Australian/New Zealand Standard™

Composite structures—Composite steel-concrete construction in buildings





AS/NZS 2327:2017

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee BD-032, Composite Construction. It was approved on behalf of the Council of Standards Australia on 25 October 2017 and by the New Zealand Standards Approval Board on 6 November 2017. This Standard was published on 20 December 2017.

The following are represented on Committee BD-032:

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This Standard was issued in draft form for comment as DR AS/NZS 2327:2016.

AS/NZS 2327:2017 (Incorporating Amendment No. 1)

Australian/New Zealand Standard[™]

Composite structures—Composite steel-concrete construction in buildings

Originated in Australia as AS 1480 Supplement 1—1974. Previous edition AS 2327.1—2003. Jointly revised and redesignated as AS/NZS 2327:2017. Reissued incorporating Amendment No. 1 (June 2020).

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ISBN 978 1 76035 970 6

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Technical Committee BD-032, Composite Construction, to supersede AS 2327.1—2003 Composite structures, Part 1—Simply supported beams.

This Standard incorporates Amendment No. 1 (June 2020). 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.

The objective of this Standard is to set out minimum requirements for the design, detailing and construction of composite steel-concrete members (beams, columns, slabs, joints) in buildings. The Standard is to be used by structural engineers when designing steel framed building structures.

This revision incorporates a number of technical and editorial changes, as follows:

- (a) Changes to the strength of concrete, raising the maximum compressive cylinder strength to 100 MPa.
- (b) Changes to the yield strength of steel, raising the maximum tensile yield strength to 690 MPa.
- (c) Provisions for the design of composite slabs using profiled steel sheeting.
- (d) Provisions for the design of composite beams.
- (e) Provisions for the design of composite columns.
- (f) Provisions for the design of composite joints.
- (g) Provisions for system behaviour floor design.
- (h) Provisions for fire design.
- (i) Provisions for earthquake design.

Statements expressed in mandatory terms in Notes to Tables are deemed to be requirements of this Standard.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendices 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

