

## D.5 Guatemala- 1976 - Earthquake

### Case study: Materials distribution and training

#### Project type:

Distribution of building materials  
Training support

#### Disaster:

Earthquake in Guatemala

#### No. of houses damaged:

222,261

#### Project target population:

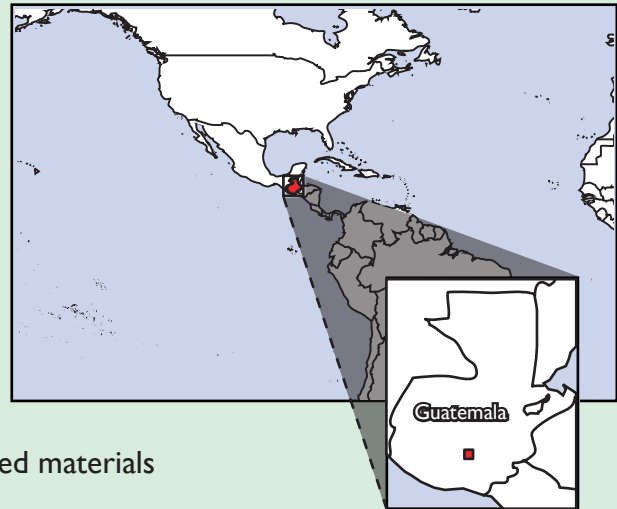
15,000 families, in four rural districts

#### Occupancy rate on handover:

Very low for initial tents  
Very high for shelters constructed from distributed materials

#### Shelter size

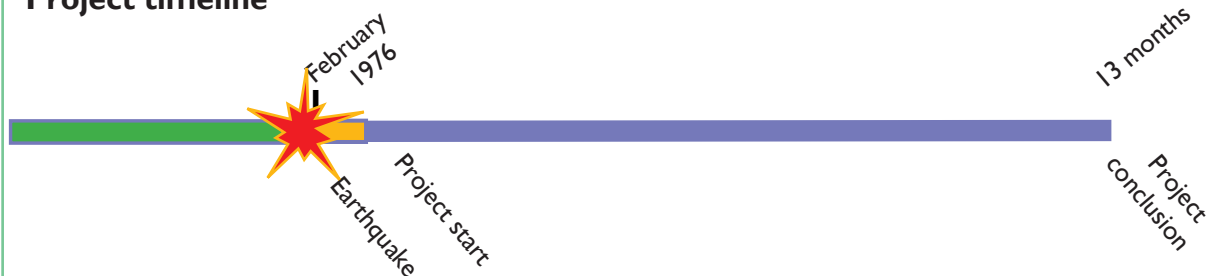
Various



#### Summary

Housing materials were distributed, and training and advice were provided through locally hired teams. The aim of this was to accelerate reconstruction and provide community-wide training on seismic-resistant construction techniques.

#### Project timeline



#### Strengths and weaknesses

X Permanent reconstruction was able to start on an immediate basis. Even when the roofing sheets were initially used to build a small shelter, they were then reused to build the permanent house.

X Self-build methodologies allowed for support to a greater number of beneficiaries and gave them training on how to 'build back safer'.

- Small group cooperative reconstruction projects worked better in rural areas than in urban areas.
- Once organisational budgets were reduced towards the end of the programme, it became obvious that it was cheaper to build using skilled, higher-paid workers, than apprentices on low wages.

W Although the distribution of educational booklets was widespread and popular with other organisations, they did not always support this by interactive training. This reduced the booklets' impact on those using them at a distance.

W Lack of coordination between agencies and differing methodologies (free distribution of materials vs. subsidised resale) reduced programme impact in terms of training and self-reliance for beneficiaries.

W Lack of clarity on the principles behind the seismic resistance guidelines led to some questioning of the need or usefulness of improvements.

### Before the earthquake

During the preceding decade, Guatemala City and other urban areas had seen rapid increases in population, with many of the new arrivals living in hazardous areas on steep slopes at the edges of the city. Even in the rural areas, many had built their houses out of adobe, often with heavier tile roofs, without the inclusion of seismic-resistant features.

Prior to the earthquake, a number of smaller INGOs, as well as local community-based organisations, had been active in development programmes (but not necessarily shelter-related) in the affected areas. While the official language of the country is Spanish, many of those in the rural affected areas had limited command of this language and preferred to communicate in local Mayan dialects.

