RED CROSS 143

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Build a stronger and resilient house for your family.

BADLY BUILT HOUSES KILL PEOPLE DURING DISASTERS!

This Information, Education and Communication (IEC) is developed based from Build Change Design and Construction Guideline, 8 Key Messages from Shelter Cluster and Philippine Red Cross site observations during construction.

PHILIPPINE RED CROSS

Build Back Safer

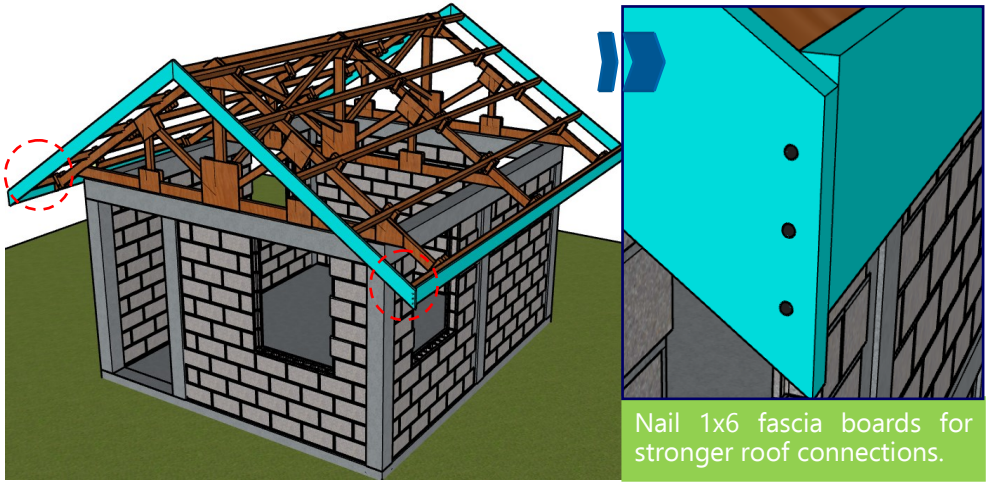
one-story masonry design

shelter assistance

Booklet Topics

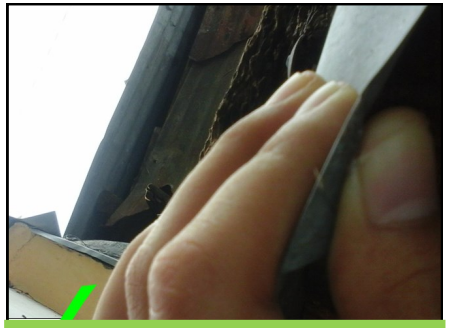
g. Strengthen the roof

On roof perimeter



Nail 1x6 fascia boards for stronger roof connections.

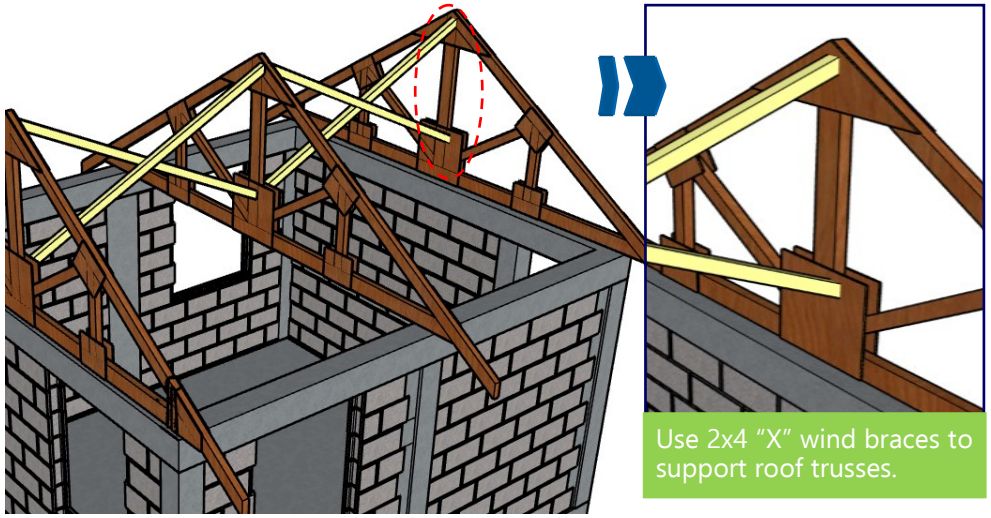
Choosing CGI sheets



Use gauge 26 (0.48 mm) CGI sheet for roofing.

