

# YOU CAN KEEP YOUR FAMILY SAFE FROM EARTHQUAKES BUILD WITH TIMBER INSTEAD OF MASONRY



**Destroyed Masonry Home**



**Intact Timber Home**

**Timber House**  
Safer  
Cheaper  
Faster

*Timber is more flexible and lighter weight than bricks. It is easier and less expensive to build a safe, comfortable house from timber. A timber house is a better choice if you are building on soft soil or a sloped site as the timber house has fewer problems due to settling. It is also easier to repair if damaged.*

## FOLLOW THESE SIMPLE RULES TO BUILD AN EARTHQUAKE RESISTANT SEMI PERMANENT HOUSE:



**Diagonal bracing in all 4 corners**



**Every connection must have peg**



**Keep wood column off ground with concrete starter**



**Wind bracing between truss**



**Use proper splice joinery**



**The masonry skirt may be made from bricks or concrete blocks but it must have a nail connecting masonry to column**



**Before plastering, be sure to paint all timber with preservative paint**



**Install the chain-link lath and bend nails over to stretch it tightly**



**Install backing boards and plaster**



Save the Children

World Vision



For more information, please contact  
Build Change at [build.indonesia@gmail.com](mailto:build.indonesia@gmail.com)  
or through CRS office: Hotel Permata Bunda,  
Jl.Gajah Mada No. 316, Agam-Lubuk Basung.  
For 24-hour help-line please contact CRS at:  
0751-9071370



# YOU CAN KEEP YOUR FAMILY SAFE FROM EARTHQUAKES!

**Follow these important rules to build an earthquake resistant permanent house!**



**Why do some permanent houses collapse while others resist the earthquake? Learn the 3 Cs:**

**Configuration:** Build a simple, symmetric shape, a square is the best!

**Connections:** Connect beams and columns together using steel overlap detail. Connect masonry to tie columns using steel reinforcement bar.

**Construction Quality:** Buy good quality materials and follow these important techniques...

## PROBLEM

## SOLUTION



Problem: No sloof beam, ring beam or tie columns



Use tie columns and bond beams to tie the walls together. Cast the column and ring beam concrete after you build the wall.



Problem: No overlap in steel connection



Make strong connections between confining elements (like columns and beams) by overlapping bars at least 40 cm



Problem: Collapsed masonry gable wall



Do not use masonry in the gable wall. It is heavy and can easily tip over and collapse. Use timber or build a hipped roof.



Problem: Walls with large windows and doors can collapse easily



For all walls with windows and doors, use a lintel beam or horizontal steel reinforcement, tied into the columns



Problem: Bricks laid dry, joints not filled completely with mortar



Build a strong wall by soaking the bricks in water before laying and filling joints completely with mortar



Problem: No connection between the walls and tie column



For all walls without openings, use besi stick to connect the bricks and column



For more information, please contact Build Change at [build.indonesia@gmail.com](mailto:build.indonesia@gmail.com) or through CRS office: Hotel Permata Bunda, Jl. Gajah Mada No. 316, Agam-Lubuk Basung. For 24-hour help-line please contact CRS at: 0751-9071370





# Good Quality Materials, for YOUR SAFE HOUSE !



**BUILDING MATERIALS** Examine before buying for your home.  
If not, you will be in danger during the next earthquake!

## NOT RECOMMENDED



Avoid using **SMOOTH STEEL** and **USED STEEL** that is rusty, especially for primary reinforcement.



For concrete work, do not use smooth gravel / mixed with soil or sand.



Do not use sand mixed with mud or soil.



Avoid using stones with a smooth or muddy surface for stone masonry work.



Do not use warped wood, wood with fibrous texture, or wood that has a lot of knots and bark.



Do not use weak brick from old buildings and has a lot of cracks.  
*(Test bricks before buying them using the simple method shown. If at least 3 of 7 bricks break when stepped on by an average size man, then the bricks are too weak. Find stronger bricks elsewhere.)*



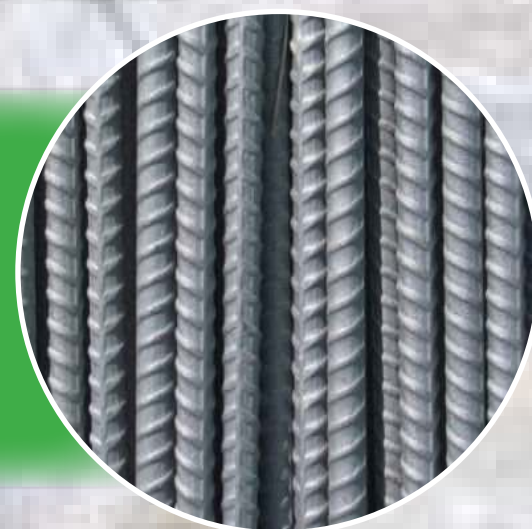
Test concrete blocks by dropping them from shoulder height. If at least 2 of 5 blocks break, the blocks are not good, and you should search elsewhere for strong blocks.



## RECOMMENDED



For Main Reinforcement, use (SNI) min . Ø 10 mm ( new ribbed steel without rust ).



Use gravel / crushed stone. Crushed aggregate will be angular instead of round. The maximum diameter should be 2 cm.



