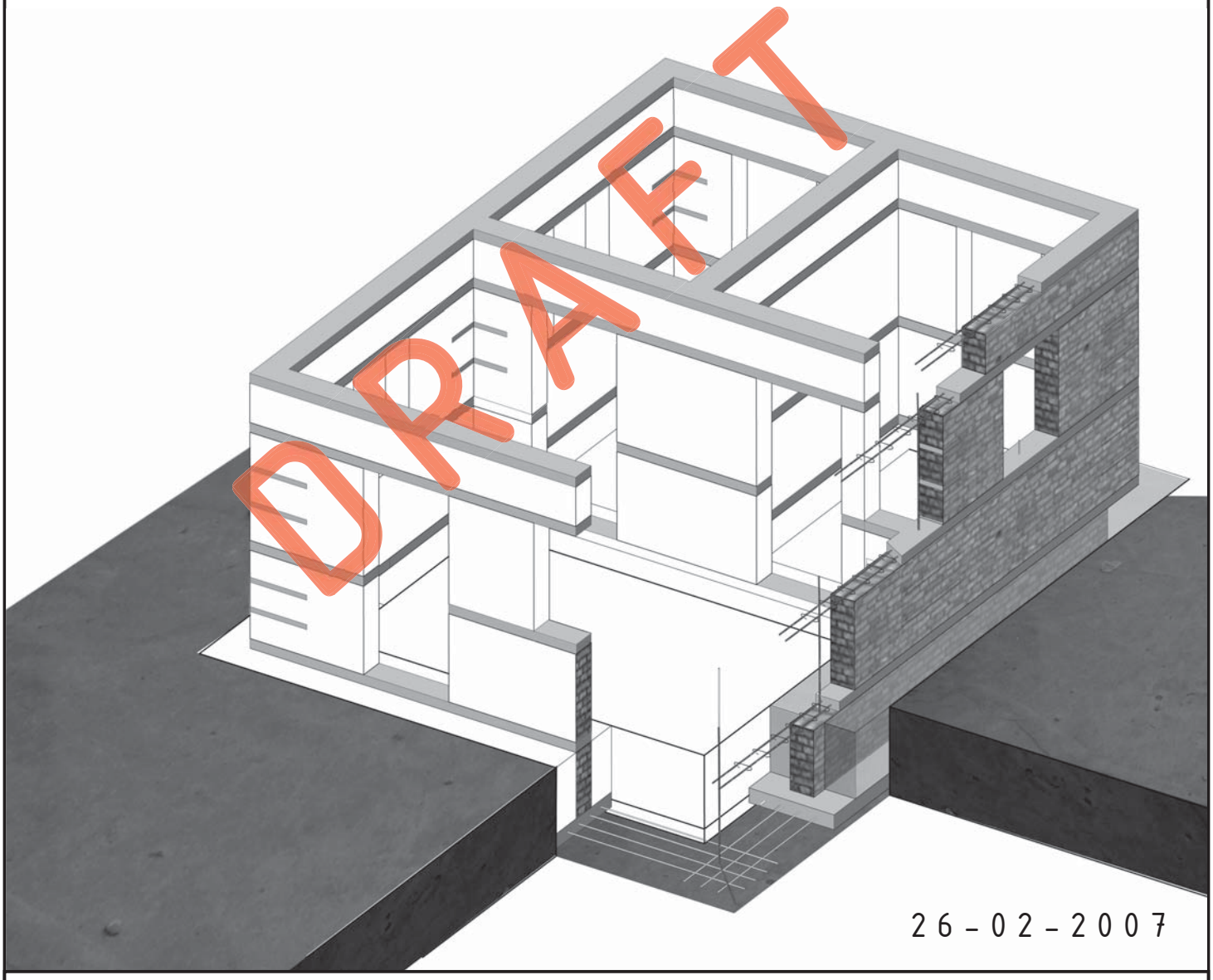
Reinforced Masonry

Reference guide



26-02-2007

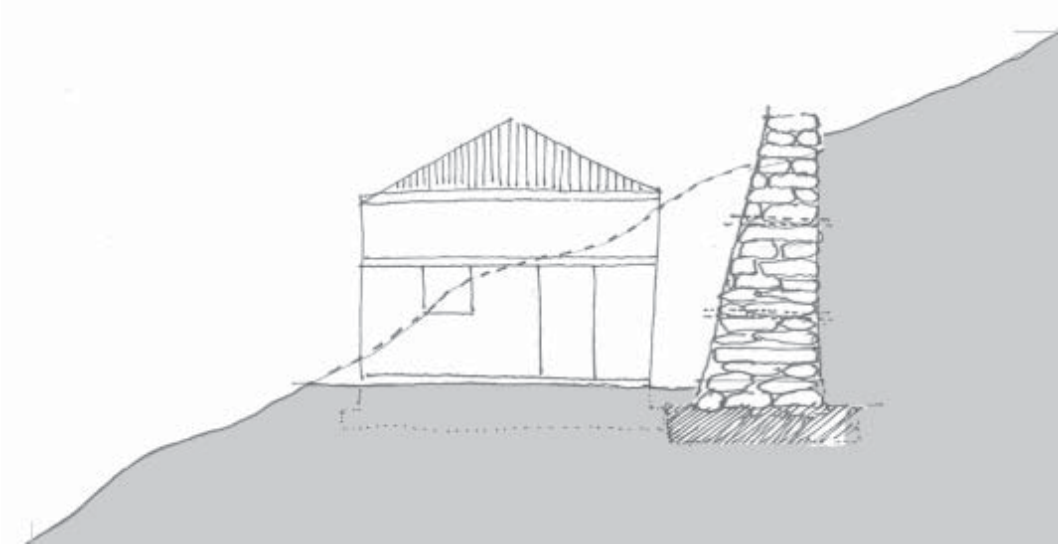
ERRA

الصليب الأحمر الفرنسي

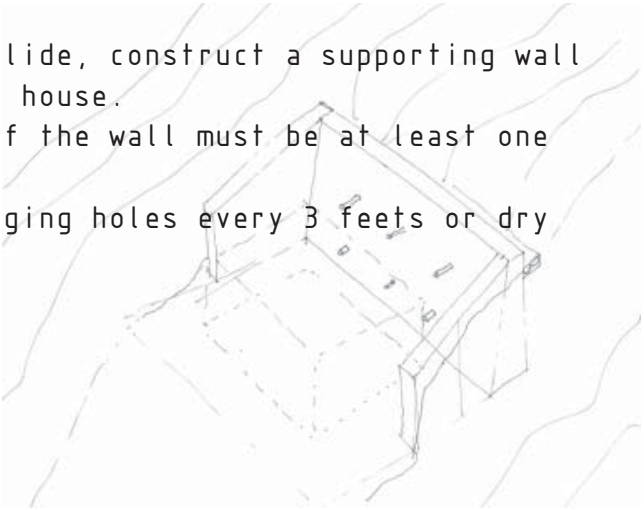
FRENCH RED CROSS

ARCHITECTURE & DEVELOPPEMENT

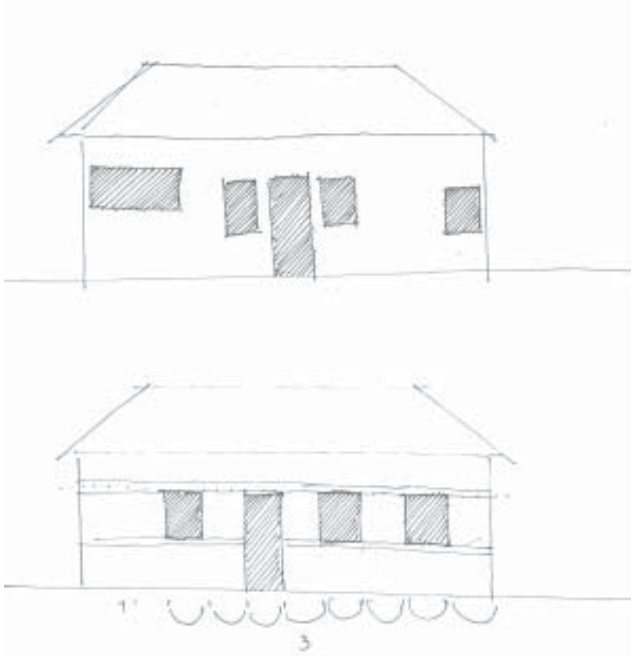
1-Supporting Walls



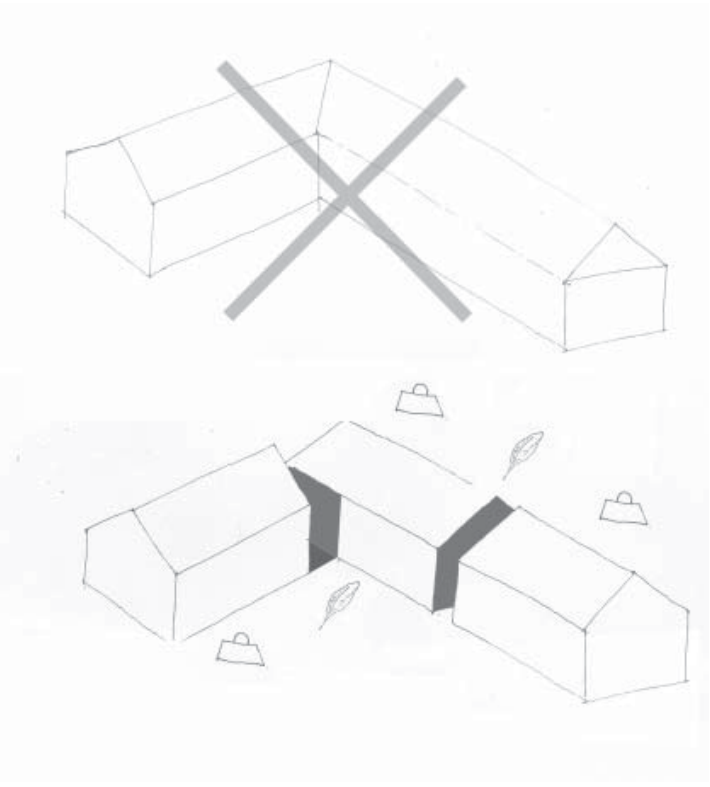
1- If possible avoid construction on slope, near by river or below slidy rockstones.
2- When constructing on a slope arrange flat surface for construction by excavating ground, avoid embankement.
3- To protect the excavating slope to slide, construct a supporting wall minimum 1/3 of its height away from the house.
4- To insure good strenght the bottom of the wall must be at least one third of its height.
5- Make permeable walls either by arranging holes every 3 feets or dry stone techniques.

