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14. FLOORING

14.1 GENERAL

The tier or levels which divide a building in two stages or storeys are called floors. These are made of materials quite different both in composition and construction. They range from relatively thin covering, contributing little or no structural strength to a building, to much thicker materials capable of withstanding reasonable stresses, and in some designs, essential to the strength of the building.

14.2 EARTH FLOORING

14.2.1 SCOPE

Unless otherwise specified, earth flooring shall be constructed in accordance with the following specifications.

14.2.2 MATERIAL

Earth (clay) shall conform to following Specifications:

Source:
Clay shall be obtained from good earth containing 20 % to 30% fine sand.

Quality:

Clay shall not contain more than 0.5% soluble salts more than 0.2% sulphate and more than 4% organic contents. It shall not contain any gravel, coarse sand, kanker roots of the grass and plant.

14.2.3 LAYING AND CONSOLIDATION

Earth shall be placed in layers of six inches and shall be sprinkled with water and rammed to such an extent that a layer of 6inch thick loose earth evenly spread is reduced to 4 inches in thickness. The consolidated surface shall be such that a very faint impression can be made on it with the heel of a boot or the blow of a rammer.

14.3 MUD FLOORING

14.3.1 SCOPE

Unless otherwise specified, mud flooring shall be constructed in accordance with the following specifications.

14.3.2 MATERIAL

a) Earth (clay) shall conform to Specifications as mentioned above 14.2.

b) Mortar shall conform to Specifications in Section 11- Brickworks Mud Mortar.

Laying

After laying earth floors as per Specifications 14.2for Earth Flooring, the surface shall be finished with one inch thick mud plaster with gobri leeping conforming to Specifications in Section 15.1.12 for Mud Plaster.

14.4 BRICK OR TILE FLOORING

14.4.1 SCOPE

Unless otherwise specified brick or tile flooring shall be constructed in accordance with the following specifications:

14.4.2 MATERIAL

a) Brick or tile shall conform to Specifications as mentioned in Section 11 for Clay Bricks.

b) Mortar shall conform to Specifications as mentioned in Section 11– Brickwork, Mortars.

14.4.3 BASE

The construction and preparation of base for ground floor and subsequent levels shall comply with the provisions of Clause 14.10.

14.4.4 WETTING OF BRICKS/TILES

Bricks or tiles shall be wetted in accordance with the Specifications mentioned in Section 11 for Brick work

14.4.5 PATTERN

The laying of bricks or tiles shall be plain, diagonal, herring-bone or any other specified pattern.

14.4.6 JOINTS

a) Where pointing is not to be done the Joints shall not exceed 3/16 inch in thickness. The mortar oozing out of the joints shall be struck off with trowel or wiped off with damp cloth.

b) Where pointing is to be done the joints shall not exceed 3/8 inch in thickness. The mortar in the Joint shall be raked out one inch deep while it is still green.

14.4.7 POINTING

otherwise specified, the joints shall be flush pointed with specified mortar.

14.4.8 THICKNESS OF BEDDING MORTAR

Unless otherwise specified the floor shall be laid on 3/4 inch thick minimum bed of specified bedding mortar spread evenly on the base.

14.4.9 LAYING OF BRICKS/TILES

Bricks/tiles shall be laid with specified mortar in position on the bedding mortar.

14.4.10 PROTECTION

Flooring shall be allowed to mature, undisturbed, and protected from the effects of weather. It shall be kept wet for at least 7 days after completion. If pointing is to be done, it shall be kept wet for at least 14 days after the completion of pointing.

14.4.11 SURFACE

Surface shall be finished to specified levels. All joints shall be uniform, true and parallel and square bricks shall be rubbed to ensure this where it is very necessary, without extra cost.

14.4.12 EDGE WITH BULLNOSED BRICKS

No damaged bricks or tiles shall be used. Bats shall not be used except to close any course of bricks or tiles. Unless otherwise specified, the overhanging edge of the paving shall be finished off by special bull-nosed bricks.

14.5 MARBLE TILE FLOORING

14.5.1 SCOPE

Unless otherwise specified marble flooring shall be constructed In accordance with the following specifications.

14.5.2 MARBLE

Marble slabs of an approved quality shall be used. The marble shall be super white, Lasbela or Badal as specified.

14.5.3 MORTARS

Cement sand mortar on which marble tiles are placed shall be 1:3 unless otherwise specified

14.5.4 BASE

For ground and subsequent floors the base shall be laid as per Specifications 14.10.

14.5.5 SIZE COLOUR AND PATTERN

Marble shall be of the size colour and pattern, as specified.

14.5.6 THICKNESS DRESSING OF EDGES AND JOINTS

All slabs shall have a true plain surface and shall be accurately sawn; truly square at edges to the full thickness. All marble slabs shall have a minimum thickness of 3/4" of an Inch. No Joints shall be more than 1/16 of an Inch in thickness. Slabs projecting over the edges of verandah or steps shall have their edges finished with a bull-nosed ending.

14.5.7 PREPARATION OF BASE

Before laying marble slabs, the surface of the base shall be washed and scrubbed with wire brushes. Where they are to be laid directly over roof slab, the later shall be roughened while it is still green.

