GOVERNMENT OF ODISHA

RURAL DEVELOPMENT DEPARTMENT

DETAILED TENDER CALL NOTICE
(FOR ROAD WORKS)

OFFICE OF THE SUPERINTENDING ENGINEER
RURAL WORKS DIVISION-II, BHADRAK

GOVERNMENT OF ODISHA
OFFICE OF THE SUPERINTENDING ENGINEER
RURAL WORKS DIVISION-II, BHADRAK.

ee_rwbdk2@yahoo.co.in

"e" Procurement Notice for Road Works

Identification Online Tender 01/RWD/BDK-II / 2026-27 ,Dtd. 27.04.2026

1. Name of the Work :-Road Works as per Annexure
2. Total Number of Works :-1 No
3. Approximate Estimated Cost :-Rs . 99.92 lakhs
4. Class of Contractor :- "B"Class
5. Period of Completion :- As Per Annexure
6. Type of Tender :Double Cover
7. Other details : - The details are as follows

Procurement Officer	Bid Identification No.	Availability of Tender on-line for bidding		Last Date & Time of seeking tender clarification	Date & Time of Opening of the Bid	
		From	To		Technical Bid	Financial Bid
1	2	3	4	5	6	7
Executive Engineer ,R.W. Division-II, Bhadrak	01	05.05.2026 At 11.00 A.M.	14.05.2026 up to 5.00 P.M	13.05.2026 up to 3.00 P.M	15.05.2026 at 11.00 AM	Will be intimated latter

8. **Further details can be seen from the e-procurement portal "https:// www.tendersorissa.gov.in"**
9. Any other changes / Corrigendum may be seen only in website www.tendersorissa.gov.in

Executive Engineer
R.W. Division-II,Bhadrak

Memo No. 2558 /Dated. 27.04.2026

Copy forwarded to the Manager (Publication), I & P.R. Department,Government of Odisha ,Bhubaneswar with a request to get it published in 2 **(two) Nos of leading Oriya daily & 1(one) No of Local English daily** News papers at an early date for wide circulation. The complementary copy of the news papers containing the Tender Call Notice may be sent to this office for reference and record.

Executive Engineer
R.W. Division-II,Bhadrak

ee_rwbdk2@yahoo.co.in

GOVERNMENT OF ODISHA
OFFICE OF THE SUPERINTENDING ENGINEER
RURAL WORKS DIVISION-II, BHADRAK.

Invitation for Bids (IFB)
"e" Procurement Notice for Road Work
Identification Online Tender -01/RWD /BDK-II/ 2026-27, dtd.27.04.2026

1. The Superintending Engineer, Rural Works Division-II, Bhadrak on behalf of Governor of Odisha invites Percentages Rate bids in **Double cover** system in online mode for the construction of work as detailed in the table ,from the class of eligible contractors as mentioned with the State Governments and contractors of equivalent from the appropriate authority shall be enclosed along with the Bid. If Successful, the bidder who has not registered under State Government has to registered under the appropriate registering authority of the State Government of Odisha in appropriate class of eligibility before award of the work.
2. Bid documents consisting of plans ,specifications ,the Bill of quantities and the set of terms and conditions of contracts and other necessary documents can be seen in the website: http://www.tenderorissa.gov.in
3. Bid must be accompanied with financial instruments towards cost of bid documents in online, issued from any Nationalized/ Scheduled Bank prepared in NEFT and payable of each bid respectively as per of above table.
4. (i) E.M.D. in shape of POSB/POTD/NSC/KVP duly pledged in favour of Superintending Engineer,R.W.Division-II, Bhadrak.

   ii) The successful bidders who have quoted less bid price /as rates than the estimated cost put to tender shall have to furnish Additional Performance Security (APS) as per Works Departments O**.M.No.173,dtd.03.01.2026 & O.M No.632 dtd.09.01.2026 (Enclosed)** in shape of Term Deposit Receipt /Bank Guarantee from any Nationalised /Scheduled Bank in India counter guaranteed by its local branch at Bhadrak pledged in favour of the Superintending Engineer, R.W. Division-II, Bhadrak within 7(Seven) days of receipt of this acceptance letter, otherwise the bid shall be cancelled and the security deposit shall be forfeited as per office memorandum no.14299,dtd.03.10.2017of Works Department .

GOVERNMENT OF ODISHA

WORKS DEPARTMENT

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OFFICE MEMORANDUM

No. 07764600022025 632 /W., Bhubaneswar Dt. 9.1.26

Sub- Clarification on Works Department Office Memorandum No.173 dt 03.01.2026 regarding Amendment of Codal and Contractual Provisions.

The following clarifications are issued on Works Department Office Memorandum No. 173 dated . 03.01.2026

1. The phrase " .... ***to abolish the extant provisions of threshold negative bid caps (14.99%) introduced*** ....." in the first para of the Works Department OM No. 173 dated. 03.01.2026 may be read as " .... ***to abolish the extant provisions of threshold negative bid caps of 15 % introduced vide Works Department OM No. 12366/W dt. 08.11.2013 and amended vide Works Department OM No. 1437 dt, 31.01.2023 .....***"

2. If more than one bid is quoted (decimal up to two numbers will be taken for all practical purposes), either at the estimated cost put to tender or less than the estimated cost put to tender, the tender accepting Authority will finalize the tender through a transparent lottery system, where all the concerned bidders/their authorized representatives, the concerned SE/EE of the concerned Division and Divisional Accounts Officer (DAO) will remain present.

3. If the rate quoted by the SC and ST Category Contractors comes to the rate quoted by the L1 bidder(decimal up to two numbers will be taken for all practical purposes) after availing 10% price preference as per Para 2 of Works Department Resolution No. 27748 dated. 11.10.1977, the tender shall be finalized by the tender accepting authority through a transparent lottery system along with other categories of contractors.

4. As regards the bidding process in which the tender has been floated before the issue of Works Department Office Memorandum No.173 dt 03.01.2026, the bid shall be finalized as per the earlier provisions in Appendix-IX, Clause 36 of OPWD Code Volume-II.

5. This has been concurred in by the Finance Department in File No **FIN-WF1-MISC-0102-2025**

By order of the Governor

Principal Secretary to Government

Memo No. 633 /W, dated 9.1.26

Copy along with soft copy forwarded to Gazette Cell, Commerce and Transport (Commerce) Department, Bhubaneswar, for information and necessary action.

They are requested to publish the Office Memorandum in the extraordinary issue of the Gazette and supply 20 (twenty) copies to this Department.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No. 634 /W., Dt. 9.1.26

Copy forwarded to the P.S. to the Hon'ble Chief Minister, Odisha for the kind information of the Hon'ble Chief Minister.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No. 635 /W., Dt. 9.1.26

Copy forwarded to the P.S. to the Hon'ble Minister, Law, Works, Excise, Odisha for the kind information of the Hon'ble Minister.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No. 636 /W., Dt. 9.1.26

Copy forwarded to the OSD to the Chief Secretary, Odisha, for the kind information of the Chief Secretary, Odisha.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No. 637 /W., Dt. 9.1.26

Copy forwarded to Sr. P.S. to the DC-cum-ACS, Odisha, for the kind information of the DC-cum-ACS, Odisha.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No. 638 /W., Dt. 9.1.26

Copy forwarded to Principal Accountant General (A&E), Odisha, Bhubaneswar/ Principal Accountant General (E & SR Audit), Odisha, Puri Branch, Puri for kind information and necessary action.

09.01.2026

Memo No. 639 /W., Dt. 9.1.26 EIC-cum-Special Secretary to Government

Copy forwarded to P.S. to the Principal Secretary to Govt., Finance Department/ H & UD Department/ Works Department for the kind information of the Principal Secretary, Finance Department/ H & UD Department/ Works Department respectively.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No. 640 /W., Dt. 9.1.26

Copy forwarded to P.S. to the Commissioner-cum-Secretary to Govt., RD Department/ PR&DW Department for the kind information of the Commissioner-cum-Secretary, RD Department/ PR&DW Department respectively.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No. 641 /W., Dt. 9.1.26

Copy forwarded to the Finance Department/ H & UD Department/ RD Department/ PR&DW Department/DoWR/ all other Departments for information and necessary action.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No. 642 /W., Dt. 9.1.26

Copy forwarded to the FA-cum-Special Secretary to Government, Works Department for kind information and necessary action.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No. 643 /W., Dt. 9.1.26

Copy forwarded to all Collectors & DMs for information and necessary action.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No./ 644 W., Dt. 9.1.26

Copy forwarded to EIC(Civil-cum-Roads), Odisha /EIC, Water Resources, Odisha/ EIC, Rural Works, Odisha/ EIC (PH), H&UD Department/ EIC (RWSS) PR&DW Department/ EIC, DPQ, Odisha/ EIC, NHs, Odisha/ EIC-cum-Managing Director, OB & CC Ltd., Bhubaneswar, Odisha/ Chief Engineer, Roads-I & II, Odisha / Chief Engineer, Buildings-I & II, Odisha / Chief Engineer, NHs, Odisha/ Chief Engineer, Bridges, Odisha / Chief Engineer, P&IP, Odisha / Chief Engineer, RD &QP, Odisha /Chief Engineer, RW-I & II, Odisha / Chief Engineer, PH (Urban), Odisha / Chief Engineer, Electricity, Odisha / Managing Director, OCC Ltd., Bhubaneswar/ all State PSUs for kind information and necessary action.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No./ 645 W., Dt. 9.1.26

Copy forwarded to DDG & State Informatics Officer. National Informatics Centre, Odisha State Centre, Bhubaneswar, Email- sio-ori@nic.in for information and necessary action.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No. 646 /W., Dt. 9.1.26

Copy forwarded to the Chief Executive Officer (Administrative), Odisha Computer Application Centre(OCAC), Bhubaneswar, for information and necessary action.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No. 647 /W., Dt. 9.1.26

Copy forwarded to all EICs/CEs/CCEs/ SEs/ EEs of the Works Department for kind information and necessary action.

09.01.2026

EIC-cum-Special Secretary to Government

Memo No. 648 /W., Dt. 9.1.26

Copy forwarded to Roads Section/ A/C-I Section /A/C-II Section/ Plan Section / Building Section / Budget Section / N.H. Section / FC & AA Section, Works Department for information and necessary action

09.01.2026

EIC-cum-Special Secretary to Government

GOVERNMENT OF ODISHA

WORKS DEPARTMENT

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OFFICE MEMORANDUM

No. 07764600022025 173 /W., Bhubaneswar Dt. 03/01/26

Sub:- Amendment of Codal & Contractual Provisions.

After careful observation, Government has been pleased to abolish the extant provisions of threshold negative bid caps (14.99%) introduced in Appendix-IX, Clause 36 of OPWD Code Volume-II in the procurement of works undertaken by the Govt of Odisha and its agencies to ensure the procurement process results in a viable and successful manner with adoption of following incremental **Additional Performance Security(APS)** system:

1. Additional performance security shall be taken on an incremental basis from the selected bidder for low bid prices in the project works as under:

I. **where the bid price is below 0% but not below 10% of the project cost put to bid,** no additional performance guarantee/security percentage is required.

II. **where the bid price is below 10% but not below 20% of the project cost put to bid,** the additional performance guarantee/security percentage shall be incremented by 0.1% for every percentage of bid price below 10% of the project cost put to bid starting at 11% with the additional bid performance guarantee being 0.1% and this additional performance guarantee percentage shall be applied on the bid price;

III. **where the bid price is 20% or more below of the project cost put to bid**, the additional performance guarantee percentage shall be incremented by 0.2% for every percentage of bid price below 20% of the project cost put to bid in addition to 1% of the bid price and this additional performance guarantee percentage shall be applied on the bid price;

IV. The additional performance guarantee percentage shall be rounded off to the next lower percentage based on whether the decimal point of the percentage of bid price is below 0.5% or next higher percentage based on whether the decimal point of the percentage of bid price is 0.5% or more.

V. The additional performance security shall be treated as part of the performance security.

VI. Justification for abnormally low bids shall be scrutinized by the Departmental Technical Committee and recommended to the competent authority of the Administrative Department for the approval of the Additional Performance Security(APS). An abnormally low bid is one in which the Bid price, in combination with other elements of the Bid, appears so low that it raises material concerns as to the capability of the Bidder to perform the contract at the offered price. Procuring Entity may, in such cases, seek written clarifications from the Bidder, including detailed price analyses of its Bid price in relation to scope, schedule, resource mobilization, allocation of risks and responsibilities, and any other requirements of the bid document., If, after evaluating the price analyses, the procuring entity determines that the Bidder has substantially failed to demonstrate its capability to deliver the contract at the offered price, the Procuring Entity may reject the Bid/ Proposal. However, it would not be advisable to fix a normative percentage below the estimated cost, which would automatically be considered as an abnormally low bid.

2. These amendments shall take effect from the date of issue of the O.M.

3. Accordingly, the relevant existing codal/contractual provision stands modified with effect from the date of issue of this O.M.

