

Steel, concrete and composite bridges —

Part 9: Bridge bearings —

Section 9.1 Code of practice for design of bridge bearings

ICS 93.040

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This British Standard, having been prepared under the direction of the Civil Engineering and Building Structures Standards Committee, was published under the authority of the Board of BSI and comes into effect on 31 January 1983

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The following BSI references relate to the work on this standard:
Committee reference CSB/30
Draft for comment 80/10184 DC

ISBN 0 580 13015 0

Amendments issued since publication

Amd. No.	Date	Comments
16749 Corrigendum No. 1	31 October 2006	Correction to equation in 10.10.1

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Foreword

BS 5400 is a document combining codes of practice to cover the design and construction of steel, concrete and composite bridges and specifications for loads, materials, and workmanship. It comprises the following Parts and Sections:

- *Part 1: General statement;*
- *Part 2: Specification for loads;*
- *Part 3: Code of practice for design of steel bridges;*
- *Part 4: Code of practice for design of concrete bridges;*
- *Part 5: Code of practice for design of composite bridges;*
- *Part 6: Specification for materials and workmanship, steel;*
- *Part 7: Specification for materials and workmanship, concrete, reinforcement and prestressing tendons;*
- *Part 8: Recommendations for materials and workmanship, concrete, reinforcement and prestressing tendons;*
- *Part 9: Bridge bearings;*
- *Section 9.1: Code of practice for design of bridge bearings;*
- *Section 9.2: Specification for materials, manufacture and installation of bridge bearings;*
- *Part 10: Code of practice for fatigue.*

This Section of Part 9, together with Section 9.2, supersede appendix F of BS 5400-2:1978, which is to be withdrawn by an amendment.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

This code of practice represents a standard of good practice and takes the form of recommendations. Compliance with it does not confer immunity from relevant legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to vi, pages 1 to 18, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This Section of Part 9 of BS 5400 gives recommendations for the design and performance of the most common types of bridge bearings. It should be read in conjunction with the other Parts of BS 5400 that cover loading, design, materials and workmanship of steel, concrete and composite bridges. The recommendations given in this Section of Part 9 are appropriate only when the materials and workmanship comply with Section 9.2.

This Section of Part 9 does not cover concrete hinges and special bearings for moving bridges, e.g. swing and lift bridges.

2 References

The titles of the publications referred to in this Section of Part 9 are listed on the inside back cover.

3 Definitions and symbols

3.1 Definitions. For the purposes of this Section of Part 9, the following definitions, together with those given for **design loads** and **design load effects** in Part 1, apply.

3.1.1

elastomer

a compound containing natural or chloroprene rubber with properties similar to those of rubber

3.1.2

roller bearing

a bearing consisting essentially of one or more steel rollers between parallel upper and lower steel plates (See Figure 1(a) and Figure 1(b).)

3.1.3

rocker bearing

a bearing consisting essentially of a curved surface in contact with a flat or curved surface and constrained to prevent relative horizontal movement. The curved surfaces may be cylindrical or spherical. (See Figure 1(c) and Figure 1(d).) Rocker bearings permit rotation by rolling of one part on another

3.1.4

knuckle bearing

a bearing consisting essentially of two or more members with mating curved surfaces. The curved surfaces may be cylindrical or spherical. [See Figure 1(e), Figure 1(g) and Figure 1(h).] Knuckle bearings permit rotation by sliding of one part on another

3.1.5

leaf bearing

a bearing consisting essentially of a pin passing through a number of interleaved plates fixed alternately to the upper and lower outer bearing plates [See Figure 1(f).]

3.1.6

sliding bearing

a bearing consisting essentially of two surfaces sliding one on the other [See Figure 1(i).]

3.1.7

elastomeric bearing

a bearing comprising a block of elastomer that may be reinforced internally with steel plates

3.1.8

laminated bearing

an elastomeric bearing reinforced with steel plates [See Figure 1(j).]

3.1.9

plain pad bearing

an unreinforced elastomeric bearing

3.1.10

strip bearing

a plain pad bearing for which the length is at least ten times the width

3.1.11

pot bearing

a bearing consisting essentially of a metal piston supported by a disc of unreinforced elastomer that is confined within a metal cylinder [See Figure 1(k).]

3.2 Symbols. The symbols used in this Section of Part 9 are as follows.

A	overall plan area of elastomeric bearing
A_e	effective plan area of elastomeric bearing
A_1	reduced effective plan area of elastomeric bearing
b	overall width of bearing (the shorter dimension of a rectangular bearing)
b_e	effective width of elastomeric bearing
E	modulus of elasticity
E_b	bulk modulus of elastomer
G	shear modulus of the elastomer
H	horizontal force
k	a factor
l	overall length of bearing (the longer dimension of a rectangular bearing)
l_e	effective length of elastomeric bearing
l_p	force-free perimeter of elastomeric bearing