14.5.8 THICKNESS OF BEDDING MORTARS

Marble slabs shall be laid over Specified bedding mortar not more than 3/4 of an inch thick.

14.5.9 LAYING

Slabs shall be laid in position on bedding mortar in specified pattern. The joints shall be filled with specified putty.

14.5.10 LEVELS

The surface of marble slabs when laid shall be perfectly true, level, projected or sloped.

14.5.11 PROTECTION AND CURING

The floor shall be protected from the effects of weather. During the progress of work and for 10 days after laying the floor shall be kept watered. Three clear days shall be given for setting before anyone is allowed to walk over, but no weight shall be brought on the surface till 7 clear days have elapsed after the completion of laying.

14.5.12 POLISHING

When properly set the floor shall be rubbed with carborandum stone or with some other hard stone of approved quality and sand. When roughness is removed, sand shall be washed off and the process continued either with very fine carborandum stone or with brick and emery powder. The surface shall then be finally smoothed down with a pumice stone. When the smoothing process has been completed, the surface shall be polished with putty powder rubbed by felt pads.

14.6 GLAZED TILE OR CEMENT TILE FLOORING

14.6.1 SOURCE

Unless otherwise specified, the work of glazed tile or cement tile flooring shall be done in accordance with the Specifications 14.4for Brick or Tile Flooring in all respects, except with the following modifications:

14.6.2 GLAZED TILES

The glazed tiles shall be of an approved quality as specified hereunder.

a) **Composition**
Glazed tiles shall be manufactured from ball clay, china stone & flint fired to not less than 1200˚C.

b) **Quality**
The tiles shall be non-slippery fully glazed on the face, uniform in colour free from cracks and other defects arises to be sharp and true.

c) **Shape**
Tiles shall be true and even face and even thickness throughout. The backs shall be with bond under cut key sufficient to ensure a good grip of the fixing medium. For wall tiling the tiles shall have holed formed in the edges to take galvanized or copper clamps.

14.6.3 CEMENT TILES

Cement tile shall be of an approved quality as specified.

All tiles shall be laid in water for 36 hours before they are laid.

The joints shall not be more than 1/16 of an inch which shall be grouted with cement, matching the colour of the tiles.

When necessary the tiles shall be cut with wire saw to the exact size having a clean sharp edge so as to have fine joints.

Saw dust shall be used as the work proceeds for removing stains etc.

14.7 MOSAIC TILES FLOORING

Unless otherwise specified mosaic tile flooring shall be done in accordance with the Specifications No. 14.4for Brick or Tile Flooring in all respect, except with the following modifications:-

The mosaic tiles shall conform to the following Specifications:

14.7.1 SOURCE

The mosaic tiles shall be obtained from an approved source. If manufactured departmentally through a contractor, the method of manufacturer shall be 'approved by the Engineer-in-charge.

14.7.2 QUALITY

Tiles shall be hydraulically pressed and fully cured. They shall be uniform in colour, free from cracks and other defects like efflorescence and crazing, the arises to be sharp and true. Pattern tiles shall bear the approved pattern on their faces. Mosaic tiles shall have polished surfaces. The constituent materials shall be as specified by the Engineer-in-charge.

14.7.3 SHAPE

Tiles shall be true and even on face and of even thickness throughout. The backs shall be with bond under-cut key sufficient to ensure a good grip of the fixing medium. For wall tiling, tiles shall have holes formed in the edges to take galvanized or copper cramps.

14.7.4 SIZE

The size of the tile shall be as specified.

14.7.5 TEST

A fully dried tile when immersed in water for any length of time shall not absorb water more than 2.5 per cent of the weight of dry tile.

14.7.6 LAYING OF TILES

All tiles shall be kept in water for 36 hours before they are laid.

The joints shall not be more than 1/16 of an inch which shall be grouted with specified mortar.

The joints shall be rubbed with very fine carborandum stone so that slight projections or edges of mortar etc. rising above the surface of tiles are levelled.

14.8 DRY BRICK PAVING

14.8.1 SCOPE

Unless otherwise specified dry brick paving shall be done in accordance with the following specifications.

14.8.2 MATERIAL

a) Bricks shall conform to Specifications as mentioned in Section 11 for Clay Bricks.

b) Sand shall conform to Specifications No. 14.10for Base for Flooring.

c) Mud mortar shall conform to Specifications as mentioned in Section 11 - Brickwork.

14.8.3 PREPARING SURFACE

The ground surface shall be thoroughly watered, well rammed and shall be dressed to the specified slope, camber or cross grade.

14.8.4 LAYING

Bricks shall be laid dry, on edge or flat in the specified pattern over half an inch thick mud plaster given on the surface. The joints shall not exceed one quarter of an inch in thickness. After laying the bricks the Joints shall be sand grouted. Where required, the joints shall be filled with specified cement sand mortar

14.9 WOODEN FLOORS

14.9.1 FLOOR BEARER GROUND FLOOR

In the case of ground floors, floor joists (bridging joists) shall rest on pillars, dwarf walls, rails or beams as may be specified.

The plinth under the flooring shall be excavated to the depth specified by the Engineer-in-charge and dressed level and rammed. If directed a suitable protective layer as approved by the Engineer-in-Charge shall be laid otherwise dwarf walls or pillars shall be built on a the specified concrete foundation. The dimensions and spacing shall be as indicated in the drawings or otherwise directed by the Engineer-in-Charge.

