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METHOD OF MEASUREMENT OF BUILDING AND CIVIL ENGINEERING WORKS

PART IV STONE MASONRY

(Third Revision)

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Indian Standard

METHOD OF MEASUREMENT OF BUILDING AND CIVIL ENGINEERING WORKS

PART IV STONE MASONRY

(Third Revision)

0. FOREWORD

0.1 This Indian Standard (Part IV) (Third Revision) was adopted by the Indian Standards Institution on 26 August 1976, after the draft finalized by the Civil Works Measurement Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Measurement occupies a very important place in planning and execution of any civil engineering work from the time of first estimates to final completion and settlement of payments for the project. Methods followed for measurement are not uniform and considerable differences exist between practices followed by one construction agency and another and also between various Central and State Government departments. While it is recognized that each system of measurement has to be specifically related to the administrative and financial organizations within the department responsible for work, a unification of the various systems at technical level has been accepted as very desirable, specially as it permits a wider circle of operation for civil engineering contractors and eliminates ambiguities and misunderstandings arising out of inadequate understanding of various systems followed.

0.3 Among the various civil engineering items, measurement of building was first to be taken up for standardization and this standard having provisions relating to all building works, was first published in 1958 and was revised in 1964 and 1970.

0.4 In the course of usage of this standard by various construction agencies in the country, several clarifications and suggestions for modifications were received and as a result of study, the Sectional Committee decided that its scope, besides being applicable to buildings should be expanded so as to cover civil engineering works like industrial and river valley project works.

0.5 Since various trades are not related to one another, the Sectional Committee decided that method of measurement for each trade as given in IS : 1200-1964* be issued separately as a different part, which will be helpful to specific users in various trades. This part covering method of measurement of stone masonry applicable to buildings as well as civil engineering works was, therefore, issued as a second revision in 1970.

0.6 In the course of use of this standard in the past five years, based on suggestions received, certain amendments were issued to this standard by the Sectional Committee and the third revision has been prepared so as to incorporate such amendments.

0.7 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the results of a measurement, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part IV) covers method of measurement of stone masonry in buildings and civil engineering works.

2. GENERAL

2.1 Clubbing of Items — Items may be clubbed together provided that break-up of clubbed items is on the basis of detailed descriptions of items as stated in this standard.

2.2 Booking of Dimensions — In booking dimensions, the order shall be consistent and generally in the sequence of length, breadth or width and height or depth or thickness.

2.3 Measurements — All work shall be measured net in the decimal system, as fixed in its place, unless otherwise stated herein, as given below:

a) Dimensions shall be measured to the nearest 0·01 m.

b) Areas shall be worked out to the nearest 0·01 m^2, and

c) Cubic contents shall be worked out to the nearest 0·01 m^3.

2.4 Description of Item — Description of each item shall, unless otherwise stated, be held to include, conveyance, delivery, handling, unloading, storing, waste, returning of packings, scaffolding, tools and tackle, as necessary.

*Method of measurement of building works (*revised*).

†Rules for rounding off numerical values (*revised*).

2.5 Waste — All measurements of cutting shall, unless otherwise stated, be deemed to include consequent waste.

2.6 Deduction — Where minimum area is defined for deduction of an opening, void, or both, such area shall refer only to opening or void within the space measured.

2.7 Work to be Measured Separately — Work executed in the following conditions shall be measured separately:

a) Work in or under water,

b) Work in liquid mud,

c) Work in or under foul positions,

d) Work interrupted by tides, and

e) Work in snow.

2.7.1 Levels of high and low water tides, where these occur, shall be stated.

2.7.2 Where springs requiring pumping are encountered, dewatering shall be measured against a separate specific provision made for the purpose [*see* **2.7** of IS : 1200 (Part I)-1974*].

2.8 Bills of Quantities — Items of work shall fully describe materials and workmanship, and accurately represent the work to be executed.

2.9 Measurement in Stages — Work shall be measured in the following categories in convenient stages stating height or depth:

a) Below ground/datum line, and

b) Above ground/datum line.

NOTE — Ground/datum line shall be specified in each case.

3. WALLING

3.1 Type of stone, kind of walling and mix of mortar shall be described. Item of general walling shall be deemed to include the following:

a) Bond stones;

b) Raking out joints for plastering or for pointing, done as a separate process or finishing joints flush as work proceeds;

c) Preparing top of existing wall and the like for raising;

d) Rough cutting and waste for forming gables, cores of arches, splays at eaves and the like and all rough cutting in the body of walling;

*Method of measurement of building and civil engineering works: Part I Earthwork (*third revision*).

e) Leaving holes for pipes and similar items;

f) Building-in holdfasts, air bricks, fixing bricks, etc;

g) Bedding wall plates, lintels, sills, roof tiles, corrugated sheets, etc, in or on walls, if not covered in respective trade;

h) Building-in ends of joists, beams, lintels, etc, and making good; and

j) Forming openings and flues for which no deduction is made (*see* **4.3**).

