**IS 10421 : 2024**

***भारतीय मानक***

***Indian Standard***

|  |
| --- |
|  |

***कंक्रीट कार्यों के लिए शटरिंग/फॉर्मवर्क की इकाई दर के विश्लेषण के लिए प्रोफार्मा***

*( पहला पुनरीक्षण )*

**Proforma for Analysis of Unit Rate of Shuttering/ Formwork for Concrete Works**

*( First Revision )*

ICS 93.160

@ BIS 2024



भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

मानक भवन, 9 बहादुर शाह

ज़फर मार्ग, नई दिल्ली - 110002

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG

NEW DELHI - 110002

[www.bis.gov.in](http://www.bis.org.in) [www.standardsbis.in](http://www.standardsbis.in)

**October 2024 Price Group X**

Measurement and Cost Analysis of Works for River Valley Projects Sectional Committee, WRD 23

FOREWORD

The Indian Standard (First Revision) was adopted by the Bureau of Indian Standards after the draft was finalized by the Measurement and Cost Analysis of Works for River Valley Projects Sectional Committee and had been approved by the Water Resources Division Council.

The shuttering/formwork constitutes a major portion of the expenditure in a project and therefore its uniform and precise estimation plays a significant role in estimating the cost of any project. The material used for shuttering in most of the cases is either steel or timber. Shuttering provided for concrete works may be plain formwork or shuttering of special shapes such as circular, horse-shoe, conic and other shapes as required for the structure. Shuttering/formwork for concrete works for river valley projects can be broadly classified of the following types:

1. Panel forms;
2. Built-in-place forms;
3. Mobile forms; and
4. Special forms.

This standard was first published in 1983. The first revision of this standard has been brought out to adopt the latest field practices observed while using the standard and to bring it in the latest style and format of the Indian Standards. The major changes incorporated in revision of this standard are:

1. Relevant taxes and duties, wherever applicable, have been updated in calculation of unit rates to include building and other construction works (BOWC) Cess and GST;
2. Provisions for contractor’s overheads and profits have been indicated; and
3. The number of reuse for steel and wooden shuttering/formwork has been added.

The composition of the Committee responsible for formulation of this standard is given at Annex A.

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 test, shall be rounded off in accordance with IS 2 : 2022 'Rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded-off value should be the same as that of the specified value in this standard.

*Indian Standard*

PROFORMA FOR ANALYSIS OF UNIT RATE OF SHUTTERING/ FORMWORK FOR CONCRETE ITEMS

*( First Revision )*

**1 SCOPE**

This standard lays down the proforma for analysis of unit rate of steel and wooden shuttering/formwork for concrete items in river valley projects.

**2 DETAILS REQUIRED FOR UNIT RATE ANALYSIS**

The details of plan, elevation and sections of the work and full dimensional sketches of the formworks for the complete work as well as for individual units should be made available. The quantity of struts, braces and ties required in a single or multi-stage shuttering/formwork depends upon the requirements of project and site specific conditions. The following information may be assimilated at a place for full appreciation of the type and nature of the shuttering work involved:

1. Name of project;
2. Name of work;
3. Layout plan of project;
4. Location of work;
5. Purpose of work;
6. Longitudinal and cross-section;
7. Construction agency:
8. Departmental or contract; and
9. Name of department/contractor.
10. Volume of concrete work;
11. Approximate area for shuttering;
12. Average lead and lift for the formwork;
13. Type of shuttering;
14. Normal size of shuttering units used; and
15. Detailed dimension sketches of special shapes.

**3 PROFORMA**

The proforma for analysis of unit rate of shuttering/formwork for concrete items is as given in Table 1 and Table 2.

**Table 1 Proforma for Analysis of Unit Rate of Steel Shuttering/Formwork**

(*Clause* 3.1)

