# PUBLIC WORKS DEPARTMENT
# ARUNACHAL PRADESH

# 2023

# SCHEDULE OF RATES

## FOR
## ROAD AND BRIDGE WORKS

**ZERO LEAD BASED**
**(EXCLUDING CARRIAGE COST)**

**PUBLISHED UNDER THE AUTHORITY OF**
**THE CHIEF ENGINEER (CSQ)**
**P.W.D., ARUNACHAL PRADESH, ITANAGAR**

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सत्यमेव जयते

# CHIEF MINISTER
# ARUNACHAL PRADESH

## Message

I am glad to know that Arunachal Pradesh Schedule of Rates - 2023 and Arunachal Pradesh Analysis of Rates - 2023 for Road and Bridge is being brought out by Public Works Department, Arunachal Pradesh.

This schedule of rates is needed for realistic preparation of projects as well as their effective implementation on site for road development and bridge infrastructure in the state.

I convey my best wishes to the Engineers of Public Works Department, Arunachal Pradesh for proper and effective use of the Arunachal Pradesh Schedule of Rate 2023 and Arunachal Pradesh Analysis of Rates 2023 for Road and Bridge Works.

My best wishes to the Engineers of Public Works Department, Arunachal Pradesh.

**(Pema Khandu)**

**KALING TAYENG, IAS**
**PRINCIPAL SECRETARY**

सत्यमेव जयते

**Government of Arunachal Pradesh**
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# MESSAGE

The Public Works Department, Arunachal Pradesh is bringing out the Schedule of Rates- 2023 and Analysis of Rates- 2023 for Road and Bridge work. The Schedule of Rates once brought out will be very useful for preparation of realistic projects estimate at the prevailing price level in the market to be adopted in the various regions of the State.

The Public Works Department under Government of Arunachal Pradesh is one of the premier organisations undertaking construction of roads and bridges in the State. The revision of schedule of rates plays an important role in preparation of estimate, design and scheduling of projects.

I commend all officers and staff who have been part of preparation of Arunachal Pradesh Schedule of Rates -2023 and Arunachal Pradesh Analysis of Rates- 2023 for Road and Bridge works.

Date :- 20.08.2024
Place :- Itanagar

(Kaling Tayeng) IAS,
Principal Secretary (PWD)
Govt. of Arunachal Pradesh
Itanagar

***Taniyok Taga***
Chief Engineer (CSQ)

Govt. of Arunachal Pradesh
Public Work Department
Nirman Bhawan, 2nd Floor
Itanagar, Arunachal Pradesh

## FOREWORD

The Arunachal Pradesh Schedule of Rates and Analysis of Rates for Road and Bridge works was last published in the year 2021. The Schedule of Rates and Analysis of Rates provide a basic framework to evaluate cost estimate of the projects. The Arunachal Pradesh Schedule of Rates (APSR 2023) and Analysis of Rates (APAR 2023) for Road and Works is brought out after updating the basic rates of labour and materials to present market rates and current prevailing GST.

The important establishments in the state where major construction activities take place are scattered in the different locations with varying distance from the foothills. Hence, in order to evolve common rates for the major construction activities for the purpose of the publication of the Schedule of Rates 2023 for Road and Bridges works, the rates of major construction materials like Cement, Steel and Bitumen are updated based on the rates in nearest authorized dealers located in foothills in Assam and in Arunachal Pradesh. In the process of project evaluation based on this Schedule of Rates, the additional cost involved in carriage of materials from approved sources to site of work shall be added, to arrive at the actual execution cost. Further the schedule of Rates shall not be directly adopted for payment to contractor for the work done by them at any site.

Basic structure and nomenclature of items are as per the Standard Data Book of the **Ministry of Road Transport & Highways, Govt. of India, New Delhi.** Therefore, the executions of items in this schedule at site are to be done in concurrence with the **MoRTH & MoRD Specifications** for Road and Bridge Works.

It is emphasized that while adopting the APSR 2023, the user shall acquaint themselves with the General Notes for Road & Bridge for various cost assumptions considered like CP & OH in the analysis and all preambles before every chapter and related **MoRTH & MoRD Specifications** precisely for accomplishing itemized tasks.

Overhead charges 10 % for Roads &Overhead charges 20 % for Bridges, GST 18% shown as multiplying factor of 0.2016, contractor's profit 10% and Labour cess 1% has been adopted in the rate of APAR 2023 and APSR 2023. (Road and Bridge Works).

Apart from state PWD, this Schedule of Rates is being used as a guide by numbers of departments, Public Sector Undertakings, private builders etc. The state PWD welcomes comments on this Schedule of Rates and Analysis of Rates from the users for improvement in future publications.

***Taniyok Taga***
Chief Engineer (CSQ)

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Govt. of Arunachal Pradesh
Public Work Department
Nirman Bhawan, 2nd Floor
Itanagar, Arunachal Pradesh

It is mandatory as per CPWD Manual that the scheduled rate is updated after every alternative year. Hence, this scheduled rate will be due to revised or updating by 2025. Accordingly, all Divisions / Circles of PWD should furnish basic rates to this office in due date.

I would like to extend my gratitude and thanks to all Divisions / Circles of PWD officers& Staff who have given lot of input to bring out this schedule.

I appreciate my predecessor, Shri Robin Nani, then CE (CSQ) who immensely contributed in finalization of APSR 2023&APAR2023.

I express my sincere thanks to all officers and staff of CSQ, PWD for contributing their time in compiling of this schedule. Also, my special thanks and appreciation to Shri P.S. Bhattacharjee, Sr. Estimator who has given his full timeand attention on the job.

Due care has been made to bring out APSR 2023 and APAR 2023 without error; still if such errors are noticed; same could be intimated to SE (CSQ) for necessary correction in the next edition.

E-mail :cecsqpwd@gmail.com

(Taniyok Taga)
Chief Engineer (CSQ)
PWD, AP, Itanagar

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| (A) Usage Rates of Plant and Machinery | | | | | | |
|---|---|---|---|---|---|---|
| **Code** | **Description of Machine** | **Activity** | **Output of Machine** | **Output** | **Unit** | **Rate** |
| P&M-001 | Air Compressor | General Purpose | capacity in cfm | 170/250 | hour | 658.00 |
| P&M-002 | Batching and Mixing Plant (a) 30 cum capacity | Concrete Mixing | cum/hour | 20 | hour | 3,200.00 |
| P&M-003 | Batching and Mixing Plant (b) 15 - 20 cum capacity | Concrete Mixing | cum/hour | 13 | hour | 3,154.00 |
| P&M-004 | Bitumen Pressure Distributor | Applying bitumen tack coat | sqm/hour | 1750 | hour | 1,509.00 |
| P&M-005 | Bitumen Boiler oil fired | Bitumen Spraying | capacity in litre | 1500 | hour | 348.00 |
| P&M-006 | Concrete Paver Finisher with 40 HP Motor | Paving of concrete surface | cum / hour | 20 | hour | 3,690.00 |
| P&M-007 | Concrete Pump of 45 & 30 cum capacity | Pumping of concrete | cum / hour | 33 / 22 | hour | 2,726.00 |
| P&M-008 | Concrete Bucket | For Pouring concrete | capacity in cum | 1 | hour | 22.00 |
| P&M-009 | Concrete Mixer (a) 0.4/0.28 cum | Concrete Mixing | cum/hour | 2.5 | hour | 291.00 |
| P&M-010 | Concrete Mixer (b) 1 cum | Concrete Mixing | cum/hour | 7.5 | hour | 306.00 |
| P&M-011 | Crane (a) 80 tonnes | Lifting Purpose | | | hour | 1,665.00 |
| P&M-012 | Cranes b) 35 tonnes | Lifting Purpose | | | hour | 1,166.00 |
| P&M-013 | Cranes c) 3 tonnes | Lifting Purpose | | | hour | 490.00 |
| P&M-014 | Dozer D - 80 - A 12 | Spreading /Cutting / Clearing | cum/hour | 300/ 150/250 | hour | 5,045.00 |
| P&M-015 | Dozer D - 50 - A 15 | Spreading /Cutting / Clearing | cum/hour | 200/ 120/150 | hour | 3,398.00 |
| P&M-016 | Emulsion Pressure Distributor | Applying emulsion tack coat | sqm/hour | 1750 | hour | 1,160.00 |
| P&M-017 | Front End loader 1 cum bucket capacity | Soil loading / Aggregate loading | cum/hour | 60 /25 | hour | 1,838.00 |
| P&M-018 | Generator (a) 125 KVA | Genration of electric Energy | KVA | 100 | hour | 1,135.00 |
| P&M-019 | Generator( b) 63 KVA | Genration of electric Energy | KVA | 50 | hour | 883.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| P&M-020 | GSB Plant 50 cum | Producing GSB | cum/hour | 40 | hour | 1,511.00 |
| P&M-021 | Hotmix Plant - 120 TPH capacity | DBM/BM/SDC/ Premix | cum/hour | 40 | hour | 32,730.00 |
| P&M-022 | Hotmix Plant - 100 TPH capacity | DBM/BM/SDC/ Premix | cum/hour | 30 | hour | 25,480.00 |
| P&M-023 | Hotmix Plant - 60 to 90 TPH capacity | DBM/BM/SDC/ Premix | cum/hour | 25 | hour | 20,099.00 |
| P&M-024 | Hotmix Plant - 40 to 60 TPH capacity | DBM/BM/SDC/ Premix | cum/hour | 17 | hour | 15,405.00 |
| P&M-025 | Hydraulic Chip Spreader | Surface Dressing | sqm/hour | 1500 | hour | 3,640.00 |
| P&M-026 | Hydraulic Excavator of 1 cum bucket | Soil Ordinary/Soil Marshy / Soil Unsuitable | cum/hour | 60 /60 /60 | hour | 2,044.00 |
| P&M-027 | Integrated Stone Crusher 100THP | Crushing of Spalls | TPH | 100 | hour | 11,408.00 |
| P&M-028 | Integrated Stone Crusher 200 HP | Crushing of Spalls | TPH | 200 | hour | 22,887.00 |
| P&M-029 | Kerb Casting Machine | Kerb Making | Rm/hour | 80 | hour | 407.00 |
| P&M-030 | Mastic Cooker | Mastic Wearing coat | capacity in tonne | 1 | hour | 135.00 |
| P&M-031 | Mechanical Broom Hydraulic | Surface Cleaning | sqm/hour | 1250 | hour | 473.00 |
| P&M-032 | Motor Grader 3.35 mtr blade | Clearing /Spreading /GSB /WBM | cum/hour | 200/200/50/50 | hour | 3,247.00 |
| P&M-033 | Mobile slurry seal equipment | Mixing and laying slurry seal | sqm/hour | 2700 | hour | 1,328.00 |
| P&M-034 | Paver Finisher Hydrostatic with sensor control 100 TPH | Paving of DBM/ BM/SDC/ Premix | cum/hour | 40 | hour | 3,847.00 |
| P&M-035 | Paver Finisher Mechanical 100 TPH | Paving of WMM /Paving of DLC | cum/hour | 40/30 | hour | 1,386.00 |
| P&M-036 | Piling Rig with Bantonite Pump | 0.75 m dia to 1.2 m dia Boring attachment | Rm/hour | 2 to 3 | hour | 10,129.00 |
| P&M-037 | Pneumatic Road Roller | Rolling of Asphalt Surface | cum/hour | 25 | hour | 1,708.00 |
| P&M-038 | Pneumatic Sinking Plant | Pneumatic Sinking of wells | cum/hour | 1.5 to 2.00 | hour | 5,508.00 |
| P&M-039 | Pot Hole Repair Machine | Repair of potholes | cum/hour | 4 | hour | 1,207.00 |
| P&M-040 | Prestressing Jack with Pump & access | Stressing of steel wires/stands | | | hour | 170.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| P&M-041 | Ripper | Scarifying | cum/hour | 60 | hour | 88.00 |
| P&M-042 | Rotavator | Scarifying | cum/hour | 25 | hour | 57.00 |
| P&M-043 | Road marking machine | Road marking | Sqm/hour | 100 | hour | 128.00 |
| P&M-044 | Smooth Wheeled Roller 8 tonne | Soil Compaction /BM Compaction | cum/hour | 70/25 | hour | 783.00 |
| P&M-045 | Tandem Road Roller | Rolling of Aspalt Surface | cum/hour | 30 | hour | 1,641.00 |
| P&M-046 | Tipper - 5 cum | Transportation of soil, GSB, WMM, Hotmix etc. | Capacity in cum | 5.5 | km | 87.00 |
| P&M-047 | Tipper - 5 cum | Transportation of soil, GSB, WMM, Hotmix etc. | Capacity in cum | 5.5 | tonne.km | 87.00 |
| P&M-048 | Tipper - 5 cum | Transportation of soil, GSB, WMM, Hotmix etc. | Capacity in cum | 5.5 | hour | 916.00 |
| P&M-049 | Transit Mixer 4.0/4.5 cum | Transportation of Concrete Mix to site | cum/hour | 4.5 | hour | 1,265.00 |
| P&M-050 | Transit Mixer 4/4.5 cum | Transportation of Concrete Mix to site | cum/hour | 4.5 | tonne.km | 80.00 |
| P&M-051 | Transit Mixer 3.0 cum | Transportation of Concrete Mix to site | cum/hour | 3 | hour | 1,174.00 |
| P&M-052 | Transit Mixer 3.0 cum | Transportation of Concrete Mix to site | cum/hour | 3 | tonne.km | 79.00 |
| P&M-053 | Tractor | Pulling | capacity in HP | 50 | hour | 530.00 |
| P&M-054 | Tractor with Rotevator | Rate of Tractor + Rotevator | | | hour | 494.00 |
| P&M-055 | Tractor with Ripper | Rate of Tractor 6+ Ripper | | | hour | 511.00 |
| P&M-056 | Truck 5.5 cum per 10 tonnes | Material Transport | capacity/cum | 4.5 | km | 106.00 |
| P&M-057 | Truck 5.5 cum per 10 tonnes | Material Transport | capacity/cum | 4.5 | hour | 778.00 |
| P&M-058 | Truck 5.5 cum per 10 tonnes | Material Transport | capacity/cum | 4.5 | tonne.km | 18.00 |
| P&M-059 | Three wheel 80-100 kN Statis Roller | Earth or soil / GSB / WBM | cum/hour | 100/60/60 | hour | 969.00 |
| P&M-060 | Water Tanker | Water Transport | capacity in KL | 6 | hour | 724.00 |
| P&M-061 | Water Tanker | Water Transport | capacity in KL | 6 | km | 77.00 |
| P&M-062 | Wet Mix Plant 60 TPH | Wet Mix | cum/hour | 25 | hour | 1,731.00 |
| P&M-062 (A) | Vibratory roller 8 to 10 tonne | Intermediate rolling. | cum/hour | 3.9 | hour | 856.00 |

| Code | Description of Machine | Unit | Rate |
|---|---|---|---|
| P&M-063 | Air compressor with pneumatic chisel attachment for cutting hard clay. | hour | 723.00 |
| P&M-064 | Batch type cold mixing plant 100-120 TPH capacity producing an average output of 75 tonne per hour | hour | 23,790.00 |
| P&M-065 | Belt conveyor system | hour | 2,233.00 |
| P&M-066 | Boat to carry atleast 20 persons | hour | 2,278.00 |
| P&M-067 | Cement concrete batch mix plant @ 20 cum per hour (effective output) | hour | 3,770.00 |
| P&M-068 | Cement concrete batch mix plant @ 75 cum per hour | hour | 5,170.00 |
| P&M-069 | Cold milling machine @ 20 cum per hour | hour | input |
| P&M-070 | Crane 5 tonne capacity | hour | 827.00 |
| P&M-071 | Crane 10 tonne capacity | hour | 838.00 |
| P&M-072 | Crane 15 tonne capacity | hour | 902.00 |
| P&M-073 | Crane 20 tonne capacity | hour | 1,452.00 |
| P&M-074 | Crane 40 T capacity | hour | 1,447.00 |
| P&M-075 | Crane with grab 0.75 cum capacity | hour | 1,040.00 |
| P&M-076 | Compressor with guniting equipment along with accessories | hour | 896.00 |
| P&M-077 | Drum mix plant for cold mixes of appropriate capacity but not less than 75 tonnes/hour. | hour | 449.00 |
| P&M-078 | Epoxy Injection gun | hour | 3,723.00 |
| P&M-079 | Generator 33 KVA | hour | 506.00 |
| P&M-080 | Generator 100 KVA | hour | 938.00 |
| P&M-081 | Generator 250 KVA | hour | 1,154.00 |

| | | | |
|---|---|---|---|
| P&M-082 | Induction, deinduction and erection of plant and equipment including all components and accessories for pneumatic method of well sinking. | hour | input |
| P&M-083 | Joint Cutting Machine with 2-3 blades (for rigid pavement) | hour | 143.00 |
| P&M-084 | Jack for Lifting 40 tonne lifting capacity. | day | input |
| P&M-085 | Piling rig Including double acting pile driving hammer (Hydraulic rig) | hrs | 7,335.00 |
| P&M-086 | Plate compactor | hour | 382.00 |
| P&M-087 | Snow blower equipment 140 HP @ 600 cum per hour | hour | input |
| P&M-088 | Texturing machine (for rigid pavement) | hour | 301.00 |
| P&M-089 | Truck Trailor 30 tonne capacity | hour | input |
| P&M-090 | Truck Trailor 30 tonne capacity | t.km | input |
| P&M-091 | Tunnel Boring machine | hour | input |
| P&M-092 | Vibrating Pile driving hammer complete with power unit and accessories. | hour | input |
| P&M-093 | Wet Mix Plant 100 TPH | hour | 2,240.00 |
| P&M-094 | Wet Mix Plant 75 TPH | hour | 1,794.00 |
| P&M-095 | Hot mix Plant -120 TPH capacity | hour | 16,471.00 |
| P&M-096 | Hot mix Plant -100 TPH capacity | hour | 13,681.00 |
| P&M-097 | Drum Type HMP of 60-90 TPH capacity @ 75 tonne per hour actual output | hour | 10,712.00 |
| P&M-098 | Backhoe-loader | hour | 2,200.00 |

| (B) Labour | | | |
|---|---|---|---|
| **Code** | **Description of Labour** | **Unit** | **Rate** |
| L-01 | Blacksmith (IInd class) | day | 551.00 |
| L-02 | Blacksmith (Ist class)/ Welder/ Plumber/ Electrician | day | 593.00 |
| L-03 | Blaster (Stone cutter) | day | 551.00 |
| L-04 | Carpenter I Class | day | 593.00 |
| L-05 | Chiseller (Head Mazdoor) | day | 551.00 |
| L-06 | Driller (Jumper) | day | 551.00 |
| L-07 | Diver | day | 869.00 |
| L-08 | Fitter | day | 593.00 |
| L-09 | Mali | day | 551.00 |
| L-10 | Mason (IInd class) | day | 551.00 |
| L-11 | Mason (Ist class) | day | 593.00 |
| L-12 | Mate / Supervisor | day | 551.00 |
| L-13 | Mazdoor | day | 424.00 |
| L-14 | Mazdoor/Dresser (Semi Skilled) | day | 424.00 |
| L-15 | Mazdoor/Beldar/Dresser/Sinker (Skilled) | day | 508.00 |
| L-16 | Medical Officer | day | 1,490.00 |
| L-17 | Operator(grouting) | day | 593.00 |
| L-18 | Painter I class | day | 593.00 |
| L-19 | Para medical personnel | day | 869.00 |
| L-20 | Beldar | day | 424.00 |
| L-21 | Coolie | day | 424.00 |
| L-21 | Bhisti | day | 424.00 |

| (C) Materials | | | |
|---|---|---|---|
| **Code** | **Description** | **Unit** | **Rate** |
| M-001 | Stone Boulder of size 150 mm and below at Cruser Plant | cum | 956.00 |
| M-002 | Supply of quarried stone 150 - 200 mm size for Hand Broken at site | cum | 923.00 |
| M-003 | Boulder with minimum size of 300 mm for Pitching at Site | cum | 893.00 |
| M-004 | Coarse sand at Mixing Plant | cum | 650.00 |
| M-005 | Coarse sand at Site | cum | 650.00 |
| M-006 | Fine sand at Site | cum | 650.00 |
| M-007 | Moorum at Site | cum | 350.00 |
| M-008 | Gravel/Quarry spall at Site | Cum | 300.00 |
| M-009 | Granular Material or hard murrum for GSB works at Site | Cum | 500.00 |
| M-010 | Granular Material or hard murrum for GSB works at Mixing Plant | Cum | 450.00 |
| M-011 | Fly ash conforming to IS: 3812 ( Part II & I) atHMP Plant / Batching Plant / Crushing Plant | Cum | input |
| M-012 | Filter media/Filter Material as per Table 300-3 (MoRT&H Specification) | Cum | 1,450.00 |

| Code | Description | Unit | Rate at Plant (HMP/Batching) | Rate at Site |
|---|---|---|---|---|
| M-013 | Close graded Granular sub-base Material 53 mm to 9.5 mm | cum | 900.00 | 900.00 |
| M-014 | Close graded Granular sub-base Material 37.5 mm to 9.5 mm | cum | 880.00 | 880.00 |
| M-015 | Close graded Granular sub-base Material 26.5 mm to 9.5 mm | cum | 850.00 | 850.00 |
| M-016 | Close graded Granular sub-base Material 9.5 mm to 4.75 mm | cum | 800.00 | 800.00 |
| M-017 | Close graded Granular sub-base Material 9.5 mm to 2.36 mm | cum | 780.00 | 780.00 |
| M-018 | Close graded Granular sub-base Material 4.75mm to 2.36 mm | cum | 750.00 | 750.00 |
| M-019 | Close graded Granular sub-base Material 4.75mm to 75 micron mm | cum | 720.00 | 720.00 |
| M-020 | Close graded Granular sub-base Material 2.36 mm | cum | 700.00 | 700.00 |
| M-021 | Stone crusher dust finer than 3mm with not more than 10% passing 0.075 sieve. | cum | 700.00 | 700.00 |
| M-022 | Coarse graded Granular sub-base Material 2.36 mm & below | cum | 700.00 | 700.00 |
| M-023 | Coarse graded Granular sub-base Material 4.75mm to 75 micron mm | cum | 720.00 | 720.00 |
| M-024 | Coarse graded Granular sub-base Material 4.75 mm to 2.36 mm | cum | 780.00 | 780.00 |
| M-025 | Coarse graded Granular sub-base Material 9.5 mm to 4.75 mm | cum | 800.00 | 800.00 |
| M-026 | Coarse graded Granular sub-base Material 26.5 mm to 4.75 mm | cum | 850.00 | 850.00 |
| M-027 | Coarse graded Granular sub-base Material 26.5 mm to 9.5 mm | cum | 850.00 | 850.00 |
| M-028 | Coarse graded Granular sub-base Material 37.5 mm to 9.5 mm | cum | 880.00 | 880.00 |
| M-029 | Coarse graded Granular sub-base Material 53 mm to 26 .5mm | cum | 900.00 | 900.00 |
| M-030 | Aggregates below 5.6 mm | cum | 1,300.00 | 1,300.00 |
| M-031 | Aggregates 22.4 mm to 2.36 mm | cum | 1,020.00 | 1,020.00 |
| M-032 | Aggregates 22.4 mm to 5.6 mm | cum | 1,590.00 | 1,590.00 |
| M-033 | Aggregates 45 mm to 2.8 mm | cum | 790.00 | 790.00 |
| M-034 | Aggregates 45 mm to 22.4 mm | cum | 1,010.00 | 1,010.00 |
| M-035 | Aggregates 53 mm to 2.8 mm | cum | 850.00 | 850.00 |
| M-036 | Aggregates 53 mm to 22.4 mm | cum | 1,010.00 | 1,010.00 |
| M-037 | Aggregates 63 mm to 2.8 mm | cum | 820.00 | 820.00 |

| | | | | |
|---|---|---|---|---|
| M-038 | Aggregates 63 mm to 45 mm | cum | 980.00 | 980.00 |
| M-039 | Aggregates 90 mm to 45 mm | cum | 950.00 | 950.00 |
| M-040 | Aggregates 10 mm to 5 mm | cum | 1,550.00 | 1,550.00 |
| M-041 | Aggregates 11.2 mm to 0.09 mm | cum | 1,500.00 | 1,500.00 |
| M-042 | Aggregates 13.2 mm to 0.09 mm | cum | 1,200.00 | 1,200.00 |
| M-043 | Aggregates 13.2 mm to 5.6 mm | cum | 1,600.00 | 1,600.00 |
| M-044 | Aggregates 13.2 mm to 10 mm | cum | 1,580.00 | 1,580.00 |
| M-045 | Aggregates 20 mm to 10 mm | cum | 1,850.00 | 1,850.00 |
| M-046 | Aggregates 25 mm to 10 mm | cum | 1,860.00 | 1,860.00 |
| M-047 | Aggregates 19 mm to 6 mm | cum | 1,600.00 | 1,600.00 |
| M-048 | Aggregates 37.5 mm to 19 mm | cum | 1,900.00 | 1,900.00 |
| M-049 | Aggregates 37.5 mm to 25 mm | cum | 1,910.00 | 1,910.00 |
| M-050 | Aggregates 6 mm nominal size | cum | 1,300.00 | 1,300.00 |
| M-051 | Aggregates 10 mm nominal size | cum | 1,800.00 | 1,800.00 |
| M-052 | Aggregates 13.2/12.5 mm nominal size | cum | 1,820.00 | 1,820.00 |
| M-053 | Aggregates 20 mm nominal size | cum | 1,900.00 | 1,900.00 |
| M-054 | Aggregates 25 mm nominal size | cum | 1,920.00 | 1,920.00 |
| M-055 | Aggregates 40 mm nominal size | cum | 1,900.00 | 1,900.00 |

| Code | Description | Unit | Rate |
|---|---|---|---|
| M-056 | AC pipe 100 mm dia | metre | 43.00 |
| M-057 | Acrylic polymer bonding coat | litre | 371.00 |
| M-058 | Alluminium Paint | litre | 355.00 |
| M-059 | Aluminium alloy plate 2mm Thick | sqm | input |
| M-060 | Aluminium alloy/galvanised steel | tonne | 63,142.00 |
| M-061 | Aluminium sheeting fixed with encapsulated lens type reflective sheeting including 2% towards lettering, cost of angle iron, cost of drilling holes, nuts, bolts etc.and signs as applicable | sqm | 170.00 |
| M-062 | Aluminium studs 100 x 100 mm fitted with lense reflectors | nos | 567.00 |
| M-063 | G. I Barbed wire | kg | 102.00 |
| M-064 | Bearing (Cost of parts) | nos | input |
| M-065 | Bearing (Cast steel rocker bearing assembly of 250 tonne ) | nos | 3,44,046.00 |
| M-066 | Bearing (Elastomeric bearing assembly consisting of 7 internal layers of elastomer bonded to 6 nos. internal reinforcing steel laminates by the process of vulcanisation,) | nos | 16,514.00 |
| M-067 | Bearing (Forged steel roller bearing of 250 tonne | nos | 3,02,759.00 |
| M-068 | Bearing (Pot type bearing assembly consisting of a metal piston supported by a disc, PTFE pads providing sliding surfaces against stainless steel mating together with cast steel assemblies/ fabricated structural steel assemblies duly painted with all components | nos | 68,782.00 |
| M-069 | Bearing (PTFE sliding plate bearing assembly of 80 tonnes ) | nos | 2,06,437.00 |
| M-070 | Bearing (Supply of sliding plate bearing of 80 tonne) | nos | 16,514.00 |
| M-071 | Bentonite | kg | 14.00 |
| M-072 | Binding wire | kg | 105.00 |
| M-073 | Bitumen ( Cationic Emulsion ) | tonne | 55,000.00 |
| M-074 | Bitumen (60-70 grade) | tonne | 58,973.00 |
| M-075 | Bitumen (80-100 grade ) | tonne | 57,924.00 |
| M-076 | Bitumen (Cutback ) | tonne | 63,348.00 |
| M-077 | Bitumen (emulsion) | tonne | 55,000.00 |
| M-078 | Bitumen (modified graded) | tonne | 58,000.00 |
| M-078 (A) | Bitumen grade PMB - 40 | tonne | 37,030.00 |
| M-078 (B) | Modified Bitumen Refinary produced CRMB - 60 | tonne | 35,116.00 |
| M-079 | Brick | each | 12.00 |

