

SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

UNIT I - INTRODUCTION

ESTIMATE:

An estimate is the anticipated or probable cost of a work and is usually prepared before the construction is taken up. Before undertaking any work or project it is necessary to know its probable cost which is obtained or derived by estimating. The estimate is prepared by computing, calculating the quantities required and then 'calculating the cost at suitable rates, to get the expenditure likely to be incurred in the construction of the work or structure.

DATA FOR ESTIMATE

Drawings

Plan, sectional elevations, and detailed drawings to scale and fully dimensioned are required. The plan, elevation and sectional elevations are usually drawn to a scale of 1cm=1m and detailed drawings are prepared to scales of 1 cm=10 cm to 1 cm=29 cm

Rates

The rates per unit of various items of work, the rates of various materials to be used in the construction, and the wages of different categories of labour, skilled or unskilled as mason. carpenter. mazdoor, bhishti, etc., available for preparing estimate. The location of the work and its distance from the source of materials and the cost of transport should be known. These rates may be obtained from P.W.D. Schedule of Rate book or the rates may be worked out by the "Analysis of rate" method.

Different types of estimate

- (I) Preliminary Estimate or Approximate or Abstract Estimate or Rough Cost Estimate.
- (2) Plinth Area Estimate.
- (3) Cube Rate Estimate or Cubical Content Estimate.
- (4) Approximate Quantity Method Estimate.
- (5) Detailed Estimate or Item Rate Estimate
- (6) Revised Estimate.
- (7) Supplementary Estimate.
- (8) Supplementary and Revised Estimate.

Annual Repair or Maintenance Estimate

IMPORTANCE AND ITS PURPOSES

To ascertain the necessary amount of money required by the owner to complete the proposed work. For public construction works, estimates are required in order to obtain administrative approval, allotment of funds and technical sanction.

To ascertain quantities of materials required in order to programme their timely procurement. To procure controlled materials, if any, like cement, steel, etc, quantities of such materials are worked out from the estimate of the work and attached with the application for verification.

To calculate the number of different categories of workers that are to be employed to complete the work within the

scheduled time of completion.

To assess the requirements of Tools, Plants and equipment required to complete the wok according to the programme.

To fix up the completion period from the volume of works involved in the estimate.

To draw up a construction schedule and programme and also to arrange the funds required according to the programming.

To justify the investment from benefit cost ratio.

To invite tenders and prepare bills for payment.

An estimate for an existing property is required for valuation.

SPECIFICATION

Specifications describe the nature and the class of the work, materials to be used in the work, workmanship etc. and is very important for the execution of the work. The cost of a work depends much on the specifications



Purpose of giving Specifications

- The cost of a unit quantity of work is governed by its specifications.
- Specification of a work is required to describe the quality and quantity of different materials required for a construction work and is one of the essential contract documents.

• This also specifies the workmanship and the method of doing the work. Thus specification of a work serves as a guide to a supervising staff of a contractor as well as to the owner to execute the work to their satisfaction.

- A work is carried out according to its specification and the contractor is paid for the same. Any change in specification changes the tendered rate.
- As the rate of work is based on the specification, a contractor can calculate the rates of various items of works in tender with his procurement rates of materials and labour. Thus tender rate without specification of works is baseless, incomplete and invalid.
- Specification is necessary to specify the equipment tools and plants to be engaged for a work and thus enables to procure them beforehand.
- The necessity of specification is to verify and check the strength of materials for a work involved in a project.

Types of Specifications

General Specifications

In general specifications, nature and class of works and names of materials that should be used are described. Only a brief description of each and every item is given. It is useful for estimating the project. The general specifications do not form a part of contract document.

Detailed Specifications

The detailed specifications form a part of a contract document. They specify the qualities, quantities and proportions of materials and the method of preparation and execution for a particular item of works in a project. The detailed specifications of the different items of the work are prepared separately and they describe what the work should be and how they shall be executed. While writing the detailed specifications, the same order sequence as the work is to be carried out is to be maintained.

Detailed specifications consists of:

- General provisions
 - Conditions of contract
 - Depend on nature of work
 - Relating to documents
 - General obligations of the contractor
 - Conditions relating to labour
 - Subletting, execution of work
 - Measurement and payment
 - > Default and non-completion settlement of disputes and specific conditions etc..

- ITechnical provisions
 - Shows desired quality of final product
 - Details of inspection and test
 - Deals with specifications of materials, workmanship, performance and proprietary commodities
- Standard specifications
 - Strandadized format.
 - > Lengthy process of wording will be avoided.
 - ➢ Saves time, labour and cost.
 - ➤ Eg: earth work, brick work, etc.
- Can be used in Cpwd, Mes, Railway dep.

Essential requirements of specifications

Subject matter:

- ^I The subject matter of the specification should relate to the information required for the contractor after the contract is given to him.
- 1 The requirements which are to be enforced only should be included in the specification. Grammar:
- All sentences should follow the rules of grammar. Abbreviations:
- ^I Well known abbreviations in the building industry should be used. Development of style:
- ¹ The main aim is to resent a clear picture of facts. The style of arranging of ideas should be clear and brief.

Selection of words:

Suitable words in the desired meaning should be used. Words having more than one meaning or unfamiliar words shall not be used.

Accuracy:

The information given in the specification should be complete and correct. Information should not be repeated.

Clearness

As far as possible the information should be clear. It should state whether the contractor shall or shall not do. In fact the parties, owner and contractor should follow the same sense.

Brevity:

Sentences should be short simple and concise. Straight forward specification would be clearly understood by the persons filling the tenders. The brevity is the essence of specifications.

Practical limits & commercial sizes:

The specification should be framed within the practical limitation of the materials and workman ship. It should not specify practical impossibilities. It should specify the use of commercial sizes and pattern of materials available in the market.

Fairness:

The specification should be fair and should not be framed in such a way so as to throw all the risks on the shoulders of the contractors. Likely hazards, difficulties should be specified so as to give a clear picture of the work to the contractor.

SPECIFICATIONS FOR CEMENT PLASTERING:

Preliminary - procedure for first coat - procedure for second coat - measurement

The work of sand faced cement plater shall be carried out after masonry joints are raked out to a depth of 20mm and the walls are well-watered.

The first coat for sand faced cement plaster shall be of cement mortar of proportion 1:4 i.e., one part of cement to four parts of clean, coarse and angular river sand by volume. The mortar of one cement bag shall be prepared at a time and it shall be prepared on a water-tight platform or in a steel trough. The mortar shall be consumed in 30 minutes after adding water. The first coat of plaster shall be uniformly applied in the best workmanship manner after watering the surface of walls in advance and putting dots

and preparing screeds for maintaining uniform thickness of plastered surface. The thickness of first coat shall be nowhere less than 12mm. The fist coat shall be well-watered atleast for 7 days. The first coat shall be provided with zigzag lines such that the first coat adheres well with the second coat.

The second coat of sand faced cement plater shall be carried out in c:m of proportion 1:1 and shall be of thickness 8mm. The second coat shall be applied on the first coat atkeast after 7 days of completion of first coat. The second coat shall give uniform grey colour to the whole structure. The sand to be used in the mortar for the second coat shall be perfectly screened so that sand of uniform size shall appear on the surface. The sponge shall be used in the second coat and it shall be applied when the second coat is wet and it shall be so worked that the density of sand grains appearing on the surface shall be equal and uniform. After completion of the second coat, the surface shall be kept well-watered atleast for 15 days.

The payment shall be made for superficial area covered. The measurements and deductions are made accordingly.

SPECIFICATIONS FOR MARBLE FLOORING AND DADOO:

Marble stone: Marble shall be of good quality having smooth, hard surface, regular in shape, size and of uniform thickness, of good appearance, and of sharp and square edges. It shall be free from cracks and other defects. Marble stone of uniform size with more than 45cm and the minimum length of 1200mm to fit in the counter and floor, may be from Godavari Marble factory (polished of minimum size 600mmx600mm) or Rajasthani (Indian) Marble equivalent conforming to IS 1130 – latest Revision or BS specification or as approved by the engineer.

No small marble will be allowed except in the thin wall or skirting or the edges or unless specified by engineer. The marble must be backed with the nylon grip net. The marble shall be of minimum thickness of 20mm. The colour shall be as per the instruction of engineer or drawings. Sample of marble stone to be used shall be submitted to the Project manager and his approval should be taken before the bulk purchase. All the marble stone supplied shall conform to the approved sample in all respect.

Proportion: Base Course: 1 part cement; 2 parts sand and mixing shall be done as per specification for mortar mixing of brick masonry work.

Dressing: Each marble stone slab shall be machine cut to required size and shape as specified in the drawing and as instructed by engineer. All angles and edges of the marble slabs shall be true and square and free from chippings and the surface shall be true and plane. The thickness of the stone shall be as specified in the drawing. No tolerance shall be allowed for thickness.

For flooring, the marble slabs shall be machine cut with good finish at edges and corners. The contractor shall ensure that no chisel marks are visible on the surface of the stone before fixing. Marbles with chisel marks or broken edges shall be rejected.

Laying: The base shall be made rough and watered and given a cement wash and then the mortar shall be laid in 20 mm thick layers as per instruction of Engineer. After laying mortar, it should be levelled with wooden floats. Proper slope for draining wash water shall be provided as per instruction of the Engineer. And over this, marble stone should be laid; the joints should not be more than 3 mm. The joints should be painted with white cement slurry.

Curing: After about two hours of laying, the surface shall be covered with wet bags and kept wet and left undisturbed for two days.

Finish: Finally, when the surface is absolutely dry, oxalic acid powder shall be rubbed well on the surface with grinding machine with water, and this operation shall be repeated until the surface becomes perfectly smooth and glossy. The surface shall be rubbed with wax to give a glazing surface. White cement or colour cement shall be used in joint to have the required colour as per specified or as per

instruction of Engineer. Care shall be taken that the floor is not left slippery and that ordinary wax is not used under any circumstances.

If required by the Engineer, the grinding and polishing shall be done by grinding machine in 3 operations, first grinding with machine fitted with coarse Carborundum stone, second grinding

with medium grade Carborundum stone and final grinding with fine grade Carborundum stone.

Measurement: Measurement shall be in square meter of exact length and breadth (length and height in dado) of the floor. Rate shall include materials, mixing, laying, curing, finishing, grinding, polishing and labour etc., all complete.

SPECIFICATIONS FOR WOOD WORK – DOORS, WINDOWS, FRAMES AND SHUTTERS:

All wood work shall be planed neatly and truly finished to the exact dimensions. All joints shall be neat and tight, truly and accurately fitted. Wall plates, purlins and rafter shall be painted 2 coats.

All beams shall be bedded on (1:2:4) RCC beds of 10cm x 7.5cm x 4.5cm dimension with a minimum of 15cm bearing or as specified in the drawing. All portion of timber in contact with masonry shall have 6mm gap sides. All beams shall rest on bearing.

Measurement of wood work shall be in volumes for the finished work, including fixing, sawing, planning, joining, nails, screws etc. Wooden blocks/joints wherever specified may be measured in number.

DOOR AND WINDOWS

Wooden frames: The contractor is to clear out and destroy or remove all cut and shavings and other wood waste from all parts of the building and the site generally, as the work progress and at the conclusion of the work.

Carpentry: All carpentry shall be executed with workmanship of the best quality.Scantling and boarding shall be accurately sawn and shall be of uniform width and thickness throughout. All carpenter's work shall be left with sawn surface except where particularly specified to be wrought.

All carpenter's work shall be accurately set out in strict accordance with the drawings and shall be framed together and securely fixed in best possible manner with properly made joints. All necessary brads, sheet metal screws, etc. shall be provided as directed and approved.

Joinery: All joints shall be accurately set out on boards to full size for the information and guidance of the artisans before commencing the respective works, with all joints, iron work and other works connected therewith fully delineated. Such setting out must be submitted to the Engineer In-charge and approved before such respective works are commenced.

All jointer's work shall be cut out and framed together as soon after the commencement of the building as is practicable, but is not to be wedged up or glued until the building is ready for fixing same. Any portions that warp, wind or develop shakes or other defects within six months after completion of the works shall be removed and new fixed in their place on contractor's own expense.

All work shall be properly mortises, tenons, house, shouldered, dovetailed, notched, wedged, pinned, braided, etc., as directed and to the satisfaction of the consultants and all properly glued up with the best quality approved glue.

Joints in joinery must be as specified or detailed, and so designed and secured as to resist or compensate for any stresses to which they may be subjected. All nails, springs, etc. are to be punched and puttied. Loose joints are to be made where provision must be made for shrinkage, glued joints where shrinkage need not be considered and where sealed joints are required. Glue for load-bearing joints or where conditions may be damp must be damp must be of the resin type. For non-load-bearing joints or conditions may be guaranteed casein or organic glues may be used. All exposed surfaces of joinery work shall be wrought and all arise "eased-off" by plaining and sand papering to an approved finish suitable to the specified treatment.

Dimensions: Joinery shall hold up to the specified sizes and as measure.

Fixing Joinery: All beads, fillets and small members shall be fixed with round or oval brads on nails well punched in and stopped. All large members shall be fixed with brass screws, the heads let in and palette to match the grain.

Unless otherwise specified, plugs of external work shall be of hardwood; plugs for internal work may be of softwood. Holes for plugging must be made with a proper drilling tool and the holes completely filled with the plugging material.

Unless otherwise specified all skirting, window, grounds and backings for same, fillets etc., shall be plugged at intervals not exceeding 600mm.

