VISION:

To ensure that the Diploma Level Technical Education constantly matches the latest requirements of Technology and industry and includes the all-round personal development of students including social concerns and to become globally competitive, technology led organization.

MISSION:

To provide high quality technical and managerial manpower, information and consultancy services to the industry and community to enable the industry and community to face the challenging technological & environmental challenges.

QUALITY POLICY:

We, at MSBTE are committed to offer the best in class academic services to the students and institutes to enhance the delight of industry and society. This will be achieved through continual improvement in management practices adopted in the process of curriculum design, development, implementation, evaluation and monitoring system along with adequate faculty development programs.

CORE VALUES:

MSBTE believes in the following:

- Skill development in line with industry requirements
- Industry readiness and improved employability of Diploma holders
- Synergistic relationship with industry
- Collective and Cooperative development of all stake holders
- Technological interventions in societal development
- Access to uniform quality technical education.

A Laboratory Manual

For

Building Materials and Construction

(312338)

SEMESER-II

“K-SCHEME”

(CE/CR/CS/LE)

Maharashtra State

Board of Technical Education, Mumbai.

(Autonomous) (ISO: 9001:2015) (ISO/IEC 27001:2013)

Maharashtra State Board of Technical Education, Mumbai
(Autonomous) (ISO: 9001: 2015) (ISO/IEC 27001:2013)
4th Floor, Government Polytechnic Building, 49, Kherwadi,
Bandra (East), Mumbai – 400051,
(Printed On _____, 2024)

Maharashtra State
Board of Technical Education, Mumbai.

Certificate

This is to certify that Mr. / Ms. ……

Roll No……of Second semester of Diploma in ……..…….... of Institute……..…… …… (Code :…) has completed the term work satisfactorily in course **Building Material and Construction (312338)** for the academic year 20…… to 20…… as prescribed in the curriculum**.**

Place: …… Enrollment No: ……..

Date: ……. Exam. Seat No: ……

Subject teacher **Head of the Department** **Principal**

Seal of Institution

PREFACE

The primary focus of any engineering laboratory/ field work in the technical education system is to develop the much-needed industry relevant competencies and skills. With this in view. MSBTE embarked on this innovative 'K' Scheme curricula for engineering diploma programs with outcome-based education as the focus and accordingly, relatively large amount of time is allotted for the practical work. This displays the great importance of laboratory work making each teacher, instructor and student to realize that every minute of the laboratory time need to be effectively utilized to develop these outcomes, rather than doing other mundane activities. Therefore, for the successful implementation of this outcome- based curriculum, every practical has been designed to serve as a **'vehicle'** to develop this industry identified competency in every student. The practical skills are difficult to develop through chalk and duster' activity in the classroom situation. Accordingly, the 'K' scheme laboratory manual development team designed the practical to **focus** on the **outcomes**, rather than the traditional age-old practice of conducting practical to 'verify the theory" (which may become a byproduct along the way).

This laboratory manual is designed to help all stakeholders, especially the students, teachers and instructors to develop in the student the pre-determined outcomes. It is expected from each student that at least a day in advance, they have to thoroughly read through the concerned practical procedure that they will do the next day and understand the relevant theoretical background associated with the practical. Every practical in this manual begins by identifying the competency, industry relevant skills, course outcomes and practical outcomes which serve as a key focal point for doing the practical. The students will then become aware about the skills they will achieve through procedure shown there and necessary precautions to be taken, which will help them to apply in solving real-world problems in their professional life.

This manual also provides guidelines to teachers and instructors to effectively facilitate student-centered lab activities through each practical exercise by arranging and managing necessary resources in order that the students follow the procedures and precautions systematically ensuring the achievement of outcomes in the students.

Building material and construction is a Basic subject in Civil Engineering, which deals with the construction processes of sub structure, super structure, Building finishes and maintenance of buildings. This course essentially imparts the knowledge of construction material along with the processes involved in it and various construction equipment’s used for effective execution of various construction activities. This knowledge shall be used for effective and efficient up keeping of building after construction. This will enable the students to undertake the activities in comparatively shorter period of time.

Although best possible care has been taken to check for errors (if any) in this laboratory manual, perfection may elude us as this is the first edition of this manual. Any errors and suggestions for improvement are solicited and highly welcome

Programme Outcome (POs) to be achieved through Practical

PO 1. Basic & Discipline specific knowledge: Apply knowledge of basic mathematics, sciences and engineering fundamentals and engineering specialization to solve the engineering problems.

PO 2. Problem Analysis: Identify and analyze well defined engineering problems using codified standard methods.

PO 3. Design /Development Solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

PO 4. **Engineering tools experimentation and testing:** Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO 5. Engineering practices for society sustainability and environment: Apply appropriate technology in context of society, sustainability, environment and ethical practices.

PO 6. **Project Management:** Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

PO 7. Lifelong learning: Ability to analyze individual needs and engage in updating in context of technological changes.

List of Industry /Employer expected Outcome

The following industry/employer relevant skills expected by implement safe building construction practices with relevant building materials are to be developed in you by undertaking the practical of this laboratory manual.

1. Identify components of building structures
2. Select materials required for the components
3. Identify defects in woods and grain distribution.
4. Propose suitable type of foundation for building structures
5. Set out foundation plan on ground
6. Measurement skill
7. Select appropriate material for construction of wall.
8. Construct the brick wall in English and Flemish bond
9. Maintain verticality and horizontality of wall
10. Select the relevant material for termite chemical.
11. Apply relevant method of for termite chemical.
12. Select the relevant material for finishing works and waterproofing.
13. Apply relevant method of painting.
14. Apply relevant method of plastering
15. Measure surface evenness using plumb bob.
16. Select suitable type of masonry for building structures.
17. Select the materials for scaffolding formwork and centering
18. Select relevant scaffolding for work
19. Erect the scaffolding, formwork and centering
20. Check the level of scaffolding, formwork and centering
21. Propose relevant means of communications for different types of buildings.
22. Select the staircase on the basis of utility
23. Locate the position of Door and Window
24. Execute the process of flooring and roofing
25. Identify defects in flooring, roofing plastering and suggest remedial measures
26. To understand traditions that are specific to your ancestors.
27. Acknowledgement of historical artefacts, practices and sites which should be preserved for the benefit of future generations.

Guidelines to teachers

1. Teacher should provide the guideline with demonstration of practical to the students with all features.
2. Teacher shall explain prior concepts to the students before starting of each practical.
3. Involve students in performance of each practical.
4. Teacher should ensure that the respective skills and competencies are developed in the students after the completion of the practical exercise.
5. Teachers should give opportunity to students for hands on experience after the demonstration.
6. Teacher is expected to share the skills and competencies to be developed in the students.
7. Teacher may provide additional knowledge and skills to the students even though not covered in the manual but are expected the students by the industry.
8. Finally give practical assignment and assess the performance of students based on task assigned to check whether it is as per the instructions.

Instructions to Students

1. Organize the work in the group and make record all programs.
2. Students shall develop maintenance skill as expected by industries.
3. Student shall attempt to develop related hand-on skills and gain confidence.
4. Student shall develop the habits of evolving more ideas, innovations, skills etc. those included in scope of manual
5. Student shall refer technical magazines.
6. Student should develop habit to submit the practical on date and time.
7. Student should well prepare while submitting write-up of exercise.
8. Attach /paste separate papers wherever necessary.

Practical Course Outcome matrix

Course Outcomes (Cos)

- CO1 - Identify relevant type of construction materials for the given type of building.
- CO2 - Use the relevant type of special purpose construction materials in the given situation.
- CO3 - Undertake the given type of building construction activity for the given component of building Structure.
- CO4 - Design the relevant means of communication for the given building structure.
- CO5 – Use the relevant type of material for finishing purpose in the given situation.

Pr. No.	Title of the Practical	Mapped Course Outcome				
		CO 01	CO 02	CO 03	CO 04	CO 05
01	*Identify minimum three available construction materials in the laboratory and prepare a report with photos/pictures/sketches including write up on its sources and utility.	√	--	--	--	--
02	Identify the grain distribution pattern of the given sample of wood material available in the laboratory and draw the various patterns to prepare concise report on it. (along and perpendicular to the grains)	√	--	--	--	--
03	Prepare the inspection report with relevant photographs by inspecting the three pits of foundation of a site to Identify the different types of layers of soil strata.	√	--	--	--	--
04	*Record the dimensions of 10 bricks to find its average dimension, weight with relevant interpretation report.	√		--	--	--
05	*Perform field tests on given sample of brick such as- dropping, striking and scratching by nail and interpret the results obtained to decide its quality and prepare a report on it.	--	√	--	--	--
06	Apply the relevant termite chemical on given damaged surface of timber and submit the observation report after one month with photos/pictures.	--	√	--	--	--
07	Apply two or more coats of selected paint on the prepared base of a given wall surface for the area of 2m x 2m using relevant tools brush/rollers adopting safe practices and prepare a report on it.	--	√	--	--	--
08	Prepare the cement mortar of proportion 1:3 or 1:6 using artificial sand as a special processed construction material and prepare a report on it with sketches/photos while preparation of mortar.	--	--	√	--	--
09	*Assemble one and half Brick thick wall in an English Bond and prepare a report on it with pictures/photos.	--	--	√	--	--

10	Assemble Brick thick wall in a Flemish Bond. (Minimum 3 Course) and prepare a report on it with sketches/photos.	--	--	√	--	--
11	Prepare a visit report with sketches/photos by arranging visit to stone masonry construction work.	--	--	√	--	--
12	Prepare a visit report with sketches/photos of construction site with respect scaffolding, formwork and centering work.	--	--	√	--	--
13	*Prepare report with labelled sketches of inspected staircase components during site visit.	--	--	--	√	--
14	*Prepare report with labelled sketches of inspected doors and windows components during site visit.	--	--	--	√	--
15	Prepare report with labelled sketches of inspected flooring and roofing materials during site visit.	--	--	--	--	√
16	*Prepare a visit report with sketches/photos by observing the process of plastering and pointing of a masonry work at construction site.	--	--	--	--	√
17	Prepare a visit report with sketches/photos by observing keenly the process of painting in residential / public building.	--	--	--	--	√
18	*Carry out market survey of the building materials used for Brickwork, Flooring, Plastering and Painting, available in your city & prepare a report (each of five).	√	√	--	--	--
19	Prepare the site visit report of the nearby heritage structure to inspect the Civil Engineering attributes with reference to IKS.	√	--	√	--	--

Content page

List of Practical's and Formative Assessment sheet.

Pr. No	Title of the Practical	Page No.	Date of performance	Date of Submission	Assessment marks	Dated sign of teacher	Remarks (if any)
01	*Identify minimum three available construction materials in the laboratory and prepare a report with photo.	1					
02	Identify the grain distribution pattern of the given sample of wood material available in the laboratory and draw the various patterns to prepare concise report on it.	5					
03	Prepare the inspection report with relevant photographs by inspecting the three pits of foundation of a site to Identify the different types of layers of soil strata.	9					
04	*Record the dimensions of 10 bricks to find its average dimension, weight with relevant interpretation report.	14					
05	*Perform field tests on given sample of brick such as- dropping, striking and scratching by nail and interpret the results obtained to decide its quality and prepare a report on it.	18					
06	Apply the relevant termite chemical on given damaged surface of timber and submit the observation report after one month with photos/pictures.	23					
07	Apply two or more coats of selected paint on the prepared base of a given wall surface for the area of 2m x 2m using relevant tools brush/rollers adopting safe practices and prepare a report on it.	28					
08	Prepare the cement mortar of proportion 1:3 or 1:6	33					
09	*Assemble one and half Brick thick wall in a English Bond and prepare a report on it with pictures/photos.	38					

Pr. No	Title of the Practical	Page No.	Date of perfor mance	Date of Submis sion	Assess ment marks	Dated sign of teacher	Remarks (if any)
10	Assemble Brick thick wall in a Flemish Bond. (Minimum 3 Course) and prepare a report on it with sketches/photos.	44					
11	Prepare a visit report with sketches/photos by arranging visit to stone masonry construction work.	50					
12	Prepare a visit report with sketches/photos of construction site with respect scaffolding, formwork and centering work.	56					
13	*Prepare report with labelled sketches of inspected staircase components during site visit.	61					
14	*Prepare report with labelled sketches of inspected doors and windows components during site visit.	67					
15	Prepare report with labelled sketches of inspected flooring and roofing materials during site visit.	74					
16	*Prepare a visit report by observing the process of plastering and pointing of a masonry work at construction site.	79					
17	Prepare a visit report with sketches/photos by observing keenly the process of painting in residential / public building.	85					
18	*Carry out market survey of the building materials used for Brickwork, Flooring, Plastering and Painting, available in your city.	90					
19	Prepare the site visit report of the nearby heritage structure to inspect the Civil Engineering attributes with reference to IKS.	94					
Total marks :							

These marks are to be transferred in pro-forma published by MSBTE

- '*' Marked Practical's (LLOs) are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

Practical No.1: Identify the different construction materials used in a Construction.

