Optimization of Time and Cost in Establishment of Temporary Accommodations after the Crisis

S. F. Sajedi[1*], S. H. Hashemi[2], S. M. Kalvandi[2]

[1] Department of Civil Engineering, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran

[2] Department of Civil Engineering, Qeshm Branch, Islamic Azad University, Qeshm, Iran

ABSTRACT: There is a long history of occurrences for events and natural &/ un-natural crisis in Iran. Some natural crisis are as earthquake, flood, storm, reaper, landslide and fire. Generally, in every crisis the homes and accommodations of majority of people are damaged and some people getting into financial and psychological damages. Temporary accommodation of injured people in every crisis is the main task for the authorities of each country. Temporary accommodation operation should be conducted with due observance on the rules such as time, cost and operation of the site. Nowadays, much progresses has been conducted in the world in building of the temporary accommodations and then construction velocity and quality were improved. In this research, Iran's country conditions were studied and optimization of time and cost of building of temporary accommodations were investigated using both of particle size optimization algorithm (PSOA) and MATLAB software. The aim of research was optimal distribution of demographic blocks in residences so that firstly, do not exceed the capacity of any settlement and secondly, the minimum distance and cost for moving the population is spent. The obtained results showed finally that for optimization of time and cost of operation which demographic block should be moved to what accommodation. Regarding to the limited capacity of every settlement, the population overflow for some demographic blocks should be moved to several settlements. Some advantages for settlements structures compared to others, are as fast installation, low cost, and convenient storage.

1- Introduction

Nowadays confronting the crisis contains a wide range of concepts and actions of planning, design and construction including before the crisis, during the crisis and after the crisis [1]. During the construction of temporary residence accommodation, principles of planning and optimizing cost and time raises the performance of residences and causes that threats and losses will be reduced and improving the critical situation will also made be sooner. The basic principles should be considered at all levels of planning and design of accommodation. In general, the basic principles and guidelines for the construction of temporary residence. Accommodation should be observed in the following steps [2]:

*Planning stage includes items such as locating and arranging habitats, seismicity of the site, the barriers and natural disasters existing in area, dispersal of habitats, distances or proximity to faults and occurrences, security and sanitary measures.

* Construction phase includes items such as construction of residential and non-residential buildings, construction of infrastructure (roads, electricity, gas, water, etc.) and the construction of public spaces (clinics, schools, baths, etc.).

Corresponding author, E-mail: sajedi@iauahvaz.ac.ir

* Exploitation phase includes security issues, desirability and endless service, maintenance and proper operation of the infrastructure and the establishment of appropriate communications.

In each of the foregoing, it is necessary to improve the quality of the service provision and to reduce the vulnerability of future incidents in the future [3].

2- Research methodology

The optimization algorithm was first introduced in 1995 as a non-deterministic search method for optimizing a function by Eberhart and Kennedy. This algorithm is inspired by the collective movement of birds seeking food. The particle size optimization algorithm is a social search algorithm modeled on the social behavior of bird categories. Initially, this algorithm was used to explore patterns governing the simultaneous flight of birds and their sudden change of direction and optimal deformation. In this algorithm, particles are flowing in the search space. The particle movement in the search space is influenced by the experience and knowledge of themselves and their neighbors. Therefore, the other particle position affects how a particle is searched. The result of the modeling of this social behavior is the process of searching for particles toward the above areas. Particles learn from each other and based on the knowledge they get, they go to their

best neighbors. The principle of the method of optimization algorithm is based on the principle that at any moment, every particle, its place in the search space, according to the best place ever housed there, and the best place in its entire neighborhood, it adjusts [4].

