

# BHUTAN STANDARDS

## Road Safety Signs and Symbols



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## **BHUTAN STANDARDS BUREAU**

The National Standards Body of Bhutan  
THIMPHU 11001

March 2017

## Price Group....

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## **BHUTAN STANDARDS**

### **Road Safety Signs and Symbols**

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**Contents**

Foreword.....	iii
Introduction.....	v
1 Scope.....	1
2 Normative References .....	1
3 Terms and Definitions .....	1
4 Classification of Road Signs.....	2
4.1 Mandatory/ Regulatory Signs.....	2
4.2 Warning/Cautionary Signs .....	6
4.3 Informatory/Guide Signs .....	9
5 Overhead Signs .....	12
6 Pavement or Road Marking.....	15
7 Road Delineators .....	20
Bibliography .....	22
Annexure 1 .....	23

## **Foreword**

Bhutan Standards Bureau (BSB) is the National Standards Body of Bhutan. The work of preparing National Standard is usually carried out through BSB Technical Committees constituted for its purpose which is represented by different stakeholders including public-governmental and private sector. It liaise and work closely with other regional and international standards organisation.

This Bhutan Standard was adopted by Bhutan Standards Bureau after draft finalised by the Graphical Symbol Technical Committee (TC-09) and is approved and endorsed by BSB Board.

## **Introduction**

There is need to standardize road safety signs and symbols to ensure its consistent use. With continued growth in international trade, travel and mobility of labour requires a common method of communicating safety information.

Generally, Road signs contain instructions that the road user is required to obey and others necessary information such as to warn about hazard, routes directions, destinations and other information's.

## 1 Scope

This standard prescribes the general requirement for development and layout of road safety signs and road markings to be used in Asian/National Highways, Dzongkhag Roads, Thromde Roads and Gewogs Roads however, the sign should not limit to those given in the standard.

The use of road safety sign should not replace the need for proper accident prevention measures and this can be only use for instructions which are relevant to road safety.

## 2 Normative References

There is no normative reference.

## 3 Terms and Definitions

### 3.1 Asian Highways

The roads intended for use by vehicles travelling between different countries, as agreed under bilateral and multilateral agreements.

### 3.2 Dzongkhag roads

All internal Dzongkhag roads including road that connects a Dzongkhag Centre and an Integrated Gewog Centre or connects two Dzongkhag Centres not otherwise designated as National Highway or connects an Integrated Gewog Centre with an existing road of equal or higher classification.

### 3.3 Gewog roads

A road that links agricultural farmland areas to national highways and other roads primarily to enable the transportation of inputs to the farm and agricultural produce to the market.

### 3.4 Pavement or Road Markings

Pavement markings are form of lines, symbols, messages, or numerals, and may be set into the surface of, applied upon, or attached to the pavement. In some cases, pavement markings are used as a supplement to other traffic control devices, such as traffic signals and road signs. In other instances, they may simply guide traffic or give advance warning or they may impose restrictions supported by traffic regulations.

### 3.5 Primary National Highways

The designated road that conforms to standards for national and international highways as specified by the Department of Roads

### **3.6 Road Delineators**

Roadside delineator posts are reflective plastic posts which provide drivers with a warning of a change in alignment and tracking of the roadway at the curves or narrow roads.

### **3.7 Secondary National Highways**

The designated road that confirms to national standards for secondary National Highway as specified by the Department of Roads.

### **3.8 Thromde roads**

The roads administered and managed within a Thromde boundary by the Thromde Tshogde including section of the national highways passing through it.

## **4 Classification of Road Signs**

### **4.1 Mandatory/ Regulatory Signs**

All Mandatory or regulatory signs are in circular shape. Mandatory/Regulatory signs are to indicate prohibition upon certain kind of vehicles. These signs shall clearly indicate the requirements imposed by the regulators and shall be designed and installed to provide adequate visibility and legibility in order to obtain compliance. Mandatory or regulatory sign shall be illuminated enough to show the same shape and similar colour during day and night.

Mandatory/Regulatory signs indicate the application of legal or statutory requirements, i.e. Obligation to give way at intersections, speed limits, prohibition of movements at intersections and parking of vehicles. Some of the example of the mandatory signs are given in Annexure I.

#### **4.1.1 Size, Colour and Shape of Mandatory/Regulatory**

The color of the Mandatory or Regulatory sign shall be white background with red border and black graphical symbol. The shape and size of the signs shall be as determined in clause 4.1.2.1 to 4.1.2.7.

#### **4.1.2 Types of Mandatory/Regulatory**

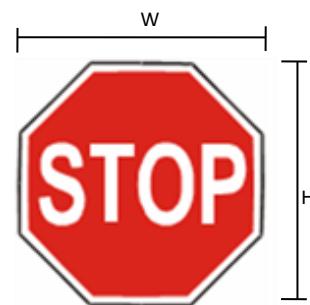
Generally, the mandatory/regulatory signs are classified based on their design and application as follows:

##### **4.1.2.1 Stop signs**

This sign is intended to use on roads where traffic is required to stop before entering a major road, and where it is intended that the vehicle shall proceed, past the stop line only after ascertaining that this will not cause danger to traffic on the main road. The sign shall be in octagonal shape and shall have red background and white border. The word "STOP" written in white and is centrally located. The size and dimensions of the signs shall be as prescribed in Table 1.

**Table 1: Sizes & Dimensions of 'STOP' sign**

Types of Roads	Size (W x H) mm	Font Size (mm)
Asian/National Highways	900 x 900	150
Thromde Roads	750 x 750	125
Dzongkhag roads & others	600 x 600	100

**Fig 1: 'STOP' Sign**

#### 4.1.2.2 Give Way signs

This signs are used to assign right way to traffic on certain roadways at intersections, whereby the vehicles controlled by this signs are required to give way and is need to slow down or stop when necessary to avoid interfering with conflicting traffic. This sign shall be an equilateral triangle with the apex downwards. It shall have red border and white background with black graphical symbol. The size and dimensions of the signs shall be as prescribed in Table 2.