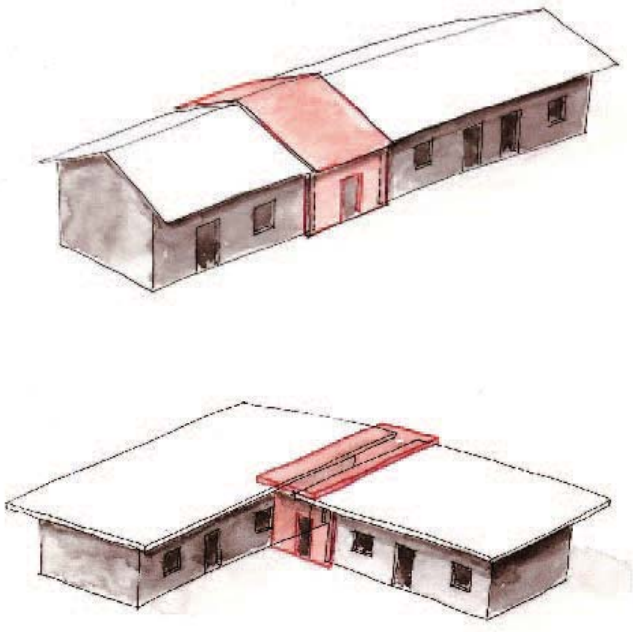


2-Form & Design

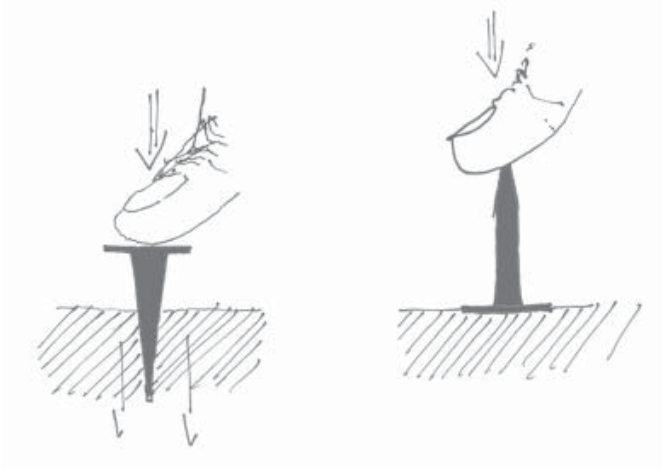


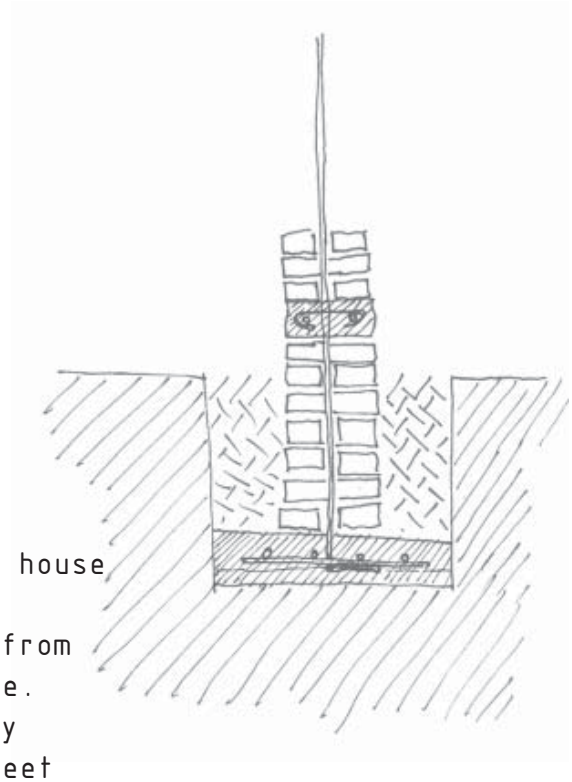
1. Earthquake will rock your house against the next one. To avoid damage, keep a good distance.
2. If you want to stick the buildings together, create a crush zone between them.
3. A crush zone will be demolished by an earthquake, but the main houses will be safe.
4. Use the crush zone for rooms where people stay only a short time, like an entrance or a toilet.
5. A crush zone must be weaker than the buildings, build it in un-reinforced masonry.
6. Put the walls and roofs against the existing ones, not between, so they can move independently.