Page

1.1 APPLICATION 5 1.2 MATERIALS. 16 1.3 CONSTRUCTION 17 1.4 GENERAL DESIGN REQUIREMENTS. 18 1.5 ACTIONS AND DESIGN SITUATIONS 20 1.6 METHODS OF STRUCTURAL ANALYSIS. 21 1.7 DESIGN OF STRUCTURAL ANALYSIS. 21 1.7 DESIGN OF COMPOSITE SLABS 23 2.1 GENERAL 23 2.2 DETAILING PROVISIONS 25 2.3 ACTIONS AND ACTION EFFECTS. 27 2.4 ANALYSIS FOR INTERNAL FORCES AND MOMENTS 28 2.5 VERIFICATION OF PROFILED STEEL SHEETING AS FORMWORK FOR 30 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR PROFILED STEEL 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS. 30 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS. 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS. 30 2.8 VERIFICATION OF COMPOSITE BEAMS 31 3.1 GENERAL 42 3.3 2.2 STEEL BEAM REQUIREMEN	SECTIO	N 1 GENERAL REQUIREMENTS	
1.2 MATERIALS	1.1	APPLICATION	5
1.3 CONSTRUCTION 17 1.4 GENERAL DESIGN REQUIREMENTS 18 1.5 ACTIONS AND DESIGN SITUATIONS 20 1.6 METHODS OF STRUCTURAL ANALYSIS 21 1.7 DESIGN OF COMPOSITE SLABS 22 SECTION 2 DESIGN OF COMPOSITE SLABS 23 2.1 GENERAL 23 2.2 DETAILING PROVISIONS 25 2.3 ACTIONS AND ACTION EFFECTS 27 2.4 ANALYSIS FOR INTERNAL FORCES AND MOMENTS 28 2.5 VERIFICATION OF PROFILED STEEL SHEETING AS FORMWORK FOR 30 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.8 VERIFICATION OF COMPOSITE SLABS FOR SERVICEABILITY LIMIT STATES 30 2.8 VERIFICATION OF COMPOSITE BEAMS 30 2.8 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAMS 41 3.1 GENERAL 42 3.3	1.2	MATERIALS	16
1.4 GENERAL DESIGN REQUIREMENTS. 18 1.5 ACTIONS AND DESIGN SITUATIONS 20 1.6 METHODS OF STRUCTURAL ANALYSIS. 21 1.7 DESIGN ASSISTED BY TESTING. 22 SECTION 2 DESIGN OF COMPOSITE SLABS 23 2.1 GENERAL 23 2.2 DETAILING PROVISIONS 25 2.3 ACTIONS AND ACTION EFFECTS. 27 2.4 ANALYSIS FOR INTERNAL FORCES AND MOMENTS 28 2.5 VERIFICATION OF PROFILED STEEL SHEETING AS FORMWORK FOR 101 1.11 TIMATE LIMIT STATES 30 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.8 VERIFICATION OF COMPOSITE BEAMS 31 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 42 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF COMPOSITE NOF AC	1.3	CONSTRUCTION	17
1.5 ACTIONS AND DESIGN SITUATIONS 20 1.6 METHODS OF STRUCTURAL ANALYSIS 21 1.7 DESIGN ASSISTED BY TESTING 22 SECTION 2 DESIGN OF COMPOSITE SLABS 23 2.1 GENERAL 23 2.2 DESIGN OF COMPOSITE SLABS 25 2.3 ACTIONS AND ACTION EFFECTS. 27 2.4 ANALYSIS FOR INTERNAL FORCES AND MOMENTS 28 2.5 VERIFICATION OF PROFILED STEEL SHEETING AS FORMWORK FOR 30 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR PROFILED STEEL 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.8 VERIFICATION OF COMPOSITE BLABS 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS. 30 2.8 VERIFICATION OF COMPOSITE BLABS 30 2.9 VERIFICATION OF COMPOSITE BEAMS 31 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 GENERAL 42 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAMS </td <td>1.4</td> <td>GENERAL DESIGN REQUIREMENTS</td> <td> 18</td>	1.4	GENERAL DESIGN REQUIREMENTS	18
1.6 METHODS OF STRUCTURAL ANALYSIS. 21 1.7 DESIGN ASSISTED BY TESTING 22 SECTION 2 DESIGN OF COMPOSITE SLABS 23 2.1 GENERAL 23 2.2 DETAILING PROVISIONS 25 2.3 ACTIONS AND ACTION EFFECTS 27 2.4 ANALYSIS FOR INTERNAL FORCES AND MOMENTS 28 2.5 VERIFICATION OF PROFILED STEEL SHEETING AS FORMWORK FOR 30 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR PROFILED STEEL 310 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR SERVICEABILITY LIMIT 31 STATES 38 34 SECTION 3 DESIGN OF COMPOSITE BEAMS 3.1 GENERAL 42 32 STEEL BEAM REQUIREMENTS 42 3.3 STEEL BEAM REQUIREMENTS 42 33 42 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAMS 44 3.5 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 3	1.5	ACTIONS AND DESIGN SITUATIONS	20
