

# **A STUDY IN POST-DISASTER HOME ENVIRONMENTS: A COMPARATIVE CASE STUDY BETWEEN PEOPLE LIVING IN VILLAGES AND IN THE TOWN CENTER OF DINAR, TURKEY**

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## **Abstract**

**This paper is based on a case study of the villages and the town centre of Dinar, Turkey, which was struck by an earthquake on October 1<sup>st</sup>, 1995 leaving 94 people dead and many damages.**

**After the disaster, instead of leaving survivors to rebuild their destructed houses, the Turkish Government intervened to build post-disaster houses in Dinar and it's surrounding villages. Eight years after this earthquake the survivors are still living in these post-disaster houses and they have noteworthy experiences about trying to adapt themselves into their new social and physical environment. Social and psychological problems occur; as well, according to initial responses from before the families started to live in post-disaster houses, they have changed their perspectives on housing demands such as strength, safety, functionality and aesthetic.**

**With the help of a comparative case study between the people living in villages and the town centre of Dinar, this paper tries to find out the effects of social and cultural qualities on human perception and experiences and about victims perceptions of the strength, safety, functionality and aesthetic in permanent post- disaster houses.**

*Keywords: Permanent post-disaster houses; perception; disaster psychology; experience; Turkey*

## **INTRODUCTION**

There is considerable evidence that the experience of extremely stressful events can lead to both short and long-term psychological and physical health risks This risk is exacerbated when the stressor is external and uncontrollable, such as the case of a

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natural disaster. Earthquake is one of the external and uncontrollable natural disasters that threaten the settlements and the life built by human beings.

Turkey is one of the countries that has to cope with increasing post-disaster problems, as it is struck by so many earthquakes. To help the population after an earthquake disaster event has happened, generally the government intervenes to build post-disaster houses instead of leaving people to repair their destructed houses. However, there are many problems associated with government intervention at this stage.

Almost complete damage of the physical environment, moreover disrupted social environment of the people who lived in this area, unpredicted amount of the property loss and the sudden change in their living conditions increase the pessimism in the victims lives, thus the increasing level of environmental stress. It is sensed first physically, and later social and psychological consequences affect the spatial perception of human beings. To decrease the psychological and environmental stress, we must be concerned with developing new formations and solutions for post-disaster home environments and re-formulating the design criteria acceptable for these people.

The earthquake that struck Dinar, Turkey, October 1<sup>st</sup>, 1995 took 94 lives and damaged most of the houses. One year later the government had rebuilt the urban areas and dwellings damaged by the earthquake. Eight years after this earthquake, families are still living in these post-disaster houses. They have noteworthy experiences living in a post-disaster house as they try to adapt to the new social and physical environment. Thus, social and psychological problems occur and their perceptions of spatial demands for strength, safety, eligibility and aesthetic are changed from their initial perceptions before having started to live in post-disaster houses. These factors, which are evident in the Dinar case study, make it an appropriate case for this research.

The aims of this paper, in relation to post-disaster home environments, are:

- (1) To obtain the data received from the case study on the post-traumatic perception of people who live in post-disaster houses in Dinar, Turkey, in order to develop new configurations and solutions for post-disaster home environments, and
- (2) To develop a comparative case study of cross cultural aspects in order to find the differences in necessity and responses between people who live in permanent post-disaster houses built by Turkish Government in villages or in the town centre of the Dinar.

With the help of this case study, we try to find out the answers for design criteria as defined by strength, safety, functionality and aesthetical appearance in the new physical environment and also measure the socio-psychological and socio-cultural

parameters by using survivor perception and experiences in order to convey the post-disaster experiences for new post-disaster house constructions.

In order to obtain new solutions in the formation of macro or microenvironments, we will be searching for the answers to the following questions: What are the effects of social and cultural qualities on human perception especially living in post-disaster housing? What are the effects of human experiences on attitudes towards the post-disaster house? In what ways do people who live in villages or towns cause differences in the responses of design criteria for the strength, safety, eligibility and aesthetical appearance in a post-disaster house?

## **LOCATION AND HISTORY**

Earthquake experience is not new to Turkey since 92% of its population, 90% of its cities, 75% of its industrial complexes, and 40% of its dams are in active earthquake zones (Atac, 1995). Earthquakes frequently destroy settlements across the country. Fifty-five earthquakes in this century alone have killed over 70,000 people, injured another 122,000, and destroyed 420,000 buildings (Gulkan and Ergunay, 1992).

