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STUDY ON SOIL STRUCTURE INTERACTION WITH RING FOUNDATION

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ABSTRACT

Now a days the construction time, different innovative foundation technique have been used, for the durability and cost of construction of any structure plays important role to compensate the cost of project. There are number of new technique and innovative method used, the ring foundation interaction with soil is also the method of constructing the slender and tall structure like chimneys, water tank and high rise buildings. The use of ring foundation helps to strengthen the high rise buildings and slender structure in which the foundation is provided such that more than half of the load acts at centre and remaining force distributed uniformly along all the direction of the ring foundation. The overall system is arranged such that the structure gains more stability and strength even in the loose soil conditions and settlements. This foundation can be provided for the maximum stability and lesser settlements.

Keywords*: *Ring Foundation , Soil Interaction , Slender Structure , High Rise Buildings, Water Tank,Soil settlements.

I.OBJECTIVE

Ring foundations are a special type of shallow foundations used to support loads of structures such as bridge piers, water tank structures, and silos. In comparison with circular footings, ring foundations are more suitable and economical because less material is required, and the construction is easier as well. However, there are still uncertainties about the assessment of bearing capacity and settlement of such footings.
The calculation of interaction of ring foundation with soil settlement is rarely taken into consideration in the literature review.

- **Importance Of The Study**

- To strengthen the load bearing capacity of ring foundation when interacts with soil .
- To consider the effect of underlying soil in the analysis of ring foundation

- To adopt the use of this foundation more and more because it has more strength and less material requirement as compared to circular foundation.

- **Work to be performed**
- To check the settlement of the soil by load test on ring foundation.
- To consider the effect of underlying soil in the study of ring foundation.
- To increase the flexibility of the foundation.
- To adopt widely this foundation by improving its strength, stability and reducing its settlement as well as the cost of construction.

II. INTRODUCTION

Basic Analysis of Ring Foundation as per IS:11089-1984

The basic assumptions of conventional method of analysis of Ring foundation given in IS:11089-1984 are (i) the foundation which is rigid relative to the supporting soil and the compressible soil layer is relatively shallow; and (ii) the contact pressure distribution is assumed to vary linearly throughout the foundation. The cross-sectional elevation and plan of chimney with ring foundation and the pressure distribution under ring are given in Figure 1. As per IS:11089-1984 [34], the nonuniform pressure distribution under ring is modified to uniform pressure distribution , where it is uniform pressure due to dead loads, and is pressure due to bending effects.

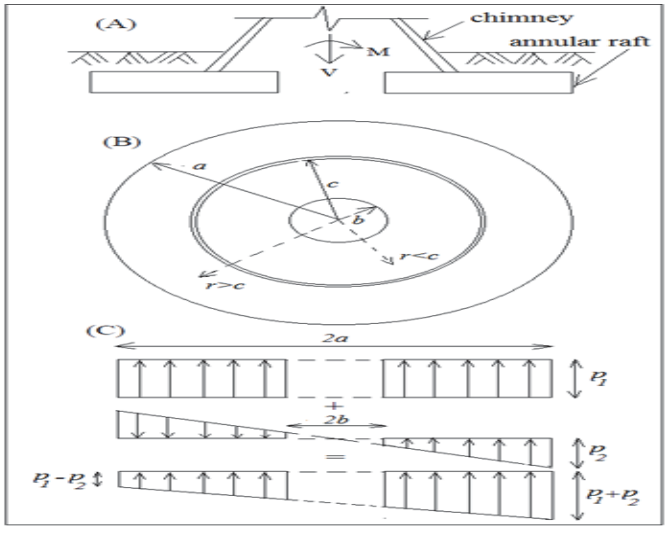


Fig.1 Ring foundation

III.EXPERIMENTAL PLAN

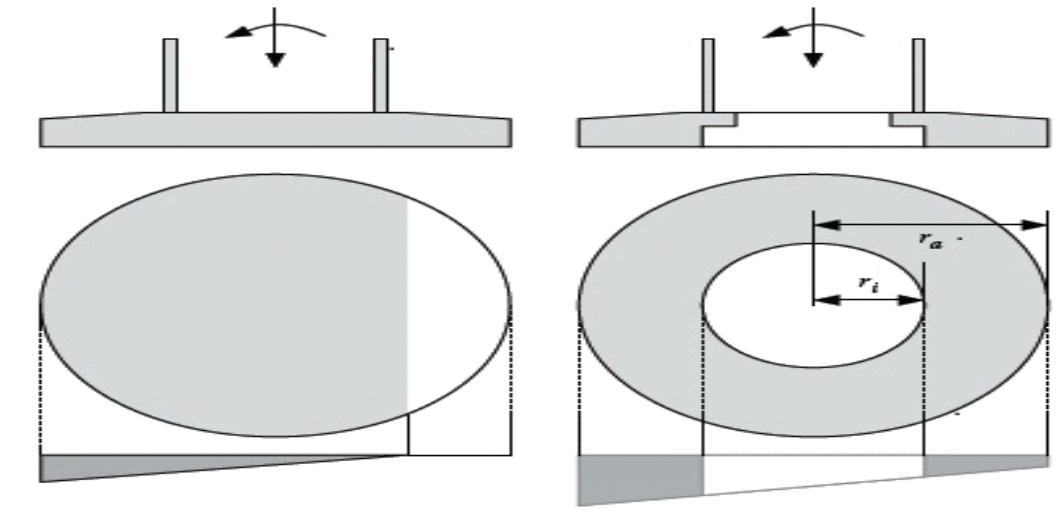
In this project we are going to design and construct ring foundation of some specified dimension such that some loads can be applied on it to check the settlements and load bearing capacity of the ring foundation.Then the reading is taken and various considerations will be determined through this process.The purpose is to provide