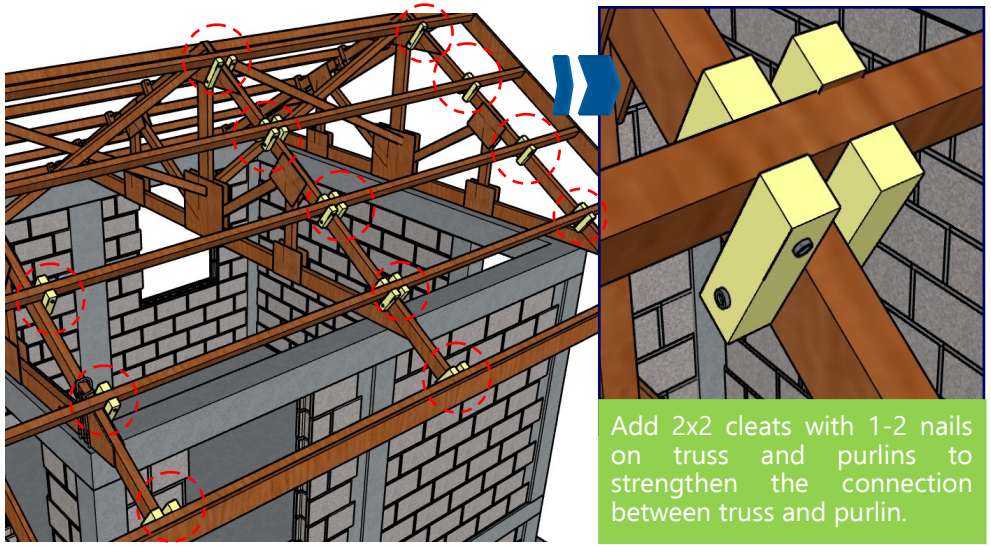
g. Strengthen the roof

In between roof trusses



Use 2x4 "X" wind braces to support roof trusses.

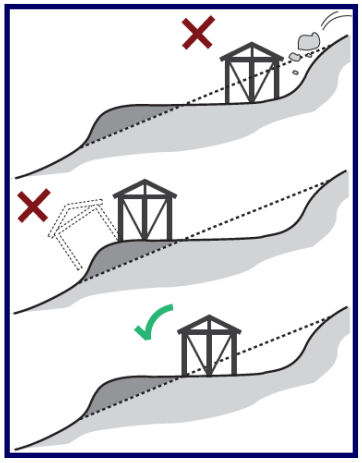
Purlin-Truss Cleats



Add 2x2 cleats with 1-2 nails on truss and purlins to strengthen the connection between truss and purlin.

a. Choose safe and stable location

Safe Site Locations



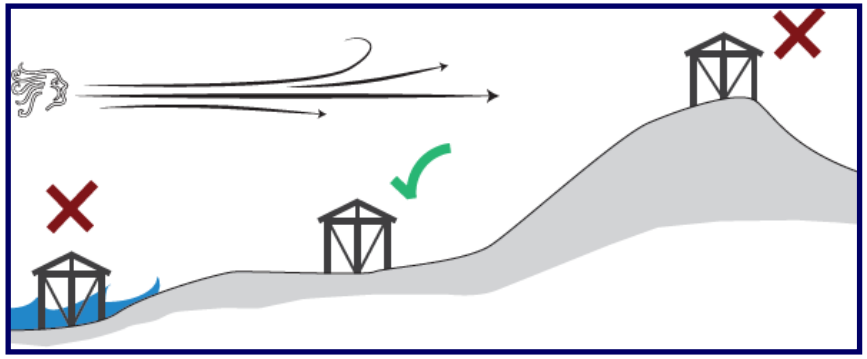
Don't build where rocks might fall.

Don't build near edges of cliffs.

Keep a safe distance from the edges and build on stable ground.

Don't build too close to large trees.

Keep a safe distance from large trees.

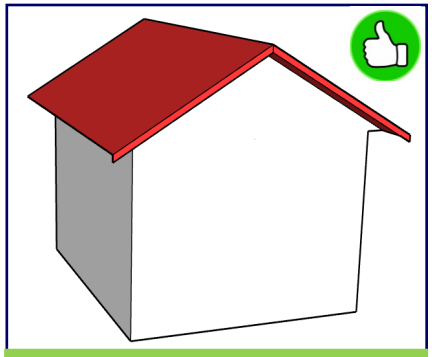


Don't build on or near bodies of water.

