Scientific Journal of Impact Factor(SJIF): 3.134

e-ISSN(O): 2348-4470
p-ISSN(P): 2348-6406

International Journal of Advance Engineering and Research Development

Volume 1,Issue 12, December -2014

A REVIEW OF PERAMETRIC STUDY OF RAFT FOUNDATION

Jay P. Chaliyawala[1], Hitesh K.Dhameliya[2]Hiten L. Kheni[3]

[1]*Civil Department, ChhotubhaiGopalbhai Patel Instituteof Technology, jchaliyawala@gmail.com*
[2]*Asst. Prof.Civil engineering Department,ChhotubhaiGopalbhai Patel Insttitueof Technology,hitesh.dhameliya@utu.ac.in*
[3]*Asst. Prof.Civil engineering Department, Chhotubhai Gopalbhai Patel Insttitue of Technology, UTU hiten.kheni@utu.ac.in*

Abstract—*In the recent years, there has been significant increase in high rise buildings due to lack of space and requirement of amenities at a particular place. This has necessitated the use of raft foundation. The use of raft foundation tends to reduce the chances of differential settlement and allow increased pressure at foundation level to be transmitted with the concept of Buoyancy Raft.In conventional analysis & design of raft foundation through has been found that the effect of soil which supports the structure is generally neglected. Actually behavior of structure depends on soil strata. The design of raft foundation is a soil structure interaction problem. SSI effect depends on many factors like Superstructure stiffness, Loadings, Footing stiffness, Raft Rigidity. The S.S.I has less influence on low rise buildings.*

Keywords- *Raft Foundation, conventional method, Flexible Method*

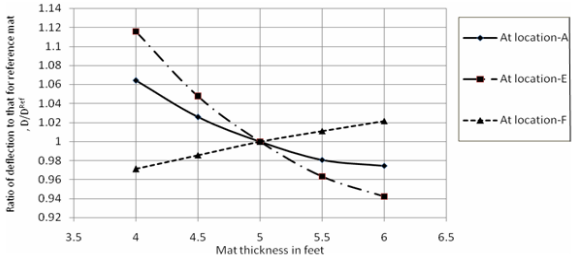
I. INTRODUCTION

During last few decades, due to rapid urbanization and lack of space for horizontal expansion, cities have grown vertically. High rise building are increasing at a rapid rate. For foundations of such high rise building, normally raft foundation, pile foundation or piled-raft foundation are used.
Design of raft foundation is a soil structure interaction problem and there are many factors affecting raft foundation design. It has been observed that in practice, it has been very much difficult for designer to consider the influence of all parameters, that are likely to affect design and generally simplified approach of conventional design is adopted in most of the cases.

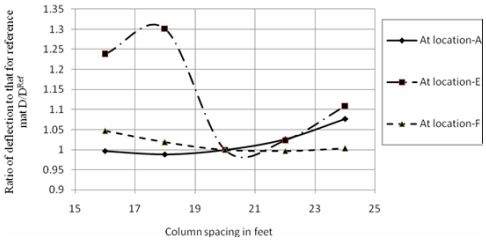
II. LITERATURE REVIEW:

A. INFLUENCE OF STRUCTURAL AND SOIL PARAMETERS ON MAT DEFLECTIONINTERNATIONAL JOURNAL OF CIVIL AND STRUCTURAL ENGINEERING VOLUME 2, NO 1, 2011

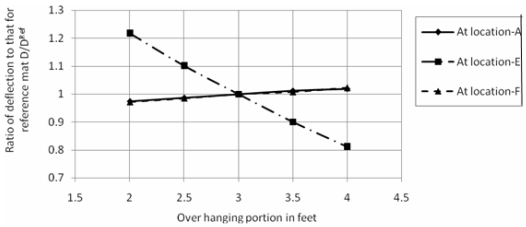
In this studyImam, Md. Hasan. Deflection has been checked for various parameter on selected portion of the Raft foundation. The location of selected portion are at raft center, raft corner and interior panel of midpoint. The change in parameter are subgrade-reaction, Column spacing column size over hanging portion and L/B ratio of panel. The Analysis is carried out using Finite Element method. He found that Deflection decrease at mat center and mat corner with increase thickness of raft. The reverse trend has been shown at raft interior panel mid-portion with increasing thickness of raft. Also when column spacing increase on raft the deflection of raft increase at the raft center portion but reverse trend is seen at interior panel. When column size on raft increase it show wavy pattern of deflection. When overhanging portion of the raft increase deflection at center and interior panel slightly increase and at mat corner it sharply deflection decrease. When they take another parameter subgrade reaction the deflection decrease with increase in subgrade reaction.so He found various parameter effect the defection on raft.



The variation of mat thickness shows graph at different location. That Deflection decrease at mat center and mat corner with increase thickness of raft.



When column spacing increase on raft the deflection of raft increase at the raft center portion but reverse trend is seen at interior panel.



From these variations it is experientially observed that when deflection within mat is not significantly influenced by overhanging portion, it is sharply affected at mat corners.

