STRUCTURES DESIGN MANUAL FOR HIGHWAYS AND RAILWAYS

2013 Edition

AMENDMENT NO. 1/2025

March 2025

Highways Department
The Government of the Hong Kong Special Administrative Region

STRUCTURES DESIGN MANUAL FOR HIGHWAYS AND RAILWAYS

2013 Edition

AMENDMENT NO. 1/2025

INTRODUCTION

The "Structures Design Manual for Highways and Railways – 2013 Edition" (SDM) published by the Government of the Hong Kong Special Administrative Region sets out standards and provides guidance for the design of highway and railway structures in Hong Kong. In 2024, Highways Department conducted reviews on design requirements for walkway covers and the provision of fall protection measures at roofs of highway structures.

Following the reviews, amendments to Chapters 1, 2, 3, 12 and 16 of the SDM are made.

As an environmentally friendly measure, amendments to the SDM will no longer be prepared in form of replacement pages to reduce the consumption of paper and promote the use of electronic documents. Continuously updated version of the SDM is available in the departmental website for viewing and downloading.

AMENDMENT DETAILS

The following amendments are made :-

1. CHAPTER 1 GENERAL

(a) Clause 1.1 – SCOPE

Add the following new sub-clause after sub-clause (6):

(7) Unless otherwise stated, the design of walkway covers, sign gantries and noise barriers/enclosures shall follow this Manual in the same manner as other highway structures.

Replace the numbering of sub-clause "(7)**" with "**(8)**", "**(8)**" with "**(9)**" and "**(9)**" with "**(10)**".**

2. CHAPTER 2 RELIABILITY MANAGEMENT

(b) Clause 2.2 – DESIGN WORKING LIFE

Delete "The design of walkway covers, sign gantries and noise

barriers/enclosures shall follow this Manual in the same manner as other highway structures, except that the peak velocity pressure q_p determined under simplified procedure for calculation of wind actions shall be reduced in accordance with Clause 3.4.2.1(3) of this Manual.**" after "**UK NA to BS EN 1990.**" in sub-clause (2).**

3. CHAPTER 3 ACTIONS

(c) Clause 3.4.2.1 – Peak Velocity Pressure for Wind Leading Combinations

Delete "walkway covers,**" after "**the design of**" and add "**With reference to Clause 2.2(2),**" before "**the peak velocity pressure q_p obtained from Table 3.7 or Table 3.8**" in sub-clause (3).**

Add the following new sub-clause after sub-clause (4):

(5) For the design of walkway covers, the determination of the peak velocity pressure q_p shall follow Clause 12.17(2)(a)(i).

(d) Clause 3.4.6 – Force Coefficient and Pressure Coefficient

Add the following new sub-clause after sub-clause (2):

(3) For the design of walkway covers, the requirements given in Clause 12.17(2)(a)(ii) shall be followed.

(e) Clause 3.6.1 – General

Add the following new sub-clause after sub-clause (5):

(6) For the design of walkway covers against accidental actions, further guidelines are given in Clause 12.17(2)(d).

4 CHAPTER 12 FOOTBRIDGES AND SUBWAYS

(f) Replace the chapter title with "FOOTBRIDGES, SUBWAYS AND WALKWAY COVERS".

(g) Add the following clause:

Clause 12 – INTRODUCTION

Unless otherwise specified, the requirements for footbridges and subways are given in Clauses 12.1 to 12.16 while those for walkway covers are given in Clause 12.17.

(h) Clause 12.2 – COVERS

Add the following new sub-clause after sub-clause (2):

(3) For further guidelines on the design of layout and choice of materials

for covers for footbridges and subways, reference shall be made to Highways Department Guidance Notes No. BS/GN/047 – "Guidance Notes on Design of Covers for Walkways and Passenger Shelters".

Replace the numbering of sub-clause "(3)**" with "**(4)**".**

(i) Clause 12.13 – WATERPROOFING

Delete ", Covered Walkways**" in the title of sub-clause 12.13.2.**

(j) Add the following clause:

Clause 12.17 – WALKWAY COVERS

(1) For general guidelines on the design of layout and choice of materials for walkway cover, reference shall be made to Highways Department Guidance Notes No. BS/GN/047 – "Guidance Notes on Design of Covers for Walkways and Passenger Shelters" where covers for at-grade walkways and covers for passenger shelters are referred to as walkway covers in this Manual.

(2) The specific design requirements are stated in the following sub-clauses.

(a) Wind action –

(i) The peak velocity pressure q_p shall be obtained from Table 12.1 for walkway covers. No further adjustment for degree of exposure as defined in Table 3.8 shall be made.