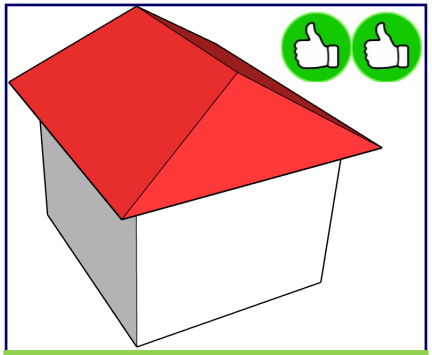
Don't build on hills that are too high.

b. Choose disaster-resilient designs

Type of Roof Designs

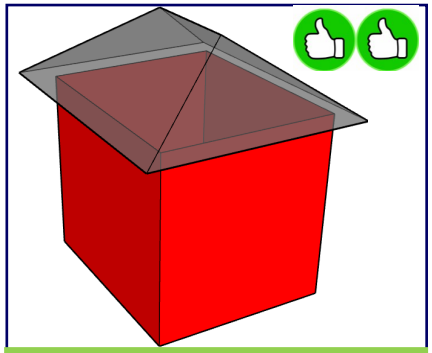


Gable / *2-sided roof*

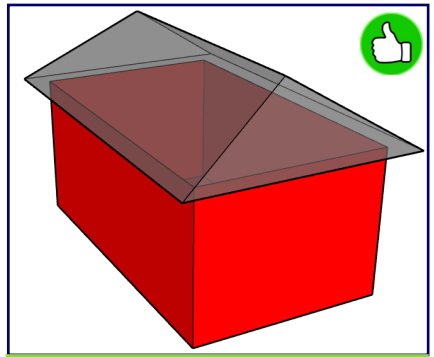


Hip / *4-sided roof*

Shape of Floor Plans

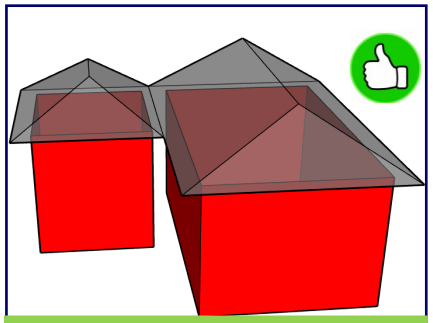


Simple Square



Simple Rectangle

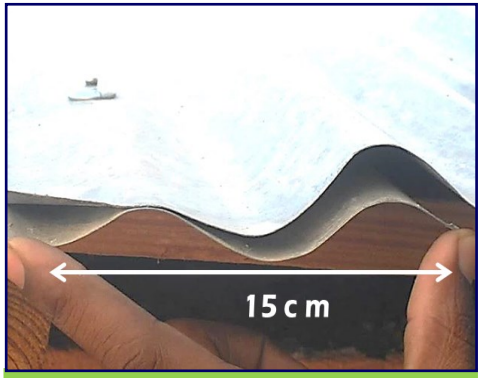
Note:
Regular-shaped house is more stable than irregular-shaped



Safer L-Shape

g. Strengthen the roof

Proper CGI sheets overlap



Overlap CGI sheets every 2 waves or corrugation on sides.

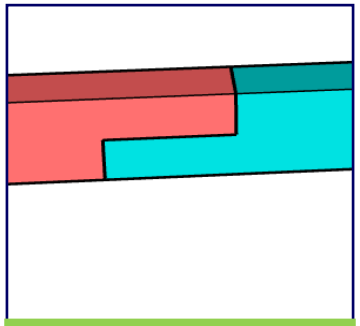
Overlap CGI sheets at 15 cm at ends.

Proper CGI sheets nailing

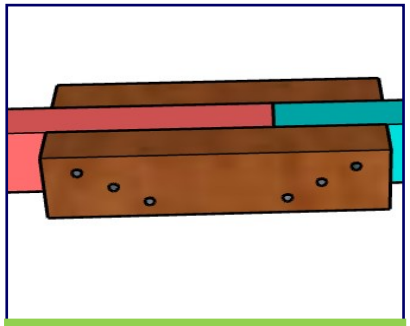
Apply umbrella nails on 3 consecutive waves at side edges and CGI overlaps, and every wave at top and bottom edge of roof.

f. Strengthen timber connections

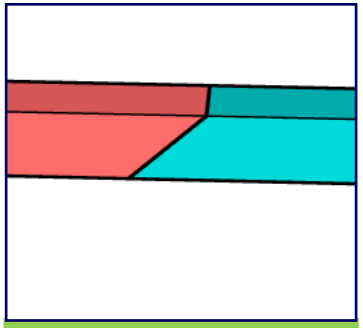
Proper wood splicing



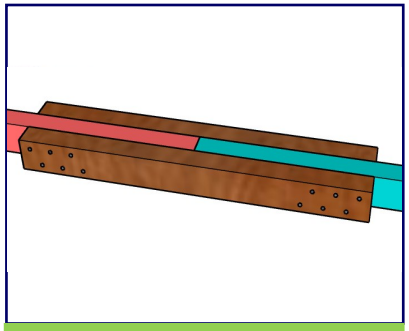
Cut 1/2 of wood depth each wood



Nail the same wood size on both sides.