I. Practical Significance-The Knowledge of Basic construction materials is the primary requirement for civil engineering. Identifying different construction materials is crucial for ensuring structural integrity, cost-effectiveness, and safety in construction projects. It aids in selecting materials suitable for specific purposes, understanding durability factors, and complying with building codes and regulations.

II. Industry or Employer Expected Outcome-

Undertake safe building construction practices with relevant building materials.

III. Course Level Learning Outcome-

Identify relevant type of construction materials for the given type of building.

IV. Laboratory Learning Outcome-

Identify the different construction materials used in a Construction.

V. Relevant Affective domain related Outcome

1. Follow safety practices
2. Practice good housekeeping

VI. Relevant Theoretical Background

1. Construction of the structures is the basis of development of any country and the world. For Construction process different kinds of materials are required.
2. Stone, bricks, timber lime, Cement, Sand jellies and tiles are the traditional building materials.
3. Use of steel, aluminum, glass, glazed Tiles, plaster of Paris (POP), paints and varnishes are improved the quality of buildings and other Structures.

VII. Actual Diagram with equipment specification

Figure 1.1: Basic Construction Materials

VIII. Resources required

Sr. No.	Particulars	Specification	Quantity	Remark
1	Measurement Scale	15 or 30 cm length	1 No.	Per batch
2	Cement	---	1 Bag	Per batch
3	Steel	---	---	Per batch
4	sand and aggregates	---	---	Per batch
5	Bricks	---	10 Nos.	Per batch

IX. Precautions to be followed

1. Handle the particular construction material very carefully so that it will not break at any stage.

X. Procedure

1. Collect the information of various construction material from sources like wall charts, internet websites, journals or books etc.
2. Discuss the construction material and its physical properties and uses with batch mates.
3. Teacher should display various construction material in the laboratory.
4. Student should observe the construction material by handling properly and note down the same in observation table provided.

XI. Observation Table

Sr. No.	Physical Properties	Uses	Type of Material
1			
2			
3			
4			
5			

XII. Result

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XIII. Interpretation of results

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XIV. Conclusions and Recommendations (if any)

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XV. Practical Related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions so as to ensure the achievement of identified CO. Write answers of minimum three questions.

1. State the nos. of construction material samples available in your laboratory.
2. Name the material which is used generally for decorative purpose in constructions.
3. State uses of ……material. (Teacher should mention the type of construction material)
4. State four physical properties of ……. Material **(Teacher should mention the type of construction material)**
5. State the importance of building Construction Material.

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XVI. References/ suggestions for further Reading

Sr.No.	Link	Discription
1	http://surl.li/quyuj	-
2	https://youtu.be/a1cQcIJfjPw?si=UxElScuZlpaewxH7	Introduction of construction material
3	https://youtu.be/pGjBipfEqMU?si=AsLRJnQdri1lQ-bI	Introduction of construction material

XVII. Suggested Assessment Scheme

Performance Indicators		Weightage (%)
Process related: 15 Marks		**60%**
1	Identification of basic construction material	30%
2	Recording of Observations	30%
Product related: 10 Marks		**40%**
1	Interpretation of result	10%
2	Answer to practical related questions.	20%
3	Submission of report in time	10%
Total : 25 Marks		**100%**

Marks Obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.2: Identify the Grain Distribution Pattern used in a construction.

I. Practical Significance- The grain distribution pattern in construction results in a structurally sound, dimensionally stable, and aesthetically pleasing outcome, demonstrating a holistic understanding of the materials used in the building process.

II. Industry or Employer Expected Outcome-

Undertake safe building construction practices with relevant building materials.

III. Course Level Learning Outcome-

Identify relevant type of construction materials for the given type of building.

IV. Laboratory Learning Outcome-

Identify the Grain Distribution Pattern used in a construction.

V. Relevant Affective domain related Outcome

1. Follow safety practices
2. Practice good housekeeping

VI. Relevant Theoretical Background

Different wood grain descriptions: straight, irregular, interlocking, wavy, spiral.

1. **Straight-** the wood fibers consistently run in a straight direction along the cut piece of timber.
2. **Spiral**-a wood whose fibers twist as the tree develops.
3. **Interlocked-**taking things a step further than spiral grain, this describes a timber whose fibers Align in opposite directions.
4. **Interlocked-** taking things a step further than spiral grain, this describes a timber whose fibers Align in opposite directions.
5. **Avy-** describing a wood whose fibers change direction constantly.

VII. Actual Diagram with equipment specification

Figure 2.1: Horizontal grain & Vertical grain

VIII. Resources required

Sr.No.	Particulars	Specification	Quantity	Remark
1	Saw of different types	---	---	---
2	Measurement Scale	15 or 30 cm length	1 No.	Per batch

IX. Precautions to be followed

1. Handle the particular wood sample very carefully so that it will not break at any stage.
2. There should not be any marking with pen or pencil on the given wood sample.

X. Procedure

1. Teacher should explain the information about grain distribution of various sample of wood.
2. Discuss the grain distribution of wood and physical properties of wood.
3. Teacher should display various wood sample in the laboratory.
4. Student should observe the wood sample by handling properly and note down the same in observation table provided.

XI. Observation Table

Sr.No.	Grain Pattern	Color	Weight of sample	Whether it is Teak wood(Y/N)
1				
2				
3				
4				
5				

XII. Result

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XIII. Interpretation of results

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XIV. Conclusions and Recommendations (if any)

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XV. Practical Related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions so as to ensure the achievement of identified CO. Write answers of minimum three questions.

1. State the nos. of wood samples available in your laboratory.
2. Name the Wood sample which is used generally for decorative purpose in constructions.
3. State uses of ……Wood. (Teacher should mention the type of construction material)
4. State four physical properties of ……. Wood (Teacher should mention the type of construction material)
5. State the importance of wood in building Construction

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XVI. References/ suggestions for further Reading

Sr. No.	Links	Discription
1	https://youtu.be/p8ZB3lCHT3s?si=zeLM-wdVvflsji0p	Grain distribution pattern in construction
2	https://youtu.be/qV3cVAYv0PE?si=gO0Q4b1bG87VUHfg	Grain distribution pattern in construction
3	https://unplash.com/	--

XVII. Suggested Assessment Scheme

Performance Indicators		Weightage (%)
Process related: 15 Marks		**60%**
1	Identification of Grain pattern of wood	30%
2	Recording of Observations	30%
Product related: 10 Marks		**40%**
1	Interpretation of result	10%
2	Answer to practical related questions.	20%
3	Submission of report in time	10%
Total : 25 Marks		**100%**

Marks Obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.3: Identify various layers and types of soil strata in foundation pit.

I. Practical Significance- Identifying various layers and types of soil strata in a foundation pit results in a foundation design that is optimized for the site-specific conditions, reduces construction risks, improves cost-effectiveness, ensures compatibility with the soil, and allows for a more thorough environmental impact assessment. This comprehensive understanding contributes to the overall success and sustainability of construction projects.

II. Industry or Employer Expected Outcome-

Undertake safe building construction practices with relevant building materials.

III. Course Level Learning Outcome-

Identify relevant type of construction materials for the given type of building.

IV. Laboratory Learning Outcome-

Identify various layers and types of soil strata in foundation pit.

V. Relevant Affective domain related Outcome

1. Follow safety practices

VI. Relevant Theoretical Background

- The unconsolidated mineral of crust is known as soil.

Importance of soil-

- As a construction material in civil engineering-
    1. Clay
    2. Pervious and impervious soil
    3. For WBM water bound macadam roads
    4. Canal and embankments
    5. Retaining walls
- As foundation materials-
    1. Bridge Pier foundation
    2. Building foundation
    3. Earth dams
    4. Railways
    5. Runways of airport, roads etc.

VII. Actual Diagram with equipment specification

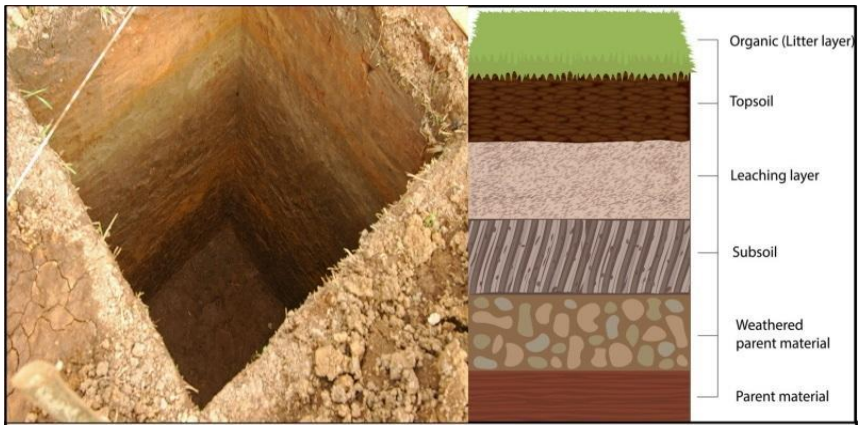

Figure 3.1: Various layers and types of soil strata in foundation Pit

VIII. Resources required

Sr.No.	Particulars	Specification	Quantity	Remark
1	Measuring Tape	-	-	-
2	Photographic tool	-	1 nos.	-

IX. Precautions to be followed

1. Maintain discipline during visit
2. Listen and follow the instructions given by site in-charge
3. Use safety measures on site.

X. Procedure

1. Conduct the visit to actual site of foundation Pit.
2. Observe the layer of soil strata
3. Discuss about the soil present in pit.
4. Find the properties of soil present in pit.

XI. Observation Table

Sr.No.	Soil type	Depth of layer	Colour	Physical Properties
1				
2				
3				

XII. Result

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XIII. Interpretation of results

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XIV. Conclusions and Recommendations (if any)

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XV. Practical Related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions so as to ensure the achievement of identified CO. Write answers of minimum three questions.

1. State the nos. of Layer available in foundation Pit.
2. State the importance of soil in Civil Engineering.
3. State the function of soil used for foundation.
4. State four physical properties of soil.
5. Define soil.
6. What is foundation pit and state their size

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XVI. References/ suggestions for further Reading

Sr. No.	Links	Discription
1	https://youtu.be/urPzND_JbL8?si=y4E-LIR3Dbo9IRUe	Various layers of soil in foundation Pit
2	https://youtu.be/TXl5dVlOiZA?si=EDFoIwSABcKn6Cpr	Various layers of soil in foundation Pit

XVII. Suggested Assessment Scheme

Performance Indicators		Weightage (%)
Process related: 15 Marks		**60%**
1	Identification of Type of soil	30%
2	Recording of Observations	30%
Product related: 10 Marks		**40%**
1	Interpretation of result	10%
2	Answer to practical related questions.	20%
3	Submission of report in time	10%
Total : 25 Marks		**100%**

Marks Obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.4: Record dimensions of given bricks.

I. Practical Significance- Recording the dimensions of given bricks has practical outcomes that include efficient material usage, improved quality control, precise construction planning, adherence to standards, and enhanced precision in masonry work. These factors collectively contribute to the success and reliability of construction projects.

II. Industry or Employer Expected Outcome-

Undertake safe building construction practices with relevant building materials.

III. Course Level Learning Outcome-

Identify relevant type of construction materials for the given type of building.

IV. Laboratory Learning Outcome-

Record dimensions of given bricks.

V. Relevant Affective domain related Outcome

1. Follow safety practices
2. Practice good housekeeping

VI. Relevant Theoretical Background

A brick is building material used to construct walls, pavements and other elements in masonry construction

There are Two Main Types of Bricks.

1. **Traditional Bricks-** The commonly adopted nominal size of traditional brick is 23cm x 11.4cm x 7.6cm. The length varies from 20 to 25 cm.
2. **Modular Bricks-** The actual size of the brick is 19 cm x 9cm x 9cm. Masonry modular bricks are economical to manufacture, require less area for drying, and staking and requires less brick work for the same surface area of the wall in comparison to conventional bricks. Modular brick is also classified as a) Unburnt Bricks b) Burnt Bricks.

