# Concreting of Piles

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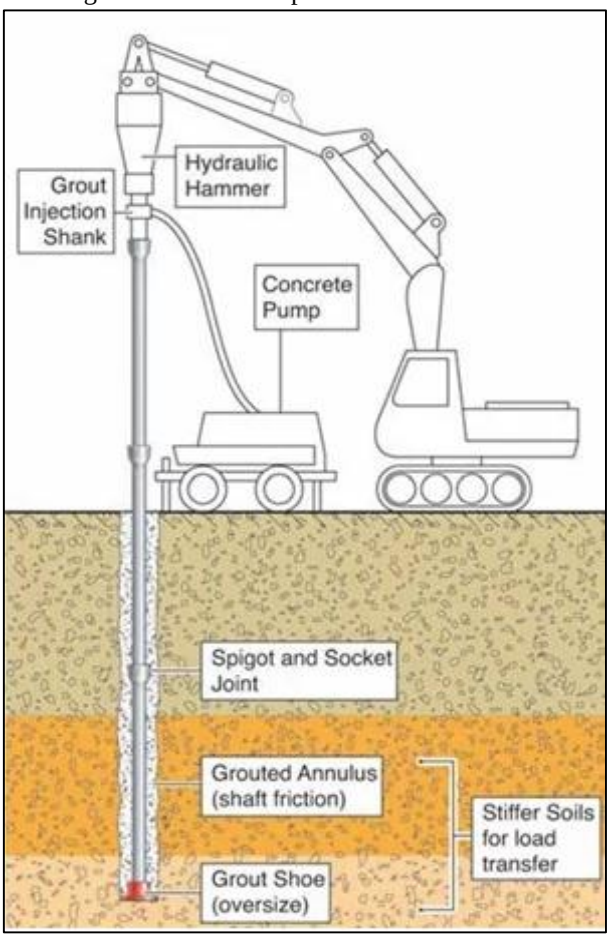
*Abstract*— Augmented Reality (AR) is the concept of combining virtual world and real world. The environment around us provides a lot of information that is difficult to show in a computer. Also these worlds are very simple and mainly created for the purpose of entertainment and games. An augmented reality system is a combination of the virtual environment generated by the computer and real scene viewed by the user that augments the scene. This improves the experience and performance of the user and perception of the world. The ultimate goal here is to use this concept and come up with a system such that the user cannot tell the difference between the real world and the virtual augmentation of it so as to make information gathering more regular and easy. Here we will consider a museum scenario. This paper deals with how it can be done and proposes the development of a module of the system.

***Keywords:*** Mobile platform, Augmented Reality, Image Processing, 3-D modelling A pile foundation is a civil engineering concept that is, at its most basic, a substructure that is supported by piles. When it becomes impossible to provide the suitable surface foundation for a structure; the use of pile foundations becomes necessary, this situation arose from either the soil condition or the order of bottom layers, the nature of the loads transferred to the soil or the nature of the site and operational conditions. The main components of the foundation are the pile cap and the piles .piles are long and slender members which transfer the load to deeper soil or rock of high bearing capacity avoiding shallow soil of low bearing capacity. The main types of materials used for piles are wood, steel and concrete .Piles made from these materials are driven, drilled or jacked into the ground and connected to pile caps. Depending upon type of soil, pile materials and load transmitting characteristic piles are classified accordingly. Pile foundations have been used as load carrying and load transferring systems for many years. In the early days Timber Piles were driven in to the ground by hand or holes were dug and filled with sand and stones. Steel piles have been used since 1800 and concrete piles since about 1900. The industrial revolution brought about important changes to pile driving system through the invention of steam and diesel driven machines. More recently the growing need for housing and construction has forced authorities and development agencies to exploit lands with poor soil characteristics. This has led to the development and improved piles and pile driving systems. Today there are many advanced techniques of pile installation

## I. Introduction

Concreting of pile foundations requires quality and workability of concrete to be maintained for durable construction of pile foundations with required strength purpose.

Consistency of concrete to be used for the piles must be suitable to the method of installation of piles. Concrete is so designed or chosen as to have a homogeneous mix having a slump/workability consistent with the method of concreting under the given conditions of pile installation.




### *A. Concreting of Pile Foundation*

The grade of concrete to be used for piling should be minimum M25 (or as required at the site for load conditions) with the minimum cement content of 400 kg/m3. Mixing is carried out in mechanical mixer only.

In case of piles subsequently exposed to free water or in case of piles where concreting is done under water or drilling mud using method other than trimmie, 10% extra cement over the design grade of concrete at the specified slump is used subject to a minimum quantity of cement specified above.

