Design Manual for Roads and Bridges

Highway Structures & Bridges
Design

CD 350
The design of highway structures

(formerly BD 100/16, BA 57/01, BD 57/01, IAN 124/11)

Revision 0

Summary
This document contains requirements, advice and guidance of the Overseeing Organisation for the design of highway structures.

Application by Overseeing Organisations
Any specific requirements for Overseeing Organisations alternative or supplementary to those given in this document are given in National Application Annexes to this document.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Highways England team. The email address for all enquiries and feedback is: Standards_Enquiries@highwaysengland.co.uk

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Contents

Release notes 3

Foreword 4
Publishing information . . . 4
Contractual and legal considerations . . . 4

Introduction 5
Background . . . 5
Assumptions made in the preparation of this document . . . 5

Abbreviations 6

Terms and definitions 7

1. Scope 8
Aspects covered . . . 8
Implementation . . . 8
Use of GG 101 . . . 8

2. Modification design requirements 9

3. General design requirements 10
General . . . 10
Modifications to published documents . . . 11
Other standards with no need for a departure . . . 11

4. Reporting requirements 12

5. Departures 13

6. Execution requirements 14

7. Specific design requirements 15
Traffic loads on bridges . . . 16
Traffic loads on highway structures . . . 16
Heavy load road . . . 17
Bridges which are subjected to an agreement with a third party . . . 18
Design for seismic resistance . . . 18

8. Design for durability 19
Structural continuity . . . 19
Expansion joints . . . 19
Post-tensioning . . . 19
External prestressessing . . . 19
Access . . . 19
Water management . . . 20
Waterproofing . . . 20
Cladding . . . 21

9. Project specific information to be recorded 22

10. Normative references 23

11. Informative references 25

Appendix A. Eurocode clauses for which the published document clause provides a default means of compliance 26

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Appendix B. Project specific information to be recorded **35**
B1 Notes on the specific information to be recorded 35
B2 Tables to record specific information 35

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Release notes

Version	Date	Details of amendments
0	Mar 2020	CD 350 replaces BD 100/16, BA 57/01 and BD 57/01. This full document has been re-written to make it compliant with the new Highways England drafting rules.

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Foreword

Publishing information

This document is published by Highways England.

This document supersedes BD 100/16, BA 57/01, BD 57/01 and IAN 124/11 which are withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

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Introduction

Background

This document gives requirements, advice and guidance of the Overseeing Organisation on the use of Eurocodes for the design of highway structures (including any associated geotechnical works, but not including approach embankments or ground bearing temporary works) and aspects of execution relevant to the design.

Durability is a key issue throughout the design, detailing and construction phases of highway structures. Whilst the control of materials and quality of construction is achieved through standards and procedures, historically the lack of attention to the durability aspect of design has resulted in a premature loss of serviceability in many highway structures. It has been found that the durability of many bridges in the Overseeing Organisations' stock has been limited by decisions made at the design stage in relation to the bridge configuration and the choice of details. These decisions were often limited to a design philosophy in which minimising the initial capital cost was paramount.

This document aims to promote the concept of design for durability, thereby shifting the emphasis to a lowest whole life cost design philosophy. It gives requirements and advice to be used in conjunction with current design standards to improve the durability of highway structures and minimise future maintenance to avoid disruption.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 19.N] apply to this document.

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Abbreviations

Abbreviations

Abbreviation	Definition
AIP	Approval in Principle
BSI	British Standards Institution
CEN	Comité Européen de Normalisation (European Committee for Standardization)
EOTA	European Organisation for Technical Assessment
LM	Load model
NA	National Annex
NDP	Nationally Determined Parameter
PD	BSI Published Document
SV	Special vehicles
TAA	Technical approval authority

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Terms and definitions

Terms

Term	Definition
Application Rules	As defined in BS EN 1990 [Ref 17.N]
Approval In Principle	As defined in CG 300 [Ref 23.N]
Category	As defined in CG 300 [Ref 23.N]
Departure from standard	Criterion, which departs from, or is an aspect not covered by, the standards contained in the Technical Approval Schedule, the DMRB or project specific requirements
Designer record	Used to record decisions that affect the design of the permanent works
Eurocodes	As defined in BS EN 1990 [Ref 17.N]
European Assessment Document	A harmonised technical specification for construction products developed by the European Organisation for Technical Assessment (EOTA) for cases where a product is not fully covered by harmonised European standards. European Assessment Documents are the basis for issuing European Technical Assessments
Execution	As defined in BS EN 1990 [Ref 17.N]
Harmonised standard	A European standard developed by a recognised European Standards Organisation: CEN, CENELEC, or ETSI and has been cited in the Official Journal of the European Union. Manufacturers, other economic operators, or conformity assessment bodies can use harmonised standards to demonstrate that products, services, or processes comply with relevant EU legislation.
National Annex	As defined in BS EN 1990 [Ref 17.N]
Nationally Determined Parameter	As defined in BS EN 1990 [Ref 17.N]
Principles	As defined in BS EN 1990 [Ref 17.N]
Published Documents	For the purpose of this document, Published Documents contain Non-Contradictory Complementary Information (NCCI) to assist in the application of Eurocode Principles.
Technical Approval Authority	As defined in CG 300 [Ref 23.N]
Third party	Any person, organisation or other legal identity that is not employed directly or indirectly by the Overseeing Organisation

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1. Scope

Aspects covered

1.1 The requirements set out in this document shall be adopted for the design of highway structures in concrete, steel and composite concrete steel, masonry, timber and aluminium.

Implementation

1.2 This document shall be implemented forthwith on all schemes involving the design of concrete, steel and concrete composite, steel, masonry, timber and aluminium structures on the Overseeing Organisations' motorway and all-purpose trunk roads according to the implementation requirements of GG 101 [Ref 19.N].

Use of GG 101

1.3 The requirements contained in GG 101 [Ref 19.N]] shall be followed in respect of activities covered by this document.

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2. Modification design requirements

2.1 Eurocodes shall be used as the basis for the design of the following modification works:

1) strengthening or upgrading works design;
2) structural element replacement design;
3) component replacement design in conjunction with the relevant Harmonised Standards (hEN) or European Assessment Documents (EAD) for the component;
4) other modification design.

2.2 Where strengthening or modification of the existing structure involves deriving the resistance, serviceability performance or durability of a section that comprises both new and existing materials acting together, a statement shall be made in the Approval in Principle (AIP) to justify the use of Eurocodes.

2.3 The statement made in the AIP justifying the use of Eurocodes shall take into account the properties of the existing materials and workmanship compared to those required by the relevant European Standards upon which the relevant Eurocodes depend.

2.4 Where modification is outside the scope of Eurocodes yet the use of Eurocodes is proposed, this shall be justified in the AIP.

2.4.1 Where it is not possible to demonstrate the adequacy of a structural element using Eurocodes, assessment standards may be used to re-examine particular elements/load effects for which failure is determined.

2.5 Assessment standards shall not be used for any new element design.

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3. General design requirements

General

3.1 Where particular clauses within the DMRB documents are in conflict with the Eurocodes, harmonised standards or European Assessment Documents (EAD), these clauses shall not be used.

3.1.1 Conflicting DMRB clauses should be reported to the Overseeing Organisation.

3.2 For structures not fully covered by the Eurocode Application Rules, additional design rules including values of partial factors, combination factors and values and configurations of actions shall be determined for the individual project, in accordance with the relevant Principles given in BS EN 1990 [Ref 17.N].

NOTE *Structures not fully covered by the application rules in the Eurocodes can include special types of structures such as moveable bridges or bridges carrying both road and rail/light rail traffic.*

3.2.1 Eurocodes may be applied, with agreement from the Overseeing Organisation and recorded in the AIP, to the design of structures where materials used and/or the actions applied are outside the scope of Eurocodes.

3.3 Where Eurocodes are used, information listed in Appendix A relating to the individual project, options and choice of method adopted shall be recorded for Categories 2 and 3 structures.

3.4 Where supplementary guidance or advice that is non contradictory and complementary to Eurocodes from recognised sources and publications from professional institutions is used, this shall be referenced in the AIP.

3.5 Clauses in the Published Documents (PD) listed in Appendix A shall be deemed to comply with Eurocode principles and application rules unless covered by the exceptions in clauses 3.6 and 3.7.

NOTE *The PD clauses listed in Appendix A provide a default means of compliance with Eurocodes clauses including situations which the Eurocode provisions are not considered to fully cover.*

3.5.1 Alternative methods of complying with Eurocode clauses may be permitted.

3.5.2 PD documents which may be referenced for highway structure design include:

1) PD 6688-1-1 [Ref 15.I] Recommendations for the design of structures to BS EN 1991-1-1;
2) PD 6688-1-4 [Ref 1.I] Background paper to the UK National Annex to BS EN 1991-1-4;
3) PD 6688-1-7 [Ref 16.I] Recommendations for the design of structures to BS EN 1991-1-7;
4) PD 6688-2 [Ref 17.I] Recommendations for the design of structures to BS EN 1991-2;
5) PD 6687-1 [Ref 3.I] Background paper to the UK National Annexes to BS EN 1992-1 and BS EN 1992-3;
6) PD 6687-2 [Ref 18.I] Recommendations for the design of structures to BS EN 1992-2:2005;
7) PD 6695-1-9 [Ref 20.I] Recommendations for the design of structures to BS EN 1993-1-9;
8) PD 6695-1-10 [Ref 19.I] Recommendations for the design of structures to BS EN 1993-1-10;
9) PD 6695-2 [Ref 12.I] Recommendation for the design of bridges to BS EN 1993;
10) PD 6696-2 [Ref 2.I]PD 6696-2 Background paper to BS EN 1994-2 and the UK National Annex to BS EN 1994-2;
11) PD 6694-1 [Ref 13.I]Recommendations for the design of structures subject to traffic loading to BS EN 1997-1:2004;
12) PD 6698 [Ref 14.I] Recommendations for the design of structures for earthquake resistance to BS EN 1998;
13) PD 6703 [Ref 23.I] Structural bearings – Guidance on the use of structural bearings;
14) PD 6705-2 [Ref 21.I] Recommendations for the execution of steel bridges to BS EN 1090-2;
15) PD 6705-3 [Ref 22.I] Recommendations on the execution of aluminium structures to BS EN 1090-3;

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16) PD 6702-1 [Ref 24.I] Structural use of aluminium. Recommendations for the design of aluminium structures to BS EN 1999.

Modifications to published documents

3.6 Types of reinforcement other than those covered in BS EN 1992-1-1 [Ref 7.N] shall not be used.

NOTE *The use of clause 2.5 of PD 6687-1 [Ref 3.I], Background paper to the UK national annex to BS EN 1992-1 is not permitted.*

3.7 For lightweight road structures, the restraint on the deck of a foot/cycle track bridge shall be designed for the action of the vehicle collision forces locally but need not be designed globally provided the required minimum headroom is achieved.

NOTE 1 *The use of the first sentence of clause 2.5.2 of PD 6688-1-7 [Ref 16.I] Recommendations for the design of structures to BS EN 1991-1-7 is not permitted.*

NOTE 2 *The second sentence of clause 2.5. of PD 6688-1-7 [Ref 16.I] requiring restraint on the deck of foot/cycle track bridges to prevent the deck being removed from the support under the action of the vehicle collision forces given in NA to BS EN 1991-1-7 [Ref 24.N] remains extant.*

Other standards with no need for a departure

3.8 Standards used in the design of a structure shall be recorded as per the requirements of CG 300 [Ref 23.N].

3.8.1 Annex D of BS EN 15050 [Ref 11.I] may be used in the design.

NOTE *This Annex relates to bridge deck continuity at supports for decks constructed using precast concrete elements and offers a simplified approach to dealing with redistribution effects due to creep and shrinkage at the connection.*

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4. Reporting requirements

4.1 Where a design is produced contrary to the recommendations given in a Published Document (PD), this information shall be recorded in the AIP (or AIP addendum) for Category 2 and 3 structures.

