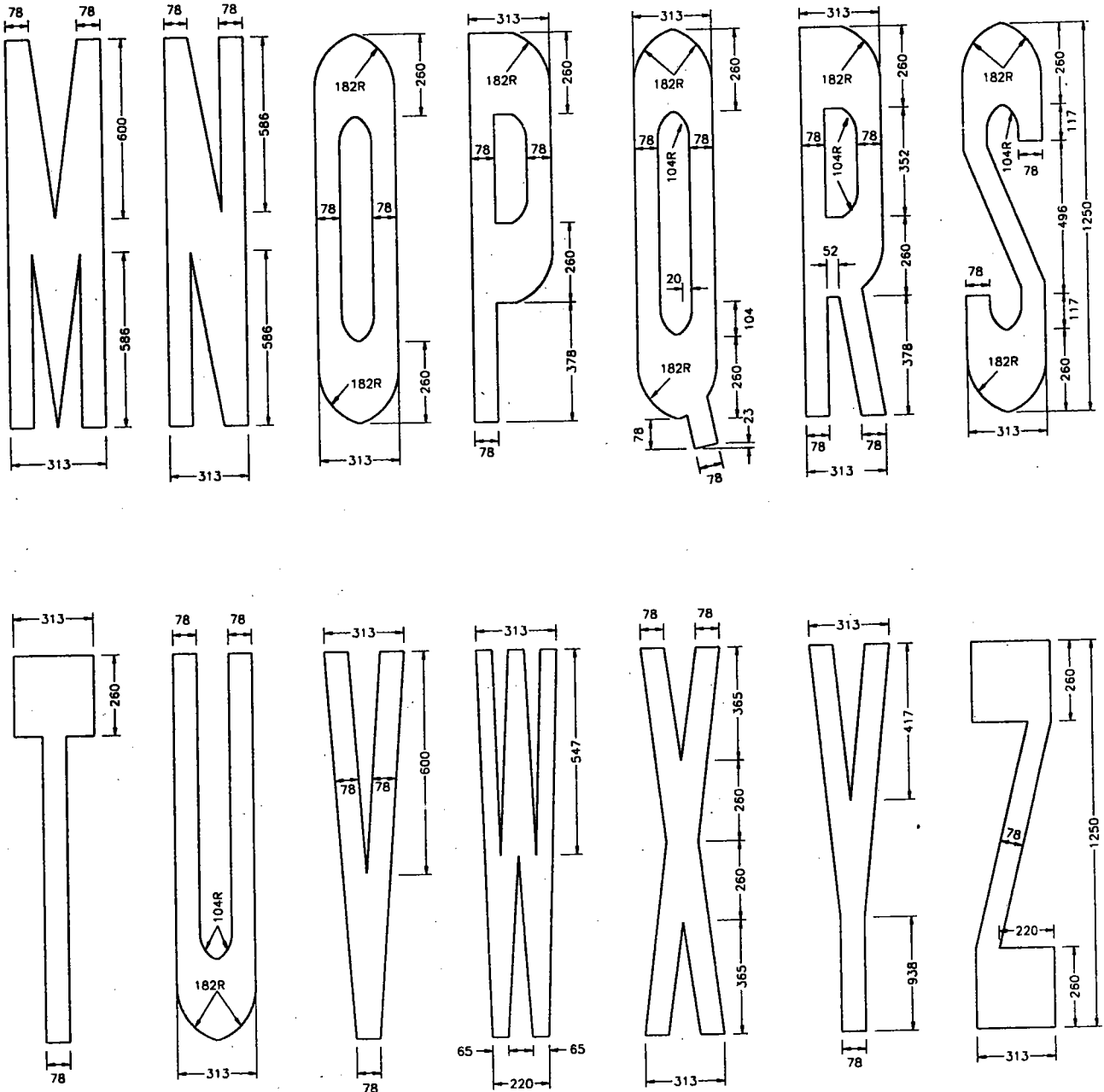
Markings for Pedestrian Crossing at some typical locations

PLATE - 2 (1/3)
(Ref. Para 12.1.2)



SIZE OF LETTERS AND NUMERALS FOR WORD MESSAGES
(SPEED 50 KM PER HOUR OR LESS)