1.7 DESIGN ASSISTED BY TESTING	1.6	METHODS OF STRUCTURAL ANALYSIS	21
SECTION 2 DESIGN OF COMPOSITE SLABS 2.1 GENERAL	1.7	DESIGN ASSISTED BY TESTING	22
SECTION 2 DESIGN OF COMPOSITE SLABS 23 2.1 GENERAL 23 2.2 DETAILING PROVISIONS 25 2.3 ACTIONS AND ACTION EFFECTS 27 2.4 ANALYSIS FOR INTERNAL FORCES AND MOMENTS 28 2.5 VERIFICATION OF PROFILED STEEL SHEETING AS FORMWORK FOR 30 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR PROFILED STEEL 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.8 VERIFICATION OF COMPOSITE SLABS FOR SERVICEABILITY LIMIT 31 2.9 STEEL BEAM REQUIREMENTS 38 SECTION 3 DESIGN OF COMPOSITE BEAMS 31 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAMS 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PENETRATIONS 87 3.10 DESIGN FOR SERVICEABILITY 87 3.11 FATIGUE 92 SECTION 4 DESIGN OF COMPOSITE COLUMNS 93 <td>1.7</td> <td></td> <td></td>	1.7		
2.1 GENERAL 23 2.2 DETAILING PROVISIONS 25 2.3 ACTIONS AND ACTION EFFECTS. 27 2.4 ANALYSIS FOR INTERNAL FORCES AND MOMENTS 28 2.5 VERIFICATION OF PROFILED STEEL SHEETING AS FORMWORK FOR ULTIMATE LIMIT STATES. 30 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR PROFILED STEEL SHEETING USED AS FORMWORK 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS. 30 2.8 VERIFICATION OF COMPOSITE SLABS FOR SERVICEABILITY LIMIT STATES 30 2.8 VERIFICATION OF COMPOSITE BEAMS 31 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF COMPOSITE COLUMNS 71 3.11 FATIGUE 92 </td <td>SECTIO</td> <td>N 2 DESIGN OF COMPOSITE SLABS</td> <td></td>	SECTIO	N 2 DESIGN OF COMPOSITE SLABS	
2.2 DETAILING PROVISIONS 25 2.3 ACTIONS AND ACTION EFFECTS 27 2.4 ANALYSIS FOR INTERNAL FORCES AND MOMENTS 28 2.5 VERIFICATION OF PROFILED STEEL SHEETING AS FORMWORK FOR ULTIMATE LIMIT STATES 30 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR PROFILED STEEL SHEETING USED AS FORMWORK 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.8 VERIFICATION OF COMPOSITE SLABS FOR SERVICEABILITY LIMIT STATES 38 SECTION 3 DESIGN OF COMPOSITE BEAMS 31 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF SUPPORTING 77 3.10 DESIGN OF COMPOSITE COLUMNS 92 4.1 COMPOSITE COMPRESSION MEMBE	2.1	GENERAL	23
2.3 ACTIONS AND ACTION EFFECTS. 27 2.4 ANALYSIS FOR INTERNAL FORCES AND MOMENTS 28 2.5 VERIFICATION OF PROFILED STEEL SHEETING AS FORMWORK FOR ULTIMATE LIMIT STATES. 30 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR PROFILED STEEL SHEETING USED AS FORMWORK 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS. 30 2.8 VERIFICATION OF COMPOSITE SLABS FOR SERVICEABILITY LIMIT STATES 38 SECTION 3 DESIGN OF COMPOSITE BEAMS 31 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PENETRATIONS 87 3.1 FATIS 87 3.2 RESTINAWERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PEN	2.2	DETAILING PROVISIONS	25
2.4 ANALYSIS FOR INTERNAL FORCES AND MOMENTS 28 2.5 VERIFICATION OF PROFILED STEEL SHEETING AS FORMWORK FOR ULTIMATE LIMIT STATES 30 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR PROFILED STEEL SHEETING USED AS FORMWORK 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.8 VERIFICATION OF COMPOSITE SLABS FOR SERVICEABILITY LIMIT STATES 38 SECTION 3 DESIGN OF COMPOSITE BEAMS 42 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 44 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF SERVICEABILITY 87 3.10 DESIGN OF COMPOSITE COLUMNS 41 4.1 COMPOSITE COMPRESSION MEMBERS	2.3	ACTIONS AND ACTION EFFECTS	27
