



19 May 2011

Changes for Christchurch Seismicity

The objective of Building Code clause **B1** is to:

- Safeguard people from injury caused by structural failure
- Safeguard people from loss of amenity caused by the way the structure behaves
- Protect other property from physical damage caused by structure failure.

This objective is supported by the Verification Method, **B1/VM1**, and the Acceptable Solutions **B1/AS1** and **B1/AS3**.

New knowledge about the seismic risk for Christchurch means that the Department has made immediate changes to **B1/VM1**, **B1/AS1** and **B1/AS3**, effective from 19 May 2011.

The changes affect the *Canterbury earthquake region* only. This is the area covered by the Christchurch City Council, the Selwyn District Council and the Waimakariri District Council.

Changes to Verification Method B1/VM1 – hazard factor for Christchurch

- In the Verification Method, the hazard factor Z (which is described in **AS/NZS 1170**), for the *Canterbury earthquake region* has been increased from 0.22 to 0.3 minimum. The Verification Method references **AS/NZS 1170**, so this means that anywhere where **AS/NZS 1170** currently shows $Z < 0.3$, the Z factor is now 0.3. Anywhere the factor is shown as > 0.3 , the larger factor will apply.
- The increased hazard factor only applies to all structure periods < 1.5 seconds. For structure periods > 1.5 seconds, the Z factor needs to be determined by special study and advice needs to be sought from a seismologist, for example GNS.
- In the *Canterbury earthquake region*, the risk factor for the serviceability limit state shall be taken as $R_s = 0.33$.

Changes to Acceptable Solution B1/AS1

The changes affect the referencing of **NZS 3604**, **NZS 4229** and **NZS 4299** in the Acceptable Solution.

NZS 3604:1999

Outside the *Canterbury earthquake region*, use **NZS 3604:1999** unchanged.

Inside the *Canterbury earthquake region*, the following changes apply:

- A new definition of 'good ground' excludes ground where liquefaction and/or lateral spread could occur.
- For bracing demand, replace Section 5 of **NZS 3604:1999** with Section 5 of **NZS 3604:2011**.
- The *Canterbury earthquake region* shall be taken as Earthquake Zone 2.
- Piled foundation details and perimeter concrete foundation wall details are unchanged.
- All concrete slab-on-ground foundations on 'good ground' are to have reinforcing steel. ▶

- All perimeter foundations must be tied to the concrete slab with reinforcing steel.
- All reinforcing is to be Ductility Class E, in accordance with **NZS 4671**.
- Minimum slab reinforcing is to be 2.27kg/m² welded reinforcing mesh sheets (1.15kg/m² in each direction) lapped 225mm.
- Once slabs exceed 24m, a free joint must be formed as required in the Standard, except that there shall be dowel bars placed to minimise the risk of differential settlement.
- Brick veneer tie requirements are to be determined from **NZS 4210** for Earthquake Zone A.
- Foundations where 'good ground' has not been established, are outside **B1/AS1** and need to be subject to specific engineering design. In particular:
 - Where liquefaction and lateral spread up to 50mm is possible and there is perimeter ground protection, designs may be based on the Department's '*Guidance on house repairs following the Canterbury Earthquake*'.
 - Outside this, ie, where there has been severe land damage, the specific engineering design must include appropriate geotechnical investigations. These areas are defined by the Christchurch City Council, the Selwyn District Council and the Waimakariri District Council.

(The following diagrams illustrate the options in **NZS 3604:1999** that can and cannot be used)

NZS 4229:1999

Outside the *Canterbury earthquake region*, use **NZS 4229:1999** unchanged.

Inside the *Canterbury earthquake region*, use **NZS 4229** modified as follows:

- Bracing demand is to be determined as for Earthquake Zone A. Currently this is determined for Earthquake Zone B.
- For foundations on 'good ground', concrete slabs on ground are to be as for **NZS 3604:1999** as modified above.
- Foundations where 'good ground' has not been established are outside **B1/AS1**, and need to be subject to specific engineering design.

NZS 4299:1998

Outside the *Canterbury earthquake region*, use **NZS 4299:1998** unchanged.

Inside the *Canterbury earthquake region*, use **NZS 4299:1998** modified as follows:

- Bracing demand shall be determined using the earthquake zone factor >0.6.
- For foundations on good ground, concrete slabs-on-ground are to be as for **NZS 3604:1999** as modified above.
- Foundations where good ground has not been established are outside **B1/AS1** and need to be subject to specific engineering design.