| | | | |
|---|---|---|---|
| M-080 | C.I.shoes for the pile | kg | 66.00 |
| M-081 | Cement | tonne | 9,100.00 |
| M-082 | Cold twisted bars (HYSD Bars) | tonne | 67,000.00 |
| M-083 | Coller for joints 300 mm dia | nos | 143.00 |
| M-084 | Compressible Fibre Board(20mm thick) | sqm | 798.00 |
| M-085 | Connectors/ Staples | each | 63.00 |
| M-086 | Copper Plate(12m long x 250mmwide) | kg | 850.00 |
| M-087 | Corrosion resistant Structural steel | tonne | 71,000.00 |
| M-088 | Corrugated sheet, 3 mm thick, "Thrie" beam section railing | kg | 71.00 |
| M-089 | Credit for excavated rock found suitable for use | cum | 270.00 |
| M-090 | Curing compound | liter | 59.00 |
| M-091 | Delineators from ISI certified firm as per the standard drawing given in IRC - 79 | each | input |
| M-092 | Earth Cost or compensation for earth taken from private land | cum | - |
| M-093 | Elastomeric slab seal expansion joint assembly manufactured by using chloroprene, elastomer for elastomeric slab unit conforming to clause 915.1 of IRC: 83 (part II), | metre | 11,591.00 |
| M-094 | Electric Detonators @ 1 detonator for 1/2 gelatin stick of 125 gms each | 100 nos | 1,159.00 |
| M-095 | Epoxy compound with accessories for preparing epoxy mortar | kg | 257.00 |
| M-096 | Epoxy mortar | kg | input |
| M-097 | Epoxy primer | kg | 281.00 |
| M-098 | Epoxy resin-hardner mix for prime coat | kg | 169.00 |
| M-099 | Flag of red color cloth 600 x 600 mm | each | 69.00 |
| M-100 | Flowering Plants | each | 50.00 |
| M-101 | Galvanised MS flat clamp | nos | 38.00 |
| M-102 | Galvanised steel wire crates of mesh size 100 mm x 100 mm woven with 4mm dia. GI wire in rolls of required size. | sqm | 191.00 |
| M-103 | Galvanised structural steel plate 200 mm wide, 6 mm thick, 24 m long | kg | 228.00 |
| M-104 | Gelatin 80% | kg | 166.00 |
| M-105 | Geo grids | sqm | input |
| M-106 | Geomembrane | sqm | input |
| M-107 | Geonets | sqm | input |
| M-108 | Geotextile | sqm | 54.00 |

| | | | |
|---|---|---|---|
| M-109 | Geotextile filter fabric | sqm | input |
| M-110 | GI bolt 10 mm Dia | nos | 44.60 |
| M-111 | Grouting pump with agitator | hour | 193.00 |
| M-112 | Grass (Doob) | kg | 18.00 |
| M-113 | Grass (Fine) | kg | 18.00 |
| M-114 | HDPE pipes 75mm dia | metre | 70.00 |
| M-115 | HDPE pipes 90mm dia | metre | input |
| M-116 | Hedge plants | each | 13.00 |
| M-117 | Helical pipes 600mm diameter | metre | 1,352.00 |
| M-118 | Hot applied thermoplastic compound | litre | 209.00 |
| M-119 | HTS strand | tonne | 74,697.00 |
| M-120 | Joint Sealant Compound | kg | 340.00 |
| M-121 | Jute netting, open weave, 2.5 cm square opening for seeding and Mulching | sqm | 15.00 |
| M-122 | LDO for steam curing | litre | 46.00 |
| M-123 | M.S. Clamps | nos | 81.00 |
| M-124 | M.S. Clamps | kg | 257.00 |
| M-125 | M.S.shoes @ 35 Kg per pile of 15 m | kg | 58.00 |
| M-126 | Tor Steel bars | tonne | 67,000.00 |
| M-127 | Modular strip/box seal expansion joint including anchorage catering to a horizontal movement beyond 70 mm and upto 140mm assembly comprising of edge beams, central beam,2 modules chloroprene seal, anchorage elements, support and control system, all steel sections protected against corrosion and installed by the manufacturer or his authorised representative | metre | 2,44,696.00 |
| M-128 | Modular strip/box seal expansion joint catering to a horizontal movement beyond 140mm and upto 210mm box/box seal joint assembly containing 3 modules/cells and comprising of edge beams, two central beams, chloroprene seal, anchorage elements, support and control system, all steel sections protected against corrosion and installed by the manufacturer or his authorised representative | metre | 2,70,454.00 |
| M-129 | Nipples 12mm | nos | 32.00 |
| M-130 | Nuts and bolts | kg | 120.00 |
| M-131 | Paint | litre | 450.00 |
| M-132 | Pavement Marking Paint | litre | 450.00 |
| M-133 | Paving Fabric | sqm | input |
| M-134 | Perforated geosynthetic pipe 150 mm dia | metre | input |
| M-135 | Perforated pipe of cement concrete, internal dia 100 mm | metre | 150.00 |

| | | | |
|---|---|---|---|
| M-136 | Pesticide | kg | 361.00 |
| M-137 | Pipes 200 mm dia, 2.5 m long for drainage | metre | input |
| M-138 | Plastic sheath, 1.25 mm thick for dowel bars | sqm | 2.00 |
| M-139 | Plastic tubes 50 cm dia, 1.2 m high | nos | input |
| M-140 | Polymer braids | metre | input |
| M-141 | Pre moulded Joint filler,25 mm thick for expansion joint. | sqm | 950.00 |
| M-142 | Pre-coated stone chips of 13.2 mm nominal size | cum | 2,107.00 |
| M-143 | Preformed continuous chloroprene elastomer or closed cell foam sealing element with high tear strength, vulcanised in a single operation for the full length of a joint to ensure water tightness. | metre | 5,151.00 |
| M-144 | Pre-moulded asphalt filler board | sqm | 71.00 |
| M-145 | Pre-packed cement based polymer concrete of strength 45 Mpa at 28 days | kg | 39.00 |
| M-146 | Primer (Best Quality) | kg | 207.50 |
| M-147 | Quick setting compound | kg | 59.00 |
| M-148 | Random Rubble Stone | cum | 605.00 |
| M-149 | RCC Pipe NP 2 heavy duty non presure pipe 1000 mm dia | metre | 1,800.00 |
| M-150 | RCC Pipe NP 2 heavy duty non presure pipe 1200 mm dia | metre | 2,210.00 |
| M-151 | RCC Pipe NP 2 heavy duty non presure pipe 300 mm dia | metre | 490.00 |
| M-152 | Reflectorising glass beads | kg | 243.00 |
| M-153 | Reinforcement strips 60 mm wide 5 mm thick as per clause 3102. (Copper Strips) | metre | input |
| M-154 | Reinforcement strips 60 mm wide 5 mm thick as per clause 3102. (Galvanised carbon steel strips) | metre | input |
| M-155 | Reinforcement strips 60 mm wide 5 mm thick as per clause 3102. (Glass reinforced polymer/fibre reinforced polymer/ polymeric strips) | metre | input |
| M-156 | Reinforcement strips 60 mm wide 5 mm thick as per clause 3102. (Stainless steel strips) | metre | input |
| M-157 | Reinforcement strips 60 mm wide 5 mm thick as per clause 3102. Aluminium strips) | metre | 381.00 |
| M-158 | Rivets | each | 1.00 |
| M-159 | Sand bags (Cost of sand and Empty cement bag) | nos | 11.00 |
| M-160 | Sapling 2 m high 25 mm dia | each | 103.00 |
| M-161 | Scrap tyres of size 900 x 20 | nos | 150.00 |
| M-162 | Seeds | kg | 354.00 |
| M-163 | Selected earth | cum | 212.00 |
| M-164 | Separation Membrane of impermeable plastic sheeting 125 micron thick | sqm | 32.00 |
| M-165 | Sheathing duct | metre | 116.00 |

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|---|---|---|---|
| M-166 | Shrubs | each | 25.00 |
| M-167 | Sludge / Farm yard manure @ 0.18 cum per 100 sqm at site of work for turfing | cum | 141.00 |
| M-168 | Sodium vapour lamp | each | 2,125.00 |
| M-169 | Square Rubble Coursed Stone | cum | 605.00 |
| M-170 | Steel circular hollow pole of standard specification for street lighting to mount light at 5 m height above deck level | each | 6,500.00 |
| M-171 | Steel circular hollow pole of standard specification for street lighting to mount light at 9 m height above road level | each | 10,625.00 |
| M-172 | Steel drum 300 mm dia 1.2 m high/empty bitumen drum | nos | 71.00 |
| M-173 | Steel helmet and cushion block on top of pile head during driving. | kg | 212.00 |
| M-174 | Steel pipe 25 mm external dia as per IS:1239 | metre | 150.00 |
| M-175 | Steel pipe 50 mm external dia as per IS:1239 | metre | 280.00 |
| M-176 | Steel wire rope 20 mm | kg | 450.00 |
| M-177 | Steel wire rope 40 mm | kg | 823.00 |
| M-178 | Strip seal expansion join | metre | 14,167.00 |
| M-179 | Structural Steel | tonne | 50,728.00 |
| M-180 | Super plastisizer admixture IS marked as per 9103-1999 | kg | 64.00 |
| M-181 | Synthetic Geogrids as per clause 3102.8 and approved design and specifications. | sqm | input |
| M-182 | Through and bond stone | each | 15.00 |
| M-183 | Tie rods 20mm diameter | nos | 289.00 |
| M-184 | Tiles size 300 x 300 mm and 25 mm thick | each | input |
| M-185 | Timber | cum | 28,685.00 |
| M-186 | Traffic cones with 150 mm reflective sleeve | nos | 1,545.00 |
| M-187 | Tube anchorage set complete with bearing plate, permanent wedges etc | nos | 4,894.00 |
| M-188 | Unstaked lime | tonne | 15,000.00 |
| M-189 | Water | KL | 71.00 |
| M-190 | Water based cement paint | litre | 140.00 |
| M-191 | Welded steel wire fabric | kg | 69.00 |
| M-192 | Wire mesh 50mm x 50mm size of 3mm wire | kg | 170.00 |
| M-193 | Wooden ballies 2" Dia for bracing | each | 45.00 |

| | | | |
|---|---|---|---|
| M-194 | Wooden ballies 8" Dia and 9 m long | each | 580.00 |
| M-195 | Wooden packing | cum | 16,977.00 |
| M-196 | Wooden staff for fastening of flag 25 mm dia, one m long | each | 71.00 |
| M-197 | Coldmix Binder | tonne | 66,861.00 |
| M-198 | Paving Asphalt VG-30 of approved quality | tonne | 41,549.00 |
| M-199 | Waste plastic additive | tonne | 42,000.00 |
| M-200 | Dry hydrated lime (factory made) | quintal | 300.00 |
| M-201 | Mirror polish granite 0.5 Sq.m Granite of any colour, 18 mm thick | sqm | 1,739.00 |
| M-202 | Granite stone slab 30mm thick | sqm | 1,890.00 |
| M-203 | Interlocking C.C. paver block, ( 60 mm thick, M-30) | sqm | 420.00 |
| M-204 | Matt finished vitrified tile 100x100 x16mm | sqm | 1,100.00 |
| M-205 | Vitrified tile 300x300 x9.8mm | sqm | 559.50 |
| M-206 | Tactile tile 300x300 9.8mm | sqm | 1,050.00 |
| M-207 | Coloured inter locking C.C. paver Block | sqm | 472.50 |
| M-208 | Interlocking C.C. paver block (80 mm thick, M-30) | sqm | 470.00 |
| M-209 | Sundries | | 2.75 |
| M-210 | Hire and running charges of mech mixer | | 2.75 |
| | Lead from Mixing Plant to working site | | 0 |
| | Lead for E/W borow area to site | | 3 |
| | Lead for fly ash from source to site | | 50 |

| **Description** | **Percentage of Rate** |
|---|---|
| GST for Road Works 18 % (as a Multiplying factor ) | 0.2016 |
| Overheads for Road Works | 10 % |
| Contractors profit for Road Works | 10 % |
| Cess for Road Works | 1% |
| Overheads for Bridge Works | 20 % |
| Overheads for Bridge Works (Rehabilitation) | 10 % |
| Contractors profit for Bridge Works | 10 % |

| Items No. | Summary of Rates calculated and used for analysis of rates of other items | Unit | Rate |
|---|---|---|---|
| Item 8.3 | Printing new letter and figures of any shade (ii) English Roman (As per Analysis Directly Used Items) | per cm height per letter | 1.10 |
| Item 8.8 | Painting Two Coats on New Concrete Surfaces ( ---DO---) | sqm | 162.00 |
| Item 8.9 | Painting angle iron post two coats ( ---DO---) | sqm | 141.00 |
| Item 12.6 (B) | Cement mortor 1:2 (Excluding OH & CP) ( ---DO---) | cum | 7,105.00 |
| Item 12.6 (A) | Cement mortor 1:3 (Excluding OH & CP) ( ---DO---) | cum | 5,727.00 |
| Item 12.6 (D) | Cement mortor 1:6 (Excluding OH & CP) ( ---DO---) | cum | 3,823.00 |
| Item 12.7 (A ) | Course Rubble masonary in cement mortor 1:3 (including OH & CP) ( ---DO---) | cum | 6,751.00 |
| Item 12.7 (Addl) B) | Random Rubble masonary in cement mortor 1:6 (including OH & CP) ( ---DO---) | cum | 5,605.00 |
| Item 12.8 (A) | PCC Grade M15 including OH & CP for Open Foundation by Mixer ( ---DO---) | cum | 9,371.00 |
| Item 12.8 (A) | PCC Grade M15 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Mixer ( ---DO---) | cum | 5,625.00 |
| Item 12.8 (B) PCC | PCC Grade M20 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Mixer ( ---DO---) | cum | 6,090.00 |
| Item 12.8 (C) Case I | RCC Grade M20 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Mixer ( ---DO---) | cum | 6,103.00 |
| Item 12.8 (C) RCC | RCC Grade M20 including OH & CP for Open Foundation by Batching Plant ( ---DO---) | cum | 9,665.00 |
| Item 12.8 (C) Case II | RCC Grade M20 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Batching Plant ( ---DO---) | cum | 5,802.00 |
| Item 12.8 (D) | PCC Grade M25 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Mixer ( ---DO---) | cum | 6,594.00 |
| Item 12.8 (D) | PCC Grade M25 including OH & CP for Open Foundation by Batching Plant ( ---DO---) | cum | 10,465.00 |
| Item 12.8 (D) | PCC Grade M25 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Batching Plant ( ---DO---) | cum | 6,297.00 |
| Item 12.8 (E) | RCC Grade M25 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Mixer ( ---DO---) | cum | 6,612.00 |
| Item 12.8 (E) | RCC Grade M25 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Batching Plant ( ---DO---) | cum | 6,415.00 |

| | | | |
|---|---|---|---|
| Item 12.8 (F) Case I | PCC Grade M30 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Mixer ( ---DO---) | cum | 6,649.00 |
| Item 12.8 (F) Case II | PCC Grade M30 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Batching Plant ( ---DO---) | cum | 6,346.00 |
| Item 12.8 (G) | RCC Grade M30 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Mixer ( ---DO---) | cum | 6,643.00 |
| Item 12.8 (G) | RCC Grade M30 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Batching Plant ( ---DO---) | cum | 6,343.00 |
| Item 12.8 (H) | RCC Grade M35 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Mixer ( ---DO---) | cum | 6,782.00 |
| Item 12.8 (H) | RCC Grade M35 including OH & CP for Open Foundation by Batching Plant ( ---DO---) | cum | 6,788.00 |
| Item 12.8 (H) | RCC Grade M35 excluding OH & CP for Open Foundation by Batching Plant ( ---DO---) | cum | 10,874.00 |
| Item 12.8 (H) | RCC Grade M35 for Open Foundation Per Cum Basic Cost of Labour, Material & Mechinery by Batching Plant ( ---DO---) | cum | 6,591.00 |
| Item 12.11 (C) i | PCC Grade M20 for Open Foundation (Bottom Plug) Per Cum Basic Cost of Labour, Material & Mechinery by Mixer ( ---DO---) | cum | 6,604.00 |
| Item 12.11 (C) i | PCC Grade M20 for Open Foundation (Bottom Plug) Per Cum Basic Cost of Labour, Material & Mechinery by Batching Plant ( ---DO---) | cum | 6,089.00 |
| Item 12.11 (C) ii | PCC Grade M25 for Open Foundation (Bottom Plug) Per Cum Basic Cost of Labour, Material & Mechinery by Mixer ( ---DO---) | cum | 6,884.00 |
| Item 12.11 (C) ii | PCC Grade M25 for Open Foundation (Bottom Plug) Per Cum Basic Cost of Labour, Material & Mechinery by Batching Plant ( ---DO---) | cum | 6,366.00 |
| Item 12.11 (C) iii | PCC Grade M30 for Open Foundation (Bottom Plug) Per Cum Basic Cost of Labour, Material & Mechinery by Mixer ( ---DO---) | cum | 6,938.00 |
| Item 12.11 (C) iii | PCC Grade M30 for Open Foundation (Bottom Plug) Per Cum Basic Cost of Labour, Material & Mechinery by Batching Plant ( ---DO---) | cum | 6,423.00 |
| Item 12.11 (C) iv | PCC Grade M35 for Open Foundation (Bottom Plug) Per Cum Basic Cost of Labour, Material & Mechinery by Mixer ( ---DO---) | cum | 7,066.00 |
| Item 12.11 (C) iv | PCC Grade M35 including OH & CP for Well Foundation (Bottom Plug) by Batching Plant ( ---DO---) | cum | 10,965.00 |
| Item 12.11 (C) iv | PCC Grade M35 for Open Foundation (Bottom Plug) Per Cum Basic Cost of Labour, Material & Mechinery by Batching Plant ( ---DO---) | cum | 6,548.00 |
| Item 12.11 (F) iv | PCC Grade M35 including OH & CP for Well Foundation (Well Cap) by Batching Plant ( ---DO---) | cum | 10,696.00 |

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|---|---|---|---|
| Item No. 3.13 | Excavation for Structures (Manual Means) ( ---DO---) | cum | 524.00 |
| Item No. 3.13 | Excavation for Structures (Mechenical Meanse) ( ---DO---) | cum | 78.00 |
| Item 14.1(A) | RCC Grade M20 for super-structure including OH & CP by Batching Plant ( ---DO---) | cum | 11,044.00 |
| Item 14.1(B) | RCC Grade M20 for super-structure including OH & CP by Batching Plant ( ---DO---) | cum | 12,071.00 |
| Item 14.1(E) | RCC Grade M20 for super-structure including OH & CP by Batching Plant ( ---DO---) | cum | 12,835.88 |
| Item 14.1(C) | RCC Grade M30 for super-structure including formwork and excluding OH & CP by Batching Plant ( ---DO---) | cum | 7,619.00 |
| Item 14.1(C) | RCC Grade M30 for super-structure excluding formwork and excluding OH & CP by Batching Plant ( ---DO---) | cum | 6,349.00 |
| Item 14.2 A | Supplying ,fitting and placing HYSD bar reinforcement in super-structure exncluding OH & CP ( ---DO---) | tonne | 76,604.00 |
| Item 13.6 | Supplying, fitting and placing HYSD including OH & CP for sub-structure ( ---DO---) | tonne | 1,20,323.00 |
| Item 5.17 | Fog Seal ( ---DO---) | sqm | 68.00 |
| Item 5.21 Case-I | Crack Prevention courses. Case-I Stress Absorbing Membrane (SAM) crack width less than 6 mm ( ---DO---) | sqm | 102.00 |
| Item 5.21 Case-II | Crack Prevention courses. Case-II Stress Absorbing Membrane (SAM) with crack width 6 mm to 9 mm ( ---DO---) | sqm | 124.00 |
| Item 5.21 Case-IV | Crack Prevention courses. Case-III Stress Absorbing Membrane (SAM) crack width above 9 mm and cracked area above 50 % ( ---DO---) | sqm | 166.00 |
| Item 5.21 Case-IV | Crack Prevention courses. Case-IV Bitumen Impregnated Geotextile ( ---DO---) | sqm | 183.00 |
| Item 5.15 Case-I | Slurry Seal Case-I 5 mm thickness ( ---DO---) | sqm | 111.00 |
| Item 5.15 Case-II | Slurry Seal Case-II 3 mm thickness ( ---DO---) | sqm | 77.00 |
| Item 5.15 Case-III | Slurry Seal Case III 1.5 mm thickness ( ---DO---) | sqm | 47.00 |
| Item 5.9 Case-I | Surface Dressing Case-I 19 mm nominal chipping size ( ---DO---) | sqm | 156.00 |
| Item 5.9 Case-II | Surface Dressing Case-II 13 mm nominal size chipping ( ---DO---) | sqm | 124.00 |

## A. Roads Works

## Basic Notes for Preparation of Schedule of Rates

The basic approach for the preparation of schedule of rates for Road Works is indicated as under :

**Description of items**

1. The description of items is given briefly and linked with the relevant clause of the MoRT&H Specifications for Road and Bridge Works, which may be referred for detailed description, provisions and interpretation.

2. **Mechanical Means**

   Due to mechanization of construction work, rate for various items have been derived using mechanical means. However, manual means have also been provided for certain cases, where areas may be inaccessible for machines or quantum of work may not be large enough to justify deployment of the machines.

3. **Overhead Charges**

3.1 **10 percent overhead charges has been considered in the schedule of rates**

(i) Site accomodation, setting up plant, access road, water supply, electricity and general site arrangements.

(ii) Office furniture, equipment and communications.

(iii) Expenditure on

a) Corporate office of contractor

b) Site Supervision

c) Documentation and "as built" drawings

(iv) Mobilisation/de-mobilisation of resources.

(v) Labour camps with minimum amenities and transportation to work sites.

(vi) Light vehicles for site supervision including administrative and managerial requirements

(vii) Laboratory equipment and quality control including field and laboratory testing

(viii) Minor T&P and survey instruments and setting out works, including verification of line, dimensions, trial pits and bore holes, where required

(ix) Watch and ward

(x) Traffic management during construction

(xi) Expenditure on safeguarding environment

(xii) Sundries

(xiii) Financing Expenditure

(xiv) Work Insurance/compensation

4. **Contractor Profit**

   10 percent of cost of works. Contractor profit is also added on overhead charges.

5. **Basic Inputs**

   Other than the Basic given in the standard data book of MoRT&H the ratefor plants & equipments, material and labour are as per the prevailing market rates from the near by authorised dealers/quarry etc. excluding all Taxes/charges on Zero lead basis.

6. **Plants and Equipments**

6.1 A dozer is proposed for excavation where cutting and filling for the roadway is within 100 m. For longer leads, a combination of hydraulic excavator and tipper is proposed.

6.2 Keeping in view the job and managerial factors and the age factor of machines, the output of plant and equipment is taken approximately 70 percent of the rated capacity given by manufacture under ideal conditions.

6.3 It has been assumed that a water tanker would make one trip per hour on an average. Water charges have not been included for items where the requirement is very nominal. It is assumed that the same would be covered under sundries.

6.4 Output of plant/equipment is considered for the compacted quantities.

6.5 The usage charges for machines include ownership charges, cost of repair and maintenance including replacement of tyres and running and operating charges which includes crew, fuel and lubricants.

7. **Materials**

7.1 Quantities of materials considered in the rate are approximate for the purpose of estimating and include normal wastages. Actual consumption would have to be based on mix design.

7.2 Arunachal Pradesh has typical and hard terrain having different altitude, wherein maximum construction material are brought from Assam and utilised in different station located in state. Hence, to maintain the uniformity in rates, it is decided to prepare the APSR-2023 without considering any lead on materials and aggregate. The transportation cost shall be included in the estimate as per distance from the source of procurement of material/aggregate. The following sources has been adopted in the schedule 2023.

(i) Bitumen product - Near by Authorised Dealer

(ii) All steel items/Cement :- Tezpur/Banderdewa/North Lakhimpur/Silapathar/Dibrughar /Tinsukia

(iii) Bricks :- Kiln in Assam nearest to site of work

(iv) Aggregate :- At quarry nearby site of work.

(v) Other items :- Avarage market rates fixed for all district headquarter of state.

(vi) R.C.C. Hume Pipes :- Naharlagun/Likabali or nearby source in Assam.

7.3 The alternative proposal for crushing own aggregate by installing crusher is compared with procurement of crushed aggregates from the market and proposal found economical is to be adopted.

7.4 The specifications of materials shall be governed by section 1000 of MoRT&H Specifications for Road and Bridge Works.

8. **Labour**

8.1 The avarage market rate has been adopted which are workable in the state

8.2 One mate has been provided for 25 labours

9. **Carriage of Materials**

9.1 The unit for vehicle for carriage has been taken as under :

a) In hours where lead is variable. The loading and unloading for such cases have been provided separetely.

b) In tonne - km where lead is variable. The loading and unloading for such cases have been provided separately.

c) Ziro lead has been considered for the stone aggregate in order to work out the actual rates of aggregates by adding the transportation cost up to the site of work.

d) In case of Hot Mix Plant Zero lead has been considered. The lead may be considered as per actual location of plant.

9.2 Where the quantity of material to be transported is small such as dismantled materials and the same are required to be loaded manually, provision of tractor-trolley has been made instead of tipper.

10. **General :**

10.1 The clause numbers refer to MoRT&H Specifications for Road and Bridges Works.

10.2 Assumptions made have been indicated in respective chapter in the form of notes, where required.

10.3 Sundries to cater for unforeseen contingency and miscelleneous items have been added in the overhead charges.

10.4 Arrangement for traffic during construction shall be as per Clause 112 of MoRT&H Specifications for Road and Bridge Works.

10.5 Contractor will make his own arrangements for borrowing earth. However, compensation for earth taken from private land has been included in the rate for construction of embankment with borrowed earth.

10.6 **Credit for Dismantled Material**

Credit for dismantled materials has not been included in this schedule of rates. The dismantled materials should be examined and a realistic assessment made for such materials, which can be utilised for works and to be reflected in the estimate.

10.7 The source of material and samples are required to be approved by the Engineer before start of any work.

10.8 The rates of items include cost of testing dismantled materials.

10.9 The use of surface by construction vehicles shall be governed by Clause 119 of MoRT&H Specifications.

10.10 The contractor shall arrange to provide and maintain adequate equipment field laboratory as per Clause 121.

10.11 Quality Control of works shall be governed by Section 900 of MoRT&H Specifications.

10.12 The various activities of works shall also be documented by photographs and vedio cassettes as per Clauses 125 & 126 of MoRT&H Specifications.

10.13 The classification of soil shall be as per Clause 301.2 of MoRT&H Specifications.

10.14 The earth excavated from foundations has been considered to be backfilled and balance utilised locally for road work except in the case of marshy soil.

10.15 The rate for removal of unsuitable soil does not provide for replacement by suitable soil which will have to be paid separately.

10.16 Items for hilly terrain have been analysed separately.

10.17 The hire charge rates for machinery and equipment are taken from the Standard Data Book and prevailing market rate.

10.18 10 per cent extra cement has been provided for concreting under water, where required.

10.19 Grade of cement may be adopted as per mix design.

10.20 Quantities of cement in various grades of cement concrete have been taken as per IRC:21-2000 and IRC:18-2000.

10.21 The coarse and fine aggregates shall conform to IS:383.

10.22 For pricing of RCC slab culverts, the items given in respective chapters in bridge section may be reffered.

10.23 Some of major steel producing firms have evolved thermo-mechanically treated steel which has enhanced strength, better corrosion resistance, ductility, weld ability and high temparature thermal resistance. Enquiries from these are made on technical specifications and use of such products considered in works based on performance in works where these have already been used.

10.24 In case it is decided to include the following items and their maintenance in the BOQ, the scope and specifications should be worked out and defined in a detailed manner in the tender document to avoid any dispute during execution.

(i) Site office and furniture for Engineer and his staff.

(ii) Site residential accomodation for Engineer and other supervisory staff.

(iii) Providing and maintaining vehicle for the Engineer.

## GENERAL
# Notes - Bridge Works

The basic approach for the preparation of schedule of rates for Bridge works in indicated as under :

1. **Description of items**

   The description of items is given briefly and linked with relevant clause of MoRT&H's Specifications for Road and Bridge Works, which may be referred for detailed description, provisions and interpretation.

2. **Overhead Charges**

   The rates include over head charges considering the following elements -

2.1 **20 percent overhead charges has been considered in the schedule of rates for :-**

(i) Site accomodation, setting up plant, access road, water supply, electricity and general site arrangements.

(ii) Office furniture, equipment and communications.

(iii) Expenditure on

a) Corporate office of contractor

b) Site Supervision

c) Documentation and "as built" drawings

(iv) Mobilisation/de-mobilisation of resources.

(v) Labour camps with minimum amenities and transportation to work sites.

(vi) Light vehicles for site supervision including administrative and managerial requirements

(vii) Laboratory equipment and quality control including field and laboratory testing

(viii) Minor T&P and survey instruments and setting out works, including verification of line, dimensions, trial pits and bore holes, where required

(ix) Watch and ward

(x) Traffic management during construction

(xi) Expenditure on safeguarding environment

(xii) Sundries

(xiii) Financing Expenditure

(xiv) Work Insurance/compensation

3 **Contractor Profit**

10 percent of cost of works. Contractor profit is also added on overhead charges.

4 **Basic Inputs**

Basic inputs are only given in the standard data book. The rates for material and labour are as per the prevailing market/govt. rates.

5 **Plants and Equipments**

The usage/hire charges of machinery/equipment have been worked out based upon present cost of equipments, repairs, POL and Operational charges.

6. **Materials**

6.1 Quantities of materials considered in the rate are approximate for the purpose of estimating and include normal wastages. Actual consumption would have to be based on mix design.