2.5 VERIFICATION OF PROFILED STEEL SHEETING AS FORMWORK FOR ULTIMATE LIMIT STATES	2.4	ANALYSIS FOR INTERNAL FORCES AND MOMENTS	28
ULTIMATE LIMIT STATES 30 2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR PROFILED STEEL SHEETING USED AS FORMWORK 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.8 VERIFICATION OF COMPOSITE SLABS FOR SERVICEABILITY LIMIT STATES 38 SECTION 3 DESIGN OF COMPOSITE BEAMS 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PENETRATIONS 87 3.10 DESIGN OF COMPOSITE COLUMNS 93 4.1 COMPOSITE COMPRESSION MEMBERS 93 4.2 RESISTANCE OF COMPOSITE COLUMNS 106 4.3 DETAILING PROVISIONS 106 4.4 VERIFICATION OF COMPOSITE COLUM	2.5	VERIFICATION OF PROFILED STEEL SHEETING AS FORMWORK FOR	
2.6 SERVICEABILITY LIMIT STATE REQUIREMENTS FOR PROFILED STEEL SHEETING USED AS FORMWORK		ULTIMATE LIMIT STATES	30
SHEETING USED AS FORMWORK 30 2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.8 VERIFICATION OF COMPOSITE SLABS FOR SERVICEABILITY LIMIT 37 STATES 38 SECTION 3 DESIGN OF COMPOSITE BEAMS 42 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PENETRATIONS 87 3.10 DESIGN OF COMPOSITE COLUMNS 4.1 COMPOSITE COMPRESSION MEMBERS 93 4.2 RESISTANCE OF COMPOSITE COLUMNS 106 4.3 DETAILING PROVISIONS 106 4.3 DETAILING PROVISIONS 108 4.4 VERIFICATION OF COMPOSITE COLUMNS 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT ST	2.6	SERVICEABILITY LIMIT STATE REQUIREMENTS FOR PROFILED STEEL	
2.7 ULTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS 30 2.8 VERIFICATION OF COMPOSITE SLABS FOR SERVICEABILITY LIMIT STATES 38 SECTION 3 DESIGN OF COMPOSITE BEAMS 31 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PENETRATIONS 87 3.10 DESIGN OF COMPOSITE COLUMNS 92 SECTION 4 DESIGN OF COMPOSITE COLUMNS 106 4.1 COMPOSITE COMPRESSION MEMBERS 93 4.2 RESISTANCE OF COMPOSITE COLUMNS 106 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT STATES 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT 109 4.5 SECOND ORDER EFFECTS 110 <td></td> <td>SHEETING USED AS FORMWORK</td> <td>30</td>		SHEETING USED AS FORMWORK	30
2.8 VERIFICATION OF COMPOSITE SLABS FOR SERVICEABILITY LIMIT STATES 38 SECTION 3 DESIGN OF COMPOSITE BEAMS 42 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PENETRATIONS 87 3.10 DESIGN FOR SERVICEABILITY 87 3.11 FATIGUE 92 SECTION 4 DESIGN OF COMPOSITE COLUMNS 10 4.1 COMPOSITE COMPRESSION MEMBERS 93 4.2 RESISTANCE OF COMPOSITE COLUMNS 106 4.3 DETAILING PROVISIONS 106 4.3 DETAILING PROVISIONS 106 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT STATES 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICE	27	UILTIMATE LIMIT STATE REQUIREMENTS FOR COMPOSITE SLABS	30
2.3 VIAINTENTION OF COMPOSITE DEADS FOR SERVICE ABLETT FEMILY STATES 38 SECTION 3 DESIGN OF COMPOSITE BEAMS 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PENETRATIONS 87 3.10 DESIGN OF COMPOSITE COLUMNS 87 4.1 COMPOSITE COMPRESSION MEMBERS 93 4.2 RESISTANCE OF COMPOSITE COLUMNS 106 4.3 DETAILING PROVISIONS 106 4.3 DETAILING PROVISIONS 106 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT STATES 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT STATES 4.5 SECOND ORDER EFFECTS 110 SEC	2.7	VERIFICATION OF COMPOSITE SLABS FOR SERVICEABILITY LIMIT	
