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Cost Analysis and Comparative Study of Different Types of Retaining Wall

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Abstract: Holding divider is a structure planned and built to oppose the horizontal weight of soil, when there is an ideal change in ground height that surpasses the point of rest of the soil. Retaining dividers are generally unbending dividers utilized for supporting the dirt mass along the side with the goal that the dirt can be held at various dimensions on the different sides. Holding dividers are structures intended to control soil to an incline that it would not normally keep to (regularly a lofty, close vertical or vertical slant). They are utilized to bound soils between two unique rises regularly in zones of territory having bothersome slants or in regions where the scene should be molded harshly and designed for increasingly explicit purposes like slope cultivating or roadway bridges. A holding divider that holds soil on the rear and water on the frontside is known as a seawall or a bulkhead. The most significant thought in appropriate structure and establishment of holding dividers is to perceive and balance the propensity of the held material to move downslope because of gravity. This makes parallel earth weight behind the divider which relies upon the point of interior grating (ϕ) and the firm quality (c) of the held material, just as the heading and size of development the holding structure undergoes. Lateral earth weights are zero at the highest point of the divider and – in homogenous ground – increment relatively to a greatest incentive at the most minimal profundity. Earth weights will drive the divider forward or topple it if not appropriately tended to.

Keywords: Optimal Design, Cost effective, Economical wall, Reinforced retaining wall, Counterfort retaining wall, Gravi-loft retaining wall, Analysis by 2D plaxis Software.

I. INTRODUCTION

A Retaining divider is a generally unbending divider utilized for supporting soil mass along the side with the goal that the dirt can be held at various dimensions on the different sides. Holding dividers are structures intended to control soil to a slant that it would not normally keep to. They are utilized to bound soils between two distinct heights regularly in territories of territory having bothersome inclines or in zones where the scene should be formed harshly and designed for increasingly explicit purposes like slope cultivating or roadway bridges. The most significant thought in legitimate structure and establishment of holding dividers is to perceive and check the propensity of the held material to move downslope. This makes horizontal earth weight behind the divider which relies upon the point of interior erosion and the firm quality of the held material, just as the bearing and size of development the holding structure undergoes. Lateral earth weights are zero at the highest point of the divider increment relatively to a most extreme incentive at the least profundity. Earth weights will drive the divider forward or topple it if not appropriately tended to. Additionally, any groundwater behind the divider that isn't disseminated by a seepage framework causes hydrostatic weight on the divider. The absolute weight or push might be expected to act at 33% from the most minimal profundity for the long way stretches of uniform stature.

II. LITERATURE SURVEY

A. Siavash Zamiran, Abdolreza Osouli

One of the classic approaches to find out reasonable earth pressure applied to the retaining walls for seismic condition is Mononobe-Okabe method. Although this method has a wide range of application in dynamic analysis of the retaining walls in cohesionless material, the method has some limitations for cohesive soils and for dynamic computation with different seismic parameters. In this study an investigation was carried out to evaluate lateral earth pressures for retaining wall backfilled with clayey soils under seismic condition. A numerical model of a cantilever wall was conducted with finite difference method using staged construction and installation of different layers of backfill.

B. Tamadher Abood, Hatem E. Younis Abdulrahim Eldawi, Faeza R. Elnaji

Retaining structures hold back soil or other loose material where an abrupt change in ground elevation occurs. The retained material or backfill exerts a push on the structure and thus tends to overturn or slide it, or both.

C. Shravya Donkada and Devdas Menon

This paper aims at developing an understanding of optimal design solutions for three types of reinforced concrete retaining walls, namely, cantilever retaining walls counterfort retaining walls and retaining walls with relieving platforms. Using genetic algorithms, parametric studies were carried out to establish heuristic rules for proportioning the wall dimensions corresponding to the minimum cost points.

D. K. Senthil, S. Rupali, M.A. Iqbal

Three-dimensional finite element analysis has been carried out in order to study the response of retaining walls subjected to lateral earth pressure using ABAQUS/Standard. The height of the cantilever wall was 5.5 m and the designation of retaining wall was classified as “A” for less toe-more heel and “B” for less heel-more toe configuration.

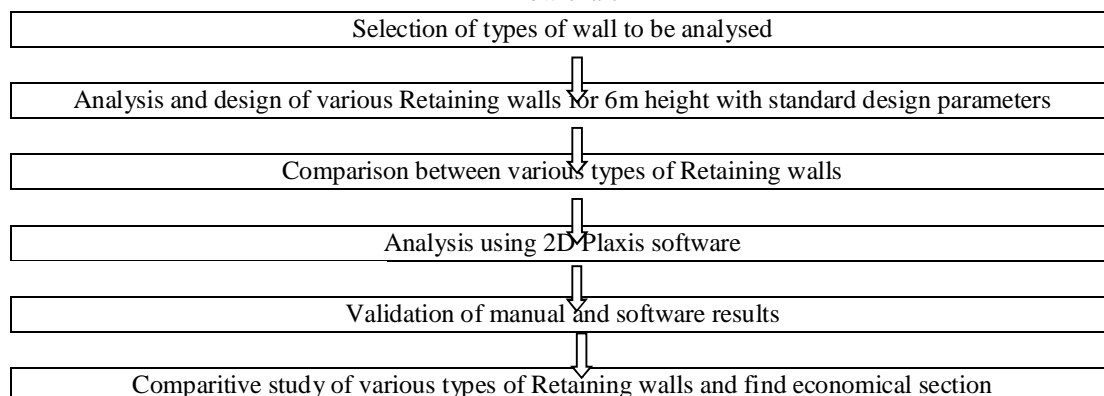
E. Haifa Fakhira Hittayatullah, IrAzhar Ahmad

This paper presents an optimum analysis and cost estimation of cantilever retaining wall to produce an interactive program that provides a safe and effective conventional cantilever wall for a single layer with different type of soil (backfill) and two different layer of soil (backfill). In order to obtain an optimum dimension of cantilever retaining wall, a preliminary dimension proportion is determined at the beginning. The height of the wall that used in design is limited from 3 meters to 6 meters only, based on commonly used retaining wall height. Stability checking such as overturning, sliding and settlement also has been analysed with factor of safety of 1.5.

III. METHODOLOGY

- A. The first step is the selection of all types of Retaining walls along with the GraviLoft wall considering height of the wall 6m.
 - B. As per the requirements and the soil conditions the sections so planned are designed. Same material standards are used for all types of Retaining walls.
 - C. Comparison between the various types of Retaining walls designed by using same design parameters.
 - D. Analysis of all types of Retaining walls using 2D Plaxis software.
 - E. Validation of results obtained manually as well as by using software.
 - F. Finally, comparative study of the analyzation carried out and finding the economical Retaining wall.
- 1) *Retaining wall Cost Factor:* While the material, tallness and length will contribute more than anything, there are other remote factors that can increment or abatement your holding divider cost :Sadly, a few zones of the nation see more extraordinary climate than others, going from hurricanes to seismic tremors. In the event that you live in such an area, your holding divider may require more noteworthy auxiliary fortification and broad waterproofing, the two of which increment the expense to manufacture a holding divider.

Flow chart





IV. CONCLUSION

- A. Introduced the effectiveness in cost, time and space saving retention structures by using innovative technology. The claimed economy is strengthened by providing the 50 years age warranty of the wall, which is an exclusive feature of this technology.
- B. Retaining Solutions promotes these wall types as a very effective technical solution for the construction of heavily loaded retaining structures in the major infrastructure markets. Retaining Solutions is able to provide the specialist construction skills that are required for walls of this critical nature.

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