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Design optimization of Base-Frame structure of Portable-Cabin using Structural Analysis

Portable-Cabins are widely used in remote engineering fields for multiple purpose such as accommodation with different layout, Kitchen, offices, mess etc. Manufacturing of Portable-Cabins is very demanding in Pakistan as there are many engineering fields that operate remotely in rural areas which lack in proper accommodations. The base frame structure of the portable-cabin is the most critical part as it bears the major portion of the load. For this study, we have considered a two room and two bath (2R/2B) Portable-Cabin. The load calculation was performed and structural analysis was carried out on current design of the 2R/2B to have the benchmark strength, safety factor and material cost associated with it. The purpose of this study was to reduce fabrication cost being in safety limits by trying cheaper and available cross-sections in local market. By doing so, we have proposed five new possible layouts of base frame with lower material cost and higher strength. Furthermore, gage analysis for proposed layouts is also performed to see if it can further reduce cost of fabrication without having a major effect. The results shows that using different available cross sections cost can be reduced to a great extent. These structures can be useful for settlement after a disaster like earth quake or flood in form of schools and accommodation, development of a green city, economical house/hotels, portable-toilets, and portable-offices for remote sites.

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