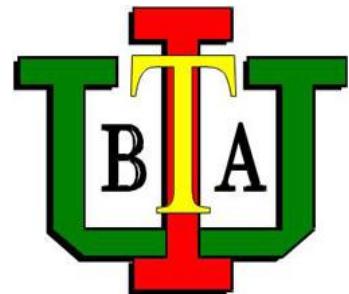


A Study on Super Structural Construction Work Process of A Ten Storied Residential Building



Md. Samim Alam

ID : 14206071

Department of Civil Engineering

IUBAT—International University of Business Agriculture and Technology

Contents

- Introduction
- Objectives
- Company Overview & Project Details
- Design Specifications
- Construction Materials and Equipment
- Construction Works of Column, Beam, Slab and Stair
- Conclusion

Introduction

- I have completed my practicum work proposed 10-storied building for **B.H. Builders Limited**. My project name was **B.H. Modhumoti Tower**.
- In that period of my practicum I observed construction process of column, beam, slab, and stair.
- I got the idea about construction materials and their properties.
- Also I had done some field test.

Objectives

- To understand drawings and design specifications.
- To acquire practical knowledge based on theoretical knowledge.

Company Overview

Company Name & Address

B.H. Builders Limited

547/2 ECB Chottor, Cantonment, Dhaka.