SECTION 3 DESIGN OF COMPOSITE BEAMS 3.1 GENERAL 42 3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PENETRATIONS 87 3.10 DESIGN FOR SERVICEABILITY 87 3.11 FATIGUE 92 SECTION 4 DESIGN OF COMPOSITE COLUMNS 93 4.1 COMPOSITE COMPRESSION MEMBERS 93 4.2 RESISTANCE OF COMPOSITE COLUMNS 106 4.3 DETAILING PROVISIONS 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT 109 4.5 SECOND ORDER EFFECTS 110 SECTION 5 DESIGN OF COMPOSITE JOINTS 109 4.5 SECOND ORDER EFFECTS 110	2.0	STATES	38
SECTION 3 DESIGN OF COMPOSITE BEAMS 3.1 GENERAL		STATLS	
3.1GENERAL423.2STEEL BEAM REQUIREMENTS423.3CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS433.4EFFECTIVE SECTION OF A COMPOSITE BEAM443.5ULTIMATE LIMIT STATE513.6DESIGN OF SHEAR CONNECTORS623.7COVER AND CONCRETING773.8TRANSVERSE REINFORCEMENT IN CONCRETE SLABS783.9DESIGN OF WEB PENETRATIONS873.10DESIGN FOR SERVICEABILITY873.11FATIGUE92SECTION 4DESIGN OF COMPOSITE COLUMNS1064.1COMPOSITE COMPRESSION MEMBERS934.2RESISTANCE OF COMPOSITE COLUMNS1064.3DETAILING PROVISIONS1084.4VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT STATES1094.5SECOND ORDER EFFECTS110SECTION 5DESIGN OF COMPOSITE JOINTS112	SECTIO	N 3 DESIGN OF COMPOSITE BEAMS	
3.2 STEEL BEAM REQUIREMENTS 42 3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS 43 3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM 44 3.5 ULTIMATE LIMIT STATE 51 3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PENETRATIONS 87 3.10 DESIGN FOR SERVICEABILITY 87 3.11 FATIGUE 92 SECTION 4 DESIGN OF COMPOSITE COLUMNS 93 4.2 RESISTANCE OF COMPOSITE COLUMNS 106 4.3 DETAILING PROVISIONS 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT 109 4.5 SECOND ORDER EFFECTS 110 SECTION 5 DESIGN OF COMPOSITE JOINTS 112	3.1	GENERAL	42
3.3 CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS	3.2	STEEL BEAM REQUIREMENTS	42
3.4 EFFECTIVE SECTION OF A COMPOSITE BEAM	33	CALCULATION OF DESIGN ACTION EFFECTS DUE TO DESIGN LOADS	43
3.1 DITION OF NEODINATE DEFINITION 3.5 ULTIMATE LIMIT STATE 3.6 DESIGN OF SHEAR CONNECTORS 3.7 COVER AND CONCRETING 3.7 COVER AND CONCRETING 3.7 COVER AND CONCRETING 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PENETRATIONS 87 3.10 DESIGN FOR SERVICEABILITY 87 3.11 FATIGUE 92 SECTION 4 DESIGN OF COMPOSITE COLUMNS 4.1 COMPOSITE COMPRESSION MEMBERS 93 4.2 RESISTANCE OF COMPOSITE COLUMNS 4.1 COMPOSITE COMPRESSION MEMBERS SUBJECTED TO COMBINED ACTIONS 106 4.3 DETAILING PROVISIONS 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT STATES 109 4.5 SECOND ORDER EFFECTS 110 SECTION 5 5.1 SCOPE	3.4	EFFECTIVE SECTION OF A COMPOSITE BEAM	15
3.6 DESIGN OF SHEAR CONNECTORS 62 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PENETRATIONS 87 3.10 DESIGN FOR SERVICEABILITY 87 3.11 FATIGUE 92 SECTION 4 DESIGN OF COMPOSITE COLUMNS 93 4.1 COMPOSITE COMPRESSION MEMBERS 93 4.2 RESISTANCE OF COMPOSITE COMPRESSION MEMBERS SUBJECTED TO COMBINED ACTIONS 106 4.3 DETAILING PROVISIONS 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT STATES 109 4.5 SECOND ORDER EFFECTS 110 SECTION 5 DESIGN OF COMPOSITE JOINTS 112	3 5	LII TIMATE I IMIT STATE	51
3.6 DESIGN OF STIERAR CONTRECTORS 02 3.7 COVER AND CONCRETING 77 3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS 78 3.9 DESIGN OF WEB PENETRATIONS 87 3.10 DESIGN FOR SERVICEABILITY 87 3.11 FATIGUE 87 3.11 FATIGUE 87 3.11 FATIGUE 92 SECTION 4 DESIGN OF COMPOSITE COLUMNS 93 4.1 COMPOSITE COMPRESSION MEMBERS 93 4.2 RESISTANCE OF COMPOSITE COMPRESSION MEMBERS SUBJECTED TO COMBINED ACTIONS 106 4.3 DETAILING PROVISIONS 106 4.3 DETAILING PROVISIONS 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT STATES 109 4.5 SECOND ORDER EFFECTS 110 SECTION 5 DESIGN OF COMPOSITE JOINTS 110	3.6	DESIGN OF SHEAR CONNECTORS	62