3.1.1 Random or uncoursed rubble walling brought up to courses shall be measured separately stating minimum and maximum heights of courses.

3.1.2 In case of coursed work, height of course shall be stated, if regularly diminished, it shall be so described stating maximum and minimum heights of courses.

3.1.3 Stone walling circular on plan to a mean radius not exceeding 6 m shall be measured separately and shall include all cutting and waste and templates.

3.1.4 Stone walling circular on plan to a mean radius exceeding 6 m shall be measured net and included with general walling.

3.1.5 The following classes of work shall be included with general walling:

a) Footings;

b) Battered stone masonry (measured net). Battered surfaces shall, however, be measured separately in square metres as an *extra-over*;

c) Eaves or beam filling, no deduction being made for joists, rafters, etc;

d) Stone walling in chimney breasts, chimney stacks; smoke or air flues; and

e) Pilasters.

4. MEASUREMENT

4.1 Except where otherwise stated, stone masonry generally shall be measured in cubic metres and face work in square metres.

4.2 No deduction or addition shall be made for the following:

a) Ends of dissimilar materials (that is, joists, beams, lintels, posts, girders, rafters, purlins, trusses, corbels, steps, etc) up to 0·1 m^2 in section;

b) Openings up to 0·1 m^2 in area (*see* Note);

c) Wall plates, bed plates, and bearing of slabs, *CHAJJAS* and the like, where thickness does not exceed 10 cm and bearing does not extend over the full thickness of wall;

d) Cement concrete blocks for holdfasts, holding-down bolts and the like; and

e) Iron fixtures such as wall ties, pipes up to 300 mm diameter and holdfasts of doors and windows.

NOTE — In calculating area of an opening, any separate lintel or sill shall be included with the size of the opening but end portions of lintel shall be excluded [*see* **4.2** (a)] and extra width of rebated reveals, if any, shall also be excluded.

4.3 Fireplaces, Chimneys, etc — Stone walling in chimney breasts, chimney stacks, with smoke or air flue(s) not exceeding 0·20 m^2 each in sectional area shall be measured as solid, and no extra measurement shall be taken for pargetting and coring such flue(s). Where flue(s) exceed 0·20 m^2 in sectional area, deduction shall be made for the same and pargetting and coring flue(s) shall be measured in running metres stating size(s) of flue(s). Aperture for fireplace shall not be deducted and no extra labour shall be measured for splaying of jambs and throating.

4.4 Pillars/Columns — Pillars/columns shall be fully described and measured in cubic metres. These shall be measured in the following categories:

a) Rectangular or polygonal on plan;

b) Curved on plan to any radius; and

c) Any other type.

NOTE — Rectangular pillar/column shall mean a detached masonry portion such that its breadth does not exceed 3 times its thickness and thickness itself does not exceed 60 cm.

5. STONE NOGGING

5.1 Stone nogging shall be measured in square metres, stating thickness of wall and shall include face work to both sides. Dimensions shall be measured overall.

5.1.1 Timber work shall be measured separately [*see* IS : 1200 (Part XXI)-1973*].

6. STONE MASONRY IN ARCHES AND VAULTS

6.1 Stone work in rough arches and vaults shall be described and measured separately and shall include centering for spans up to 2 m. For spans exceeding 2 m, centering shall be measured separately [*see* IS : 1200 (Part V)-1972†].

6.1.1 Facings to arches shall be measured separately.

7. UNDERPINNING

7.1 Stone walling in underpinning shall be measured separately and an item for extra labour and material in wedging up on top of underpinning with thin slabs or slates shall be measured in square metres (as length multiplied by width of top course).

8. LEVELLING UP

8.1 Levelling up of uncoursed random walling for damp-proof courses, band courses, and the like shall be measured separately in square metres and the material such as concrete or mortar to be used in levelling up shall be described.

9. FACINGS

9.1 If facing stones are the same as those used in body of walling, additional work involved in dressing stones shall be described as 'extra-over' walling.

9.1.1 If stones are to be dressed on beds and joints, it shall be so stated.

9.1.2 If facing stones are different from those used in body of walling, facings may be stated as 'stone and labour in facing'. Type of such facing and average bed shall be described, and bonders, if any, shall also be described and number per square metre stated. Bonding to stone walling and to brick work shall be measured separately.