Changes to Acceptable Solution B1/AS3

- Earthquake bracing units are to be determined for the *Canterbury earthquake region* from Table 2 for Earthquake Zone A.

Designers need to refer to the B1 documents for full details.

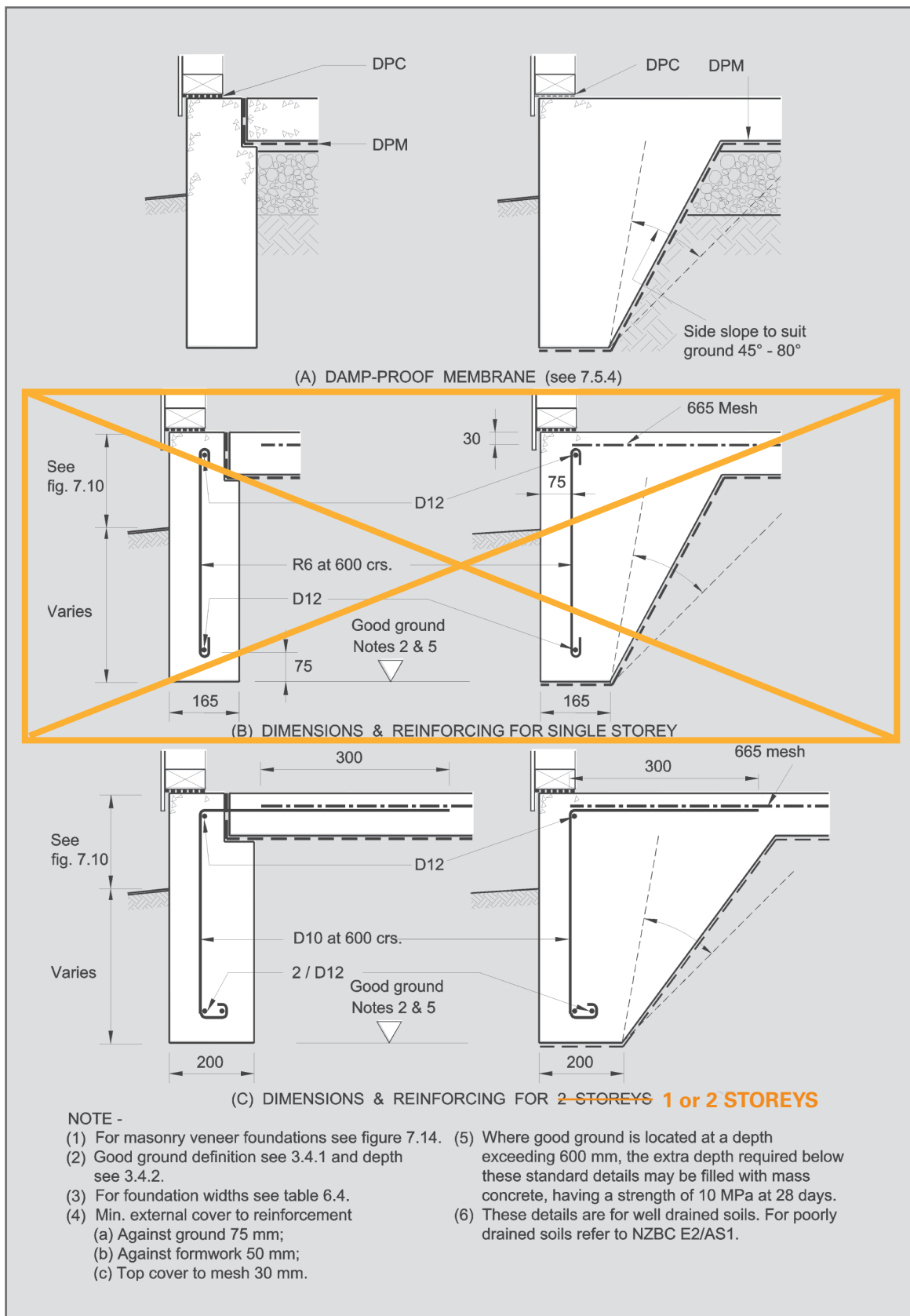


Figure 7.12 – Foundation edge details – *In situ* concrete (see 7.5.2.3)