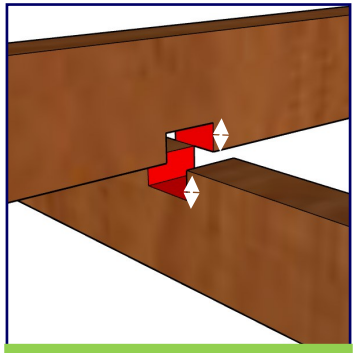


Make diagonal cut for both wood ends.



Nail the same wood size with

Allowable wood cuts



Cut up to 1” maximum

c. Use good quality materials

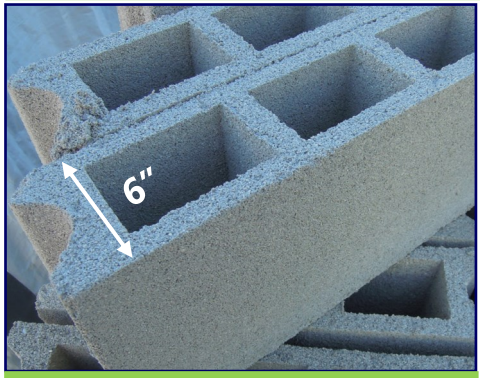
Good Quality Materials

Use 3/4” gravel size (thumb size) for concreting.

Use clean river sand (not brownish in color) for concreting.

Use Type 1 Portland cement for concreting.

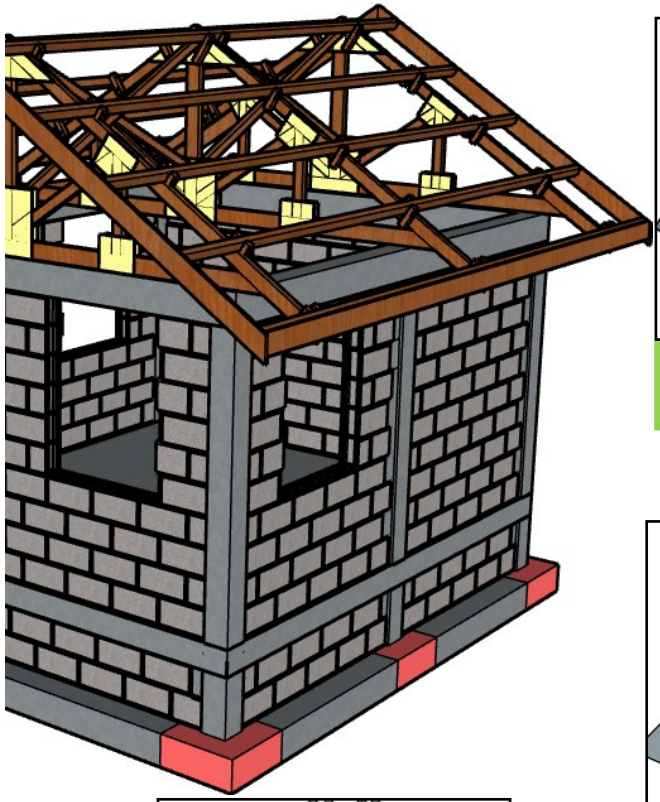
Use deformed, rust-free rebars.

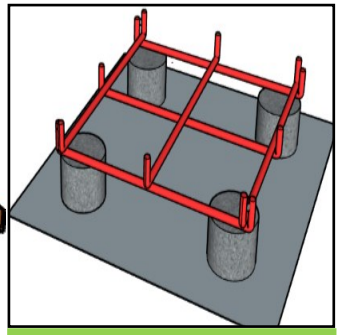


Use 6” masonry blocks.