For the design purpose of bore cast-in-situ piles, the strength of concrete mix using above mentioned quantities of cement is taken as M20. Concreting for the piles is to be done with trimmie of suitable diameter. Natural rounded shingle of appropriate size may be used as coarse aggregate. It helps to give high slump with less water cement ratio.

For trimmie concreting aggregates having nominal size more than 20mm should not be used.

*1) Weigh Batching:*

The aggregate is always measured by weigh batching making due allowance for the water content in the aggregate. Volume batching of aggregate should not be used.

*B. Concreting of Pile*

The concrete is delivered by means of transit mixers with the capacity of transit mixer being = 6M3. The concrete is received on site and delivery ticket is checked for correctness in accordance with the approved mix design. The concrete was checked for slump and temperature having different slump values for different works. Concrete cubes were also taken as per specification. The concrete had an access to the site only after concrete quality was found in compliance with the specifications. In case of Piles the concreting was done with the help of trimmie pipes in order to avoid segregation.

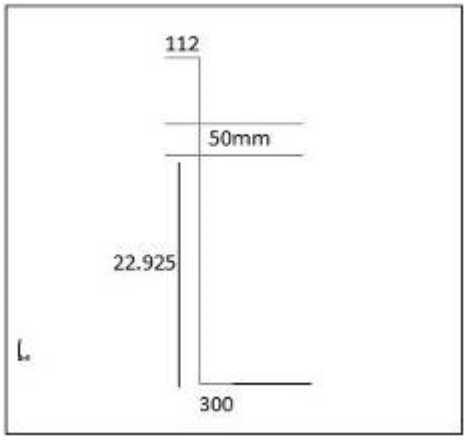
*C. Mix Design for M35:*

CEMENT USED = TCI MAX, OPC—43
Water Cement Ratio = 0.4
Water = 188.40 kg/m3
Cement = 471 kg/m3
Sand = 676 kg/m3
Coarse Aggregates = 1044 kg/m3
Admixture Used = FOSROC SP-400
1.2 % by weight of cement
CEMENT: SAND: COARSE AGGREGATES
= 1: 1.43 : 2.21

## II. REMOVAL OF TEMPORARY GUIDE CASING

After concreting, the guide casing will be withdrawn by the piling rig. A sufficient head of concrete will be maintained to prevent reducing in diameter of pile shaft by earth pressure, Bentonite slurry or soil and to prevent extraneous material from mixing with fresh concrete. The quantity of poured concrete volume will be measured and it will be compared with the theoretical volume. Soil from drilling of boreholes shall be removed from site to designated disposal areas.

*A. Reinforcement Detail of 23 Meters Depth Bore Cage Piles*




Ltd = 35 = 560mm Ldc=28 = 448mm
Diameter of bars for vertical reinforcement = 16mm @100c/c 24 numbers.
Diameter of bars for helical reinforcement (TOP) = 16mm @100c/c.

Diameter of bars for helical reinforcement (remaining length) = 10mm @150c/c.

1) Vertical Bars = 24 numbers.

Length of bar = 0.300 + 22.925 + 0.05 + 0.448 + 0.112
= 23.835 mts.
Weight of 24 bars = 22.835 X 24 X 1.58 = 903.823 kgs
Where 1.58 is unit weight of steel.

2) Helical bars 16 mm@100c/c (1.5 X 2) = 3mts

Top = 0.300 + 1.200 = 1.500 mts depth @100c/c
Nπ (D+d) + 8d.
X = 1.5/0.1 X 3.141(1.05+0.016) + 8 X 0.016
= 15 X 3.141 X 1.066) + 0.128 = 50.336mts @1.58
= 79.53 X 2 = 159 kgs
Helical 10 mm@150c/c
Length = 7.52 mts
= 7.52/0.15 X 3.141 X 1.066 + 8x + 0.016

## III. CONCLUSION

1) At each place of installation of piles, soil investigation is done by the geotechnical staff and samples are sent to the laboratory for further tests to determine various properties of soil. And also N-values are determined, on this basis depth of the pile is decided by the Designers and Design is provided according to these results.
2) In this project all latest machines and equipments are used. Reinforcement cages are prepared on site. Rigg machines and cranes are used to move the things from one place to another and for the installation of these reinforcement cages.
3) Concrete from each and every mixer is first checked by the engineers to know its Slump Value. And if the slump value comes out to be less than the required value, Admixture is added to the concrete present in the truck. And the concrete cubes are taken to the laboratory for 7 and 28 days strength tests to be carried out on them.
4) Piles are often used because adequate bearing capacity cannot be found at shallow enough depths to support the structural loads. It is important to understand that piles get support from both end bearing and skin friction. The proportion of carrying capacity generated by either end bearing or skin friction depends on the soil conditions. Piles can be used to support various different types of structural loads.

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