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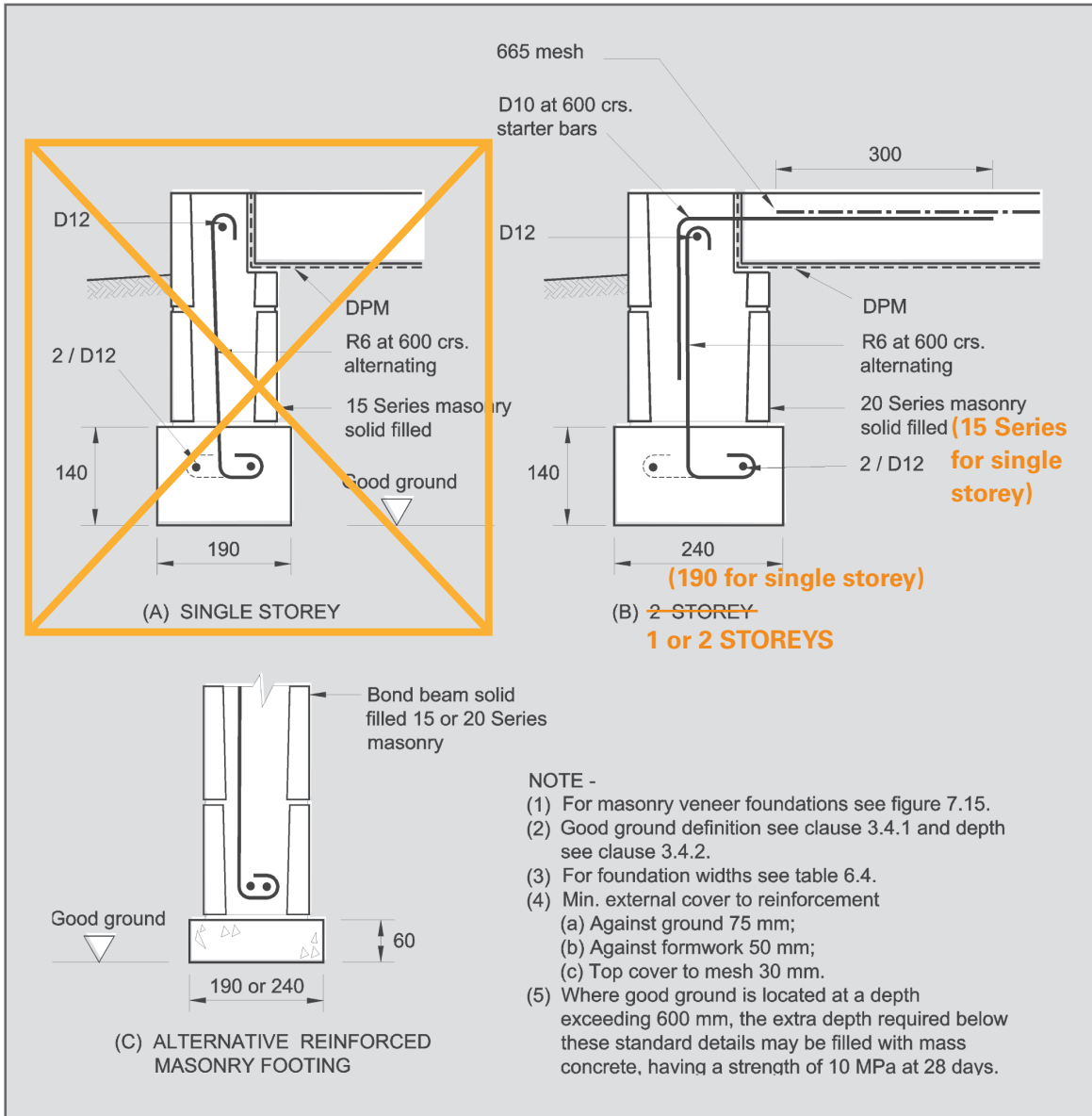


Figure 7.13 – Foundation edge details – Concrete masonry (see 7.5.2.3)