6.2 Arunachal Pradesh has typical and hard terrain having varying altitude, wherein maximum construction materials are brought from Assam and utilised in different station located in state. Hence, to maintain the uniformity in rates, it is decided to prepare the APSR-2023 without considering any lead on materials and aggregate. The transportation cost shall be included in the estimate as per distance from the source of procurement of material/aggregate. The following sources has been adopted in the schedule .

(i) Bitumen product - Near by authorised Dealer.

(ii) All steel items/Cement :- Tezpur/Banderdewa/North Lakhimpur/ /Dibrughar /Tinsukia

(iii) Bricks :- Kiln in Assam nearest to site of work

(iv) Aggregate :- At quarry nearby site of work.

(v) Other items :- Avarage market rates fixed for all district headquarter of state.

(vi) R.C.C. Hume Pipes :- Naharlagun/Likabali or nearby source in Assam.

6.3 The alternative proposal for crushing own aggregate by installing crusher is compared with procurement of crushed aggregates from the market and proposal found economical is to be adopted.

6.4 The specifications of materials shall be governed by section 1000 of MoRT&H Specifications for Road and Bridge Works.

7. **Labour**

7.1 The avarage market rate has been adopted which are workable in the state

7.2 One mate has been provided for 25 labours

8. **Carriage of Materials**

8.1 The unit for vehicle for carriage has been taken as under :

a) In hours where lead is variable. The loading and unloading for such cases have been provided separetely.

b) In tonne - km where lead is variable. The loading and unloading for such cases have been provided separately.

c) Ziro lead has been considered for the stone aggregate in order to work out the actual rates of aggregates by adding the transportation cost up to the site of work.

9 **General :**

9.1 The clause numbers refer to MoRT&H Specifications for Road and Bridges Works.

9.2 Assumptions made have been indicated in respective chapter in the form of notes, where required.

9.3 Sundries to cater for unforeseen contingency and miscelleneous items have been added in the overhead charges.

9.4 Arrangement for traffic during construction shall be as per Clause 112 of MoRT&H Specifications for Road and Bridge Works.

9.5 Contractor will make his own arrangements for borrowing earth. However, compensation for earth taken from private land has been included in the rate for construction of embankment with borrowed earth.

9.6 **Credit for Dismantled Material**

Credit for dismantled materials has not been included in this schedule of rates. The dismantled materials should be examined and a realistic assessment made for such materials, which can be utilised for works and to be reflected in the estimate.

9.7 The source of material and samples are required to be approved by the Engineer before start of any work.

9.8 The rates of items include cost of testing dismantled materials.

9.9 The contractor shall arrange to provide and maintain adequate equipment field laboratory as per Clause 121.

9.10 Quality Control of works shall be governed by Section 900 of MoRT&H Specifications.

9.11 The various activities of works shall also be documented by photographs and vedio cassettes as per Clauses 125 & 126 of MoRT&H Specifications.

9.12 The classification of soil shall be as per Clause 301.2 of MoRT&H Specifications.

9.13 The earth excavated from foundations has been considered to be backfilled and balance utilised locally for road work except in the case of marshy soil.

9.14 The rate for removal of unsuitable soil does not provide for replacement by suitable soil which will have to be paid separately.

9.15 The hire charge rates for machinery and equipment are taken from the Standard Data Book and prevailing market rate.

9.16 10 per cent extra cement has been provided for concreting under water, where required.

9.17 Grade of cement may be adopted as per mix design.

9.18 Quantities of cement in various grades of cement concrete have been taken as per IRC:21-2000 and IRC:18-2000.

9.19 The coarse and fine aggregates shall conform to IS:383.

9.20 Some of major steel producing firms have evolved thermo-mechanically treated steel which has enhanced strength, better corrosion resistance, ductility, weld ability and high temparature thermal resistance. Enquiries from these are made on technical specifications and use of such products considered in works based on performance in works where these have already been used.

9.21 In case it is decided to include the following items and their maintenance in the BOQ, the scope and specifications should be worked out and defined in a detailed manner in the tender document to avoid any dispute during execution.

(i) Site office and furniture for Engineer and his staff.

(ii) Site residential accomodation for Engineer and other supervisory staff.

(iiI) Providing and maintaining vehicle for the Engineer.

10. **Guide Bund**

10.1 The item for the guide bund are excavation, embankment and protection works.

10.2 In case bridge construction works are to be done on wide and deep water channels in major rivers provision of floating barracges etc. for taking the construction materiasl and equipments inside water shall be made separately.

10.3 The item for singking of wells cover diameters from 6 m to 12 and Twin D Type and size 12 m x 6 m. For other shapes like rectangular or any other size, the rates of sinking may be worked out on pro-rata basis.

10.4 The lift for casting of concrete in well steining may be 2 to 2.5 m restricting the free fall of concrete to 1.5 m and concreting layer to 450 mm.

11 **Foundation**

The Corrosion resistant treated Steel Driven Pile item has to be used only after getting the proper design approved by the authorities as per the specific need at the site.

## CHAPTER - 1

## CARRIAGE OF MATERIALS

***Preamble:***

1 The rate analysis of loading and unloading of various items include stacking.

2 The rate analysis for loading and unloading has been given both by manual and mechanical means. Means of loading/unloading appropriate to the work and site is to be adopted.

3 The rate analysis for haulage of materials has been made in terms of tonne-kilometre (t.km) for ease of adoption depending upon the lead in km and load in tonnes.

4 The cost of carriage will vary depending upon the riding surface of the road. Provision has accordingly been made considering surfaced roads, unsurfaced gravel roads and katcha tracks.

5 Analysis for carriage of materials is exclusive of the loading, unloading and stacking and this has to be added as applicable.

6 Carriage of materials if done by boats shall be paid at the same rates as given for carriage of materials by road.

7 Analysis and the rates for the Carriage of materials on Hill roads has been made available for judicious application according to site locations.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| ***Item No.*** | ***Descriptions*** | **Unit** | **Rate** |
| | ***CHAPTER-1*** | | |
| | ***CARRIAGE OF MATERIALS*** | | |
| | ***FOR PLAIN ROADS*** | | |
| ***1.1*** | ***Loading and unloading of stone boulder / stone aggregates / sand / kanker / moorum.*** *(Placing tipper at loading point, loading with front end loader, dumping, turning for return trip, excluding time for haulage and return trip)* | cum | **243.00** |
| ***1.2*** | ***Loading and Unloading of Boulders by Manual Means*** | cum | **285.00** |
| ***1.3*** | ***Loading and Unloading of Cement or Steel by Manual Means and stacking.*** | tonne | **359.00** |
| ***1.4*** | ***Cost of Haulage Excluding Loading and Unloading*** | | |
| ***(i)*** | ***Surfaced Road*** | tonne.km | **9.30** |
| ***(ii)*** | ***Unsurfaced Gravelled Road*** | tonne.km | **11.20** |
| ***(iii)*** | ***Katcha Track and Track in river bed / nallah bed and choe bed.*** | tonne.km | **22.50** |
| 1.5 | ***FOR HILL ROADS*** | | |
| | **Loading and Unloading of Stone Boulder / Stone aggregates / Sand / Kanker/Moorum / Lime / Shingle / Earth / Excavated Rock and Kerb Stone for hill roads**. Placing tipper at loading point, loading with front end loader, dumping, turning for return trip, excluding time for haulage and return trip. | cum | **243.00** |
| 1.6 | **Loading and Unloading of Stone Boulder / Stone aggregates / Sand / Kanker/Moorum / Lime / Shingle / Earth /** Excavated Rock and Kerb Stones by Manual Means for hill roads. | cum | **286.00** |
| 1.7 | **Loading and Unloading of Cement / Steel / Structural Steel / RC Pipe / Wooden Logs / Bricks / Bitumen and Timber etc**, by Manual Means and Stacking for hill roads. | tonne | **360.00** |
| 1.8 | **Cost of Haulage Excluding Loading and Unloading on hill roads**. Haulage of materials by tipper excluding cost of loading, unloading and stacking. | | |
| (i) | **Surfaced Road** | tonne.km | **13.30** |
| (ii) | **Unsurfaced Graveled Road** | tonne.km | **16.00** |
| (iii) | **Katcha Track and Track in River Bed/Nallah Bed and Choe Bed.** | tonne.km | **32.10** |
| 1.9 | **Cost of Haulage of Bitumen Excluding Loading and Unloading on hill roads**. Haulage of materials by truck excluding cost of loading, unloading and stacking. | | |
| (i) | **Surfaced Road** | tonne.km | **15.80** |
| (ii) | **Unsurfaced Graveled Road** | tonne.km | **19.00** |
| (iii) | **Katcha Track and Track in River Bed/Nallah Bed and Choe Bed.** | tonne.km | **38.20** |

## Chapter – 2

## SITE CLEARANCE

**Preamble:**

1 Unless otherwise stated, the rates include sorting and disposal of unserviceable material and stacking of serviceable material with all lifts and upto a lead of 1000 m.

2 The rates include Tools & Plants (T&P) and scaffolding required for items of dismantling.

3 Carriage of dismantled materials, bushes, branches of tree, etc. has been catered with a tractor-trolley of 3 tonnes capacity with manual loading and unloading @ 2 trips per hour within a lead of 1000 m. This will be economical for such works as compared with a tipper.

4 The dismantling of structures has been catered both by manual and mechanical means. The Engineer can use his discretion depending upon quantum of work and particular site conditions.

5 Rate analysis for removing of stumps and roots has also been provided separately.

6 Dismantling of Hume pipes has been catered manually as pipes can be easily rolled by men to a suitable stacking place within the right-of-way.

7 For dismantling of structures, which remain submerged in water, the cost may be enhanced by 50 per cent. If site conditions warrant lowering of water level to facilitate dismantling, the cost may be enhanced by additional 25 per cent.

8 Dismantling of utilities, like, water supply lines, electric and telephone lines is required to be done under the supervision of concerned departments with prior information to the user public.

9 In certain items of dismantling, like, pipe culverts, utilities, etc. excavation in earth and dismantling of masonary works is not included in this analysis for which suitable notes have been inserted in respective Chapters. These items are required to be priced separately based on actual quantities at site and nature of work.

10 The dismantled materials should be examined and a realistic assessment and provision should be made after due process for the salvage value for such materials, which can be utilized for works or auctioned.

11 In case where lead for disposal is more than 1000 m, extra cost of carriage is required to be added based on tonne-kilometerage as per Chapter 1.

12 All minor Tools & Plants (T&P) items required for dismantling have been considered to have been included in overhead charges.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| | **CHAPTER-2**<br>**SITE CLEARANCE** | | |
| 2.1 | ***Cutting of Trees, including Cutting of Trunks, Branches and Removal*** *(Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and up to a lead of 1000 mtrs and earth filling in the depression/pit.)* | | |
| (i) | ***Girth from 300 mm to 600 mm*** | each | **468.00** |
| (ii) | ***Girth from 600 mm to 900 mm*** | each | **826.00** |
| (iii) | ***Girth from 900 mm to 1800 mm*** | each | **1,621.00** |
| 2.2 | ***Clearing Grass and Removal of Rubbish*** | hectare | **32,750.00** |
| 2.3 | ***Clearing and Grubbing Road Land .*** *(Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.)* | | |
| (i) | ***By Manual Means:-*** | | |
| A | ***In area of light jungle*** | hectare | **99,028.00** |
| B | ***In area of thorny jungle*** | hectare | **1,32,556.00** |
| (ii) | ***By Mechanical Means*** | | |
| A | ***In area of light jungle*** | hectare | **77,483.00** |
| B | ***In area of thorny jungle*** | hectare | **93,999.00** |
| 2.4 | ***Dismantling of Structures*** *(Dismantling of existing structures like culverts, bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and lead of 1000 metres)* | | |
| (i) | ***Lime /Cement Concrete*** | | |
| I | ***By Manual Means*** | | |
| A | ***Lime Concrete, cement concrete grade M-10 and below*** | cum | **692.00** |
| B | ***Cement Concrete Grade M-15 & M-20*** | cum | **823.00** |
| C | ***Prestressed / Reinforced cement concrete grade M-20 & above*** | cum | **2,183.00** |
| II | ***By Mechanical Means for items No. 202( b) & ( c)*** | | |
| A | ***Cement Concrete Grade M-15 & M-20*** | cum | **948.00** |
| B | ***Prestressed / Reinforced cement concrete grade M-20 & above*** | cum | **1,601.00** |
| (ii) | ***Dismantling Brick / Tile work*** | | |
| A | ***In lime mortar*** | cum | **430.00** |
| B | ***In cement mortar*** | cum | **561.00** |
| C | ***In mud mortar*** | cum | **380.00** |
| D | ***Dry brick pitching or brick soling*** | cum | **352.00** |
| (iii) | ***Dismantling Stone Masonry*** | | |
| A | ***Rubble stone masonry in lime mortar*** | cum | **483.00** |
| B | ***Rubble stone masonry in cement mortar.*** | cum | **561.00** |
| C | ***Rubble Stone Masonry in mud mortar.*** | cum | **430.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| D | Dry rubble masonry | cum | 404.00 |
| E | Dismantling stone pitching/ dry stone spalls. | cum | 380.00 |
| F | Dismantling boulders laid in wire crates including opening of crates and stacking dismantled materials. | cum | 430.00 |
| (iv) | Wood work wrought framed and fixed in frames of trusses upto a height of 5 m above plinth level | cum | 1,053.00 |
| (v) | Steel work in all types of sections upto a height of 5 m above plinth level excluding cutting of rivet. | | |
| A | Including dismembering | tonne | 2,736.00 |
| B | Excluding dismembering. | tonne | 2,037.00 |
| C | Extra over item No( V ) A and( V ) B for cutting rivets. | tonne | 20.00 |
| (vi) | Scraping of bricks dismantled from brick work including stacking. | | |
| A | In lime/Cement mortar | 1000 numbers | 2,293.00 |
| B | In mud mortar | 1000 numbers | 819.00 |
| (vii) | Scraping of Stone from dismantled stone masonry | | |
| A | In cement and lime mortar | cum | 920.00 |
| B | In Mud mortar | cum | 195.00 |
| (viii) | Scarping plaster in lime or cement mortar from brick/ stone masonry | sqm | 29.00 |
| (ix) | Removing all type of hume pipes and stacking within a lead of 1000 metres including earthwork and dismantling of masonry works. | | |
| A | Up to 600 mm dia | metre | 340.00 |
| B | Above 600 mm to 900 mm dia | metre | 460.00 |
| C | Above 900 mm | metre | 788.00 |
| 2.5 | **Dismantling of Flexible Pavements** *(Dismantling of flexible pavements and disposal of dismantled materials up to a lead of 1000 metres, stacking serviceable and unserviceable materials separately)* | | |
| I | By Manual Means | | |
| A | Bituminous courses | cum | 1,278.00 |
| B | Granular courses | cum | 912.00 |
| II | By Mechanical Means | | |
| A | Bituminous course | cum | 506.00 |
| 2.6 | **Dismantling of Cement Concrete Pavement** *(Dismantling of cement concrete pavement by mechanical means using pneumatic tools, breaking to pieces not exceeding 0.02 cum in volume and stock piling at designated locations and disposal of dismantled materials up to a lead of 1000 metres, stacking serviceable and unserviceable materials separately)* | cum | 2,134.00 |
| 2.7 | **Dismantling Guard Rails** *(Dismantling guard rails by manual means and disposal of dismantled material with all lifts and up to a lead of 1000 metres, stacking serviceable materials and unserviceable materials separately.)* | metre | 140.00 |
| 2.8 | **Dismantling Kerb Stone** *(Dismantling kerb stone by manual means and disposal of dismantled material with all lifts and up to a lead of 1000 metre)* | metre | 26.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| **2.9** | ***Dismantling Kerb Stone channel*** *(Dismantling kerb stone channel by manual means and disposal of dismantled material with all lifts and up to a lead of 1000 metre)* | metre | **39.00** |
| **2.10** | ***Dismantling Kilometre Stone*** *(Dismantling of kilometre stone including cutting of earth, foundation and disposal of dismantled material with all lifts and lead upto 1000 m and back filling of pit.)* | | |
| **A** | ***5th KM stone*** | each | **689.00** |
| **B** | ***Ordinary KM Stone*** | each | **405.00** |
| **C** | ***Hectometre Stone*** | each | **81.00** |
| **2.11** | ***Dismantling of Fencing*** *(Dismantling of barbed wire fencing/ wire mesh fencing including posts, foundation concrete, back filling of pit by manual means including disposal of dismantled material with all lifts and up to a lead of 1000 metres, stacking serviceable material and unserviceable material separately. )* | metre | **92.00** |
| **2.12** | ***Dismantling of CI Water Pipe Line*** *(Dismantling of CI water pipe line 600 mm dia including disposal with all lifts and lead upto 1000 metres and stacking of serviceable material and unserviceable material separately under supervision of concerned department)* | metre | **218.00** |
| **2.13** | ***Removal of Cement Concrete Pipe of Sewer Gutter*** *(Removal of cement concrete pipe of sewer gutter 1500 mm dia under the supervision of concerned department including disposal with all lifts and up to a lead of 1000 metres and stacking of serviceable and unserviceable material separately but excluding earth excavation and dismantling of masonry works.)* | metre | **314.00** |
| **2.14** | ***Removal of Telephone / Electric Poles and Lines*** *(Removal of telephone / Electric poles including excavation and dismantling of foundation concrete and lines under the supervision of concerned department, disposal with all lifts and up to a lead of 1000 metres and stacking the serviceable and unserviceable material separately)* | each | **317.00** |

## Chapter – 3

## EARTHWORK, EROSION CONTROL AND DRAINAGE

**Preamble:**

1 The rates have been analysed using mechanical means. Manual means for certain items have also been provided which can be used for areas inaccessible to machines and also for small jobs.

2 In the rate analyses of earthwork, compacted volume of earth has been considered.

3 Cutting of earth by dozer has been proposed where the cut earth can be utilized for filling for embankment within a lead upto 100 m.

4 Where lead for transporting of earth is more than 100 m, excavator and tipper have been provided.

5 The rate caters for disposal of unsuitable soil only upto a distance of 1 km. The cost of transportation beyond the initial lead of 1 km will be paid separately based on tonne-kilometerage.

6 The replacement of unsuitable soil by suitable soil shall be provided separately in the estimate. The rate analysis for removal of unsuitable soil does not provide for replacement by suitable soil.

7 In cases where embankment is constructed with earth taken from roadway, the cost of depositing the earth at the site of embankment is already included in the disposal of excavated earth and, therefore, the input of dozer for spreading earth can be deleted.

8 For narrow and restricted areas, plate compactor has been proposed for compaction to achieve the desired density.

9 In case excavated rock is found suitable for incorporation in works, suitable credit for the available rock shall be given.

10 For excavation of structures refer to Chapter 11 dealing with items of Foundation.

11 The possibility of using the blasted rock fragments for backfilling behind structures or backfilling of foundation pits or filling in medians/separators or use in service road shall be examined before proposing disposal of excavated rock.

12 For inhabited areas, controlled blasting with limited charges of explosives has been provided. This involves smaller drill holes and additional requirement of electric detonators. Provision has been made accordingly.

13 Any work involved for crossing of water courses for irrigation purpose, etc. will be priced under respective items, like, excavation, grubbing, clearing, etc. for which rate analysis have separately been made.

14 Earth excavated from drains can be used in roadway berms. Hence carriage for disposal of same is not provided.

15 In case of rock fill embankment, it is assumed that material is available at site from rock cutting.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| | **CHAPTER-3** | | |
| | **EARTH WORK, EROSION CONTROL AND DRAINAGE** | | |
| **3.1** | ***Excavation in Soil by Manual Means.*** *(Excavation for roadway in soil using manual means including loading in truck for carrying of cut earth to embankment site with all lifts and lead upto1000 metres.)* | cum | **341.00** |
| **3.2** | ***Excavation in ordinary rock by manual means*** *(Excavation in ordinary rock using manual means including loading in a truck and carrying of excavated material to embankment site with in all lifts and leads upto 1000 metres )* | cum | **477.00** |
| **3.3** | ***Excavation in Soil with Dozer with lead upto 100 metres (*** *Excavation for road way in soil by mechanical means including cutting and pushing the earth to site of embankment upto a distance of 100 metres (average lead50 metres), including trimming bottom and side slopes in accordance with requirements of lines, grades and cross sections.)* | cum | **254.00** |
| **3.4** | ***Excavation in Ordinary Rock with Dozer with lead upto 100 metres*** *(Excavation for roadway in ordinary rock by deploying a dozer, 80 HP including cutting and pushing the cut earth to site of embankment upto a distance of 100 metres ( average lead 50 metres ), trimming bottom and side slopes in accordance with the requirements of lines, grades and cross sections.)* | cum | **430.00** |
| **3.5** | ***Excavation in Hard Rock (requiring blasting) with disposal upto 1000 metres*** *(Excavation for roadway in hard rock (requiring blasting) by drilling, blasting and breaking, trimming of bottom and side slopes in accordance with requirements of lines, grades and cross sections, loading and disposal of cut road with in all lifts and leads upto 1000 metres )* | cum | **386.00** |
| **3.6** | ***Excavation in Soil using Hydraulic Excavator CK 90 and Tippers with disposal upto 1000 metres.*** *(Excavation for roadwork in soil with hydraulic excavator of0.9 cum bucket capacity including cutting and loading in tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transporting to the embankment location within all lifts and lead upto 1000m)* | cum | **113.00** |
| **3.7** | ***Excavation in Ordinary Rockusing Hydraulic ExcavatorCK-90 and Tippers with disposal upto 1000 metres.*** *(Excavation for roadway in ordinary rock with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, transporting to embankment site within all lifts and lead upto 1000 m, trimming bottom and side slopes in accordance with requirements of lines, grades and cross sections.)* | cum | **142.00** |
| **3.8** | ***Excavation in Hard Rock (blasting prohibited)*** *(Excavation for roadway in hard rock (blasting prohibited) with rock breakers including breaking rock, loading in tippers and disposal within all lifts and lead upto 1000 metres, trimming bottom and side slopes in accordance with requirements of lines, grades and cross sections.)* | | |
| ***A*** | ***Mechanised*** | cum | **727.00** |
| ***B*** | ***Manual Method*** | cum | **2,019.00** |
| **3.9** | ***Excavation in Hard Rock (controlled blasting) with disposal upto 1000 metres*** *(Excavation for roadway in hard rock with controlled blasting by drilling, blasting and breaking, trimming of bottom and side slopes in accordance with requirements of lines, grades and cross sections, loading and disposal of cut road with in all lifts and leads upto 1000 metres )* | cum | **467.00** |
| **3.10** | ***Excavation in Marshy Soil*** *(Excavation for roadway in marshy soil with hydraulic excavator 0.9 cum bucket capacity including cutting and loading in tippers and disposal with in all lifts and lead upto 1000 metres, trimming of bottom and side slopes in accordance with requirements of lines, grades and cross sections.)* | cum | **126.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| **3.11** | ***Removal of Unserviceable Soil with Disposal upto 1000 metres*** *(Removal of unserviceable soil including excavation, loading and disposal upto 1000 metres lead but excluding replacement by suitable soil which shall be paid separately as per clause 305.)* | cum | **115.00** |
| **3.12** | ***Pre-splitting of Rock Excavation Slopes*** *(Carrying out excavation in hard rock to achieve a specified slope of the rock face by controlled use of explosives and blasting accessories in properly aligned and spaced drill holes, collection of the excavated rock by a 80 HP dozer, loading in tipper by a front end loader and disposing of the material with all lifts and lead upto 1000 m, all as specified in clause No. 303)* | sqm | **245.00** |
| **3.13** | ***Excavation for Structures*** *(Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom, backfilling the excavation earth to the extent required and utilising the remaining earth locally for road work.)* | | |
| ***(i)*** | ***Ordinary soil*** | | |
| ***A*** | ***Manual Means (Depth upto 3 m)*** | cum | **524.00** |
| ***B*** | ***Mechanical Means (Depth upto 3 m)*** | cum | **78.00** |
| ***(ii)*** | ***Ordinary rock (not requiring blasting)*** | | |
| ***A*** | ***Manual Means (Depth upto 3 m)*** | cum | **655.00** |
| ***B*** | ***Mechanical Means*** | cum | **102.00** |
| ***(iii)*** | ***Hard rock ( requiring blasting )*** | | |
| ***A*** | ***Manual Means*** | cum | **1,064.00** |
| ***(iv)*** | ***Hard rock ( blasting prohibited )*** | | |
| ***A*** | ***Mechanical Means*** | cum | **1,294.00** |
| ***(v)*** | ***Marshy soil*** | | |
| ***A*** | ***Manual means ( upto 3 m depth)*** | cum | **1,018.00** |
| ***B*** | ***Mechanical Means*** | cum | **398.00** |
| **3.14** | ***Scarifying Existing Granular Surface to a Depth of 50 mm by Manual Means*** *(Scarifying the existing granular road surface to a depth of 50 mm and disposal of scarified material within all lifts and leads upto 1000 metres. )* | sqm | **46.00** |
| **3.15** | ***Scarifying existing bituminous surface to a depth of 50 mm by mechanical means*** *(Scarifying the existing bituminous road surface to a depth of 50 mm and disposal of scarified material with in all lifts and lead upto 1000 metres.)* | sqm | **11.00** |
| **3.16** | ***Embankment Construction with Material Obtained from Borrow Pits*** *(Construction of embankment with approved material obtained from borrow pits with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirement of table 300-2)* | cum | **363.00** |
| **3.17** | ***Construction of Embankment with Material Deposited from Roadway Cutting*** *(Construction of embankment with approved materials deposited at site from roadway cutting and excavation from drain and foundation of other structures graded and compacted to meet requirement of table 300-2)* | cum | **170.00** |
| **3.18** | ***Construction of Subgrade and Earthen Shoulders*** *(Construction of subgrade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table No. 300-2)* | cum | **427.00** |
| **3.19** | ***Compacting Original Ground*** | | |
| *Case-I* | ***Compacting original ground supporting subgrade*** *(Loosening of the ground upto a level of500 mm below the subgrade level, watered, graded and compacted in layers to meet requirement of table 300-2 for subgrade construction.)* | cum | **91.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| ***Case-II*** | ***:Compacting original ground supporting embankment*** | cum | **39.00** |
| ***3.20*** | ***Stripping and Storing Top Soil*** *(Stripping, storing of top soil by road side at 15 m internal and re-application on embankment slopes, cut slopes and other areas in localities where the available embankment material is not conducive to plant growth)* | cum | **402.00** |
| ***3.21*** | ***Stripping, storing and re-laying top soil from borrow areas in agriculture fields.*** *(Stripping of top soil from borrow areas located in agriculture fields, storing at a suitable place, spreading and re-laying after taking the borrow earth to maintain fertility of the agricultural field, finishing it to the required levels and satisfaction of the farmer.)* | cum | **153.00** |
| ***3.22*** | ***Turfing with Sods*** *(Furnishing and laying of the live sods of perennial turf forming grass on embankment slope, verges or other locations shown on the drawing or as directed by the engineer including preparation of ground, fetching of rods and watering)* | sqm | **62.00** |
| ***3.23*** | ***Seeding and Mulching*** *(Preparation of seed bed on previously laid top soil, furnishing and placing of seeds, fertilizer, mulching material, applying bituminous emulsion at the rate of0.23 litres per sqm and laying and fixing jute netting, including watering for 3 months all as per clause 308)* | sqm | **185.00** |
| ***3.24*** | ***Surface Drains in Soil*** *(Construction of unlined surface drains of average cross sectional area 0.40 sqm in soil to specified lines, grades, levels and dimensions to the requirement of clause 301 and 309. Excavated material to be used in embankment within a lead of50 metres (average lead 25 metres))* | | |
| ***A*** | ***Mechanical means*** | metre | **115.00** |
| ***B*** | ***Manual Means*** | metre | **131.00** |
| ***3.25*** | ***Surface Drains in Ordinary Rock*** *(Construction of unlined surface drain of average cross sectional area 0.4 sqm in ordinary rock to specified lines, grades, levels and dimensions as per approved design and to the requirement of clause 301 to 309. Excavated material to be used in embankment at site.)* | | |
| ***A*** | ***Mechanical Means*** | metre | **234.00** |
| ***B*** | ***Manual Means*** | metre | **197.00** |
| ***3.26*** | ***Surface Drains in Hard Rock*** *(Rate per metre may be worked out based on quantity of hard rock as per design.)* | metre | |
| ***3.27*** | ***Sub Surface Drains with Perforated Pipe*** *(Construction of subsurface drain with perforated pipe of 100 mm internal diameter of metal/ asbestos cement/ cement concrete/PVC, closely jointed, perforations ranging from 3 mm to 6 mm depending upon size of material surrounding the pipe, with 150 mm bedding below the pipe and 300 mm cushion above the pipe, cross section of excavation 450 x 550 mm. Excavated material to be utilised in roadway at site )* | | **859.00** |
| ***3.28*** | ***Aggregate Sub- Surface Drains*** *(Construction of aggregate sub surface drain 300 mm x 450 mm with aggregates conforming to table 300-4, excavated material to be utilised in roadway )* | metre | **382.00** |
| ***3.29*** | ***Underground Drain at Edge of Pavement*** *(Construction of an underground drain 1 m x 1 m (inside dimensions) lined with RCC-20 cm thick and covered with RCC slab10 cm in thickness on urban roads)* | metre | **4,950.00** |
| ***3.30*** | ***Preparation and Surface Treatment of formation.*** *(Preparation and surface treatment of formation by removing mud and slurry, watering to the extent needed to maintain the desired moisture content, trimming to the required line, grade, profile and rolling with 8-10 tonne smooth wheeled roller, complete as per clause 310.)* | sqm | **4.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| **3.31** | ***Construction of Rock fill Embankment*** *(Construction of rock fill embankment with broken hard rock fragments of size not exceeding 300 mm laid in layers not exceeding 500 mm thick including filling of surface voids with stone spalls, blinding top layer with granular material, rolled with vibratory road roller, all complete as per clause 313)* | cum | **95.00** |
| **3.32 (i)** | ***Excavation in Hill Area in Soil by Mechanical Means*** *(Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres)* | cum | **255.00** |
| **3.32 (ii)** | ***Depositing of excavated earth on the barren valley side.*** *(Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth on the Barren Valley side)* | cum | **130.00** |
| **3.33 (i)** | ***Excavation in Hilly Area in Ordinary Rock by Mechanical Means not Requiring Blasting.*** *(Excavation in hilly area in ordinary rock not requiring ballasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 metres )* | cum | **373.00** |
| **3.33 (ii)** | ***Disposal of excavated earth on the barren valley side.*** *(Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of excavated earth on the barren valley side)* | cum | **207.00** |
| **3.34** | ***Excavation in Hilly Areas in Hard Rock Requiring Blasting*** *(Excavation in hilly areas in hard rock requiring blasting, by mechanical means including trimming of slopes and disposal of cut material with all lifts and lead upto 1000 metres.)* | cum | **485.00** |
| **ii)** | ***Disposal of excavated earth on the barren valley side.*** *Excavation in hilly areas in hard rock requiring blasting, by mechanical means including trimming of slopes and disposal of excavated earth on the barren valley side.* | cum | **318.00** |
| **3.35 (i) A** | ***Excavation in Hilly Areas in Soil by Manual Means*** *(Excavation in soil in Hilly Area by Manual Means including cutting and trimming of side slopes and disposing of excavated earth with a lift upto 1.5 m and a lead upto 20 m as per drawing and Technical Specification Clause 1603.1)* | cum | **328.00** |
| **3.35 (i) B** | *Deduct for quantum of earthwork of all types disposal directly by throwing into the valley without involving any lead and lift (Ordinary and Hard Soil/Hard Shale, Soil containing shingle or small size boulders.* | cum | **125.00** |
| **3.35 (ii) A** | ***Excavation in Hilly Area in Ordinary Rock by Manual Means*** *(Excavation in Ordinary Rock using Manual Means including loading in a truck and carrying of excavated material to embankment site with a lift upto 1.5 m and lead upto 20 m as per Clause 1603.2.)* | cum | **721.00** |
| **3.35 (ii) B** | *Deduct for quantum of earthwork of all types disposal directly by throwing into the valley without involving any lead and lift. (Ordinary and Hard Rock)* | cum | **199.00** |

## Chapter – 4

## SUB-BASES, BASES (NON-BITUMINOUS) AND SHOULDERS

**Preamble:**

1 Quantities of materials provided are approximate and are meant for the purpose of estimating only. Actual quantities shall be as per mix design.

