

AS 3850.3:2021



STANDARDS  
Australia



# Prefabricated concrete elements

## Part 3: Civil construction



This is a preview. [Click here to purchase the full publication.](#)

AS 3850.3:2021

This Australian Standard ® was prepared by BD-066, Prefabricated Concrete Elements. It was approved on behalf of the Council of Standards Australia on 08 June 2021.

This Standard was published on 25 June 2021.

The following are represented on Committee BD-066:

- Australasian Fire and Emergency Service Authorities Council
- Australian Council of Trade Unions
- Australian Engineered Fasteners and Anchors Council
- Australian Institute of Building Surveyors
- Australian Steel Institute
- Austrroads
- Better Regulation Division – SafeWork NSW
- Building Designers Association of NSW
- Cement Concrete & Aggregates Australia — Cement
- Cement Concrete & Aggregates Australia — Concrete
- Civil Contractors Federation
- Concrete Institute of Australia
- Concrete Pipe Association of Australasia
- Crane Industry Council of Australia
- Curtin University of Technology
- Department of Transport and Main Roads (QLD)
- Engineers Australia
- National Precast Concrete Association Australia
- Steel Reinforcement Institute of Australia
- Sydney University
- WorkSafe Victoria

This Standard was issued in draft form for comment as DR AS 3850.3:2019.

### **Keeping Standards up-to-date**

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

[www.standards.org.au](http://www.standards.org.au)

ISBN 978 1 76113 409 8

This is a preview. [Click here to purchase the full publication.](#)

# **Prefabricated concrete elements**

## **Part 3: Civil construction**

First published as AS 3850.3:2021.

© Standards Australia Limited 2021

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth).

## Preface

This Standard was prepared by the Standards Australia Committee BD-066, Prefabricated Concrete Elements.

The objective of this document, is to provide requirements which impact on safety in the planning, manufacturing, construction, design, casting, transportation, erection and incorporation into the final structure of prefabricated concrete elements in civil, infrastructure and non-building construction.

This document complements AS 3850.1 and AS 3850.2:2015.

A list of all parts in the AS 3850 series can be found in the Standards Australia online catalogue.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

*This document includes commentary on some of the clauses, tables and figures of the Standard. The commentary directly follows the relevant clause, table or figure, is designated by “C” preceding the clause number and is printed in italics in a box. The commentary is for information and guidance and does not form part of the Standard.*

# Contents

<b>Preface</b>	<b>ii</b>
<b>1 Scope and general</b>	<b>1</b>
1.1 Scope	1
1.2 Normative references	1
1.3 Terms and definitions	2
<b>2 Design, construction and documentation</b>	<b>4</b>
2.1 General	4
2.2 Design stages	4
2.3 Erection design	5
2.4 Structure stability during erection and construction	5
2.5 Design Considerations for manufacture, handling and erection	6
2.5.1 Size and shape	6
2.5.2 Determination of design loads	6
2.5.3 Typical rigging configurations	10
2.5.4 Lifting inserts	12
2.5.5 Bracing inserts	16
2.5.6 Wind loads	19
2.5.7 Strength specification of concrete	19
2.5.8 Design of elements for manufacture, transport, installation and erection	20
2.5.9 Temporary bracing	21
2.5.10 Slenderness, size and shape of concrete elements	26
2.5.11 Supports	27
2.6 Superimposed construction loads	28
2.7 Joints between prefabricated concrete elements	28
2.8 Footings	29
2.8.1 Permanent footings used for temporary support	29
2.8.2 Temporary footings, including deadman anchors and concrete mass blocks	29
2.9 Connections	32
2.9.1 General	32
2.9.2 Horizontal restraint of vertical elements	32
2.10 Documentation	33
2.10.1 General	33
2.10.2 Essential information	33
2.10.3 Review of product documentation	34
2.11 Tolerances	34
<b>3 Casting</b>	<b>35</b>
3.1 General	35
3.2 Layout of on-site casting	35
3.3 Moulds	35
3.4 Curing and release agents	35
3.5 Lifting, bracing and fixing inserts	35
3.6 Welding of lifting, bracing or fixing inserts	36
3.7 Identification and orientation	36
3.8 Inspection	36
3.9 Compaction of concrete	37
<b>4 Transport, crane and erection</b>	<b>37</b>
4.1 Transport	37
4.1.1 Planning	37
4.1.2 Loading	38
4.1.3 Unloading	39
4.2 Storage and multiple handling	39
4.3 Cranes and rigging	40
4.3.1 Cranes	40