Table 12.1 – Peak Velocity Pressure q_p for Walkway Covers

Height above ground level (m)	**Peak Velocity Pressure q_p (kN/m^2)**
≤ 4	1.54
> 4 – 8	1.72
> 8 – 12	1.84

Where the walkway cover is located at an orography significant site as defined in Clause 4.3.3 of BS EN 1991-1-4 and Clause NA.2.13 of the UK NA to BS EN 1991-1-4, the peak velocity pressure q_p obtained from Table 12.1 shall be multiplied by a topographical factor $c_o(z)$ in accordance with Annex A.3 of BS EN 1991-1-4 and Clause NA.2.17 of the UK NA to BS EN 1991-1-4.

For height other than the range given in Table 12.1, the

designer shall consult the Chief Highways Engineer/Bridges and Structures for advice.

(ii) The pressure coefficient of the walkway covers shall be taken in accordance with BS EN 1991-1-4 Clause 7.3. For the post, beam and other main elements, $c_{f,x}$ shall be obtained in accordance with Clause 3.4.6.3(2).

(b) The roof of walkway covers shall be designed to resist a uniformly distributed vertical load of 0.5 kN/m^2 as maintenance load which shall be considered as variable traffic action and combination with other variable actions is not required.

(c) Unless otherwise justified, for determining the road traffic actions or the horizontal earth pressure arising from traffic load surcharge, consideration of the effect from SV and SOV vehicles is not required.

(d) Design against vehicular impact – The principles given in Clause 3.6.1 of this Manual and Clause 3.3 of BS EN 1991-1-7 shall be followed. In essence, a walkway cover shall be designed and constructed so that it is inherently robust and not unreasonably susceptible to the effects of accidents or misuse, and disproportionate collapse. The overall structural integrity of the structure shall be maintained following impact from road vehicles, but local damage to the support posts or other structural members can be accepted. In general, if a walkway cover does not collapse after loss of any one post, its robustness requirement is deemed to be satisfied and further checking against a prescribed vehicular impact load is not necessary.

(e) Drainage – The requirements applicable to footbridge covers given in Clause 12.9 shall also be followed.

(f) Waterproofing – For concrete walkway covers, the requirements given in Clauses 12.13.1 and 12.13.2 shall be followed.

(g) Special Materials – For walkway covers with roofing panels made of the materials covered in Clause 12.14, the corresponding requirements given therein shall be followed.

(h) For other design requirements, the provisions given elsewhere in this Manual shall be followed.

5 CHAPTER 16 OPERATIONAL CONSIDERATIONS

(k) Add the following clause:

Clause 16.8 – PROVISION OF FALL PROTECTION MEASURES AT ROOFS OF HIGHWAY STRUCTURES

(1) The Designer shall propose a routine maintenance arrangement of roofs of highway structures with an aim to eliminate or reduce workers' risk of falling from height for maintenance parties' consideration and agreement. The Designer shall devise such arrangement with the following criteria duly considered:

(a) If the geometry and configuration of roofs are suitable for standing on;

(b) If labour-based routine maintenance on roofs can be avoided; and

(c) The practicality of the proposed arrangement taking into account site conditions including but not limited to impact to road traffic, restrictions for protection of nearby railway (if any), and associated maintenance cost, etc.

(2) In connection to Clause 16.8(1)(a), the Designer may make reference to the relevant international standards in determining roofs' suitability to stand on, for example, "Preventing Falls in Housing Construction - Code of Practice" published by Safe Work Australia and "Best Practice Guidelines for Working on Roofs" published by the Ministry of Business, Innovation and Employment of New Zealand.

(3) The Designer shall design roofs of highway structures with their maintainability duly considered such that the need of working on roofs is reduced.

(4) Should working on roofs for routine maintenance be considered necessary, the Designer shall recommend and design appropriate fall protection measures at roofs in accordance with the guiding principles stated in Chapter 8 Section I Paragraph b) of the "Occupational Safety and Health Management in Renovation and Maintenance Works for the Property Management Industry" published by Labour Department. Suitable permanent fencing should be considered in the first place, followed by temporary fencing. Only if the provision of permanent or temporary fencing is not reasonably practicable, active fall protection system should be provided as the last resort.

(5) The Designer shall design the appearance and layout of permanent fencing with an aim to minimize the visual impact as much as possible. For instance, tension wire parapet, which is a common type of permanent fencing, is adopted and installed at some existing noise enclosures.

(6) Suitable, sufficient and safe access points should be provided to eliminate or reduce workers' risk of falling from height in the course of access to and egress from roofs.

(7) For private highway structure which is subject to the control under the Buildings Ordinance, the means of access to the roof and fall protection measures at the roof should also comply with the requirements stipulated in section 4.2 of the "Code of Practice on Access for External Maintenance 2021 (2024 Edition)" published by the Buildings Department.