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**METHOD OF MEASUREMENT OF
BUILDING AND CIVIL ENGINEERING WORKS**

PART V FORMWORK

(Third Revision)

(Incorporating Amendment No. 1)

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BUREAU OF INDIAN STANDARDS
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Indian Standard

METHOD OF MEASUREMENT OF BUILDING AND CIVIL ENGINEERING WORKS

PART V FORMWORK

(Third Revision)

Method of Measurement of Works of Civil Engineering (Excluding
River Valley Projects), BDC 44

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(*Continued on page 2*)

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IS : 1200 (Part V) - 1982

(Continued from page 1)

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Indian Standard

METHOD OF MEASUREMENT OF
BUILDING AND CIVIL ENGINEERING WORKS

PART V FORMWORK

(*Third Revision*)

0. FOREWORD

0.1 This Indian Standard (Part V) (Third Revision) was adopted by the Indian Standards Institution on 25 October 1982, after the draft finalized by the Method of Measurement of Works of Civil Engineering (Excluding River Valley Projects) Sectional Committee had been approved by the Civil Engineering Division Council.

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

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

0.4 Since various trades are not related to one another, the Sectional Committee decided that each type of trade as given in IS : 1200-1964* be issued separately as different parts, which will be helpful to specific users in various trades. This part covering formwork was first issued in 1972 and now revised so as to keep requirements up to date.

0.5 This edition 4.1 incorporates Amendment No. 1 (February 1989). Side bar indicates modification of the text as the result of incorporation of the amendment.

*Method of measurement of building works (*first revision*).

IS : 1200 (Part V) - 1982

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

1. SCOPE

1.1 This standard (Part V) (Third Revision) covers the method of measurement of formwork, where it is required to be measured separately.

2. GENERAL RULES

2.1 Clubbing of Items — Items may be clubbed together provided these are on the basis of the detailed description of items 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 of thickness.

2.3 Description of Items — The description of each item shall, unless stated otherwise, be held to include where necessary, conveyance and delivery, handling, loading, unloading, storing, fabrication, hoisting, lowering all labour for finishing to required shape and size, and levels of striking and removal.

2.4 Measurements — All works shall be measured net in decimal system, as fixed in its place as given in **2.4.1** and **2.4.2**.

2.4.1 Dimensions shall be measured to the nearest 0.01 m.

2.4.2 Areas shall be worked out to the nearest 0.01 m².

2.5 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, and
- d) Work interrupted by tides.

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

2.5.1 The levels of high and low water tides, where occurring, shall be stated.

2.5.2 Where springs requiring pumping are likely to be encountered, the work shall be measured against a separate specific provision made for the purpose (*see 2.5.3*).

2.5.3 Special pumping, where resorted to, shall be measured separately for all stages of pumping, including intermediate stages, unless stated otherwise, in kilowatt hours or HP hours, against specific provision made for the purpose.

2.6 Bills of Quantities — The bills of quantities shall fully describe the materials and workmanship, and accurately represent the work to be executed.

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

- a) Below ground/datum level, and
- b) Above ground/datum level.

NOTE — The ground datum level shall be specified in each case.

3. DESCRIPTION OF FORMWORK

3.1 The formwork shall include the following:

- a) Splayed edges, notchings, allowance for overlaps and passings at angles, sheathing battens, strutting, bolting, nailing, wedging, easing, striking and removal;
- b) All supports, struts, braces, wedges as well as mud sills, piles or other suitable arrangements to support the formwork;
- c) Bolts, wire ties, clamps, spreaders, nails or any other items to hold the sheathing together;
- d) Working scaffolds, ladder, gangways, and similar items;
- e) Filleting to form stop-chamfered edges or splayed external angles not exceeding 20 mm wide to beams, columns and the like;
- f) If required, temporary openings in the forms for pouring concrete, inserting vibrators, and cleaning holes for removing rubbish from the interior of the sheathing before pouring concrete;
- d) Dressing with oil to prevent adhesion; and
- h) Raking or circular cutting.