4.3.2	Rigging.....	41
4.4	Erection and installation.....	41
4.4.1	Planning.....	41
4.4.2	Erection preparation.....	43
4.4.3	Erection platform.....	44
4.4.4	Element checks prior to lifting.....	44
4.4.5	Element release.....	45
4.4.6	Lifting and placing.....	45
4.4.7	Release of rigging.....	46
4.5	Pipes, poles, piles and elements with circular or near circular cross-section.....	46
<b>5</b>	<b>Temporary supports.....</b>	<b>47</b>
5.1	Installation and inspection of temporary bracing and propping.....	47
5.1.1	General.....	47
5.1.2	Brace connections.....	47
5.2	Superimposed loads.....	48
5.3	Levelling pads and shims.....	48
<b>6</b>	<b>Fixing and grouting of structural elements and removal of temporary supports.....</b>	<b>48</b>
6.1	Fixing of elements.....	48
6.2	Grouting of elements.....	49
6.3	Inspection and removal of temporary supports.....	49
6.4	Damage and repair.....	50
<b>Appendix A (normative) Information required on drawings.....</b>		<b>51</b>
<b>Appendix B (informative) Roles in the planning, construction, design, casting, transportation and erection of prefabricated concrete elements.....</b>		<b>54</b>
<b>Appendix C (informative) Lifting design process.....</b>		<b>58</b>
<b>Appendix D (informative) Typical rigging configurations.....</b>		<b>60</b>
<b>Bibliography.....</b>		<b>71</b>

# Australian Standard®

## Prefabricated concrete elements

### Part 3: Civil construction

## 1 Scope and general

### 1.1 Scope

This document provides requirements which impact on safety for planning, manufacturing, construction, design, casting, transportation, erection and incorporation into the structure of prefabricated concrete elements in civil, infrastructure and non-building construction. It applies to prefabricated concrete elements, including but not limited to pipes, culverts, bridge elements, tunnel elements, poles, piles, drainage and sewerage access and maintenance chambers, manholes, pits, lintels, headwalls, covers and surrounds, and water quality products.

This document does not cover the in-service design of these elements.

Additional requirements for some products are covered in other Standards.

This document does not cover the following:

- (a) Elements used in building construction.
- (b) Small individual concrete elements able to be handled manually (e.g. bricks, blocks, pavers).

### 1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

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

AS 1379, *Specification and supply of concrete*

AS 1597.1, *Precast reinforced concrete box culverts, Part 1: Small culverts (not exceeding 1200 mm span and 1200 mm height)*

AS 1597.2, *Precast reinforced concrete box culverts, Part 2: Large culverts (exceeding 1200 mm span or 1200 mm height and up to and including 4200 mm and 4200 mm height)*

AS 1657, *Fixed platforms, walkways, stairways and ladders — Design, construction and installation*

AS 2550 (all parts), *Cranes, hoists and winches — Safe use*

AS 3600, *Concrete structures*

AS 3610.1, *Formwork for concrete, Part 1: Specifications*

AS 3799, *Liquid membrane-forming curing compounds for concrete*

AS 3850.1, *Prefabricated concrete elements, Part 1: General requirements*

AS 4100, *Steel structures*

AS 4139, *Fibre reinforced concrete pipes and fittings*

AS 4991, *Lifting devices*

AS 5100 (series), *Bridge design*

AS 5216, *Design of post-installed and cast-in fastenings in concrete*

AS(/NZS) 1100, *Technical drawing*

AS/NZS 1170.0, *Structural design actions, Part 0: General principles*

AS/NZS 1170.1, *Structural design actions, Part 1: Permanent, imposed and other actions*

AS/NZS 1170.2, *Structural design actions, Part 2: Wind actions*

AS/NZS 1554 (series), *Structural steel welding*

AS/NZS 2425, *Bar chairs in reinforced concrete — Product requirements and test methods*

AS/NZS 4058, *Precast concrete pipes (pressure and non-pressure)*

AS/NZS 4671, *Steel for the reinforcement of concrete*

### 1.3 Terms and definitions

For the purposes of this document, the terms and definitions given in AS 3600 and the following apply.

#### 1.3.1

##### **casting bed**

bed used for the manufacture of concrete elements with a flat underside

Note 1 to entry: see mould ([1.3.11](#)) for other elements.

#### 1.3.2

##### **competent person**

person who has acquired through training, qualifications or experience, or a combination of these, the knowledge and skills enabling that person to perform a specified task

Note 1 to entry: See [Appendix B](#) for information on specific competent persons.

#### 1.3.3

##### **deadman**

##### **deadman anchor**

##### **deadman footing**

object buried in, or secured to, the ground for the purpose of providing anchorage of a temporary support

EXAMPLE Concrete pile or trench footing.

#### 1.3.4

##### **documentation**

##### **1.3.4.1**

##### **erection documentation**

installation documentation, drawings, arrangements, procedures and instructions for lifting and temporary support for above- and below-ground installation of elements

Note 1 to entry: Erection documentation is specified in [Appendix A](#).

##### **1.3.4.2**

##### **product-specific documentation**

specification or data sheet provided by the manufacturer of a standard precast concrete element

EXAMPLE Documentation provided for concrete pipe.

##### **1.3.4.3**

##### **project-specific documentation**

engineering project drawings, shop drawings, layout plans and elevations provided by designers which detail the requirements of elements used for individual projects