

# **Analysis of rates for building works**

# Analysis of rates for building works

**Def:**The process of separation into components/ elements (Viz. Labour, materials, machinery ,T&P, overheads and profit) of work and pricing them.

## **1. Analysis of rates is required for:**

- Insertion in a tender (i.e.) as a lump sum, item rates
- To check reasonability of rates inserted by tenderers

# Analysis of rates for building works

- To assess various quantities of labour, materials, machinery, money and to effect economy by using alternatives and to optimize the resources
- To assess the rates payable for deviations, extra items of work to the builder
- To compare the costs with sanctioned amount and to take action for regularization of excess/ less cost

# Analysis of rates for building works

- To workout the budget and cash flows at various stages of the work and arranging interim/ final payments
- To detect irrational rates quoted by tenderers
- To serve as basic data in case of disputes that may arise at a latter stage

# Analysis of rates for building works

## **2. Elements which constitute the rate:**

- a) Material cost inclusive of wastage
- b) Labour cost
- c) Plant & machinery owning and operating charges
- d) Water charges
- e) Taxes
- f) Insurance/ risk coverage charges
- g) Contractor's overheads and profit

# Analysis of rates for building works

## 3. Percentage profits & overhead charges:

Element of profit normally varies from 5 to 10%. Overheads vary from 3 to 7 ½%. The total element of overheads and profit shall not normally exceed 17 ½% on estimated rates. This should be restricted to 10% if paid bills/ days work is considered.

# Analysis of rates for building works

**4. Cement constants:** The cement constants for various items of work including wastage of  $2\frac{1}{2}\%$ . These constants are based on observations made by CBRI Roorkee, concrete association of India, CPWD, MES and other construction organizations. The constants are shown in Appendix 'A'.

# Analysis of rates for building works

- 5. Material constants:** Cost of materials includes the supplier's price, transportation, loading/ unloading, haulage to site, handling for incorporation into the work, wastages/breakage/pilferage, storage charges, deterioration on storage, returning of empty bags/ cases and taxes and other incidentals. The constants in use in various departments and organizations is as per Appendix 'B'.



# Analysis of rates for building works

- 6. Labour output constants:** Some of the labour output constants are covered in IS – 7272. The constants given by NBO, CPWD, MES, State governments are also considered and given in Appendix 'C'.
- 7. Specification of various building materials:** Generally the building materials shall conform to the relevant Indian standards. Where no such standards exist the relevant British/ American standards in so far as they are applicable could be followed.

# Analysis of rates for building works

- 7. Specification of various building materials:** The materials of local origin (Within 40 km or distance as specified) shall be best available and approved by competent authority.
- 8. Basic costs:** Cost of materials, labour, machinery, tools & plant (depreciated cost), and direct overheads connected to the particular project.
- 9. Indirect costs:** Not directly related to the project but otherwise involved. The corporate office expenses, consultant charges, outsourced costs etc.

# Analysis of rates for building works

10. **Daily wages:** wages which the builder is bound to pay to labour which will not be less than statutory wages.
11. **All in rates:** Wages + proportionate element of terminal benefits such as bonus, gratuity.
12. **Standing charges:** Includes element of depreciation, interest where as running charges include cost of operation of plant, POL, operator & supporting staff.

# Analysis of rates for building works

- 13. Fixed/ variable overheads:** fixed overheads are those incurred only once like construction of site office, where as variable overheads are salaries paid and other expenses as per employment of labour hours every month.
- 14. Standard schedule of rates:** Many organizations/ departments shall have schedule of rates of materials/ items of works. These schedules contain specifications for materials & methods giving references to relevant Indian standards.

# Analysis of rates for building works

**14. Standard schedule of rates:** The schedules are revised at periodic intervals of 3 to 5 years or yearly. In certain cases certain percentage addition/ deduction is specified to bring them in line with market rates.

**15. Derived rates:** The rates derived by interpolation/ extrapolation of rates inserted in the contract.

Eg. The rate for PCC 1:3:6 can be derived from quoted rate for PCC 1:4:8. The rate for M-20 can be derived from quoted rate for M- 25 concrete.

# Analysis of rates for building works

**16. Star rates/ Market rates:** The rates worked out based on market enquiry/ quotations and applying the percentage above/ below for similar quoted trade items plus overheads and profit.  
Alternately rates worked out for material/ labour based on paid bills/ vouchers produced by contractor plus profit.

# Analysis of rates for building works

1. Excavation for a cesspit 3x2m in size 3m deep in ordinary soil in two equal lifts of 1.5m each, provision of shuttering to lower half of excavation and cost of disposal of soil up to a distance of 100m.

Unit 1 cum.

(Plan area is  $< 10\text{sqm}$  hence treated as excavation over area)

# Analysis of rates for building works

Labour:

0.40 Mazdoor for excavation over  
areas n.e. 1.5m deep and getting out

0.36 Mazdoor for taking up excavated  
material from spoil heaps, filling  
borrows/ baskets and wheeling/  
removing and depositing up to a  
distance of 100m

Total 0.76 Mazdoors



# Analysis of rates for building works

Total quantity of excavation	$6 \times 3 = 18$ cum	
Mazdoors required for 18 cum	$18 \times 0.76 =$	13.68
Extra mazdoors required for lift on lower half portion ( For each additional lift of 1.5m beyond the initial lift of 1.5m depth)	$9 \times 0.12$	1.08
Cost of 18 cum of excavation & removal	$14.76 \times \text{Rs } 90/\text{day}$	1328.40
		(A)

B. Cost of planking and shuttering/sqm (open timbering):

Material:

0.029 cum timber @Rs12000/cum	348.00
0.20 kg wire nails @ Rs33/kg	6.60
Cost of tarring	<u>2.40</u>
	357.00

# Analysis of rates for building works

Assuming 8 usages cost/use  $357/8 = 44.63$

Total area of shuttering required on lower portion  
(1.5m) of excavation  $(3+2) \times 2 \times 1.5 = 15\text{sqm}$

Cost of 15 sqm of shuttering  $15 \times 44.63 = 669.45$  (2)

Summary:

Cost of excavation & removal (1)	1328.40
Cost of shuttering (2)	669.45
Add 10% for overheads & profit	199.78
Cost/cum Rs 2197/18 = 122.09 say	Rs122

# Analysis of rates for building works

2. RCC 1:1½: 3 in a beam of size 230x450mm including shuttering, finished fair on sides and bottom (Reinforcement measured separately)

Unit – 1cum

Materials:

400kg Cement @ Rs4.00/kg	1600
0.42 cum Sand @ Rs500/cum	210
0.84 cum 20mm graded aggregate @ Rs 450/cum	<u>378</u>
	2188

# Analysis of rates for building works

## Labour:

0.2 Mason @ Rs 150/day	30
(2.5+0.5) Mazdoor @ Rs 90/day	270
(0.8+0.1) Bhistie @ Rs 90/day	81
0.07 Mixer with driver @ Rs 100/day	70
0.07 Vibrator @ Rs400/day	<u>28</u>
	479

# Analysis of rates for building works

Form work: Data for 10 sqm

11.5 sqm Ply wood 12mm thick @  
Rs400/sqm 4600

0.06 cum Scantlings/ battens  
@ Rs 12000/cum 720

2kg bolts/nuts @ Rs 45/kg 90

0.5 kg nails @ Rs 40/kg 20

5430

38 Rm of steel struts @ Rs 150/Rm 380/use

(Considering 15 uses)

# Analysis of rates for building works

Labour for form work

3.00 carpenter/ fitter @ Rs 170/day      510

2 Mazdoors @ Rs 90/day      180

Assuming 7 uses for form work

Cost/ Use     $5430/7 = 775 + 380 = 1155$

Length of RCC beam/1cum =  $1/0.23 \times 0.45 = 9.66\text{m}$

Area of shuttering  $9.66 \times 1.13 = 10.92 \text{ sqm}$

Rate/cum for formwork =  $\frac{1155 \times 10.92}{10} = 1261$

# Analysis of rates for building works

## Summary:

Cost of concrete	2667
Cost of form work	1261
Add 1% for water	42
Add 7 1/2% for overheads on Rs3970	298
Add 10% for profit on Rs 4268	427
Total	Rs 4695/cum

# Analysis of rates for building works

3. Brick work in cement mortar 1:6 for super structure using old sized bricks (22.86x11.11x6.985cm)

Unit - 1 cum

Materials:

455 Bricks @ Rs 2000/1000	910
0.246 cum cement mortar 1:6 @1668/cum	<u>410</u>
	1320



# Analysis of rates for building works

Cement mortar 1:6:

1.07 cum Sand @ Rs 500/cum 535

254.6 kg Cement @ Rs Rs4/kg 1018

Labour:

0.36 Mazdoor @ Rs 90/day 32

0.10 Bhistie @ Rs 90/day 9

0.07 mixer machine @ Rs 1000/day 70

Water charges 4

Total 1668

# Analysis of rates for building works

## Labour:

0.98 Mason @ Rs 150/day	147
1.93 Mazdoor @ Rs 90/day	174
0.20 Bhistie @ Rs 90/day	18

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339

Total Material+Labour 1320+339=Rs1659/cum

Add 7 ½% for overheads 124

Add 10% for profit 178

Total Rs 1961/cum

# Analysis of rates for building works

4. Steel reinforcement including transportation, bending, binding, fixing in position including cost of material, labour, tools & tackles lead up to 100m and lift up to 20m. Unit 1 Quintal

## A. Material:

100kg Steel for reinforcement Rs28/kg	2800
1kg Binding wire @Rs32/kg	32
Differential cost between full length and scrap at 5% allowable wastage $0.05 \times 2800 = 140$	
Scrap value $0.05 \times 800 = (-)40$	
	100
Add 5% for transportation on 2932	147
Total cost including transportation	3079

# Analysis of rates for building works

## B. Labour (cutting,bending,tyeing,fixing in position up to 5m)

0.1 Blacksmith Rs 130/day	13.00
0.1 Hammer man @ Rs110/day	11.00
0.4 Fitter @ Rs 150/day	60.00
0.4 Helper @ Rs 100/day	<u>40.00</u>
	124.00

For lifting reinforcement every additional 5m beyond initial 5m height @ 0.07 man days for every additional lift  $\underline{0.07 + 0.14 + 0.21} = 0.42$  @ Rs 100/day

