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Sustainable Building Technologies for Post-Disaster Temporary Housing: Integrated Sustainability Assessment and Life Cycle Assessment

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Abstract : After natural disasters, displaced people (DP) require important numbers of housing units, which have to be erected quickly due to emergency pressures. These tight timeframes can cause the multiplication of the environmental construction impacts. These negative impacts worsen the already high energy consumption and pollution caused by the building sector. Indeed, post-disaster housing, which is often carried out without pre-planning, usually causes high negative environmental impacts, besides other economic and social impacts. Therefore, it is necessary to establish a suitable strategy to deal with this problem which also takes into account the instability of its causes, like changing ratio between rural and urban population. To this end, this study aims to present a model that assists decision-makers to choose the most suitable building technology for post-disaster housing units. This model focuses on the alternatives sustainability and fulfillment of the stakeholders’ satisfactions. Four building technologies have been analyzed to determine the most sustainability technology and to validate the presented model. In 2003, Bam earthquake DP had their temporary housing units (THUs) built using these four technologies: autoclaved aerated concrete blocks (AAC), concrete masonry unit (CMU), pressed reeds panel (PR), and 3D sandwich panel (3D). The results of this analysis confirm that PR and CMU obtain the highest sustainability indexes. However, the second life scenario of THUs could have considerable impacts on the results.

Keywords : sustainability, post-disaster temporary housing, integrated value model for sustainability assessment, life cycle assessment
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