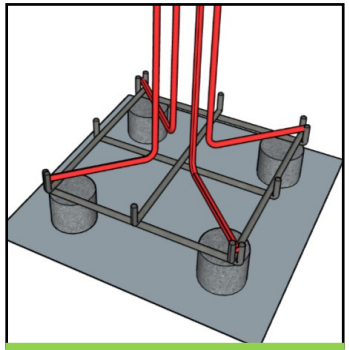
d. Build strong foundation

Rebars for Footing

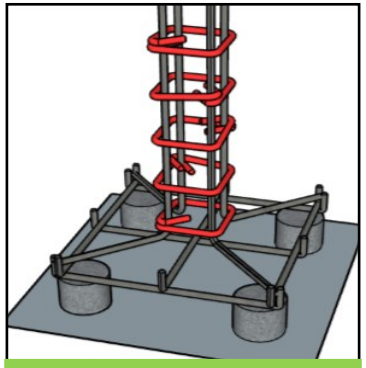




12 mm rebars for footing pad



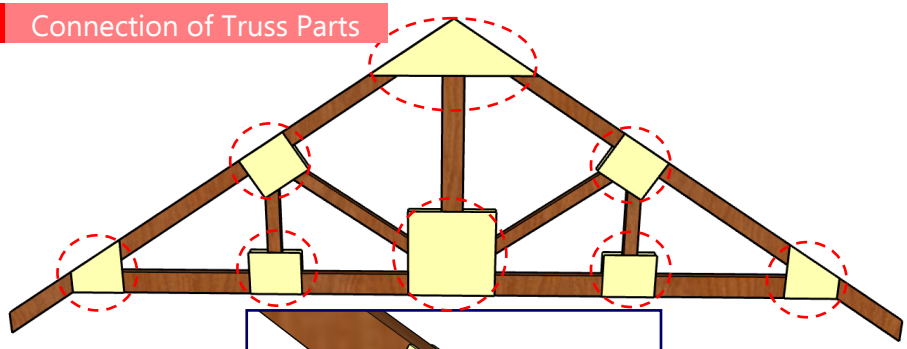
12 mm rebars for main bars

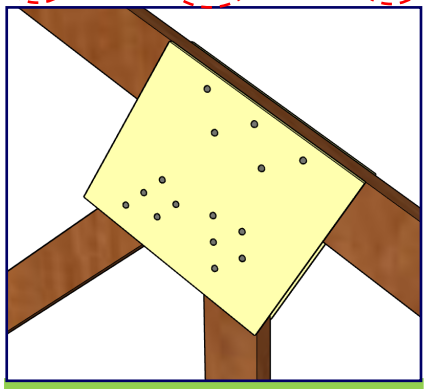


10 mm rebars for stirrups and ties

f. Strengthen timber connections

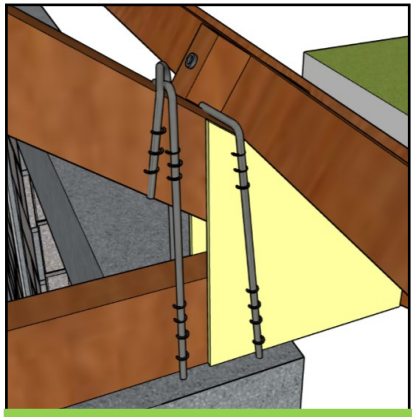
Connection of Truss Parts



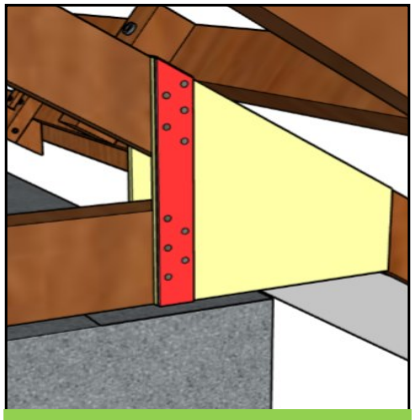


Add 3/4" plywood on both sides to strengthen the connections of truss members.