VII. Actual Diagram with equipment specification

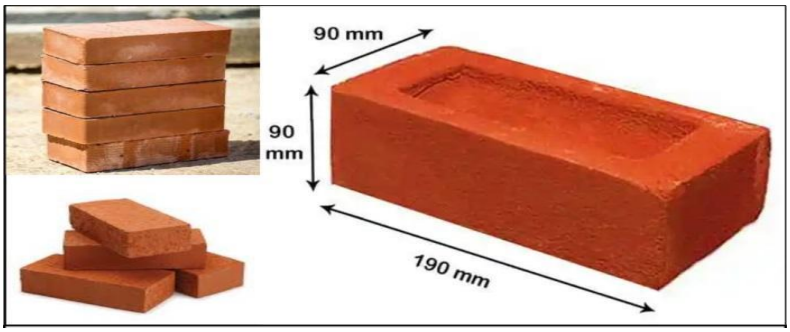

Figure 4.1: Bricks

VIII. Resources required

Sr.No.	Particulars	Specification	Quantity	Remark
1	Weighing balance	With an accuracy of 0.01 gm	1 No.	Per batch
2	Pan	---	1 No.	Per batch
3	Bricks and blocks of different sizes	---	10 nos.	Per batch

IX. Precautions to be followed

1. Handle the particular Brick sample very carefully so that it will not break at any stage.
2. There should not be any marking with pen or pencil on the given Brick sample.

X. Procedure

1. Teacher should explain the detailed information of bricks.
2. Select five bricks at random.
3. Student should observe the bricks sample available in laboratory.
4. Their size, shape, and color.
5. Find the properties of brick.

XI. Observation Table

Sr.No.	Type of Brick	Size of brick	Color	Other Physical Properties
1				
2				
3				
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XII. Result

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XIII. Interpretation of results

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XIV. Conclusions and Recommendations (if any)

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XV. Practical Related Questions

Note: Below given are few sample questions for reference. **Teachers must design more such questions so as to ensure the achievement of identified CO.** Write answers of minimum three questions.

1. Define Brick.
2. State the importance of Bricks in Civil Engineering.
3. State four physical properties of Bricks.
4. Explain Types of Bricks.
5. What is first class brick?
6. Which type of brick used for decorative purpose.

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XVI. References/ suggestions for further Reading

Sr.No.	Links	Discription
1	https://youtu.be/gF79hv14uw4?si=hI9DLt12BUDxbBm9	Dimensions of given bricks
2	https://youtu.be/QexqM4k7-yE?si=LLGM2jmkAv2WbWUo	Dimensions of given bricks

XVII. Suggested Assessment Scheme

Performance Indicators		Weightage (%)
Process related: 15 Marks		**60%**
1	Identification of type of Brick	30%
2	Recording of Observations	30%
Product related: 10 Marks		**40%**
1	Interpretation of result	10%
2	Answer to practical related questions.	20%
3	Submission of report in time	10%
Total : 25 Marks		**100%**

Marks Obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.5: Perform field test on given sample of brick.

I. Practical Significance- Bricks are basic building blocks of masonry work and construction. Field tests like dropping, striking, and scratching on a given sample of brick provide practical outcomes related to strength, durability, surface hardness, quality control, and material suitability. These outcomes guide construction decisions and contribute to the overall success and longevity of the built structure.

II. Industry or Employer Expected Outcome-

Undertake safe building construction practices with relevant building materials.

III. Course Level Learning Outcome-

Use the relevant type of special purpose construction materials in the given situation.

IV. Laboratory Learning Outcome-

Perform field test on given sample of brick.

V. Relevant Affective domain related Outcome

1. Follow safety practices
2. Practice good housekeeping

VI. Relevant Theoretical Background

1. **Dropping Test -**When bricks are dropped from the height of 1 to 1.2m (4 feet), it should not crack or break. This ensures the durability and quality of bricks.
2. **Striking Test**-For struck test, take 2 bricks and strike each other along the longer edge. If it produces metallic or Ring bell sound, the bricks are quality bricks.
3. **Scratching Test-** When bricks are scratched by iron nail it does must produce any impressions on the surface, these bricks are quality bricks.

Classification of Burnt Bricks-

a) First Class Bricks-

These are 19 x 9 x 9 cm in size. They are made from good earth, free from saline deposits.

They should be thoroughly burnt.

They should be of good color. They should be of regular shape with square edges and parallel

Faces.

b) Second Class Bricks-

Second class bricks are also fully burnt and give a clear ringing sound when struck together. Slightly irregularities in shape, size or color are accepted.

Slight difference in the structure on fractured surfaces is admissible.

c) Third Class Bricks-

These are not burnt so fully as in previous two cases but are generally of uniform reddish yellow color.

Defects in uniformity or shape are tolerated. On striking together, they produce a dull thud sound.

d) Fourth Class Bricks-

These types of bricks are irregular in shape and dark in color which is due to over burning.

VII. Actual Diagram with equipment specification

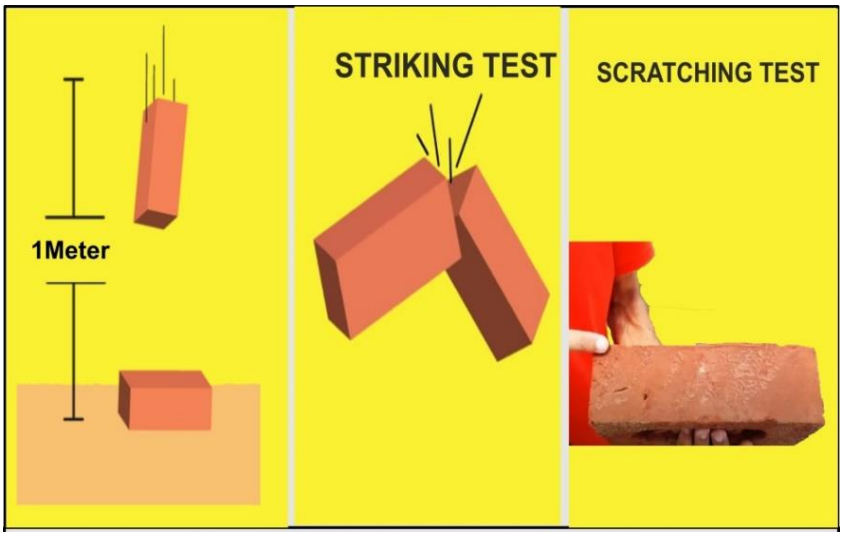

Figure 5.1: Field test on given sample of brick

VIII. Resources required

Sr.No.	Particulars	Specification	Quantity	Remark
1	Weighing balance	With an accuracy of 0.01 gm	1 No.	Per batch
2	Measurement Scale	15 or 30 cm length	1 No.	Per batch
3	Bricks	-	10	Per batch

IX. Precautions to be followed

1. Handle the particular Brick sample very carefully so that it will not break at any stage.
2. There should not be any marking with pen or pencil on the given Brick sample.

X. Procedure

1. Conduct the visit to Perform field test on bricks.
2. Student should select the bricks and conduct the test such as dropping, striking and scratching.
3. Student should observe the bricks and action of dropping, striking and scratching.
4. Identify the properties of brick.

XI. Observation Table

Sr.No.	Test	Size of Brick	Observation
1	Dropping		
2	Striking		
3	Scratching by nail		

XII. Result

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XIII. Interpretation of results

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XIV. Conclusions and Recommendations (if any)

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XV. Practical Related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions so as to ensure the achievement of identified CO. Write answers of minimum three questions.

1. Write the standard Size of bricks
2. Write the Use of First-class bricks.
3. State the function of second-class bricks.
4. State the water absorption capacity of first-class brick.
5. Compare compressive strength of brick.

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XVI. References/ suggestions for further Reading

Sr.No.	Links	Discription
1	https://youtu.be/lwuqPGHotwE?si=ZzXDsRbWneM52OO0	Field Test on brick
2	https://youtu.be/RsB7-IXafYM?si=CRynoGVsOC-ugjAu	Field Test on brick
3	https://bitly.ws/3cR3j	-

XVII. Suggested Assessment Scheme

Performance Indicators		Weightage (%)
Process related: 15 Marks		**60%**
1	Identification of type of Brick	30%
2	Recording of Observations	30%
Product related: 10 Marks		**40%**
1	Interpretation of result	10%
2	Answer to practical related questions.	20%
3	Submission of report in time	10%
Total : 25 Marks		**100%**

Marks Obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.6: Apply the relevant termite chemical to prevent the surface damage.

I. Practical Significance- Applying relevant termite chemicals to prevent surface damage contributes to structural preservation, long-term cost savings, and increased lifespan of wooden elements, maintained aesthetic appearance, and an overall strategy of preventive maintenance. These practical outcomes are essential for ensuring the resilience and longevity of wooden structures.

II. Industry or Employer Expected Outcome-

Undertake safe building construction practices with relevant building materials.

III. Course Level Learning Outcome-

Use the relevant type of special purpose construction materials in the given situation.

IV. Laboratory Learning Outcome-

Apply the relevant termite chemical to prevent the surface damage.

V. Relevant Affective domain related Outcome

1. Follow safety practices
2. Practice good housekeeping

VI. Relevant Theoretical Background

- Natural oils like orange oil and neem oil can be used to control termites. Orange oil contains a compound called d-limonene which comes in contact with termites and kills them. Neem oil should be applied repeatedly on the wooden furniture till the termite colonies are completely destroyed.

VII. Actual Diagram with equipment specification

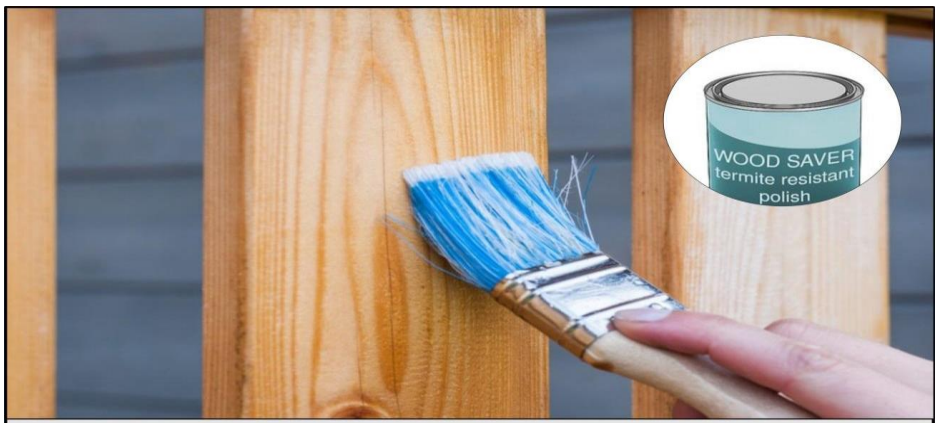

Figure 6.1: Termite Chemical

VIII. Resources required

Sr.No.	Particulars	Specification	Quantity	Remark
1	Anti-termite chemical	---	---	---
2	Brush	---	1 No.	Per batch

IX. Precautions to be followed

1. Handle the particular construction material very carefully so that it will not break at any stage.

X. Procedure

1. Identify the Termite damage on timber.
2. Apply Anti-termite chemical or oil by brush or spray.
3. And observe it after One month and Take an observation.
4. Student should observe the wood after one month by handling properly and note down the same in observation table provided.

XI. Observation Table

Sr.No.	Type of wood	Name of Anti –Termite Chemical/Oil	Observation
1			
2			
3			
4			
5			

XII. Result

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XIII. Interpretation of results

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XIV. Conclusions and Recommendations (if any)

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XV. Practical Related Questions

Note: Below given are few sample questions for reference. **Teachers must design more such questions so as to ensure the achievement of identified CO.** Write answers of minimum three questions.

1. What is Termite Proofing?
2. List the Five Anti-Termite Chemical Name.
3. What is the best Termite proof for wood?
4. How to Control Termite without Chemical?
5. How to manage Dry wood from Termite.

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XVI. References/ suggestions for further Reading

Sr.No.	Links	Discription
1	https://youtu.be/e4llyNbm4IA?si=_iacAUGgFiEms4xi	Termite chemical
2	https://youtu.be/dtTNU_KgU_M?si=FcxZW3YzVI7TrBzo	Termite chemical
3	https://www.freepik.com/	--

XVII. Suggested Assessment Scheme

Performance Indicators		Weightage (%)
Process related: 15 Marks		**60%**
1	Identification of Anti-Termite chemical /Oil	30%
2	Recording of Observations	30%
Product related: 10 Marks		**40%**
1	Interpretation of result	10%
2	Answer to practical related questions.	20%
3	Submission of report in time	10%
Total : 25 Marks		**100%**

Marks Obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.7: Paint the given surface of wall after preparing a required base of relevant material.

I. Practical Significance- Painting a wall surface after preparing the required base results in enhanced aesthetics, surface protection, improved durability, easy maintenance, and increased property value. These practical outcomes contribute to creating a more attractive, resilient, and valuable living or working environment.

II. Industry or Employer Expected Outcome-

Undertake safe building construction practices with relevant building materials.

III. Course Level Learning Outcome-

Use the relevant type of special purpose construction materials in the given situation.

IV. Laboratory Learning Outcome-

Paint the given surface of wall after preparing a required base of relevant material.