Dinar (population 35,000 in 1990) is a sparsely populated rural agricultural city center in the "Lake District" of southwestern Anatolia, Turkey. It is located on a major transportation artery of road and rail that connects the surrounding provinces of Denizli, Burdur, and Isparta with Antalya in the South, Izmir to the West, and Konya-Ankara in the East. The Dinar region is comprised of 9 towns and 56 villages where farming, animal husbandry, family poultry or governmental works are the main economic sources.

An earthquake, magnitude 6.1 on the Richter scale, struck Dinar on the 1st of October 1995. The damage it created on habitat was: 1,228 houses totally destroyed or heavily damaged, 990 houses moderately damaged, and 1,558 with minor damaged in addition to a minimum of 90 men, women, and children who died in their homes or in public buildings. Over 250 people were injured. The amount of damage to housing in this case caused striking results; the impact of this natural disaster on family's habitats was certainly more than other similar earthquakes.

Buildings in Dinar are one to five storeys (mostly are one or two storeys buildings). Commercial retail stores usually occupy the first levels of multi-storey buildings in the town centre of Dinar. Almost all the five-storey apartment buildings were destroyed or heavily damaged. These buildings, as with the buildings on the main streets, were built with reinforced concrete. For the most part in both the town centre and in the villages of Dinar, one or two storey buildings were built with either solid or hollow brick walls.



Two storey old building in Dinar



Two storey old building in Dinar

Before the biggest earthquake, small ones started to shake city and its villages for few days. Because of that most of the people were out of their homes, which decrease the number of deaths.

### **PERMANENT POST- DISASTER HOUSES IN DINAR**

Permanent post-disaster housing construction was finished one year after (in 29<sup>th</sup> October 1996) the earthquake disaster. In the centre of the Dinar there are two plan types of post-disaster houses. First plan type has 4 storeys and 16 flats in total. 4 flats were planned in each storey of the building. Second plan type also has 4 storeys but has 4 shops in ground floor and 6 flats in total on the upper floors; every storey has only two flats.

Permanent post-disaster houses for city-dwellers were built inside the old centre of Dinar City, nearby the remaining undamaged old buildings.



Permanent post-disaster houses



Two plan types of post-disaster houses

With the new urban master plans of Dinar, instead of narrow, disordered, spontaneously developed streets within one or two storey, solid or hollow brick walled buildings with large gardens; new grid-formed wide streets and four storey buildings constructed by tunnel mould system with small gardens, were organized.

Post-disaster houses with shops were built on the main streets and a new intercity motorway was built to make additional new city trade and shopping centres.

In villages of Dinar there is only one type post-disaster house. It is a one-storey building with a detached storeroom in a garden. But village settlements plans were different from each other according to people's demands. For example in one village named Aktoprak, post-disaster houses were built inside the old village closer the remaining undamaged old buildings, instead of near the ones which were damaged or collapsed as in Dinar. But in the other village named Gencali, the new settlement was built near the motorway, 5 km away from old one.



Old and new streets in Dinar City



The old buildings and the post-disaster houses in Aktoprak Village

These permanent post-disaster house flats were distributed to survivors by a lottery. Because of that neighbours and families get their new flats in different parts of Dinar. Thus people in Dinar who used to live in one or two storey buildings and don't have any experience of apartment life, start a new life in apartment flats with new neighbours.

## **METHOD**

The comparative case study between people living in the villages of Dinar (Aktoprak Village and Gencali Village) and centre of Dinar City was done through individual face-to-face interviews. This paper presents the result of this case study, which was conducted among the selected sample of a total of 50 earthquake survivors. The sample group consisted of 25 people living in the town centre of Dinar City, and 25 people living in rural area of Dinar City.

The case study was applied with a “fill in questionnaire”, in order to learn about:

- (1) Socio-demographic structure, such as age, education, income, job, social development and standards, family structure, neighbourhood relations, etc.
- (2) Features of their old houses and the settlement before earthquake happened
- (3) Responses and opinions about their new permanent post-disaster houses and
- (4) Answers of design criteria in new physical environment by using survivor perception and experiences.

During the data analysis, respondents were analysed according to their perception of design criteria, such as strength, safety, functionality and aesthetical appearance in permanent post- disaster houses. “Strength” of the building protects your life when a disaster has happened. Living in a structurally strong building became a very important criterion for people who experienced an earthquake disaster. “Safety” in the buildings is psychological phenomena felt by users, such as unbreakable windows, seeing (or not seeing) structure of the building, spaciousness in residence. “Functionality” for the building is: being suitable for people in daily usage, having sufficient and functional spatial quality. “Aesthetical appearance” is personal appreciation about the building elevation and spatial quality of where he/she lives.



