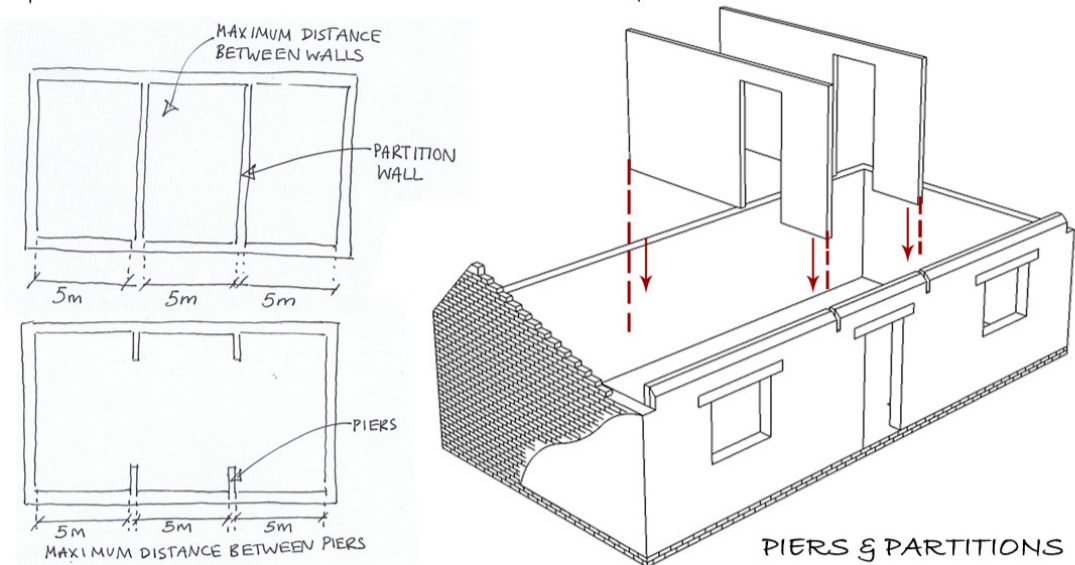


Guidelines for Safer House Construction

Retrofitting - improving existing houses

STRENGTHENING THE ROOF STRUCTURE

Where walls are longer than 5m construct an internal or external pier or partition wall. These must be constructed with foundations.

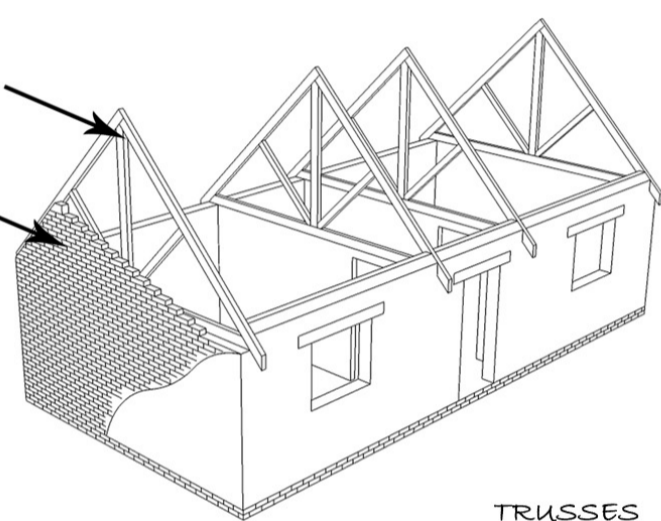


Gables should be removed and a hip roof constructed or a braced truss fitted to the gable ends.

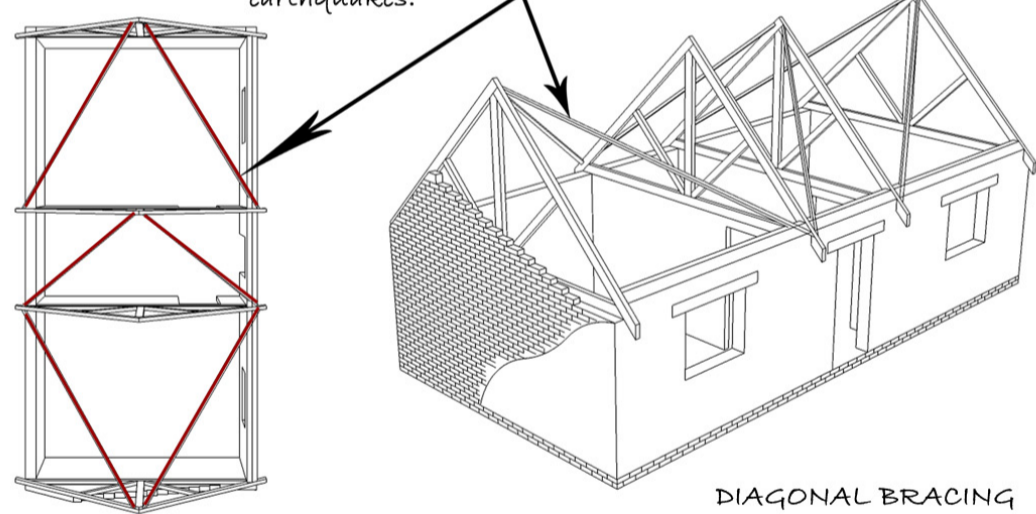
A braced truss should be fitted to the gable ends.