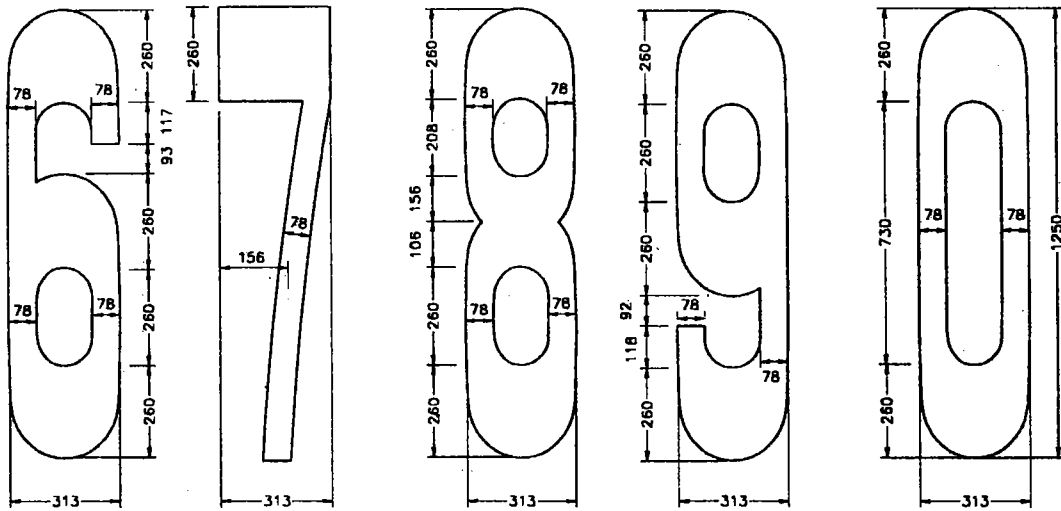
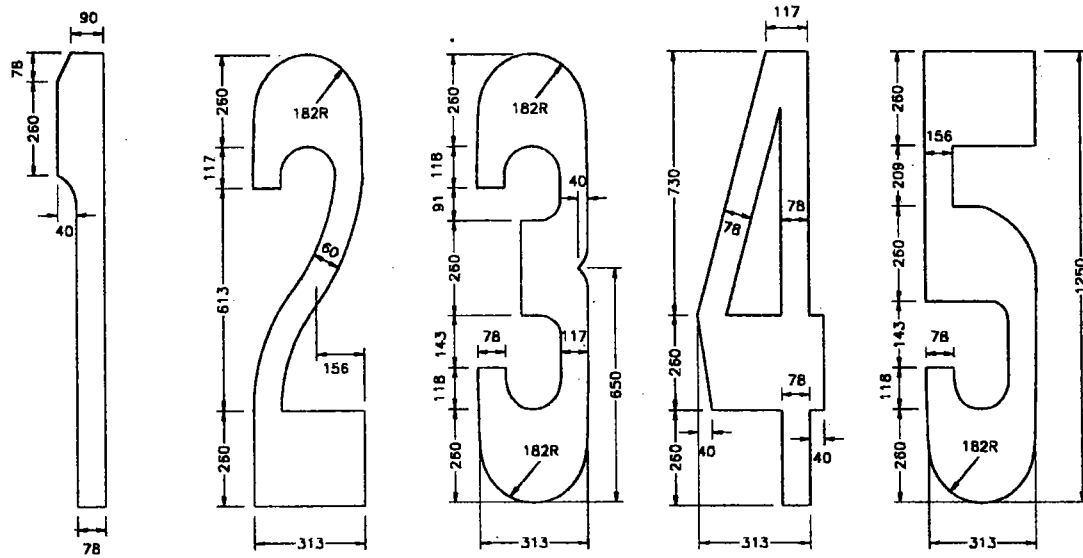
ALL DIMENSIONS ARE IN mm



SIZE OF LETTERS AND NUMERALS FOR WORD MESSAGES
(SPEED 50 KM PER HOUR OR LESS)

