

Australian Standard™

Concrete structures



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Concrete structures

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Previous edition AS 3600—1994.
Third edition 2001.
Reissued incorporating Amendment No. 1 (May 2002).
Reissued incorporating Amendment No. 2 (October 2004)

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PREFACE

This Standard was prepared by Standards Australia Committee BD-002, Concrete Structures, to supersede AS 3600—1994.

This Standard incorporates Amendment No. 1 (May 2002) and Amendment No. 2 (October 2004). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

Objective of the Standard

The principal objective of the Standard is to provide users with nationally acceptable unified rules for the design and detailing of concrete structures and elements, with or without steel reinforcement or prestressing tendons, based on the principles of structural engineering mechanics. The secondary objective is to provide performance criteria against which the finished structure can be assessed for compliance with the relevant design requirements.

Background to the Third Edition

Amendment No. 1 to the 1994 edition of the Standard was issued in August 1996 to take account of the low ductility of wire to AS 1303 and mesh to AS 1304. It also incorporated improvements based on user experience in implementing AS 3600.

Following a five-year review, further amendments to the Standard were approved by the Concrete Structures Committee in August 1999. These amendments take account of more recent revisions of key materials Standards, and incorporate additional improvements to the clarity and intent of particular requirements, based on user comments.

In view of the number and extent of the amendments to AS 3600 now involved, the SAI Concrete Structures Committee recommended that, rather than issuing further ‘green slip’ amendments, a Third Edition of AS 3600 be published which incorporated all published and approved amendments, Amendment 1 and 2.

Differences between the Second and Third editions of AS 3600

As noted in the opening paragraphs of the Preface, this Edition incorporates Amendment No. 1 of August 1996 and amendments approved in August 1999.

Areas of major change covered in Amendment 2, which have been incorporated into this edition, are as follows:

- 1 Introduction of 500 MPa reinforcing steel with AS/NZS 4671 covering the specification for the new grade of reinforcing steel. The carbon equivalent of the reinforcement has been held to a level so that current practices for site welding of reinforcement including ‘locational tack welding’ can continue to be used.
- 2 Increase in the maximum concrete compressive strength to 65 MPa.
- 3 Consistency of references and information within AS 1379—*Specification and supply of concrete*, including a change to the basic shrinkage strain value to reflect normal class concrete.
- 4 Fire-resistance periods for the structural adequacy for columns has been revised following research by BRANZ, and allowances for chases and recesses in concrete walls have been included and are consistent with those in AS 3700, *Masonry structures*.
- 5 Linear elastic analysis requirements have been reviewed with consideration of propping, effective stiffness, secondary effects and moment redistribution.

- 6 Beam strength and serviceability design requirements have been significantly reviewed with changes to the minimum strength requirements, deflection by simplified calculation, the deemed to comply span-to-depth ratios, crack control provisions and end anchorage of fitments among others. The maximum transverse bar spacing have also been increased.
- 7 Changes have been made to the rules for flexural crack control of slabs, including reduction of the maximum transverse bar spacing.
- 8 Development length and splicing of reinforcement has been revisited and include amendments to the deemed to comply lengths and the size of bars permitted in tension and compression lapped splices. Rules for welded and mechanical splices have been removed and new rules are under development.
- 9 Material requirements have been updated with reference to the current AS 1379 and the new reinforcing steels to AS/NZS 4671.
- 10 Section 20 has been deleted in its entirety, with all aspects of the testing and assessment of concrete referred to AS 1379.
- 11 Section 21, on the testing of members and structures, has been completely redrafted and relabelled as Appendix B.