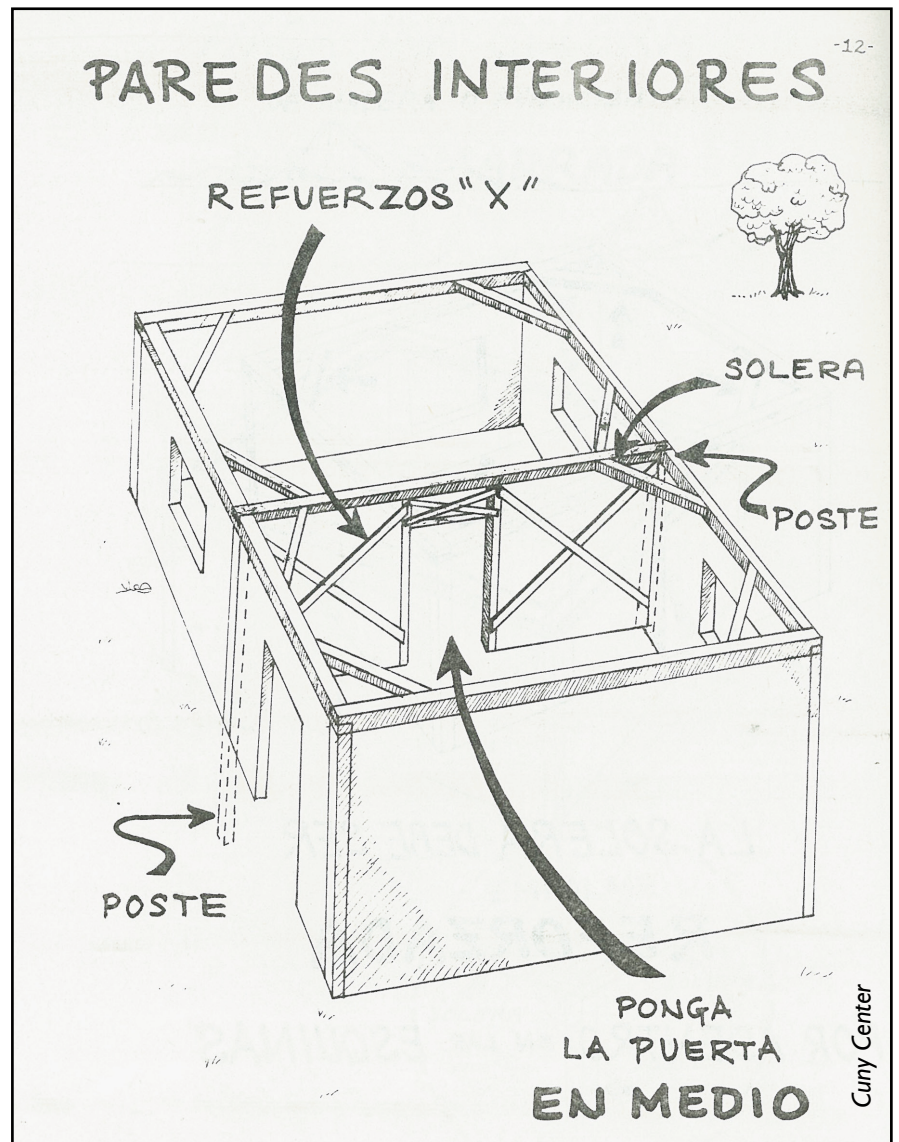
### After the earthquake

The earthquake struck the Central Highlands of Guatemala, killing 23,000 people and leaving more than a million homeless. Some 58,000 houses were destroyed in Guatemala City and 163,000 in the rural areas.

Initial official relief efforts were further hampered by the number of roads and rivers blocked by landslides. The emergency response from the US and other governments was swift, with 5,000 tents transported to Guatemala City within seven hours of the earthquake.

As equally rapid as the external response was the rate at which affected families started building impromptu shelters themselves. Around 50,000 shelters were built within the first 24 hours of the disaster. Although this meant that much of the affected population were quickly under shelter, it led to a rapid increase in the price of corrugated galvanised iron roofing sheets. There were additional concerns that this would cause scarcity for the reconstruction effort and cause the materials to be too expensive for many of the affected people.

Because of the high-profile nature of the disaster many organisations without prior field experience sent personnel to the disaster. The government was generally unable to enforce coordination between organisations.



Sketch showing earthquake-resistant techniques bracing

The international NGO in question partnered with a regionally-based NGO that already had ongoing programmes in Guatemala (it was implementing the earthquake shelter programme), in order to accelerate programming and ensure incorporation of local knowledge.

