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Highways Department Technical Circular No. 4/2010

Fire Mains and Hydrants on
New Trunk Roads and Elevated Highway Structures

Introduction

This Circular provides the general principles on the planning and design of fire fighting facilities on highway works. It supersedes HyDTC No. 2/2000 which is hereby cancelled.

General Principles on Planning and Design

2. For the purpose of installing fire mains and hydrants on new trunk roads and elevated highway structures, agreements have been reached among Highways Department (HyD), Fire Services Department (FSD) and Water Supplies Department (WSD) on some general principles to facilitate the planning and design of our highway works as follows:

- (i) FSD and WSD shall be consulted at an early stage in the design process to ascertain the fire fighting facilities, including but not limited to fire mains and hydrants, and detailed requirements on each and every individual case. The operation and maintenance responsibilities of such fire fighting facilities shall be discussed and resolved amongst all departments concerned. The Bridges and Structures Division, HyD shall also be consulted if highway structures are involved.
- (ii) Fire mains, in common with other utilities service installations, should normally be installed along service roads or within the existing subsidiary road network. If the location of a fire main within the highway reserve is unavoidable, it should normally be located in the roadside verge but not in the carriageway. In such circumstances, fire hydrants may be provided in the verge to FSD requirements, with adequate protection to ensure the safety of road users.

- (iii) Installation of salt water fire mains should be avoided on highway structures due to potential corrosion problem.
- (iv) Provision of fire hydrants to at-grade trunk road:

Case 1: Normal Provision

Provision of fire hydrants to at-grade trunk road shall be at a distance of 100 metres, staggered on alternate sides of the roadway.

Case 2: Provision under Extenuating Circumstances ^{See Note 1}

Where there are extenuating circumstances, the spacing and location could be relaxed subject to agreement with FSD. For trunk roads in urban area (urban area includes all developed area such as new town), the maximum spacing could be relaxed to 330 m. For trunk roads in rural area with no development on the roadside, the maximum spacing could be relaxed to 1000 m. Fire hydrants shall be staggered on alternate sides of the roadway if possible.

- (v) Provision of fire hydrants to elevated highway structures:

Case 1: Elevated Highway Structure with Adjacent At-grade Road

Fire hydrant may not be required on an elevated highway structure if fire fighting operations can be performed with the aid of fire hydrants along an adjacent at-grade road (Fig. 1). This would, however, be subject to actual configuration and prior agreement with FSD.

Case 2: Short Flyover

For a flyover shorter than 330 m in urban area or 1000 m in rural area with no development on the roadside, fire hydrants shall be provided at the ground approaches. (Fig. 2)

Case 3: Long Viaduct

For a long viaduct without alternative provision of fire hydrants as in Case 1 above, fire hydrants shall be provided on the structure at a maximum spacing of 330 m in urban area or 1000 m in rural area with no development on the roadside. Fire hydrants shall be staggered on alternate sides of the viaduct if possible. (Fig. 3)

Note 1 : The followings are some examples of extenuating circumstances under which laying a continuous fire main along the road verge may be impossible/very difficult and the spacing of fire hydrants may be relaxed:

- (a) Land constraints
- (b) Engineering constraints, e.g. excessive rock cutting or filling is involved
- (c) Very congested utilities along the road verge

Case 4: Long Span Cable-supported Bridge or Similar Long Span Bridge

For a long span cable-supported bridge or similar long span bridge, where it is technically infeasible to install water mains, consideration may be given to the provision of suitable water tender(s) for fire fighting purposes. Fire hydrants shall be provided outside the bridge. (Fig. 4)

- (vi) In general, fresh water fire hydrants shall be painted red and salt water fire hydrants shall be painted yellow. Different colours may be proposed to the exposed fire mains to match with the surrounding environment or for aesthetic effects.
- (vii) It may be necessary to build booster pumping station to provide adequate water pressure and flow for fire mains on new trunk roads or elevated highway structures. Concerned departments responsible for the operation and maintenance of the pumping station shall be consulted for the need and layout for such pumping station.
- (viii) Fire-hydrants should be installed with a minimum horizontal clearance of 1.5 m from vertical objects such as lighting columns, sign posts or gantry legs.
- (ix) Continuity of roadside barriers and parapets of highway structures is an important factor in road safety. The practice of allowing short gaps in roadside barriers and parapets of highway structures for facilitating access to fire hydrants shall be avoided. Where necessary, the fire hydrant may be, subject to agreement by FSD and the maintenance authorities, raised to avoid obstruction by the barriers and parapets.

For fire hydrants adjacent to at-grade roadside barriers where the 1.5 m horizontal clearance requirement in (viii) cannot be met, the hydrant outlets should be at least 100 mm above the top of the barrier and a minimal horizontal clearance of 500 mm should be maintained between the fire hydrants and the barriers wherever practicable.

The outlets of a raised fire hydrant should not be more than 950 mm above ground; otherwise, consideration should be given to provision of a concrete stepping platform for the hydrant if requested by FSD and agreed by the maintenance authorities. Details of the platform are to be agreed with FSD and the maintenance authorities based on the actual site conditions.

Mains above ground used in raising of fire hydrants should be protected by grade 20/20 concrete jacket. The external diameter of the jacket should at least equal to the diameter of the bell shaped bottom of the fire hydrant.

For fire hydrants on elevated highway structures, the typical arrangement is as shown in Fig. 5.

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