**IS 14835 : 2024**

 ***भारतीय मानक***

 ***Indian Standard***

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***नदी घाटी परियोजनाओं में पत्थर चिनाई के निर्माण के कार्य की वस्तुओं की अनुमानित इकाई दर के लिए मार्गदर्शिकाऐं***

*( पहला पुनरीक्षण )*

**Guidelines for Estimating Unit Rate of Items of Work in Construction of Rubble Masonry for River Valley Projects**

*( First Revision )*

 ICS 93.160

 @ BIS 2024

 भारतीय मानक ब्यूरो

 BUREAU OF INDIAN STANDARDS

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 **October 2024 Price Group X**

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

FOREWORD

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

Estimation of unit rates for different types of works in the construction of rubble masonry for river valley projects is being done by various methods. It becomes very essential to follow certain guidelines during the process of estimation of unit rates so that uniform methods are followed by concerned personnel.

This standard was first published in 2000. The standard lays down the guidelines for estimating the unit rate of items of work in the construction of rubble masonry for river valley projects. In view of the experiences gained while using the standard, this revision has been undertaken to bring the existing clauses in sync with the practices in the field and to bring the standard in the latest style and format of the Indian Standards.

The composition of the Committee responsible for the formulation of this standard is given in 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.

**IS 14835 : 2024**

*Indian Standard*

**Guidelines for Estimating Unit Rate of Items of Work in Construction of Rubble Masonry for River Valley Projects**

 *( First Revision )*

# 1 SCOPE

# This standard stipulates general requirements for the estimation of unit rate of various items of work in the construction of rubble masonry used in river valley projects.

# 2 REFERENCES

The standards given below contain provision which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on these standards are encouraged to investigate the possibility of applying the most recent edition of these standards:

|  |  |
| --- | --- |
| *IS No.* | *Title* |
| IS 269 : 2015 | Ordinary portland cement — Specification (*sixth revision*) |
| IS 455 : 2015 | Portland slag cement — Specification (*fifth revision*) |
| IS 456 : 2000 | Plain and reinforced concrete — Code of practice (*fourth revision*) |
| IS 650 : 1991  | Standard sand for testing cement - Specification (*second revision*) |
| IS 1489 (Part 1) : 2015 | Portland Pozzolana Cement — Specification: Part 1 Fly Ash Based (*fourth revision*) |
| IS 1489 (Part 2) : 2015 |  Portland Pozzolana Cement — Specification: Part 2 Calcined Clay Based (*fourth revision*) |
| IS 1597 (Part 1) : 1992 | Construction of stone masonry — Code of Practice: Part 1 Rubble Stone Masonry (*first revision*) |
| IS 1597 (Part 2) : 1992 | Construction of stone masonry — Code of Practice: Part 2 Ashlar Masonry (*first revision*) |
| IS 2116 : 1980 | Specification for sand for masonry mortars (*first revision)* |
| IS 2250 : 1981 | Code of practice for preparation and use of masonry mortars (*first revision*) |
| IS 3466 : 1988 | Specification for masonry cement (*second revision*) |
| IS 4852 : 2024 | Estimating unit rate of random rubble masonry used in construction of river valley projects proforma (*third revision*) |
| IS 6909 : 1990 | Supersulphated Cement – Specification (*first revision*) |
| IS 8112 : 1989 | 43 Garde ordinary Portland Cement – Specification (*first revision*) |
| IS 8605 : 1977 | Code of practice for construction of masonry in dams |
| IS 9103 : 1999 | Concrete admixtures – Specification (*first revision*) |
| IS 12269 : 1987 | 53 Grade Ordinary Portland Cement – Specification |

# 3 TERMINOLOGY

For the purpose of this standard, the definitions of terms defined in IS 1597 (Part 1) shall apply.

# 4 MATERIAL, PREPARATION AND LAYING OF MASONRY

The material used, preparation and laying of masonry shall conform to IS 1597 (Part 1).

# 5 UNIT RATE

In order to arrive at the output norms for various classes of masonry, the stone masonry shall be classified, as one of the following or a combination of various classes of works mentioned below:

1. Cut stone in cement mortar;
2. Ashlar arching in cement mortar;
3. Rubble arching in cement mortar;
4. Coursed rubble in cement mortar – first sort;
5. Coursed rubble in cement mortar – second sort: and
6. Random rubble in cement mortar.