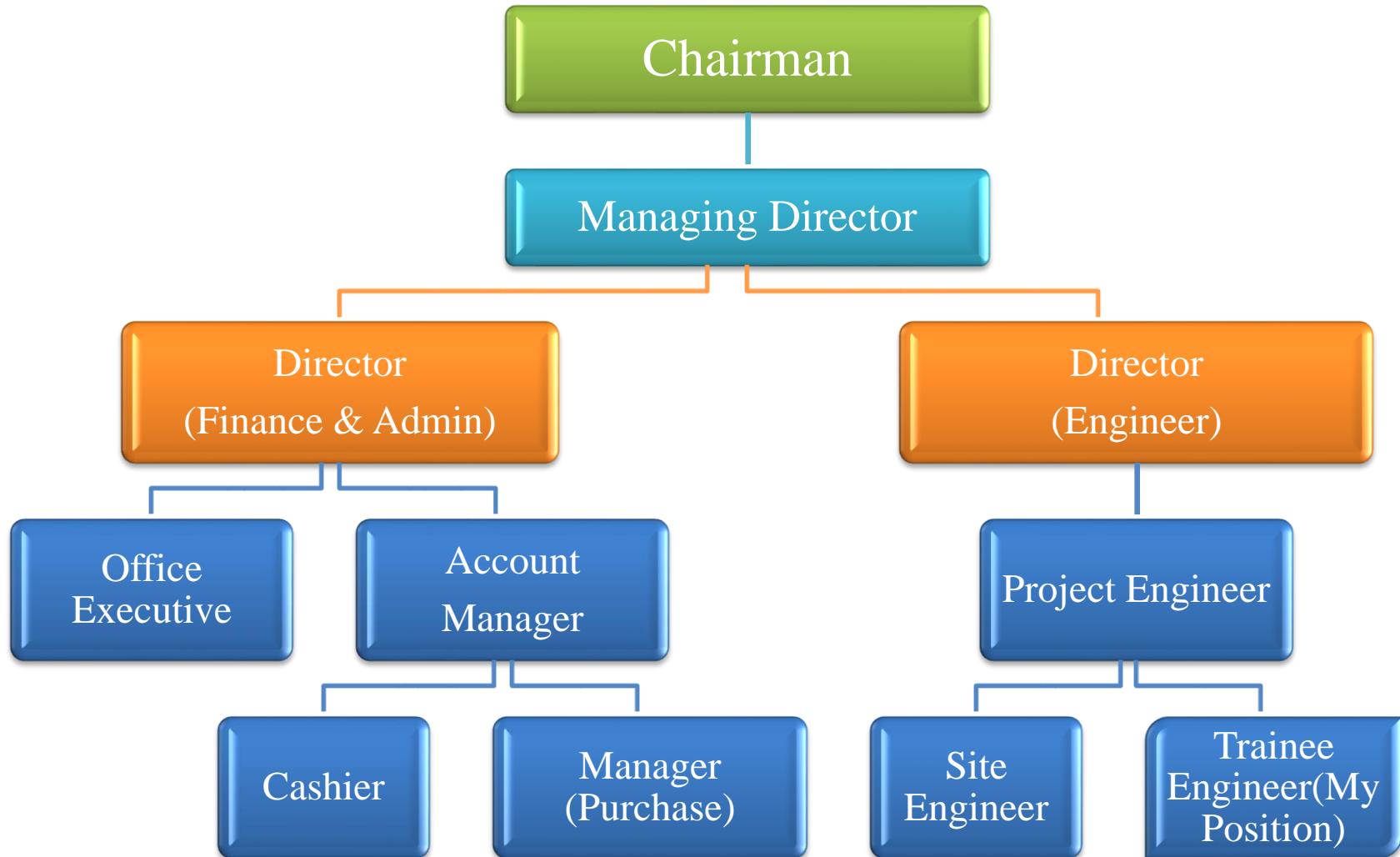
Contact Number

Contact No: +8801712665267

Phone: +8801933954944

E-mail: bhbl11@yahoo.com

Company Organogram



Project Details

Project Name: B. H. Modhumoti Tower

Address: Alabodirtek, Dhaka Cantonment, Dhaka

Building Type: Ten Storied Residential Building

Area: 10 Katha

Starting time: 01/06/2017

Completion Date: 30/12/2019

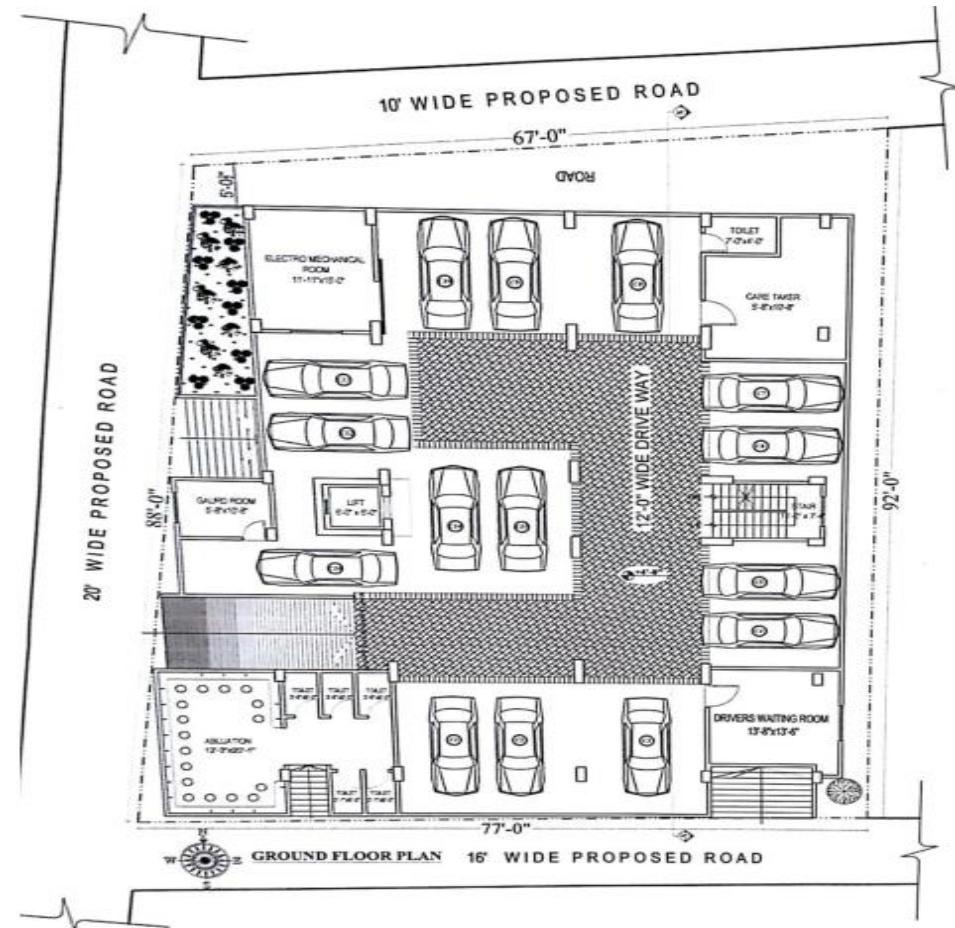


Project location on map



Project View 3D

Ground Floor Plan Details



Ground Floor (15 car parking space)

Facilities

- Community space
- Driver waiting lounge
- Guard room
- Electro Mechanical room
- Sub-station room
- Lift machine room
- Generator room

Typical Floor Plan

W N
E S
1ST TO 9TH. FLOOR PLAN (FURNITURE)



Typical floor plan

- Apartment Numbers: 36
- Apartment Size: 1270 sft.
- Floor facilities:
 - ✓ One master bed room with attached toilet
 - ✓ One Child bed room with attached toilet
 - ✓ One general bed room,
 - ✓ One common toilet
 - ✓ Three veranda
 - ✓ One kitchen,
 - ✓ Dining and drawing room

Design Specification

Concrete Compressive strength

- $f_c' = 3500$ psi for Pile and Pile Caps
- $f_c' = 3000$ psi for others members

Minimum Concrete Ratio:

- 1:1.5:3 for Column, Footing, Grade beam and beam slab
(Use Stone Chips)
- Water cement ratio 0.5

Steel Reinforcement:

- Steel Reinforcement are 60 grade high strength deformed bar made from billet steel

Design Specifications

Concrete Aggregate:

- **Fine Aggregate:** Sand FM 2.5 minimum
- **Coarse Aggregate:** 20 mm down graded stone chips to be used in all R.C.C work

Clear Cover

- 1.5 inch(column and beam) 0.75 inch(slab)
- Sub structure (clear cover 3 inch)

Design Specifications

Lap Length

| Bar dia (mm) | Tension (mm) | | Compression (mm) |
|-----------------|--------------|-------------|---------------------|
| | Top bars | Bottom bars | |
| 6 Ø | 325 | 325 | 325 |
| 10 Ø | 400 | 325 | 325 |
| 12 Ø | 525 | 425 | 350 |
| 16 Ø | 650 | 525 | 425 |
| 20 Ø | 725 | 600 | 500 |
| 22 Ø | 900 | 700 | 575 |
| 25 Ø | 1500 | 1150 | 650 |
| 28 Ø | 1900 | 1450 | 725 |
| 32 Ø | 2400 | 2000 | 1000 |

Construction Materials & Equipment

Materials

- Cement
- Coarse aggregate
- Fine aggregate
- Reinforcement bar
- Bricks
- Wooden plank
- Runner
- Bamboo props
- Steel shutter
- Plain sheet

