زانکۆی سەلاحەدین - هەولێر
Salahaddin University-Erbil

Salahaddin University-Erbil

College of Engineering

Water Resources Engineering Department

Report of Internship Program

In

Mass Hills

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CHAPTER one

1.2 Objectives and Goals of the internship

During the past four years at the university of a lot of theoretical lessons that we had and so many analyses lesson and reports about structural engineering and so many reports about soil and foundation and we've learned so many ways to estimation and also, we have so many design lessons that benefit us.

For the past four years now, we have opportunity to use our skills and lessons on the site and communicate with the engineers on the site.

During this period of time, we are on the site we've learned a lot of practical lessons and we've communicated our theorical lessons with the practical lessons.

Our goal in this internship to learn how to as engineer work on the site, however use our lessons that we had at the university use on the site as fresh engineers we want to learn from the site engineers about how the communicate with people on the site in addition how to handle the situation that come to us that it would not face us during university, use our information and idea as engineers to solve the problem that come to us on the site.

CHAPTER TWO

2.1.1 Wall

Wall is a structural element which divides the space (room) into two spaces (rooms) and also provides safety and shelter. Generally, the walls are differentiated as a two types outer-walls and inner-walls.

Wall construct by:

Ponza block (used in massive structure).

Brick (both massive and normal structure).

Block (normal structure).

Concrete.

In a massive structure brick or ponza are used to construct the partition wall because their weight is not heavy as much as block and it make the structure safe and reduce the self-weight of structure and also reduce settlement.

During this internship we have seen two types of walls **(partition wall and load bearing wall).**

A partition wall is a divider wall, Figure 2.1 typically, non-load bearing, used to separate spaces in residential, commercial, and industrial buildings.

Figure 2.1 partition wall

figure 2.2 load-bearing wall

load-bearing wall or bearing wall is a wall that is an active structural element of a building, which holds the weight of the elements above it, by conducting its weight to a foundation structure below it.

2.1.2 Mortar

Mortar is the material (cement mixed with sand and water) used to hold block or brick together.

2.1.3 tie up partition wall with structure

In the process of building wall should be tie up partition wall and structure through steel and those steels should be tie up into column by chemical anchor. Figure 2.3 and 2.4.

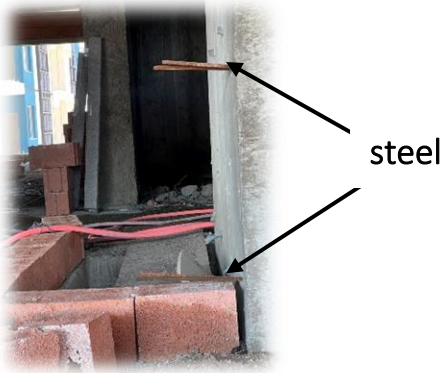

Figure 2.3 demonstrate the steel that tie up wall and structure

Figure 2.4 **chemical anchor That used to tie up steel and structure**

2.1.4 Lentil

Lentil use on the door and window and the length of lentil depend on the length of door and window and also the length of lentil should be more than the length of door and window to carry the load. Figure 2.5.

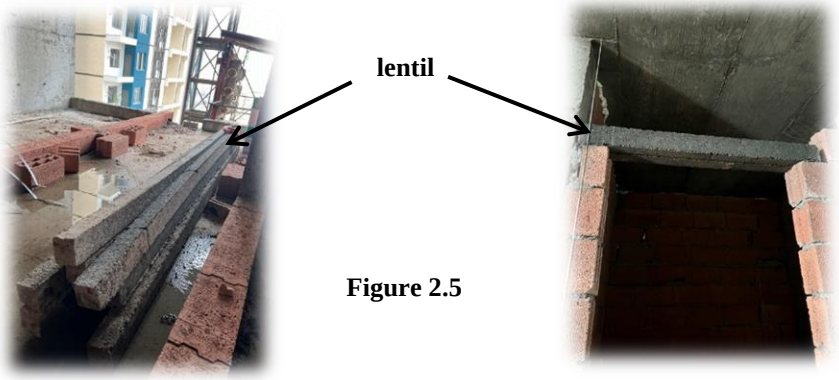

Figure 2.5

2.1.5 Types of Lintels

1. Timber Lintel
2. Stone Lintel
3. Brick Lintel
4. Reinforced Brick Lintel
5. Steel Lintel
6. Reinforced Cement Concrete Lintel.