14.9.2 FLOOR BEARER SUSPENDED FLOORS

In the case of upper floors the bridging joists shall rest on wall plates, beams, rails or on other joists as shown on the drawings, or otherwise directed by the Engineer-in-Charge.

14.9.3 FLOOR BEARERS MATERIAL AND FIXING

The timber for the floor joists shall be of the kind specified and shall be in accordance with the specifications for wood work. The full number of joists for each continuous floor shall be laid and dressed to one level and tested before flooring is commenced.

14.9.4 PRESERVATIVES

All joists wall plates, bearers and the underside of planking shall be given two coats of hot wood preservative such as solignum creosote or coal tar as directed by the Engineer-in-Charge. The rate does not include this work, which shall be paid for separately according to the rates for painting with these materials.

14.9.5 BOARDING MATERIALS AND SIZE

The boarding for the floor shall not be planned on the underside in the case of ground floors and suspended floors to be coiled. Unless otherwise specified or shown in the drawings, in the case of deodar, kail or chir wood, the boards or battens shall be 1-1/2”, inches thick, not more than 6” inches wide and not more than 20 feet long. In the case of teak they shall be 1 inch thick, 4 inches wide and as long as possible. No board shall be less than 6 feet long, the ends being truly squared up after any split portion has been sawn off. All boards shall be uniform and parallel in width and shall have the same thickness.

14.9.6 JOINTS

The planks shall be planed true on one side (on both sides for uncoiled upper floors) the edges to be planed, rebated or tongued and grooved as directed by the Engineer-in-charge. Unless otherwise specified, the edges shall be tongued and grooved, with concealed joints for teak wood floors, and rebated joints for other floors.

14.9.7 PLANKING METHOD OF LAYING

The outer lines of boarding shall be accurately fixed paralleled with and close to the wall. Each subsequent line shall have the side joints carefully joined up and shall then be cramped into position by floor cramps, and nailed or screwed as specified, so that the heads shall be sunk below the finished surface of floor, or otherwise fixed with "secret joints". The cramps shall not be removed until the nails or screws have been fixed. The ends of plank shall rest on the centre of joist, and the ends of no two adjacent planks shall be on the same joist. Paved floors shall be stopped under a brass strip screwed to wooden floors where the two meet.

14.9.8 NAILS AND SCREWS

The nails or screws shall be subject to the approval of the Engineer-in-charge and shall have a length at least twice the thickness of the plank, two being used at each end and one at every Intermediate joist alternately on opposite sides of the plank. All screws shall be oiled before Insertion.

14.9.9 PLANING

After the floor has been laid, it shall be planed in both directions and made perfectly smooth. All depressions in the wood nail holes and all small defects of every kind, where permitted by the Engineer-In-charge to remain in the work, shall unless otherwise specified, be filled with "Beaumont age" or stopping out wax.

14.10 BASE FOR FLOORING

Unless otherwise specified, the base of all ground floors shall be constructed in accordance with the following specifications:

14.10.1 PREPARATION OF SUB-BASE

Earth (clay) conforming to following Specifications shall be used for sub-base:

Source:

Clay shall be obtained from good earth approved by the Engineer-in-Charge containing 20 % to 30% fine sand.

Quality:

Clay shall not contain more than 0.5 % soluble salts more than 0.2 % sulphate and more than 4% organic contents. It shall not contain any gravel, coarse sand, kanker, the grass and plant.

Earth filling shall be done up to the specified level in a layer of six inches and shall be properly watered and consolidated as specified hereunder:

Earth shall be placed in layers and shall be sprinkled with water and rammed to such an extent that a layer of 6 inches thick loose earth evenly spread is reduced to 4 inches in thickness. The consolidated surface shall be such that a very faint impression can be made on it with the heel of boot or the blow of hammer.

The sub-base shall be properly levelled before sand filling.

14.10.2 SAND FILLING

Sand filling shall be done as specified and shown on Drawings in layers not more than 3 Inches thick and shall be rammed after saturation to such an extent that a three-Inch layer is reduced to about two Inches after compaction.

Sand shall conform in all respects to the specifications for fine aggregate under Section 5 – Plain Reinforced Concrete except for its grading i.e. it shall pass through a sieve No. 16 and not more than 30 per cent shall pass through a sieve No. 100.

14.10.3 BRICK BALLAST

Brick ballast to be used in the base of floors shall be obtained from well burnt or over-burnt bricks which are hard, durable and strong. Brick ballast shall be free from impurities, quarry sap, dust, dirt; and solubility characteristics. The size of brick ballast shall be specified or as directed by the Engineer-in-Charge.

14.10.4 CONCRETE

Concrete shall be cement concrete as specified and shown on drawings complying with the provisions of Section 5 – Plain and Reinforced Concrete.

14.10.5 CONCRETE LAYING

Concrete shall be laid in one operation in a uniform layer of specified thickness, absolutely true and parallel to the required level of the finished surface and to the entire satisfaction of the Engineer-in-charge.

14.10.6 SURFACING TO BOND WITH CONCRETE

Concrete shall be cured for at least 7 days before any topping is laid. The surface shall be kept wet and protected from earth, dirt or other foreign matter. Before laying the topping, 'the surface' shall be washed and scrubbed with wire brushes so that the concrete and the topping are well bonded.