2 For construction of sub-base, two alternatives as under have been provided.

a. Mix in place method

b. Plant mix method

3 Construction of shoulders: - Earthen, Hard and Paved shoulders have been considered, the rates applicable are for subgrade, sub-base and different layers of pavement respectively.

4 In the case of improvement of subgrade with lime stabilization, soil is assumed to be available at the site and has not been provided for. Only lime has been catered. In the case of lime stabilization of sub-base, soil has been provided to form the sub-base.

5 While providing for the rate of materials, detailed local enquires should be made and prevailing market rates ascertained from concerned suppliers in the area keeping in view the location of crushing plants and lead involved.

6 The quantities considered in the output are the compacted quantities. The quantities of aggregates provided in the rate analysis under the head material are the uncompacted quantities.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |

## CHAPTER-4

## SUB-BASES, BASES ( NON- BITUMINOUS) AND SHOULDERS

| | | | |
|---|---|---|---|
| **4.1** | ***Granular Sub-base with Close Graded Material (Table:- 400-1)*** | | |
| **A** | ***Plant Mix Method*** *(Construction of granular sub-base by providing close graded Material, mixing in a mechanical mix 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 the desired density, complete as per clause 401 )* | | |
| **(i)** | ***for grading- I Material*** | cum | **1,946.00** |
| **(ii)** | ***for grading- II Material*** | cum | **1,868.00** |
| **(iii)** | ***for grading-III Material*** | cum | **1,809.00** |
| **B** | ***By Mix in Place Method*** *(Construction of granular sub-base by providing close graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401)* | | |
| **(i)** | ***for grading- I Material*** | cum | **1,727.00** |
| **(ii)** | ***for grading- II Material*** | cum | **1,649.00** |
| **(iii)** | ***for grading-III Material*** | cum | **1,590.00** |
| **4.2** | ***Granular Sub-Base with Coarse Graded Material ( Table:- 400- 2)*** *(Construction of granular sub-base by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401)* | | |
| **(i)** | ***for grading- I Material*** | cum | **1,738.00** |
| **(ii)** | ***for grading- II Material*** | cum | **1,691.00** |
| **(iii)** | ***for grading-III Material*** | cum | **1,604.00** |
| **4.3** | ***Lime Stabilisation for Improving Subgrade*** *(Laying and spreading available soil in the subgrade on a prepared surface, pulverising, mixing the spread soil in place with rotavator with 3 % slaked lime having minimum content of 70% of CaO, grading with motor grader and compacting with the road roller at OMC to the desired density to form a layer of improved sub grade)* | | |
| **A** | ***By Mechanical Means*** | cum | **1,388.00** |
| **B** | ***By Manual Means*** | cum | **1,424.00** |
| **4.4** | ***Lime Treated Soil for Sub- Base*** *(Providing, laying and spreading soil on a prepared sub grade, pulverising, 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 the road roller at OMC to achieve at least 98%of the max dry density to form a layer of sub base.)* | cum | **1,617.00** |
| **4.5** | ***Cement Treated Soil Sub Base/ Base*** *(Providing, laying and spreading soil on a prepared sub grade, pulverising, adding the designed quantity of cement to the spread soil, mixing in place with rotavator, grading with the motor grader and compacting with the road roller at OMC to achieve the desired unconfined compressive strength and to form a layer of sub-base/base.)* | cum | **1,396.00** |
| **4.8** | ***Inverted Choke*** *(Construction of inverted choke by providing, laying, spreading and compacting screening B type/ coarse sand of specified grade in uniform layer on a prepared surface with motor grader and compacting with power roller etc)* | cum | **1,284.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| **4.9** | ***Water Bound Macadam*** *(Providing, laying, spreading and compacting stone aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with vibratory roller 8-10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/ binding Materials to fill up the interstices of coarse aggregate, watering and compacting to the required density.)* | | |
| **A** | ***By Manual Means*** | | |
| **(i)** | ***Grading- I (Using Screening Crushable type such as Moorum or Gravel)*** | | |
| **(a)** | ***Using Screening Crushable type such as Moorum or Gravel*** | cum | **2,438.00** |
| **(b)** | ***Using Screening Type-A (13.2mm Agg.)*** | cum | **3,046.00** |
| **(ii)** | ***Grading- II (Using Screening Crushable type such as Moorum or Gravel)*** | | |
| **(a)** | ***Using Screening Crushable type such as Moorum or Gravel*** | cum | **2,488.00** |
| **(b)** | ***Using Screening Type-A (13.2mm Agg.)*** | cum | **2,806.00** |
| **(c)** | ***Using Screening Type-B (11.2mm Agg.)*** | cum | **3,012.00** |
| **(iii)** | ***Grading- III (Using Screening Crushable type such as Moorum or Gravel)*** | | |
| **(a)** | ***Using Screening Crushable type such as Moorum or Gravel*** | cum | **2,541.00** |
| **(b)** | ***Using Screening Type-B (11.2mm Agg.)*** | cum | **3,066.00** |
| **B** | ***By Mechanical Means:*** | | |
| **(i)** | ***Grading- I (Using Screening Crushable type such as Moorum or Gravel)*** | | |
| **(a)** | ***Using Screening Crushable type such as Moorum or Gravel*** | cum | **2,105.00** |
| **(b)** | ***Using Screening Type-A (13.2mm Agg.)*** | cum | **2,714.00** |
| **(ii)** | ***Grading- II (Using Screening Crushable type such as Moorum or Gravel)*** | | |
| **(a)** | ***Using Screening Crushable type such as Moorum or Gravel*** | cum | **2,155.00** |
| **(b)** | ***Using Screening Type-A (13.2mm Agg.)*** | cum | **2,473.00** |
| **(c)** | ***Using Screening Type-B (11.2mm Agg.)*** | cum | **2,680.00** |
| **(iii)** | ***Grading- III (Using Screening Crushable type such as Moorum or Gravel)*** | | |
| **(a)** | ***Using Screening Crushable type such as Moorum or Gravel*** | cum | **2,209.00** |
| **(b)** | ***Using Screening Type-B (11.2mm Agg.)*** | cum | **2,733.00** |
| **4.10** | ***Crushed Cement Concrete Sub-base / Base*** *(Breaking and crushing of material obtained by breaking damaged cement concrete slabs to size range not exceeding 75 mm as specified in table 400.7 transporting the aggregates obtained from breaking of cement concrete slabs at a lead of L km., laying and compacting the same as sub base/ base course, constructed as WBM to clause 404 except the use of screening or binding Material.)* | cum | **394.00** |
| **4.11** | ***Penetration Coat Over Top Layer of Crushed Cement Concrete Base*** *(Spraying of bitumen over cleaned dry surface of crushed cement concrete base at the rate of 25 kg per 10 sqm by a bitumen pressure distributor, spreading of key aggregates at the rate of 0.13 cum per 10 sqm by a mechanical gritter and rolling the surface as per clause 506.3.8)* | sqm | **49.00** |
| **4.12** | ***Wet Mix Macadam*** *(Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the 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 the desired density.)* | cum | **2,145.00** |

| *Summary of Rate Analysis* | | | |
|---|---|---|---|
| ***Item No.*** | ***Descriptions*** | **Unit** | **Rate** |
| ***4.13*** | ***Construction of Median and Island with Soil Taken from Roadway Cutting*** *(Construction of Median and Island above road level with approved material deposited at site from roadway cutting and excavation for drain and foundation of other structures, spread, graded and compacted as per clause 407)* | cum | **428.00** |
| ***4.14*** | ***Construction of Median and Island with Soil Taken from Borrow Areas*** *(Construction of median and Island above road level with approved material brought from borrow pits, spread, sloped and compacted as per clause 407)* | cum | **655.00** |
| ***4.15*** | ***Construction of Shoulders*** *(A. Earthen Shoulders)* | | |
| ***4.17*** | ***Crusher Run Macadam Base*** *(Providing crushed stone aggregate, depositing on a prepared surface by hauling vehicles, spreading and mixing with a motor grader, watering and compacting with a vibratory roller to clause 410 to form a layer of sub-base/Base)* | | |
| ***A*** | ***By Mix in Place Method*** | | |
| **(i)** | **For 53 mm maximum size** | cum | **2,671.00** |
| **(ii)** | **For 45 mm maximum size** | cum | **2,950.00** |
| ***B*** | ***By Mixing Plant :*** | | |
| **(i)** | **For 53 mm maximum size** | cum | **2,880.00** |
| **(ii)** | **For 45 mm maximum size** | cum | **1,980.00** |
| ***4.18 (A)*** | ***Preparation of sub grade*** *(Preparation of sub grade by excavating earth to an average depth of 22.50 cm, dressing to camber and consolidating with road roller, making good the undulations etc. and disposal of surplus earth, lead upto 50 m.)* | sqm | **135.00** |
| ***4.18 (B)*** | ***Consolidation of sub-grade*** *with road roller of 8 to 12 tonne capacity including making good the undulations etc. with earth or quarry spoils etc. and rerolling the sub grade.* | sqm | **6.46** |

## Chapter – 5

## BASES AND SURFACE COURSES (BITUMINOUS)

**Preamble:**

1 Various alternatives for machines and materials have been provided. The one that suits a particular situation and design may be adopted.

2 The outputs considered for construction equipment are for compacted quantities of relevant items and not for loose quantities.

3 In case of prime coat and tack coat, average quantities of binder indicated in specifications have been taken.

4 Tack coat and prime coat, wherever provided, are required to be measured and paid separately.

5 Cleaning of surface is a part of the item of prime coat and tack coat. As such cleaning of surface has not been provided for bituminous courses as the same is already catered in prime/tack coat. However, for those cases where such coats are not required to be done, cleaning of surface shall be included and paid.

6 Rolling of bituminous courses is required to be done as per Clause 501.6 of MORD Specifications. Provision in the analysis has been made accordingly. It has been observed during actual practice at work sites, that the availability of road roller is generally inadequate. As compaction is the key to good construction, this point is being specifically highlighted to ensure that adequate number of road rollers as per provision in the rate analysis are deployed at site.

7 Spreading of bituminous materials shall be done by mechanical means except in areas where a mechanical paver cannot have access.

8 Hot Mazdoor is the one who work for Bitumen heating/spreading or spreading of hot bituminous mix. He will be paid the same wages. However, he will be provided safety kits containing normally gumboots, hand gloves, dark goggles, barnol, country soap, coconut oil, tarring outfits, etc. For this purpose, additional 0.5 per cent sundries have been provided in the analysis of rates in addition to the normal sundries covered by overheads.

9 Where the proposed aggregates fail to pass the stripping value test, an approved adhesion agent shall be added to the binder as per Clause 507.2.4 with the approval of the Engineer and cost of the adhesion agent shall be added under the subhead of materials.

10 The Factor for usage of rollers has been taken as 0.65 in case of Bituminous Macadam only.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| | **CHAPTER-5** | | |
| | **BASES AND SURFACE COURSES (BITUMINOUS)** | | |
| 5.1 | ***Prime coat*** *(Providing and applying primer coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.60 kg/sqm using mechanical means.)* | sqm | **52.00** |
| 5.2 | ***Tack coat*** | | |
| | ***Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.20 kg per sqm on the prepared bituminous/granular surface cleaned with mechanical broom.*** | sqm | **19.00** |
| 5.3 | ***Bituminous Macadam*** *(Providing and laying bituminous macadam with 100-120 TPH hot mix plant producing an average output of 75 tonnes per hour 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 as per clauses 501.6 and 501.7 to achieve the desired compaction)* | | |
| (i) | ***for Grading I ( 40 mm nominal size )*** | cum | **11,590.00** |
| (ii) | ***for Grading II (19 mm nominal size)*** | cum | **11,420.00** |
| 5.4 | ***Bituminous Penetration Macadam*** *(Construction of penetration macadam over prepared Base by providing a layer of compacted crushed coarse aggregate using chips spreader with alternate applications of bituminous binder and key aggregates and rolling with a smooth wheeled steel roller 8-10 tonne capacity to achieve the desired degree of compaction)* | | |
| A | ***50 mm thick*** | sqm | **535.00** |
| B | ***75 mm thick*** | sqm | **728.00** |
| 5.5 | ***Built-Up-Spray Grout*** *(Providing, laying and rolling of built-up-spray grout layer over prepared base consisting of a two layer composite construction of compacted crushed coarse aggregates using motor grader for aggregates. key stone chips spreader may be used with application of bituminous binder after each layer, and with key aggregates placed on top of the second layer to serve as a Base conforming to the line, grades and cross-section specified, the compacted layer thickness being 75 mm)* | sqm | **428.00** |
| 5.6 | ***Dense Bituminous Macadam*** *(Providing and laying dense bituminous macadam with 100-120 TPH batch type HMP producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 4.0 to 4.5% by weight of total mix of mix and filler, transporting the hot mix to work 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 as per MoRTH specification clause No. 507 complete in all respects.)* | | |
| (i) | ***for Grading I ( 40 mm nominal size )*** | cum | **14,015.00** |
| (ii) | ***for Gradingll(19 mm nominal size)*** | cum | **13,979.00** |
| 5.7 | ***Semi - Dense Bituminous Concrete*** *(Providing and laying semi dense bituminous concrete with 100-120 TPH batch type HMP producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 4.5 to 5 % of mix and filler, transporting the hot mix to work 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 as per MoRTH specification clause No. 508 complete in all respects)* | | |
| (i) | ***for Grading I ( 13 mm nominal size )*** | cum | **14,272.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| (ii) | for GradingII(10 mm nominal size) | cum | 15,219.00 |
| 5.8 | **Bituminous Concrete** *(Providing and laying bituminous concrete with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 5.4 to 5.6 % of mix and filler, transporting the hot mix to work 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 as per MORTH specification clause No. 509 complete in all respects)* | | |
| (i) | for Grading-I ( 13 mm nominal size ) | cum | 15,773.00 |
| (ii) | for Grading-II(10 mm nominal size) | cum | 15,539.00 |
| 5.9 | **Surface Dressing** *(Providing and laying surface dressing as wearing course in single coat using crushed stone aggregates of specified size on a layer of bituminous binder laid on prepared surface and rolling with 8-10 tonne smooth wheeled steel roller)* | | |
| Case -I | :-19 mm nominal chipping size | sqm | 155.00 |
| Case - II | 13 mm nominal size chipping | sqm | 123.00 |
| 5.10 | **Open - Graded Premix Surfacing** *(Providing, laying and rolling of open - graded premix surfacing of 20 mm thickness composed of 13.2 mm to 5.6 mm aggregates either using penetration grade bitumen or cut-back or emulsion to required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a smooth wheeled roller 8-10 tonne capacity, finished to required level and grades.)* | | |
| (i) | Case - I: Mechanical method using Penetration grade Bitumen and HMP of appropriate capacity not less than 75 tonnes/hour . | sqm | 214.00 |
| (ii) | Case - II: Open-Graded Premix Surfacing using cationic Bitumen Emulsion | sqm | 263.00 |
| 5.11 | **Close Graded Premix Surfacing/Mixed Seal Surfacing (** *Mechanical means using HMP of appropriate capacity not less than 75 tonnes/hour. Providing, laying and rolling of close-graded premix surfacing material of 20 mm thickness composed of 11.2 mm to 0.09 mm (Type-a) or 13.2 mm to 0.09 mm (Type-b) aggregates using penetration grade bitumen to the required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a Smooth wheeled roller 8-10 tonne capacity, and finishing to required level and grade. )* | sqm | 282.00 |
| 5.12 | **Seal Coat** *(Providing and laying seal coat sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall using Type A and B seal coats)* | | |
| (i) | Case - I : Type A | sqm | 108.00 |
| (ii) | Case - II : Type B *(Providing and laying of premix sand seal coat with HMP of appropriate capacity not less than 75 tonnes/ hours using crushed stone chipping 6.7 mm size and penetration bitumen of suitable grade.)* | sqm | 80.00 |
| 5.14 | **Mastic Asphalt** *(Providing and laying 25 mm thick mastic asphalt wearing course with paving grade bitumen meeting the requirements given in table 500-29, prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated fine-grained hard stone chipping of 13.2 mm nominal size at the rate of 0.005cum per 10 sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of surfaces not less than 1000C, protruding 1 mm to 4 mm over mastic surface, all complete as per clause 515.)* | sqm | 1,120.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| ***5.15*** | ***Slurry Seal*** *Providing and laying slurry seal consisting of a mixture of fine aggregates, portland cement filler, bituminous emulsion and water on a road surface including cleaning of surface, mixing of slurry seal in a suitable mobile plant, laying and compacting to provide even riding surface)* | | |
| ***(i)*** | ***5 mm thickness*** | sqm | **119.00** |
| ***(ii)*** | ***3 mm thickness*** | sqm | **79.00** |
| ***(iii)*** | ***1.5 mm thickness*** | sqm | **48.00** |
| ***5.17*** | ***Fog Spray*** | sqm | **63.00** |
| ***added*** | ***1.In case it is decided by the engineer to blind the fog spray, the following may be added*** | sqm | **6.00** |
| ***5.18*** | ***Bituminous Cold Mix*** *( Including Gravel Emulsion) (Providing, laying and rolling of bituminous cold mix on prepared base consisting of a mixture of unheated mineral aggregate and emulsified or cutback bitumen, including mixing in a plant of suitable type and capacity, transporting, laying, compacting and finishing to specified grades and levels.)* | | |
| ***(i)*** | ***Using bitumen emulsion and 9.5 mm or 13.2 mm nominal size aggregate*** | cum | **18,592.00** |
| ***(ii)*** | ***Using bitumen emulsion and 19 mm or 26.5 mm nominal size aggregate*** | cum | **18,657.00** |
| ***(iii)*** | ***Using cutback bitumen and 9.5 mm or 13.2 mm nominal size aggregate*** | cum | **14,725.00** |
| ***(iv)*** | ***Using cutback bitumen and 19 mm or 26.5 mm nominal size aggregate*** | cum | **14,767.00** |
| ***5.19*** | ***Sand Asphalt Base Course*** *(Providing, laying and rolling sand-asphalt base course composed of sand, mineral filler and bituminous binder on a prepared sub-grade or sub-base to the lines, levels, grades and cross sections as per the drawings including mixing in a plant of suitable type and capacity, transporting, laying, compacting and finishing.)* | cum | **12,969.00** |
| ***5.21*** | ***Crack Prevention Courses*** | | |
| ***(i)*** | ***Stress Absorbing Membrane (SAM) crack width less than 6 mm*** *(Providing and laying of a stress absorbing membrane over a cracked road surface, with crack width below 6 mm after cleaning with a mechanical broom, using modified binder complying with clause 521, sprayed at the rate of 9 kg per 10 sqm and spreading 5.6 mm crushed stone aggregates @ 0.11 cum per 10 sqm with hydraulic chip spreader, sweeping the surface for uniform spread of aggregates and surface finished to conform to clause 902.)* | sqm | **102.00** |
| ***(ii)*** | ***Stress Absorbing Membrane (SAM) with crack width 6 mm to 9 mm*** *(Providing and laying of a stress absorbing membrane over a cracked road surface, with crack width 6 to 9 mm after cleaning with a mechanical broom, using modified binder complying with clause 521, sprayed at the rate of 11 kg per 10 sqm and spreading 11.2 mm crushed stone aggregates @ 0.12 cum per 10 sqm, sweeping the surface for uniform spread of aggregates and surface finished to conform to clause 902.)* | sqm | **126.00** |
| ***(iii)*** | ***Stress Absorbing Membrane (SAM) crack width above 9 mm and cracked area above 50 %*** *(Providing and laying a single coat of a stress absorbing membrane over a cracked road surface, with crack width above 9 mm and cracked area above 50 % after cleaning with a mechanical broom, using modified binder complying with clause 521, sprayed at the rate of 15 kg per 10 sqm and spreading 11.2 mm crushed stone aggregates @ 0.12 cum per 10 sqm, sweeping the surface for uniform spread of aggregates and surface finished to conform to clause 902.)* | sqm | **166.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| ***5.22*** | ***Recipe Cold Mix*** *(Providing and laying of premix of crushed stone aggregates and emulsion binder, mixed in a batch type cold mixing plant, laid over prepared surface, by paver finisher, rolled with a pneumatic tyred roller initially and finished with a smooth steel wheel roller, all as per clause 519.3)* | | |
| ***(i)*** | ***75 mm thickness*** | cum | **13,472.00** |
| ***(ii)*** | ***40 mm thickness*** | cum | **17,604.00** |
| ***(iii)*** | ***25 mm thickness*** | cum | **19,036.00** |
| ***5.23*** | MORTH - 508.2; IRC: SP : 100 - 2004, chapter 6.5 Using Cold Mix Binder (Exceeds IS 8887 : 2004 of SS-2) Providing, laying and rolling open graded premix carpet of 20mm thickness copmposed of 13.2 mm to 5.6 mm aggregates using Cold Mix Binder (Tailor made ) to reguired line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a three wheel 80-100 KN static roller capacity, finished to required level and grades to be followed by seal coat (Application: Cold OGPC as per Design mix & Implementation by Manufacturer's discretion only) | sqm | **299.00** |
| ***5.24.1*** | Seal Coat | | |
| | MORTH - 510 ; IRC: SP : 100 - 2004, chapter 6.5 & 6.2 Using Cold Mix Binder (Exceeds IS 8887 : 2004 of SS-2) Providing, laying and rolling of seal coat sealing the voids i a bituminous surface laid to the specified levels, grade and cross fall using Cold Mix Binder and stone chips passing 6.3 mm and IS sieve (Application: Seal Coat (A), Liquid Seal Coat as per Design mix & implementation by Manufacturers's discretion only) | sqm | **153.00** |
| ***5.24.2*** | MORTH - 510 ; IRC: SP : 100 - 2004, chapter 6.5 Using Cold Mix Binder (Exceeds IS 8887 : 2004 of SS-2) Providing, laying and rolling of seal coat sealing the voids i a bituminous surface laid to the specified levels, grade and cross fall using Cold Mix Binder and stone chips passing 9.5 mm and IS sieve & retain on 2.36 mm IS sieve (Application: Seal Coat (C), as per Design mix & implementation by Manufacturers's discretion only) | sqm | **123.00** |
| ***5.25.1*** | Close Graded Premix Surfacing/Mixed Seal Surfacing | | |
| | MORTH - 511 ; IRC: SP : 100 - 2004, chapter 6.5 Using Cold Mix Binder (Exceeds IS 8887 : 2004 of SS-2) Providing, laying and rolling of close graded premix surfacing material of 20 mm thickness composed of 11.2 mm to 0.09 mm (Type A) or 13.2 mm to 0.09 mm (Type B) aggregates using using Cold Mix Binder to the required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a smooth wheeled roller 8-10 ton cappacity and finishing to required level and grade (Application: Cold MiSS (Mix Seal Surfacing as per Designmix & Implementation by Manufacturer's discretion only) | sqm | **362.00** |
| ***5.25.2*** | Providing, laying and rolling of close graded premix surfacing material of 20 mm thickness composed of 11.2 mm to 0.09 mm (Type A) or 13.2 mm to 0.09 mm (Type B) aggregates using using Cold Mix Binder to the required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a smooth wheeled roller 8-10 ton cappacity and finishing to required level and grade (Application: Cold MSS (Mix Seal Surfacing as per Designmix & Implementation by Manufacturer's discretion only) | sqm | **380.00** |
| ***5.26*** | MORTH - 504 IRC: SP : 100 - 2004, chapter 7.1 Using Cold Mix Binder (Exceeds IS 8887 : 2004 of SS-2) | | |
| | Providing, laying and rolling of cold BM (50 mm) on prepared base consisting of a mixture of unheated mineral aggregate (19 mm nominal size) and Cold Mix Binder, including mixing in a plant of suitable type and capacity, transporting, laying, compacting and finsishing to specified grades and levels (Application: Cold BM as per Designmix & Implementation by manufacturer's discretion only) | cum | **15,648.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| *Item No.* | *Descriptions* | Unit | Rate |
| ***5.27*** | MORTH - 504 IRC: SP : 100 - 2004, chapter 7.2 Using Cold Mix Binder (Exceeds IS 8887 : 2004 of SS-2) | | |
| | Providing, laying of Semi Dense Bituminous Concrete with 100-120 TPH HMP producing an average output of 75 tonnes per hour using crushed aggregates of specified grading (9.5 mm nominal size), premixed with cold mix binder @ 7.5% by weight of mix, transporting the cold mix to work site, laying with a hydrostatic paver finisher with sensor control to required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction (Application: Cold BM as per Designmix & Implementation by manufacturer's discretion only) | cum | **20,510.00** |
| ***5.28*** | Providing and laying Bituminous concrete using crushed stone aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site by tippers, laying with paver finisher equiped with electronic sensor to the required grade, level and alignment and rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction and density as per specification, complete and as per directions of Engineer-in-Charge. | | |
| ***(a)*** | 40/50 mm compacted thickness with bitumen of grade VG-30 @ 5.5% (percentage by weight of total mix) and lime filler @ 3% (percentage by weight of Aggregate) and waste plastic additive @ 8% (percentage by weight of bitumen) prepared in Batch Type Hot Mix Plant of 100- 120 TPH capacity. | cum | **13,326.30** |
| ***(b)*** | 40/50 mm compacted thickness with bitumen of grade VG-30 @ 5.5% (percentage by weight of total mix) and lime filler @ 3% (percentage by weight of Aggregate) and waste plastic additive @ 8% (percentage by weight of bitumen) prepared in drum Type Hot Mix Plant of 60-90 TPH capacity. | cum | **13,158.90** |
| ***5.29*** | Providing and laying Bituminous concrete using crushed stone aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site by tippers, laying with paver finisher equiped with electronic sensor to the required grade, level and alignment and rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction and density as per specification, complete and as per directions of Engineer-in-Charge. | | |
| ***(a)*** | 40/50 mm compacted thickness with bitumen of grade PMB-40 @ 5.5% (percentage by weight of total mix) and lime filler @ 3% (percentage by weight of Aggregate) prepared in Batch Type Hot Mix Plant of 100-120 TPH capacity. | cum | **11,859.90** |
| ***5.30*** | Providing and laying Bituminous concrete using crushed stone aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site by tippers, laying with paver finisher equiped with electronic sensor to the required grade, level and alignment and rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction and density as per specification, complete and as per directions of Engineer-in-Charge. | | |
| ***(a)*** | 440/50 mm compacted thickness with bitumen of grade CRMB-60 @ 5.5% (percentage by weight of total mix) and lime filler @ 3% (percentage by weight of Aggregate) prepared in Batch Type Hot Mix Plant of 100-120 TPH capacity. | cum | **11,496.70** |

## Chapter – 6

## CEMENT CONCRETE PAVEMENT

**Preamble:**

1 High capacity batch mix plants of 75 cum/hour (effective output) has been considered in the rate analysis of cement concrete pavement works.

