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Identification and Categorization of Roof Designs in Western Province Houses, Sri Lanka

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Abstract

Timber is widely used as a structural material in residential house construction. Among them, the roof is the most crucial part of a house that covers the interior of a building. The Western Province has the highest number of residential houses in Sri Lanka. Approximately 22,414 homes are built in the Western Province within a year, and various roof designs can be identified under different complexity categories. This study aimed to identify and categorize major roof types in Western Province houses based on their design complexity. For this study, 30 house plans were collected from Colombo, Kaluthara, and Gampaha districts (a total of 90 house plans) from the house owners, architects, and draftsmen as softcopies and hard copies. Collected 90 house plans were visually analyzed to identify their basic roof types. Then the roof design complexity was analyzed based on the number of basic roof types presented in each house plan. Five basic roof types (Gable roof, Hip roof, One side hip roof, Lean-on roof or Shed roof, and Pyramid roof) and 23 roof designs were identified in the Western Province houses of Sri Lanka. 75.5% of selected house plans had a Gable roof as the primary roof type. The simple-level roof design was the most abundant in Kaluthara and Gampaha districts with 40% and 43.33%, respectively. However, moderate-level complexity roof design was the most abundant type in the Colombo District with 46.66%. Only 3.33% of complex-level roofs were found in the Kaluthara District, while Gampaha and Colombo districts had 6.66% and 10% complex roofs. As per the final result the complexity of roofs increases from Kaluthara, Gampaha, and Colombo districts, which may be attributed to the economic levels of house owners. Out of the 90 house plans in the Western Province houses, 38% of roof designs had the simple-level of complexity. 34%, 21%, and 7% of house roofs had moderate, very simple, and complex-level categories, respectively. Roof design directly relates to the house owner's perception. However, roof designers can recommend simple roof designs for their clients to enhance the structural accuracy and the cost-effectiveness of a residential house roof.

Keywords: Roof design, Complexity, House plans, Western province