TECHNICAL REPORT- SHELTERING, FROM RELIEF TO RECONSTRUCTION:
One Year after the 2010 East Azerbaijan Province Earthquake

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Abstract
On 11th August 2012, at 16:53 and 17:04 (local times), two major earthquakes measuring 6.4 and 6.3 respectively on the Richter scale, hit the East Azerbaijan Province, in the North-West of Iran. Although the timing of these strong tremors meant that few residents were at home, approximately 250,000 people and 327 villages were affected by the resulting disaster. The main impacts were felt around the towns of Ahar, Varzaghan and Herees to the North-East of Tabriz, leaving more than 300 residents dead, 4500 injured and 72,000 with damaged or destroyed properties.

Considering the climatic and topographic conditions of East Azerbaijan Province, the Housing Foundation of Iran (HF) managed to mobilize and accelerate its activities to minimize the threats posed by the upcoming winter on the people affected by the earthquakes. Using the new concept of “transitional accommodation” in its reconstruction policy, earthquake survivors were initially provided with “multi-functional units,” which sheltered them from the cold while permanent houses were being constructed. This technical report aims to review the shelter provision process, based on the author’s careful observations and qualitative data collected from the field, a year after the disasters. The report concludes that, although most families are now housed in their permanent shelters, a number of them are still struggling with recovery from the impact the disasters had on their lives. Despite this, great feats have been made in the reconstruction of public service facilities, social and cultural centers, site works and amenities, which are all in the process of being completed.

Keywords: sheltering; post-disaster reconstruction; East-Azerbaijan Earthquake; Iran.

INTRODUCTION
During the holy month of Ramadan when most residents were practicing the spiritual act of fasting, twin earthquakes claimed more than 300 lives, injured thousands and left tens of thousands homeless. The shocks were felt in the towns of Harees, Varzeqan, Ahar, and the provincial capital, Tabriz. The first 6.4 magnitude quake struck 60 km. northeast of the city of Tabriz at a depth of 9.9 km, while the second, striking 11 minutes later, measured 6.3 on the Richter scale and jolted 50 km. northeast of Tabriz at a depth of 9.8 km. (Fig. 1).
East-Azabaijan Province is located is a high-risk seismic zone to the northwest of Iran and has frequently experienced major earthquakes for centuries, with the City of Tabriz having a long history of destruction and reconstruction, as a result of these natural disasters. In the 2012 catastrophe, twelve villages in Varzaqan were completely destroyed and approximately 60 others were extremely damaged by the earthquake. The natural disaster also afflicted the area with an estimated four billion dollars in damage. Overall, almost 29,000 units in three devastated areas in Ahar, Varzigan and Harees, suffered various degrees of damage (Press TV, 2012).

EMERGENCY AND REHABILITATION PHASES
The Iranian Red Crescent and Housing Foundation¹ (HF) established a joint rescue operation, adding to the efforts already commenced by the local neighboring survivors. As the earthquakes struck during the afternoon, most male residents were working in their agricultural fields. This meant that the fatalities mostly comprised of women, children and the elderly. The rescue operation lasted for a few days, and emergency shelters, such as tents and other essential needs, were provided by the relief agencies. (Fig. 2) In addition, as the housing pattern in the affected areas were predominantly adobe and unreinforced brick masonry, such buildings were not stable and therefore, most of them collapsed or received major destruction during the earthquakes – intensifying the reconstruction efforts required.

¹ Housing Foundation of Islamic Republic of Iran (HF) founded in 1979 aims to provide housing for low-income people in rural and urban regions as well as reconstruction of areas suffering damage from natural and man-made catastrophes within the framework and policies of the government of Iran.
An issue which became an obstacle to achieving an effective and speedy relief operation related to distrust felt towards the relief items deliveries. Indeed, in the early days of the disasters, propaganda and rumors were broadcasted by neighboring countries by sending messages to people’s cell phones indicating that public donation might not be delivered to the survivors. This caused some residents from neighboring areas insisting on delivering their own relief items to the devastated zones, resulting in heavy traffic around the affected areas hampering the speed of operations. However, the Red Crescent immediately made a statement denying such a false rumor.

As the majority of rural households have high dependence upon their livestock as a means of both income and food, over 7,000 livestock shelters were constructed by the Housing Foundation (HF) and the Ministry of Jihad-e Sazandegi to speed up the economic recovery of the affected population. These shelters, built using corrugated galvanized steel in the shape of a semi-cylinder, aimed to ease the health and security concerns of survivors for their animals by providing shelter for the livestock and protection from freezing weather conditions (Fig. 3).

