

Semi-Permanent Schools with Reinforced Polystyrene as an Alternative for Communities Affected by Disaster or Crisis

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Abstract:

Education was and still is one of the most important components of the progress of all nations, so international conventions affirmed the right to education for all children as one of their most important rights. However, disasters and crises have a significant negative impact on societies, especially children, and the extent to which appropriate educational services are provided to them. Therefore, strategies must focus on the need to ensure children's access to education, especially in areas affected by disasters and crises. The study presents the concept of semi-permanent buildings as a suitable tool to accelerate the construction of schools, which facilitates the process of rapid recovery from the effects of disasters and emergency crises, in addition to being economical, safe and easy to use. The study mentions the rapid construction methods for semi-permanent buildings, and in particular the method of construction with reinforced polystyrene panels as one of the modern construction methods, taking into account factors such as speed of construction, flexibility and sustainability. To demonstrate the capabilities of the proposed construction system, the research presents a comparison of this system with an existing model that was built in the traditional manner. By analyzing the results of the comparison, the study concluded that the advantages of using this system for semi-permanent buildings allow providing the appropriate educational environment in the fastest time and at an appropriate cost..

Keywords:

Disasters, semi-permanent buildings, schools, rapid build systems, reinforced Polystyrene

References:

1. ABNewswire. (2020, February 19). Panelized Modular Building Systems Market 2020: Global Key Players, Trends, Share, Industry Size, Segmentation, Opportunities, Forecast To 2026. Retrieved from <https://virtual-strategy.com/2020/02/19/panelized-modular-building-systems-market-2020-global-key-players-trends-share-industry-size-segmentation-opportunities-forecast-to-2026/>
2. Author. (2022). Field documentation of the study area. The Kingdom of Saudi Arabia.
3. Author. (2023). A design model developed with one of the companies that produce foam insulation panels reinforced with reinforcing wires. Cairo.
4. Booth, S. (1993). *Crisis Management Strategy: Competition & Change in Modern Enterprises*. London: Routledge.
5. CBRI. (2017). *Manual for Expanded Polystyrene (EPS) Core Panel System and its field Application*. Roorkee: CSIR – Central Building Research Institute.
6. CEDA. (2016). *The Kingdom of Saudi Arabia's Vision 2030*. Riyadh: The Council of Economic and Development Affairs. Retrieved from https://www.vision2030.gov.sa/media/5ptbkbxn/saudi_vision2030_ar.pdf
7. FAO. (2015). *The Impact of Natural Hazards and Disasters on Agriculture and Food Security and Nutrition*. World Conference on Disaster Risk Reduction. Sendai. Retrieved from <https://www.fao.org/3/i4434e/i4434e.pdf>
8. FEMA. (2023). *National Risk Index - Technical Documentation*. Federal Emergency Management Agency (.gov). Retrieved from https://www.fema.gov/sites/default/files/documents/fema_national-risk-index_technical-documentation.pdf
9. Gitter, S. R. (2007). Credit, Natural Disasters, Coffee, And Educational Attainment, In *Rural Honduras*. *World Development*, 35(3).
10. Mishra, G. (2020). *Precast Concrete Floor, Wall and Frame Construction*. Retrieved from [The Constructor: https://theconstructor.org/concrete/precast-concrete-floor-wall-frame-construction/273/](https://theconstructor.org/concrete/precast-concrete-floor-wall-frame-construction/273/)
11. Moe, T. L. (2006). An integrated approach to natural disaster management: Public project management and its critical success factors. *Disaster Prevention and Management*, 5(3), 396-413.
12. Obinna, U. (2022, October 21). *Light Gauge Steel Building*. Retrieved from [Structville Integrated Services Limited: https://structville.com/light-gauge-steel-building-construction](https://structville.com/light-gauge-steel-building-construction)
13. Partnership, T. G. (2012). *Education Cannot Wait: Protecting Children and Youth's Right to a Quality Education in Humanitarian Emergencies and Conflict Situations*. The Global Partnership. Retrieved from <http://www.globalpartnership.org/news/364/762/Education-Cannot-Wait-Protecting-Children-and-Youth-s-Right-to-a-Quality-Education-in-Humanitarian-Emergencies-and-Conflict-Situations/>
14. Rahman, F. U. (2020). *Pre-Cast Concrete Walls – Types, Connections, and advantages*. Retrieved from

- The Constructor: <https://theconstructor.org/concrete/precast-concrete-walls-types-connections-advantages/37998/>
15. Ryan M. Colker, J. C. (2019, March). Design for Modular Construction: An Introduction for Architects. National Institute of Building Sciences Staff. Retrieved from https://content.aia.org/sites/default/files/2019-03/Materials_Practice_Guide_Modular_Construction.pdf
 16. Setiadi, A. (2014). Socio-Economic Impact of National Disasters on the Education Sector: A Case Study of Indonesia. *Journal Dialog Penanggulangan Bencana*, 5(2), 80-81.
 17. UNDP. (2012). Act Now, Save Later: new UN social media campaign launched. Retrieved from <http://www.undp.org/content/undp/en/home/presscenter/articles/2012/07/02/act-now-save-later-new-un-social-media-campaign-launched/>
 18. UNESCO. (1990). World Declaration on Education for All and Framework for Action to Meet Basic Learning Needs. World Conference on Education for All - Meeting Basic Learning Needs. Jomtien.
 19. UNESCO. (2000). Dakar Framework for Action Education for All: Meeting Our Collective. World Education Forum Dakar. Senegal.
 20. UNICEF. (2022). Reimagining school construction for scalability and sustainability. Retrieved from <https://www.unicef.org/supply/stories/reimagining-school-construction-scalability-and-sustainability>
 21. UNISDR. (2009). United Nations International Strategy for Disaster Reduction. UNISDR Terminology on Disaster Risk Reduction. Geneva. Retrieved from http://www.preventionweb.net/files/7817_UNISDRTerminologyEnglish.pdf
 22. W. Maref, M. M. (2012). Field Energy Performance of an Insulating Concrete Form (ICF) Wall. Canada: National research council Canada. Retrieved from <https://www.rmcao.org/wp-content/uploads/2021/09/Insulating-Concrete-Forms.pdf>
 23. Welch, A. (2022, February 22). Benefits of Timber Frame Houses. Retrieved from <https://www.glasgowarchitecture.co.uk/benefits-of-timber-frame-houses>
 24. Y, A. P. (2020, September 4). Development of modular school design as a permanent solution for post-disaster reconstruction in Indonesia. *International Journal of Disaster Resilience in the Built Environment*, 12(1). Retrieved from <https://www.emerald.com/insight/1759-5908.htm>

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