3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SLABS	3.0	COVER AND CONCRETING	02 77
3.8 TRANSVERSE REINFORCEMENT IN CONCRETE SEABS	2.8	TDANSVEDSE DEINEODCEMENT IN CONCRETE SLADS	/ / 78
3.9 DESIGN OF WEB FEREIRATIONS 87 3.10 DESIGN FOR SERVICEABILITY 87 3.11 FATIGUE 92 SECTION 4 DESIGN OF COMPOSITE COLUMNS 92 4.1 COMPOSITE COMPRESSION MEMBERS 93 4.2 RESISTANCE OF COMPOSITE COMPRESSION MEMBERS SUBJECTED TO COMBINED ACTIONS 106 4.3 DETAILING PROVISIONS 106 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT STATES 109 4.5 SECOND ORDER EFFECTS 110 SECTION 5 DESIGN OF COMPOSITE JOINTS 112	2.0	DESIGN OF WED DENETDATIONS	/0
3.10 DESIGN FOR SERVICEABILITY 87 3.11 FATIGUE 92 SECTION 4 DESIGN OF COMPOSITE COLUMNS 92 4.1 COMPOSITE COMPRESSION MEMBERS 93 4.2 RESISTANCE OF COMPOSITE COMPRESSION MEMBERS SUBJECTED TO COMBINED ACTIONS 93 4.3 DETAILING PROVISIONS 106 4.3 DETAILING PROVISIONS 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT STATES 109 4.5 SECOND ORDER EFFECTS 110 SECTION 5 DESIGN OF COMPOSITE JOINTS 112	5.9 2.10	DESIGN OF WED PENETRATIONS	0/
3.11 FATIGUE	5.10	DESIGN FOR SERVICEABILITY	0/
SECTION 4 DESIGN OF COMPOSITE COLUMNS 4.1 COMPOSITE COMPRESSION MEMBERS	3.11	FATIGUE	92
4.1 COMPOSITE COMPRESSION MEMBERS 93 4.2 RESISTANCE OF COMPOSITE COMPRESSION MEMBERS SUBJECTED TO COMBINED ACTIONS 106 4.3 DETAILING PROVISIONS 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT STATES 109 4.5 SECOND ORDER EFFECTS 110 SECTION 5 DESIGN OF COMPOSITE JOINTS 112	SECTIO	N 4 DESIGN OF COMPOSITE COLUMNS	
4.1 COMINECTION RESIDENT RESIDENT REMERSION MEMBERS SUBJECTED TO 4.2 RESISTANCE OF COMPOSITE COMPRESSION MEMBERS SUBJECTED TO COMBINED ACTIONS 106 4.3 DETAILING PROVISIONS 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT 109 4.5 SECOND ORDER EFFECTS 110 SECTION 5 DESIGN OF COMPOSITE JOINTS 112	<u>4</u> 1	COMPOSITE COMPRESSION MEMBERS	93
4.2 RESISTANCE OF COMPOSITE COMPLETED TO COMBINED ACTIONS 106 4.3 DETAILING PROVISIONS 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT 109 4.5 SECOND ORDER EFFECTS 100 SECTION 5 DESIGN OF COMPOSITE JOINTS 112	4.1	RESISTANCE OF COMPOSITE COMPRESSION MEMBERS SUBJECTED TO))
4.3 DETAILING PROVISIONS 100 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT 109 4.5 SECOND ORDER EFFECTS 110 SECTION 5 DESIGN OF COMPOSITE JOINTS 112	7.2	COMBINED ACTIONS	106
4.3 DETAILING PROVISIONS 108 4.4 VERIFICATION OF COMPOSITE COLUMNS FOR SERVICEABILITY LIMIT 109 4.5 SECOND ORDER EFFECTS 109 4.5 SECOND ORDER EFFECTS 110 SECTION 5 DESIGN OF COMPOSITE JOINTS 112	12		100
4.4 VERIFICATION OF COMPOSITE COLUMINS FOR SERVICEABILITY LIMIT STATES 109 4.5 SECOND ORDER EFFECTS 110 SECTION 5 DESIGN OF COMPOSITE JOINTS 112	4.5	VEDIEICATION OF COMPOSITE COLUMNS FOR SERVICEADILITY LIMIT	108
4.5 SECOND ORDER EFFECTS	4.4	VERIFICATION OF COMPOSITE COLUMINS FOR SERVICEABILITY LIMIT	100
4.5 SECOND ORDER EFFECTS	4.5	STATES	109
SECTION 5 DESIGN OF COMPOSITE JOINTS 5.1 SCOPE	4.5	SECOND ORDER EFFECTS	110
51 SCOPE 112	SECTIO	N 5 DESIGN OF COMPOSITE JOINTS	
	51	SCOPE	112
5.2 COMPONENT METHOD 114	5 2	COMPONENT METHOD	114
5.2 ROTATIONAL STIFFNESS 116	53	ROTATIONAL STIFFNESS	116
5.4 FLEXURAL STRENGTH 125	5.5 5.4	FI FXURAL STRFNGTH	125
	т		120

