

PART C

Chapter 1

Overview

This chapter provides an overview of the building design and detailing process, using Part B (*Design*) and Part C (*Detailing*).

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- 1.2 DESIGN AND DETAILING PROCESS**

With the increasing complexity of Australian Standards and Building Regulations, designers, builders and tradespeople are either being swamped with too much unnecessary information or being denied the important information necessary for building.

Competitive design fees are generally too low to permit the time for thoughtful and comprehensive detailing and specification to be performed. Too often architects and structural engineers provide only the overall building dimensions of a building and its components on the contract drawings, omitting the details of how the various components are intended to “fit together”. These drawings are often accompanied by the briefest of specifications, indicating only the principal Australian Standards, but failing to specify even the simplest of material property requirements.

At the other end of the building process, builders and tradespeople, accustomed to meaningless or impractical detailing expectations, simply ignore any details or specification that are provided in the contract documents.

Thus it is timely for the publication of simple-to-read manuals accompanied by builder-friendly details.

1.1.1 BUILDING REGULATIONS

It is the responsibility of the State Governments to

- determine the local policies in regards health, amenity and safety,
- to enact building legislation, and
- prepare associated building regulations.

The building acts and building regulations of each state are prepared by state BCCs (Building Control Commissions) using a model, the NCC (National Construction Code) – BCA (Building Code of Australia), prepared by the ABCB (Australian Building Codes Board). Historically, state BCCs have been effective in health and amenity issues, but have lacked the requisite experience to tackle structural safety issues effectively. For example, the concepts of “return period”, “probability of failure”, “limit states” and “reliability index”, have not generally been within the expertise of state policy makers. Thus structural safety issues have devolved to Australian Standards. However, recent trends indicate that this tendency is being reversed.

The Building Acts and Building Regulations are legal documents, and must meet “legalistic” requirements. Although there have been attempts at writing “user-friendly” regulations, they are not able to comprehensively cover the diverse range of products and practices in use in Australia. For example, NCC–BCA Volume Two for domestic houses provides many “deemed-to-satisfy” construction details that fulfil the purpose of the regulations, but there are

many other products and practices that are not covered.

1.1.2 AUSTRALIAN STANDARDS

Australian Standards cover a wide number of applications, including providing design rules for the structural design of masonry and masonry components. For example, AS 3700 *Masonry structures* is “deemed-to-satisfy” the performance requirements set out in the NCC–BCA. The design rules of an Australian Standard (including AS 3700) must be comprehensive, covering all common construction cases, eg unreinforced and reinforced brickwork and blockwork, in all sorts of exposures, subject to permanent, imposed, wind and earthquake loads. Despite a desire to make Australian Standards “user-friendly”, the requirement that they be both comprehensive and precise mitigates against simplicity of use.

1.1.3 DESIGN AIDS

While the Building Regulations (based on the NCC–BCA) provide the performance requirements and the Australian Standards provide a comprehensive means of satisfying those requirements, there is a need for simple, practical details and specifications that can be used quickly and easily by designers to transfer generic information into project documentation. Such design aids may include manuals or technical notes, generic details and specifications, design software and other software. They may be available as hard copy manuals or technical notes, on disk or on the internet.

It is most important that these documents comply fully with the requirements of the Building Regulations and the Australian Standards. If there are any deviations or controversial interpretations, they must be highlighted, together with the reasons and circumstances.

The origin and application of the design aids must also be transparent.