Equipment

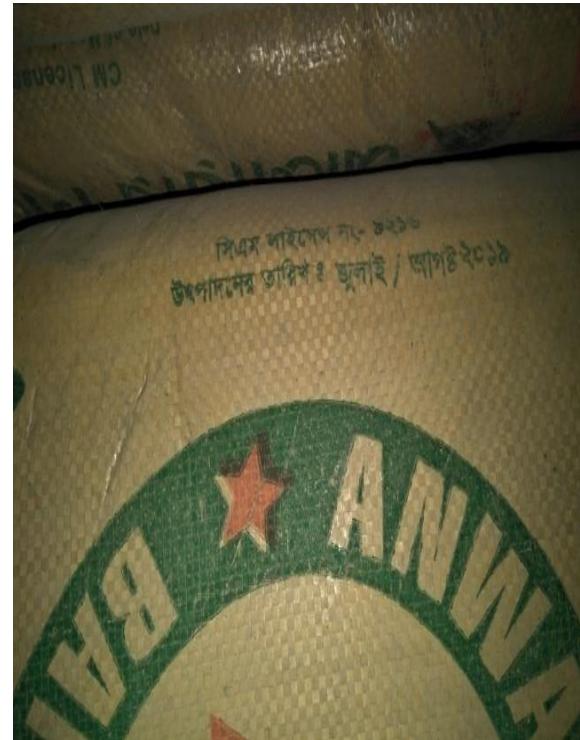
- Mixer machine
- Vibrator machine
- Grinding machine
- Steel cutter
- Crane

