

CONSTRUCTION TECHNOLOGY PAST AND PRESENT REPORT

MIHAELA STOINEA

STUDENT ID: 1918817

TABLE OF CONTENTS

1.INTRODUCTION

2.RESEARCH INFORMATION

3.COMPONENTS OF THE PROPOSED BUILDING

4.FOUNDATIONS

4.1 INTRODUCTION

4.2 TYPES OF FOUNDATION

4.3 PAD FOUNDATION

4.4 STRIP FOUNDATION

5.CONCLUSIONS

6.REFERENCES

1.INTRODUCTION

Buildings are enclosed constructions over a plot of land with roofs and walls standing permanently in one place. The primary functions of a building are to provide a safe and stable shelter, a comfortable environment and to have an aesthetic and psychological appeal. Various requirements need to be taken into consideration for a comfortable internal environment. The interior of a building must be provided with thermal insulation and temperature control, acoustic insulation, provision of light, control of humidity, ventilation and exclusion of contaminants. From the proposed building it is expected structural stability, durability, flexibility and buildability. This report is going to capture the information that is required for this project to be a success.

2.RESEARCH INFORMATION

In the past years, the digitization of construction projects became a standard in the process that leads from concept to construction and then management. The use of BIM (Building Information Modelling) software has helped users to simplify a projects development especially for new buildings. The opportunity to manage a whole process with a single tool is a great change in the construction industry. It is known that most of the BIM software is designed for projecting a new construction, plans, components and sections and it can be modified in real-life by anyone who is licensed (Daniotti, 2020). The BIM approach to a project offers a single database created and shared by all the people involved in the project because it is a digital exchange of information during the construction process (Hsiao, 2016).

3.COMPONENTS OF THE PROPOSED BUILDING

The two major components of a building are the substructure and superstructure. Substructure means the part of the building that is underneath the ground, while the superstructure is everything that is above the ground. The purpose of the substructure of a building is to transfer the loads of the superstructure to the soil that is underneath. The superstructure of a building is much lengthier than the substructure and it is the area where people spend most of their time.

1. SUBSTRUCTURE

FOUNDATION – The foundation is the lowest part of the building in direct contact with the soil. It provides support for the structure, transferring the load to layers of soil or rock that have sufficient bearing capacity.

2. SUPERSTRUCTURE

FLOORS – Floors are what divide the structure into different levels. Also known as the part of the structure where people walk around, place furniture and store numerous items.

WALLS – Walls are built to surround parts of the construction. Walls are commonly built from bricks or concrete and they hold the pressure from the roof and beams.

COLUMNS – Columns are upright structures that can maintain a lot of pressure. Without a proper positioning of the columns the structure will begin to collapse if additional pressure is put on them.

BEAMS – They represent horizontal elements that withstand the upright pressure. The load from the upright pressure is supported at the endpoints of the beams and the load is then conducted to the columns or the beam support.

ROOF – Is indispensable to every structure in view of the fact that the roof preserves the floors and the inner part of the superstructure against the outside environment.

INSULATION – Insulation is the material with the purpose to hold back the heat or noise from being circulated through walls from one room to another.

DOORS – Doors are part of a wall opening that provides practical access to the interior of a room. They most commonly swing on hinges that allows them to open, close and sometimes to lock.

WINDOWS – Windows are vented barriers provided in wall openings to admit light and air into the structure and give outside view.

INTERIOR FINISHES – Interior finishes are attached to other structural elements of the building for example walls, floors, ceilings. It is the final appearance of all interior surfaces and finish materials such as wood, paint, tile, plastic laminate, marble.

4. FOUNDATIONS

4.1 INTRODUCTION

The shape of the building commences with the build-up of the foundation (substructure) that disperses the load of the walls, beams, columns and other parts of the superstructure. Any construction must have a solid and strong base that can support the superstructure. For low rise houses and bungalows, a shallow foundation is used. Different types of footing are used for every foundation, not only underground but ground foundations which have a different construction methodology. The ground and soil condition plays a major part in understanding the behaviour of the construction, based on that it is decided which materials to use and if the structure will stand firm for a long period of time or not. Studying the ground soil and checking if the area is prone to earthquake is important before constructing any foundation (Jayes Magar, 2020).

