



Short-Term Missions Building Specifications

We are aware that many members of short-term missions teams are not professional construction personnel. In order to be good stewards of our precious resources, we believe it is important to have some minimal construction standards in place. This document is intended to help ensure that all ministry facilities are safe for the occupants and maintainable long into the future.

This specification may be somewhat stricter than codes and practices in some countries. It is, however, indicative of what you will find in many overseas localities with several enhancements added for safety and long-term maintenance reasons. It is the responsibility of the construction team to research any local code and permit requirements prior to executing the construction project. For any trip, the team shall enforce all local building codes. In cases where local codes exceed this specification, the local code shall prevail as the minimum requirement.

This document is intended to be a minimum specification. Construction teams are responsible to ensure that their techniques and final specifications are adequate for the project.

Planning

- Any new structure shall have a set of drawings that has been prepared or approved by the field ministry. (Host Receivers).
- The construction team (Goer Guests) shall coordinate with the field ministry (Host Receivers) to determine what support from professional engineers is required for the project. Specific attention shall be paid to roof trusses and systems, structural walls (wood or block), foundation plans, and site conditions.
- A written document shall be prepared describing the scope of work for the short-term trip. The construction team (Goer Guests) and the field ministry (Host Receivers) shall agree upon this document prior to the trip. The intent of this document is to ensure that both groups fully understand what is expected during the trip and what the project will look like when the team departs.
- Upon confirmation of the scope of work, the team shall prepare a detailed schedule that indicates, on a daily basis, the required personnel, tools, materials, and resources to complete the project within the time constraints.
- The construction team shall create a safety plan for the project. The safety plan shall specifically address site hazards and the various phases of construction.
- Each member of the construction team shall receive training, prior to departure, on the specific skills required for the project. This training shall include any special construction techniques and a discussion of the safety hazards as described in the project safety plan. The training phase for the project should also include an assessment, by the team leader, that required tasks are within the physical capability of the team members.

Electrical

- If electrical work is required, the team leader shall ensure that there is at least one experienced electrician on the trip.
- Any electrical switch or receptacle shall be rated for a minimum of 20 Amps.
- No conductor shall be less than 12 AWG (20 Amps capacity). (Larger if required.)
- Romex, BX or similar “bundled” conductors shall not be placed in conduit or be exposed on the exterior of a building.
- Romex and other non-metal encased “bundled” conductors are not intended to be surface mounted. Surface mounting these conductors is a violation of the National Electric Code (U. S.) and violates several manufacturers recommendations. It is understood, however, that this is common practice in many locations. Therefore, if the decision is made to surface mount these conductors, it shall be done with great care. Specific precautions shall ensure that the exterior insulation is not damaged. Additionally, conductors will not be surface mounted in a location where they can be easily damaged.
- Any surface mounted conductors shall be properly supported to a wall, joist or studs.
- If any bundled conductors are used, they will have at least three conductors (hot, neutral and ground).
- All circuits shall include a separate ground wire that runs back to the distribution panel. The ground wire may be part of a bundled conductor.
- If an interior conductor requires a splice, the splice shall be enclosed in a steel box. This specifically includes surface mounted conductors.
- Grommets shall be used whenever a surface mounted conductor enters a box.
- Any circuit on the exterior of a building shall be placed in conduit and have at least three conductors (1-black, 1-white, 1-green). A green ground wire shall be run in all exterior circuits. The conduit shall not be less than ½” and will be strapped, as a minimum, 36” on center. The conductors shall not be smaller than 12 AWG. (Larger if the circuit capacity requires.) Insulation on the conductors shall be THHN, THHW, XHHW, or XHHN.
- Any surface mounted outlet or switch shall be placed in a steel box.
- Any outlet in a restroom, kitchen, shed or other work area shall be a “Ground Fault Interrupt.”
- All switch, outlet and splice boxes shall have the appropriate metal cover.
- Any electrical box, switch or outlet on the exterior of a building, or exposed to the weather, shall be watertight and suitable for the application.

Concrete and Mortar Mixes

- Recommended Mortar Formula (by volume):
 - 1800 psi (Type S): 1 cement + ½ lime + 4 sand
 - 2500 psi (Type M): 1 cement + ¼ lime + 4 sand
 - Use type M for ANY below grade work*
- Recommended Concrete Formula (by volume):
 - Rich: 1 cement + 2 sand + 3 gravel
 - Normal: 1 cement + 2 sand = 4 gravel
 - A rich mix is recommended for roads or wet areas.*

Concrete and Mortar Mixes (continued)

- Concrete or mortar shall have a water to cement mass ratio of 0.35 to 0.6. Water will not be added to any mix once the appropriate amount has been introduced.
- Concrete and mortar shall be placed within one hour of being batched.
- Controls shall be in place to ensure adequate mix control and a minimal amount of contaminants introduced from the water, gravel, sand or mixing location.
- Forms for foundations, bond beams, and lentils shall remain in place for a minimum of 72 hours.