4.2 For Category 2 and 3 structures, the use of the following clauses shall be proposed in the AIP or AIP addendum:

1) PD 6687-1 [Ref 3.I], clause 2.22;
2) PD 6687-2 [Ref 18.I] clauses 7.6.3 (limiting stress ranges in Tables 2A and 2B), 8.2.2, 8.2.3 (use of guidance provided in CIRIA C660 [Ref 8.I]), 9.1 and 10.1.

4.2.1 CIRIA C766 [Ref 2.N] may be used instead of CIRIA C660 [Ref 8.I] to calculate crack widths due to early age restraint of imposed deformation.

NOTE *CIRIA C660 [Ref 8.I] has been replaced by CIRIA C766 [Ref 2.N]. PD 6687-2 [Ref 18.I] does not reflect this change.*

4.3 Where structural elements are proposed to be designed to a higher or lower consequence class than for the whole structure, this shall be proposed in the AIP or AIP addendum.

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5. Departures

5.1 Applications for departure from Eurocodes (BS EN) and UK National annexes (UKNA) shall not be permitted except as follows:

1) there is adverse safety implication in the application of BS EN and/or UKNA in the design;
2) error in the BS EN and/or UKNA has been identified and it is being considered by BSI or CEN for an amendment or corrigendum;
3) aspects not covered by BS EN or UKNA;
4) application to use Eurocodes for the assessment of an existing structure.

5.1.1 Where there is adverse safety implication in the application of BS EN and/or UKNA in the design, BSI should be notified without delay.

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6. Execution requirements

6.1 Where Eurocodes are used for the design of highway structures, their execution shall be in accordance with the relevant execution standards and parts of the Specification for Highway Works (SHW [Ref 20.N]).

6.1.1 Where the publication of revised sections of the SHW [Ref 20.N] (Manual of Contract Documents for Highway Works Volume 1) incorporating the requirements of the execution standards referred to above are pending, departures from standards should be sought for the use of project specific specifications incorporating these standards.

6.1.2 For concrete and steelwork the Execution Class should be in accordance with Series 1700 of the Manual of Contract documents for Highway Works (MCHW Series 1700 [Ref 21.N]) and PD 6705-2:2010 (PD 6705-2 [Ref 21.I]) respectively.

6.1.3 For steelwork the quantified service category should be in accordance with PD 6705-2:2010 PD 6705-2 [Ref 21.I]).

6.1.4 The Consequence Classes given in this document should be used.

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7. Specific design requirements

7.1 The required design working life shall be defined for the individual structure in accordance with the requirements for the technical approval of highway structures and design working life category classifications given in Table 7.1.

Table 7.1 Design working life

Design working life category 1 (temporary structures, typically 10 years design working life)	
Temporary structures (1)	
Design working life category 2 (replaceable structure parts, typically 50 years design working life)	
Expansion joints	Waterproofing systems
Safety barriers	Parapets
Design working life category 3 (Short term structures, typically 50 years design working life)	
Lighting columns	Environmental barriers
CCTV masts, High mast lighting	Sign and signal gantries
Columns for traffic signs/signals	Bridge gantries, access systems
M&E installations	
Design working life category 4 (typically 51-120 years design working life)	
No examples given	
Design working life category 5 (typically >120 years design working life)	
Bridges	Retaining walls
Tunnels	Buried structures
Bridge bearings(2)	
(1) Structures or parts of structures that can be dismantled with a view to being re-used are not be considered as temporary. (2) The design working life of bridge bearings can be reduced to 50 years subject to agreement with the Technical approval authority (TAA)	

7.1.1 Unless defined in other standards or project specific requirements, the design working life of a highway structure should be determined, taking into account:

1) functional requirement;
2) safety;
3) consequence;
4) traffic disruption;
5) durability;
6) sustainability;
7) financial; and
8) practical feasibility if it were to be replaced in the future.

7.1.2 Alternative values of design working life may be determined with the agreement of the TAA.

7.2 Requirements for Reliability Classes, the corresponding Design Supervision Levels and Inspection Levels for highways structures shall be as given in Table 7.2 based on the corresponding structure category.

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Table 7.2 Categories and Reliability Classes

				Comments
Whole structure category as defined in CG 300 [Ref 23.N] BS EN 1990 [Ref 17.N] PD 6705-3 [Ref 22.I]	0	1 and 2	3	
Consequence class BS EN 1990 [Ref 17.N] Table B1 (i) for the whole structure (ii) for structural elements / components and details	CC1 Project specific	CC2 Project specific	CC3 Project specific	Structure elements can be designated a higher or lower consequence class than for the whole structure.
Reliability class BS EN 1990 [Ref 17.N] Table B2	RC1	RC2	RC3	For whole structure
Design supervision level BS EN 1990 [Ref 17.N] Table B4	DSL1	DSL2	DSL3	For the whole structure.
Inspection Level during execution BS EN 1990 [Ref 17.N] Table B5	IL1 or IL2	IL2	IL2 or IL3	For whole structure or parts of structure
Inspection level during execution for individual projects	project specific	project specific	project specific	To be recorded in the contract documents

NOTE *Details on Consequence Class, Reliability Classes, Design supervision levels, and Inspection levels are in BS EN 1990 [Ref 17.N] Annex B, and NA to BS EN 1990 [Ref 16.N].*

7.3 As reliability differentiation is achieved by varying the design supervision and execution inspection levels, K_{FI} shall be taken as 1.0.

NOTE *Table B3 of BS EN 1990 [Ref 17.N] is not used for achieving reliability differentiation.*

7.3.1 Inspection levels should be linked to the quality management class given in the relevant execution standards and implemented through appropriate quality management measures.

NOTE *IL3 - Third party inspection: Inspection performed by an organisation different from that which has executed the works. (Note: Differs from Third Party as defined in the Terms and Definitions of this document).*

7.3.2 Higher or lower classes and/or levels than those given in Table 7.2 may be used subject to agreement with the TAA.

Traffic loads on bridges

Traffic loads on highway structures

7.4 Highway structures that carry traffic loads shall be designed for BS EN 1991-2 [Ref 4.N] load models (LM) LM1, LM2 and, if appropriate for pedestrians, LM4.

7.5 Highway structures that carry motorway and all-purpose trunk road traffic shall also be designed for all the special vehicles (SV) models given in LM3 as defined in the UKNA to BS EN 1991-2 [Ref 4.N].

7.6 The SV models to be used in the design shall be agreed with the TAA for the individual structure.

7.6.1 Bridges carrying motorways and all-purpose trunk roads should be designed using SV80, SV100 and SV196.

7.6.2 The recommendations given in Table 7.6.2 should be used for bridges over motorways and all-purpose trunk roads.

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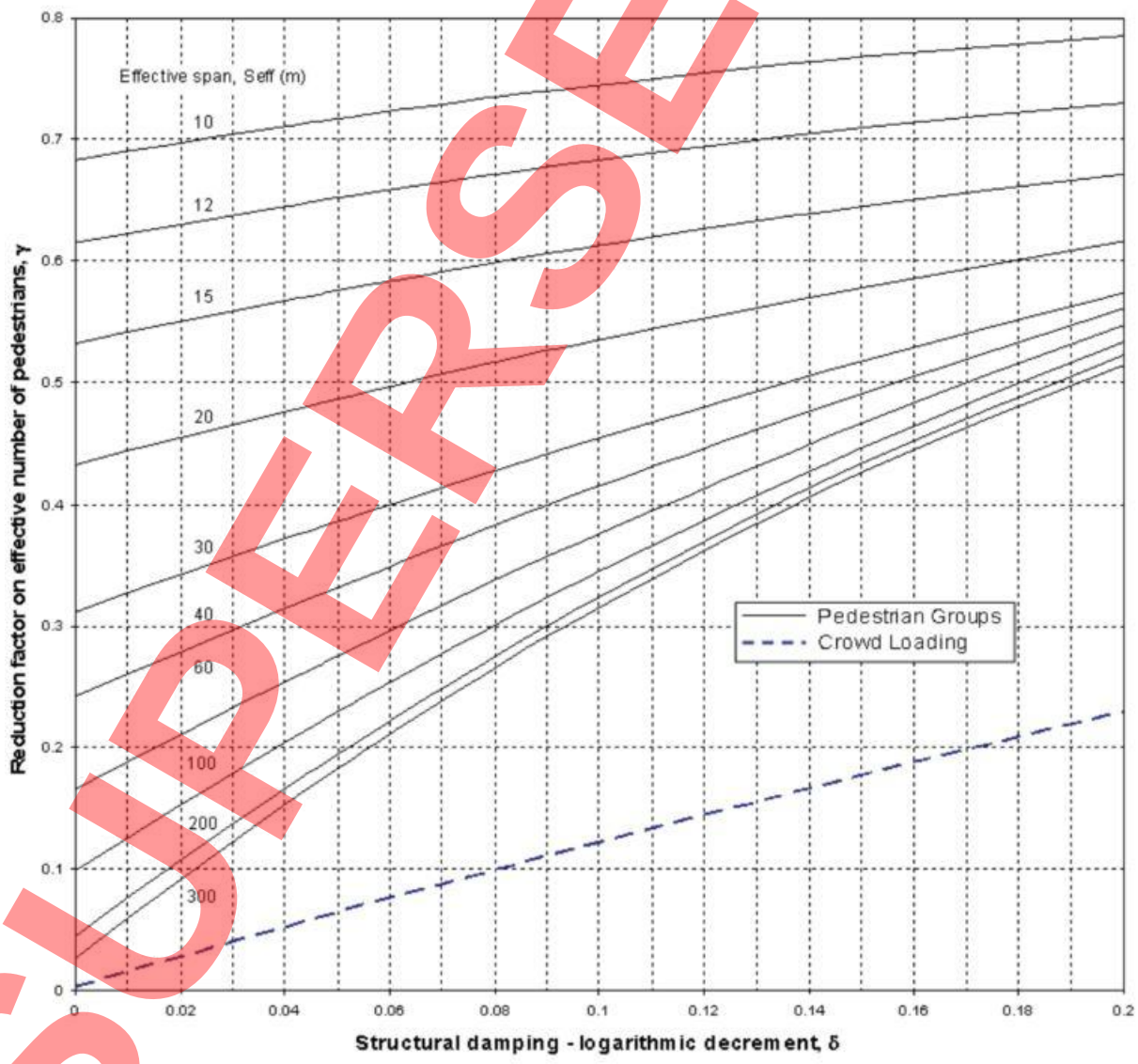
Table 7.6.2 SV models to be used in the design

Class or road carried by highway structure	SV models
Motorway and all-purpose trunk roads Principal road extensions of trunk roads	SV80, SV100, SV196
Principal roads as agreed by TAA	SV80, SV100
Other Public roads as agreed by TAA	SV80

7.7 Figure NA.9 in the UK NA to BS EN 1991-2 [Ref 25.N] published 2008 shall not to be used.

7.7.1 Figure 7.7.1 should be used instead.

Figure 7.7.1 NA.9 Reduction factor, γ, to allow for the unsynchronized combination of pedestrian actions within groups and crowds



7.7.2 Figure 7.7.1 may be used without a departure from standard.

Heavy load road

7.8 Where a highway structure carries traffic on a route designated as a heavy load route, the structure

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shall be designed for the appropriate SOV models as defined in the UK NA to BS EN 1991-2 [Ref 4.N] and/or specific individual vehicles as required.

