

Highway parapets for bridges and other structures —

Part 4: Specification for parapets of reinforced and unreinforced masonry construction

ICS 93.040

Confirmed December 2011

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee B/509, Road equipment, to Subcommittee B/509/1, Road restraint systems, upon which the following bodies were represented:

- Aluminium Federation
- Association of Consulting Engineers
- Association of County Councils
- Association of Safety Fencing Contractors
- British Cement Association
- British In-situ Concrete Paving Association
- British Precast Concrete Federation Ltd
- County Surveyors' Society
- Department of Transport (Highways Agency)
- Institution of Civil Engineers
- Motor Industry Research Association
- National Fencing Training Authority
- Railtrack
- Royal Society for the Prevention of Accidents
- Transport Research Laboratory
- UK Steel Association

This British Standard, having been prepared under the direction of the Sector Committee for Building and Civil Engineering, was published under the authority of the Standards Committee and comes into effect on 15 August 1999

© BSI 24 September 2002

The following BSI references relate to the work on this standard:
Committee reference B/509/1
Draft for comment 97/108800 DC

ISBN 0 580 28291 0

Amendments issued since publication

Amd. No.	Date	Comments
13712	24 September 2002	Revision of Figure 4

Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
Introduction	1
1 Scope	2
2 Normative references	2
3 Terms and definitions	3
4 Symbols	5
5 Designation of masonry vehicle parapets	6
6 Design	6
6.1 Levels of containment	6
6.2 Wind loading	7
6.3 Parapet heights	7
6.4 Front face and top face profile	7
6.5 Pilasters	9
6.6 Reinforced masonry parapets	9
6.7 Unreinforced masonry parapets	14
7 Materials and workmanship	24
7.1 General	24
7.2 Materials	24
Annex A (informative) Risk assessment related to vehicle impacts on unreinforced masonry parapets	26
Annex B (informative) Site specific levels of containment, assessment of existing parapets	30
Annex C (informative) Reinforced masonry parapets — Dimensions and reinforcement of prototype	34
Annex D (informative) Reinforced masonry parapets — Strain in vertical reinforcement	34
Annex E (normative) Determination of the characteristic initial shear strength of masonry	38
Annex F (informative) Background to the derivation of the containment charts for unreinforced masonry parapets	46
Annex G (informative) Movement joints in unreinforced masonry parapets	46
Bibliography	48
Figure 1 — Reinforced masonry parapets, dimensions and profiles	8
Figure 2 — Containment chart, high mortar adhesion	19
Figure 3 — Containment chart, medium mortar adhesion	20
Figure 4 — Containment chart, low mortar adhesion	21
Figure 5 — Containment chart, drystone or mortared slate or similar parapets	22
Figure 6 — Drystone construction showing the basis for determining voids percentage	23
Figure 7 — Curved ends to parapet to prevent end on impact	24
Figure A.1 — Theoretical trajectory of a masonry block	27
Figure B.1 — Impacts with curved parapets	30
Figure B.2 — Relationship between divergent width and impact speed for impact angle of 20° (from TRRL Report No. 801)	31
Figure B.3 — Chart relating divergent width and impact speed of errant vehicle	32

	Page
Figure B.4 — Chart relating divergent width and impact speed of errant vehicle for a curved layout	33
Figure C.1 — High containment bridge parapet	35
Figure C.2 — High containment bridge parapet (reinforcement)	36
Figure D.1 — Strain versus time in vertical reinforcement	37
Figure E.1 — Dimensions of shear test specimen	40
Figure E.2 — Loading of shear test specimen	42
Figure E.3 — Precompression load	43
Figure E.4 — Types of failure	44
Figure E.5 — Shear strength and angle of internal friction	45
Table 1 — Designation of masonry vehicle parapets	6
Table 2 — Equivalent static nominal loads (Q_k) for panel lengths (L) 2.0 m to 3.5 m inclusive	9
Table 3 — Values of γ_f	10
Table 4 — Values of f_{cu} , f_y , f_k and γ_m , ultimate limit state	11
Table 5 — Criteria for unreinforced masonry parapets designed in accordance with Figure 2	16
Table 6 — Criteria for unreinforced masonry parapets designed in accordance with Figure 3	16
Table 7 — Shear transfer at movement joints	18
Table A.1 — Risk evaluation	26
Table E.1 — Dimensions and type of shear test specimens	39
Table G.1 — Suggested spacing of movement joints in unreinforced masonry parapets	47

Foreword

This part of BS 6779 has been prepared under the direction of Subcommittee B/509/1, Road restraint systems.

Other parts already published in the series are:

- *Part 1: Specification for vehicle containment parapets of metal construction;*
- *Part 2: Specification for vehicle containment parapets of concrete construction;*
- *Part 3: Specification for vehicle containment parapets of combined metal and concrete construction.*

Annex A, Annex B, Annex C, Annex D, Annex F and Annex G are informative. Annex E is normative.

This publication does not purport to include all necessary provisions of a contract. Users are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 48, an inside back cover and a back cover.

The BSI copyright notice displayed throughout this document indicates when the document was last issued.

