

**Government of Nepal
Ministry of Physical Planning and Works
Department of Roads**

NEPAL BRIDGE STANDARDS-2067

Kathmandu-2067

Acronyms

DOR-Department of Roads

IRC-Indian Roads Congress

*AASHTO-American Association of State Highway and Transportation
officials*

HFL-Highest Flood Level

1.0 INTRODUCTION AND BACKGROUND

1.1 Department of Roads (DOR) has formulated these standards with a view to establish a common procedure for design and construction of road bridges in Nepal.

2.0 DEFINITION OF DIFFERENT TERMS

Afflux: A rise in water level behind the bridge structures due to obstruction to flow.

Bridge: A structure that spans a body of water, a valley, or a road and affords passage for pedestrians, or vehicles of all kinds, or any combination thereof.

Design Discharge: That maximum discharge which the structure allows to pass through it with fully serving its function.

Design Life: Period of time after construction throughout which the structure fulfills its function for which it is constructed.

Footpaths: A portion of the bridge deck intended for the movement of pedestrian traffic which is usually separated from vehicular movement by raising or by safety curb.

Free board: A vertical clearance of the lowest point of superstructure from the highest flood level.

HFL: Level of the highest flood ever recorded or the calculated level for the highest possible flood of specified return period.

Curb: The edge of a sidewalk next to the main roadway. The wheel-guard in a bridge.

Permanent Bridge: A bridge intended to provide a reliable passage of vehicles across a river or any obstacles without interruption throughout its design life in contrary to *Temporary Bridges* such as submergible causeways, ferries etc.

Return period: Also known as a *recurrence interval* is an estimate of the interval of time between flood or river discharge flow of a design intensity or size.

Raised Curb: A curb that is raised above the level of the carriageway.

Safety Curb: A curb that separates vehicular movement from pedestrian movement with a barrier.

Temporary Bridge: A bridge constructed to provide passage of vehicles either for relatively a short period of a few years or few months or low level structures like submergible/vented causeways or pontoons functioning during the period of low discharge only.

3.0 GERNERAL

3.1 DESIGN LIFE

All permanent bridges shall be designed for a design life of minimum 50 years. Traffic projections shall be made for a period of 30 years.

3.2 DESIGN DISCHARGE

All permanent bridges shall be designed for a discharge of 100 yrs. return period. For the calculation of design discharge empirical formulas especially developed for other catchments shall not be used.

4.0 BRIDGE LOADINGS

4.1 ROAD BRIDGE LOADINGS

All permanent road bridges in Nepal shall be designed as per IRC loadings or AASHTO loadings. All design shall be carried out in accordance to IRC standards for bridges unless otherwise specified in this document.

5.0 GEOMETRIC STANDARDS

5.1 CARRIAGEWAY

- All bridges in Highways and Urban Roads shall be designed with a minimum carriageway width of 7.5m.
- All bridges in Feeder Roads shall be designed with a minimum carriageway width of 6.0m.
- No permanent bridge shall be designed with a carriageway width of less than 6.0m except on minor (district and village) roads having length less than 25m.

5.2 FOOTPATH

Footpaths shall be provided on all bridges located at settlement areas or on areas of high movement of pedestrian traffic. They should be separated from the vehicular traffic by safety curbs (in rural areas) and by raised footpath or curbs (in urban areas). The width of the footpath should be decided according to projection of pedestrian traffic, however, a minimum clear width (excluding the width of railings) of 1.0 m footpaths to be provided, where necessary.

6.0 CLEARANCES

6.1 VERTICAL CLEARANCE

The vertical clearance is shown in **Fig 6.1**.

The vertical clearance of structures shall be,

- I. For all roads not less than 4.75 m for through structures
- II. Overhead wires, poles etc shall be at least 7.0 m above the highest point of the road surface.

6.2 HORIZONTAL OR LATERAL CLEARANCE

The horizontal clearance is the clear width available for the passage of vehicular traffic as shown on **Fig. 6.1**.

For culverts, the full roadway width as well as the width of shoulders shall be carried through.

The size of curbs and footpaths shall be as shown in **Fig. 6.1**.