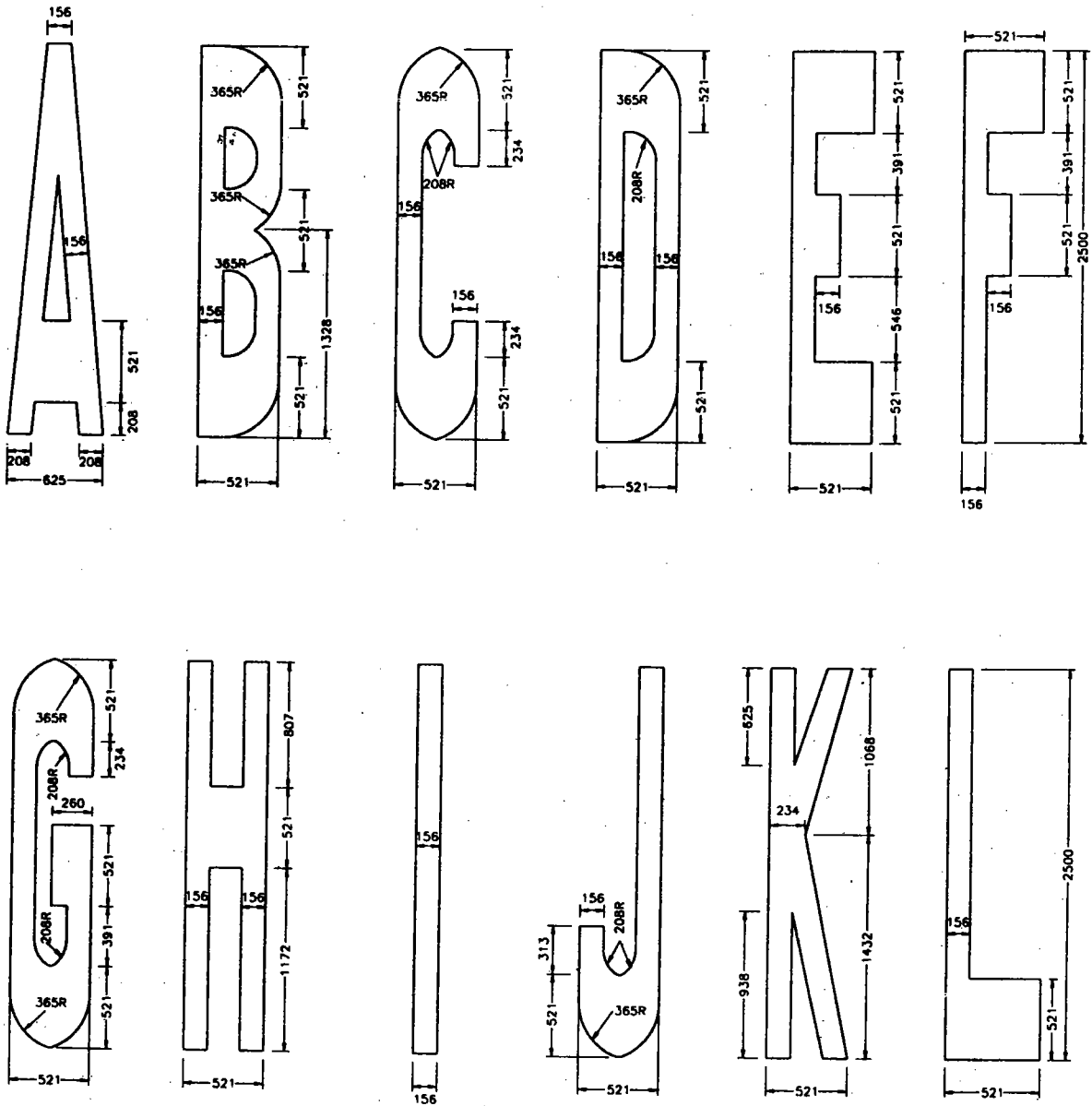
ALL DIMENSIONS ARE IN mm

PLATE - 2 (3/3)
(Ref. Para 12.1.2)



SIZE OF LETTERS AND NUMERALS FOR WORD MESSAGES
(SPEED 50 KM PER HOUR OR LESS)