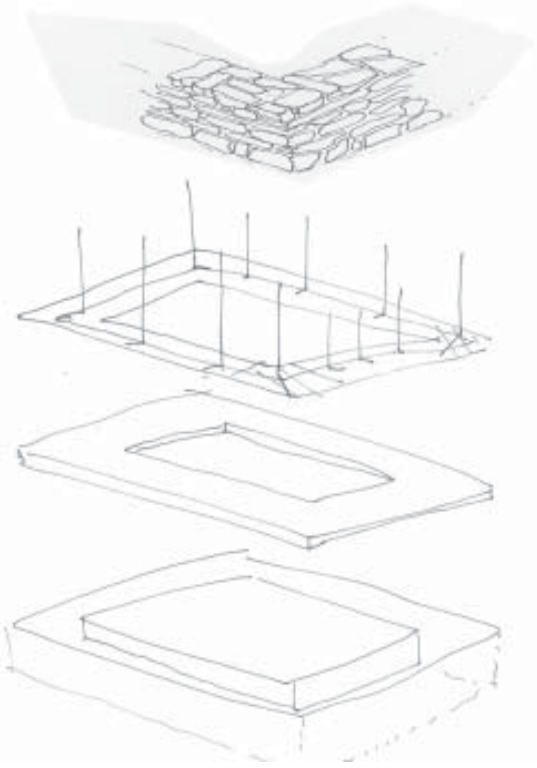


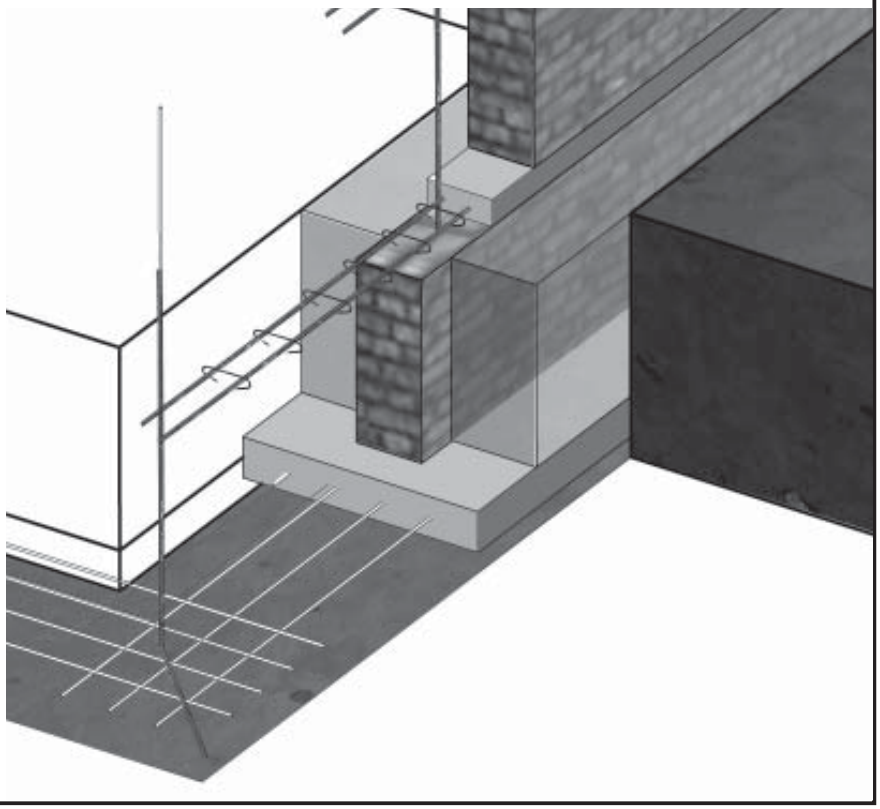
3-Fundations



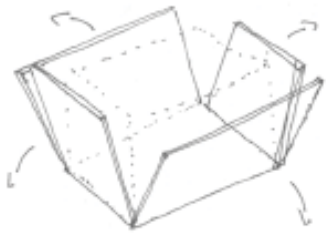


1- Fundations insure good connexion of the house with the ground.
2- The main purpose is to keek walls away from plunging into the ground by widening its base.
3- The fundation are continous bellow every structural walls and must be minimum 2 1/2 feet deep and 2 1/2 feet wide.
4- Bottom part is a croncrete slab 4 inches thick reinforced with steel bars. All vertical steel renforcement must be anchored in L shape from this level.
5- Fundation must rise 1/2 foot above ground ended with plinth concrete band.