Bedding Joinery: All door and window frames, sills, wooden bars etc., which are fixed to brickwork, concrete by means of grounds, lugs, etc., shall be bedded solid in mortar as previously described and pointed with a recessed joint 6mm deep to the approval of the Engineer In-charge.

Plywood, Block boards, Chipboards and MDF board, shall be bonded with synthetic resin of "interior" type and sheet metal screws unless otherwise stated for the doors. Where stated to be "exterior" type, they shall be weatherproof.

All exposed edges of block board and chipboard shall be lipped with hardwood as described below.Samples of all such materials and their source of manufacture must be approved by the Engineer In-charge before used in the works.

Inspection and Testing : The Engineer In-charge shall be given facilities for inspection of all works in progress whether in workshop or on site. All timber as it arrives on the site and not approved by them must be removed forthwith, failing which the Employer, with the advise of the Engineer In-charge, may arrange for the removal of the rejects and impose of them as they may consider advisable at the contractor's expenses.

The contractor is to allow for testing or prototypes of special construction units and the Engineer In- charge shall be at liberty to select any samples they may require for the purpose of testing i.e. for moisture content, or identification of species, strength, etc.

Where timbers need to be extended into a wall, they shall be thoroughly "Brush Treated" with

a wood preservative approved by the Engineer In-charge, and as much clear air space maintained around the timber where it adjoins the wall as possible. Measurement: Measurement of works will be made in m³ of works as specified.

Payment: Payment for work will be made on the basis of contract unit price indicated in the BOQ. The payment will be full and final compensation for all material, labour, and equipment to complete the works as specified.

Panelled shutters: The window shutters may be fully panelled, fully glazed, partly glazed and partly panelled, battened or Venetian as specified. Styles and panels shall be neatly planed and truly finished to exact dimensions. Styles and rails shall be framed properly and accurately with mortise and tenon joints and fixed with bamboo pins as per drawing. Glue shall be applied at al joints before clamping and fixing with bamboo pins. Panels shall be of one piece without any joints and shall be housed with 12.5mm insertion into rails and styles.

Panels shall be of thickness as specified in the drawing. All rails above 100mm in width shall have double tenon. No tenon shall exceed 6mm the thickness of the member. In case of swing door, swing door hung in lace shall not be rebated together. It shall be fitted with vision panels. Measurement: Measurement of works will be made in m2 of works as specified.

Payment: Payment for work will be made on the basis of contract unit price indicated in the BOQ. The payment will be full and final compensation for all material, labour, and equipment to complete the works as specified.

Glazed, Ply, Teak, GI sheet and Wiremesh shutters

Shutter or frame shall be as described in Panelled doors.

Putty: Putty for glazing in wood frames shall be composed of pure linseed oil and whiting powder free from grittiness.

Wooden beads: All wooden beads shall be from hard wood fitted against the glass. Wooden beads shall be bedded against the rebate and secured by 12.5mm glass nails fixed at 75mm apart. The rebate depth shall be 12.5mm Wooden beads shall not project beyond the rebate. All glass panes shall have edge- clearance, when fitted of 1.5mm all round. Beads shall be painted with approved paint before fixing glass pane.

Hinges/ handles/bolts/screwes: The window shutters shall have minimum of two-piece 100mm steel hinges with steel screws, one aluminium handle and two pieces of 150mm tower bolts of super brand or equivalent with steel screws.

The timber louvers shall be 12 mm. thick of the size and fixing as shown in the Drawing. Vertical slats if required shall be provided as per instruction of the Engineer.

Construction Procedure: The window shutters may be fully panelled, fully glazed, partly glazed and partly panelled, battened or Venetian as specified. Styles and panels shall be neatly

planed and truly finished to exact dimensions.

Styles and rails shall be framed properly and accurately with mortise and tenon joints and fixed with bamboo pins as per drawing. Glue shall be applied at all joints before clamping and fixing with bamboo pins. Panels shall be of one piece without any joints and shall be housed with 12.5mm insertion into rails and styles.

Panels shall be of thickness as specified in the drawing. All rails above 100mm in width shall have double tenon. No tenon shall exceed 6mm the thickness of the member. In case of swing door, swing door hung in lace shall not be rebated together. It shall be fitted with vision panels. Rebates of metal frames receiving glass shall be prepared and treated with primer for putty prior to glazing and putty shall be primed ten days after glazing (See Painting).

Glass louvers shall have ground edges and be fixed in accordance with the instruction of the louver frame manufacturer.

Mirrors shall be 4mm silvered plate glass or Swan brand with polished edges, and shall be drilled for and fixed with four chromium plated screws with detachable dome heads.

On completion remove all broken, scratched or cracked panes and replace with new to the satisfaction of the Engineer In-charge. Clean inside and out with approved cleaner. On no account shall scraping with glass clean windows.

Solid core shutters

Wooden solid core of lightwood with 4mm Teak plywood in both sides glued and lipped with mould salwood of sample approved by project engineer. The tolerances for the overall size are +-3mm +-1mm in thickness. Where described as "External Quality" flushes doors are to be finished with weatherproof

plywood as before described and the Engineer Incharge must approve sample doors before the doors are completed.

The door shutters are polished with clear chapra polish and painted with two coats of touch wood polish. The doors shall be sticked with moulding of approved design in the shape as shown in the drawing.

The Door shutters shall have minimum of three pieces of 150mm brass hinges with brass screws, one IPSA Mortise lock of heavy duty or equivalent, two pieces of 150mm brass tower bolts of good quality with brass screws, 75 mm doorstopper.

Construction Procedure: The window shutters may be fully panelled, fully glazed, partly glazed and partly panelled, battened or Venetian as specified. Styles and panels shall be neatly planed and truly finished to exact dimensions.

Styles and rails shall be framed properly and accurately with mortise and tenon joints and fixed with bamboo pins as per drawing. Glue shall be applied at all joints before clamping and fixing with bamboo pins. Panels shall be of one piece without any joints and shall be housed with 12.5mm insertion into rails and styles.

Panels shall be of thickness as specified in the drawing. All rails above 100mm in width shall have double tenon. No tenon shall exceed 6mm the thickness of the member. In case of swing door, swing door hung in lace shall not be rebated together. It shall be fitted with vision panels.

Measurement: Measurement of works will be made in m2 of works as specified.

Payment: Payment for work will be made on the basis of contract unit price indicated in the BOQ. The payment will be full and final compensation for all material, labour, and equipment to complete the works as specified.

NB: These specifications may be adopted for other type of shutters viz plywood, teak, GI sheet flush doors etc as well. For such items replace glass with relevant material as specified.

SPECIFICATIONS FOR WHITE WASHING IN THREE COATS:

Walls to be cleaned - lime and gum - workmanship - cleaning - measurement.

The walls to be whitewashed shall be cleaned before the work is started.

The fresh white lime shall be slaked at site of work and shall be mixed thoroughly with sufficient quantity of water in a tub and shall then be screened through a clean cloth. The clean gum or rice dissolved in hot water shall me mixed with lime in required quantities.

The whitewash shall be applied with jute brush and the brush shall be so worked that a surface with uniform colour is obtained. Three coats shall be applied, each after the previous coat has completely dried.

The stains of whitewash on the floor or other surface shall be removed.

The payments shall be made on superficial contents and openings shall be deducted once only to compensate for tops, bottoms and sides of the openings.

SPECIFICATIONS FOR PAINTING IN THREE COATS:

Cleaning - paint- coats - workmanship - measurement.

The surface to be painted shall be cleaned and made smooth by rubbung sand-papers of different grades. In case of steel work, the dust and scales shall be thoroughly removed. All broken edges, cracks, loose plaster and wavy surface shall be brought up by plaster work and all the holes and undulations shall be filled up with plaster of paris and rubbed smooth.

The paint to be used shall be of approved tint and make. The pure turpentine shall be used as a thinning agent.

A priming coat shall first be applied and then all cracks, holes, etc shall be filled with putty or with a mixture of glue and plaster of paris. The second coat of paint shall then be applied and after it has dried, the final coat of paint shall be applied.

The paint shall be applied in the best workmanship manner. The brushes to be used shall be of the best quality and they shall be worked in such a way that a surface of uniform shade is obtained without any hair marks, drops of paint, etc. At the end of the day's work, the brushes shall be cleaned by turpentine and shall be kept dry.

The painting shall be paid in superficial contents. The doors and windows shall be measured flat on two sides and no extra measurement shall be taken for mouldings, etc. The gaps of grillwork shall be measured on one side only for painting both sides of the grillwork. The half of the glazed part shall be deducted from the measurements of flat area. The louvers and venetians shall be treated as one and a half times of the corresponding flat area.

SPECIFICATIONS FOR TILING (VITRIFIED/CERAMIC):

Tiles: The tile material for Glazed/Non-glazed Vitrified Porcelain(Granite Viglacera-Vietnam, Portebello- Brazil or equivalent make) /Glazed/Non-glazed Ceramic tiles (Somany, Kajaria or equivalentmake), shall confirm to IS:777 (respective IS standards) or Equivalent approved by the Engineer. The tiles shall be of approved colour, size and shape or as shown in the drawings and shall be laid to the pattern approved by the Engineer. The tiles shall be of uniform colour, true to size and shape and free from cracks, twists, uneven edges, crazing and other defects. The size and thickness of the tiles shall be as specified. The contractor shall submit samples of tile for selection and approval by the Engineer In-charge and all tiles delivered to the site shall conform to the approved samples with regard to size, quality, texture and colour.

Mixing: Mixing shall be done as per specification for mortar mixing of brick masonry work

Preparation of Surface and installation: Wall surfaces shall be brushed cleaned and wetted. Prior to installing any tile, the Contractor shall inspect surface and conditions in areas to receive tile work and shall notify the Engineer of any serious defects or conditions that will interfere with or prevent a satisfactory tile installation and shall coordinate with other traders of work.

Approximately 12 mm thick level and plumb, scratch coat of cement mortar 1:4 or as specified by site engineer shall be applied. The scratch coat shall be moist cured for at least 24 hours before application of floating coat.

Before applying floating coat the scratch coat shall be thoroughly wetted. The floating coat, plastic mix of neat cement of approximately 3 mm thickness shall be applied even with screeds to true plane.

Floating coat shall be applied over areas no larger than can be covered with tile while the mortar is still plastic (half set).

Glazed tile shall be soaked, completely immersed in clean water at least 30 minutes and drained. Individual tile that exhibits drying along edges shall be allowed to remain on the backs of tile at the time of setting.

Tiles shall be installed by applying a skin coat of a plastic mix of neat cement to backs of tile and firmly pressing tile into the floating coat to true plane and position. White cement shall be used for the skin coat where white joints are required. During the process of setting tiles, continuous horizontal and vertical cuts every 40cm to 60 cm shall be made through the floating coat while plastic, using the point of a trowel turned edge wise, Care shall be taken to prevent cutting into the scratch coat.

Where full size tile cannot be laid, it shall be cut (sawn) to required size and edges rubbed smooth to ensure a true and straight joint.

All tile work finishing shall be adequately protected from damage during the progress of construction and any damage shall be repaired to the satisfaction of the Engineer at the Contractor's expense.

Joints in Tile Work: Joints in tile work shall be accurately aligned with horizontal joints level and vertical joints plumb. Joints shall be maintained uniformly wide by aligning spacer lugs on tile edges if tiles are so manufactured or by use of wetted strings.

Tile Layout: Tiles shall be laid out in such a way that no tile less than half size occurs. Where tile must be cut at edges or penetrated the cut edges shall be carefully filed and neatly ground. Chipped, cracked or broken tile shall not be used and all defective work shall be replaced and repaired to the satisfaction of the Engineer at the Contractor's expense.

Grouting the Tile Joints: After tiles have been set firm and strings removed, the tiles shall be dampened and joints grouted full with a plastic mix of neat cement by trowel, brush or finger application. Unless otherwise directed, grout shall be white cement. During grouting all excess grout shall be cleaned off the tile surface with damp cloth sponges.

The finished floor surface shall be true to required levels. All tile work finishing shall be adequately protected from damage during the progress of construction till completion and any damage shall be repaired to the satisfaction of the Engineer at the Contractor's expense. Upon completion prior to final inspection and acceptance, the Contractor shall clean all tile work. Acids or agents liable to damage the work shall be avoided. If tile surface show mass scratches, crack or other imperfections, which cannot be removed by cleaning; the Contractor shall remove the defective material and replace with new material at no additional expense. Sample of workmanship and tile grout proposed (silicone) shall be approved prior to execution of work.

Measurement : The measurement shall be in square meters of the work done including the setting mortar. The rate shall be for the material and labour, all complete.

Curing (Same as first class brickwork) Measurement (Same as first class brickwork)

Finishing

Plastering of the underside and sides shall be done immediately after opening of the centering with fresh cement and coarse sand mortar of 1 : 3 proportion to a minimum thickness of 12 mm

(1/2").

White washing

- Fresh white lime slacked at site of work should be mixed with sufficient water to make a thin cream.
- The approximate quantity of water required in making the cream is **5 litres of water to 1kg of lime**.
- It shall then be screened through a coarse cloth and gum (glue) in the proportion of **100grams** of gum to 16 litres
- 1 The surface should be dry and thoroughly cleaned from dust and dirt.
- The wash shall be applied with jute brush, vertically and horizontally alternately and the wash kept stirred in the container while using.
- Two or three coats shall be applied as specified and each coat shall be perfectly dry before the succeeding coat is applied over it. After finishing the surface shall be of uniform colour.
- ¹ The white wash should not splash on the floor and other surfaces.
- In old surface the surface should be cleaned and repaired with cement mortar where necessary and allowed to dry before white wash is applied. For final coat blue pigment powder should be mixed to the required quantity with the lime water to give a bright white surface.