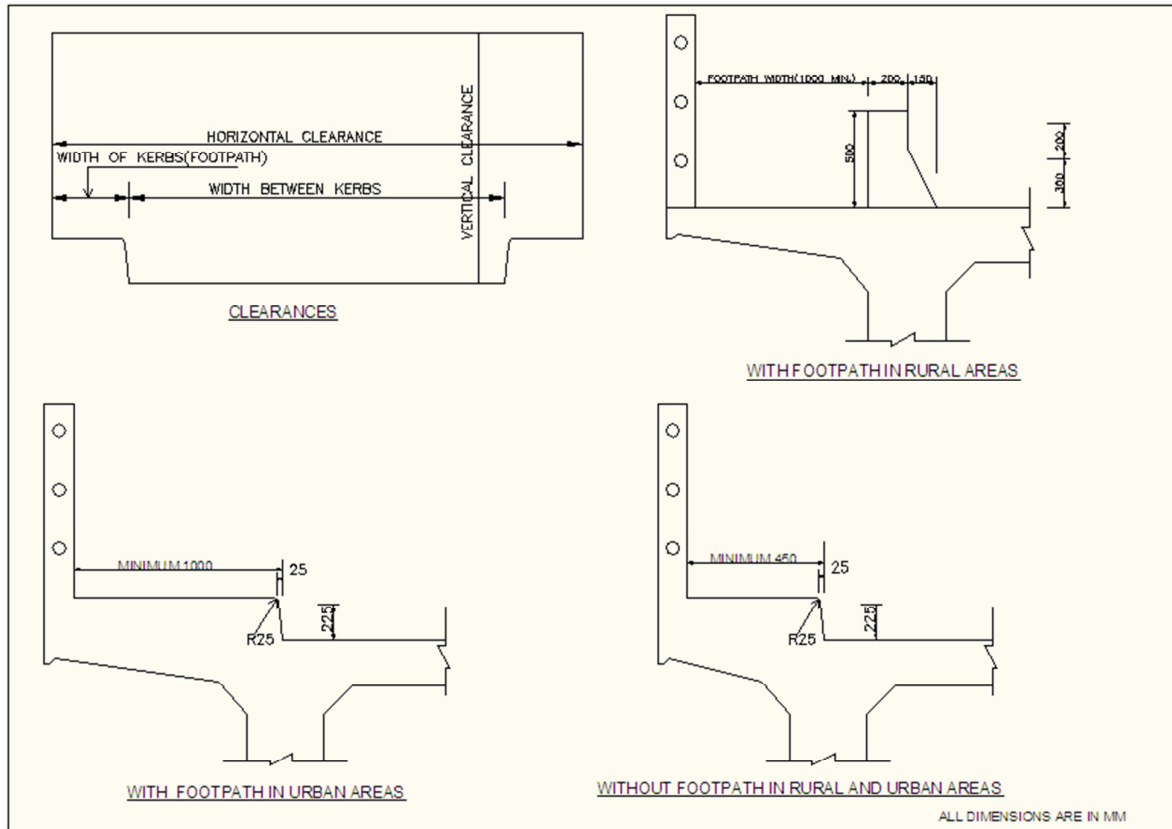


Fig. 6.1 Horizontal and Vertical Clearances

7.0 BRIDGE CLASSIFICATION

Classification of bridges shall be as follows:

- **Culvert** : Length up to 6 m
- **Minor Bridge** : When length \leq 50 m (with span \leq 25 m)
- **Major Bridge** : When span $>$ 25 m or length $>$ 50 m (with smaller spans)
- **Special Bridge** : Bridges that require special design considerations, whose construction features (e.g. concrete girder bridges with $>$ 50m span, steel trusses $>$ 100m span, arch bridges, suspension bridges, cable-stayed bridges and other non-standard bridges).

8.0 FREE BOARD

8.1 MINIMUM FREE BOARD

In case of bridges over water bodies, the free board from the design HFL with afflux to the lowest point of bridge superstructure shall not be less than 1.0 m. The minimum freeboard shall be as shown on the following table.

Table 8.1

Discharge m ³ /sec	Minimum Free board, mm
Less than 200	1000
201-500	1200
501-2000	1500
2001-5000	2000
5000 and above	More than 2000 (depending on the reliability of the available data for the calculation of discharge)

9.0 CURBS AND SAFETY CURBS (BRIDGE BARRIERS)

Raised curbs shall not be less than 450 mm wide. Wider curbs shall be designed for footway loadings. Height of raised curbs shall not be less than 200 mm.

The height of the safety bridge curb above the carriageway shall not be less than 500 mm from the safety consideration.

10.0 CARRIAGEWAY DRAINAGE

Transverse and longitudinal drainage of the carriageway shall be managed respectively by providing a suitable cross fall and a camber or gradient. Water flowing down grade on the approach should be intercepted and not permitted to run to the bridge.

The details of deck drains shall be such as to prevent the discharge of drainage water against any portion of the structure and to prevent erosion adjacent to the outlet of the drainage. Overhanging portion of concrete deck shall be provided with drip head or notch, continuous where possible.

11.0 RAILINGS

Railings shall be provided along the edges of structures for protection of traffic and pedestrians.

The height of the railing should be a minimum of 1.0 m from the top of the footpath or curb surface.

12.0 MATERIAL SPECIFICATION

Material Specification is to be adopted as per Standard Specification for Road and Bridges Works published by Ministry of Physical Planning and Works, Department of Roads-2001.

13.0 PROVISION FOR UTILITIES

All bridges shall be designed taking into consideration the provision of carrying utilities (electricity, water, telephone, cables etc.) through them wherever required.