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

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Contents

	Page
Foreword	iii
Introduction	1
1 Scope	2
2 Normative references	2
3 Terms, definitions, symbols and abbreviated terms	3
4 Assumptions and process	6
4.1 Assumptions – competence and appointment	6
<i>Figure 1 — Flowchart showing a suggested process for masonry parapet assessment</i>	7
4.2 Process – information	8
4.3 Process – inspection and assessment	8
4.4 Process – reporting	8
4.5 Process – measures resulting from the assessment	9
5 Inspection for assessment	10
5.1 General	10
5.2 Unreinforced masonry parapets	10
6 Assessment of reinforced masonry parapets	11
6.1 Reinforced masonry parapets	11
<i>Figure 2 — Reinforced masonry parapets, typical dimensions and profile</i>	12
6.2 Assessment actions for parapet panel lengths (L) 2.0 m to 3.5 m	13
<i>Table 1 — Parapet capacity – Equivalent static nominal loads (Q_k) for parapet panel lengths (L) 2.0 m to 3.5 m inclusive</i>	13
6.3 Assessment actions for parapet lengths greater than 3.5 m	13
6.4 Punching shear	13
6.5 Assessment method	14
<i>Table 2 — Values of γ_{fl}</i>	14
<i>Table 3 — Values of f_{cu}, f_y, f_k and γ_{mr}, ultimate limit state</i>	14
6.6 Applied assessment load values	15
6.7 Applied assessment load effects	15
6.8 Assessment load resistance values	15
6.9 Attachment systems and anchorages	16
7 Assessment of unreinforced masonry parapets	16
7.1 Assessment	16
7.2 Traffic speed	16
7.3 Assessment charts for unreinforced masonry parapets	17
<i>Figure 3 — Parapet performance chart: for 80 km/h for mortared parapets of height, H (mm) (density: 2 000 kg/m³) that contain and direct cars at an impact angle of 20° or less</i>	17
<i>Figure 4 — Parapet performance chart for 110 km/h: for mortared parapets of various height, H (mm) (density: 2 200 kg/m³) that contain and direct cars at an impact angle of 20° or less</i>	18
<i>Table 4 — Criteria for unreinforced masonry parapets with mortar joints assessed in accordance with Figure 3 and Figure 4</i>	19
7.4 Assessment of drystone or mortared slate or similar unreinforced masonry parapets	20
<i>Figure 5 — Containment chart, drystone or mortared slate or similar parapets</i>	20
<i>Figure 6 — Drystone construction showing the basis for determining voids percentage</i>	21
7.5 Site-specific levels of containment	22
<i>Figure 7 — Background to the levels of containment</i>	22
<i>Figure 8 — Chart relating divergent width and impact speed of errant vehicle</i>	23
<i>Figure 9 — Chart relating divergent width and impact speed of errant vehicle for a curved layout</i>	24
8 Risk assessment	24

8.1	General	24
8.2	Risk assessment for detached masonry	26
	<i>Table 5 — Risk evaluation – Fatal Accident Rate (FAR) for common activities</i>	26
	<i>Table 6 — Return period nomenclature</i>	27
8.3	Consequence of errant vehicle impact	27
	<i>Figure 10 — Extent of debris spread: definition</i>	28
	<i>Table 7 — Extent of debris spread: values of d</i>	28
8.4	Road over road	29
	<i>Figure 11 — Definition of direct and indirect impacts</i>	29
8.5	Road over rail	30
	<i>Table 8 — Factors for road over rail; incursion risk ranking</i>	30
8.6	Calculated FAR value	30
8.7	FAR risk assessment result	31
9	Maintenance and repair of masonry parapets	31
9.1	Management of masonry parapets	31
9.2	Repair and refurbishment of masonry parapets	31
9.3	Installation of road restraint kerbs	32
Annex A	(normative) ALARP risk assessment	34
	<i>Table A.1 — Modified ease of upgrading factor F_3 for masonry parapets</i>	34
Annex B	(informative) Background to the derivation of the containment charts for unreinforced masonry parapets	35
Annex C	(informative) Site-specific levels of containment	36
	<i>Figure C.1 — Relationship between divergent width and impact speed for impact angle of 20°</i>	37
Annex D	(informative) Calculation of risk	37
	<i>Table D.1 — Environmental factors based on CS 1 [4]</i>	38
	<i>Table D.2 — Derivation of “Score” equivalent for AADT</i>	39
	<i>Figure D.1 — Typical descriptions of road types</i>	40
	<i>Table D.3 — T_0 for different site environmental factors (from Table D.1) and AADT Score (from Table D.2)</i>	40
	<i>Table D.4 — Calculation of total slowing distances (in m) at different road speeds</i>	42
Annex E	(informative) How masonry parapets relate to BS EN 1317-2	43
	<i>Table E.1 — Safety barrier requirements</i>	43
	<i>Table E.2 — Vehicle behaviour requirements</i>	44
	<i>Table E.3 — Impact severity level computed from simulations</i>	44
	Bibliography	45

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

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 May 2022. It was prepared by Subcommittee B/509/1, *Road restraint systems*, under the authority of Technical Committee B/509, *Road equipment*. A list of organizations represented on these committees can be obtained on request to their committee manager.

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.

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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”.

Comments, 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., WELBB, 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/dmrbs/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/dmrbs/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.