CHAPTER 1

ABOUT THE INTERNSHIP

1.0 General

An internship is a professional learning experience that offers meaningful, practical work related to a student's field of study or career interest. An internship gives a student the opportunity for career exploration and development, and to learn new skills. By bridging the gap between learning and finding a career, internships can speed up the process of moving you toward career goals. An internship allows trying out a career in a low-stakes situation, helping to make more informed decisions in life.

The Internship program aims to provide an opportunity to consolidate theoretical foundation through practical experience. It associates in engineering field to develop insight into the practical application of academic knowledge. A major component of this experience is the formation of a professional attitude. An internship is on-the-job training for many professional jobs, similar to an apprenticeship to supplement formal education and to expose to the real world of work. It provides platform to develop personality and capacity to adapt and handle, challenging situations in the competitive world. It also helps in acquiring transferable skills such as communications skills, interpersonal skills, technical skills, teamwork skills, management skills and problem-solving skills.

1.1 The purpose of the internship:

- To enrich classroom learning through exposure to related on-the-job experiences.
- To assist in the determination of career goals.
- To provide experience in the field for those just entering the electronics and communication field.
- To broaden that experience and the students' perspective on technology issues for those who have prior experience in the communication field.
- Internship leads to the intern's individual development through challenging occupational coursework.
- A typical and worthy extra-curricular activity that helps develops credentials for their semester.
- It is designed and planned through consultation with the college or university so as to fit into the postgraduate practice.
- Internship involves closed direction or mentoring by a specialized expert.
- It includes work experiences that go together with classroom learning.
- It too ends in an appraisal process at the wrapping up of the internship.
- It builds upon the association of any academy institute or university with hasemployer.

- It is mainly victorious when the intern, the college or university, and the employer all share conscientiousness in making it a valuable practice.

1.2 Benefits of Internship

- Gain valuable work job and research experience.
- Internships provide exposure to the real world.
- Internships give you a platform to establish critical networking connections.
- Internships allow you to learn more about yourself.
- Internships equip you with more than just technical skills.
- Internships allow you to gain a competitive edge.
- Explore a career path.
- Access to a variety of tasks and departments.
- Secure good references and recommendations.
- Transition to a permanent job.
- Create a professional network.
- Build a strong resume.
- Give yourself an edge in the job market.
- Develop skills.
- Network with professionals in the field.
- Gain confidence.
- Transition into a job.

1.3 The Meritoriousness of nailing an internship:

- **Real world experience:** Participating in an internship allows an intern to get a perspective on potential employment once they are done studying. It helps them by apply the concepts that they learned in their classrooms. Such an exposure creates a smoother transition for Interns from the classroom to the work-station.
- **Personal development:** Both the categories have been Personal development includes building up of soft-skills such as personal work ethic, inter-personal skills, and also the technical hard skill like execution, and refining of analytical capabilities. shown to play an important part in the building up of human capital. Internship programs facilitate the build-up of such capital to some extent.

1. **Choices:** Decisions about careers arc quite perplexing, more so when one has not discovered what one really wants to do. However, exposure beyond formal learning can go a long way resolving such early age dilemmas. So, with the knowledge and experience that Interns collect from their internships, individuals would be better placed to make choices about their future career.

    a. For a career-oriented applied education, VTU has introduced a new and significant Civil Engineering students Internship Programmed (CESIP) for level-3 students. This internship bridges the gap between theory and practice and provides students with practical, field based, real-world experiences during their years of shady. During this training period, we the students learn how to relate our theoretical knowledge with practical fields. What are the difficulties faced by an engineer? How to manage everything and what are the duties of an Engineer. For these practical and technical skills we participated in CESIP under "CIVIL WORKSHOP construction firm.

2. **Networking:** Interns during their short stint would likely get to know a lot of Pros and this knowledge would help them find new opportunities and make new connections. That is, they could use these contacts for future references or for work related advice.

1.4 OBJECTIVES OF THE WORK

The internship aims to develop our skills as implement theoretical knowledge into practical fields and objectives were:

- To orient us with the practical Civil Engineering works.
- To allow us to apply our theoretical knowledge into practical fields.
- To let us gain practical experience.
- To let us understand the planning, design, drawing of construction.

CHAPTER 2

TASK PERFORMED

2.0 General

2.1 VARIOUS WORKS OBSERVED OUT DURING INTERNSHIP TRAINING

During the internship program works like Foundation work, Plinth beam work, Lintel, construction of building, wall finishing, Wall construction, drainage construction, interlock, Where observed in different sites.

2.2 DETAILS OF SITE INSPECTIONS

The list of site inspection during internship training

- Site visited Judge quarters kurunjibag sullia.
- The construction site of residential building near Lakshmi Xerox shop kurunjibag sullia.
- The construction site of commercial building visited near BCM hostel kurunjibag sullia.
- The construction of drain in front of KVG town hall kurunjibag sullia.
- Site visited kurunjiguda zigzag interlock system.
- Site visited near Ayurvedic College, kurunjibag sullia.

2.2.1 SITE VISITE OF CONSTRUCTION OF JUDGE QUARTERS

The construction site of Senior/Junior/Fast track/Civil Judge Quarters,in Sullia. The structure is planned, designed by Dr. H.S. Nirmithikendra. The site was visited on 5/9/2022.

There is a level difference in the ground, the area of sloping hence building is planned to the different level. To take the advantage earthwork is done different A retaining wall is provided to protect soil between two portions. During visit, observed work of columns and wall construction as shown in fig 2.10.

Table 2.1 General data of the site:

Particular	Details
Ceiling height	3.25m
Wall thickness	0.25m
Block used	Laterite, cement block
Cost of one brick	Rs 34/block & 24/blocks
Class of brick	First class bricks