2 While tippers have been provided for tranportation of dry lean cement concrete and rolled cement concrete, transit truck mixers have been considered for the cement concrete pavement.

3 Super plasticizer admixture has been provided to improve workability with reduced water cement ratio.

4 Cement 43 grade has been catered for the cement concrete pavement i.e., for pavement quality concrete to get higher strength. However, for dry lean concrete, cement of 33 grade may be preferred.

5 While a slip form paver has been catered for the top layer of concrete pavement, a mechanical paver has been provided for dry lead and roller cement concrete.

6 Materials provided in the rate analysis are for estimating prupose. Exact quantity of materiasl be determined for the job mix formula.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |

## CHAPTER-6

## CEMENT CONCRETE PAVEMENTS

| | | | |
|---|---|---|---|
| **6.1** | ***Dry Lean Cement Concrete Sub- base*** *(Construction of dry lean cement concrete Sub- base over a prepared sub-grade with coarse and fine aggregate conforming to IS: 383, the size of coarse aggregate not exceeding 25 mm, aggregate cement ratio not to exceed 15:1, aggregate gradation after blending to be as per table 600-1, cement content not to be less than 150 kg/ cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, laid with a paver with electronic sensor, compacting with 8-10 tonnes vibratory roller, finishing and curing.)* | cum | **5,235.00** |
| **6.2** | ***Cement Concrete Pavement*** *(Construction of un-reinforced, dowel jointed, plain cement concrete pavement over a prepared sub base with 43 grade cement @ 400 kg per cum, coarse and fine aggregate conforming to IS 383, maximum size of coarse aggregate not exceeding 25 mm, mixed in a batching and mixing plant as per approved mix design, for M40 Grade having minimum 28 days flexural strength of 4.5 Mpa, using approved admixtures, transported to site, laid with a fixed form or slip form paver, spread, compacted and finished in a continuous operation including provision of contraction, expansion, construction and longitudinal joints, joint filler, separation membrane, sealant primer, joint sealant, debonding strip, dowel bar, tie rod, admixtures as approved, curing compound, finishing to lines and grades as per drawing. )* | cum | **10,472.00** |
| **6.3** | ***Rolled Cement Concrete Base*** *(Construction of rolled cement concrete base course with coarse and fine aggregate conforming to IS:383, the size of coarse aggregate not exceeding 25 mm with minimum, aggregate cement ratio15:1 and minimum cement content of 200 kg/cum, aggregate gradation to be as per table 600-4 after blending, mixing in batching plant at optimum moisture content, transporting to site, laying with a paver with electronic sensor, compacting with 8-10 tonnes smooth wheeled vibratory roller to achieve, the designed flexural strength, finishing and curing.)* | cum | **5,906.00** |
| **6.4** | ***Provision for "Cold-Weather Base*** *(Concrete to beplaced safely without damage from freezing throughout the winter months in cold climates when for more than 3 successive days the average daily temperature drops below 5 degree Celcius and stays below 3 degrees Celcius for more than one half of any 24 hour period)* | | |
| | Add extra for cost of additional Portland cement @ 60 to 120 kg per Cum of cement concrete as per the direction of the Engineer-in-charge and as per the discretion of the designer's decision for required 'Heat Hydration' using mix design with particular water cement ration, dimension of the concrete placement, ambiant air temperature, initial concrete temperature, admixtures and the composition. | | |
| | Mass Concreting by design mix (maximum cement content to be 400 kg per Cum of concrete) | Cum | **20%** |
| | Add extra for cost of Chloride free Hardening accelerator at the rate of 0.20% to 5% by weight of cement, low water-cement ration, low-slum concrete as per site climate and as per the direction of the Engineer-in-charge (the dosage of the Chloride free accelerator should be as specified by the manufacturer and as per the discretion of the designer's decision) | | |
| | PCC / RCC Concreting by design mix | Cum | **7%** |
| | (or) | | |

| *Summary of Rate Analysis* | | | |
|---|---|---|---|
| ***Item No.*** | ***Descriptions*** | **Unit** | **Rate** |
| | Add extra for cost of heating the water or aggregates or sand or combination of all except cement to attain the temperature of concrete to be poured between 7 degree Celcius to 21 degree Celcius as per the direction of the Engineer in charge (the temperature of concrete poured should be controlled to eliminate possibility of thermal shrinkage and cracking by design mix according to size of concrete members, climate conditions) | | |
| | PCC / RCC Concreting by design mix | Cum | **15%** |
| | (or) | | |
| | Add extra for cost of concreting on grounds or floors by thawing the surface before placing the concrete with suitable temperature and maintaining the temperature upto the extent of curing period by covering with insulated blankets and thawing if necessary as per the discretion of the designer and as per the direction of the Engineer in charge. | | |
| | PCC / RCC Concreting by design mix | Cum | **12%** |
| | (or) | | |
| | Add extra for cost of concreting on closed conditions by providing and fixing insulated tarpaulin all around with vented heater arrnagement to maintain the required temperature to avoid freezing while mixing / pouring, till initial setting time and upto curing period whichever is desirable as per the direction of the designer as as per the direction of the Engineer in charge (a small portion of Building or Bridge sites as selected to minimise the installlation of insulated covering and vented heater arrangement repetively at every stage of work). | | |
| | For insulated covering and vented heating arrangement upto time period required as directed by Engineer in charge (this item can be combined with any of the concreting methods specified in item 6.4 (i) or (ii) or (iii) or (iv) and combination of any as per the designer's discretion (record to be maintained for temperature of concrete poured to till curing period climate condition. The test results for the concrete at required intervals are to be made available and maintained as per designed requirements). | per 'Cum of Concreting | **25%** |

## Chapter–8

## TRAFFIC SIGNS, MARKINGS AND OTHER APPURTENANCES

**Preamble:**

1 Rate analysis for fencing has been done for two different heights, i.e., 1.20 m and 1.80 m. Any of these two can be adopted depending upon a particular situation and design.

2 Rate analysis for fencing provides for three types as under :

a) Barbed wire fencing

b) Welded steel wire fencing with mesh size of 75X25 mm

c) Welded steel wire fabric with mesh size of 75X50 mm

3 Kerbstone laying and road marking has been provided for laying by mechanical means.

4 Back filling of foundatin of boudary pillars has been proposed with stone spalls, tightly packed and compacted.

5 The item pertaining to road traffic signals has not been analysed as this is a specialised work and rates can be obtained from firms having specialisation for design and installation of this work.

6 For metal beam crash barrier, a 'W' shaped beam of size 311 x 83 mm flange width made with structural steel corrugated plate 3 mm thick and having a length of 4.5 m has been provided, over a channel post of 150 x 75 x 5 mm with a spacer of channel section 150 x 75 x 5 mm, 330 mm long.

7 Printing of letters and signs is required to be measured and paid separately. A separate rate for lettering has been prepared and included in this chapter for this purpose.

8 Two support have been provided for direction and place identification signs where size is more than 0.9 sqm. Only one support is provided for size upto 0.9 sqm.

9 The traffic signs proposed are of retro-reflectorised type made of encapsulated lens type reflective sheeting fixed over almunium sheeting as per Clause 801.3 and installation.

10 The size, location of traffic signs shall be as per IRC:67.

11 The rates for rigid, semi-regid and flexible crash barriershave been included.

12 Provision has been made for a crance for installation of overhead signs.

13 Separate rates have been derived for Tubular steel railing with RCC posts and MS steel posts.

14 The organisation and financial aspects are required to be finalised in consultation with administrative and traffic authorities.

15 The rate for message display board for gantry mounted variable message sign is required to be ascertained from the market, this being a commercially produced item by specialised firms.

16 The rate analysis for traffic impact attenuators at abutments and piers have been inlcuded.

17 In the case of road signs and direction boards the depth of foundation and quantity of cement concrete provided in the rate analysis are indicative. These may be suitably increased in areas of higher wind velocities like coastal areas.

18 **Ducts for Utility Services Along and Across the Expressway/Highways :**

The running metre cost of duct along the road including inspection chambers (where applicable) or across the road will depend upon the approved design. The various item involved are earthen work, plain cement concrete, brick stone masonry, reinforcement cement concrete, form work, steel reinforcement, laying of pipe line (where duct is of pipe) and cast iron/RCC cover for the inspection chamber. The rate for these items are available under respective clauses which can be applied and running metre cost of duct worked out as per the approved design and drawing for particular situations. In case cast iron cover for the inspection chamber, the rate can be ascertained from the market for the size provided in the design and approved drawings.

19 **Noise Barriers :**

Noise barrier can be provided in the form of a brick wall of a suitable height as per the site requirement and approved design. The items involved for the construction of this barrier like earthwork, brick masonry, plain cement concrete, etc. are available in the Data Book, which can be applied to arrive at the cost of noise barrier based on the design adopted.

Alternatively, wherever space permits, cluster of trees, shrubs and plants can be grown by the road side 6 m away from the edge of the roadway. This will intercept the annoying sound waves and fumes from road vehicles.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |

## CHAPTER-8

## TRAFFIC SIGNS, MARKINGS & OTHER ROAD APPURTENANCES

| | | | |
|---|---|---|---|
| **8.1** | ***Cast in Situ Cement Concrete M20 kerb*** *(Construction of cement concrete kerb with top and bottom width 115 and 165 mm respectively, 250 mm high in M 20 grade PCC on M-10 grade foundation 150 mm thick, foundation having 50 mm projection beyond kerb stone, kerb stone laid with kerb laying machine, foundation concrete laid manually, all complete as per clause 408)* | | |
| ***A*** | ***Using Concrete Mixer*** | metre | **491.00** |
| ***B*** | ***Using Concrete Batching and Mixing Plant*** | metre | **492.00** |
| **8.2** | ***Cast in Situ Cement Concrete M 20 Kerb with Channel*** *(Construction of cement concrete kerb with channel with top and bottom width 115 and 165 mm respectively, 250 mm high in M 20 grade PCC on M10 grade foundation 150 mm thick, kerb channel 300 mm wide, 50 mm thick in PCC M20 grade, sloped towards the kerb, kerb stone with channel laid with kerb laying machine, foundation concrete laid manually, all complete as per clause 408)* | | |
| ***A*** | ***Using Concrete Mixer*** | metre | **909.00** |
| ***B*** | ***Using Concrete Batching and Mixing Plant*** | metre | **922.00** |
| **8.3** | ***Printing new letter and figures of any shade*** *(Printing new letter and figures of any shade with synthetic enamel paint black or any other approved colour to give an even shade)* | | |
| ***(i)*** | ***Hindi*** *( Matras commas and the like not to be measured and paid for Half letter shall be counted as half )* | cm height per letter | **1.80** |
| ***(ii)*** | ***English and Roman*** | cm height per letter | **1.10** |
| **8.5** | ***Direction and Place Identification signs upto 0.9 sqm size board.*** *(Providing and erecting direction and place identification retro-reflectorised sign asper IRC:67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminium sheeting, 2 mm thick with area not exceeding 0.9 sqm supported on a mild steel single angle iron post 75 x 75 x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 x 45 x 60 cm, 60 cm below ground level as per approved drawing)* | sqm | **3,432.00** |
| **8.6** | ***Direction and Place Identification signs with size more than 0.9 sqm size board.*** *(Providing and erecting direction and place identification retro-reflectorised sign asper IRC :67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminium sheeting, 2 mm thick with area exceeding 0.9 sqm supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm, 2 Nos. firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)* | sqm | **6,679.00** |
| **8.8** | ***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)* | sqm | **170.00** |
| **8.9** | ***Painting on Steel Surfaces*** *(Providing and applying two coats of ready mix paint of approved brand on steel surface after through cleaning of surface to give an even shade)* | sqm | **148.00** |
| **8.10** | ***Painting on Wood Surfaces*** *(Providing and applying two coats of ready mix paint of approved brand on wood surface after through cleaning of surface to give an even shade)* | sqm | **166.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| ***8.11*** | ***Painting Lines, Dashes, Arrows etc on Roads in Two Coats on New Work*** *(Painting lines, dashes, arrows etc on roads in two coats on new work with ready mixed road marking paint conforming to IS:164 on bituminous surface, including cleaning the surface of all dirt, dust and other foreign matter, demarcation at site and traffic control )* | | |
| ***(i)*** | **Over 10 cm in width** | sqm | **249.00** |
| ***(ii)*** | **Up to 10 cm in width** | sqm | **218.00** |
| ***8.12*** | ***Painting Lines, Dashes, Arrows etc on Roads in Two Coats on Old Work*** *(Painting lines, dashes, arrows etc on roads in two coats on old work with ready mixed road marking paint confirming to IS: 164 on bituminous surface, including cleaning the surface of all dirt, dust and other foreign matter, demarcation at site and traffic control )* | | |
| ***(i)*** | **Over 10 cm in width** | sqm | **168.00** |
| ***(ii)*** | **Up to 10 cm in width** | sqm | **180.00** |
| ***8.13*** | ***Road Marking with Hot Applied Thermoplastic Compound with Reflectorising Glass Beads on Bituminous Surface*** *(Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads @ 250 gms per sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35 .The finished surface to be level, uniform and free from streaks and holes.)* | sqm | **861.00** |
| ***8.14*** | ***Kilo Metre Stone*** *(Reinforced cement concrete M15grade kilometre stone of standard design as per IRC:8-1980, fixing in position including painting and printing etc)* | | |
| ***(i)*** | **5th kilometre stone (precast)** | each | **6,379.00** |
| ***(ii)*** | **Ordinary Kilometer stone (Precast)** | each | **3,843.00** |
| ***(iii)*** | **Hectometer stone (Precast)** | each | **1,075.00** |
| ***8.16*** | ***Boundary pillar*** *(Reinforced cement concrete M15 grade boundary pillars of standard design as per IRC:25-1967, fixed in position including finishing and lettering but excluding painting)* | each | **855.00** |
| ***8.17*** | ***G.I Barbed wire Fencing 1.2 metre high*** *(Providing and fixing 1.2 metres high GI barbed wire fencing with 1.8 m angle iron posts 40 mm x 40 mm x 6 mm placed every 3 metres center to center founded in M15 grade cement concrete, 0.6 metre below ground level, every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and provided with 9 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GI staples, turn buckles etc complete as per clause 807 )* | metre | **425.00** |
| ***8.18*** | ***G.I Barbed wire Fencing 1.8 metre high*** *(Providing and fixing 1.8 metres high GI barbed wire fencing with 2.4 m angle iron posts 50 mm x 50 mm x 6 mm placed every 3 metres center to center founded in M15 grade cement concrete, 0.6 metre below ground level, every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and provided with 12 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GI staples, turn buckles etc complete as per clause 807 )* | metre | **675.00** |
| ***8.19*** | ***Fencing with welded steel wire Fabric 75 mm x 50 mm (Suggestive)*** *(Providing 1.20 metre high fencing with angle iron posts 50 mm x 50 mm x 6 mm at 3 metre center to center with 0.40 metre embedded in M15 grade cement concrete, corner, end and every 10th post to be strutted, provided with welded steel wire fabric of 75 mm x 50 mm mesh or 75 mm x 25 mm mesh and fixed to iron posts by flat iron 50 x 5 mm and bolts etc. complete in all respects.)* | metre | **952.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| **8.20** | ***Tubular Steel Railing on Medium Weight steel channel ( ISMC series) 100 mm x 50 mm*** *(Providing, fixing and erecting 50 mm dia steel pipe railing in 3 rows duly painted on medium weight steel channels (ISMC series) 100 mm x 50 mm, 1.2 metres high above ground, 2 m centre to centre, complete as per approved drawings)* | metre | **2,783.00** |
| **8.21** | ***Tubular Steel Railing on Precast RCC posts, 1.2 m high above ground level*** *(Providing, fencing and erecting 50 mm dia painted steel pipe railing in 3 rows on precast M20 grade RCC vertical posts1.8 metres high (1.2 m above GL) with 3 holes 50 mm dia for pipe, fixed 2 metres centre to, complete as per approved drawing)* | metre | **2,374.00** |
| **8.22** | ***Reinforced Cement Concrete Crash Barrier*** *(Provision of an Reinforced cement concrete crash barrier at the edges of the road, approaches to bridge structures and medians, constructed with M-20 grade concrete with HYSD reinforcement conforming to IRC:21 and dowel bars 25 mm dia, 450 mm long at expansion joints filled with pre-moulded asphalt filler board, keyed to the structure on which it is built and installed as per design given in the enclosure to MOST circular No. RW/NH - 33022/1/94-DO III dated 24 June 1994 as per dimensions in the approved drawing and at locations directed by the Engineer, all as specified)* | | |
| ***(i)*** | **M 20 grade concrete** | metre | **6,137.00** |
| **8.23** | ***Metal Beam Crash Barrier*** | | |
| ***A*** | ***Type - A, "W" : Metal Beam Crash Barrier*** *(Providing and erecting a "W" metal beam crash barrier comprising of 3 mm thick corrugated sheet metal beam rail, 70 cm above road/ground level, fixed on ISMC series channel vertical post, 150 x 75 x 5 mm spaced 2 m centre to centre, 1.8 m high, 1.1 m below ground/road level, all steel parts and fitments to be galvanised by hot dip process, all fittings to conform to IS:1367 and IS:1364, metal beam rail to be fixed on the vertical post with a spacer of channel section 150 x 75 x 5 mm, 330 mm long complete as per clause 810)* | metre | **4,264.00** |
| ***B*** | ***Type - B, "THRIE" : Metal Beam Crash Barrier*** *(Providing and erecting a "Thrie" metal beam crash barrier comprising of 3 mm thick corrugated sheet metal beam rail, 85 cm above road/ground level, fixed on ISMC series channel vertical post, 150 x 75 x 5 mm spaced 2 m centre to centre, 2 m high with 1.15 m below ground level, all steel parts and fitments to be galvanised by hot dip process, all fittings to conform to IS:1367 and IS:1364, metal beam rail to be fixed on the vertical post with a space of channel section 150 x 75 x 5 mm, 546 mm long complete as per clause 810)* | metre | **5,942.00** |
| **8.24** | ***Road Traffic Signals electrically operated*** *(Since it is a ready made item commercially produced and erected by specialised firm in the electrical and electronic field, rate may be taken based on market enquiry from firms specialised in this field and ISI certified for the approved design and drawing.)* | | |
| **8.25** | ***Flexible Crash Barrier, Wire Rope Safety Barrier*** *(Providing and erecting a wire rope safety barrier with vertical posts of medium weight RS Joist (ISMB series) 100 mm x 75 mm (11.50 kg/m), 1.50 m long 0.85 m above ground and 0.65 m below ground level, split at the bottom for better grip, embedded in M 15 grade cement concrete 450 x 450 x 450 mm, 1.50 m center to center and with 4 horizontal steel wire rope 40 mm dia and anchored at terminal posts 15 m apart. Terminal post to be embedded in M 15 grade cement concrete foundation 2400 x 450 x 900 mm (depth), strengthened by a strut of RS joist 100 x 75 mm, 2 m long at 450 inclination and a tie 100 x 8 mm, 1.50 m long at the bottom, all embedded in foundation concrete as per approved design and drawing, rate excluding excavation and cement concrete.)* | metre | **8,028.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| **8.27** | ***Street Lighting*** *(Providing and erecting street light mounted on a steel circular hollow pole of standard specifications for street lighting, 9 m high spaced 40 m apart, 1.8 m overhang on both sides if fixed in the median and on one side if fixed on the footpath, fitted with sodium vapour lamp and fixed firmly in concrete foundation.)* | | |
| **(i)** | ***For Fixing in Median*** | each | **21,676.00** |
| **(ii)** | ***For fixing in Footpath*** | each | **20,865.00** |
| **8.28** | ***Lighting on Bridges*** *(Providing and fixing lighting on bridges, mounted on steel hollow circular poles of standard specifications, 5 m high fixed on parapets with cement concrete, 20 m apart and fitted with sodium vapour lamp)* | each | **13,621.00** |
| **8.29** | ***Cable Duct Across the Road*** *(Providing and laying of a reinforced cement concrete pipe duct, 300 mm dia, across the road (new construction), extending from drain to drain in cuts and toe of slope to toe of slope in fills, constructing head walls at both ends, providing a minimum fill of granular material over top and sides of RCC pipe as per IRC:98-1997, bedded on a 0.3 m thick layer of granular material free of rock pieces, outer to outer distance of pipe at least half dia of pipe subject to minimum 450 mm in case of double and triple row ducts, joints to be made leak proof, invert level of duct to be above higher than ground level to prevent entry of water and dirt, all as per IRC: 98 - 1997 and approved drawings.)* | | |
| **(i)** | ***Single Row for one utility service*** | metre | **1,812.00** |
| **(ii)** | ***Double Row for two utility services*** | metre | **3,235.00** |
| **(iii)** | ***Triple Row for three utility services*** | metre | **4,689.00** |
| **8.35** | ***Road Markers/Road Stud with Lense Reflector*** *(Providing and fixing of road stud 100x 100 mm, die cast in aluminium, resistant to corrosive effect of salt and grit, fitted with lense reflectors, installed in concrete or asphaltic surface by drilling hole 30 mm upto a depth of 60 mm and bedded in a suitable bituminous grout or epoxy mortar, all as per BS 873 part 4:1973)* | each | **929.00** |
| **8.36** | ***Traffic Cone*** *(Provision of red fluorescent with white reflective sleeve traffic cone made of low density polyethylene (LDPE) material with a square base of 390 x 390 x 35 mm and a height of 770 mm, 4 kg in weight, placed at 1.5 m interval, all as per BS 873)* | each | **2,275.00** |
| **8.43** | ***Portable Barricade in Construction Zone*** *(Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 450, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 )* | each | **4,195.00** |
| **8.44** | ***Permanent Type Barricade in Construction Zone*** | | |
| **A** | ***With Steel Components*** *(Construction of a permanent type barricade made of steel components, 1.5 m high from road level, fitted with 3 horizontal rails 200 mm wide and 4 m long on 50 x 50 x 5 mm angle iron vertical support, painted with yellow and white strips, 150 mm in width at an angle of450, complete as per IRC:SP:55-2001 )* | each | **6,611.00** |
| **B** | ***With Wooden Components*** *(Construction of a permanent type barricade made of wooden components, 1.5 m high from road level, fitted with 3 horizontal planks 200 mm wide and 3.66 m long on 100 x 100mm wooden vertical post, painted with yellow and white striups, 150 mm in width at an angle of450, complete as per IRC:SP:55-2001 )* | each | **8,930.00** |
| **C** | ***With Bricks*** *(Construction of a permanent type barricade made with brick work in mud mortar, 1.5 m high, 4 m long, 600 mm thick, plastered with cement mortar 1:6, painted with yellow and white strips)* | each | **37,599.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| ***Item No.*** | ***Descriptions*** | **Unit** | **Rate** |
| ***8.45*** | **Drum Delineator in Construction Zone** (Provision of metal drum/empty bitumen drum delineator, 300 mm in diameter, 800 mm high, filled with earth for stability, painted in circumferential strips of alternate black and white 100 mm wide fitted with reflectors 3 Nos of 7.5 cm dia, all as per IRC:SP:55-2001) | each | **824.00** |
| ***8.46*** | ***Flagman*** *(Positioning of a smart flagman with a yellow vest and a yellow cap and a red flag 600 x 600 mm securely fastened to a staff 1 m in length for guiding the traffic)* | each | **861.00** |
| ***8.47*** | ***Cement mortar 1 : 4 (1 cement : 4 fine sand)*** | cum | **4,566.00** |
| ***8.48*** | ***Providing and laying 60mm thick faciory made cement concrete interlocking paver block of M -30 grade made by block making machine with strong vibratory compaction, of approved size, design & shape, laid in required colour and pattern over and including 50mm thick compacted bed of coarse sand, filling the joints with line sand etc. all complete as per the direction of Engineer-in-charge.*** | Sqm | **856.20** |
| ***8.49*** | ***Providing and laying gang saw cut 18 mm thick, mirror polished pre moulded and pre polished machine cut granite stone of required size and shape of approved shade, colour and texture in footpath, flooring cut granite stone of required size and shape of approved shade, colour and texture in footpath, flooring in road side plazas and similar locations, laid over 20mm thick base of cement mortar 1:4 (1cement : 4 coarse sand) including grouting the joints with white cement mixed with matching pigment, epoxy touch ups etc. complete as per direction of Engineer-in-Charge.*** | | |
| ***(i)*** | ***With granite stone of area less than 0.50 sqm.*** | sqm | **4,084.30** |
| ***8.50*** | ***Providing and laying gang saw cut 30 mm thick, mirror polished pre moulded and pre polished machine cut granite stone of required size and shape of approved shade, colour and texture in footpath, flooring in road side plazas and similar locations, laid over 20mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) including grouting the joints with white cement mixed with matching pigment, epoxy touch ups etc. complete as per direction of Engineer-in-Charge.*** | | |
| ***(i)*** | ***With granite stone of area less than 0.50 sqm.*** | sqm | **4,317.10** |
| ***8.51*** | ***Providing and laying matt finished vitrified tile of size 100x100x16mm having water absorption less than 0.5% and conforming to IS: 15622 of approved make in all colours and shades in out door floors such as footpath, court yard multi models etc., laid on 20mm thick base of cement mortar 1:4 (1cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as direction of Engineer-in-Charge.*** | sqm | **2,267.60** |
| ***8.52*** | ***Providing and laying matt finished vitrified tile of size 300x300x9.8mm having with water absorption less than 0.5% and conforming to IS: 15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineerin- Charge.*** | sqm | **1,459.20** |
| ***8.53*** | ***Providing and laying tactile tile (****for vision impaired persons as per standards) of size 300x300 x 9.8 mm having with water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.* | sqm | **2,169.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| *Item No.* | *Descriptions* | **Unit** | **Rate** |
| *8.54* | ***Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in- Charge.*** | | |
| *(i)* | ***60mm thick cement concrete paver block of M-35 grade with approved colour, design & pattern.*** | sqm | **929.10** |
| *(ii)* | ***80 mm thick C.C. paver block of M-30 grade with approved color design and pattern.*** | sqm | **929.60** |

## Chapter – 9

## PIPE CULVERTS

**Preamble:**

1 Pipe culverts of sizes 1000 mm and 1200 mm dia in single row and double row which are generally used on roads, have been included. Providing and laying of pipe has been included in the rate analysis. Items of auxiliary works such as excavation, bedding, backfilling, concrete and masonry shall be analysed, as provided under the respective sections and paid for separately.

2 Analysis has been given separately for NP2 pipes for ease of adoption.

3 Cost of any river training and protection work like stone pitching, apron, curtain wall etc. may be analysed under the respective item included in Chapter 16.

4 The joining of pipes is proposed by collar joints.

5 Chain & pulley for lifting the pipes is considered part of overheads.

6 The thickness of first class bedding has been taken as 150 mm. The height of bedding has been taken as 1/10th of overall height of pipe in the analysis. This may be modified as per thickness indicated in the approved drawing.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| | **CHAPTER-9** | | |
| | **PIPE CULVERTS** | | |
| **9.1** | ***PCC 1:3:6 in Foundation*** *(Plain cement concrete 1:3:6 mix with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)* | cum | **7,467.00** |
| **9.2** | ***Laying Reinforced Cement Concrete Pipe NP2/prestrssed concrete pipe on first class bedding in single row . (Laying Reinforced cement concrete pipe NP2/prestrssed concrete pipe for culverts on first class bedding of granular material in single row including fixing collar with cement mortar 1:2 but excluding excavation, protection works, backfilling, concrete and masonry works in head walls and parapets .*** | | |
| ***A*** | ***1000 mm dia*** | metre | **3,212.00** |
| ***B*** | ***1200 mm dia*** | metre | **4,007.00** |
| **9.3** | ***Laying Reinforced Cement Concrete Pipe NP 2 /prestrssed concrete pipe on first class bedding in double row . (Laying Reinforced cement concrete pipe NP2 /prestrssed concrete pipe for culverts on first class bedding of granular material in double row including fixing collar with cement mortar 1:2 but excluding excavation, protection works, backfilling, concrete and masonry works in head walls and parapets . )*** | | |
| ***A*** | ***1000 mm dia*** | metre | **6,630.00** |
| ***B*** | ***1200 mm dia*** | metre | **8,235.00** |

## Chapter – 10

## MAINTENANCE OF ROADS

**Preamble:**

1 In the case of rain cuts, it has been assumed that some material cut by rain, approximately 25 per cent will be available at site which can be retrieved and re-used and the balance 75 per cent is required to be provided as fresh material.