Gable end rebuilt at 115mm wall tied with wire to the truss.

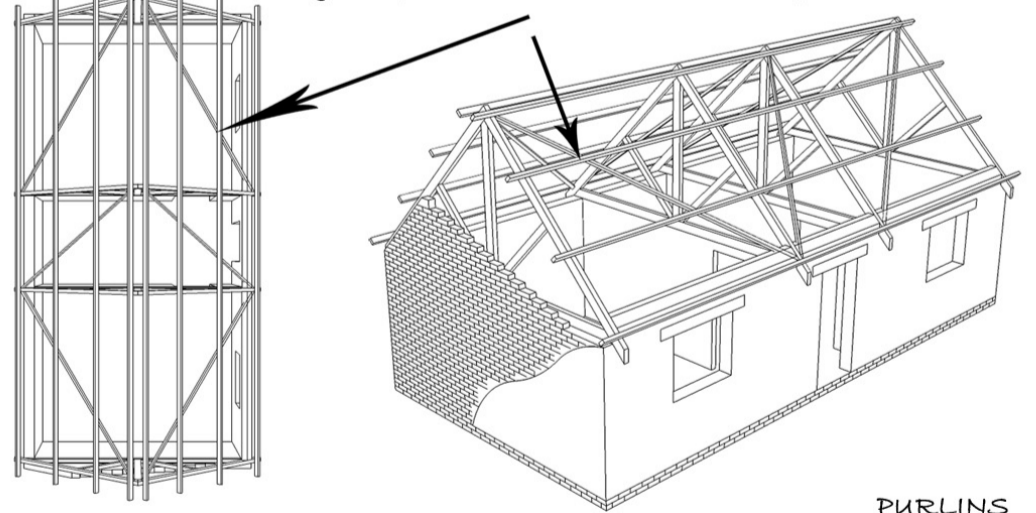
Roof trusses can also be constructed using steel. This has the advantage of providing protection from termites.



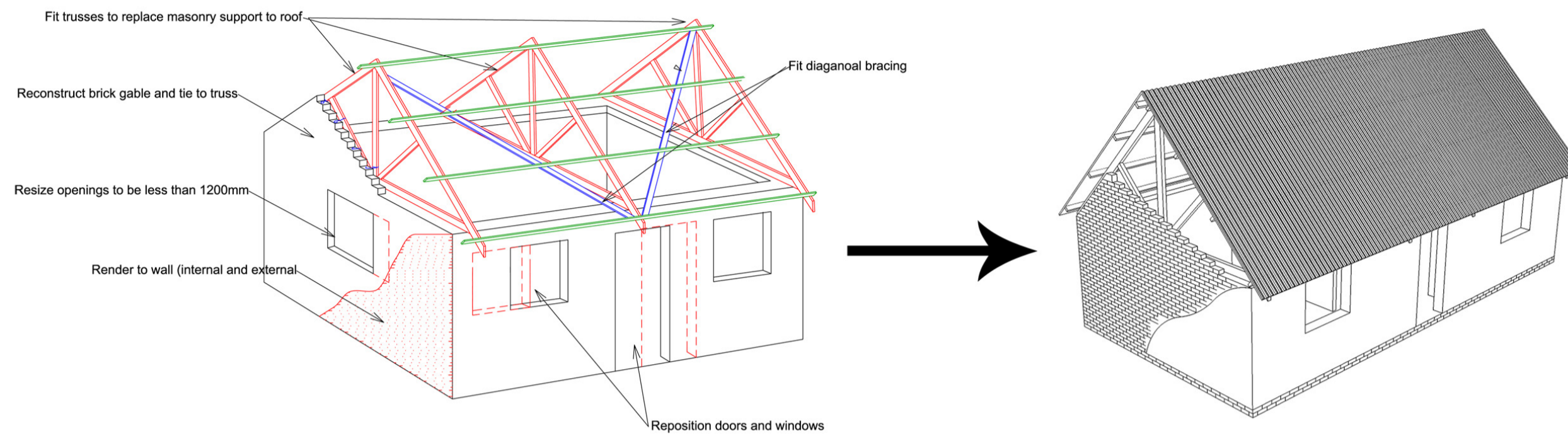
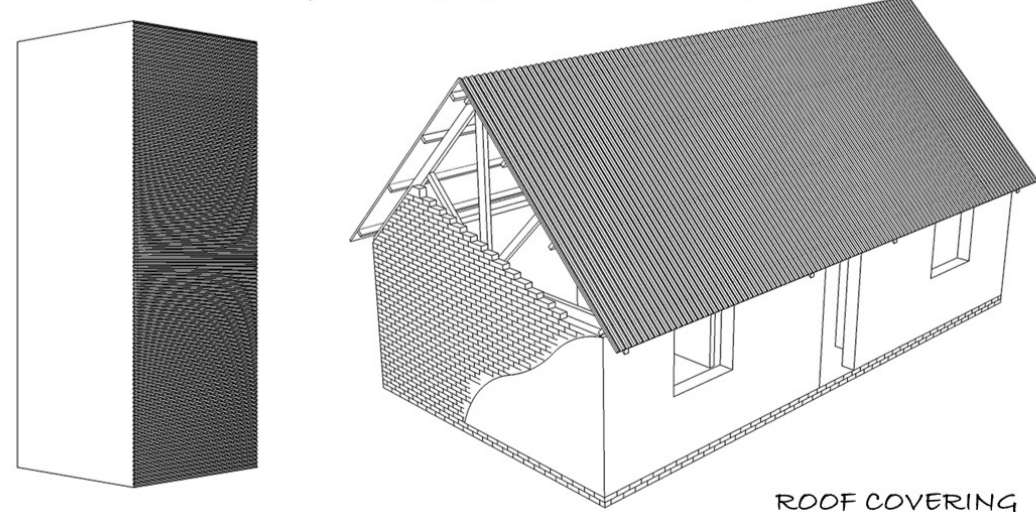
The roof should be fitted with diagonal bracing fitted to the underside of the purlins. The roof must be braced with 100 x 50mm timber to prevent movement from wind loads and earthquakes.



