

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI – 590 018



INTERNSHIP REPORT
On
CONSTRUCTION OF
MULTISTORIED BUILDING

*Submitted in partial fulfillment of the
Requirement for the Award of*

BACHELOR OF ENGINEERING

in
CIVIL ENGINEERING

Submitted By

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Internship carried out at:

PUBLIC WORKS DEPARTMENT (PWD)

UNDER THE GUIDANCE OF

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DEPARTMENT OF CIVIL ENGINEERING

S J C INSTITUTE OF TECHNOLOGY

CHICKBALLAPUR – 562 101

2021-22



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CHICKBALLAPUR - 562 101, KARNATAKA

DEPARTMENT OF CIVIL ENGINEERING



CERTIFICATE

This is to certify that the Internship Work entitled "CONSTRUCTION OF MULTISTORIED BUILDING" is a bonafide work carried out by **KIRAN KUMAR B C (1SJ18CV052)** is bonafide student of S J C Institute of Technology in partial fulfillment for the award of Bachelor of Engineering in Electronics and Communication Engineering in Visvesvaraya Technological University, Belagavi during the academic year 2021-22. It is certified that they have completed the Internship satisfactorily.

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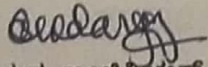
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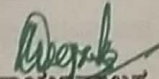
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INTERNSHIP COMPLETION CERTIFICATE

This is to certify that **Mr. KIRAN KUMAR B.C(USN: 1SJ18CV052)** student of S J C Institute Of Technology Chickaballapur has successfully completed his internship Vide Ref No: **SJCIT/CED/IL/177/2021-2022** date: **20-04-2022** in the Civil works of Multistoried Buildings and State Highway Development Project in our Subdivision from the date: **20-04-2022** to **20-05-2022** during his internship his Conduct and Character is Good in his service of One Month in This Division.

ತಮ್ಮವಿಶ್ವಾಸಿ,


ಸಹಾಯಕ ಇಂಜಿನಿಯರ್ -2


ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಇಂಜಿನಿಯರ್
ಲೋಕೋಪಯೋಗಿ ಇಲಾಖೆ ಉಪವಿಭಾಗ,
ಮಧುಗಿರಿ.

ACKNOWLEDGMENT

With great pride I would like to express my gratitude to S J C Institute of Technology. The temple of learning for providing us the required platform for the fulfillment of the internship.

Remembering with reverence, I offer my pranamas at the lotus feet of Byravaikya Padmabhushana Paramapoojya Jagadguru Sri Sri Sri Dr. Balagangadharanatha Mahaswamiji.

Submitting devout pranamas and seeking the blessings of his holiness Paramapoojya Jagadguru Sri Sri Sri Dr. Nirmalanandanatha Mahaswamiji and poojya Sri Sri Mangalanatha Swamiji.

I express my sincere thanks to Dr. G T Raju, Principal of SJCIT, Chickballapur for providing us with excellent infrastructure to complete the internship.

I express wholehearted gratitude to HOD Mr. NARAYANA.G who is the respectable HOD, Civil Department. We wish to acknowledge the support for making our task easy by providing us with all valuable help and encouragement.

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And last but not the least, I would be very pleased to express my heartfelt thanks to PUBLIC WORKS DEPARTMENT(PWD), MADHUGIRI for their guidance and support provided to complete the internship.

I also thank all those who extended their support and co-operation while bringing out this internship.

Finally, I would like to thank our family members and friends for their kind co-operation and motivation to proceed in my Internship work.

KIRAN KUMAR B C (1SJ18CV052)

ABSTRACT

Internship training offered by Public Works department (PWD) Madhugiri was fortunate opportunity for me during my 4th year of under graduation it helped me to apply my theoretical knowledge gained during the university academic program into real world industrial based execution and experience professional construction process it helped me to enhance my skill and to enrich my industrial knowledge keeping me update with the latest technologies. This opportunity has extremely helped me to expose into an environment where I could think as a civil engineer.

I had my training experience from 20th April to 20th May 2022 at PWD Madhugiri.