2.1.6 Curing

Curing ensuring the continuity of the chemical reaction between cement and water in mortal Curing process should be begin as soon as plastering has set. The wall should be cured for at least 7 days (it changes according to seasons and temperature in summer need more curing than winter) and the duration may depend on moisture and temperature.

Figure 2.6 process of curing wall

During the wall process as engineer we have to check the wall after finishing First, we have to check for the dimension of wall, then check diagonal and balance of the wall by building level tool, weep whole and gap should be fill with foam spray or backer rod.

If the gap is large enough, a backer rod is added to support it, if the gap is smaller, can be filled with foam spray.

The most important thing curing process should be checked.

2.2 Internal Plastering

2.2.1 gypsum

Gypsum is a mineral found in crystal as well as masses called gypsum rock. Figure 2.7. It is a very soft mineral and it can form very pretty, and sometimes extremely large colored crystals. Massive gypsum rock forms within layers of sedimentary rock, typically found in thick beds or layers.

Figure 2.7 gypsum

Internal wall plastering refers to the process of applying a layer of plaster to the inside walls of a building.
This process usually involves a single layer of plaster (gypsum) that is approximately range between (12.5 to 25) mm thick. The end goal is to achieve a good quality finish.

Figure 2.8 process of internal plastering during finishing first layer

The plaster serves multiple purposes like enhancing the wall's appearance and improving thermal performance. Additionally, plaster also resists erosion, thus ensuring that the wall is resistant to moisture and effectively bonded and most importantly used to give the suitable appearance of the inside buildings.

2.2.2 concrete juice

we have to aware of if used ponza block or bricks (concrete juice) to prevent the reflection of ponza or brick to internal plastering Figure 2.9 show the concrete juice on the wall before the internal plastering.
And also, concrete juice used to give a rough shape of the wall that it helps gypsum and wall to connected but if gypsum used for the soft wall (without concrete juice) it gives weak connection between them also used to enhance the wall power.

Figure 2.9 concrete juice on the wall before the internal plastering

2.2.3 using BRC on the joint

Also, if we have a joint in the wall between (beam and wall or wall and column or we have to different wall besides each other) we have to use (BRC) British reinforcement concrete for tie the joints and enhance the wall if we wouldn't use (BRC) and we have joints in the

wall it makes cause of crack of the internal plastering and the appearance of inside building unsuitable.

Figure 2.10 show BRC on the wall in case having joints.

In some cases, need to be used double BRC if the space between wall and column and we have other space for mechanical work like bord of electricity and pipes. Specially we have to used double BRC the place of pipes because they have movement inside the wall.

Figure 2.11 double BRC used because mechanical works on the wall.

Figure 2.12 double BRC used because large space in the wall.

Internal plastering is consisting of three layers: -

First layer should be soft and not have any slope and spaces, and the first layer thicker than second layer that range between (12.5 to 25) mm.

And second layer typically used to give a comfortable appearance to the surface of the plastering and the thickness it might less than (7) mm.

Last part of the internal plastering is painting.

Figure 2.13 demonstrate first layer of internal plastering.

Before starting the first layer should be:

We have to cover the wall with the mix (sand, cement and water) to make the gypsum more durability and prevent the reflection of brick or ponza block.

If not used the mix (sand, cement and water) it would be cause of reflection color of brick or ponza block.

Figure 2.14 in beginning process of first layer the distance of rulers from (50 cm to 70 cm)

2.3 Concrete

Concrete is a basic material used in engineering, such as constructing structures. Concrete is cement, sand, and fine and coarse rock aggregate mixture. The cement works as a binder, holding the components together.

Figure 2.15

During the concrete mixing should be consider some process.

2.3.1 Preparing of construction materials (quality control)

In this part should be take an example of (sand, gravel, cement and water)

After take an example the report should be send to the laboratory then the information and report should be received to assure that the material conform to the require specification, if the result of sample is not same with specification that we are required the material should be

remove then another material provide and also that material should be checked.