Purlins provide support to the roof covering. Generally purlins should not be less than 100 x 50mm in section. The spacing of the trusses is determined by the spacing and dimensions of the purlins.



The roof covering is supported by the purlins. If all the above guidelines are followed then the roof has a much greater resistance to collapse during high winds and earthquakes.



RETROFITTING

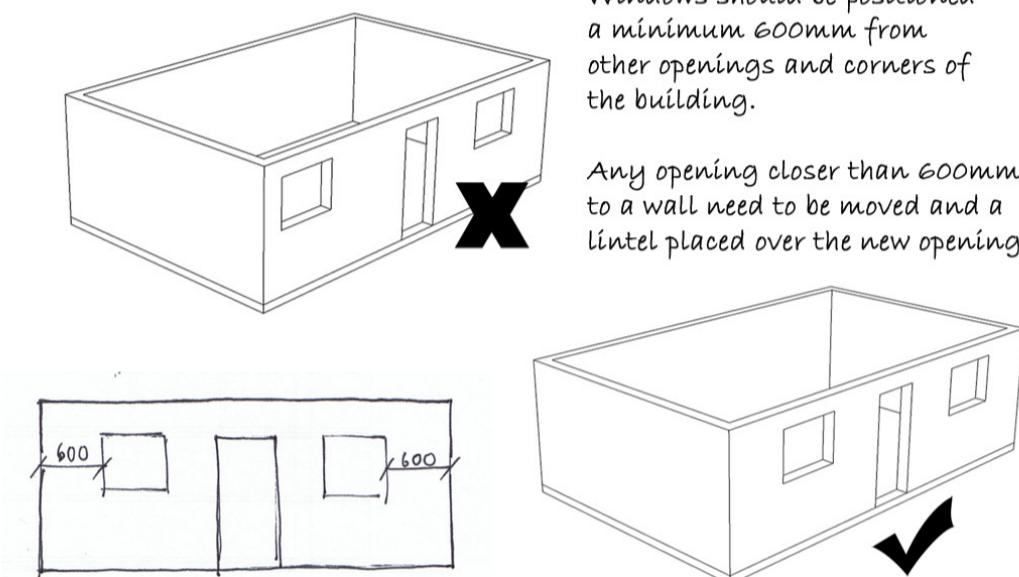
RETROFITTING IS THE PROCESS OF MAKING AN EXISTING STRUCTURE STRONGER.

THE SUGGESTIONS IN THIS POSTER DEMONSTRATE HOW THIS CAN BE DONE.

WINDOW & DOOR OPENINGS

POSITION OF WINDOWS

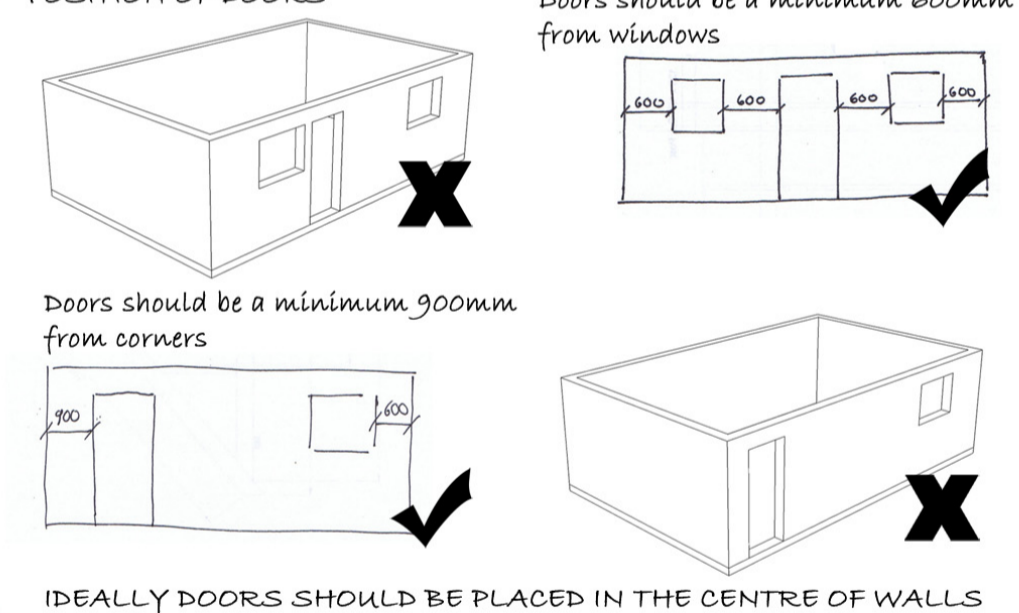
Windows should be positioned a minimum 600mm from other openings and corners of the building.