2 For making up earthen shoulders, it has been assumed that on an average 150 mm filling will be required. Similarly, for stripping of excess soil from shoulder, an average depth of 75 mm has been assumed.

3 In the case of chocking of drain, it has been assumed that half the depth of drain has been filled with earth/debris, which requires clearance.

4 During the process of landslide clearance on hill roads, it has been assumed that earth will be disposed off by dozer on the valley side. In case there is any objection to this arrangement due to particular site conditions, resources like loader and tipper will have to be provided for disposal of earth/debris for the lead involved.

5 The item like slurry seal, fog spray, crack preventation courses, surface dressing for maintenance works have already been included in chapter 5 and are not being repeated in this chapter.

6 The cost of other items like repair of ruts and undulation maintenance of earthen shoulders, cross drainage works, minor and major bridges and miscelleneous items like turfing and arboriculture, painting and lettering on km stones, repair to signage, repair to footpath, street lighting, railing dividers, separators and under passes for pedestrains has been given in the "Report of the Committee on Norms for Maintenance of Roads In India" Published by IRC in January 2001 which may be referred for guidance.

7 The repair items related to bridges have been given in chapter 16

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| | **CHAPTER-10** | | |
| | **MAINTENANCE OF ROADS** | | |
| **10.1** | ***Restoration of Rain Cuts*** *(Restoration of rain cuts with soil, moorum, gravel or a mixture of these, clearing the loose soil, benching for 300 mm width, laying fresh material in layers not exceeding 250 mm and compacting with plate compactor or power rammers to restore the original alignment, levels and slopes)* | cum | **303.00** |
| **10.2** | ***Maintenance of Earthen Shoulder (filling with fresh soil)*** *(Making up loss of material/ irregularities on shoulder to the design level by adding fresh approved soil and compacting it with appropriate equipment.)* | sqm | **125.00** |
| **10.3** | ***Maintenance of Earth Shoulder (stripping excess soil)*** *(Stripping excess soil from the shoulder surface to achieve the approved level and compacting with plate compactor)* | sqm | **39.00** |
| **10.4** | ***Filling Pot- holes and Patch Repairs with open - graded Premix surfacing, 20mm.*** *(Removal of all failed material, trimming of completed excavation to provide firm vertical faces, cleaning of surface, painting of tack coat on the sides and base of excavation as per clause 503, back filling the pot holes with hot bituminous material as per clause 511, compacting, trimming and finishing the surface to form a smooth continuous surface, all as per clause 3004.2)* | sqm | **258.00** |
| **10.5** | ***Filling Pot- holes and Patch Repairs with - Bituminous concrete, 40mm. (*** *Removal of all failed material, trimming of completed excavation to provide firm vertical faces, cleaning of surface, painting of tack coat on the sides and base of excavation as per clause 503, back filling the pot holes with hot bituminous material as per clause 504, compacting, trimming and finishing the surface to form a smooth continuous surface, all as per clause 3004.2)* | | |
| **(i)** | ***for grading I Material*** | sqm | **592.00** |
| **(ii)** | ***for grading II Material*** | sqm | **628.00** |
| **10.6** | ***Crack Filling*** *(Filling of crack using slow - curing bitumen emulsion and applying crusher dust in case crack are wider than 3mm.)* | metre | **7.00** |
| **10.7** | ***Dusting*** *(Applying crusher dust to areas of road where bleeding of excess bitumen has occurred.)* | sqm | **2.21** |
| **10.9** | ***Repair of joint Grooves with Epoxy Mortar*** *Repair of spalled joint grooves of contraction joints, longitudinal joints and expansion joints in concrete pavements using epoxy mortar or epoxy concrete)* | metre | **560.00** |
| **10.10** | ***Repair of old Joints Sealant*** *(Removal of existing sealant and re sealing of contraction, longitudinal or expansion joints in concrete pavement with fresh sealant material)* | metre | **97.00** |
| **10.11** | ***Hill Side Drain Clearance*** *(Removal of earth from the choked hill side drain and disposing it on the valley side manually)* | metre | **69.00** |
| **10.12** | ***Land Slide Clearance in soil*** | | |
| **(i)** | *Clearance of land slides in soil and ordinary rock by a bull-dozer D 80 A-12, 180 HP and disposal of the same on the valley side* | cum | **130.00** |
| **(ii)** | *Clearance of land slides in soil and ordinary rock by a bull-dozer D 50 A-15 and disposal of the same on the valley side* | cum | **90.00** |
| **10.13** | ***Land slide Clearance in Hard Rock Requiring Blasting*** *(Clearing of land slide in hard rock requiring blasting for 50% of the boulders and disposal of the same on the valley side with Bulldozer D 50)* | cum | **179.00** |
| **10.14** | ***Snow Clearance on Roads with Dozer*** *(Snow clearance from road surface by a bull- dozer 165 Hp and disposing it on the valley side)* | cum | **6.00** |
| **10.15** | ***Maintenance of WBM Road*** *(Maintenance of WBM road including filling up of pot holes, ruts and rectifying corrugated surface, damaged edges and ravelling as per technical specification clause 1906).* | sqm | **286.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| **10.16** | ***Maintenance of Hume Pipe*** *(Maintenance of Hume Pipe Culvert by way of Cleaning, Clearing, Erosion repair, repairs to cracks, parapet wall and protection work as per drawing and technical specification Clasue 1908)* | each | **2,130.00** |
| **10.17** | ***Maintenance of Culverts Slab type*** *(Maintenance of Slab type Culvert by way of Cleaning, Clearing, Erosion repair, repairs to cracks, parapet wall and protection work as per drawing and technical specification Clasue 1908).* | each | **4,196.00** |
| **10.18** | ***Maintenance of Causeway*** *(Maintenance of Causeway by way of minor Surface repairs, replacing Guide Posts, repair of flood gauges, removal of debris, providing boulders and protection work and painting as per technical specifications Clause 1909).* | metre | **113.00** |
| **10.19** | ***Maintenance of Road signs*** *(Maintenance of Road signs by way of cleaning and repainting of mandatory/regulatory/cautionary/informatory and place identifications sign board as per drawings and technical specifications Clause 1910).* | km | **1,823.00** |
| **10.20** | ***Cutting of branches of trees shrubs and trimming of grass and weeds*** | | |
| ***(i)*** | *Cutting of branches of tress and shrubs from the road way or with in R.O.W. including disposal of wood and leaves to suitable location as per technical specification Clause 1914.* | per tree | **209.00** |
| ***(ii)*** | *Cutting of shrubs from the road way or with in R.O.W. and disposal of shrubs to suitable location as per technical specification Clause 1914.* | per shrub | **13.00** |
| ***(iii)*** | *Triming of grass and weeds from the shoulders/berms and disposing off the same to suitable locations as per technical specifications Clause 1914.* | sqm | **4.00** |
| **10.21** | ***White washing of parapet walls of CD work and tree trunks*** *(White washing two coats on parapet walls and tree trunks including preparation of surface by cleaning scraping etc. as per technical specifications Clause 1915)* | sqm | **34.00** |
| **10.22** | **Land Slide Clearance in soil** | | |
| | *Clearance of land slides in soil and ordinary rock by a Hydrolic Excavator including loding in a truck and carrying of excavated material to embankment site with a lift upto 1.5 m and lead upto 20 m.* | cum | **56.00** |

## Chapter – 11
## HORTICULTURE

**Preamble:**

1. The items of turfing with sods andf seeding and mulching have been included in the chapter of earthwork.

2. The rates for grassing of lawns and hedges has been included, as the same may be needed for resting places on highways.

3. Five types of tree guards as under have been provided -

   a) Half brick circular type

   b) Tree guards made from empty bitumen drums 1.30 m high.

   c) Tree guards made from empty bitumen drums 2.00 m high.

   d) Tree guards with MS flat iron.

   e) Tree guards with MS angle and 3 mm steel wire welded on MS flat and bolted to angle iron posts.

4. Selection from above may be made as per actual situation and design.

5. Rates for wrought iron and mild welded work has been included to cater for any miscelleneous work in connection with horticulture, fencing and traffic sign.

6. Though the estimate for compensatory afforestation is made by the forest department, the rate for this item has been analysed and included for the purpose of estimation.

7. As grass and plantation need more care, one mate has been provided for every 10 mazdoors in case of horticulture.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| | **CHAPTER-11** | | |
| | **HORTICULTURE** | | |
| 11.1 | ***Spreading of Sludge Farm Yard Manure or/and good Earth*** *(Spreading of sludge farm yard manure or/ and good earth in required thickness (cost of sludge, farm- yard manure or/and good earth to be paid for separately))* | cum | **44.00** |
| 11.2 | ***Grassing with ' Doobs' Grass*** *(Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed)* | | |
| (i) | ***In rows 15 cm apart in either direction*** | sqm | **44.00** |
| (ii) | ***In rows 7.5 cm apart in either direction*** | sqm | **77.00** |
| 11.3 | ***Making Lawns including Ploughing and Dragging with 'Swagha' Breaking of Clod*** *(Making lawns including ploughing and breaking of clod, removal of rubbish, dressing and supplying doobs grass roots and planting at 15 cm apart, including supplying and spreading of farm yard manure at rate of 0.18 cum per 100 sqm)* | sqm | **45.00** |
| 11.4 | ***Maintenance of Lawns or Turfing of Slopes*** *(Maintenance of lawns or Turfing of slopes (rough grassing) for a period of one year including watering etc)* | sqm | **334.00** |
| 11.5 | ***Turfing Lawns with Fine Grassing including Ploughing, Dressing*** *(Turfing lawns with fine grassing including ploughing, dressing including breaking of clods, removal of rubbish, dressing and supplying doobs grass roots at 10 cm apart, including supplying and spreading of farm yard manure at rate of0.6 cum per 100 sqm)* | sqm | **53.00** |
| 11.6 | ***Maintenance of Lawns with Fine Grassing for the First Year*** | sqm | **356.00** |
| 11.7 | ***a) Planting Permanent Hedges including Digging of Trenches*** *(Planting permanent hedges including digging of trenches, 60 cm wide and 45 cm deep, refilling the excavated earth mixed with farmyard manure, supplied at the rate of 4.65 cum per 100 metres and supplying and planting hedge plants at 30 cm apart)* | metre | **248.00** |
| (b) | ***Maintenance of Hedge for one year*** | metre | **315.00** |
| 11.8 | ***a) Planting Flowering Plants and Shrubs in Central Verge*** | km | **76,071.00** |
| (b) | ***Maintenance of Flowering Plants and Shrubs in Central Verge for one Year*** | km | **3,78,114.00** |
| 11.9 | ***Planting of Trees and their Maintenance for one Year*** *(Planting of trees by the road side (Avenue trees) in 0.60 m dia holes, 1 m deep dug in the ground, mixing the soil with decayed farm yard/sludge mannure, planting the saplings, backfilling the trench, watering, fixing the tree guard and maintaining the plants for one year)* | each | **4,708.00** |
| 11.10 | ***Renovation Lawns including, Weeding, Forking the Ground, Top Dressing with Forked Soil*** *(Renovation lawns including, weeding, forking the ground, top dressing with forked soil, watering and maintenance the lawns, for 30 days or more, till the grass forms a thick lawn, free from weeds, and fit for moving and disposal of rubbish as directed, including supplying good earth, if needed but excluding the cost of well decayed farm yard manure)* | sqm | **28.00** |
| 11.11 | ***Supply at Site Well Decayed Farm Yard Manure*** *(Supply at site of work well decayed farm yard manure, from any available source, approved by the engineer in charge including screening and stacking)* | cum | **207.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| 11.14 | ***Half Brick Circular Tree Guard, in 2nd class Brick, internal diametre 1.25 metres, and height 1.2 metres, above ground and 0.20 metre below ground*** *(Half brick circular tree guard, in 2nd class brick, internal diametre 1.25 metres, and height 1.2 metres, above ground and 0.20 metre below ground, bottom two courses laid dry, and top three courses in cement mortar 1:6 ( 1 cement 6 sand) and the intermediate courses being in dry honey comb masonry, as per design complete)* | each | **4,635.00** |
| 11.15 | ***Edging with 2nd class Bricks, laid dry lengthwise (Edging with 2nd class bricks, laid dry lengthwise, including excavation, refilling, consolidation, with a hand packing and spreading nearly surplus earth within a lead of 50 metres)*** | metre | **96.00** |
| 11.16 | ***Making Tree Guard 53 cm dia and 1.3 m high as per design from empty bitumen drum*** *(Making tree guard 53 cm dia and 1.3 m high as per design from empty bitumen drum, slit suitably to permit sun and air, (supplied by the department at stock issue rate) including providing and fixing 2 nos MS sheet rings 50 x 0.5 mm with rivets, complete in all respect)* | each | **375.00** |
| 11.17 | ***Making Tree Guard 53 cm dia and 2 metres high as per design from empty bitumen drums*** *(Making tree guard 53 cm dia and 2 metres high as per design from empty bitumen drums, slit suitably to permit sun and air, ( supplied by the department at stock issue rate) including providing and fixing four legs 40 cm long of 30 x 3 mm MS riveted to tree guard and providing and fixing 2 nos MS sheet rings 50 x 0.5 mm with rivets complete in all respects)* | each | **706.00** |
| 11.18 | ***Wrought Iron and Mild Steel Welded Work (Wrought iron and mild steel welded work)*** *(using angles, square bars, tees and channel grills, grating frames, gates and tree guards of any size and design etc. including cost of screens and welding rods or bolts and nuts complete fixed in position but without the cost of excavation and concrete for fixing which will be paid separately)* | quintal | **11,745.00** |
| 11.19 | ***Tree Guard with MS Iron*** *(Providing and fixing MS iron tree guard 60 cm dia and 2 metre high above ground level formed of 4 Nos (25 x 6 mm) and 8 Nos (25 x 3 mm) vertical MS riveted to 3 Nos (25 x 6 mm) iron rings in two halves, bolted together with 8 mm dia and 30 mm long bolts including painting two coats with paint of approved brand over a coat of priming, complete in all respects.)* | each tree guard | **2,840.00** |
| 11.20 | ***Tree Guard with MS Angle Iron and Steel Wire*** *(Providing and fixing tree guard 0.60 metre square, 2.00 metre high fabricated with MS angle iron 30 x 30 x 3 mm, MS iron 25 x 3 mm and steel wire3 mm dia welded and fabricated as per design in two halves bolted together)* | each tree guard | **4,911.00** |
| 11.21 | ***Compensatory Afforestation*** *(Planting trees as compensatory afforestation at the rate of 290 trees per hectare at a spacing of 6 m by grubbing and leveling the ground upto a depth of 150 mm, digging holes 0.9 m dia, 1 m deep, mixing farm yard/sludge manure with soil, planting of sapling 2 m high with 25 cm dia stem, backfilling the hole and watering)* | hectare | **1,87,408.00** |

## Chapter – 12
## FOUNDATION

**Preamble:**

1 Excavation for structures has been provided both by manual and mechanical means.

2 The earth excavated from foundation has been proposed to be backfilled and balance quantity utilised for road works locally except for marshy soil where disposal has been provided.

3 In case of rocks, excavation has been considered upto a depth of 3 m only.

4 Embedment of foundation in soft and hard rocks has been provided as required by the specifications.

5 Dewatering has been provided in excavation for foundation on percentage basis. In case less dewatering is required or is not required at all for a particular site condition, the same may be reduced/omitted.

6 Mixing of cement concrete has been considered by using concrete mixer and batching plant. The rate can be adopted depending upon availability of equipment and as approved by the Engineer.

7 Concrete batching plant is considered to be placed within 10 (ten) km of the bridge site.

8 The coarse and fine aggregate for cement concrete shall be as per IS:383.

9 Description of items has been given very briefly. Relevant Clause of MoRT&H Specifications have to be referred for detailed specification.

10 The rate for well foundation has been included for diametre varying from 6 m to 12 m. Well for twin D type has also been included.

11 Pneumatic sinking is a specialised job. All safety precautions as per IS:4138 are required to be taken. Medical supervision for such works is considered very essential. Depth of Pneumatic sinking has been restricted to 30 m below normal water level.

12 Rates for various type of piles like bored cast-in-situ, driven precast RCC pile and driven steel piles of H section have been included. If the steel casting in case of driven pile is required to be retained the same is required to be priced separately.

13 Pile driving rigs including vibratory hammers are considered to be self contained with power units and necessary accessories required for driving.

14 The quantity of concrete which is required to be stripped off upto a minimum height of 600 mm above the designed top level of the pile has been taken into account in the rate.

15 The levelling course below the pile cap is proposed with M 15 grade concrete.

16 Rates for Steel reinforcement for cement concrete works are provided separately.

17 Appendix-4 of IRC:78-2000 has to be referred regarding precautions to be taken during sinking of wells.

18 In case of blasting during sinking of wells the inner face of the curb is required to be protected with the steel plates of thickness not less than 10 mm upto top level of well curb. For height above top of curb, the thickness of steel plate may be reduced to 6 mm. This extra height of steel lining should be limited to 3 m.

19 The concrete mix used in bottom plug shall have a minimum cement content of 330 kg/cum and a slump of abot 150 mm to permit easy flow of concrete through tremie to fill-up all cavaties.

20 Necessary safety precautions shall be taken for excavation on open foundations for which guidance may be taken from IS:3764.

21 A levelling course of 100 mm thickness in M 10 (1:3:6) shall be provided before laying open foundations.

22 In the case of open foundation, dewatering shall not be permitted from the time of placing of concrete upto 24 hours after placement.

23 In case of open foundations in rock, the trenches around the footing shall be fillied-up with concrete of M 15 grade upto a level of 0.6 m for hard rock and 1.5 m for soft rock above the foundation level. The portion above this shall be filled by boulders grouted with cement.

24 When there are two or more compartments in a well, the lower edge of the cutting edge of the middle stems of such wells shall be kept about 300 mm above that of outer stems to prevent rocking.

25 The well curb shall be in RCC of mix not leaner than M 25 grade with minimum steel reinforcement of 72 kg/cum excluding bond rods.

26 The top of bottom plug shall be atleast 300 mm above top of curb.

27 No dewatering shall be carried out within 7 days of casting of bottom plug.

28 In case of cement concrete piles, the minimum grade of concrete shall be M 35 with minimum cement content of 400 kg/cum.

29 The top of the pile shall project 50 mm into the pile cap and reinforcement of pile shall be fully anchored in pile cap.

30 The minimum thickness of pile cap should be atleast 0.6 m or 1.5 times the diametre of the pile whichever is more.

31 Guidance for piles is to be obtained from IS:2911.

32 Concrete in driven cast-in-situ piles shall be cast upto a minimum height of 600 mm above the designed top level of pile, which shall be stripped off to obtain sound concrete either before final set or after 3 days.