V. Relevant Affective domain related Outcome

1. Follow safety practices
2. Practice good housekeeping

VI. Relevant Theoretical Background

1. A paint should possess good covering power or spreading power.
2. Should have such consistency so that it can be applied easily and freely on the surface with a brush or spray.
3. It should adhere well to the surface to which it is applied.
4. The paint smooth, hard and wear resisting.
5. Paint should be not affected by weathering agencies.
6. Paint color should neither fade nor change.
7. It should offer a surface which is durable and strong enough to resist moisture penetration.

VII. Actual Diagram with equipment specification

Figure 7.1: Paint on surface of wall

VIII. Resources required

Sr.No.	Particulars	Specification	Quantity	Remark
1	Paints	OBD, acrylic, plastic emulsion.	---	---
2	Painting brushes	---	1 No.	Per batch
3	Acrylic painting and rollers	---	1 No.	Per batch

IX. Precautions to be followed

1. Handle the Paint and painting instrument very carefully

X. Procedure

1. Select the 2m x 2m wall where apply paint coat
2. Clean and dry this selected wall.
3. Apply two or more coats of selected paint on the prepared base of a given wall surface.
4. Student should observe the wall after painting and note down the same in observation table provided.

XI. Observation Table

Sr. No.	Name of Paint	Name of color	No. of coats applied
1			
2			
3			
4			
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XII. Result

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XIII. Interpretation of results

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XIV. Conclusions and Recommendations (if any)

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XV. Practical Related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions so as to ensure the achievement of identified CO. Write answers of minimum three questions.

1. What is paint and its types?
2. Give any four properties of plastic paints.

3. State the situation where oil paint is used
4. State the Uses of paints.
5. What are Distempers and where it is used?

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XVI. References/ suggestions for further Reading

Sr.No.	Title of Book Links	Discription
1	https://youtu.be/UdeZkJEv5xU?si=vjgmKfc5GM5p4kks	Paint the given surface of wall
2	https://youtu.be/3iiYgnU5lKc?si=PQV9qPYLsdxbAKaC	Paint the given surface of wall
3	https://www.asianpaints.com/	-

XVII. Suggested Assessment Scheme

Performance Indicators		**Weightage (%)**
Process related: 15 Marks		**60%**
1	Identification of Anti-Termite chemical /Oil	30%
2	Recording of Observations	30%
Product related: 10 Marks		**40%**
1	Interpretation of result	10%
2	Answer to practical related questions.	20%
3	Submission of report in time	10%
Total : 25 Marks		**100%**

Marks Obtained			**Dated Sign of Teacher**
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.8: Prepare the cement mortar of given proportion.

I. Practical Significance- Preparing cement mortar with the given proportion results in consistent material quality, optimized strength and durability, enhanced workability, adherence to building codes, and cost-effective construction practices. These practical outcomes are fundamental for achieving successful and resilient construction projects.

II. Industry or Employer Expected Outcome-

Undertake safe building construction practices with relevant building materials.

III. Course Level Learning Outcome-

Undertake the given type of building construction activity for the given component of building structure.

IV. Laboratory Learning Outcome-

Prepare the cement mortar of given proportion.

V. Relevant Affective domain related Outcome

1. Follow safety practices
2. Practice good housekeeping

VI. Relevant Theoretical Background

1. Cement mortar is used for plastering of stone and brick masonry.
2. It is also used for grouting and guniting.

Properties of cement mortar-

1. It should be capable of resisting penetration of rain water.
2. Mortar must have sufficient strength.
3. It should be capable of developing good adhesion with the building units such as bricks, stones etc.
4. It should be capable of developing the designed stresses.
5. It should be cheap.
6. It should be durable.
7. It should be easily workable.

VII. Actual Diagram with equipment specification

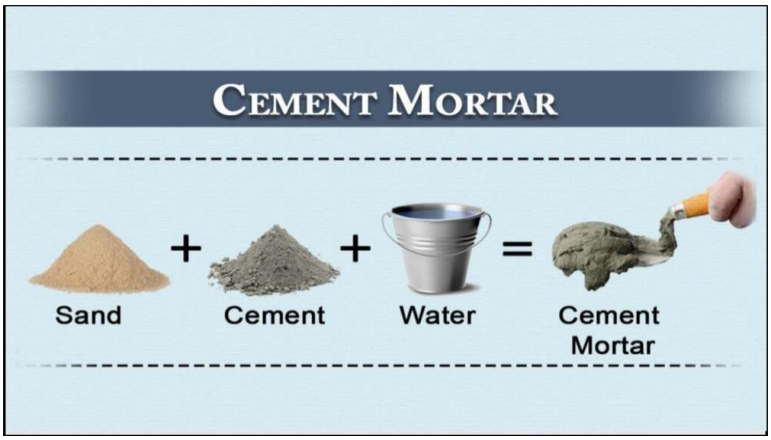

Figure 8.1: Cement Mortar

VIII. Resources required

Sr.No.	Particulars	Specification	Quantity	Remark
1	Weighing balance	With an accuracy of 0.01 gm	1 No.	Per batch
2	Pan, spade	---	1 No.	Per batch
3	Sand	---	---	---
4	Ordinary Portland Cement, PPC	---	---	---

IX. Precautions to be followed

1. Handle the all tools very carefully.

X. Procedure

1. To make cement mortar, you will need cement, sand, and water. Measure the correct proportions of each material before you begin.
2. Mix the cement and sand together in a dry state until the two are evenly distributed. This helps to ensure that the mortar has a consistent strength and workability.
3. Slowly add water to the dry mix while mixing continuously.

   Continue mixing the ingredients until the mix is thoroughly combined and the desired consistency is achieved.
4. Record observations in observation Table.

XI. Observation Table

Sr.No.	Name and Brand of Cement	Proportion	Observation
1			
2			
3			
4			
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XII. Result

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XIII. Interpretation of results

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XIV. Conclusions and Recommendations (if any)

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XV. Practical Related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions so as to ensure the achievement of identified CO. Write answers of minimum three questions.

1. Write four properties of cement mortar.
2. Write the five brands of cement.
3. State the situation where lime mortar is used with its proportion
4. Write the various types of mortars.
5. Write difference between artificial sand and natural sand.

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XVI. References/ suggestions for further Reading

Sr.No.	Links	Discription
1	https://youtu.be/LrFP6ohFAGg?si=X0kWjKfa4LHhFN73	Prepare cement mortar
2	https://youtu.be/ehBKETtRImk?si=DdHoEkj5-CAFCVdE	Prepare cement mortar

XVII. Suggested Assessment Scheme

Performance Indicators		**Weightage (%)**
Process related: 15 Marks		**60%**
1	Identification of Anti-Termite chemical /Oil	30%
2	Recording of Observations	30%
Product related: 10 Marks		**40%**
1	Interpretation of result	10%
2	Answer to practical related questions.	20%
3	Submission of report in time	10%
Total : 25 Marks		**100%**

Marks Obtained			**Dated Sign of Teacher**
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.9: Assemble one and half Brick thick wall in a given Bond.

I. Practical Significance- Brick masonry is a process of arranging bricks in courses in order to develop longitudinal and transverse interlocking for individual bricks. Assembling a one and a half brick thick wall in a given bond results in practical outcomes related to structural integrity, uniform appearance, proper load distribution, construction efficiency, and ease of maintenance. These outcomes collectively contribute to the overall success and longevity of the constructed wall.

II. Industry or Employer Expected Outcome-

Undertake safe building construction practices with relevant building materials.

III. Course Level Learning Outcome-

Undertake the given type of building construction activity for the given component of building structure.

IV. Laboratory Learning Outcome-

Assemble one and half Brick thick wall in a given Bond. (English Bond).

V. Relevant Affective domain related Outcome

1. Follow safety practices & precautions.
2. Demonstrate working as a leader/a team member.
3. Maintain tools and equipment. Practice good housekeeping

VI. Relevant Theoretical Background

1. Cement mortar is used for plastering of stone and brick masonry.
2. It is also used for grouting and guniting.

Properties of cement mortar-

Brick masonry is the arrangement of bricks in successive courses in order to tie brickwork

Together to achieve maximum strength called bond. It is required to know importance of

Selection and soaking of bricks. It is required to make use of line string, plumb-bob, and

Spirit level to maintain verticality and horizontally in the construction of brick wall in English

Bond. This bond is produced by laying alternate courses of headers and stretchers.

For breaking Joints vertically, it is essential to place queen closer after the header quoin in the Heading course

VII. Actual Diagram with equipment specification

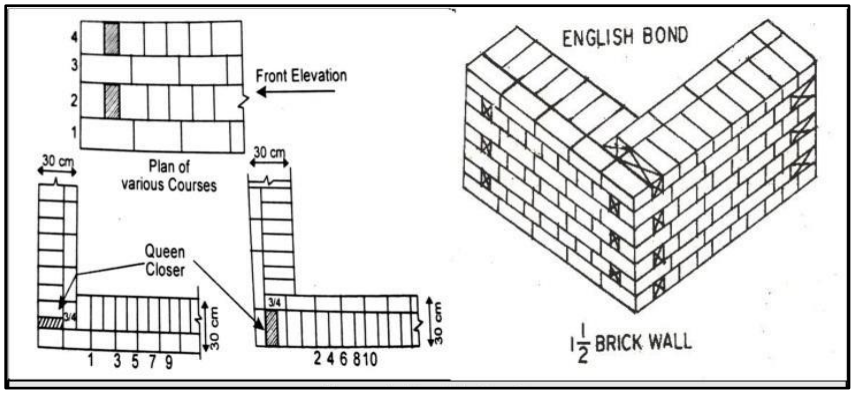

Figure 9.1: English Bond

VIII. Resources required

Sr. No.	Particulars	Specification	Quantity	Remark
1	Trowel (Thapi)	Medium type 15 cm long	10	Per batch
2	Line string/dori	1 to 2 mm diameter	50m	Per batch
3	Plumb-bob	Mild steel	2 no.	---
4	Water tube level	5 mm diameter plastic tube	10 m	---
5	Mason spirit level	30 cm long with vertical and horizontal bubble	5 no.	---

IX. Precautions to be followed

1. Never start header course with queen closer.
2. Every alternate header comes centrally over the joint between the two stretchers in the course below giving a lap of one-fourth brick.
3. Check the verticality of a wall with plumb bob after every course.

X. Procedure

1. All the bricks to be used are thoroughly soaked in water so that they do not absorb water from mortar.
2. Prepare mortar with proportion CM 1:6.
3. Spread the mortar over the area to be covered with the thickness of 15mm.
4. First construct the corner of the wall. Lay one brick at the corner and press it with hands so that the thickness of the bed joint remains only about 10mm.

5. The first queen closure is also fixed as corner brick. Check the level and alignment. Lay other bricks to form thickness of one and half brick thick wall.
6. After laying first course spread the mortar over entire course and arrange the bricks to get bond.
7. Similarly lay down the corner at another end of wall the corner construction will guide for filling between bricks of various courses.
8. Stretch the line string along top of the first course laid at each corner of wall the course is then raised. The line string is then shifted up and second course is constructed this process is repeated for consecutive courses.
9. The verticality and horizontality is checked by plumb bob and spirit level for every course.
10. The joints should be cleaned after every day's work.

XI. Observation Table

Sr.No.	Type of bond	No. of bricks	Observation
1			
2			
3			
4			
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XII. Result

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XIII. Interpretation of results

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XIV. Conclusions and Recommendations

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XV. Practical Related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions so as to ensure the achievement of identified CO. Write answers of minimum three questions.

1. Suggest suitable type of bond for compound wall and partition wall.
2. Explain the method to break the continuity of vertical joint.
3. State the function of line string, plumb bob, masons square, level tube.
4. Give the reasons for following.
    a) The bricks are soaked in water before its use
    b) Brickwork is kept moist for seven days
    c) English bond is stronger than Flemish bond
    d) The frog is kept upward while placing in position.

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XVI. References/ suggestions for further Reading

Sr. No.	Links	Discription
1	https://youtu.be/M4fIe5ov0JY?si=Z1pdw_njZMV38o7K	English bond
2	https://youtu.be/1R8mW2ZJJCo?si=bDeURVU00cMxgdOl	English bond

XVII. Suggested Assessment Scheme

Performance Indicators		Weightage (%)
Process related: 15 Marks		**60%**
1	Laying bricks in line with frog upward	15%
2	Use of Queen closer appropriately	10%
3	Placing the mortar in joints	10%
4	Checking the verticality of wall by plumb bob	10%
5	Checking the right angle with mason's square	10%
6	Working in team.	5%
Product related: 10 Marks		**40%**
1	Construction of wall in 3 courses	25%
2	Answer to practical related questions.	10%
3	Submission of report in time	5%
Total : 25 Marks		**100%**

Marks Obtained			Dated Sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.10: Assemble Brick thick wall in a Flemish Bond. (Minimum 3 Course) and prepare a report on it with sketches/photos.