This report contains the knowledge and experience I have gained through my Internship training at PWD Madhugiri(T), Tumkur(D).

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CHAPTER-1

1.1 ABOUT THE COMPANY

INTRODUCTION

PWD : PUBLIC WORKS DEPARTMENT

The Public Works Department is the central authority that looks into all kinds of public sector works in India.



Karnataka Public Works Department (also known as Karnataka Public Works, Ports and Inland Water Transport Department or KPWD) is the Karnataka government agency in charge of the public works in the state of Karnataka, India. It is entrusted with the responsibility of construction and maintenance of buildings for most of the Karnataka government departments and Public undertakings and maintenance of road works including the National Highways, State Highways and Major District roads.



Fig. 1.1: PWDOFFICE, Madhugiri (T),Tumkur (D)

Karnataka State has been divided into four revenue divisions, 49 sub-divisions, 31 districts, 237 taluks and 747 hoblies/revenue circles and 5628-gram panchayats for administrative purposes.

Public Works Department is engaged in planning, designing, construction and maintenance of government assets in the field of built environment and infrastructure development. Public Works Department (PWD) is responsible for construction and maintenance of most of the Master Plan roads in Delhi.

The functions of PWD Department are Design, construction and management of central Government on-residential buildings other than those of Railway, Communications, and Atomic energy, Defense Service, All India Radio, Door darshan and Airports. Construction and maintenance of residential accommodation meant for Central Government Employees.

1.2 VISION AND MISSION OF PWD DEPARTMENT

VISION

- ❖ Build World-Class ,Mega Organization which makes significant contribution to the Society. And have a positive effect on the economic and social life of our state.

1.3 MISSION

- Based on innovative products and services that make a difference and excellence of its business operations.
- By providing the best quality and range of professional services with minimal cost and on-time completion.
- Continual improvement in quality and cost through innovative technology and effective utilization of resources.
- By exceeding customer satisfaction.
- Survey, plan, Design, Estimate and execute various classes of road as well as Government buildings and other infrastructure facilities all over the state.
- Work with the communities ,other Government Department and the private sector together best result.

1.4 ABOUT THE PROJECT

INTRODUCTION ABOUT PROJECT

Construction of 4th Additional District And Sessions Court At Tumkur (to sit at Madhugiri) in Tumkur District. The site area is 404.4 ft length and 101.1 ft Breadth . On the defending court building under the tossa works(Appendix-E) (4059-80-051-0-32-386) Ray court has already began building a two court hall. The total estimated cost for the project is 200.00 lakhs.

- 1) Implementation of RCC M20 concrete, beams columns for canopy and chassis.
- 2) Non-Modular brick in 1:6 c.c.
- 3) Non-Modular brick 11.2 cm. Partition wall of thickness in 1:4 c.g.
- 4) Collapsible steel doors.
- 5) For MS grill windows.
- 6) Aluminum window doors.
- 7) Nandi wood door frames.
- 8) Horned wood door valves.
- 9) Vitrified flooring.
- 10) Granite flooring for corridors and lobbies.
- 11) Muddy work for brick building in 1:6 c.g.
- 12) Plastic emulsion paint coating to the interior of the building.
- 13) Texture paint to the exterior of the building.
- 14) The price of TMT.
- 15) Electro dynamic water supply and sanitary works.
- 16) Implementation of air conditioning.
- 17) Implementation of POP.

18) Implementation of wardrobe.



