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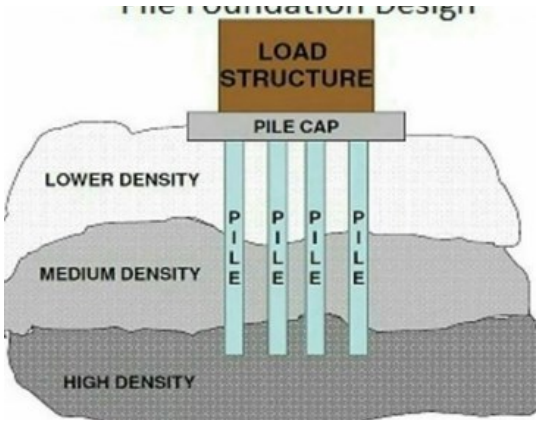
What is Pile Foundation

Foundations provide support to the structure and transfer the loads from the structure to the soil. But the layer at which the foundation transfers the load shall have an adequate bearing capacity and suitable settlement characteristics.

Broadly speaking, foundations can be classified as shallow foundations and deep foundations. Shallow footings are usually used when the bearing capacity of the surface soil is adequate to carry the loads imposed by a structure. On the other hand, different types of deep foundations are usually used when the bearing capacity of the surface soil is not sufficient to carry the loads imposed by a structure. So, the loads have to be transferred to a deeper level where the soil layer has a higher bearing capacity. ***Pile foundation*** is one of the deep foundation types. It is generally used for large structures and in situations where the soil at shallow depth is not suitable to resist excessive settlement, resist uplift.



A ***Pile foundation***, a kind of deep foundation, can be defined as a slender column or long cylinder made of materials such as concrete or steel which are used to support the structure and transfer the load at desired depth either by end bearing or skin friction. Pile foundations are deep foundations. They are formed by long, slender, columnar elements typically made from steel or reinforced concrete. A foundation is described as 'piled' when its depth is more than three times its breadth.

The following are the situations when using a pile foundation system can be beneficial.

- When the groundwater table is high foundation pilings are the best solution.
- Heavy and uniform loads from superstructure are imposed.
- Other types of foundations are costlier or not feasible.
- When the soil is at shallow depth is compressible.
- When there is the possibility of scouring, due to its location near the riverbed or seashore.
- When there is a canal or deep drainage system near the structure.
- When soil excavation is not possible up to the desired depth due to poor soil conditions.
- When it becomes impossible to keep the foundation trenches dry by pumping or by any other measure due to heavy inflow of seepage.

Whenever one of the above conditions occurs (where pile foundations are suitable for), the foundation engineer must choose a foundation for the structure among different types of pile foundation. Piling foundations can be classified based on function, materials, and installation process.

-Dr. Sunil G. Kirloskar
(HOD, Civil Engg Dept)

Department Vision:
To transform students into creative and technically proficient Civil Engineers to serve the nation

Department Mission:
M1: To adapt to collaborative teaching learning practices for efficient learning.
M2: To become a centre of excellence for providing knowledge base and consultancy services to the community.
M3: To follow ethical and moral practices and educate students for professionalism and sustainability.

Concrete

Concrete is a construction material composed of cement, fine aggregates (sand) and coarse aggregates mixed with water which hardens with time. Portland cement is the commonly used type of cement for production of concrete. Concrete technology deals with study of properties of concrete and its practical applications.

In a building construction, concrete is used for the construction of foundations, columns, beams, slabs and other load bearing elements.

Reinforced Cement Concrete

Reinforced cement concrete (**RCC**), is a composite material in which concrete's relatively low tensile strength and ductility are compensated for by the inclusion of reinforcement having higher tensile strength or ductility. The reinforcement is usually, though not necessarily, steel bars (rebar) and is usually embedded passively in the concrete before the concrete sets. However, post-tensioning is also employed as a technique to reinforce the concrete. In terms of volume used annually, it is one of the most common engineering materials. In corrosion engineering terms, when designed correctly, the alkalinity of the concrete protects the steel rebar from corrosion. Many different types of structures and components of structures can be built using reinforced concrete including slabs, walls, beams, columns , foundations, frames and more.