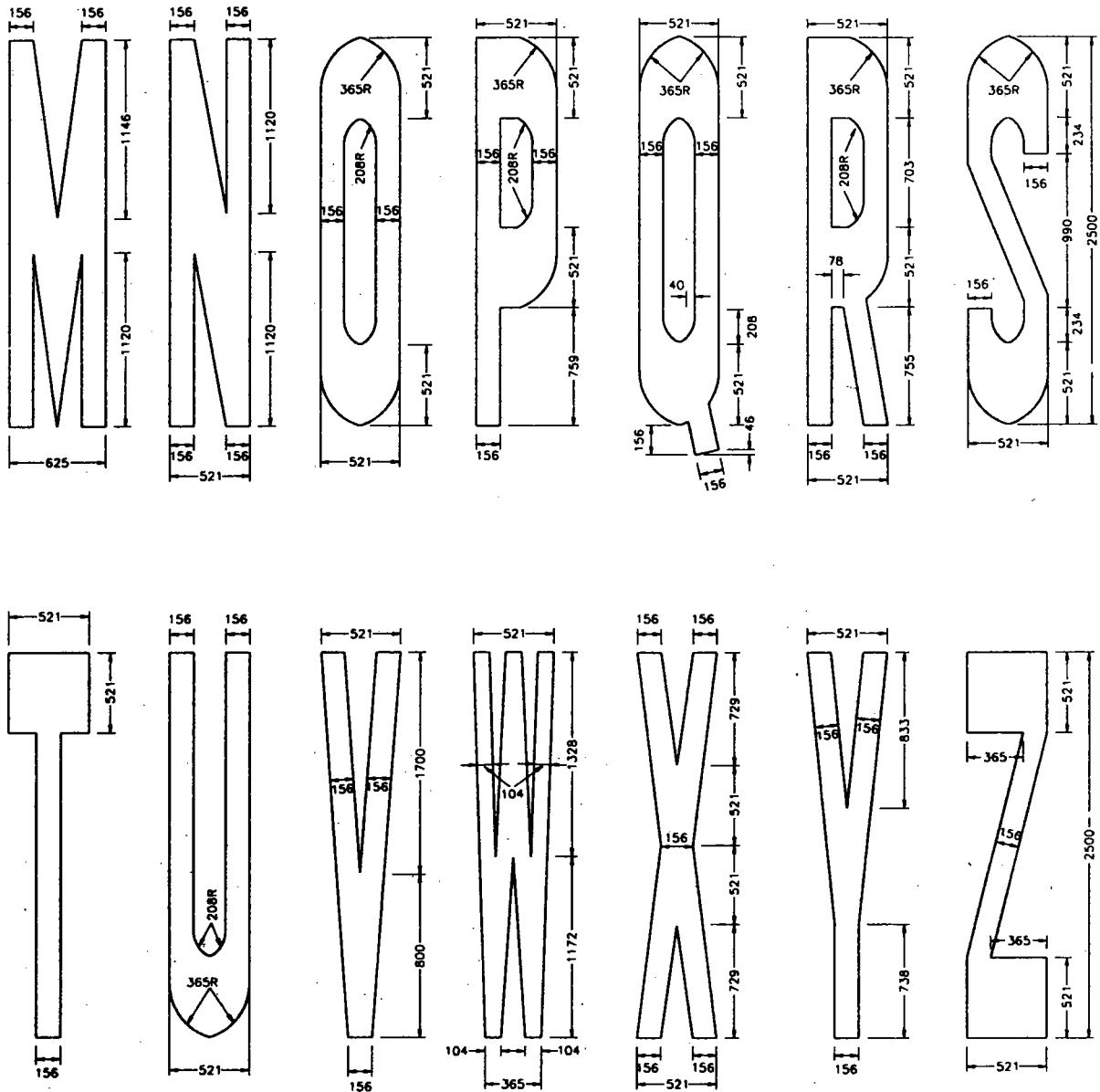
ALL DIMENSIONS ARE IN mm



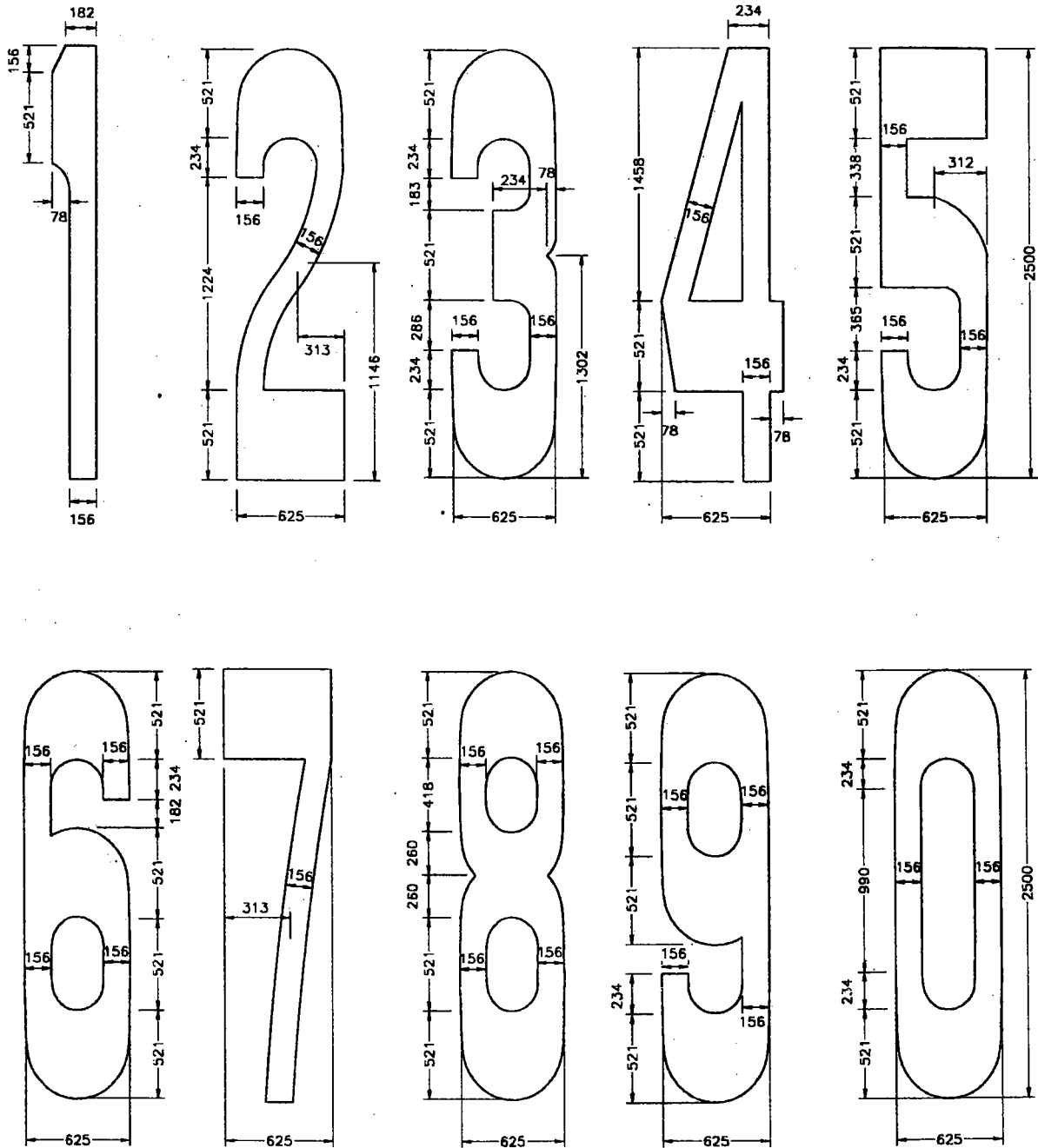
SIZE OF LETTERS AND NUMERALS FOR WORD MESSAGES
(SPEED MORE THAN 50 KM PER HOUR)
ALL DIMENSIONS ARE IN mm



PLATE - 3 (2/3)
(Ref. Para 12.1.2)



SIZE OF LETTERS AND NUMERALS FOR WORD MESSAGES
(SPEED MORE THAN 50 KM PER HOUR)
ALL DIMENSIONS ARE IN mm



SIZE OF LETTERS AND NUMERALS FOR WORD MESSAGES
(SPEED MORE THAN 50 KM PER HOUR)

ALL DIMENSIONS ARE IN mm