3

14.00

# Analysis of rates for building works

Add 2% towards T & P on Rs 138	3
Add 7 ½% towards overheads on 3220	242
Add 10% towards contractor's profit	346
Total	Rs 3808/quintal

# Analysis of rates for building works

5. Structural steel fabrication & erection using plate girders or stanchions built up of single sections with flange plates, caps, bases, splices, angle brackets including necessary bolting, riveting, welding. **Unit: Quintal**

## A. Material. Data for 1 MT

Structural steel including transportation		32000
Add invisible wastage @ 1%		320
Add wastage as scrap @ 4%	1280	
Less scrap value	800	400

# Analysis of rates for building works

Priming coat

300

Details of welding:

Actual length of welding rod  $450 - 10\% \times 450 = 405\text{mm}$   
(Considering 10% wastage)

Volume of electrode  $\pi/4 \times 0.004\text{m}^2 \times 0.405$   
(Considering 4mm electrode)

Area of welding  $1/2 \times 0.008 \times 0.008$  ( 8mm weld)

Welding length for one electrode

$$\frac{\pi/4 \times 0.004\text{m}^2 \times 0.405}{1/2 \times 0.008 \times 0.008} = 0.16\text{m}$$

# Analysis of rates for building works

Assuming welding length of 40m/MT

Number of electrodes required/ MT  $40/0.16 = 250$

Cost of electrodes 250x 6	1500
Gas, Electricity/electrode 250x4	1000
Total material cost	35520

## B. Labour

Fabrication:

10.5 Black smith @ Rs 130/day	1365
7.0 Fitter/ welder @ Rs150/day	1050
9.0 helper @ Rs100/day	900
9.0 Mazdoor 100/day	900



# Analysis of rates for building works

Hire charges for lifting tackles/ cartage @10%  
on labour charges

422

Total /Ton

4637

Erection:

8.5 Fitter @ Rs150/day

1275

3.5 helpers @ Rs 100/day

350

10.0 Mazdoors @ Rs 100/day

1000

Hire charges for crane

1.2hrs 400/hr

480

Total labour cost (A+B)  $4637 + 3105 = 7742$ /Ton

# Analysis of rates for building works

Total material & labour cost (A+B)  $35520 + 7742 = 43262$

C) Add  $7\frac{1}{2}\%$  for overheads on (A+B) Rs 43262      3244

D) Add 10% for profit on Rs 46506      4651

Cost/MT = Rs 51157

or Rs 5116/ quintal

(Supply of steel by contractor)

or

Rs  $35520 + 7\frac{1}{2}\%$  on 43262 + 10% on 7742 =

Rs 39539/MT or Rs 3954/Quintal, if steel is supplied by owner.

# Analysis of rates for building works

6. 8mm thick CGI sheeting in roofs with 1 ½ corrugation side lap and 150mm end lap fixed with screws and washers to and 50x100mm second class timber purlins laid @ 800mm apart. Size of sheet 3000x800mm (10 Corrugations)

Unit 1Sqm:

Let us consider 4 sheets in a row and 10 such rows to calculate the wastage in laps.

Total sheets required  $4 \times 10 = 40$

# Analysis of rates for building works

## A. Material

40x2.8 sqm CGI sheets 22g (0.8mm)

@ 6.73kg/sqm @ Rs 42000/MT 31658

0.5 cum 2<sup>nd</sup> class hard wood

(6.92/0.8x11.55x0.05x0.1) @ Rs16000/cum 8000

Cost of bolts/ washers 2% of cost of material 800

## B. Labour

0.08 Black smith @ Rs150/day 12

0.07 Mazdoor @ Rs100/day 7

C. Add 7 ½% for overheads on (A+B) Rs40477 3035

Add 10% profit on (A+B+C) on Rs43512 4351

Cost/sqm Rs599 say Rs 600

# Analysis of rates for building works

7. Plastering 15mm thick in cement mortar in 1:6 and 1:3 (rendering coat 10mm thick and finishing coat 5mm thick) on brick work in super structure.

Unit 1sqm, Data for 10 sqm

Quantity of plaster  $10 \times (15 + 0.6 + 0.6) / 1000 = 0.162 \text{ cum}$

Rendering coat            0.108 cum

Finishing coat            0.054 cum

# Analysis of rates for building works

Cement mortar 1:3

## A. Material

1.07 cum sand @ Rs500/cum	535
493 kg cement @ Rs4/kg	1972

## B. Labour

0.36 Mazdoor @ Rs100/day	36
0.10 Bhistie @ Rs90/day	9
Water @ 1%	26
Total	2578/cum

# Analysis of rates for building works

Cement mortar 1:6

## A. Material

1.07 cum sand @ Rs500/cum	535
254 kg cement @ Rs4/kg	1016

## B. Labour

0.36 Mazdoor @ Rs100/day	36
0.10 Bhistie @ Rs90/day	9
Water @ 1%	16
Total	1612/cum

# Analysis of rates for building works

## A. Material (1Sqm)

0.0108cum cement mortar rendering coat in CM 1:6 @ Rs 1612/cum	17.41
0.0054cum cement mortar finishing coat in CM 1:3 @ Rs 2578/cum	13.92

## B. Labour

$(0.035+0.015)=0.05$ plasterer @ Rs150/day	7.50
$(0.095+0.015)=0.11$ Mazdoor @ Rs100/day	11.00
0.04 Bhistie @ Rs90/day	9.94

C. Add 7 ½% for overheads on (A+B) on 59.77 4.48

D. Profit 10% on (A+B+C) on 64.25 6.43

Rate/sqm Rs 70.68



# Analysis of rates for building works

8. Random rubble masonry uncoursed well bonded and solidly hearted in cement mortar 1:6, face work to consist of stones hammer dressed on face, sides and bed, quoins and jamb stones to be dressed as per face stones but with face, beds and joints chisel dressed 5cm and 2 ½ cm respectively (So that no portion of chisel dressed surface has a depression more than 6mm from a straight edge held against it), bond stones to be not less than 2 per sqm of face (Granite stone to be used). Unit: 1cum

# Analysis of rates for building works

## Materials:

1.12 cum Stones @ Rs 360/cum	403
0.08 cum bond stones @ Rs500/cum	40
75.34 kg Cement @ Rs 4/kg	301
0.32cum Coarse sand @ Rs 500/cum	160
Mixing charges for mortar L.S	<u>25</u>
	929 (A)

## Labour:

0.75 Mason for RR wall uncoursed	
0.10 Mason Hammer dressing to faces/beds/joints	
<u>1.00</u> Mason Chisel dressing to beds/joints of	
1.85 quoins/jambs	

# Analysis of rates for building works

## Labour:

1.85 Mason @ Rs 150/day	278
2.07 Mazdoor @ RS100/day	207
0.07 Bhistie @ Rs100/day	7
Add water charges @ 0.25% on (A+B)	<u>4</u>
	496(B)
C) Add overheads @ 7 1/2% on (A+B)	107
D) Add profit @ 10% on (A+B+C)	153
Total Rs 1685/ cum	

# Analysis of rates for building works

9. Polished kota stone flooring slabs (using ready polished slabs of uniform size) 20 – 25mm thickness of size 250x250mm bedded over 15 – 20mm thick cement mortar 1:6 jointed and pointed in cement mortar 1:3. Unit: 1 sqm.

## A. Material

1 sqm(16 slabs) Kota stone tiles

@ Rs 250/sqm 250

0.02 cum Bedding layer in C.M 1:6

@ Rs 1612/cum 32

2.5 kg Cement slurry @ Rs4/kg 10

# Analysis of rates for building works

0.6 kg White cement for grouting joints

@ Rs 25/kg 15

## B. Labour

0.12 Tile layer @ Rs 200/day 24

0.12 Mazdoor @ Rs 100/day 12

Add 1% for water 4

C. Add 7 ½% for overheads on Rs 347 26

D. Add 10% for profit on Rs 373 37

Total    Rs 410/ sqm

# Analysis of rates for building works

10. 40mm thick  $\frac{1}{2}$  panelled and  $\frac{1}{2}$  glazed shutter for doors including aluminium hardware, MS butt hinges, screws etc. using 12mm thick particle board panels. Unit: 1 sqm (Size of shutter 2.0x1.1m)

## A. Materials

Styles  $4 \times 2.00 \times 0.10 \times 0.04 = 0.0320$  cum

### Rails

Top rail  $1 \times 1.12 \times 0.10 \times 0.04 = 0.0044$  cum

Lock & bottom rail  $2 \times 1.12 \times 0.20 \times 0.04 = 0.0179$  cum

Sash bars  $2 \times 1.12 \times 0.04 \times 0.038 = 0.0034$  cum

Beading  $18.80 \times 0.02 \times 0.012 = \underline{0.0045}$  cum

Total  $0.0622$  cum

# Analysis of rates for building works

Panels  $2 \times 0.74 \times 0.39 = 0.5772$  sqm

3mm thick glass  $8 \times 0.4 \times 0.18 = 0.576$  sqm

Timber 1<sup>st</sup> class hard wood teak  $0.0622 \times 45000 = 2799$

Panels 12mm thick particle board

panels  $0.58 \times 266/\text{sqm} =$  154.28

3mm thick glass  $0.58 \times 230$  133.40

Butt hinges(100x58x1.9mm)

6 Nos. x Rs 22/each 132.00

Aluminium anodized barrel tower bolts

200mm long 3 Nos. @ Rs 50/each 150.00

# Analysis of rates for building works

Aluminium anodized sliding door bolts with  
hasp and staple 300mm long 2 Nos.