Column to Truss Connection



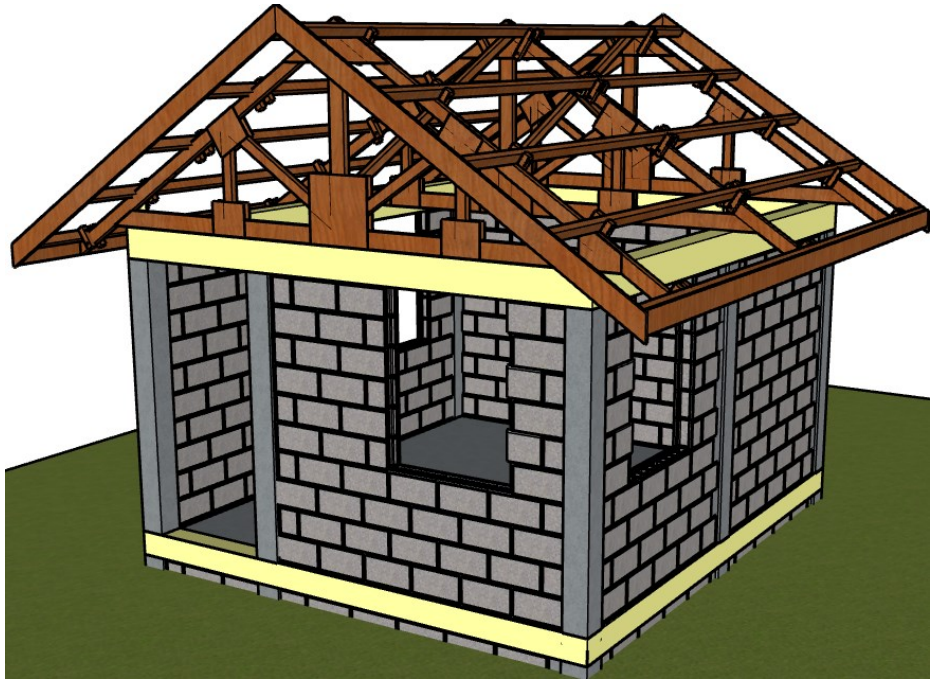
Bend column rebars and add nails on each side.

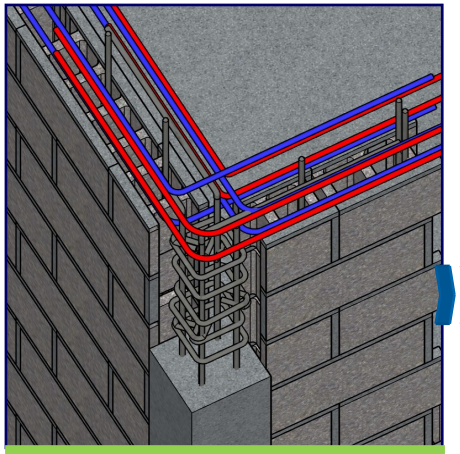


Add Gauge 18 metal straps with 10 nails per side.

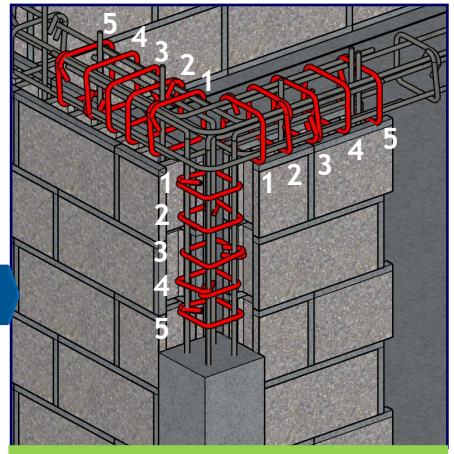
e. Build strong masonry walls

Confine walls with beams





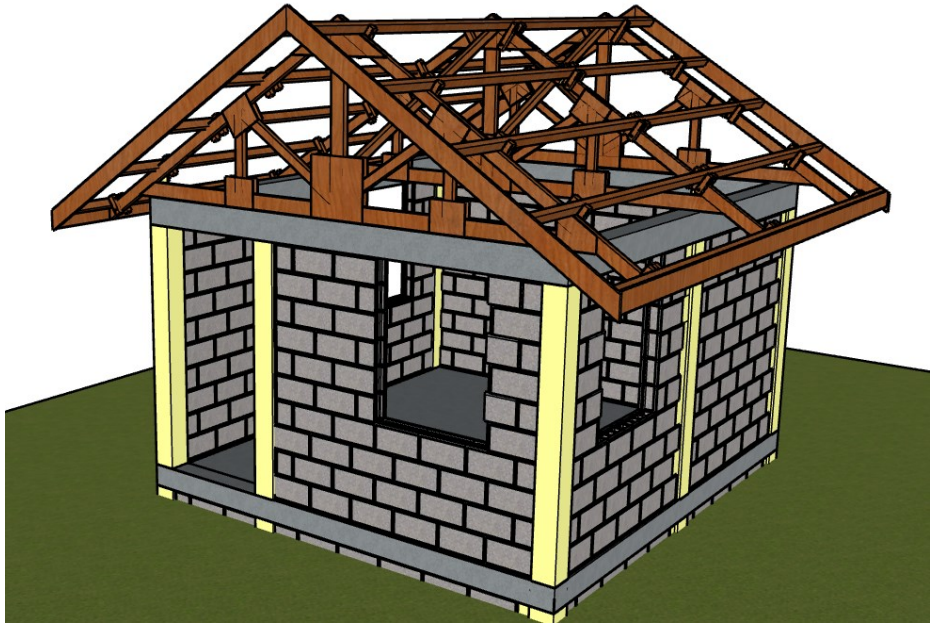
Bend 12 mm rebars of beams on corner columns.