Any opening closer than 600mm to a wall need to be moved and a lintel placed over the new opening.

POSITION OF DOORS

Doors should be a minimum 600mm from windows.

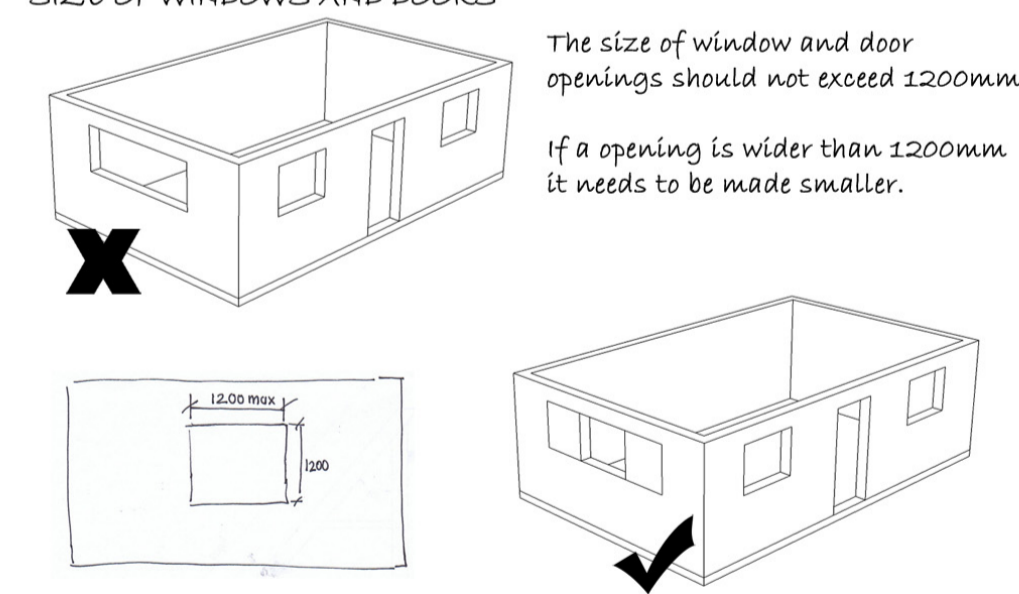


Doors should be a minimum 900mm from corners.

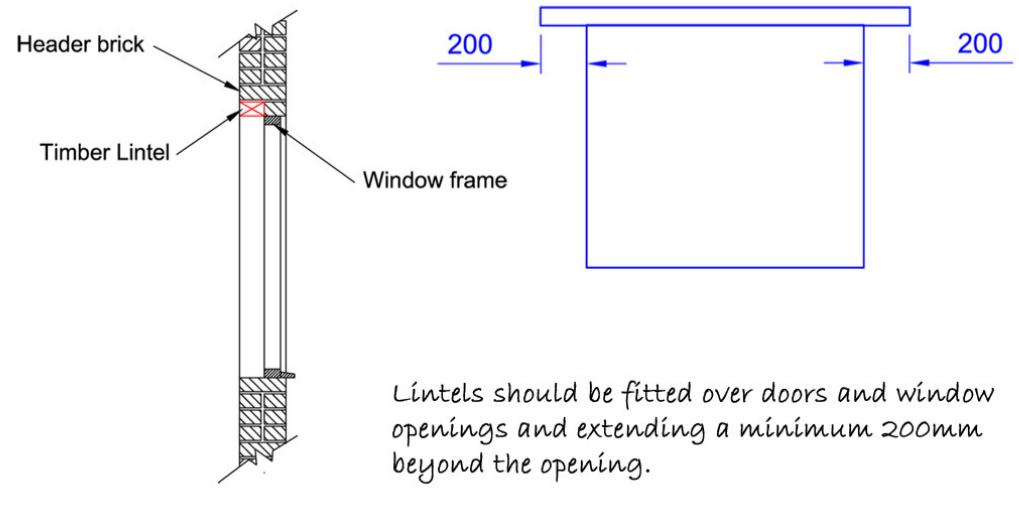
IDEALLY DOORS SHOULD BE PLACED IN THE CENTRE OF WALLS

SIZE OF WINDOWS AND DOORS

The size of window and door openings should not exceed 1200mm. If a opening is wider than 1200mm it needs to be made smaller.