4. This has been concurred in by the Finance Department vide **File No. FIN-WF1-MISC-0102-2025**

By order of the Governor

Principal Secretary to Government

Memo No. 174 /W, dated 03/01/26

Copy along with soft copy forwarded to Gazette Cell, Commerce and Transport (Commerce) Department, Bhubaneswar, for information and necessary action.

They are requested to publish the Office Memorandum in the extraordinary issue of the Gazette and supply 20 (twenty) copies to this Department.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 175 /W., Dt. 03/01/26

Copy forwarded to the P.S. to the Hon'ble Chief Minister, Odisha for the kind information of the Hon'ble Chief Minister.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 176 /W., Dt. 03/01/26

Copy forwarded to the P.S. to the Hon'ble Minister, Law, Works, Excise, Odisha for the kind information of the Hon'ble Minister.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 177 /W., Dt. 03/01/26

Copy forwarded to the OSD to the Chief Secretary, Odisha, for the kind information of the Chief Secretary, Odisha.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 178 /W., Dt. 03/01/26

Copy forwarded to Sr. P.S. to the DC-cum-ACS, Odisha, for the kind information of the DC-cum-ACS, Odisha.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 179 /W., Dt. 03/01/26

Copy forwarded to Principal Accountant General (A&E), Odisha, Bhubaneswar/ Principal Accountant General (E & SR Audit), Odisha, Puri Branch, Puri for kind information and necessary action.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 180 /W., Dt. 03/01/26

Copy forwarded to P.S. to the Principal Secretary to Govt., Finance Department/ H & UD Department for the kind information of the Principal Secretary, Finance Department/ H & UD Department respectively.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 181 /W., Dt. 03/01/26

Copy forwarded to P.S. to the Commissioner-cum-Secretary to Govt., RD Department/ PR&DW Department for the kind information of the Commissioner-cum-Secretary, RD Department/ PR&DW Department respectively.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 182 /W., Dt. 03/01/26

Copy forwarded to the Finance Department/ H & UD Department/ RD Department/ PR&DW Department/DoWR/ all other Departments for information and necessary action.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 183 /W., Dt. 03/01/26

Copy forwarded to the FA-cum-Special Secretary to Government, Works Department for kind information and necessary action.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 184 /W., Dt. 03/01/26

Copy forwarded to all Collectors & DMs for information and necessary action.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 185 /W., Dt. 03/01/26

Copy forwarded to EIC(Civil-cum-Roads), Odisha /EIC, Water Resources, Odisha/ EIC, Rural Works, Odisha/ EIC (PH), H&UD Department/ EIC (RWSS) PR&DW Department/ EIC, DPQ, Odisha/ EIC, NHs, Odisha/ EIC-cum-Managing Director, OB & CC Ltd., Bhubaneswar, Odisha/ Chief Engineer, Roads-I & II, Odisha / Chief Engineer, Buildings-I & II, Odisha / Chief Engineer, NHs, Odisha/ Chief Engineer, Bridges, Odisha / Chief Engineer, P&IP, Odisha / Chief Engineer, RD &QP, Odisha /Chief Engineer, RW- I & II, Odisha / Chief Engineer, PH (Urban), Odisha / Chief Engineer, Electricity, Odisha / Managing Director, OCC Ltd., Bhubaneswar/ all State PSUs for kind information and necessary action.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 186 /W., Dt. 03/01/26

Copy forwarded to all CCEs/ SEs/ EEs of the Works Department for kind information and necessary action.

03.01.26

EIC-cum-Special Secretary to Government

Memo No. 187 /W., Dt. 03/01/26

Copy forwarded to Roads Section/ A/C-I Section /A/C-II Section/ Plan Section / Building Section / Budget Section / N.H. Section / FC & AA Section, Works Department for information and necessary action

03.01.26

EIC-cum-Special Secretary to Government

Bids must also accompany scanned copy of the following documents

i) Attested copy of contractors Registration Certificate/CDMS registration is mandatory.

ii) Attested copy of Valid PAN, GSTIN Certificate.

iii) No relation certificate in the prescribed format.

iv) An affidavit in support of the authenticity of the documents in the prescribed format Scheduled-F.

v) Information Regarding Current Litigation Scheduled-E.

13. The amount put to tender is exclusive of GST .GST as applicable shall be paid over and above the bill amount.

14. The bid documents will be available in the website: http://www.tendersorissa.gov.in.

15. The bidder must possess compatible Digital Signature Certificate (DSC) of Class-II or Class-III.

16. The ST/SC contractors willing to avail the facilities as fixed by Government will submit the scan copy of the caste certificate / affidavit for price preference along with tender documents in online at the time of bidding. Otherwise they will not be entitled to avail such facilities.

17.If the office happens to be closed on the opening day due to subsequent declaration as holiday in Government or Local authority the tenders will be opened on the immediate next working day at same time and venue respectively.

18. The affidavit regarding correctness and authentication of all documents must be uploaded online otherwise the tender likely to be disqualified. Original affidavit regarding correctness and authentication of documents is to be furnished physically at Office of the Superintending Engineer,Rural Works Division-II,Bhadrak before signing the agreement.

19. Authority reserves the right to reject any or all the tenders without assigning anyreasonsreof.

Executive Engineer
R.W. Division-II,Bhadrak

Memo No. 2559 Dt. 27.04.2026

Copy along with soft copy of notice submitted to the Joint Secretary to Govt. of Orissa Information & Technology Department for exhibiting the advertisement in the Website of the Govt. as suggested in IT Department Lt. No.221/31.08.2002 addressed to all Secretaries.

Executive Engineer
R.W. Division-II,Bhadrak

By Regd.Post with A.D.

Memo No. 2560 Dt. 27.04.2026

Copy forwarded to the Superintendent Govt. Press Orissa, Madhupatna, Cuttack with a request to please publish the above notice in the next issue of the Orissa Gazette for wide publication.

Executive Engineer
R.W. Division-II,Bhadrak

Memo No. 2561 Dt. 27.04.2026

Copy in duplicate submitted to theEngineer-In-Chief/Chief Engineer,(Road),Rural Works, Orissa, Bhubaneswar forfavour of kind information and necessary action.

Executive Engineer
R.W. Division-II,Bhadrak

Memo No. 2562 Dt. 27.04.2026

Copy in duplicate submitted to the Chief Construction Engineer, Rural Works Circle, Balasore for favour of kind information and necessary action.

Executive Engineer
R.W. Division-II,Bhadrak

Memo No. 2563 Dt. 27.04.2026

Copy submitted to the Collector & District Magistrate, Bhadrak/ Superintendent of Police, Bhadrak for information & necessary action.

Executive Engineer
R.W. Division-II,Bhadrak

Memo No. 2564 Dt . 27.04.2026

Copy to the Superintending Engineer R.W.Division,Bhadrak/R.W.Division, Balasore/Balasore-II/ Jaleswar / (R&B) Division, Bhadrak/ E.E. Salandi Canal Division, Bhadrak for information with request to please exhibit the above notice on his notice board for wide publication.

Executive Engineer
R.W. Division-II,Bhadrak

Memo No. . 2565 Dt. 27.04.2026

Copy forwarded to all the Sub-Divisional Officers under R.W. Division-II,Bhadrak for information and wide publication.

Executive Engineer
R.W. Division-II,Bhadrak

Memo No. 2566 Dt.27.04.2026

Copy forwarded to the Divisional Accounts Officer/ Estimator/ Cashier of this Division for information and necessary action.

Executive Engineer
R.W. Division-II,Bhadrak

Memo No.. 2567 Dt. 27.04.2026

Copy to Notice Board wide circulation / File

Executive Engineer
R.W. Division-II,Bhadrak

ANNEXURE

Sl No.	Name of the Work	Approximate Estimated Cost (in Lakhs.)	EMD Required	Cost of Tender Paper (in Rs.)	Class of Contractor	Time for completion (in calender months)	Name of the R.W. Division/R.W Sub-Division
1	**2**	**3**	**4**	**5**	**6**	**7**	**9**
1	Construction of Irrigation embankment to darsendukula road in the District of Bhadrak for the year 2026-27.	99.92	1% of the estimated cost put to tender	10,000/-	"B" Class	03(Three) Months	Bhadrak-II/Dhamnagar

Executive Engineer
R.W. Division-II,Bhadrak

GOVERNMENT OF ODISHA
OFFICE OF THE SUPERINTENDING ENGINEER
RURAL WORKS DIVISION-II, BHADRAK.

ee_rwbdk2@yahoo.co.in

"e" Procurement Notice for Road Works

1st Corrigendum to Identification Online Tender 01/RWD/BDK-II / 2025-26 ,Dtd. 27.04.2026

Due to some unavoidable circumstances, the availability of online tender TCN-01 dtd.27.04.2026 for bidding from 05.05.26 at 11.00 AM to 14.05.26 up to 5.00PM is hereby cancelled & following changes has been made.

Procurement Officer	Bid Identification No.	Availability of Tender on-line for bidding		Last Date & Time of seeking tender clarification	Date & Time of Opening of the Bid	
		From	To		Technical Bid	Financial Bid
1	2	3	4	5	6	7
Executive Engineer ,R.W. Division-II, Bhadrak	01	20.05.2026 at 11.00 A.M.	27.05.2026 up to 5.00 P.M	26.05.2025 up to 3.00 P.M	28.05.2026 at 10.00 A.M	Will be intimated latter

Other conditions are remain same.

Executive Engineer
R.W. Division-II, Bhadrak

By Special Massenger
Memo No. 2914 / Date. 19.05.26

Copy in duplicate forwarded to the Manager, Publication, Information and Public Relation Department, Govt. of Orissa, Bhubaneswar with a request to please get the above notice published in consecutive issues in two local dailies Oriya newspaper& one daily English newspaper for wide publication. The complementary copies of the advertisement may please be sent to this office for record.

Encl: - As above

Executive Engineer
R.W. Division-II, Bhadrak

Memo No. 2915 /Date. 19.05.26

Copy along with soft copy of notice submitted to the Joint Secretary to Govt. of Orissa Information & Technology Department for exhibiting the advertisement in the Website of the Govt. as suggested in IT Department Lt. No.221/31.08.2002 addressed to all Secretaries.

Executive Engineer
R.W. Division-II, Bhadrak

A. GENERAL

Incorporation of amendment provision in the DTCN as per Works Department office memorandum letter No.12366 dt.8.11.2013

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1) Amendment to para.3.4.16(a)(vii) of OPWD code Vol.I by substitution.

Note.(vii).For the purpose of estimate the approved quarry lead is to be provided judiciously Engineers in charge would be responsible for ensuring the quality of the materials supplied. The contractors would however be responsible for procurement of materials from authorized sources and voluntarily disclose the source of procurement for the purpose of billing. Besides, the bidder would be required to submit the details of quarry for procurement while submitting the bids.

2) Ammendment to para-3.5.14 Note-I of OPWD code Vol-I by inclusion.

Note.I-If L1 bidder does not turn up for agreement after finalization of the tender, then he shall be debarred from participation in bidding for three years and action will be taken to blacklist the contractor. In that case the L2 bidder, if fulfils other required criteria would be called for drawing agreement for execution of work subject to the condition that L2 bidder negotiates as per with the rate quoted by the L1 bidder otherwise the tender will be cancelled. In case a contractor is black listed, it will be widely published and intimated to all departments of Government and also to Govt. and also to Govt. of India agencies working in the state.

3) Amendment to Appendix-IX Clause-36 of OPWD code Vol-II by inclusion.

Clause No.36 if the rate quoted by the bidder is less than 15% of the tendered amount then such a bid shall be rejected and the tender shall be finalized basing on merits of rest bids, but if more than one bid is quoted at 14.99%(Decimals up to two numbers will be taken for all practical purposes)less than the estimated cost, the tender accepting authority will finalize the tender through a transparent lottery system, where all bidders/ their authorized representatives the concerned Executive Engineer and DAO will remain present.

(B).Amendment to Para-3.5.5.(v)Note-III of OPWD code. Vol.I by inclusion:-

Note.III-For availing incentive clause in any project which is completed before the stipulated date completion, subject to other stipulations it is mandatory on the part of the concerned Executive Engineer to report the actual date of completion of the project as soon as possible through fax or e-mail so that the report is received within 7days of such completion by the S.E,C.E & the Administrative Department. The incentive for timely completion should be on a graduated scale of one percent to 10 percent of the contract value. Assessment of incentives may be worked out for earlier completion of work in all respect in the following scale.

Before 30% of contract period = 10% of contract value.
Before 20 to 30% of contract period=7.5% of contract value.
Before 10 to 20% of contract period=5% of contract value.
Before 5 to 10% of contract period=2.5% of contract value.
Before 5% of contract period=1% of contract value

4) **Amendment to para-3.2.8 Note-II of OPWD code Vol.I inclusion.**

Note-II- in case of tender accepted below schedule of rate the tender amount excluding centages shall be treated as sanctioned amount and allotment will be limited to that extent. Any deviation in scope of work affecting the agreement amount in such an agreement will be governed by the relevant provisions of OPWD code.