7.9 The appropriate SOV model shall be agreed with the TAA .

Bridges which are subjected to an agreement with a third party

7.10 Accommodation bridges shall be designed for BS EN 1991-2 [Ref 4.N] load models LM1 and LM2 and, if appropriate for pedestrians, LM4.

7.11 Where the provision of a structure is the subject of an agreement with a third party, then the third party shall notify the Overseeing Organisation of the traffic loading the structure is able to carry.

7.12 The notification of the traffic loading on the structure shall be done before any agreement is concluded between the Overseeing Organisation and the third party.

Design for seismic resistance

7.13 Structures shall be designed to resist seismic loads in accordance with BS EN 1998-2 [Ref 15.N] where applicable.

Table 7.13 Importance classes of highway structures

				Comments
Structure category	0 and 1	2	3	CC is assumed to correspond to structure categories as shown
Consequence Class BS EN 1990 [Ref 17.N]	CC1	CC2	CC3	For whole structure
Importance Class BS EN 1998-2 [Ref 15.N] clause 2.1(4) P Note	IC I	IC II	IC II or IC III as agreed by TAA	

7.13.1 The provisions of EN1998 should not apply unless otherwise agreed by the TAA.

NOTE *As the whole of the UK is considered to be an area of very low seismicity, the provisions of BS EN 1998 [Ref 18.N] need not apply unless otherwise agreed by the TAA.*

7.13.2 Any specific seismic requirements should be evaluated for the individual structure. (See PD 6688-2 [Ref 17.I] and Table 7.13 for further information.)

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8. Design for durability

Structural continuity

8.1 All bridges shall be designed as continuous over intermediate supports unless special circumstances exist as agreed with the Overseeing Organisation.

8.1.1 Continuity may be either full continuity of the whole deck structure or partial continuity of the deck slab alone.

8.2 All bridges with a skew angle up to 30 degrees or 60m length or less shall be designed as integral bridge structures.

8.2.1 Bridges with a skew angle greater than 30 degrees or lengths greater than 60m may be designed as integral structures.

8.3 Hinges in concrete structures shall not be used.

8.4 Half joints shall not be used in structures.

NOTE *Further guidance about structural continuity can be found in CIRIA C543 [Ref 5.I].*

Expansion joints

8.5 Structures with expansion joints shall include measures for water management as per CD 357 [Ref 1.N] and CG 300 [Ref 23.N].

Post-tensioning

8.6 Precast segmental post-tensioned concrete structures with an internal grouted system shall not be used.

8.6.1 Precast segmental structures incorporating continuous external post-tensioned duct systems, and precast non-segmental construction with either external or internal continuous duct systems, may be designed providing that post-tensioned structures using external systems or unbonded tendons are detailed such that inspection of all individual tendons and their eventual replacement is possible without restricting traffic.

External prestressessing

8.7 All external and unbonded tendons shall be replaceable without having to restrict traffic on the highway.

8.8 Provision shall be made for the inspection and maintenance of external tendons.

Access

8.9 Access shall be provided for the following purposes:

1) all maintenance activities, including cleaning and painting, routine maintenance, jacking, removal or replacement of bearings;
2) inspection of closed cell and box members.

8.9.1 Access should be provided from below deck level to avoid access from the upper surfaces of bridge decks.

8.9.2 Galleries should be provided below abutment deck joints.

8.9.3 Galleries should be provided with at least two points of access/egress.

8.10 Access facilities provided for inspection and maintenance shall be secure, preventing access by unauthorised personal.

8.11 Access openings shall be watertight.

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8.12 Water and debris shall not be permitted to accumulate on or around openings.

8.13 Ventilation shall be provided to all accessible closed cell or box sections.

8.13.1 Ventilation provisions should be detailed to prevent them acting as a conduit for water ingress.

8.14 Water shall not accumulate in closed cell and box sections.

8.14.1 Where provided, drainage holes should permit inspection access using endoscopic type equipment.

8.14.2 In closed sections where access for inspection is provided, provision for artificial lighting should be made.

NOTE 1 *Access points can be at each end of the structure at points that are safe and easily accessible and do not require traffic control. Means of access can include gantries, walkways, scaffolding ladders, rails or aerial work platform.*

NOTE 2 *Additional information on access for maintenance and repair is given in CIRIA C686 [Ref 6.I].*

Water management

8.15 Surface water shall be removed from decks through appropriate water management plans.

8.15.1 Drainage systems in structures should:

1) include sub-surface drains;
2) minimise blockage and the requirement for cleaning;
3) minimise traffic management during cleaning operations;
4) be sufficiently robust to withstand damage during cleaning;
5) be resistant to all commonly occurring chemical spillage;
6) include facilities for rodding and other necessary maintenance for closed systems;
7) restrict surface water from falling freely from bridge decks;
8) include drainage provision for service bays;
9) include drainage provision for voids;
10) include sealed access hatches or manhole covers for box members to prevent leakage into the box.

8.16 Drainage details integral with the structure shall not be used.

8.17 Downpipes cast into piers shall not be used.

8.18 Drainage water from bridge decks shall not be discharged into the drainage layers in the vicinity of piers and behind abutments.

8.18.1 All gullies should be fully trapped.

8.18.2 Water from the approaches to structures should be prevented from entering the structure.

8.19 Ventilation and drainage holes shall be provided to reduce condensation and eliminate any ponding inside the box as a result of a possible ingress of water.

8.19.1 Ventilation and drainage holes should be detailed to prevent access and colonisation by birds and animals.

NOTE *By far the most serious source of damage is salty water leaking through joints in the deck or service ducts, and poor, faulty or badly maintained drainage systems. Of crucial importance is the provision of a positive, well designed, detailed and constructed drainage system for managing water from the deck and into a drainage system.*

Waterproofing

8.20 The deck shall be provided with a waterproofing system according to CD 358 [Ref 26.N].

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8.21 Abutment galleries and service bays shall have all exposed concrete surfaces waterproofed.

8.22 The following concrete surfaces shall be waterproofed:

1) vertical faces at deck ends and abutment curtain walls;
2) top faces of piers and abutment bearing shelves;
3) inaccessible areas which can be subject to leakage, for instance beam ends;
4) buried concrete surfaces.

NOTE *The most important properties of an effective waterproofing system are its waterproofing ability and its bond to the deck. If bonding is effective over the whole deck area, then any local lack of watertightness in the waterproofing layer is incapable of causing significant damage to the deck.*

Cladding

8.23 Where external cladding is used the fixings for the cladding shall use corrosion resistant materials.

8.23.1 Detailing of cladding systems should allow easy removal for the purpose of principal inspection of the structure, or for maintenance work.

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9. Project specific information to be recorded

9.1 The tables in Appendix B list the clauses in Eurocodes where project specific information shall be defined and where these should be recorded.

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10. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. CD 357, 'Bridge expansion joints'
Ref 2.N	Construction Industry Research and Information Association. CIRIA C766, 'Control of cracking caused by restrained deformation in concrete'
Ref 3.N	BSI. BS EN 1991-1-1, 'Eurocode 1 - Actions on Structures - Part 1-1: General actions- Densities, self weight, imposed loads for buildings'
Ref 4.N	BSI. BS EN 1991-2, 'Eurocode 1. Actions on structures. Traffic loads on bridges'
Ref 5.N	BSI. BS EN 1991-1-3, 'Eurocode 1: Actions on structures. General actions - Snow loads'
Ref 6.N	BSI. BS EN 1991-1-5, 'Eurocode 1: Actions on structures. Part 1-5: General actions – Thermal actions'
Ref 7.N	BSI. BS EN 1992-1-1, 'Eurocode 2: Design of concrete structures. General rules and rules for buildings'
Ref 8.N	BSI. BS EN 1993-1-8, 'Eurocode 3 Design of steel structures. Design of Joints.'
Ref 9.N	BSI. BS EN 1993-1-1, 'Eurocode 3. 'Design of steel structures. General rules and rules for buildings'
Ref 10.N	BSI. BS EN 1993-2, 'Eurocode 3. Design of steel structures Part 2: Steel bridges'
Ref 11.N	BSI. BS EN 1993-1-9, 'Eurocode 3. Design of steel structures. Fatigue.'
Ref 12.N	BSI. BS EN 1993-1-10, 'Eurocode 3: Design of steel structures - Part 1-10:Material toughness and through-thickness properties'
Ref 13.N	BSI. BS EN 1993-1-11, 'Eurocode 3: Design of steel structures - Part 1-11: Design of structures with tension components'
Ref 14.N	BSI. BS EN 1993-1-5, 'Eurocode 3: Design of steel structures - Part 1-5: Plated structural elements'
Ref 15.N	BSI. BS EN 1998-2, 'Eurocode 8. Design of structures for earthquake resistance - Part 2: Bridges'
Ref 16.N	BSI. NA to BS EN 1990, 'Eurocode: Basis of structural design'
Ref 17.N	BSI. BS EN 1990, 'Eurocode: Basis of structural design'
Ref 18.N	BSI. BS EN 1998 , 'Eurocode 8: Design of structures for earthquake resistance'
Ref 19.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 20.N	Highways England. SHW, 'Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works'
Ref 21.N	Highways England. MCHW Series 1700, 'Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works - Series 1700 Structural Concrete'
Ref 22.N	Highways England. CD 377, 'Requirements for road restraint systems'
Ref 23.N	Highways England. CG 300, 'Technical approval of highway structures'
Ref 24.N	BSI. NA to BS EN 1991-1-7, 'UK National Annex to Eurocode 1 - Actions on structures - Part 1-7 General actions - Accidental actions'

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Ref 25.N	BSI. NA to BS EN 1991-2, 'UK National Annex to Eurocode 1: Actions on structures – Part 2: Traffic loads on bridges'
Ref 26.N	Highways England. CD 358, 'Waterproofing and surfacing of concrete bridge decks'

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11. Informative references

The following documents are informative references for this document and provide supporting information.

