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Ph/fax 575.895.5400 mail@builderswithoutborders.org 119 Kingston Main St., Hillsboro, New Mexico 88042
Ph/fax 510.525.0525 mfhammer@pacbell.net 1348 Hopkins St., Berkeley, California 94702

Strawbale Demonstration Wall Notes and Observations

Report No. 2

By Andy Mueller

Project No.

Date of Site Visit:
Date Produced: 12.10.15
Time:
Temperature:
Weather:

Routed to: Martin Hammer and Catherine Wanek

Notes:
Location: Khorang, Nepal

PURPOSE FOR STRAWBALE DEMONSTRATION WALL:

1. To better understand the process of constructing a load-bearing strawbale wall system in the rural region of Sankhuwasabha (Khorang) through the construction of a demonstration wall measuring approximately 3'x12"x3'.
2. To fabricate straw bales with a manual compression mould.
3. Although the proposed wall system is similar to that constructed in Haiti by BWB, one critical addition/change to that of the Haiti building is the elimination of lateral cable bracing in favor of lightweight nylon netting/wire mesh which will serve the same purpose. The demonstration wall will help to determine the physical sequencing of the load bearing strawbale wall construction.

NOTES AND OBSERVATIONS: (Preliminary findings are as follows):

Straw Bales

1. 23kg of rice straw was purchased for $10 USD (this is local Nepali price and also not inflated by the current fuel crisis).
2. Straw bales (approx. 12"x12"x23") produced with the compression mould weighed 4kg each. Note: moisture content was not determined. 5.75 straw bales were produced with given material. (=$1.74/bale not including labor or transportation).
3. It was determined that each straw bale took two people approximately 15 minutes to produce.

Foundation and Wall System

1. Foundation demonstrates two separate “mesh wrap” conditions; A). ¾” diamond shape, light gauge, galvanized chicken wire and B) 1” diamond shape, nylon fish net mesh (rating unknown).

2. Foundation- note that the stone foundation wall was assembled dry and not mortared due to time constraints.

3. Mesh wraps lap sides of foundation and are imbedded in a 2” thick concrete wall cap.

4. Note: thru-ties are recommended as foundation wall is erected to ensure wire mesh is held close to wall when receiving initial cementitious wall plaster.

5. Strawbales were stacked, externally pinned and thru-tied with ¾” wide bamboo strips. A temporary wooden top plate was installed and secured to the bamboo pins. Galvinized mesh was fixed on the left (note that the application of wire mesh on the bale face required judicious use of thru-ties to achieve a suitable plastering surface). The nylon mesh on the right was pulled tight to the bale face after an initial clay plaster application and secured to the temporary top plate. It should be noted that the nylon mesh was much easier to work with as it requires no thru-tying and is fixed to the top plate by rolling it into the upper wall plaster stop as opposed to it steel mesh counterpart. The straw reinforced clay plaster (1.5” chopped straw) applied could not sufficiently penetrate the steel mesh size and resulted in plaster “buckling” This was also a pronounced condition with the 1” diamond mesh used on the TiKay strawbale building in Haiti.

6. I decided to apply the scratch clay plaster coat to the bale wall prior to that of the cementitious plaster of the foundation wall. This may aid with two foreseeable issues in terms of sequencing; 1) eliminates length of time one had to avoid the bunched-up nylon mesh at the bottom of the foundation wall during construction and 2) I had struggled with the transition (imaginary plaster stop or “cold” joint) between clay wall plaster and cement foundation wall plaster on the TiKay building. This role reversal was an attempt to understand if wall plastering should be applied first (perhaps this interface requires further investigation in terms of detailing).