**Table 2: Sizes & Dimensions of 'GIVE WAY' sign**

Types of Roads	Size (H) mm	Font Size (mm)
Asian/National Highways	900	120/95
Thromde Roads	750	100/80
Dzongkhag & other roads	600	80/65

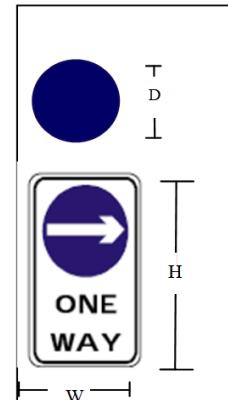
**Fig 2: 'GIVE WAY' sign**

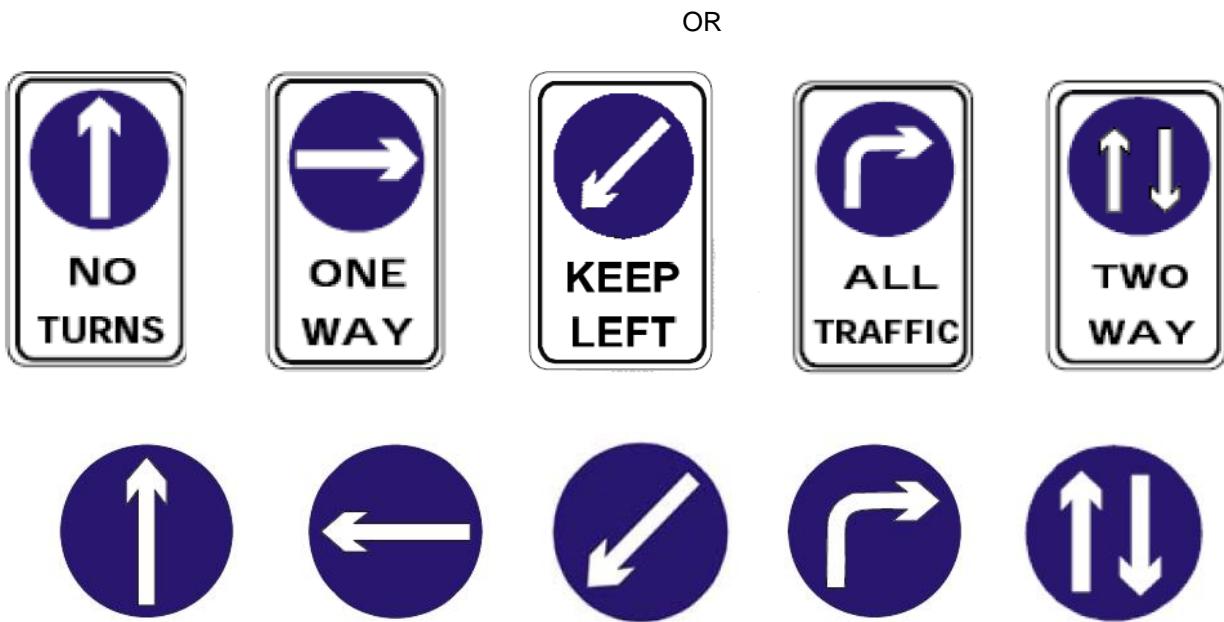
#### 4.1.2.3 Direction signs

This signs shall be circular in shape with blue background and white border with white arrow graphical symbols or white background on plate as indicated in Figure 3. The size and dimensions of the signs shall be as prescribed in Table 3.

**Table 3: Sizes & Dimensions of Direction Signs**

Types of Roads	Size (W x H) mm	Size (dia) mm
Asian/National Highways	550x900	750
Thromde Roads	450x750	600
Dzongkhag & other roads	350x600	450





**Figure 3: Direction Signs**

#### 4.1.2.4 Prohibitive or Restrictive Signs

This signs usually give instruction regarding maneuver that must not be made. They cover both at junctions and the sections of roads between junctions. This sign shall be of circular shape with red border, white background with black graphical symbol or red disc with white symbol or on white plate background.

**Table 4: Sizes & Dimensions of Prohibitive Signs**

Types of Roads	Size (dia) mm
Asian/National Highways	750
Thromde Roads	600
Dzongkhag & other roads	450



**Figure 4: Pedestrian prohibited.**



**Trucks Prohibited**

#### 4.1.2.5 Speed limit Signs

This sign shall be of circular shape with red border, white background and black graphical symbol. This signs shall be erected at the beginning of any section of road or the side of the structure which subject to prohibition so as to face entering traffic.

**Table 5. Sizes & Dimensions of Speed Signs**

Types of Roads	Size (Dia) mm	Font Size (mm)
Asian/National Highways	600	200
Thromde Roads	450	150
Dzongkhag & other roads	300	100

**Figure 5: Speed signs**



#### 4.1.2.6 No Parking Signs

This sign shall be of circular shape with red border, white background, black graphical symbol and red annular as shown in Fig.6. These size of this signs shall be as indicated in Table 6 and legend should cover at least 75% of the area.

**Table 6. Sizes & Dimensions of parking and No Horn Signs**

Types of Roads	Size (Dia) mm	Font Size (mm)
Asian/National Highways	750	250
Thromde Roads	600	200
Dzongkhag & other roads	450	150

**Figure 6: Parking signs**



#### 4.1.2.7 No Horn Signs

This sign shall be of circular shape with red border, white background, black graphical symbol and red annular as shown in Fig.7. This signs are use as an audible warning device is prohibited, where this sign is used, except to avoid an accident or those vehicles that are authorized to use warning devices in case of emergency. The NO Horn sign is usually erected in the vicinity of hospitals, schools, libraries, etc.

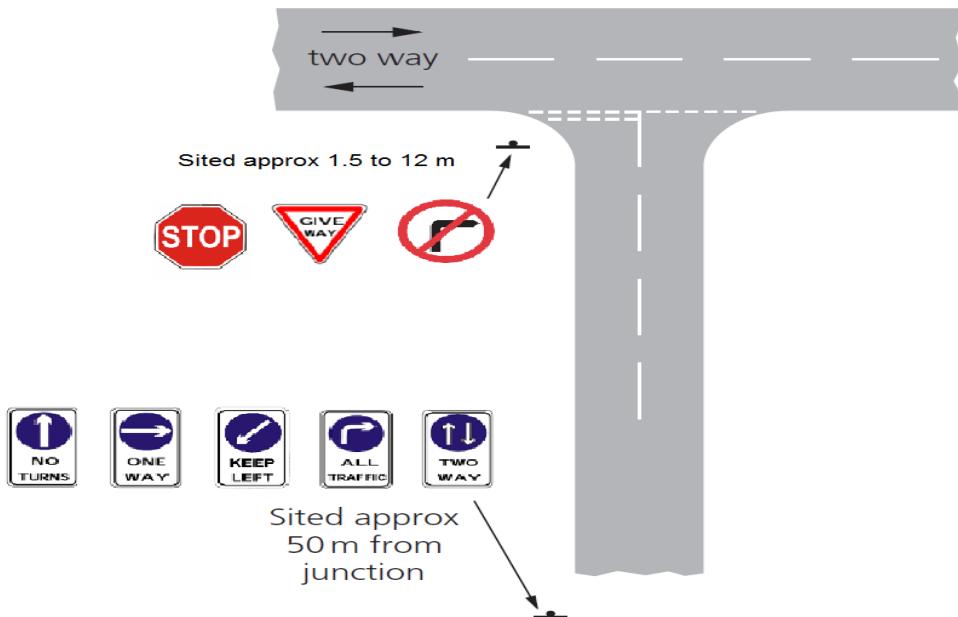
**Table 7. Sizes & Dimensions of parking**