Ref 1.I	BSI. PD 6688-1-4, 'Background information to the National Annex to BS EN 1991-1-4 and additional guidance'
Ref 2.I	BSI. PD 6696-2, 'Background paper to BS EN 1994-2 and the UK National Annex to BS EN 1994-2'
Ref 3.I	BSI. PD 6687-1, 'Background paper to the UK National Annexes to BS EN 1992-1 and BS EN 1992-3'
Ref 4.I	Thomas Telford Ltd. Denton S and Gulvanessian H. Denton & Gulvanessian, 'Bride Design to Eurocodes - Understanding Key Concepts of EN1990'
Ref 5.I	CIRIA. Soubry, MA. CIRIA C543, 'Bridge detailing guide'
Ref 6.I	CIRIA. J Iddon, J Carpenter. CIRIA C686, 'C686 Safe access for maintenance and repair'
Ref 7.I	Highways England. CD 356, 'Design of highway structures for hydraulic action'
Ref 8.I	Construction Industry Research and Information Association. CIRIA C660, 'Early-age thermal crack control in concrete'
Ref 9.I	BSI. BS EN 1991-1-7, 'Eurocode 1 - Actions on structures - Part 1-7 General actions - Accidental actions'
Ref 10.I	BSI. BS EN 1991-1-4, 'Eurocode 1: Actions on structures. Part 1-4: General actions – Wind actions'
Ref 11.I	BSI. BS EN 15050, 'Precast concrete products. Bridge elements.'
Ref 12.I	BSI. PD 6695-2, 'Recommendation for the design of bridges to BS EN 1993'
Ref 13.I	BSI. PD 6694-1, 'Recommendations for the design of structures subject to traffic loading to BS EN 1997-1:2004'
Ref 14.I	BSI. PD 6698, 'Recommendations for the design of structures for earthquake resistance to BS EN 1998'
Ref 15.I	BSI. PD 6688-1-1, 'Recommendations for the design of structures to BS EN 1991-1-1'
Ref 16.I	BSI. PD 6688-1-7, 'Recommendations for the design of structures to BS EN 1991-1-7'
Ref 17.I	BSI. PD 6688-2, 'Recommendations for the design of structures to BS EN 1991-2'
Ref 18.I	BSI. PD 6687-2, 'Recommendations for the design of structures to BS EN 1992-2:2005'
Ref 19.I	BSI. PD 6695-1-10, 'Recommendations for the design of structures to BS EN 1993-1-10'
Ref 20.I	BSI. PD 6695-1-9, 'Recommendations for the design of structures to BS EN 1993-1-9'
Ref 21.I	BSI. PD 6705-2, 'Recommendations for the execution of steel bridges to BS EN 1090-2'
Ref 22.I	BSI. PD 6705-3, 'Recommendations on the execution of aluminium structures to BS EN 1090-3'
Ref 23.I	BSI. PD 6703 , 'Structural bearings – Guidance on the use of structural bearings'
Ref 24.I	BSI. PD 6702-1, 'Structural use of aluminium. Recommendations for the design of aluminium structures to BS EN 1999'

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Appendix A. Eurocode clauses for which the published document clause provides a default means of compliance

These clauses are applicable for the design of concrete, steel and composite steel and concrete highway structures.

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Table A.1 published document clauses providing default compliance with the Eurocodes

Published document	Published document clause number	Eurocode and clause for which the published document clause provides a default means of compliance
PD 6688-1-1: Background paper to the UK National Annex to BS EN 1991-1-1 PD 6688-1-1 [Ref 15.I]	None.	
PD 6688-1-4:2009 Background paper to the UK National Annex to BS EN 1991-1-4 PD 6688-1-4 [Ref 1.I]	Annex A excluding clauses A.1.5.2 and A.1.5.3.	BS EN 1991-1-4 [Ref 10.I] Annex E
PD 6688-1-7:2009 Recommendations for the design of structures to BS EN 1991-1-7 PD 6688-1-7 [Ref 16.I]	cl. 2.5	BS EN 1991-1-7 [Ref 9.I] cl. 4.1 (1) Note 1
	cl. 2.6	BS EN 1991-1-7 [Ref 9.I] cl. 4.1 (1) Note 3
	cl. 2.7	BS EN 1991-1-7 [Ref 9.I] cl. 4.3.1 (1) Note 1
PD 6688-2:2011 Recommendations for the design of structures to BS EN 1991-2 PD 6688-2 [Ref 17.I]	cl. 3.13.1 last sentence of the fourth paragraph and fifth paragraph	
	cl. 3.13.2 last sentence of the fifth paragraph and sixth paragraph	
	cl. 3.20	
PD 6687-1:2010: Background paper to the UK National Annexes to BS EN 1992-1 and BS EN 1992-3 PD 6687-1 [Ref 3.I]	None.	

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Table A.1 published document clauses providing default compliance with the Eurocodes (continued)

Published document	Published document clause number	Eurocode and clause for which the published document clause provides a default means of compliance
PD 6687-2:2008 Recommendations for the design of structures to BS EN 1992-2:2005 PD 6687-2 [Ref 18.I]	cl. 3.2	BS EN 1992-1-1 [Ref 7.N] cl. 2.4.2.4 (3) and Annex A
	cl. 5.1	BS EN 1992-1-1 [Ref 7.N] cl. 4.3
	cl. 6.4	BS EN 1992-1-1 [Ref 7.N] cl. 5.5
	cl. 6.6 (fourth and fifth paragraphs)	BS EN 1992-1-1 [Ref 7.N] cl. 5.6.3
	cl. 7.2.4.4	BS EN 1992-1-1 [Ref 7.N] cl. 6.2.3 (107)
	cl. 7.2.4.5	BS EN 1992-1-1 [Ref 7.N] cl. 6.2.3 (109)
	cl. 7.2.5 (first paragraph)	BS EN 1992-1-1 [Ref 7.N] cl. 6.2.4
	cl. 7.2.6	BS EN 1992-1-1 [Ref 7.N] cl. 6.2.5
	cl. 9.2	BS EN 1992-1-1 [Ref 7.N] cl. 8.10.1.3
	cl. 9.4	BS EN 1992-1-1 [Ref 7.N] cl. 8.10.5
	cl. 10.2	BS EN 1992-1-1 [Ref 7.N] cls. 9.2.1.2 (3) and 9.5.3 (6)
	cl. 10.5	Voided slabs
	cl. 12	Additional rules for external prestressing [A1]

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Table A.1 published document clauses providing default compliance with the Eurocodes (continued)

Published document	Published document clause number	Eurocode and clause for which the published document clause provides a default means of compliance
PD 6695-1-9:2008 Recommendations for the design of structures to BS EN 1993-1-9 PD 6695-1-9 [Ref 20.l]	cl. 2.3	BS EN 1993-1-9 [Ref 11.N] cl. 1.1 (2)
	cl. 2.4 (third paragraph)	BS EN 1993-1-9 [Ref 11.N] cl. 1.1 (2)
	cl. 3	BS EN 1993-1-9 [Ref 11.N] cl. 2 (2)
	cl. 5.3 [A2]	BS EN 1993-1-9 [Ref 11.N] cl. 3 (1)
	cl. 6.2	BS EN 1993-1-9 [Ref 11.N] cls. 5 & 6
	cl. 6.3.1	BS EN 1993-1-9 [Ref 11.N] cls. 5 & 6
	cl. 6.3.2	BS EN 1993-1-9 [Ref 11.N] cls. 5 & 6
	cl. 6.3.3.1 [A3]	BS EN 1993-1-9 [Ref 11.N] cls. 5 & 6
	cl. 6.3.3.2	BS EN 1993-1-9 [Ref 11.N] cls. 5 & 6
	cl. 6.3.3.3	BS EN 1993-1-9 [Ref 11.N] cls. 5 & 6
	cl. 6.3.4	BS EN 1993-1-9 [Ref 11.N] cls. 5 & 6
	cl. 8.2.1	BS EN 1993-1-9 [Ref 11.N] Annex A
	cl. 8.2.2	BS EN 1993-1-9 [Ref 11.N] Annex A
	cl. 8.2.3	BS EN 1993-1-9 [Ref 11.N] cl. A.1, A.2, A.3 & A.4
PD 6695-1-10:2009 Recommendations for the design of structures to BS EN 1993-1-10 PD 6695-1-10 [Ref 19.l]	cl.3.2	BS EN 1993-1-10 [Ref 12.N] cl.3

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Table A.1 published document clauses providing default compliance with the Eurocodes (continued)

Published document	Published document clause number	Eurocode and clause for which the published document clause provides a default means of compliance
PD 6695-2:2008 Recommendation for the design of bridges to BS EN 1993 PD 6695-2 [Ref 12.I]	cl. 4.2	BS EN 1993-2 [Ref 10.N] cl. 5.1.2
	cl. 4.3	BS EN 1993-1-8 [Ref 8.N] cls. 2.7 & 5 BS EN 1993-2 [Ref 10.N] Annex D
	cl. 4.4	BS EN 1993-1-8 [Ref 8.N] cl. 3.4.1 BS EN 1993-2 [Ref 10.N] cl. 5.2
	cl. 4.5	BS EN 1993-1-8 [Ref 8.N] cl. 5 BS EN 1993-2 [Ref 10.N] cls. 5.3 & 6.3.4.2
	cl. 5	BS EN 1993-2 [Ref 10.N] cls. 6.3.2.2, 6.3.2.3 & 6.3.4
	cl. 6.2	BS EN 1993-2 [Ref 10.N] cls. 6.3.2.2, 6.3.2.3 & 6.3.4
	cl. 6.3	BS EN 1993-2 [Ref 10.N] cls. 6.3.4.2 & Annex D
	cl. 7.2	BS EN 1993-2 [Ref 10.N] cls. 6.3.2.2, 6.3.2.3 & 6.3.4
	cl. 8.2	BS EN 1993-2 [Ref 10.N] cls. 6.3.2.2, 6.3.2.3 & 6.3.4

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Table A.1 published document clauses providing default compliance with the Eurocodes (continued)

Published document	Published document clause number	Eurocode and clause for which the published document clause provides a default means of compliance
PD 6695-2:2008 Recommendation for the design of bridges to BS EN 1993 PD 6695-2 [Ref 12.I]	cl. 8.3	Note A4
	cl. 8.4	BS EN 1993-2 [Ref 10.N] cls. 6.3.4 & Annex D
	cl. 8.5	Note A4
	cl. 9	BS EN 1993-2 [Ref 10.N] cl. 6.3.4.2
	cl. 10 A5	BS EN 1993-2 [Ref 10.N] cl. 5.3.3 BS EN 1993-1-8 [Ref 8.N] cl. 5
	cl. 11	BS EN 1993-2 [Ref 10.N] cl. 6.3.4.2
	cl. 12	BS EN 1993-1-5 [Ref 14.N] cls. 4.1, 4.6 & 10
	cl. 13.3.1 A6	BS EN 1993-1-5 [Ref 14.N] cl. 8
	cl. 13.3.2 A6	BS EN 1993-1-5 [Ref 14.N] cl. 7.2
	cl. 13.3.4 A6	BS EN 1993-1-1 [Ref 9.N] cl. 6.3.1.2 BS EN 1993-1-5 [Ref 14.N] cl. 4.5.3(5)
	cl. 14	BS EN 1993-1-5 [Ref 14.N] cls. 2.3 & 9.2.4
	cl. 15 paragraphs 2,3 and 4	BS EN 1993-1-5 [Ref 14.N] cl. 9
	cl. 16.1 paragraph 2	BS EN 1993-1-5 [Ref 14.N] cl. 9
	cl. 16.2 paragraph 2	BS EN 1993-1-5 [Ref 14.N] cl. 9

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Table A.1 published document clauses providing default compliance with the Eurocodes (continued)

Published document	Published document clause number	Eurocode and clause for which the published document clause provides a default means of compliance
PD 6695-2:2008 Recommendation for the design of bridges to BS EN 1993 PD 6695-2 [Ref 12.I]	cl. 16.3 Note A7	BS EN 1993-1-5 [Ref 14.N] cl. 9
	cl. 16.4	BS EN 1993-1-5 [Ref 14.N] cl. 9
	cl. 17.2	BS EN 1993-1-8:2005 cls. 2.7 & 3.12
	cl. 17.3.1	BS EN 1993-1-1 [Ref 9.N] cl. 5.3.3
	cl. 17.3.2	BS EN 1993-1-1 [Ref 9.N] cl. 6.2.4
	cl. 17.4.2	BS EN 1993-1-1 [Ref 9.N] cl. 6.2.3
	cl. 17.5.2	BS EN 1993-1-8 [Ref 8.N] cl. 3.12 BS EN 1993-1-1 [Ref 9.N] cl. 6.24
	cl. 17.5.4	BS EN 1993-1-8 [Ref 8.N] cl. 3.4
	cl. 18	Note A4
	cl. 19.2.1	BS EN 1993-1-8 [Ref 8.N] cl. 3
	cl. 20.2	BS EN 1993-1-8 [Ref 8.N] cl. 4
	cl. 20.3	BS EN 1993-1-8 [Ref 8.N] cl. 4
	cl. 20.3.1.1	BS EN 1993-1-8 [Ref 8.N] cl. 4