Fig: 2.1 TALUK COURT COMPLEX, MADHUGIRI



Fig:2.2 PLAN

CHAPTER 2

2.1 PLAN

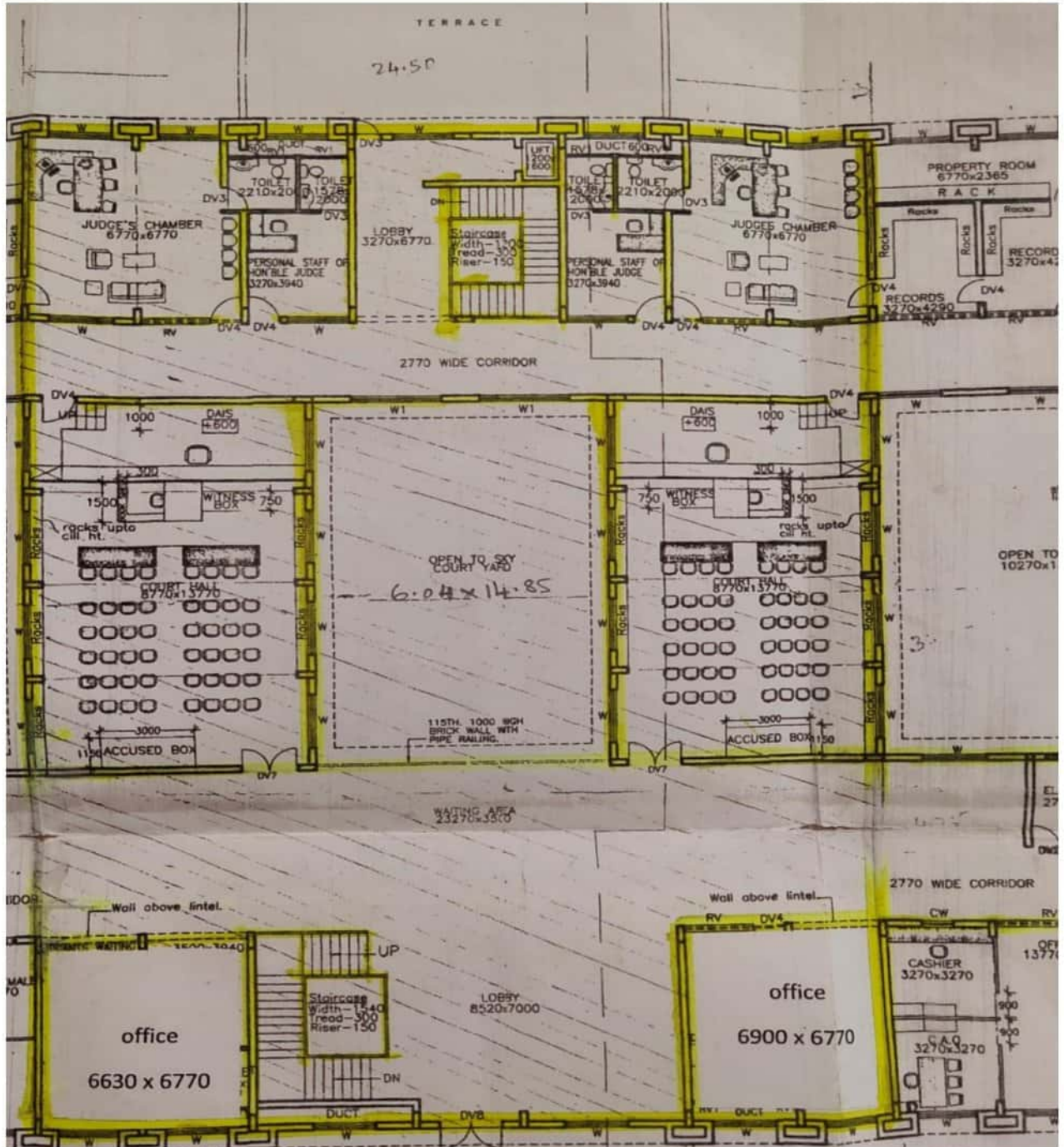


Fig:3.1 PLAN FOR CONSTRUCTION OF 4th ADDITIONAL DISTRICT AND ADDITIONAL COURT AT TUMKUR (to sit at Madhugiri) IN TUMKUR DISTRICT

2.2 SITE SAFETY RULES AND SITE LOCATION

SAFETY(ENVIRONMENTAL, HEALTH & SAFETY)

After a brief introduction of the Company, Project and Departments, We were assigned to EHS department for.

Safety of all the people at the site is of at most importance to SHREEDEVI DEVELOPERS; hence each Personnel entering the Site will be briefed about the safety requests and preventive measures to be taken for safe and efficient operation.