The Committee is in the process of a major revision of AS 3600, which includes the areas of high-strength concrete, bond and anchorage requirements and application of mechanical and welded splices.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

CONTENTS

	<i>Page</i>
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE AND APPLICATION.....	8
1.2 REFERENCED DOCUMENTS	9
1.3 USE OF ALTERNATIVE MATERIALS OR METHODS	9
1.4 DESIGN	9
1.5 CONSTRUCTION.....	10
1.6 DEFINITIONS	10
1.7 NOTATION	14
SECTION 2 DESIGN REQUIREMENTS AND PROCEDURES	
2.1 DESIGN REQUIREMENTS	22
2.2 DESIGN FOR STABILITY.....	22
2.3 DESIGN FOR STRENGTH.....	22
2.4 DESIGN FOR SERVICEABILITY	22
2.5 DESIGN FOR STRENGTH AND SERVICEABILITY BY LOAD TESTING OF A PROTOTYPE	24
2.6 DESIGN FOR DURABILITY	24
2.7 DESIGN FOR FIRE RESISTANCE.....	24
2.8 OTHER DESIGN REQUIREMENTS	24
SECTION 3 LOADS AND LOAD COMBINATIONS FOR STABILITY, STRENGTH AND SERVICEABILITY	
3.1 LOADS AND OTHER ACTIONS.....	25
3.2 LOAD COMBINATIONS FOR STABILITY DESIGN	25
3.3 LOAD COMBINATIONS FOR STRENGTH DESIGN	26
3.4 LOAD COMBINATIONS FOR SERVICEABILITY DESIGN.....	26
3.5 LOAD COMBINATIONS FOR FIRE-RESISTANCE DESIGN	26
SECTION 4 DESIGN FOR DURABILITY	
4.1 APPLICATION OF SECTION.....	27
4.2 DESIGN FOR DURABILITY	27
4.3 EXPOSURE CLASSIFICATION	27
4.4 REQUIREMENTS FOR CONCRETE FOR EXPOSURE CLASSIFICATIONS A1 AND A2.....	29
4.5 REQUIREMENTS FOR CONCRETE FOR EXPOSURE CLASSIFICATIONS B1, B2 AND C.....	30
4.6 REQUIREMENTS FOR CONCRETE FOR EXPOSURE CLASSIFICATION U	30
4.7 ADDITIONAL REQUIREMENTS FOR ABRASION	30
4.8 ADDITIONAL REQUIREMENTS FOR FREEZING AND THAWING	31
4.9 RESTRICTIONS ON CHEMICAL CONTENT IN CONCRETE.....	31
4.10 REQUIREMENTS FOR COVER TO REINFORCING STEEL AND TENDONS....	31
SECTION 5 DESIGN FOR FIRE RESISTANCE	
5.1 SCOPE OF SECTION	34
5.2 DEFINITIONS	34
5.3 DESIGN REQUIREMENTS	35
5.4 FIRE-RESISTANCE PERIODS FOR BEAMS	35
5.5 FIRE-RESISTANCE PERIODS FOR SLABS.....	37
5.6 FIRE-RESISTANCE PERIODS FOR COLUMNS.....	39