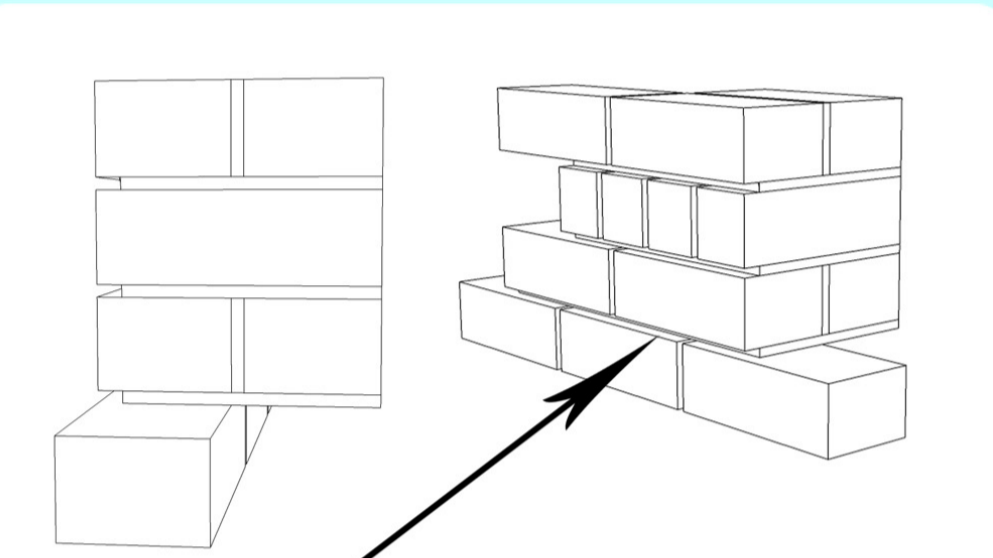


LINTELS OVER WINDOWS AND DOORS

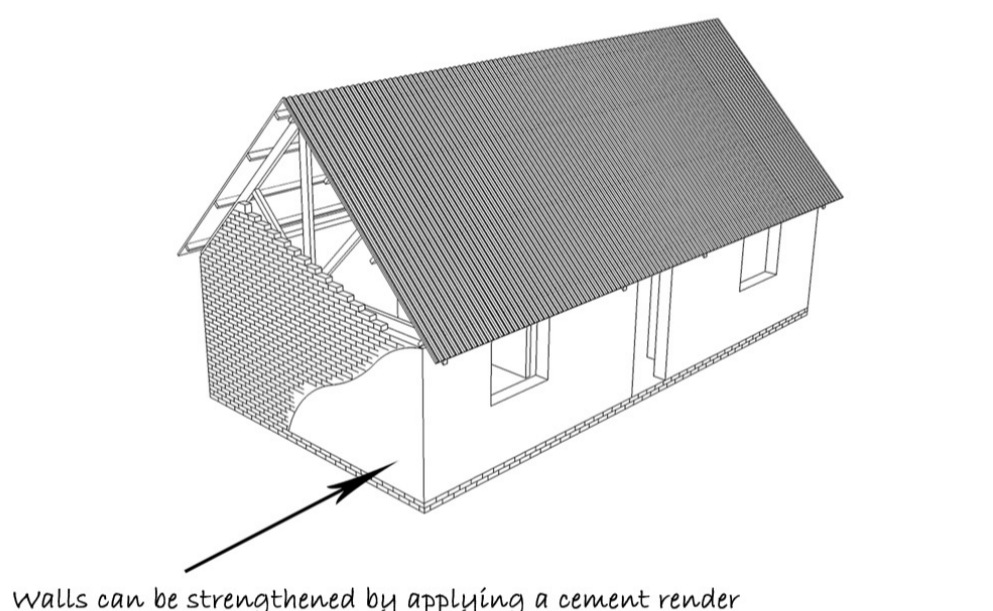


Lintels should be fitted over doors and window openings and extending a minimum 200mm beyond the opening.

APPLYING CEMENT RENDER TO WALLS



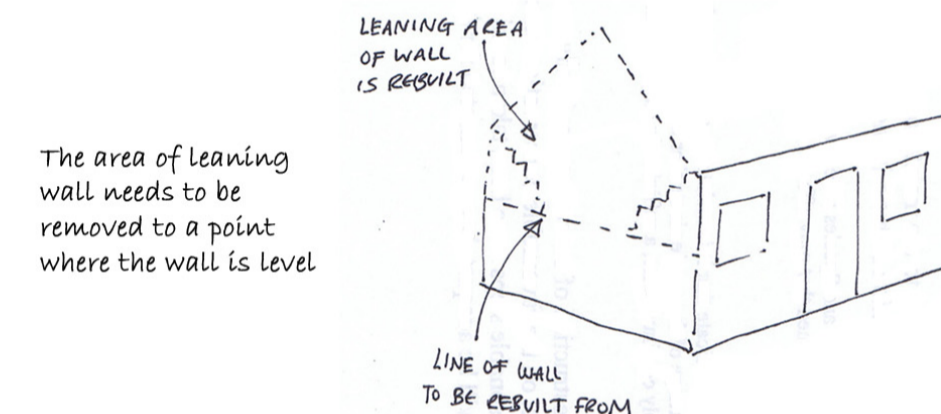
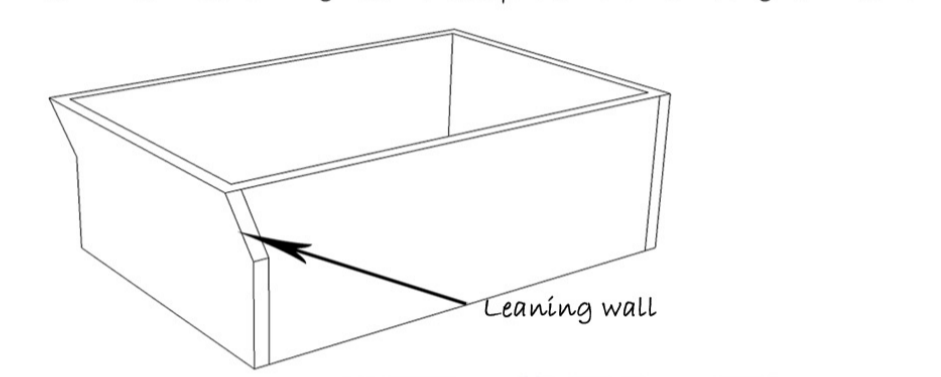
The brick joints must first be raked out by a minimum of 20mm so that the render has sufficient key.



