



## **SURVIVAL UNIT DESIGN CRITERIA FOR REFUGEES AND DISASTER VICTIMS**

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### **ABSTRACT**

All through history the need for shelter has been a vital concern in the Anatolian peninsula due to catastrophes and migration. The primary requirements of refugees and disaster victims in need of a shelter with the hopes of living a decent life and overcoming financial and moral difficulties proves the importance of providing an accommodation to ease daily troubles.

The research focuses on aspects of migration in the Anatolian peninsula presenting the historical panorama of migration related to historical events as well as socio-economic causes. As the residents of the Anatolian peninsula historically carry a nomadic lineage, presenting an analysis of the subject in relation to the local culture and events may provide a strong foundation for the study. Therefore, the study evaluates various shelter types from tents to prefabricated housing, observing the ecological circumstances and requirements focusing on sustainability adaptation for climate changes. The study also focuses on the psychological, sociological and economical circumstances in which refugees find themselves in aiming to provide a living unit for 3-4 person with the maximum space of 15m<sup>2</sup> acceptable by international regulations.

**Keywords:** Awareness, Refugees, Migration, Survivor, Shelter, Industrial Design.

### **INTRODUCTION**

Throughout history, Anatolia has been a bridge to many migrations being geography at the very center of geological movements always affected by earthquakes and climate change. Due to the origin of local nomadic cultures, such migration movements in a society are not considered strange. Earthquake events became a reality creating a feeling of acceptance in such cultures. Being one of the countries with high earthquake intensity, Japan has found a solution to this problem with scientific studies (Masuda, 2014). If lessons could be learned from the earthquakes in this geography, it would not be necessary to live face to face with the fear of earthquakes. The fact that a shelter is the most important element required to alleviate the adverse conditions caused by disasters and migration, focus on the subject has determined the direction of the study. The study provides various solutions for the psychological, sociological, economic, design and even physical problems regarding disaster victims and refugees. In this research different designs such as "tents", "containers" and "prefabricated houses" are examined in order to meet the housing needs of those in distress. In the light of all the data presented a new design approach is introduced in order to provide an insight on the subject.

## 1. HISTORY OF MIGRATION IN TURKEY

Because of Turkey's geo-political properties and historical ties, populations have faced many challenges related to migration. This migration movement, which started from the Ottoman Empire and continued in the Republic period, has been from all directions including West, East, North, South and Africa. In the 20th century and in the first 17 years of the 21st century, migration took place as a response to economic and security problems caused by conflicts and wars. In the most general sense, migration is defined as “all displacements occurring within a period sufficient to create a meaningful distance and impact” (Erder, 1986). The number of people living outside their country or born in a country other than the country where their parents were born, international immigrants and those with an immigrant background, is a population approximately around 230 million individuals (Kaya & Erdoğan, 2015). Migrations continued during the Republic period as well with the departure of non-Muslims from Anatolia and their replacement by Turks and Muslims from abroad converted Anatolia into a Muslim region.

The population exchange problem, one of the unresolved issues with the Treaty of Lausanne, was obtained on 10th June, 1930 thanks to the friendship between Atatürk and Venizelos, encompassing the Greeks residing in Istanbul and the Greeks in western Thrace (Efe, 2018). All Greeks residing in Turkey living as a part of the Turkish population were subject to exchange (Sander, 2009). As a result of this initiative, Greece and Turkey has exchanged over 500,000 citizens forming the initial largest group of immigrant groups from Turkey. As a total sum, 1.5 million people have migrated from Turkey to Greece today. During the republican era, in terms of the number of immigrants coming to Turkey, the second largest group of immigrants consists of Bulgarian Turks. Turks began to migrate based on the Bulgarian-Turkish residence contract in 1925, continued in the aftermath of the Second World War. The Bulgarian government has forced the Turks to migrate in 1950, 1952 and 1960 as well as within the scope of family reunification during the 1970's. The last wave of migration to Turkey took place in Bulgaria in 1989. The Bulgarian government again chose to send the Turks forcefully to Turkey. More than 200,000 people were subject to forced migration. Republic Period is the third most important wave of migration from Yugoslavia to Turkey. The immigration from this country was due to socio-economic reasons, not by government force. Romania has a large number of immigrants from Turkey. The migration wave that started after the Ottoman-Russian War of 1877-1878 with countries such as Romania, Serbia and Montenegro gained their independence with the Berlin Treaty, these countries followed a policy of creating a nation-state and suppressing or sending minorities (Duman, 2008).