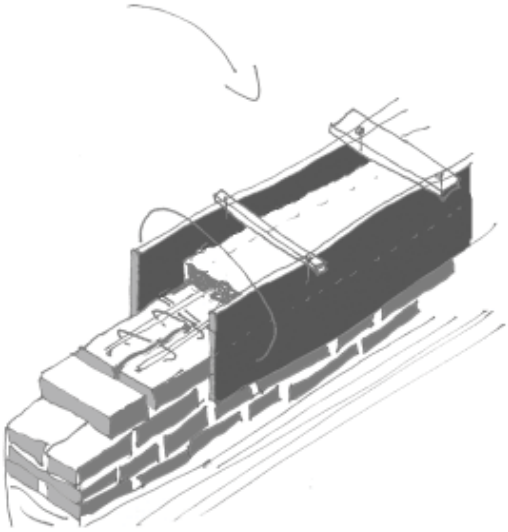




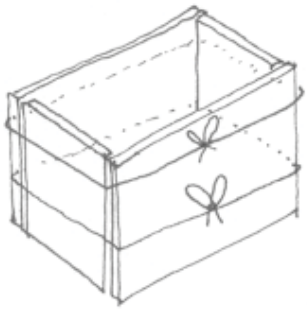
4-Seismic Bands

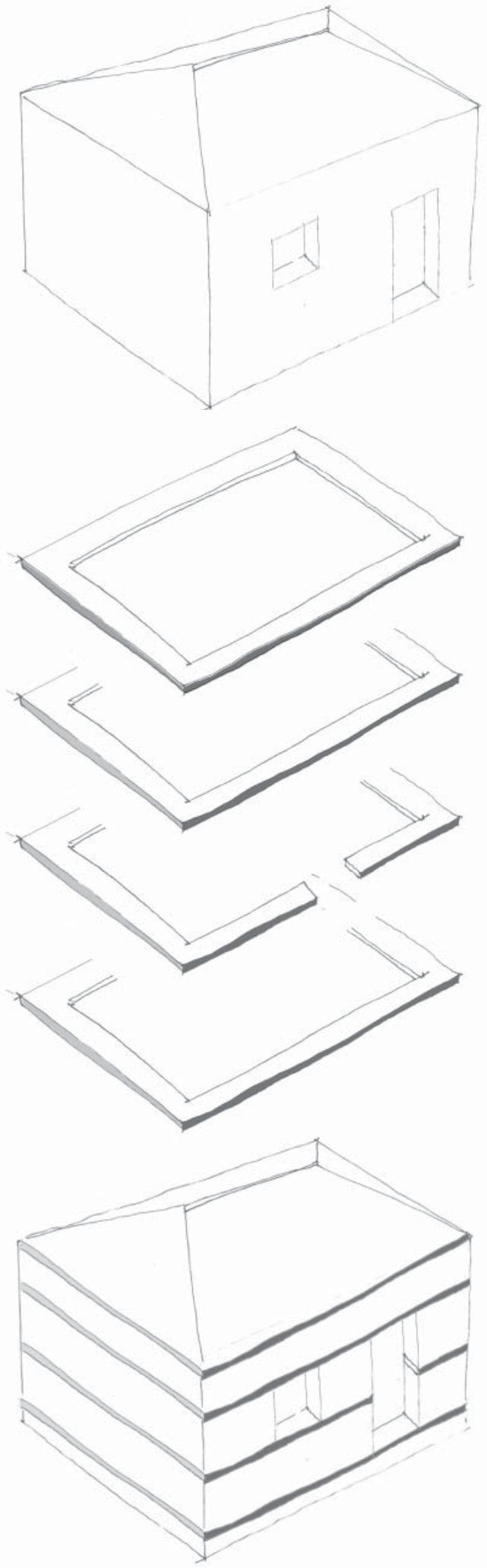


1- Seismic bands strengthen walls and keep it away from falling appart.
2- Bands must be at plinth level, bellow first opening (still band), above doors (bond bands)and on top end(bond band)
3- Bands must be of same thickness as the walls, it is done at once all around the house using frame cast.

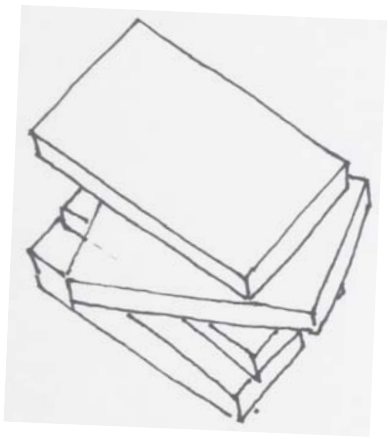


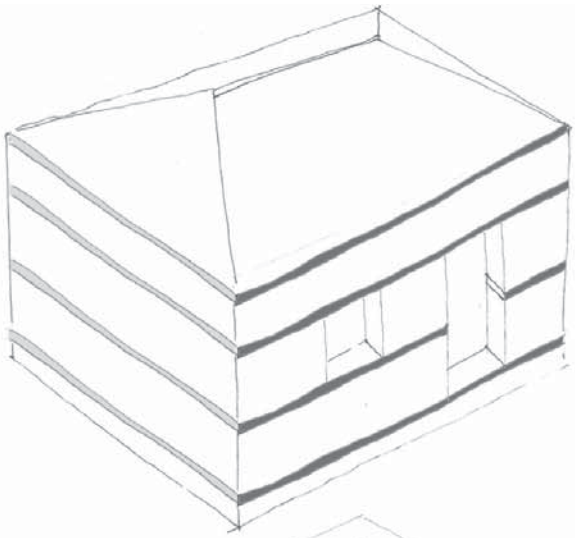
4- The band must be of concrete minimu 3 inches thick with 2 horizontal steel bands connected with rings.
5- Vertical steel bars must go through it and tighten to horizontal steel reinforcement.
6-