I. Practical Significance

Bricks are the most commonly used material for building walls. The main reason for it is easily available and it is easy to handle. Bricks, as building material, are used in construction of load bearing structures walls and nonstructural members such as partitions walls etc. Brick masonry is a process of arranging bricks in courses.in courses bricks are longitudinal and transverse interlock to each other and form bound. Bonding in brick masonry is necessary to remove the continuity of the vertical joints in the successive course of the faces of a wall. For the construction of brick masonry Stretcher bond, Header bond, English bond, Flemish bond are used.

II. Industry/Employer Expected outcomes (POs)

This practical is expected to develop the following skills for the Industry identified.

1. Identify good quality of Bricks.
2. A student should be able to self-assemble brick masonry.
3. Construct brick wall in different bond.
4. To check verticality and horizontality of wall.

III. Course Level Learning Outcomes

Undertake the given type of building construction activity for the given component of building structure.

IV. Laboratory learning outcome(s)

Assemble one and half Brick thick wall in given bond.

V. Relevant Affective Domain

1. Follow safety practices and precautions.

2. Maintain tools and equipment.

3. Maintain uniformity in work.

VI. Relevant Theoretical Background

Flemish Bond-

In Flemish bond, alternatively the header and stretcher are present in the same course. And the appearance remains the same in every course of the brick masonry. In this arrangement, the alternative courses start with a header and stretcher face. Queen closer is present after header quoin in the course which starts with header face for disturbing the vertical joints continuity in the successive courses. Bat is used in this type of bond when the thickness of the wall is equal.

VII. Actual diagram with equipment specification.

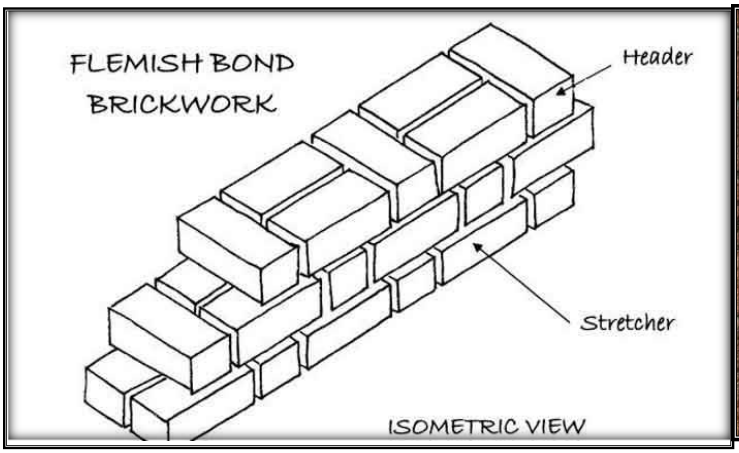

Figure 10.1: Flemish Bond Brickwork

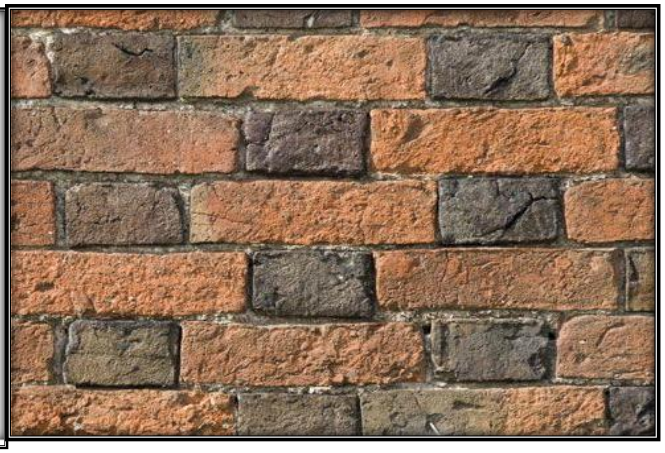

Figure 10.2: Flemish Bond

VIII. Resources required

Sr. No	Particulars	Specification	Quantity	Remark
1	Bricks	first class bricks	200 nos	
2	Ordinary Portland Cement	OPC	2 bags	
3	Sand	Artificial sand	5 cum	
4	String/dori	1 to 2 mm dia	1 No	
5	Trowel	15 cm long	5 No	
6	Plumb-bob	Mild steel	2 No	
7	Spirit level	30 cm long with vertical and horizontal bubble	2 No	
8	Water-level tube	5 mm plastic tube	2 No	
9	Mason square	60 cm long leg	2 No	
10	Measuring tape	Steel tape 30m	2 No	
11	Pans (Ghamela)	Iron	5 No	
12	Portable Hammer	Iron	2 No	
13	Spade	20cm wide MS blade	2 No	

IX. Precautions to be followed

1. All the bricks are thoroughly soaked in water so that they do not absorb water from mortar.

2. Every alternate course of Flemish bond starts with header at the corner.

3. For the breaking of vertical joints in the successive courses, closers are inserted in alternate courses next to the quoin header.

4. Check the verticality of a wall with plumb bob after every course.

5. Maintain tools and equipment.

X. Procedure:

1. Prepare mortar with proportion of (Cement+sand) 1:6.

2. Spread the mortar over the area having the thickness of 15mm.

3. First construct the corner of the wall. Lay one brick at the corner and press it with hands so that the thickness of the bed joint remains only about 10mm.

4. The first queen closure is also fixed as corner of brick.

5. Laying alternate headers and stretchers in a single course.

6. After laying first course spread the mortar over entire course and arrange the bricks to get bond.

7. The next course of brick is laid such that header lies in the middle of the stretcher in the course below

8. After laying first course spread the mortar over entire course and arrange the bricks to get bond.

9. Stretch the line string along top of the first course laid at each corner of wall. The course is then raised. The line string is then shifted up and second course is constructed.

10. Above the procedure is repeated for consecutive courses.

11. The verticality and horizontality are checked with the help of plumb bob and spirit level for every course.

12. The joints should be cleaned after every day's work.

XI. Observation Actual Procedure followed – Assemble wall in Flemish bond

(Attached Photograph)

XII. Result

XIII. Interpretation of results

XIV. Conclusions and Recommendations

XV. Practical Related Questions (Provide blank pages)

1) State the importance of bonding in brick masonry.
2) As a civil engineer what kind of precautions will you recommend during the construction of brick masonry?
3) Draw plan and section of Flemish bond.

XVI. References/Suggestions for further Reading

Sr.no	Links	Discription
1	https://youtu.be/IXDyBE4x7kE?si=FECrUtNSyZ_KyKB4	Flemish bond
2	https://www.youtube.com/watch?v=3XGt-p-hpdU	Flemish bond
3	https://www.youtube.com/watch?v=L-VGe2j53NU	Flemish bond

XVIII. Suggested Assessment Scheme

Performance Indicators		**Weightage (%)**
Process related: 15 Marks		**60%**
1	Prepare the mortar for brick masonry	25%
2	Follow the process for construction.	25%
3	Working of team	10%
Product related: 10 marks		**40%**
1	Answers to practical related questions	30%
2	Submission of report in time	10%
Total:25 Marks		100%

Marks Obtained			**Dated sign of Teacher**
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.11: Prepare a visit report with sketches/photos by arranging visit to stone masonry construction work.

I. Practical Significance

Stone masonry is a construction method that involves the use of natural stones. Stones are bounded by using mortar. If irregularly shaped stones are used without much shaping is known as Rubble masonry and if stones are cut into uniform sizes and shapes known as Ashlar masonry. A visit to stone masonry site you can gain valuable knowledge its construction methods, aesthetic appeal, observing process, unique characteristics of stone masonry work.

II. Industry/Employer Expected outcomes (POs)

This practical is expected to develop the following skills for the Industry identified.

1. A student should be able to know material used in stone masonry.
2. To know the procedure of construction stone masonry.
3. To check verticality and horizontally of stone masonry.

III. Course Level Learning Outcomes

Undertake the given type of building construction activity for the given component of building structure.

IV. Laboratory learning outcome(s)

Prepare a site visit report with reference to stone masonry.

V. Relevant Affective Domain

1. Follow safety practices and precautions.

2. Maintain tools and equipment.

VI. Relevant Theoretical Background

1.Recommended stones for various masonry work.
2.Types of stone masonry work.
3.Mortar used in stone masonry work.

VII. Actual diagram with equipment specification.

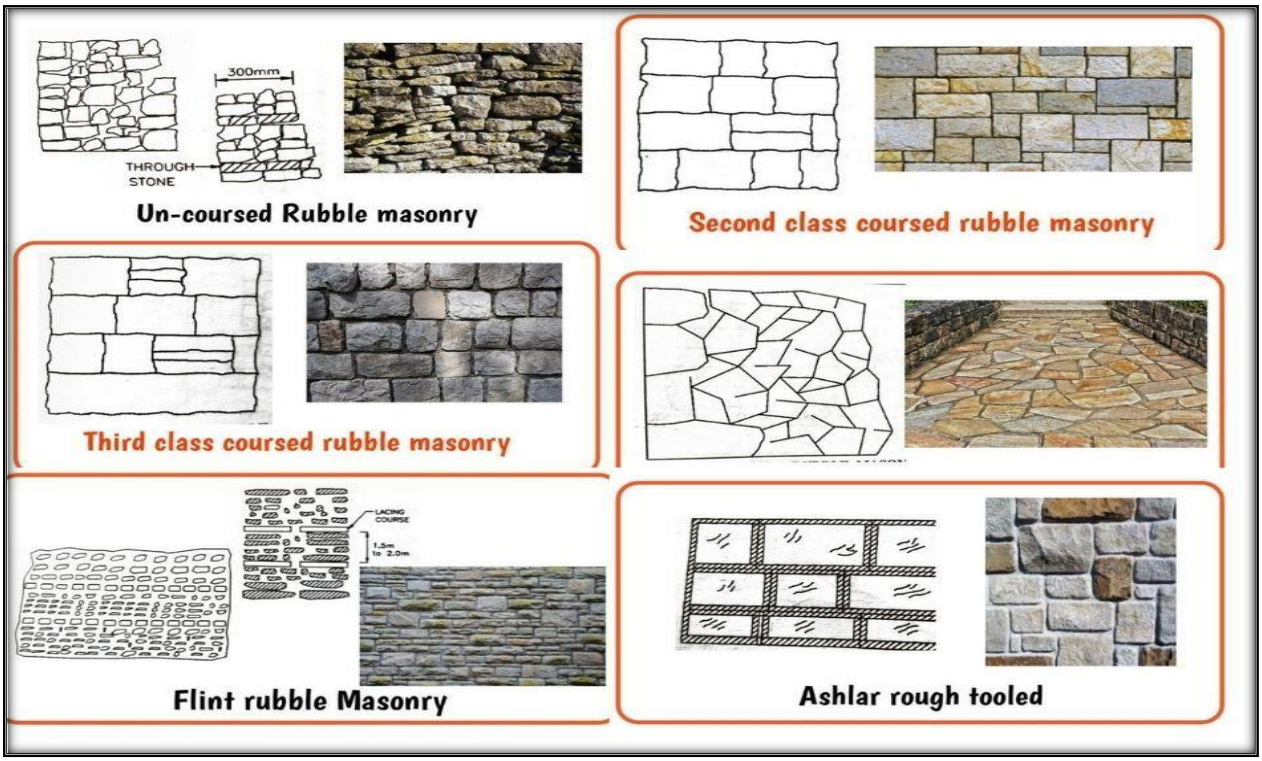

Figure 11.1: Stone Masonry

VIII. Resources required

Sr. No	Particulars	Specification	Quantity	Remark
1.	Plan			
2.	Measuring Tape	30m Steel Tape	2 Nos	
3.	Plumb-bob	Mild steel	2 No	
4.	Spirit level	30 cm long with vertical and horizontal bubble	2 No	
5.	Water-level tube	5 mm plastic tube	2 No	

IX. Precautions to be followed

1. Stones should be properly immersed in water before they are laid so that they do not suck water from the mortar.
2. Dressing should be as per the specified requirement.
3. Hard and durable stones,
4. Free from defects like cavities, veins, etc., should be used.
5. Facing and backing should be laid neatly and checked with wooden temple.

6. The center of the masonry should be filled with stone chips and mortar.
7. Mortar of correct proportion should be used.
8. Verticality of the wall should be frequently checked with plumb bob.
9. Through stones should be within 1.5 m distances.
10. Proper curing is necessary for 2-3 weeks
11. Use safety measures on site.
12. Listen and follow the instruction given by site in charge.
13. Maintain discipline during Visit.