Types of Roads	Size (Dia) mm
Asian/National Highways	600
Thromde Roads	450
Dzongkhag & other roads	300

**Figure 7: No Horn signs**

#### 4.1.3 Location of Mandatory/Regulatory Signs

The regulatory signs are usually located on the left side of the carriageway to face the approaching traffic. There should be enough distance from the point where regulatory action is required to the location of sign, to give the drivers adequate time to decide.

**Figure 8: Location of Regulatory Signs (Height: 2m lower edge of the sign board with diagram)**

#### 4.2 Warning/Cautionary Signs

Warning/Cautionary signs are generally used to caution and alert the road users about potential danger or existence of certain hazardous condition either on or adjacent to the roadways so that they can take the desired actions. They indicate a need for special caution by road users and may require a reduction in speed or some other course of actions. Warning signs advise of conditions that require caution on the part of the driver, and may call for a reduction in speed, in the interest of his safety and that of other drivers and pedestrians.

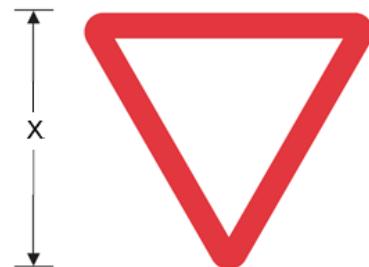
#### 4.2.1 Size, Colour and Shape of Warning signs

Warning/Cautionary signs are triangular in shape with red border and black graphical symbol with white background. The size of one side of the equilateral triangular shaped signs shall be as indicated in Table 8. For low-speed roads with restricted spaces, smaller signs can be considered as shown in following.

**Table 8: Sizes & Dimensions of Speed Signs**

Types of Roads	Size (X) mm
Asian/National Highways	750
Thromde Roads	600
Dzongkhag & other roads	450

**Figure 9: Size of warning signs**



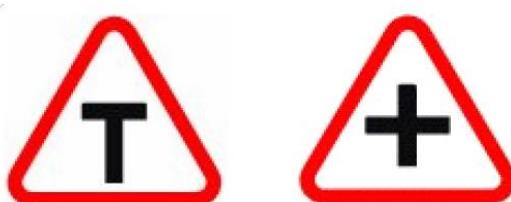
#### 4.2.2 Types of Cautionary/Warning Signs

##### 4.2.4.1 Horizontal Alignment Signs

This signs are used in conjunction with pavement markings and delineation to advise motorists to change the roadway alignment. The uniform application of these signs conveys a consistent message that establishes driver expectancy and promotes effective roadway operations.

##### 4.2.4.2 Intersection and Junction Signs

This signs are used in intersections and junctions including traffic circles. Intersections are classified into 3 – ways, 2 ways, 5 ways etc. depending on number of road segments. This signs gives instruction to vehicle entering the intersection to give way to vehicle going straight ahead.



**Figure 10: Intersection signs**

#### 4.2.4.3 Road Width Signs

This signs are used to give warning related to road width restrictions as shown in fig.11.



Figure 11: Road width signs

#### 4.2.4.4 Road Obstacle Signs

This signs are used to indicate the obstacles on roads like uneven road, steepness of the road or any other situations that cause obstruction on the road. Some of the examples of this signs are indicated in Fig. 12 and Fig.13.



**Note:** The type of animal inscribed in "Animal Crossing Sign" shall be those animals in that locality

Figure 12: Road Obstacle Signs



Figure 13: Pedestrian and School sign

### 4.2.3 Location of Warning/Cautionary Signs

Warning Signs are generally installed on the right side of the carriageway so that it will convey its message most effectively. However, in special circumstances the sign may be erected on the left side of the carriageway. In Thromde areas, advance warning signs should be placed at not less than 20 m or more than 100 m in advance of the hazard, while in rural areas the signs should be placed at not less than 60 m nor more than 160 m in advance of the hazard. In any case, normal traffic speed and the action required by the driver will influence the distance between the posted warning sign and the hazard. The travel distance is therefore, the distance the driver needs to understand and react to the sign message and to perform any necessary action. The distance between the sign and the hazard is called the advance posting distance.

**Table 9: Advance posting distance**

8 <sup>th</sup> percentile speed (km/h)	40	50	60	70
Advance posting distance (m)	50	75	100	160

**Note:** 85<sup>th</sup> percentile speed is a speed at or below which 85% of all vehicles are observed to travel under idle flowing condition.

### 4.3 Informatory/Guide Signs

All informatory or guide signs are in rectangular shape. These signs are used to provide information and to guide road users along routes. The information could include names of places such as recreational, tourist, cultural interest area signs and emergency management signs, sites, direction to the destinations, and distance to places, etc.

#### 4.3.1 Shape and Colour of Informatory signs

The Informatory signs are generally rectangular in shape but it has different colour codes for different types.

#### 4.3.2 Types of Informatory/Guide Signs

Generally, the Informatory/guide signs are classified based on their design and application as follows:

##### 4.3.2.1 Advance Direction, Intersection Direction and Reassurance Direction signs

This sign shall be with white legend on standard green background. Green for highways and blue for Thromde and other Roads with black or white legend. The Dzongkha word shall be bigger in size than the English word and placed above the English word as shown in Fig.14.



Figure 14: Advance Direction Signs

#### 4.3.2.2 Intersection Direction Signs

This signs supplement advance direction signs and should be placed at more important intersections or decision points to show where the intersecting roads lead. The principal destination for the route shall be repeated on an intersection direction sign if it has been given on the advanced direction sign. A distance indication should not be shown on intersection direction signs as this distance is usually shown on the reassurance direction sign beyond the intersection points.