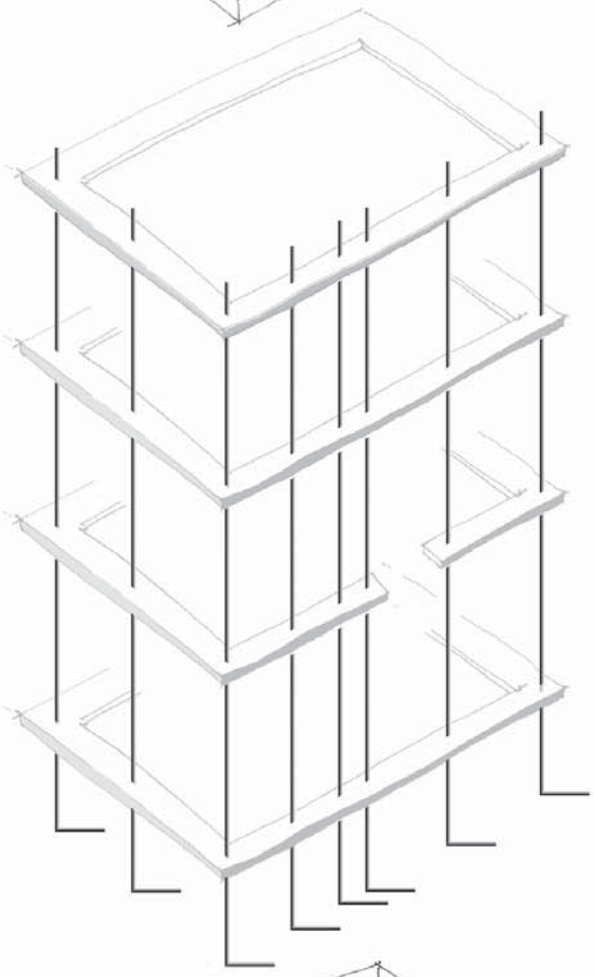


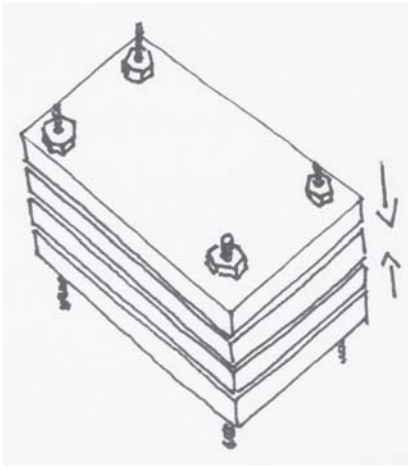
5-Vertical bars

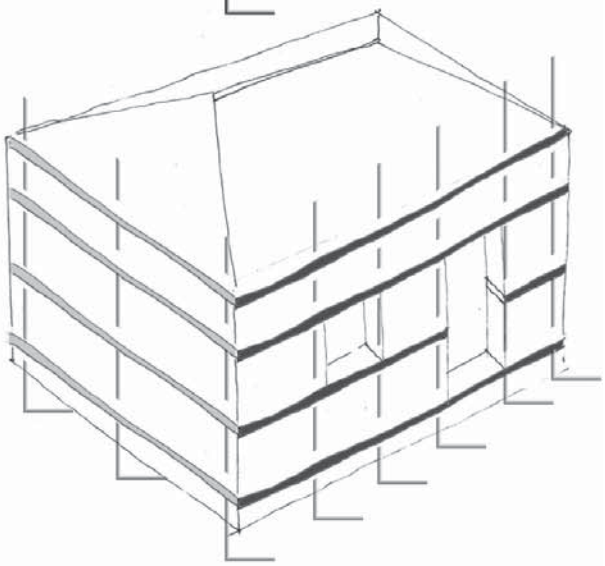




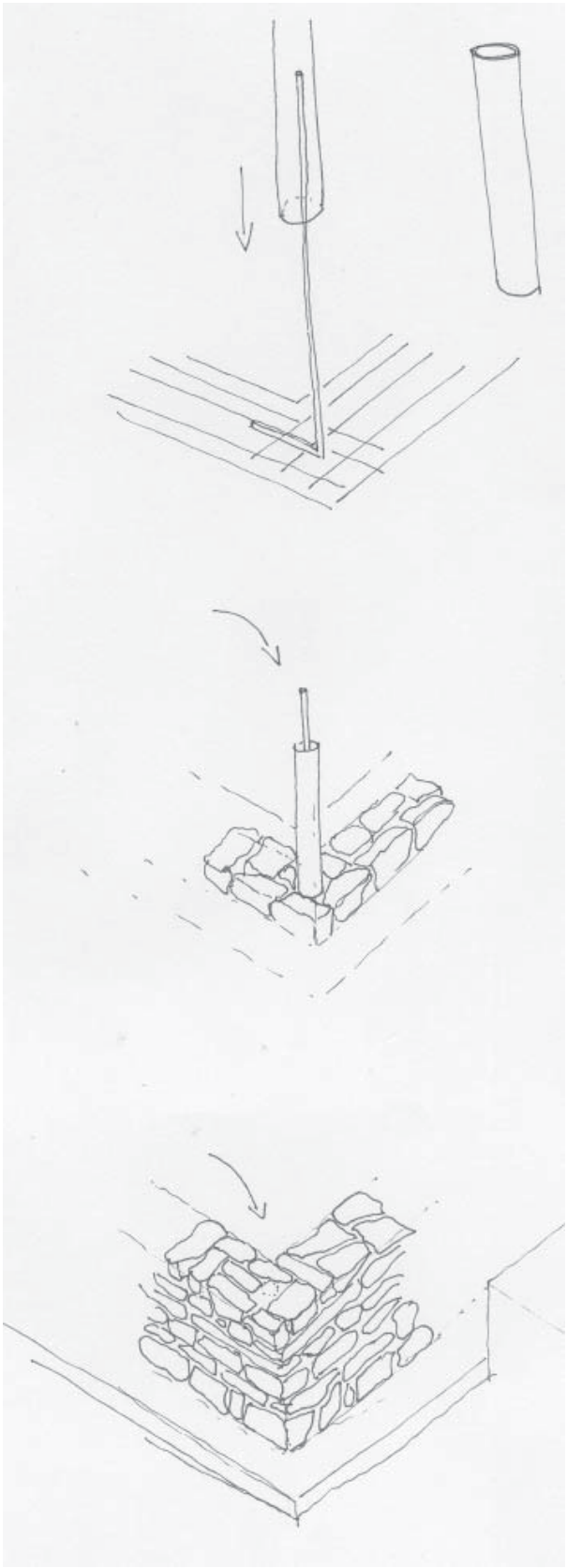
1- Vertical bars Tighten the walls from fundation to roof.
2- Make vertical bars continuous at least 1&1/2 feet above the estimated height of roof.
3- Place vertical bars at every corner, on each window or door sides and at maximum 5 feet distance in continuous walls.

