BS 8779:2022

BSI Standards Publication

Assessment, maintenance and repair of masonry highway parapets for bridges and other structures — Code of practice

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Published by BSI Standards Limited 2022

ISBN 978 0 5 9 12228 2

ICS 13.080, 93.040

The following BSI references relate to the work on this document:
Committee reference B/509/1
Draft for comment 21/30406772 DC

Amendments/corrigenda issued since publication

Date	Text affected

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Summary of pages
This document comprises a front cover, an inside front cover, pages I to IV, pages 1 to 46, an inside back cover and a back cover.

Foreword

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Relationship with other publications

This British Standard covers assessment, maintenance and repair of masonry highway parapets for bridges and other structures previously included in BS 6779 which was withdrawn in 2017.

Information about this document

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Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

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Introduction

There are a large number of reinforced and unreinforced masonry parapets present on the United Kingdom (UK) highway network. Reinforced masonry parapets generally contain steel reinforcement usually anchored into the supporting structure. Unreinforced masonry parapets are built directly onto the supporting structure without any special provision for anchorage.

Accidental actions from an errant vehicle impacting with a masonry parapet might cause individual blocks or sections of masonry to become dislodged and ejected. Therefore, an assessment of the possible injury or damage risk from ejected masonry can be used to determine the acceptability of an existing masonry parapet at a particular site.

Masonry parapets are in situ construction works, which were usually constructed to protect pedestrians and livestock from steep drops. As traffic has changed, they are now called upon to contain errant vehicles. As masonry parapets are of solid construction, they provide effective pedestrian protection without modification, subject to satisfying the minimum height requirements specified in BS 7818:1995, Table 1.

The standards and guidance for masonry parapets have developed since the 1990s. The history that has led to the publication of BS 8779 is as follows, in chronological order.

A guidance document for unreinforced masonry parapets was published in 1995 – County Surveyors' Society Guidance Note, *The assessment and design of unreinforced masonry vehicle parapets*, Report No. 1/95 [1].

This informed the development of the first standard for masonry parapets – BS 6779-4, *Highway parapets for bridges and other structures – Part 4: Specification for parapets of reinforced and unreinforced masonry construction*. This was mainly a design standard, but it also contained some assessment and maintenance information.

With the availability of enhanced numerical simulation models and the introduction of Eurocodes, further guidance was considered to be necessary. In 2012, *Guidance on the design, assessment and strengthening of masonry parapets on highway structures* [2] was published. This document is referred to as *Masonry parapet guidance* [2] in this standard.

Since BS 6779-4 was considered to conflict with certain Eurocodes in respect of design, the standard was withdrawn in 2017.

However, the sections in BS 6779-4 (withdrawn) on assessment, maintenance and repair do not conflict with the Eurocodes and given the large number existing masonry parapets, are still relevant.

Consequently this British Standard has been produced to give recommendations for the assessment, maintenance and repair of existing reinforced and unreinforced masonry parapets.

In the case of unreinforced masonry parapets, individual blocks or sections of the masonry might be dislodged and mobilized by a vehicle impact. Most of this masonry is propelled away from the highway, but some can come to rest on the highway in the immediate vicinity of the parapet. An assessment of the possible injury or damage risk from mobilized masonry can be used to determine the acceptability of the use of an unreinforced masonry parapet at a particular site.

Vehicle containment levels are related to defined vehicle impacts. For unreinforced masonry parapets, only vehicle containment levels applicable to cars are considered explicitly in this British Standard. Containment levels for cars are similar to those for normal containment (as defined in BS EN 1317-2:2010, Table 2). Higher levels of containment cannot generally be achieved by unreinforced masonry parapets.

Key objectives of BS 8779 are to ensure that existing masonry parapets are capable of:

- providing levels of containment to limit the penetration by errant vehicles and reducing the risk of such vehicles overtopping the parapet or overturning;
- protecting other highway users by either redirecting vehicles on to a path close to the line of the parapet or arresting the vehicle motion with acceptable deceleration forces; and
- protecting those in the vicinity of a parapet by ensuring any masonry ejected does not lead to disproportionate consequences.

The recommendations and guidance given in this British Standard form part of the process for the management of parapets on highway structures, principally bridges and retaining walls.

1 Scope

This British Standard provides recommendations and guidance for the assessment, maintenance and repair of existing reinforced and unreinforced masonry parapets.

This British Standard is applicable to unreinforced masonry parapets of 10 m or greater in length or, if the parapet contains movement joints, with a minimum parapet panel length between joints of 10 m and to reinforced masonry parapets with parapet panels 2 m or greater in length.

This British Standard is intended to be used by highway authorities, railway authorities, designers and contractors.

NOTE These include County, District and Unitary Councils, Network Rail, Transport for London and their respective supply chains.

This British Standard relates to highway structures only.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document.[1)]

[N1] COLLINS. J., ASHURST, D., WEBB, J., GHOSE, A. and SPARKES, P. *Hidden defects in bridges. Guidance for detection and maintenance.* CIRIA Report C764. London: CIRIA, June 2017.

[N2] NATIONAL HIGHWAYS. *Design Manual for Roads and Bridges.* CS 454 – Assessment of highway bridges and structures. London: March 2020. [Available from: https://www.standardsforhighways.co.uk/dmrb/search/0b0a95ee-7a5e-4a90-90e0-a774806b5508]

[N3] NATIONAL HIGHWAYS. *Design Manual for Roads and Bridges*. CS 455 – The assessment of concrete highway bridges and structures. London: January 2021. [Available from: https://www.standardsforhighways.co.uk/dmrb/search/1f91c68f-a74a-41c9-abfa-8e17066b12f7]

[N4] DEPARTMENT FOR TRANSPORT(DfT). *Managing accidental rail obstructions by road vehicles*. TAL 06/03. London: DfT, September 2003. [Available from: https://www.gov.uk/government/publications/managing-accidental-rail-obstructions-by-road-vehicles-tal-0603]

1) Documents that are referred to solely in an informative manner are listed in the Bibliography.

