

DESIGN DEVELOPMENT OF POST-DISASTER TRANSITIONAL SHELTER

Abstract

Transitional Housing is a crucial intermediate phase in the disaster recovery process, where the affected population resides for a temporary period until they can return to their habitats.

The built environment today is affected more and more by rapid and drastic changes due to human-made and natural disasters. Presently, Humanitarian Aid of disaster relief shelters functioning the role of transitional shelters is often in the form of plastic sheets, tents, prefabricated units, and public community buildings such as community centres, schools, hospitals, university halls of residence, places of worship, sports venues, and private rentals. The provision of such facilities is often carried out by the government administrations, NGOs, and Humanitarian Aid Agencies. The term of residence in such facility ranges from days to years, which disrupts the normal functioning of the public institution that is used to house the displaced population, especially schools and colleges. The study begins by studying the impact of disasters and Humanitarian Aid with a focus on Shelter Aid. The definition of transitional accommodation by several aid agencies is analysed with the help of case study of transitional shelters implemented in the aftermath of past disasters. We identified essential characteristics of transitional housing by making a comparative review of different solutions developed in the past in the global context by universities, architects, designers, engineers, manufacturers, NGOs, and governments.

The objective of this research is to develop the design guidelines for transitional shelter aftermath of a flood disaster, with a focus to create dignified living conditions which are both environmentally sustainable and economically feasible. The context of the study is the Flood Plains of the Brahmaputra Valley in the North Eastern state of Assam, India which gets flooded annually displacing thousands of people. The residents of the flood-plains and scattered river islands in the form of sandbars of the Brahmaputra basin reside there due to the available fertile land for agricultural activity. Evidence of architectural adaptation in the form of '*chang ghar*' or houses on stilts is observed in the indigenous tribal houses to address the floods. Most households had personal boats for transportation during floods.

A sequential mixed method approach is used in this research. The qualitative phase focused on selected study of three flood-prone settlements in the Brahmaputra Valley. This study documents the rural homesteads lifestyle in the valley by a selective survey of households from three locations which are annually affected by floods. Visual documentation supported by draft

measured drawing and user interviews are used to study the homesteads, which are mostly non-engineered. Salient building elements are identified and documented. Structural components, Comfort, Material Technology, Architectural Design, Sanitation and Waste Management are studied in detail to understand the lifestyle of the people and the cultural influences. Further, analysis is made to understand the housing response to the disaster profile of the context.

The genre of transportable, flexible and ephemeral architecture is rapidly expanding in the Humanitarian Shelter Aid sector. The research proceeds with the development of a full-scale prototype of a temporary shelter kit model made using the locally abundant material of Bamboo with community participation. The full-scale prototype underwent three iterations until March 2020. The design criteria are determined by the analysis of different aspects that could contribute to the optimization of the final product: life in relief shelter camps, essential qualities of a domestic environment, its spaces and functions, general requirements set by aid organizations and technical strength requirements. Bamboo is considered as a material for construction due to its availability in abundance, a renewable resource, and because many people in the region reside in houses made of Bamboo.

From the findings of the design exercise, we realize that Bamboo is the most appropriate material for use in transitional housing across the region of Assam. The structural stability with thermal comfort and privacy contribute to the cultural acceptance of the shelter type. The design development involved the community at every step of its conception to develop ownership over the project and also the construction of the same. However, the storage of the shelter kit of non-treated Bamboo was found to be a challenge.

We also explored the option of enterprise development of the shelter kit to establish the delivery of the shelter locally within the community as part of disaster preparedness.