5) **Amendment to Appendix.XXX(Bills)clause-21 of OPWD code.Vol-II and to the clause-6 of F2 contract**.

Bills-Clause021 For works above values Rs.5.00Lakh in civil works and work value above Rs.1.00 Lakh in electrical/P.H works the J.Es and A.Es will be required to submit bill for each on going work on 20th or next working day of every month to the concerned E.E. The E.E. on receipt of the bill will take steps for payment of the same by 30th or the next working day during the month. The E.E.in charge of the Division will furnish a certificate to the Chief Engineer with copy to the concerned S.E. that the bills for all on going months have been paid failing action will be initiated against the erring officer.

6) **Amendment to para-3.5.18 Note-VIII of OPWD code Vol.I**

Note-Viii-Before acceptance of tender the successful bidder will be required to submit a work programme and milestone basing on the financial achievement so as to complete the work within stipulated time and in case of failure on the part of the Agency to achieve the milestone liquidated damage will be imposed.

Those tenderers who are willing to accept all the terms & conditions of this amendment provision in the DTCN need submit tenders.

Government of Odisha
Works Department
***

Office Memorandum

File No.07556900032016 - 5288 /W, dated, 4.5.2016

Sub:-Amendment of Codal / Contractual provisions.

After careful consideration Government have been pleased to make amendment to the contractual and codal provisions for promoting efficiency and transparency while dealing with works for infrastructural development of the State as per Annexure- I.

1. These amendments shall take effect from the date of issue of the order.
2. Accordingly, relevant existing codal/ contractual provision made vide Works Department in Office memorandum No.12336/W dt.08.11.2013 stands modified with effect from the date of issue of this O.M.
3. This has been concurred in by Finance Department in their UOR No.79-WF-I dt.18.03.2016.

04/5/16
EIC - cum- Secretary to Government

Memo No. 5289 /W, dated, 4.5.2016

Copy forwarded to P. S. to Hon'ble Chief Minister, Odisha for information and necessary action.

4/5/2016
FA - cum- Addl. Secretary to Government

Memo No. 5290 /W, dated, 4.5.2016

Copy forwarded to OSD to Chief Secretary, Odisha/ P.S. to Development Commissioner- cum-Additional Chief Secretary, Odisha for information and necessary action.

4/5/2016
FA - cum- Addl. Secretary to Government

(P.T.O.)

-2-

Memo No. 5297 /W, dated, 4.5.2016

Copy forwarded to All Departments / Managing Director, OB & CC Ltd., Bhubaneswar / Managing Director, OCC Ltd., Bhubaneswar for information and necessary action.

4/5/2016
FA - cum- Addl. Secretary to Government

Memo No. 5292 /W, dated, 4.5.2016

Copy forwarded to EIC (Civil), Odisha / All Chief Engineers, Odisha / All Superintending Engineers / All executive Engineers (under Works Department) for information and wide circulation among sub-ordinate offices.

4/5/2016
FA - cum- Addl. Secretary to Government

Memo No. 5293 /W, dated, 4.5.2016

Copy forwarded to the Accountant General (A&E), Odisha, Bhubaneswar/ Accountant General, Odisha, Puri Branch, Puri for information and necessary action.

4/5/2016
FA - cum- Addl. Secretary to Government

Memo No. 5294 /W, dated, 4.5.2016

Copy forwarded to the Luminous Infoways Pvt. Ltd., N-6 / 373, Jaydev Vihar, Bhubaneswar email: support @ lipl.in for information and necessary action.

They are requested to display it in the web-site of State Government.

4/5/2016
FA - cum- Addl. Secretary to Government

Memo No. 5295 /W, dated, 4.5.2016

Copy forwarded to the Director, Printing, Stationary & Publication, Orissa, Cuttack for information and necessary action.

He is requested to publish it in the next issue of Orissa Gazette.

4/5/2016
FA - cum- Addl. Secretary to Government

Memo No. 5296 /W, dated, 4.5.2016

Copy forwarded to A/C-I Section / A/C-II Section / Road Section / Plan Section / Building Section / Budget Section / N.Hs. Section / FC & AA Section / PPP Cell / EAP Cell, Works Department for information and necessary action.

4/5/2016
FA - cum- Addl. Secretary to Government

(Cont.-P.-3)

INSTRUCTION TO BIDDERS
FOR
DETAILS OF THE DOCUMENTS TO BE FURNISHED FOR ONLINE BIDDING

1. ***The bidder shall transfer online the cost of bid paper (non-refundable) & EMD/ Bid Security of the amount specified for the work in the table.***
2. ***Only those bidders who successfully remit their Cost of Tender Paper /EMD on submission of bids would be eligible to participate in the tender/ bid process. The bidders with pending or failure payment status shall not be able to submit their bid. Tender inviting authority, State Procurement Cell, NIC, the designated Banks shall not be held responsible for such pendency or failure.***
3. ***The Original documents are to be produced before the undersigned as and when required. Engineering contractor who is desirous to avail the facility of exemption of EMD is required to submit the affidavit in original to the effect that he/she has not yet availed the facility for more than two works during the current financial year. Name of the two works and authority to which the tender is being submitted must be mentioned in affidavit failing which; the tender will be liable for rejection.***

Details of documents to be furnished

1. Scanned copies of the following valid documents to be up-loaded in PDF format in the website **www.tendersorissa.nic.in.**

   1.2.1 GST

   1.2.2 PAN Card

   1.2.3 Valid CDMS Registration

   1.2.4 Affidavit regarding correctness of information /certificate/No Litigation/abandonment of work

   1.2.5 Affidavit regarding no relation certificate

   1.2.6 Labour license or Affidavit towards submission at the time of drawal of agreement

   1.2.7 The successful bidders who have quoted less bid price /rates than the estimated cost put to tender shall have to furnish Additional Performance Security (APS) as per Works Departments O.M.No.4559,dtd.05.04.2021 in shape of Term Deposit Receipt /Bank Guarantee from any Nationalised /Scheduled Bank in India counter guaranteed by its local branch at Bhadrak pledged in favour of the Superintending Engineer,R.W.Division-II,Bhadrak within 7(Seven) days of receipt of this acceptance letter, otherwise the bid shall be cancelled and the security deposit shall be forfeited as per office memorandum no.14299,dtd.03.10.2017of Works Department .In view of the above ,the State Government is pleased to fix the following rate of Additional Performance Security

2. Uploaded documents of valid successful bidders will be verified with the original before signing the agreement. The valid successful bidder has to provide the originals to the concerned authority on receipt of such letter, which will be sent though registered post.

3. DTCN is not to be uploaded by the bidder. The bidder has to only agree / disagree on the conditions in the DTCN. The bidders who disagree on the conditions of DTCN, can not participate in the tender.

4. The bidders have to produce the original DD towards cost of tender paper / EMD in approved form before office of the concerned Circle/ Division Office before the date & time of opening of the technical bid as mentioned in the table above, failing which the bidder will be disqualified.

DETAILED TENDER CALL NOTICE

INVITATION OF TENDERS:-

1.1 Item rates bids for works are to be received online in the Website **www.tendersorissa.gov.in**

1.2 Only those tenderers who are willing to accept all the terms & conditions of this detailed tender call notice need submit the tenders. Joint Venture/ Consortium agreements/ M.O.Us are not allowed to participate in the Bid.

1.3 The availability of Tender on-line for bidding will be from **27.12.24 to 04.01.25** . Bids will be sold and received through on-line only, &. The tenders will be opened by the Superintending Engineer, R.W. Division-II, and Bhadrak at **11.00** A.M. On **dt.15.01.2025** in the presence of the bidders or their authorised representatives who wish to attend.

1.4 Bidders have to upload scanned copy of the financial instrument alongwith the Technical Bid & produce the original documents before the Procurement Officer on or before the time & date of opening of Technical Bid.

The earnest money deposit & initial security deposit should be in shape of pledged NSC/ POTD/ POSB/ KVP. The EMD/ISD shall be pledged in favour of the Superintending Engineer concerned as mentioned in **TCN** in respect of the work. In case the actual cost of work exceeds the original cost of work as per the accepted tender, the amount to be recovered from bills of the contractors will be such as to make together with deposits already realized an amount equal to the prescribed percentage of the actual cost of work executed.

Besides the Earnest Money Deposit & initial Security Deposit, contractors of B class & above will be required to furnish security deposit by way of deduction from their bill at the rate of 5% of the gross amount or each bill where as in case of C & D class contractor such deduction will be made at the rate of 3% of gross amount of each bill.

In the case of Govt.Undertakings, Co-operative Societies, Diploma or Degree holders in Engineering and SC & ST Contractors who are registered with the State Govt, the rules framed by Govt. from time to time regarding earnest money deposit, initial security deposit will apply.

1.5 Upon acceptance of the tender, the successful tenderer shall within a period of 10 days from the date of written intimation of the acceptance of the tender, deposit with the concerned authority a sum of such amount towards initial security as would together with the earnest money make 2% of the work as per the accepted tender excluding the addl. EMD for hiring machineries out side State & sign the agreement in the PWD form-2 (Schedule- XLV Form No.61) in the office of the concerned Executive Engineer.
Failure to deposit this additional amount towards initial security deposit or to sign the contract within the stipulated time, which shall include any extension granted by the Chief Engineer, Rural Works, Bhubaneswar at his discretion, will make the earnest money deposit of the tenderer liable to forfeiture & acceptance of his tender shall be treated as withdrawn.

1.6 The written agreement in PWD form F-2 to be entered into between the successful tenderer here-in-after called the contractor & the State Govt. shall be the foundation of the rights of both the parties & the contract shall be deemed to be incomplete until the agreement has been first signed by the contractor & then by the proper officer authorized to enter into the contract on behalf of the State Govt.

1.7 The acceptance of the tender & award of the contract even to more than one contractor, if considered necessary, will rest with the Chief Engineer, Rural Works, Bhubaneswar who does not bind himself to accept the lowest tender & will reserve to himself the authority to reject any or all of the tenders received, without assigning any reasons.

1.8 A) Tender may not, at the discretion of the competent authority, be considered, unless accompanied by scanned copies of the ITCC or GST clearance certificate in GST-612, & the original certificates are to be produced before the tender opening authority as & when required for verification.

B) Bidders from outside the state can participate in the tender with out having GST clearance Certificate subject to condition that they should submit undertakings in the form of an affidavit indicating there in that they are not registered under the GST Act as they have not started any business in the state & they have no liability under the Act. But before award of the final contract, such bidders will have to produce the GST clearance Certificate in form GST-612.

C) Bidders registered under other State Governments /MES/Railways/CPWD in equivalent rank may participate in the tender, but successful bidder has to register under the state PWD before signing the Agreement.

1.9 All the rates & prices in the tender shall cover all taxes viz Central or State Sales Tax, GST Octroi, any other local taxes,cess, ferry, tollages charges & royalties & any other charges.

The contractors shall produce necessary receipts in support of payment of royalty & taxes for the materials supplied by them for the work failing which royalty taxes as applicable will be deducted from their bills.

1.10 The work is to be completed in all respects within the period mentioned in TCN in calendar months from the date of written order to commence the work. There will be provision of incentive @1% in case of completion of work ahead of one month (part of the month excluded) & the maximum amount payable will be fixed at 2% of the work is completed two months ahead of the scheduled time.

Incentive should be paid in respect of individual project for new construction/substantial additional or improvement works, the minimum value of which is mentioned below

	Name of work	**Minimum value**
1.	Building work/ PH. Work	Rs. 40.00 lakhs
2.	Road work	Rs.3.00 crores
3.	Irrigation work	Rs.10.00 crores

The claims for incentives shall be considered subject to the condition that the Executive Engineer in charge of the work shall intimate the actual date of completion to the concerned S.E., Chief Engineer and Govt. within three days of completion date.

1.11 After opening the tenders if a tenderer withdraws him self from the competition during the validity of tender, The EMD received along with the tender shall be forfeited & credited to the Govt.

2. INSTRUCTIONS TO TENDERS

2.1 **Eligibility Criteria**

The eligibility criteria for participation in this tender are given below. The tenderer(s) should go through these eligibility criteria before purchasing the tender documents. Tenderer(s) not fulfilling the eligibility criteria and submit the tender, can do so at their own risk, as the tender will summarily be rejected.

(1) The intending tenderer(s) should have not abandoned any work of similar nature nor should their contract have been rescinded during the last five years.

(2) The intending tenderer(s) should have the valid Registration Certificate in CDMS as on date, of the required class as mentioned in the Table in NIT.
(3) The intending tenderer(s) should submit No-Relation/Relation Certificate as required.

(4) The intending tenderer(s) should have up to date valid ITCC, GST clearance Certificate, Labour License.

During scrutiny evaluation & comparison of the tenders the authority at his discretion may ask any tenderer for clarification on his tender document including breakdown of the unit rates. The request for clarification & the response shall be in writing. No additional documents in fresh which will affect the original status of the eligibility criteria of the tender at the time of receipt of tenders are acceptable.

The successful tenderer shall make his own arrangement for all materials T&P machineries required for satisfactory completion of work in time. unless otherwise specified in the conditions or contract.