14.10.7 LEVELS AND SLOPES

Unless otherwise specified, the base shall be perfectly level. A slope of 1:64 shall, however, be provided in verandah and bath rooms.

14.10.8 BASE FOR FIRST & SUBSEQUENT FLOORS

The top surface of the roof slabs shall be roughened with wire brushes while it is still green. The base shall be constructed with cement concrete complying with the provisions of Section 5 – Plain and reinforced concrete, as specified, shown on drawings and approved by the Engineer-in-Charge. The brickbats shall be placed under concrete where specified. Further operations shall comply with the requirements of preparation of base for ground floor.

14.11 CEMENT CONCRETE FLOORS

a) They comprise cement concrete (1:2:4) topping laid in panels over a base. Thickness of topping varies with requirement. The thickness varies from 1-1/2 inch to 3 inches. For 1-1/2" or more thickness, it can be laid either in single or double layers. In later case half an inch thick wearing surface composed of 1 part of cement and 2 parts of very fine aggregate is laid immediately on the lower layer of cement concrete in the ratio of 1:3:6 by volume. To avoid, cracks the area of a panel is restricted to 16 square feet unless otherwise approved by the Engineer-in-Charge

b) The concrete for flooring shall comply with the requirements of Section 5 – Plain & Reinforced Concrete.

c) Division strips shall be cut from 5mm thick glass plate in width as specified in drawings or as directed by the Engineer-in-Charge

14.12 TERRAZZO / MOSAIC FLOOR

14.12.1 SCOPE

The work shall include furnishing all labour material and equipment and performing all operations as required to lay the Terrazzo floors which include but is not limited to;

- Sub-base in sand and brick ballast and terrazzo wearing course in accordance with Clause 14.10.
- Base in cement concrete as specified.
- Grinding and polishing or washing if not polished.
- Skirting, Dado in Terrazzo.

14.12.2 MATERIALS

a) Cement, Sand, Aggregate for concrete and water shall conform to relevant specifications given in Section - 5, Concrete.
b) Sub-base / Base shall conform to the provisions of Clause 14.10.
c) Marble chips shall be crushed marble and shall be best quality white or coloured. It shall have an abrasive hardness of not less than 16 and the size shall vary from No. 4 to 8 as specified or as directed by the Engineer-in-Charge.
d) Dividing strips of glass shall be 5mm thick and 38mm wide or as required in the Drawings.

e) Mineral Pigment for colouring the matrix of terrazzo / mosaic shall be of the best quality and purity and shall be alkali resistant, sun proof and lime proof with a specific gravity similar to that of Portland Cement and as approved by the Engineer-in-Charge.

f) Commercial products for polish shall be of the best quality available as approved by the Engineer-in-Charge.

14.12.3 BASE & WEARING SURFACE

The ground shall be prepared and sub - base laid as Shown in the Drawings in accordance with the requirements of sub-section 14.10. Concrete of 220 kg/cm2 strength (1:2:4) shall then be mixed and laid in the manner specified for cement concrete floor, using a minimum quantity of water for workability. The net thickness specified for wearing surface shall be that obtained after grinding and polishing

14.12.4 DIVIDING STRIPS

Floors shall be laid in panels of about 1.2 x 1.2 meters or of size and pattern as shown on the Drawings. Dividing strips of glass as specified shall be provided and fixed to exact levels making an allowance for grinding. Glass strips shall not be less than 5 mm thick and of width equal to the total thickness of cement concrete base and terrazzo topping or as specified or as directed by the Engineer-in-Charge.

14.12.5 PLACEMENT

The cement concrete base shall be levelled with a trowel and straight edge, consolidated and finished with steel trowels to an even but rough surface. the top layer of cement marble chips mixed in the proportion of 1:2 (1 cement and 2 marble chips) and pigment, if required, shall be laid over it within 24 hours. The cement and marble chips must be mixed dry in such quantities as are sufficient for a unit of specified shade. Water shall be added to only such quantities as can be mixed thoroughly and consumed in less than 30 minutes, the quantity of water being. the minimum for workability. Mixing must be done on water tight platform and any mix not used within 30 minutes shall be discarded .and removed from the site. A layer of cement and marble chipping mixture should be well trowelled into the surface of the base concrete before filling to the top level of the screeds. The layer should be well compacted and all voids shall . be filled in. A layer of neat cement, of the specified colour shall then be well trowelled into the surface leaving a plain smooth surface.