Migration from the Caucasus to Turkey from the USSR during the Ottoman-Russian War of 1877-1878, has caused the establishment population settlements of Kars and Ardahan. After the customs agreement, many immigrants from Armenia, Azerbaijan and Georgia continued to come to this region as the young Republic was closely interested in various issues of the immigrants (Aslan, 2007). In recent years, especially with the Syrian crisis, Turkey has been a solution of migration from the Middle East countries, regular and irregular migration from Africa and Asia. Unstable Middle East, especially Syria, Turkey has been a target of migration flows. Due to the conflict of Syria and Iraq and many of the immigrants from Pakistan and Afghanistan, has been living in Turkey. The population of African immigrants has also been increasing in recent years. According to the State Statistics Institute figures, and in 2013 the number of people who entered Turkey from African countries are approximately 143,330 individuals. The largest group among West and

Central Africans is the Senegalese with the Nigerians following them. Cameroon, Republic of Congo, Sudan, immigrants from Ethiopia and the Somali Republic also live in Turkey in large numbers. Unfortunately majority of African migrants live without benefiting from basic health and community services (Şaul, 2015).

Faced with the biggest exodus in the history of Turkey today, the United Nations refugee agency has been declared the country that hosts the most refugees in the world. Ever since 1923, Turkey currently provides a home to 3.1 million immigrants. These figures reveal what a great immigration wave Turkey is faced with. It is quiet a large population for a country to shelter, educate and provide health solutions. It is also clear that these refugees will not return to their countries in the short term. Therefore, long-term strategies and policies for immigrants should be developed immediately. The study aims to provide housing and living possibilities related to urbanization and security solutions.

## **2. LIVING UNIT FOR DISASTERS AND REFUGEES**

While the situation of the refugees is previously presented, the situation of disaster victims is not much different, especially for the earthquake victims. Disasters such as and earthquake, fire, flood, drought, landslide, storm, freezing cold cause conditions of which extraordinary requirements are necessary. Providing shelter and other vital necessities such as food, medicine, drinking water after a disaster and emergency organization can only be achieved with a solid disaster infrastructure. Definition of a disaster according to the United Nations; "Disasters are the consequences of natural, technological or anthropogenic events that cause physical, economic and social losses, affect communities by stopping or interrupting normal life and human activities, and that the affected community cannot overcome by using its own means and resources" as mentioned by (Ergünay, 2005). One of the most devastating earthquakes in the past has been identified as the 1509, Istanbul earthquake. In 1509 Istanbul earthquake, which is called the small apocalypse of Istanbul with a population of 160 thousand, 4000-5000 people lost their lives and 10,000 people were wounded. It is obvious that such a vital phenomenon is also of great importance in terms of measures to be taken.

In order to overcome such difficulties caused by natural or manmade disasters, it is an essential project to plan and design short, medium and long-term living units that can meet the needs of people. These people who have been left with the obligation to migrate, living in adverse conditions and who are deprived of psychological, sociological and physical opportunities requires urgent assistance especially in terms of accommodation. Since the main starting point of the study is to find solutions for people in emergency situations, every vital situation in difficult conditions must be taken into consideration. The solutions presented and emphasized in the study will serve not only for the disaster victims but also for groups of people with similar qualities but in different situations. Disaster units having a structure that varies within the concept of modularity, which is a flexible aspect of this project, and designing with the awareness that the same living unit should be used as a holiday home when desired, renders the designed product more valuable and more functional. However, the priority of the current research is the focus on living units that produce its own energy that can respond to such difficult conditions, equipped with solar system, reuse the waste water, benefit from rain water, compost the waste, dissolve insulation, easily disassemble and install with a design of portable industrial materials. In this sense, there have been many different types of applications in terms of shelter from the past to the present. Previously, cloth

tents, later made of synthetic materials, inflatable tents, dome tents, later metal containers and prefabricated houses served as alternatives for short, medium and long-term uses. Types of tents are presented in the section of the study

## 2.1 Tents

A tent is a portable type of shelter that is connected to the ground, attached by poles of woven cloth or synthetic material in various ways or lifted by air pressure. Since it is made of fabric-type material, it can be reduced in a way that can be described as foldable or collectible unit, and offers benefits on transportation and storage stages. It is the most useful short-range shelter in disasters or migration movements, as this feature allows it to be set up and dismantled in a short time. Apart from the common tents, different types of tents have also been developed for different purposes such as triangle tents, dome tents, tunnel tents as presented below.

### 2.1.1 Triangular Tents

It is a type of shelter that is woven from bristle, produced using coarse cloth or synthetic materials, usually attached to the poles in the middle axis and connected to the ground in an angular manner.



**Figure:** Triangular Tent

### 2.1.2 Inflatable Tents

It is a portable shelter type formed by double-walled synthetic material, shaped by air pressure easily assembled.