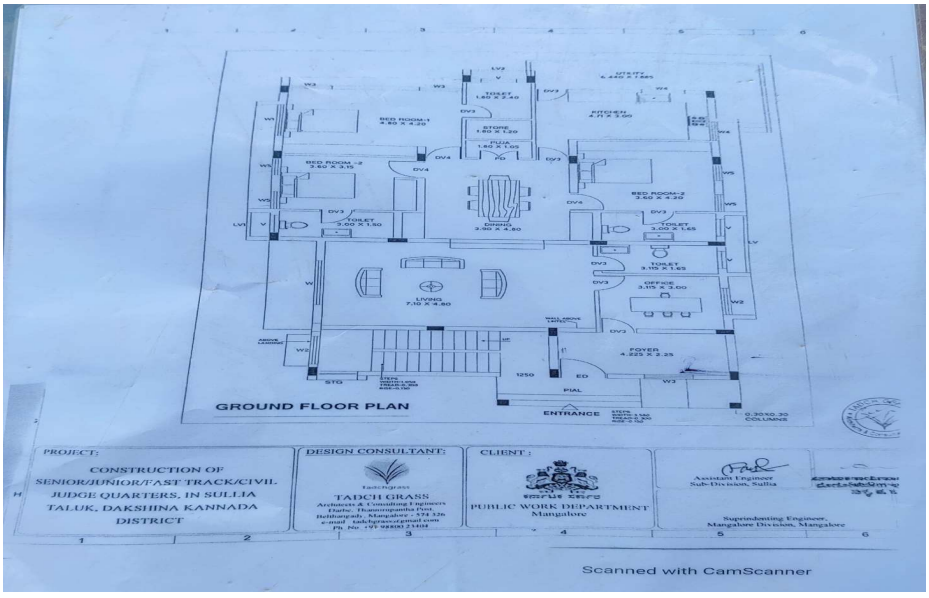


Fig 2.1 Plan of Judge Quarters

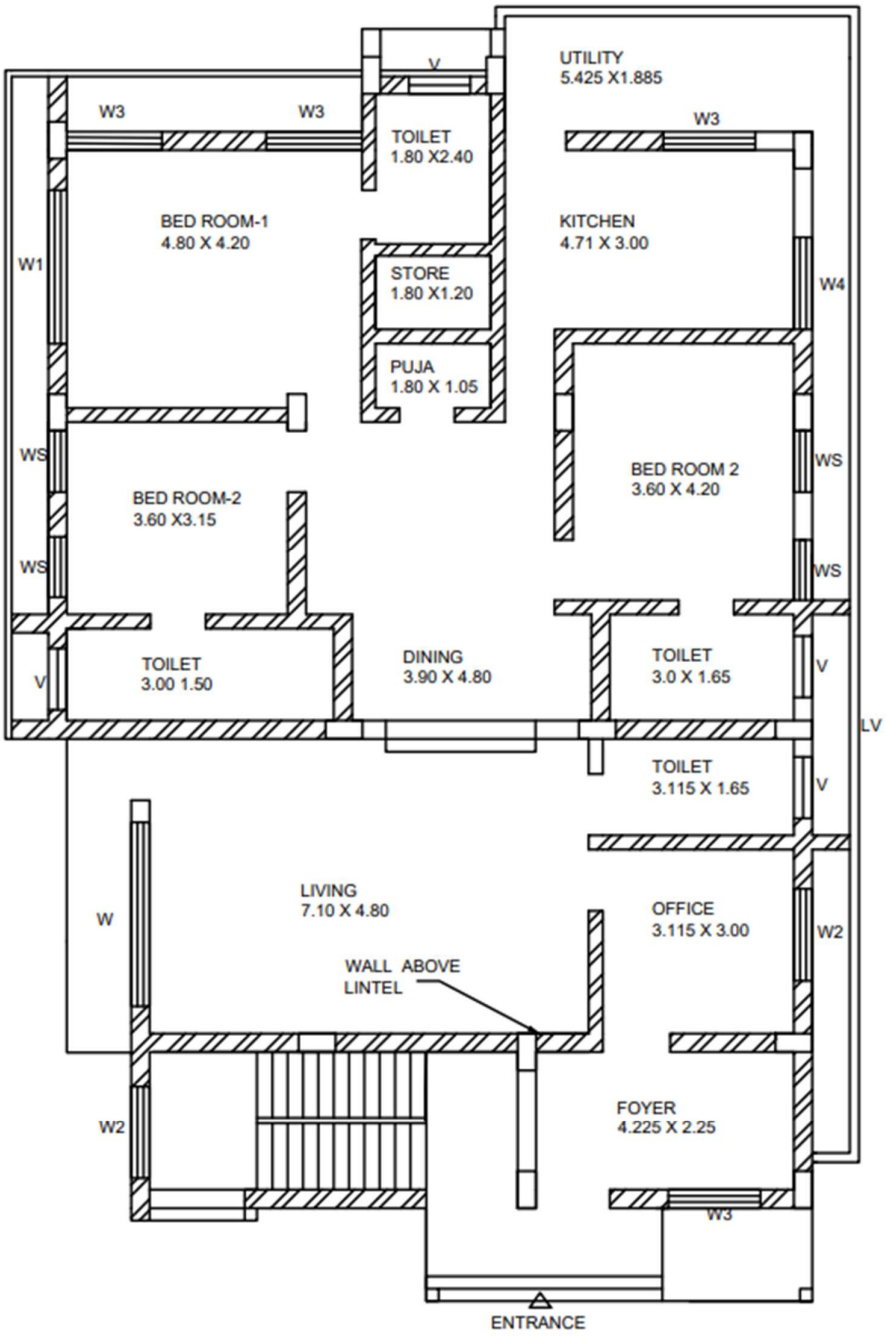


fig 2.1 JUDGE QUARTERS PLAN

Estimation of Judge Quarters :

Calculation :

Step 01: Calculation of centre to centre main wall of 30cm thick wall =

2.55+5.1+1.7+3.25+4.4+5+1.9+4.91+3.2+4.3+1.85+1.85+3.2+2.55+3.925+6.79=56.42m

Step 2: Calculation of centre to centre partition wall 20cm thick wall

Partition wall = 2.6+1.30+1.15=5.05m

Step 03: Identification of junction :

Plus type junction T-type junction

L-type junction

Number of junction:

M-M = 8

M-P=14

P-P=3

Meassurment form:

Sl no	Particulars	No	Length (m)	Breadth (m)	Depth (m)	Quantity (m^2/m^3)	Remarks
1	Earth work excavation						
	30cm thick wall	1	52.8	0.9	1.05	49.9	L=56.475-8*(1/2*0.9)=52.875
	20cm thick wall	1	2.3	0.7	0.065	1.04	L=5.05-[14*(0.9/2)]-[3*0.7/2]=2.3
					Total	50.94	
2	Bed concrete for foundation						
	30cm thick wall	1	52.8	0.9	0.2	9.51	L=56.475-8*(1/2*0.9)=52.875
	20cm thick wall	1	0.2	0.7	0.2	0.2	L=5.05-[14*(0.6/2)]-[3*0.7/2]=0.2
					Tota	9.53	
3	SSM in foundation						
	30cm thick wall						
	1st Footing		54.02	0.6	0.3	9.7	L=56.475-8*(0.6/2)=54.02
	2nd Footing		54.4	0.5	0.4	12.24	L=56.475-8*(0.5/2)=54.02
	Upto plinth		54.8	0.4	0.3	6.53	L=56.475-8*(0.4/2)=54.825
					Total	28.47	
	20cm thick wall						
	1st Footing		0.8	0.5	0.45	0.18	L=5.05-[14*(0.5/2)]-[3*0.5/2]=0.8
	Upto plinth		1.1	0.4	0.3	0.13	L=5.05-[14*(0.4/2)]-[3*0.5/2]=0.8
					Tota	0.31	
4	Dam proof course						
	30cm thick wall		54.825	0.4		21.93	
	20cm thick wall		1.1	0.4		0.44	
					Total	22.37	

5	Brick work in CM						
	30cm thick wall		55.23	0.3	3	49.7	L=56.475-8*(0.3/2)=55.23
	20cm thick wall		2.65	0.3	3	2.38	L=5.05-[14*(0.3/2)]-[3*0.2/2]=2.65
					Total	52.08	
4	Deduction for openings						
	Doors						
	D	1	1.1	0.3	2.1	0.693	
	D1	8	1.1	0.2	2.1	3.696	
	D2	4	1.1	0.3	2.1	2.772	
	Window						
	W	1	2.1	0.3	1.2	0.756	
	W1	1	1.6	0.3	1.2	0.576	
	W2	2	1.5	0.3	1.2	1.08	
	W3	3	1.2	0.3	1.2	1.296	
	W4	2	1	0.3	1.2	0.72	
	W5	4	1.2	0.3	1.2	1.728	
	Ventilation						
	V	4	0.9	0.3	0.45	0.486	
					Total	13.806	
5	Deduction for lintel						
	Doors (D)	1	1.4	0.3	0.15	0.063	
	D1	8	1.4	0.2	0.15	0.336	
	D2	4	1.4	0.3	0.15	0.252	
					Tota	0.651	
	Window						
	W	1	2.1	0.3	0.15	0.108	
	W1	1	1.9	0.3	0.15	0.085	
	W2	2	1.8	0.3	0.15	0.162	
	W3	3	1.5	0.3	0.15	0.202	
	W4	2	1.3	0.3	0.15	0.117	
	W5	4	1.5	0.3	0.15	0.27	
					Total	1.648	
	Total brick work before						
		52.08 -13.806					
		38.09 m^3					
	Total brick work after						
		38.09 - 1.648					
		36.45 m^3					
6	Roof slab (150 mm)		17.6	12.21	0.15	36.23	
7	Brick work in cm (1:5) for						
	parapet wall						
	Long wall	2	17.6	0.1	0.6	2.112	
	Short wall	2	12.21	0.1	0.6	1.465	
					Total	3.577	
8	Celling plaster in cm (1:2)						

	Inside						
	Foyer	1	4.285	2.25		9.5	
	Office	1	3.115	3		9.345	
	Living	1	7.1	4.8		34.08	
	Toilet	1	3.15	1.65		5.19	
	Bed room - 2	1	3.6	4.2		15.12	
	Toilet	1	3	1.65		4.95	
	Dining	1	3.9	4.8		18.72	
	Bed room - 2	1	3.6	3.15		11.34	
	Toilet	1	3	1.5		4.5	
	Bed room - 1	1	4.8	4.2		20.16	
	Pooja	1	1.8	1.05		1.89	
	Store	1	1.8	1.2		2.16	
	Toilet	1	1.8	2.4		4.32	
	Kitchen	1	4.71	3		14.13	
					Total	145.4	
	Outside						
	Long wall	2	17.3		3	103.8	
	Short wall	2	12.21		3	73.26	
					Total	177.06	
	Deduction for window,door						
	ventilation	177.06 - 15.454					
		161.60 m^3					
9	Plastering in cm (1:3) for						
	foundation						
	Long wall	2	17.3		0.5	17.3	
	Short wall	2	12.21		0.5	12.2	
					Total	29.51	
10	Flooring in cc (1:3:6) all room						
	combained	1	145.4			145.4	
12	Painting two coats in walls						
	(inside & outside	1	36.45		3	109.35	
		1	161.6		3	484.8	
	Celling painting	1	145.4			145.4	
					Total	739.55	
13	Enamel painting to door ,						
	window , ventilation						
	Doors						
	D	1	2.25*2.1		2.1	5.25	
	D1	8	2.25*2.1		2.1	5.25	
	D2	4	2.25*2.1		2.1	2.25	
	Window						
	W	1	2.25*2.1		1.2	5.67	
	W1	1	2.25*1.6		1.2	4.32	
	W2	2	2.25*1.5		1.2	4.05	
	W3	3	2.25*1.2		1.2	3.24	
	W4	2	2.25*1.0		1.2	2.97	
	W5	4	2.25*1.2		1.2	3.24	
					Total	39.24	