14.12.6 SURFACE GRINDING & FINISHING

a) Plain Finish

Three days after laying, the top layer must be evenly and smoothly machine ground with carborandum blocks of coarse, medium and the fine grades so as to ensure that all marble chipping are evenly exposed all over the surface. If marble chips are not evenly exposed, the Contractor shall remove the surface and relay it at his own cost. After the first grinding, the floor shall be thoroughly grouted with the same cement and colour composition as specified for the mosaic' mix. The grout shall be of the consistency of thick cream and shall be brushed over the floor to eliminate all depressions and thoroughly fill the surface for final grinding. The surface after grinding shall be left undisturbed and cured for 2 or 3 weeks, after which it shall be cleaned of dirt and dust by rubbing gently with pumice stone or washing soda in sufficient water. Three days after the surface has been cleaned it shall be rubbed hard with 1:10 solution of oxalic acid using felt. The surface shall then be cleaned and washed with plenty of water. After the surface has dried a final gloss shall be given by polishing the surface to the satisfaction of the. Engineer-in-Charge. The walls and all surfaces of the finished works of other trades shall be properly protected from damage and spoiling during the process of grinding and washing of the mosaic. After the finish grinding has been completed and the

surface treatment and polish applied, the mosaic work shall be covered and protected with material approved by the Engineer until completion of the work of all other trades.

b) Washed Mosaic - Rough Finish

Before the mosaic is hardened the top surface shall be brushed down. plenty of water being used in this process. The brushing shall continue till the matrix is removed and each piece of marble chips is clearly exposed. If brushing of surface does not produce desired results tooling process shall be carried out by kango Hammer. After whole of the area is evenly exposed the surface shall be sprayed with water and lightly brushed down cleaning all the adhering mortar and revealing the true colour of the marble chips.

14.12.7 TERRAZZO DADO & SKIRTING

The plastered surface over which the dado/skirting is to be applied shall be well roughened and watered, cement mortar of specified ratio shall then be plastered over this well roughened surface to .the indicated thickness. Before the base course has set the layer of mosaic mixture shall be well trowelled into the surface of the base to a thickness which after grinding shall result in the finished thickness. A layer of neat cement of the specified colour shall then be well trowelled into the surface leaving a plain smooth surface. The Contractor shall start finishing as specified for floors above. Mosaic skirting shall be provided around all mosaic floors unless shown otherwise. Skirting and dado shall' be straight, level and in plumb. Intersections at floors shall be straight and flush.

14.13 CONGLOMERATE FLOORING (CEMENT CONCRETE)

Unless otherwise specified, the conglomerate flooring shall be constructed in accordance with the following specifications.

14.13.1 MATERIALS

a) Cement shall conform **to ASTM C150 / C150M -09 Standard Specifications for Portland Cement** or BS 12.

b) **Fine Aggregate**

Source:

Fine Aggregate shall be obtained from an approved source.

Grading:

Fine Aggregate shall consist of well graded sand, stone screening or other inert material of similar characteristics, or a combination of these. The whole of it shall pass through 3/16 inch sieve and 2 to 10 per cent through sieve No. 100.

Cleanliness:

Fine aggregate shall be clean and free from clay lumps, soft and flaky particles shale, alkali, organic matter, loam, mica and injurious amounts of deleterious substances. The sum of percentages of all deleterious substances shall not exceed 5 per cent by weight.

Quality:

Fine aggregate shall be sharp, cubical, hard dense and durable.

Storage:

Fine aggregate shall be stacked on a brick, wooden or other suitable platform so as to adequately protect it from dust and other admixtures.

(c) **Coarse Aggregate**

Source:

Coarse aggregate shall be obtained from an approved source.

Grading:
Coarse aggregate shall be well graded within the range of 3/16 in to 3 in of any size or range of sizes within such limits as actually specified for any particular work. It shall consist of quarried or crushed stone or other inert material or combination of these as specified.

Cleanliness:
Coarse aggregate shall be clean and free from soft, friable, thin or elongated pieces, alkali, organ matter, or injurious amounts of deleterious substances. The sum of the percentage of all deleterious substances in any size shall not exceed 3 per cent by weight.

Quality:
Coarse aggregate shall consist of well shaped, hard, dense, durable, uncoated rock fragments or brick bats.

Storage:
Coarse aggregate shall be stacked on a brick, wooden or other suitable platform so as to adequately protect it from dust and other admixtures. Each type and size of aggregate shall be stacked separately.

(d) **Water**

Source :

Water for construction shall be obtained from an approved source.

Quality:
Water shall be free from earth, vegetable, organic impurities and any other substance likely to cause efflorescence or interfere with setting of mortars or otherwise prove harmful to the work. Broadly speaking any water which does not show any intensive odour or brackish taste shall be considered suitable for building works, whereas water fit for drinking shall be accepted as suitable for all engineering works. PH value of water shall range between 6 and 8.

Storage:
Water shall be stored in watertight tanks or containers so as to be adequately protected from the admixture of dust and other foreign matter.

14.13.2 BASE

The base for ground and subsequent floors shall be laid as per Specifications 14.10.

14.13.3 OPERATION

Unless otherwise specified conglomerate flooring shall consist of laying a topping of cement concrete of specified thickness over the base.

14.13.4 RATIO OF CONCRETE

Unless otherwise specified cement concrete used for topping shall be of the ratio 1:2:4 by volume and shall conform to Section 5 – Plain & Reinforced Concrete.

14.13.5 DIVIDING INTO PANELS

Before laying the topping. the surface of the base shall be divided into symmetrical panels by wooden or iron screeds. Unless otherwise specified the area of panel shall not exceed 16 square feet. The top of the screed shall be adjusted to the specified level of the finished floor surface.

14.13.6 PREPARATION OF BASE

Before the laying of topping the surface of base concrete shall be washed and scrubbed with wire brushes so that topping and the base concrete are well bonded. Where topping is to be laid directly on roof slab, It shall be roughened while it is still green.