4.2 TYPES OF FOUNDATION

(Jayes Magar, 2020) There are different types of foundations such as:

-PAD FOUNDATION: a subcategory of shallow foundation that settles and lays out over the soil safely.

-STRIP FOUNDATION: is also called strip footing is used to provide continuous level of support to a linear structure.

-COMBINED FOUNDATION: is constructed when two or more columns are near to each other and their foundations fold over each other.

-TRAPEZOIDAL FOUNDATION: is used when two columns support uneven load and the space outside the column of the substantial load is narrow.

-STRAP FOUNDATION: two columns have separate footing support, and they are attached by a beam.

-MAT OR RAFT FOUNDATION: can be described as a continuous slab placed on the ground that is sustaining the construction and carrying the load to the soil.

-PILE FOUNDATION: columns of small-scale circular wideness are plunged into the soil.

-PIER FOUNDATION: known as post foundation is fundamentally a group of sizeable cylindrical broadness to bear the construction and move heavy, additional load to the firm layer underneath.

-COMPENSATED FOUNDATION: contains deep basements which are utilized to hold up high rise structures.

-CAISSON FOUNDATION: are watertight constructions assembled in parallel alongside the excavation in order to obtain the substructure of docks, viaducts, tidal zones.

4.3 PAD FOUNDATION

Pad foundation is preferred when the soil at the site does not have sufficient strength and it is not too deep. The density of the pad is normally even and is stretching carefully on top of the intensified load to the bearing level. The foundation needs to be firm so that the stable disperse of the load to the topsoil occurs without making the foundation pressure transcend the allowed capacity for sustaining pressure. Forming the pad deep or as another choice by adding more support, benefits the disperse of the pressure in a predetermined direction. The dimensions of the pad must be planned in order to rule out the probability of cracking, by dispensing the constraint in the material. The alignment of pad foundation is influenced by the supporting competency of

the land, overburden pressure, accessible area and the framework that will be constructed (Jayes Magar, 2020).

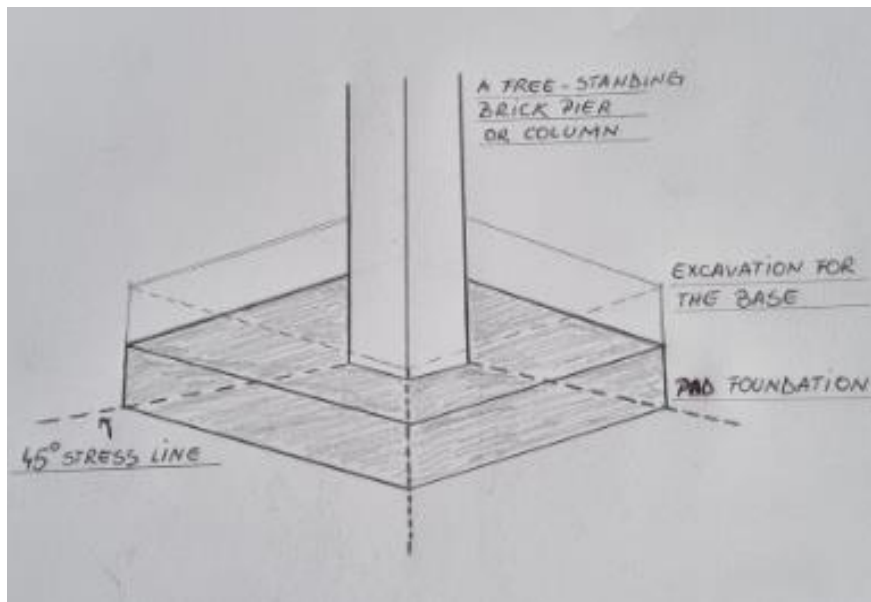


Fig.1 Pad foundation

Advantages of pad foundation:

- Needs little excavation.
- It is economic due to control of the foundation size.
- Can be designed to accommodate tight sites.
- It can be added reinforcement.

