

Masonry wall safety

During construction work

January 2010

www.worksafe.qld.gov.au



During construction work, masonry walls (brick or block) can fail due to side loads on the walls, the rate of construction, inadequate foundations or adjacent excavations. Side loads may include wind, inadvertent impact with the walls or leaning materials against them. Such failures can result in serious injuries or fatalities.

You can improve the safety of masonry walls during construction work with good planning and preparation, risk management and (where required) temporary supports.

Temporary supports – e.g. braces – are often required until the wall is incorporated into the completed structure.

1. Plan and prepare

Principal contractors and masonry contractors are jointly responsible for the masonry work on site. As part of your preparation, provide:

- advice about who is responsible for installing, inspecting and removing any temporary supports
- designs and materials for temporary supports, considering the particular walls' characteristics (seek engineering advice if necessary)
- materials to identify no-go zones – e.g. fencing, tape or signage
- instruction for workers, including site induction and supervision.

If you're a masonry contractor, you must also prepare a work method statement in consultation with workers and get it reviewed by the principal contractor before you start work. Ensure that you use any relevant information from the manufacturer, supplier and site management.

2. Identify and assess the risks

Principal contractors and masonry contractors are jointly responsible for the risk assessment, which should identify any walls that may need temporary supports during construction work. Include in your assessment:

- walls previously identified on the design drawings as needing temporary supports
- any features of the wall that may affect its strength – e.g. control joints, lintels, damp proof course, bond type or openings
- worker walkways or access paths
- plant, equipment and material movement, including delivery and storage areas
- the proposed sequence for the wall construction, including whether you will build cross walls or returns at the same time as the wall so that they support each other, the rate of construction and proposed stop heights the structural adequacy of the foundations
- existing or proposed excavations
- walls adjacent to another property or a public area
- likely weather conditions for the location and season – e.g. wind (see table 1), extreme temperatures and rain
- the proposed height, width and layout of walls (see table 2 and figure 1).

In addition to your risk assessment, establish an ongoing inspection program – at the start of each day and after adverse weather conditions, inspect the walls and any temporary supports for damage. If repairs are required, maintain no-go zones until it is safe to approach.

Table 1: Wind characteristics and recommended actions on unsupported masonry walls

Description	Wind gust speed		Wind characteristics	Recommended actions
Low winds	0-19 km/h	0-11 knots	Small branches and dust not moving	Safe to build masonry wall up to heights in table 2
Moderate winds	20-29 km/h	12-16 knots	Raises dust and loose paper; small branches are moving	Brace walls, then masonry work may continue if wind is not likely to increase
Fresh winds	30-39 km/h	17-21 knots	Small trees begin to sway; crested wavelets form on inland waters	Stop all masonry work at heights above the fresh wind heights in table 2 and brace walls
Strong winds	40-50 km/h	22-27 knots	Large branches in motion; whistling heard in telephone wires (overhead power lines); umbrellas used with difficulty	Stop all masonry work and establish a no-go zone around masonry walls

Source: Based on the Beaufort Wind Scale.

Note: Assess the wind speed at the wall location.

Table 2: Maximum unsupported wall height – single skin (leaf) or cavity wall

Width of brick or block (mm)		Maximum unsupported wall height (mm)			
		Low to moderate winds		Fresh winds	
Brick	90	Single skin	1500	Single skin	750
		Cavity	2100	Cavity	1050
	110	Single skin	1800	Single skin	900
		Cavity	2500	Cavity	1250
Block	90	1050		525	
	140	1600		800	
	190	2500		1250	

Note: This table is based on a maximum spacing of 3 m between supports, and applies to standard-weight extruded or pressed-clay bricks and hollow-core concrete blocks. Lower heights apply for lighter weight bricks or blocks – seek engineering or manufacturer’s advice.