Distempering:

- ¹ The distemper shall be of best quality and the colour should be as specified.
- ¹ The distemper should be mixed and prepared and water added, as laid down in the instructions of manufacturer.

- ^I First a paste is made by adding little hot water to the distemper powder and stirred thoroughly, and the paste is allowed to stand for a few minutes.
- The paste is then thinned with Water to have a thin cream to the consistency of oil paint and stirred thoroughly all the time while applying.
- If the surface is rough, it should be smoothened with sand paper. The surface must be perfectly dry before, distempering is commenced.
- In new cement plaster the surface shall be washed over with a solution of **zinc sulphate**, **one kg zinc sulphate in 10 litres of water** and then allowed to dry. In old surface, the surface shall he repaired with plaster of paris wherever required and then whole surface sand papered and washed and allowed to dry.
- ¹ The number of coats shall be two or as specified. The distemper shall be kept well stirred in containers and shall be applied with broad brushes first horizontally and immediately crossed vertically.
- Brushing should not be continued too long to avoid brush marks. The second coat shall be applied after the first coat is dried up. After each day's work the brushes shall **be washed and kept dry**. Distempering should be done during dry weather but **not during too hot weather nor wetweather**.

Oil distempering

- Ordinary dry distemper in powder form
- Oil is mixed to the dry compound while manufacturing.
- ¹ While application, required amount of water is added to it and applied to the surface.

Skirting and dados:

- Skirting is usually around 6inches high around floors and normally made of same design and material as that of the floors. Primarily to protect walls daily from floor mopping and minor spillages on floors.
- Dados are 4 feet or more in height, in baths, WCs and in Staircases, on walls, made of glazy materials like glazed porcelain/vitrified tiles. In staircases, even synthetic enamel paints are also used. In staircases, dados protect the walls from frequent human touches and in Bath and W.C, it protects the plastered walls from water splashes during washing and bathing.

Tile flooring, Dado & Skirting

- The type, quality and thickness of tiles for flooring, skirting and dados shall be of the best quality as described and approved by the Project Manager
- shall be hard, dense, uniform, homogenous in texture, have even crystallising grains and be

free from cracks and other defects.

- All angles and edges of the tiles shall be true and square and free from chipping. Bull nosing, grooves & chamfering of edges for staircases & skirting, etc., shall be as indicated in the detailed drawings.
- Before laying sub-surfaces shall be thoroughly cleaned and washed of all loose materials, dirt, etc and then well wetted without forming water pools on the surface.

Bedding

The screed bed for laying floor tiles shall be of cement and sand mortar 1:4. Bedding over which the tile shall be laid shall not be less than 10mm at any place. Tiles shall be soaked in water before laying.

Laying

- Base concrete or RCC slab shall be cleaned and wetted. The bedding shall then be laid evenly over the surface, tamped and corrected to desired levels and allowed to harden enough to offer a rigid cushion to tiles.
- Before laying the tiles, cement slurry of honey like consistency at 3 kg/ sq m shall be applied over the bedding. At a time, area to accommodate about twenty tiles shall be applied with cement slurry.
- Tiles shall then be washed clean and fixed in the grout one after the other, each tile being gently tapped in its position till it is properly bedded and in level and line with adjoining tiles.
- The joints shall be as thin as possible but not exceeding 1.5mm wide. The ceramic tiles shall be set, jointed with cement slurry and pointed in neat coloured cement to match the colour of tiles. The surface shall be cured for seven days and then washed clean.
- In the cases of skirting and dado, vertical surfaces shall be thoroughly cleaned and wetted and evenly and uniformly covered with approximately a 12mm thick coat of cement mortar (1:4).
- ¹ The wall surface shall be covered with about 10mm thick plaster of cement and sand mortar as indicated and allowed to harden.
- ¹ The plaster shall be roughened with wire brushes or by scratching diagonal lines. The back of tiles shall be buttered with cement paste and set on bedding mortar.
- ¹ The tiles shall be gently tapped in position one after the other.
- Top of skirting or dado shall be truly horizontal and the joints vertical or as per required pattern. Joints shall be flush pointed with white cement with pigment to match the colour of tiles.
- The payment shall be made for the actual work done on site on superficial area basis and no extra amount shall be paid for wastage of materials, anchors, dowels, etc,

- The rate of the marble work shall include any drilling, cutting, fitting or making any special provisions required in the marble work.
- Flaming on polished granite to achieve the required undulated flame finish shall be done using the thermal torch.
- The ignited torch shall be held at 45 degrees to the granite slab plane with required temperature using combination of Oxygen and LPG gasses in presence of continuous water jet for immediate cooling. The pressure of the gasses required, depends on the level, intensity and pattern of flaming as approved by the Project consultant. Granite Slabs for Lift flooring shall have suitable Epoxy underlays & adhesives as per the detailed drawings and manufacturers specifications.



SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

UNIT II – RATE ANALYSIS AND ESTIMATION FORMAT

Introduction

The determination of rate per unit of a particular item of work, from the cost of quantities of materials, the cost of labourers and other miscellaneous petty expenses required for its completion is known as the Analysis of Rates.

The rates of materials and labour vary from place to place and hence the rates of different items of works also vary from place to place.

Purpose of Rate Analysis

Following are the main purpose of doing rate analysis

- 1. To work out the actual cost per unit of the items
- 2. To work out the economical use of materials and process in completing the particular items
- 3. To work out the cost of extra items which are not provided in the contract bond but are to be done as per direction of the department
- 4. To revise the schedule of rates due to increase in the cost of material and labour or due to change in technique.

Importance of Rate Analysis

The process of doing rate analysis gives a clear picture of the various types of labour and material required for completing particular work.

Requirement of Rate Analysis

- 1. Correct information of the market rate and materials
- 2. Correct information of the rate of various categories of labourers
- 3. Output of laborues i.e. task or out turn per day for various types of labourers.
- 4. Knowledge, rate and out turn of various types of plants to be used in the construction work.
- 5. Update knowledge of construction work

Factors affecting of Rate Analysis

- 1. Quality of materials
- 2. Proportion of mortars
- 3. Construction facilities available with regards to tools and plants
- 4. Location of the site work
- 5. Facilities available for transportation of labour and material to the work site.
- 6. Transportation charges, condition of road or passage to the site of work
- 7. Overhead charges
- 8. Miscellaneous expenditure and profit desired
- 9. Experience of workers and amenities provided to them

10. Proper management and guidance.

Procedure for Rate Analysis

The analysis of rate is done for the unit of payment of the particular item. Details of materials and labour are worked out and are added together to get the total cost of material and labour. To this 1.5% of its added for water charges (only in those item which require water in any way). 10% contractor's profit is also added. The total of all above is the cost of item.

Let the cost of material for unit item	$= \mathbf{X}$
Let the cost of labours T + P, sundries etc. For unit	titem $=$ y
Total cost of material and labourers	= x + y
Add 1.5 water charges	= 1.5 (x+y)
	100
Add 10% Contractor's profit	= 10 (x+y)
	100
	Grand total = $(x+y)+(1+\underline{1.5}+\underline{10})$ 100 100

Rate per unit of the Item

=1.115(x+y).

Need of Rate Analysis

- 1. To determine the actual cost per unit of the items.
- 2. To work out the economical use of materials and processes in completing the particulars item.
- 3. To calculate the cost of extra items which are not provided in the contract bond, but are to be executed as per the directions of the department.
- 4. To revise the schedule of rates due to increase in the cost of material and labour or due to change in technique

RATES OF ITEMS DEPEND ON:

- 1. Specifications of works and material, their quality, proportion and method of constructional operation.
- 2. Quantity of materials and their costs.
- 3. Cost of labours and their wages.

- 4. Location of site of work and the distances from source and conveyance charges.
- 5. Overhead and establishment charges
- 6. Profit and miscellaneous expenses of the contractor

COST OF MATERIALS

- 1. The costs of materials are taken as delivered at site of work.
- 2. This is inclusive of The first cost (cost at origin),

Cost of transport, railway freight (if any), etc.

Local taxes and other charges.

Labour

May be classified into three types.

- □ Skilled Ist class
- □ Skilled IInd class
- □ Unskilled

Labour charges can be obtained from Schedule of Rates. 30% of the skilled labour in data should be taken as Ist class and remaining 70% as IInd class.

LEAD STATEMENT

The distance between the source of availability of material and construction site is known as "Lead " and is expected in Km. The cost of convenayce of material depends on lead.

This statement is required when a material is transported from a distant place, more than 8kms (5 miles).

S.No.	Materials	Cost at Source	Per	Lead in Km	Conveyance charges per Km
1	Rough Stone	260.00	cum	18	5.00/cum
2	Sand	12.00	cum	25	4.00/cum
3	Cement	2100.00	tonn	Local	(77)

Typical example of Lead Statement

Analysis of Rates from Lead Statement

S.No.	Mtls.	Cost at Source	Per	Lead in Km	Conveyance charges Rs.	Total Conveyance charges Rs.	Total Cost Rs.
1	Rough Stone	260.00	cum	18	5.00/cum	5×18= 90.00	260+90= 350.00
2	Sand	12.00	cum	25	4.00/cum	4×25= 100.00	100+ <mark>12</mark> = 112.00
3	Cement	2100.00	tonn	Local	-	121 121	2100/ tonn

Lead

During the earthwork, the average horizontal distance between center of excavation to the center of deposition is known as Lead.

Lead is normally calculated in multiple of 50m

Lift

Similarly during the earthwork, the average height through which soil has to be lifted from source to the place of spreading(also known as heaping) is known as Lift.

The first Lift is taken upto 2m.

The extra lift is counted for upto 1m after the first lift and so on.

Let us say we need to calculate number of lifts

when soil is to be lifted 3.5m from the source.

Upto 2m : 1 Lift

1m : 1 Lift

0.5m : 1 Lift

Total number of Lifts are 3 in this case.

CONTRACTOR'S PROFIT

This is the 6-10% net profit that is allowed to the contractor. 10% profit is not allowed on cement and steel.

MISCELLANEOUS

Lump sum provisions are made for miscellaneous items.

OVERHEAD COSTS

The overhead costs comes to about 6-8% of the project cost and include the indirect expenses incurred during the execution of a project.

General Overheads

- a) Establishment (office staff)
- b) Stationary, printing, postage
- c) Travel expense
- d) Telephone
- e) Rent & taxes

Job Overheads

a) Supervision (salaries of engineer, supervisor etc)

- b) Handling of materials
- c) Repairs, carriage, depreciation of T&P
- d) Labour amenities
- e) Workers compensation, insurance etc

f) Interest on investment

g) Losses on advances

TASK / OUT TURN WORK

- The capacity of doing work by an artisan or skilled labour in the form of quantity of work per day in known as Task Work or Out-turn of the labour.
- The out turn of work per artisan varies with situations and locations.
- In bigger cities where specialized and experienced labour is available, the out-turn is greater than in small towns and country side.
- In well organized work, less labour is required.

Analysis & Rates

The capacity of doing work by an art is an or s killed labour in the form of quantity of work per day is known as the task work or out turn of the labour.

T he out- turn of work per art is an varies to some extent according to the nature, size, height, situation,

location, etc., I n bigger c i ties where s specialized and experienced labour is available the out - turn is greater than s mall towns and ccountry sides. In well organized work les s labour is required.

The following may be taken as the approximate quantity of work or out turn or task for an average art is an per day.