By submitting a tender for the work, a tenderer will be deemed to have satisfied himself by actual inspection of the site & locality of the work about the quality & availability of the required quantity of materials, medical & labour & food stuffs etc. & that the rates quoted by him in the tender will be adequate to complete the works according to the specifications & conditions attached there to & that he has taken into account all conditions & difficulties that may be encountered during its progress & to have quoted labour rates, & materials rates which shall include cost of materials with taxes, octroi & other duties, lead, lift loading & unloading, freight for materials & all other charges necessary for the completion of the work, to the entire satisfaction of the Chief Engineer, Rural Works, Bhubaneswar & his authorized subordinates. After acceptance of the contract rates, Govt. will not pay any extra charges from any reasons in case the contractor is found later on to have misjudged the condition as regards availability of materials, labour or any other factors.

Acceptance of the tender will be intimated online to the successful tenderer. The tenderer is to deposit the initial security deposit & sign the agreement as prescribed in the Notice Inviting Tenders.

If the tenderer has a relative employed as Officer in the rank of a Asst. Engineer & above in the State PWD or Asst. Secretary & above in the Works Deptt., he shall inform the Chief Engineer,Rural Works, Bhubaneswar mentioning the exact details in a covering letter along with the tender failing which his tender will not be considered. Also if the fact or relationship subsequently comes to light, his contract will be rescinded. The Earnest Money & the total Security Deposit will be forfeited & he shall be liable to make good any loss or damage resulting from such cancellation. In case, the tenderer has no relationship with any of the Officers mentioned above he shall have to furnish with tender a certificate to this effect.

No contract work however petty may be carried out except under & in accordance with duly executed agreement, or a special written authority from the Executive Engineer-in-Charge of work.

Canvassing in any form is prohibited & the tenders submitted by the tenderers who resort to canvassing will be rejected & the tenderer will not be allowed to tender for any other works in this Organisation.

Details of drawing & specifications if any as are not supplied with the tender documents for the work may be seen in the respective Office of the Executive Engineer, Rural Works, Division, **mentioned in TCN** on working days during working hours.

If any other information regarding plan & specifications etc. are required before submission of the tender, the same can be obtained from the respective Executive Engineer, Rural Works Division, **mentioned in TCN**.

The detailed specification for all items of work involved in the work shall be in accordance with the following:-

(a) IRC & ISI Codes of practice & MOST publications such as specifications of road & bridge works & sound engineering practices.

(b) Orissa detailed standard specification.

(c) Any other standard code or specifications or work as prescribed by the Chief Engineer, Rural Works, Bhubaneswar/ respective Superintending Engineer, R.W.Circle,/Executive Engineer,R.W.Division-II,Bhadrak **mentioned in TCN**.

In case of variations in provisions of codes or specifications of works referred to above, the decision of the Chief Engineer, Rural Works, Bhubaneswar as regards the specifications to be adopted in the work, shall be final, conclusive & binding on both the parties. Every tenderer must examine the aforesaid specification before submitting his tender. The Chief Engineer, Rural Works, Bhubaneswar or his authorized sub-ordinates reserves the right, without impairing the contract to make such increase or decrease in the quantities or items of work mentioned in the schedule attached to the tender notice as may be considered necessary to complete the work duly & satisfactorily. Such increase or decrease shall in no case invalidate the contractor's rates. It shall be definitely understood that the Govt. does not accept any responsibility for the correctness or the completeness of the quantities shown in the schedule. The schedule is liable to alteration by omissions or additions or deductions. Such omissions, additions or deductions to any extent shall in no case invalidate the contract & extra monetary compensation will be entertained.

The quoted rate for the work will deem to include all incidental items which may be necessary such as bailing out of water from foundation, construction of bench marks, level pillars, profiles, benching leveling of ground etc. where required., The incidental items mentioned here in any only indicative & not exhaustive. No extra payment or claim will be admissible on these grounds.

All arrangements for traffic during construction including provision of temporary cross drainage structures, if required, & treated shoulder, including their maintenance, dismantling & clearing debris, where necessary shall be considered as incidental to the works & shall be the contractors respectively.

The contractor has to arrange for the adequate supply or clean water required for the works & also has to arrange adequate lighting arrangements for night work whenever necessary at his own cost.

Whenever possible, & available in stock the necessary pumps & pipe lines required for the work may be supplied by the deptt. on hire charges as fixed by the Executive Engineer. The cost of installations of the pumps & laying of pipe & dismantling the same including necessary carriage from the departmental godown & back shall be borne by the contractor.

The tenderers are required to go through each clause of PWD form F2 carefully in addition to the clauses here in before & herein after provided as these are deemed to be the part of the contract.

The notice inviting tenders, instructions to tenderers, general condition of contract, detailed call notice, special contract, specifications, schedule of quantities alongwith printed conditions of PWD form F2, approved drawing, time schedule & the rate together with the letter of awarding the work will form part of the contract. In case of conflict between any of the provisions, the same is to be got clarified by the tenderer before submission of the tender. If such conflicts arise after the tenders are opened the decision of Chief Engineer, Rural Works, Bhubaneswar shall deem to be final & binding on the contractor.

(a) The tenders will be considered to be valid for 90 days from the date of opening of the tenders.

(b) The period of validity of tender can also be extended if agreed by the tenderer & the deptt.

In case of ambiguous between clauses of this DTCN & F-2 contract form, the relevant clauses of F-2 contract form, shall prevail over the DTCN. The clauses not covered in F-2 contract form shall be governed by DTCN.

3. GENERAL CONDITION OF CONTRACT:

3.1 Deptt. will have the right to inspect the scaffolding & centering made for the work & can reject partly or fully such structures if found defective from safety or any other grounds. The contractor has to carry out any such detailed instructions from the Engineer-in-Charge or his authorized subordinates regarding such

structures. All the centering & shuttering should be got approved by the Engineer-in-Charge before concreting is done.

3.2 The contractor shall not sublet whole or part of the work without written consent of the concerned Superintending Engineer or transfer be made by power of attorney authorizing others to receive payment on behalf of the contractor & such consent if given shall not responsible for the acts, defaults & neglects of any sub-contractor employed by him as fully as if they were the acts, defaults & neglects of the contractor, his agents, servants or workmen. Employing labour directly on piece work basis shall not be deemed to be understood as subletting as explained above.

3.3 The contract comprises the construction, completion & maintenance of the works & except in so far as contract otherwise provided of provision of labour, material & construction plant, temporary works & everything whether of a temporary or permanent nature required in & for such construction, completion & subsequent maintenance for a period of **24(Twenty Four) months**.

3.4 (a) The drawing shall remain in the safe custody of the Executive Engineer, but two sets of copies there of shall be furnished to the contractor free of cost. At the completion of the work, the contractor shall return to the concerned Executive Engineer one set of all the drawings, supplied to him duly signed as completion drawing.

(b) No claim shall be entertained against the Deptt. on account of any increase in Railway or road freight or prices of cement, steel, petrol, coal, fuel, Oil lubrication, explosives & other materials or commodities, labour charges etc. During the course of construction or after tendering for this work, except for each extra cost, however, an escalation clause is enclosed separately.

3.5 The contractor shall give adequate notice in writing to the Engineer-in-Charge for any further drawing or specification that may be required for the execution of the work or other wise under the contract. In the event of any delay in the issuing of any of the detailed drawings etc. for any reasons what-so-ever reasonable extension of time may be granted on application by the contractor but on no account any claim for monetary compensation will be entertained.

3.6 One copy of the drawing supplied to the contractor shall be made available at the site for reference for use of the departmental officers during inspection.

3.7 From time to time the contractor shall submit to the Executive Engineer-in-Charge for his approval the programme showing the order of procedure & method in which he proposes to carry out the work & whenever required by the concerned Executive Engineer-in-Charge or his representative furnish for the information. Particulars in writing of the contractor's arrangements for the carrying out of the work & of the constructional plant & temporary work which the contractor intends to supply, use or construct as the case may be. The submission to the approval by the Engineer-in-Charge of such programme of furnishing of such particulars shall not relieve the contractor of any of his duties or responsibility under the contract.

3.8 The contractor shall be responsible for the true & proper setting out of the work & for the correctness of the position, levels, dimensions & alignment of all part of the work & for the provision of all necessary instruments, appliances & labour in connection there with. If any time during the progress of the works, any error shall appear or arise in the position, levels, dimensions or alignment of any part of the works the contractor on being required to do so by the concerned Superintending Engineer-in-Charge or his representative shall at his own expenses rectify such error to the satisfaction of concerned Superintending Engineer-in-Charge. The checking of any setting out or of any line or level by the concerned Superintending Engineer of his representative shall not in any way relieve the contractor of his responsibility for the correctness there of & the contractor shall carefully protect & preserve all bench marks, pegs & other things used in setting out of the works.

3.9 Explosives shall not be used on the work by the contractor without the permission in writing of the concerned Superintending Engineer & then only in the manner & to the extend prescribed. Where explosives are used the same shall be stored in a special magazine to be provided by & at the cost of the contractor who shall be liable of all damages, loss or injury to any person or property & shall be responsible for complying with all the statutory rules & regulations prescribed by the Chief Inspector of Explosives.

It is responsibility of the contractor to procure explosive required for the work. However, the deptt. may tender necessary possible help for procuring explosive License. No claim will however be entertained for delay or failure in rendering such help by the deptt.

3.10 The contractor shall in connection with works provide & maintain at his own cost all lights, guards, fencing & watching as & where necessary as required by the concerned Executive Engineer or his representative for the protection of the works or for the safety & convenience of the public or others.

3.11 The contractor shall indemnify the deptt. against all losses & claims for injuries or damages to any persons or property what-so-ever which may arise out of or in consequence of the construction & maintenance of the works & against all the claims, demands, proceedings, costs charges & expenses what-so-ever in respect of or in relation there to.

3.12 The contractor shall abide by the CPWD safety code introduced by the Govt. of India, Ministry of Housing & Supply in standing order No.44.250 dt.25.11.1957 any working day during office hours.

3.13 The contractor shall abide by “Fair wages” clause in accordance with the Govt. of Orissa, Works & Transport Deptt. Lr.No.A-VIIR-18/52/25 dt.26.2.1955 & No.IIM-56/52-28845 (A) dt.27.9.1961 & workmen Compensation Act. 1923 & other laws as may be introduce by the Govt. from time to time.

3.14 The contractor in accordance with the requirement of the deptt. afford all reasonable opportunities for carrying out their work to any other contractors employed by the Deptt. & their workmen & to the workmen of the deptt. & of any other duly constituted authorities who may be employed in execution on or near the site of any work not included in the contract or of any contract which the deptt. may enter into in connection with or ancillary to works.

3.15 The contractor shall at his own expenses provide & maintain all the constructional plant, temporary works, materials both for temporary & for the permanent works, labour transport to or from the site & in & around the works & other things of every kind required for the construction, completion & maintenance of the works.

3.16 The Deptt. may supply materials as are available with them but the contractor shall keep himself in touch with the day-to-day position regarding the supply of the materials from the Superintending Engineer-in-Charge & to so adjust the progress of the work that their labour may not remain idle not may there be any other claim due to or arising out of the delay in obtaining the materials. It should be clearly understood that the contractor is solely responsible to make his own arrangements for all the materials required for the completing of the work in time.

3.17 On the completion of the work, all rubbish, debris, GSTs, tanks, materials & temporary structures of any sort of kind used for the purpose of or connected with its construction are to be removed by the contractor & all pits & excavations filled up at his own cost & the site handed over in a tidy & workmen like condition & the final payment in settlement of the accounts for the said work shall be held to be due or shall not be made to the contractors till such site clearance shall have been effected by him & such clearance may be done by the concerned Superintending Engineer at the expense of the contractor. In the event of his failure to comply with this provisions with 7 days after receiving notice in writing from the Engineer-in-Charge to that effect if it becomes necessary for the Engineer-in-Charge to have the site clearance done as indicated above at the expenses of the contractor the deptt. shall under no circumstances by held liable for any losses or damages to such of the contractor’s property as may be no such site due to such removal there from, removal of which may be effected by means of public sale of such materials & property or in such way as deemed fit & most convenient to the concerned Superintending Engineer.

3.18 The contractor shall have to submit to the Engineer-in-Charge fortnightly return of labour both skilled & unskilled as employed by him on the work in the proforma to be prescribed by the Chief Engineer,Rural Works, Bhubaneswar.

3.19 The contractors are requested to quote their rates. The deptt. Reserves the right of deciding the type of the structures to be constructed i.e. frames or masonry structures & the contractor shall abide by the decision of the deptt. In case of alternative item or items occurring in the tender the Chief Engineer, Rural Works, Bhubaneswar/ respective Chief Construction Engineer,R.W.Circle / Superintending Engineer as **mentioned in TCN** may order to execute any of the item or items at his direction, & the contractor shall not have choice in this decision to his advantage.

3.20 The rates in the tender will be deemed to include cost of all materials including loading ,unloading ,leads,lifts,taxes,royalities etc & in other charges whether the materials are issued the Department or arrange from any other sources by the contractor.