@ Rs100/each	200.00
Screws	40.00

Total cost/sqm =  $3609/2.2 = \text{Rs } 1640$

## B. Labour

2.00 Carpenter @ Rs 200/day	400.00
0.50 Helper @ Rs 100/day	50.00

C. Add 7 ½% for overheads on (A+B) on 1640 123.00

D. Add 10% for profit on Rs 1763 176.00

Total Rs 2389/sqm



# Analysis of rates for building works

11. Aluminium snap grid false ceiling with 12mm thick perforated particle board with decorative finish on one side including finishing with ready made french polish 2 coats. Unit: 1 sqm

A. Materials

B. 1 sqm anodized aluminium snap grid frame	
work for false ceiling @ Rs 250/sqm	250
1 sqm 12mm thick perforated particle board @ Rs 250/sqm	250

# Analysis of rates for building works

French polish

Filler paste of whiten in mythelated spirit LS 20

0.25 ltr ready made french polish @ Rs 120/ltr 30

B. Labour

0.08(1<sup>st</sup> coat)

0.06(2<sup>nd</sup> coat)

0.14 Painter @ Rs 200/day 28

C. Add 7 1/2% for overheads on Rs 578 43

D. Add 10% for profit on Rs 621 62

Total Rs 683/sqm

# Analysis of rates for building works

12. Painting to wood work with one coat of primer and two coats of plastic emulsion paint.

Unit: 1 Sqm (Data for 10 sqm)

## A. Materials

0.07 Itr Patent shellac knotting @Rs110/Itr	7.70
0.20 kg Putty for stopping @ Rs 40/kg	8.00
0.85 Itr Pink primer @ Rs 80/Itr	68.00
1.40 Itr Plastic emulsion paint 2 coats @Rs 200/Itr	280.00
Sand paper, brushes etc. LS	50.00

# Analysis of rates for building works

## B. Labour

### 1.32 Painter

Preparation of surfaces 0.20

Knotting/stopping 0.15

Priming coat 0.25

Under coat 0.35

Finishing coat 0.37

1.32 @ Rs 200/day 200

0.25 helper @ Rs 100/day 25

# Analysis of rates for building works

C. Add 7 ½% for overheads on (A+B) Rs 639	48
D. Add 10% for profit on Rs 687	69

Total Rs 756/10sqm or Rs 76/ sqm

# Analysis of rates for building works

14. Workout rate per sqm of centering to soffits of RCC slabs using plywood for formwork (reusable 12 times) and Sal ballies for centering (reusable 16 times). Soffit of slab is 3.5m high from floor below

Unit: sqm Assume room size 3x3m

## A) Materials:

Ply wood required	9 sqm	
Add 5% for wastage	0.45 sqm	
Cost of ply wood BWR grade 12mm th. @ Rs370/sqm		3497
Cost/ use/ sqm		291



# Analysis of rates for building works

Cost of material & labour Rs 879

Add sundries & water charges @ 1% 9

Total 888

C) Add 7 1/2% for overheads on (A+B) 67

D) Add 10% for profit on (A+B+C) 96

Rate/ sqm 1051/9 116.77

Say Rs117



# Analysis of rates for building works

15. Point wiring in PVC conduits fixed on wooden gutties.

Length of wiring per point 12m. Unit: per point

## A) Materials:

PVC conduit 20mm 12.6m including

5% wastage @ Rs20/m 252

Fixing wooden gutties @ Rs 5/RM

Along with clips & saddles 63

Elastomer sheathed single core cable

2.5 sq mm 3x 12 @ Rs3.8/RM 137

452

# Analysis of rates for building works

Point wiring in PVC conduits fixed on wooden gutties.

Length of wiring per point 12m. Unit: per point

B) Labour:

Wireman 0.25 day @ Rs 200/day	50
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Helper 0.25 day @ Rs100/day	<u>25</u>
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75

Material & Labour (A+B)	527
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C) Add 7 ½% for overheads on (A+B)	40
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D) Add 10% for profit on (A+B+C)	57
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Rate/ point	Rs 624
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# **ANALYSIS OF RATES (MORTH)**

# **Analysis of Rates (MORTH)**

- **INTRODUCTION**
- **GENERAL PRINCIPLES**
- **EARTH WORK**
- **ROAD WORKS**
- **PAVEMENTS**
- **GEOSYNTHETICS & REINFORCED EARTH**
- **ROAD SIGNS**
- **BRIDGE WORKS**
- **CONCLUSION**

# Analysis of Rates (MORTH)

**1.Introduction:** Ministry of Road Transport & Highways (MORTH) have published guide lines (Revision September 2003) for working out analysis of rates for various road infrastructure works. This will also help in working out cost component of resources like man power, materials, machinery and money and time required for completion of works. These guide lines are equally applicable for other infrastructure works as well.

# Analysis of Rates (MORTH)

**1.Introduction (Contd):** These resources can also be used for allocation and management in CPM / PRECEDENCE / PERT networks or software tools like MS PROJECT / PRIMEVERA for planning, monitoring and control of projects. These guide lines are linked to MORTH specifications for road and bridge works.

# Analysis of Rates (MORTH)

## 2. General Principles:

**2.1. Mechanical means:** considers use of mechanical equipment as far as possible.

Manual means considered where quantum of work is not large and inaccessible locations

**2.2. Overhead charges:** These include

Site accommodation, setting up plant, access road, water supply, electric supply security arrangements

# Analysis of Rates (MORTH)

## 2. General Principles:

### 2.2. Overhead charges: These include

- Office furniture, equipment & communications
- Expenditure on contractor's corporate office, site supervision, documentation & as built drawings
- Mobilization and demobilization of resources
- Labour camps with minimum amenities and transportation to work site



# Analysis of Rates (MORTH)

## 2.General Principles:

### 2.2.Overhead charges: These include

- Light vehicles for site supervision including administrative and managerial requirements
- Laboratory equipment & quality control including field testing lab
- T&P survey instruments, setting out works, verification of dimensions, trial bores
- Watch & ward

# Analysis of Rates (MORTH)

## 2. General Principles:

### 2.2.Overhead charges: These include

- Traffic management during construction
- Expenditure on safeguarding environment
- Sundries
- Financing expenditure
- Sales/ Turnover tax
- Work insurance / Compensation

# Analysis of Rates (MORTH)

## 2. General Principles:

### 2.2. Overhead charges: These include

- Cost up to Rs50 crores 10%
- Cost above Rs50 crores 8%

### 2.3. Contractor's profit 10% of cost

**2.4. Basic inputs:** The rates of materials and labour are to be obtained from local authorities and market where project is located

# Analysis of Rates (MORTH)

## 2. General Principles:

### 2.5. Plants and equipment: Assumptions:

- Dozer is proposed for excavation, cutting, filling within 100m and hydraulic excavator and tipper is considered for longer leads
- Output of the plant and equipment considered as 70% of rated capacity under ideal conditions
- Water tanker would make one trip per hour

# Analysis of Rates (MORTH)

## 2. General Principles:

### 2.5. Plants and equipment: Assumptions:

- Output of plant/ equipment is considered for compacted quantities
- Usage charges for machines include ownership charges, cost of repair and maintenance including replacement of tyres and operating charges for crew, fuel and lubricants

# Analysis of Rates (MORTH)

## 2.General Principles:

### 2.6.Materials:

- Quantities given in the analysis of rates are approximate and include normal wastage
- Rates for materials shall include basic cost, loading, unloading cost of carriage and stacking at plant site
- Alternative proposal for crushing own aggregates by installing crusher, ready mix plant shall be worked out to effect economy

# Analysis of Rates (MORTH)

## 2. General Principles:

### 2.7. Labour:

- Labour wages shall be as per rates fixed by State government
- One mate has been provided for 25 labour
- Skilled labour include mason, carpenter, blacksmith, mechanics, welders, electrician

# Analysis of Rates (MORTH)

## 2. General Principles:

### 2.8. Carriage of materials:

- Unit for carriage of materials has been taken in hours where lead is defined including loading/unloading. In case of variable lead, unit is indicated as tonne- km with separate loading and unloading. For smaller quantities tractor trailer is considered. Where loading is done by mechanical plant 10% extra over carriage charge



# Analysis of Rates (MORTH)

## 2. General Principles:

### 2.9. General:

- Sundries have been catered for unforeseen and miscellaneous items
- Requirement of machinery has been worked out considering 6 effective working hours in a shift of 8 hours

# Analysis of Rates (MORTH)

## 2. General Principles:

### 2.9. General:

- Cost of work in urban areas is 10 - 15% more due to mixed traffic, traffic jams, congestion
- Wages are higher in urban areas, extra cost for working in the night for lighting, transportation of working parties at odd hours. An addition of 2 - 3% may be considered according to severity of ground conditions

# Analysis of Rates (MORTH)

## 2.General Principles:

### 2.10.Dismantled materials:

Realistic assessment is required for credit of such materials for reuse or disposal

### 2.11. Rates:

- Rates include cost of testing materials and works
- Items of hilly terrain have to be analyzed separately

# Analysis of Rates (MORTH)

## 2. General Principles:

### 2.11. Rates:

- Replacement of unsuitable soil needs to be paid separately
- 10% extra cement may be provided for working under water
- Contractor shall provide field lab. Provision of fly ash has been made for embankment, sub-base construction and concrete pavement

# 3. Earth work

## Excavation in soil manually:

Excavation in soil for road way including loading in trucks for carrying out cut earth to embankment site with all lifts and lead up to 1000m Unit: 1Cum (Output 120cum)

### a) Labour

Mate 1.8 day @ Rs110/day 198

Mazdoor 45 days @ Rs100/day 4500

### b) Machinery

Truck 5.5cum capacity 10 hr  
@ Rs 400/hr 4000

c) Over heads @ 10% on (a+b) 870

d) Profit @10% on (a+b+c) 957

Cost/cum 10525/120 Rs 87.70 sayRs 88

# 3. Earth work

## Excavation in ordinary rock manually:

Excavation in ordinary rock including carrying of excavated material in a truck to embankment site with all lifts & lead up to 1000m. Unit = cum, out put 120 cum

### a) Labour

Mate 2.8 days @ Rs110/day 308

Mazdoor 70 Nos @ Rs 100/day 7000

### b) Machinery

Truck 5.5 cum capacity 10hrs @ Rs400/hr 4000

c) Overheads @10% on (a+b) Rs11308 1131

d) Contactor's profit @10% on (a+b+c) 1244

Rate/cum Rs13683/ 120

114.02 say Rs 114

# 3. Earth work

**Excavation in soil with dozer with lead up to 100 m: Unit Cum, Output – 180cum**

**a) Labour**

Mate 0.08 Nos @ Rs110/day	9
Mazdoor 2 Nos @Rs100/day	200

**b) Machinery**

Dozer, 80 HP @30cum/hr 6hr Rs2400/hr	14400
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**c) Overheads 10% on (a+b) 1461**