This sign indicated where the road leads to and indicates the name of place and the direction is indicated by arrowhead as shown in Fig.15.



Figure 15: Intersection Direction Signs

#### 4.3.2.3 Reassurance signs

This sign should be erected on important roads beyond an intersection or junctions to reassure driver that the desired direction is being followed as shown in Fig. 16. The name of the place should be written both in Dzongkha and English where Dzongkha word should be placed above the English which will be bigger in size than the English word.

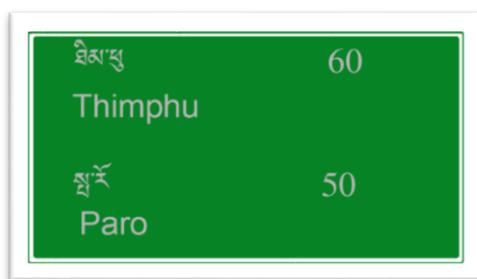


Figure 16: Reassurance Signs

#### 4.3.2.4 Service signs

This sign gives the information to the road user regarding the location and availability of services. This includes hotels, toilets, hospitals, etc. This sign should with white legend on blue background as indicated in Fig. 17.



Figure 17: Service Signs

#### 4.3.3 Size of Informatory Signs for Asian Highway, PNH and SNH

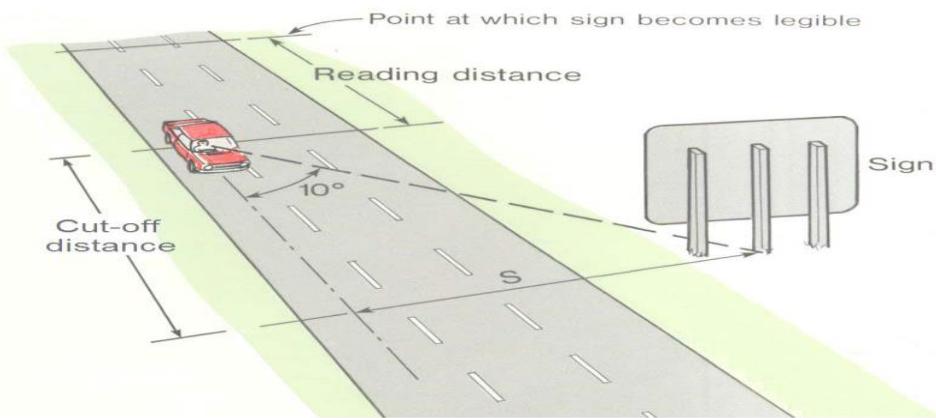
Standardization the size of Informatory Signs is not always practicable due to the variety of legends used. The size adopted will depend on the required letter size, the number of words in the legend, symbols used and the general arrangement. The likely visual impact of the sign must be considered in relation to its location, background and surroundings. For example, in an urban street with advertising signs, guide signs may need to be increased in size to compete effectiveness with adjacent signs. Depending on the site situation, the height of the lower edge of the sign should range from 900 mm to 1500 mm above the carriageway. However, if it is erected above the footpaths, the height of 2300 mm is recommended. The size of letters on the sign boards should be ranging from 50 to 300 mm depending on the number of words and reading distances available.

#### 4.3.4 Size of Informatory Signs for Dzongkhag Roads

In the road of less important or where the speed is comparatively lower than primary highways, the smaller size of Informatory signs can be erected.

#### 4.3.5 Location of Informatory Signs

Informatory Signs should be generally located on the left side of the road where a driver would expect to find them always. However, in urban situations with wide medians and roadside development, mounting of signs within the median may be suitable. It can also be mounted above the carriageway in special conditions.



**Figure 18: Location of Informative signs**

**Note:**

*The Reading Distance = Reading Time x Speed (85 percentile speed)*

*Reading Time = 2 + N/3 seconds (N = no. of words on sign, say 3) = 2 + 3/3 = 3 seconds*

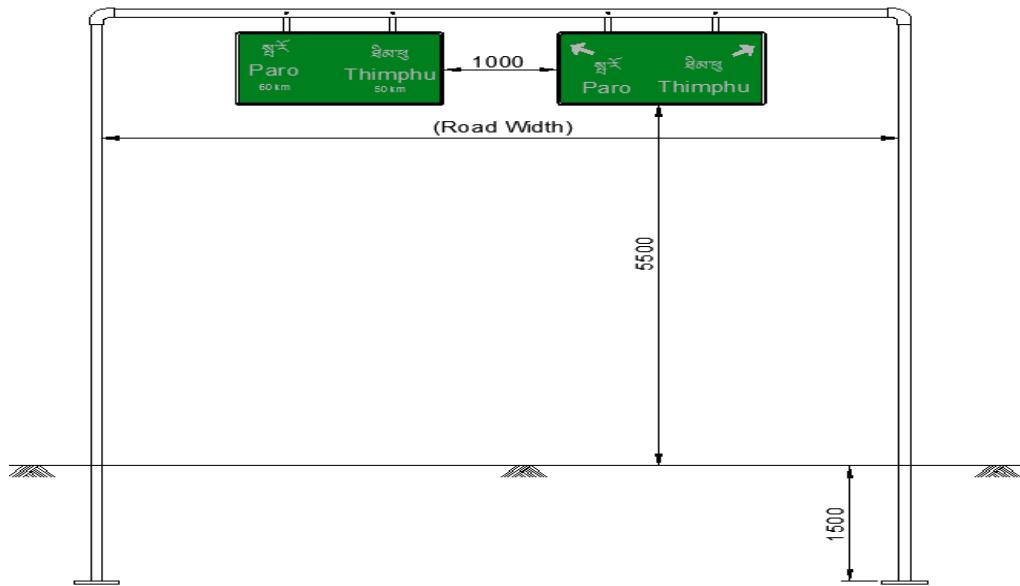
*If 85<sup>th</sup> percentile speed = 50 Km/h = 14 mps.*

*Therefore: Reading Distance = 3 seconds x 14 mps = 42 m.*

## 5 Overhead Signs

Overhead signs need to be larger than signs mounted in normal positions at the side of a road, while roads, which carry predominantly high-speed traffic, require larger signs than low-speed roads. A person with normal 20/30 eye vision (Someone with "20/30 vision" stands 20 feet from a reading chart but sees letters and objects that people with normal vision see 30 feet away from the chart) can read a standard highway sign about 10 m away for each 25 mm of letter height. That means a highway sign having 200 mm letter height can be read from 150 m distance. Thus, assuming the availability reading distance of 20 to 150 m on highways, the letter height of ranging from 50 mm to 300 mm is practically feasible.

