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भारतीय मानक मसौदा

यांत्रिक माध्यमों द्वारा तटबंध निर्माण में इकाई दर आकलन के लिए प्रोफार्मा

(IS 11638 का दूसरा पुनरीक्षण)

Draft Indian Standard

PROFORMA FOR ESTIMATION OF UNIT RATE IN CONSTRUCTION OF EMBANKMENT BY MECHANICAL MEANS

(*Second Revision of IS 11638*)

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

**Last Date for Comments:
15 May 2022**

FOREWORD (*Formal clauses of the foreword will be added later*)

Construction of embankments for drainages, canals, dams, etc., is generally done by mechanical means. The fill material is obtained from borrow pits selected for the purposes as well as from excavations of dam foundation and appurtenant works like spillway, tunnels, stilling basin, etc. The mode of excavation depends on site conditions as well as type of machinery and equipment used. The material suitable for embankment is either hauled to the placement site directly or stockpiled for subsequent use. The site conditions that affect the rate of production involve the type of materials, quantum of work, equipment used, conditions of haul roads, lead, lift, etc. The cost of embankment, therefore, varies from project to project.

This standard was first published in 1986. The first revision of this standard was brought out in 2000 incorporating new item works like dewatering, excavation, dressing and levelling. The second revision of this standard has been brought out to sync with the latest field practices observed while using the standard over time and to bring it in the latest style and format of the Indian Standards. The major changes incorporated in this second revision of the standard are:

- a) Relevant taxes and duties, wherever applicable, have been added in calculation of unit rates.
- b) Provisions for contractor's overheads and profits have been indicated.
- c) Further clarification, where there are separate provisions for dewatering in bill of quantity(BOQ), and
- d) Provisions to account for swell factor and bulk volume in case of earthwork by machinery has been indicated.

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 or analysis, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1 SCOPE

This standard lays down proforma for estimation of unit rate in construction of embankment by mechanical means.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provision 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:

<i>IS</i>	<i>Title</i>
11399 (Part 1) : 1985	Guidelines for estimating output norms of items of work in construction of river valley projects: Part 1 Earth work excavation
11590 : 1995	Guidelines for working out unit rate cost of the construction equipment used for river valley projects (<i>first revision</i>)

3 CLASSIFICATION

3.1 The fill material used in construction of embankments may be classified as follows:

- a) *Dumped fill* — Dumped fill involves moving of material from the site of excavation and depositing it in a fill embankment and dressed to the required level.
- b) *Rolled fill* — The rolled fill involves placement of selected fill materials in various zones to the required fill lines, grading and compacting to the required density.

4 PROFORMA

4.1 A separate proforma for estimation of unit rate of construction of embankment by mechanical means for an equivalent lead in meters, as given in Table 1 shall be prepared for each class of fill material.

4.1.1 Equivalent lead is the shortest distance between the excavation and the fill material which takes lift into consideration. It is measured from the center of gravity of the excavation to that of the fill including section en-route.

4.1.2 The proforma in Table 1 indicates the various heads/ sub-heads under which the estimates have to be worked out. For each one of these heads/ sub-heads, it is necessary to prepare sub-estimates which shall include machinery, materials and labour taking into consideration the factors like site conditions, type of soil, equipment combination, working hour rates of machinery, output norms of equipment, consumables, facilities required, etc. for which guidance may be obtained from IS 11399 (Part 1) and IS 11590.

TABLE 1 PROFORMA FOR ESTIMATION OF UNIT RATE OF EQUIVALENT CONSTRUCTION OF EMBANKMENT BY MECHANICAL MEANS FOR AN EQUIVALENT LEAD IN METRES*(Clauses 4.1, 4.1.2)*

Sl. No. (1)	Item (2)	Unit (3)	Quantity (4)	Rate (5)	Amount (6)	Remarks (7)
i)	<i>General</i>					
	a) Royalty					
	b) Removal of overburden, shrubs, trees, etc.					
	c) <i>Dagbelling</i> , layout, and establishment of reference pillars and benchmarks					
	d) Haul roads, haul tracks, ramps, etc.					
	e) Lighting and safety measures at site					
	f) Dewatering					
ii)	<i>Excavation and Loading</i>					
	a) Drilling					
	b) Blasting					
	c) Ripping and dozing					
	d) Loading					
	e) Excavation					
iii)	<i>Haulage and Placement</i>					
	a) Transport					
	b) Dumping and spreading					
	c) Grading					
	d) Dressing and levelling					
iv)	<i>Watering and Compaction</i>					

- a) Watering
- b) Compaction

- v) **Total Prime Cost (i) to (iv)**

- vi) **Overheads and Profits**
(Proportional cost of the following overheads should be added on the item of unit rate embankment):
 - a) **Field Set-up**
 - i. Buildings
 - ii. Water supply, lighting, sanitary and drainage
 - iii. Service road
 - iv. Temporary constructions

 - b) **Field Charges**
 - i. Establishment expenditure (Salary and office-expenditure, inspection, vehicles)
 - ii. Compensation, retrenchment compensation, bonus, PF, gratuity, statutory holidays, leave wages, etc
 - iii. Worksite amenities (medical, education, recreation, etc.)
 - iv. Survey {excluding item i) c}
 - v. Testing of film material for relevant requirements
 - vi. Small tools and plants
 - vii. Maintenance
 - viii. Carriage and freight of machinery
 - ix. Contingencies

- c) *Head Office and Financial Expenses*
 - i. Dividend/return on capital
 - ii. Indirect charges not covered under **v b)**
 - iii. Interest charges
 - iv. Profit envisaged

- vii) *Taxes and duties :*
 - a) Tax on works
 - b) Services tax
 - c) Labour Cess
 - d) VAT
 - e) Entry tax

- viii) *Total Rate (v) to (vii)*

NOTE —

1. List of sub items mentioned under the item of overhead is only indicative. Overhead expenses are usually expressed as a percentage of total prime cost [Item **(i)** to **(iv)**].
2. All items mentioned above shall include erection, operation, depreciation, repairs, maintenance and dismantling of machinery where used.
3. If separate provision for dewatering, haul roads and their maintenance etc. have been kept in bill of quantity (BOQ), the same should not be considered under item **(i)**.
4. In case of earthwork by machines, swell factor and bulk volume shall be accounted.
5. **Contractors overheads and profit may be decided suitably in the project.**