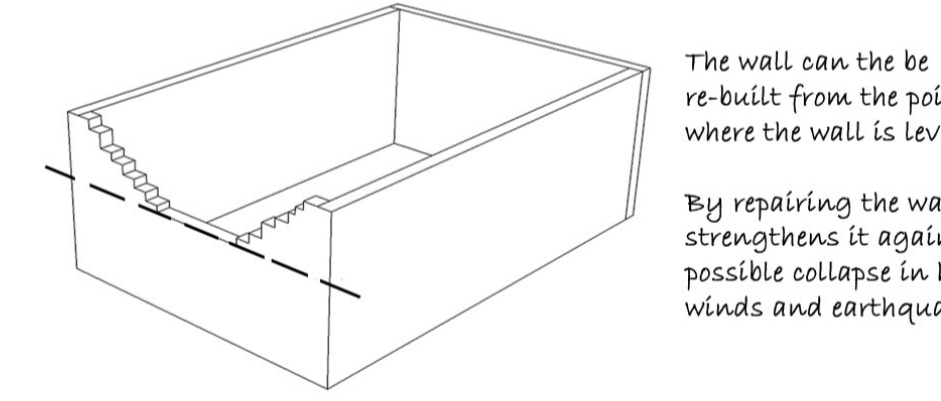
Walls can be strengthened by applying a cement render

REBUILDING LEANING WALLS

Walls that are leaning need to be repaired so as to strengthen the wall.



The area of leaning wall needs to be removed to a point where the wall is level.

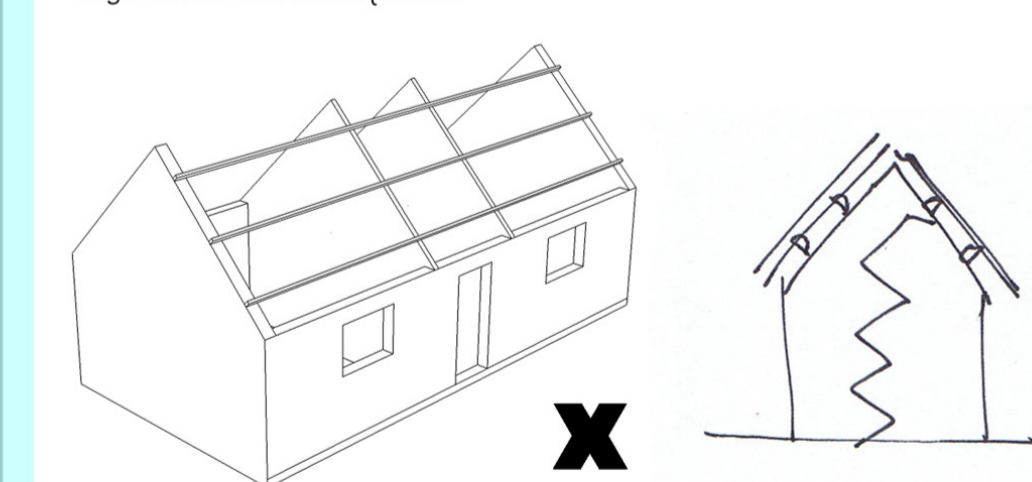


The wall can be rebuilt from the point at where the wall is level.

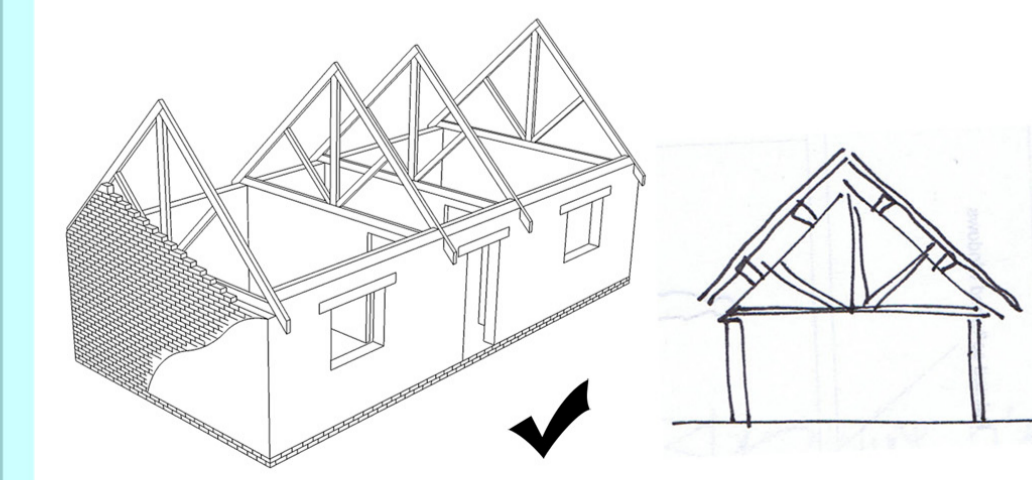
By repairing the wall it strengthens it against possible collapse in high winds and earthquakes.