There should be enough distance from the point where action is required to the location of sign, to give the drivers adequate time to decide. Overhead Signs can be either erected with two posts or with single post.



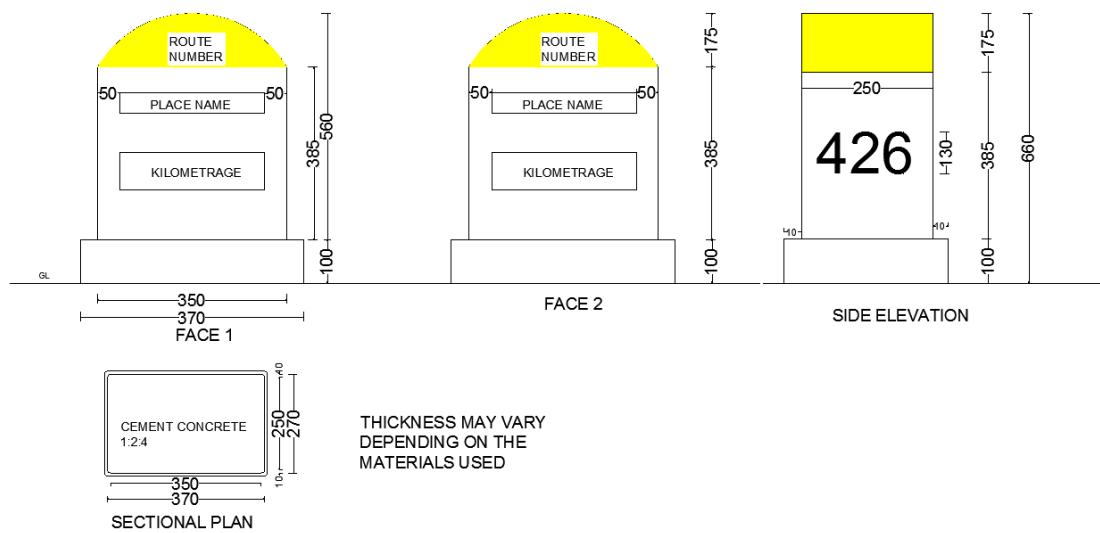
**Figure 19: Overhead signs**

## 5 Kilometer Post (Milestones)

### 5.1 Shape, size and colour of Kilometre post

#### 5.1.1 National Highways

For National Highways (Asian Highway, Primary National Highway & Secondary National Highway), the letter shall be with black legend on white background with top hemisphere yellow in colour with black legend and the size shown in Fig. 20 and Fig. 21. The ordinary Kilometre post shall be placed in every Kilometre and 5<sup>th</sup> Kilometre post on distance of every 5 Kilometre.



**Figure 20: Design for Ordinary Kilometre Post on National Highways**

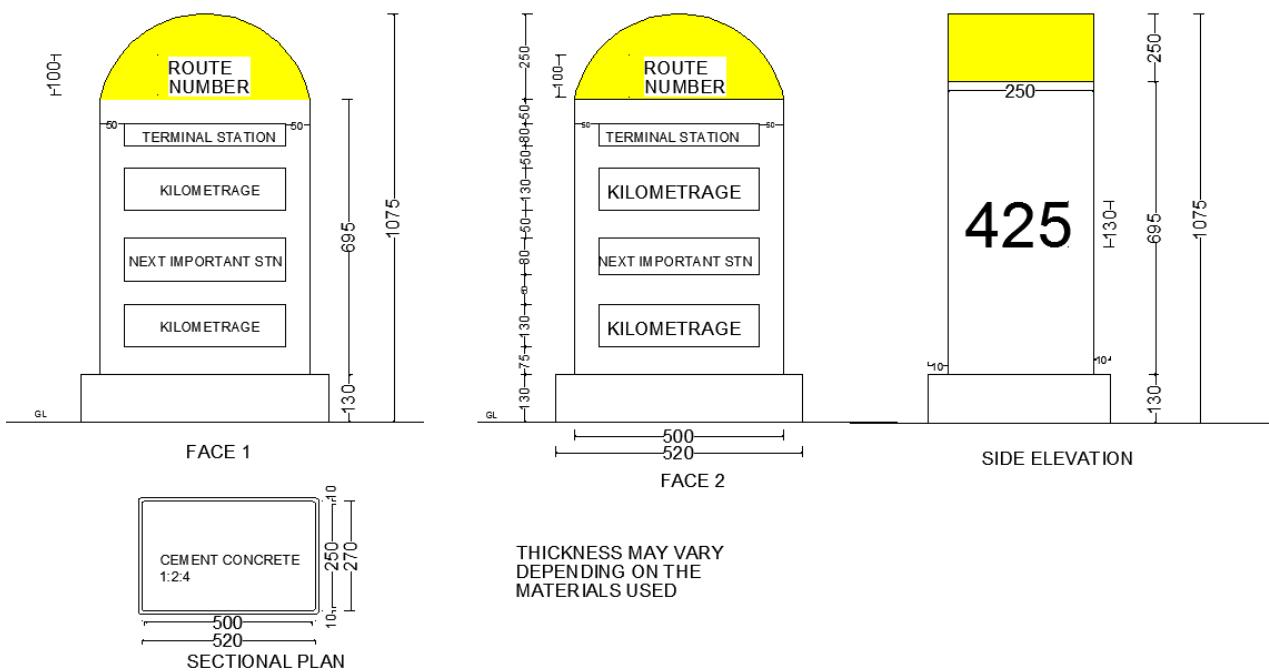
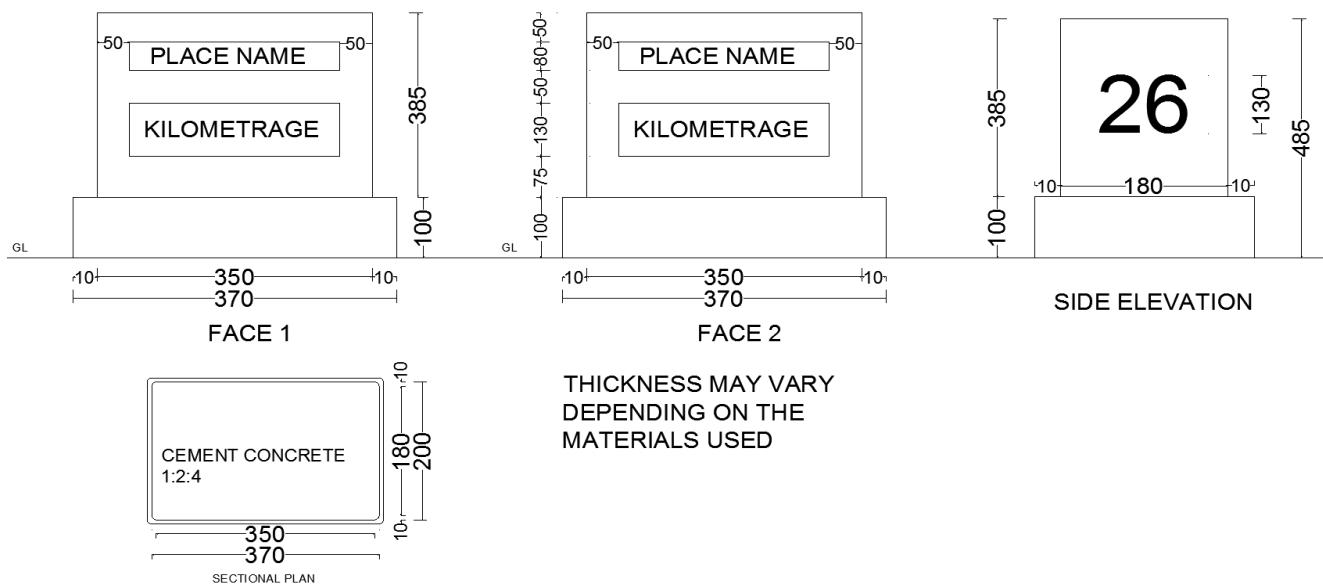