The EHS Department at site, Headed by the PM consisted of

- EHS MANAGER.
- SR. ENGINEER.
- Safety Stewards.
- Workmen.

2.2 SAFETY SCOPE

- SAFETY POLICY
- MASTER LIST OF DOCUMENTS
- HIRA
- SOP
- TRAINING
- INCENTIVES AND AWARDS
- EMERGENCY PREPAREDNESS
- CONTINUAL IMPROVEMENT

2.3 INTRODUCTION PROGRAMME.

It's a preliminary audio, Visual Training Which informs every personnel about the precautionary measures to be followed, such as, NOT to

- Sleeping at site.
- Take shelter below parked vehicles.
- Smoking at zones.
- Jumping directly from higher floors.
- Operating electrical equipment's without help from Certified ELECTRICIAN. Etc...

2.4 DIGITAL AID FOR INDUCTION

We were introduced to various PPE's and their usage. Few PPE (Personal protection equipment)'s are,



Fig: 3.2 Digital AID for induction

- Helmet.
- Safety Shoes.
- Reflective Jackets.
- Nose cap.
- Gloves.
- Glasses.
- Ear plug .

We were familiarized with the various hazards at the site through an animated film, which depicted the ill effects of not following the safety procedures.

CHAPTER 3

3.1 QUALITY CONTROL

3.1 COMPRESSION TEST ON CUBES

- This test give us an idea about all the characteristics of concrete. With the help of this test we can check that whether Concreting has been done properly or not. and compressive strength is the ability of material or structure to carry the loads on its surface without any crack or deflection. A material under compression tends to reduce the size, while in tension, size elongates.
- Compressive strength of concrete depends on many factors such as water-cement ratio, cement strength, quality of concrete material, quality control during production of concrete etc.



Fig 3.3 Compression test on concrete blocks

3.1.1 RESULTS OF COMPRESSION STRENGTH ON 10 DAYS (TABLE 1.1)

Sl.no	Dimension of specimen(mm)	Cross sectional area(sq.mm)	Date of casting	Date of testing	Age at test(days)	Weighth(kg)	Failure load(kN)	Compressive strength(N/m ²)
1.	150*150*150	22500	21-08-20	31-08-20	10	8.25	680	30.2
2.	150*150*150	22500	21-08-20	31-08-20	10	8.20	690	30.7
3.	150*150*150	22500	21-08-20	31-08-20	10	8.22	675	30.0

3.1.2 RESULTS ON COMPRESSION STRENGTH ON 28 DAYS (TABLE 1.2)

Sl.no	Dimension of specimen(m m)	Cross sectional area(sq.mm)	Date of casting	Date of testing	Age at test(days)	Weighth(kg)	Failure load(kN)	Compressive strength(N/mm ²)
1.	150*150*150	22500	21-08-20	18-09-20	28	8.24	1073	47.7
2.	150*150*150	22500	21-08-20	18-09-20	28	8.18	1038	46.1
3.	150*150*150	22500	21-08-20	18-09-20	28	8.23	1050	46.1

CHAPTER-4

REINFORCEMENT BARS



Fig\$:3.4 REINFORCEMENT BARS

4.1SIZE OF THE BARS

The following are the size (diameter) of reinforcement for different works.

- Column (8mm,10mm, 16mm, 20mm, 25mm)
- IS 555 TMT steel bars are used for the construction of column and other works.



Fig:3.5 CONSTRUCTION SITE OF COURT BUILDING



4.2 COLUMN REINFORCEMENT DETAILS

- Bar size - 8mm,10mm, 16mm, 20mm, 25mm.
- Spacing - 4#20mm dia Longitudinal Bars at 250mm C/C
2#20mm dia bars at 100mm C/C
12mm dia Vertical stirrups at 300mm C/C



Fig:3.6 COLUMN REINFORCEMENT

4.3 SHUTTERING



Fig:4.1 SHUTTERING

To hold the concrete shuttering firmly in place and for proper alignment a concrete pad called starter is cast before fixing the shuttering. The thickness is about 45 mm to 60 mm and dimensions are precisely the same as the dimensions of proposed column. The starter should be cured for a day or 2 so that it is hard enough to fix the shuttering around it.