Disadvantages of pad foundation:

- Deficient against the force of wind, earth tremor and uplift pressure.
- Extensive digging for foundation would depend on support to avoid collapsing.
- Limited foundation suitability to point loads of framed buildings.
- Separate foundation make the design deficient against differential settlement (Jayes Magar, 2020).

4.4 STRIP FOUNDATION

Strip foundation is also a subcategory of shallow foundation and it is utilized to lay out stepped strip of sustain for walls, rows or columns with little space between them build in the middle on top of them. Ground that has a good

sustainability is more appropriate for a strip foundation, but it can be done in mostly all sub soils. This foundation is usually utilized in the construction of low and medium rise residential buildings. Depending on the overall width of the wall it can be decided the position and size of the strip foundation. The bottom part of the strip support is required to in depth so that ground frost effect does not occur. Traditional strip foundation is equal or greater than the overall wall width and the foundation width is three times the width of the supported wall (Jayes Magar, 2020).

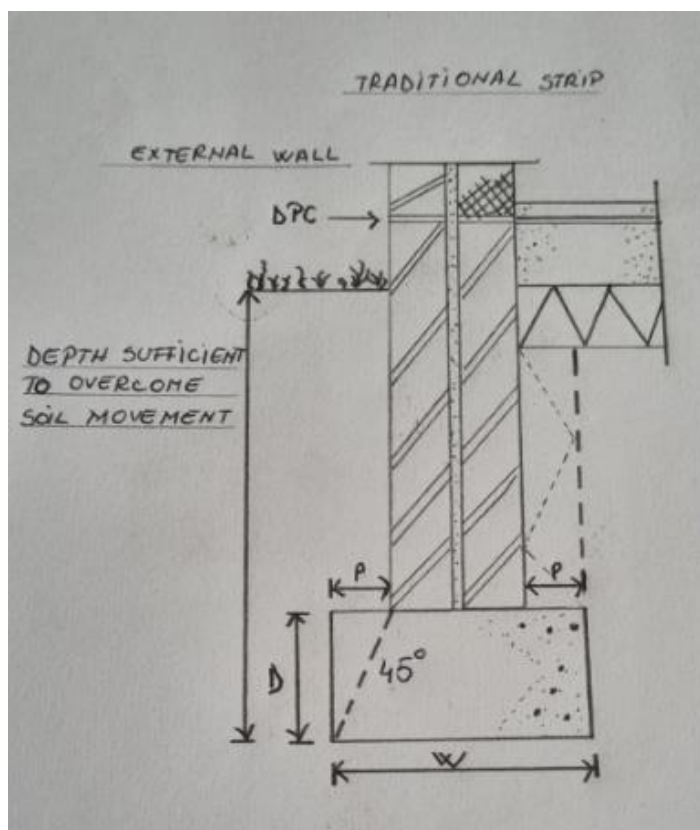


Fig.2 Traditional strip

Advantages of strip foundation:

- Average preparation is required for labour, simple to construct.
- Especially long-lasting durability.
- Gives the floors a stronger insulation.
- It can withstand great loads.
- The price is much lower.

Disadvantages of strip foundation:

- It is suitable only for low and medium rise buildings.
- Not suitable for every soil.
- Filling must be done in a sole go and the quantity of material to produce represents a worry (Jayes Magar, 2020).

5.CONCLUSIONS

The purpose in the report was to supply elaborate and collaborative knowledge on how to support a building construction. From understanding the functions of a building to the steps that need to be followed so that the construction of the proposed building is a success. This report gives an overview of the components of a building, using modern technology software and a detailed perspective on foundations that is useful for design construction and understanding of the subject.

References

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