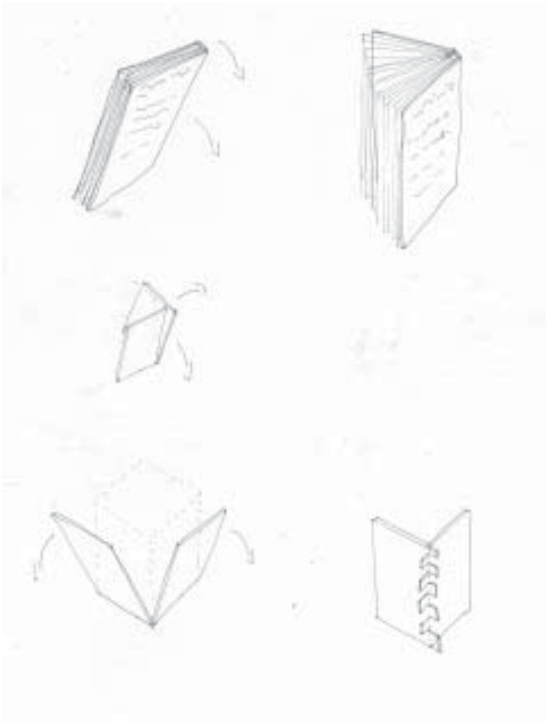






6-Walls masonry

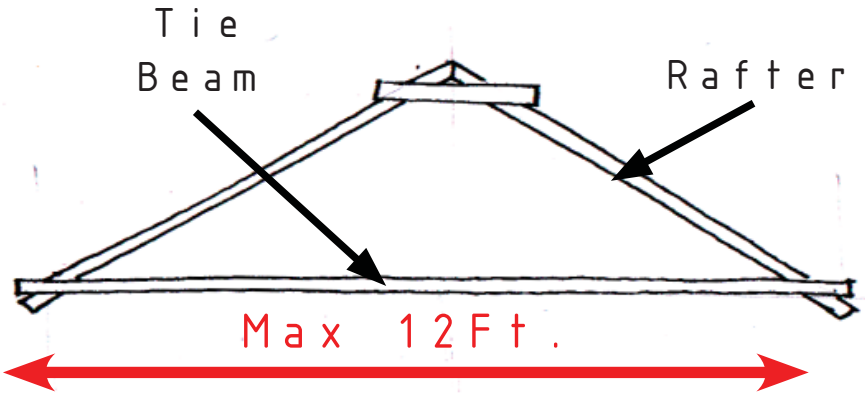




7 - Roof

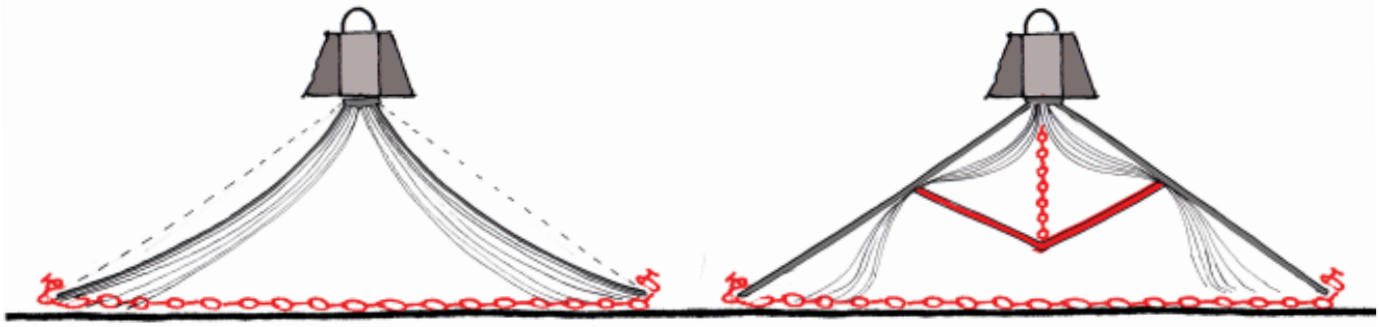
1- Parts of trusses are submited to different efforts.

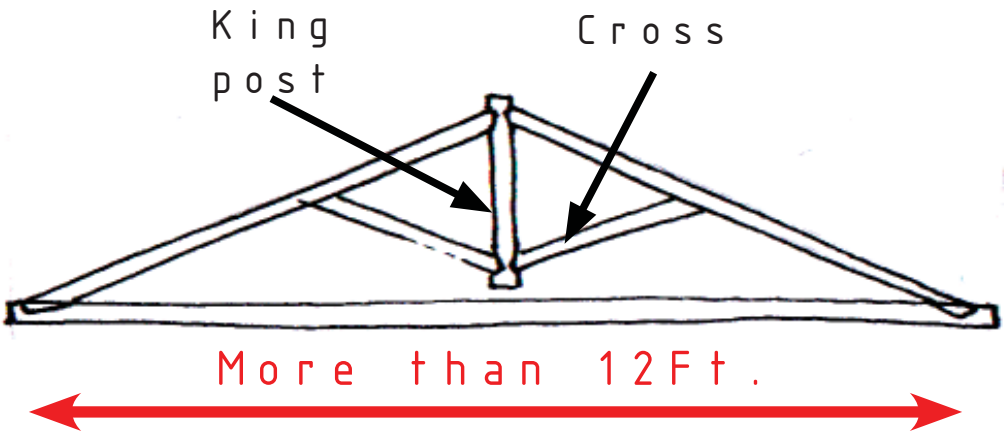
2- Tie Beam holds (Ties)rafters together like a chain (traction)



3-Rafters transmit weight of the roof to walls (Compression)

4- When Tie Beam is shorter than 12 Feet those elements are enough to hold roof.