**Figure:** Inflatable Tent

### 2.1.3 Dome Tents

Dome-shaped tents are technically called geodesic domes. It has a global structure adaptable to many types of structures. Sphere is a geometric object that provides the most volume with the least surface area among 3-dimensional objects.



**Figure:** Dome Tent

#### 2.1.4 Tunnel Tents

As the name suggests, they are half-cylinder shaped tents that stand horizontally. It is a type of tent with a high level of resistance when the wind direction is calculated correctly



**Figure:** Tunnel Tent

#### 2.2 Containers

Containers are large boxes designed to carry various loads. The use of containers in the field of architecture has emerged spontaneously as an alternative architectural structure due to reasons such as sustainability, environmental concerns and financial approaches (Bicheno & Saltz, 1988). Except for extraordinary situations, containers are generally used on functions such as sales units, roadside restaurants, guest houses, outbuildings, children's playgrounds and cafes. In Turkey it is used as construction site buildings, canteen in school gardens, public toilets as urban equipment. They are easily transportable, demountable, lightweight, economical and stable prefabricated structures created out of organized traditional architectural materials. Prefabricated buildings, on the other hand, have a wider range compared to containers. Unlike the simple units called containers, these structures are widely detailed and comfortable products in a traditional home format. Due to the fact that the containers are easily transportable, they do not have compelling legal measures such as residence permits and is a preferred product for temporary locations in areas where housing is not possible. Containers are used safely due to their strong structural and cellular structure. The fact that it is suitable for architectural use has made it widely common. Containers are designed to provide high performance against various external factors and elements such as rain, snow, fire.

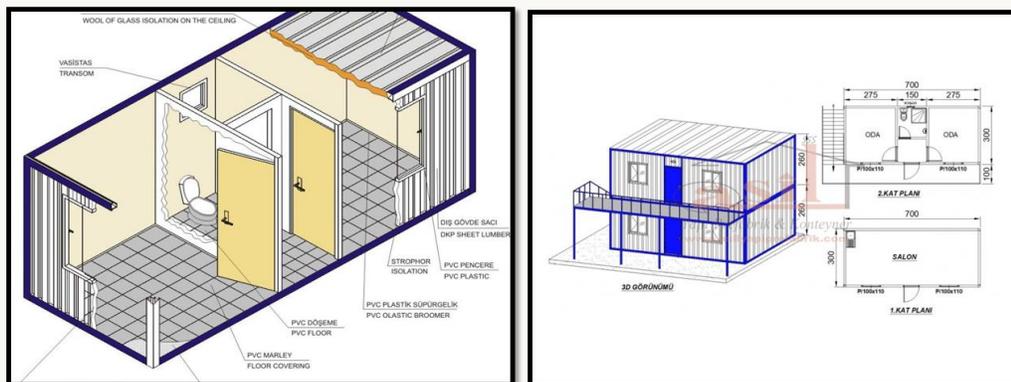
### Properties of Containers

There are some features that containers should have in order to achieve the targeted efficiency. Producing these features with consideration during the design phase is important for the usage performance of the container.

- 1) **Insulation:** Taking measures to reduce the effect of cold and heat to normal levels.
- 2) **Ventilation:** Establishing the order that can provide air passage of the interior space.
- 3) **Solar system heating:** Creating a system to benefit from solar heat.
- 4) **Dismountable:** Easy and quick to install.
- 5) **Modularity:** 3D Growing-Shrinkable structure.
- 6) **Portability:** Easy to move by means of installation.
- 7) **Lightness:** Having a feature that is important for portability.
- 8) **Durability:** Especially having the ability to withstand external influences.



**Figure:** Container Examples



**Figure:** Container Technical Drawings

### 2.3 Prefabricated Structures

It is a type of building that is created by combining the units with use of assembly easily dismountable and portable. Initially, it is important that such living units are set up very quickly when they need to be used for the victims in disaster situations and have easy installation features such as lightness and practical solution required related to speed.



**Figure:** Prefabricated Structure Example

For this reason, prefabricated structures are easier to carry, it can be assembled faster, lighter and more durable. It is very important to design and develop the intended living unit by taking these inputs into consideration.

### 3. NEW REGION ANALYSIS

It is likely that a new way of life, which is intended to be created for refugees, victims and homeless people, will naturally come up with negative aspects as well as positive aspects. Projecting with awareness beforehand minimizes such negativity. While projecting the considered formation, preserving or even improving the current situation will be the most important initiative in the name of sustainability. Here, the concept of 'Sustainability' starts from the number of people per square meter, to create a sustainable landscape design, to improve the existing texture, to use energy and water consumption in the most efficient way as mentioned in the proposed project, to put all the necessary systems into use and to maximize maintenance costs. The optimal design can be defined as the process of minimizing and creating a livable external environment with a sustainable strength. In a sustainable design, the health of all living organisms is secured, improved, and the benefits and harms of the existing nature are evaluated and presented to life. Considering the characteristics of the regions, their own climatic conditions, which are rainfall, wind conditions and sun conditions, must be taken into consideration as well as additional land structure and vegetation cover must be taken into account. In this context, the size, location and direction of living units should be designed according to current conditions.