**5.1 Unit Rate for Cement Mortar (1:X) – Rate for 1 cum**

The mix proportion for the cement mortar shall comply with the requirement of IS 2250 or as directed by the engineer-in-charge, according to the nature and requirements of items of work involving cement mortar. Mix proportion 1:X (containing X part of sand by volume to be taken as one cubic metre and one part of cement by volume to be taken as 1440/X kg).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S. No.** | **Quantity** | **Description of Work** | **Unit** | **Rate** | **Amount** |
| (1) | (2) | (3) | (4) | (5) | (6) |
| i) | 1440/X | Cement | kg |  |  |
| ii) | 1 | Sand | cum |  |  |
| iii) | 1 | Mixing charges for mortar | cum |  |  |
| iv) |  | Sundries | Lumpsum |  |  |

**5.2 Unit Rate for Cut Stone in Cement Mortar (1:X) – Rate for 10 cum**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S. No.** | **Quantity** | **Description of Work** | **Unit** | **Rate** | **Amount** |
| (1) | (2) | (3) | (4) | (5) | (6) |
| i) | 10.5 | Cut stone roughly dressed to shape at quarry | cum |  |  |
| ii) | 1.6 | Cement mortar | cum |  |  |
| iii) | 35.3 | Masons including stone cutter labour |  |  |  |
| 10.6 | I Class | Each |  |  |
| 24.7 | II Class | Each |  |  |
| iv) | 35.5 | Mazdoors Category I | Each |  |  |
| v) | 28.2 | Mazdoors Category II | Each |  |  |
| vi) |  | Sundries (For brushing, washing, raking, watering, curing, etc.) | Lumpsum |  |  |

NOTES:

1. For rates applying to floor works above the first storey or lift above the initial lift of 2 metres, the concerned schedule of rates applicable to the area and year of execution shall be adopted.
2. It should be noted that the labour including the stone cutter allowed in the unit rate norms is for final stone dressing at the work site and building. Rough dressing to cut stone size at the quarry is to be included in the cost of the stone at the quarry.

**5.3 Ashlar Arching in Cement Mortar (1:X) – Rate for 1 cum**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S. No.** | **Quantity** | **Description of Work** | **Unit** | **Rate** | **Amount** |
| (1) | (2) | (3) | (4) | (5) | (6) |
| i) | 1 | Rate for “Cut- stone in cement mortar” (1:X) | cum |  |  |
| ii) | 1.4 | Extra masons – I Class | Each |  |  |
| iii) |  | Centering, etc. | Lumpsum |  |  |

**5.4 Rubble Arching in Cement (1:X) – Rate for 10 cum**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S. No.** | **Quantity** | **Description of Work** | **Unit** | **Rate** | **Amount** |
| (1) | (2) | (3) | (4) | (5) | (6) |
| i) | 11.50 | Selected stones of sizes | cum |  |  |
| ii) | 2.80 | Cement mortar (1:X) | cum |  |  |
| iii) | 42.4 | Masons including stone cutter |  |  |  |
| 14.2 | I Class | Each |  |  |
| 28.2 | II Class | Each |  |  |
| iv) | 14.2 | Mazdoors category I | Each |  |  |
| v) | 28.2 | Mazdoors category II | Each |  |  |
| vi) |  | Centering and Sundries | Lumpsum |  |  |
|  |  |  | **Total** |  |

**5.5 Coursed Rubble in Cement Mortar (1:X) – First Sort – Rate for 10 cum**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S. No.** | **Quantity** | **Description of Work** | **Unit** | **Rate** | **Amount** |
| (1) | (2) | (3) | (4) | (5) | (6) |
| i) | 11.0 | Stone (including bond stones) | cum |  |  |
| ii) | 2.8 | Cement mortar (1:X) | cum |  |  |
| iii) | 35.3 | Masons (including stone cutters vide standard specifications for dressing and rounding corners, etc.) |  |  |  |
| 10.6 | I Class | Each |  |  |
| 24.7 | II Class | Each |  |  |
| iv) | 14.1 | Mazdoor category I | Each |  |  |
| v) |  | Mazdoor category II | Each |  |  |
| vi) |  | Sundries | Lumpsum |  |  |

**5.6 Coursed Rubble in Cement Mortar (1:X) – Second Sort – Rate for 10 cum**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S. No.** | **Quantity** | **Description of Work** | **Unit** | **Rate** | **Amount** |
| (1) | (2) | (3) | (4) | (5) | (6) |
| i) | 1)6 | Coursed rubble stone including bond stones | cum |  |  |
| ii) | 1)5 | Rough stones | cum |  |  |
| iii) | 3.2 | Cement mortar (1:X) | cum |  |  |
| iv) | 24.7 | Masons (including stone cutters vide standard specifications for dressing and rounding comers, etc. |  |  |  |
| 7.1 | I Class | Each |  |  |
| 17.6 | II Class | Each |  |  |
| v) | 14.1 | Mazdoor category II | Each |  |  |
| vi) |  | Sundries | Lumpsum |  |  |
|  |  |  | **Total** |  |

1) The proportion may vary for various clauses of stone and work specifications.