SNo.	Particulars of items	Quantity	Per day
1.	Brick work in lime or cement mortar in foundation and plinth	1. 25cum	(45cuft) per mason
2.	Brick work in lime or cement mortar in	1.00cum	(35cuft) per mason
3.	Brick work in mud mortar in foundation	1. 50cum	(55cuft) per mason
4.	Brick work in mud mortar in superstructure	1. 25cum	(45cuft) per mason
5.	Brick in cement or lime mortar in arches	0. 55 cum	(20cuft) per mason
6.	Brick in cement or lime mortar in jack	0. 55 cum	(20cuft) per mason
7.	Half brick wall in partition	5. 00sqm	(50sqft) per mason
8.	Coursed rubble stone masonry in	0. 80cum	(30 cuft)per mason
9.	lime cement mortar including dressing Random rubble stone masonry in lime	1. 00cum	(35cuft) per mason
10.	or cement mortar Ashlars masonry in lime or cement	t 0. 40cum	(15cuft) per mason
11.	mortar Stone arch work	0. 40cum	(15cuft) per mason
12.	Lime concrete in foundation or floor	8. 50cum	(300cuft)per mason
13.	Lime concrete in roof terracing	6. 00cum	(200cuft)per mason
14.	Lime concrete 1: 2; 4	5. 00cum	(1/5cuft) per mason
15.	KB WORK	1.00cum	(35cult) per mason
10.	KUU WOIK	5. 00cum	(123cuit)per mason

17.	12mm (1/2) plastering with cement or lime mortar	8. 00sqm	(80sqft) per mason
18.	Pointing with cement or lime mortar	10. 00sqm	(100sqft) per mason
19.	White washing or colour washing coats	70. 00sqm	(700sqft)per white
20.	W hite washing or colour washing coats	200. 00sqm	(2000sqft)per white
21.	Painting or varnishing doors or windows	25sqm	(250sqft)per painter
22.	Coal tarring or soligum painting one coat	35. 00sqm	(350sqft)per painter
23.	Painting large surface one coat	35. 00sqm	(350sqft)per painter
24.	Distempering one coat	35. 00sqm	(350sqft)per painter
25.	2. 5cm(1') CC floor	7. 50sqm	(75sqft) per painter
26.	Flag store floor laying with lime or cement mortar excluding LC	10. 00sqm	(100sqft)per painter
27.	Brick on edge in floor lime or cement mortar excluding LC	7. 00sqm	(70sqft) per painter
28.	Brick bat floor as in above	8. 00sqm	(80sqft) per painter
29.	Timber framing sal or teak wood	0.0^{7} cum	(2. 5cuft) per carpenter
30.	Timber framing sal or country wood	0. 15cum	(5cuft)per carpenter
31.]	Door and window shutters paneled	0.15sqm	(7sqft) per carpenter
C	or glazed		
32.]	Door and window shutters paneled	0. 80sqm	(0. 80sqft)per carpenter
0	r battened	per	
33. 5	Sawing hard wood	4. 00sqm	(40sqft) per pair
of s	awers	per	
34. S	Sawing soft wood	6. 00sqm	(40sqft) per pair
35. S	Single Allahabad tiling or Mangalore	6. 00sqm	(60sqft) per tile layer
tilin	g		
36.	Double Allahabad tiling	4. 00sqm	(40sqft) per tile layer
37.H	Breaking of brick ballest 40mm	0. 75cum	(35cuft)per labourer
38	Breaking of brick ballest 25mm	0 55cum	(20cuft)per labourer
(1")	gauge or breaker	0. <i>33</i> 00	
39.I	Breaking of stone ballest 40mm	0. 40cum	(10cuft)per labourer
(11/	2") gauge or breaker		
40.H	Breaking of stone ballest 40mm	0. 40cum	(10cuft)per labourer
(11/	2") gauge or breaker	0.05	
41.E	Breaking of stone ballest 25mm (1'')	0. 25cum	(10cuft)per labourer
gau		0.70	
42.A	Ashlar stone dressing	0. /0cum	(25cutt) per stone cutter
43.F	lag stone dressing	1. 50sqm	(25sqft) per stone cutter

44. Earthwork in excavation in ordinary soil	3.00cum	(100cuft)	per belder	
			Mazdoor	
45. Earthwork in excavation in hard soil	2.00cum	(75cuft)p	er belder	
			mazdoor	
46. Excavation in soil	1.00cum	(35cuft)p	er belder	
		Μ	lazdoor	
47.	Number of	bricks		
laid by a manson in	600 bricks p	er mason.		
brick work upto a height of 3m (10")				
Amount of work done by a mazdoor helper per day				
Mix	3.00 cum (1	00 cuft) mor	tar per mazdoc	or
48. Deliver Brick 4000 No's to a				
distance of 15m (5'0") per mazdoor				
49.	Deliver morta	ar 5.5cum	(200 cuft)	per
mazdoor				-
50.	Scaffolding f	for single stor	rey residential	
(Rest 1.5% of 50 per cuft) of brick work. Building	5			

Items 46,47 and 48 are based on the committee report on rates and cost government of India.

LABOUR (MAZDOOR) REQUIRED FOR DIFFERENT WORKS

Extract from the report on productivity projects in building industries issued by National Building Organization are given below.

a) Earthwork per 28. 30 cum (12000 cu f t)

- Excavation in foundations, trenches etc., in ordinary soil including disposal up to 30m (100') and lift of 1. 5m(5ft) -5 beldars and 4 mazdoors can do 28. 30 cum (1000cu ft) per day.
- Refilling excavated earth in foundations, pointh etc, including consolidation in 15cm(6") layers -3 beldars, 2 mazdoors and ½ bhisti can do 28. 30 cum (1000cu ft) per day.
- Disposal of surplus earth within a lead of 30m (100') -1 mazdoor can do
 2. 83cum (100 cuft) per day.

b) Cement concrete work per 2. 83 cum (100cuf t)

laying cement concrete – 2 beldars, 3 mazdoors, $\frac{3}{4}$ bhisti and $\frac{1}{4}$ mason, can do 2. 83 cum (100 cuft) per day.

c) RCC work:-

1) Laying reinforced concrete -3 beldars, 3 mazdoors, $1\frac{1}{2}$ Bhisti and $\frac{1}{2}$ mason can do 2. 83 cum (100cuft) per day.

2) Centering and shuttering for flat surfaces -4 beldars and 4 carpenters (II class) can do 9. 6sqm(96s q ft) per day.

3) Reinforcement work for R C C -1 blacksmith or fit ter and 1 beldar can bend and place in position 1 quintal (2 cwt) of steel per day.

d) Stone work per 2. 83 cum (100cuf t) -

Random rubble masonry with blue stone in foundations -3 masons, 3 beldars, 2 mazdoors and 1/4bhisti can do 2. 83 cum (100cuft 0 per day

e) Brick work per 2. 83 cum (100cuf t) -

First class brick work in 1: 4 cement mortar in superstructure partition walls, junctions of roof, parapet walls and string course $-2\frac{1}{2}$ masons, $4\frac{1}{2}$ mazdoors and 1/2 bhisti can do 2. 83 cum (100cuft) per day.

- F) Wood work :-
 - For the frames of doors and windows -2 carpenters and 1 beldar can work
 18 cum (6. 40cuft) of wood equivalent to door frames 7. 5cm x 10m of
 2m x 2. 1m (3'x 4'of 3'x 11'x 7')siz e per day.
 - For paneled, glazed, etc, shutters -15 carpenters and 4 beldars can make and fix 4 shutters 40 mm thick of size 2.00m x 1.15m (1 ¹/₂ thick of size of 6'-9x 3'-9') per day. Quantity of wood per shutter -0.075 cum, ie2. 66 cuft.
- g) Iron work :-
 - Fixing 40mm x 3mm= 38cm(1 ¹/₂ " x ¹/₂ 'x 15"0 flat iron holdfasts -1 blacksmith (II class), I mason and I beldar can fix 36 holdfasts per day.
 - 2) Fixing 16mm dia. 5/ 3" dia) M S rods -1 blacksmith (II class), 2 carpenters (II class) and 3 mazdoors can fix 16. 5 m (54rft) per day.
- h) Flooring: -

4cm thick $(1 \ 1/2)$ thick cement concrete flooring of 40sqm (400sqft) require 5 masons, 4 beldars, 3 mazdoors and 1 bhisti per day for mixing laying and finishing.

I) Finishing :-

1) Plastering with any mortar 12mm (5") thick -3 masons, 3 mazdoors and 1 bhisti can plaster 40sqm (400a ft) per day.

2) White washing or colour washing (3 coats) - 1 white washer and 1 mazdoor can do 60sqm (600sqft) per day.

3) Painting two coats such as chocolate, red, grey, etc on wood are steel -3Painters and 2 mazdoors can paint 10sqm (100sqft) per day.

LOAD FOR A TWO – BULLOCKS CART

		Quantity or Number			
Sl.No	Particulars of materials	On Kachcha Road	On Pucca Road		
1.	Brick 19 cm x 9cm x 9cm	275nos	400nos		
2.	Brick ballast	0. 85 cum (30cuft)	1. 10 cum (40cuft)		
3.	Stone ballast	0. 70 cum (25 cuft)	1.00 cum (35cuft)		
4.	Kankar	0. 85 cum (30cuft)	1. 10 cum (40cuft)		
5.	Sand surkhi	0. 85 cum (30cuft)	1. 10 cum (40cuft)		
6.	Lime	1. 10 cum (40cuft)	1. 40 cum (50cuft)		
7.	Tiles Allahabad or Mangalore	275nos	400nos		
8.	Cement	15bags	20 bags		
9.	Steel	0. 75 tonne	1 tonne		

Note; A bullock can carry about one tonne load. The average speed for a bullock cart may be taken as 3. 20km (2 units) per hour and $\frac{3}{4}$ hour may be allowed for loading and unloading. Taking 8 hours working per day, the number of trips per day, can be calculated.

LOAD FOR TRUCKS

ON PUCCA METALLED ROAD -

Trucks 3 tonners 5 tonners 8 tonners diesel truck Brick or Allahabad tiles or Mangalore t iles -1000nos 1500nos 2000 nos

Cement, steel and other Heavy materials 3 tonne 5 tonne8 tonne

Other materials – Ballast, Kankar, grit Sand coal, etc., 2. 8cum 4. 20cum 5. 6c um (100cuft) (150cuft)(2 0 0cu ft)

On kachcha earthen road the load will be less by 33 per cent.

MATERIALS FOR DIFFERENT ITEMS OF WORKS

The requirement of materials for different items of works is as given below: -

S.No	Description	Qunty	
	_	-	
1.	Bricks (9" x 4 ½ " x 3" or 20 cm x	1350 nos for	50000 nos per %
1.	10 cm x $10 cm$ nominal size)	100cuft	cum (500nos.
	for		per
	brick work		cum)
2.	Dry mortar for brick work 30%	30cuft for 100 cuft	30cum for 100
2		125 0 6 100	cum
3.	125%	cuft for 100	cum
4.	Dry mortar for rubble stone masonry 42%	42cuft for 100 cuft	42cum for 100 cum
5.	Bricks for brick ballast	1050cuft for 100	37000cum for 100
	for lime concrete	cuft	cum
6.	Brick bats or brick ballast for lime	150cuft for 100	150cum for 100
	concrete	cuft	cum
7.	Brick ballast for lime concrete	100cuft for 100	100cum for 100
8	Dry mortar for lime concrete I	35cuft for 100	35cum for 100 cum
0.	foundation and floor 35%	550ut 101 100	
9.	Dry mortar for lime concrete in roof terracing 45%	45cuft for 100	45 cum for 100 cum
10.	Materials for cement concrete 1: 2: 4		
	Ballast or grit 88%	88cuft for	88 cum for 100 cum
	C .	100cuft	
	Sand 44%	44cuft for	44 cum for 100 cum
		100cuft	
	Cement 22%	22cuft for	22cum (60 bags) for
11	Materials for $2.5 \text{ som } (1^{"})$ as $1:2$	100cuft	100 cum
11.	4 floor		
	Stone grit	8cuft for	2 for 100 (40 cum)
		100sqft	
	Sand	4cuft for 100s	1 for 100 (20 cum)
	Cement	$2^{1/4}$ cuft	0.08cum (24 bags)
		(2 bags)	for 100 cum
10		tor 100cutt	42000 (420
12.	Bricks for K B work	1200nos for	42000 nos (420
12	Dura un auton fan D. D 1- 450/		mps (erici)
13.	Dry mortar for K B Work 45%	43cuft for 100cuft	45cum for 100 cum

14.	Dry mortar for $12mm$ (1/2)	6cuft for	2.00 cum for 100
	plastering	100sqft	sq.m
15.	Dry mortar for pointing in brickwork	2cuft for	0.60cum for 100
		100sqft	sq.m
16.	Lime for white washing one coat	1kg for	10kg for 100 sq.m
		100sqft	
17.	Dry distemper for ist coat	0. 65 kg for	6 ^{1/2} kgfor 100sq.m
10		100sqft	51 C 100
18.	Dry distemper for 2 nd coat	0. 50 kg for 100sqft	Skg for 100 sqm
19.	Snow-Ce m for Ist coat	3kg for 100sqft	30kg for 100 sqm
20.	Snow-Ce m for 2 nd coat	2kg for 100sqft	20kg for 100 sqm
21.	Paint ready mixed for painting one	1/3gl. for	10ltr for 100 sqm
	coat	100sqft	1
22.	Paint (stiff) for painting one coat	1kg for 100	10kg for 100 sqm
		sq.ft	
23.	Bricks (20 x 10 x 10cm) for	500 No's for	5000 no for
	brick floor or half brick wall	100 sq.ft	100cumsqm
24.	Dry mortar for brick floor or half	12cuft for 100	3.20 cum for 100
	brick wall	sq.ft	sqm
25.	Bricks (9" x 4 ½ " x 3") for brick	350 no's for	3500 nos for 100
	flat work	100 sq.ft	sqm
26.	Dry mortar for brick flat floor	8cuft for 100	2.25cum for
		sqft	100cum
27.	Bricks (9" x 4 $\frac{1}{2}$ " x 3") required for	325 nos for	3250 no's for
	honey comb wall	100 sq.ft	100sqm
28.	Dry mortar for honey comb wall	8 cuft for 100	2.5cum for 100cum
		sq.ft	
29.	Materials for $2 \text{ cm} (3/4^{\circ})$ thick damp		
	proof course of 1: 2 cement mortar	225	0.00 (271)
	Cement	325 nos for	0.90cum (2/bags)
	C 1	100 sq.ft	1 90 mm fan
	Sand	o cult for 100	1.80cum for
	Compound or importe @ 11rg	$\frac{\text{Sq.}11}{25 \log \text{ for } 100}$	27kg for $100gg$ m
	per bag of coment	2.5Kg IOI 100	27kg 101 100sq.111
30	Materials for 2. $5am (1'')aa 1 \cdot 1 \frac{1}{2} \cdot 2$	oyu	
50.	damp proof course		
	Stone grit	8cuft for 100	2.25cum for
		sqft	100cum
	Sand coarse	4cuft for 100	1.13cum for
		sqft	100cum