F G

Η

Ι

5.5	DUCTILITY	
5.6	DETAILING OF REINFORCEMENT	
SECTIC	ON 6 DESIGN OF COMPOSITE FLOOR SYSTEMS	100
6.1	GENERAL.	
6.2	DEFLECTIONS	
6.3	CRACKING	
6.4	VIBRATIONS	136
SECTIO	N 7 DESIGN FOR FIRE RESISTANCE	
7.1	SCOPE	142
7.2	BASIS OF DESIGN	148
7.3	MATERIAL PROPERTIES	150
7.4	DESIGN PROCEDURES	161
7.5	TABULATED DATA	167
7.6	TEMPERATURE CALCULATIONS	
7.7	SIMPLE STRUCTURAL CALCULATION METHODS	
7.8	ADVANCED CALCULATION METHODS	
7.9	CONSTRUCTIONAL DETAILS	
SECTIO	N 8 DESIGN FOR EARTHQUAKE	
8.1	SCOPE AND GENERAL	193
8.2	GENERAL DESIGN AND ANALYSIS PHILOSOPHY	193
8.3	METHODS OF ANALYSIS AND DESIGN	196
8.4	MATERIAL REQUIREMENTS	197
8.5	DESIGN AND DETAILING OF COMPOSITE MEMBERS	198
8.6	JOINTS	
8.7	COMPOSITE MOMENT-RESISTING FRAMED SEISMIC SYSTEMS	
8.8	COMPOSITE ECCENTRICALLY BRACED FRAMED SEISMIC RESISTI	NG
	SYSTEMS	
8.9	COMPOSITE CONCENTRICALLY-BRACED FRAMED SEISMIC RESIS	TING
	SYSTEMS	
APPEN	DICES	
Α	CONSTRUCTION STAGES AND MINIMUM CONSTRUCTION LOADS	
В	INFORMATION FOR THE SERVICEABILITY LIMIT STATE	
С	INFORMATION FOR THE ULTIMATE LIMIT STATE DESIGN OF COM	POSITE
	AND NON-COMPOSITE BEAMS WITH WEB OPENINGS	
D	LONGITUDINAL SHEAR RESISTANCE OF COMPOSITE SLABS	
	USING THE <i>m-k</i> METHOD	
Е	FIRE TESTING OF COMPOSITE FLOOR SLABS	

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard

Composite structures—Composite steel-concrete construction in buildings

SECTION 1 GENERAL REQUIREMENTS

1.1 APPLICATION

A1 **1.1.1 Scope and general**

This Standard sets out minimum requirements for the design, detailing and construction of composite steel-concrete members (beams, columns, slabs, joints) in buildings.

This Standard does not cover the design of composite beams and columns-

- (a) where the elements of the steel section are less than 3 mm thick or the value of the yield stress (f_y) assumed in design exceeds 690 MPa;
- (b) where the concrete characteristic compressive strength at 28 days is outside the range of 20 MPa to 120 MPa; or
 - (c) for road or railway bridges (see NOTE).
 - NOTE: For the design of composite bridge beams, reference should be made to AS/NZS 5100.6.

1.1.2 Normative references

The following normative documents are referred to in this Standard:

AS	
1012	Methods of testing concrete
1012.12.1	Determination of mass per unit volume of hardened concrete—Rapid
1012.12.2	Determination of mass per unit volume of hardened concrete—Water displacement method
1110	ISO metric hexagon bolts and screws—Product grades A and B (series)
1111	ISO metric hexagon bolts and screws—Product grade C (series)
1112	ISO metric hexagon nuts (series)
1163	Cold-formed structural steel hollow sections
1170	Structural design actions
1170.4	Part 4: Earthquake actions in Australia
[Deleted]	
1379	Specification and supply of concrete
1397	Continuous hot-dip metallic coated steel sheet and strip—Coatings of zinc and zinc alloyed with aluminium and magnesium
1530 1530 4	Methods for fire tests on building materials, components and structures Part 4: Fire-resistance tests for elements of construction
1550.4	
1554 2	Structural steel welding Part 2: Stud welding (steel stude to steel)
1554.2	
1579	Arc-welded steel pipes and fittings for water and waste-water

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	3597	Structural and pressure vessel steel—Quenched and tempered plate
	3600	Concrete structures
A1	3610 [Deleted]	Formwork for concrete
	4100	Steel structures
	AS/NZS 1163	Cold-formed structural steel hollow sections
	1170 1170.0 1170.1 1170.2 1170.3	Structural design actions Part 0: General principles Part 1: Permanent, imposed and other actions Part 2: Wind actions Part 3: Snow and ice actions
	1252	High-strength steel fastener assemblies for structural engineering—Bolts, nuts and washers
A1	1252.1 [Deleted]	Part 1: Technical requirements
	[Deleted]	
	1554 1554.1 1554.4	Structural steel welding Part 1: Welding of steel structures Part 4: Welding of high-strength quenched and tempered steels
	1594	Hot-rolled steel flat products
A1	[Deleted]	
·	2425	Bar chairs in reinforced concrete—Product requirements and test methods
	3678	Structural steel—Hot-rolled plates, floorplates and slabs
	3679 3679.1 3679.2	Structural steel Part 1: Hot-rolled bars and sections Part 2: Welded I-sections
	4600	Cold-formed steel structures
	4671	Steel reinforcing materials
	5100 5100.6	Bridge design Part 6: Steel and composite construction
	ISO 3183	Petroleum and natural gas industries—Steel pipe for pipeline transportation systems
	13918	Welding—Studs and ceramic ferrules for arc stud welding
	NZS 1170 1170.5	Structural design actions Part 5: Earthquake actions—New Zealand
	3101	Concrete structure Standard—The design of concrete structures
A 1 1	3104	Specification for concrete production
AI	3404	Steel structures Standard
A1	EN [Deleted]	