**d) Contractor's profit 10% on (a+b+c) 1607**

Rate/cum Rs17677/180	Rs98.20	say Rs 98
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# 3. Earth work

## **Excavation in hard rock (Requiring blasting) with disposal up to 100m**

Excavation in hard rock by drilling, blasting and breaking, trimming of bottom and sides to grades and levels, loading and disposal of rock up to 1000m Unit Cum, output 180 cum

### a) Labour

Mate	0.22 days @ Rs 110/day	22
Mazdoor	3 days @ Rs 100/day	300
Driller	2 days @ Rs 130/day	260
Blaster	0.25 days @ Rs 150/day	38



# 3. Earth work

## Excavation in hard rock (Contd)

### b) Machinery

Dozer, 80HP @ 30cum/hr	6hr @ Rs2400/hr	14400
Air compressor, 250 cfm with 2 jack hammers		
6 hrs @ Rs 206/hr		1236
Front end loader 1 cum bucket capacity	6 hrs	
@ Rs 520/hr		3120
Tipper 10 t capacity	11.25 hrs @Rs 400/ hr	4500

# 3. Earth work

## Excavation in hard rock (Contd)

### c) Materials

Gelatin 80% 63 kg @ Rs30/kg	1890
Electric detonators @ 1 detonator for 2 gelatin sticks of 125gms each 252 @ Rs20/each	5040
Credit for 50% of excavated rock 90cum (-)	4500
d) Overheads @10% on (a+b+c)	2630
d) Contractor's profit @ 10% (a+b+c+d)	2894
Rate/ cum Rs 31830/180	176.83 say 177

# 3. Earth work

## Excavation in rock, blasting prohibited:

Excavation in hard rock with rock breakers including breaking rock, loading in tippers and disposal up to 1000m. Unit Cum, output 36cum

### a) Labour

Mate 0.40 day @ Rs 110/day 44

Mazdoor 10 Nos @ Rs 100/day 1000

### b) Machinery

Hydraulic excavator with breaker @ 6cum/hr  
@ Rs 1500/hr 9000

Tipper 5.5 cum capacity 6.5hrs @400/hr 2600

Credit for excavated rock 18 cum (-) 900

## 3. Earth work

### Excavation in rock, blasting prohibited:

c) Overheads @ 10% on (a+b)	1174
d) Contractor's profit @10% on (a+b+c)	1291
Rate/ cum Rs14209/ 36	394.69 say 395

# 3. Earth work

**Construction of embankment with material obtained from borrow pits:** Unit cum, output 100cum lead 1 km

Construction of embankment with approved material obtained from borrow pits with all lifts and lead, transporting to site, spreading, grading to required slope and compacting as specified.

## a) Labour

Mate	0.04 days @ Rs 110/day	4.40
Mazdoor	1.00 day @ Rs 100/day	100.00

# 3. Earth work

**Construction of embankment with material obtained from borrow pits:** Unit cum, output 100cum, Lead 1km

b) Machinery

Hydraulic excavator 1cum bucket capacity @ 60cum/hr 1.67 hr @1100/hr	1837
Tipper 10 t capacity 160xL/ t.km @ Rs 3.40/t.km	544
Add 10% of cost of carriage for loading/ unloading	272
Dozer 80HP for spreading 0.5cum @ 200cum/hr @ Rs 2400/hr	1200
Motor grader for grading 1.00cum @ 100cum/hr @ Rs1545/hr	1545

# 3. Earth work

**Construction of embankment with material obtained from borrow pits:** Unit cum, output 100cum, Lead 5km

b) Machinery

Water tanker 6KL capacity

for 4 hr @ Rs450/hr 1800

Vibratory roller 8-10T for 1 hr @100cum/hr @ Rs1000/hr 1000

# 3. Earth work

**Construction of embankment with material obtained from borrow pits:** Unit cum, output 100cum, Lead 5km

c) Material

Cost of water 24KL @ Rs 50/KL 1200

Compensation for earth taken from private land 100cum @ Rs50/cum 5000

d) Overheads @10% on (a+b+c) 1450

e) Contractor's profit @ 10% on (a+b+c+d) 1595

Rate/ cum Rs  $17547.4/100 = 175.47$  say 175



# 4.Road works

Sub base, Bases (Non bituminous) and shoulders:

- For construction of sub base two methods i.e. Mix in place method, plant mix method are available
- Plant mix method is economical and achieves better progress
- In case of medians, separators, footpaths plate compactor has been considered

# 4.Road works

## Hand broken stone aggregates 63mm nominal size:

Supply of quarried stone, hand breaking into coarse aggregate 63mm size and stacking as directed (Passing 80mm sieve & retained on 50mm sieve). Unit Cum, output 1 cum

a)	Labour	
	Mate 0.06 day @ Rs 110/day	6.60
	Mazdoor 1.5 day @ Rs 100/day	150.00
b)	Material	
	Supply of quarried stone 150-200mm	
	1.1cum @ Rs 200/cum	220.00
c)	Overheads @10% on (a+b)	37.66
d)	Contractor's profit @10% on (a+b+c)	41.43
	Rate/cum (a+b+c+d)= 455.75 say 456	

# 4.Road works

Crushing of stone aggregate 20mm nominal size:

Crushing of stone boulders of 150mm size in an integrated crushing unit of 200 T/hr capacity comprising of primary & secondary crushing units, belt conveyor, and vibrating screens

Unit: cum, Output 670cum

## a) Labour

Mate 0.76 day @ Rs 120/day 91.20

Mazdoor skilled 2 days @ Rs 110/day 220.00

Mazdoor 17 days @ Rs 100/day

for breaking 1700.00

# 4.Road works

## Crushing of stone aggregate 20mm nominal size:

### b) Material

Stone boulders of size 150mm

800cum @ Rs200/cum 160000

### c) Machinery

Integrated stone crusher of

200tph 6 hr @ Rs11760/hr 70560

Front end loader 1cum capacity

20 hrs @ Rs 520/hr 10400

Tipper 5.5 cum 20 hrs @ Rs400/hr 8000

d) Overhead charges @ 10% on (a+b+c) 25097

e) Contractor's profit @10% on (a+b+c+d) 27607

Rate/cum  $303675/670 = 453.24$  say 453

, 90% of 670cum shall be 20mm & 10% 10mm below

# 4.Road works

Granular sub base with close graded material (Plant mix method)

Construction of granular sub base by providing close graded material, mixing in a mechanical plant at OMC, carriage of mixed material to work site, spreading in uniform layers with motor grader on prepared surface and compacting with vibratory power roller to achieve desired density

Unit cum, Output 225cum(450T)

## a)Labour

Mate 0.4 day @ Rs120/day	48
Mazdoor skilled 2 days @ Rs110/day	220
Mazdoor 8 days @ Rs100/day	800

# 4.Road works

Granular sub base with close graded material (Plant mix method)

## b) Machinery

Wet mix plant @ 75T/hr for 6Hr@ Rs900/hr	5400
Electric generator set 125KVA for @ 6hr600/hr	3600
Water tanker 6KL 5Km lead, 4.5hr @ Rs 450/hr	2025
Front end loader 1cum bucket capacity 6hr @ Rs 520/hr	3120
Add 10% towards cost of loading/unloading	312
Motor grader 110 HP for 6 hr @ 1545/hr	9270
Vibratory roller 8-10T for 6 hr @ 994/h	5964

# 4.Road works

Granular sub base with close graded material (Plant mix method)

## c) Materials Grading I

53mm to 9.5mm @50%, 144cum

@Rs 275/cum 39600

9.5mm to 2.36mm @20%, 57cum

@ Rs460/cum 26220

2.36mm below @ 30% 86.4cum

@ Rs 460/cum 39744

Cost of water 27 KL @ Rs50/KL 1350

d) Overheads @ 10% on (a+b+c) 13767

e) Contractor's profit @ 10% on (a+b+c+d) 15144

Rate/ cum Rs  $166584/225 = 740.37$  say 740

# 4.Road works

Lime treated soil for sub base:

Providing, laying and spreading soil on a prepared sub grade, pulverizing, mixing the spread soil in place with rotavator with 3% slaked lime with minimum content of 70% of CAO, grading with motor grader and compacting with road roller at OMC to achieve at least 98% of the maximum dry density to form a layer of sub base

Unit cum, Output 300cum (525T), lead 1 km

## a) Labour

Mate 0.48 day @ Rs 120/day	57.60
Mazdoor skilled 2 days @ 110/day	220.00
Mazdoor 10 days @ Rs 100/day	1000.00



# 4.Road works

Lime treated soil for sub base:

b) Machinery

Excavator 1 cum bucket 6 hrs @ Rs 1100/hr	6600
Tipper for carriage of soil 525xL t.Km @ Rs3/t.km	1575
Add 10% for loading/ unloading	
1575 Motor grader 110HP for 6 hr @50cum/hr @ Rs1545/hr	9270
Vibratory roller 8-10 T 6 hrs @ 1000/hr	6000
Tractor with rotavator for 12hr @ 25cum/hr @ Rs 250/hr	3000
Water tanker 12 hrs @ Rs450/hr	5400

# 4.Road works

Lime treated soil for sub base:

## c) Material

Lime at site 15.75 T @ Rs 4000/T 63000

Cost of water 72 KL @ Rs 50/KL 3600

d) Overheads @ 10% on (a+b+c) 10130

e) Contractor's profit @ 10%

on(a+b+c+d) 11143

Rate/cum  $122571/300 = 408.57$  say 409

# 4.Road works

## water bound macadam

Providing laying, spreading and compacting stone aggregates of specific sizes to water bound macadam including spreading in uniform thickness, hand picking, rolling with 3 wheeled steel/ vibratory roller 8-10T in stages to proper grade and camber, applying and brooming requisite type screenings/ binding ,materials to fill up interstices of aggregates, watering and compacting to required density

Unit cum, output 360 cum using machinery

### a) Labour

Mate 0.68 day @ Rs 120/day	81.60
Mazdoor skilled 2.0 day @ Rs 110/day	220.00
Mazdoor 15 days @ Rs 100/day	1500.00

# 4.Road works

## water bound macadam

### b) Machinery

Motor grader 110HP for 7.2 hrs

@ 50cum/hr for spreading @Rs1545 11124

3 wheeled roller 8-10T for 12hrs

@ 30cum/hr @ Rs 297/hr/hr 5964

Water tanker 6 KL for 24 hr @450/h 3564

## 4.Road work

c) Grading II 63 to 45mm aggregate	435.6cum	
@ 0.91cum /10sqm for compacted		
thickness of 75mm @Rs275/cum		119790
Stone screenings type B 11.2mm,	96.01	
cum @ 0.20cum/10sqm @ Rs 360/cum		34564
Blinding material 28.80cum @		
0.08cum/10sqm @ Rs210/cum		6048
Cost of water 144 KL @ Rs 50/KL		7200

# 4.Road works

## water bound macadam

d) Overheads @ 10% on (a+b+c)	19005
e) Contractor's profit @ 10% on (a+b+c+d)	20906

Rate/cum  $229967/360 = 638.79$ , say 639

### Components:

Labour	0.80
Machinery	8.90
Material	72.90
Overheads/ Profit	17.40

# 4.Road works

## **Wet mix Macadam:**

Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing material with water at OMC in mechanical mix plant, carriage of mixed material by tipper to site, laying in uniform layers with paver in sub base / base course on well prepared surface and compacting with vibratory roller to achieve desired density. Unit cum, output 225cum (495T), Lead 1 km.