Abstract form					
Sl no	**Particulars**	**Quantity**	**Unit**	**Unit rate**	**Amount (Rupees)**
1	Earth work excavation for foundation	50.94	m^3	250	12735
2	Bed concrete foundation	9.53	m^3	4500	42885
3	SSM in foundation	28.78	m^3	5000	143900
4	Damp proof coarse	22.37	m^2	150	3355.5
5	Brick work in cm	52.08	m^3	5000	260400
6	Roof slab	36.23	m^3	12500	452875
7	Parapet wall brick	3.557	m^3	5000	17785
8	Providing and fixing doors and window	13.806	m^2	10000	138060
9	Ceiling plastering				
	Inside	145.4	m^2	300	43620
	Outside	177.06	m^2	300	53118
10	Painting for foundation	29.51	m^3	250	7377.5
11	Painting two coats inside and outside	739.55	m^2	200	147910
12	Paints for doors and window	39.24	m^2	300	11772
				Total	1335793.5

(A)MATERIAL USED FOR PLASTERING:

Fig (a) Cement and Fine aggregate.

Plastering is the process of covering rough walls & uneven surface in the construction of houses. The ratio of cement & sand for first coat plaster varies from (1:3) to (1:6) apply the first coat of plaster between the spaces formed by the scared on the wall surface. This is done by means of trowel. Level the surface by means of wooden flat & wooden straight edges.

Cement

Cement is a fine, soft powder used as a binder because it hardens after contact with water. It is produced from a mixture of limestone and clay that's charred and then ground up.

Fine Aggregate

Fine aggregate is known as sand which size ranges from 0.075 mm to 4.75 mm. It is the material used in concrete production, brick works, wall plastering, filling etc. M- sand/ Manufactured sand is a fine aggregate, produced by crushing suitable stones. The crushed stones are further finely graded to match the requirements of the sand that is used for wall plastering purposes and also tile laying purpose.

2.2.2 THE CONSTRUCTION SITE OF RESIDENTIAL BUILDING

(near Lakshmi shop kurunjibag sullia)

The construction site of Residential building near Lakshmi xerox shop krunjibag Sullia. The planned designed by Little flower builders. The site was visited on 5/9/2022.

The Residential building is constructed above the ground level to maintain the level surface to the road level. The Earth work excavation in ordinary soil in foundation provided RCC columns and beam structure as pre the design throughout RCC plinth beam. Walls dressed 9'' thick laterite stone masonry in CM 1:6 for super structure (walls) and bathroom wall 4''/6'' thick concrete blocks are used.

Table 2.2 General data of the site:

Particular	Details
Ceiling height	3.25m
Wall thickness	0.25m
Block used	Laterite, cement block
Cost of one brick	Rs 34/block & 24/blocks
Class of brick	First class bricks
Sill level	0.8m
Plinth area including sitout	1320 sqft

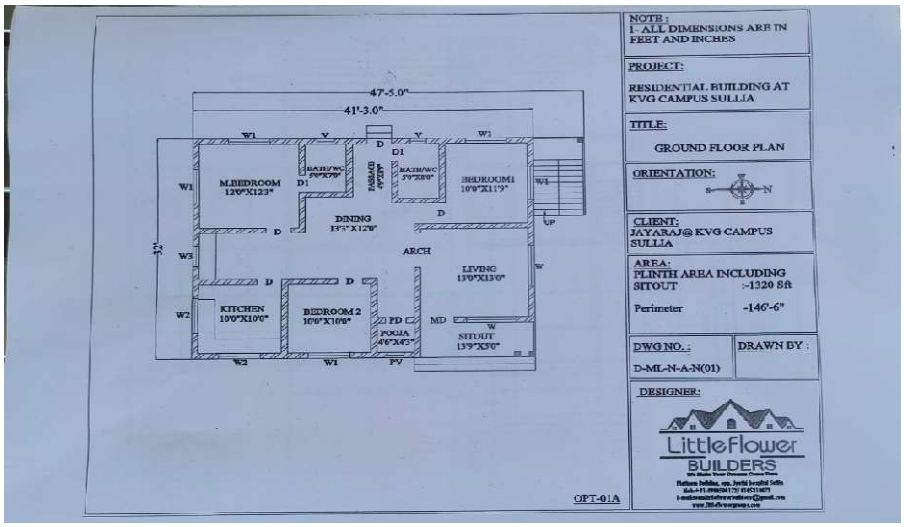


Fig 2.2. Residential building plan

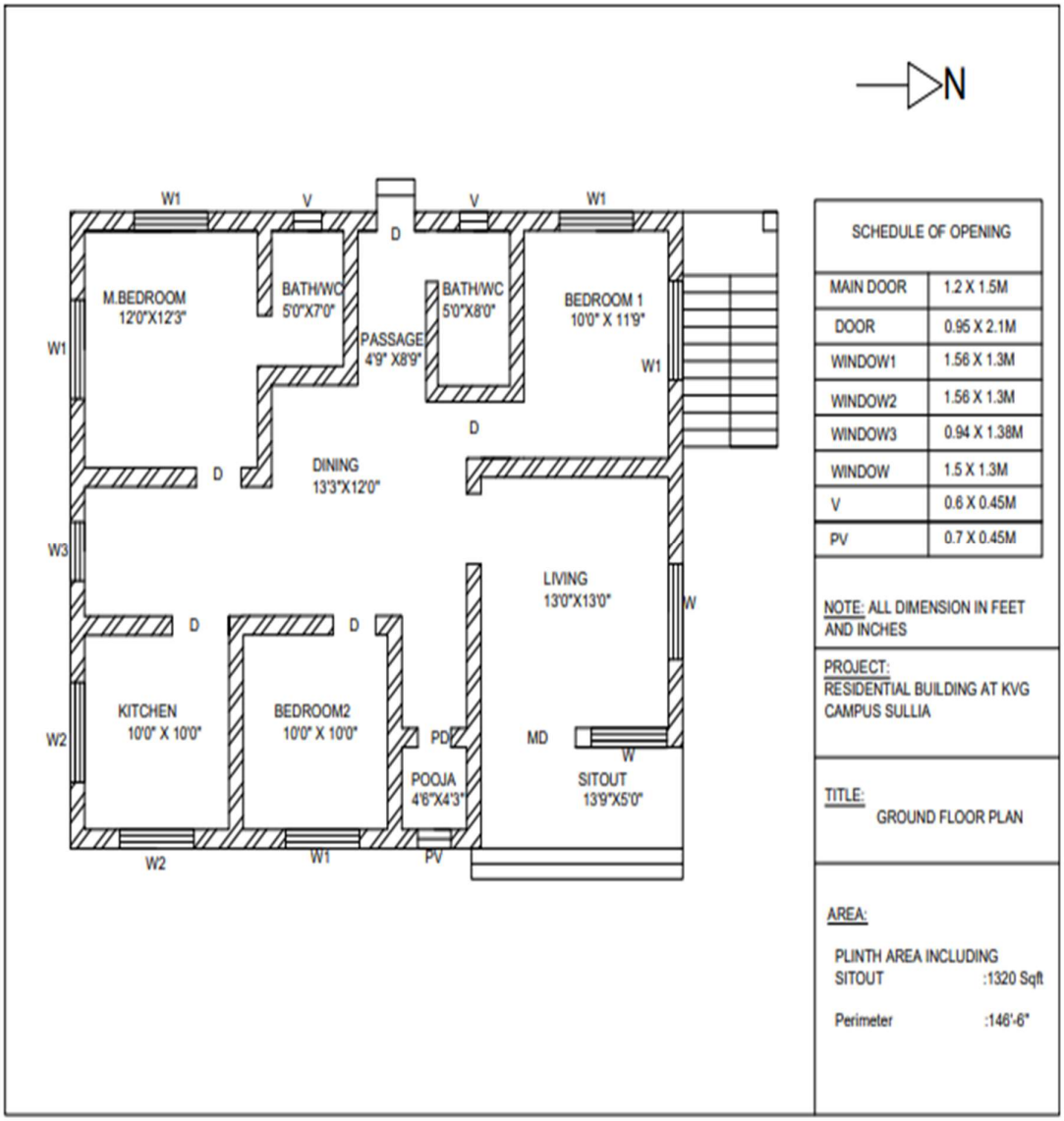


Fig 2.2 Residential building plan

Estimation of Residential building near lakshmi shop kurunjibag sullia

Calculation:

Step :01 Calculation of centre to centre length of long wall and Short wall =30cm thick walls

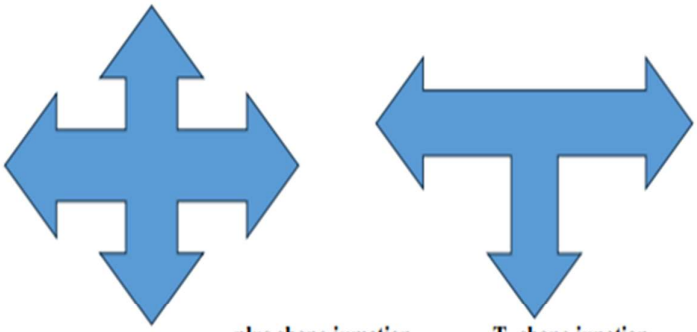
portion 01 : combined room: Combined rooms

C/C length of long wall =(0.3/2)+3.04+0.3+3.04+(0.3/2)+1.40+(0.3/2)+4.2+(0.3/2) = 12.58m
C/C lenth of long wall is 12.58 m

C/C lenth of short wall = (0.3/2)+3.04+0.3+2.07+0.3+3.74+(0.3/2) = 9.75m
C//C length of short wall is 9.75m

Calculation of total C/C length of long wall and short wall
(5*12.58)+(4*9.75)
62.90+39.00
101.90m

Step 3 : Identification of junction



plus shape jumction **T- shape junction**

A Type = 5
B Type =4
C Type = 2

Measurment form:

Sl no	Particulars	No	Lenth in	Width in 'm	Depth or heigh in 'm'	Quantity i 'm'/m²/m³	Remark
1	Earth work excavation in						
	foundation	1	97.85	0.9	1.05	92.47	101.9-5*(0.9/2)-4*(0.9/2)=97.85m
2	Bed concrete in cc (1:4:8) for						
	foundation	1	97.85	0.9	0.15	13.21	
3	Brick work in cm (1:5) for foundation						
	step 01	1	98.3	0.8	0.5	39.32	101.9-5*(0.8/2)-4*(0.8/2)=98.30m
	step 02	1	99.2	0.6	0.4	23.81	101.9-5*(0.6/2)-4*(0.6/2)=99.2m
					Total =	63.13	
4	Plinth	1	99.65	0.5	0.3	14.95	101.9-5*(0.5/2)-4*(0.5/2)=99.65m
5	DPC in cc (1:1.5:3) for plinth	1	99.65	0.5	0.1	4.98	
6	Earth filling basement						
	a) sit out	1	3.7	1.04	0.4	1.54	L=4.2-(0.5/2)-(0.5/2)=3.70
	b) Living	1	3.46	3.46	0.4	4.79	B=1.54*(0.5/2)*(0.5/2)=1.04m
	c) Dining	1	3.55	3.15	0.4	4.47	L=3.96-0.5=3.46
	d) pooja	1	0.9	0.81	0.4	0.29	L=4.05-0.5=3.55
	e) bed room 2	1	2.54	2.54	0.4	2.58	B=3.65-0.5=3.15
	f) kitchen	1	2.54	2.54	0.4	2.58	L=1.40-0.5=0.9
	g) bed room 1	1	2.54	3.12	0.4	3.17	B=1.31-0.5=0.81
	h) bath/wc	1	1.04	1.93	0.4	0.80	L=3.04-0.5=2.54
	i) master bed	1	3.15	3.24	0.4	4.08	B=3.62-0.5=3.12
	a) bath	1	1.04	1.63	0.4	0.68	BATH =L=1.54-0.5=1.04
	j) passage	1	0.99	2.21	0.4	0.88	BATH =B=2.43-0.5=1.93
							L=3.65-0.5=3.15
							B=3.74-0.5=3.24
							BATH B= 2.13-0.5=1.63
							P = 1.49-0.5=0.99
							P=2.71-0.5=2.21
					Total =	25.86	
7	Brick work in cm (1:5) for wa	1	100.55	0.3	3	90.50	L=101.9-5*(0.3/2)-4*(0.3/2)=100.55
	Deduction :						
	Door opening:						
	a) Main door (MD)	1	1.5	0.3	2.1	0.95	
	b) Arch	1	2	0.3	2.1	1.26	
	c) pojja door (PD)	1	0.75	0.3	1.8	0.41	
	d) Door (D)	5	1	0.3	2.1	0.63	
	e) Door 1 (D1)	2	0.9	0.3	2.1	0.57	
	Window opening:						
	a)window (W)	2	1.8	0.3	1.45	0.78	
	b) Window 1(W1)	5	1.5	0.3	1.45	0.65	
	c) Window 2 (W2)	2	1.5	0.3	1.2	0.54	
	d) Window 3 (W3)	1	1.2	0.3	1	0.36	
	e) Ventilation (V)	2	0.6	0.3	0.45	0.08	
	f) Pooja ventilation (PV)	1	0.6	0.3	0.5	0.09	
					TOTAL=	6.31	
					total=	84.18	
8	RCC roof slab						
		1	12.88	10.05	0.15	19.42	L= 12.58+0.15+0.15=12.88m
9	Parapet wall in cm (1:5)						B= 9.75+0.15+0.15=10.05m
	a) Long wall	1	12.88	0.1	0.6	0.77	
	b) Short wall	1	10.05	0.1	0.6	0.60	
					TOTAL=	1.38	

Abstract form

Sl no	Particulars	Quant	Unit	Unit Rate	Amount
1	Earth work excavation in	92.47	m^3	250	23117.5
	foundation				
2	Bed concrete in cc (1:4:8) for	13.21	m^3	4500	59445
	foundation				
3	Brick work in cm (1:5) for fou	63.13	m^3	5000	315650
4	Plinth	14.95	m^3	5000	74750
5	DPC in cc (1:1.5:3) for plinth	4.98	m^2	150	747
6	Earth filling basement	25.86	m^3	200	5172
7	Brick work in cm (1:5) for wa	84.18	m^3	5500	462990
8	RCC roof slab	19.42	m^3	12500	242750
9	Parapet wall in cm (1:5)	1.38	m^3	5500	7590
				total amount	1192211.5

2.2.3 CONSTRUCTION SITE (NEAR BCM HOSTEL)

A Construction site is an area or piece of land where construction work is taking place.

The construction site foundation work are progressing, the site near light house hotel sullia.

The construction details are mentioned below:

TABLE 2.3 General data of the site:

PARTICULARS	DETAILS
Number of columns	23numbers (size of column (0.58*0.3m)
Reinforcement used for column	12mm dia bars and 8mm lateral ties
Number of Combined footing	8 numbers (size of footing(4*2m))
Centre of the road to site distance	0.9m
Excavation equipment are used	Tractor (per hour 550 rupees) Etachi (per hour 850 rupees) Bulldozer (per hour 1300 rupees)
Number of columns	23 number
Number of combined footing	8 numbers

fig 2.3 : Stirrups and Combined Footing

The figure 2.3 shows that, the stirrups/lateral ties are used 8mm dia bars.

The footing details: Whenever two or more columns in a straight line are carried on a single spread footing, it is called a combined footing. Isolated footings for each column are generally the economical. Combined footings are provided only when it is absolutely necessary, as When two columns are close together, causing overlap of adjacent isolated footings. The size of the footing 4*2m and 12mm dia bars and 8mm lateral ties are used.

Fig 2.4: Columns and column reinforcement

The figure 2.4 shows the foundation pits is an open space excavated below the surface of the terrain for the purpose of founding and constructing the underground portions of a structure. Foundation is the lowest part of the building or the civil structure that is in direct contact with the soil which transfers loads from the structure to the soil safely. The foundation CC bed are provided 0.33m thick and 2m wide.

2.2.4 CONSTRUCTION OF DRAIN

The closed drain is constructed near 'KALA BHAVANA' and it is under the Nagara panchayath project.

Closed drains forms a complex network underground. The primary refuse individual areas is collected and transported to the main network, which finally goes to a treatment plant.