3.21 The contractors shall supply samples of all materials, free of cost before procurement for the works for testing & acceptance as may be required by the concerned Superintending Engineer.

3.22 The contractor shall uncover any part or parts of works or make opening in or through same as the concerned Executive may from time to time direct for testing & shall reinstate & make good such part or parts to the satisfaction of the Engineer-in-Charge.

3.23 The Engineer-in-Charge during the progress of the works has powers to order in writing in the site order book, so maintained at site of work by the contractor in the form prescribed by the deptt. from time to time.

(a) The removal from the site within such time or times as may be specified in the order of any materials which in the opinion of the Engineer-in-Charge are not in accordance with the specification.

(b) The substitution of proper & suitable materials.

(c) The removal & proper re-execution of any work in respect of materials or workmanship which in the opinion of the Engineer-in-Charge is not in accordance with the specification.

3.24 Either during execution or after completion of the work, contractor shall arrange at his own cost requisite equipments for testing the structures, if found necessary by the Engineer-in-Charge & bear the entire cost of such tests conducted as per the direction of the concerned Superintending Engineer.

3.25 The contractor shall on the written order of the concerned Superintending Engineer suspend the progress of the work or any part there of for such time or times & in such manner as the Engineer-in-Charge may consider necessary & shall during such suspension, properly protect & secure the work as far as in necessary in the opinion of the Engineer-in-Charge. No claim in this regard will be entertained.

3.26 The contractor shall after award of the works commence the work on site within the period to the prescribed by the Engineer-in-Charge & shall also maintain proportionate progress. The contractor should bear all expenses & **charges of special or temporary roads required by him in connection with** access to the site. Subject to any requirement in the contract as to the **completion of any portion of the works before completion of the whole**, the whole of the works shall be completed within the time stated in the contract. Normally no extension of time will be granted.

3.27 The concerned Executive Engineer shall make any variation of the form quality or quantity of the works or any part thereof that may in his opinion be necessary & for that purpose or of for any other reasons it shall in his opinion be desirable. If due to such alterations or additions any item or items of works are to be executed which are not specially covered by the contract **then <u>the same may be taken up departmentally through job work agreements with the same contractor or separate piece workers or through Muster Rolls at the prevailing schedule of rate at or rates approved by the Chief Engineer,Rural Works, Bhubaneswar</u>**. When the extra or additional items are executed through the same contractor he shall give in writing his willingness to accept the prevailing schedule of rates or the rates approved by the Chief Engineer,Rural Works, Bhubaneswar, prior to taking up the work.

It is to be clearly understood that no claims what-so-ever will be entertained as regards extra or less quantity of work against the items provided in the contract or extra items of work done under written order of the concerned Executive Engineer, the rate in the later case being the prevailing schedule of rates or the rates approved by the Chief Engineer, Rural Works, Bhubaneswar. If the contractor executes the extra items but fails to give in writing his willingness to accept the prevailing schedule of rates the decision of the Chief Engineer,Rural Works, Bhubaneswar, will be final as regards rates admissible which will be binding on the contractor.

Orissa GST on finished products shall not be paid separately. If any such tax levied, the contractor shall bear the same. The contractor should accordingly quote the rate in the individual items. No special condition on this issue will be entertained. They should also give an undertaking on this point as indicated below: Certified that the rates quoted by me are inclusive of GST on finished work. No extra amount shall be claimed.

3.28 Normally the Department will not supply any material required for the work to the contractor. In case material like Steel or Bitumen is supplied the following provisions shall apply. Such materials as per Annexure A, if available with Deptt. may be supplied to the contractor at the direction of the Deptt. at the place & at the rates as noted against each. The contractor may satisfy himself about the quality & quantity of materials at the time of issue. In case of non-supply of these materials for any reason what-so-ever it shall be the responsibility of the contractor to procure such materials (to be approved by the Engineer-in-Charge) form the market & complete the work within the stipulated time. No monetary claim or compensation of any kind what-so-ever will be entertained by the Deptt. nor this can be taken as a plea by the contractor to apply for extension of time to complete the work. The safe custody & up keep of the materials so issued by the Deptt. will be the sole responsibility of the contractor. He is also to bear in addition, all the incidental charges such as transport, storage, handing of material .

However the deptt.shall have the right to supply at any time in the interest of work any departmental materials to be issued in the work in addition to those mentioned above & the contractor shall use such materials without any controversy or dispute on the account.

The rates of such materials as supplied under clause 3.28 and 3.29 will be at the stock issue rates fixed by the Deptt.at the time of issue or market rates prevalent at the time of supply, whichever is higher.

The contractor may take delivery of departmental supply of materials according to his need for the work issued by the Sub-division Officer. The contractor shall make all arrangements for proper storage including cost of store sheds required for the purpose & provide for watching arrangement at his expenses.

The Deptt. is not responsible for any theft of materials. Under any such contingencies if the contractor stops or delays in the execution of work relevant penalty clause as per F-2 agreement will enforced.

The contractor will be responsible for the misuse, loss or damage due to any reason, what-so-ever of any departmental materials supplied to him during the execution of the work. In case of such loss, damage or misuse, recovery at the rate of 5 times the cost of the materials so issued will be deducted from the bills or his other dues.

3.33 (a)In case of departmental supply of Bitumen and Emulsion,the cost of empty bitumen drum basing on quantity issued will be deducted @ Rs.100/- (Rupees One Hundred only) per drum. In case of emulsion bitumen the cost of empty emulsion bitumen drum will be deducted @ Rs.200/- (Rupees Two Hundred only) per drum.

(b) No return of empty bitumen drum/ empty emulsion bitumen drum to the department is permissible.

(c) The differential cost of cement in case of lesser consumption due to design mix in comparison to the provision in the sanctioned estimate will be deducted from the contractor bill at the estimated rate of cement.

(d) All tests required for the work are to be conducted in Govt. laboratory/Govt. approved Laboratory only.

Machinery if available may be issued at the direction of Deptt. to the contractor on hire at daily or hourly rates as per Appendix-'B' without P.O.L. subject to condition that the contractor executes in advance an agreement with the Engineer-in-Charge as per circular letter No. Vide Work Deptt. Lr.No.8949 dt.3.2.89.

The contractor will refund the machinery taken by him for use in the work in good & serviceable condition to the issuing store at his own cost.

The hire charges will be calculated from the date of issue to the date of return.

Super/Special class Contractor shall employ under him One Graduate Engineer and Two Diploma Holders belonging to the State of Orissa. Likewise "A" Class Contractor shall employ under him One Graduate Engineer or Two Diploma Holders belonging to the State of Orissa.

The contractor shall pay to the Engineering personnel monthly emoluments which shall not be less than the emoluments of the personnel of equivalent qualification employed under the Government of Orissa.

The Chief Engineer, Roads, Orissa may however assist the contractor with names of such unemployed Graduate Engineers and Diploma Holders if such help is sought for by the Contractor

The names of such Engineering personnel appointed by the contractor should be intimated to the tender receiving authority along with each tender as to who would be supervising the work. In absence of such intimation the tender shall be treated as incomplete.

Each work bill of the Super Class, Special Class and "A" Class contractor shall be accompanied by an employment roll of the Engineering personnel together with a certificate of the Graduate Engineer or Diploma Holders so employed by the contractor to the effect that the work executed and included in the bill has been supervised and measured by him/ them. The Rule is amended in Government of Orissa, Works Department Office Memo No. 13/93 24317 dtd. 28.09.1993

METHOD OF ISSUE OF MATERIALS

(a) (i) M.S Roads, Plates, structural & High Tensile steel bars if issued will be supplied in length & sizes & available in the stock.

For payment of reinforcement the steel including authorized lap page shall be measured in lengths of different diameters as actually used (including hooks & bends) in the work correct to a cm. & their weight calculated on the sectional weight/area prescribed by the Indian Standard Specifications. Wastages, spaces bars & unnecessary lap page will not be paid for. Annealed steel wires used for binding shall not be measured, its cost being included in the rate of reinforcement.

(ii) The contractor will have to bear the charges of straightening, cutting, bending, binding, tying jointing, welding etc. to required sizes without extra cost of Govt. No cut pieces of M.S Angles, M.S Rods, joints etc. less than 1m. in length will accepted back as surplus & all this will be contractor's property. Cut pieces of more than 1m. in length will be returned by the contractor at the issuing store without any conveyance charge..

(b) (i) Bitumen will be supplied in bulk or in standard drums as available.
(ii) All empty bitumen drums should not be returned to the issuing store & these drums are the property of the contractor for which the cost of each empty drum @ Rs.100/- (Rupees One Hundred only) is to be recovered from the contractor

HIGH TENSILE STEEL:

(a) HT steel may be supplied by Deptt. as required, if available in the Deptt. store. The steel will be supplied in lengths as received from the manufactures.

(b) Special cares will be taken by the contractor to store the HT steel under suitable shed as approved by the Engineer-in-Charge. He or his authorized representative should always have easy access to the store yard for inspecting the HT steel & satisfy themselves regarding the condition thereof. Any modifications suggested by them shall be scrupulously followed by the contractor.

(c) HT steel shall always be protected from rusting by suitably sealing the same which shall be removed just before the steel is being used. During monsoons days the HT steel shall be kept as far as practicable in air tight stores at the expense of the contractor.

(d) The contractor shall at all times maintain records showing the basis of the indents the receipts & the utilization of HT steel supplied by Deptt. These shall at all times be open for inspection by the Engineer or his authorized representative. Also no claim shall be entertained for loss due to earthquake, flood, cyclone, epidemic, riot or any other calamity whether natural or incidental & damage so caused will have to be made good by the contract at his own cost.

The contractor should at his own cost arrange necessary tools & plant required for efficient execution of work & the rates should be inclusive of the running charges of such plant & cost of consumable.

Tenders containing extraneous condition not covered by tender notice are liable to be rejected. The tender should be strictly in accordance with the items mentioned in the call notice. Any change in wording will not be accepted.

The contractor will be responsible for the loss or damage to any departmental materials or machinery during transit & in the execution of the work due to any reasons what-so-ever & the cost of such materials will be recovered from the bills at stock issue rates or market rates which-ever-is higher.

From the commencement of the works to the completion of the same they are to be under contractor's charge. The contractor is to be held responsible to make good all injuries, damages & repairs occasioned or rendered necessary to the same by the fire or other causes & they are to hold Governor of Orissa harmless for any claims for injuries to persons or for structural damages to property happening from any neglect, default, want of proper care or misconduct on the part of the contractor or any one in his employment during the execution of the work. Also no claim shall be entertained for loss due to earthquake, flood, cyclone, epidemic, riot or any other calamity whether natural or incidental & damage so caused will have to be made good by the contractor at his own cost.

It shall be presumed that the tenderer has satisfied himself as to the nature & location of works, sub soil strata & local conditions particularly those bearing on transports availability, storage & handling of material, weather conditions, monsoons conditions, currents in the river & availability of sweet water etc. & has estimated his cost accordingly. Deptt. will bear no responsibility for the lack of acquaintance of those conditions on the part of the tenderer. The consequences of the lack of such knowledge will be at the risk & cost of the tenderer.

The information & data shown in the contract documents are meant form general guidance only. The deptt. will not be responsible for the strict accuracy thereof for any deduction, interpretation, conclusion drawn there from by the tenderer.

The Engineer-in-Charge has full power to require the removal from the premises of all materials which in his opinion are not in accordance with the specification & in case of default the Engineer is to be at liberty to sell such materials & to employ other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. The Engineer is also to have full power to require other proper materials to be substituted & in case of default the Engineer may cause the same to be supplied & all costs which may attend such removal & substitution are to be borne by the contractor & may be recovered from the sale proceeds of such rejected materials when necessary, the balance if any, being kept in deposit in the contractor's favour.

If in the opinion of the Engineer-in-Charge, any of the work had been executed with improper materials of defective workshop the contractor, when required by the Engineer forth-with is to re-execute the same & to substitute proper materials & workmanship & in case of default of the contractor in so doing within a week the Engineer is to have the full power to employ other persons to re-execute the work & the cost thereof shall be borne by the contractor.

The Engineer-in-Charge or any other office authorized by the Deptts. to have at all times access to the works & the works shall be entirely under his control. He may require the contractor to dismiss any person in the contractor's employment for that works who may be incompetent or who may misconduct his SELF & the contractor shall comply with such requisition. Should be contractor not comply within one week this requisition for dismissal, the Engineer-in-Charge will have the power of closing down the work.

Provided that if the employee concerned is the Chief Agent of the contractor an appeal may be made by the contractor to the Chief Engineer the order of dismissal passed by the Engineer within 7 days of the order & the decision of the Chief Engineer on this point shall be final any conclusive.

If the Chief Engineer upholds the order of dismissal passed by the Engineer & the contractor does not comply within 3 days from the date of communication of the Chief Engineer's order with the requisition for dismissal the Engineer will have power of closing down the work. When the work is closed down under the above provision the contractor shall have no claim to any compensation from the deptt. either for loss of time, damage of materials loss of money by wages, hire, interest etc. for any cause.