Debris management became problematic over the course of the recovery process, particularly during the relief and rescue period. The HF attempted to mitigate this problem by organizing almost 1000 units of machinery, including trucks, loaders, excavators and bulldozers, to remove over 3 million tons of debris in less than two months. These machineries were sourced from the HF of other provinces, The Ministry of Roads and Urban Development as well as from the private sector, and continued to be utilized for the transportation of materials after debris removal phase (HF Report No. 1, 2012). Given the size and heaviness of these vehicles however, they were at time unable to pass through roads and forced to stop causing traffic.

Despite the efforts listed above, it was frequently observed that in some areas, debris was left on the side of roads or even on floodways. The fact that the disaster occurred in a mountainous region with sharp and sloppy rural road networks increased the risk of pollution to water supplies, and led to the Health Organization announcing the need to ensure debris was located far away from human settlements and water supply resources.

**TRANSITONAL ACCOMMODATION**

Although at the beginning of the operation, it was decided that the reconstruction phase would immediately follow the emergency period, completely bypassing the stage of temporary

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2 Aysan and Davis, 1993, mention this as a political commitment, stating that ‘While most governments in the immediate aftermath of a disaster declare their intentions of making up for all losses, with the progress of time, they can easily lose the initial momentum. As media attention drops, the public loses faith in receiving support and the authorities shift their focus on other issues’ (p. 22).
sheltering, it soon became clear that freezing weather conditions would not permit the long-term use of tents by survivors. In addition, based on past reconstruction experiences within Iran, where the concept of transitional accommodation could be linked as part of permanent housing, recipients had been satisfied with results (Fallahi, 1993). For instance, after the 1990 and 2003 earthquakes in Manjil and Bam respectively, the survivors were involved in allocating the location of their transitional accommodation within their plot of lands. As a result, those units became parts of the final residences (Fallahi, 1996, 2007). Given these positive experiences, a transitional accommodation policy was employed for the East Azarbaijan Province operation, considering the cold climate together with the essential need of people towards rebuilding permanent housing.

The Housing Foundation (HF) was assigned as the responsible organization for transitional accommodation, as well as, permanent housing. Due to the large area affected comprising mostly rural areas; the H.F. utilized the capacity of 11 other provincial offices, so called the ‘Auxiliary Headquarters’ (AHs). Accordingly, the devastated area was divided into 11 zones with each being allocated to one individual Auxiliary Headquarter, based on its professional capacities and experiences. Priority for sheltering was given to residents who owned a house prior the disaster, while seasonal residents who did not own a house, were promised secondary accommodation (HF Report No. 1, 2012). Every 50 houses were supervised technically by a resident architectural engineer.

Accordingly, a number of 12 square meter pre-fabricated units or ‘multi-functional spaces’ were allocated to house the survivors. This meant that, the residents, following a short period of living in tents, were provided with units sheltered them from the winter cold. These units included steel frames and sandwich panels in construction of the roofing and walls. They provided safety against wind and seismic loads benefits in the form of heat insulation and noise protection. (Fig. 4) The architectural and structural elements, such as sandwich panels, steel studs, etc. were transported onto sites, and used in constructing foundations and part assembly by respective contractors and technicians employed by the Housing Foundation. In order to speed up economic recovery, the suppliers of construction materials and logistical needs and manpower were recruited locally.

The families who were moved to their new units received household incentive packages that included essential home appliances such as a refrigerator, oven, carpet, and heater. These 12 square meter units would be utilized as a store, study room or extra living space subsequent to the completion of the reconstruction phase.

![Figure 4: Transitional accommodations beside emergency shelters (Source: Author).](image)
RECONSTRUCTION PHASE

It was announced that the process of providing 12 sq-m prefabricated units would be conducted in parallel and simultaneously with permanent housing in rural and urban areas, due to the cold season. It was for the first time the construction of multi-functional units and permanent housing would take place together on a large scale. 60 square meter permanent housing was allocated for those individual households that experienced more than 30% irreparable damage to their property by the disaster. (Fig. 5)

These units benefit from reinforced concrete foundations and the structures were designed considering weight and seismic loads to make them compatible with the soil characteristics of the region. Most of these units were built with prefabricated steel frames and bolted connections and a limited number by confined masonry and concrete structures. Two types of building roofs were implemented, “the joist slab reinforced concrete” roofing and “galvanized gabled sloped”. Although galvanized gabled sloped roofing was not common in the region, they were constructed, for the sake of insulation in cold climate when concreting was not possible. This approach also reduced the risk of freezing weather conditions impeding the progression of the reconstruction phase.

Figure. 5: 12 sq-m prefabricated units provided in parallel with permanent housing (Source: Author).