Use clean sand / not dirty and mixed with mud or soil



Use **MOUNTAIN STONE**, sized 15-30 cm, with rough surfaces clean of soil.



Use wood grade I & II with a smooth surface.



Good bricks will not break when subjected to the simplified test. Good bricks are reddish crimson in color and makes a shrill sound when tapped.



Use **STRONG BLOCK**. Strong block will not break when dropped and make a metallic sound when tapped.



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# HELP KEEP YOUR FAMILY SAFE FROM EARTHQUAKES

## BUILD A SAFE TRANSITIONAL SHELTER



This poster describes ways to make a transitional shelter by choosing materials that can be reused in the re-constructed house. Even if you have a T-shelter, you are still eligible for the government cash grant.

### RECLAIM AND RECYCLE BUILDING MATERIALS TO SAVE MONEY!

Reclaim timber, CGI Sheets, windows, doors and other usable materials from damaged home to build transitional shelter.

### SITE SELECTION:

Build the transitional shelter on your existing homestead, but far enough away that damaged house will not collapse on it. Keep the site for your new house clear so that you can start construction without moving your transitional shelter.



Re-use materials from transitional shelter to finish construction of your new home. Make sure to follow safe demolition procedures when reclaiming materials from a damaged house. Wear personal protection equipment like shoes, gloves, and masks.

### LAYOUT:

The transitional shelter should be at least 18 square meters and have at least one partition wall to provide privacy for the family members. Install openings on 3 walls to ensure adequate ventilation.

### CONSTRUCTION TIPS:



Build frame straight and plumb. Use good quality wood that can be reused in new house. Nail connections firmly and use short pieces of wood to reinforce spliced connections.



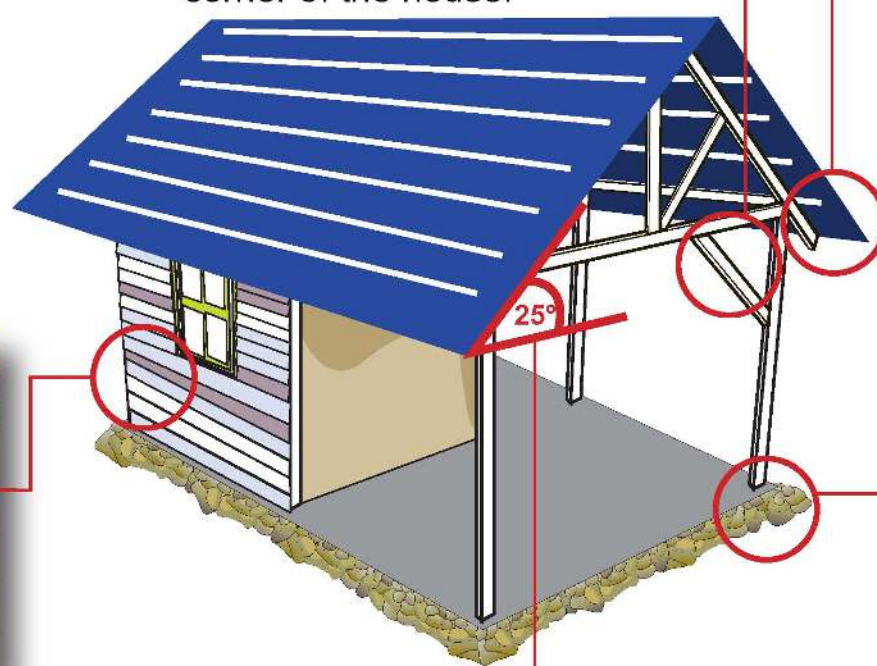
Use a diagonal brace at each corner of the house.



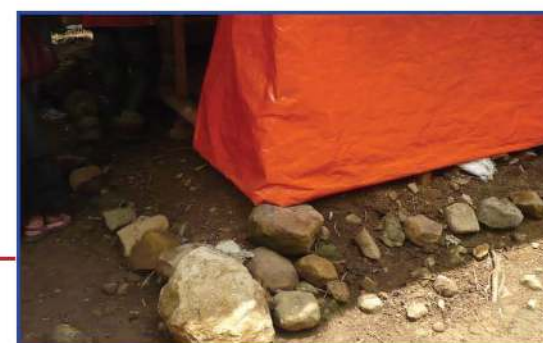
The eaves should extend at least 40 cm past the walls to ensure rain does not get inside.



Start your transitional shelter walls with a tarp, but replace with more durable materials like plywood when you can afford it.



The roof should be pitched at 25 degrees to shed rain effectively. Rumbia is better than CGI sheets for a transitional shelter as it keeps the small space cool in the sun. To reduce heat transfer, cover sheets with rumbia or paint them white.



Use rubble to build up a raised platform so the shelter is at least 15 cm above grade. Cover with a layer of screed concrete. Dig a ditch to drain excess water.



For more information, please contact  
Build Change at [build.indonesia@gmail.com](mailto:build.indonesia@gmail.com)

This poster was developed for the 2009 West Sumatra Post-Earthquake Housing Reconstruction Program. Use of this poster or its contents for other purposes without the prior written consent of Build Change is prohibited.

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