Cement

➤ Cement: Portland Composite Cement



Anwar Cement



Manufacturing Date of Cement

Field Test of Cement



Color Test



Adulteration Test

Field Test of Cement



Temperature Test



Floating Test

Construction Materials



Sylhet Sand



Local Sand



Brick Chips



Stone Chips

Field Test of Sand



Silt Test

Clay Test

Brick

- **Brick**



- **Field Test of Brick**



Sound Test



Hardness Test

Field Test of Brick



T-Test



Size Test of Brick

Reinforcement

➤ Field Test of Reinforcement



500W TMT Reinforcement



Smoothness Test



Bending and Re-bending Test



Construction Materials



Bamboo



Wooden Plank



Runner



Steel Shutter



Plain Sheet

Construction Equipment's



Mixer Machine



Steel Cutter

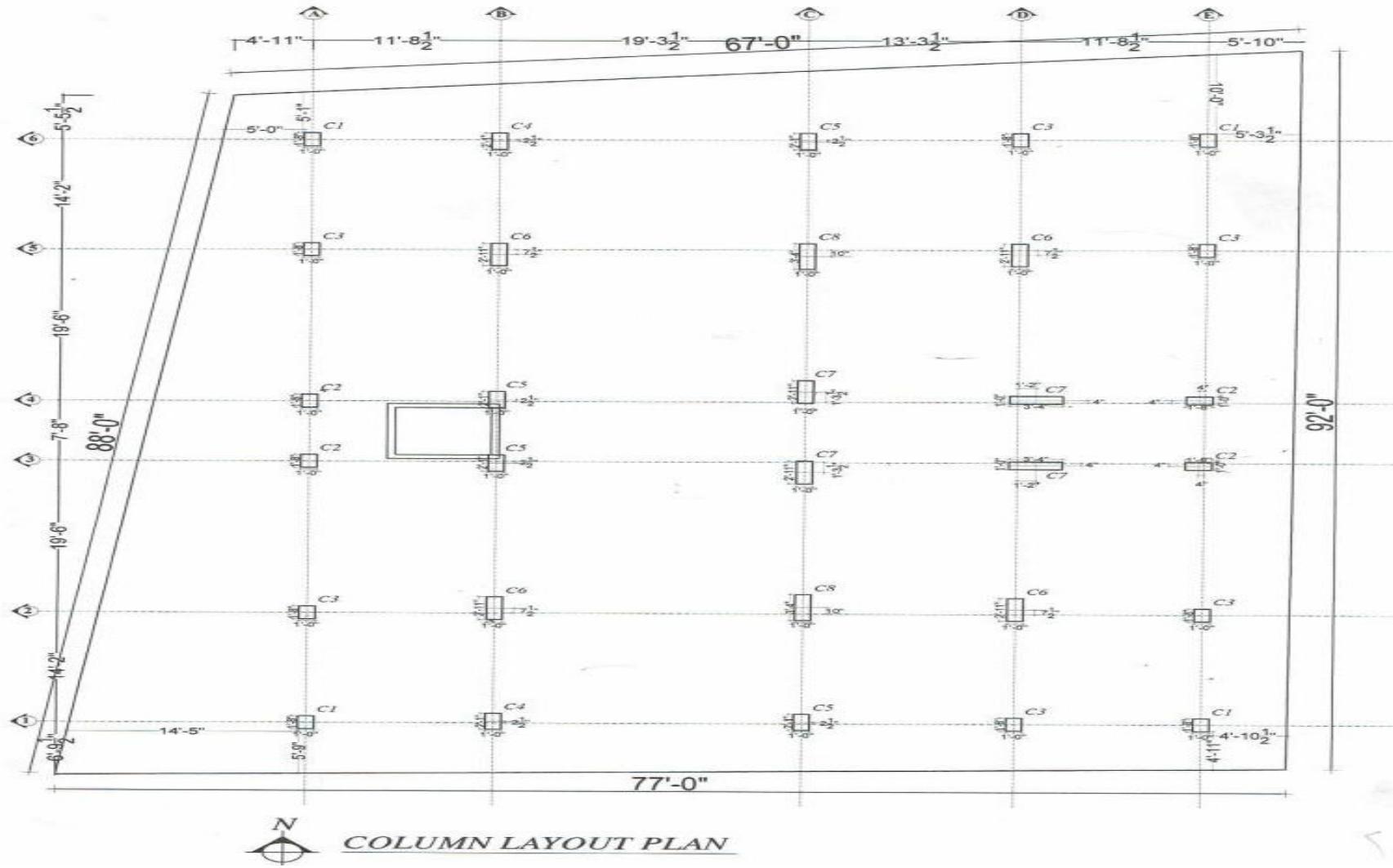


Vibrator Machine



Crane

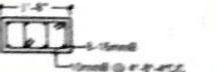
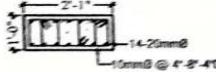
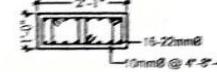
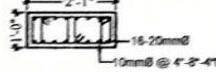
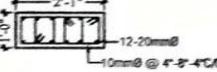
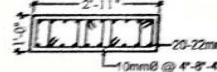
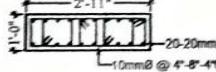
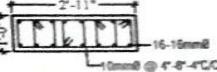
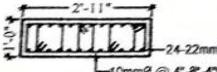
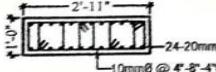
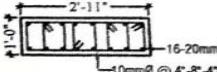
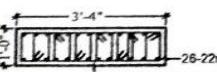
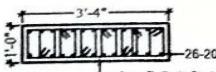
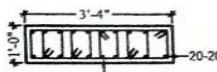
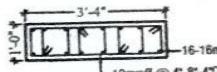
Column Layout



➤ Total Column 30

➤ Column Type 8

Column Schedule

| COLUMN | BASEMENT - 2ND. FLOOR | 3TH -5TH. FLOOR | 6TH -7TH FLOOR | 8TH -ABOVE |
|--------|--|--|--|--|
| C1 |  1'-8" x 1'-0" 10mmØ @ 4'-8"-4'C/C 10mmØ @ 4'-8"-4'C/C |  1'-8" x 1'-0" 10mmØ @ 4'-8"-4'C/C 10mmØ @ 4'-8"-4'C/C |  1'-8" x 1'-0" 10mmØ @ 4'-8"-4'C/C 10mmØ @ 4'-8"-4'C/C |  1'-8" x 1'-0" 10mmØ @ 4'-8"-4'C/C 10mmØ @ 4'-8"-4'C/C |
| C2 |  1'-8" x 1'-0" 10mmØ @ 4'-8"-4'C/C 10mmØ @ 4'-8"-4'C/C |  1'-8" x 1'-0" 10mmØ @ 4'-8"-4'C/C 10mmØ @ 4'-8"-4'C/C |  1'-8" x 1'-0" 10mmØ @ 4'-8"-4'C/C 10mmØ @ 4'-8"-4'C/C |  1'-8" x 1'-0" 10mmØ @ 4'-8"-4'C/C 10mmØ @ 4'-8"-4'C/C |
| C3 |  1'-8" x 1'-0" 12-22mmØ 10mmØ @ 4'-8"-4'C/C |  1'-8" x 1'-0" 12-20mmØ 10mmØ @ 4'-8"-4'C/C |  1'-8" x 1'-0" 12-20mmØ 10mmØ @ 4'-8"-4'C/C |  1'-8" x 1'-0" 8-16mmØ 10mmØ @ 4'-8"-4'C/C |
| C4 |  2'-1" x 1'-0" 14-22mmØ 10mmØ @ 4'-8"-4'C/C |  2'-1" x 1'-0" 14-20mmØ 10mmØ @ 4'-8"-4'C/C |  2'-1" x 1'-0" 12-20mmØ 10mmØ @ 4'-8"-4'C/C |  2'-1" x 1'-0" 10-16mmØ 10mmØ @ 4'-8"-4'C/C |
| C5 |  2'-1" x 1'-0" 15-22mmØ 10mmØ @ 4'-8"-4'C/C |  2'-1" x 1'-0" 16-20mmØ 10mmØ @ 4'-8"-4'C/C |  2'-1" x 1'-0" 12-20mmØ 10mmØ @ 4'-8"-4'C/C |  2'-1" x 1'-0" 10-16mmØ 10mmØ @ 4'-8"-4'C/C |
| C6 |  2'-11" x 1'-0" 20-22mmØ 10mmØ @ 4'-8"-4'C/C |  2'-11" x 1'-0" 20-20mmØ 10mmØ @ 4'-8"-4'C/C |  2'-11" x 1'-0" 16-20mmØ 10mmØ @ 4'-8"-4'C/C |  2'-11" x 1'-0" 16-16mmØ 10mmØ @ 4'-8"-4'C/C |
| C7 |  2'-11" x 1'-0" 24-22mmØ 10mmØ @ 4'-8"-4'C/C |  2'-11" x 1'-0" 24-20mmØ 10mmØ @ 4'-8"-4'C/C |  2'-11" x 1'-0" 16-20mmØ 10mmØ @ 4'-8"-4'C/C |  2'-11" x 1'-0" 16-16mmØ 10mmØ @ 4'-8"-4'C/C |
| C8 |  3'-4" x 1'-0" 26-22mmØ 10mmØ @ 4'-8"-4'C/C |  3'-4" x 1'-0" 26-20mmØ 10mmØ @ 4'-8"-4'C/C |  3'-4" x 1'-0" 20-20mmØ 10mmØ @ 4'-8"-4'C/C |  3'-4" x 1'-0" 16-16mmØ 10mmØ @ 4'-8"-4'C/C |

Column Kicker Work



Kicker Making



Kicker shuttering



Kicker Casting



Kicker Height Checking



Kicker Length



Kicker Width

Column Reinforcement Details



- 20-20mmØ reinforcement bars used as a main bar
- 10mmØ tie bar used @ 4"-8"-4" C/C