Column box or shuttering for columns is made of plywood sheets or steel sheets fabricated with adequate stiffeners.

A thin films of oil or grease should be applied to inner surface of the shuttering to enable easy removal of the column after the concrete hardens.

Shuttering should be properly aligned to its verticality and diagonals to be checked to ensure accuracy in dimensions.

Formwork has to be thoroughly supported with props size before pouring the concrete so that it does not moves horizontally or vertically during concreting.

The gaps near the shuttered joints should be sealed with plaster or a piece of wood to prevent any leakage of slurry.

Appropriate space is to be provided in the inner face of the shutter and reinforcement by fixing cover blocks of about 40mm.

It is preferable to remove shutters after 24 hrs. of casting and if they need to be removed earlier, it should not be removed within sixteen hours.

The removal of shutters has to be done gently without jerks so that edges of columns are not damaged.

Care should be taken regarding fixing and supports of column shuttering to prevent it from movement during concreting.

Diagonals of the shuttering to be checked to ensure dimensional accuracy.

4.4 CONCRETING

Concrete pouring is the final step for column construction.

Manual mix concrete was used in the construction of column. Concrete should be poured up to slab bottom and the remaining column should be concerted during beam and slab concreting.

Mechanical vibrator are used for full compaction of column and each layer should be compacted properly.

After that curing was done for the column concrete about 7 to 10 days.



Fig:4.2. CONCRETING

CHAPTER 05

CONSTRUCTION OF BURNT BRICK MASONRY

5.1 CONSTRUCTION OF BURNT BRICK MASONRY (BBM) WITH CEMENT MORTAR (CM 1:6)



Fig:4.3 BRICKS



FIG:4.4 CEMENT MORTAR (1:60)



Fig:4.5 CONSTRUCTION OF BURNT BRICK MASONRY WALL

5.2 WORK PROCEDURE OF BRICKWORK IN MASONRY CONSTRUCTION

‘Standard specification and work procedure for brickwork in masonry construction’ provides guidelines about quality of bricks, mortar, soaking of bricks, laying of bricks, curing, scaffolding etc. The construction of brickwork in substructure and superstructure requires quality control on various aspects of material and construction procedure.

5.2.1 MATERIALS FOR BRICKWORK

Bricks

The quality of bricks to be used in masonry construction should be of standard specifications (good brick earth, thoroughly burnt and deep cherry red or copper in color). Bricks should be regular in shape and their edges should be sharp. Bricks should emit a clear ringing sound on being struck and should be free from cracks, chips, flaws and lumps of any kind.

Bricks should not absorb water more than one-sixth of their weight after one-hour soaking by immersing in water. Standard bricks should have a crushing strength of 105 kg/sq.cm or 1500 lbs/sq.in.

Mortar

Mortar should be of the specified grade and materials used for mortar should be of standard specifications.

For cement mortar, cement should be fresh Portland cement or pozzolana Portland cement of standard specifications. Sand should be sharp, clean, and free from organic and foreign matters. Coarse or medium-sized sands should be used for rich mortar, and local fine sand may be used for weak mortar.

The proportion of cement-sand for mortar can vary from 1:3 to 1:6 or as specified. Materials of mortar should be measured to have required proportion with measuring box. Cement and sand should first be dry-mixed to have a uniform color on a clean masonry platform and then mixed by adding clean water slowly and gradually to have workable consistency and mixed thoroughly by turning at least three times.

Only freshly mixed mortar should be used for construction; old and stale mortar should not be used. Mortar for one hour’s work should only be mixed with water so that they can be used before setting starts.

Soaking of Bricks

Bricks should be fully soaked in clean water by submerging in a tank for a period of 12 hours immediately before use. Soaking should be continued till the air bubbles have ceased to appear.

Laying of Bricks

Bricks should be laid in English bond unless specified and should be well bonded. Every course should be truly horizontal, and walls should be truly in plumb. Vertical joints of consecutive course should not come directly over one another; vertical joints in the alternate course should come directly over one another.

