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PROFORMA FOR ANALYSIS OF UNIT RATE OF EARTHWORK USED IN CONSTRUCTION OF RIVER VALLEY PROJECTS

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PROFORMA FOR ANALYSIS OF UNIT RATE OF EARTHWORK USED IN CONSTRUCTION OF RIVER VALLEY PROJECTS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 16 April 1982, after the draft finalized by the Cost Analysis and Cost Estimates Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Earthwork is required to be done for Dams, Dykes, Canals, Bunds and various other types of embankments required for River Valley Projects. Excavation and transportation may be carried out mechanically and/or manually. Keeping in view the requirement of the standard, three separate tables have been prescribed for working out the unit rate of earthwork.

The unit rate of earthwork consists of several items like jungle clearance and stripping, excavation, transportation, spreading and levelling, watering, compaction, slope-dressing and other minor miscellaneous items. These items have been considered for working out the unit rate of earthwork for construction of river valley projects.

0.3 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*. 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

1.1 This standard lays down the proforma for analysis of unit rate of earthwork used in the construction of river valley projects.

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

2. PROFORMA FOR ANALYSIS OF UNIT RATE OF EARTHWORK USED IN CONSTRUCTION OF RIVER VALLEY PROJECTS

2.1 The proforma recommended for use in analysis of unit rate of earthwork for river valley projects is given in the following tables, depending on the method employed:

a) Table 1 — by Manual Labour

b) Table 2 — by Machine-cum-Manual Labour

c) Table 3 — by Machine

TABLE 1 PROFORMA FOR ANALYSIS OF RATE PER m^3 OF EARTHWORK BY MANUAL LABOUR FOR A LEAD OF . . . . . METRES

i) Jungle Clearance and Stripping;

ii) Manual Excavation Inclusive of Initial Lead and Lift of 30 metres and Lift of 1·5 metres;

iii) Additional Charges

*Lead (One Lead=30 metres)

†Lift (One Lift=1·5 metres)

iv) Spreading/Levelling;

v) Watering;

vi) Compaction;

*Lead is the distance over which earthwork has at any time to be conveyed from a cutting to a place of deposit. Lead shall be measured by the shortest practicable distance between the centre of gravity of excavated earth to that of placed earth. This will constitute the mean lead for the section. No cross leads whatsoever shall be measured and paid for.

†Lift is the height to which earth has to be moved in executing earthwork. Lift shall be measured from the centre of gravity of the excavated earth to that of placed earth. This shall constitute the mean lift for that section. When earth has to be carried over a spoil bank and dumped beyond it, the mean lift would be the difference in level between the centre of gravity of the excavated earth and top of the spoil bank omitting the dowel.

For converting lift into horizontal lead, the vertical lift 'h' (metres) will be multiplied by $\frac{10\ h}{3}$, subject to this multiplying factor being not less than 10 and more than 20.

(*Continued*)

TABLE 1 PROFORMA FOR ANALYSIS OF RATE PER m^3 OF EARTHWORK BY MANUAL LABOUR FOR A LEAD OF .... METRES — (*Contd*)

vii) Slope-Dressing;

viii) Ancillaries and Incidentals;

a) Provision (excluding operation and maintenance) of the following:

1) Transportation of labour,
2) Labour and staff quarters,
3) Service and haul roads,
4) Electric power system,
5) Water supply system,
6) Sanitary system,
7) Surface drainage,
8) Safety measures including fire fighting arrangements, and
9) Other amenities,

b) Maintenance/operation of items mentioned above, and

c) Supervisory works establishment.

ix) Contingencies;

x) Quality Control Including Laboratory Charges;

xi) Overhead (Excluding Profit); and

This shall include establishment, office stationery, general tools and plant, staff cars and their running and maintenance, insurance, workman's compensation, telephones and telecommunication facilities, security arrangements, etc.

Total-all-in-rate.

NOTE 1 — The above items may be expressed on pro-rata basis.

NOTE 2 — All machine items mentioned above shall include depreciation, erection, operation, repairs, maintenance and dismantling of machinery where used.

xii) Miscellaneous Items

(These items shall consist of minor T and P scarification)

TABLE 2 PROFORMA FOR ANALYSIS OF RATE PER m³ OF EARTHWORK BY MANUAL EXCAVATION AND TRANSPORTATION BY TRUCKS, ETC, FOR A LEAD OF . . . . . METRES

(*Clause* 2.1)

i) Jungle Clearance and Stripping;

ii) Manual Excavation;

iii) Manual Loading and Unloading;

iv) Transportation by Trucks;

v) Spreading/Levelling;

vi) Watering;

vii) Compaction;

viii) Slope-Dressing;

ix) Ancillaries and Incidentals;

a) Provision (cxcluding operation and maintenance) of the following:

1) Transportation of labour,
2) Labour and staff quarters,
3) Service and haul roads,
4) Electric power system,
5) Water supply system,
6) Sanitary system,
7) Surface drainage,
8) Safety measures including, fire fighting arrangements, and
9) Other amenities,

b) Maintenance/operation of items mentioned above, and

c) Supervisory works establishment.

x) Contingencies;

xi) Quality Control Including Laboratory Charges;

xii) Overhead (Excluding Profit); and

This shall include establishment, office stationery, general tools and plant, staff cars and their running and maintenance, insurance, workman's compensation, telephones and telecommunication facilities, security arrangements, etc.

Total-all-in-rate.

NOTE 1 — The above items may be expressed on pro-rata basis.

NOTE 2 — All machine items mentioned above shall include depreciation erection, operation, repairs, maintenance and dismantling of machinery where used.

xiii) Miscellaneous Items.

(These items shall consist of minor T and P scarification)

TABLE 3 PROFORMA FOR ANALYSIS OF RATE PER m³ OF EARTHWORK BY MACHINE FOR A LEAD OF . . . . . METRES

(*Clause* 2.1)

i) Jungle Clearance and Stripping;

ii) Excavation and Transportation:

a) Excavator,
b) Dozer, and
c) Dumper,

or

a) Scrapper, and
b) Pusher

or

Any other combination.

iii) Spreading/Levelling;

iv) Water;

v) Compaction;

vi) Slope-Dressing;

vii) Ancillaries and Incidentals;

a) Provision (excluding operation and maintenance) of the following:
   1) Transportation of labour,
   2) Labour and staff quarters,
   3) Service and haul roads,
   4) Electric power system,
   5) Water supply system,
   6) Sanitary system,
   7) Surface drainage,
   8) Safety measures including fire fighting arrangements, and
   9) Other amenities,

b) Maintenance/operation of items mentioned above; and

c) Supervisory works establishment.

viii) Contingencies;

ix) Quality Control Including Laboratory Charges;

x) Overhead (Excluding Profit); and

This shall include establishment, office stationery, general tools and plant, staff cars and their running and maintenance, insurance, workman's compensation, telephones and telecommunication facilities, security arrangements, etc.

Total-all-in-rate.

NOTE 1 — The above items may be expressed on pro-rata basis.

NOTE 2 — All machine items mentioned above shall include depreciation, erection, operation, repairs, maintenance and dismantling of machinery where used.

xi) Miscellaneous Items.

(These items consist of minor T and P scarification)

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2