REMOVING INTERNAL SUPPORTING WALLS

Internal brick walls supporting the roof are likely to collapse during high winds and earthquakes.



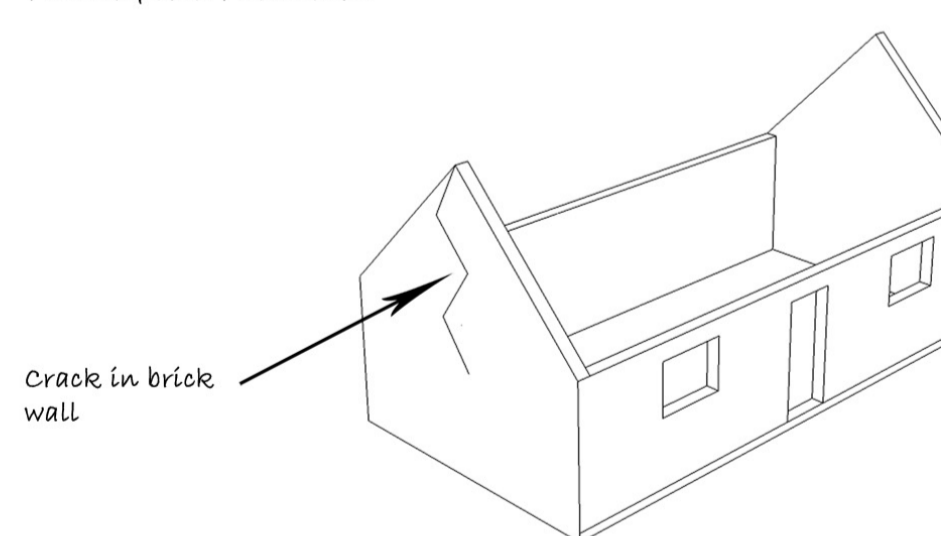
INTERNAL WALLS SUPPORTING THE ROOF SHOULD BE REPLACED WITH TIMBER TRUSSES



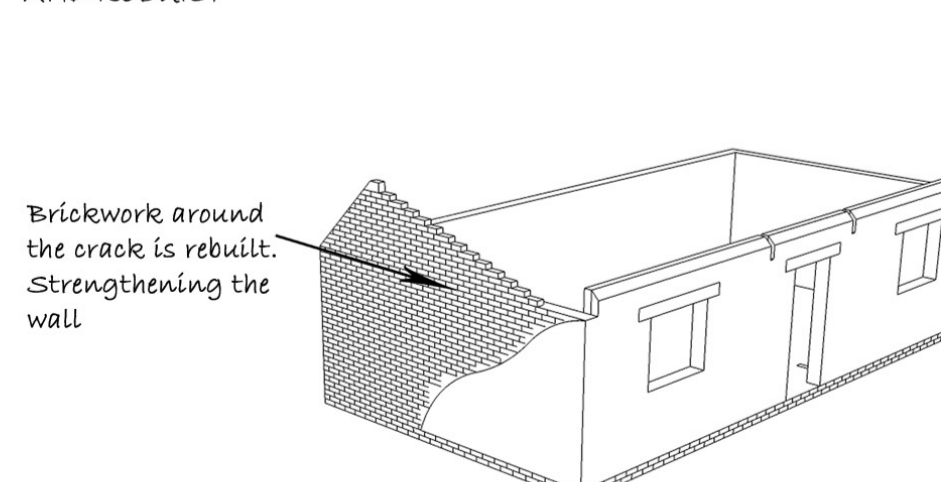
The spacing of the trusses is determined by the spacing and dimensions of the purlins. Generally purlins should not be less than 100 x 50mm in section.