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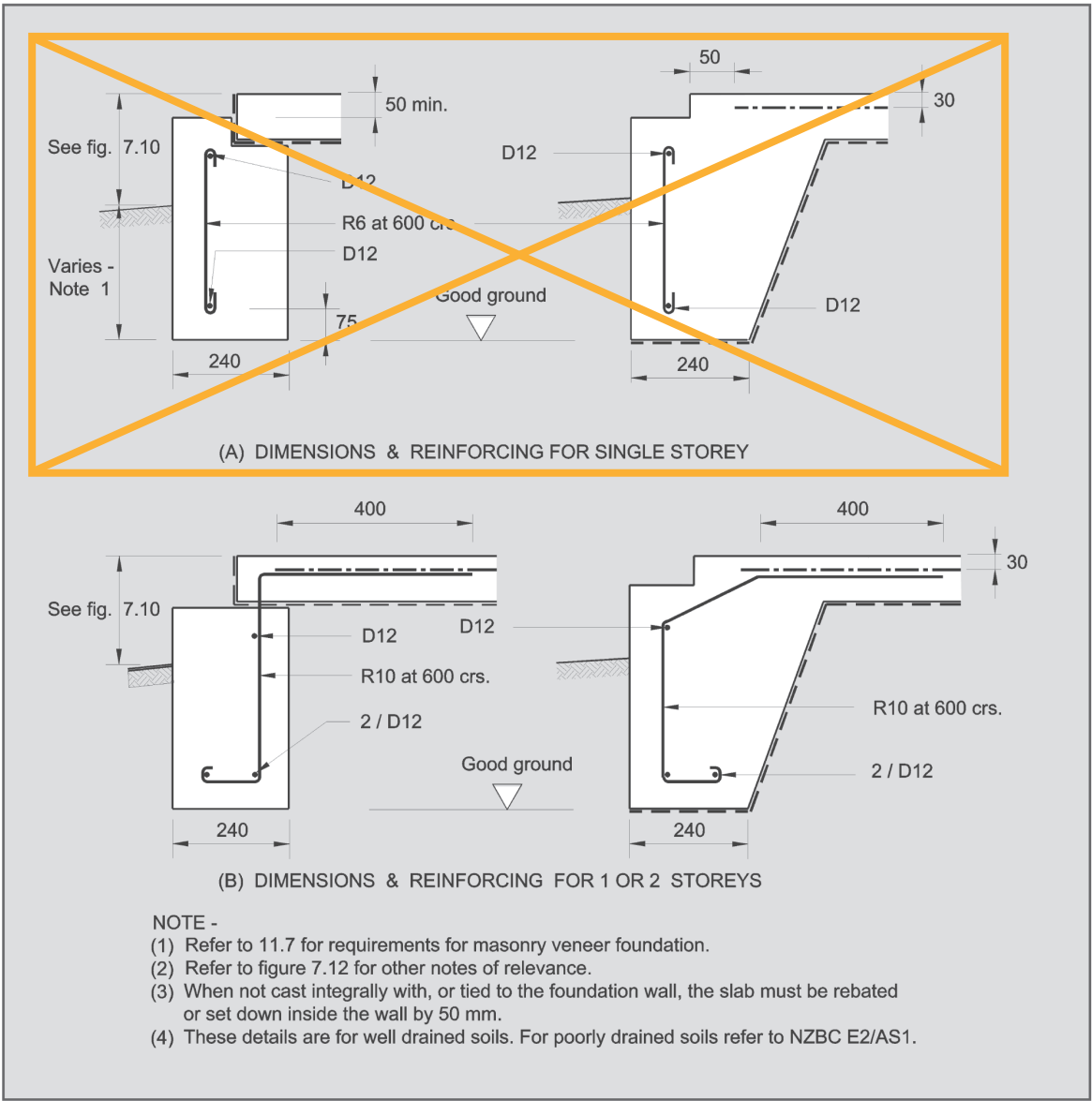


Figure 7.14 – Masonry veneer foundation edge details –*In situ* concrete (see 7.5.2.3 and 11.7)

