

HIT AND MISS BRICK SCREEN

SHADE
PRIVACY

NON-COMBUSTIBLE
VENTILATION

SCREEN MOTIF
REDUCE GLARE

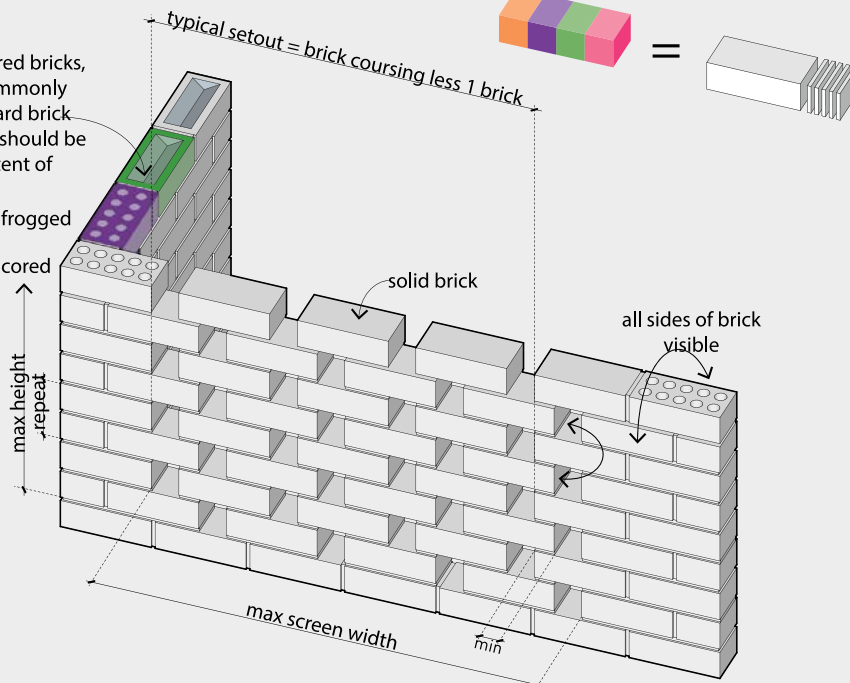
TRADE SKILL LEVEL:

SOME RULES OF THUMB

frogged or cored bricks, (which are commonly used in standard brick construction) should be avoided in extent of screen.

example of frogged brick

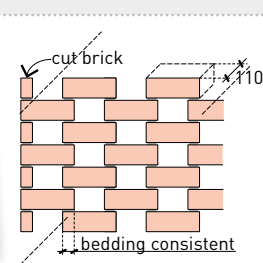
example of cored brick



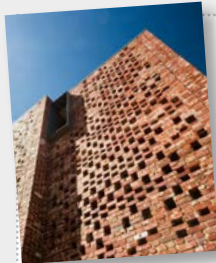
SOME OTHER BRICK SCREENS WE LOVE



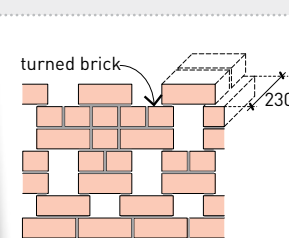
TRADE SKILL LEVEL:



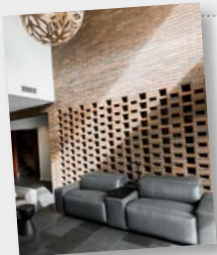
Inglis Architecture
Toorak House, Vic



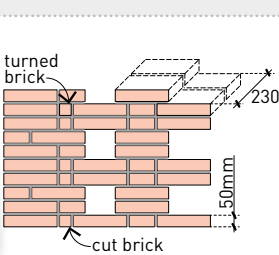
TRADE SKILL LEVEL:



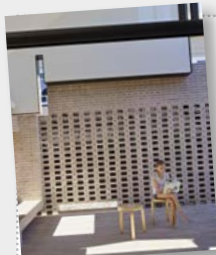
Tridente Architects,
6 on 6th Apartments, SA



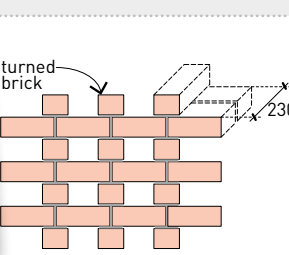
TRADE SKILL LEVEL:



Klopper & Davis
Carr Place Residence, WA



TRADE SKILL LEVEL:



Aperture House
Cox Rayner Architects, Qld

Consult with a structural engineer to ensure that the wall will be robust and structurally sound.

Wall thickness can be adapted to block out high summer sun but still allow winter sun to penetrate.