	<i>Page</i>
5.7 FIRE-RESISTANCE PERIODS FOR WALLS	40
5.8 FIRE-RESISTANCE PERIODS FROM FIRE TESTS	43
5.9 PREDICTION OF FIRE-RESISTANCE PERIODS	44
5.10 INCREASE OF FIRE-RESISTANCE PERIODS BY USE OF INSULATING MATERIALS	44
5.11 RECESSES FOR SERVICES IN WALLS.....	46
5.12 CHASES.....	46
 SECTION 6 DESIGN PROPERTIES OF MATERIALS	
6.1 PROPERTIES OF CONCRETE	48
6.2 PROPERTIES OF REINFORCEMENT	52
6.3 PROPERTIES OF TENDONS.....	53
6.4 LOSS OF PRESTRESS IN TENDONS.....	55
 SECTION 7 METHODS OF STRUCTURAL ANALYSIS	
7.1 GENERAL	59
7.2 SIMPLIFIED METHOD FOR REINFORCED CONTINUOUS BEAMS AND ONE-WAY SLABS	62
7.3 SIMPLIFIED METHOD FOR REINFORCED TWO-WAY SLABS SUPPORTED ON FOUR SIDES.....	63
7.4 SIMPLIFIED METHOD FOR REINFORCED TWO-WAY SLAB SYSTEMS HAVING MULTIPLE SPANS	66
7.5 IDEALIZED FRAME METHOD FOR STRUCTURES INCORPORATING TWO-WAY SLAB SYSTEMS.....	69
7.6 LINEAR ELASTIC ANALYSIS	71
7.7 ELASTIC ANALYSIS OF FRAMES INCORPORATING SECONDARY BENDING MOMENTS.....	74
7.8 RIGOROUS STRUCTURAL ANALYSIS	74
7.9 PLASTIC METHODS OF ANALYSIS FOR SLABS	75
7.10 PLASTIC METHODS OF ANALYSIS OF FRAMES.....	75
 SECTION 8 BEAMS FOR STRENGTH AND SERVICEABILITY	
8.1 STRENGTH OF BEAMS IN BENDING	76
8.2 STRENGTH OF BEAMS IN SHEAR	80
8.3 STRENGTH OF BEAMS IN TORSION	85
8.4 LONGITUDINAL SHEAR IN BEAMS	87
8.5 DEFLECTION OF BEAMS	89
8.6 CRACK CONTROL OF BEAMS.....	91
8.7 VIBRATION OF BEAMS.....	93
8.8 T-BEAMS AND L-BEAMS	93
8.9 SLENDERNESS LIMITS FOR BEAMS.....	93
 SECTION 9 DESIGN OF SLABS FOR STRENGTH AND SERVICEABILITY	
9.1 STRENGTH OF SLABS IN BENDING	95
9.2 STRENGTH OF SLABS IN SHEAR.....	98
9.3 DEFLECTION OF SLABS.....	101
9.4 CRACK CONTROL OF SLABS.....	104
9.5 VIBRATION OF SLABS	107
9.6 MOMENT RESISTING WIDTH FOR ONE-WAY SLABS SUPPORTING CONCENTRATED LOADS	107
9.7 LONGITUDINAL SHEAR IN COMPOSITE SLABS	107

SECTION 10 DESIGN OF COLUMNS FOR STRENGTH AND SERVICEABILITY	
10.1 GENERAL	108
10.2 DESIGN PROCEDURES	108
10.3 DESIGN OF SHORT COLUMNS	109
10.4 DESIGN OF SLENDER COLUMNS	110
10.5 SLENDERNESS	111
10.6 STRENGTH OF COLUMNS IN COMBINED BENDING AND COMPRESSION	115
10.7 REINFORCEMENT REQUIREMENTS FOR COLUMNS	116
10.8 TRANSMISSION OF AXIAL FORCE THROUGH FLOOR SYSTEMS	119
SECTION 11 DESIGN OF WALLS	
11.1 APPLICATION	120
11.2 DESIGN PROCEDURES	120
11.3 BRACING OF WALLS	120
11.4 SIMPLIFIED DESIGN METHOD FOR BRACED WALLS SUBJECT TO VERTICAL FORCES ONLY	121
11.5 DESIGN OF WALLS FOR IN-PLANE HORIZONTAL FORCES	122
11.6 REINFORCEMENT REQUIREMENTS FOR WALLS	123
SECTION 12 DESIGN OF NON-FLEXURAL MEMBERS, END ZONES AND BEARING SURFACES	
12.1 DESIGN OF NON-FLEXURAL MEMBERS	124
12.2 ANCHORAGE ZONES FOR PRESTRESSING ANCHORAGES	126
12.3 BEARING SURFACES	127
SECTION 13 STRESS DEVELOPMENT AND SPLICING OF REINFORCEMENT AND TENDONS	
13.1 STRESS DEVELOPMENT IN REINFORCEMENT	129
13.2 SPLICING OF REINFORCEMENT	130
13.3 STRESS DEVELOPMENT IN TENDONS	132
13.4 COUPLING OF TENDONS	132
SECTION 14 JOINTS, EMBEDDED ITEMS, FIXINGS AND CONNECTIONS	
14.1 DESIGN OF JOINTS	133
14.2 EMBEDDED ITEMS AND HOLES IN CONCRETE	133
14.3 REQUIREMENTS FOR FIXINGS	134
14.4 CONNECTIONS	134
SECTION 15 PLAIN CONCRETE MEMBERS	
15.1 APPLICATION	135
15.2 DESIGN	135
15.3 STRENGTH IN BENDING	135
15.4 STRENGTH IN SHEAR	135
15.5 STRENGTH IN AXIAL COMPRESSION	136
15.6 STRENGTH IN COMBINED BENDING AND COMPRESSION	136
SECTION 16 CONCRETE PAVEMENTS, FLOORS AND RESIDENTIAL FOOTINGS	
16.1 APPLICATION	137
16.2 ADDITIONAL DESIGN CONSIDERATIONS FOR PAVEMENTS AND INDUSTRIAL AND COMMERCIAL FLOORS	137
16.3 RESIDENTIAL FLOORS AND FOOTINGS	137