The contractor is not to vary or deviate from the approved drawing of specification or executive any extra work of any kind what-so-ever unless upon the authority of the Engineer-in-Charge to be sufficiently shown by a order in writing or a drawing expressly given & signed by him as an extra or variation, or by any subsequent written approval signed by him.

Any authority by the Engineer-in-Charge for any alterations or addition in or to the work is not to vitiate the contract but additions, omissions, alterations or substitutions made in carrying out the work are to be measured & valued & certified by the Engineer & added to or deducted from the amount of the contract as the case may be at approved rates of the particular item of work.

In those cases in which such rates do not exist the Superintending Engineer will fix the rates to be paid. In case of any dispute the matter may be referred to the Chief Engineer whose decision shall be final & binding.

All works & materials brought & left at site by contractor or by his order, for the purpose of property of the Govt. of Orissa & the same are not to be removed or taken away by the contractor or any other person without the special permission in writing of the Engineer-in-Charge but the Governor of Orissa will not be liable for any loss or damage which may happen to or in respect of any such.

Any defects, shrinkage or other faults which may be noticed within 24(Twenty Four) months from the completion of work arising out of defective or improper materials or workmanship are upon the direction of Engineer-in-Charge to be amended & made good by the contractor at his own cost unless the Engineer for reasons to be recorded in writing shall decide that they sought to be paid for & in case of default the cost of making good the work shall be recovered from the contractor.

A certificate of the Engineer or an award of the refer herein after referred to as the case may be showing final balance due to payable to the contractor is to be conclusive evidence of the work having been duly completed & that the contractor is entitled to receive payment of the final balance but without prejudice to the liability of the contractor under the provision of clause.

For the purpose of jurisdiction in the event of dispute if any, the contract shall be deemed to have been entered into within the State of Orissa & it is agreed that neither party to the contract shall be competent to bring suit in regard to the matter by the contract at any place, outside the State of Orissa.

If at any time after the commencement of the work, the Governor of Orissa shall for any reason what-so-ever not require the whole thereof as specified in the tender to be carried out, the Engineer-in-Charge shall give notice in writing of the fact to the contractor who shall have no claim to any payment of compensation what-so-ever an account of any profit or advantage which he might have derived from execution of the work in full but he did not derive in consequence of the full amount of the work not having been carried out neither shall be have any claim for compensation by reason of any alteration having been made in the original specification, drawings, designs & instruction which all involve curtailment or increase of the work as originally contemplated.

USE OF SITE

The contractor shall at his own expenses make all necessary arrangements of lands & their reclamation if any where necessary for stores, field office having sweet water supply & similarly arrangements required for his materials & his employees etc. & shall pay direct all charges & taxes the authorities & owner concerned.

The contractor shall have to abide by the regulation of the authorities concerned as well as the direction of the Engineer of the use of the site of work & should refrain from causing undue obstruction for the normal traffic in the river.

PROGRESS SCHEDULE

The contractor shall furnish within 15(Fifteen) days from the date of order to start the work, a progress schedule in quadruplicate indicating date of start, the monthly progress expected to be achieved & the

anticipated completion of date of each major item of work to be done by him, also indicating procurement & setting up materials plant & machinery for the completion of the whole work in the time limit & of the particular items, if any in the due date specified in the contract & shall have the approval of the Engineer-in-Charge. Further the date for the progress in this schedule shall be kept up. In case it is subsequently found necessary to alter the schedule, the contractor shall submit in good time a revised one incorporating necessary modification proposed and get the same approved by the Engineer-in-Charge. No revised schedule shall be operative without such acceptance by writing. The Engineer-in-Charge is further empowered to ask for more detailed schedule week by week for any item or items & the contractor shall supply the same as & when asked for.

The contractor shall take all necessary precautions for the safety of the worker & preserving their health working in such jobs as required special protection & preparation. The following are some of the requirement listed; the same are not exhaustive & the contractor shall augment those precautions on his own where necessary & all comply with the direction issued by the Engineer-in-Charge in this behalf from time to time & at all times.

Providing protective foot wear & head wear to workmen in situation like mixing & placing of mortar or concrete, in quarries & places where the work done in & too much in wet condition.

Providing protective head wear to workers working near equipments, cession launching etc. to protect them against accidental fall of material from above.

Taking such normal precautions like providing hand rails at the edges of the floating platforms or cargos allowing rails or metal parts of useless timbers to speared amount etc.

Supporting workmen will use proper belts, rope etc. when working in any plants, cranes hoists & dredger sets.

Taking necessary steps towards training the workers concerned in the use of machinery before they are allowed to handle it independently & taking all necessary precautions in & around the area where machines, hoist & similar units are working.

Providing adequate no of boats for playing on the river during floods if work is under progress to prevent over load & crowding.

Providing life belts to all men working at all such situations from where they may accidentally fall in to the water & equipping the boats with adequate no of life buoys etc.

Avoiding bare live wires etc. as would electrocute workers.

Making all platforms staging an temporary structure sufficient strong & got causing the workmen, supervisory staff to take under risk.

Providing sufficient first & trained staff & equipment to be available quickly at the work site to tenders immediate first aid treatment in case of accidents due to suffocation, drawing & injuries.

Taking all necessary precautions with regard to diver if necessary.

The workers engaged on risky jobs should be adequately insured.

No claim of idle labour etc. on any account will be entertained by the Deptt.

Approval of the Chief Engineer on the design method & specifications adopted in the bridge shall not absolve the contractor of his responsibility for the soundness of the structure or the efficiency of its execution.

The contractor shall have to make & maintain all diversion including light barriers etc. as directed by the Engineer-in-Charge if construction of the bridge disturbs the traffic.

The tender has to arrange lunching girder etc. which may be necessary to lunch the priestesses girder in to position at his own cost. The tenderer should quote their rates taking in to account of the launching of the priestesses girder into position at their own cost corm casting yard.

The clauses of printed form F-2 contract with late addition/deletion/corrections substitution etc. will also be binding.

3.63 Before issue or the above materials to him, the contractor shall furnish Bank guarantee of any of the Nationalized Banks located at Mentioned in Column No. 8 of TCN for a sum equal to the cost of materials. The Bank guarantee should be valid for the entire period of agreement. The same may be refunded to the contractor only after the materials supplied to him are fully utilized in the works and cost thereof recovered from his bill(s) in full or – if the materials are partly utilized materials are returned by him to the department in full and in good condition and receipt thereof duly acknowledged by the concerned department officer

4. **FAIR WAGE CLAUSE**

The contractor should abide by the "*Model rules*" & additional Fare Wage Clauses as introduced in Govt. of Orissa Works Deptt. No.28842 (5) dt.27.9.61 over & above the one enforced in G.O No.4-A.VIII-18/52-25 dt.26.2.55. They should also abide with any amendment done by the Govt. from time to time.

MODEL RULES

4.1 Application: These rules shall apply to all construction works in charge of Orissa Public Work Deptt. which are expected to continue for a year or more.

Definition: "Workplace" means a place at which at a average fifty or more workers are employed in connection with construction work.

FIRST AID

At every work place there shall be maintained in readily accessible place First Aid appliances including an adequate supply of sterilized dressing an sterilized cotton wool. The appliance shall be kept in good order & in large work places they shall be placed under the charge of a responsible person who shall be readily available during working hours.

At large work place where hospital facilities are not available within easy distances of the work, First Aid Posts shall be established & be run by a trained compounded.

Where large work place are situated in cities or in their suburbs no beds are considered necessary owing tot the proximity of site or town hospital as ambulance shall be provided to facilitate removal or urgent cases to these hospital. At these work place some conveyance facilities such as a car shall be kept readily available to take injured person or persons suddenly taken seriously ill to the nearest hospitals.

DRINKING WATER

(a) In every work place there shall be provided & maintained at suitable places easily accessible to labour, a supply of water fit for drinking.

(b) When drinking water is obtained from an intermittent public supply each work place shall be provided with storage where such drinking water shall be stored.

(c) Every water supply storage shall be at a distance not less than 50 feet from any latrines, drain or other source of pollution. Where water has to be drained from an existing well which is within such approximate of latrine, drain or any other sources of pollution the well shall be properly chlorinated before water in drawn from it for drinking. All such wells shall be entirely closed in & be provided with a trap door which shall be dust & water proof.

(d) A reliable pump shall be fitted to each covered well. The trap door shall be kept locked & opened only for cleaning to inspection which shall be done at least once in a month.

(e) The temperature of drinking water supplied to worker shall not exceed 90^0 F.

WASHING & BATHING PLACES

(i) Adequate washing & bathing places shall be provided separately for men & women.

(ii) Such place shall be kept in clean & drained condition.

SCALE OF ACCOMMODATION IN LATRINES & URINALS

There shall be provided within the proximity of every workplace latrines & urinals in a accessible place & the accommodation separately for each of them shall not be less than following scale:

	No.of Seat
(a) Where the number of persons employed does not exceed 50	2
(b) Where the number of persons employed exceeds 50, but does not exceed 100	3
(c) For every addition 100, (in particular cases the Executive Engineer shall have the power to vary the scale, necessary)	3 per 100

LATRINES & URINALS FOR WOMEN

If women are employed separate latrines & urinals screened from those for men an marked in the vernacular in conspicuous letter “For women only” shall be provided on the scale laid in rule-6.

Therefore man shall be similarly marked “for men only”. A poster showing figure of a man & woman shall also be exhibited at the entrance of latrines of each sex. There shall be adequate supply of water close to the urinals & latrines.

LATRINES & URINALS

Except workplace provided with water flushed latrines connected with a water borne sew age system, all latrines shall be provided with receptacles on dry either system which shall be cleared at least four times daily & at least twice during working hours & kept on a strictly sanitary condition. The receptacles shall be tarred inside & outside at least once a year.

CONSTRUCTION OF LATRINE

The inside wall be constructed of masonry or some suitable heat resisting non-absorbent materials & shall be cement washed inside & outside at least once a year. The date of cement washing shall be noted in a register maintained for this purpose & kept available.

DISPOSAL OF EXCRETA

Unless otherwise arranged for by the local sanitary authority arrangements for proper disposal of excreta by incineration at the workplace shall be made by means of a suitable incinerator approved by Assistant Director of Public Health of Municipal Medical Officer of Health as the case may be in whose jurisdiction the workplace is situated. (Alternatively excreta may be disposal of by putting a layer of night soil at the bottom of pucca tank prepared for the purpose & covering it with 6” layer of waste of refuse & other covering it up with a layer of earth for a overnight when it will turn into manure).

PROVISION OF SHELTERS DURING REST

At every workplace there shall be provided free of cost two suitable sheds on for males & the other for rest of the use of labour. The height of the shelter shall not be less than 11 feet from the floor level of the lowest part of the roof.

CRECHE

At every workplace at which more than 50 women worker are employed there shall be provided only one hut for the use of children under the age of 6 years belonging to such women & shall be used for infants games & play & their bed room. The hut shall not be constructed to a lower standard than the following:-

(i) Thatched roofs.

(ii) Mud floors & walls.

(iii) Planks spread over the mud floor covered with matting.

The hut shall be provided with suitable & sufficient opening for light & ventilation. There shall be adequate provision of sweeper to deep the place clean. There shall be two Dais in attendance. Sanitary utensils shall be provided to the satisfaction of the Health Officer of the area concerned. The use of the hut shall be restricted to children, their attendants & mothers of the children.

Where the number of women workers in more than 50 the contractor shall provide hut & one Dai to look after the children of women workers.

The size of crèche shall vary according to the number of women workers.

Crèche shall be properly maintained & necessary equipment like toys etc. shall be provided.

ADDITIONAL CLAUSE TO BE INCLUDED IN THE FAIR WAGE CLAUSES INTRODUCED IN G.O. NO. 4A- VII-R 18/52-25 DT.26.12.55

Clause (G) Under the provision of the Minimum Wages Act 1948 & the Minimum Wages (Central) Rules 1950 the contractor is bound to allow or cause to be allowed to labourers directly or indirectly employed in the works on day rest or six days continuous work & pay wages at the same rates as for duty. In the even of default Executive Engineer of Asst. Engineer concerned shall have the right to deduct the sum or sums not paid on account of wages for weekly holiday to any labourers & pay the same to the persons entitled there to from any payment due to the contractor.

Clause (H) The Contractor shall at his own expenses provide or arrange for the provisions of foot wear for any labourers doing cement mixing work & black topping or roads (The contractor has undertaken to execute under this contract to the satisfaction of the Engineer-in-Charge & on his failure to do so, Govt. shall be entitled to provide the same & recover the cost from the contractor.

Clause (I) The contractor shall submit by the 4^{th} & 19^{th} of every month to the Engineer-in-Charge a true statement showing in respect of the second half of the preceding month & the first half of the current month respectively (1) the number of labourers employed by him on the work (2) their working hours (3) the wages paid to them (4) accidents that occurred during the said fortnight showing the circumstance under which they happened & the extent of damage & injury caused by them & (5) the numbers of female workers who have been allowed maternity benefit according to clause (K) & the amount paid to them failing which the contractor shall be liable to pay to Govt. a sum but exceeding Rs.50/- only per each default of materially incorrect statement. The decision of the Executive Engineer shall be final in deducting from any bill due to the contractor the amount levied as fine.