Figure 21: Design for every 5<sup>th</sup> Kilometre post on National Highways

### 5.1.2 Dzongkhag and other Roads

For Dzongkhag and other roads, the kilometre post shall have black legend on white background and size indicated in Fig. 22.



**Figure 22: Design for Kilometre Post on Dzongkhag & Other Roads**

## 6 Pavement or Road Marking

A system of clear and effective pavement markings is essential for the guidance and control of vehicles and pedestrians. They are used as a supplement to other traffic control devices, such as traffic signals and road signs. There are many types of pavement marking like longitudinal lines, Transverse lines and other special markings.

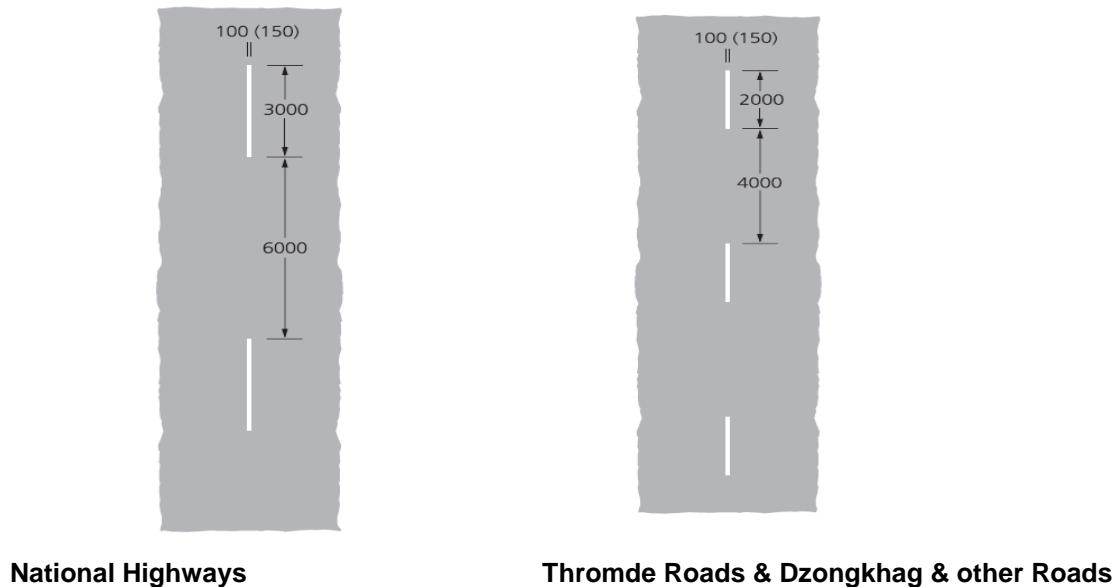
## 6.1 Longitudinal Centre Lines

A centre line is used to separate opposite traffic movements along a roadway and is generally placed centrally on all roads. If the approaching bridge is narrow, the centre lines should be discontinued around 30 m from the abutment point. However, a continuous white line of 150mm width may be used in the following cases:

- a) On roads with more than two lanes if not separated by median islands.
- b) Around a curve.
- c) On approaches to an intersection or junction.
- d) On road edges as edge line to make driving safer and more assured and to discourage Travelling on road shoulders.

**Table 10: Thickness and gap of the Road markings**

Road Type	Road Marking (m)	Gap (m)	Width of lines (m)
Asian/National Highways	3	6	100 (150mm)
Thromde	1.5	3	100 (150mm)
Dzongkhag & other Roads	2	4	100 (150mm)



**Fig 23: Road Markings**

## 6.2 Barrier Lines or No Over Taking Zone Marking

'No overtaking' zones should be established at vertical and horizontal curves and elsewhere, as deemed necessary via road engineering and road safety judgment, where overtaking must be prohibited because of restricted sight distance or other hazardous conditions.

Barrier line criteria or "No overtaking marking". Barrier lines should not be marked unless the sight distance available falls below the appropriate minimum sight distance (**A**) for at least the road length (**B**) shown in Table 11.

If the length of road with sight distance below the minimum sight distance (**A**) is less than the minimum length of barrier line (**C**) shown in Table 11, the additional length of the marking should be added to the beginning of the zone.

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 distance (**D**) shown in Table 11, the barrier lines should be joined to form one continuous barrier line?

In the following cases, a barrier lines (unbroken lines) should be used:

- As centre lines on approaches to major intersections.
- As centre lines of multi-lane roads where overtaking must be prohibited, because of sight restrictions.
- In 'No Overtaking' zones where there is restricted sight distance due to horizontal or vertical curve alignments, or both.