9.1.3 In case of circular facings, not exceeding 6 m radius on plan, radius shall be stated. Circular facings exceeding 6 m radius on plan shall be included with general facing.

*Method of measurement of building and civil engineering works: Part XXI Woodwork and joinery.

†Method of measurement of building and civil engineering works: Part V Formwork.

10. ARCHES IN FACINGS

10.1 Dressing to arches in faced work shall be measured in square metres, measured on face and exposed soffit; rise of arch and width of soffit shall be stated and joints described. In case of arches in random rubble, cutting of skewbacks and over and under arches shall be included with the item. Cutting over arches, skewbacks, etc, in superior type of facework shall be measured separately in running metres.

11. ANGLES IN FACINGS

11.1 External angles in facings shall be measured in running metres and if quoin stones are larger than general facing stones, their average size shall be stated. If edge margins of quoin stones are drafted, this shall be described stating width of drafting.

11.1.1 Squints, birds-mouths, splayed or rounded angles and the like shall each be measured separately in running metres stating width of splay or girth of rounded angle.

11.1.2 Squints, birds-mouths and external and internal angles to battered facings shall each be measured separately in running metres; if quoin stones to battered facings have horizontal joints, these shall be so described.

12. CHASES, REBATES, ETC

12.1 Cutting chases, rebates, throatings, grooves, etc, in walling shall be measured in running metres stating girth and classified according to girth as follows except in case of throating which shall be measured separately:

a) Not exceeding 10 cm in girth, and

b) Exceeding 10 cm but not exceeding 20 cm in girth.

12.1.1 Chases, rebate, etc, exceeding 20 cm in girth, shall be measured in square metres (girth multiplied by length).

13. CUTTING HOLES

13.1 Cutting holes through walling and making good shall be measured per centimetre of depth of cutting and shall be classified as follows:

a) Holes not exceeding 400 cm^2 in area; and

b) Holes exceeding 400 cm^2 and not exceeding 0·1 m^2 in area.

14. CUTTING OPENINGS

14.1 Cutting openings exceeding 0·1 m^2 in area shall be measured in cubic metres.

15. TOOTHING AND BONDING

15.1 Where new walls are bonded to existing walls, an item of labour and material in cutting, toothing and bonding shall be measured in square metres of surface in contact with new work only. Spacing and size of toothings required to be cut in the existing work shall be described.

16. DRESSED STONEWORK

16.1 Stonework as in sills, steps, string courses, cornices, columns, caps, copings, lintels, etc, shall each be measured in cubic metres. Type of dressing shall be described and measured in square metres as extra-over.

16.2 Dressed stonework as in *CHAJJAS, JALLIES,* shelves and the like shall be described as measured in square metres (inclusive of bearing).

16.3 Each stone shall be measured as smallest rectangular block from which finished dressed stone can be worked.

17. ADDITIONAL LABOUR IN DRESSED STONEWORK

17.1 The following labours shall be measured separately in square metres when exceeding 10 cm in girth or width and in running metres if not exceeding 10 cm in girth or width, unless included in the main item:

a) Sunk work to faces, beds and joints as in arches, voussoirs and key blocks, splays, batters, weatherings, etc; and

b) Moulded work as in cornices (girth of moulding measured).

17.2 The following labours shall be measured separately in running metres, when not exceeding 10 cm in width or girth, unless included in the main item:

a) Chamfers, arrises, or splays not exceeding 1·5 cm in width;

b) Chamfers, arrises, or splays exceeding 1·5 cm but not exceeding 10 cm in width;

c) Rounded bullnoze-angles or mouldings or hollow angles;

d) Rebates, grooves (square, hollow or dove-tailed) in facework;

e) Rebates, grooves (square, hollow or dove-tailed) for joints, tongues of sills, etc; and

f) Cutting chisel drafted margin.

17.3 Drilling or cutting holes shall be enumerated stating diameter of hole and its depth.

17.4 Cutting rectangular or dove-tailed mortice in dressed stones shall be enumerated stating size in cubic centimetres; and running with cement or lead shall be described.

18. STOPS, MITRES, ETC

18.1 Stops, mitres and returned ends shall be described and enumerated.

19. FIGURES, LETTERS, ETC

19.1 Curved figures, letters, etc, shall be described and enumerated stating dimensions.

20. BOULDER WORK

20.1 Boulder work shall be measured in cubic metres stating size of boulders and classified as follows:

a) Boulder filling dry hand-packed,

b) Boulder walling dry, and

c) Boulder walling in mortar stating mix of mortar.

BUREAU OF INDIAN STANDARDS

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