**5.7 Random Rubble (Undressed and Brought to Course) in Cement Mortar (1:X) – Rate for 10 cum**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S. No.** | **Quantity** | **Description of Work** | **Unit** | **Rate** | **Amount** |
| (1) | (2) | (3) | (4) | (5) | (6) |
| i) | 10.0 | Rough stone | cum |  |  |
| ii) | 1.0 | Bond stone | cum |  |  |
| iii) | 3.4 | Cement mortar | cum |  |  |
| iv) | 17.7 | Masons (including stone cutter) |  |  |  |
| 7.1 | 7.1 No. I Class | Each |  |  |
| 10.6 | 10.6 No. II Class | Each |  |  |
| v) | 14.1 | Mazdoors category I | Each |  |  |
| vi) | 14.1 | Mazdoors category II | Each |  |  |
| vii) |  | Sundries | Lumpsum |  |  |
|  |  |  | **Total** |  |

NOTES:

1. For ‘Coping Work’ – burnt stone on edge in mortar add 1.4 masons II Class for 1 cum of finished work.
2. For well steining in this class of masonry add 1.4 masons – II class for 1 cum of finished work
3. Thirty-eight (38) percent of mortar shall be adopted in the data for Random Rubble Masonry Work for construction of Dam and appurtenant works.
4. In individual cases and if warranted, the above percentage limit can be raised up to forty (40) percent by the Superintending Engineer-in-Charge of the work for recorded reasons.
5. The provisions for bond stones shall be deleted in the data for Random Rubble Masonry for dams and its appurtenant works.
6. Contractors Overhead and profits may generally be taken as 20 percent of prime cost.

The following taxes and duties may be considered wherever applicable (this list is just indicative).

1. Sales Tax on works;
2. Services tax;
3. Labour cess;
4. VAT; and
5. Entry tax.

For the purpose of notes 2 and 5 above:

1. ‘Dam’ means a hydraulic structure built across a stream to hold water;
2. Appurtenant works of a masonry dam are the abutments, aprons, water cushions and retaining walls forming part of masonry dam; and
3. Diversion works like anicuts, head regulators cannot be classified as Dams.

**5.8** Works for cornice, corbel stones and other ornamental finishes, the unit rates shall be decided by the Engineer-in-Charge, based on observed data at site of work for the specifications and drawings.

**ANNEX A**

(*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 DirectorShri 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* 1)Shri Sudheer Kumar Singh (*Alternate* 2)  |
| 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 ChandraShri Shankar Kumar Saha (*Alternate*) |
| Karnataka Power Corporation Limited, Bangaluru | Shri Chinnasomaiah |
| Larsen & Toubro Construction India Ltd., New Delhi | Shri Sanjay PajniShri Sravan Kumar Meghavarupu (*Alternate*)  |
| National Hydroelectric Power Corporation, Faridabad | Ms. Swati GargMs. Renu Bhadrasen (*Alternate* 1) Shri Anil Singh Bhandari (*Alternate* 2)  |
| National Thermal Power Corporation Limited, Noida | Shri Shailendra Kumar PandeyShri Jagat Singh Yadav (*Alternate*) |
| Sardar Sarovar Narmada Nigam Limited, Gandhinagar | Shri K B ParmarShri V.K. Gupta (*Alternate*)  |
| Satluj Jal Vidyut Nigam Limited, Shimla | Shri M.C. Verma |
| Tehri Hydro Development Corporation India Ltd., Rishikesh | Shri J. S. RawatShri Atul Kumar Singh (*Alternate*) |
| Water and Power Consultancy Services Limited, New Delhi | Shri Anupam MishraShri Amitabh Tripathi (*Alternate*) |
| Water Resources Department, Govt of Madhya Pradesh, Bhopal | Chief Engineer, Bodhi |
| Water Resources Department, Govt of Punjab, Chandigarh | 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