# 4.Road works

## Wet mix Macadam:

### a) Labour

Mate 0.48 day @ Rs 120/day	58
Mazdoor skilled 2.00 @ Rs 110/day	220
Mazdoor 10.00 @ Rs 100/day	1000

### b) Machinery

Wet mix plant 75T/hr 6.6 hrs @ Rs 900/day	5940
Electrical generator 125 KVA for 6hrs @ Rs600/hr	3600
Front end loader 1cum capacity @ 520/hr	3120
Paver finisher 100 TPH 6hrs @ Rs 629/hr	3774
Vibratory roller 8-10T, for 6hrsx0.65 @ Rs994/hr	3877
Water tanker for 3 hrs @ Rs 450/hr	1350
Tipper 495xL t.km @ Rs 3/km	1485
Add 10% for loading/ unloading	149



# 4.Road works

## Wet mix Macadam:

### c) Material

45mm to 22.4mm @ 30%, 89.1cum

@ Rs 290/cum 25839

22.4mm to 2.36mm @ 40%, 118.80cum

@ Rs 360/cum 42768

2.36mm to 75 micron @ 30%, 89.10cum

@ Rs 460/cum 40986

Cost of water 18 KL @ Rs 50/KL 900

# 4.Road works

## Wet mix Macadam:

d) Overheads @ 10% on (a+b+c)	13507
e) Contractor's profit @ 10% on (a+b+c+d)	14857
Rate/cum $163430/225 = 726.35$ say 726	

## Components:

Labour	0.80%
Machinery	14.25%
Material	67.60%
Overheads/ profit	17.35%

# 4.Road works

## **Bases and surface course (Bituminous):**

### Preamble:

1. Machinery that suits for particular situation shall be adopted
2. Outputs for construction equipment are for consolidated quantities
3. Quantities indicated for primer, tack coat, binder are the minimum and adjustment shall be done for quantities as per design
4. Tack coat and prime coat where provided shall be measured separately. Tack coat will be provided immediately before bituminous layer

# 4.Road works

## **Bases and surface course (Bituminous):**

Preamble:

5. Compaction is the key for good construction, hence availability of road roller shall be ensured
6. Spreading of bituminous material shall be done by mechanical means except where a mechanical paver cannot be deployed
7. The source of materials must be tested by the engineer

# 4.Road works

## Bases and surface course (Bituminous):

Prime coat: providing and applying bituminous emulsion on prepared surface of granular base including clearing of road surface and spraying primer at the rate of 0.60kg/sqm using mechanical means:

Unit- Sqm, output- 3500 sqm

### a) Labour

Mate 0.08 day @ Rs 110/day                      8

Mazdoor 2days @ Rs 100/ day                  200

# 4.Road works

## Bases and surface course (Bituminous):

Prime coat:

### b) Machinery

Mechanical broom for 2.8 hrs @1250sqm/hr @ Rs 230/hr	644
Air compressor 250 cfm for 2.8hr @ 206/hr	577
Bitumen pressure distributor for 2 hr @ 1750sqm/hr @ Rs 692/hr	1384
Water tanker 6 KL for 1 hr @ 1 trip/hr 10 km	156

# 4.Road works

## Bases and surface course (Bituminous):

Prime coat:

c) Material

Bitumen emulsion 2.10 T @ 0.6 kg/sqm

@ Rs 14000/T 294000

Cost of water 6 KL @ Rs 50/KL 300

d) Overhead charges @ 10% on (a+b+c) 29726

e) Contractor's profit @ 10% on (a+b+c+d) 32700

Rate/ sqm  $\text{Rs } 359695/3500 = 102.77$  say 108

# 4.Road works

## Bases and surface course (Bituminous):

Tack coat:

Providing and applying tack coat with bitumen emulsion using pressure distributor at the rate of 0.20 kg /sqm on the prepared bituminous/ granular surface cleaned with mechanical broom:  
Unit Sqm, Output 3500sqm

### a) Labour

Mate 0.08 day @ Rs 110/day	8
Mazdoor 2 days @ Rs 100/day	200



# 4.Road works

## Bases and surface course (Bituminous):

Tack coat:

### b) Machinery

Mechanical broom @ 1250/hr for 2.80hr

@ Rs 230/hr 644

Air compressor 250 cfm for 2.8 hr

@ Rs 206/hr 577

Emulsion pressure distributor @

1750sqm/hr for 2.8 hr @ Rs 692/hr 1938

# 4.Road works

## Bases and surface course (Bituminous):

Tack coat:

### c) Material

Bitumen emulsion @ 0.2 kg/sqm for

0.70 T @ Rs 14000/T 9800

d) Overhead charges @ 10% on (a+b+c) 1317

e) Contractor's profit @ 10% on (a+b+c+d) 1448

Rate/sqm  $\text{Rs}15932 / 3500 = 4.55$  say 5

Components:

Labour	1.31%	Materials	61.51
Machinery	19.82%	Overheads/ profit	17.35

# 4.Road works

## **Bases and surface course (Bituminous):**

Bituminous Macadam:

Providing and laying bituminous macadam with 100-120 TPH hot mix plant producing an average of 75 T/hr using crushed aggregates of specified grading premixed with bituminous binder, transported to site, laid over a previously prepared surface with paver finisher to the required grade, level and alignment and rolled to achieve desired compaction. Unit Cum, Output 205cum (450T) 20km lead.

## 4.Road works

### Bases and surface course (Bituminous):

#### Bituminous Macadam:

##### a) Labour

Mate 0.84 day @ Rs 110/day 92

Mazdoor for working with HMP etc  
16 days @ Rs 100/day 1600

Skilled mazdoor 5 days for checking  
line/level@ Rs 110/day 550

# 4.Road works

## Bases and surface course (Bituminous):

Bituminous Macadam:

### b) Machinery

Batch mix HMP 100-120T/hr @ 75 T/hr actual output for 6 hrs @ Rs 15100/hr	90600
Mechanical broom hydraulic @ 1250sqm/hr for 2.2 hrs @ Rs 230/hr	506
Air compressor 250 cfm for 2.2 hrs @ Rs 206/hr	453
Paver finisher 100TPH with sensor control @ 75 cum/hr for 6 hrs @ Rs 1725/hr	10350

# 4.Road works

## Bases and surface course (Bituminous):

Bituminous Macadam:

### b) Machinery

Generator 250 KVA for 6 hrs @ Rs 600/hr	3600
Front end loader 1cum bucket for 6hrs @ Rs 520/hr	3120
Tipper 10T capacity 450 X 20 t.km @ Rs 2/km	18000
Add 10% for loading/ unloading	1800
Smooth wheeled roller 8 -10T for for 6 x 0.65 hrs for initial rolling @ Rs 802/hr	3128

# 4.Road works

## Bases and surface course (Bituminous):

Bituminous Macadam:

### b) Machinery

Vibratory roller 8T for intermediate rolling

for 6x 0.65 hrs @ Rs 994/hr 3877

Finishing rolling with 6-8T smooth wheeled

tandem roller for 6x0.65 hrs @ Rs 738/hr 2878

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138312

# 4.Road works

## Bases and surface course (Bituminous):

Bituminous Macadam:

c) Material

Bitumen @ 3.3% of mix

14.85T @ Rs 14000/T

207900

Aggregates: Total weight of mix – 450T

Wt. of bitumen – 14.85 T, Wt. of aggregate

$450 - 14.85 = 435.15$  T, Taking density

of aggregate as 1.5T/cum, Volume= $290.1$ cum

@ Rs 360/cum

104436

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312336



# 4.Road works

## Bases and surface course (Bituminous):

Bituminous Macadam:

d) Overhead charges @ 10% on (a+b+c) 45289

e) Contractor's profit @ 10% on (a+b+c+d) 49818

Rate/ cum Rs  $547997/205=2673.16$  say 2673

Components:

Labour	0.41%
Machinery	25.23%
Material	57.00%
Overheads/profit	17.35%

# 4.Road works

## **Bases and surface course (Bituminous):**

### **semi dense bituminous concrete:**

Providing and laying semi-dense bituminous concrete with 100-120 TPH batch type HMP producing an average output of 75T/hr using crushed aggregates of specified grading, premixed with bituminous binder @ 4.5 to 5 % of mix and filler, transporting the hot mix to site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction.

