

Optimum design of parabolic steel box arches

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Abstract: An optimization procedure has been prescribed for the minimum weight design of symmetrical parabolic arches subjected to arbitrary loading. The cross section is assumed to be a symmetrical box section with variable depth and flange areas. The webs are unstiffened and have constant thickness. The proposed sequential, iterative search technique determines the optimum geometrical configuration of the parabolic arch which includes the optimum depth profile and the optimum lengths and areas of the required flange plates corresponding to the prescribed number of curtailments. The study shows that the optimum value of rise to span ratio (h/L) of a parabolic arch is maximum at 0.41 for uniformly distributed loading over the entire span. For any other loading, the optimum value of h/L is less than 0.41.