REPAIRING CRACKS IN WALLS

CRACKS IN BRICKWORK CANNOT BE REPAIRED BY SIMPLY FILLING WITH MORTAR

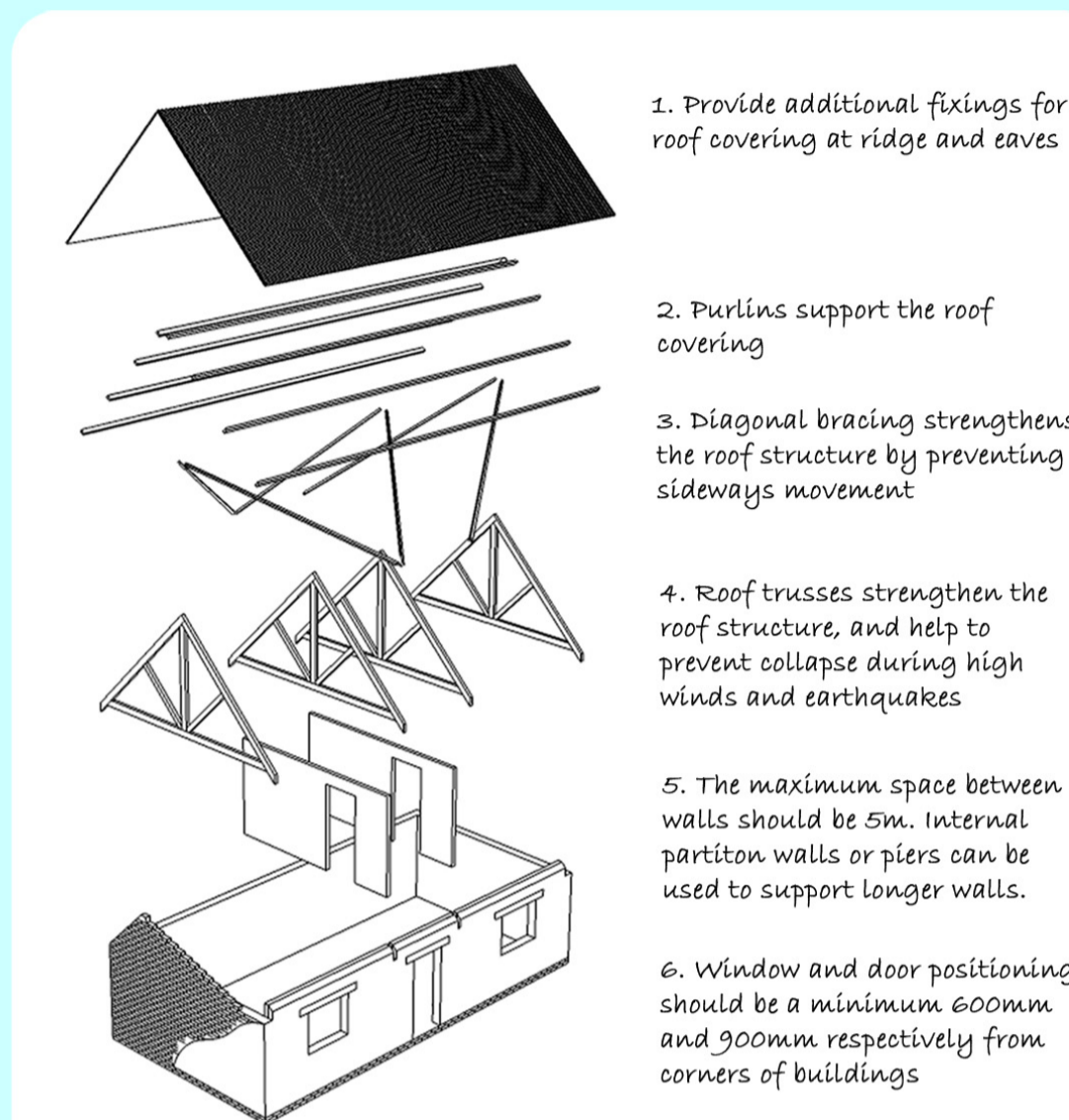


THE BRICKWORK IN THE AFFECTED AREA HAS TO BE REMOVED AND REBUILT

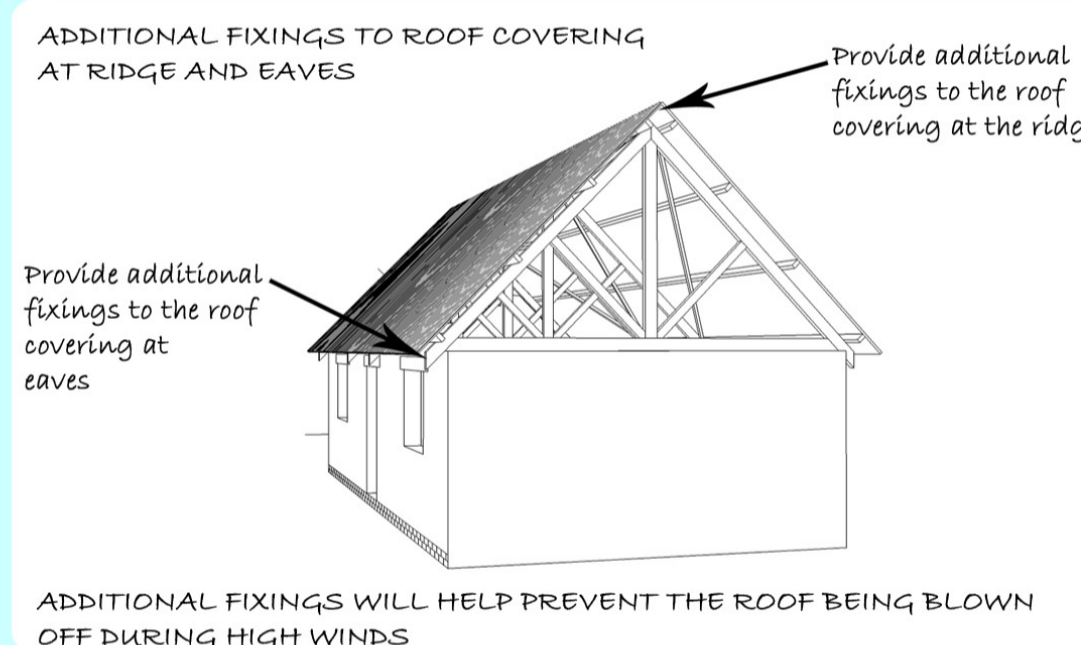


Brickwork around the crack is rebuilt. Strengthening the wall

RETROFITTING TO STRENGTHEN HOUSES



ADDITIONAL FIXINGS TO THE ROOF



ADDITIONAL FIXINGS TO ROOF COVERING AT RIDGE AND EAVES

Provide additional fixings to the roof covering at eaves

ADDITIONAL FIXINGS WILL HELP PREVENT THE ROOF BEING BLOWN OFF DURING HIGH WINDS

TIES FROM WALL PLATE OR RAFTERS