Unit – Cum, Output – 195 cum (450T), Lead 10km

# 4.Road works

## Bases and surface course (Bituminous): semi dense bituminous concrete:

### a) Labour

Mate 0.84 day @ Rs 110/day	92.40
Mazdoor 16 Nos @ Rs100/day	1600.00
Skilled mazdoor 5 Nos @ Rs 100/day	500.00

### b) Machinery

Batch mix HMP @ 75T/hr for 6 hrs @ Rs15100	90600
Paver finisher hydrostatic with sensor control for 6 hrs@ 75cum/hr @ Rs 1725/hr	10350

# 4.Road works

## Bases and surface course (Bituminous): semi dense bituminous concrete:

### b) Machinery

Generator 250 KVA for 6 hrs @ Rs 600/hr 3600

Front end loader I cum bucket for 6 hrs  
@ Rs 520/hr 3120

Tipper 10 T capacity 450x 10 t.km  
@ Rs 2/km 9000

Add 10% for loading/ unloading 900

# 4.Road works

**Bases and surface course (Bituminous):  
semi dense bituminous concrete:**

## b) Machinery

Smooth wheeled roller 8-10T for initial rolling for 6 x0.65 hrs @ Rs 802/hr	3128
Vibratory roller 8T for intermediate rolling for 6x0.65 hrs @ Rs 994/hr	3877
Finish rolling with 6-8 T smooth wheeled tandem roller for 6x0.65 hrs @ Rs 738/hr	2878

# 4.Road works

## Bases and surface course (Bituminous): semi dense bituminous concrete:

### c) Material

Bitumen @ 5% of wt. of mix 22.50 T

@ Rs 14000/T 315000

Aggregate – Total wt. 450T, wt of bitumen  
22.50T, wt. of aggregate – 427.5 T.

Taking density of aggregate as 1.5 T/cum,  
volume of aggregate 13 mm is 285.0 T

@ Rs360/cum 102600

# 4.Road works

## Bases and surface course (Bituminous): semi dense bituminous concrete:

### c) Materials

Filler @ 2% wt. of aggregates

8.62 T @ Rs 4000/T 34480

d) Overhead charges @ 10% on (a+b+c) 58173

e) Contractor's profit @ 10% o (a+b+c+d) 63990

Rate/cum Rs  $703888/195 = 3609.68$  say Rs3610

### Components:

Labour	0.31%	Materials	64.23%
Machinery	18.11%	Overheads/Profit	17.35%

# 4.Road works

## **Bases and surface course (Bituminous):**

### **Open graded premix surfacing:**

Providing, laying and rolling of open graded premix surfacing of 20mm thickness composed of 13.2mm to 5.6mm aggregates either using penetration or cutback or emulsion to required line, grade and level to serve as wearing course on previously prepared base, including mixing in a suitable plant, laying and rolling with a smooth wheeled roller 8-10 T.

Unit Sqm, Output 10250 Sqm (205cum), lead 2 km



# 4.Road works

## Bases and surface course (Bituminous):

### Open graded premix surfacing:

#### a) Labour

Mate 0.84 days @ Rs120/day	101
Mazdoor 16 days with HMP @ Rs 100/day	1600
Mazdoor skilled 5 days @Rs110/day	500

# 4.Road works

## Bases and surface course (Bituminous):

### Open graded premix surfacing:

#### b) Machinery

Batch type HMP 75T/hr 6 hr

@ Rs1440/hr 8640

Electric generator 250 KVA for

6 hrs @ Rs600/hr 3600

Front end loader I cum bucket

for 6 hr @ Rs 520/hr 3120

Tipper 10 T 450x2t.km @ Rs 2 t.km 1800

Add 10% for loading/ unloading 180

# 4.Road works

## Bases and surface course (Bituminous):

### Open graded premix surfacing:

#### b) Machinery

Paver finisher hydrostatic with

sensor 6hrs @ Rs1725/hr 10350

Smooth wheeled/ tandem roller

for 6 hrs @ Rs 802/ hr 4812

#### c) Materials

Bitumen 14.97 T@ Rs 14000/T 209580

Crushed stone chippings 276.75 cum

13.2 to 5.6mm@ 0.27/sqm @ Rs 360/cum 99360

# 4.Road works

## Bases and surface course (Bituminous):

### Open graded premix surfacing:

d) Overhead charges @ 10% on  
(a+b+c) 34584

e) contractor's profit @ 10% on  
(a+b+c+d) 38043

Rate/ sqm  $\text{Rs}418471/10250=40.82$  sayRs41

### Components:

Labour	0.53%	Material	73.83%
Machinery	8.29%	Overheads/profit	17.35%

# 4.Road works

## Bases and surface course (Bituminous):

### Seal coat:

Providing and laying seal coat sealing the voids in a bituminous surface laid to the specified levels, grade and cross section and cross fall using type A stone chippings.

Unit - Sqm, Output -10250 sqm(92.25 cum), lead 2 km

### a) Labour

Mate 0.24 days @ Rs 110/day	26.40
Mazdoor 6 days @ Rs 100/day	600.00

# 4.Road works

## Bases and surface course (Bituminous):

### Seal coat:

#### b) Machinery

Hydraulic self propelled chip spreader for 6 hrs @ Rs 1700/hr	10200
Tipper 5.5 cum capacity for 6 hr @ Rs 400/hr	2400
Front end loader 1 cum bucket for 6 hrs @ Rs 520/hr	3120
Bitumen pressure distributor for 6 hrs @ 1750sqm/hr @ Rs 692/hr	4152
Smooth wheeled roller for 6 hrs @ Rs 802/hr	4812

# 4.Road works

## Bases and surface course (Bituminous):

### Seal coat:

#### c) Material

Bitumen 10.05 T @ 9.80 kg/10 sqm

@ Rs 14000/T 140700

Crushed stone chippings 6.7mm size

92.25 cum @ 0.09cum/10 sqm

@ Rs 460/cum 42435

d) Overheads @ 10% on (a+b+c) 20845

e) Contractor's profit @ 10% on (a+b+c+d) 22929

Rate/sqm Rs  $252219/10250 = 24.61$  say Rs25

# 4.Road works

**Bases and surface course (Bituminous):**

**Seal coat:**

Components:

Labour 0.25

Machinery 9.79

Material 72.60

Overheads and profit 17.36



# 4.Road works

## **Bases and surface course (Bituminous):**

Crack prevention courses- stress absorbing membrane (SAM) Crack width < 6mm:

Providing and laying a stress absorbing membrane over a cracked road surface with crack width < 6mm after cleaning with a mechanical broom, using modified binder sprayed @ 9kg/10sqm and spreading 5.6mm stone aggregates@ 0.11cum/10sqm with hydraulic chip spreader, sweeping the surface for uniform spread of aggregates and surface finished.

Unit - Sqm, Output - 10500sqm

# 4.Road works

## Bases and surface course (Bituminous):

Crack prevention courses- stress absorbing membrane (SAM) Crack width < 6mm:

### a) Labour

Mate 0.24 day @ Rs 110/day	26.40
Mazdoor 6 days @ Rs100/day	600.00

### b) Machinery

Mechanical broom for 6 hrs @ 1250sqm/hr @ Rs 230/hr	1380.00
Air compressor 250cfm for 6 hrs @ Rs 206/day	1236.00

# 4.Road works

## Bases and surface course (Bituminous):

Crack prevention courses- stress absorbing membrane (SAM) Crack width < 6mm:

### b) Machinery

Bitumen pressure distributor

@1750sqm/hr for 6 hrs @ Rs 692/hr 4152

Hydraulic chip spreader

for 6 hrs @ Rs 1700/hr 10200

Smooth wheeled roller 8-10T

for 6 hrs @ Rs 802/hr 4812

# 4.Road works

## Bases and surface course (Bituminous):

Crack prevention courses- stress absorbing membrane (SAM) Crack width < 6mm:

### c) Material

Modified binder 9.45 T @ Rs16000/T 151200

Crushed stone aggregates

5.6mm size 105cum @ Rs 460/cum 48300

d) Overheads @ 10% On (a+b+c) 22191

e) Contractor's profit @ 10% on (a+b+c+d) 24410

Rate/ Sqm Rs 268507/10500 = 25.57 say Rs 26

# 5.Cement concrete pavements

## Cement concrete pavements:

### Preamble:

- High capacity batch mix plant of 75 cum/hr has been considered
- Rolled transit truck mixers have been considered for cement concrete
- Super plasticizer admixtures have been provided to improve workability and reduce water cement ratio

# 5.Cement concrete pavements

## Cement concrete pavements:

### Preamble:

- Cement 43 grade has been catered
- Slip form paver has been catered
- Exact quantities are to be worked out as per job mix formula

# 5. Cement concrete pavements

## **Cement concrete pavements:**

### **Dry lean cement concrete sub base:**

Construction of dry lean cement concrete sub base over a prepared sub grade with coarse and fine aggregate, size of coarse aggregate not exceeding 25mm, aggregate cement ratio not to exceed 15:1, cement content not less than 150 kg/cum, optimum moisture content to be determined, concrete strength not less than 10Mpa at 7 days, mixed in a batching plant, brought to site, laid with paver with electronic sensor, compacting with 8-10 t vibratory roller, finishing and curing. Unit –cum, Output 450cum(990 T)

# 5.Cement concrete pavements

## Cement concrete pavements:

### Dry lean cement concrete sub base:

#### a) Labour

Mate 1.12 day @ Rs110/day	123.10
Mazdoor skilled 6 days @ Rs 110/day	660.00
Mazdoor 22 days @ Rs 100/day	2200.00

#### b) Machinery

Front end loader 1 cum bucket 6 hr @ Rs 520/hr	312.00
Cement concrete batch mix plant @ 55 cum/hr @ Rs 1700/hr	93500.00



# 5. Cement concrete pavements

## Cement concrete pavements:

### Dry lean cement concrete sub base:

b) Electric generator 100 KVA for 6 hrs @ Rs 450/hr	2700
Paver with electronic sensor for 6 hrs @ Rs 1725/hr	10350
Vibratory roller 8- 10T for 8 hrs @ Rs 994/ hr	7952
water tanker 6 KL for 8 hrs @ Rs223/hr	1784
Tipper 990xL t.km @ Rs2/t.km	3960
Add 10% for loading/ unloading	396

# 5. Cement concrete pavements

## Cement concrete pavements:

### Dry lean cement concrete sub base:

#### c) Materials

Crushed stone aggregate 25mm,  
12.5mm nominal sizes @

0.9cum/cum of concrete for 405  
cum@Rs360/cum

145800

Coarse sand 203 cum @0.45 cum/ cum  
of concrete @ Rs400/cum

81200

Cost of water 48 KL @ Rs50/KL

2400

# 5. Cement concrete pavements

## Cement concrete pavements:

### Dry lean cement concrete sub base:

- |   |       |
|---|-------|
| d) Overheads @10% on (a+b+c)              | 35338 |
| e) Contractor's profit @ 105 on (a+b+c+d) | 38868 |