8 <sup>th</sup> percentile speed (km/h)	Minimum sight distance (m) A	Minimum road length with sight distance less than minimum sight distance (m) B	Minimum length of the barrier line (m) C	Minimum distance between sections of barrier line (m) D
40	120	20	60	100
50	150	25	75	125
60	180	30	90	150
70	210	35	105	175
80	240	40	120	200

**Table 11: Barrier markings**

### 6.3 Edge Line

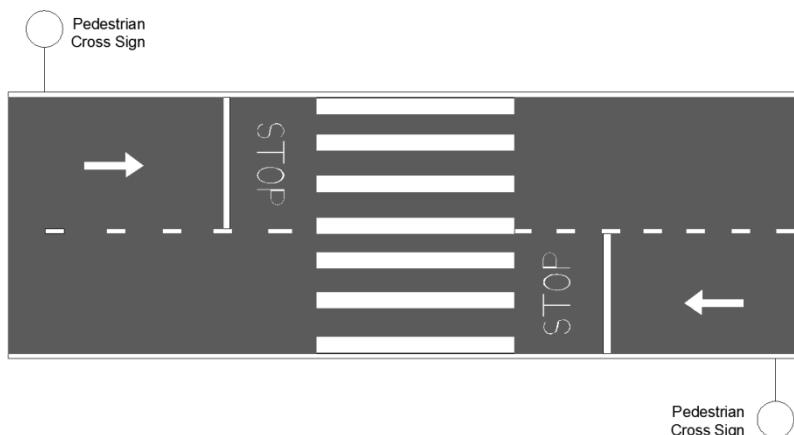
The edge line is used to delineate the edge of the travelled way and to distinguish it from the shoulder area. It should be a continuous white line of 150mm wide.

In general, there are three main purposes to installing edge lines:

- To discourage travel on road shoulders;
- To make driving safer and more assured, particularly at night and during inclement weather by providing a continuous guide for the driver; and
- To act as a guide past objects which are close to the edge of pavement and which constitute hazards.

### 6.4 Pedestrian Crossing Marking

The main type of pedestrian crossing that would be in use is a 'zebra' (no signalized) crossing. The marking consists of a series of white longitudinal bars 300 mm wide with a gap of 300mm. The markings are generally not less than 3 m long. The bars are marked parallel to the road centre line with gaps of equal width to the bar. The stop line should be 1m to 2m from the zebra crossings. The zebra crossing shall be in white continuous line.

**Figure 24: Zebra Crossing on 2 way Street**



Pedestrian  
Cross Sign

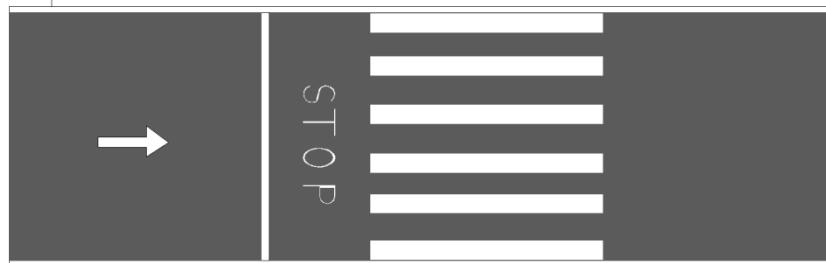


Figure 25: Zebra Crossing on one way Street

## 6.5 Hazard Markers

The Hazard markers are generally used to emphasize to the approaching driver a marked change in the direction of travel and the presence of an obstruction.

### 6.5.1 Shape, Size and colour of the Hazard Markers

Hazard markers are rectangular and generally consist of a series of alternate black and yellow bands. The yellow portion is always reflectorized. The bands may consist of either diagonal strips where only a target is required or of chevron where directional, as well as target, properties are desirable.

#### 6.5.1.1 Chevron Signs - One Way Hazard Markers

This sign shall be used to inform the drivers about sharpness of the curve and other change in road alignment. The sign shall be vertical Reflectorized yellow background with Reflectorized black arrow whereas the height depends on the site conditions. The Dimension (in mm) of the sign shall be as indicated in Fig 26.

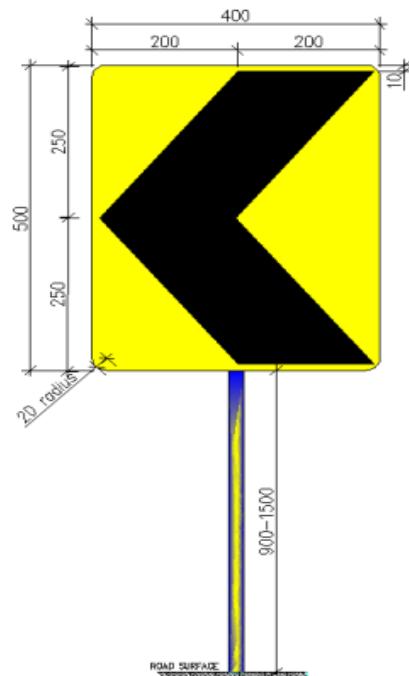


Figure 26: Chevron Sign

### 6.5.1.2 One-Way Hazard Marker

One way hazard markers indicate to the approaching driver the direction to be followed if the marker appears in the driving path as Shown in Fig. 27. They may point to the left or right as appropriate and are used:

- to delineate an abrupt narrowing of pavement, for example, at a lane drop
- at exposed ends of raised median islands where traffic is required to pass to one side
- on central island of a roundabout facing entering traffic
- to delineate the curve approach just prior entering an intersection