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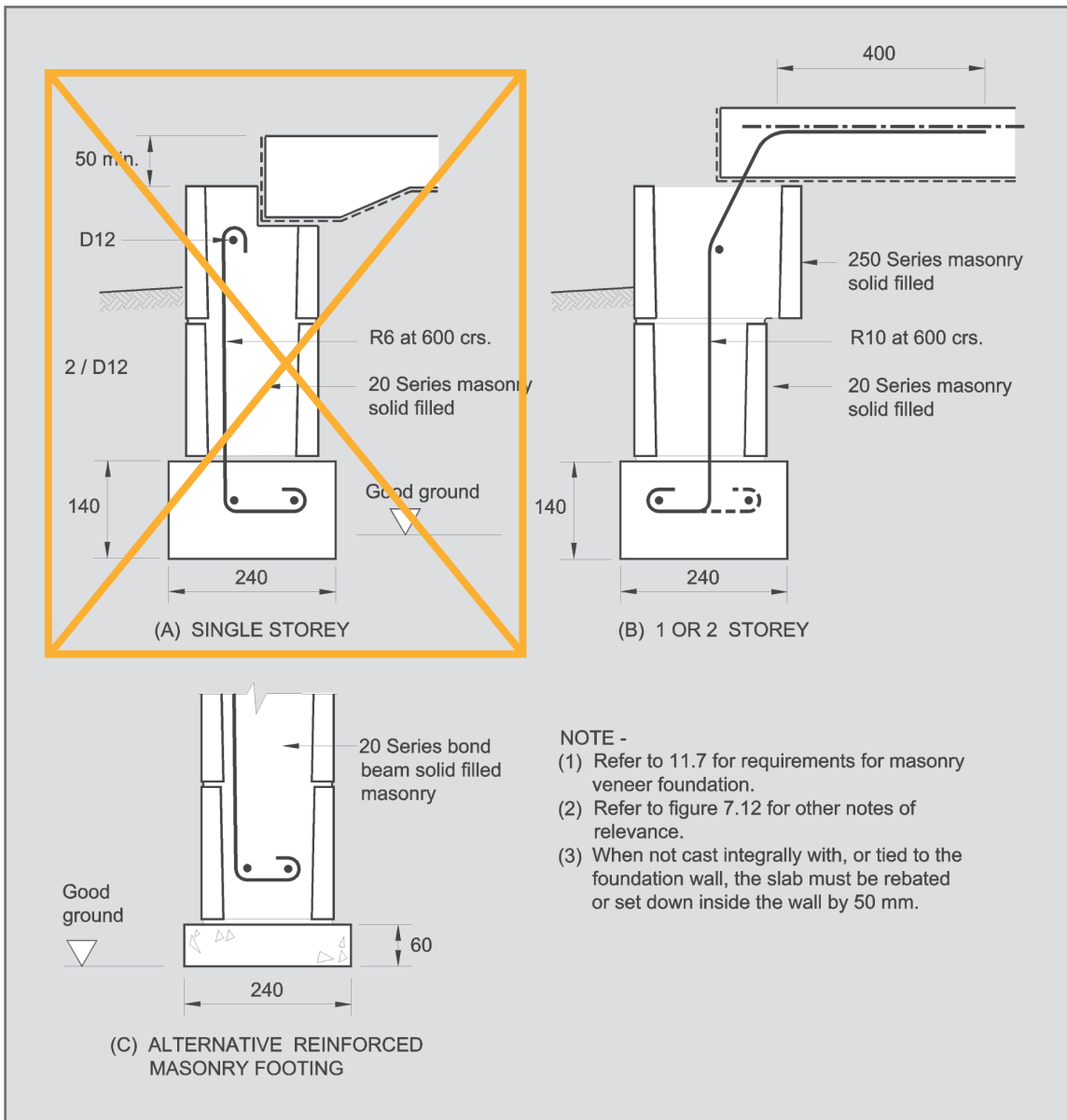


Figure 7.15 – Masonry veneer foundation edge details – Concrete masonry (see 7.5.2.3 and 11.7)

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B1/VM1

B1/AS1

B1/AS3

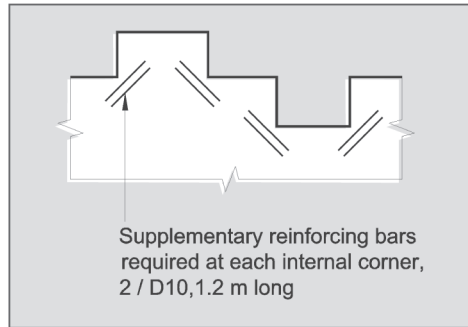


Figure 7.17 – Irregular slab (plan view) (see 7.5.8.6.2) 4)

(Amendment No. 1, December 2000)

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B1/VM1

B1/AS1

B1/AS3