IS : 1200 (Part V) - 1982

4. TYPE OF FORMWORK

4.1 Separate items shall be provided for formwork with type of contact surface, such as:

- a) wrought formwork (that is, sheathing having planed surfaces or sawn timber);
- b) sheathing formed from tongued and grooved boards;
- c) sheathing having plywood lining;
- d) sheathing having special lining or any other arrangement to give extra smooth finish or texture or decorative surface for architectural concrete;
- e) sheathing of steel sheeting, tubing or other varieties; and
- f) slip form technique extrusion process.

5. CLASSIFICATION

5.1 Formwork shall be generally classified as follows and measured separately, unless specified otherwise:

- a) Foundation, footings, bases of columns, etc; and mass concrete;
- b) Flat surfaces, such as soffits of floors, roofs landing and the like; where floors exceed 200 mm in thickness the formwork shall be measured separately stating the thickness;
- c) Vertical surfaces, such as walls, partitions and the like, including attached pilasters, buttresses, plinth and string courses and the like, etc;
- d) Sloping or battering surfaces, including folded plates;
 - i) Where inclination to horizontal plane does not exceed 30° (requiring shuttering only on the underside);
 - ii) Where inclination to horizontal plane exceeds 30° (where shuttering may be provided both on underside and upper-side, if required) (only underside area to be measured);
- e) *Arches*
 - i) up to 6 m span
 - ii) above 6 m span
- f) *Cylindrical Shells (Area of Underside to be Measured)*
 - i) radius less than 3 m
 - ii) radius above 3 m

- g) Waffle or ribbed slabs where shuttering is required for bottom inclined surface;
- h) Dormer vaults and shell roofs having curved surfaces in both directions (only the area of underside shall be measured);
- j) Sides and soffits of beams, beam haunchings, cantilevers, girders, bressumers and lintels; beams and girders 1 m deep and over shall be measured separately;
- k) Sides of columns, piers, pillars, posts and stanchions and struts (square/rectangular/polygonal/circular/curved to be measured separately);
- m) Edges of slabs and breaks in floors and walls (to be measured in running metres where under 200 mm width or thickness);
- n) Cornices and mouldings;
- p) Small surfaces, such as cantilever ends, brackets and ends of steps, caps and bases to pilasters and columns and the like;
- q) *Chullah* hoods, weather shades, *Chhajjas*, corbels, etc, including edges;
- r) Staircases with sloping or stepped soffits, including risers and stringers, excluding landing;
- s) Spiral staircases;
- t) Chimneys and shafts;
- u) Elevated water reservoirs;
- v) Well steining; and
- w) Fins.

6. METHOD OF MEASUREMENT

6.1 Formwork shall be measured in square metres as the actual surfaces in contact with the concrete or any other material requiring formwork. Formwork to small features, such as in 5.1 (p) shall be enumerated. Formwork left in shall be so described.

6.2 Where formwork is required to be lined with wallboard, hardboard, polyethylene sheet or paper lining or to be coated with mould liquid or limewhite, such formwork shall be so described and measured separately.

6.3 Where lining of wallboard, asbestos, cork slab and the like is of a permanent character and is to be left in, such lining shall be measured separately; the description shall include any necessary fixing to the concrete.

IS : 1200 (Part V) - 1982

6.4 No deductions shall be made for each of opening up to 0.4 m^2 . No deduction shall be made for any opening/cutouts when slip form technique is used.

6.5 Raking or circular cutting and rounded or moulded edges shall be measured in running metres. Moulded stoppings shall be enumerated.

6.6 Formwork to secondary beams shall be measured up to the sides of main beams, but no deduction shall be made from the formwork of the main beam where the secondary beam intersects it. Formwork to beam shall be measured up to sides of column, but no deduction shall be made from the formwork to stanchion or column casings at intersections of beam.

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