Rate/cum Rs  $427543 / 450 = 950.09$  say Rs 950

# 5. Cement concrete pavements

## **Cement concrete pavements:**

### **Cement concrete pavement:**

Construction of un-reinforced, dowel jointed, plain cement concrete pavement over a prepared sub base with 43 grade cement @400kg/cum, coarse and fine aggregate conforming to IS 383, maximum size of coarse aggregate not > 25mm, mixed in a batching & mixing plant, transported to site, laid with a slip form/ fixed form paver, spread, compacted and finished including, provision of construction/expansion joint filler

# 5. Cement concrete pavements

## Cement concrete pavements:

### Cement concrete pavement:

Separation membrane, sealant primer, joint sealant, debonding strip, dowel bar, tie rod, admixtures as approved, curing compound finishing to grades and lines:

Unit- Cum, Output 1050 cum

#### a) Labour

Mate 2 days @ Rs 120/day	240
Mazdoor skilled 15 days @ Rs 110/day	1650
Mazdoor 35 days @ Rs 100/day	3500

# 5. Cement concrete pavements

## Cement concrete pavements:

### Cement concrete pavement:

#### b) Machinery

Road sweeper @1250sqm/hr

for 2.8hrs @ Rs230/hr 644

Front end loader 1cum bucket for 18 hrs

@ Rs 520/hr 9360

Cement concrete batch mix plant

@ 175cum/hr for 6 hrs @ Rs 20000/hr 120000

Electric generator 250 KVA for

6 hrs @ Rs600/hr 3600

# 5.Cement concrete pavements

## Cement concrete pavements:

### Cement concrete pavement:

#### b) Machinery

Slip form paver with electronic sensor for 6 hrs @ Rs 1725/hr	10350
Water tanker 6 KL for 6 hrs @ Rs223/hr	1338
Transit truck agitator 5 cum capacity for 2415x2 km @ Rs2 t.km	9660
Add 10% for loading and unloading	966
Concrete joint cutting machine for 12 hrs @ Rs200/hr	2400
Texturing machine for 12 hrs @ Rs 250/hr	3000

# 5. Cement concrete pavements

## Cement concrete pavements:

### Cement concrete pavement:

#### c) Material

Crushed stone aggregate 25/12.5mm

945cum @ Rs 360/cum 340200

Sand 473cum @ Rs400/cum 189200

Cement 43 Gr.414T @ Rs4000/T 1656000

32mm MS dowel bars 9.45 T @ Rs

32000/T 302400

16mm CTD tie bars 1.17 T @ Rs33000/T 38610

Separation membrane plastic

3675 sqm @ plastic sheeting 125 micron

@ Rs5/sqm 18375



# 5. Cement concrete pavements

## Cement concrete pavements:

### Cement concrete pavement:

#### c) Material

Pre moulded joint filler, 25mm thick for expansion joint	16.33 sqm @ Rs 580/sqm	9471
Joint sealant	875 kg @ Rs 35/kg	30625
Plastic sheath 1.25mm thick for dowel bars	46.67 sqm @ Rs5/sqm	233
Curing compound	1850 Litre @ Rs20/lr	37000
Super plasticizer	2070 kg @ Rs40/kg	82800
Cost of water	216 KL @ Rs 50/Kl	10800

# 5. Cement concrete pavements

## Cement concrete pavements:

### Cement concrete pavement:

d) Overheads @ 10% on (a+b+c) 288242

e) Contractor's profit @ 10% on (a+b+c+d) 317066

Rate/cum Rs34  $87730/1050=3321.65$  say Rs3322

### Components:

Labour	0.15%
Machinery	4.63%
Material	77.86%
Overheads/ profit	17.36%

# 6. Geosynthetics & reinforced earth

## **Laying paving fabric beneath a pavement overlay:**

Providing and laying paving fabric over a tack coat of paving grade bitumen 80-100 penetration, laid at the rate of 1 kg/sqm over thoroughly cleaned and repaired surface to provide water resistant membrane and crack retarding layer. Paving fabric to be free of wrinkling and folding and to be laid before cooling of tack coat, brooming and rolling of surface with pneumatic roller to maximize fabric contact with pavement surface

Unit – sqm, output – 2800 sqm

# 6. Geo synthetics & reinforced earth

## Laying paving fabric beneath a pavement overlay:

### a) Labour

Mate 0.8 day @ Rs110/day 88

Mazdoor 20 days @ Rs100/day 2000

### b) Machinery

Road sweeper @ 1250sqm/hr for 2.24 hrs @  
Rs@230/hr 515

Pneumatic roller 14 T, @ 2000 sqm/hr  
for 1.4 hrs @ Rs802/hr 1123

Bitumen pressure distributor @ 1750 sqm/hr  
for 1.68 hrs @ Rs 692/hr 1163

# 6. Geo synthetics & Reinforced earth

## Laying paving fabric beneath a pavement overlay:

### c) Material

Paving fabric 2940 sqm @Rs20/sqm 58800

Paving bitumen 2.80 T @ Rs14000/T 39200

c) Overheads @ 10% on (a+b+c) 10289

d) Contractor's profit @ 10% on (a+b+c+d) 11318

Rate/sqm  $\text{Rs}124496/2800=44.46$  say Rs 44

### Components

Labour 1.68%

Machinery 2.25%

Materials 78.71

Overheads/ profit 17.35%

# 6. Geo synthetics & Reinforced Earth

Reinforced Earth Structures: Average ht. 8m  
Assembling, jointing and laying of reinforcing elements

A. With reinforcing element of steel/aluminium/polymeric strips:

Unit RM, Output 450m

a) Labour

Mate 0.36 day @ Rs 110/day	40
Mazdoor 6 days @ Rs 100/day	600
Mazdoor skilled 3 days @ Rs110/day	330

# 6. Geo synthetics & Reinforced Earth

Reinforced Earth Structures: Average ht. 8m  
Assembling, jointing and laying of reinforcing elements

## b) Material

Reinforcement strips 60mm wide 5mm thick  
Galvanized carbon/Copper/stainless steel/

polymeric strips 450m @ Rs100/Rm 45000

Add 10% extra for accessories 4500

c) Overheads @ 10% on (a+b) 5047

d) Contractor's profit @ 10% on (a+b+c) 55517

Cost/Rm Rs  $55517/450 = \text{Rs}123$

# 6. Geo synthetics & Reinforced Earth

Reinforced Earth Structures: Average ht. 8m

Assembling, jointing and laying of reinforcing elements

B. With reinforcing elements of synthetic geo grids: Unit sqm, Output 300 sqm

a) Labour

Mate 0.36 day @ Rs110/day	40
Mazdoor 6 days @ Rs 100/day	600
Mazdoor skilled 3 days @ Rs110/day	330

b) Material

Synthetic geo grids 300 sqm @ Rs 40/sqm	12000
Add 10% extra for accessories	1200

c) Overheads @ 10% on (a+b) 1417

d) Contractor's profit @ 10% on (a+b+c) 1559

Rate/sqm  $15587/300 = \text{Rs}52$



# 6. Geo synthetics & Reinforced Earth

Reinforced Earth Structures: Average ht. 8m

Assembling, jointing and laying of reinforcing elements

## C. Facing elements of RCC

Unit Sqm, Output 75 Sqm

### a) Labour

Mate 0.18 day @Rs110/day 20

Mazdoor 3 days @ Rs 100/day 300

Mazdoor skilled 1.5 days @ Rs110/day 165

### b) Machinery

Light crane 3T for 6 hrs @ Rs 230/hr 1380

Precast RCC M-35 facing elements 18cm th.  
@ Rs 800/sqm 60000

Add 2 % for ty form work 1200

# 6. Geo synthetics & Reinforced Earth

Reinforced Earth Structures: Average ht. 8m

Assembling, jointing and laying of reinforcing elements

d) Overheads @ 10% on (a+b) 6307

Contractor's profit @ 10% on (a+b+c) 6937

Rate/sqm  $76309 / 75 = \text{Rs } 1017$

# 6. Geo synthetics & reinforced earth

## Overhead signs:

Providing and erecting overhead signs with a corrosion resistant 2mm thick aluminium alloy sheet with high intensity grade retro-reflective sheeting on encapsulated lens type with vertical and lateral clearance and installed over designated support system of aluminium alloy or GI trestles and trusses of sections and type as per structural design

Unit - Tonne, Output 1 Tonne

# 6. Geo synthetics & reinforced earth

## Overhead signs: A) Truss and vertical support

### a) Labour

Mate for 0.24 days @ Rs 110/day	26
Blacksmith 2 days @ Rs 130/day	260
Mazdoor 4 days @ Rs 100/day	400

### b) Material

Aluminium alloy/GI including 5% wastage for 1.05 T @ Rs 120/kg	126000
Add 1% for bolts/ nuts	12600
Add 15% for fabrication	18900

# 6. Geo synthetics & reinforced earth

## Overhead signs:

### c) Machinery

Crane 3 T capacity for 3 hrs @ Rs230/hr 690

Truck 0.5 hrs @ Rs 300/h 150

d) Overheads @ 10% On (a+b+c) 15902

e) Contractor's profit @ 10% on (a+b+c+d) 17493

Rate/Tonne Rs 192421

### B. Aluminium alloy plate for overhead sign

Unit Sqm, Output 1 sqm

#### a) Labour

Mate 0.02 day @ Rs 110/day 22

Blacksmith 0.1 day @ Rs 130/day 13

Mazdoor 0.15 day @ Rs 100/day 15

# 4.Road works

## Cement concrete pavements:

Overhead signs:

b) Material

Aluminium alloy plate 2mm thick fixed  
with high intensity grade sheeting 1 sqm

@ Rs 5.6x 120

672

Miscellaneous

Add 1% for lifting, ladders, pulleys

67

c) Overheads @ 10% on (a+b)

79

d) Contractor's profit @10% on (a+b+c+d)

87

Rate/sqm Rs 955

# 4.Road works

## **Cement concrete pavements:**

Road marking with hot applied thermoplastic compound with reflectorising

# 7. Bridge works

Brick masonry work in cement mortar 1:3 in foundation complete excluding pointing and plastering

Unit cum, Output 5cum

## a) Materials

Bricks 1 <sup>st</sup> class 2500 nos. @ Rs 2000/1000	5000
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Cement mortar 1:3, 1.2 cum @ Rs 2000/cum	2400
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## b) Labour

Mate 0.48 day @ Rs 110/day	53
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Mason 4 days @ Rs 150/day	600
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Mazdoor 8 days @ Rs 100/day	800
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# 7. Bridge works

Brick masonry work in cement mortar 1:3 in foundation complete excluding pointing and plastering

Unit cum, Output 5cum

c)	Overheads @ 10% on (a+b)	885
d)	Contractor's profit @ 10% on (a+b+c)	974

Rate/cum  $\text{Rs}10712/5 = 2142.4$  say Rs2142

Components:

Material	69.08%
Labour	13.56%
Overheads/ profit	17.35%

# 7. Bridge works

Stone masonry in cement mortar in foundation complete

Square rubble coursed rubble masonry:

Unit 1cum, Output 5cum

## a) Material

Stone 5.50cum @ Rs400/cum	2200
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Through and bond stones 35 Nos.