Clause (J) In respect of all labour directly or indirectly employed in the works for the performance of contractor's part of this agreement, the contractor shall comply with or cause to be complied with all the rules framed by Govt. from time to time for the protection of health & sanitary arrangements for workers employed by the Orissa Public Workers Deptt. & its contractors. This will apply to work place having 50 or more workers.

Clause (K) Maternity Benefit Rules for female workers employed by contractor. Leave & pay during leave shall be regulated as follows:-

Leave (i) In case of delivery:- Maternity leave upto 8 weeks, 4 weeks upto & including the day of delivery & 4 weeks following that day.

(ii) In case of miscarriage"- Upto 3 weeks from the date of miscarriage.

Pay (1) in case of delivery :- Leave pay during maternity leave will be at the rate of the women's average daily earning calculated no the total wages earned on the days when full time work was done during a period of 3 months immediately preceding the date on which she give notice that she excepts to be confined or at the rate of twelve annals a day which ever is greater.

(2) In case of miscarriage:- Leave pay at the rate of average daily earnings calculated on the total wages earned on the days when full time work was done during a period of such miscarriage.

Conditions of the grant of maternity leave:- No maternity leave benefit shall be admissible to women unless she has been employed for a total period not less than month immediately preceding the date on which she proceeds on leave.

This will apply to work place which may continue a year of more,

CONDITIONS FOR WORKING & SECURITY

Definition:-
Restricted area (s) for the purpose of the contract means the area(s) declared as such by the Govt. & shown in the site plan.

Secrecy:-
The contractor shall take all steps necessary to ensure that all persons employed on any work in connection with the contract have noticed that the Indian Official Secrets Act 1923 IXIV of 1923 applies to them & will continue so to apply even after the execution of such works under contract.

Contractor documents:-
The contract is confidential & must be strictly confined to the contractor's use except so far as confidential disclosure to sub contractor or suppliers is necessary & to the purpose of the contract.
All document is copies thereof & extract there from furnished to the contractor shall be returned to the Chief Engineer,Rural Works,Bhubaneswar on the completion of the works of the earlier termination of the contract.

Admission of site:-
The contractor will be permitted entry other than for inspection purpose of take possession of the site until instructed to do so by the Chief Engineer,Rural Works,Bhubaneswar. The portions of the site to the occupied by the contractor will be clearly defined and/or marked on the site plan & the contractor will on no account be allowed to extend his operation beyond these areas.

The Chief Engineer,Rural Works,Bhubaneswar reserves the right of taking over at any time any portion of the site which they may require & the contract shall at his own expense clear such portion for with. No photographs of the site or the works or any part thereof shall be taken, published or otherwise circulated without the prior written approval of the Deptt. Chief Engineer, Rural Works, Bhubaneswar.

Any construction officials connected with the contract shall have right of entry on this at all times.

The authorities shall have the power to exclude from the site may person whose admission there to may, in their opinion be undesirable for any reason what-so-ever. The contractor shall not be allowed any compensation on this account.

The contractor's agents, representatives, workmen etc. & his materials, carts, trucks or other means of transport etc. will be allowed to enter through & leave from only such gate or gates & at such time as the authorities in charge of the restricted area may at their present at the place of enter & exit for purpose of identifying his carts, trucks etc. to this personnel in charge of the security of the restricted area.

Identify cares passes:-
The contractor, his agents & representatives are required individually to be in possession of an identify card or pass duly signed by the concerned authorities. The identity cards & passes will be examined by the security staff at the time of entry into or exit from the restricted area & also at any time or any number of times inside the restricted area.

The contractor shall be responsible for the conduct & action of his workmen, agents or representatives.

Search:-

Through search of all persons & transport shall be carried out at each gate for as many time as the gate is used for entry or exists & may be carried out at any time or any number or times at the work site within the restricted area.

Access to restricted area after completion or work:-
After the works are completed & the surplus store etc. removed the contractor, his agents, representatives or workmen etc. may not be allowed any access to the restricted area except for attending to any rectification of defects pointed out to him by concerned authorities.

Fire precautions:-
The contractor, his agents, representatives, workers etc. shall strictly observe the orders pertaining to fire precautions within the restricted area.

SPECIAL CONDITIONS

6.1 Care should be taken not to interfere as much as possible with traffic. The contractor shall use all due precautions for the safety of traffic & shall place barriers across each end of the length of the road which is being worked upon. Watchmen shall be employed & bright red lights place & maintained around the obstacle & elsewhere as the Engineer-in-Charge may direct. All diversion sign shall be clearly marked by white washed stones or any other means, when traffic is allowed along the shoulders. Barricades & warning signs shall be put as directed by the Engineer-in-Charge. These measures shall be at no extra cost to Govt.

6.2 Earth work will be done as per specification of IRC & as directed by Engineer-in-Charge from time to time. Measurement of earth work in road embankment will be done by section measurement, after it is compacted to the desired degree as per departmental directions.

6.3 Wherever possible, temporary land may be made available to the contractor for obtaining earth & in all such cases the depth of pits in borrow areas should be as per earth work specification attached to the DTCN. Wherever the depth of pits exceeds the permissible limits, the contractor is liable to pay compensation as may be required to pay to the land owners. The contractor must make his own arrangements for carriage of earth work at his own cost. No payment will be made for jungle clearance & for making a road or foot path or temporary bridges etc. Wherever required for earth from the borrow areas. The contractor shall, if required also arrange to obtain & carry earth from other sources at his own cost without any extra expenditure to the deptt. Borrow pit materials shall not be used unless it has been tested & approved by the Engineer-in-Charge. No claims will be entertained on grounds of non availability of temporary land or non-availability or adequate quantity of earth.

6.4 No claim will be entertained due to any delay involved in land acquisition required for the work. It shall be construed that the contractor has thoroughly acquainted himself about the situational condition before tendering for the work & after having fully satisfied himself about the site condition & after going through the stipulation of proceeding para of the special conditions of DTCN as quoted rates. Thus his quoted rates could be deemed to cover any & all distance & situations of the source of soil & also any & all modes of transport either by manual or mechanical means not with standing the fact that the concerned estimate or tender or schedule of rate for that matter does not envisage such provision.

6.5 No claim will be entertained due to any delays involved in land acquisition required for the execution of the work. However, suitable extension of time may be given on the recommendation of the Engineer-in-Charge.

6.6 The quantity of metal, gravel or moorum, sand, chips etc. should conform to the specification attached. The stacks of road metal & gravel of moorum will be measured in boxes to be provided by contractor of size 1.5m. x 1.5m. x 0.5m. which will be taken as 1.0cum & of chips 1.5m. x 1.5m. x 0.47m. equivalent to 1.0 cum.

The soil stones & other stones will be measured in suitable stacks as per direction of the Engineer-in-Charge & deduction for voids at the rate of $1/6^{th}$ of volume or more will be made from the total measurement depending upon the looseness of stacking.

6.7 A quarry chart as may be available may be seen in the office of the Executive Engineer. The contractor must however, satisfy himself that materials as per required specification & quantity are available in those quarries. No extra payment will be made due to non availability of materials as per required specification & quantity in the quarries shown in the departmental quarry chart. The quarry chart is only information & the

deptt. do not accept any responsibility, if the materials are not available in full quantity & of approved quality.

6.8 Earth work, moorum consolidation, soling, metalling & bituminous construction will be done as per specification attached.

6.9 Any other new items to be executed will be done as directed by the Engineer-in-Charge. Bridge & culvert construction will be done as per specification attached.

6.10 For all purposes of payment, earth work excavation in foundation shall mean earthwork excavation below the natural ground level. The natural level in nallahs, streams, rivers or any drainage channel shall mean bed level at the site of construction.

6.11 The form work used shall be made of steel or unless specifically permitted by the Engineer in which case the form work shall be with seasoned salwood planks bullahs with lining of steel sheet inside & made watertight & shall be made sufficiently rigid by the use of ties & bracings to prevent displacement or sagging between supports & to withstand all pressure, ramming & vibration, without deflection from the prescribed lines occurring during & after placing of the concrete. The contractor has to submit to the Deptt. full working plan of the centering & shuttering to the bridge prior to execution. It is to be further noted that in the event of collapse of false work & staging, the contractor is liable to be blacklisted apart from other penalties according to the terms of contract & law.

6.12 Form works shall be so constructed as to be removed in sections in the desired sequence without damaging the surface of the concrete.

6.13 Bolts & rods for internal ties of the form work shall not remain projected beyond the concrete surface, when the form works removed. These shall be cut to a depth of 25mm. (1”) from the exposed surface & holes refilled with concrete.

6.14 When oil is used for coating the inside of the forms, it shall be non-staining & applied before the reinforcement is placed. All savings, chips, debris & dust must be cleaned out of the forms immediately before placing the concrete. Care shall be taken to prevent reinforcement from coming in contract with the oil coating.

6.15 Centering shall be gradually & uniformly lowered in such a manner as to avoid any shock or vibration or injurious stress in any part of structure.

6.16 Immediately after removal of the form work, the concrete shall be carefully inspected. Any defects shall made good as soon as practicable.

6.17 Concrete should be machine mixed unless otherwise ordered in writing by Engineer-in-Charge.

6.18 The depth of foundation indicate on the drawing are provisional but these may be altered if necessary in the light of the nature of state indicated by boring or sub soil exploration which must be taken in advance of the actual execution of the foundation.

6.19 (a) Concrete test specimens whether plain or reinforced concrete for work if desired by the Engineer-in-Charge shall be taken by the contractor in the presence of responsible officer of the rank not lower than that of a Asst. Engineer or Sub-divisional officer.

(b) Test specimen shall be formed carefully in accordance with the standard methods & no plea shall be entertained later on the grounds that the casting of test specimen was faulty & that the result of the test specimen did not give a correct indication of the actual quality of concrete.

6.20 The standard of acceptance of the cube strength of concrete shall be per standard specification & code practice for Bridge Code of IRC 24-1972.

6.21 Sinking of wells shall be measured from low water level or bottom of well cap or the level of the cutting edge originally placed to the bottom of cutting edge, which ever is lower. The decision of Engineer-in-Charge as to the level of the low water level shall be binding & final & conclusive on all parties concerned.

6.22 All methods of sinking including sinking by employment of divers & other equipment shall be included in the rate of sinking through all kinds of soil. Removal of any trees, logs of trees of isolated boulders etc. shall also be included within the rate of sinking.

6.23 When resort has to be made to pneumatic sinking, the necessity for the same & rates there of shall be decided by the authority accepting the tender. The written order of the Engineer-in-Charge should be obtained before starting pneumatic sinking.

6.24 Construction of coffer dam or islands or the works of open excavation or dressing required for laying well curb shall be included in the rate of well sinking.

6.25 For concreting the bottom plugs of wells under water the method of pouring concrete should be either with tremie baskets or bags as will be directed by the Engineer-in-Charge.

6.26 No claims will be entertained in respect of difficulties due to sand blowing etc. met with during sinking of wells.

6.27 (a) Concrete should be machine mixed unless otherwise ordered in writing by the Engineer-in-Charge. Only controlled concrete will be used in all type of concrete work. The proportion of ingredients in the concrete will be strictly determined by weight & not by volume. The contractor shall furnish to the Engineer-in-Charge the mix design for each class of concrete & should get it approved by him before actual execution. The decision of the Engineer-in-Charge in respect of any variation or conflict of opinion shall be final, binding & conclusive on all parties concerned. The contractor should conduct all tests necessary & provide all machineries thereof as may be required by the Engineer-in-Charge for deciding the design.

(b) **COARSE AGGREGATE:-** Only crusher broken coarse aggregates will be used. The aggregate shall consist of clean hard, strong, dense, nonporous, durable pieces of granite. They shall not contain any pieces of disintegrated stone, soft, flaky, collated particles, salt, alkali, vegetable matter of other deleterious materials so as to reduce the strength or durability of the concrete or to attack the steel reinforcement. It shall comply with I.S. 383 1970. For RCC & priestesses concrete work, the maximum size of the coarse aggregate & grading will be decided by the Engineer-in-Charge.

FINE AGGREGATE: - This shall consist of hard strong durable cubical clean particles of natural sand. They shall not contain dust lumps soft of flaky particles, mica & other deleterious materials so as to reduce the strength or durability of concrete or to attack the reinforcement. Fine aggregate shall conform to I.S. 283 1970.

WATER :- The water used in concrete & mortar & for during & for easing any of ingredients of surface coming in contract with mortar or concrete shall be sweet portable water, clean & free from earth, vegetable salt, organic matter, acids & alkaline substance in solution or in suspension. The water used shall be that approved by the Engineer-in-Charge.

