

**2011 Winner of the \$100,000 Lemelson-MIT Award for Sustainability**  
*Dr. Elizabeth Hausler*

**Build Change Success – Earthquake-Resistant Housing**

In 2004 Dr. Elizabeth Hausler founded Build Change, a nonprofit with the mission of greatly reducing deaths, injuries and economic losses caused by housing collapses due to earthquakes in developing countries. To date, the organization has:

Contributed to earthquake-resistant homes in disaster stricken areas of:



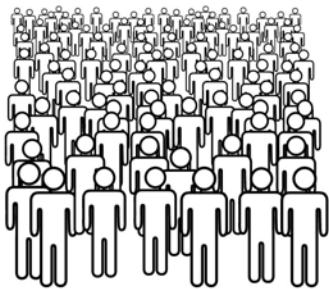
*Port-au-Prince, Haiti*



*Aceh and West Sumatra, Indonesia*



*Sichuan, China*



Trained **12,400**  
global citizens  
(homeowners,  
builders) in safer  
building practices

Improved **18,350**  
houses  
*representing*  
**73,000** people in  
safer homes



Produced culturally-accepted houses using local materials and labor that cost **\$4K - \$17K** less than donated homes

*Donor-Driven Homes*

**\$12K – 20K**



*Homeowner-Driven Homes*

**\$3K – 8K**

Worked in partnership with some of the world's largest relief agencies:



## **Build Change Reconstruction Technology – The Three C’s – of Earthquake-Resistant Housing**

While building techniques and materials used vary by location, to ensure successful implementation and sustainability, Build Change has identified three critical factors, or “The Three C’s,” for durable, culturally acceptable and affordable reconstruction, outlined below.



*Confined masonry is the most commonly preferred structural system by homeowners in Aceh, Indonesia, shown here. In partnership with a team of pro bono structural engineers, Build Change performed engineering analysis and developed confined masonry structural design drawings for this typical single family house.*

### **1. Configuration**

Applying careful thought to a home’s design plan and layout can improve its resistance to earthquakes at little or no extra cost. For example, ensuring that structural walls are symmetrical and that there are approximately the same number of load-bearing walls in each direction per home will help improve its durability during a natural disaster.

### **2. Connections**

Unreinforced or unconfined masonry walls fail in earthquakes. Making strong “connections” between all components of the home (e.g., all walls, the foundation and the confining elements) is necessary for structural integrity. Connecting the roof to the walls especially is essential for safety in both earthquakes and hurricanes.

### **3. Construction Quality**

Using quality materials and workmanship is the first line of defense for an earthquake-resistant home. Simple, inexpensive techniques, like soaking bricks in water prior to building a masonry wall, make all the difference in the resilience of a house. Using locally available resources and labor also help make this the most affordable, culturally acceptable and sustainable reconstruction process.