Earthquake-Resistant Design and Construction Guideline

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For Single Story Reinforced Concrete Confined Masonry Houses Built in the Aceh Permanent Housing Reconstruction Program

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Build Earthquake Resistant Houses
Change Construction Practice Permanently

build change

About Build Change

- Build Change is an international non-profit engineering company based in San Francisco, CA USA. Build Change's team of engineers, architects, and construction supervisors have completed an 11 house pilot project in Aceh Besar, Indonesia and are now providing design inputs, construction supervision, and builders training programs for other organizations building houses in Aceh.
- Build Change's house design for Aceh recently won a Structural Engineers Association of Northern California Excellence in Structural Engineering Award for 2006.

Acknowledgements

- Build Change gratefully acknowledges funding and support from the following sources, which have made the 11 house pilot project, production of this design and construction guideline, and much more, possible.
  - Mercy Corps
  - Draper Richards Foundation
  - Echoing Green
  - Earthquake Engineering Research Institute
  - US-based engineering companies and engineers

Purpose and Disclaimer

- This design and construction guideline is intended for use in Aceh and Nias during the post-tsunami and earthquake housing reconstruction programs. It is applicable to single story reinforced concrete confined brick masonry structures on strip footings with timber truss roofs with lightweight covering.
- The focus of the design guideline is on earthquake resistance of the structure itself. Thus, it does not address issues such as siting, water and sanitation, and electrical installation.
- This guideline is in no means intended as a substitute for detailed engineering analysis. A detailed engineering analysis, including a soils investigation, is recommended prior to starting any construction project. Build Change accepts no liability. Use at your own risk.

Request for Comments and Feedback

This guideline is a DRAFT DOCUMENT. It is open for discussion. Your comments, inputs and questions are greatly appreciated.

Please submit via e-mail to info@buildchange.org

Source and Basis

This guideline is based on the following:

- Build Change's Acehnese and expatriate staff experience, prior to tsunami, in US, Indonesia, Iran, and India; an 11-house post-tsunami pilot project in Aceh, and observations of damage caused by the 27 May 2006 Central Java, Indonesia Earthquake
- Set of calculations by Build Change's team of licensed, pro bono structural engineers for 0.4g design acceleration
- BRR (Indonesia) reconstruction guideline
- Experience and posters by Teddy Boen (Indonesia)
- Eurocode 8 and City University London's guideline on confined masonry in Eurocode 8
- Construction and Maintenance of Masonry Houses, M. Blondet (Peru)
- Indian Institute of Technology, Kanpur (NICEE) Earthquake Tip Sheets
- Inputs from academic and practicing structural engineers from US and Canada