The information about Drains mentioned below:

Particulars	Details
Contractor name	Zaheer
Cost of the project	4 lakhs
Types of drain	Closed drain
Lenth of the drain	54m
Reinforcement details: Main bars Distribution bars	 10mm dia @150mm c/c 8mm dia @ 150mm c/c
Slab size Drain size	4*2m 2.5*2.5m
CC – bed (depth)	6 inches (150mm)
Material used : Coarse aggregate M-Sand	 20mm down size

Fig 2.5(a) Drain Reinforcement and form work

Fig 2.5(b) Drain project

A ‘drainage system’ can include anything from gutters and drains in houses to remove rainwater, stormwater systems to drain rainwater from roads into roadside drains and drainage systems to remove sewage from houses into municipal ‘sewers’ for disposal**.** There are two uses for a drainage system as part of existing and developing urban systems or cities. Drainage systems are in place to remove the excess water in development. This could be floodwater, rainwater, and different kinds of runoff. Drainage systems are also in place to effectively remove wastewater, which is referred to as a sewer system. There are both closed and open drains in different areas. Closed drain forms a complex network underground. The primary refuse from individual areas is collected and transported to the main network, which finally goes to a treatment plant.The fig 2.6 shows that reinforcements of the drains and spacing of the reinforcements. The spacing of the reinforcement 150mm c/c at both sides and length of the drain is 54m.

2.2.5 KURUNJIGUDA ZIGZAG INTERLOCK SYSTEM.

One of the sustainable and most durable flooring solutionsin the market, interlocking floor tiles are all the rage today. Interlocking floor tiles are one of the fastest-growing forms of specialty flooring options. As the name suggests, interlocking tiles can be easily installed as they fit together without the need for any gluing solutions.

Fig 2.6 different types of interlock system

Information about interlock system :

Site place	Kurunji gudda(under the nagara panchayath project)
Coast of the project	25lakhs
Total construction area	5,000 sqft (1 sqft=3 interlock)
Coarse aggregate	8mm down size aggregate are used
Types of interlock system	Zig-zag inter lock system are used

About interlock system and procedure:

Interlocking pavers can add aesthetic appeal to driveways, patios and walkways. Pavers are also known to be stronger than poured concrete and are easy to maintain and repair.

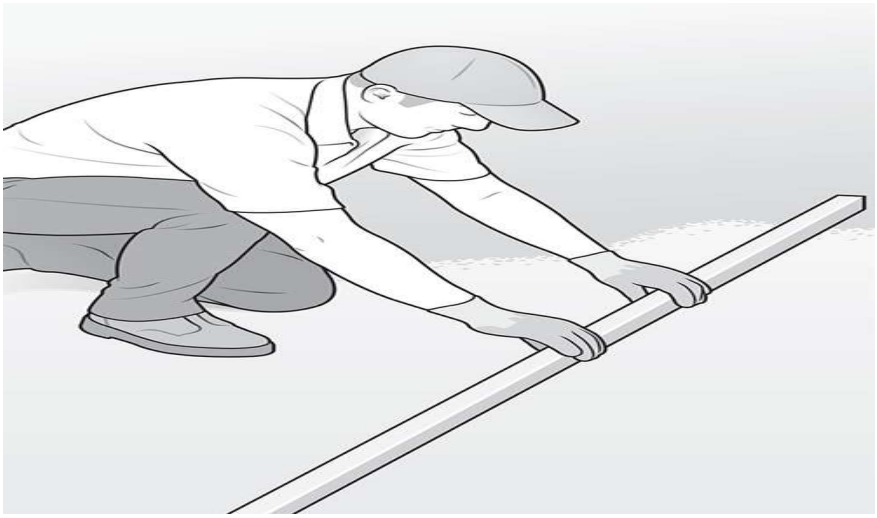
Before laying interlocking pavers, it's important to create a well-compacted, stable base. Begin by excavating all unstable or unconsolidated subgrade material. To estimate the depth of excavation needed, consider the final grade of the project by adding the height of the paver unit, the depth of the bedding sand and the thickness of the compacted base material.

Next, compact the paver base. You will want 3-4 inches of compacted base for pedestrian traffic, 4-5 inches of compacted base for vehicular traffic and 6-8 inches of compacted base if large vehicles will be driving over the paver installation. Fill the excavated site with the appropriate amount of paver base material and compact it using a vibrating plate compactor. The base must be well-compacted and level to provide a smooth, even surface on which to

lay the bedding sand. When preparing the grade of the base, be sure to provide a 1/8-1/4 inch of drop per foot for proper drainage.

Follow these steps to properly lay interlocking pavers.

Step 1



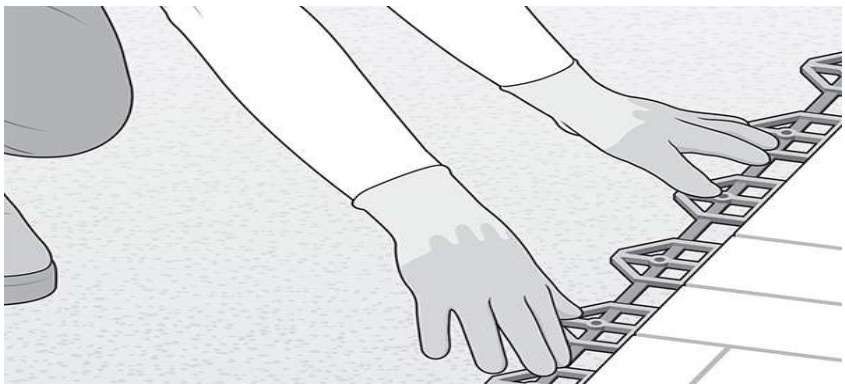
Lay Bedding Sand

A bed of sand is necessary to provide final leveling properties and help secure the pavers in place. Use clean, sharp concrete sand 1-inch deep. Allow for 1 cubic yard of sand per 300 square feet of project area.

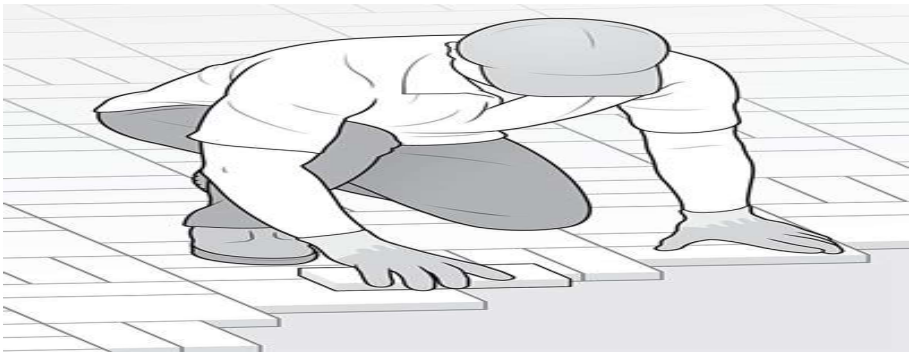
Step 2

Instal Edge Restraint

Install a stable edge restraint to eliminate any lateral movement of the pavers and sand bedding. Examples of edge restraints include an existing hard edge (such as the side of a house), vinyl molded restraints or concrete restraints.



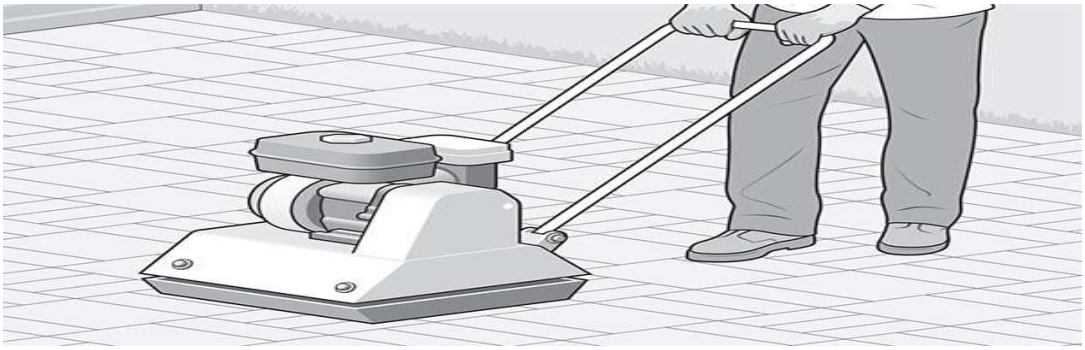
Step 3



Lay the Pavers

Place pavers flat on the sand bed, working in a forward motion. Start the process at either a 90-degree corner or within the field by using a pre-set string to guide the straightness of the pavers.

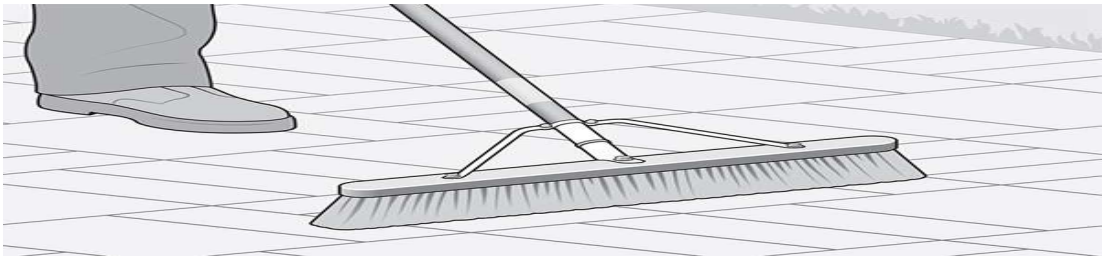
Step 4



Vibrate the Pavers

Once the paver field and borders have been placed, spread a light layer of sand over the pavers and run a vibrating plate compactor over them to begin the interlocking process.