the foundation which can be widely adopted for the construction due to its strength , durability, economically and the most important is lesser settlements .

Tests that are to be performed-

- Compressive strength test
- Plate load test
- Cube test
- Distributed load test
- Uniform load test

The process involves the analysis of various cases which is to be carried out till the innovative techniques.Now, the some more advancement and research is to be done by this analysis and study to make the construction of ring foundation more easier and to determine the soil structure interaction even in loose soil condition .The objective of this study is to derive a general expression for the settlement of ringfoundations in which the effects of geometry (inner to outer radii ratio), stiffness, andembedment of the footing as well as soil non-homogeneity are included by introducing corresponding displacement influence factors. To achieve this objective, a number of numerical models are performed and mathematical relations of influence factors are derived based on curve fitting.



Settlement in Ring Foundation

The settlement is to be checked by applying the load of specified weight under the jack, and settlement is to be identified and observed. After doing this, the bearing capacity, stiffness, and flexibility of all such is analysed

Thickness of slab

The thickness of slab is taken from the IS code :1904-1986 to a minimum depth below the ground level is 50 cm.

IV.APPLICATION

The Ring foundation has very wide application in the construction of water tank , overhead tank , tall chimney and any slender structure with high strength and durability.One of the common application of ring foundation is given below.

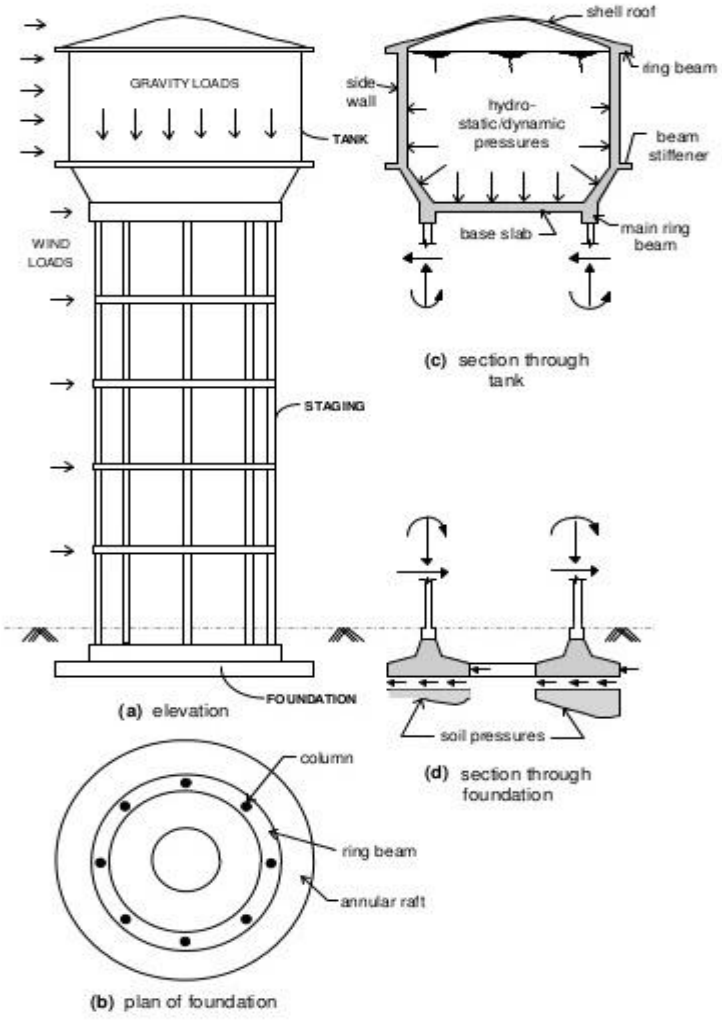


Fig. 1.7 Structural system of an elevated water tank

V.CONCLUSION

In this paper, work is done on design and consideration of ring foundation with soil structure interaction and the settlement is recorded ,so that the bearing capacity of the ring foundation can be determined with the minimum settlement ,even in loose soil condition.

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