ABSTRACT

The subject of vibration, as it deals with the oscillatory behavior of bodies, is acquiring increasing importance in the field of engineering because most of the machines and engineering structures experience vibration and their design generally requires consideration for their dynamic behavior. The use of constructions of variable thickness serves two-fold requirements of safety and economy. Plates of variable thickness are often encountered in several engineering application and their use in telephone industry, nuclear reactor technology, naval structures, earth-quake resistant structures, aeronautical field and machine designs are very common.

In the course of development of space techniques, the demand of study of vibration of plate of certain aspect ratio with some simple restraints on the boundaries has increased. In cold regions rocket motors are developed with the use of soft filaments in aerospace structure supported with elastic or visco-elastic media. To finalize a design a construction engineers should understand the first few modes of vibration, as they are important.

The present work is an attempt to study some vibration problems of visco-elastic parallelogram plate of variable thickness. The whole range of the subject of study is divided into four chapters which deal with vibration of visco-elastic parallelogram plate of linearly and parabolically varying thickness in one and both direction. Rayleigh-Ritz technique has been used to obtain the frequency equation. Time period and transverse displacement corresponding to the first two modes of vibration has been computed for different values of aspect ratio, taper constants and skew angle. These results have been presented in both tabular and graphical forms. The results obtained in this study may be reduced to that of parallelogram plate of uniform thickness and have of rectangular plate, which have generally been compared with the published one.
A survey of literature on vibration of skew plates of variable thickness subjected to taper constant effects has been presented in 'Introduction'. The libraries of I.I.T., Roorkee, C.C.S. University, Meerut, I.I.T., Delhi and through personal efforts by requesting centers of advance studies and author of paper on the subject concern have been the provision sources.

Chapter wise summary of the thesis is given below:

**Chapter-I:**

In this chapter free vibration of visco-elastic parallelogram plate of linearly varying thickness has been studied. Rayleigh-Ritz technique has been used to obtain the frequency equation. Time period and transverse displacement corresponding to the first two modes of vibration has been computed for visco-elastic parallelogram plate for different values of aspect ratio, taper constant and skew angle.

**Chapter-II:**

Here free vibration of visco-elastic parallelogram plate of parabolically varying thickness has been studied. Rayleigh-Ritz technique has been used to obtain the frequency equation. Time period and transverse displacement corresponding to the first two modes of vibration has been computed for visco-elastic parallelogram plate for different values of aspect ratio, taper constant and skew angle.

**Chapter-III:**

Current chapter deals the free vibration of visco-elastic parallelogram plate of linearly varying thickness in one-direction and parabolically in another direction. Rayleigh-Ritz technique has been used to obtain the frequency equation. Time period and transverse displacement corresponding to the first two modes of vibration has been computed for visco-elastic parallelogram plate for different values of aspect ratio, taper constants and skew angle.
Chapter-IV:

In this chapter free vibration of visco-elastic parallelogram plate of linearly varying thickness in both directions has been studied. Rayleigh-Ritz technique has been applied to obtain the frequency equation. Time period and transverse displacement corresponding to the first two modes of vibration has been computed for visco-elastic parallelogram plate for different values of aspect ratio, taper constants and skew angle.