

DEVELOPMENT OF WEIGHT BASED DECISION SUPPORT SYSTEM FOR OPTIMUM ECONOMIC ROOF TYPE FOR A GARBLE FRAME

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ABSTRACT

The choice of roof truss type for use in buildings is arbitrary and often determined by a simple rule of thumb. It is usually difficult or time consuming in determining an economic roof truss type at the design period. In this work five commonly used roof truss types of the same span were chosen and analyzed for internal stresses (axial forces in the members). An expression for the weight of the truss element as a function of its axial force was developed. This was used to compute a weight coefficient for the truss. Values of this coefficient were compared for roof trusses of different types, and at different roof pitches. The results showed that the flat pitch truss and the warren truss generally gave an economic design for roof trusses. The pratt truss and fink truss gave a more expensive design for lower pitches and this increase comparatively for higher pitches. It was observed that at very high pitch heights (heights greater than 8m) the calculated weights of the roofs tend to converge. Hence the choice of roof truss type at such pitch height should be governed by other considerations other than weight.

Keywords: Economic design, roof truss types, roof cost.