



Dominic Dowling
Faculty of Engineering
University of Technology, Sydney
PO Box 123 Broadway NSW 2007
AUSTRALIA
Ph: 0423 957 389
dominic.m.dowling@uts.edu.au
www.eng.uts.edu.au/~ddowling

July 2006

MODEL HOUSE 4A

Specifications:

1:2 scale
Length: 3.4m
Width: 1.8m
Height: 1.2m
Wall thickness: 0.15m
Openings: 2 x doors, 1 x window

Construction Process:

1) Built as a traditional, unreinforced house (walls wetted and rubbed down to create smooth and attractive appearance)



2) Then retrofitted with string, bamboo, wire and timber ring beam

a) Mark and drill holes (using masonry bit + hand / electric drill)



b) Wet holes, insert string loops, and fill holes with mud (using a modified plastic syringe).
[If building a new house, the string can be laid in the mortar joints during construction]



c) Tie on vertical bamboo poles (inside and outside building)



(The steel plates in the photo were for instrumentation during testing and are not part of the proposed system)

- d) Attach timber ring beam / wall plate to top of wall using dowels / pins (drilled into top course of adobe bricks). Connect bamboo poles and ring beam, with wire and nails



- e) Tie fencing wire horizontally between bamboo poles. (We used 2mm galvanized wire). Tighten using pliers.



Testing Process:

Shake table simulations [El Salvador earthquake, 13 January 2001 (Mw 7.7, Depth, z = 10km)]:

S1 – 10% (intensity)

S2 – 25%

S3 – 50%

S4 – 75% (first minor cracking)

S5 – 100% (progressive damage)

S6 – 125% (progressive damage)

S7 – 100% (repeated... progressive damage, but collapse prevented)

[Note: unreinforced u-shaped wall unit totally failed (collapse imminent) during 75% intensity simulation]

Photos after S7 – 100% intensity (repeated):