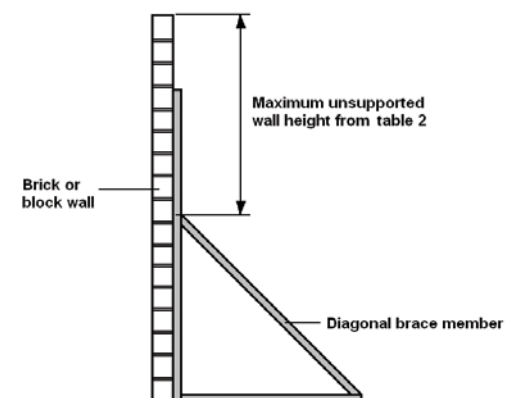


Figure 1: Illustration of unsupported wall height above a brace

Note: The upright member above the diagonal is ignored, as it may not be rigid enough to provide support. If the brace was not in place, the maximum unsupported wall height from table 2 would apply from ground level.

3. Control the risks

Your risk assessment may identify a range of control measures – such as:

- designing walls to provide additional stability during the construction phase, such as adding sequential core filling with reinforcing or wall stiffeners (see figures 2 and 3)
- building walls at the same time as cross walls (see figure 4) or returns, or nailing-off frame ties in veneer construction, so that they support each other
- installing temporary supports (see figure 5)
- establishing stop heights to allow mortar to gain adequate strength before further construction – e.g. at lintel height
- stacking materials away from unsupported masonry walls – i.e. no leaning materials against walls
- preventing inadvertent impact on walls by plant such as wheelbarrows, cranes or pallet trolleys – e.g. using dedicated travel paths and storage areas
- monitoring weather conditions – e.g. wind (see table 1), extreme temperatures and heavy rain – and amending work practices to suit
- stopping work if the existing top course is affected by rain to the point where the mortar bond strength will be impaired
- preventing the collapse of excavation behind masonry retaining walls
- not backfilling behind masonry retaining walls until they are permanently supported or (for self-supporting walls) have reached their design strength
- installing no-go zones, identified by barricades or other physical identifiers, to keep people outside of potential collapse zones. **(This is not an adequate control measure for walls that could fall outside the construction site. Prevent such walls from falling under all likely conditions.)**

No-go zones

Ensure that any no-go zone extends – at right angles to the wall on both sides – at least the distance equivalent to the total unsupported wall height plus 1.2 m.

If winds exceed ‘fresh winds’ (see table 1), establish a no-go zone – regardless of any wall supports already in place.

Consider individual no-go zones for each wall, isolating specific areas or isolating the entire site.

Do not let anyone within the no-go zones.

Note: You may need no-go zones for issues other than masonry wall failures – e.g. for falling objects.

Communicate the adopted risk control measures to all relevant people on site via site-specific induction training. Also communicate any changes to the controls – e.g. via toolbox talks.