| Name of work for which shuttering is required:  Quantity of concrete:  Type and shape of shuttering: | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl No.** | **Item** | **Unit** | **Quantity** | **Rate** | **Amount** | **Remarks** |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| i) | *Materials* | |  |  |  |  |
|  | a) | Steel plates |  |  |  |  |
|  | b) | Steel sections |  |  |  |  |
|  | c) | Pipes |  |  |  |  |
|  | d) | Miscellaneous materials including that required for welding, riveting, etc. |  |  |  |  |
| ii) | *Labour charges for fabrication* | |  |  |  |  |
|  | a) | Foremen/supervisors |  |  |  |  |
|  | b) | Welders |  |  |  |  |
|  | c) | Fitters |  |  |  |  |
|  | d) | Helpers |  |  |  |  |
|  | e) | Skilled/ordinary labour |  |  |  |  |
|  | f) | Others |  |  |  |  |
| iii) | *Charges for machinery and equipment including charges for power/gas/diesel* | |  |  |  |  |
|  | a) | Cutting machine |  |  |  |  |
|  | b) | Welding/riveting machine |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | c) | Rolling machine |  |  |  |  |
|  | d) | Air compressors |  |  |  |  |
|  | e) | Others |  |  |  |  |
| iv) | *Maintenance charges of items under* (iii) above | |  |  |  |  |
| v) | *Ancillaries and incidentals* (proportional cost of the following job facilities): | |  |  |  |  |
|  | a) | Labour and staff quarters |  |  |  |  |
|  | b) | Service roads and transportation arrangements for staff and laborers |  |  |  |  |
|  | c) | Electric supply |  |  |  |  |
|  | d) | Water supply |  |  |  |  |
|  | e) | Sanitary facilities |  |  |  |  |
|  | f) | Drainage facilities |  |  |  |  |
|  | g) | Medical facilities |  |  |  |  |
|  | h) | Other amenities |  |  |  |  |
| vi) | *Maintenance cost of items* under clause (v) above | |  |  |  |  |
| vii) | *Proportional cost of supervisory work establishment* | |  |  |  |  |
| viii) | *Contingencies* | |  |  |  |  |
| ix) | *Overheads and Miscellaneous* | |  |  |  |  |
|  | a) | Total cost of shuttering |  |  |  |  |
|  | b) | Area of shuttering |  |  |  |  |
|  | c) | Number of reuse\* |  |  |  |  |
|  | d) | Cost of shuttering/unit/use |  |  |  |  |
| x) | Erection cost | |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | a) | Transportation charges | | | | |  |  |  |  |
|  | b) | Labour charges with details | | | | |  |  |  |  |
|  | c) | Materials including oiling, sealing, etc. | | | | |  |  |  |  |
|  | d) | Scaffoldings | | | | |  |  |  |  |
|  | e) | Machinery charges, if any | | | | |  |  |  |  |
| xi) | *Dismantling/stripping cost* | | | | | |  |  |  |  |
|  | a) | Transportation charges | | | | |  |  |  |  |
|  | b) | Labour charges with details | | | | |  |  |  |  |
|  | c) | Machinery charges, if any | | | | |  |  |  |  |
| xii) | *Taxes and duties*: | | | | | |  |  |  |  |
|  | a) | BOCW CESS | | | | |  |  |  |  |
|  | b) | GST | | | | |  |  |  |  |
| xiii) | *Total Charges of chargeable to work* | | *formwork* | *per* | *square* | *meter* |  |  |  |  |
| NOTES  **1** Overheads shall include establishment, office stationery, general tools and plants staff cars, their running and maintenance, insurance, workman’s compensation” telephone and telecommunication facilities, consultation services, social activity, etc.  **2** Contractors overheads and profit may be decided suitably in the project.  **3** The taxes given in the standard are indicative. | | | | | | | | | | |

\* Steel shuttering is recommended for 40 times of reuse.

**Table 2 Proforma for Analysis of Unit Rate of Wooden Shuttering/Formwork**

(*Clause* 3.1)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Name of work for which shuttering is required:  Quantity of concrete:  Type and shape of shuttering: | | | | | | |
| **Sl. No.** | **Item** | **Unit** | **Quantity** | **Rate** | **Amount** | **Remarks** |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| i) | *Materials* | |  |  |  |  |
|  | a) | Type of timber |  |  |  |  |
|  | b) | Wooden joists |  |  |  |  |
|  | c) | Jigs and joists |  |  |  |  |
|  | d) | Miscellaneous material |  |  |  |  |
| ii) | *Labour charges for fabrication* | |  |  |  |  |
|  | a) | Foremen/supervisors |  |  |  |  |
|  | b) | Carpenters |  |  |  |  |
|  | c) | Labour for creating in position |  |  |  |  |
|  | d) | Helpers |  |  |  |  |
|  | e) | Other labour, if any. |  |  |  |  |
| iii) | *Charges for machinery and equipment including charges for power/gas/diesel* | |  |  |  |  |
|  | a) | Band/circular/trolley saw |  |  |  |  |
|  | b) | Planer |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | c) | Shaper |  |  |  |  |
|  | d) | Others |  |  |  |  |
|  | e) | Others |  |  |  |  |
| iv) | *Ancillaries and incidentals (proportional cost of the following job facilities):* | |  |  |  |  |
|  | a) | Labour and staff quarters |  |  |  |  |
|  | b) | Service road and transportation arrangements for staff and labourers |  |  |  |  |
|  | c) | Electric supply |  |  |  |  |
|  | d) | Water supply |  |  |  |  |
|  | e) | Sanitary facilities |  |  |  |  |
|  | f) | Drainage facilities |  |  |  |  |
|  | g) | Medical facilities |  |  |  |  |
|  | h) | Other amenities |  |  |  |  |
| v) | *Maintenance of items under* iv) | |  |  |  |  |
| vi) | *Proportional cost of supervisory work establishment* | |  |  |  |  |
| vii) | *Contingencies* | |  |  |  |  |
| viii) | *Overheads and Miscellaneous* | |  |  |  |  |
|  | a) | Total cost of shuttering |  |  |  |  |
|  | b) | Area of shuttering |  |  |  |  |
|  | c) | Number of reuse# |  |  |  |  |
|  | d) | Cost of shuttering/unit/use |  |  |  |  |
| ix) | *Erection cost* | |  |  |  |  |
|  | a) | Transportation charges |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | b) | Labour charges with details |  |  |  |  |
|  | c) | Materials including oiling sealing, etc. |  |  |  |  |
|  | d) | Scaffoldings |  |  |  |  |
|  | e) | Machinery charges, if any |  |  |  |  |
| x) | *Dismantling/stripping cost* | |  |  |  |  |
|  | a) | Transportation charges |  |  |  |  |
|  | b) | Labour charges with details |  |  |  |  |
|  | c) | Machinery charges, if any |  |  |  |  |
| xi) | *Taxes and duties*: | |  |  |  |  |
|  | a) | BOCW CESS |  |  |  |  |
|  | b) | GST |  |  |  |  |
| xii) | *Total Charges of chargeable to work formwork per square meter* | |  |  |  |  |
| NOTES  **1** Overheads shall include establishment, office stationery, general tools and plants staff cars, their running and maintenance, insurance, workman’s compensation, telephone and telecommunication facilities, consultation services, social activity etc.  **2** Contractors overheads and profit may be decided suitably in the project.  **3** The taxes given in the standard are indicative.  **4** Steel shuttering is recommended for 8 times of reuse | | | | | | |