The life in post-disaster houses

## RESULTS

Analysis of the case study shows that eight years after the earthquake the families have been living in these post-disaster houses and they have noteworthy experiences about living in these houses. According to Dinar earthquake survivors, design criteria defined as strength, safety, functionality and aesthetical appearance becomes much more important after experience living in the house than their first impressions reported to the government just after building the post disaster housing.

In the centre of Dinar, people find their post-disaster house structurally stronger than their old houses. They experienced small magnitude earthquakes inside of these post-disaster houses and no one was injured nor died. But they are afraid of these high post-disaster buildings, because they think that when an earthquake starts getting outside from a 4 storey post-disaster house is impossible compared to a one or two storey building. They also find their post-disaster house safe. They think materials used in construction were suitable for buildings in an earthquake zone. They feel safe because the windows are small, all the post-disaster house walls are concrete curtain walls and the rooms are compact. According to people of Dinar, the post-disaster houses don't have functionality for daily use. The numbers of rooms are not enough for large families; they need more but can't construct additional parts. Before the disaster, when they need they can easily add parts to their old houses, but the structural features of the post-disaster houses don't let them. They also need semi-open areas for daily, special or winter preparations (making bread for fast period, drying vegetables, etc.). The balcony of their post-disaster flats is not enough for these purposes, so generally they use the front garden of the house for these preparations with their neighbours. They think that villagers are luckier, having lots of space for this work. Aesthetically, people like the appearance of post-disaster houses; they like the colours used and find the elevations well arranged and planned. And they think that post-disaster houses make their rural city look like a city with urban character.

Distributing the post-disaster houses to survivors by a lottery and a new experience living in an apartment life, make deep social problems. The lottery caused people to stay in different parts of the city far away from their previous neighbourhoods. Because of that, families and close neighbours were separated from each other. They were forced to live in apartment buildings with many families who never knew each other before.



Women are making breads in the garden of their post-disaster house in Dinar

The post-disaster house plan type with shops is not found suitable for usual trade and commercial activities by the residents. They think that the placement of these



apartments blocks was not planned properly for family privacy; shops should have been placed outside the dwellings, in a trade or shopping centre.

In the villages of Dinar (Aktoprak Village and Gencali Village), people find their one storey rural post-disaster house built with reinforced concrete stronger compared to previous houses. They also find their post-disaster house safer because of concrete use in construction but say that their solid or hollow brick walled buildings were cooler in summer and warmer in winter. Like as the city-dweller, villagers also find their post-disaster house inadequate for daily usage evaluated according to functionality. Post-disaster houses were designed for small families (2-4 members), having not enough rooms for cohabitation of parents, children and their families. They also need additional parts for different functions such as a bread house for making bread, a stable, a poultry-house, a sheepfold, larger storeroom, and a garage for their tractor. But they find themselves much more luckier than city-dwellers because they can easily add parts when they need. Aesthetically, villagers like the white coloured appearance of the post-disaster houses. They think that new grid-formed wide streets, well-arranged settlement and planned houses make their village look like a town.

In Aktoprak Village, people want their post-disaster houses built inside the old village closer the remaining undamaged old buildings. Thus, they can easily use their undamaged old houses for additional functions. But in Gencali Village, according to their demands, the new settlement was built near the motorway, 5 km away from old ones.



Post-disaster houses in Gencali Village with additional parts

This caused some problems: they have to build new additional parts, they didn't find enough water in new settlement so have to sink wells and their fields are closer to the old village so must travel 5 km to fields everyday.

## CONCLUSION

The results, which are obtained from this case study, show that almost complete damage of the physical environment, moreover disrupted social environment of the people who lived in this area, unpredicted amount of the property loss and the sudden change in their living conditions increase the pessimism in their lives, thus an increasing level of environmental stress has been tied to these conditions. It is sensed first physically, yet later social and psychological consequences affect the spatial perception of human beings.

From that point we can say that the effects of experiences, social and cultural qualities on human perception are significant in rural city Dinar and in its villages.

In both settlements, people are used to living in one or two storey, detached, solid or hollow brick walled buildings with their gardens and additional parts for daily usage. They have large families and a close neighbourhood. They have an experience of earthquake disaster. After the trauma, they were forced to live in an apartment building with many families who never knew each other before. Because of that their demands and responses are changed in house design criteria, compared to their first impressions expressed to the government.

With the help of this case study, we can say that, according to their affected spatial perception, survivors want to feel or see the strength, safety, functionality and aesthetic view in their new houses and want to live in better conditions, but don't want to see the changes in their social and cultural life.

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