Step 5



Sand the Pavers

Spread dry paver joint or masonry sand over the surface of the paver area approximately ¼ inch deep. Using the vibrating plate compactor, pass over the sanded pavers two or three times to allow sand to fill the voids between the pavers. Sweep remaining sand into voids until they are completely filled.

Fig 2.7 Laying of interlock system

2.2.6 COMMERCIAL BUILDING CONSTRUCTION

(Near ayurveda college sullia)

The commercial building are building that are used for commercial purposes. And includes office building, warehouse, and retail building (e.g. convenience stores, 'big box' stores , and shopping malls).

The commercial building constructed near Ayurveda college sullia, the parking facilities are provided in ground floors and in front of the building retaining wall is constructed about 3m height.

The details of the building mentioned below:

Column size	0.45*0.3m
Retaining wall Height Lenth	 3m 12.35m
Stair case opening	1.2m
Stair case reinforcement Main bar	 16mm dia bars
Column reinforcement Main bars Lateral ties	 16mm dia bars 8mm dia bars
Slab thickness	0.27m

COLUMN CONSTRUCTION STEPS AT SITE

Column construction is a crucial aspect of any structural project. Columns play a vital role in transmitting the load from the slab and beams to the underlying soil. Proper construction of columns ensures the stability and durability of the entire structure. In this article, we will discuss the step-by-step process of column construction at the construction site.

Types of RCC Column depending on Shapes Before diving into the construction process, it's essential to understand the different types of RCC columns based on their shapes. This classification helps in achieving specific architectural and structural requirements. The two primary types of RCC columns based on shapes are:

- Circular Columns: Circular columns are often used for uncovered exteriors, providing an elegant architectural view.
- Square or Rectangular Columns: Conventionally, square or rectangular columns are used for any structure.

Types of RCC Column Depending on Length

The length of a column also affects its design and construction. Based on the length-to-width ratio, RCC columns can be classified as:

- Short Columns: Short columns are considered when the height-to-width ratio (L/B) is less than or equal to 12. In most cases, a floor height of 3 meters or 10 feet results in the provision of short columns.
- Long Columns: When the height of a floor exceeds 3 meters or 10 feet, it is necessary to verify the L/B ratio. If the ratio is greater than 12, long columns are required. Designing long columns requires careful consideration of various forces that are produced.

Construction Process of RCC Columns

The construction process of RCC columns can be divided into the following four phases:

1. Column layouts - The first step in column construction is determining the layout of the columns. This involves placing ropes in the grid lines and labeling the position of columns. Accurate column

2. Column Reinforcement Work - Column reinforcement is a critical step to ensure the strength and stability of the columns. The following points should be considered during the reinforcement work:

- Verify the number and diameter of vertical bars.
- Determine the spacing between vertical bars.
- Calculate the development length based on the diameter of the bar.
- Ensure proper lapping of alternate bars at the same height.
- Avoid providing lapping inside beams or slabs.
- Provide lapping at l/3 or 2l/3 of the column, as per structural notes.
- Determine the spacing for stirrups according to the drawing.
- Bend the hooks of stirrups at precise angles.
- Verify the corner of the stirrups, ensuring they are perfectly tied with binding wire.

3. Column Formwork- Formwork is essential to provide support and shape to the columns during the concrete pouring process. Proper column formwork ensures accurate alignment and prevents any deformation. Consider the following points during the column formwork:

- Ensure the columns are aligned vertically to transmit the load effectively.
- Use adequately strong formwork to withstand the pressure of fresh concrete.
- Secure the formwork in position throughout the concreting process.

4. Pouring of Concrete- The final phase of column construction is the pouring of concrete. This step must be executed with precision to achieve a strong and durable column. Consider the following points during and after the concreting process:

- Determine the appropriate method of concrete placement, whether manual or with the aid of a machine or pump.
- Use machine-mix concrete for smaller quantities and ready-mix concrete (RMC) for larger quantities.
- Confirm with the client if the concrete should be placed using a pump or by hand.
- Aim for a target slump of 160 mm.
- Pour the concrete from a height not exceeding 1.5 meters to prevent segregation.
- Avoid construction joints in the column.
- Maintain the proper cover as per the structural drawings.
- Keep the temperature below 30 degrees Celsius during concrete pouring.
- After pouring and vibrating the concrete, carefully examine the horizontality.

Fig 2.8 Front view of Retaining wall

Fig 2.9 Column

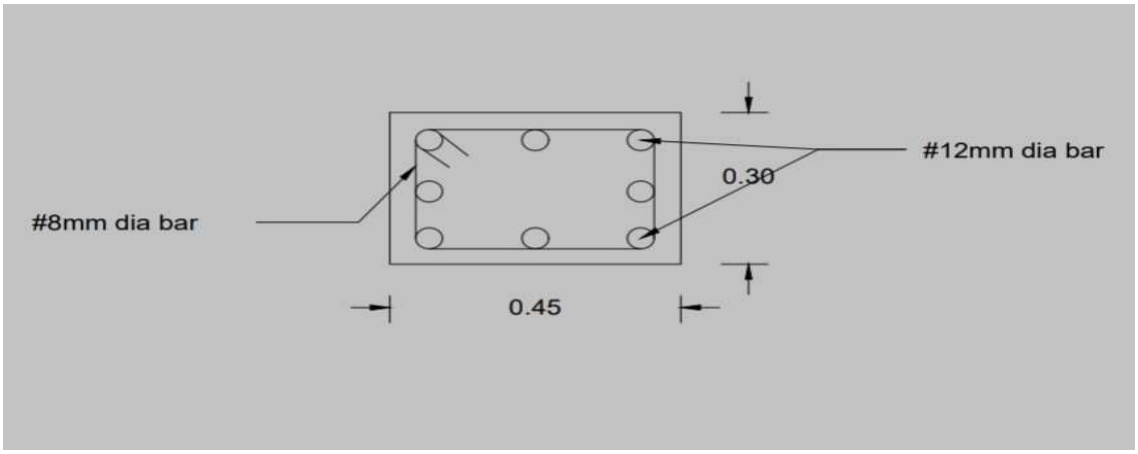


Fig 2.9(a) Cross section of column

(A) DIRECT SHEAR TEST

A direct shear test is a laboratory or field test used by geotechnical engineers to measure the shear strength properties of soil or rock material, or of discontinuities in soil or rock masses.

OBJECTIVES :

• To estimate the angle of friction and cohesion of soils.

Equipment used for test:

• Direct shear device

• Load and deformation dial gauge

• Calipers.

• Balance

STANDARD REFERENCE:

ASTM D3080: Standard test method for direct shear test of soil under consolidation drained conditions.

METHODS:

Preparation of specimen

1. samples can be obtained using sample trimmer or core cutter Undisturbed rammed into the field site and dugout. The sample obtained is thus leveled using a spatula.
2. Remolded sample can be prepared by compacting soil inside the shear box under various in situ condition depending on soil type or either outside the box and trimmed into required size
3. Size of sample vary from 60mm*60mm to 100mm*100mm depending on the size of the shear box and usually 20-25mm thick.

- The prepared sample is placed inside the shear box (2 halves secured with connecting pins and spacing screws) in the order of base plate-metal plate-plain grid plate- soil sample-plain grid plate-metal plate and loading pad with steel ball, from bottom to top.
- This order is for undrained unconsolidated test
- Serration of grid plates are perpendicular to the direction of shear
- The initial water content of the sample is needed to be measured
- The whole shear box is then secured inside the shearing apparatus (carriage box) provided with a water jacket to prevent the drying of the sample.
- Proving ring is placed forming contact with u shaped bend on the upper half of the shear box.
- Loading yolk is placed forming contact with the steel ball of the loading pad, which is used to apply normal stress.

- 2 Dial gauges are placed accordingly to measure longitudinal(shear) and vertical(normal) displacement of the sample during the test.
- Dial gauges and proving ring are set to zero.
- The shear load readings indicated by the proving ring assembly and the corresponding longitudinal displacements and vertical displacements should be noted at regular intervals (recommended 30sec) until the failure of the sample which is indicated by a kickback of pointer in dial gauge or until the longitudinal displacement exceeds 12mm. (20 % of the dimension of the specimen in direction of shear)
- After the end of the test. the final water content of the specimen is to be measured.
- This test shall be carried out for 3 to 4 samples of similar density and water content with varying normal stress which should correspond to the field values and design requirements.