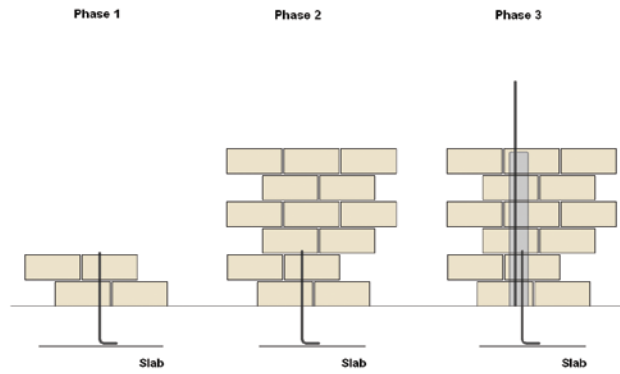


Figure 2: Sequential core filling with reinforcing

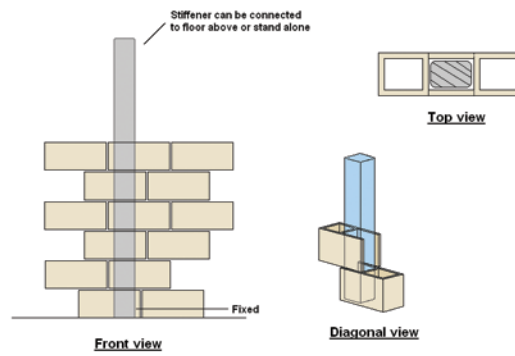


Figure 3: Wall stiffener – open-ended blocks used to build around stiffener

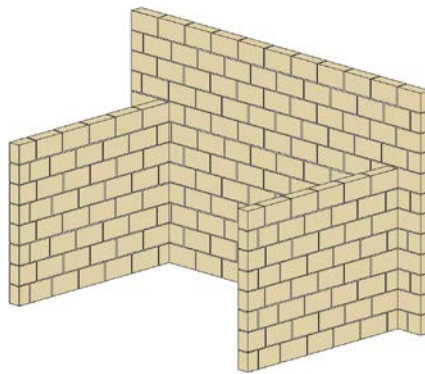


Figure 4: Cross walls

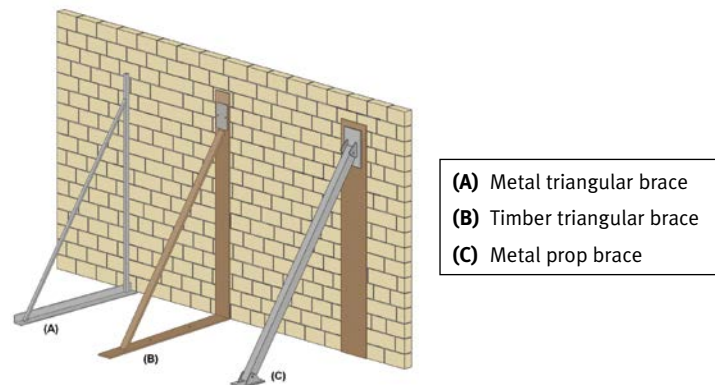


Figure 5: Examples of typical types of temporary supports (not to scale)

Note: If your risk assessment identifies temporary supports as a control measure, select an appropriate design for your wall that is of adequate strength and can be adequately fixed. You may need to prevent wall failure from either side. Typical examples are shown in figure 5.

Space the braces, fix them to the floor and to the wall if required, in accordance with the design specifications. Braces may be designed and installed as either single-acting or double-acting. Double-acting braces are installed on one side only, with through-wall connection.

Once you have erected the supports, maintain them until the wall is incorporated into the completed structure or you have installed alternative support – e.g. a cross wall.

Further information

WorkCover NSW:

Call us on **13 10 50**.

Go to our website **www.workcover.nsw.gov.au**

- See our safety alert:
 - *Working near walls (Catalogue No. WCo4053)*

Reference material:

- Think Brick Australia – *Manual 10: Construction guidelines for clay masonry*
- *Building Code of Australia*

Australian Standards:

You can purchase Australian Standards from SAI Global, by contacting the customer service centre on **13 12 42** or visiting **www.saiglobal.com/shop**

AS 1170 *Structural design actions (series)*

AS 3600 *Concrete structures*

AS 3700 *Masonry structures*

AS 4055 *Wind loads for housing*

AS 4455 *Masonry units, pavers, flags and segmental retaining wall units – Part 1: Masonry units*

Acknowledgements

Contributors to this industry safety standard include:

- Austral Bricks
- Australand
- CFMEU
- Concrete Masonry Association
- CSR
- Department of Justice – Workplace Standards Tasmania
- Fugen
- Housing Industry Association Ltd
- Masonry Contractors Association
- Master Builders Association NSW
- Mirvac Limited
- SafeWork South Australia
- Workplace Health and Safety Queensland, Department of Justice and Attorney-General
- WorkSafe Western Australia.

Occupational health and safety legislation

For specific occupational health and safety state requirements, contact:



Queensland
Government

Workplace Health and Safety Queensland

Workplace Health and Safety Infoline: 1300 362 128

www.worksafe.qld.gov.au



WorkCover New South Wales

WorkCover Assistance Service: 13 10 50

www.workcover.nsw.gov.au



Government of South Australia
SafeWork SA

SafeWork South Australia

Help Centre: 1300 365 255

www.safework.sa.gov.au



Tasmania
Explore the possibilities

WorkCover Tasmania

Helpline: 1300 366 322

www.workcover.tas.gov.au



WorkSafe Western Australia

Customer Help Centre: 1300 307 877

www.worksafe.wa.gov.au



Queensland
Government

Workplace Health and Safety Queensland

Workplace Health and Safety Infoline: 1300 362 128

www.worksafe.qld.gov.au