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Table A.1 published document clauses providing default compliance with the Eurocodes (continued)

Published document	Published document clause number	Eurocode and clause for which the published document clause provides a default means of compliance
PD 6695-2:2008 Recommendation for the design of bridges to BS EN 1993 PD 6696-2 [Ref 2.I]	cl. 21.1 paragraphs 2 and 3	BS EN 1993-1-5 [Ref 14.N] cl. 9
	cl. 21.2	BS EN 1993-1-5 [Ref 14.N] cl. 9
	cl. 22.2	BS EN 1993-1-5 [Ref 14.N] cl. 9
	cl. 23.2	BS EN 1993-2 [Ref 10.N] cls. 6.2.7 & 6.2.8 BS EN 1993-1-5 [Ref 14.N] Annex C A8
	cl. 23.3	BS EN 1993-2 [Ref 10.N] cls. 6.2.7 & 6.2.8 BS EN 1993-1-5 [Ref 14.N] Annex C A8
	cl. 23.4	BS EN 1993-2 [Ref 10.N] cls. 6.2.7 & 6.2.8 BS EN 1993-1-5 [Ref 14.N] Annex C A8
	cl. 23.5	BS EN 1993-2 [Ref 10.N] cls. 6.2.7 & 6.2.8 BS EN 1993-1-5 [Ref 14.N] Annex C A8
	cl. 24 Note A9	BS EN 1993-2 [Ref 10.N] cl. 5.2 BS EN 1993-1-5 [Ref 14.N] cls. 2, 3, 4, 5, 6, 7, 8, 9, 10 & Annex C A8
	cl. 25	BS EN 1993-2 [Ref 10.N] cls. 6.2.7 & 6.2.8 BS EN 1993-1-5 [Ref 14.N] Annex C A8
	cl. 26	BS EN 1993-2 [Ref 10.N] cl. 7.4
PD 6696-2:2007 Background paper to BS EN 1994-2 and the UK National Annex to BS EN 1994-2 PD 6696-2 [Ref 2.I]	All clauses where appropriate.	
PD 6694-1:2011 Recommendations for the design of structures subject to traffic loading to BS EN 1997-1:2004 PD 6688-1-1 [Ref 15.I]	All clauses where appropriate.	
PD 6698:2009 Recommendations for the Design of Structures for Earthquake Resistance to BS EN 1998 PD 6698 [Ref 14.I]	None.	

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Note A1. Traffic restrictions may not be appropriate for highly utilised structures with high delay costs.

Note A2. Either the 'safe life' method (PD 6695-1-9 [Ref 20.I] clause 5.2) or 'damage tolerant' method (PD 6695-1-9 [Ref 20.I] clause 5.3) should be used.

Note A3. The gross geometrical stress concentrating effects listed are not exhaustive and designers should consider other cases as appropriate.

Note A4. The clauses are not covered by Eurocodes.

Note A5. Should be used if second order analysis is not undertaken.

Note A6. If computer analysis is used designers should take these stresses into account.

Note A7. Other load effects including but not limited to differential settlement, soil pressures and wind may need to be considered.

Note A8. The specific requirements for the design of plated diaphragms, cross frames, the design for torsion and distortion, are not given in Eurocodes. However the reference clauses should provide the necessary guidance.

Note A9. Should be used where simple calculation methods without use of computer software are to be used.

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Appendix B. Project specific information to be recorded

B1 Notes on the specific information to be recorded

The information is categorised as "Core" or "Special". "Core" indicates that information should be recorded in all cases. "Special" indicates that information is only to be recorded in special cases where it is applicable to the project.

The location for the information to be recorded may be the relevant part of the AIP, or if the information does not require technical approval then it may be recorded in the Designer Record.

The Designer Record may need to be passed to the checker or the contractor but is not submitted to the TAA.

Specific cases for which information or assumptions should be communicated to the contractor are highlighted in the "Category" column with a reference to note [1].

It is the responsibility of the compiler of the AIP and Designer Record to ensure that the Standards, references and clauses listed are relevant and up-to date.

Where the information to be recorded in the AIP is not available at the time of its submission, this should be noted. The information should be added to the AIP or AIP addendum when available.

Additional Notes referenced in tables below:

[1]. The Designer should ensure that information or assumptions that affect the execution are communicated to the contractor, for example, by including relevant information on the drawings.

[2]. The Designer Record should be used to record decisions that affect the design of the permanent works. For the technical approval of temporary works, it is typically appropriate to record this information in the AIP instead of the Designer Record.

B2 Tables to record specific information

The following tables set out the information that should be recorded for each project.

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Table B.1 BS EN 1990:2002+A1:2005 Eurocode – Basis of structural design

BS EN clause	National Annex clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
2.1 (4)P NOTE 1		Special project-specific accidental design events to be taken into account or special robustness requirements.	Special	In most cases the provisions of BS EN 1991-1-7 [Ref 9.I] and its NA should be used. Further guidance is given in PD 6688-1-7 [Ref 16.I]. Special requirements should be recorded in the AIP.	AIP 4.1.7.Methodology for demonstrating robustness may be given in the Designer Record.
2.3 (1) Table 2.1	NA.2.1.1 NOTE, and Table NA.2.1	Design working life as determined for the individual project.	Core	Design working life should be as detailed in Table A.1 of this document.	AIP 3.1
3.4 (1)P NOTE 2		Special project-specific serviceability requirements.	Special	Information only to be recorded in special cases where the serviceability requirements as set out in the relevant Eurocodes need to be supplemented.	AIP 5.1 or 4.7
4.1.2 (8)		Design value of project-specific accidental actions	Special	In most cases the provisions of BS EN 1991-1-7 [Ref 9.I] and its NA should be used. Further guidance is given in PD 6688-1-7 [Ref 16.I].	AIP 4.1.7
4.1.2 (9)		Design value of seismic actions	Special	Seismic actions should not be required in the UK except for unusual cases e.g. large span bridges, see A.13 of this document. Where necessary the approach should be based on BS EN 1998 [Ref 18.N] and the design value should be recorded in the AIP. Guidance is provided in PD 6698 [Ref 14.I].	AIP 4.1.9. Further details may be recorded in the Designer Record.

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Table B.1 BS EN 1990:2002+A1:2005 Eurocode – Basis of structural design (continued)

BS EN clause	National Annex clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
A2.1(1) NOTE 4		Alternative combination rules if clauses A2.2.2 to A2.2.5 are changed.	Special	Clauses A2.2.2 to A2.2.5 should be used, except in rare cases where it may be necessary to use a Departure to specify alternative requirements.	AIP 4.6
A2.2.1 (2), Note 1	NA.2.3.2	Combinations involving actions that are outside the scope of EN 1991.	Special		AIP 4.1.9 or 4.7
A2.2.1 (10) NOTE		Special requirements for snow loads and wind actions to be combined with other construction loads during transient design situations.	Special[1]		AIP 4.1.8
A2.2.1 (13) NOTE		Limits on total settlement and differential settlement.	Core		AIP 6.3
A2.2.1 (15) NOTE 1		Special requirements for the combination of actions for determining the magnitude of settlements.	Core	The combination of actions to be used for settlement calculations should be stated in the AIP. For most highway structures the settlements may be modelled using the quasi-permanent combination of actions. However in some cases it may be necessary to consider the effect of occasional heavy loads.	AIP 6.3[1] Further details may also be recorded in the Designer Record.
A2.2.2 (3) NOTE		Special combination rules for special vehicles with normal traffic and other variable actions.	Special	Information to be recorded only where combination rules defined in NA to BS EN 1990 [Ref 16.N]NA.2.3.3.2 are not used.	AIP 4.1.2 or 4.6

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Table B.1 BS EN 1990:2002+A1:2005 Eurocode – Basis of structural design (continued)

BS EN clause	National Annex clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
A2.2.2(4), NOTE and A2.2.3(3), NOTE	NA.2.3.3.3 and NA.2.3.4.2	Combination of snow loads and group loads gr1a and gr1b.	Special	Information to be recorded only where recommended values or methods are not used.	AIP 4.1.2
A2.2.2(6), NOTE and A.2.2.3(2), NOTE	NA.2.3.3.4 and NA.2.3.4.1	Alternative simultaneity rule for wind and thermal actions, depending upon the local climatic conditions	Special	Information to be recorded only where recommended values or methods are not used.	AIP 4.1.2
A2.2.3(4), NOTE	NA.2.3.4.3	Combinations of actions for footbridges on which pedestrian and cycle traffic is fully protected from all types of bad weather.	Special	It may be appropriate to specify higher values of γ for accompanying variable actions (up to 1.0) where crowds of pedestrians may shelter from bad weather in covered footbridges.	AIP 4.1.9 or 4.7
A2.2.5 (2) NOTE 2		Additional combinations of actions for other accidental design situations.	Special	In most cases the provisions of BS EN 1991-1-7 [Ref 9.I] and its NA should be used. Further guidance is given in PD 6688-1-7 [Ref 16.I].	AIP 4.1.7 or 4.7
A2.2.5 (4) NOTE		Additional requirements for ship impact	Special	Some guidance on ship impact is provided in BS EN 1991-1-7 [Ref 9.I] and its NA. Generally the actions should be agreed on a project specific basis and recorded in the AIP.	AIP 4.1.7 or 4.7
A2.2.6 (1) NOTE 3	NA.2.3.6.3	Representative values of water forces (F_{wa}).	Special		AIP 4.1.8 or 4.1.9

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Table B.1 BS EN 1990:2002+A1:2005 Eurocode – Basis of structural design (continued)

BS EN clause	National Annex clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
A2.2.6 NOTE 5		Combinations of actions to be used for specific design situations	Special	It is appropriate to use the quasi-permanent combination of actions for the calculation of bridge camber for aesthetics and drainage considerations.Where this recommendation is not used or for any other special design situations the requirements should be recorded in the AIP.	AIP 4.1.9
A2.3.1(1) and Table A2.4 (A), (B) and (C)	NA.2.3.7.1 and Tables NA.A2. 4 (A), (B) and (C) NOTE 2	Method for determining design actions dependent on the level of water	Special	Where relevant, the approach to be used should be defined in the AIP. Where a partial factor approach is proposed, the values should be justified.	AIP 4.1.9
A2.3.1(1) and Table A2.4 (A), (B) and (C)	NA.2.3.7.1 and Tables NA.A2. 4 (A), (B) and (C) NOTE 4	Partial factors for all other actions, not covered in NOTES 1 to 3.	Special		AIP 4.1.9 or 4.7
A2.3.1(1) and Table A2.4 (A), (B) and (C)	NA.2.3.7.1 and Tables NA.A2. 4(A), (B) and (C) NOTE 7	Partial factors for actions involving aerodynamic effects of wind on bridges.	Special	Aerodynamic effects on bridges are covered by PD 6688-1-4 [Ref 1.I] Annex A. PD 6688-1-4 [Ref 1.I] Annex A (excluding A.1.5.2 and A.1.5.3) is treated as a default means of compliance in Annex B of this document.	Where special partial factors are to be used these should be defined in the AIP 4.7. It may be appropriate to record further details of the methodology in the Designer Record.
A2.3.1(1) and Table A2.4(A)	NA.2.3.7.1 and Table NA.A2.4(A) NOTE 9	Special partial factors for verifications sensitive to spatial variations in the magnitude of actions and the resistance of structural elements or the ground.	Special	For verifications that are sensitive to special variations in the magnitude of actions and the resistance of structural elements or the ground, the partial factors should be recorded in the AIP. Guidance is provided in Denton & Gulvanessian [Ref 4.I]	AIP 4.1.1 or 4.1.8, or AIP 4.7 if the approach given in Denton and Gulvanessian Denton & Gulvanessian [Ref 4.I] is not used.