MOULD FIGURE :

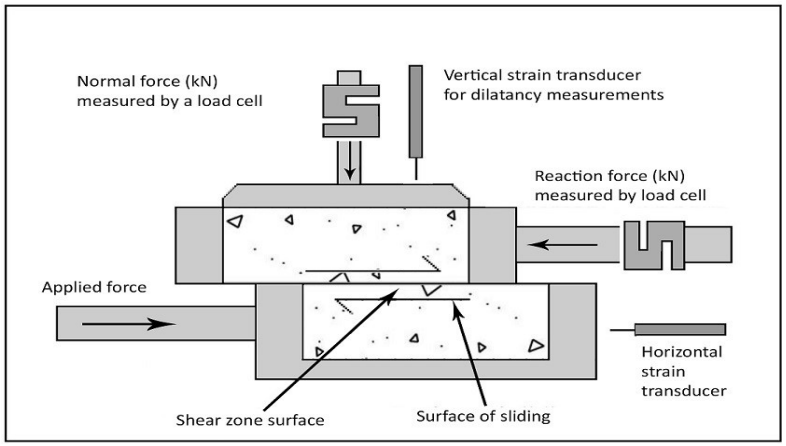


Fig 2.10 Direct shear Mould

MOULD SIZES:

01. Size of mould = 6cm
02. Area of the sample=36cm²
03. Height of mould =2.3cm
04. Volume of sample =A*H=36*2.3cm
    = 82.80cm³

Weight of soil= Volume of the mould*density MDD = 1.6 g/cc

= 82.8*1.6 OMC = 12%

= 132.48=133.00 gm

Weight of water = wt of soil * omc

133*(12/100) =15.96 = 16 ml

TABULATION AND CALCULATION:

Sl no.	DGR (mm)	Dl (DGR*Le)	Strain e=(dl/L)	Corrected area A '=B*(B-e)	PRR (KN)	Load (P)	Stress =(p/A')
01	50	0.5	0.02	35.88	8	0.0259	7.218
02	100	1	0.04	35.76	12	0.038	10.626
03	150	1.5	0.06	35.64	26	0.084	23.563
04	200	2	0.086	35.48	44	0.142	40..022
05	250	2.5	0.1086	35.34	52	0.168	47.538
06	300	3	0.13	35.22	56	0.181	51.391
07	350	3.5	0.152	35.08	68	0.220	62.713
08	400	4	0.173	34.96	82	0.262	74

Sl no.	DGR (mm)	Dl (DGR*Le)	Strain e=(dl/L)	Corrected area A '=B*(B-e)	Normal stress	Load (P)	PRR (KN)	Stress =(p/A')
01	400	4	0.173	34.96	0.5	0.262	82	74.942
02	500	5	0.217	34.69	0.7	0.389	120	112.136
03	550	5.5	0.239	34.56	0.9	0.454	140	131.36

Trail no.	Normal stress (KN/m²)	Shear stress (KN/m²)
01	50	74.942
02	70	112.136
03	90	131.36

RESULT: The shear parameters

Cohesion (C) = 48.5KN/m² , Angle of internal friction (Ø)= 43°

Fig 2.11 Apparatus and test sample of direct shear test

(B) CORE CUTTER

The core cutter method is a test used to determine the in-situ dry density of soil. It is only used in fine-grained cohesive soils without stones. The test requires cylindrical core cutters about 130 mm long and 100 mm in diameter. The bulk density of soil can be easily calculated using this method.

Where,

W_1 = Weight of cutter

W_2 = Weight of the soil + cutter

$W_2 – W_1$ = Weight of soil

V = Volume of the cutter

observation:

Sl no	Particulars	Trail
1	Diameter of Core cutter (D)	10cm
2	Height of the Core cutter (H)	13cm
3	Volume of Core cutter V=(μD²/4)*H	1021.01cm³
4	`Weight of empty core cutter (w1)	1036 grm
5	Weight of core cutter +soil (w2)	2962 grm
6	Weight of the soil w=w2-w1	1926 grm
7	Bulk density =W/V	1.88 g/cc
8	Water content w%	20%
9	Dry density	1.56g/cc

Water content determination :

Cup no	Wt of empty cup (w1) grm	Wt of cup +wet soil (w2)grm	Wt of cup +dry soil (w3)grm	Wt of Dry soil (w3-w1) grm	Wt of water (w2-w1) grm	Water content (w) (w2-w3)/(w3-w1)*100
1	20	50	45	25	5	20

Water content =(w2-w3)/(w3-w1)*100

(50-45)/(45-20)*100

=20%

Dry density = wet density /1+w= 1.88/1+0.20

=1.56g/cc

Result :

The bulk density of given soil sample =1.88g/cc

The water content w = 20%

The dry density of given soil = 1.56g/cc

Fig 2.12 CORE CUTTER

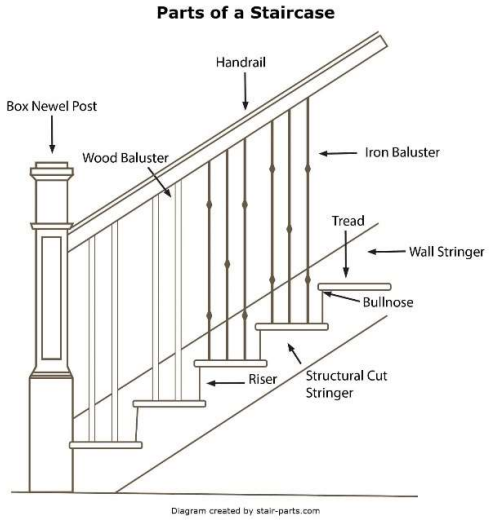
(C) STAIR CASE:

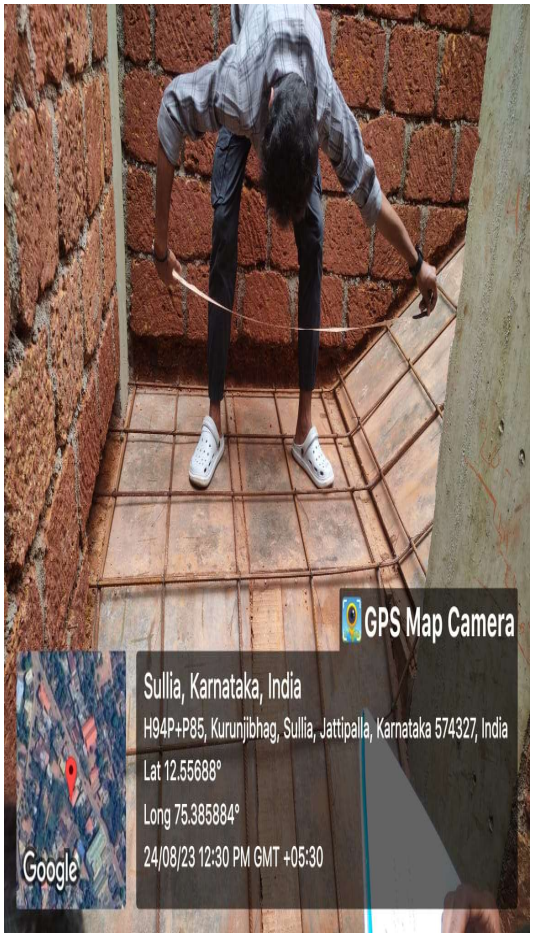
A stair flight is a run of stairs or steps between landings. A staircase or stairway is one or more flights of stairs leading from one floor to another, and includes landings, newel posts, handrails, balustrades and additional parts**.**

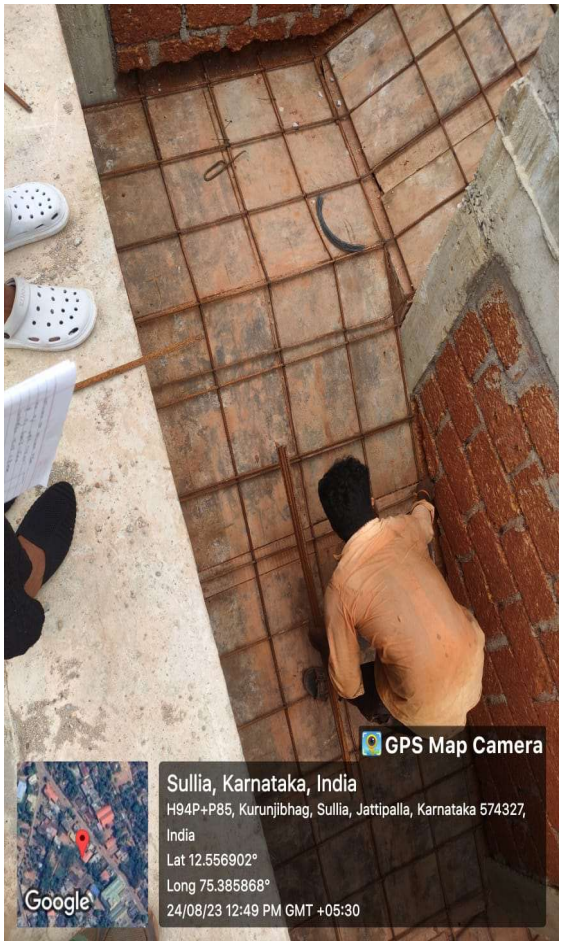
The different types of stairs are almost endless. The most common types of stairs are straight stairs, circular stairs, spiral stairs, switchback stairs, winder stairs, split stairs, and stairs with intermediate landings.