	Cement	$2^{1/2}$ cuft	0.75cum for
		^{(21/2} Bags)for	(221/2bags) for
		100 sqft	100cum
	Compound or impermo @ 1kg	2 ^{1/2} Kg for 100	22 ^{1/2} Kg for 100
	per bag of cement	sq.ft	sq.m
31.	Bitumen or asphalt for painting	15kg for 100	150kg for 100 sqm
	on D P C or on root -1^{st} coat	sqft	
	2 nd coat	10kg for 100	100kg for 100 sqm
		sq.ft	
32.	G G I sheet for roof	128sqft for	128sqm for 100
		100 sqft	sqm
33.	A G corrugate d sheet for roof	115 sqft for	115sqm for 100sqm
		100 sqft	
34.	Timber for paneled door shutter	15cuft for 100	4.5cum for 100cum
	$4 \text{cm} (1 \frac{1}{2})$ thick	sqft	
35.	Timber for battend door	13 cuft for 100	4.0cum for 100cum
	snutter 4cm $(1 \frac{1}{2})$ thick	sqft	
36.	Timber for paneled &	11cuft for 100	3.0cum for 100cum
	thick	sqft	
37.	Timber for fully glazed shutter	8cuft for 100	2.0cum for 100cum
	$4 \text{cm} (1 \frac{1}{2}) \text{ thick}$	sqft	

RATE ANALYSIS FOR DIFFERENT ITEMS OF WORK

Nature of work	Quantity	Labour
(a)	28.30m ³ (1000 cuft)	Beldar – 5 No's
1.Earthwork	do	Mazdoors – 4 No's
Excavation in foundation		Beldar – 3 No's
trenches etc. in ordinary soil		Mazdoors – 2 No's
including disposal upto 30m		Bhisti – 0.5 No's
and lift of 1.5m		Mazdoors – 1 No's.
2.Refilling of excavated earth in	$28.30 \text{m}^3 (100 \text{ cuft})$	Beldar – 5 No's
foundations, plinth etc.		Mazdoors – 4 No's
including consolidation in 15		Beldar – 3 No's
cm layers.	-	Mazdoors – 2 No's
Disposal of surplus earth within		Bhisti – 0.5 No's
a lead of 30m		Mazdoors – 1 No's.
Cement concrete work		
Laying of cement concrete	2.83 m^3 (100 cuft)	Beldar – 2 No's
		Mazdoors – 3 No's
		Bhisti – 0.75 No's
		Mason – 0.25 No's
RCC Work	$2.83 m^{3}(100 cuft)$	Beldar – 3 No's

Laving of RCC Work		Mazdoors 3 No's
Laying of RCC work		Dhisti 15 No's
		Binsu = 1.5 No s
		Mason – 0.5 No´s
6.Centering and shuttering	$9.6m^2(100 \text{ sq.ft})$	Beldar – 4 No's
for flat surfaces		Carpenters – 4 No's (II class)
7.Reinforcement work for RCC	1 quintal (2 ewt)	Blacksmith – 1 No's
		Or fitter
Stone Work		Beldar – 1 No
8.Random rubbie masonry with	$2.88 \text{ m}^{3}(100 \text{ cuft})$	Mason– 3 No's
blue stone in		Beldar – 3 No's
(e) Brick work		Mazdoor – 2 No's
		Bhisti – 0.25 No's
9.First class brick work in 1:4	$2.83 \text{ m}^3(100 \text{ cuft})$	Mason–2.25 No's
cement mortar in superstructure		Mazdoor – 4.5 No's
,partition walls junctions of roof,		Bhisti – 0.5 No's
parapet wall and string course.		
Wood work	$0.18 \text{ m}^3(6.4 \text{cuft})$	Carpenter – 2 No's
10.Frames of doors and windows	$0.30 \text{ m}^3(10.64 \text{ cuft})$	Beldar – 1 No's
11.paralleled,ga;zed shutters etc		Carpenter – 15 No's
Iron work		Beldars – 4 No's
12.Fixing of 40x38x3mm flat	36 No's	Blacksmith – 1 No's (II class)
boldfasts		Mason – 1 No's
		Beldars -4 No's
13. Fixing of 16mm 5/8dia, M.S.	16.5 r.m (54 r.ft)	Blacksmith – 1 No's (II class)
rods		Carpenters -2 No's
(h) Flooring		Beldars -3 No's
14 4 cm (15") thick cement	$40 \text{ m}^2 (400 \text{ sq ft})$	Masoons - 5 No's
concrete flooring		$\frac{1}{10000000000000000000000000000000000$
(f) Flooring		Mazdoors 3 No's
		Phisti 1 No's
15.12mm (1/2") thick plastering	(400 sq.ft)	Mazdoors – 3 No's
		Bhisti – 1 No's
16. 3"coats white or colour	$60m^2(600 \text{ sq.ft})$	Whitewasher – 1 No's
washing		Mazdoors – 1 No's
17. Two coats painting on wood	10m (100 sq.ft)	Painters – 3 No's
or steel in chocolate red, grey etc,		Mazdoors – No's
colour		

Kindly note : - The rate and calculation here they mentioned is basic kindly refere online for the revised rate for items of work to be carried out.

Description	Quantity of materials	Per
1.Brick for obtaining brick ballast for lime concrete	3700 Nos	10 m ³ of L.C
2.Brick-bats for brick- ballast for lime concrete	10.5m ³	10 m ³ of L.C
3.Dry mortar for brick work	3m ³	10 m ³ of B.W
4.Stone for rubbie stone masonry	12.5m ³	10 m ³ of S.M
5.Dry mortar for rubbie stone masnory	4.2m ³	10 m ³ of S.M
6.Bricks for Brick work	5000 Nos	10 m ³ of B.W
7.Bricks for reinforced brick work	4200 Nos	10 m ³ of R.B.W
8.Dry mortar for R.B. work	4.5m ³	10 m ³ of R.B.W
9. Dry mortar for pointing in B.W	0.6 m ³	100 m ³ or surface
10.Brick Ballast for Lime concrete	10 m ³	10 m ³ of L.C
11.Dry mortar for Lime concrete in foundation and floor	3.5 m ³	10 m ³ of L.C
12.Dry mortar for I.C is roof terracing	4.5 m ³	10 m ³ of L.C
13.Lime for one coat white washing	10 kg	100 m ² of Surface
14.dry distemper for 1 st coat	6.5kg	100 m ² of Surface
15.dry distemper for 2 nd coat	5 kg	100 m ² of Surface
16.Snow-cem for 1 st coat	30Kg	100 m ² of surface
17.Snow-cem for 2 nd coat	20Kg	100 m ² of surface
18.Stiff paint for one coat painting	10Kg	100 m ² of surface
19. Ready mixed paint for	10 Litres	$100 \text{ m}^2 \text{ of surface}$

Requirements of materials for various items of works

one coat painting		
20. 2cm thick D.P.C of 1:2		
cement mortar		
Cement	0.90 m^2	100 m ² of surface
Sand	1.80 m^2	
Composed or Impermo	27Kg	
@/Kg of cement		
21. 2.5cm thick D.P.C of		
1:5:3 C.C.		
Cement	0.75 m^2	
Coarses sand	1.80 m^2	100 m ² of D.P.C
Stoen grit	1.80 m ²	
Composed or Impermo	22.5 Kg	
@/Kg of cement		
22.Drymortar for half brick	$3.2 m^2$	100 m^2 of surface
wall or brick flooring		
23.Bricks for brick	5000 No's	100 m ² of surface
flooring or half rick wall		
(19 x9 x9 cm size)		
24.Brick for flat bricks	3500 No's	$100 \text{ m}^2 \text{ of surface}$
flooring (23x12x7 cm)		
25. Bricks for honey comb	3200 No's	$100 \text{ m}^2 \text{ of surface}$
wall (23x12x7 cm)		
26.Dry mortar for honey	2.5 m^2	100 m^2 of surface
comb wall		
27.A.C. Corrogated sheets	115 m ²	100 m^2 of surface
for roof		
28. G.I Sheets (corrugated)	115 m ²	100 m ² of surface
for roof		
29.Asphalt or Bitumen for		
painting on D.P.C or on		100 m ² of surface
roof 1 st coat	150 Kg	
2^{nd} coat	100 Kg	
30.materials for 25.cm		
thick 1:2:4 C.C flooring		
Cement	0.08 m^2	100 m ² of surface

Sand	1.20 m^2	
Grit	2.40 m ²	

Materials Rates:- The material rates vary from place to place. Materials rates given below have been used for the rate analysis of various items in this chapter.

Material	Rate at Site
1.Bricks 1 st Class (150)	1575/- per % No's.
2.Brick 2 nd class (100)	1250/- per % No's.
3.Burnt bricks (Straight all) (Khanjar)	1500/- per % No's.
4.Brick Tiles	1575/- per % No's.
5.Overburnt brick ballast 4 cm gauge	260/- per m ³
6.1 st Class brick ballast 2.5 cm gauge	290/- per m ³
7.hard stone ballast 6mm to 10mm gauge	630/- per m ³
8.Stone ballast 20mm gauge	875/- per m ³
9.Stone ballast 40mm to 65mm gauge	315/- per m ³
10.Stone ballast 12mm gauge	$775/- \text{ per m}^3$
11.Ordinary Portland Cement	140/- per bag
12. Portland White Cement	475/- per bag
13. White lime for lime wash	300/- per quintal
14. White lime for concrete and masonry	180/- per quintal
15 Marble chips (white or black)	160/- per quintal
16 Marble chips (coloured)	140/- per quintal
17 Marble Dust	125/- per quintal
18 Coarse sand	$\frac{400}{\text{ per m}^3}$
19 Local sand	150/- per m ³
20 Surkhi	290/- per m ³
21. Kankar Lime	360/- per m ³
22.Steel	1650/- per quintal
23.Teak wood	36000/- per m ³
24.Shisham wood	25000/- per m ³
25.Sal wood	20000/- per m ³
26.Country wood	$11000/- \text{ per m}^3$

Labour Rates : The Labour rates vary from place to place . Labour rates given below has been used for the preparation of rate analysis of various items of work in this chapter.

Type of Labour	Unit	Rate
	Per day	Rs
1.Mistri	- do -	130.00
2.mason	- do -	115.00
3.Carpenter	- do -	130.00
4.Blacksmith	- do -	110.00
5.Hammer -man	- do -	75.00
6.Fitter	- do -	80.00
7.Thatcher	- do -	80.00
8.Painter	- do -	110.00
9.Plumber	- do -	120.00
10.Stone cutter	- do -	90.00
11.Mate	- do -	100.00
12. Beldar	- do -	75.00
13.Mazdoor (coolie)	- do -	65.00
14.Bhisti	- do -	75.00
15.Well Sinker	- do -	80.00
16.Bullock cart with two bullocks and one driver	- do -	180.00
17.Mote or charsa including two bullocks,one driver one puller	- do -	170.00
18.Sawyer per pair	- do -	90.00
19.White washer	- do -	80.00
20.Beldar for bitumen or Tar work	- do -	77.00
21.Glazier	- do -	80.00
22.Rivetter or welder	- do -	80.00
23.Cane -man	- do -	75.00
24.Brick moulder	- do -	80.00

The quantities of materials and number fo labours given in the various items of rate-analysis as per standards laid down by the government departments. For obtaining the rate of a particular the reader should multiply the rate of materials and labourers with their respective quanatities

complete the rate analysis as given in this chapter.

Problems for Understanding.

Item No. 1 – Analysis of rate of excavation in foundation in ordinary soil including lift upto 1.5m and lead upto 30m and including filling ,watering and ramming of excavated earth and removal and disposal of surplus earth as directed by the engineering – in-charge upto a distance of 30m. (for –per % cu.m)

S.No	Particulars	Qnty or No's	Rate	Amount
1	Mistri	0.5 No's	130.00 p.day	65.00
2	Beldar	21 No's	75.00 p.day	1575.00
3	Coolie	25 No's	65.00 p.day	1625.00
4	Blacksmith for tools	0.5 No's	90.00 p. day	45.00
	sharpening etc		Total	3310.00
5	Tools plants and baskets	-	Lump Sum	16.00
	etc.		Total	<u>3326.00</u>
Add 10% for contractor's Profit				332.60
Grand Total			3658.60	
	Rate per.cu.m =3658.60/	100 = Rs. 36.58		Per % cu.m

Item No. 2 – Analysis of rate of excavation in foundation in soil mixed with moorum /Shingle/ kankar, requiring the use of special T and P such as pickaxes, sabbals etc. (for -per % cu.m)

S.No	Particulars	Qnty or No's	Rate	Amount
1	Mistri	0.5 No's	130.00 p.day	65.00
2	Beldar	28 No's	75.00 p.day	2100.00
3	Coolie	23 No's	65.00 p.day	1625.00
4	Blacksmith for	0.5 No's	90.00 p. day	45.00
	sharpening T & P etc		Total	3835.00
5	T & P and Basket	-	Lump Sum	16.00
			Total	<u>3851.00</u>
Add 10% for contractor's Profit				385.10
Grand Total			<u>4236.10</u>	
	Rate per.cu.m =4236.10/	100 = Rs. 42.36		Per % cu.m

Item No. 3 – Analysis of rate of Cast Cement Concrete as in item No.14, but also including supply of reinforcement and its bending complete work (for –per % cu.m)