Reinforcement Placement

- 10 mm reinforcement bar for column tie
- 8 inches c/c at mid zone tie bar L/2 distance
- 4 inches c/c at top and bottom zone for L/4 distance tie bar
- Lap length was 29 inches



Main & Tie Bar Placement



Tie Spacing
Check 4" c/c



Tie Spacing
Check 8" c/c



Lap Length Check

Column Casting & Curing



Column Shuttering



Vertical Alignment Checking



Column Casting and Using
Vibrator Machine



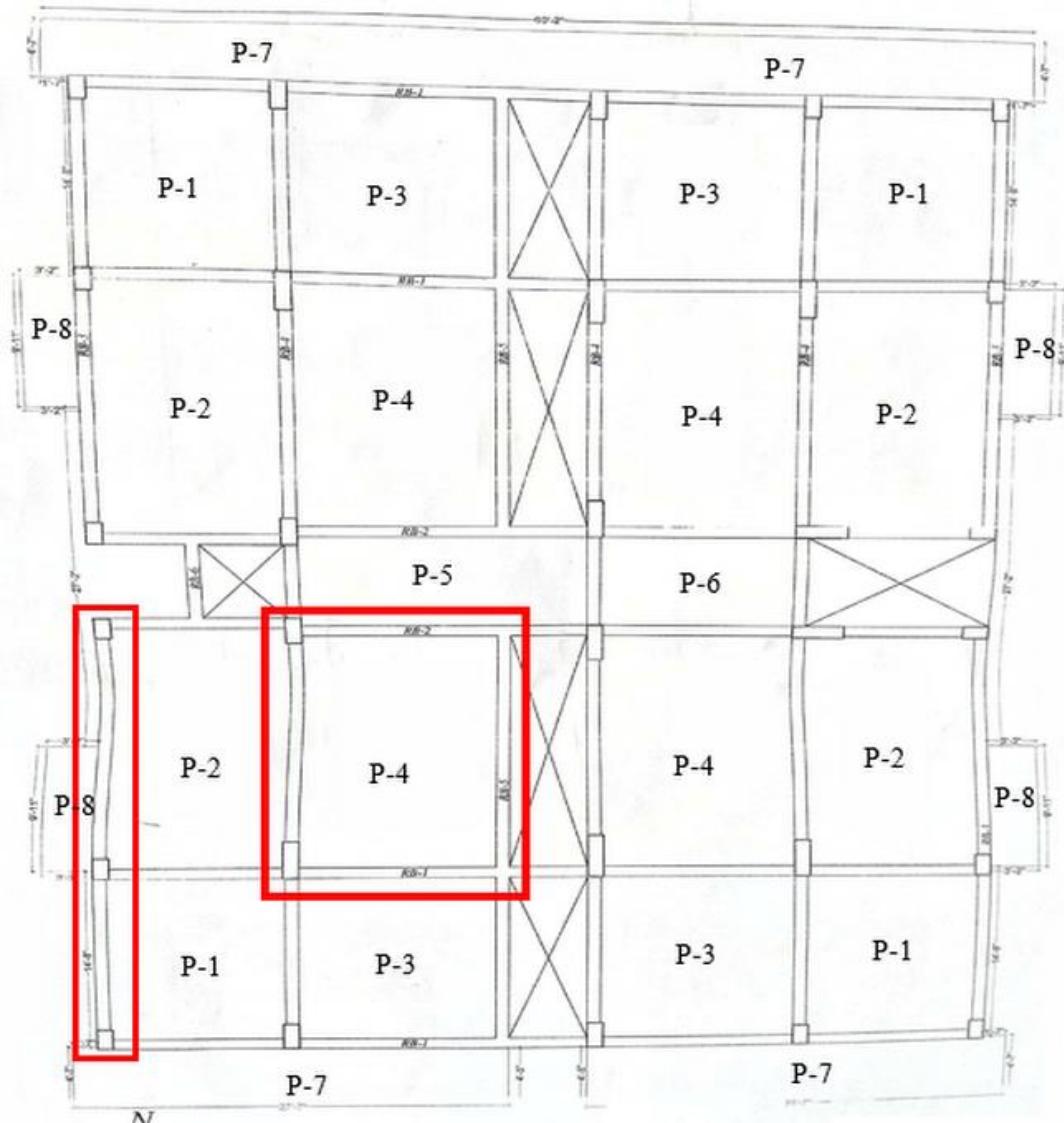
Column Curing

Work Schedule of Column

| Work Description | 18-Jun | 19-Jun | 20-Jun | 21-Jun | 22-Jun | 23-Jun | 24-Jun | 25-Jun | 26-Jun | 27-Jun | 28-Jun | 29-Jun | 30-Jun | 1-Jul | 2-Jul | 3-Jul | 4-Jul | 5-Jul | 6-Jul | 7-Jul | 8-Jul | 9-Jul | 10-Jul | 11-Jul | 12-Jul | 13-Jul | 14-Jul | 15-Jul |
|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| Lay out of column | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Preparing of kicker | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Casting of column kicker | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Placing of main bar | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Placing of tie bar | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Binding of tie bar | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shuttering of column | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Casting of column | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Curing of column | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Beam & Slab Layout

- Six types of beam
- Eight types of panel
- Beam size 10"x20"
- I have discuss about RB-3 and panel-4
- Length of RB-3 is 30.33 ft
- Size of pane-4 is 19.5'x13.29'



Beam and Slab Layout

Formwork Preparation of Beam



Bottom Shutter Setup



Side Shutter Setup



Beam Width Check



Beam Height Check

Formwork Preparation of Slab

Shuttering of Slab

- Used wooden runners in short direction of slab at 2' distance
- Used wooden planks in wood runner and side of beam.
- Used bamboo at 24" to 25" distance
- Plain sheet used (3'×6' and 1'x6')