Components of Staircase:

1. Tread
2. Riser.
3. Head room.
4. Nosing.
5. Pitch or Slope.
6. Landing.
7. Hand rail.
8. Blusters. Stringer.
9. Window
10. Riser.







SL.NO	PARTICULARS	LENTHS
01	Stair case Opening	1.2 m
02	Stair case reinforcement for cover	2 inch/5cm/50mm
03	Reinforcement for stairs	10mm dia bars @150mm c/c
04	Reinforcement mat raised or raising mat	1 inch/25mm
05	Number of columns	4 no
06	Slab thickness	0.27m/2700mm
07	Beam width	0.30m

2.13 Fig and tabulation about Stair Case

2.2.7 ETABS SOFTWARE

ETABS is the abbreviation of " Extended3D Analysis of building System ". ETABSis a product of Computers and Structures, Inc. which is recognized globally as the pioneering leader in structural engineering analysis and design software for structural and earthquake engineering.

Advantages of ETABS

Compared to the other structural engineering software packages available in the market, ETABS has several advantages. Here are some of them:

- Built-in drawing utilities: To aid the engineers in modeling, ETABS comes with a built-in feature for drawing and drafting. Some other packages also have this feature, but the quality is much better in ETABS.
- Extensive reports: ETABS generates detailed and comprehensive reports for every project or task you perform, be it calculation of stresses, deformation or failure analysis, and design summary.
- Design of concrete and steel frames: Among all the materials available to build structures, concrete and steel are by far utilized the most in terms of volume. ETABS has specialized modules that deal with concrete and steel frames to optimize your calculations and offer capacity checks for frame elements.

ETABS (Engineering Analysis and Design Software) is commonly used in structural engineering for building analysis and design. The procedure for using ETABS involves several steps:

1. ***Model Creation**:* Begin by creating a 3D model of the structure within the software. Input the structural geometry, including columns, beams, slabs, and other components.

2. ***Assign Properties**:* Define material properties such as concrete or steel, as well as section properties like dimensions and reinforcement details.

3. ***Loading**:* Apply loads to the structure, including dead loads, live loads, wind loads, seismic loads, etc. These loads should comply with relevant building codes.

4. ***Analysis**:* Perform structural analysis within the software. ETABS uses various methods (such as finite element analysis) to analyze the structure's response to the applied loads and determine its behavior.

5. ***Design**:* Based on the analysis results, design the structural elements to ensure they meet safety and code requirements. ETABS provides tools to design elements like beams, columns, slabs, etc.

6. ***Review and Iteration**:* Review the analysis and design results, making necessary adjustments if required. This iterative process ensures the structure meets safety and performance standards.

7. ***Documentation**:* Generate reports, drawings, and documentation that summarize the structural analysis and design for further review and construction purposes.

Here are some key points about ETABS:

1. ***Structural Analysis and Design**:* ETABS is a specialized software used for structural analysis, design, and modeling of buildings and structures.

2. ***Multistory Buildings**:* It's particularly adept at handling complex multistory structures, considering various elements like beams, columns, slabs, shear walls, etc.

3. ***Geometric Modeling**:* Provides tools for creating accurate 3D models of structures, enabling detailed analysis and design.

4. ***Loads and Load Combinations**:* Allows users to apply various types of loads (such as gravity, wind, seismic) and create load combinations based on applicable design codes.

5. ***Analysis Methods**:* Utilizes diverse analysis methods like linear and nonlinear static and dynamic analyses to assess structural behavior under different conditions.

6. ***Design Codes and Standards:*** Supports various international design codes and standards, ensuring compliance with local regulations and industry standards.

7. ***Efficiency and Iterative Design**:* Facilitates an iterative design process, allowing engineers to analyze, optimize, and refine structural designs for efficiency and safety.

8. ***Output and Reporting**:* Generates detailed reports, drawings, and analysis results that aid in decision-making, documentation, and communication with stakeholders.

9. ***Integration and Compatibility:*** Offers interoperability with other engineering software and allows for importing and exporting data to ensure seamless collaboration.

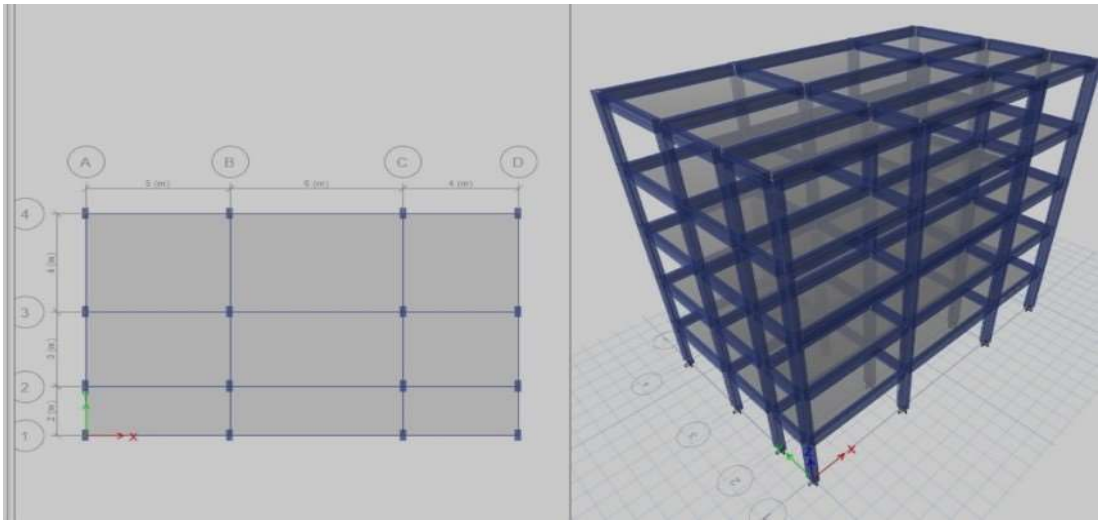


Fig 2.14(a) Sketch-up drawing (Column Marking)

Fig 2.14(b) Information about E-Tabs

Fig 2.14(c). Sharing information about E-Tabs

CHAPTER 3

SPECIFIC OUTCOMES OF INTERNSHIP

- As ability to apply knowledge of mathematics, science, and engineering As ability to function on multidisciplinary teams.
- An understanding of professional and ethical responsibility An ability to communicate effectively.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- A recognition of the need for, and an ability to engage in life long learning.

3.1 PERFORMANCE DURING ACCOMPLISHING WORK

- Site visits
- Attended technical talks by lectures
- Site measurements
- Observation of building drawing

3.2 BENEFITS OF INTERNSHIP TRAINING

As a result of internship program, the following conclusion are listed Identify and solve engineering problems.

- Understand the need of education to understand the impact of engineering.
- Use skills and techniques of using tools.
- Identify different leadership skills and styles.
- Assess and evaluate personal managerial strengths and weakness.
- Evaluate the carrier alternatives. Improve written and oral communication skills and typing skills.
- Conduct the field experiments and develop or suggest alternative solution
- Improved my way of communicating with labours

3.3 CHALLENGES FACED

Construction projects are complex and time-consuming undertakings that require the interaction and cooperation of many different persons to accomplish. The construction industry is typically divided into specialty areas, with each area requiring different skills, resources, and knowledge to participate effectively in it. In order to integrate and work closely in each section it is a challenging task to one person especially when he/she is fresh or beginner. In fact some challenges may be solved by me but some are above my limit and even the workers at the site also. In general I have faced the following challenges in the internship period.

- Weather condition of the site.
- Shortage of knowledge in some portion of the work at the site.
- Unsatisfactory answers for questions from labours.
- Safety facility