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PROFORMA FOR ESTIMATING UNIT RATE OF CONCRETE USED IN MECHANIZED CONSTRUCTION OF RIVER VALLEY PROJECTS

(Second Revision)

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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PROFORMA FOR ESTIMATING UNIT RATE OF CONCRETE USED IN MECHANIZED CONSTRUCTION OF RIVER VALLEY PROJECTS

(Second Revision)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 25 February 1987, after the draft finalized by the Cost Analysis and Cost Estimates Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 This standard was first published in 1968 and was revised in 1978 to incorporate certain modifications in Table 1 with a view to rationalizing the major operational characteristics and in this second revision Appendices A and B have been excluded. The method of calculation of depreciation and the estimated life of plant and machinery used in concrete is covered in IS : 11590 (Part 1)-1986*.

0.3 Unit rates of concrete available from various river valley projects in the country differ so widely in their structure that comparision of rates becomes impracticable. The variation in the unit rate of particular type of concrete occurs due to several factors, such as situation of work, wages of labourers, specifications of materials, cost of machinery and their repair charges, productivity, etc. It is, therefore, felt necessary to prepare a proforma for the estimation of the unit rate of concrete in such a manner as would take into account all the elements of costs that are expected to go into the item rate and present them in a unifrom pattern so that the rates obtained in different projects can be compared and the item/items of operation showing differences is/are identified and understood.

0.4 The proforma has been drawn up operation-wise, and, as such, the depreciation of machinery, wages of labour including supervisory labour, etc, have all been taken into account in the costs of various operations indicated in the proforma.

*Guidelines for working out unit rate of the construction equipment used for river valley projects: Part 1 General.

0.5 The proforma presents the costs of different operations in their final shape. It does not show the details of the break-up of the cost of each operation. Besides this final proforma, a number of other proformae would be required to analyse and work out the costs of the different operation and elements that are indicated here in the final proforma. These supporting proformae have to be drawn up by the concerned project authorities or construction agencies according to their requirements and necessities.

0.6 Separate rates will, howerer, be worked out for each type of concrete which should be specified in the beginning of the proforma.

0.7 There are different practices followed in the country in regard to inclusion of costs of shuttering and reinforcement in the computation of unit rate of concrete. The general consensus was that since shuttering is a very improtant item a separate proforma should be brought out. Accordingly a separate standard IS : 10421-1983* has been prepared for computing the unit rate of shuttering.

1. SCOPE

1.1 This standard lays down the proforma for estimating unit rate of concrete used in mechanized construction of river valley projects.

2. PROFORMA FOR UNIT RATE OF CONCRETE

2.1 The proforma recommended for use in estimating unit rate of concrete for river valley project is as given in Table 1.

TABLE 1 PROFORMA FOR ESTIMATING UNIT RATE OF CONCRETE

(Clauses 0.2 and 2.1)

Sl No.	Item	Unit	Quantity	Rate	Amount	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	*Coarse aggregates*:					
	a) Royalty and other fees for quarrying					
	b) Removal of overburden					
	c) Quarrying:					
	1) Drilling					
	2) Blasting					

(Continued)

*Proforma for analysis of unit rate of shuttering, form work for concrete items.

TABLE 1 PROFORMA FOR ESTIMATING UNIT RATE OF CONCRETE — *Contd*

Sl No.	Item	Unit	Quantity	Rate	Amount	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	3) Mucking					
	4) Dewatering (if required)					
	d) Transport to crushers					
	e) Crushing and processing and conveyance to stockpiles					
	f) Transport from stockpiles to batching plant					
	g) Losses in transit, storage, handling, etc (percent)					
	ii) *Sand (fine aggregates)*:					
	a) Royalty and other fees for quarrying					
	b) Removal of overburden					
	c) Quarrying or crushing and processing					
	d) Grading and washing					
	e) Transport to site					
	f) Transport from stockpiles to batching plant					
	g) Losses in transit, storage, handling, etc (percent)					
	iii) *Cement*:					
	a) Cost ex-factory					
	b) Rail or road transport and handling to site of work					
	c) Storage and handling up to batching plant					
	d) Losses in transit, storage, handling, etc (percent)					
	iv) *Admixture*:					
	a) Cost ex-factory					
	b) Rail or road transport and handling to site of work					
	c) Storage and handling up to batching plant					
	d) Losses in transit, storage, handling, etc (percent)					

(*Continued*)

TABLE 1 PROFORMA FOR ESTIMATING UNIT RATE OF CONCRETE — *Contd*

Sl No.	Item	Unit	Quantity	Rate	Amount	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
v)	*Batching, mixing, laying and curing*:					
	a) Cleaning and preparation of construction joints					
	b) Batching and mixing					
	c) Placing:					
	1) Transport from batching plant					
	2) Placing					
	3) Vibrating and					
	4) Green cutting/finishing					
	d) Curing					
	e) Water					
	f) Wastage (percent)					
vi)	*Other items*:					
	a) Cooling system:					
	1) Pre-cooling plant:					
	i) Cost of plant					
	ii) Operation cost					
	2) Embedded system:					
	i) Cost of the system					
	ii) Operation cost					
vii)	*Overheads*:					
	Proportional cost of the following overheads should be added to the item of unit rate concrete:					
	a) Field set up:					
	1) Buildings					
	2) Water supply, lighting, sanitary and drainage					
	3) Service road					
	4) Temporary constructions					
	b) Field charges:					
	1) Establishment expenditure (salary and office-expenditure, inspection, vehicles, etc)					

(*Continued*)

TABLE 1 PROFORMA FOR ESTIMATING UNIT RATE OF CONCRETE — *Contd*

Sl No.	Item	Unit	Quantity	Rate	Amount	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2) Compensation, retrenchment compensation, bonus, etc					
	3) Worksite amenities (medical, education, recreation, etc)					
	4) Survey					
	5) Testing					
	6) Small T&P					
	7) Maintenance					
	8) Carriage and freight of machinery					
	9) Contingencies					
	c) Head office and financial expenses					
	1) Dividend/return on capital					
	2) Interest charges					
	3) Head office changes including subordinate controlling offices					
	4) Profit envisaged					
	Total all — in rate					

NOTE 1 — The overhead expenses may be included as percentage of prime cost [Items (i to vi)]

NOTE 2 — All the items mentioned above shall include depreciation, erection, operation and repairs, maintenance and dismantling of machinery where used. Unit rates of these can be estimated as per IS : 11590 (Part 1)-1986*.

*Guideliness for working out rate of the construction equipment used for river valley project: Part 1 General.

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^2
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

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