	<i>Page</i>
SECTION 17 LIQUID RETAINING STRUCTURES—DESIGN REQUIREMENTS	138
SECTION 18 MARINE STRUCTURES	
18.1 APPLICATION	138
18.2 ADDITIONAL LOADS AND ACTIONS	138
18.3 ADDITIONAL DURABILITY AND DESIGN REQUIREMENTS	138
SECTION 19 MATERIAL AND CONSTRUCTION REQUIREMENTS	
19.1 MATERIAL AND CONSTRUCTION REQUIREMENTS FOR CONCRETE AND GROUT	139
19.2 MATERIAL AND CONSTRUCTION REQUIREMENTS FOR REINFORCING STEEL	142
19.3 MATERIAL AND CONSTRUCTION REQUIREMENTS FOR PRESTRESSING DUCTS, ANCHORAGES AND TENDONS	144
19.4 CONSTRUCTION REQUIREMENTS FOR JOINTS AND EMBEDDED ITEMS	146
19.5 TOLERANCES FOR STRUCTURES AND MEMBERS	146
19.6 FORMWORK	147
APPENDICES	
A ADDITIONAL REQUIREMENTS FOR STRUCTURES SUBJECT TO EARTHQUAKE ACTIONS	151
B TESTING OF MEMBERS AND STRUCTURES	161
C REFERENCED DOCUMENTS	167
INDEX	170

STANDARDS AUSTRALIA

Australian Standard
Concrete structures

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE AND APPLICATION**1.1.1 Scope**

This Standard sets out minimum requirements for the design and construction of concrete structures and members that contain reinforcing steel, or tendons, or both. It also sets out minimum requirements for plain concrete members.

This Standard will be referenced in the Building Code of Australia by way of BCA Amendment No. 9 to be published by 1 July 2001, thereby superseding the previous edition, AS 3600—1994, which will be withdrawn 12 months from the date of publication of this edition.

1.1.2 Application

This Standard is intended to apply to concrete structures made of concrete—

- (a) with a characteristic compressive strength at 28 days (f'_c) in the range of 20 MPa to 65 MPa; and
- (b) with a saturated surface-dry density in the range 1800 kg/m³ to 2800 kg/m³.

The Standard also applies to reinforcing steels complying with—

- (a) AS 1302, or having a yield strength (f_{sy}) of 500 MPa and Ductility Class N in accordance with AS/NZS 4671. These reinforcing materials may be used, without restriction, in all applications referred to in this Standard; and
- (b) AS 1303 or AS 1304, or having a yield strength (f_{sy}) of 500 MPa and Ductility Class L in accordance with AS/NZS 4671. These reinforcing materials shall not be used in any situation where the reinforcement, is expected to undergo large deformation under strength limit state conditions.

NOTE: The use of Ductility Class L reinforcement is further limited by other clauses within this Standard.

- (c) Prestressing tendons complying with AS 1310, AS 1311, or AS 1313, as appropriate.

For concrete road bridges and for concrete railway bridges, HB77.5 and HB77.8, respectively, shall be used where applicable.

The general principles of concrete design and construction embodied in this Standard may be applied to concrete other than that specified above, or to concrete structures or members not specifically mentioned herein.

This Standard is not intended to apply to the design of mass concrete structures. It is also not intended that the requirements of this Standard should take precedence over those of other Australian Standards.

NOTES:

- 1 It is intended that the design of a structure or member, to which this Standard applies, be carried out by, or under the supervision of, a suitably experienced and competent person.