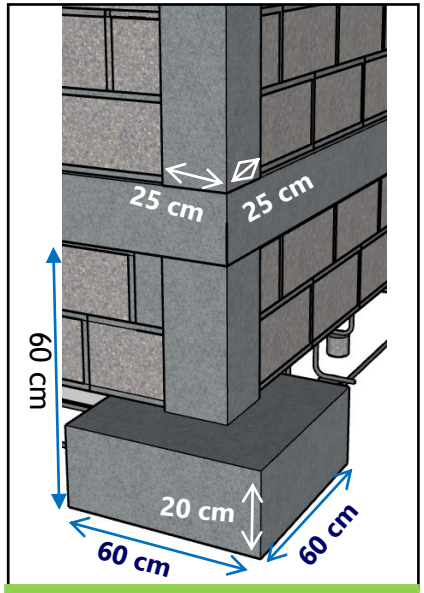


Install first 5 stirrups (10 mm rebars) at 10 cm spacing on corners and intersection.

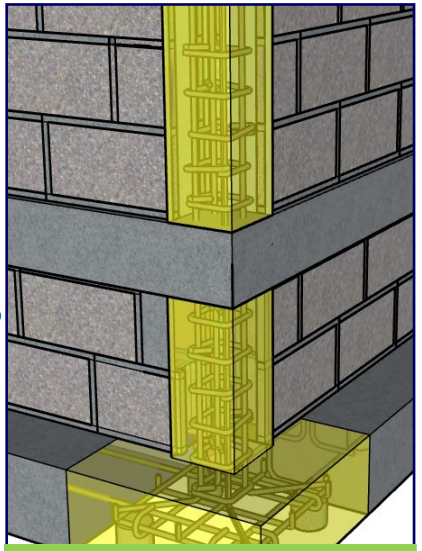
e. Build strong masonry walls

Confine walls with columns





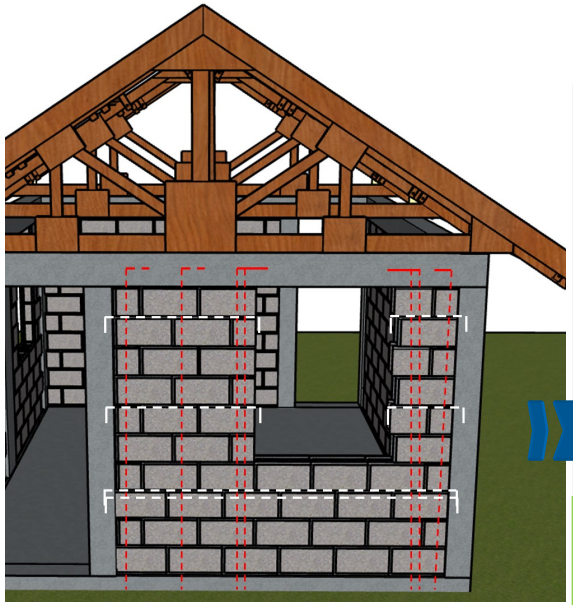
Concrete foundation size

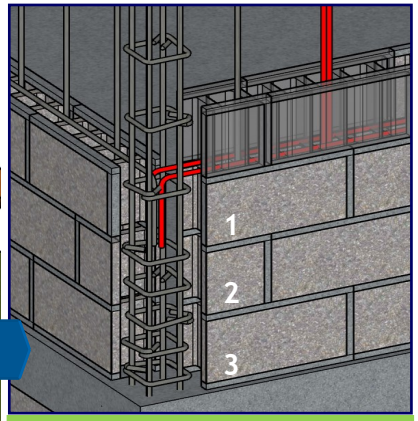


Concrete column rebars

e. Build strong masonry walls

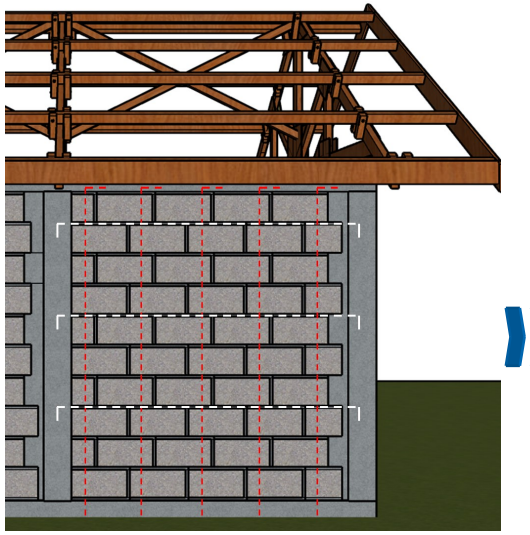
Rebars on walls with windows

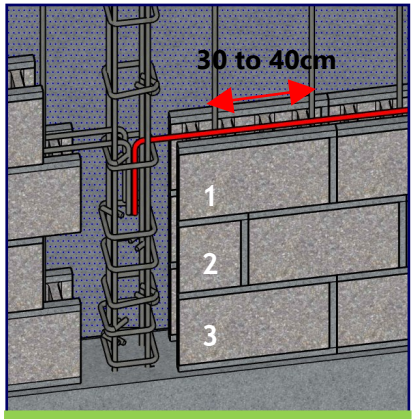




Install 2 rebars (12 mm) on window openings on every 3 layers of CHB.

Rebars on walls w/out windows