14.13.7 MIXING AND PLACING

Mixing and placing of concrete shall be in accordance with the Section 5 – Plain & Reinforced Concrete.

14.13.8 CONSOLIDATION

Placing operation shall be specifically timed. No sooner the concrete has been evenly spread in a panel, than it shall be beaten for about 5 to 10 minutes with "wooden thapies" (about 5 Ibs weight).

14.13.9 FINISHING

Immediately after consolidation, the surface shall be levelled with a wooden trowel. Excessive trowelling in the early stage shall be avoided. The surface shall be tested with a straight edge to detect undulations, which, if found, shall be eliminated. The finer s in the concrete which has come to the surface with the stroking shall be quickly but carefully smoothed with the steel trowel. When the concrete has hardened sufficiently, trowelling shall be done with steel trowel. No dry cement or a mixture of dry cement with sand shall be sprinkled on the surface for hardening the surface.

14.13.10 CURING

The concrete for topping shall be cured in accordance with Section 5 – Plain & Reinforced Concrete.

14.13.11 PRESERVING PANELS ALREADY LAID

After 24 hours of laying, the screeds shall be removed and strips of non-absorbent paper placed against the exposed side and folded over the finished surface so as to prevent concrete of adjoining panels from adhering to the edge or spreading over the finished surface. Panels shall be laid alternately, where possible; the adjoining panels shall be laid at an interval of 24 hours.

14.14 CONGLOMERATE FLOORING (TWO COAT WORK)

14.14.1 SCOPE

Unless otherwise specified, the conglomerate flooring (two coat work) shall be constructed in accordance with Specifications 14.13 for Conglomerate Floor (Single coat) except with the following modifications:-

i) It shall be laid in two layers with a top layer half an inch thick, wearing surface composed of cement and fine aggregate conforming to the provisions of Sub-section 14.13.1 and a bottom layer of cement concrete conforming to Specifications as mentioned in Section 5 – Plain & Reinforced Concrete, of specified thickness.

ii) Unless otherwise specified, the cement concrete for the bottom layer shall be composed of one cubic foot of cement, 3 cubic feet of fine aggregate and 6 cubic feet of coarse aggregate by volume and shall conform to the applicable provisions of Section 5 – Plain & Reinforced Concrete.

iii) Unless otherwise specified, the surface layer shall compose of one part of cement and two parts of fine aggregate by volume. The pigment of approved shade and colour may be added to give the desired colour to the topping layer.

iv) The bottom layer shall be brought to a level so that top layer shall have a minimum thickness of half an inch. The bottom layer shall be thoroughly compacted by tamping but shall not be finished smooth. While the bottom layer Is still plastic, the top layer shall be placed over it and levelled with a steel float after light tapping for five minutes.

14.15 PVC ASBESTOS AND RUBBER TILE FLOORING

14.15.1 GENERAL

Such flooring shall consist of PVC flexible tiles or Asbestos based PVC tiles or plain designed rubber tiles of approved size, colour and thickness. Tiles shall confirm to the relevant British Standard Specifications or of approved manufacturers..

14.15.2 BASE

Base for these tiles shall be according to cement concrete flooring as per specification 14.11 topped with ½" thick 1:3 cement sand mix or any other specified mix.

14.15.3 LAYING

After completing the curing of the base, it will be allowed to dry completely and cleaned thoroughly to make it free from contamination of dust, moisture, oil or grease. Any irregularity on the base shall be filled in and levelled before laying the tiles. The area of not exceeding 25 square foot at a time shall be coated with approved adhesive material. Sufficient number of tiles for this shall be treated with adhesive material. 10 to 15 minutes shall be spent for airing the adhesive. The tiles shall be laid starting from one side of the room. The tiles shall be pressed thoroughly with appropriate means so that complete adhesion take place. The finished surface shall be washed with soap and water after 3 days.

14.15.4 CURING

The curing involves complete veratilization and 3 days shall be allowed for this purpose before the loading is applied to the floors.

14.16 REINFORCING STEEL / MESH

The work for procurement and placing of the reinforcing steel shall conform to the applicable provisions of Section 5 – Plain & Reinforced Concrete.

14.17 RUBBING AND POLISHING OLD MARBLE / MOSAIC FLOOR

14.17.1 SCOPE

The work shall include furnishing all materials, tools and plant, labour, equipment etc. as well as performing all operations to complete the work in workman like manner in accordance with the herein stated specifications, stipulations and requirements except when such stipulations and requirements are specially modified by the Engineer-in-Charge in connection therewith.

14.17.2 PREPARATION OF SURFACE

i) If the old marble/mosaic floor is firm and sound, grinding of the surface shall be done with a coarse Carborandum brick or disk, using water freely. The whole surface is then scrubbed using plenty of water, till all dirt, grease, projections and the grinding mud is removed.

ii) If the surface bars holes, cracks and other inequalities, these shall be raked out, squarely shaped and cut to a depth and then filled with a fine, identically tinted mix, well pressed in by a trowel, in accordance with specifications prescribed. Filling in of the squarely cut patches shall be kept a little above (generally 6mm or as specified or as directed by the Engineer-in-

Charge) the rest of the floor. These patches shall be kept damp till the second grinding of the floor surface is done.

iii) The second grinding shall be done after a further five days using a finer grained Carborandum brick or disk and this shall complete the grinding unless there are still faulty patches, which must be filled as specified or as directed by the Engineer and a third grinding carried out.

iv) After each grinding, the floor shall be washed thoroughly, but after the final grinding, this washing shall be done with hot water and pure soft soap.