Concrete Block

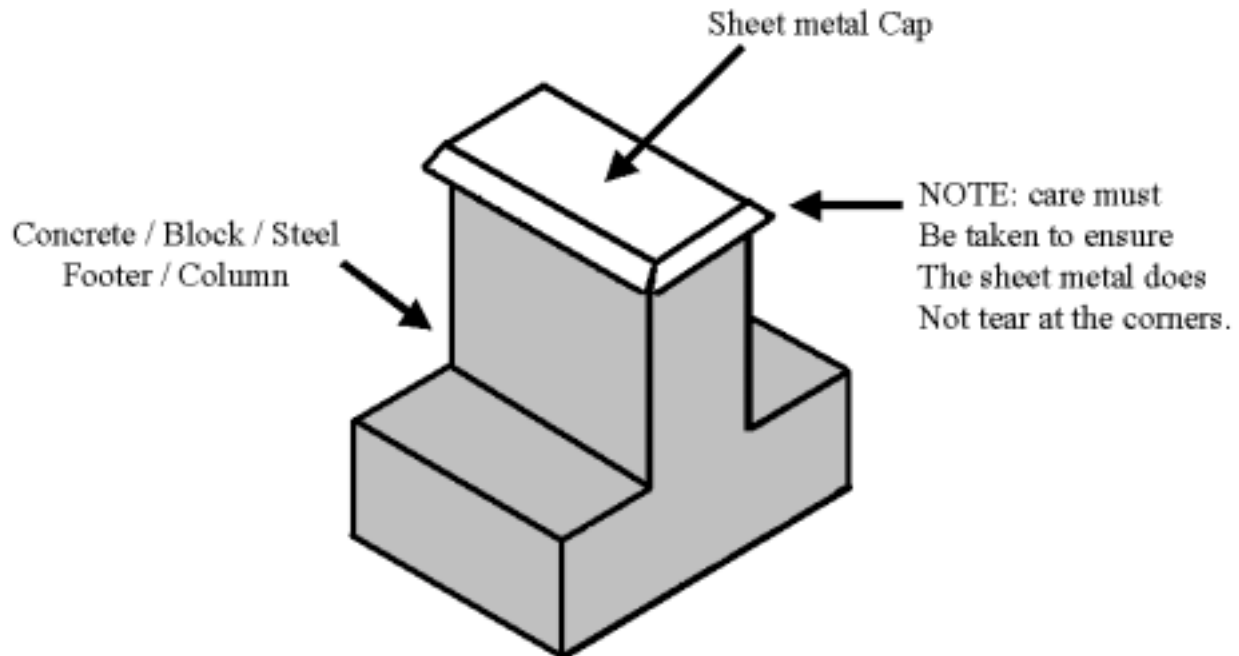
- Vertical reinforcement is required on all structures. If the reinforcement is placed within cores of the blocks, the cores shall be filled with concrete or mortar. If the vertical reinforcement is in the form of a concrete column, specific care shall be taken to ensure that all of the concrete in the column is consolidated, will be free of voids, and present a clean, attractive finish. Any voids will be grouted when the forms are removed.
- Whenever steel bars need to be spliced, the bars shall lap a minimum of 36 bar diameters and be tied in a minimum of three locations.
- Lateral reinforcement steel shall be placed between every third course of block.
- Specific care shall be taken to ensure that mortar joints are uniform in size and appearance.
- Specific care shall be taken to ensure that any block wall is straight and plumb.
- A bond beam shall be placed on top of the final course of block. The bond beam shall be poured concrete (3000 PSI minimum) and have a reinforcing steel cage consisting of not less than four steel reinforcement bars. The bars in the bond beam shall not be smaller than #5. The bars in the bond beam shall also be tied to any vertical reinforcement steel. Specific care shall be taken to ensure that all of the concrete in the bond beam is consolidated, will be free of voids, and present a clean, attractive finish. Any voids will be grouted when the forms are removed.
- Concrete lentils shall be placed over every window and door opening. Lentils shall not be less than one block in height; will extend at least one block length (or 12”) on either side of the opening, shall be made of 3000 PSI minimum concrete; and have a reinforcing steel cage consisting of not less than four steel bars at least #5 in size. Specific care shall be taken to ensure that all of the concrete in the lentil is consolidated, will be free of voids, and present a clean, attractive finish. Any voids will be grouted when the forms are removed.

Wooden Structures / Construction

- Special care shall be taken when sizing and spacing trusses, beams, studs, columns, and joists. Consult a structural engineer to ensure that the adequate wind load (on roofs and walls) and floor load is considered.
- Whenever possible, use treated lumber. If treated lumber is too expensive or limited in supply, attempt to use treated lumber on all of the areas underneath and/or below the building.

Wooden Structures / Construction (continued)

- Ensure that wooden structures have adequate ventilation beneath them to avoid moisture build up. This is especially important in high humidity environments.
- If possible, have the soil beneath the building treated for termites. If the soil is treated, ensure that the team understands what chemicals were used and what precautions are needed. These precautions shall be included in the safety plan. When overseas, it must be remembered that many readily available chemicals are banned in the United States due to their toxicity and impact on the environment. Do not use any chemicals unless it is clear what exactly is in them.
- Do not allow any wood to come in contact with the soil.
- Do not use wooden columns to raise a building off of the ground. Concrete or steel is preferred. If wood must be used, ensure that the columns are sitting on concrete and that termite shields are installed on top of the concrete. (see drawing below)
- Use termite shields on top of any steel or concrete columns.



The Ultimate Standard

- Ensure that your project has glorified God:
When all our enemies heard about this, all the surrounding nations were afraid and lost their self-confidence, because they realized that this work had been done with the help of our God. *Nehemiah 6:16*

***For questions or comments on these specifications, please email us at:
mike@grababrick.org.***