Runner Placement



Measuring Runner Spacing



Wooden Plank Placement

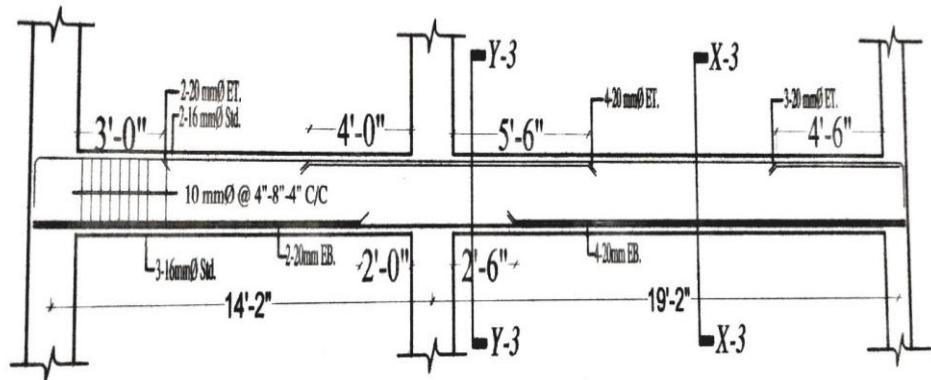


Plain Sheet Placement

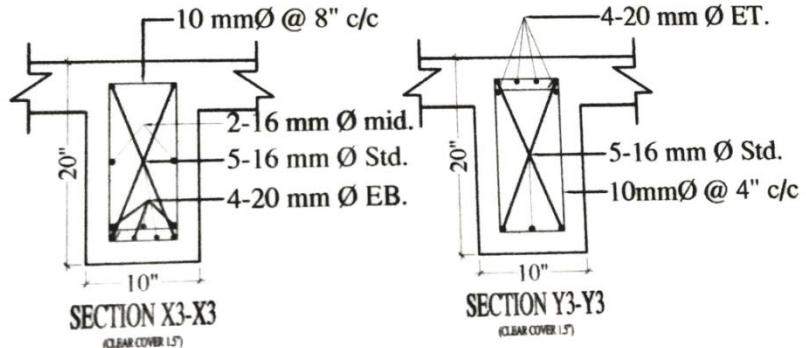
Beam Reinforcement Details

For Beam RB-3

- Top main bar 2-16mmØ
- Bottom main bar 3-16mmØ
- Mid main bar 2-16mmØ
- Top Extra bar 4-20mmØ
- Bottom extra bar 4-20mmØ
- Tie bar 10mm @ 4"-8"-4" c/c



Long Section of RB-3



RB-3 Reinforcement Details

Beam Reinforcement Placement



Beam Reinforcement
Placement



Stirrup Placement



Stirrup Binding



Stirrup Spacing 4"



Stirrup Spacing 8"