14.17.3 POLISHING

After the washed floor has dried, a final gloss shall be given by polishing the surface to the satisfaction of the Engineer-in-Charge.

14.17.4 FINISHING

The walls and all surfaces of the finished works of other trades shall be properly protected from damage and spoiling during the process of grinding and washing of the mosaic. After the finishing grinding has been completed and the surface treatment and polish applied, the floor shall be covered and protected with material approved by the Engineer-in-Charge until completion of the work of all trades.

14.18 FLAGGED FLOORING

14.18.1 SCOPE

Unless otherwise specified, flagged flooring shall be constructed in accordance with the following specifications.

14.18.2 STONE

The flags are the rectangular stone slabs of specified size. The specified stones from which the flags are made shall conform to Sub-section 12.1.2 for Stone of Stone Masonry.

14.18.3 MORTAR

Mortar shall be as actually specified cement mortar complying with Sub-section 11.7.2 (ii) – Brickwork.

14.18.4 BASE

The base shall be laid as per Sub-section 14.10, Flooring.

14.18.5 SIZE OF FLAG

Flags shall not be less than one inch and a half in thickness. The length and breadth shall not be less than 14 inches and more than 30 inches. The size of flags shall be such as to give uniform parallel courses.

14.18.6 DRESSING

Flags shall be chisel dressed so as to have a flat surface, free from windings. All edges shall be accurately dressed, truly square to their full depth. Flags projecting over the edges of verandahs or steps shall have their outer edges bull-nosed.

14.18.7 SOAKING

Flags that be soaked in water for one hour before laying.

14.18.8 JOINTS

The thickness of joints shall not be more than 1/8 of an inch. Unless otherwise specified, the mortar in joints shall be made flush with a trowel.

14.18.9 POINTING

If pointing has been specified the flags shall be laid against wood or iron strips of uniform thickness, so as to form joints not less than ¼ inch wide. When a row of flags is laid, the strips shall be removed and the open joints shall at once be filled with specified mortar, and shall then be flush pointed with specified mortar.

14.18.10 THICKNESS OF BEDDING MORTAR

Flags shall be laid over specified bedding mortar not more than ¾ inch thick.

14.18.11 LAYING OF FLAGS

Flags shall be placed in position and brought down to the required finished level and the joints shall then be filled with specified mortar.

14.18.12 PATTERN

Flags shall be laid in the specified pattern. The courses shall be of uniform width and, unless otherwise specified, parallel to the wall having the main entrance. Flags shall break joint in adjacent courses by not less than 8 inches.

14.18.13 PROTECTION AND CURING

The floor shall be protected from the effects of weather. During the progress of work and for 10 days after laying, the floor shall be kept watered. Three clear days shall be given for setting before anyone is allowed to walk over, but no weight shall be brought on the surface till 7 clear days have elapsed after the completion of laying.

14.19 MURUM FLOORING

14.19.1 SCOPE

The work shall include furnishing all labour, materials, equipments, and performing all operations specified herein to lay the murum floors in accordance with the drawings, or as directed by Engineer-in-charge.

14.19.2 MATERIALS

a) All murum used in construction murum flooring shall be in complete conformity with the applicable requirements set forth in this section
b) Rubble or broken bricks

14.19.3 PREPARING SURFACE

All filling up-to 30 cm below the proposed floor level shall be dug out and the hollow thus created shall be treated as specified hereunder

14.19.4 LAYING

All murum floors shall be constructed in accordance with the detail shown on drawings, the Engineer-in-charge's instructions and the stipulations and requirements set forth herein, as follow

a) The dug out surface as mentioned in 14.9.3 above shall be properly watered and rammed with hand rammers sufficiently to the entire satisfaction of Engineer-in-charge. The consolidated surface shall be such that a very faint impression can be made on it with the heel of boot or the blow of hammer.
b) 230mm bricks of sub-base of broken bricks or hand packed rubble shall be laid to a template evenly and watered thoroughly and allow to dry. The surface shall be fairly levelled and beaten with rammers to produce one uniform level. Up-to the entire satisfaction of the Engineer-in-charge.
c) Then a layer of good hard murum, 150mm thick, shall be added and water thoroughly for 2 days. When the whole mass has become too slushy, it shall be tempered over by

coolies so as to form a one uniform mass. Then the surface shall be fairly levelled and beaten with hand rammers, to one uniform level. It shall be then allowed for dry for 2 to 3 days.

d) Finally, spread 25mm layer of fine powder or flaky variety of murum, which shall be thoroughly beaten by hand rammers. As a check of good work, the surface shall not now crack on drying and the floor is complete.