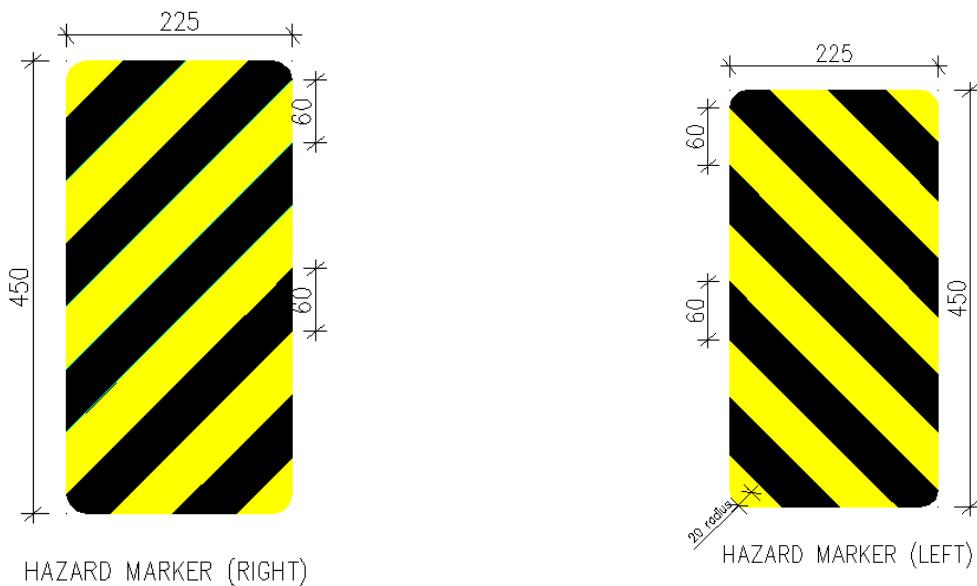
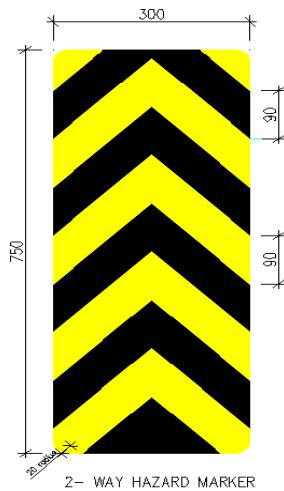


Fig 27: One Way Hazard Marker

### 6.5.1.3 Two-Way Hazard Marker

The two way hazard markers are used where it is necessary to delineate an exposed obstruction on a traffic island nose at which traffic may pass to either side. This sign can be used on a wide column of an overpass structure, or a median island separating the carriageway with traffic proceeding in the same direction. If the Hazard Markers are to be placed at median (central of the two way road), it should be provided with flexible base (hinged base) as Shown in Fig. 28.



**Figure 28: Two way Hazard Marker**

## 7 Road Delineators

Delineators are reflective roadside markers used to guide traffic at night, during adverse weather, through work zones, and at locations with confusing alignment features. Delineators can be embedded in the centerline or edge-line or mounted on posts at curves. These are often referred to as *cat's eyes*. Delineators are a good safety device because they are less affected by harsh weather than pavement markings, and delineators do not have to be replaced as often because traffic does not drive on them.



**Figure29: Different Types of Delineators**



**Figure 30: Cat's eye**

## 7.2 Location of Delineators

Generally delineator's posts are placed near the edge of the shoulder at a height such that the lower edge of the reflecting surface should not be less than 500 mm above the pavement surface level. Delineators should be located at intervals not exceeding 30 meters with closer spacing on curves.

The maximum projection height for a cat's eye is 20 mm from the road surface. The spacing of cat's eyes will depend on factors like speed of vehicle, number of lanes, curvature of roads and the purpose for which the studs are used. However, in most cases, a spacing of 3 m to 4.5 m is adopted depending on the judgment at site.

## Bibliography

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2. ISO 3864 Graphical Symbols- Safety Colors and Safety Signs- Part: 2 Design Principles for product safety labels.
3. IRC: 67-2012 Code of Practice for Road Signs (3rd Revision).
4. IS 9457 (2005): safety colors and safety signs- Code of Practice
5. IRC:8-1980: Types design for highway kilometer stones
6. IRC: 103-1988: Guidelines for Pedestrian Facilities

**Annexure 1**

**Mandatory Signs**



Stop Sign



No 'U' Turn



Speed limit



Give Way



No Trucks allowed



Load (weight) restriction



No buses allowed



One Way



Straight ahead



No left turn



No right turn



No entry



No Overtaking



No standing



Horn Prohibited



Pedestrian Prohibited



Cycles prohibited



No parking

### Cautionary Signs



Left hand curve



Right hand curve



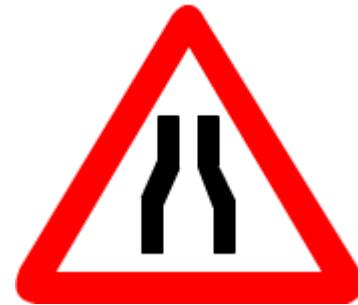
Right hair pin bend



Left hair pin bend



Loose gravel



Narrow Road



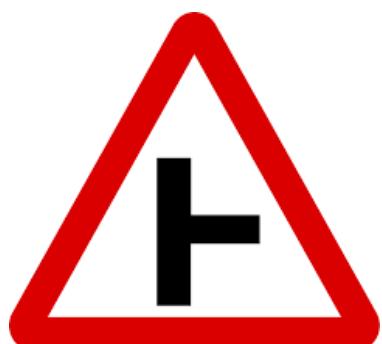
Left Reverse Bend



Right Reverse Bend



Series of bends



Side (feeder) road right



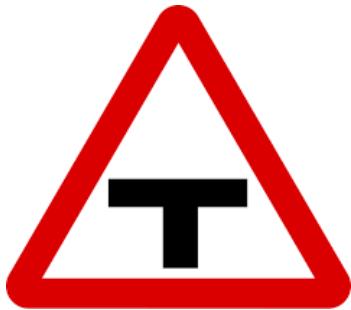
Side (feeder) road left



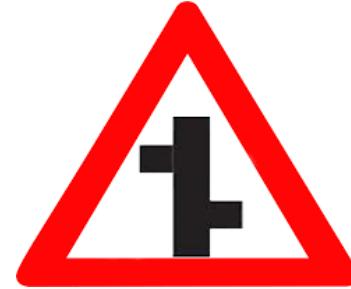
Y – Intersection



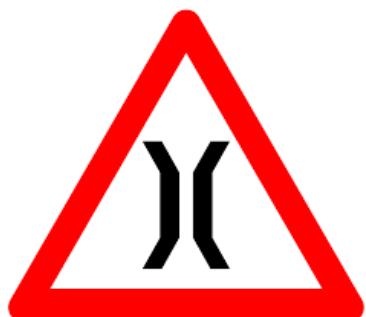
Roundabout



T – Junction



Staggered Intersection



Narrow Bridge



Steep Ascent



Steep Descent



Rock Falling



Dangerous Dip



Speed Breaker



School Ahead



Pedestrian Crossing



Cycling area

ଭୁଟାନ ପାଇଁ ରୋଡ୍ ସେସଟି ପାଇଁ ପରିବହନ ବିଭାଗ

## BHUTAN STANDARDS

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