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Table B.1 BS EN 1990:2002+A1:2005 Eurocode – Basis of structural design (continued)

BS EN clause	National Annex clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
A2.3.1(1) and Table A2.4(B) and (C)	NA.2.3.7.1 and Table NA.A2.4 (B) and (C) NOTE 9	Approach for partial factors and model uncertainty factor and values to be used.	Special	In most cases it should be appropriate to use the values of γ_G (or γ_Q) without sub-division into γ_g (or γ_q) and γ_{Sd}. Where it is proposed to sub-divide γ_G and γ_Q the values of the factors should be stated in the AIP for Set B and Set C.	AIP 4.1.9
A.2.3.1(7)	NA.2.3.7.3	General and local scour depths, special requirements for actions on bridge piers in a waterway.	Special	Advice is given in CD 356 [Ref 7.I]. Record values in the AIP.	AIP 4.1.9 or 4.7
A.2.3.1(8)	NA.2.3.7.4 and Tables NA.A2.4 (A), (B) and (C)	γ_p values for prestressing actions	Special	In the case where γ_P values for prestressing actions are not provided in the relevant design Eurocodes, these values should be determined for the individual project and recorded in the AIP.	AIP 4.7
A2.3.2(1) and Table A2.5 - (***)	NA 2.3.8 and Table NA.A2.5 –B)	Specification of particular seismic design situations.	Special	AIP 4.1.9 should record whether the seismic design situation is to be used and specify any particular seismic design situations, see also A.1 3 of this document.	AIP 4.1.9
A2.3.2 (2) NOTE		Special requirements to combine variable construction loads with accidental actions.	Special[1]	As an example, some construction loads may act simultaneously with the action corresponding to the accidental fall of a prefabricated unit. This may be particularly important for bridges built by the cantilever method.	Values to be recorded in AIP 4. 1.8. Further details may be recorded in the Designer Record[2] if appropriate.

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Table B.1 BS EN 1990:2002+A1:2005 Eurocode – Basis of structural design (continued)

BS EN clause	National Annex clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
A2.4.1(2) NOTE	NA 2.3.9.3	Project-specific serviceability requirements	Special	Information only to be recorded where the serviceability requirements as set out in the relevant Eurocodes need to be supplemented.	AIP 5.1
A2.4.3.1 (1) NOTE		Project-specific design situations relating to the control of pedestrian traffic	Special	Generally the provisions of BS EN 1990 [Ref 17.N], BS EN 1991-2 [Ref 4.N] and their NAs should be used. Any special provisions should be recorded in AIP 4.1.5.	AIP 4.1.5
A2.4.3.1 (3) NOTE 1		Definition of traffic categories and the relevant design situations.	Special	Generally the provisions of BS EN 1990 [Ref 17.N] BS EN 1991-2 [Ref 4.N], and their NAs should be used. Any special provisions should be recorded in AIP 4.1.5.	AIP 4.1.5
Annex B	NA.3.2.1	Consequence class	Core	See Table A.2 of this document.	AIP 3.6.1
Annex C	NA.3.2.2	Use of probabilistic methods.	Special	In most cases it should not be necessary to use probabilistic methods. In special cases where probabilistic methods are proposed, the methodology should be fully defined in the AIP.	AIP 5.1

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Table B.2 BS EN 1991-1-1:2002 Eurocode 1: Actions on structures. General actions - Densities, self-weight, imposed loads for buuildings

BS EN clause	National Annex clause	Description	Category	Comment or requirement	Where recorded, if applicable to the project
4.1 General (1) NOTE		Definition of selected values of densities when a range is given in the table in Annex A	Core	Where a particular value of density is to be used for a project this should be recorded. Where there are no specific requirement the range in Annex A of BS EN 1991-1-1 [Ref 3.N] should be used.	AIP 4.1.1
4.1 General 2)		Characteristic densities for materials not covered in Annex A of BS EN 1991-1-1	Special	Where non-standard materials are proposed the characteristic densities should be recorded in the AIP.	AIP 4.1.1
5.2.3 (1)	Table NA.1	Range of values to be assumed for the self-weight of fill.	Core	The upper and lower values for density of fill should be recorded in the AIP taking into account changes in properties over time.	AIP 4.1.1

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Table B.3 BS EN 1991-1-3:2003 Eurocode 1: Actions on structures. General actions - Snow loads

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
1.5		Use of tests and/or numerical methods to determine snow loads.	Special	Where it is proposed that the design snow loads should be based on tests or numerical methods, these should be agreed in a departure. In most cases where snow loading is required, the methods of BS EN 1991-1-3 [Ref 5.N] should be appropriate.	AIP 4.1.2 & 4.6
4.1 (1) NOTE 1		Unusual local conditions influencing snow loads.	Special	If the characteristic snow load is to be altered to account for unusual local conditions, this should be agreed in a departure. In most cases where snow loading is required, the methods of BS EN 1991-1-3 [Ref 5.N] should be appropriate.	AIP 4.1.2 & 4.6

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Table B.4 BS EN 1991-1-5:2003 Eurocode 1: Actions on structures. General Actions - Thermal actions

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
6.1.1(1) NOTE 2	NA.2.2.1 (2nd paragraph)	Thermal actions for types of bridges not covered in BS EN 1991-1-5.	Special	For bridge types not covered by BS EN 1991-1-5 [Ref 6.N], the uniform temperature component and temperature difference component should be recorded in the AIP.	AIP 4.1.2 or 4.7
6.1.2(2)	NA.2.3	Selection of Approach for thermal actions	Special	Generally Approach 2 should be used to determine the actions. If Approach 1 is proposed this should be agreed and recorded in the AIP.	AIP 4.1.2
6.1.4(3)	NA.2.7	The initial temperature difference at the closure of cantilever construction.	Special[1]	The initial temperature difference at the closure of cantilever construction should be recorded if relevant to the project.	AIP 4.1.2 or Designer Record[2]

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Table B.5 BS EN 1991-1-6:2005 Eurocode 1: Actions on structures. General actions. Actions during execution

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
1.1 (1) NOTE 2		Rules concerning the safety of people in and around the construction site.	Core[1]	Safety risks during execution, maintenance operation and demolition should be recorded in the AIP.	AIP 3.11
1.1(3)	NA.2.1 Design rules for auxiliary construction works	Design rules for auxiliary construction works.	Special[1]	Define design rules to be used in the Designer Record. NA2.1 provides references that may be applicable.	Designer Record[2]
2.2 (3) NOTE		Tolerances for position of "fixed" construction loads.	Special[1]		Designer Record[2]
2.2(4) NOTE 1	NA.2.2	Limits of movement for "free" construction loads	Special[1]		Designer Record[2]
3.1(5) NOTE 1	NA.2.4	Return periods for the determination of the characteristic values of variable actions during execution.	Special[1]	Record the return periods in the AIP where the recommended minimum values are not used.	AIP 4.1.8
3.1(5) NOTE 2	NA.2.5	Minimum wind velocity during execution.	Special[1]	Record the minimum wind speed where the recommended minimum value is not used.	Designer Record[2]
3.1(7)	NA.2.6	Rules for combination of snow loads and wind actions with construction loads.	Special[1]	Any special combination rules should be recorded in the Designer Record	Designer Record[2]
3.1(8) NOTE 1	NA.2.7	Imperfections in the geometry of the structure and of structural members.	Special[1]	Where the structure is sensitive to geometric imperfections during execution, the assumed values should be recorded in the Designer Record. 3.1(8) NOTES 1 and 2 provide further references.	Designer Record[2]
3.1 (12) NOTE		Scour levels for construction works in flowing water.	Special[1]	For long construction phases it should be appropriate to consider the levels of scour that may develop around construction works. The approach should be recorded in the Designer Record .	Designer Record[2]

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Table B.5 BS EN 1991-1-6:2005 Eurocode 1: Actions on structures. General actions. Actions during execution (continued)

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
3.3(2)	NA.2.8	Criteria associated with serviceability limit states during execution.	Core[1]	The serviceability criteria to be used during execution should be defined in the AIP.	AIP 4.1.8
3.3 (5) NOTE		Combinations of actions for transient design situations during execution	Special[1]	The combinations of actions for transient design situations during execution are usually the characteristic combination and the quasi-permanent combination. Where it is necessary to consider frequent values of particular actions during execution these should be agreed and recorded in the AIP.	AIP 4.1.8
3.3(6)	NA.2.9	Serviceability requirements for auxiliary construction works.	Special[1]	The criteria should be defined in the Designer Record. NA2.9 provides further references.	Designer Record[2]
4.1 (5) NOTE		Loads associated with friction	Special[1]	Where it is necessary to consider loads arising from friction effects the assumed friction coefficients should be recorded in the Designer Record.	Designer Record[2]
4.4 (1) NOTE		Prestressing forces during execution.	Special[1]	Where there are specific requirements for the prestressing forces during execution these should be recorded in the AIP.	AIP 4.1.8
4.7 (1) NOTE		Dynamic response procedure for wind actions in the execution stages.	Special[1]	The criteria and procedures for considering the dynamic response associated with wind actions during the execution stages should be recorded in the Designer Record or the AIP.	Designer Record[2] or AIP 4.1.8
4.7 (3) NOTE		Maximum wind speed for lifting and moving operations or other construction phases that are of short duration.	Special[1]	Limiting wind speeds should be recorded in the Designer Record.	Designer Record[2]

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Table B.5 BS EN 1991-1-6:2005 Eurocode 1: Actions on structures. General actions. Actions during execution (continued)

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
4.9 (2) NOTE		Classification of actions caused by water as permanent or variable actions.	Special[1]	The approach for modelling water actions should be recorded in the Designer Record	Designer Record[2]
4.9 (4) NOTE 1		Hydrodynamic forces	Special[1]	The approach of Expression (4.1) may be used to check the stability of bridge piers and cofferdams subject to hydrodynamic forces. Where a more refined approach is used this should be recorded in the Designer Record.	Designer Record[2]
4.9 (5) NOTE 1		Debris forces	Special[1]	The approach of Expression (4.2) may be used to check the stability of bridge piers and cofferdams subject to debris forces. Where an adjusted method is proposed, this should be recorded in the Designer Record.	Designer Record[2]
4.9(6) NOTE 2	NA.2.10	Loads and water levels associated with actions due to ice, including floating ice.	Special[1]	The approach should be defined in the Designer Record	Designer Record[2]
4.10(1)P	NA.2.11	Representative values of the actions due to atmospheric icing.	Special[1]	Representative values should be defined in the Designer Record. NA.2 .11 provides references to further guidance.	Designer Record[2]
4.11.1 General(1) NOTE 2		Load groups for construction loads	Special[1]	The construction load groupings considered for design should be recorded in the Designer Record.	Designer Record[2]
Table 4.1 NOTE 1,3, 4	NA.2.12	Representation of construction loads	Special[1]	Information to be recorded only where recommended minimum values are not used.	Designer Record[2]
4.11.2(1) NOTE 2	NA.2.13	Construction loads during the casting of concrete	Special[1]	Record where the recommended minimum values Q_{ca} and Q_{cc} are not to be used. Record the proposed value for Q_f in the Designer Record.	Designer Record[2]

