



THE HIGHWAYS AGENCY

BD 20/92



THE SCOTTISH OFFICE DEVELOPMENT DEPARTMENT



THE WELSH OFFICE
Y SWYDDFA GYMREIG



THE DEPARTMENT OF THE ENVIRONMENT
FOR NORTHERN IRELAND

Bridge Bearings

Use of BS 5400: Part 9:1983

Summary: This Standard gives the requirements for the design of bridge bearings using BS 5400: Part 9: 1983

REGISTRATION OF AMENDMENTS

Amend No	Page No	Signature & Date of incorporation of amendments	Amend No	Page No	Signature & Date of incorporation of amendments

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VOLUME 2	HIGHWAY STRUCTURES: DESIGN (SUBSTRUCTURES AND SPECIAL STRUCTURES), MATERIALS
SECTION 3	MATERIALS AND COMPONENTS

PART 1

BD 20/92

**BRIDGE BEARINGS USE OF BS 5400:
PART 9: 1983**

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Annex A Amendments to BS 5400: Section 9.1:
1983

1. INTRODUCTION

1.1 This Standard updates and replaces BD 20/83: Bridge Bearings - Use of BS 5400: Part 9: 1983. The major changes in this revision are as follows:-

- i. All references relating to the specification clauses in BS 5400: Part 9: Section 9.2: 1983, are withdrawn. Specification clauses given in the Specification for Highway Works (December 1991) (MCHW 1) shall be used.
- ii. In clause 10.6 of BS 5400: Section 9.1: 1983 the equation for $e\alpha$ is modified.

Scope

1.2 This standard covers the use of BS 5400: Part 9: Section 9.1: 1983 for the design of bearings in highway bridges.

Implementation

1.3 This Standard should be used forthwith on all schemes for the construction, improvement and maintenance of trunk roads, including motorways, currently being prepared provided that, in the opinion of the Overseeing Department, this would not result in significant additional expense or delay progress. Design Organisations should confirm its application to particular schemes with the Overseeing Department.

2. USE OF THE BRITISH STANDARD

2.1 The design of bearings for the Overseeing Department's highway bridges shall be carried out in accordance with BS 5400: Section 9.1 as amended by this Standard. The amendments to Section 9.1 are given in Appendix A to this standard.

2.2 The British Standard BS 5400: Section 9.1 as amended by this Standard supersedes the following:

- i. Technical Memorandum (Bridges) No BE 1/76; Design Requirements for Elastomeric Bridge Bearings.
- ii. Interim Memorandum (Bridges) No IM 11; PTFE in Bridge Bearings.

2.3 Where reference is made to any Part of BS 5400, this shall be taken as a reference to that Part as implemented by the Overseeing Department.

3. ADDITIONAL REQUIREMENTS

3.1 Specification clauses for bearings for use in the Overseeing Department's highway bridges are given in the Specification for Highway Works (December 1991) (MCHW 1). Advice on these is contained in the Notes for Guidance on the Specification for Highway Works (December 1991)(MCHW 2).

3.2 The clauses in BS 5400: Section 9.1 are expressed in the form of recommendation generally using the word "should"; however these shall be considered as mandatory for the purpose of this Standard.

3.3 Proprietary bearings, and structural components of bearings (eg in aluminium alloy), which fall outside the scope of BS 5400: Part 9, are not covered by this Standard.

3.4 Where bridge bearings are procured through a contract incorporating the Specification for Highway Works (December 1991) (MCHW 1) products conforming to equivalent standards or specifications of other member states of the European Community will be acceptable in accordance with the terms of the 104 and 105 Series of Clauses of that Specification. Any contract not containing these Clauses must contain a suitable clause of mutual recognition having the same effect regarding which advice should be sought.

4. REFERENCES

- 4.1 BS 5400: Steel, Concrete and Composite Bridges Part 9: Bridge bearings. Section 9.1: 1983, Code of Practice for design of bridge bearings.
- 4.2 Manual of Contract Documents for Highway Works:-
- Volume 1: Specification for Highway Works (December 1991): HMSO (MCHW 1).
- Volume 2: Notes for Guidance on the Specification for Highway Works (December 1991): HMSO (MCHW 2).

5. ENQUIRIES

All technical enquiries or comments on this Standard should be sent in writing as appropriate to:-

Chief Highway Engineer
The Department of Transport
St Christopher House
Southwark Street
London SE1 0TE

T A ROCHESTER
Chief Highway Engineer

The Deputy Chief Engineer
Roads Directorate
The Scottish Office Industry Department
New St. Andrew's House
Edinburgh EH1 3TG

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AMENDMENTS TO BS 5400: SECTION 9.1: 1983

Page 4

5.6 Add the following at the end of clause:-

"For bearings in halving joints access for inspection and replacement is practically impossible for slab type bridges and extremely difficult for beam and slab construction."

Page 7

5.17 Delete clause and insert the following

"Bearing Schedule. The bearing design requirements and acceptance tests shall be listed in a bearing schedule. A typical bearing schedule for this purpose is set out in Appendix A of Section 9.1."

Page 10

10.1.1 After the last sentence, insert additional sentence as follows:-

"The use of pad and strip bearings shall be restricted to small and simply supported structures of spans less than 10 metres."

Page 11

10.6 Delete the equation for $\epsilon\alpha$ and insert the following:

$$\epsilon\alpha = \frac{(b_e^2 \alpha b + l_e^2 \alpha l) t_i}{2 \Sigma (t_i^3)}$$

The outer protective layers shall be ignored in the calculation of $\epsilon\alpha$."

Page 12

10.6 Delete definition for Σt_i .

10.11 Delete 'Numerically, $H < 0.1 (V + 2A_1)$ '; and insert
"H is less than each of the following:-

- i. $0.1 (V + 2A_1)$
- ii. $0.2V$ "

Table 9 Extend the typical bridge bearing schedule by adding the following items and additional footnote at the bottom:-

Number of complete bearings to be subjected to acceptance testing	Bearings other than elastomeric bearings	Combined vertical and horizontal load** test at serviceability limit state				
		Combined vertical and horizontal load** test at ultimate limit state				
	Laminated elastomeric bearings	Quick production test				
		Compressive stiffness test				
		Shear stiffness test				

** Load values for testing shall be derived from the design load effects above multiplied by the appropriate value of partial material factor γ_m .