Take steps to ensure the skill level and qualification of the bricklayer is appropriate for the project.

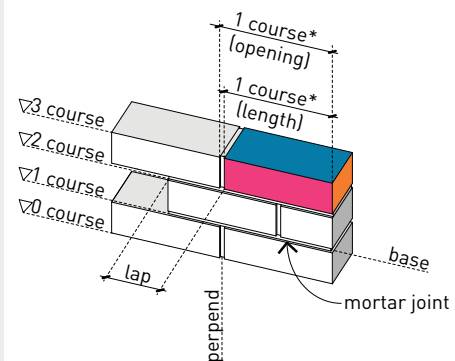
Try varying gap sizes to create dynamic effects and patterns.

Integrate fixed glazing or translucent material behind brick screen to create a watertight facade.

Consider different brick formats to achieve alternative pattern proportions.

Locate the screen so that it is out of reach for little ones that would be tempted to climb it. Other risks (e.g. security, flood, things that may bump into it, etc.) should be considered here too.

Remember, all sides of the brick will be visible. Use solid bricks, or if frogged bricks are to be used, give some thought as to whether bricks should be frog up or frog down.



* non-standard brick layouts may affect coursing.

Stretcher face
Header face
Sailor face

STRUCTURAL DESIGN CONSIDERATIONS

This flyer raises some of the issues that an engineer may need to consider when advising on the design of a 'hit and miss' brick wall.

While hit and miss brickwork is becoming increasingly popular with architects and clients, its design requires more consideration to ensure that it can be constructed safely.

It is less structurally sound than a stretcher bonded wall, due to:

- The absence of perpend joints, and
- The discontinuous nature of horizontal mortar joints which in turn causes:
 - reduced bedded area of each brick; and consequently
 - reduced unit overlap with the layers above and below it.

Due to the absence of perpend joints, hit and miss construction falls outside the scope of AS 3700 section 7.4.3 and thus those provisions may not necessarily reflect or consider its actions accurately.

Furthermore, due to the absence of comprehensive testing, its actions are relatively unknown. Engineers are advised that they will need to use their own judgement to determine how to design these walls safely.

With almost an infinite number of potential designs, any guidance on hit and miss brickwork can only look at general principles and not provide definitive advice.

Some considerations

Load-bearing

As very little research has been carried out to date on hit and miss brick walls, designers are advised to treat them as non-load-bearing walling systems.

To ensure they have sufficient structural strength, they should be supported on all four sides (or 3 sides, leaving the top free) and designed with guidance from the provisions outlined in AS 3700 section 7 'Structural Design of unreinforced Masonry' predominantly using the sections focused on bending and shear.

It must be noted that in order to satisfy the criteria for vertical bending and shear bond strength, the flexural tensile strength (f'_{mt}) or bond strength provided by the bonding between the masonry unit and the mortar will need to be adequate and will likely be the most critical parameter in ensuring the wall works effectively.

AS 3700 'Masonry Structures'

Engineers are advised to pay attention to the following clauses within AS 3700 when completing their designs:

- **Clause 4.6 'Design for Robustness'**
Walls must satisfy the robustness requirements and be proportioned to resist a uniformly distributed out of plane lateral load of 0.5 kPa;

- **Clause 7.4 'Design for Members in Bending'**

Due to the absence of perpend joints, the clauses within this section related to horizontal bending won't be applicable and will require some modification. Engineering judgement is therefore advised when interpreting these sections to account for this characteristic.

The designer should apply the sections related to vertical bending, ensuring adequate bond strength is achieved in accordance with Cl 3.3.3

Considerations should also be made to ensure the amount of compressive stress placed on the bed joints is either minimised and/or accounted for in design and/or the mortar composition.

- **Clause 7.5 'Design for Members in Shear'**

Shear requirements should be calculated with guidance from this section. Consideration and care should be made to ensure the bedded area has adequate bond strength to achieve the required vertical bending and shear capacity.

Furthermore, the shear factor for fully bedded joints should be reduced depending on the amount of overlap. Since there are no perpend joints in the wall, shear strength in vertical direction must be assumed to be zero;

- **Clause 7.6 'Design of Masonry Veneer Walls'**

Due to the non-load-bearing capacity of the construction, it may be necessary to consider and incorporate any similarities to the design/construction of veneer walls.

Providing additional strength

Designers creating walls that exceed calculated allowable areas have options they can use to provide additional strength.

For example, they may divide the desired wall area into a number of allowable sections and support each section at horizontal and vertical interfaces using bond beams and/or engaged piers.

Solutions such as these can help to minimise structural weakness and deliver a more workable hit and miss wall.

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