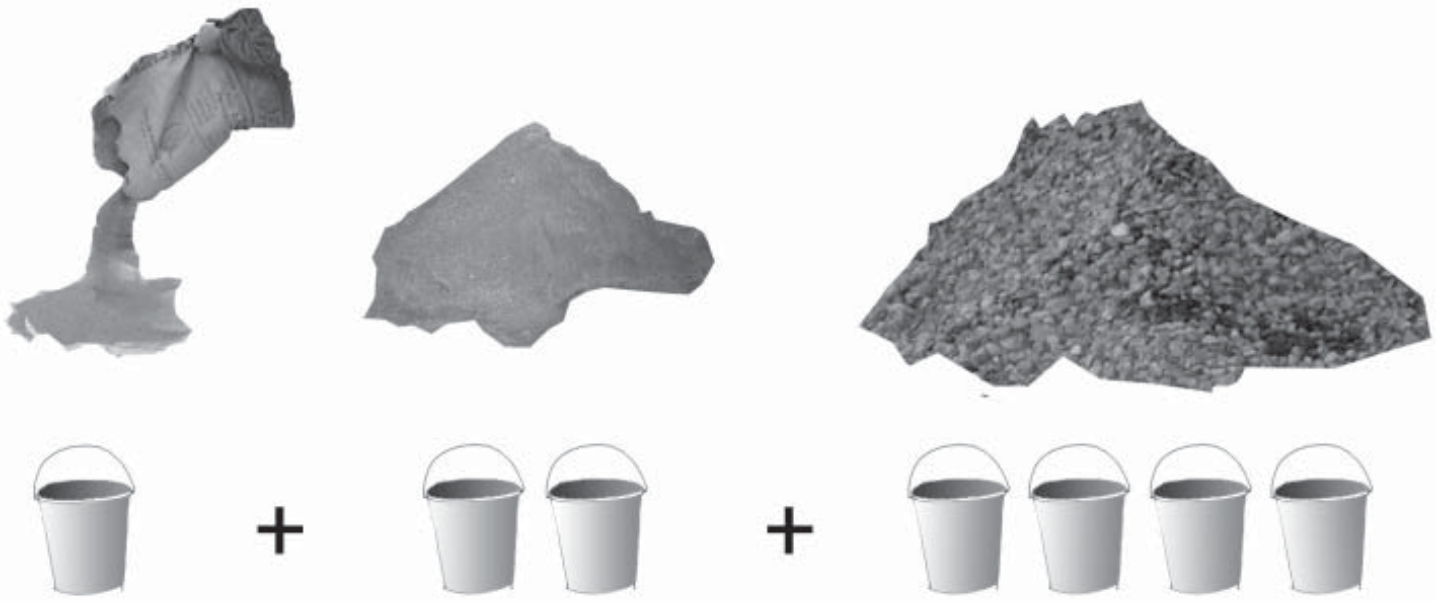




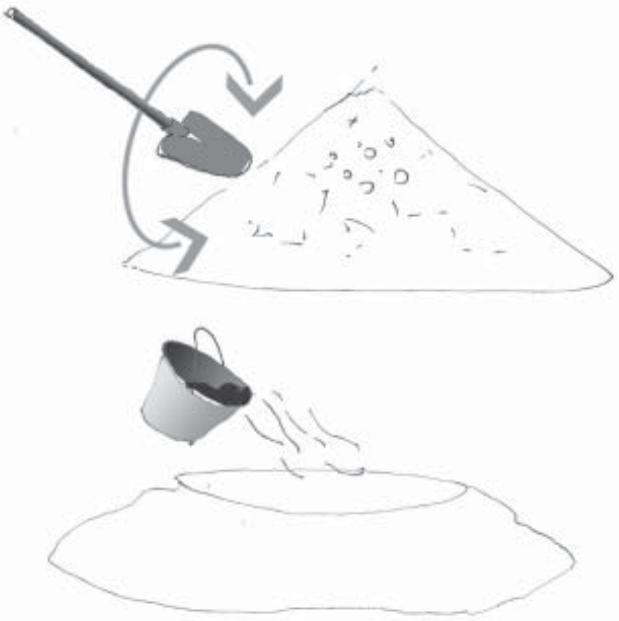
5- When Tie Beam is bigger than 12 feet, rafter tend to bend under weight of roof or snow.

6- King post and crosses are then required to strenghten the Truss.

8-Concrete



1- For concrete mix one mesure of cement with 2 mesure of sand and 4 mesure of crush.
2- Cement and sand must be mix toghether at first then the crush is added.
3- Mix carrefuly before watering.
4- Make small amount of mixture at a time, the preparation must not be used after 1&1/2 hour.



5- After casting water the concrete for at least 3 days.