

Analysis and Comparative Study of Folded Plate Type Foundation for Retaining Wall

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ABSTRACT

Footing is an important part of structure. The footing is an architectural element attached to ground and also transfer loads of structure to ground. The purpose of footing is to support structure and also prevent instability of structure. A structure's foundation is connector between part of structure and footing. Footing secures foundation by gaining actual strength of structure. This paper gives an information about Analysis and Comparative study of folded plate foundation for retaining wall with varying geometric parameters. This paper also helps to find out economical structure with prevention of sliding and also gaining high strength to whole structure.

Keywords: Footing, Folded Plate, retaining wall, V shaped folded plate,

I. INTRODUCTION

Architect found an innovative solution for designing the various engineering structure in the form of folded plates. Folded plate structure is an assembly of number of thin plates arranged in series and rigidly connected together their edges and supported by frames or transverse diaphragm. In this research work, the plate acts as the separate column. In case of Civil engineering, analysis of folded structure is done by using finite element method because of complex nature of structure.

1.1 Retaining wall

Retaining walls are rigid walls used for supporting soil mass which can be retained at different levels on two sides. Retaining walls are designed to restrain soil to slope that may be steep or vertical slope. They are used to bound soils between two different elevation points in hilly or terrain area for the purpose of hillside farming or roadway.

1.2 V Shaped Folded Plate Type of Foundation

Folded plate structure is an assembly of number of thin plates arranged in series and rigidly connected together their edges and supported by frames or transverse diaphragm. In this research work, the plate acts as the separate column.

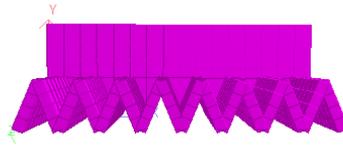


Fig 1: V shaped folded plate type foundation

1.2.1 Behavior of Folded Plate

Each plate is assumed to act as a beam in its own plane (This is justified when the ratio of the span length of the plate to its height width is large enough.)

1.2.2 Assumptions for The Analysis of Folded Plates

1. Material is homogenous, elastic, and isotropic
2. Thickness of plate is small when compared to plate dimensions.
3. Problem will be treated as one-dimension if plate is assumed to behave in beam action
4. Joints are assumed to be rigid

1.3 Objective

The objective of this paper is to determine maximum deflection occurred due to varying angles between plates and plate length for study of V shaped folded plate type foundation for retaining wall with varying geometric parameters.

1.4 Methodology

In this study the data is being collected and then the analysis work is being done for the folded plate foundation for retaining wall. STAAD Pro models made for V shaped folded plate foundation for retaining wall with varying geometric parameters like internal angle of plate and also length of each plate at foundation.

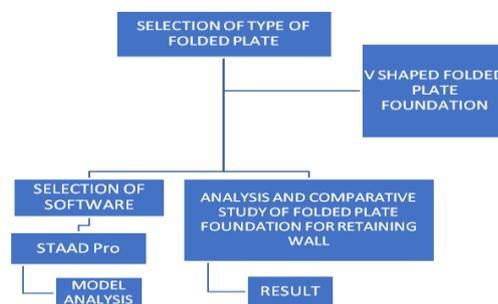


Fig. 2 Flow Chart

(Methodology followed for present Project)

1.4 Result and Discussion

The aim of this paper is to achieve an ideal V shaped plate foundation for retaining wall which covers up to 27m length. Using the principle of FEM with several models to analyze the geometric parameter i.e. length and internal angle. Folded plate provided in foundation for retaining wall. Elastic mat is provided as foundation for retaining wall. The STAAD Pro models have been made for the internal angle of 45, 60, 75 degrees with change in length as 1,1.5 m.

Table 1: V Shaped Plate with varying internal angle and length

SR. NO.	INTERNAL ANGLE (DEGREE)	LENGTH OF EACH PLATE (METER)	MAXIMUM DEFLECTION (MM)
1	45	1	118.596
		1.5	88.576
		2	74.388
2	60	1	120.665
		1.5	107.144
		2	92.855
3	75	1	124.586
		1.5	122.083
		2	120.665

II.CONCLUSION

For Folded plate as a foundation, very less amount of literature is available. In this research work, V shaped folded plate foundation for retaining wall can be used instead of simple foundation provided for retaining wall.

The conclusion of this paper as per STAAD Pro models are as follows:

1. As the internal angle between each plate increase, deflection of structure also decreases.
2. As the length of folded plate increases, deflection of structure also decreases.

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