~			(1	
S.No	Particulars	Qnty or No's	Rate	Amount Rs.
	Materials:	-	-	18737.50
	As in item No.13			
	Labour :			
	As in item No.13	-	-	3330.00
	Centering & shuttering			
	both erection and			
	dismantling	-	-	2375.00
	As in item No. 14			
	Extra			
1	Mild steel bars @ 1%	7.85 quintal	1650/-p.q	12952.50
	=0.1 cu.m.m			
2	Blacksmith	8 No's	110.00/-	880.00
			p.day	
3	Beldar	8 No's	75.00/- p.day	600.00
4	T & P etc		L.S	15.00
		-		
	Total			14,447.00
	Total of all materials	s and labour		38890.00
	Add $1^{1/2}$ for wate	r charges		583.35
	Add 10% for Contra	ctor's profit		<u>3889.00</u>
	Grand tota	al		43362.35
	Rate per.cu.m =43362.35/	10 = Rs. 4336.23		Pu.10.cu.m

Item No. 4 – Analysis of rate of R.C.C work in column in proportion of 1:1.5:3 with cement coarse sand and 2 cm stone ballast including supply of all materials. T & P etc. required for complete work. (for –per % cu.m)

	(P		
Particulars	Qnty or No's	Rate	Amount Rs.
Materials:			
Stone ballast of 2cm	8.4 cu.m	875/- p.cu.m	7350.00
gauge			
Coarses sand	4.2 cu.m	400/- p.cu.m	1680.00
Cement (2.8 cu.m)	84 Bags	140/- p.bag	11760.00
M.steel bars @ 1.5%=	11.78	1650/-	<u>19437.00</u>
0.15cu.m @ 78.5	quintal	p.quintal	40227.00
q/cu.m		Total	
	ParticularsMaterials:Stone ballast of 2cmgaugeCoarses sandCement (2.8 cu.m)M.steel bars @ 1.5%=0.15cu.m @ 78.5q/cu.m	ParticularsQnty or No'sMaterials:Stone ballast of 2cm gauge8.4 cu.mCoarses sand4.2 cu.mCement (2.8 cu.m)84 BagsM.steel bars @ 1.5%=11.78 quintal0.15cu.m @ 78.5 q/cu.mquintal	ParticularsQnty or No'sRateMaterials: Stone ballast of 2cm gauge8.4 cu.m875/- p.cu.mCoarses sand4.2 cu.m400/- p.cu.mCement (2.8 cu.m)84 Bags140/- p.bagM.steel bars @ 1.5%= 0.15cu.m @ 78.5 quintal q/cu.m11.78 p.quintal Total

4	Labour:		-	3330.00
	As in item No.15	-		
	Centering & shuttering			
	both erection and			
	dismantling			
	As in item No.14	-	_	2375.00
	Bending and binding of			
	steel bars			
1	Blacksmith	12 No.s	90/- p.day	1080.00
2	Beldar	12 No.s	75/- p.day	900.00
3	T & P etc	-	L.S	15.00
	Total of all materials	s and labour		47927.00
Add $1^{1/2}$ for water charges				718.90
Add 10% for Contractor's profit				<u>4792.70</u>
Grand total			<u>53438.60</u>	
	Rate per.cu.m =53438.60/	10 = Rs. 5343.86		Pu.10.cu.m

Item No. 5 – Analysis of rate of first class brick work in kankar lime in foundation and plinth including supply of all materials, labour and T & P etc. complete work. (for – per % cu.m)

S.No	Particulars	Qnty or No's	Rate	Amount Rs.
	Materials:			
1.	Bricks (500 bricks per	5000 No's	1575/-	7875.00
	cu.m)		p.% No's	
2	Kankar Lime	3.0 cu.m	360/- p.cu.m	1080.00
	Labour			
2	Mistri	0.6 No	130/- p.day	78.00
3	Mason	7 No's	115/- p.day	805.00
4	Beldar	7 No's	75/- p.day	525.00
5	coolie	7 No's	65/- p.day	455.00
6	Bhisti	2 No.s	75/- p.day	150.00
7	T & P etc	-	L.S	20.00
	Total			2033.00
	Total of materials a	and labour		10988.00

Add 1 ^{1/2} for water charges	164.82
Add 10% for Contractor's profit	<u>1098.80</u>
Grand total	<u>12,251.62</u>
Rate per.cu.m = $12251.62/10$ = Rs. 1225.16	Pu.10.cu.m

Item No. 6 – Analysis of rate of first class brick work in 1:6 Cement sand mortar including supply of all materials, labour, T & P etc., complete item of work (for –per % cu.m)

S.No	Particulars	Qnty or No's	Rate	Amount Rs.
	Materials:			
1.	Bricks	5000 No's	1575/-	7875.00
			p.% No's	
2	Cement (0.45 cu.m)	13.5 Bags	140/- p.bag	1890.00
3	Local sand	2.7 cu.m	150/- p.cu.m	405.00
	Labour:		Total	10170.00
	Same as per item No.18			2033.00
	12203.00			
	183.05			
	<u>1220.30</u>			
	<u>13,606.34</u>			
	Pu.10.cu.m			

Item No. 7 – Analysis of rate of first class brick work in 1:4 Cement sand mortar including supply of all materials, labour, T & P etc., complete item of work (for –per % cu.m)

S.No	Particulars	Qnty or No's	Rate	Amount Rs.
	Materials:			
1.	Bricks	5000 No's	1575/-	7875.00
			p.% No's	
2	Cement (0.45 cu.m)	18 Bags	140/- p.bag	2520.00
3	Local sand	2.4 cu.m	150/- p.cu.m	360.00
	Labour:		Total	10755.00
	Same as per item No.18			2033.00
Total of materials and labour				12788.00
	191.82			
	<u>1278.80</u>			
	<u>14258.62</u>			
	Pu.10.cu.m			



SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

UNIT III – DETAILED ESTIMATE

INTRODUCTION

Detailed Estimate – data required, factors to be considered, methodology of preparation, abstract of Estimate, contingencies, labour charges, bill of quantities, different methods of estimate for interior design works, methods of measurement of works.

DETAILED ESTIMATE

Detailed estimate – data required, factors to be considered, methodology of preparation, abstract of estimate, contingencies, work-charged establishment, bill of quantities, different methods for estimating building works, methods of measurement of works. – With case studies.

ESTIMATE:

An estimate is the anticipated or probable cost of a work and is usually prepared before the construction is taken up. Before undertaking any work or project it is necessary to know its probable cost which is obtained or derived by estimating. The estimate is prepared by computing, calculating the quantities required and then 'calculating the cost at suitable rates, to get the expenditure likely to be incurred in the construction of the work or structure.

DATA FOR ESTIMATE

Drawings

Plan, sectional elevations, and detailed drawings to scale and fully dimensioned are required. The plan, elevation and sectional elevations are usually drawn to a scale of 1cm=1m and detailed drawings are prepared to scales of 1 cm=10 cm to 1 cm=29 cm

Specifications

General Specifications or Brief Specifications.

These gives the nature, quality and class .of work and materials, in general terms, to be used in the various pans of the work. General specifications help to from a general idea of the whole building or structure and are useful in preparing the detailed estimate.

Detailed Specifications.

These give the detailed description of the various items of work laying down the quantities and qualities of materials, their proponions, the method of preparation, workmanship and execution of work. Detailed specification describe every item of work separately, in detail and are helpful for the execution of the different items of work.

Rates

The rates per unit of various items of work, the rates of various materials to be used in the construction, and the wages of different categories of labour, skilled or unskilled as mason. carpenter. mazdoor, bhishti, etc., available for preparing estimate. The location of the work and

its distance from the source of materials and the cost of transport should be known. These rates may be obtained from P.W.D. Schedule of Rate book or the rates may be worked out by the "Analysis of rate" method.

Different types of estimate

- (I) Preliminary Estimate or Approximate or Abstract Estimate or Rough Cost Estimate.
- (2) Plinth Area Estimate.
- (3) Cube Rate Estimate or Cubical Content Estimate.
- (4) Approximate Quantity Method Estimate.
- (5) Detailed Estimate or Item Rate Estimate
- (6) Revised Estimate.
- (7) Supplementary Estimate.
- (8) Supplementary and Revised Estimate.
- (9) Annual Repair or Maintenance Estimate

Preliminary or Approximate or Abstract Estimate

- It is required for preliminary studies of various aspects of a work or project, to decide the financial position and policy for administrative sanction by she competent administrative authorities. In case of commercial projects as Irrigation projects, Residential building project and similar projects which earn revenue income, the probable income may be worked out, and from the preliminary estimate the approximate cost may be known and then it may be seen whether the investment on the project is justified or not.
- For non-commercial projects or for projects giving no direct return, their necessity, utility, availability or money, etc may be considered before final decision is taken.
- ¹ The approximate estimate is Prepared from the practical knowledge and cost of the similar works.
- This estimate is prepared showing separately the approximate cost of all important items of work as cost of land, cost of each building, cost of roads, water supply sanitary works, electrification, etc.
- The estimate is accompanied by brief report explaining the necessity and utility of the project and showing how the cost of separate items have been arrived at. This is also accompanied with a site plan or layout plan. A percentage of about 5% to 10% is added as contingencies.

Plinth area Estimate:

This is prepared on the basis of plinth area of building, the rate being deducted from the cost of similar building having similar specification, heights and construction, in the locality. Plinth area estimate is calculated by finding the plinth area of the building and multiplying by the Plinth area Rate. The plinth area should be calculated for the covered area by taking external dimension of the building at the floor level. Courtyard and other open area should not be included in the plinth area. Plinth area estimate is only approximate, and is a preliminary estimate, to know the approximate cost before hand. If the plan of the building is not ready or available, at the beginning just prepare a proposal, floor area of rooms, etc. may be determined from the requirement and 30 to 40 per cent of the total area thus found may be added for walls, circulation and waste to get the approximate total plinth area which multiplied by the plinth area of 100 sq m @ Rs. 900,' - per sq m works out as 90000. For storeyed building, the Plinth Area Estimate is prepared for each storey separately.

Cube rate of Estimate:

Cube rate of Estimate is a preliminary estimate or an approximate estimate, and is prepared on the basis of the cubical contents of the building the cube rate being detected form the cost of the similar building having similar specifications and construction, in the locality.

- This is calculated by finding the cubical content of the building, (length x breadthxheight) and multiplied it by the cube rate. The length and breadth should he taken as the external dimension of the buildings at the floor level and the height should be taken from the floor level to top of roof (or half way of the sloped roof). For storeyed building the height should be taken between the floor level of one storey to top of next-higher floor. The foundation and plinth, and the parapet above roof are not taken into account in finding the cubical content.
- Cube rate estimate is most accurate as compared to the Plinth Area Estimate as the height of the building is also compared. The approximate cost of a building of cubic content (volume) of 400 cu in @ Rs. 180,- per cu m comes to Rs. 72,000.

Approximate Quantity Method Estimate

In this method approximate total length of walls is found in running metre and this total length multiplied by the rate per running metre of wall gives a fairly accurate cost. For this method the structure may be divided into two parts viz. (i) foundation including plinth and (ii) superstructure. The running metre cost for foundation and superstructure should be calculated first and these running metre rate should be multiplied by the total length of walls.

To find the running metre rate for foundation, the approximate quantities of items such as excavation, foundation, brickwork upto plinth, and damp proof, course are calculated per running metre and by multiplying by the rates of these items - the price or rate per running metre is determined. Similarly for superstructure the price or rate per running metre is determined from the approximate quantities of brickwork, wood works, roof,

floor finishing, etc. For this method the plan or line plan of the structure should be available.

Detailed Estimate or Item Rate Estimate

Detailed estimate is an accurate estimate and consists of working out the quantities of each item of works, and working the cost. The dimensions, length, breadth and height of each item are taken out correctly from drawing and quantities of each item are calculated, and abstracting and billing are done. The detailed estimate is prepared in two stages :—

- (i) Details of Measurement and Calculation of Quantities—The details of measurements of each item of work are taken out correctly from plan and drawings and quantities under each item are computed or calculated in a tabular form named as Details of Measurement.
- (ii) Abstract of estimated cost,— the cast of each item of work is calculated in a tabular form from the quantities already computed and total cost is worked out in Abstract of Estimate Form .The rates of different items of work are taken as per schedule of rates or current workable rates or analysed rates for finished items of work. A percentage usually 3% of the estimated cost is added to allow for contingencies for miscelaneous petty items which do not come under any classified head of items of work and a percentage of about 2% is provided for workcharged establishment. The Grand total thus obtained gives the estimated cost of work.
- The detailed estimate is usually prepared work-wise, under each sub-work as main building. servant quarters, garage, boundary walls etc.
- ^[] The detailed estimate is accompanied with :—
- I (I) Report.
- (2) General specifications.
- (3) Detailed specifications.
- (4) Drawings:—Plan, elevation, Sectional elevations, Detailed drawings, Site plan or Layout plan or Index plan etc.
- (5) Calculation and designs. —Designs of foundation, beam, slab, lintel, design of channel in case of irrigation channel, design of thickness of metal crust in case of road etc.
- (6) Analysis of rates, if rates are not as per schedule of rates or for the non-scheduled items.
- Detailed Estimate is prepared for technical sanction of the competent authority, for arranging contract and for the execution of work. If in the 'Abstracts of Estimate' form the columns of rates and amounts are left blank (to be filled by contractor it is then known as bill of Quantity.