No damaged or broken bricks should be used. Closers should be of clean-cut bricks and should be placed near the ends of walls but not at the other edge. Selected best-shaped bricks should be used for face work.

Mortar joints should not exceed 6 mm (1/4 inch) in thickness and joints should be fully filled with mortar. Bricks should be laid with frogs upward except in the top course where frogs should be placed downwards.

Brickwork should be carried out for not more than 1 metre or 3 feet in height at a time. When one part of the wall has to be delayed, stepping should be left at an angle of 45 degrees. Corbelling or projections, where made, should not be more than 1/4 brick projections in one course. All joints should be raked and faces of wall are cleaned at the end of each day's work.

Curing of Brickwork

The brickwork should be kept wet for a period of at least 20 days after laying. At the end of day's work, the tops of walls should be flooded with water by making small weak mortar edging to contain at least 2.5cm or 1 inch deep water.

Protection for Brickwork

The brickwork should be protected from the effect of sun, rain, frost etc. during the construction since it is green and likely to get damaged.

Scaffolding for Brickwork

Necessary and suitable scaffolding should be provided to facilitate the construction of a brick wall. Scaffolding should be sound and strong with supports and members sufficiently strong to withstand all loads likely to come upon them.

Measurement of Brickwork

Brickwork should be measured in cubic meter or cubic feet. Different kinds of brickwork with different mortar should be taken under separate items. The thickness of the wall should be taken as the multiple of half brick as 10cm, one brick as 20cm, 1.5 bricks as 30 cm and so on. The rate should include the cost of complete work including scaffolding and all tools and plants.



Fig:4.6 CONSTRUCTION OF BRICK WALL

5.3 BRICK MASONRY CONSTRUCTION PROCEDURE

- Initially, mix the mortar with water and blend it until a smooth and plastic mortar is produced.
- After that, place the mortar on foundation line evenly using trowel (25mm thickness and one brick wide is recommended for laid mortar).
- Then, lay the first course of stretcher bricks in the mortar. Start with second brick, apply mortar to the head joint end of each brick, After that shove the bricks into place firmly so that the mortar is squeezed out of all side of the joints.
- Utilize a level to examine the course for correct height. ensure that bricks are plumb and level.
- Place another mortar line alongside the first course, then begin laying the second course.
- Use the two half bricks to begin the second to ensure that the first two courses are staggered for structural purposes.
- To finish the second course of the lead, lay three header bricks and make sure that they are plumb and level.
- The third and fifth courses consists of stretchers similar to the first course. The fourth course begins with single header, followed by stretchers. Use the level to make sure that the lead is true on each course. Lastly, this pattern of brick laying is used till the target height is reached.

5.4 POINTS CONSIDERED IN SUPERVISING BRICK MASONRY CONSTRUCTIONS

The following points should be observed in the construction of brick masonry:

- Use good quality bricks.
- Ensure that brick courses are perfectly horizontal.
- Verticality of the wall should be ensured by frequently checking with plumb-bob.
- Whenever work is stopped brick masonry should be left with toothed end.
- Use of brick bats should be avoided.
- Raising walls by more than 1.5 m in one day shall be prevented.
- Raise face joints to a depth of 12 to 20mm so as to be used as a key for plastering or pointing.
- Brick masonry should be regularly cured for 2 weeks.
- The thickness of mortar joints shall be 10 mm both horizontally and vertical.

CHAPTER -6

CONCLUSION

The internship is a bridge between the theoretical knowledge and the practical or the reality work at the field of construction or civil engineering work. we all who take the internship class go the companies that already working either as a consultant or a contractor. This program played an important role to break the conventional thought that field works can be only implemented by students who hold a degree or people who have an experience in building construction. As an undergraduate, this training program was an excellent opportunity for me to get to the ground level and experience the things that I would have never gained through going straight into a job. Internship was very great opportunity I got to apply the theories that I learnt with the real industry for real situations. Having exposed to situations I was able to obtain lot of experiences which will be definitely helpful to attain success in my future career as an engineer. Finally, I can say with a great pleasure that 30 days of internship was a helpful period of time for me to excel my skills. The experience I gained through this training program will be a strong foundation to my career.