14.20 GROUTING DRY BRICK WORK WITH CEMENT MORTAR

14.20.1 GENERAL

Unless otherwise specified, pure Portland cement and rich mixture of sand and cement with an excess of water, termed grout, shall be used in the form of a water paste of about the consistency of cream to grout in brick work or stone masonry, paving stones, sets and wood blocks laid dry. This grouting consists of the filling in of the cavities, cracks, joints etc. by pouring in, brushing in, or otherwise forcing such a liquid mixture of cement and water, and occasionally sand in to every joint. The amount of water to be used with the cement to make the grout will vary with the climatic conditions, and the absorptive nature of the material with which it is to be used. It is best to use as little water as possible, having regard to getting the grout to penetrate the required parts. The practice is condemned, where the conditions are unusual, as cement used in this way will never develop its full strength, unless otherwise specified, grouting dry brickwork with cement mortar of specified mix proportion and consistency or as directed by Engineer-in-charge, shall be done in accordance with the following specifications.

14.20.2 SCOPE

The work shall include furnishing all labour, materials, equipments, plants, instruments, accessories and services necessary to complete the work at the locations shown on the drawings or as directed by Engineer-in-charge in accordance with these specifications.

Materials

a) Brick shall conform to Specifications as mentioned in Section 11 for Clay Bricks.

b) Mortar shall conform to Specifications as mentioned in Section 11– Brickwork, Mortars.

14.20.3 LAYING

Grouting dry brickwork with cement mortar of specified mix proportion shall be done in accordance with the details shown on drawings, the Engineer-in-charge instructions and the stipulations and requirements set forth herein, as follow;

a) Grout shall be made by mixing specified cement: sand mix proportion with water to produce mortar with specified consistency or as directed by the Engineer-in-charge, so as to form a watery paste of about the consistency of cream to flow into the joints of dry brick work and filled the joints fully upto the surface subject to the approval of Engineer-in-charge. The surplus grout sticking to the surface of the dry brickwork shall be swept over and the surface shall be cleared.

b) Only so much should be mix in one time as can be used before it commences to set and any which has begun to stiffen should be rejected.

14.21 ASPHALT FLOORING

14.21.1 SCOPE

The work shall include furnishing all labour, materials, equipments, plants, instruments, accessories and services necessary to complete the work at the locations shown on the drawings or as directed by Engineer-in-charge in accordance with these specifications.

14.21.2 MATERIALS

Asphalt used in constructing the asphalt flooring shall be in complete conformity with the applicable requirements set forth in the specifications for asphalt or as approved by Engineer-in-charge

Bitumen used for mixing with the asphalt shall be refined cut-back bitumen having viscosity (Standard Tar Viscometer) of 110 to 150 seconds at 40 degree centigrade or as approved.

Clean sharp sand used for mixing with the asphalt shall confirm to specifications 5.3.1.3

14.21.3 BASE

The base should be prepared in conformity with specification 14.10.

14.21.4 LAYING

Asphalt flooring shall be done in accordance with the details shown on the drawings, the Engineer-in-charge instructions and the stipulations and requirements set forth herein as under;

All dust and sand shall be swept-off, and the asphalt having been mixed and melted in the following proportions, unless otherwise specified or as directed by Engineer-in-charge.

Asphalt	1 part
Bitumen	1/32 part
Clean sharp sand	½ parts

Shall be laid on smoothly and evenly of uniform thickness as specified and carefully and steadily rubbed with hand float until the surface shall be perfectly even and true.

14.21.5 FINISHING

The junction of the sections of the asphalting shall be carefully made, and before the surface becomes hard, it shall be worked perfectly level and smooth with fine clean sand, and left of a uniformly dark colour.

14.22 MEASUREMENT AND PAYMENT

14.22.1 COMPOSITE RATE

The measurement and payment for the items of the work of Brickwork hereof shall be made corresponding to the applicable CSR items as provided in Contract Agreement and shall constitute full compensation, for procurement, transportation, performance in all respects and completion of work as specified including the site clearance as approved by the Engineer-in-Charge.

14.22.2 LABOUR RATE

The measurement and payment for the items of the work of Brickwork hereof shall be made corresponding to applicable CSR item as provided in Contract Agreement and shall constitute full compensation for procurement transportation, performance in all respects and completion of work as specified including site clearance, as approved by the Engineer-in-Charge except the cost of materials to be provided by Department at designated location as defined in the Contract Agreement.

14.22.3 QUANTIFICATION

The unit of measurement shall be measured as mentioned below in accordance with corresponding CSR items.

1. For Volumetric items, the unit of measurement shall be cubic meter or cubic foot. Following items of CSR are measured in the above mentioned criteria;
   Item No.: 14-1 and 14-44
2. Following item shall be measured as %age increase
   Item No.: 14-69
3. For surface area items, the quantity of work shall be measured by surface area. The unit of measurement shall be Square meter or Square foot. Following item of CSR are measured according to this criteria;
   Item No.: 14-2 to 14-6, 14-8 to 14-21,14-23 to 14-42, 14-45 to 14-61 and 14-64 to 14-68
4. For linear items, the quantity of work shall be measured linearly along centre line of structure. The unit of measurement shall be running meter or running foot. Following items of CSR are measured according to this criteria;
   Item No.: 14-22 and 14-43
5. For bulk items, the quantity of work shall be measured in units of weight i.e. Tonne or Tons. Following item of CSR is measured according to this criteria;

   Item No.: 14-7
6. The following Items of CSR shall be measured as Weight units i.e. Kilogram or Pound
   Item No.: 14-21, 14-62 and 14-63