X. Procedure:

Field Visit Report

Date of Visit----------

Site Address----------

Name of Project----------

Name of Contractor & Site Engineer----------

Status of project-Completed/ongoing----------

XI. Observation Actual Procedure followed –

(Attached Photograph)

XII. Result

XIII. Interpretation of results

XIV. Conclusions and Recommendations

XV. Practical Related Questions

1. Describe the various types of stone masonry work.
2. Suggest the recommended stones for various type of work.
3. Enlist the points to be observed during construction.
4. Enlist the precaution taken during construction.
5. Draw neat sketch of Rubble and Ashlar masonry work.

XVI. References/Suggestions for further Reading

Sr. No	Links	Discription
1	https://youtu.be/ULpl8LyQXhA?si=qFev12X2-mgIVSyS	Stone masonry construction work
2	https://www.youtube.com/watch?v=XsFeVuVQE-E	Stone masonry construction work
3	https://www.youtube.com/watch?v=3XGt-p-hpdU	Stone masonry construction work

XVII. Suggested Assessment Scheme

Performance Indicators		Weightage (%)
Process related: 15 Marks		**60%**
1	Identify type of stone masonry structure.	25%
2	Selection of materials as per requirement	25%
3	Working of team	10%
Product related: 10 marks		**40%**
1	Answers to practical related questions	30%
2	Submission of report in time	10%
Total:25 Marks		100%

Marks Obtained			Dated sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.12: Prepare a visit report to construction site with respect scaffolding, formwork and centering work.

I. Practical Significance

Scaffolds are temporary structures constructed for supporting the workers and the materials. The scaffolds are platform-like structures that are used for structures with a height of more than 1.5 m. The scaffolds are removed once the construction of the building component is over. While Formwork is the structure, usually temporary, used to contain poured concrete and to mold it to the required dimensions and support until it is able to support itself. Centering is a type of formwork. It is done during construction to support the formwork for horizontal surfaces including floor beams and slabs. It is set up for a temporary period of time.

II. Industry/Employer Expected outcomes (POs)

This practical is expected to develop the following skills for the Industry identified.

1. A student should be able to know various material used in scaffolding, formwork and centering work
2. Select the material for scaffolding, formwork and centering work.
3. Check the level of scaffolding, formwork and centering work.

III. Course Level Learning Outcomes

Undertake the given type of building construction activity for the given component of building structure.

IV. Laboratory learning outcome(s)

Prepare a site visit report with respect to scaffolding, formwork and centering work.

V. Relevant Affective Domain

1. Follow safety practices and precautions.

2. Maintain tools and equipment.

VI. Relevant Theoretical Background

1. Component parts of scaffolding.
2. Types of scaffolding
3. Requirement of good formwork and its purpose
4. Component parts of formwork.
5. Material required for scaffolding, formwork, centering.

VII. Actual diagram with equipment specification.

Figure 12.1: formwork work.

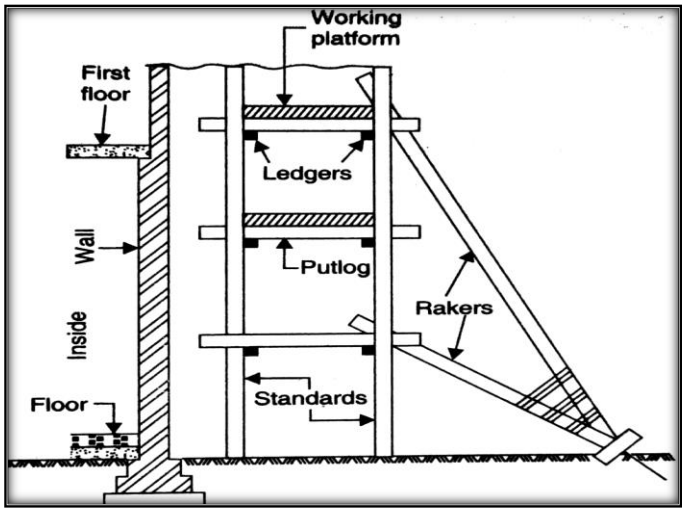

Figure 12.2: scaffolding work.

Figure 12.3: centering work

VIII. Resources required

Sr. No	Particulars	Specification	Quantity	Remark
1.	Types of scaffolding models		2 No	
2.	Measuring tape	Steel tape 30m	2 No	
3.	Camera, Note Pad			

IX. Precautions to be followed

1. To check Type of structure.
2. Type of scaffolding, formwork and centering
3. Material used for scaffolding, formwork and centering
4. Various parts of scaffolding, formwork and centering
5. Precaution taken at the time of erection.
6. Using of civil equipment
7. Use safety measures on site.
8. Listen and follow the instruction given by site in charge.
9. Maintain discipline during Visit.

X. Procedure:

Field Visit Report

Date of Visit----------

Site Address----------

Name of Project----------

Name of Contractor & Site Engineer----------

Status of project-Completed/ongoing----------

XI. Observation Actual Procedure followed – (Attached Photograph)

XII. Result

XIII. Interpretation of results

XIV. Conclusions and Recommendations

XV. Practical Related Questions

1. Define scaffolding, formwork and centering
2. Enlist the various parts of scaffolding, formwork and centering
3. Enlist the types of scaffolding
4. State the Requirement of good scaffolding, formwork and centering
5. List the causes of failure.

XVI. References/Suggestions for further Reading

Sr. No	Links	Discription
1	https://youtu.be/LfJAZb_0TJo?si=jBBBcpm5sGvC-naa	scaffolding, formwork and centering work.
2	https://www.youtube.com/watch?v=XsFeVuVQE-E	scaffolding, formwork and centering work.
3	https://youtu.be/Blw1bYBR1Co?si=IEzT5MLOhXf8RZv2	scaffolding, formwork and centering work.

XVII. Suggested Assessment Scheme

Performance Indicators		**Weightage (%)**
Process related: 15 Marks		**60%**
1	Identify scaffolding, formwork and centering materials	25%
2	Selection of materials as per requirement	25%
3	Working of team	10%
Product related: 10 marks		**40%**
1	Answers to practical related questions	30%
2	Submission of report in time	10%
Total:25 Marks		100%

Marks Obtained			**Dated sign of Teacher**
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.13: Prepare report with labelled sketches of inspected staircase components during site visit.

I. Practical Significance

The buildings are constructed with multiple floors nowadays. The buildings require different means for vertical communication. Vertical communication refers to the movement of persons and goods vertically using staircase, ramps, lift, etc. A stair is a combination of steps that leads from one floor to the other. The overall area that includes the steps, hand rail, landing, etc. is known as staircase. The staircases are provided in different shapes. The shape of the staircases is selected based on the availability of the space and the aesthetics of the building.

II. Industry/Employer Expected outcomes (POs)

This practical is expected to develop the following skills for the Industry identified.

1. A student should be able to know various technical terms associated with stairs.
2. Classify stair on the basis of shapes and material used.
3. Draw suitable geometric design.

III. Course Level Learning Outcomes

Design the relevant means of communication for the given building structure.

IV. Laboratory learning outcome(s)

Prepare a site visit report with reference to Identify various components of stair case.

V. Relevant Affective Domain Relevant

Follow safety practices and precautions.

Maintain tools and equipment.

VI. Relevant Theoretical Background

The technical terms associated with the design and construction of stair are

- Step: It flat-topped unit used moving from one level to another.
- Tread: is the horizontal portion of step, which the foot placed while ascending or descending.
- Rise: is vertical distance between the successive tread faces, that is, it is the vertical distance covered in a step.
- Riser: is vertical portion of the providing support to the tread.
- Going: It is horizontal distance between two successive riser faces
- Flight: Its series of without any platform on landing or break in their direction
- Landing**:** This platform provided between two flights of stair. It may extend to full width or only to half width staircase. Former known as half-spaced landing, while the latter known as quarter-spaced landing.

- Filler: This is ordinary step rectangular shape plan.
- Winder: This tapering step used to change the direction of stair.
- Stringer: sloping member supporting the steps known as stringer.
- Waist: thickness sloping slab case RCC stair known as waist.
- Nosing: projecting part of the tread beyond the face of the riser is known as nosing
- Slope: The angle made by the line nosing with the horizontal is termed as pitch or slope.
- Handrail: It the inclined rail provided at the edge of stair and parallel to the nosing line.it provide grasp to the hand during ascent and descent.
- Baluster: This is vertical member which support the handrail.
- Newel post: This is the vertical placed at the end of flights to connect the ends of strings and handrails.
- Railings: additional members provided to serve safety barrier.
- Scotia: This additional finish or mounding provided to the nosing to provide improved elevation or additional strength the nosing.
- Soffit: The under surface the stair known as soffit.
- Run: The total length of stair in a horizontal plane is known as run.it includes the length of landing also.
- Headroom**:** The vertical distance between the noising of one flight and the soffit of the flight immediately above known headroom.

VII. Actual diagram with equipment specification.

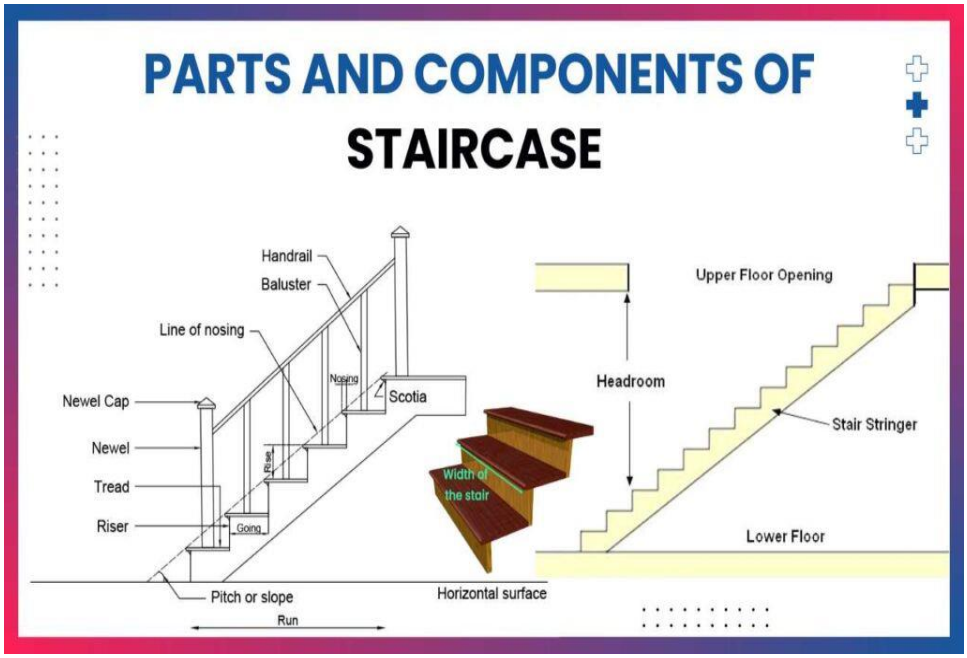

Figure 13.1: component parts of staircase.

VIII. Resources required

Sr. No	Particulars	Specification	Quantity	Remark
1.	Models of Staircase	Model showing all component parts of staircase.	02 No	

IX. Precautions to be followed

1. Type of structure.
2. Type of Staircase
3. Material and its proportion used.
4. Various parts of stair case observed during visit.
5. Use safety measures on site.
6. Listen and follow the instruction given by site in charge.
7. Maintain discipline during Visit.

IX. Procedure:

Field Visit Report

Date of Visit----------

Site Address----------

Name of Project----------

Name of Contractor & Site Engineer----------

Status of project-Completed/ongoing----------

XI. Observation Actual Procedure followed – (Attached Photograph)

XII. Result

XIII. Interpretation of results

XIV. Conclusions and Recommendations

XV. Practical Related Questions

Define vertical circulation.
Enlist the various parts of staircase.
State the importance of handrail, baluster, and Newel post
State the Requirement of good stair.
Enlist the type of stairs and situations where they used.

XVI. References/Suggestions for further Reading

Sr. No	Link	Discription
1	https://www.youtube.com/watch?v=XsFeVuVQE-E	staircase components
2	https://youtu.be/ATGEhLFBtk4?si=WU792UXhW00920-X	staircase components
3	https://youtu.be/fC12ziLBok8?si=BRAmjcdcb766kD8j	staircase components

XVII. Suggested Assessment Scheme

Performance Indicators		Weightage (%)
Process related: 15 Marks		**60%**
1	Identify type of staircase	25%
2	Selection of staircase as per requirement	25%
3	Working of team	10%
Product related: 10 marks		**40%**
1	Answers to practical related questions	30%
2	Submission of report in time	10%
Total:25 Marks		100%

Marks Obtained			Dated sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.14: Prepare report with labelled sketches of inspected doors and windows components during site visit.

I. Practical Significance

Doors, windows and ventilators are essential parts of building. The main function of a door in a building is to serve as a connecting link between the internal parts and to allow free movement to the outside of the building. While a window is defined as an opening in a wall of a building to serve one or more of the functions like natural light, natural ventilation. Ventilators are provided in the rooms at the top of the roofs, just below the roofs because if the air inside the room gets hot the hot air rises up and flow through these ventilators.

