5.4 Carparks

For design of car park structures the designer should refer to the publication Economical Car parks - A Design Guide, 2nd edition, OneSteel (2004) which also presents the requirements of AS/NZS 2890.1:2004 Parking facilities - Off-street parking as well as preliminary designs for several common layouts.

Structure design consideration should include the following:

- Economical beam layout
- Waterproofing of top deck
- Expansion / contraction joints
- Bracing location
- Fire safety
- Ramp system and the flow of traffic
- Cantilevered beams at the building perimeter
- Headroom
- Crack control and the use of unpropped construction
- Roof over the top level
- Durability and corrosion protection

5.4.1 Economical Beam Layout

Primary beams span between columns and are usually in the short span direction but may be orientated to suit floors that cantilever beyond column lines at the edge of buildings or internally at split floor level arrangements. Refer Figure 5.10 for cantilevered beams. Secondary beams are usually orientated so that they span the larger dimension and are spaced up to the maximum allowable span of the selected decking profile. Secondary beam spacing multiples need not coincide with column spacing.

5.4.2 Waterproofing of Top Deck

The importance of the waterproofing of the top deck is dependent on the occupancy of the floor below. If the floor below is retail level then the composite floor should be treated as outlined in section 5.3.2. If however it is a car park below then design of the slab to limit crack widths to those prescribed by Australian Standards will generally suffice. It is generally shrinkage cracks rather than cracks due to bending that cause leaking. Thus the slab should be designed to have what is referred to in the Australian Standard as a 'strong degree' of crack control.

5.4.3 Expansion / Contraction Joints

Car parks that have a large area or irregular footprint may require the floor to be divided up into isolated sections. ***Contraction / expansion joints cater for drying shrinkage and thermal movements. Joints can be achieved by either using double columns or corbels with appropriate bearing pads***. The joints need to be adequately sealed to prevent water ingress whilst still accommodating the expected movements.

Figure 5.8 Corbel expansion / contraction joint.

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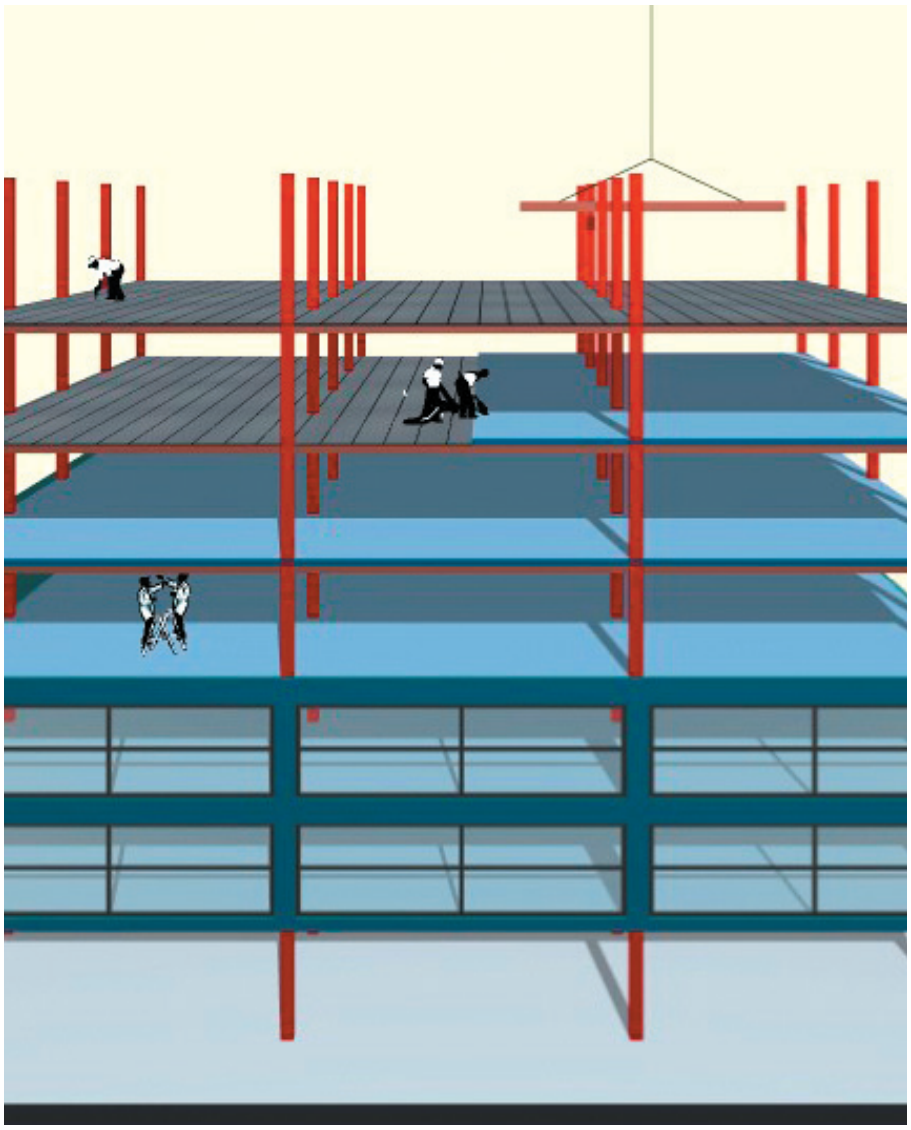
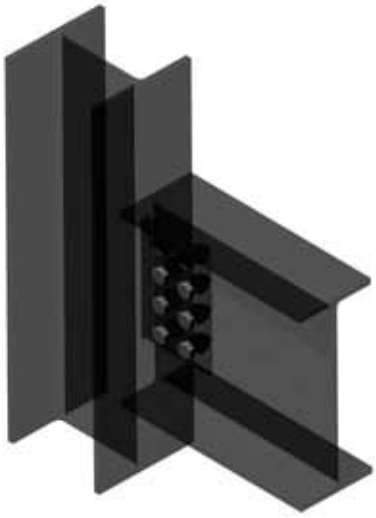
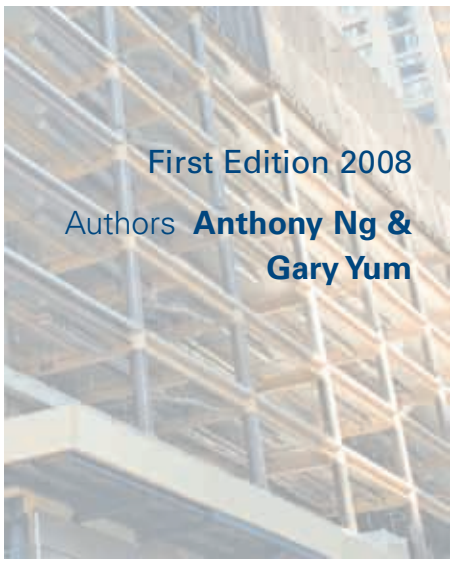
Design aspects for construction – Composite steel framed structures







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