

Effect of Pile Stiffness with Varying Diameter of Piles on Structure in Various Zones of Seismicity

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Abstract— Pile foundations are commonly used for various structures on weak soil. Seismic design is very important to ensure efficient functioning of structure under sever seismic loading condition. IS:1893 is to be used for analysis of seismic forces on a structure. This study includes selection of particular type of building structure. It will be shown that comparison of building with and without pile foundation. Seismic behavior is not similar for the different structure because of their varying characteristics. The effect of pile stiffness on the seismic response of the structure is to be studied. The stiffness of pile foundation may effect on structure. With the increase in seismic activities there may be need of efficient design of pile foundation to resist earthquake load & damage due to earthquake. This work is mainly focused on comparing stiffness of pile with change in diameter and also zone.

Keywords—Pile Foundation, STADD-Pro, Structure , Stiffness, zone, Pile Cap, Load Estimation, Pile cap, Pattern of Pile.

I. INTRODUCTION

Pile foundation and their seismic design is very important structure to ensure efficient functioning of various structures under various seismic loading conditions. In this process ground condition plays an important role in terms of foundation capacity. For this design Indian Standards are used. The finite element analysis is used for seismic response of a foundation pile in a saturated coarse grained deposit. Through a series of centrifuge test, the seismic response of closely spaced group of piles in unimproved and improved soft clays was studied. Also some of simplified methods, essential based on the Winkler soil model provide reasonably accurate solutions. In this project work we were going to design building using STAAD-PRO software and designing pile foundation with varying diameter and varying zone. It includes selecting various factors for the design purpose estimating various types of load acting on the structure depending upon the type of the structure selected according to the recommendation made in

IS Code. It also includes selecting various criteria for the design of pile foundation and after designing the pile next step is finding stiffness for all the foundation.

II. METHODOLOGY

A. General

In this project work we are going to design building using STAAD-PRO software and designing pile foundation with varying diameter and varying zone .It includes selecting various factors for the design purpose estimating various types of load acting on the structure depending upon the type of the structure selected according to the recommendation made in IS Code. It also includes selecting various criteria for the design of pile foundation and after designing the pile next step is finding stiffness for all the foundation.

B. Selection of Building

Combination of member selected together in such way to serve a useful purpose is called structure. There are different types of the structure mentioned as below:

1. Rigid frame structure
2. Load bearing structure
3. Composite structure

C. Estimation of Load

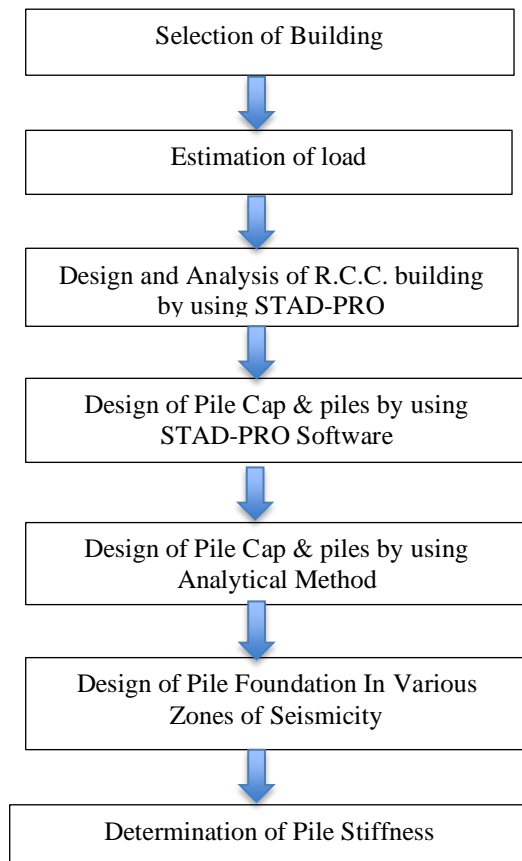
1. Dead load
2. Live load
3. Earthquake load

Analysis and Design of Building Foundation Using STAAD-PRO Software:

In practice, multi-story buildings analyzed, designed, and detailed using commercially available software. The commercial software packages available in the market include STAAD Pro SAP 2000, ETABS, SAFE, Nastran,

Midas NFX, ANSYS and STRUDS. In addition a number of free/open source programs are also available and include Open Sees, Frame3DD, and IDARC 2D. Many of these programs have analysis and design capability. Special structural design packages are also available and some engineers have developed their own spread sheets for the design of structural elements (e.g., FRAME, RC Slab, RC Beam and RC Foundation developed by Computer Design Consultants.

Flow Chart of Methodology:



III. EXPECTED RESULT / OUTCOME

By analysis it will be observe that pile cap has a good contribution against the lateral load. By changing the zone there is no change in stiffness of pile. The different factor like length of pile, position of pile cap from ground level implies lateral resistance of pile cap.

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