Revised Estimate:

- Revised Estimate is a detailed estimate and is required to be prepared under any one of the following circumstances: (i) When the original sanctioned estimate is exceeded or likely to exceed by more than 5%. (ii) When the expenditure on a work exceeds or likely to exceed the amount of administrative sanction by more than 10%. (iii) When there is material deviation from the original proposal, even though the cost may be met from the sanctioned amount.
- The revised estimate should be accompanied by a comparative statement showing the variations of each item of works, its quantity, rate and cost under original and revised, side by side. The excess or saving and reason for variation.
- Supplementary Estimate is a detailed estimate and is prepared when additional works are required to supplement the original works, or when further development is required during the progress of work. This is a fresh detailed estimate of the additional works in addition to the original estimate.
- The Abstract should show the amount of the original estimate and the total amount including the Supplement, amount for which sanction is required.

Supplementary and Revised Estimate

When a work is partially abandoned and the estimated cost of the remaining work less than 95 per cent of the original work, that is less than 95 per cent of the original sanctioned estimate. or when there are material deviations and changes in the design which may cause substantial saving in the estimate, then the amount of the original estimate is revised by the competent authority. A supplementary and Revised Estimate is then prepared and fresh Technical sanction of the competent authority is obtained. If at any time either before or during the execution of original work, it is found that the original estimate is excessive, then Divisional officer may sanction a revised estimate of reduced amount. While giving such sanction the Accountant General and other higher authorities are informed.

Annual repair or Maintenance Estimate (A.R. or A.M. Estimate)

Annual Repair or annual Maintenance Estimate is a detailed estimate and is prepared to maintain the structure or work in proper order and safe condition. For building; this includes white washing, color washing, painting, minor repairs etc. For road works the A. R estimate provides for patch repairing, renewals, repairs of bridge, and culverts, etc. Further, there may be special repair estimate, Monsoon damage repair estimate, etc.

Contingencies

The terms 'Contingencies indicates incidental expenses of miscellaneous character which cannot be classified under any distinct item sub-head, yet pertain to the work as a whole. In an estimate a certain amount in the form of contingencies of 3 per cent to 5 per cent of estimated

cost, is provided to allow for the expenses for miscellaneous petty items which do not fall under any sub-head of items of work. Miscellaneous incidental expenses which cannot be classified under any sub-head or item, are met from the amount provided under contingencies. If there is any saving against the amount provided under contingencies, this amount may the utilized with the sanction of the competent authority, to meet the expenses of extra items of work. if any unforeseen, expenditure, expenses to minor changes in design, etc.

Work charged Establishment

Work-charged Establishment is the establishment which is charged to works directly. During the construction of a building or a project, a certain number of work-supervisors, chaukidars, etc., are required to be employed, and their salaries are paid from the amount of work-charged establishment provided in the estimate. For work-charged establishment a percentage 0f 11/2% to 2% of the estimated cost is included in the estimate_ The work-charged employees are temporary staff and their appointment shall have to be sanctioned by the competent authority for a specific period. Their services are terminated at the expiry of the sanctioned period, if their services are required fresh sanction shall have to be taken. Their services can however be terminated at any time but usually one months' notice is given For big work or project a percentage of 1% to 11/2% of the estimated cost is provided in the estimate for the purchase of Tools and Plants which will be required for the execution of the work. Normally the contractor has to arrange and use his own tools and plants.

Report—Estimate is usually accompanied with a report which gives all information in brief, of the whole work or project. Report should be such as to give a clear picture or idea of the whole project or work. Report should consist of the following main points :—

- (i) Brief history, with reference to the proposal.
- (ii) Object, necessity, utility and feasibility of the project with reasons.
- 1 (iii) Selection of site or selection of alignment.
- (iv) Surveying.
- (v) Accommodation provided or brief description of the works provided in the estimate.
- (vi) Nature of soil, and topography of the land, orientation, etc.
- I(vii) General specifications and basis of design calculations.
- (viii) Arrangements for water supply, sanitary works and electrical installations.
- (ix) Roads and drains
- (x)Miscellaneous items as labour amenities, temporary accommodation for staff. etc. for big project.
- (xi) Manner of execution.

- (xii) Total cost and how to be financed.
- (xii)Return or revenue income if any.
- (xiv)Rent statement if any
- $\square (xv) Time of execution.$

Schedule of rates—Schedule of rates is a list of rates of various items of works. To facilitate the preparation of estimates, and also to serve as a guide in setting rates in connection with contract agreements, a schedule of rates for all items of work is maintained in the Engineering Department in the form of a printed books known as "Schedule of Rate Books."

Rate per unit of various items of work and materials, rates of wages of labour and rates of transport are given in the 'Schedule of Rates'. P.W.D. maintain printed schedule of rate book for various items of the work and estimate is prepared with these rates. The rates are workable rates for the completion of the items including materials, transport, labour, profit, etc. The Schedule of Rate is prepared on the basis of analysis of rates. Usually, transport of materials upto distance of 8 km (5 miles) is included in the rates. As the rates vary slightly from year to year, the rates are increased or decreased by a percentage on the 'Schedule of Rates'. If the workable rates differ much from the Schedule of Rates', then the rates are revised and a new 'Schedule of Rates' is prepared.

Bill of Quantities - It is a statement of the various items of work giving the description, quantities and unit of rates. It is prepared in a tabular form similar to the 'Abstract of Estimated cost' of the detailed estimate, but the rate and amount columns are left blank (unfilled). When priced, that is, the rates and the amounts

are filled up and totaled, this gives the estimated coat. It is primarily meant for inviting tender, and supplied to the contractor to fill up the rates and amounts columns. On receipt-Of the tenders the rates and amounts are compared and decision about entrusting the work is finalized.

Item No	Particulars of item	Quantity	Rate	Unit	Amount Rs. P
			Rs. P	per	
1.	Earth work in excavation	32.51		Per %	
		cu.m		cu.m	
2.	Earth work in filling	27.48		Per %	
		cu.m		cu.m	
3.	Lime concrete in foundation	11.33		Per	
		cu.m		cu.m	
4.	Ist Class brickwork in lime mortar in	23.14		Per	
	foundation and Plinth	cu.m		cu.m	
5.	Damp proof course 2.5cm C.C. 1:1 ^{1/2} :3	11.02		Per	
		cu.m		sq.m	

Bill of Quantities (Typical Sheet)

6.	First Class brickwork in 1:6 cement mortar	31.76	Per	
		cu.m	sq.m	
7.	And so on	-	-	

Note – For different type of works, tenders, contract, security money, measurement, payment, preparation of project, stock account etc. (see chapter 17 P.W.D Account and procedure for works).



SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

UNIT IV - COSTING OF FIXTURES AND FITTINGS

Electrical wiring is an electrical installation of cabling and associated devices such as switches, distribution boards, sockets, and light fittings in a structure.

Wiring is subject to safety standards for design and installation. Allowable wire and cable types and sizes are specified according to the circuit operating voltage and electric current capability, with further restrictions on the environmental conditions, such as ambient temperature range, moisture levels, and exposure to sunlight and chemicals.

Wiring Methods:

Associated circuit protection, control and distribution devices within a building's wiring system are subject to voltage, current and functional specification. Wiring safety codes vary by locality, country or region. The International Electrotechnical Commission (IEC) is attempting to harmonise wiring standards amongst member countries, but significant variations in design and installation requirements still exist. Materials for wiring interior electrical systems in buildings vary depending on:

Intended use and amount of power demand on the circuit

Type of occupancy and size of the building

National and local regulations

Environment in which the wiring must operate.

Wiring systems in a single family home or duplex, for example, are simple, with relatively low power requirements, infrequent changes to the building structure and layout, usually with dry, moderate temperature and non-corrosive environmental conditions. In a light commercial environment, more frequent wiring changes can be expected, large apparatus may be installed and special conditions of heat or moisture may apply. Heavy industries have more demanding wiring requirements, such as very large currents and higher voltages, frequent changes of equipment layout, corrosive, or wet or explosive atmospheres. In facilities that handle flammable gases or liquids, special rules may govern the installation and wiring of electrical equipment in hazardous areas.

Wires and cables are rated by the circuit voltage, temperature rating and environmental conditions (moisture, sunlight, oil, chemicals) in which they can be used. A wire or cable has a voltage (to neutral) rating and a maximum conductor surface temperature rating. The amount of current a cable or wire can safely carry depends on the installation conditions.

The international standard wire sizes are given in the IEC 60228 standard of the International Electrotechnical Commission. In North America, the American Wire Gauge standard for wire sizes is used.

Cost of Electrical Wiring

Electrical wiring now-days is usually with concealed wiring, where the wiring is hidden under plaster. Concealed wires are placed inside walls & below flooring. Wires are protected inside duct/channel.

Cost depends on number of switches required, or rather connections

Wiring for Special equipments, heavy duty appliances cost more.

Cost for new connection is different from cost of replacing old electrical point.

Cost of Switch & Switch board varies with brand & design

Modular Switch boards are new trends. They allow easy maintenance & look good.



What is included in above Rate ?

All rates are with unit of "Per Point"

Wiring included in this rate is wiring that is running between switchboard and endpoint within same room PVC Conduit pipes which are ISI certified.

Includes Wire, Switch & Switchboard.

Material used is of branded company & of good quality

Above rate includes all fixing charges & wiring

Rate also includes the task of scrapping plaster (in Hindi known as Jhari) to place conduit pipe

Once wiring is one, cement grouting is on above scrapped line of plaster

	Incandescent incl. Tungsten Halogen	Fluorescent	Compact Fluorescent Lamp	Metal Halide	High Pressure Sodium
Wattages (Lamp only)	15-15,000	15-219	4-40	175-1000	70-1000
Life (hr)	750-12,000	7,500-24,000	10,000- 20,000	1,500- 15,000	24,000
Efficacy (Im/W) lamp only	15-25	55-100	50-80	80-100	75-140
Lumen maintenance	Fair to excellent	Fair to excellent	Fair	Good	Excellent
Color renditions	Excellent	Good to excellent	Good to excellent	Very good	Fair
Light direction control	Very good to excellent	Fair	Fair	Very good	Very good



0.5 X 0.5 FT 9W Normal White LED Ceiling Light with 950 Lumens, >100 Lm/W Luminary Efficacy & 1 Years Performance Warranty Brand: EFFE

M.R.P.: ₹3,400.00 Price: ₹2,600.00



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AKG STEEL INDUSTRIES

(Formerly J K Tube Co.)

B-39, Sector-81, Noida, Phase-II, U.P. E-mail: <u>akgsteelconduits@iktube.in</u> Web: <u>www.akgsteelind.com</u>

(Effective from 1st July 2017)

Black Stoving Painted Accessories

		20MM	25MM	32MM	40MM	50MM
1	Surface Junction Box - 1 & 2 Way	30.00	33.00	65.00	80.00	147.00
2	Surface Junction Box - 3 & 4 Way	32.00	36.00	70.00	88.00	162.00
3	Inspection Bend	28.00	31.00	56.00	76.00	143.00
4.	Inspection Tee	30.00	33.00	64.00	80.00	147.00
5	Inspection Elbow	25.00	28.00	51.00	57.00	137.00
6	2.5" Deep Junction Box (65 MM) - 1 & 2 Way	57.00	59.00	79.00	91.00	-
7	2.5" Deep Junction Box (65 MM) - 3 & 4 Way	63.00	65.00	87.00	100.00	-
8	3" Deep Junction Box (75 MM) - 1 & 2 Way	69.00	69.00	94.00	107.00	-
9	3" Deep Junction Box (75 MM) - 3 & 4 Way	76.00	76.00	103.00	117.00	-
10	Inspection Coupler/ Socket	33.00	38.00	74.00	112.00	216.00
11	Solid Bend	28.00	39.00	73.00	137.00	286.00
12	Solid Coupler/ Socket	7.00	10.00	12.00	17.00	32.00
13	Reducer (Black Enameled)	25 x 20	32 x 25	32 x 20	40 x 25	40 x 20
-	interest (proce channeled)	20.00	32.00	52.00	60.00	70.00



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Within industry, piping is a system of pipes used to convey fluids (liquids and gases) from one location to another. The engineering discipline of piping design studies the efficient transport of fluid.Industrial process piping (and accompanying in-line components) can be manufactured from wood, fiberglass, glass, steel, aluminum, plastic, copper, and concrete. The in-line components, known as fittings,[3] valves, and other devices, typically sense and control the pressure, flow rate and temperature of the transmitted fluid, and usually are included in the field of piping design (or piping engineering), though the sensors and automatic controlling devices may alternatively be treated as part of instrumentation and control design. Piping systems are documented in piping and instrumentation diagrams (P&IDs). If necessary, pipes can be cleaned by the tube cleaning process.

Piping sometimes refers to piping design, the detailed specification of the physical piping layout within a process plant or commercial building. In earlier days, this was sometimes called drafting, technical drawing, engineering drawing, and design, but is today commonly performed by designers that have learned to use automated computer-aided drawing or computer-aided design (CAD) software.

Plumbing is a piping system with which most people are familiar, as it constitutes the form of fluid transportation that is used to provide potable water and fuels to their homes and businesses. Plumbing pipes also remove waste in the form of sewage, and allow venting of sewage gases to the outdoors. Fire sprinkler systems also use piping, and may transport nonpotable or potable water, or other fire-suppression fluids.

Piping also has many other industrial applications, which are crucial for moving raw and semi-processed fluids for refining into more useful products. Some of the more exotic materials used in pipe construction are Inconel, titanium, chrome-moly and various other steel alloys.

The material with which a pipe is manufactured often forms as the basis for choosing any pipe. Materials that are used for manufacturing pipes include:

Carbon steel ASTM A252 Spec Grade 1, Grade 2, Grade 3 Steel Pile Pipe Plastic piping, e.g. HDPE pipe, PP-R pipe or LDPE pipe. Low temperature service carbon steel Stainless steel Nonferrous metals, e.g. cupro-nickel, tantalum lined, etc. Nonmetallic, e.g. tempered glass, Teflon lined, PVC, etc.