Measuring Lap Length

Beam Reinforcement Placement

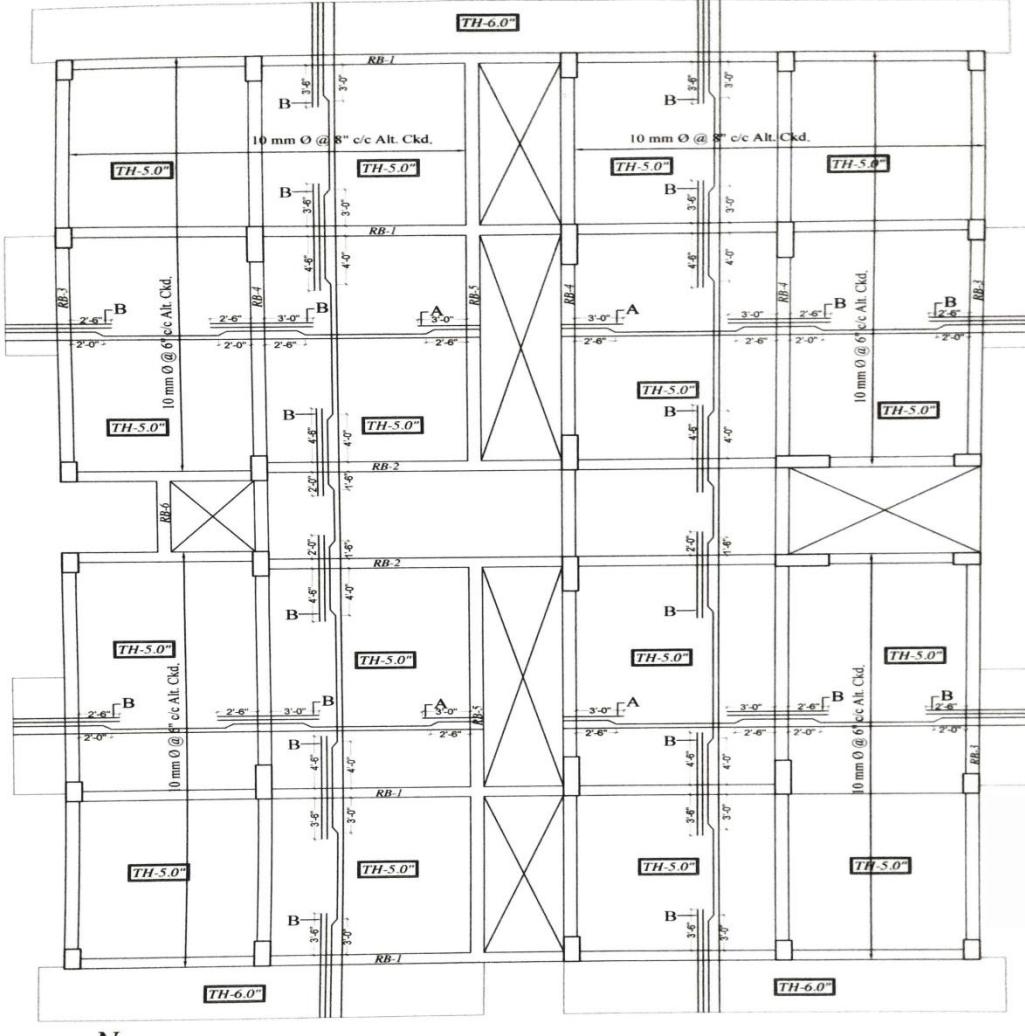


Clear Cover Block Placing



Clear Cover Check (1.5")

Reinforcement Details of Slab



Slab Reinforcement

- 10mm used as straight bar and crank bar
- 12mm bar used as extra top bar
- Spacing 6" at long direction
- Spacing 8" at short direction

Slab Reinforcement Details

Slab Reinforcement Placement



Slab Reinforcement
Placement



Reinforcement Binding



Crank Bar Making



Spacing of Bottom Bar
6"



Spacing of Top Bar 8"



Spacing of Crank Bar 12"

Slab Reinforcement Placement



Reinforcement for Extra Top



Extra Top Placement



Block Placement

Beam and Slab Casting

- Casting Ratio –1:2:4
- $f'_c = 3000 \text{ psi}$
- Concrete mix by mixer machine
- Using vibrator during casting
- Thickness of Slab 5 inches



Concrete Mixing



Beam and Slab Casting



Using Patta for Leveling



Vibrator Using

Beam & Slab Curing

- Made a temporary boundary line surrounding the slab area.
- Used curing by pounding and sprinkling system
- Curing work continued 14 days after casting



Beam Slab Curing by Pounding System

Work Schedule of Beam and Slab

| Work Description | 22-May | 23-May | 24-May | 25-May | 26-May | 27-May | 28-May | 29-May | 30-May | 31-May | 1-Jun | 2-Jun | 3-Jun | 4-Jun | 5-Jun | 6-Jun | 7-Jun | 8-Jun | 9-Jun | 10-Jun | 11-Jun | 12-Jun | 13-Jun | 14-Jun | 15-Jun | 16-Jun | 17-Jun | 18-Jun | 19-Jun | 20-Jun | 21-Jun | 22-Jun | 23-Jun | 24-Jun | 25-Jun | 26-Jun |
|----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Shuttering of beam | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shuttering of slab | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Placing of main bar of beam | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Placing of stirrup of beam | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Placing of extra top of beam | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Placing of main bar of slab | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Placing of binder bar of slab | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Placing of extra top bar of slab | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Binding of bar with each other | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Casting of beam and slab | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Curing of slab and beam | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