Reinforced concrete can fail due to inadequate strength, leading to mechanical failure, or due to a reduction in its durability. Corrosion and freeze/thaw cycles may damage poorly designed or constructed reinforced concrete. When rebar corrodes, the oxidation products (rust) expand and tends to flake, cracking the concrete and debonding the rebar from the concrete.

Mr. Jaydeep Chougale
(Asst. Prof. Civil Engg Dept)

STUDENT DEVELOPMENT ACTIVITIES

Department arranged number of expert lectures on different domain of Civil Engineering.

The Expert lecture on **"Development of building plan with 3-D Walk through by using Google sketchup software"** was organised for Civil Engineering Students on 29th November, 2020. The speaker was: Khushbu Parmar –an expert in Building Information Modelling. Few drawing commands were explained to illustrate the procedure of drafting an elevation plan for any building. Different parts in an elevation plan were introduced to the students followed by their variations.

The another expert lecture was organised on the topic **"Shear and Torsion Reinforcement in RCC Structures"** and the speaker was Mr. Dada Patil, a renowned professor in structural engineering field from 20 years. The speaker started right from the basic concept of transverse loads i.e. shear and also bending moment in beams. Also solved some numerical stating the different criteria where only minimum reinforcement were required and where designing shear reinforcements was very well necessary. The another expert session was organised on 6th of December 2020 on **"Application of Flexibility Method For Analysis of Structure"** and the speaker was Mr. Dada Patil, explained about various methos of structural analysis and its applications.

PRESTRESSED CONCRETE

Prestressed concrete is a system devised to provide sufficient precompression in the concrete beam by tensioned steel wires, cables, or rods that under working conditions the concrete has no tensile stresses or the tensile stresses are so low that no visible cracking occurs.

Prestressed concrete is a form of concrete used in construction. It is substantially "prestressed" (compressed) during production, in a manner that strengthens it against tensile forces which will exist when in service. This compression is produced by the tensioning of high-strength "tendons" located within or adjacent to the concrete and is done to improve the performance of the concrete in service. Tendons may consist of single wires, multi-wire strands or threaded bars that are most commonly made from high-tensile steels, carbon fiber or aramid fiber. The essence of prestressed concrete is that once the initial compression has been applied, the resulting material has the characteristics of high-strength concrete when subject to any subsequent compression forces and of ductile high-strength steel when subject to tension forces. This can result in improved structural capacity or serviceability compared with conventionally reinforced concrete in many situations. In a prestressed concrete member, the internal stresses are introduced in a planned manner so that the stresses resulting from the imposed loads are counteracted to the desired degree.

Prestressed concrete is used in a wide range of building and civil structures where its improved performance can allow for longer spans, reduced structural thicknesses, and material savings compared with simple reinforced concrete. Typical applications include high-rise buildings, residential slabs, foundation systems, bridge and dam structures, sil os and tanks, industrial pavements and nuclear containment structures.

STUDENTS ACHIEVEMENTS:

- **Ms. Gauravi Alave** secured 1st Runner up position in National Level Poster Competition on the topic "World Peace Day " organized by Civil Engineering Students Association, K.D.K. College of Engineering, Nagpur on 5/10/2020
- **Ms. Gauravi Alave** secured 3 rd Place in the category of Adult Artist VOSAP (Voice of Specially Abled People) Art Form from Heart Contest held on 5/12/2020 by an organization in Special Consultative status with UN ECOSOC.
- **Mr. Gurpreet Marwaha, Harshada Solkar, Rishabh Sharma and Prem Khanderao** entered Zonal Level in Mumbai University Event, Avishkar Research Convention 2020-2021
- **Mr. Shubham Choudhari, Jayshree Patil, Krtika Gharat and Pawan Kumhar** entered Zonal Level in Mumbai University Event, Avishkar Research Convention 2020-2021.

FACULTY ACHIEVEMENTS:

- Mr. Jaydeep B. Chougale received Certificate of Participation for guiding the research proposal titled, " Analyse and Design a Floating Structure for an Existing Breakwater in Mandwa" submitted by final year students in Engineering and Technology category and UG level for the District/Zonal level selection round of the 15th Inter-Collegiate/Institute/ Department Avishkar Research Convention 2020-2021