33 In remote areas, for isolated slab culvert/box culvert upto 2 m span, concrete can be hand mixed in accordance with Clause 806 of MORD Specifications. Therefore, in the analysis, for items of concrete, the alternative of hand mixing has also been considered.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| | **CHAPTER-12** | | |
| | **FOUNDATIONS** | | |
| **12.1** | ***Excavation for Structures*** *(Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material.)* | | |
| ***I*** | ***Ordinary soil*** | | |
| ***A*** | ***Manual Means*** | | |
| ***(i)*** | ***upto 3 m depth (without de-watering)*** | cum | **250.00** |
| ***(i)b*** | ***upto 3 m depth (with de-watering)*** | cum | **275.00** |
| ***(ii)*** | ***3 m to 6 m depth (without de-watering)*** | cum | **322.00** |
| ***(ii)b*** | ***3 m to 6 m depth (with de-watering)*** | cum | **370.00** |
| ***(iii)*** | ***Above 6 m depth (without de-watering)*** | cum | **429.00** |
| ***(iii)b*** | ***Above 6 m depth (with de-watering)*** | cum | **515.00** |
| ***B*** | ***Mechanical Means*** | | |
| ***(i)*** | ***upto 3 m depth (without de-watering)*** | cum | **106.00** |
| ***(i) c*** | ***upto 3 m depth (with de-watering)*** | cum | **111.00** |
| ***(ii)*** | ***3 m to 6 m depth (without de-watering)*** | cum | **121.00** |
| ***(ii) c*** | ***3 m to 6 m depth (with de-watering)*** | cum | **130.00** |
| ***(iii)*** | ***Above 6 m depth (without de-watering)*** | cum | **149.00** |
| ***(iii) c*** | ***Above 6 m depth (with de-watering)*** | cum | **164.00** |
| ***II*** | ***Ordinary rock (not requiring blasting)*** | | |
| ***A*** | ***Manual Means*** | | |
| ***(i)*** | ***Depth upto 3 m (without de-watering)*** | cum | **357.00** |
| ***(ii)*** | ***Depth upto 3 m ( with de-watering)*** | cum | **393.00** |
| ***B*** | ***Mechanical Means*** | | |
| ***(i)*** | ***Depth upto 3 m ( without de-watering)*** | cum | **133.00** |
| ***(ii)*** | ***Depth upto 3 m ( with de-watering)*** | cum | **146.00** |
| ***III*** | ***Hard rock ( requiring blasting )*** | | |
| ***A*** | ***Manual Means ( without de-watering)*** | cum | **865.00** |
| ***B*** | ***Manual Means ( with de-watering)*** | cum | **940.00** |
| ***IV*** | ***Hard rock ( blasting prohibited )*** | | |
| ***A*** | ***Mechanical Means ( without de-watering)*** | cum | **990.00** |
| *B* | ***Mechanical Means ( without de-watering)*** | cum | **1,089.00** |
| ***V*** | ***Marshy soil*** | | |
| ***(i)*** | ***upto 3 m depth*** | | |
| ***A*** | ***Manual means ( without de-watering)*** | cum | **941.00** |
| ***B*** | ***Manual means ( without de-watering)*** | cum | **1,156.00** |
| ***A*** | ***Mechanical Means( without de-watering)*** | cum | **265.00** |
| ***B*** | ***Mechanical Means( with de-watering)*** | cum | **318.00** |
| ***VI*** | ***Back Filling in Marshy Foundation Pits*** | cum | **640.00** |
| **12.2** | ***Filling Annular Space Around Footing in Rock*** *(Lean cement concrete 1:3:6 nominal mix. Rate may be taken as per items 13.4.)* | | |
| **12.3** | ***Sand Filling in Foundation Trenches as per Drawing & Technical Specification*** | cum | **1,462.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| 12.4 | **PCC 1:3:6 in Foundation** *(Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)* | cum | **8,143.00** |
| 12.5 | **Brick masonry work in cement mortar 1:3 in foundation complete excluding pointing and plastering, as per drawing and technical specifications** | cum | **13,745.00** |
| 12.6 A | **Cement mortar1:3 (1cement :3 sand)** | cum | **5,727.00** |
| B | **Cement mortar1:2 (1cement :2 sand)** | cum | **7,123.00** |
| C | **Cement mortar1:4 (1cement :4 sand)** | cum | **4,799.00** |
| D | **Cement mortar1:6 (1cement :6 sand)** | cum | **3,893.00** |
| 12.7 | **Stone masonry work in cement mortar 1:3 in foundation complete as per drawing and Technical Specification** | | |
| (a) | **Square Rubble Coursed rubble masonry( first sort )** | cum | **6,751.00** |
| (b) | **Random Rubble Masonry** | cum | **6,550.00** |
| 12.8 | **Plain/Reinforced cement concrete in open foundation complete as per drawing and technical specifications** | | |
| A | **PCC Grade M15** | cum | **9,371.00** |
| B | **PCC Grade M20** | cum | **10,146.00** |
| C | **RCC Grade M20** | | |
| Case I | **Using concrete mixer** | cum | **10,167.00** |
| Case II | **With Batching Plant, Transit Mixer and Concrete Pump** | cum | **9,665.00** |
| D | **PCC Grade M25** | | |
| Case I | **Using concrete Mixer** | cum | **10,959.00** |
| Case II | **With Batching Plant, Transit Mixer and Concrete Pump** | cum | **10,307.00** |
| E | **RCC Grade M25** | | |
| Case I | **Using concrete Mixer** | cum | **10,989.00** |
| Case II | **With Batching Plant, Transit Mixer and Concrete Pump** | cum | **10,489.00** |
| F | **PCC Grade M30** | | |
| Case I | **Using Concrete Mixer** | cum | **11,023.00** |
| Case II | **Using Batching Plant, Transit Mixer and Concrete Pump** | cum | **10,521.00** |
| G | **RCC Grade M30** | | |
| Case I | **Using Concrete Mixer** | cum | **11,013.00** |
| Case II | **Using Batching Plant, Transit Mixer and Concrete Pump** | cum | **10,516.00** |
| H | **RCC Grade M35** | | |
| Case I | **Using Concrete Mixer** | cum | **11,190.00** |
| Case II | **Using Batching Plant, Transit Mixer and Concrete Pump** | cum | **10,696.00** |
| 12.9 | **Providing and constructing temporary island 16 m diameter for construction of well foundation for 8m dia. Well.** | | |
| A | **Assuming depth of water 1.0 m and height of island to be 1.25m.** | each | **62,050.00** |
| B | **Assuming depth of water 4.0 m and height of island 4.5 m.** | each | **4,11,155.00** |
| C | **Providing and constructing one span service road to reach island location from one pier location to another pier location** | metre | **4,339.00** |
| 12.10 | **Providing and laying cutting edge of mild steel weighing 40 kg per metre for well foundation complete as per drawing and technical specification.** | tonne | **1,26,137.00** |
| 12.11 | **Plain/Reinforced cement concrete, in well foundation complete as per drawing and technical specification** | | |
| A | **Well curb** | | |
| (i) | **RCC M20 Grade** | | |
| Case I | **Using concrete mixer** | cum | **11,732.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,154.00 |
| (ii) | RCC M25 Grade | | |
| Case I | Using concrete mixer | cum | 12,711.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 12,332.00 |
| (iii) | RCC M35 Grade | | |
| Case I | Using concrete mixer | cum | 13,037.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 12,670.00 |
| B | Well steining | | |
| (i) | PCC M15 Grade | cum | 9,912.00 |
| (ii) | PCC M20 Grade | cum | 10,732.00 |
| (iii) | RCC M20 Grade | | |
| Case I | Using concrete mixer | cum | 10,755.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 10,224.00 |
| (iv) | PCC M25 Grade | | |
| Case I | Using concrete mixer | cum | 11,620.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,096.00 |
| (v) | RCC M25 Grade | | |
| Case I | Using concrete mixer | cum | 11,651.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,304.00 |
| (vi) | PCC M30 Grade | | |
| Case I | Using concrete mixer | cum | 11,717.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,183.00 |
| (vii) | RCC M30 Grade | | |
| Case I | Using concrete mixer | cum | 11,706.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,177.00 |
| (viii) | RCC M35 Grade | | |
| Case I | Using concrete mixer | cum | 11,951.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,614.00 |
| (ix) | RCC M40 Grade | | 11,745.00 |
| C | Bottom Plug | | |
| (i) | PCC Grade M20 | | |
| Case I | Using Concrete Mixer | cum | 11,066.00 |
| Case II | Using Batching Plant, Transit Mixer and Crane/concrete pump | cum | 10,194.00 |
| (ii) | PCC Grade M25 | | |
| Case I | Using Concrete Mixer | cum | 11,537.00 |
| Case II | Using Batching Plant, Transit Mixer and Crane/concrete pump | cum | 10,659.00 |
| (iii) | PCC Grade M30 | | |
| Case I | Using Concrete Mixer | cum | 11,628.00 |
| Case II | Using Batching Plant, Transit Mixer and Crane/concrete pump | cum | 10,756.00 |
| (iv) | PCC Grade M35 | | |
| Case I | Using Concrete Mixer | cum | 11,843.00 |
| Case II | Using Batching Plant, Transit Mixer and Crane/concrete pump | cum | 10,965.00 |
| D | Intermediate plug | | |
| (i) | Grade M20 PCC | | |
| Case I | Using Concrete Mixer | cum | 10,579.00 |
| Case II | Using Batching Plant, Transit Mixer and Crane/concrete pump | cum | 9,754.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| (ii) | Grade M25 PCC | | |
| Case I | Using Concrete Mixer | cum | 11,028.00 |
| Case II | Using Batching Plant, Transit Mixer and Crane/concrete pump | cum | 10,198.00 |
| (iii) | Grade M30 PCC | | |
| Case I | Using Concrete Mixer | cum | 11,114.00 |
| Case II | Using Batching Plant, Transit Mixer and Crane/concrete pump | cum | 10,289.00 |
| E | Top plug | | |
| (i) | Grade M15 PCC | | |
| Case I | Using Concrete Mixer | cum | 9,011.00 |
| (ii) | Grade M20 PCC | | |
| Case I | Using Concrete Mixer | cum | 9,756.00 |
| (iii) | Grade M25 PCC | | |
| Case I | Using Concrete Mixer | cum | 10,563.00 |
| Case II | Using Batching Plant, Transit Mixer and Crane/concrete pump | cum | 10,088.00 |
| (iv) | Grade M30 PCC | | |
| Case I | Using Concrete Mixer | cum | 10,652.00 |
| Case II | Using Batching Plant, Transit Mixer and Crane/concrete pump | cum | 10,166.00 |
| F | Well cap | | |
| (i) | RCC Grade M20 | | |
| Case I | Using concrete Mixer | cum | 10,076.00 |
| Case II | Using Batching Plant, Transit Mixer and Concrete Pump | cum | 9,572.00 |
| (ii) | RCC Grade M25 | | |
| Case I | Using concrete Mixer | cum | 10,989.00 |
| Case II | Using Batching Plant, Transit Mixer and Concrete Pump | cum | 10,491.00 |
| (iii) | RCC Grade M30 | | |
| Case I | Using Concrete Mixer | cum | 11,013.00 |
| Case II | Using Batching Plant, Transit Mixer and Concrete Pump | cum | 10,515.00 |
| (iv) | RCC Grade M35 | | |
| Case I | Using Concrete Mixer | cum | 11,190.00 |
| Case II | Using Batching Plant, Transit Mixer and Concrete Pump | cum | 10,696.00 |
| (v) | RCC M40 Grade | cum | 11,072.00 |
| 12.12 | **Sinking of 6 m external diameter well** *( other than pneumatic method of sinking ) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level.* | | |
| A | Sandy soil | | |
| (i) | Depth below bed level upto 3.0 M | metre | 5,944.00 |
| (ii) | Beyond 3m upto 10m depth | metre | 8,346.00 |
| (iii) | Beyond 10m upto 20m | | |
| a | Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 11,022.00 |
| (iv) | Beyond 20m upto 30 m | | |
| a | Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 20,675.00 |
| b | Add 20% of cost for Kentledge including supports, loading arrangement and Labour . | | 24,810.00 |
| (v) | Beyond 30m upto 40 m | metre | |
| a | Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter | | 49,125.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| b | Add 20% of cost for Kentledge including supports, loading arrangement and Labour . | metre | 58,950.00 |
| B | Clayey soil ( 6m dia. Well ) | | |
| (i) | Depth below bed level upto 3.0 M | metre | 8,379.00 |
| (ii) | Beyond 3m upto 10m depth | metre | 19,307.00 |
| (iii) | Beyond 10 m upto 20 m | | |
| a | Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 25,498.00 |
| b | Add for dewatering @ 5% of cost, if required. | metre | 26,773.00 |
| (iv) | Beyond 20m upto 30 m | | |
| a | Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 47,829.00 |
| b | Add 5% of cost for dewatering of the cost, if required | metre | 62,776.00 |
| c | Add 25% of cost for Kentledge including supports, loading arrangement and Labour ). | metre | 59,786.00 |
| (v) | Beyond 30m upto 40 m | | |
| a | Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 1,13,634.00 |
| b | Add 5% of cost for dewatering, if required | metre | 1,43,178.00 |
| c | Add 20% of cost for Kentledge including supports, loading arrangement and Labour). | metre | 1,36,360.00 |
| C | Soft rock (6m dia well ) | | |
| (i) | Depth of soft rock strata upto 3m | metre | 30,790.00 |
| D | Hard rock (6m dia well ) | | |
| (i) | Depth of soft rock strata upto 3m | metre | 31,065.00 |
| 12.13 | **Sinking of 7 m external diameter well** *( other than pneumatic method of sinking ) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level.* | | |
| A | Sandy soil | | |
| (i) | Depth below bed level upto 3.0 M | metre | 8,804.00 |
| (ii) | Beyond 3m upto 10m depth | metre | 11,664.00 |
| (iii) | Beyond 10m upto 20m | | |
| a | Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 15,404.00 |
| (iv) | Beyond 20m upto 30 m | | |
| a | Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 28,895.00 |
| b | Add 20% of cost for Kentledge including supports, loading arrangement and Labour) . | metre | 34,674.00 |
| (v) | Beyond 30m upto 40 m | | |
| a | Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 68,651.00 |
| b | Add 20% of cost for Kentledge including supports, loading arrangement, and Labour etc. | metre | 82,381.00 |
| B | Clayey soil ( 7m dia. Well ) | | |
| (i) | Depth below bed level upto 3.0 M | metre | 11,664.00 |
| (ii) | Beyond 3m upto 10m depth | metre | 16,670.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| (iii) | Beyond 10 m upto 20 m | | |
| a | Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 22,015.00 |
| b | Add for dewatering @ 5% of cost, if required. | metre | 23,116.00 |
| (iv) | Beyond 20m upto 30 m | | |
| a | Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 41,294.00 |
| b | Add 5% of cost for dewatering on the cost, if required | metre | 54,199.00 |
| c | Add 25% of cost for Kentledge including supports, loading arrangement and Labour ). | metre | 51,618.00 |
| (v) | Beyond 30m upto 40 m | | |
| a | Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 98,110.00 |
| b | Add 5% of cost for dewatering, if required | metre | 1,23,619.00 |
| c | Add 20% of cost for Kentledge including supports, loading arrangement and Labour). | | 1,17,733.00 |
| C | Soft rock ( 7m dia well ) | | |
| (i) | Depth of soft rock strata upto 3m | metre | 25,860.00 |
| D | Hard rock ( 7m dia well ) | | |
| (i) | Depth upto 3 m | metre | 37,292.00 |
| 12.14 | **Sinking of 8 m external diameter well** *( other than pneumatic method of sinking ) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level.* | | |
| A | Sandy soil | | |
| (i) | Depth below bed level upto 3.0 M | metre | 10,748.00 |
| (ii) | Beyond 3m upto 10m depth | metre | 13,185.00 |
| (iii) | Beyond 10m upto 20m | | |
| a | Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 17,413.00 |
| (iv) | Beyond 20m upto 30 m | | |
| a | Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 32,664.00 |
| b | Add 20% of cost for Kentledge including supports, loading arrangement and Labour . | metre | 39,196.00 |
| (v) | Beyond 30m upto 40 m | | |
| a | Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 77,604.00 |
| b | Add 20% of cost for Kentledge including supports, loading arrangement, and Labour etc. | metre | 93,124.00 |
| B | Clayey soil ( 8m dia. Well ) | | |
| (i) | Depth upto 3.0 M | metre | 14,279.00 |
| (ii) | Beyond 3m upto 10m depth | metre | 20,829.00 |
| (iii) | Beyond 10 m upto 20 m | | |
| a | Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 27,509.00 |
| b | Add for dewatering @ 5% of cost, if required. | metre | 28,884.00 |
| (iv) | Beyond 20m upto 30 m | | |
| a | Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 51,600.00 |
| b | Add 5% of cost for dewatering on the cost, if required | metre | 67,726.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| c | Add 25% of cost for Kentledge including supports, loading arrangement and Labour ). | metre | 64,500.00 |
| (v) | Beyond 30m upto 40 m | | |
| a | Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 1,22,593.00 |
| b | Add 5% of cost for dewatering, if required | metre | 1,54,468.00 |
| c | Add 20% of cost for Kentledge including supports, loading arrangement and Labour). | metre | 1,47,112.00 |
| C | Soft rock ( 8m dia well ) | | |
| (i) | Depth in soft rock strata upto 3m | metre | 28,706.00 |
| D | Hard rock ( 8m dia well ) | | |
| (i) | Depth in hard rock strata upto 3 m | metre | 38,406.00 |
| 12.15 | Sinking of 9 m external diameter well ( other than pneumatic method of sinking ) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level. | | |
| A | Sandy soil | | |
| (i) | Depth below bed level upto 3.0 M | metre | 10,927.00 |
| (ii) | Beyond 3m upto 10m depth | metre | 14,459.00 |
| (iii) | Beyond 10m upto 20m | | |
| a | Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 19,096.00 |
| (iv) | Beyond 20m upto 30 m | | |
| a | Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 35,819.00 |
| b | Add 20% of cost for Kentledge including supports, loading arrangement and Labour . | metre | 42,982.00 |
| (v) | Beyond 30m upto 40 m | | |
| a | Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 85,101.00 |
| b | Add 20% of cost for Kentledge including supports, loading arrangement, and Labour etc. | metre | 1,02,121.00 |
| B | Clayey soil ( 9m dia. Well ) | | |
| (i) | Depth below bed level upto 3.0 M | metre | 15,128.00 |
| (ii) | Beyond 3m upto 10m depth | metre | 22,421.00 |
| (iii) | Beyond 10 m upto 20 m | | |
| a | Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 29,611.00 |
| b | Add for dewatering @ 5% of cost, if required. | metre | 31,092.00 |
| (iv) | Beyond 20m upto 30 m | | |
| a | Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 55,542.00 |
| b | Add 5% of cost for dewatering on the cost, if required | metre | 72,899.00 |
| c | Add 25% of cost for Kentledge including supports, loading arrangement and Labour ). | metre | 69,427.00 |
| (v) | Beyond 30m upto 40 m | | |
| a | Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 1,31,958.00 |
| b | Add 5% of cost for dewatering, if required | metre | 1,66,267.00 |
| c | Add 20% of cost for Kentledge including supports, loading arrangement and Labour). | metre | 1,58,349.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| C | Soft rock ( 9m dia well ) | | |
| (i) | Depth upto 3m | metre | 33,720.00 |
| D | Hard rock ( 9m dia well ) | | |
| (i) | Depth of hard rock strata upto 3 m | metre | 44,689.00 |
| 12.16 | Sinking of 10 m external diameter well *( other than pneumatic method of sinking )* through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level. | | |
| A | Sandy soil | | |
| (i) | Depth below bed level upto 3.0 M | metre | 12,938.00 |
| (ii) | Beyond 3m upto 10m depth | metre | 15,326.00 |
| (iii) | Beyond 10m upto 20m | | |
| a | Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 20,241.00 |
| (iv) | Beyond 20m upto 30 m | | |
| a | Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 37,966.00 |
| b | Add 20% of cost for Kentledge including supports, loading arrangement and Labour . | metre | 45,559.00 |
| (v) | Beyond 30m upto 40 m | | |
| a | Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 90,201.00 |
| b | Add 20% of cost for Kentledge including supports, loading arrangement, and Labour etc. | metre | 1,08,242.00 |
| B | Clayey soil (10m dia. Well ) | | |
| (i) | Depth below bed level upto 3.0 M | metre | 16,987.00 |
| (ii) | Beyond 3m upto 10m depth | metre | 22,622.00 |
| (iii) | Beyond 10 m upto 20 m | | |
| a | Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 29,878.00 |
| b | Add for dewatering @ 5% of cost, if required. | metre | 31,372.00 |
| (iv) | Beyond 20m upto 30 m | | |
| a | Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 56,044.00 |
| 'b | Add 5% of cost for dewatering on the cost, if required | metre | 73,558.00 |
| c | Add 25% of cost for Kentledge including supports, loading arrangement and Labour ). | metre | 70,055.00 |
| (v) | Beyond 30m upto 40 m | | |
| a | Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 1,33,151.00 |
| b | Add 5% of cost for dewatering, if required | metre | 1,67,770.00 |
| c | Add 20% of cost for Kentledge including supports, loading arrangement and Labour). | | 1,59,781.00 |
| C | Soft rock (10m dia well ) | | |
| (i) | Depth of soft rock strata upto 3m | metre | 35,987.00 |
| D | Hard rock (10m dia well ) | | |
| (i) | Depth of hard rock strata upto 3 m | metre | 49,042.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| ***12.17*** | ***Sinking of 11 m external diameter well*** *( other than pneumatic method of sinking ) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level.* | | |
| ***A*** | ***Sandy soil*** | | |
| ***(i)*** | ***Depth from bed level upto 3.0 M*** | metre | **29,287.00** |
| ***(ii)*** | ***Beyond 3m upto 10m depth*** | metre | **24,595.00** |
| ***(iii)*** | ***Beyond 10m upto 20m*** | | |
| ***a*** | ***Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **32,482.00** |
| ***(iv)*** | ***Beyond 20m upto 30 m*** | | |
| ***a*** | ***Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **60,929.00** |
| ***b*** | ***Add 20% of cost for Kentledge including supports, loading arrangement and Labour .*** | metre | **73,114.00** |
| ***(v)*** | ***Beyond 30m upto 40 m*** | | |
| ***a*** | ***Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **1,44,757.00** |
| ***b*** | ***Add 20% of cost for Kentledge including supports, loading arrangement, and Labour etc.*** | metre | **1,73,709.00** |
| ***B*** | ***Clayey soil (11 m dia. Well )*** | | |
| ***(i)*** | ***Depth from bed level upto 3.0 M*** | metre | **28,288.00** |
| ***(ii)*** | ***Beyond 3m upto 10m depth*** | metre | **47,088.00** |
| ***(iii)*** | ***Beyond 10 m upto 20 m*** | | |
| ***a*** | ***Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **62,190.00** |
| ***b*** | ***Add for dewatering @ 5% of cost, if required.*** | metre | **65,299.00** |
| ***(iv)*** | ***Beyond 20m upto 30 m*** | | |
| ***a*** | ***Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **1,16,653.00** |
| ***b*** | ***Add 5% of cost for dewatering on the cost, if required*** | metre | **1,53,107.00** |
| ***c*** | ***Add 25% of cost for Kentledge including supports, loading arrangement and Labour ).*** | metre | **1,45,816.00** |
| ***(v)*** | ***Beyond 30m upto 40 m*** | | |
| ***a*** | ***Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **2,77,151.00** |
| ***b*** | ***Add 5% of cost for dewatering, if required*** | metre | **3,49,210.00** |
| ***c*** | ***Add 20% of cost for Kentledge including supports, loading arrangement and Labour).*** | metre | **3,32,581.00** |
| ***C*** | ***Soft rock (11m dia well )*** | | |
| ***(i)*** | ***Depth of soft rock strata upto 3m*** | metre | **80,052.00** |
| ***D*** | ***Hard rock (11m dia well )*** | | |
| ***(i)*** | ***Depth of hard rock upto 3 m*** | metre | **1,08,812.00** |
| ***12.18*** | ***Sinking of 12 m external diameter well*** *( other than pneumatic method of sinking ) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level.* | | |
| ***A*** | ***Sandy soil*** | | |
| ***(i)*** | ***I) Depth below bed level upto 3.0 M*** | metre | **61,325.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| *(ii)* | ***Beyond 3m upto 10m depth*** | metre | **69,999.00** |
| *(iii)* | ***Beyond 10m upto 20m*** | | |
| *a* | ***Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **92,446.00** |
| *(iv)* | ***Beyond 20m upto 30 m*** | | |
| *a* | ***Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **1,73,405.00** |
| *b* | ***Add 20% of cost for Kentledge including supports, loading arrangement and Labour .*** | metre | **2,08,086.00** |
| *(v)* | ***Beyond 30m upto 40 m*** | | |
| *a* | ***Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **4,11,987.00** |
| *b* | ***Add 20% of cost for Kentledge including supports, loading arrangement, and Labour etc.*** | metre | **4,94,384.00** |
| *B* | ***Clayey soil (12 m dia. Well )*** | | |
| *(i)* | ***Depth below bed level upto 3.0 M*** | metre | **68,868.00** |
| *(ii)* | ***Beyond 3m upto 10m depth*** | metre | **1,14,200.00** |
| *(iii)* | ***Beyond 10 m upto 20 m*** | | |
| *a* | ***Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **1,50,823.00** |
| *b* | ***Add for dewatering @ 5% of cost, if required.*** | metre | **1,58,365.00** |
| *(iv)* | ***Beyond 20m upto 30 m*** | | |
| *a* | ***Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **2,82,905.00** |
| *b* | ***Add 5% of cost for dewatering on the cost, if required*** | metre | **3,71,313.00** |
| *c* | ***Add 25% of cost for Kentledge including supports, loading arrangement and Labour ).*** | metre | **3,53,632.00** |
| *(v)* | ***Beyond 30m upto 40 m*** | | |
| *a* | ***Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **6,72,143.00** |
| *b* | ***Add 5% of cost for dewatering, if required*** | metre | **8,46,900.00** |
| *c* | ***Add 20% of cost for Kentledge including supports, loading arrangement and Labour).*** | metre | **8,06,571.00** |
| *C* | ***Soft rock (12m dia well )*** | | |
| *(i)* | ***Depth of soft rock strata upto 3m*** | metre | **1,84,864.00** |
| *D* | ***Hard rock (12m dia well )*** | | |
| *(i)* | ***Depth of hard rock strata upto 3 m*** | metre | **2,40,421.00** |
| *12.19* | ***Sinking of Twin D Type well*** *( other than pneumatic method of sinking ) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is reckoned from bed level.* | | |
| *A* | ***Sandy soil*** | | |
| *(i)* | ***Depth from bed level upto 3.0 M*** | metre | **13,821.00** |
| *(ii)* | ***Beyond 3m upto 10m depth*** | metre | **14,978.00** |
| *(iii)* | ***Beyond 10m upto 20m*** | | |
| *a* | ***Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **19,782.00** |
| *(iv)* | ***Beyond 20m upto 30 m*** | | |
| *a* | ***Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter*** | metre | **37,106.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| b | Add 20% of cost for Kentledge including supports, loading arrangement and Labour . | metre | 44,528.00 |
| (v) | Beyond 30m upto 40 m | | |
| a | Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 88,161.00 |
| b | Add 20% of cost for Kentledge including supports, loading arrangement, and Labour etc. | metre | 1,05,793.00 |
| B | Clayey soil (Twin D Type Well ) | | |
| (i) | Depth below bed level upto 3.0 M | metre | 16,435.00 |
| (ii) | Beyond 3m upto 10m depth | metre | 25,075.00 |
| (iii) | Beyond 10 m upto 20 m | | |
| a | Add 5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 33,114.00 |
| b | Add for dewatering @ 5% of cost, if required. | metre | 34,770.00 |
| (iv) | Beyond 20m upto 30 m | | |
| a | Add 7.5% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 62,113.00 |
| b | Add 5% of cost for dewatering on the cost, if required | metre | 81,524.00 |
| c | Add 25% of cost for Kentledge including supports, loading arrangement and Labour ). | metre | 77,642.00 |
| (v) | Beyond 30m upto 40 m | | |
| a | Add 10% for every additional meter depth of sinking over the rate of sinking for the previous meter | metre | 1,47,574.00 |
| b | Add 5% of cost for dewatering, if required | metre | 1,85,943.00 |
| c | Add 20% of cost for Kentledge including supports, loading arrangement and Labour). | metre | 1,77,089.00 |
| C | Soft rock (Twin D Type well ) | | |
| (i) | Depth of soft rock strata upto 3m | metre | 40,754.00 |
| D | Hard rock (Twin D Type well ) | | |
| (i) | Depth of hard rock strata upto 3 m | metre | 51,565.00 |
| 12.20 | Pneumatic sinking of wells with equipment of approved design, drawing and specifications worked by competent and trained personnel and comprising of compression and decompression chambers, reducers, two air locks separately for men and plant & materials, arrangement for supply of fresh air to working chambers, check valves, exhaust valves, shafts made from steel plates of riveted construction not less than 6 mm thick to withstand an air pressure of 0.50 MPa, controlled blasting of hard rock where required, staircases and 1 m wide landing plateforms with railing, arrangement for compression and decompression, electric lighting of 50 V maximum, proper rooms for rest and medical examinations and compliance with safety precautions as per IS:4138, all as per clause1207.6 of MoRTH Specifications. | cum | 1,38,970.00 |
| 12.21 | Sand filling in wells complete as per drawing and technical specifications | cum | 1,462.00 |
| 12.22 | Providing steel liner 10 mm thick for curbs and 6mm thick for steining of wells including fabricating and setting out as per detailed drawing | tonne | 1,12,345.00 |
| 12.23 | Bored cast-in-situ M35 grade R.C.C. pile excluding reinforcement complete as per drawing and technical specifications and removal of excavated earth with all lifts and lead upto 1000 m. *(Pile diameter-750 mm)* | metre | 12,059.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| 12.24 | **Bored cast-in-situ M35 grade R.C.C. pile excluding reinforcement complete as per drawing and technical specifications and removal of excavated earth with all lifts and lead upto 1000 m.** *(Pile diameter-1000 mm)* | metre | **19,630.00** |
| 12.25 | **Bored cast-in-situ M35 grade R.C.C. pile excluding reinforcement complete as per drawing and technical specifications and removal of excavated earth with all lifts and lead upto 1000 m.** *(Pile diameter-1200 mm)* | metre | **24,813.00** |
| 12.26 | **Driven cast-in-place vertical M35 grade R.C.C. pile excluding reinforcement complete as per drawing and & Technical Specification** *(Pile diameter - 750 mm)* | metre | **8,242.00** |
| 12.27 | **Driven cast-in-place vertical M35 grade R.C.C. piles excluding reinforcement complete as per drawing and & Technical Specification** *(Pile diameter - 1000 mm)* | metre | **13,179.00** |
| 12.28 | **Driven cast-in-place vertical M35 grade R.C.C. piles excluding reinforcement complete as per drawing and & Technical Specification** *(Pile diameter - 1200 mm)* | metre | **19,251.00** |
| 12.37 | **Pile load test on single vertical pile in accordance with IS:2911(Part-IV)** | | |
| | **(a) Initial and routine load test** | tonne | **450.00** |
| | **(b) Lateral load test** | tonne | **6,400.00** |
| | **(c) Lateral load test** | | |
| 12.38 | **Cement concrete for reinforced concrete in pile cap complete as per drawing and Technical Specification** | | |
| A | **RCC Grade M20** | | |
| (i) | **Using Concrete Mixer** | cum | **10,118.00** |
| (ii) | **Using Batching Plant, Transit Mixer and Concrete Pump** | cum | **9,655.00** |
| B | **RCC Grade M25** | | |
| (i) | **Using concrete mixer.** | cum | **10,998.00** |
| (ii) | **Using Batching Plant, Transit Mixer and Concrete Pump** | cum | **10,551.00** |
| C | **RCC Grade M30** | | |
| (i) | **Using concrete mixer.** | cum | **11,109.00** |
| (ii) | **Using Batching Plant, Transit Mixer and Concrete Pump** | cum | **10,646.00** |
| D | **RCC Grade M35** | | |
| (i) | **Using concrete mixer.** | cum | **11,341.00** |
| (ii) | **Using Batching Plant, Transit Mixer and Concrete Pump** | cum | **10,894.00** |
| 12.39 | **Levelling course for Pile cap** | cum | **8,763.00** |
| 12.40 | **Supplying, fitting and placing un-coated HYSD bar reinforcement in foundation complete as per drawing and technical specifications** | **tonne** | **1,20,036.48** |
| 12.41 | **Supplying, fitting and placing un-coated Mild steel reinforcement complete in foundation as per drawing and technical specification** | tonne | **1,20,640.00** |
| 12.42 | **Providing and Installation of Steel driven Piles with corrosion resistant / Treated Structural Steel including welding of joints, fabrication of Shoe, Cap etc, as per detailed drawing and specification complete and as per direction of the Engineer in charge** | MT | **1,62,528.00** |

## Chapter – 13

## SUBSTRUCTURE

**Preamble:**

1 Although, substructure are generally constructed in cement concrete, the rate for brick and stone masonry in CM 1:3 have also been included which can be adopted permitted by design.

2 The cost of formwork will vary with the height and cross-section of the substructure. Provision has been made accordingly.

3 Bridge bearing, being commercial item produced by specialised firms with imported technology and parts, the rates for the same are ascertained by quotation from the market for the approved design and technical specifications.

4 Filter media and backfilling behind abutment are required to be provided as per guidelines in IRC:78- 2000.

5 Weep holes shall be provided as per specifications.

6 In case of roller-cum-rocker bearings, only full circular rollers are to be provided.

7 Bearing shall be set truly level so as to have full and even seating.

8 For elastomeric bearings, the concrete surface shall be leveled such that the variation is not more than 1.5 mm from a straight edge placed in any direction across the area.

9 The bearing should be procured only from those manufacturers who have been prequalified by the Ministry of Road Transport and Highways.

10 The bottoms of girders resting on the bearing shall be plane and truly horizontal.

11 For spans in garde, the bearing shall be placed horizontal by using sole plates for suitbly designed RCC pedestals.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| | **CHAPTER-13** | | |
| | **SUB-STRUCTURE** | | |
| 13.1 | Brick masonry work in 1:3 in sub-structure complete excluding pointing and plastering, as per drawing and technical specifications | cum | 13,829.00 |
| 13.2 | Pointing with cement mortar (1:3 ) on brick work in substructure as per Technical specifications | sqm | 112.50 |
| 13.3 | Plastering with cement mortar (1:3 ) on brick work in sub-structure as per Technical specifications | sqm | 217.10 |
| 13.4 | Stone masonry work in cement mortar 1:3 for substructure complete as per drawing and Technical Specifications | | |
| A | Random Rubble Masonry | cum | 6,519.00 |
| B | Coursed rubble masonry (first sort ) | cum | 6,863.00 |
| C | Ashlar masonry ( first sort ) | cum | 8,947.00 |
| 13.5 | Plain/Reinforced cement concrete in sub-structure complete as per drawing and technical specifications | | |
| A | PCC Grade M15 | | |
| (p) | Height upto 5m | cum | 9,912.00 |
| B | PCC Grade M20 | | |
| (p) | Height upto 5m | cum | 10,732.00 |
| C | PCC Grade M25 | | |
| (p) | Height upto 5m | | |
| Case I | Using concrete Mixer | cum | 11,620.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,096.00 |
| (q) | Height 5m to 10m | | |
| Case I | Using concrete Mixer | cum | 12,042.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,500.00 |
| (r) | Height above 10m | | |
| Case I | Using concrete Mixer | cum | 12,570.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 12,004.00 |
| D | PCC Grade M30 | | |
| (p) | Height upto 5m | | |
| Case I | Using concrete Mixer | cum | 11,717.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,183.00 |
| (q) | Height 5m to 10m | | |
| Case I | Using concrete Mixer | cum | 12,143.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,589.00 |
| (r) | Height above 10m | | |
| Case I | Using concrete Mixer | cum | 12,675.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 12,098.00 |
| E | RCC Grade M20 | | |
| (p) | Height upto 5m | | |
| Case I | Using concrete Mixer | cum | 10,755.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 10,224.00 |
| (q) | Height 5m to 10m | | |
| Case I | Using concrete Mixer | cum | 11,146.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 10,596.00 |
| (r) | Height above 10m | | |
| Case I | Using concrete Mixer | cum | 11,634.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,061.00 |
| F | RCC Grade M25 | | |
| (p) | Height upto 5m | | |
| Case I | Using concrete Mixer | cum | 11,651.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,304.00 |
| (q) | Height 5m to 10m | | |
| Case I | Using concrete Mixer | cum | 12,033.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,674.00 |
| (r) | Height above 10m | | |
| Case I | Using concrete Mixer | cum | 12,605.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 12,229.00 |
| G | RCC Grade M30 | | |
| (p) | Height upto 5m | | |
| Case I | Using concrete Mixer | cum | 11,706.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,177.00 |
| (q) | Height 5m to 10m | | |
| Case I | Using concrete Mixer | cum | 12,036.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,492.00 |
| (r) | Height above 10m | | |
| Case I | Using concrete Mixer | cum | 12,504.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,940.00 |
| H | RCC Grade M35 | | |
| (p) | Height upto 5m | | |
| Case I | Using concrete Mixer | cum | 11,951.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,614.00 |
| (q) | Height 5m to 10m | | |
| Case I | Using concrete Mixer | cum | 12,212.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 11,868.00 |
| (r) | Height above 10m | | |
| Case I | Using concrete Mixer | cum | 12,603.00 |
| Case II | With Batching Plant, Transit Mixer and Concrete Pump | cum | 12,248.00 |
| 13.6 | Supplying, fitting and placing HYSD bar reinforcement in sub-structure complete as per drawing and technical specifications | tonne | 1,20,323.00 |
| 13.7 | Supplying, fitting and placing Mild steel reinforcement complete in sub-structure as per drawing and technical specification | tonne | 1,19,116.00 |
| 13.8 | Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing foce. Complete as per drawing and Technical specifications | each | 242.00 |
| 13.9 | Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification | | |
| A | Granular material | cum | 1,620.00 |
| B | Sandy material | cum | 1,910.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| 13.10 | Providing and laying of Filter media with granular materials/stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRTH specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and provided over the entire surface behind abutment, wing wall and return wall to the full height compacted to a firm condition complete as per drawing and technical specification. | cum | 3,379.00 |
| 13.11 | Supplying, fitting and fixing in position true to line and level cast steel rocker bearing conforming to IRC: 83(Pt.-1) section IX and clause 2003 of MoRTH specifications complete including all accessories as per drawing and Technical Specifications. | tonne capacity | 2,231.00 |
| 13.12 | Supplying, fitting and fixing in position true to line and level forged steel roller bearing conforming to IRC: 83(Pt.-1) section IX and clause 2003 of MoRTH specifications complete including all accessories as per drawing and Technical Specifications. | tonne capacity | 1,964.00 |
| 13.13 | Supplying, fitting and fixing in position true to line and level sliding plate bearing with PTFE surface sliding on stainless steel complete including all accessories as per drawing and Technical Specifications and BS: 5400, section 9.1 & 9.2 (for PTFE) and clause 2004 of MoRTH Specifications. | tonne capacity | 4,189.00 |
| 13.14 | Supplying, fitting and fixing in position true to line and level elastomeric bearing conforming to IRC: 83 (Part-II) section IX and clause 2005 of MoRTH specifications complete including all accessories as per drawing and Technical Specifications. | cubic centimetre | 1.00 |
| 13.15 | Supplying, fitting and fixing in position true to line and level sliding plate bearing with stainless steel plate sliding on stainless steel plate with mild steel matrix complete including all accessories as per drawing and Technical Specifications. | tonne capacity | 344.00 |
| 13.16 | Supplying, fitting and fixing in position true to line and level POT-PTFE bearing consisting of a metal piston supported by a disc or unreinforced elastomer confined within a metal cylinder, sealing rings, dust seals, PTFE surface sliding against stainless steel mating surface, completre assembly to be of cast steel/fabricated structural steel, metal and elastomer elements to be as per IRC: 83 part-I & II respectively and other parts conforming to BS: 5400, section 9.1 & 9.2 and clause 2006 of MoRTH Specifications complete asper drawing and approved technical specifications. | tonne capacity | 451.00 |

## Chapter – 14
## SUPERSTRUCTURE

**Preamble:**

1 The rate for the wearing coat has been analysed as under in accordance with the provisions of MORD Specifications:

a. Cement concrete wearing coat

b. Ashphaltic concrete wearing coat

c. Bitumen mastic wearing coat

The item may be selected as per approved design

2 The rates are provided for both RCC Railing and M. S. Railing, which can be adopted as per approved design.

3 The length of drainage spout has been provided in such a way that it is connected to the drainage system on the ground in case of flyovers and there is no splashing of water on the structure in case of bridges.