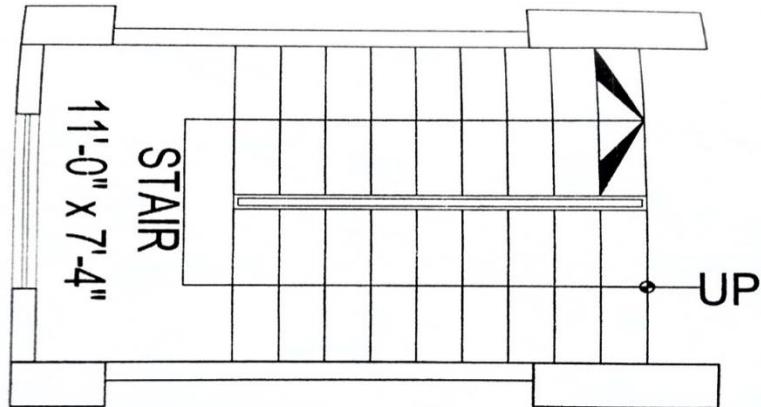
Activate Windows

Go to Settings to activate Windows

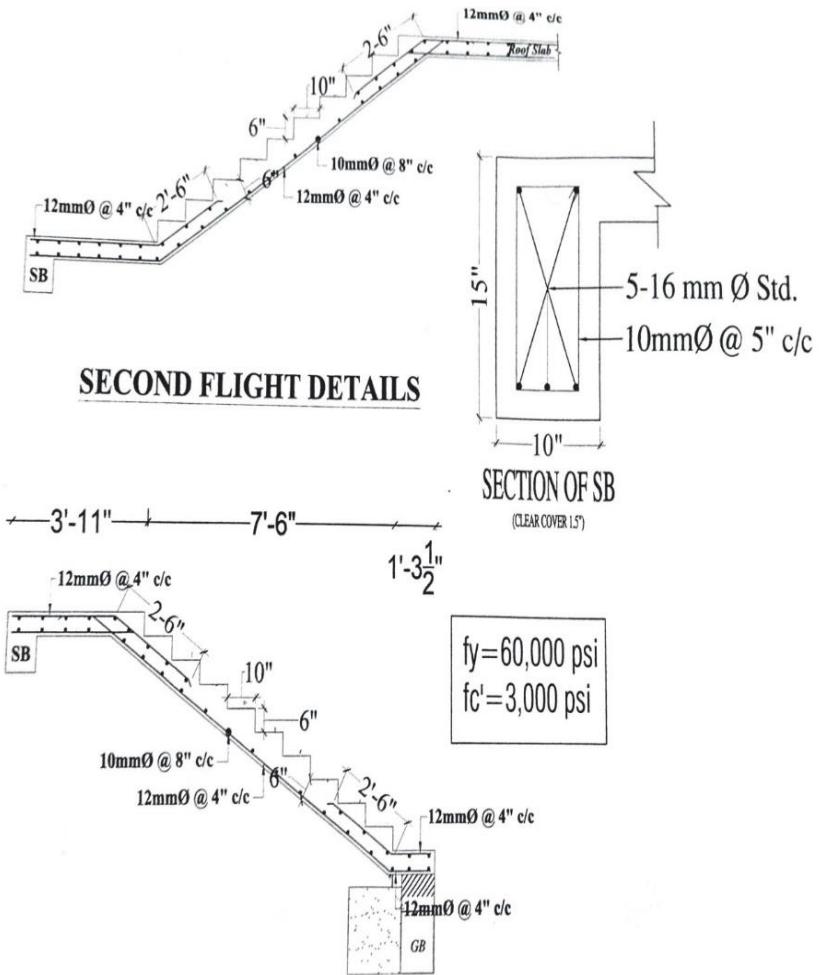
Stair Layout

Plan of Stair

- Stair size 7'- 4" × 11'-0"
- No. of rise and tread was 10
- Height of rise was 6"
- Width of tread was 10"
- Waist slab Thickness 6"



Stair Plan



Cross Section of Stair

Stair Shuttering Work



Wooden Plank Placement



Plain Sheet Placement

Stair Reinforcement Placement



Reinforcement
Placement of Stair

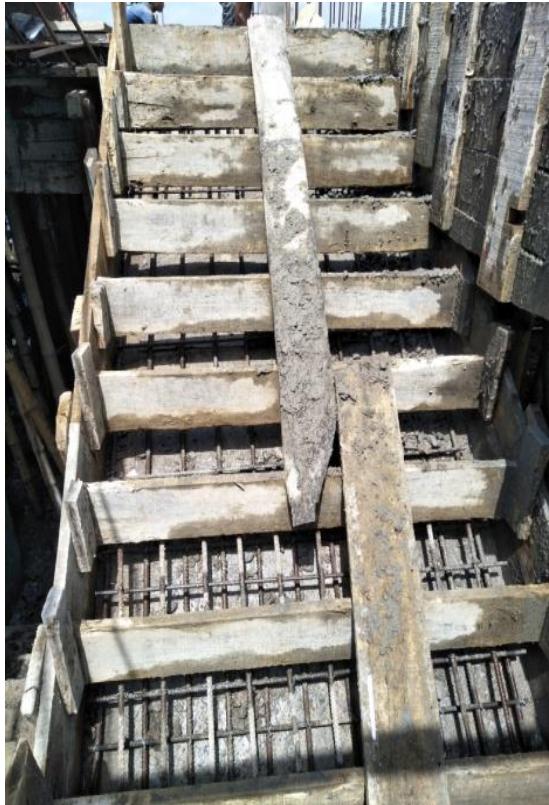


Main Bar Spacing 4"



Binder Spacing 7"

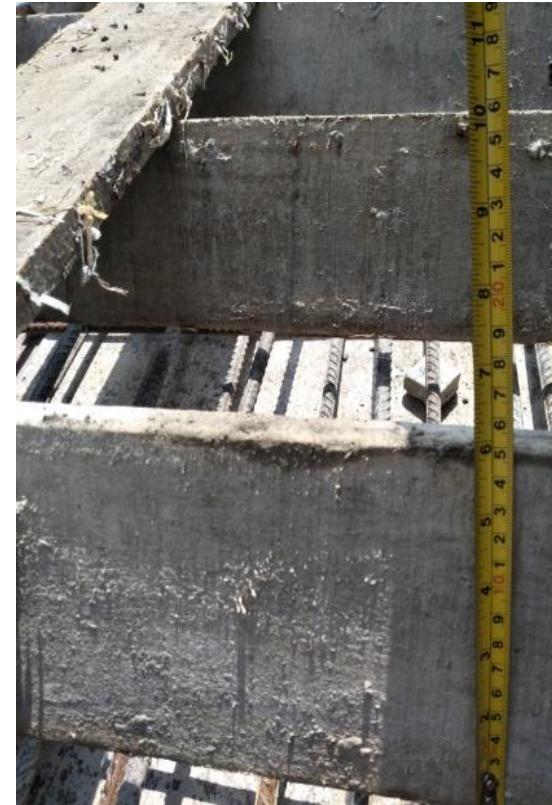
Tread & Riser Placement



Tread and Riser Setup



Tread Length Check
9.5"



Riser Height Check 6"

Stair Casting



Casting of Stair



Using Vibrator

Curing of Stair



Stair Curing

Work Schedule of Stair

| Work Description | 15-Jul | 16-Jul | 17-Jul | 18-Jul | 19-Jul | 20-Jul | 21-Jul | 22-Jul | 23-Jul | 24-Jul | 25-Jul | 26-Jul | 27-Jul | 28-Jul | 29-Jul | 30-Jul | 31-Jul | 1-Aug | 2-Aug | 3-Aug | 4-Aug | 5-Aug | 6-Aug | 7-Aug | 8-Aug | 9-Aug | 10-Aug |
|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| Shuttering of staircase | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Placing of main bar | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Palcing binder bar | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Placing of extra bar | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Placing of side shuttering | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Casting of staircase | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Curing of staircase | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Conclusion

During my practicum time I observed the process of building construction. I was following the instruction of engineer what he told the workers. Engineer helps me to give some information about building construction. Worker leader leads the worker team and he instructed them how they worked. I have learned some practical information from worker leader. During my practicum time, I have learned how to construct column, beam slab and stair.

Thank
YOU