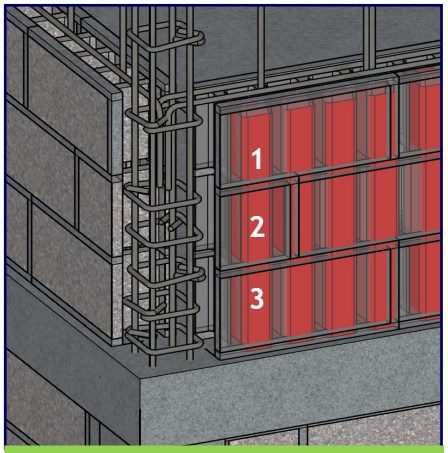




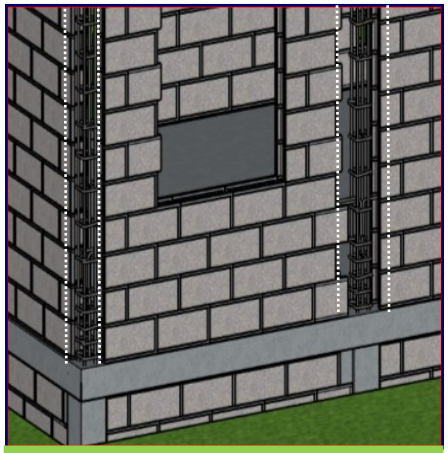
Install 1 rebar (12 mm) on walls on every 3 layers of CHB and every 30 to 40 cm spacing for vertical rebars.

e. Build strong masonry walls

CHB laying

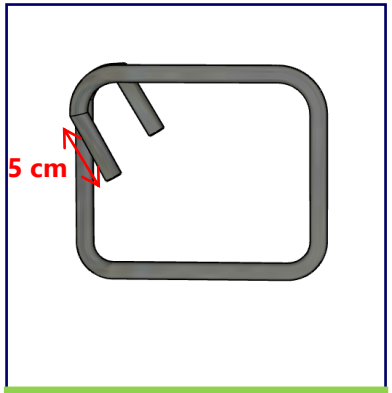


Fill CHB holes with mortar every 3 layers for stronger masonry wall.

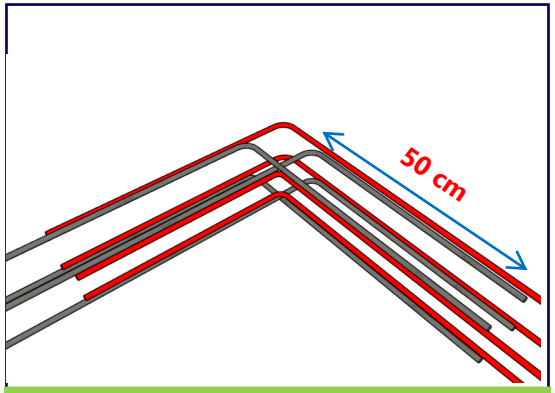


Lay CHB first before concreting columns to strengthen wall and column connection.

Hooks and Splicing



Bend stirrups' ends at 135 degrees and 5 cm hook length.



Extend or connect rebars at least 50 cm length of existing and added rebar.