1992 Design of concrete structures

1992-1-2 Part 1-2 General rules—Structural fire design

13381 Test methods for determining the contribution to the fire resistance of structural members (series)

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Where a normative reference is made with an option of an Australian or a New Zealand Standard, the Standard that shall apply is the same as the jurisdiction where the construction occurs.

Documents that are referenced for informative purposes are listed in the Bibliography.

1.1.3 Definitions

For the purpose of this Standard, the definitions below apply.

NOTE: Definitions applying only to a particular clause or section are given in that clause or section and referred in this Clause (1.1.3).

1.1.3.1 Administrative definitions

1.1.3.1.1 Authority

A body having regulatory powers, in the area in which the structure is to be erected, to control the design and erection of the structure.

1.1.3.1.2 Boundary element

Portion along wall or diaphragm edge strengthened with structural steel sections and/or longitudinal steel reinforcement and transverse reinforcement.

1.1.3.1.3 Collector element

Also known as a drag strut, this is a member that serves to transfer loads between floor diaphragms and the members of the seismic force resisting system.

1.1.3.1.4 Drawings

The drawings forming part of the project documents setting out the work to be executed.

1.1.3.1.5 May

Indicates the existence of an option.

1.1.3.1.6 Shall

Indicates that a statement is mandatory.

1.1.3.1.7 Should

Indicates a recommendation.

1.1.3.1.8 Specification

The requirements in the project document, describing the design, materials and procedure of the work to be executed.

1.1.3.2 *Technical definitions*

1.1.3.2.1 Action

The cause of stress, deformation or displacement in a structure, or in a component member of the structure.

1.1.3.2.2 Action effect

The force, moment, deformation, or like effect, produced in the members of a structure (or its foundations) by an action or combination of actions.

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1.1.3.2.3 Active link

The short section of beam in an eccentrically braced frame (EBF) designed and detailed to undergo stable shear and/or flexural inelastic deformation.

1.1.3.2.4 Capacity factor

A factor by which the nominal capacity or strength is multiplied to obtain the design capacity or strength.

1.1.3.2.5 Characteristic strength

The value of a material strength, as assessed by a standard test, which has a 95% probability of being exceeded in all such tests on the same material.

1.1.3.2.6 Collector beam

The beam outside the active link region in an eccentrically braced frame (EBF).

1.1.3.2.7 Complete shear connection of the composite beam ($\beta = 1$)

The condition where the moment capacity of the cross-section of the composite beam is not governed by the strength of the shear connection.

1.1.3.2.8 Composite beam

A steel beam and a solid or composite slab, interconnected by shear connection to act together to resist action effects as a single structural member.

1.1.3.2.9 Composite column

A column comprised of a structural steel section or tubular member which also comprises reinforced concrete. The capacity of this column is considered greater than the sum of the constituent structural steel and reinforced concrete parts.

1.1.3.2.10 Composite joint

Consists of a steel connection acting in combination with a reinforced concrete or composite slab.

1.1.3.2.11 Composite slab

A cast in situ concrete slab that incorporates profiled steel sheeting as permanent soffit formwork.

1.1.3.2.12 Concentrically braced frame (CBF) system

A braced frame in which the members are subject primarily to axial forces.

1.1.3.2.13 Concrete

A mixture of cement, aggregates and water, with or without the addition of chemical admixtures, which conforms to AS 3600 or NZS 3101.

1.1.3.2.14 Concrete slab

A slab cast monolithically with in situ concrete and reinforcement, with or without profiled steel sheeting.

1.1.3.2.15 Connector group

The shear connectors grouped at a transverse cross-section of a beam.

1.1.3.2.16 Connector set

The shear connectors between a transverse cross-section and an end of a beam.

1.1.3.2.17 Construction stage

One of the periods defined in Appendix A.