B. INTERACTION ANALYSIS OF MAT FOUNDATION AND SPACE FRAME FOR THE NON-LINEAR BEHAVIOUR OF THE SOIL BONFRING INTERNATIONAL JOURNAL OF INDUSTRIAL ENGINEERING AND MANAGEMENT SCIENCE, VOL. 2, NO. 4, DECEMBER 2012

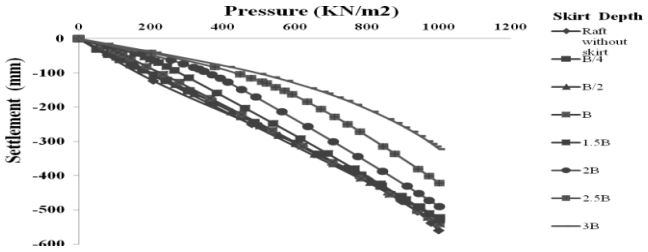
In this study the important parameter of raft foundation like stiffness of raft and stiffness of Superstructure has been taken in consideration. While in practice the stiffness of raft and stiffness of superstructure ignored during the Analysis and Design of raft foundation. In this paper this two important parameter has been taken briefly discussed. The Analysis has been carried out by Finite Element method. The stiffness of raft is denoted by Krs and the stiffness of superstructure is denoted by Krb. They observed that the value of stiffness of superstructure (Ksb) increase, rotation of column particularly corner column has maximum reduction. They also found that influence of Ksb on the contact pressure is nil. The moment in end span is increase with increase in Ksb value and Krb value also alter moment below column as well as span moment in the interior panel.

They found that settlement is higher for the non-linear soil condition irrespective of krs and ksb values. As ksb increases, the difference in the settlement decreases both at the Centre and the corner of the raft and the difference become almost negligible for the higher values of ksb (100) and krs (0.01). They found that decrease in the differential settlement is in the range of 63% to 80% for the ksb values between 15 and 100. The thickness of the raft has no influence on the total settlement. But in the differential settlement the thickness of the raft has some influence. They found that the moment in the columns at the first floor level has found to decrease with an increase in ksb for the krs values of 0.001 and 0.01.

C. BEHAVIOUR OF RAFT FOUNDATION WITH VERTICAL SKIRT USING PLAXIS 2D INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH AND DEVELOPMENT

Dr. Sunil S. Pusadkar1, Ms. Tejas Bhatkar (2013)
In this study settlement of raft has been studied for vertical skirt. Skirt is defined by wall surrounded by soil below raft. In this paper they have taken skirt at one side and both side of raft. To evaluate the settlement of raft increasing raft width 10, 20,30m and the skirt depth increase 0.25B to 3B and settlement of raft is analyzed. They found that increased in skirt depth increase in bearing capacity also found that the settlement of raft is reduced with increasing skirt depth at both sided skirt with increasing skirt depth settlement.

C.



D.

Settlement Curve for 10m Raft Foundation with Vertical Skirt on both side for different Skirt

The results were plotted for bearing capacity obtained from load-displacement curve. Figure shows load displacement curve for 10m raft foundation with two side skirt with different skirt depth. The maximum applied pressure is 1000 kN/m2 load for which settlement is measured and at settlement 100 mm which is permissible settlement for raft foundation, the corresponding safe bearing capacity noted.

D. A PARAMETRIC STUDY ON RAFT FOUNDATION INTERNATIONAL ASSOCIATION FOR COMPUTER METHODS AND ADVANCES IN GEOMECHANICS (IACMAG) 1-6 OCTOBER, 2008 GOA, INDIA

G. S. Kame, S. K. Ukarande, K. Borgaonkar, V. A. Sawant (2008)

In this paper classical theory of Winkler foundation is used for raft foundation and parametric study is done for raft foundation. The Finite analysis method is carried out for raft foundation study. The raft is idealized as a mesh of finite elements interconnected only at the nodes (corners), and the soil may be modelled as a set of isolated springs. The parameter taken for study is raft thickness, soil modulus and different load parameter. In this the major are carried out that at lower modulus deflection are increasing with increase raft thickness and at higher modulus deflection are decreased.

In this study also they have found that positive moment increase with raft thickness with raft thickness increase and negative bending moments are decreased. They have seen that soil modulus has considered positive bending moment are decrease at higher modulus and negative moments are increasing with soil.

III. CONCLUSION

All the above reviews conclude that in conventional method the raft foundation design are not considered the stiffness of raft, stiffness of slab, stiffness of superstructure, Raft Rigidity, soil subgrade modulus, column spacing etc. This factor are effect the slab bending moment and shear force and deflection. Due to consider this factor raft can be become more economical and more flexible which is the actual behavior of the raft.

REFERENCES

[1] The 12th International Conference of International Association for Computer Methods and Advances in Geomechanics (IACMAG)
[2] International Journal of Engineering Research and Development Volume 7, Issue 6 (June 2013), PP. 20-24
[3] International journal of civil and structural engineering volume 2, no 1, 2011
[4]Sharat Chandra Gupta, Raft Foundations Design and Analysis with a Practical Approach, New Age International Publishers, 2006.