II. Industry/Employer Expected outcomes (POs)

This practical is expected to develop the following skills for the Industry identified.

1. A student should be able to know various types of doors and window and its component part.
2. To know the position and how to fix.

III. Course Level Learning Outcomes

Design the relevant means of communication for the given building structure.

IV. Laboratory learning outcome(s)

Prepare a site visit report with respect to components of door and window along with types.

V. Relevant Affective Domain Relevant

1. Follow safety practices and precautions.

2. Maintain tools and equipment.

VI. Relevant Theoretical Background

1. Location of Doors, windows and ventilators.
2. Materials for Doors, windows and ventilators.
3. Size of Doors, windows and ventilators.

TERMINOLOGY

- Frame: It is the assembly of horizontal and vertical members placed along the top, bottom and sides of an opening so as to form on enclosure and support shutters.
- Threshold: This is a cross wooden member of the door at floor level to provide lateral stability to the frame. Sometimes, it may not be provided, in which case lateral stability is obtained by taking vertical member frames deeper into the floor.
- Sill: This is the lowermost horizontal member of a window frame.
- Head: This is the horizontal member of a frame.
- Transoms**:** This is the horizontal member of a frame employed to subdivide the opening.

- Horn: This is the projection of the frame beyond the opening, provided for fixing the frame in the wall. The horn is about 100-150 mm in length.
- Rebate: It is the recess made inside the door frame to receive the door shutter. Shutter: It is the part of the door or window which is used to open or close the opening
- Style: This is the outside vertical member of the shutter.
- Top rail: This is the topmost horizontal member of the shutter.
- Bottom rail: This is the lowermost horizontal member of the shutter.
- Lock rail: This is the middle horizontal member of shutter to which fixtures for locking are provided.
- Cross rail: The additional horizontal rail fixed between the top and bottom rail of a shutter is known as cross rail. A cross-rail between lock rail and top rail is known as freeze rail.
- Panel: The area of shutter enclosed between the adjacent rails is known as panel.
- Sash bar: The lightweight unit of a frame which holds the glass within the door or window frame is known as sash bar.
- Mullion: The vertical member employed to a window or door opening vertically is termed as mullion.
- Louvre: This is a piece of timber fixed in an inclined position within a frame.
- Jamb: It is the vertical face of the opening that support the frame of door and window.
- Reveal: It is the external portion of a jamb.
- Architrave: This is the strip of wood, usually molded or splayed, which is fixed round a doorframe. This is used when the frame is placed flush with the external surface of wall i.e... Without leaving any reveal.
- Holdfasts: These are the steel flats provided to fix the door or window frame with the wall they are made of flats 30 mm x 6 mm wide and 200 mm long. Usually, doors need three holdfasts on each side, while window frames require only on each side

VII. Actual diagram with equipment specification

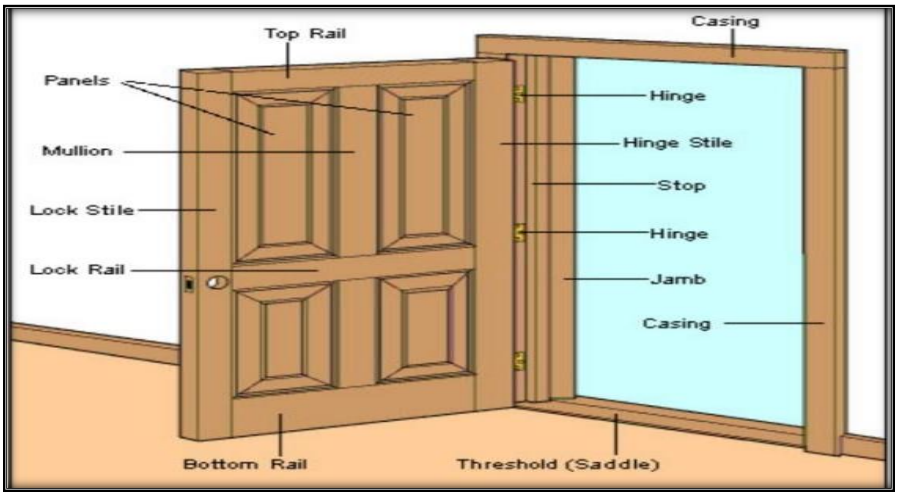

Figure 14.1: components Parts of Doors and windows

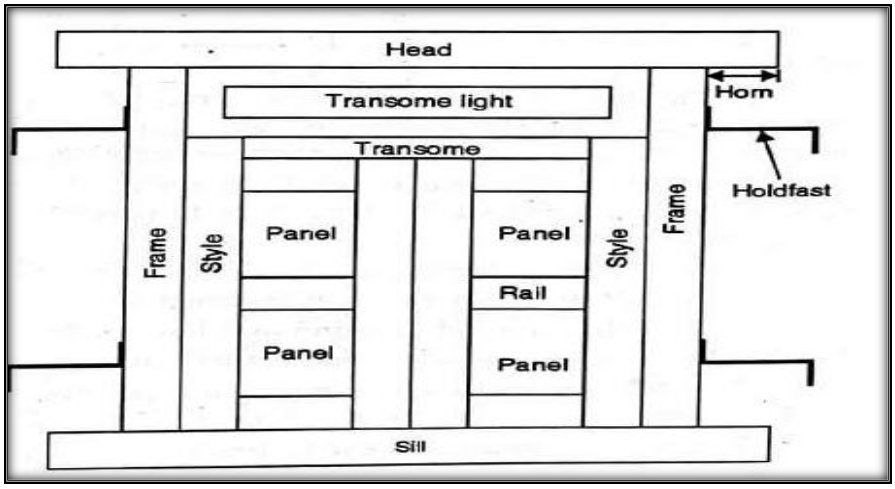

Figure 14.2: components Parts of Doors and windows

VIII. Resources required

Sr. No	Particulars	Specification	Quantity	Remark
1.	Models of Door	Model Showing all Component parts of door.	02 No	
2.	Models of Window	Model Showing all Component parts of door.	02 No	

IX. Precautions to be followed

1. Type of Doors, windows and ventilator.
2. Material used for Doors, windows and ventilator.
3. Various parts of Doors, windows and ventilator.
4. Sizes of Doors, windows and ventilator.
5. Listen and follow the instruction given by site in charge.
6. Maintain discipline during Visit

X. Procedure:

Field Visit Report

Date of Visit----------

Site Address----------

Name of Project----------

Name of Contractor & Site Engineer----------

Status of project-Completed/ongoing----------

XI. Observation Actual Procedure followed – (Attached Photograph)

XII. Result

XIII. Interpretation of results

XIV. Conclusions and Recommendations

XV. Practical Related Questions

1. Define following term sill, head, and horn.
2. Enlist the various parts of Doors, window and ventilators
3. Write the sizes of doors, window and ventilators
4. Discuss the location of doors, window and ventilators
5. Explain how door frame are fixed in the wall.

XVII. References/Suggestions for further Reading

Sr. No	Links	Discription
1	https://www.youtube.com/watch?v=XsFeVuVQE-E	Identify types of doors, windows and ventilators
2	https://www.youtube.com/watch?v=Yg4BLy7f-iI	Identify types of doors, windows and ventilators
3	https://youtu.be/lyKvxTOVGR4?si=KedfykyOcpnP0e3X	Identify types of doors, windows and ventilators
4	https://youtu.be/aKJ8CAl0G14?si=1dJHS7rzHGoBuBoX	Different parts of Door & window

XVIII. Suggested Assessment Scheme

Performance Indicators		Weightage (%)
Process related: 15 Marks		**60%**
1	Identify types of doors, windows and ventilators	25%
2	Selection of materials as per requirement	25%
3	Working of team	10%
Product related: 10 marks		**40%**
1	Answers to practical related questions	30%
2	Submission of report in time	10%
Total:25 Marks		100%

Marks Obtained			Dated sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.15: Prepare report with labelled sketches of inspected flooring and roofing materials during site visit.

I. Practical Significance

Floors divide the building into different levels one above the others and creating more accommodation one above the other within a certain limited space. The flooring provided in buildings protects the slabs on the different floors and gives the floors a nice embellishing finish. The point of providing flooring is to make the carpet area hard, leveled, and attractive to the eye. Among the various prerequisites of a suitable floor, one of the most important ones is that the flooring should also be resistant to water. A roof is the uppermost part of a building whose main function is to enclose the space and to protect the same from the effects of weather elements such as rain, wind, sun, heat and snow. Roof covering material provides protection to the roof and the structure. It prevents rainwater, moisture, heat, dust, etc. from entering the building from the top.

II. Industry/Employer Expected outcomes (POs)

This practical is expected to develop the following skills for the Industry identified.

1. A student should be able to know various types of flooring and roofing materials.
2. Execute the process of flooring and roofing
3. To know the process of fixing.

III. Course Level Learning Outcomes

Use the relevant type of material for finishing purpose in the given situation.

IV. Laboratory learning outcome(s)

Prepare a site visit report with respect to types of flooring and roofing materials.

V. Relevant Affective Domain Relevant

Follow safety practices and precautions.

Maintain tools and equipment.

VI. Relevant Theoretical Background

1. Selection of flooring according to type of building.
2. Selection of roofing for building.
3. Materials for flooring and roofing.

VII. Actual diagram with equipment specification

Figure 15.1: flooring materials

Figure 15.1: roofing materials

VIII. Resources required

Sr. No	Particulars	Specification	Quantity	Remark
1	Different Types of flooring material	Concrete, Mud flooring, wooden flooring, Terrazzo flooring.	05	
2	Different Types of Roofing material	Types of Roofs and roofing sheet, material	05	

IX. Precautions to be followed

1. Type of flooring and roofing Materials.
2. Material used flooring and roofing.
3. Method of fixing flooring and roofing.
4. Equipment used for fixing.
5. Listen and follow the instruction given by site in charge.
6. Maintain discipline during Visit

X. Procedure:

Field Visit Report

Date of Visit----------

Site Address----------

Name of Project----------

Name of Contractor & Site Engineer----------

Status of Project-Completed/ongoing----------

XI. Observation Actual Procedure followed – (Attached Photograph)

XII. Result

XIII. Interpretation of results

XIV. Conclusions and Recommendations

XV. Practical Related Questions

1. Briefly explain the various factors for selection of flooring.
2. Why cement concrete flooring popular.
3. Write the sizes of observed flooring
4. State the requirement of good roofing materials

XVI. References/Suggestions for further Reading

Sr. No	Links	Discription
1	https://youtu.be/QrvY9At4fMU?si=l1P57-Z1m49lzkgZ	Flooring and roofing materials
2	https://youtu.be/cMH7v5S-8cM?si=HI_NBdRL3Z6jTndf	Types of flooring
3	https://youtu.be/IhbB_qDM0HY?si=AwBytdGC3Ikd-sBr	Types of roofs
4	https://youtu.be/CthnmK2qlbI?si=mGyMyqXvr9XRdrTZ	Flooring and roofing materials

XVII. Suggested Assessment Scheme

Performance Indicators		**Weightage (%)**
Process related: 15 Marks		**60%**
1	Identify roofing materials and flooring material.	25%
2	Selection of materials as per requirement	25%
3	Working of team	10%
Product related: 10 marks		**40%**
1	Answers to practical related questions	30%
2	Submission of report in time	10%
Total:25 Marks		100%

Marks Obtained			**Dated sign of Teacher**
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.16: *Prepare a visit report with sketches/photos by observing the process of plastering and pointing of a masonry work at construction site.

I. Practical Significance

Building finishes include plastering, pointing, painting, etc. The main objective is protecting surface from atmospheric agent and to improve the appearance. Plastering is the process of covering rough surfaces such as walls, columns, ceilings etc. Plastering is done by mortar (binding material) which is combination of fine aggregate and water in suitable proportion. The binding material may be lime, cement or mud. Pointing is art of finishing mortar joints so make them watertight. For plastering and pointing various tools are used.

II. Industry/Employer Expected outcomes (POs)

This practical is expected to develop the following skills for the Industry identified.

1. A student should be able to know various types of plaster and pointing.
2. To select the appropriate material and method.
3. To identify the defects in flooring, roofing, and suggest remedial measures.
4. Apply relevant method of plastering.
5. To check surface evenness.

III. Course Level Learning Outcomes

Use the relevant type of material for finishing purpose in the given situation.

IV. Laboratory learning outcome(s)

Prepare a site visit report with respect to process of plastering and pointing

V. Relevant Affective Domain

Follow safety practices and precautions.

Maintain tools and equipment.

VI. Relevant Theoretical Background

1. Necessity of plastering and pointing.
2. Materials for plastering
3. Method of pointing and its type.
4. Precautions to be taken while plastering.
5. Tools and plants required for plastering and pointing.