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Table B.5 BS EN 1991-1-6:2005 Eurocode 1: Actions on structures. General actions. Actions during execution (continued)

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
4.12(1)P NOTE 2	NA.2.14	Dynamic effects due to accidental actions.	Special[1]	Record where recommended values or approaches are not used.	Designer Record[2]
4.12 (2)	NA.2.15	Dynamic effects due to falls of equipment.	Special[1]	Values to be recorded in the Designer Record.	Designer Record[2]
4.13(2)	NA.2.17	Seismic actions	Special	Where seismic actions are required, define the design values for ground acceleration and the importance factor γ_I (See BS EN 1998 [Ref 18.N]).	Designer Record[2]
A1.3(2)	NA.2.19	Characteristic values of equivalent horizontal forces.	Special[1]	Record where recommended values or approaches are not used.	Designer Record[2]
A2.3(1) NOTE 1	NA.2.20	Design values of vertical deflections for the incremental launching of bridges	Special[1]	Record where recommended values or approaches are not used.	Designer Record[2]
A2.4(2)	NA.2.21	Reduction of the characteristic value of snow loads.	Special[1]	Record where recommended values or approaches are not used.	Designer Record[2]
A2.5(2)	NA.2.23	Design values of horizontal friction forces.	Special[1]	Record where recommended values or approaches are not used.	Designer Record[2]
A2.5(3) NOTE 1	NA.2.24	Friction coefficients μmin and μmax.	Special[1]	Record where recommended values or approaches are not used.	Designer Record[2]
Annex B	NA.3.1	Actions on structures during alteration, reconstruction or demolition	Special[1]	Information to be recorded only where Annex B is used.	AIP 4.1.8

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Table B.6 BS EN 1991-1-7:2006 Eurocode 1: Actions on structures. General Actions - Accidental actions

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
2 (2)	NA.2.1	Classification of accidental actions	Special	Define the treatment of any accidental actions which are not free actions.	Designer Record
3.4 (2) Note	NA.2.8	Design approach for accidental actions on structures with higher or lower consequence classes.	Special	The design approach for accidental actions on structures with higher (C C3) or lower (CC1) consequence classes should be defined in the AIP. The recommended accidental actions should be used. If the recommended accidental actions are not used, the approach should be defined in the AIP.	AIP 4.1.7
4.3.1(1) Note 1	NA.2.11. 2.4.1	Threshold values to categorise the risk-ranking factor for pier impact	Special	Define the values for T_a and T_b if the recommended values are not used.	AIP 4.1.7
4.6.1 (3) Note 1	NA.2.33	Classification of ships to be considered for design of ship impact	Special	The classification to be used should be recorded in the AIP.	AIP 4.1.7
4.6.2 (1) Note	NA.2.34	Dynamic forces due to impact from river and canal traffic.	Special	The values of dynamic forces to be considered should be recorded in the AIP.	AIP 4.1.7
4.6.2 (3) Note 1	NA.2.36	Position and area of impact force	Special	The position and area of the impact should be recorded in the AIP.	AIP 4.1.7
4.6.2 (4) Note	NA.2.37	Impact forces on bridge decks from ships.	Special	The values of equivalent static forces to be considered should be recorded in the AIP.	AIP 4.1.7
4.6.3 (1) Note	NA.2.38	Dynamic impact forces from seagoing ships.	Special	The values of frontal and lateral dynamic impact forces to be considered should be recorded in the AIP.	AIP 4.1.7

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Table B.6 BS EN 1991-1-7:2006 Eurocode 1: Actions on structures. General Actions - Accidental actions (continued)

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
4.6.3 (4)P Note	NA.2.40	Area and position of impact force for seagoing ships.	Special	The limits on area and position should be recorded if the recommended indicative values are not used.	AIP 4.1.7
4.6.3 (5) Note 1	NA.2.41	Forces on superstructure for seagoing ships.	Special	The force to be considered should be recorded in the AIP.	AIP 4.1.7
5.3 (1)P Note] (3rd para)	NA.2.42	Internal explosions in road tunnels.	Special	The design requirements for explosions should be defined in the AIP.	AIP 4.1.7
B.5 Risk acceptance and mitigating measures (4) 2nd paragraph	NA3.2	Risk acceptance levels for risk assessments	Special	Information to be recorded only if recommended values or methods are not used.	AIP 4.1.7

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Table B.7 PD 6688-1-7: Recommendations for the design of structures to BS EN 1991-1-7

Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
2.5.1 d) 1)	Threshold of risk ranking factor for footbridges and cycle track bridges.	Special	The recommended value of T_c should be used. See Annex B of this document.	

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Table B.8 BS EN 1991-2:2003 Eurocode 1: Actions on structures. Traffic loads on bridges

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
2.3(1)	NA.2.3	Protection against collision from road and rail traffic.	Special	Where protection is provided, the requirements should be defined in the AIP. Refer to CD 377 [Ref 22.N].	AIP 4.1.7
3(5)	NA.2.5	Bridges intended for both road and rail traffic.	Special	The requirements and load models should be defined in the AIP	AIP 4.7
4.1(2)	NA.2.7	Weight restricted bridges	Special	For weight restricted bridges the load models to be used in design should be defined in the AIP.	AIP 4.1.3
4.2.1(1)	NA.2.8	Complementary load models for traffic outside the scope of the load models in E N1991-2.	Special	Where complementary load models are required, these should be defined in the AIP.	AIP 4.1.9 or 4.7
4.2.1 (1) NOTE 3		Dynamic amplification factor	Special	Where it is necessary to use a higher dynamic amplification factor than those in the load models then this should be recorded in the AIP.	AIP 4.1.3
4.2.1(2)	NA.2.9	Complementary load models for special vehicles	Special	Information to be recorded only where recommended values or methods are not used.	AIP 4.1.9 or 4.7
4.2.3 (4) NOTE		Divisions of the carriageway into notional lanes	Special	Where the standard rules given in 4.2.3(4) is to be adjusted, this should be recorded in the AIP	AIP 4.1.3
4.3.4(1)	NA.2.16 (2nd para)	Definition of the particular STGO or SO model vehicles to be used	Core	Advice is given clause A.7 of this document.	AIP 4.1.4 and 4.1.6
4.3.5 (1) NOTE		Special rules for the application of LM4, crowd loading.	Special		AIP 4.1.5
4.6.1 (2) NOTE 1		Fatigue load models, horizontal forces	Special	Where horizontal forces (e.g. centrifugal actions) need to be included for fatigue, this should be recorded in the AIP.	AIP 4.1.9
4.6.1 General (2) NOTE 4		Modification of Fatigue Load Models 1 and 2.	Special	Information to be recorded only where recommended values or methods are not used.	AIP 4.1.9

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Table B.8 BS EN 1991-2:2003 Eurocode 1: Actions on structures. Traffic loads on bridges (continued)

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
4.6.2 (1) NOTE		Non-application of the UDL component of Fatigue Load Model 1	Special	Information to be recorded only where recommended values or methods are not used.	AIP 4.1.9
4.6.4(3)	NA.2.25	Conditions of application for two Fatigue Load Model 3vehicles in the same lane.	Special	Information to be recorded only where recommended values or methods are not used.	AIP 4.1.9 or 4.7
4.6.1(2) Note 2(e), 4.6.5(1) Note 2	Table NA.5	Specific vehicle axle arrangements for Fatigue Load Model 4	Special	Specific vehicle axle arrangements for F LM4 should be defined in the AIP.	AIP 4.1.9
4.7.3.4(1)	NA.2.31	Nominal vehicle collision forces on structural members.	Special	Where required, nominal vehicle collision forces should be defined in the AIP. Information to be recorded only where vehicle collision forces in accordance with BS EN 1991-2 [Ref 4.N] 4.7.2.1 and NA.2.28 are not used.	AIP 4.1.7
4.7.3.4 (2) NOTE		Collision forces on intermediate members where damage would not cause collapse	Special	Where smaller collision forces are proposed these should be agreed and recorded in the AIP. Information only to be recorded where standard values are not used.	AIP 4.1.7
4.8(1) Note 2	NA.2.32	Actions on pedestrian parapets - class of pedestrian parapet.	Core	Parapet class to be determined and recorded in the AIP.	AIP 3.7
4.8 (2) NOTE		Actions on pedestrian parapets – criteria for parapets being protected from impact	Special	Requirements for the protection of parapets from collision should be defined in the AIP.	AIP 3.7
5.1 (2) NOTE 2		Complementary load models for large footbridges.	Special	Where complementary load models are required, these should be defined in the AIP. Information to be recorded only where recommended values or methods are not used.	AIP 4.1.5

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Table B.8 BS EN 1991-2:2003 Eurocode 1: Actions on structures. Traffic loads on bridges (continued)

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
5.2.1 (1) NOTE 1		Define loads due to horses or cattle.	Special	Where complementary load models are required, these should be defined in the AIP.	AIP 4.1.9 or 4.7
5.6.1 (1) NOTE		Define other collision forces.	Special	Information to be recorded only where recommended values or methods are not used.	AIP 4.1.9 or 4.7
5.6.3(2)	NA.2.43	Alternative load model characteristics for accidental vehicle	Special	Where complementary load models are required, these should be defined in the AIP. Information to be recorded only where recommended values or methods are not used.	AIP 4.1.7
5.7(3)	NA.2.44.1 (3rd para)	Unusual dynamic pedestrian loads	Special	Special requirements e.g. to account for mass gatherings, deliberate pedestrian synchronisation or vandal loading should be defined in the AIP if required.	AIP 4.1.5
5.7(3)	NA.2.44.2 (2)	Crowd loading densities.	Special	Crowd loading densities should be recorded in the AIP.	AIP 4.1.5
5.7(3)	NA.2.44.2 (3)	Application of jogging cases for dynamic actions	Special	Where jogging cases may be neglected, this should be stated in the AIP. Information to be recorded only where recommended values are not used.	AIP 4.1.5
5.7(3)	NA.2.44.5 (3)	Alternative dynamic models.	Special	Information to be recorded only where recommended values are not used.	AIP 4.1.5
5.7(3)	Tables NA. 9 to NA.11	Vibration serviceability limits - factors k_1, k_2, and k_3.	Special	Record values of k_1, k_2 and k_3	AIP 5.1
5.7(3)	NA.2.44.6 (1) & (2)	Vibration serviceability limits - exposure factor k_4.	Special	Record value of exposure factor k_4	AIP 5.1
5.7(3)	NA.2.44.6 (3)	Vibration serviceability limits.	Special	Where the vibration serviceability limits are to be relaxed for the project this should be recorded in the AIP, based on a suitable risk assessment.	AIP 5.1

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Table B.8 BS EN 1991-2:2003 Eurocode 1: Actions on structures. Traffic loads on bridges (continued)

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
5.9 (1) NOTE 2		Load model for abutments and walls adjacent to bridges		Information to be recorded only where recommended values or methods are not used.	AIP 4.1.9

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Table B.9 BS EN 1992-1-1:2004 Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings & BS EN 1992-2:2005 Eurocode 2: Design of concrete structures – Part 2: Concrete bridges – Design and detailing rules