4 The rate for anti-corrosive treatment is ascertained from firms specialised in this work. In this connection Circular No. RW/NH-34041/44/91-S&R dated 21.03.2000 of Ministry of Road Transport and Highways may be referred for further details

5 Expansion joints involving movements exceeding 40 mm are specialised readymade items commercially produced by reputed firms with imported technology and parts. The rates for such joints are ascertained from the firms pre-qualified by the Ministry.

6 The Rates for pre-cast and pre-tensioned girders has also been included.

7 MoRT&H letter No. RW/NH-34059/1/96 S&R dated 30-11-2000 and subsequent corrigendum dated 25-01-2001 may be referred for detailed specifications and provisions for various types of expansion joints.

8 For bridges having wide deck/span length of more than 120 m or/and involving complex movements/rotations in different directions/planes, provision of special type of modular expansion joints such as swivel joists joint are required for which firms specialised in this field may be consulted. Such cases will require prior approval of Ministry.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| | **CHAPTER-14** | | |
| | **SUPER-STRUCTURE** | | |
| 14.1 | Furnishing and Placing Reinforced/Prestressed cement concrete in super-structure as per drawing and Technical Specification | | |
| A | RCC Grade M20 | | |
| Case I | Using Concrete Mixer | | |
| (i) | For solid slab super-structure, 20-30% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 11,626.00 |
| (q) | Height 5m to 10m | cum | 12,110.00 |
| (r) | Height above 10m | cum | 12,595.00 |
| (ii) | For T-beam & slab, 25-35% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 12,110.00 |
| (q) | Height 5m to 10m | cum | 12,595.00 |
| (r) | Height above 10m | cum | 13,079.00 |
| Case II | Using Batching Plant, Transit Mixer and Concrete Pump | | |
| (i) | For solid slab super-structure, 20-30% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 11,044.00 |
| (q) | Height 5m to 10m | cum | 11,504.00 |
| (r) | Height above 10m | cum | 11,965.00 |
| (ii) | For T-beam & slab, 25-35% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 11,504.00 |
| (q) | Height 5m to 10m | cum | 11,965.00 |
| (r) | Height above 10m | cum | 12,425.00 |
| B | RCC Grade M25 | | |
| Case I | Using Concrete Mixer | | |
| (i) | For solid slab super-structure, 20-30% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 12,642.00 |
| (q) | Height 5m to 10m | cum | 13,169.00 |
| (r) | Height above 10m | cum | 13,695.00 |
| (ii) | For T-beam & slab, 25-35% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 13,169.00 |
| (q) | Height 5m to 10m | cum | 13,695.00 |
| (r) | Height above 10m | cum | 14,222.00 |
| Case II | Using Batching Plant, Transit Mixer and Concrete Pump | | |
| (i) | For solid slab super-structure, 20-30% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 12,071.00 |
| (q) | Height 5m to 10m | cum | 12,574.00 |
| (r) | Height above 10m | cum | 13,077.00 |
| (ii) | For T-beam & slab, 25-35% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 12,574.00 |
| (q) | Height 5m to 10m | cum | 13,077.00 |
| (r) | Height above 10m | cum | 13,580.00 |
| C | RCC Grade M 30 | | |
| Case I | Using Concrete Mixer | | |
| (i) | For solid slab super-structure, 20-30% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 12,826.00 |
| (q) | Height 5m to 10m | cum | 13,360.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| (r) | Height above 10m | cum | 13,895.00 |
| (ii) | For T-beam & slab, 25-35% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 13,360.00 |
| (q) | Height 5m to 10m | cum | 13,895.00 |
| (r) | Height above 10m | cum | 14,429.00 |
| Case II | Using Batching Plant, Transit Mixer and Concrete Pump. | | |
| (i) | For solid slab super-structure, 20-30% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 12,205.00 |
| (q) | Height 5m to 10m | cum | 12,713.00 |
| (r) | Height above 10m | cum | 13,222.00 |
| (ii) | For T-beam & slab, 25-35% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 12,713.00 |
| (q) | Height 5m to 10m | cum | 13,222.00 |
| (r) | Height above 10m | cum | 13,731.00 |
| D | RCC/PSC Grade M35 | | |
| Case 1 | Using concrete mixer. | | |
| (i) | For solid slab super-structure, 18-28% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 12,876.00 |
| (q) | Height 5m to 10m | cum | 13,422.00 |
| (r) | Height above 10m | cum | 13,967.00 |
| (ii) | For T-beam & slab, 23-33% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 13,422.00 |
| (q) | Height 5m to 10m | cum | 13,967.00 |
| (r) | Height above 10m | cum | 14,513.00 |
| (iii) | For box girder and balanced cantilever, 38-58% of cost of concrete. | | |
| (p) | Height upto 5m | cum | 15,058.00 |
| (q) | Height 5m to 10m | cum | 16,149.00 |
| (r) | Height above 10m | cum | 17,241.00 |
| Case II | Using Batching Plant, Transit Mixer and Concrete Pump | | |
| (i) | For solid slab super-structure, 18-28% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 12,261.00 |
| (q) | Height 5m to 10m | cum | 12,780.00 |
| (r) | Height above 10m | cum | 13,300.00 |
| (ii) | For T-beam & slab, 23-33% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 12,780.00 |
| (q) | Height 5m to 10m | cum | 13,300.00 |
| (r) | Height above 10m | cum | 13,819.00 |
| (iii) | For box girder and balanced cantilever, 38-58% of cost of concrete. | | |
| (p) | Height upto 5m | cum | 14,339.00 |
| (q) | Height 5m to 10m | cum | 15,378.00 |
| (r) | Height above 10m | cum | 16,417.00 |
| E | PSC Grade M-40 | | |
| Case 1 | Using concrete mixer. | | |
| (i) | For solid slab super-structure, 20-30% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 13,542.00 |
| (q) | Height 5m to 10m | cum | 14,107.00 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| (r) | Height above 10m | cum | 14,671.00 |
| (ii) | For T-beam & slab, 25-35% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 14,107.00 |
| (q) | Height 5m to 10m | cum | 14,671.00 |
| (r) | Height above 10m | cum | 15,235.00 |
| Case II | Using Batching Plant, Transit Mixer and Concrete Pump | | |
| (i) | For solid slab super-structure, 18-28% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 12,618.00 |
| (q) | Height 5m to 10m | cum | 13,153.00 |
| (r) | Height above 10m | cum | 13,687.00 |
| (ii) | For T-beam & slab, 23-33% of (a+b+c) | | |
| (p) | Height upto 5m | cum | 13,153.00 |
| (q) | Height 5m to 10m | cum | 13,687.00 |
| (r) | Height above 10m | cum | 14,222.00 |
| (iii) | For box girder and balanced cantilever, 38-58% of cost of concrete. | | |
| (p) | Height upto 5m | cum | 14,757.00 |
| (q) | Height 5m to 10m | cum | 15,826.00 |
| (r) | Height above 10m | cum | 16,895.00 |
| F | PSC Grade M-45 | | |
| (i) | For solid slab/voided slab super-structure, 16-26% of cost of concrete (a+b+c) | | |
| (p) | Height upto 5m | cum | 13,013.00 |
| (q) | Height 5m to 10m | cum | 13,574.00 |
| (r) | Height above 10m | cum | 14,135.00 |
| (ii) | For I-beam & slab including launching of precast girders by launching truss upto 40 m span, 21-31% of cost of concrete. | | |
| (p) | Height upto 5m | cum | 13,574.00 |
| (q) | Height 5m to 10m | cum | 14,135.00 |
| (r) | Height above 10m | cum | 14,695.00 |
| (iii) | For cast-in-situ box girder, segmental construction and balanced cantilever, 36-56% of cost of concrete. | | |
| (p) | Height upto 5m | cum | 15,256.00 |
| (q) | Height 5m to 10m | cum | 16,378.00 |
| (r) | Height above 10m | cum | 17,500.00 |
| G | PSC Grade M-50 | | |
| (i) | For cast-in-situ box girder, segmental construction and balanced cantilever, 35-55% of cost of concrete | | |
| (p) | Height upto 5m | cum | 15,650.00 |
| (q) | Height 5m to 10m | cum | 16,809.00 |
| (r) | Height above 10m | cum | 17,969.00 |
| H | PSC Grade M- 55 | | |
| (i) | For cast-in-situ box girder, segmental construction and balanced cantilever, 35-55% of cost of concrete | | |
| (p) | Height upto 5m | cum | 16,443.00 |
| (q) | Height 5m to 10m | cum | 17,660.00 |
| (r) | Height above 10m | cum | 18,878.42 |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| 14.2 | **a) Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications** | tonne | **1,22,717.00** |
| 14.3 | **High tensile steel wires/strands including all accessories for stressing, stressing operations and grouting complete as per drawing and Technical Specifications** | tonne | **2,24,214.00** |
| 14.4 | **Providing and laying Cement concrete wearing coat M-30 grade including reinforcement complete as per drawing and Technical Specifications** | cum | **20,090.00** |
| 14.5 | **Mastic Asphalt** *(Providing and laying 12 mm thick mastic asphalt wearing course on top of deck slab excluding prime coat with paving grade bitumen meeting the requirements given in table 500-29, prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated fine grained hard stone chipping of 9.5 mm nominal size at the rate of 0.005cum per 10 sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of surfaces not less than 100 deg. C, protruding 1 mm to 4 mm over mastic surface, all complete as per clause 515.)* | sqm | **607.00** |
| 14.6 | **Construction of precast RCC railing of M30 Grade, aggregate size not exceeding 12 mm, true to line and grade, tolurence of vertical RCC post not to exceed 1 in 500, centre to centre spacing between vertical post not to exceed 2000 mm, leaving adequate space between vertical post for expansion, complete as per approved drawings and technical specifications.** | metre | **3,291.00** |
| 14.7 | **Construction of RCC railing of M30 Grade in-situ with 20 mm nominal size aggregate, true to line and grade, tolurence of vertical RCC post not to exceed 1 in 500, centre to centre spacing between vertical post not to exceed 2000 mm, leaving adequate space between vertical post for expansion, complete as per approved drawings and technical specifications.** | metre | **3,195.00** |
| 14.8 | **Providing, fitting and fixing mild steel railing complete as per drawing and Technical Specification** | metre | **4,449.00** |
| 14.9 | **Drainage Spouts complete as per drawing and Technical specification** | each | **1,704.00** |
| 14.10 | **PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification** | cum | **9,011.00** |
| 14.11 | **Reinforced cement concrete approach slab including reinforcement and formwork complete as per drawing and Technical specification** | cum | **16,500.00** |
| 14.15 | **Crash Barriers** *(The rate analysis for rigid crash barrier in reinforced cement concrete, semi-rigid crash barrier with metal beam and flexible crash barrier with wire ropes have been made and included in chapter-8 on Traffic and Transportation.)* | | |
| 14.16 | **Painting on concrete surface** *(Providing and applying 2 coats of water based cement paint to unplastered concrete surface after cleaning the surface of dirt, dust, oil, grease, efflorescence and applying paint @ of 1 litre for 2 Sq.m. )* | metre | **157.00** |
| 14.17 | **Burried Joint** *(Providing and laying a burried expansion joint, expansion gap being 20 mm, covered with 12 mm thick, 200 mm wide galvanised wieldable structural steel plate as per IS: 2062, placed symmetrical to centre line of the joint, resting freely over the top surface of the deck concrete, welding of 8 mm dia. 100 mm long galvanised nails spaced 300 mm c/c along the centre line of the plate, all as specified in clause 2604.)* | metre | **2,060.00** |

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| ***14.18*** | ***Filler joint*** | | |
| ***(i)*** | ***Providing & fixing 2 mm thick corrugated copper plate in expansion joint complete as per drawing & Technical Specification.*** | metre | **6,306.00** |
| ***(ii)*** | ***Providing & fixing 20 mm thick compressible fibre board in expansion joint complete as per drawing & Technical Specification.*** | metre | **333.00** |
| ***(iii)*** | ***Providing and fixing in position 20 mm thick premoulded joint filler in expansion joint for fixed ends of simply supported spans not exceeding 10 m to cater for a horizontal movement upto 20 mm, covered with sealant complete as per drawing and technical specifications.*** | metre | **475.00** |
| ***(iv)*** | ***Providing and filling joint sealing compound as per drawings and technical specifications with coarse sand and 6% bitumen by weight*** | metre | **37.00** |
| ***14.19*** | ***Asphaltic Plug joint*** *(Providing and laying of asphaltic plug joint to provide for horizontal movement of 25 mm and vertical movement of 2 mm, depth of joint varying from 75 mm to 100 mm, width varying from 500 mm to 750 mm (in traffic direction), covered with a closure plate of 200mm x 6mm of wieldable structural steel conforming to IS: 2062, asphaltic plug to consist of polymer modified bitumen binder, carefully selected single size aggregate of 12.5 mm nominal size and a heat resistant foam caulking/backer rod, all as per approved drawings and specifications.)* | metre | **4,416.00** |
| ***14.20*** | ***Elastomeric Slab Steel Expansion Joint*** *(Providing and laying of an elastomeric slab steel expansion joint, catering to right or skew (less than 20 deg., moderately curved with maximum horizontal movement upto 50 mm, complete as per approved drawings and standard specifications to be installed by the manufacturer/supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation and clause 2606 of MoRTH specifications for road & bridge works.)* | metre | **19,592.00** |
| ***14.21*** | ***Compression Seal Joint*** *(Providing and laying of compression seal joint consisting of steel armoured nosing at two edges of the joint gap suitably anchored to the deck concrete and a preformed chloroprene elastomer or closed cell foam joint sealer compressed and fixed into the joint gap with special adhesive binder to cater for a horizontal movement upto 40 mm and vertical movement of 3 mm.)* | metre | **22,648.00** |
| ***14.22*** | ***Strip Seal Expansion Joint*** *(Providing and laying of a strip seal expansion joint catering to maximum horizontal movement upto 70 mm, complete as per approved drawings and standard specifications to be installed by the manufacturer/supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation.)* | metre | **23,911.00** |
| ***14.23*** | ***Modular Strip / Box Seal Joint*** *(Providing and laying of a modular strip Box steel expansion joint including anchorage catering to a horizontal movement beyond 70 mm and upto 140mm, complete as per approved drawings and standard specifications to be installed by the manufacturer/supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation.)* | metre | **3,92,085.00** |
| ***14.24*** | ***Modular Strip / Box Seal Joint*** *(Providing and laying of a modular strip box seal expansion joint catering to a horizontal movement beyond 140mm and upto 210mm, complete as per approved drawings and standard specifications to be installed by the manufacturer/supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation.)* | metre | **4,33,370.00** |

## Chapter – 15

## PROTECTION WORKS

**Preamble:**

1 Three types of aprons as under have been catered for:

a. Boulder apron laid dry

b. Boulder apron laid in wire crates

c. Apron laid in cement concrete blocks of M 15 grade

2 A toe wall for toe protection of pitching can be either in random rubble masonry or in nominal mix cement concrete M 10, or in brick masonry. Depending upon the design, the rates may be adopted under respective clauses.

3 Flooring has been proposed in dry rubble stone, rubble stone laid in cement mortar 1:3, cement concrete blocks M 15 and brick on edge laid in cement mortar (CM) 1:3.

4 Curtain walls proposed are of the following types:

b. Coursed rubble stone masonry (1st sort) is CM 1:3

c. Cement concrete M-15 grade

5 The rate analysis for gabionstructures comprising of stone boulders laid in wire crates have been included. Such structures are suited as retaining structures and for crosion control in river training works especially for situations where some settlement of foundation is anticipated. These structures can adjust in minor settlements, being flexible structures, without losing their functional requirement.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| **Item No.** | **Descriptions** | **Unit** | **Rate** |
| | **CHAPTER-15** | | |
| | **RIVER TRAINING AND PROTECTION WORKS** | | |
| **15.1** | ***Providing and laying boulders apron on river bed for protection against scour with stone boulders weighing not less than 40 kg each complete as per drawing and Technical specification.*** | | |
| **A** | ***Boulder laid dry without wire crates.*** | cum | **2,404.00** |
| **15.2** | ***Boulder apron laid in wire crates*** *(Providing and laying of boulder apron laid in wire crates made with 4mm dia GI wire conforming to IS: 280 & IS:4826 in 100mm x 100mm mesh (weaved diagonally) including 10% extra for laps and joints laid with stone boulders weighing not less than 40 kg each )* | cum | **3,330.00** |
| **15.3** | ***Cement concrete blocks (size 0.5 x 0.5 x 0.5 m)*** *(Providing and laying of apron with cement concrete blocks of size 0.5x0.5x0.5 m cast in-situ and made with nominal mix of M-15 grade cement concrete with a minimum cement content of 250 kg/cum as per IRC: 21-2000.)* | cum | **9,558.00** |
| **15.4** | ***Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specifications*** | | |
| **A** | ***Stone/Boulder*** | cum | **2,404.00** |
| **B** | ***Cement Concrete blocks of size 0.3x0.3 x0.3 m cast in cement concrete of Grade M15*** | cum | **9,558.00** |
| **15.5** | ***Providing and laying Filter material underneath pitching in slopes complete as per drawing and Technical specification*** | cum | **3,714.00** |
| **15.7** | ***Toe protection*** *(A toe wall for toe protection can either be in dry rubble masonry in case of dry rubble pitching or pitching with stones in wire crates or it can be in PCC M15 nominal mix if cement concrete block have been used for pitching . Rates for toe wall can be adopted from respective clauses depending upon approved design. The rate for excavation for foundation, dry rubble masonry and PCC M15 have been analysed and given in respective chapters.)* | | |
| **15.8** | ***Providing and laying Flooring complete as per drawing and Technical specifications laid over cement concrete bedding.*** | | |
| **A** | ***Rubble stone laid in cement mortar 1:3*** | cum | **9,130.00** |
| **B** | ***Cement Concrete blocks Grade M15*** | cum | **12,588.00** |
| **15.9** | ***Dry rubble Flooring*** | cum | **3,125.00** |
| **15.10** | ***Curtain wall complete as per drawing and Technical specification*** | | |
| **A** | ***Stone masonry in cement mortar (1:3)*** | cum | **6,751.00** |
| **B** | ***Cement concrete Grade M15*** | cum | **9,371.00** |
| **15.11** | ***Flexible Apron :Construction of flexible apron 1 m thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall.*** | cum | **2,512.00** |
| **15.12** | ***Gabian Structure for Retaining Earth*** *(Providing and construction of a gabain structure for retaining earth with segments of wire crates of size 7 m x 3 m x 0.6 m each divided into 1.5 m compartments by cross netting, made from 4 mm galvanised steel wire @ 32 kg per 10 sqm having minimum tensile strength of 300 Mpa conforming to IS:280 and galvanizing coating conforming to IS:4826, woven into mesh with double twist, mesh size not exceeding 100 x 100 mm, filled with boulders with least dimension of 200 mm, all loose ends to be tied with 4 mm galvanised steel wire)* | cum | **3,426.00** |

| *Summary of Rate Analysis* | | | |
|---|---|---|---|
| ***Item No.*** | ***Descriptions*** | **Unit** | **Rate** |
| ***15.13*** | ***Gabian Structure for Erosion Control, River Training Works and Protection works*** *(Providing and constructing gabain structures for erosion control, river training works and protection works with wire crates of size 2 m x 1 m x 0.3 m each divided into 1m compartments by cross netting, made from 4 mm galvanised steel wire @ 32 kg per 10 sqm having minimum tensile strength of 300 Mpa conforming to IS:280 and galvanizing coating conforming to IS:4826, woven into mesh with double twist, mesh size not exceeding 100 mm x 100 mm, filled with boulders with least dimension of 200 mm, all loose ends to be securely tied with 4 mm galvanised steel wire.)* | cum | **5,281.00** |

## Chapter – 16

## REPAIR AND REHABILITATION

**Preamble:**

1 Removal of cement concrete wearing coat and asphaltic wearing coat has been proposed with pneumatic breakers.

2 The rate for external prestressing has been analysed for three different spans of 25, 50 and 100 m.

3 Sealing of cracks has been proposed with cement grout, cement mortar (1:1) grout and epoxy grout by injecting with grout pump through nipples.

4 Bonding of new concrete with old concrete is proposed with epoxy resin.

5 The repair and replacement of following structures has been included -

a) Bridge Bearings

b) Expansion Joints

c) Concrete Railing

d) Mild Steel Railing

e) Crash Barrier

| Summary of Rate Analysis | | | |
|---|---|---|---|
| Item No. | Descriptions | Unit | Rate |
| | **CHAPTER-16** | | |
| | **REPAIR AND REHABILITATION** | | |
| 16.1 | ***Removal of existing cement concrete wearing coat including its disposal complete as per Technical specification without causing any detrimental effect to any part of the bridge structure and removal of dismantled material with all lifts and lead upto 1000m*** *(Thickness 75 mm)* | sqm | **203.00** |
| 16.2 | ***Removal of existing asphaltic wearing coat comprising of 50 mm thick asphaltic concrete laid over 12 mm thick mastic asphalt including disposal with all lift and lead upto 1000m.*** | sqm | **153.00** |
| 16.3 | ***Guniting concrete surface with cement mortar applied with compressor after cleaning surface and spraying with epoxy complete as per Technical specification*** | sqm | **1,347.00** |
| 16.4 | ***Providing and inserting nipples with approved fixing compound after drilling holes for grouting as per Technical specifications including subsequent cutting/removal and sealing of the hole as necessary of nipples after completion of grouting with Cement/Epoxy*** | each | **222.00** |
| 16.5 | ***Sealing of cracks/porous concrete by injection process through nipples/Grouting complete as per Technical specification.*** | | |
| A | ***Cement Grout*** | kg | **248.00** |
| B | ***Cement mortar (1:1) Grouting*** | kg | **239.00** |
| 16.6 | ***Patching of damaged concrete surface with polymer concrete and curing compounds, initiator and promoter, available in present formulations, to be applied as per instructions of manufacturer and as approved by the Engineer.*** | sqm | **1,968.00** |
| 16.7 | ***Sealing of crack / porous concrete with Epoxy Grout by injection through nipples complete as per clause 2803.1.*** | kg | **1,163.00** |
| 16.9 | ***Removal of defective concrete, cleaning the surface thoroughly, applying the shotcrete mixture mechanically with compressed air under pressure, comprising of cement, sand, coarse aggregates, water and quick setting compound in the proportion as per clause 2807.1., sand and coarse aggregates conforming to IS: 383 and table 1 of IS: 9012 respectively, water cement ratio ranging from 0.35 to 0.50, density of gunite not less than 2000 kg/cum, strength not less than 25 Mpa and workmanship conforming to clause 2807.6.*** | sqm | **517.00** |
| 16.10 | ***Applying pre-packed cement based polymer mortar of strength 45 Mpa at 28 days for replacement of spalled concrete*** | sqm | **221.00** |
| 16.11 | ***Eproxy bonding of new concrete to old concrete*** | sqm | **276.00** |
| 16.17 | ***Replacement of Expansion Joints complete as per drawings*** | metre | **4,018.00** |
| 16.18 | ***Replacement of damaged concrete railing.*** | metre | **405.00** |
| 16.19 | ***Replacement of crash barrier.*** | metre | **733.00** |
| 16.20 | ***Replacement of damaged mild steel railing*** | metre | **340.00** |
| 16.21 | ***Repair of crash barrier*** *(Repair of concrete crash barrier with cement concrete of M-30 grade by cutting and trimming the damaged portion to a regular shape, cleaning the area to be repaired thoroughly, applying cement concrete after erection of proper form work.)* | metre | **401.00** |
| 16.22 | ***Repair of RCC Railing*** *(Carrying out repair of RCC M30 railing to bring it to the original shape.)* | metre | **238.00** |
| 16.23 | ***Repair of steel Railing*** *(Repair of steel railing to bring it to the original shape)* | metre | **352.00** |

## Chapter – 17
## B. Bridge Works

**eamble :**

The basic approach for the preparation of schedule of rates for Bridge works in indicated as under :

1. **Description of items**

   The description of items is given briefly and linked with relevant clause of MoRT&H's Specifications for Road and Bridge Works, which may be referred for detailed description, provisions and interpretation.

2. **Overhead Charges**

   The rates include over head charges considering the following elements -

   i. Site accomodation, setting up plant, access road, water supply, electricity and general site arrangements.

   ii. Office furniture, equipment and communications.

   iii. Expenditure on

   a) Corporate office of contractor
   b) Site Supervision
   c) Documentation and "as built" drawings

   iv. Mobilisation/de-mobilisation of resources.

   v. Labour camps with minimum amenities and transportation to work sites.

   vi. Light vehicles for site supervision including administrative and managerial

   vii. Laboratory equipment and quality control including field and laboratory testing

   viii. Minor T&P and survey instruments and setting out works, including verification of line, dimensions, trial pits and bore holes, where required

   ix. Watch and ward

   x. Traffic management during construction

   xi. Expenditure on safeguarding environment

   xii. Sundries

   xiii. Financing Expenditure

   xiv. Sales/Turn over tax

   xv. Work Insurance/compensation

3 **20 percent overhead charges has been considered in the schedule of rates**

4. **Contractor Profit**

   10 percent of cost of works. Contractor profit is also added on overhead charges.

5 **Materials**

6 Quantities of materials considered in the rate are approximate for the purpose of estimating and include normal wastages.

7 The transportation cost has to be included seperately in the estimate as per actual distance from the fabrication shop to work site inclusive of loading and unloading and protected stacking in undamaged condition near site as per direction of the Engineer -in -charge.

8 Painting and the specfication of meterials to be used shall be as per section 1900 of MoRT&H Specifications for Road and Bridge Works.

9 One mate has been provided for 25 labours.

10 Carriage cost of bridge components from protected stacks near site has been included for transportation , assembling and erection as per requiremenr based on proved erection programme.

11 Arrangement for traffic during construction shall be as per Clause 112 of MoRT&H Speciffication for Road and Bridge Works.

| Summary of Rate Analysis | | | |
|---|---|---|---|
| *Item No.* | *Descriptions* | Unit | Rate |

## *CHAPTER-17*

## *STEEL BRIDGES*

*17.1* **Supply and fabrication of steel work at Fabricators workshop comprising of Main Girders, Cross Girders, Connecting plates, stringers, stiffening plates etc. from steel plates and structural steel of specified grades as per approved drawing including straightening, descaling, degreasing, cutting to size and shape, drilling, welding and grinding, supply of all MS / HTS shop or site bolts, nuts & washers, holding down bolts and nuts etc., trial assembling at workshop, one priming coat of shop paint with red lead paint conforming to IS-102 with all labour, material, cost of paints, consumables, stacking in protected condition etc complete as per specification and as directed by the Engineer in charge (Carriage cost from fabricator workshop to actual bridge site will be paid separately).**

***COMPOSITE BRIDGE***

| | | | |
|---|---|---|---|
| Case | **Upto 40m single span or in Multiples** | tonne | **109126.00** |

*17.2* **Taking delivery of fabricated steel work from stacks at site as necessary, assembling and erection at site as necessary, assembling and erection of fabricated steel structure to proper line, level and camber as per approved drawings complete in asll respect including transportation and handling supply of all fasteners. Painting of all exposed surfaces of steel work after erection with one coat of red lead conforming to IS-102 and two coats Aluminium paint to IS-2339, grouting of anchor bolts in position, including all labour, consumables, materials, machinery, tools and tackles complete as per specification and as directed by the Engineer in charge**

**COMPOSITE BRIDGE**

| | | | |
|---|---|---|---|
| Case | **Upto 40m single span or in Multiples** | tonne | **41087.00** |