Standards:

There are certain standard codes that need to be followed while designing or manufacturing any piping system. Organizations that promulgate piping standards include: ASME - The American Society of Mechanical Engineers - B31 series ASME B31.1 Power piping (steam piping etc.) ASME B31.3 Process piping ASME B31.4 Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids and oil and gas ASME B31.5 Refrigeration piping and heat transfer components ASME B31.8 Gas transmission and distribution piping systems ASME B31.9 Building services piping ASME B31.11 Slurry Transportation Piping Systems (Withdrawn, Superseded by B31.4)

ASME B31.12 Hydrogen Piping and Pipelines ASTM - American Society for Testing and Materials ASTM A252 Standard Specification for Welded and Seamless Steel Pipe Piles[14] API - American Petroleum Institute API 5L Petroleum and natural gas industries—Steel pipe for pipeline transportation systems[15] CWB - Canadian Welding Bureau EN 13480 - European metallic industrial piping code EN 13480-1 Metallic industrial piping - Part 1: General EN 13480-2 Metallic industrial piping - Part 2: Materials EN 13480-3 Metallic industrial piping - Part 3: Design and calculation EN 13480-4 Metallic industrial piping - Part 4: Fabrication and installation EN 13480-5 Metallic industrial piping - Part 5: Inspection and testing EN 13480-6 Metallic industrial piping - Part 6: Additional requirements for buried piping PD TR 13480-7 Metallic industrial piping - Part 7: Guidance on the use of conformity assessment procedures EN 13480-8 Metallic industrial piping - Part 8: Additional requirements for aluminium and aluminium alloy piping EN 13941 District heating pipes GOST, RD, SNiP, SP - Russian piping codes RD 10-249 Power Piping GOST 32388 Process Piping, HDPE Piping SNiP 2.05.06-85 & SP 36.13330.2012 Gas and Oil transmission piping systems GOST R 55990-2014 & SP 284.1325800.2016 Field pipelines SP 33.13330.2012 Steel Pipelines GOST R 55596-2013 District heating networks EN 1993-4-3 Eurocode 3 — Design of steel structures - Part 4-3: Pipelines AWS - American Welding Society AWWA - American Water Works Association MSS - Manufacturers' Standardization Society ANSI - American National Standards Institute NFPA - National Fire Protection Association

EJMA - Expansion Joint Manufacturers Association



A false ceiling is a fitted ceiling that hangs below the original ceiling of a room or home. It's usually suspended by wooden or metal frames and the illusion it brings of a lower ceiling, sometimes with parts of the original ceiling on display, has earned it the moniker 'dropped ceiling.'

These are usually mounted at a minimum distance of 8 inches from the original ceiling. They're versatile enough to be constructed in homes of any size– it's all about being clever with shapes and available space.

Gypsum False Ceiling

is an offspring of calcium and is used in the construction of lightweight ceilings. They usually come in the form of boards that are then hung off the ceiling with iron or wooden frameworks and given a lick of paint.

Cost per sq ft.: ₹50 – ₹150

Plaster of Paris False Ceiling

This is a more common variety of ceilings, not least because PoP is easy to shape and source. They're longlasting and are well-insulated even in varying weather conditions. Cost per sq ft.: ₹50 – ₹150

Wooden False Ceiling

Due to its natural grain and textures, wood has found its way onto the fifth wall many times, in the form of a ceiling. It's a tad on the pricier side, which is why you'd most likely see it in residential buildings as opposed to large-scale commercial projects.

Cost per sq ft.: ₹80 – ₹650

Of these, the first two are usually the ceiling of choice in Indian homes because they're much more customisable.

Materials	Price	Maintenance	Fire-proof	Water-proof
Gypsum	₹50 - ₹150	Low	Yes	Yes
Plaster of Paris	₹50 - ₹150	Low	Yes	Yes
Wood	₹80 - ₹650	High	No	No

How is False Ceiling Cost Calculated?

Multiple factors are involved while calculating the cost of false ceiling per sq. ft. These include:

Design: More complex the design of the false ceiling, the costlier it gets.

Size: The price is low for a larger ceiling area as the materials required can be purchased at wholesale prices in bulk.

Quality: If you go for high-quality materials, it is pricier. But as high-quality materials are durable, it has a higher return on investment (ROI).

Availability: If the materials you are using are easily available in the market, transportation and logistic costs can be cut.

Additional cost: This includes the cost of finishes, fittings, cutting, lighting, accents etc.

Types of False Ceiling Designs

To help you evaluate which ceiling design to go for, here's a rundown of both the classic and the bang-ontrend:

Single-layered False Ceiling

This type of ceiling is a fool-proof way to jazz up a room without going the whole hog. Homeowners could choose to leave it white on a white ceiling, as this adds dimension without necessarily overwhelming the space. However, if you'd like to go out with a bang, you could choose from a variety of colours, shapes, textures and lighting options to draw the eye upwards immediately. This is a great trick to distract from a small space or one that doesn't do much in terms of decor.

Multi-layered False Ceiling

Layers are a great way to experiment with an already versatile medium to create a completely personalised ceiling. In larger rooms, a multi-layered ceiling in the centre of the ceiling creates drama and the feeling of grandeur, while those laid out near the edges are more likely to make the space look wider. A multi-layered ceiling also opens up new avenues for lighting, colour and shape-based experiments, so don't be afraid to flex your creative muscles.

Plus-Minus POP False Ceiling

Constructed completely out of POP, the plus-minus ceiling design is where there are elements protruding out of a regular false ceiling or, by contrast, tucked into it. This trend is more on the elaborate side, so be sure to factor in existing decor plans and the amount of space you have before playing around with this idea.

Coffered False Ceiling

Coffers are sunken square or boxy panels that are fixed into a ceiling. Aside from instantly bringing drama into a space, this ceiling design also creates the illusion of higher ceiling height and multiple dimensions within one room.

False Ceiling Shapes

POP used in false ceilings is known for its mouldable properties making it perfect for almost any kind of ceiling design. However, there are other false ceiling materials that can be shaped and customised as well. Take a look at some of the most popular false ceiling shapes:

- Box ceiling
- Peripheral ceiling
- Geometric design
- Intricate lattice
- Wooden slats
- Inverted cove

Pros and Cons of a False Ceiling

If you're still on the fence about whether or not to install a ceiling, here are a few pros and cons that should help you decide:

Advantages of a False Ceiling

Great acoustics: Adding an additional layer to the original ceiling creates better acoustics within making it a perfect design treatment for living rooms, home theatre and AV rooms.

Hides wires: A false ceiling is a perfect place to hide wires and pipes. A false ceiling can also be fitted with sunken or hidden lighting.

Brings lofty ceilings lower: For lofty vertical space that dwarfs furniture in a room, you can consider installing a false ceiling to restore proportions.

Insulates the room: For homes in colder regions of the country, this offers up an added perk of insulating rooms. The additional layer creates a gap between itself and the original layer, which traps air and cools the room down. It also optimises the functioning of air conditioners. Because it reduces the square footage to be cool and slashes energy bills.

Disadvantages of a False Ceiling

Installation requires precision from experts: False ceiling requires precision in design, calculation and installation and must only be put in place by experts.

Not feasible for low-ceilinged rooms: It needs to be at least 8 inches away from the original wall. Therefore, it is always recommended that the ceiling height be 11 feet or higher. For compact homes, a partial ceiling in a corner of the room can do the trick.





Partition wall

Partitions are non-load bearing walls that separate spaces in buildings. As well as spatial division, they can provide; privacy, acoustic and fire separation and flexibility of layout.

Partition walls can be solid, typically constructed from brick or blockwork, or can be a framed construction. Framed partition walls are sometimes referred to as stud walls, and can be constructed from a timber, steel or aluminium frames clad with boarding such as plasterboard, timber, metal or fibreboard. Partition walls may also be glazed.

They may be purpose-designed and constructed or may be modular systems, and can incorporate openings, windows, doors, ducting, pipework, sockets, wiring, skirting, architraves and so on.

Frame constructions may include insulation to prevent the passage of sound or fire between adjacent spaces. It is important therefore that the top and bottom of the wall are properly sealed against the floor and ceiling, and where a raised floor or suspended ceiling is present, it is important to consider the potential for 'flanking' through the voids above and below.

As they are non-load bearing, partition walls can provide good flexibility, particularly if they are lightweight, framed systems, as wall positions can be changed relatively easily and inexpensively without impacting on the

overall structure of a building. Depending on the nature of the construction, it may be possible to re-use some, or all of the components of the wall in a different location.

They may also be movable. Movable partition systems include:

Pipe and drape systems with telescopic or fixed horizontal and vertical components that create a removable panel system.

Free-standing screens.

Folding partitions.

Sliding partitions with tracks attached to the floor and ceiling.

Movable partitions are commonly found in exhibitions spaces, hotels, offices and so on.

A partition wall may also be a party wall, that is, a wall that stands on the land of two or more owners. In this case, works to the wall may be subject to the requirements of the Party Wall Act.

The specification of partition walls will depend on the requirements for weight, cost, speed of installation, availability of materials, longevity, durability, flexibility, ease of reconfiguration, sound and fire insulation and surface finish. They may also be required to a perform a secondary structural role, for example supporting cupboards or shelving.



Wooden partitions:

A room divider is a screen or piece of furniture placed in a way that divides a room into separate areas.Room dividers are used by interior designers and architects as means to divide space into separate distinct areas.There are a number of different types of room dividers such as cubicle partitions, pipe and drape screens, shoji

screens, and walls. Room dividers can be made from many materials, including wood, fabric, plexiglass, framed cotton canvas, pleated fabric or mirrors. Plants, shelves or railings might also be used as dividers. Portable room dividers have folded wall panels supported on wheels.

Houses, and other residences, use a room divider to divide the space more effectively or as a decorating focus point. There are many uses for a room divider including: dividing the room, adding privacy to any space, hiding clutter and increasing storage and accents to the room. Other uses include adding color, redirecting foot traffic, creating a foyer, adding a desk front modesty screen, creating coziness, or adding a decorative background.

Most commonly used in the residence is a small room divider, sometimes called a folding shoji screen. Shoji screens are usually tri-fold walls. A shoji screen may also be used to section off part of a bedroom or family room as an office.Plants,bookshelves,railings,fireplaces, light fixtures, and drapes have all been used to effectively create distinct spaces in individuals apartments and homes.

In schools or religious facilities, room dividers primarily are used to create temporary classrooms for education in large open rooms.Since the rooms were designed originally to be open for other purposes, the most common type of room divider is a portable room divider on casters which can easily be moved from place to place. After class, the room divider is rolled back into its storage area for future use.

Hotels and restaurants use two different types of room dividers. Commonly, you will see floor-to-ceiling room dividers[10] in banquet halls and meeting spaces. These fixed dividers can be used to divide a banquet room into smaller facilities. In areas where room dividers need more flexibility, hotels and restaurants might use portable partitions similar to those used in schools.

In offices, room dividers are typically more permanent in nature and attached directly to the floor. These office cubicles room dividers allow taking a large office space and breaking it into quieter and more focused subdivided offices.

Convention centers, by their very nature, are large facilities with wide open internal spaces. Consequently, they often need to be broken down into smaller areas. The most common room divider used in convention center is pipe and drape. The convention center sets up frames made of plastic, metal, or wire tubing. Fabric material is then hung over the frame to create back drops and hide other unsightly places in addition to creating multiple subdivided rooms.

Flooring-Tiles:

Flooring ranks high on the list of considerations when planning out your home interiors. It forms the base of your home and needs to tick boxes in terms of both aesthetic value and durability. However, the growing number of flooring options can leave frazzled homeowners confused, often pushing them to make the wrong choice. This guide breaks down the difference between ceramic and vitrified tiles and how the two very popular flooring options compare against each other.

Ceramic tiles are made of clay and water baked at high temperatures in a kiln. The glaze formed gives these tiles their ubiquitous shine, but ceramic tiles are also available in a variety of colours and patterns, all of which are somewhat earthy.

On the other hand, vitrified tiles are made of clay and a mixture of other minerals and solvents. A glossy substrate develops when the composition is baked to high temperatures, leading to its characteristic smooth

texture.Since this composition is baked at high temperatures during vitrification, it develops a glossy substrate which leads to its characteristic smooth texture.

Walls, countertops and backsplashes alike have seen the use of the versatile ceramic tile in its glazed form. This is largely due to their durability and variety of colours, which can serve to spice up the colour palette in a monotonous kitchen or bathroom setup. Patterned ceramic tiles inlaid into the floor with solid-coloured tiles creates a lovely decorative base to your home interiors.

Vitrified tiles are largely used for flooring– this is because they're available in large sizes, can be placed in a close-knit manner across the floor and are generally very durable. They match marble and granite in terms of looks as well, making them a more affordable flooring option for those going for that look.

When it comes to affordability, ceramic and vitrified tiles are quite cost-effective. These flooring options remain lesser priced than expensive options like granite and marble without cutting corners on functionality.

Ceramic tiles easy to install and just as easy to replace. However, the joints can be quite spacious and this makes room for grout and grime. Vitrified tiles need hardly 48 hours of setting time before they're ready for use. Such tiles have joints that are tighter than ceramic ones; a feature that makes the removal of a few tiles difficult.