0.79 cum @ Rs 500/cum	395
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Cement mortar 1:3 1.5 cum

@ Rs 2000/cum	3000
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# 7. Bridge works

Stone masonry in cement mortar in foundation complete

Square rubble coursed rubble masonry:

Unit 1cum, Output 5cum

## b) Labour

Mate 0.66 day @ Rs 110/cum	66
Mason 7.5 days @ Rs 150/day	1125
Mazdoor 9 days @ Rs 100/day	900

# 7. Bridge works

Stone masonry in cement mortar in foundation complete

Square rubble coursed rubble masonry:

Unit 1cum, Output 5cum

c) Overheads @ 10% on (a+b)	769
d) Contractor's profit @ 10% on (a+b+c)	846

Rate/cum Rs  $9301/5 = 1860.2$  say Rs 1860

# 7. Bridge works

**RCC grade M 30 using batching plant, transit mixer and concrete pump:**

Unit cum, Output 120cum

a) Material

Cement 48.80 MT @ Rs 4000/MT 195200

Coarse sand 54cum @ Rs 400/cum 21600

20mm aggregate 64.80cum @ Rs 450/cum 29160

10mm aggregate 43.20cum @ Rs 500/cum 21600

b) Labour

Mate 0.84 day @ Rs 110/day 92

Mason 3 days @ Rs 150/day 450

Mazdoor 18 @ Rs 100/day 1800

# 7. Bridge works

**RCC grade M 30 using batching plant, transit mixer and concrete pump:**

Unit cum, Output 120cum

## c) Machinery

Batching plant @ 20cum/hr for 6 hrs @ Rs 1200/hr	7200
Generator 100 KVA for 6 hrs @ Rs 450/hr	2700
Loader 1 cum for 6 hrs @ Rs520/hr	3120
Transit mixer 4 cum capacity lead up to 1 KM for 15 hrs @ Rs 600/hr	9000
Transit mixer 4 cum lead beyond 1 KM, 300x1 @ Rs 3/km	9000
Concrete pump for 6 hrs @ Rs 165/hr	990

# 7. Bridge works

**RCC grade M 30 using batching plant, transit mixer and concrete pump:**

Unit cum, Output 120cum

d)	Form work @ 3.5% of cost of concrete	10567
e)	Overheads @ 10% on (a+b+c+d)	312479
f)	Contractor's profit @ 10% on (a+b+c+d+e)	32248

Rate/cum Rs  $378100/120 =$  Rs 3150

## Components

Material	70.78	Labour	0.62
Machinery	8.46	Form work	2.79
Overheads/ profit	17.35		

# 7. Bridge works

**RCC grade M 30 using batching plant, transit mixer and concrete pump:**

Unit cum, Output 120cum

Percentage addition for RCC work above ground level for works in super structure:

Height up to 5m	25%
Height 5 to 10m	30%
height above 10m	35%



# 7. Bridge works

Providing and laying cutting edge of mild steel weighing 40kg/sqm for well foundation complete: Unit 1 MT, Output 1MT

## a) Material

Structural steel in plates, angles etc.

1.05 MT including 5% wastage @ Rs 38000/MT 39900

Nuts & bolts 20 kg @ Rs 40/kg 800

## b) Labour

Mate 1.32 days @ Rs 110/day 145

Fitter 5.5 days @ Rs 130/day 715

Blacksmith 5,5 days @ Rs130/day 715

Welder 5.5 days @ Rs 130/day 715

Mazdoor 16.5 days @ Rs 100/day 1650

# 7. Bridge works

Providing and laying cutting edge of mild steel weighing 40kg/sqm for well foundation complete: Unit 1 MT, Output 1MT

Electrodes, cutting gas & consumables

10% of cost of material 4070

c) Overheads @ 10% on (a+b) 4871

d) Contractor' profit @ 10% on (a+b+c) 5358

Rate/ MT Rs 59939

Components

Material 75.97%

Labour 6.68%

Overheads/ profit 17.35%

# 7. Bridge works

High tensile steel wires/ strands including all accessories for stressing operations and grouting complete:

Unit MT, Output 0.377 MT (12T13 strand 40m long)

## a) Material

H.T strands @ 9.42kg/m including 2% wastage for 0.385 MT @ Rs 40000/MT	15400
Sheathing duct ID 66mm with 5% wastage for 42 m @ Rs300/m	12600
Tube anchorage set complete with bearing plate, permanent wedges etc. 2 Nos. 2000/each	4000
cement for grouting including 3% wastage @ 3 kg/m for 0.125 MT @ Rs 4000/MT	500

# 7. Bridge works

High tensile steel wires/ strands including all accessories for stressing operations and grouting complete:

Unit MT, Output 0.377 MT (12T13 strand 40m long)

a) Material

Add 0.50% cost of materials for spacer, insulation tape & miscellaneous items

b) Labour

For making and fixing cables, anchorages

Mate 0.16 day @ Rs 110/day	18
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Blacksmith 1 day @ Rs 130/day	130
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Mazdoor 3 days @ Rs 100/day	300
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# 7. Bridge works

High tensile steel wires/ strands including all accessories for stressing operations and grouting complete:

Unit MT, Output 0.377 MT (12T13 strand 40m long)

## b) For prestressing

Mate/ supervisor 0.05 day @ Rs 110/day	6
Prestressing operator/ fitter 0.25 day @ Rs 130/day	33
Mazdoor 3 days @ Rs 100/day	300

## For grouting

Mate/ supervisor 0.05 @ Rs 110/day	6
Mason 0.25 day @ Rs 150/day	38
Mazdoor 1 day @ Rs 100/day	100

# 7. Bridge works

High tensile steel wires/ strands including all accessories for stressing operations and grouting complete:

Unit MT, Output 0.377 MT (12T13 strand 40m long)

## c) Machinery

Stressing jack with pump 2.50 hrs @ Rs83/hr	208
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Grouting pump with agitator for 1 hr @ Rs60/hr	60
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Generator 33 KVA for 3.5 hr @ Rs 240/hr	840
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d) Overheads @ 10% on (a+b+c)	3566
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e) Contractor's profit @ 10% on (a+b+c+d)	3920
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Rate/MT  $43119/0.377 = \text{Rs } 114374$

# 7. Bridge works

Sinking of 10m dia. Well (Other than pneumatic method of sinking) through all types of strata viz. sandy soil, clayey soil, and rock as shown against each case. Unit RM, Output 1 M

A. Sandy soil, Depth below bed 3. Rate of sinking 0.2m/hr

a) Labour

Mate 0.2 day @ Rs 110/day 22

Sinker skilled for 1.5 day @ Rs 150/day 225

Sinking helper 3.5 days @ Rs 130/day 455

b) Machinery

Hire and running charges of crane with grab bucket of 0.75cum for 5 hrs @ Rs230/hr 1150

# 7. Bridge works

Sinking of 10m dia. Well (Other than pneumatic method of sinking) through all types of strata viz. sandy soil, clayey soil, and rock as shown against each case. Unit RM, Output 1 M

A. Sandy soil, Depth below bed 3 m.

Rate of sinking 0.20m/hr

b) Machinery

Consumables in sinking @ 10% of machinery 115

c) Overheads @ 10% on (a+b) 197

d) Contractor's profit @ 10% on (a+b+c) 216

Rate/metre 2380



# 7. Bridge works

Sinking of 10m dia. Well (Other than pneumatic method of sinking) through all types of strata viz. sandy soil, clayey soil, and rock as shown against each case. Unit RM, Output 1 M

A. Sandy soil, Depth below bed 3 m to 10m  
Rate of sinking 0.17m/hr

a) Labour

Mate 0.31 day @ Rs 110/day 34

Sinker 2 days @ Rs 150/day 300

Sinking helper 4.25 days @ Rs 130/day 553

b) Machinery

Hire charges for crane for 5.75 hrs @ Rs 230/hr 1323

# 7. Bridge works

Sinking of 10m dia. Well (Other than pneumatic method of sinking) through all types of strata viz. sandy soil, clayey soil, and rock as shown against each case. Unit RM, Output 1 M

A. Sandy soil, Depth below bed 3 m to 10m

Rate of sinking 0.17m/hr

b) Machinery

Consumables in sinking @ 10% of machinery 132

c) Overheads @ 10% on (a+b) 146

d) Contractor's profit @ 10% on (a+b+c) 249

Rate/metre 2737

# 7. Bridge works

## Painting two coats on new concrete surfaces:

Painting two coats after filling the surface with synthetic enamel paint in all shades on new plastered concrete surfaces:

Unit sqm, Output 40sqm

### a) Labour

Mate 0.12 day @ Rs110/day	13
Painter 2 days @ Rs 150/day	300
Mazdoor 1 day @ Rs 100/day	100

# 7. Bridge works

## Painting two coats on new concrete surfaces:

Painting two coats after filling the surface with synthetic enamel paint in all shades on new plastered concrete surfaces:

Unit sqm, Output 40sqm

b) Material Paint 6 lt @ Rs 180/lt	1080
Add 1 % for scaffolding	11
c) Overheads @ 10% on (a+b)	150
d) Contractor's profit @ 10% on (a+b+c)	165
Rate/sqm Rs1819/ 40= Rs 45	

# Conclusion

Skills in the preparation of analysis of rates is is very essential to the quantity surveyor. The details in the analysis are essential to work out men, machinery, material as well as financial resources. They are also required during construction for monitoring and controlling of projects and accordingly advise the management.

THANK YOU