



International Conference on Sustainable Design, Engineering and Construction

Sustainable Temporary Housing: Global Trends and Outlook

Daniel V. Perrucci^{a,b}, Bianca A. Vazquez^{a,b,*}, Can B. Aktas^a

^a University of New Haven, Department of Civil and Environmental Engineering, 300 Boston Post Rd., West Haven 06516, CT, USA

^b Authors have contributed equally

Abstract

The concept of sustainable housing can take many forms or definitions. The view embraced in this study for sustainable housing was a structure that is low-cost, energy efficient, and one that uses local renewable or recycled materials, while at the same time being safe and providing shelter to its occupants from the elements. Rather than focus on a few aspects of housing in isolation from spatial necessities or occupant demographics, the approach used in this study was to seek best practices for sustainable temporary housing that also accounts for local climatic conditions. The global need for temporary housing may be expected to increase due to multiple factors: increasing severity of natural disasters resulting in large number of displaced peoples; an increase in the number of climate refugees as a result of a changing climate; and the inability of developing countries to provide sufficient infrastructure in pace with their rapid population growth. Novel developments and promising products and methods in the field of temporary disaster relief housing have been reviewed in the study. To date, an engineered solution to the problem that is low-cost, quick to construct, environmentally and socially sustainable, takes into account the needs of the occupant, and accounts for local climatic conditions has not been found. On the contrary, every major disaster proved the inability of governments to cope with the challenges posed with providing for the large numbers of displaced peoples.

Keywords: sustainable housing; temporary housing; low-cost housing; disaster relief

1. Introduction

In the world today the severity of natural disasters are increasing, the number of climate refugees are increasing, and the inability of developing countries to provide sufficient infrastructure is becoming more common due to a

* Corresponding author.

E-mail address: bvazq2@unh.newhaven.edu

demographics that indicate rapid urbanization trends in almost every country. The former creates large numbers of displaced peoples in need of shelter and housing, whereas the latter inherently requires rapid solutions to the housing problems to sustain a standard of living in urban centers. The need for low-cost temporary housing can only be expected to rise due to the combination of these factors. Two examples can be provided to illustrate the importance of sustainable temporary housing, and sustainable temporary disaster relief housing.

Nigeria, with a 2014 population of 178 million, is expected to more than double its current population by mid century if current population increase trends continue. Moreover, 84% of the population was living below the \$2/day poverty level after adjusting for purchasing power parity. Nonetheless, 51% of the population was living in urban areas, and the shift from rural to urban regions continues today [1-2]. The state however, is having difficulty in keeping pace with the infrastructure development needs of a rising urban population.

The need for temporary housing is not limited to developing countries as revealed by a closer look at recent natural disasters that happened in the United States. Hurricane Katrina caused billions of dollars worth of damage, and caused the temporary or permanent displacement of hundreds of thousands of people. No country, independent of their income, is immune to the effects of natural disasters and the need to provide temporary housing for its population. In this study, the term housing was used in a broader sense; it was used to represent even the most basic shelters. Still, the post-disaster step forward from nothingness, lies within temporary housing.

The concept of sustainable disaster relief housing was investigated through the lens of new/innovative materials and techniques and reused or recycled materials and their effectiveness. The work begun by examining current low-cost sustainable and disaster relief housing, which was followed by discussions and recommendations on sustainable temporary of disaster relief housing. Recommendations emphasized how current practices could be improved; sustainable housing methods pertaining to different climates; sustainable disaster relief housing relating to different types of disasters; and last resort emergency relief shelter.

2. Background

2.1. Displacement of Peoples Linked to Increasing Severity and Frequency of Natural Disasters

The Center for Research on the Epidemiology of Disasters has been maintaining an Emergency Events Database (EM-DAT), which was supported by the World Health Organization and the Belgian Government. The database provides the most in-depth data on natural disasters and their impacts, dating back to 1900. Analyzing the global number of natural disasters from the EM-DAT database, it can be observed that while the number of natural disasters have remained relatively flat between 1900-1940, they have increased exponentially until the year 2000 despite fluctuations, with numbers increasing from 5 to 527 during that timeframe. The most recent decade has seen a decline in the number of natural disasters, with 2014 recording 344 such events which was comparable to 1997-1998 levels. There was much greater fluctuations in terms of economic damage as a result of natural disasters. Just in the most recent decade, the range spans \$40 billion in 2006 to \$380 billion 2011 [3]. For the U.S., the Federal Emergency Management Agency (FEMA) provides detailed information on the number of natural disasters and a preliminary damage assessment report if available. Based on the FEMA database, there were 128 disasters on average in the U.S. in the last decade [4].

As cities grow and population increases, the consequences of natural disasters are growing proportionally. Table 1 presents the direct economic cost of the top 5 disasters that struck since 1980. Only insured damages were taken into account in the table, and hence the actual economic as well as social cost can be expected to be much higher than reported results. In the case of Hurricane Katrina for example, the damages caused by the hurricane exceeded 200 billion dollars' worth of damage. The number of people displaced, either temporary or permanent, as a result of the disaster have also been provided in Table 1. It is interesting to note that most of the major natural disasters have occurred in the last decade. The number of people displaced exceed the populations of a vast majority of urban centers in the world. An immediate need that arises following population displacement of such magnitude is the need to provide shelter for the displaced in a very short period of time. The environmental problems associated with recovery efforts and actions only add to the total environmental impacts of the natural disaster, hence requires further attention [5-10].

Download English Version:

<https://daneshyari.com/en/article/853684>

Download Persian Version:

<https://daneshyari.com/article/853684>

[Daneshyari.com](https://daneshyari.com)