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BS 5400 : Part 4 : 1978

UDC 624.21.01 + 624.21.012.2

Steel, concrete and composite bridges

Part 4. Code of practice for design of concrete bridges

Ponts en acier, ponts en béton, ponts mixtes Partie 4. Règles pour le calcul des ponts en béton

Brücken aus Stahl, Beton und Verbundbau Teil 4. Richtlinie für den Entwurf und die Bemessung von Stahlbetonbrücken

British Standards Institution

Gr8 ^{R42} 1801

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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 the loads, materials and workmanship. It comprises the following :

- 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* Code of practice for bearings
- Part 10* Code of practice for fatigue

Coefficient k_e (effective thickness) Coefficient k_j (variation as a function of time) Coefficient k_L (environment) Coefficient k_e (effective thickness) Relaxation coefficient Coefficient γ₁

Coefficient γ_2 Coefficient γ_2

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*In course of preparation

British Standard

Steel, concrete and composite bridges

Part 4. Code of practice for design of concrete bridges

1. Scope

This Part of this British Standard deals with the design of concrete bridges. It contains much in common with CP 110 'The structural use of concrete'.

After stating the objectives and requirements of design, particular requirements are given for reinforced concrete, prestressed concrete and composite concrete construction,

Structural elements included are beams, slabs, columns and walls, bases, tension members and connections between precast concrete members.

2. References

The titles of the standards publications referred to in this Part of this British Standard are listed on the inside back cover.

З.	Defi	nitions	and	sym	bols
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3.1 Definitions. For definitions see Part 1. For the sake of clarity the factors which together comprise the partial safety factor for loads are restated as follows.

design loads are the loads obtained by multiplying the characteristic loads by γ_f , the partial safety factor for loads. γ_1 is a function of three individual factors, γ_{11}, γ_{12} and γ_{f_3} , which take account of the following.

- possible unusual increases in load beyond those Yin considered in deriving the characteristic load ;
- γ_{f_2} reduced probability that, with combinations of load, the individual loads would all be at their characteristic values;
- Yfa inaccurate assessment of effects of loading, unforeseen stress redistribution in structure, variation in dimensional accuracy achieved in construction and the importance of the limit state being considered.

The relevant values of the function γ_{fL} (= γ_{f_1} , γ_{f_2}) are given in Part 2.

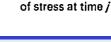
The values of γ_{f_3} are given in clause 5.

3.2 Symbols. The symbols in this Part of this standard are as follows.

Ac	Area of concrete
Ací	Area of effective concrete flange

- Ao
- Area enclosed by the median wall line A_{ps} Area of prestressing tendons
- A's Area of compression reinforcement
- A'51 Area of compression reinforcement in the more highly compressed face $A_{\rm s}$ Area of tension reinforcement
- As2 Area of reinforcement in other face
- Area of longitudinal reinforcement (for columns) $A_{\rm sc}$

AsL	Cross-sectional area of longitudinal
	reinforcement provided for torsion
Asv	Cross-sectional area of the two legs of a link
At	Area of transverse reinforcement
a	Deflection
a'	Distance from compression face to point at
	which the crack width is being calculated
ab .	Distance between bars
acent	Distance of the centroid of the concrete flange
-02110	from the centroid of the composite section
acr	Distance from the point (crack) considered to the
001	surface of nearest longitudinal bar
as.	Distance of the centroid of the steel from the
5 5	centroid of the net concrete section
Ь	Width of section
b bc	Breadth of compression face
be be	Width of contact surface /between in situ and
26	Width of contact surface (between in situ and precast components)
bı	Breadth of section at level of tension
<i>D</i> [reinforcement
bw	Breadth of web or rib of a member
Ĉ	Torgional constant
Cmin	Minimum cover to tension steel
Dc	Density of concrete at time of test
ď	Effective depth of tension reinforcement
d'	Depth to compression reinforcement
de	Depth of concrete in compression
do	Depth to additional reinforcement to resist
	horizontal loading
d_1	Effective depth in shear
d2	Depth to reinforcement
Ec	Static secant modulus of elasticity of concrete
Ecf	Modulus of elasticity of flange concrete
Ecq	Dynamic tangent modulus of elasticity of
	concrete
Ës	Modulus of elasticity of steel
e	Base of Napierian logarithms
е	Eccentricity
ea	Additional eccentricity due to deflections in
	wails
eх	Resultant eccentricity of load at right angles to
	plane of wall
ex1	Resultant eccentricity calculated at top of wall
e _{X2}	Resultant eccentricity calculated at bottom of
-	wali
Fbst	Tensile bursting force
Fbt	Tensile force due to ultimate loads in a bar or
_	group of bars
Fh	Maximum horizontal ultimate load
Fv	Maximum vertical ultimate load
fbs	Bond stress
f _{cav}	Average compressive stress in the flexural
	compressive zone
/ _{ci}	Concrete strength at (initial) transfer
fci	Stress in concrete at application of an increment





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