PLATED STRUCTURES WITH FOLDED STIFFENERS

Thesis submitted

by

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CERTIFICATE

Certified that this work "Plated Structures with Folded Stiffeners" by Mr Subhash Chander has been carried out under our supervision and it has not been submitted elsewhere for a degree.

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ABSTRACT

Folded plates in generalised form are suitable for large span roofs and box girder bridges. As such they are not economical for spans usually provided in buildings and moreover they cannot be used for floors in buildings. Herein an attempt is made to investigate the provision of small V-grooves in floors and roofs in a way that it provides stiffening effects besides covering an area.

In order to reduce the computation time, large data and memory required in the analysis using SemiLoof element, analytical models consisting of single stiffener are developed to represent exterior and interior folds in a multifold structure. A spacing of V-folds as large as 12.5m for a span of 30m has been shown to be adequate. To study the effect of folded stiffeners fold depth/span is varied from 0.02 to 0.08 in steps of 0.02, for exterior as well as interior unit. Effect of rise has been considered for mid span rise and middle third with uniform rise. Unrestrained as well as restrained end conditions have been considered. Rise/span has been increased from 0.02 to 0.1 in steps of 0.02.

A structural shape with double macro membrane action on non-rectangular plan has been proposed. For complex shapes like the one proposed, analytical results need to be corroborated by experiments. Hence three models, two of sand araldite and one of perspex sheet, were tested. Conclusions are summarised for the analytical and experimental models.

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