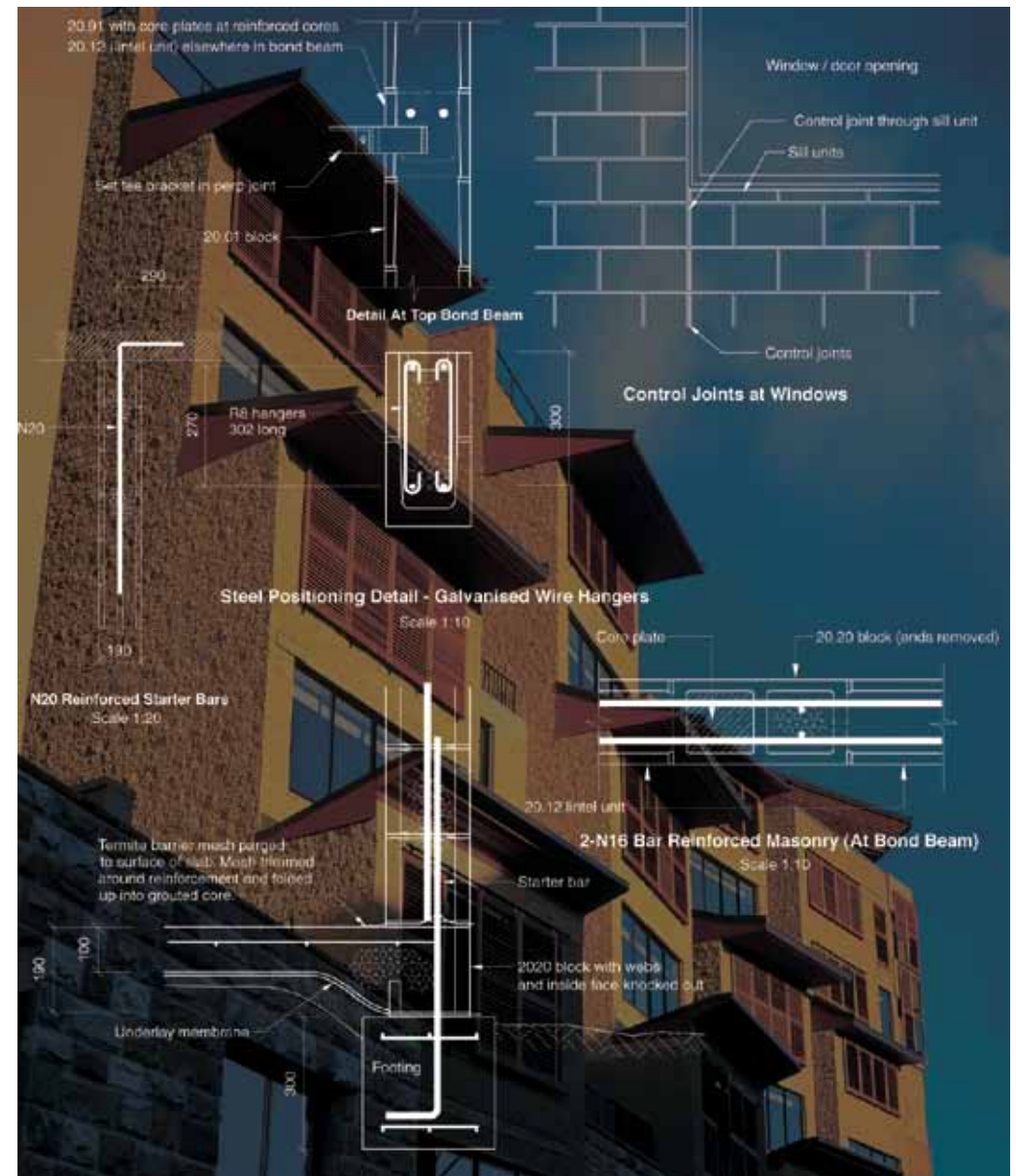
1.1.4 PROJECT DOCUMENTATION

The principal method for communicating information from a designer to a builder is via contract drawings and specifications which should set out the overall dimensions and material of the structure, together with details showing how the various components fit together, detailed specifications and quality control check lists for critical elements.

1.1.5 RELATIONSHIPS BETWEEN BUILDING REGULATIONS, AUSTRALIAN STANDARDS, DESIGN AIDS AND PROJECT DOCUMENTATION

In general, the relationships may be summarised as follows.

- Building Regulations spell out the building performance requirements in a general form.
- Australian Standards provide design rules, capable of satisfying the performance requirements for the Building Regulations.
- Design and detailing aids translate the design rules of the Australian Standards into practical generic designs, details and specifications.
- Project drawings, details and specifications (should) provide the information necessary for all aspects of the construction, and may draw on the generic design and detailing aids to provide information in an “easy-to-use” format.



Set out below are the design and detailing steps for the masonry components of typical low and medium rise buildings.

Step 1 – Building Arrangement and Loads

Determine the building layout, number of floors and principal dimensions. This manual does not detail the steps required for determining loads, analysing a structure for overall stability or designing for strength and serviceability of the other components, although some guidance is given in [Part B:Chapter 1](#).

Determine the required function of the masonry components, eg:

- Most masonry components are walls. Are there also isolated piers and masonry lintels?
- Are internal and external walls single-leaf masonry, masonry veneer or cavity masonry? Are they loadbearing or non-loadbearing? Can they be reinforced?
- Are walls require to resist out-of-plane wind loads, earthquake loads and/or fire acting on the wall?
- Are walls require to provide in-plane shear resistance and load paths for wind loads or earthquake loads acting on the whole building?
- How are external walls to be weather-proofed?

Step 2 – Acoustics

Select the thickness of walls for acoustic considerations using [Part B:Chapter 2](#).

Step 3 - Robustness

Check the thickness of walls and piers for robustness considerations using [Part B:Chapter 3](#).

Step 4 - Fire

Design all walls and piers for fire load using [Part B:Chapter 4](#).

Step 5 – Vertical Loads

If the masonry is required to support vertical loads as loadbearing walls or lintels, design using [Part B:Chapter 5](#) and detail using [Part C:Chapter 3](#).

Step 6 – Horizontal Loads

Design all walls and piers for out-of-plane and in-plane wind and earthquake loads using [Part B:Chapter 6](#) and detail using [Part C:Chapter 3](#). This covers masonry walls with vertical reinforcement, mullions, bond beams, shear walls and connections.

Step 7 – Movement

Detail and specify control and articulation joints for building movement using [Part B:Chapter 7](#) and [Part C:Chapter 2](#) and [Part C:Chapter 3](#).

Step 8 – Durability

Detail and specify masonry units, mortar, reinforcement, grout and other components for the durability requirements using [Part B:Chapter 8](#) and [Part C:Chapter 2](#) and [Part C:Chapter 3](#).

Step 9 – Thermal Performance

If the building is required to have a particular level of thermal performance, design and detail using [Part B:Chapter 9](#) and detail using [Part C:Chapter 3](#).

Step 10 – Footings and Supporting Structures

Design and detail the supporting structures using AS 3700 *Concrete structures*, AS 4100 *Steel structures*, AS 2870 *Residential slabs and footings* and similar standards. [Part B:Chapter 10](#) gives particular guidance for masonry and footings in residential buildings designed to AS 2870.