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
4.4.1.2 (7)	Table NA.14 .4.1.2 (7)	Reduction in minimum cover for stainless steel or other special measures	Special[1]	The value and justification for $\Delta c_{dur,st}$ to be recorded only where the recommended value is not used.	AIP 3.10
4.4.1.2 (8)	Table NA.14 .4.1.2 (8)	Reduction in minimum cover for concrete with additional protection	Special[1]	The value and justification for $\Delta c_{dur,add}$ to be recorded only where the recommended value is not used.	AIP 3.10
4.4.1.3(3)		Reduction in Δ_{cdev}	Special[1]	Record the value of Δ_{cdev} where a value less than 10mm is proposed, and provide justification.	AIP 3.10
5.6 (101) P		Use of plastic analysis	Special	Plastic analysis should not be used for the design of concrete bridges. Where plastic analysis is proposed it should be agreed with the TAA and recorded in the AIP. See also PD 6687-2 [Ref 18.l] 6.5.	AIP 5.1
5.7 (105)	Table NA.1 5.7(105)	Method for non-linear analysis and safety format.	Special	The use of non-linear analysis should be recorded in the AIP. Details of the method of non-linear analysis and the safety format should be described in the Designer Record. Guidance is provided in the National Annex.	AIP 5.1 and Designer Record
5.8.5		Choice of method of analysis for second order effects with axial load.	Special	Where the design requires an analysis of second order effects with axial load, the designer should record the method of analysis used in the Designer Record:(i) General method (5.8.6)(ii) Simplified method based on nominal stiffness (5.8.7)(iii) Simplified method based on nominal curvature (5.8.8)	Designer Record
5.10.6 & Annex D		Approach for time dependent losses	Special	If Annex D has been used in place of the simplified method in 5.10.6 this should be recorded in the Designer Record.	Designer Record

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Table B.9 BS EN 1992-1-1:2004 Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings & BS EN 1992-2:2005 Eurocode 2: Design of concrete structures – Part 2: Concrete bridges – Design and detailing rules (continued)

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
6		Method for verifying ULS resistance	Special	ULS resistance should be verified using the standard member resistance rules in 6.1 to 6.3, or other methods including Annex LL or the strut and tie rules in 6.5. The methods used to verify ULS resistance should be recorded in the Designer Record.	Designer Record
6.1 (109)		Method of avoiding brittle failure of prestressing tendons	Special	The method used ((a), (b), or (c) in 6.1(109)) should be recorded in the Designer Record.	Designer Record
6.2.4 (105)		Longitudinal shear with transverse bending – check of concrete crushing	Special	If it is necessary to use the method of Annex MM then this should be recorded in the Designer Record.	Designer Record
6.8.7		Concrete Fatigue verification method	Core	The fatigue verification of concrete under compression may be achieved using either the simple method in 6.8.7 (2) or the method in 6.8.7(1). The choice of method should be recorded in the Designer Record	Designer Record
9.8.3 (2)	Table NA.19 .8.3 (2)	Minimum downward load for tie beams.	Special	The minimum downward load should be determined for the project and recorded in the AIP	AIP 4.1.8
Annex KK	NA.3	Method for modelling structural effects of time dependent behaviour of concrete	Special	Annex KK contains several alternative methods, in KK.3, KK.4, KK.5 and KK.6. The choice of method should be recorded in the Designer Record.	Designer Record

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Table B.10 BS EN 1993-1-1:2005 Eurocode 3: Design of steel structures - Part 1-1: General rules and rules for buildings

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded, if applicable to the project
5.2.1 and 5.2.2		Method of analysis for second order effects with axial load.	Special	Where the design requires an analysis of second order effects with axial load, this should be recorded in the AIP. Details of the method of analysis, including how initial imperfections are considered should be recorded in the Designer Record.	AIP 5.1 and Designer Record

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Table B.11 BS EN 1993-1-5:2006 – Design of steel structures – Part 1-5: Plated structural elements

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded, if applicable to the project
2.4		Use of the reduced stress method.	Special	Where the Designer proposes the use of the reduced stress method, appropriate details should be recorded in the Designer Record.	Designer Record.
9.2.1(8)	NA.2.8	Torsional buckling of stiffeners with open cross-sections	Special	Where the Designer proposes the use of advanced analysis methods, the approach should be recorded in the Designer Record.	Designer Record.
C.6(2)		Non linear analysis of plates – stress-strain curve.	Special	Where the use of non linear analysis of plated elements is proposed, the stress-strain relationship used for the analysis should be clearly set out in the AIP.	AIP 5.1 and Designer Record
C.8	NA.2.13	Additional limit state criteria for FE analysis.	Special	Where a project specific limit state criterion is required (e.g. attainment of yield criterion or limitation of the yielding zone) appropriate details should be recorded in the AIP.	AIP 5.1

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Table B.12 BS EN 1993 -1-8:2005 –Design of steel structures – Part 1-8: Design of joints

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded, if applicable to the project
				No specific requirements	

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Table B.13 BS EN 1993 -1-9:2005 – Design of steel structures – Part 1-9: Fatigue

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded, if applicable to the project
3(2)3(7)	NA.2.4NA.2.5	The use of the damage tolerant approach to fatigue verification.	Special	The safe life approach to fatigue verification should be adopted. Where the use of the damage tolerant approach is proposed it should be recorded in the AIP and all necessary details, including relevant material partial factors should be recorded in the Designer Record.	AIP 4.1.9 and Designer Record
7.1(5)	NA.2.10	The use of fatigue strength categories not covered by Tables 8.1 to 8.10 or Annex B	Core	The form and detailing of the structure should be such that all structural details are within the scope of coverage of BS EN 1993-1-9 [Ref 11.N].	
A.3		Stress cycle counting procedure.	Special	The use of a cumulative damage approach for the assessment of specific, critical details should be agreed with the TAA and recorded in the AIP (or an AIP addendum). PD 6695-1-9 [Ref 20.I] provides information on the reservoir method of stress cycle counting.	AIP 4.1.9 and Designer Record

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Table B.14 BS EN 1993-1-10:2005 – Design of steel structures – Part 1-10: Material toughness and through-thickness properties

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded, if applicable to the project
2.2(3)		Evaluation of fracture toughness using fracture mechanics.	Special	The form and detailing of the structure should be such that all structural details are within the scope of coverage of BS EN 1993-1-9 [Ref 11.N]. Where alternative methods are proposed it should be recorded in the AIP and full details of the approach to be adopted, including any testing that may be required, should be set out in the Designer Record.	AIP 3.10 and Designer Record

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Table B.15 BS EN 1993-1-11:2006 – Design of steel structures – Part 1-11: Design of structures with tension components

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded, if applicable to the project
2.2(2) Note 5.3(2)		Interaction between gravity loads (G) and prestress (P).	Special	The method for considering the interaction between gravity loads and prestress actions and the relevant values of the partial factors to be used should be stated in the AIP.	AIP 5.1
2.3.6	NA.2.1	Replacement or accidental loss of tension components.	Special	The transient design situations and associated actions to be considered and any project specific monitoring requirements should be agreed and recorded in the AIP.	AIP 3.8.1 and 4.1.9
3.1(1) Note 6	NA.2.3	Strength of steel wires.	Special	The use of wires of tensile strengths greater than the recommended maximum values given within BS EN 1993-1-11 [Ref 13.N] should be agreed and recorded in the AIP.	AIP 3.10
4.4(2) Note 1	NA.2.4	Cables with stainless steel wires and stainless steel terminations without additional corrosion protection.	Special	The corrosion resistance class for the stainless steel should be recorded in the AIP.	AIP.3.10

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Table B.16 BS EN 1993-1-12:2007 – Design of steel structures – Part 1-12: Additional rules for the extension of EN 1993 up to steel grades S 700

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded, if applicable to the project
				No specific requirements	

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Table B.17 BS EN 1993-2:2006 Eurocode 3 - Design of steel structures - Part 2: Steel bridges

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded, if applicable to the project
2.1.3.4(1)		Robustness and structural integrity	Core	Components which need to be designed for accidental design situations should be identified in the AIP and the design approach to be adopted should be detailed in the Designer Record	AIP 4.1.7 and Designer Record
4(4)	NA.2.14	Elements that cannot be inspected.	Core	Where the use of elements with surfaces that cannot be inspected is unavoidable, details of the measures to be taken to ensure their durability over their design life should be recorded in the AIP.	AIP 3.10
5.4.1(1)	NA.2.16	Use of plastic analysis.	Special	Plastic analysis should not be used for the design of steel bridges. Where plastic analysis is proposed it should be agreed with the TAA and recorded in the AIP.	AIP 5.1
6.3.2.3 (1)	NA.2.20	Derivation of the elastic critical buckling moment for lateral torsional buckling (M_{cr})	Special	Where the Designer intends to use FE modelling to derive values of M_{cr} the Designer should record the method of analysis used in the AIP.	AIP 5.1
8.2.1.5(1)		Use of plug welds	Special[1]	The use of plug welds should be avoided. Where their use is proposed it should be agreed with the TAA and recorded in the AIP.	AIP 3.10

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Table B.18 BS EN 1993-5:2007 – Design of steel structures – Part 5: Steel piling

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded, if applicable to the project
4.1(6)		Design working life of steel pile elements	Special	The design working life for steel piling elements should be recorded in the AIP and should be at least equal to that of the structure.	AIP 3.1
4.1(8)		Corrosion protection system.	Special	Details of the corrosion protection systems for steel pile elements should be recorded in the AIP.	AIP 3.10
5.5.1(4)		Driving imperfections for combined walls.	Special	The magnitude of imperfections resulting from execution taken into account during the design should be recorded in the AIP.	AIP 5.1

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Table B.19 BS EN 1994-2:2007 – Design of composite steel and concrete structures – Part 2: General rules and rules for bridges

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded, if applicable to the project
5.4.2.8(4)		Effect of tension stiffening	Special	The design method to be adopted for composite elements subjected to tension effects should be set out in the Designer Record.	AIP 5.3

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Table B.20 NA to BS EN 1997-1:2004 National Annex to Eurocode 7: Geotechnical design – Part 1: General rules

BS EN Clause	National Annex Clause	Description	Category	Comment or requirement	Where recorded if applicable to the project
2.4.7.1(4)	Table NA.1	The values of partial factors to be used in cases of abnormal risk or unusual or exceptionally difficult ground or loading conditions.	Special	The values of partial factors should be recorded if they are different from the recommended values.	AIP 6.2
2.4.7.1(5)	Table NA.1	Reduced values of partial factors to be used for special situations for temporary structures or transient design situations.	Special1	The values of partial factors should be recorded if they are different from the recommended values.	AIP 6.2
2.5(1)	Table NA.1	The use of prescriptive measures (conventional and generally conservative rules).	Special	The use of prescriptive measures should be recorded in the AIP.	AIP 6.2
2.4.7.1(6)	NA.2 and A.6	Values and application of model factors	Core	The value of the model factor applied to the earth pressure coefficient should be recorded in the AIP. See PD 6694-1 [Ref 13.I], Clause 4.7.	AIP 5.4 or 6.2
Annex A	A.2.1 and A.3.1	Actions and partial factors on actions for which no values are set in BS EN 1990 [Ref 17.N].	Special	Record values of actions, partial factors and combination factors for actions for which no values are set in the AIP.	AIP 4.1.9 or 4.7
Annex A	A.3.3.2	Modification of partial resistance factors for pile foundation.	Special	The values of partial resistance factors should be recorded if they are different from the recommended values.	AIP 6.2
Annex H	NA.3.4	Limiting values of structural deformation and foundation movement	Core	Limiting values of structural deformations and foundation movements should be recorded in the AIP. See also BS EN 1990 [Ref 17.N] A2.2.1(13) and (15).	AIP 6.3

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