**IS 13419 : 2024**

 ***भारतीय मानक***

 ***Indian Standard***

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***नदी घाटी परियोजनाओं में शॉटक्रेटिंग/गनिटिंग की इकाई दर के विश्लेषण के लिए प्रोफार्मा***

*(* पहला *पुनरीक्षण )*

**Proforma for Analysis of Unit Rate of Shotcreting/Guniting in River Valley Projects**

*( First Revision )*

 ICS 93.160

 @ BIS 2024



 भारतीय मानक ब्यूरो

 BUREAU OF INDIAN STANDARDS

 मानक भवन, 9 बहादुर शाह

 ज़फर मार्ग, नई दिल्ली - 110002

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 **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.

Shotcreting and guniting are versatile construction techniques proven for several decades. They are used without shuttering for horizontal, vertical and overhead surfaces of free shape. Shotcreting and guniting are two of the elements of modern underground excavation. Shotcreting and guniting are extensively used in river valley projects and as such it is essential that practices relating to their cost estimation are harmonious and uniform.

This standard was first published in 1992. The first revision of this standard has been brought out to bring the standard in sync with 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 this revision of the standard are:

Relevant taxes and duties, wherever applicable, have been added in calculation of unit rates;

Provisions for contractor’s overheads and profits have been indicated;

Provision for wire mesh use has been added; and

Reference for IS 9012 has been given for variation of rebound during shotcreting.

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.

**IS 13419 : 2024**

*Indian Standard*

PROFORMA FOR ANALYSIS OF UNIT RATE OF SHOTCRETING/GUNITING IN RIVER VALLEY PROJECTS

*( First Revision )*

**1 SCOPE**

This standard lays down proforma for analysis of unit rate of guniting/shotcreting used in river valley projects.

**2 REFERENCES**

The standards listed given below contain provisions, 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 this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

|  |  |
| --- | --- |
| *IS No.* | *Title* |
|  IS 1566 : 1982  | Specification for hard - drawn steel wire fabric for concrete reinforcement (*second* *revision*) |
|  IS 9012 : 1978 | Recommended practice for shotcreting |
|  IS 11590 : 1995 | Guidelines for working out unit rate cost of the construction equipment used for river valley projects (*first revision*) |

**3 PROFORMA**

The proforma for analysis of unit rate of guniting/shotcreting is given in Table 1. For evaluating unit rate of construction, equipment references should be made to IS 11590 : 1995. The steel wire mesh, used shall conform to IS 1566.

**Table 1 Proforma for Analysis of Unit Rate for Guniting/Shotcreting**

(*Clause* **3.1**)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. No.** |  | **Item** | **Unit** | **Quantity** | **Rate** | **Amount** | **Remarks** |
| (1) |  | (2) | (3) | (4) | (5) | (6) | (7) |
| 1. i)
 | *Equipment*1. Shotcreting machine
2. Compressed air
3. Batching and mixing plant
4. Mix conveying
5. Water pump
6. Remote controlled spray (where applicable)
7. Mixing tanks and reciprocating pump for mixing of liquid additives (where applicable)
8. Labour
 | hhhhhhhhMan hour |  |  |  |  |
|  |  *Total Cost of Equipment* $\left(C\_{E}\right)$ |  |  |  |  |  |
|  |  Material1. Cement
2. Fine aggregate
3. Coarse aggregate
4. Water
5. Additives
6. Wire mesh
 | KgKgKgKgKg$$m^{2}$$ |  |  |  |  |
|  |  *Total Cost of Material* $\left(C\_{m}\right)$  |  |  |  |  |  |
|  |  Curing 1. Membrane
2. Water
3. Labour
 | Lump sumKgMan hour |  |  |  |  |
|  |  *Total Cost of Curing* $\left(C\_{c}\right)$  |  |  |  |  |  |
|  |  *Overheads and Profits (Proportional cost of the following)*:1. Water supply, lighting, sanitation and drainage
2. Temporary construction
3. Testing and supervision
4. Carriage and freight of machinery
5. Contingencies
6. Hidden cost of labour
7. Taxes and duties:

1) Tax on works2) Services tax3) Labour Cess4) VAT5) Entry tax | LumpsumLumpsumLumpsumLumpsumLumpsumLumpsum |  |  |  |  |
|  |  *Total Cost of Overheads and Profits* $\left(C\_{o}\right)$  |  |  |  |  |  |
|  |  Analysis 1. Total quantity of shotcrete1) = Q cum.
2. Cost $=C\_{E}+C\_{M}+C\_{c}+C\_{o}+C\_{T}$ Rupees
3. Additional cost for rebound $\left(C\_{R} in \%\right)^{2)}$
4. Cost per cubic meter of shotcrete $=\frac{C\_{T}+C\_{R}}{Q}$
 |  |  |  |  |  |
|  NOTE — **1** While comparing rates similarity of application of shotcrete, type, strength, etc are necessary. **2** Reinforcement mesh, if used, shall be evaluated separately along with materials and labour required for the same. **3** Contractors overheads and profit may be decided suitably in the project. **4** The total quantity of concrete includes anticipated rebound and additional quantity beyond payline).  **5** For variation in rebound during shotcrete, refer IS 9012 |

**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* 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 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* I) Shri Anil Singh Bhandari (*Alternate* II)  |
| 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 | 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