VII. Actual diagram with equipment specification

Figure 16.1: plastering and Pointing

Figure 16.2: Tools for plastering and Pointing

VIII. Resources Required.

Sr. No	Particulars	Specification	Quantity	Remark
1.	Ordinary Portland Cement	OPC	2 bags	
2.	Sand	Artificial sand	5 cum	
3.	String/dori	1 to 2 mm dia	1 No	
4.	Trowel	15 cm long	5 No	
5.	Plumb-bob	Mild steel	2 No	

6.	Spirit level	30 cm long with vertical and horizontal bubble	2 No	
7.	Water-level tube	5 mm plastic tube	2 No	
8.	Mason square	60 cm long leg	2 No	
9.	Measuring tape	Steel tape 30m	2 No	
10.	Pans (Ghamela)	Iron	5 No	
11.	Portable Hammer	Iron	2 No	
12.	Spade	20cm wide MS blade	2 No	

IX. Precautions to be followed

1. Type of plaster work and how to apply.
2. Material used for plaster and its preparation.
3. Method and type of pointing.
4. Equipment used for plastering and pointing work Use safety measures on site.
5. Listen and follow the instruction given by site in charge.
6. Maintain discipline during Visit.

X. Procedure:

Field Visit Report

Date of Visit----------

Site Address----------

Name of Project----------

Name of Contractor & Site Engineer----------

Status of Project-Completed/ongoing----------

XI. Observation Actual Procedure followed – (Attached Photograph)

XII. Result

XIII. Interpretation of results

XIV. Conclusions and Recommendations

XV. Practical Related Questions

1. Briefly explain the Necessity of plastering.
2. Briefly explain the Necessity of pointing.
3. Which Precautions to be taken while plastering.
4. Draw neat sketch of equipment used for plastering and pointing.

XVI. References/Suggestions for further Reading

Sr. No	Links	Discription
1	https://www.youtube.com/watch?v=fDKRtQqKzJM	Process of plastering and pointing of a masonry work
2	https://youtu.be/v1asQCBSuVw?si=KxjPSagK3Dj5VXd6	pointing of a masonry work
3	https://youtu.be/HgM1uRjbc9c?si=PDez_PDOui-QKApA	plastering and pointing of a masonry work
4	https://youtu.be/ZXhxau1pqUc?si=-bArzbkkspIoEoW4	Difference between plastering and pointing of a masonry work

XVII. Suggested Assessment Scheme

Performance Indicators		**Weightage (%)**
Process related: 15 Marks		**60%**
1	Type of plastering and it's applied procedure.	25%
2	Selection of materials as per requirement	25%
3	Working of team	10%
Product related: 10 marks		**40%**
1	Answers to practical related questions	30%
2	Submission of report in time	10%
Total:25 Marks		100%

Marks Obtained			**Dated sign of Teacher**
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.17: Prepare a visit report with sketches/photos by observing keenly the process of painting in residential / public building.

I. Practical Significance

Building finishes include plastering, pointing, painting, etc. The main objective is protecting surface from atmospheric agent and to improve the appearance. Painting is the process of coating the materials and providing final finishing for walls, columns, ceilings, metal materials, wood work etc. Painting is done by decorative finishes like paint, varnish, distemper, colour wash, whitewash etc. selection of paint is depending upon type of work and material due to this proper care and attention should be taken in the selection and application of paint.

II. Industry/Employer Expected outcomes (POs)

This practical is expected to develop the following skills for the Industry identified.

1. To select the appropriate material and method.
2. Apply relevant method of painting.
3. To check surface evenness.

III. Course Level Learning Outcomes

Use the relevant type of material for finishing purpose in the given situation.

IV. Laboratory learning outcome(s)

Prepare a site visit report with respect to process of painting in residential/public building.

V. Relevant Affective Domain

Follow safety practices and precautions.

Maintain tools and equipment.

VI. Relevant Theoretical Background

1. Necessity of painting.
2. Materials for painting and its types.
3. Process of painting on different surfaces.
4. Method of application of paint.
5. Tools and plants required for painting.

VII. Actual diagram with equipment specification

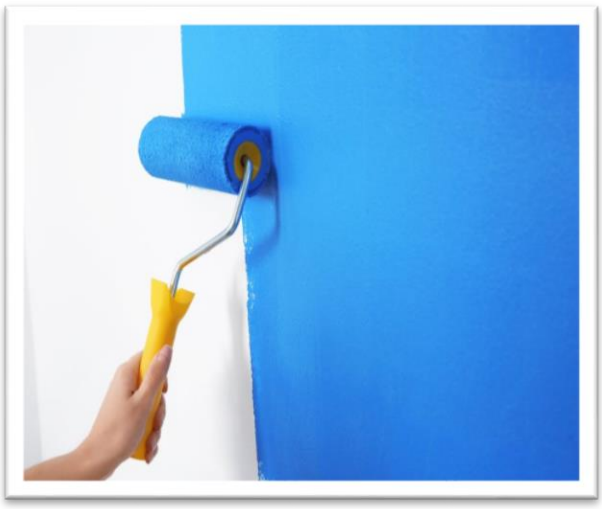

Figure 17.1: Painting

Figure 17.2: Tools for Painting

VIII. Resources Required.

Sr. No	Particulars	Specification	Quantity	Remark
1.	Painting brushes of different size for oil, acrylic painting and rollers of different size for smooth finishing work.	1 inch,2, inch,3inch,4 inch	5 No	
2.	Measuring tape	Steel tape 30m	2 No	

IX. Precautions to be followed

1. Type of paint.
2. Which Ingredients added in paint?
3. Preparation of surface before apply paint.
4. Equipment used for painting.
5. Listen and follow the instruction given by site in charge.
6. Maintain discipline during Visit.

IX. Procedure:

Field Visit Report

Date of Visit----------

Site Address----------

Name of Project----------

Name of Contractor & Site Engineer----------

Status of project-Completed/ongoing----------

X. Observation Actual Procedure followed – (Attached Photograph)

XII. Result

XIII. Interpretation of results

XIV. Conclusions and Recommendations

XV. Practical Related Questions

1. Briefly explain the Necessity of painting.
2. Explain the importance of ingredients in paint.
3. Which Precautions to be taken before painting.
4. Explain the method and application of painting.
5. Enlist the name of equipment used for painting.

XVI. References/Suggestions for further Reading

Sr. No	Links	Discription
1	https://www.youtube.com/watch?v=fDKRtQqKzJM	Painting Work
2	https://youtu.be/OmX7-t0usA0?si=hO-LbpN3vi_Uq9tV	How to paint
3	https://youtu.be/61wWj07H7Vo?si=ZPPTOdLH3ozDc4Cr	Paint by using Brush
4	https://youtu.be/ihp_YDi9-CM?si=WJGhf9ou-K4x6y0w	Preparing wall for painting

XVII. Suggested Assessment Scheme

Performance Indicators		**Weightage (%)**
Process related: 15 Marks		**60%**
1	Identify Painting material.	25%
2	Selection of materials as per requirement	25%
3	Working of team	10%
Product related: 10 marks		**40%**
1	Answers to practical related questions	30%
2	Submission of report in time	10%
Total:25 Marks		100%

Marks Obtained			**Dated sign of Teacher**
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.18: *Carry out market survey of the building materials used for Brickwork, Flooring, Plastering and Painting, available in your city & prepare a report (each of five).

I. Practical Significance

Carry out market survey of the building materials used for Brickwork, Flooring, Plastering and Painting, available in your city. This market survey aims to provide relevant information on the building material in market so that student may get a deep understanding of the material available in market. The survey includes quantitative information such as Current market trends, material variation and availability, cost, type, and company manufacturer. Etc.

II. Industry/Employer Expected outcomes (POs)

This practical is expected to develop the following skills for the Industry identified.

1. Various types of materials available in market and its cost, available company brand.
2. Execute the safe practices in building construction activities.

III. Course Level Learning Outcomes

Identify relevant type of construction materials for the given type of building.

Use the relevant type of special purpose construction materials in the given situation.

IV. Laboratory learning outcome(s)

Prepare a visit report with respect to market survey of construction materials.

V. Relevant Affective Domain

Visit market and prepare self-report, survey, questionnaire, and checklist

VI. Relevant Theoretical Background

1. Various types of building material.
2. Its types, uses and application.

VII. Resources Required.

Sr. No	Particulars	Specification	Quantity	Remark
1.	Note pad			
2.	Camera			

VIII. Precautions to be followed

1. Observer various material and its various brands available in market.
2. To check market rate and compare with another brand.
3. Listen and follow the instruction given by supplier.
4. Maintain discipline during market survey.

IX. Procedure:

Market Survey Report

Date of Visit----------

Name of shops----------

Address----------

X. Observation:

Sr. No	Type of Material	Brand Name	Rate	Unit

XI. Attach Photograph/Broachers

XII. Result

-

XIII. Interpretation of results

XIV. Conclusions and Recommendations

XV. Practical Related Questions

1. List out the building materials with its market rate.
2. Name of different company's name or brand available in market for paint and flooring.
3. List out the material available in market for brickwork and plastering.

XVI. References/Suggestions for further Reading

Sr. No	Links	Discription
1	https://www.youtube.com/watch?v=fDKRtQqKzJM	market survey of the building materials
2	https://youtu.be/nUmxk78oXT4?si=UEbV-NHcfD3o4GPD	market survey of the building materials

XVII. Suggested Assessment Scheme

Performance Indicators		Weightage (%)
Process related: 15 Marks		**60%**
1	Carry our market survey	25%
2	Identify the materials as per requirement and its type	25%
3	Working of team	10%
Product related: 10 marks		**40%**
1	Answers to practical related questions	30%
2	Submission of report in time	10%
Total:25 Marks		100%

Marks Obtained			Dated sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	

Practical No.19: Prepare the site visit report of the nearby heritage structure to inspect the Civil Engineering attributes with reference to IKS.

I. Practical Significance

The Indian Knowledge System (IKS) is a methodical transmission of knowledge from one generation to the next. It is a well-structured system and process of knowledge transfer, rather than just a tradition. The goal of promoting traditional Indian ideas and emphasizing their preservation because of its historical, architectural, cultural, aesthetic or ecological value. While also spreading their relevance in a modern context. Our cultural and natural heritage are both irreplaceable sources of life and inspiration.

II. Industry/Employer Expected outcomes (POs)

This practical is expected to develop the following skills for the Industry identified.

1. To understand traditions that are specific to your ancestors.

2. Acknowledgement of historical artefacts, practices and sites which should be preserved for the benefit of future generations.

3. Execute the safe practices in building construction activities.

III. Course Level Learning Outcomes

Identify relevant type of construction materials for the given type of building.

Undertake the given type of building construction activity for the given component of building structure.

IV. Laboratory learning outcome(s)

Prepare a visit report with respect to the nearby Indian heritage structure.

V. Relevant Affective Domain

Visit Indian heritage structure and prepare self-report, survey, questionnaire, and checklist.

VI. Relevant Theoretical Background

1. Importance's of Indian Heritage structures.

VII. Resources Required

Sr. No	Particulars	Specification	Quantity	Remark
1.	Note pad			
2.	Camera			

Precautions to be followed

1. Collected data in the context of IKS, particularly Vaastu shastra and Shilpa Shastra.

2. Compare and contrast the observed traditional techniques with modern civil engineering practices.

3. To observe technical aspects like structural stability, material and its properties.

4. Prior to the visit, research the heritage site.

5. be mindful of your surroundings and respectful of the historical significance of site.

6. Maintain silence.

VIII. Procedure:

Site visit report of the nearby heritage structure

Date of Visit----------

Name of structure----------

Address----------

X. Observation

Attach Photograph/Broachers

XI. Result

XII. Interpretation of results

XIII. Conclusions and Recommendations

XIV. Practical Related Questions

1. List out the Indian Heritage structure in your area.
2. Explain briefly importance of Indian heritage structure related to civil engineer.
3. Write in detail its historical, architectural, cultural information.

XVII. References/Suggestions for further Reading

Sr. No	Links	Discription
1	https://www.youtube.com/watch?v=fDKRtQqKzJM	heritage structure inspection
2	https://youtu.be/0WVDR03PEyk?si=otEfm4SnX9wftq5l	heritage structure inspection

XVIII. Suggested Assessment Scheme

Performance Indicators		Weightage (%)
Process related: 15 Marks		**60%**
1	Carry our survey	25%
2	Collect information about its historical, architectural, cultural.	25%
3	Working of team	10%
Product related: 10 marks		**40%**
1	Answers to practical related questions	30%
2	Submission of report in time	10%
Total:25 Marks		100%

Marks Obtained			Dated sign of Teacher
Process Related (15)	**Product Related (10)**	**Total (25)**	