2.3.2 Placing concrete

First of all, the pump should be stationary near the structure that we are work on it. Then Before the process of placing concrete, some test should be taken of the concrete, specially we have two tests on the site (compressive strength and slump test).

2.3.3 Compressive strength test of concrete cubes: -

This test is used to determine the compressive strength of concrete and compared to the minimum strength of design value of structure.

For most of the works cubical molds of size 15cm x 15cm x 15cm are commonly used(Figure 2.15).

Figure 2.15 Concrete test cube mould

2.3.4 Procedure of cube test should be like following that:

- Firstly, we should Clean the moulds and apply oil(Figure 2.17).
- In the bottom of cube has a hole, benefit of hole is under the air pressure without break the cube mould. The hole should be covered before placing concrete.
- Fill the concrete in the moulds in three layers approximately 5 cm thick.
- Compact each layer with not less than 36 strokes per layer using a tamping rod (steel bar 16mm diameter and 60cm long, bullet-pointed at lower end).
- Level the top surface and smoothen it with a trowel.

Figure 2.17 mould apply oil

Figure 2.18

2.3.5 slump test

A concrete slump test measures the consistency of a concrete batch to see how easily the concrete will flow.

2.3.6 Procedure of slump test should be like following that:

- Clean the cone. Place it on a smooth, horizontal, rigid surface(Figure 2.19).
- Fill the cone with freshly mixed concrete in three layers. Each layer should be tamped with a tamping rod 25 times.
- After filling, strike off the excess concrete level with the top of the cone using a trowel.

Figure 2.19 Prepare a slump cone

- Lift the cone vertically upwards, allowing the concrete to subside. (Figure 2.20)
- Measure the difference in height between the original height of the cone and the height of the concrete after subsidence(Figure 2.21). This difference is called the slump.

Figure 2.20 Lift the cone

Figure 2.21 Measure slump

2.3.6 type of slump

There are three main types of slumps in concrete (Figure 2.22):

i. True Slump: In this type, the concrete simply subsides evenly without any shear.

ii. Shear Slump: Shear slump occurs when one-half of the concrete mass slides down the other half.

iii. Collapse Slump: Collapse slump happens when the concrete collapses completely, losing its original shape. This indicates very low workability and excessive water content in the mix.

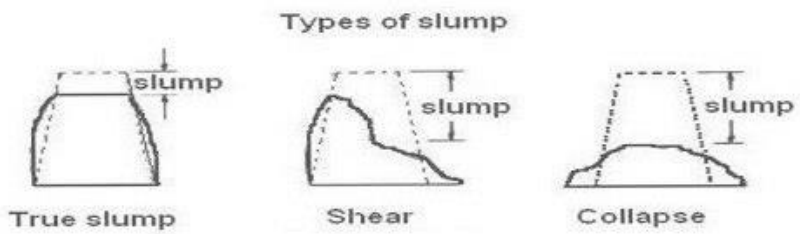

Figure 2.22 three main types of slump

2.3.7 Segregation

In concrete, segregation refers to the separation of the components of concrete mix, particularly the coarse aggregates from the rest of the mixture (Figure 2.23). This can occur due to improper mixing, handling, or placement, leading to an uneven distribution of materials and affecting the strength and durability of the concrete.

2.3.8 There are some main reasons that effect of occur segregation in concrete: -

i. Excessive water content
ii. Vibratory issues
iii. When the space of reinforcement steel is smaller than the size of coarse aggregate.
iv. Placing concrete in form more than 2 m Hight.

Segregation is one of that reason decrease strength of concrete, there are so many ways that used solve segregation but none of them are complete solution.

Figure 2.23 demonstrate the segregation in shear wall

2.3.9 Vibration

The process of vibrating concrete involves using a vibrating tool, such as a poker vibrator or a screed vibrator, to eliminate air voids and ensure proper consolidation of the concrete mix. This helps improve the strength and durability of the concrete by reducing the risk of voids and improving its overall density. The vibrator is inserted into the concrete at regular intervals to ensure uniform consolidation throughout the pour.
It is not allowed to increase the vibrating time because of the segregation of the concrete ingredients at prolonged vibration time.

2.3.10 three types of vibrators exist

surface vibrator
Internal vibrator
form mounted vibrator

Figure 2.24 the process of using vibrator in fresh concrete