### Selection of beneficiaries

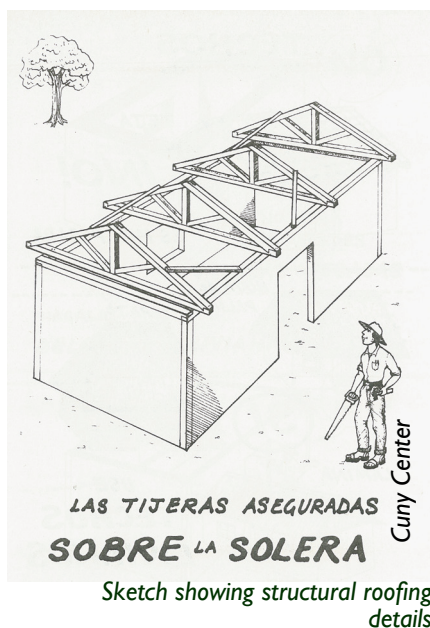
Four affected rural areas were assigned to the NGOs by the national government. A partial registration of beneficiaries was helped by an implementing partner and the fact that local cooperatives were already present in the area. In some areas there were issues of competition for beneficiaries or of beneficiaries switching NGOs when others appeared with free distributions or other attractive options.

### Land rights / ownership

Many of the affected population were squatters in peri-urban areas who often built back on traditional sites with no guarantee of tenure. At least one researcher involved in the programme counselled against wholesale rationalisation of the street systems in those areas, because it would mean depriving many families of their customary plots. Land holdings in rural areas may also have been traditional for the most part, but this issue was not as acute in those areas.

### Technical solutions

In light of the scale of the self-building of shelters, the NGOs in question made a decision to support these efforts by distributing construction materials, supported with technical training.



The programme had six key pillars:

- Salvage materials from destroyed or damaged homes;
- Use indigenous materials (apart from the roofing);
- Mount an extensive educational programme;
- Build a model house in each community using techniques (such as the introduction of timber and barbed-wire bracing) that would ensure safety the next time;
- Use the model house as a focus of further educational activity;
- Distribute the corrugated galvanised iron roofing sheets at subsidised prices through the cooperatives.

Construction materials were sold at subsidised prices to ensure that the people had a true need of the materials, to reduce the sense of dependency and to spread meagre budget resources to a wider population. There were limits to the amount of each article that each family could buy, in order to limit hoarding or speculation.

A full set of housing materials, in sufficient quantity and variety to build a whole house, was sold through the local cooperatives. But the main material, which was imported and distributed by the NGO, was the roofing sheets. The thicker 26- or 28-gauge sheets were preferred over the 30- or 35-gauge sheets. (Note: With standard wire gauge and corrugated iron sheet, the higher the gauge, the thinner the sheet.)

At the beginning of the programme, a total of 67 separate recommendations for seismic-resistant features were drawn up by a consultant for the NGO as the basis for the training programme. The intention was that even if not all of the recommendations were followed, the house would still be substantially safer. There was some disagreement, as some NGO staff thought that the list of recommendations was too comprehensive and was being used too strictly in the field. Some thought that a smaller number of recommendations might support a larger number of beneficiaries.

The NGO created four different model houses, although the families eventually built a wider range of adapted designs. A booklet was also developed and over 100,000 copies were eventually distributed as an element of training programmes.

### Implementation

The beneficiaries were provided with information and training on seismic-resistant construction, using local materials and technologies (demonstrated by the model houses). But the responsibility for the design and for reconstruction remained entirely with the beneficiaries themselves.

The local cooperatives distributed the corrugated galvanised iron and other materials and also become the focal points for the training programmes.

In many affected communities, model houses were built using local labour, as directed by the NGO and in coordination with village master craftsmen. Once these craftsmen, masons and carpenters had been trained they were then employed to train a series of apprentices while working on the reconstruction of the houses in the community.

Unfortunately, many of the trained masons found better-paid jobs in the cities and left the rural work programmes. Eventually, a local company had to be engaged and supported to take on the work for that part of

the programme. The choice of the materials that were distributed and resold through the cooperatives was also geared towards seismic-resistant construction.

### Logistics and materials

The corrugated galvanised iron sheets were imported from El Salvador. Some 95,000 sheets were bought and resold by the NGO during the first six months of the programme. Funds recovered from the resales were eventually used to expand the operation. Construction materials were sold through local, pre-existing cooperative societies. This was intended to raise the profile and develop the capacity of those cooperatives, but concerns were voiced a few years later that this had ended up overstressing their capacities and flow of funds.



Options for roofing materials - tiles, palm leaves, thatch, corrugated iron