As mentioned above, the subject is the protection of the natural structure and texture that are defined by sustainably. By keeping the existing natural conditions the same as essential, without disturbing the natural flow of plants and trees and protecting the natural wildlife, improve the soil, it is necessary to minimize the damage that may occur with construction. In the process of using water resources, creating resources that will be required for general uses other than individual uses constitutes a pillar of any project. Aiming to utilize rainwater for needs such as toilet and plant watering in order to provide the efficient use of water and to support more efficient uses by creating awareness is a global goal for sustainability. While the proposed the project is considered on the basis of Turkey's climatic conditions, user typology and psychology, family structure, habits and traditions may aid in creating a more customized design. The connection of the product to be designed with the user will be evaluated in line with these inputs in the discussion section of the research. It should be taken into account that the living unit should not be considered as a single product, it is also important to create a social environment. Neighborhood relations will also need to be established with the concept of inner courtyard that multiple units will create. The shelters, which are placed to create an inner courtyard, also form a partial safe area. It is certain

that neighborly relations and a sense of solidarity will also have a positive psychological effect on refugees and disaster victims. For this reason, the settlement plans in the region to be created should be prepared by considering the aforementioned factors.

#### **4. DISCUSSION**

In the light of the information presented and findings compiled above, whoever will live in the living unit, such as the disaster victims, refugee, homeless; needy has to live in more favorable conditions despite all the difficulties. In this context, the importance of both exterior and interior designs is increasing. One of the aims of the design is to make the psychological and physical unfavorable situations of the person feel less problematic by ensuring the most effective use of restricted areas with the right design. The principle that even the smallest corner is to be evaluated with the assumption that furniture units, which undertake many different functions, makes small spaces more useful, while proving the importance and the necessity of this proposed living unit. Therefore, it is known that the factors to be examined in the interior organization design are largely based on the psychological state of the person who dwells in it. Therefore, it is a fact that the material and color choices, ease of use and creating units designed according to habits are vital for the user. The same design should be a modular structure that can change according to the number of people in the family, that can be shaped according to the requirements of the industrial living units, which can be easily installed and disassembled, as simple as easy to carry, light and fragmented, suitable for displacement, durable enough to withstand external factors. The most frequently used thermal insulation materials today are polymers. The importance of the polymer material increases and the usage area becomes widespread day by day. In the insulation sector, they are generally handled under the main headings of polystyrene and polyurethane. Polystyrenes used in thermal insulation are divided into EPS (Expanded Polystyrene) and XPS (Extruded Polystyrene). Although they do not contain many differences in thermal insulation, these two substances are different from each other in terms of production processes. Because 90-95% of the polyurethane cells are closed, it is the best insulating material known in the world (<https://www.gnyapi.com.tr>). In addition to its thermal insulation features, its sound absorption feature, flexible structure, and its suitability for fast and timely installation due to its ease of mass production constitute the most important part of the project in terms of material. According to international data, the living units are accepted as 12 m<sup>2</sup> usage area for 2 people and maximum 15 m<sup>2</sup> usage area for families of 3-4 people. This layout presents functions such as bathroom-toilet, kitchen, eating, sleeping and resting within these square meters. Solving spatial problems with multifunctional furniture that obtains the electrical energy and heating needed depends on a solar energy source. Due to these features, living units that can be easily moved from one place to another easily assembled in case of needed providing a vital support for the lives of all disaster victims.

#### **5. CONCLUSION AND SUGGESTIONS**

In the study a living unit has been examined in line with the psychological, sociological and economic data that will enable them to live a healthy life for those who have migrated for whatever reason. These people who had to leave their homeland, who have hardly rescued their lives as a result of the disaster, or who are homeless with limited means depend on the quality of life presented by the use of living units related to accommodation. Designing removable living units, which may also be a solution for those who want to live outside of the city to get rid of the negative conditions of the mega-city life provides a wide range solution. People who want to reuse

their own water, heat up with the solar system and compost their wastes that generate electricity in order to live in a more sustainable fashion also form a target group for the units mentioned in the study as a result of the rural life people chose to live in. The main goal of the approach and philosophy presented by the study is to think about all the possibilities that can be deduced from the unfavorable conditions created by humanity in the last 50 years for a healthier life and to reveal whatever is to be developed in this direction in order to obtain a more livable world for future generations.

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