In this research, simulated data with an unbalanced population with 25% has been used to evaluate and evaluate the algorithm. The reason for such an assumption in data simulation is that, in reality, the capacity of temporary residence accommodation is not exactly in line with the population of the displaced block, and may be more or less, which in this case will suffer from a population fraction or overflow. In this research, the second region of Tehran has been studied. The area is one of the 22 districts of the city that is considered as a populated area. This area, which was used at the beginning of the formation as a good weather region, gradually became a habitat area of the population. Zone 2 is one of the developed areas in the northern and northern boundaries of Tehran. From the north to the southern slopes of the Alborz Highlands, west to the highway Ayatollah Ashrafi Isfahani and District 5, south to Azadi Avenue and the 9th and 10th districts, and East to the Chamran Highway and the 1st, 3rd and 6th districts of Tehran. In Figure 1, the location of this area is shown in comparison with other areas of Tehran. The area has an approximate area of 64 square kilometers, with 48 square kilometers below the 1800 level line, and the rest is higher than that. The 2nd area has a population of approximately 650,000 inhabitants and has 9 metropolitan areas and is divided into 14 neighborhoods and 31 councils. The region consists of 205,883 households, with an average of 3.15 people per household [5].

The 2nd district of Tehran, due to its enclosure between the highways of Shahid Chamran, Mohammad Ali Jinnah and Ashrafi Esfahani, as well as the passage of highways like Shahid Hemmat, Shahid Hakim, Yadghar Imam and Nayesh Highway, has 29 major arteries with length of 13,000 kilometers. There are 4 bus rapid transit (BRT) lines, 5 metro stations, 54 bus lines, and 600 bus stations. The existence of this transport fleet has facilitated traffic and reduced traffic in the area [5]. The optimization of temporary accommodation settlements in the study area is based on two criteria of cost and capacity.

3- Results and discussion

With the occurrence of any disaster in vulnerable societies, there are numerous financial and financial losses and various crises. One of the important issues to be considered after the earthquake is the status of survivors of a traumatic disaster. This is especially important in metropolises. Among the temporary resettlement of the injured will be a major challenge due to the prolongation of the ongoing reconstruction and permanent settlement. In this research, attempts have been made to provide appropriate recommendations for temporary accommodation with the assumption of the potential of creating temporary accommodation conditions due to the wide open space inside the city. Based on the results of this study, if parks have the necessary impact, they can be used as an appropriate urban space to estimate this basic need after an earthquake. In this research, a three-step method is proposed for the temporary accommodation of the injured. In the first step, based on the security and access factors, places are designated to accommodate the injured. Therefore, spatial

and descriptive information should be used to determine these habitats. In the second step, optimal routes between building blocks and secure habitats are determined using existing routing algorithms. In the third step, according to different criteria (capacity and cost of population displacement), an optimal arrangement of the population than safe places is made using the particle size algorithm. Particle size algorithm is one of the algorithms that acts on the basis of particle intelligence, and, like the genetic algorithm, uses a collective attempt and high repeat to approach the desired result. The main goal of the research is to focus on the third step in the triple temporary residence process. In this study, for verifying the performance of the algorithm, we can use the Voronoi diagram because, in this diagram, space is based on the distance factor of the cell.

In terms of practical applications derived from the results of this study, it can be said that, in the context of organizing a discussion on temporary residence housing, it is important for governments to spend more than they can at a lower cost, and also at a faster time Work will be done so that displaced people have less problems and more satisfaction. So, if you can minimize both time and cost at the same time, it's a laudable one. Therefore, complementary studies on both cost and time can be considered as important and significant in discussing the organization of refugee affairs. From this perspective, it is worth pointing out that these similar research and studies are worthy of help in resolving the problems of displaced persons after the crisis.

4- Conclusions

The key results from the research are as follows:
 * The construction and quality of the basic infrastructure, such as water and electricity, is not optimal in many residential areas and the infrastructure is not suitable for reliability and stability. In some resi- dents, this situation is far better evaluated.
 * Most of the existing structures in the country of residence of displaced persons are tents that are not suitable for use in terms of use, and have many problems in heat, cold, rainfall, security, resistance and enemy attacks. The advantages of this structure include quick installation, low cost and convenient storage compared to other structures.
 * Experts were more satisfied with the quality of the constructs made by the people themselves, because they were more in line with the needs and natural conditions of the region.

The status of healthy water and food in most habitats was assessed appropriately. Experts evaluated the situation of providing security and internal order of residence of temporary residents poorly and inappropriately. Inappropriate order was evident in the early days of the crisis.

The method of optimizing the algorithm of birds in optimizing the time and cost of settling temporary accommodation in the second district of Tehran has been well applied.

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