At the time of writing this report, steel frames and confined masonry structures of more than 98% of the damaged rural residential units had been erected. It is worth mentioning that the HF professional experience in reconstruction activities enabled them to shelter all survivors effectively and prior to first snow falling in the region. In terms of community participation in the process of permanent housing, it varied village to village. Despite the announcement from the Vice President during his visit in early days of the disaster, where he stated that ‘we will reconstruct the entire region within two months’ the result was a rise in people’s expectations which adversely effected their participation in the efforts. However, the outstanding numbers of erected structures and roofs as well as the threat of the cold winter in the rural areas raised the motivation of the local people to demonstrate more participation and contribution to the project (HF Report No. 2, 2012) (Fig. 6).
In general, the HF policy supports the need to enhance the level of local people involvement in the reconstruction process. This not only assists in accelerating operations but also positively contributes to the psychological recovery of the affected population. In this reconstruction, community participation was conducted through the bureaucratic processes for reconstruction administrative activities; people participate in choosing the construction site, locating the transitional accommodation on their land and working as laborers. The last activity would be regarded as a valuable supplementary source of income for the households to reduce the reconstruction costs as well as psychological recovery – assisting in the building of their new homes.

In terms of financial mechanisms, a number of methods were practiced in the field. For instance, emergency grants and low interest loans were the most common forms of financial assistance. As bank loans required collateral guarantees and survivors no longer possessed such assets, the government played the role of guarantor for all the loan recipients. The repayment periods of previous loans were also extended for the affected population. The government had also taken the responsibility for design, technical supervision, material transportation and other overhead costs incurred as part of the reconstruction operations. (Figs. 7)

As mentioned earlier, animal farming and agriculture are two major sources of income in the rural stricken areas. Therefore, the provision of appropriate livestock shelter units was of great
importance for the affected families. HF, in cooperation with the Ministry of Jihad-e Sazandeghi constructed two types of sheltering units: 24 square meter curved roofing and 18 square meters sloped roofing units. These units possessed steel frames and the roofing cover included metal sheets covered with a layer of thermal isolation, resistant against wind and earthquakes.

In order to prevent rising construction material prices due to high demands in the region, the HF attempted to procure as much of the materials from the local market as possible – this would not only stimulate the market and assist in economic recovery but would also minimize negative inflationary impacts on these markets. As such, doors and windows, steel frames of multi-functional units and steel bars for instance were purchased from local sources.

CONCLUSION
The East Azerbaijan Earthquake was an exceptional case in the Iranian reconstruction experiences. Apart from the timing of the disaster, which took place during the holy Muslim month of Ramadan, the number of aftershocks was relatively high and imposed social pressure on the residents, HF staff and contactors in the region. The rebuilding policy emphasized on providing both transitional and permanent accommodations simultaneously in the devastated areas mainly because of the cold weather. While the former would protect the families against freezing environment, the latter would form a stable and long-term base for recovery. A HF report prepared four months after the disaster indicated that over 9,000 rural permanent residential units, accounting for 95 % of the total 9,500 seriously damaged residential buildings, were fully constructed in 82 days of the catastrophe. As the first snowfall of the year blanketed the earthquake-affected areas, the HF stated that it would “stand shoulder to shoulder with people even if the hardest difficult weather occurs in the winter”.

However, a number of shortcomings were also observed. For instance, neither all the transitional units, nor all newly built permanent shelters were occupied by beneficiaries. There was a tendency among survivors not to leave emergency shelters since they were anxious about losing the facilities they received, if they would be transferred to their new residence. In this respect, the authorities promised that delivery would continue even after households' transfer to new residences and secondly, setting a household incentive package including home appliance such as refrigerator, oven, carpet, heater and so on.

In terms of economic recovery, it was decided to utilize the maximum local capacities to provide construction materials. Most of the contractors and labor force of the reconstruction were supplied through local resources. Moreover, the transportation of materials and personnel were accomplished with the priority of using local capacities. Particular attention was also given to livestock shelters to accommodate animals and agricultural storage. In order to avoid increasing construction materials, the HF attempted to bulk purchase all essential items, such as steel frames, cement and bricks and distributed in subsidized prices.

Although the HF flexible financial rules and regulations enabled it to provide budgets for upcoming demands promptly, there was much less progression in other aspects of residents’ lives. In other words ‘too often rural people are abandoned when the official books on a disaster are closed’ (Blaikie et al, 1994: 213). It should be recognized that the survivors still need to be recovery process includes the need to rebuild public service facilities, religion and cultural centers, site works, and amenities. As such, It seems that there is still a long way towards a sustainable reconstruction and the key note is to ensure survivors are supported at every point throughout the process.
REFERENCES


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