**ANNEX B**

(*Foreword*)

**COMMITTEE COMPOSITION**

Measurement and Cost Analysis of Works for River Valley Projects Sectional Committee, WRD 23

| *Organization* | *Representative(s)* |
| --- | --- |
| National Hydroelectric Power Corporation, Faridabad | Executive Director  Shri Nadeem Hasan (***Chairperson***) |
| Bhakra Beas Management Board, Chandigarh | Shri Rajesh Gupta |
| Central Electricity Authority, New Delhi | Shri Shivcharan Chhirolia  Shri Bharat Gupta (*Alternate*) |
| Central Water Commission, New Delhi | Shri Kiran Pramanik  Shri Ajay Shivlal Banode (*Alternate*) |
| Energy Infratech Private Limited, Gurugram | Shri Manoj Kumar Gupta  Shri Pramod Chand Tewari (*Alternate* I)  Shri Sudheer Kumar Singh (*Alternate* II) |
| Ferro Concrete Construction (India) Private Limited, Indore | Dr Mahavir Bidasaria  Shri Anupam Bidasaria (*Alternate*) |
| Indian Institute of Technology, Roorkee | Prof Gopal Chauhan |
| Irrigation Department, Govt. of Kerala, Thiruvananthapuram | Shri K. A. Joshy |
| Irrigation Research Institute, Roorkee | Shri Dinesh Chandra  Shri Shankar Kumar Saha (*Alternate*) |
| Karnataka Power Corporation Limited, Bangaluru | Shri Chinnasomaiah |
| Larsen & Toubro Construction India Ltd., New Delhi | Shri Sanjay Pajni  Shri Sravan Kumar Meghavarupu (*Alternate*) |
| National Hydroelectric Power Corporation, Faridabad | Ms Swati Garg  Ms Renu Bhadrasen (*Alternate* I)  Shri Anil Singh Bhandari (*Alternate* II) |
| National Thermal Power Corporation Limited, Noida | Shri Shailendra Kumar Pandey  Shri Jagat Singh Yadav (*Alternate*) |
| Sardar Sarovar Narmada Nigam Limited, Gandhinagar | Shri K. B. Parmar  Shri V. K. Gupta (*Alternate*) |
| Satluj Jal Vidyut Nigam Limited, Shimla | Shri M. C. Verma |
| Tehri Hydro Development Corporation India Ltd., Rishikesh | Shri J. S. Rawat  Shri Atul Kumar Singh (*Alternate*) |
| Water and Power Consultancy Services Limited, New Delhi | Shri Anupam Mishra  Shri Amitabh Tripathi (*Alternate*) |
| Water Resources Department, Govt of Madhya Pradesh, Bhopal | Chief Engineer, Bodhi |
| Water Resources Department, Govt of Punjab | Chief Engineer Design |
| Water Resources Development Organization, Bangalore | Shri Satish M. |
| In Personal Capacity (*Flat No-207, Bhagirathi*  *Apartment, B-9/14, Sector-62, Noida*) | Shri H. L. Arora |
| BIS Directorate General | Shri Dushyant Prajapati, Scientist ‘E’/Director AND Head (Water Resources) [Representing Director General (*Ex-Officio*)] |

*Member Secretary*

Shri Vaibhav Yadav

Scientist ‘B’/Assistant Director

## (Water Resources), BIS