All materials to be used on work such as cement, sand, coarse aggregate, reinforcement etc. shall comply with the requirements of the Engineer-in-Charge & shall satisfy the test or analysis required by him or as specified by the IRC standard specification or in the absence of such authorized specification, such tests & analysis as may be specified by the Engineer-in-Charge. Collection of samples for the tests & conducting all these tests at such places as directed by the Engineer-in-Charge, will be at the cost of the contractor.

6.28 Collection of materials should be so planned that it is commensurate with the physical progress & to the time schedule.

6.29 Bitumen to be used for the work shall be heated in boilers only & not in open fire. Spraying of bitumen wherever necessary should be done only with the mechanical sprayer & pre-mixing of bitumen & stone aggregate should be done only in proper mechanical mixer hot mix plant.

6.30 The materials to be used in the work should conform to the stipulated physical requirement & other property.

6.31 During the course of execution, the traffic should be regulated in accordance with guidelines laid down vide Ministry Lr.No.III-32 (126)/72 dt.20.3.73.

6.32 NEW CLAUSE:-

(A) The rates for earthwork & concrete items wherever dewatering is imperatively necessary, the term dewatering shall mean the execution or operation of the items due to standing water as well as due to percolation of water. The quoted rates will be inclusive of this."

(B) Performance Security and defect liability: In case, any imperfection becomes apparent in the work within **24 months** from the date of final certificate of completion, the contractor shall make the same good at his own expenses or in default the Engineer-in-Charge may cause the same to be made good by other workmen and deduct the expenses from the security deposit and the contractor shall be liable to pay any part of the expenses not so recovered by the Engineer-in-Charge

These successful contractors who have made fixed deposit need not furnish earnest money or initial security deposit but only 5% will be deducted from their bills, towards security deposit. Such of those contractor who do not pay the lump-sum security should pay 1% earnest money at the time of submitting tender and 1% as initial security deposit at the time of acceptance of tender and 5% will be deducted from the bills thus making a total of 7% from such contractor.

CONDITIONS FOR ISSUE OF PLANT & MACHINERY TO CONTRACTORS ON HIRE.

7.1 The contractor must have adequate plant & machinery of their own for the work. The deptt. shall not take any responsibility to supply plant & machineries to the contractor. No claims on account of non supply of plant & machinery by the deptt. shall be entertained & no extension of time on this ground be entertained. If any time, the contractor desired, through a written application to avail the plant & machineries of the deptt., those can only be spared, if available with the deptt. He has to utilised the same at the prevailing hire & running charges of the deptt. enclosed with this DTCN.

7.2 An aggregate shall be entered into by the contractor to the effect that these hire charges are recoverable from the bills of the contractor regularly & the final payment of the work including the refund of security deposit will not be made until the total amount due to Govt. on account of hire of machinery etc. is recoverable in full. Full amount of hire charges due from the contractor at any time shall be recovered from his next & subsequent bills.

7.3 All transit & incidental charges in connection with the dispatch of tools & plant & machinery from work shop shed/deposit return there to will be borne by the contractor.

7.4 The charges shall be recovered at the prescribed rates from & inclusive of the date the plant & machinery is made over upto & inclusive of the date it return even though the same day may not have been utilized for any reasons except for a major break down which may take more than 72 hours for repairs. The contractor shall immediately intimate in writing to the Engineer-in-Charge when any plant or machinery gets out of order requiring major repairs.

7.5 The hire charges are for clock hours. In case of tar boilers, hot mix plant & any other machinery requiring similar preparation the working hours will include the time required to make up the boiler temperature & bringing plant to the operating conditions before the actual start of work.

7.6 The machine will work in shifts of 8 hours each. Extra charges towards over time wages of any of the operating & maintenance staff will be leviable. These charges will be fixed by the Engineer-in-Charge from time to time. In no case the tools & plants shall be operated beyond 8 hours in any shift without prior written permission of the Engineer-in-Charge.

7.7 The contractor shall release the plant & machinery as & when required for periodical servicing & maintenance. He shall also provide for any labour & water source for washing the plants. In the case of concrete mixers, pavers & similar such equipment, the contractor shall arrange to get hopper cleaned & the drums etc. washed at the close of work each day.

7.8 The plant & machinery once issued to a contractor shall not be returned by him on account of lace of arrangement of labour & materials etc. on his part. The same will be returned only when they require major repair, or when in the opinion of the Engineer-in-Charge the work or a portion of work for the same was issued is completed.

7.9 The tools & plant shall while in transit & in the custody of contractor be at his sole risk & responsibility for damage &/or loss except fair wear & tear. The damage or loss as assessed by Engineer-in-Charge shall be made good by the contractor. In the event of a disagreement as to the extent of a damage or the value of articles lost, the decision of the Superintending Engineer shall be final. The contractor shall on or before the supply of the plant & machinery sign an agreement indemnifying the Govt. against loss or damage to the machine. The contractor shall also be responsible for any claim for compensation for loss of life, injury or damage to property etc. arising from any cause what-so-ever. The contractor shall provide full time choukidar for guarding the plant & machinery at site.

7.10 If the articles are not returned within the date originally specified or extended by the Engineer-in-Charge, in addition to the normal hire charge, surcharge equal to 10% of the hire charge will be levied for the period that the machinery is not returned. Such period will be treated as working time & charged as working time.

7.11 In the event of the not return of machinery, the full value of the articles at the current market price will be recovered from the contractors outstanding bills or any bills that may become due in respect of his other works under the State Public Works Deptt. The decision of the Superintending Engineer shall be final in case of dispute.

7.12 The contractor shall, before taking the possession of the machinery enter into an agreement with the Engineer-in-Charge or his nominee in the form attached.

7.13 Log books of recording the hours of daily work for each of the plant the machinery supplied to the contractor will be maintained by the deptt. & will be attached by the contractor or his authorized agent daily. In case the contractor contests the correctness of the entries and/or fails to sign the log book, the decision of the Engineer-in-Charge shall be final & binding on him. Hire charge will be calculated according to the entries in the log book & will be binding on the contractor.

AGREEMENT FOR LOANS OF GOVT. TOOLS & PLANTS:

This agreement made the . . . . . of the thousand nine hundred ninety . . . . . (here in referred to as “the hirer” which expression shall unless excluded by or repugnant to the context include his heirs, executors administrators & assigns) of the one part & the Govt. of Orissa (here in after referred to as the Govern which expression shall unless excluded by or repugnant to the context include his successors in office as assigns) of the other part.

Whereas the hirer is desirous of hiring the tools & plant of the Public Works Deptt. of the Orissa Govt. & more particularly specified in the schedule here under between here in after referred to as “the tools & plant”.

And where as Govt. has agreed to let in hire the tools & plant to the hirer on the terms & conditions here in after mentioned.

Now it is hereby agreed by & between the parties here to as follows.

In consideration of the agreement that hire charges be recovered from their bills for works executed on which this machinery will be used or any other than standing in the names of contractor in the book of the deptt. or any other Govt. Deptt., the Govt. agrees to let hirer tools & plant for period of . . .. to be computed from the date of delivery of the tools & plant to the hirer at the Public Works Deptt. workshop at . . . . . .

The rate of hire charges will be as mentioned in the schedule attached.

The hirer shall not transfer, assign or sublet or in any way part with the tools & plant or any part thereof without the previous written approval of the Engineer-in-Charge.

On the expiry of the period of the hire, the hirer shall return the tools & plant to the Public Works Deptt. workshop/store . . . . . in the same good condition in which they were received by him.

In the event of the tools & the plant mot being returned on the expiry of the above mentioned period, the hirer shall without prejudice & any other liability pay to the Govt. on account equivalent to the rate of hire specified for the working period & an increase of 10%.

The tools & plant shall be open for inspection at all times to the officer of the Govt.

The hirer shall not operate the tools & plant so hired for more than one shift/two shifts of 8 hours each per day without the prior sanction of the Engineer-in-Charge. If the hirer operates the tools & plant beyond the aforesaid limit with the prior sanction of the Asst.Engineer, he shall pay to Govt. additional hire charges as well as over time charges for staff for such excess operation at the rate approved by the Engineer-in-Charge from time to time.

In case of breakdown, repairable at the site within a period of three days hire charges specified in the schedule will be levied except in the case of major repairs.

Normally the tools & plant will be supplied with operating staff.

The hirer shall be responsible for any claims for compensation for loss of life, injury or damage to property etc. arising due to any cause what-so-ever during the period the machinery is in his charge.

All municipal or the dues & taxes payable on account of the use or operation of the tools & plant for the period or hire shall be defrayed by the hirer.

The hire shall make good any loss or damage arising out of cases other than fair wear & tear to the tools & the plant during the period of hire. The cost recoverable form hirer shall be the full replacement value as determined by the Engineer-in-Charge. In the event of any loss or damage not being made good by the hirer to the satisfaction of the said Engineer-in-Charge of officer shall be at liberty to make good himself such loss or damage & recover the cost thereof from the hirer. The hirer shall pay to the said Engineer-in-Charge on demand such an amount as shall be necessary to make good the loss or damage failing which the same will be recovered from this dues as in case of hire charges.

On the breach of any term or condition of this agreement by the hirer the Engineer-in-Charge shall be entitled to demand the return of the tools & the hirer shall return the tools & plant within 72 hours from the date of receipt of such order in writing, in case of failure on the part of the hirer to comply with such order he shall be liable to pay such penalty as may be imposed by the Engineer-in-Charge for period the tools & plant are detained provided that the maximum penalty shall not exceed the cost of replacement of the tools & plant.

In the case of any dispute between the hirer & Govt. the decision of the Superintending Engineer shall be final.

In case any question, dispute of difference shall arise between the Engineer-in-Charge & the hire as to what additions if any sought in fairness to be made the amount of the hire by reason of breakdown of the machinery, shut-down of the work due to reasons beyond the control of hirer through no fault of the hirer also so due to the increase in quantities of the work beyond that included in the contract or due to any other matter or thing arising under or out of this contract except as to the matters left to the sole decision or requisition of the Engineer-in-Charge under the clause in the contract then such question, dispute, difference should be referred to the arbitration & decision of arbitrator so be shown by both the parties to the contract. The award of such arbitrator shall be equivalent to a final decision of the matter.

This agreement shall be operated by the Engineer-in-Charge on behalf of the Govt. & the terms Engineer-in-Charge shall include all officers duly authorized by him to exercise powers on his behalf.

TOOLS PLANTS & MACHINERS:

No tools, plants & machineries ordinarily will be issued to the contractor on hire basis by the Deptt. The contractor is to have the minimum number of machineries like concrete mixers & vibrators of his own to enable him to complete the works without any hindrance.

The tenderer is to submit documentary evidences of possession of tools, plant & machineries required for the work along with his tender papers. Proforma A&B in page 31 of this DTCN should be filled up by the tenderer properly & fully.

Non-possession of the required of machineries will amount to rejection of the tender.

Adequate number of required machineries in fully running condition are to be kept at site by the contractor till completions of the work. The contractor should see that the machineries are promptly required & in running condition all the time. Repair/replacement should be done timely.

Any delay in execution of the work due to lack of repair/replacement of machineries will amount to infringement of the conditions of the agreement & will lead to rescission of the contract as per relevant clause of F-2 Agreement.

Serial No.	Description & name of the articles	No	Amount of hire per hour	Remarks

In witness where of the hirer & the Engineer-in-Charge has for & on behalf of the Governor of the State have set their respective hand the day & the year here in above written.

Signed by :
In the presence of
1. 2.

signed sealed & delivered in the presence off

1. 2.

Government of Orissa, Finance Department Memo No.48443/F Code-46/95 dt.11.12.1995 regarding "Discontinuance of the system of procurement stock by Engineer Department."

X X X X

With a view to avoiding these situations, Govt. have been please to decide that with effect from 1.4.96, there will be no purchase of departmental store materials, nor booking of materials to show utilization of budget provision. It will be the responsibility of the contractor to purchase stores & utilize them in the work since materials like cement, steel etc. are easily & abundantly available at all the places, there will be no difficulty for contractors to procure the same. Therefore, the future agreements with contractors shall be executed accordingly & necessary modifications to the agreement form may be made. In cases where agreements have already been executed for departmental supply of materials, efforts should be made to fulfill the same by utilization of the existing stores & also through inter-divisional & even inter departmental transfer of stores. For utilization of the surplus materials, agreement may however be made for supplying of materials to the extend available. In this way the existing materials should be exhausted.

Maintenance work should be undertaken by purchasing materials in case of departmental execution of work by directly charging to site account or through contractors. There should not be advance purchase of materials for the sake of storing & utilising the same in further works. No item of stores should be purchase which are available in the Central Store. Therefore, before effecting, such purchase a certificate from the Central Store has to be obtained regarding non-availability of the particular item of stores.

Consequent upon introduction of the new system, the Engineer-in-Charge of the work will have to exercise strict quality control & ensure that materials used by the contractors conform to the standard specifications.

The deptt. shall not supply any materials what-so-ever for the work. The contractor should be financially solvent & stable for advanced procurement of all materials to the required for the work vide Govt. of Orissa F.D.Memo No.as cited above.

ISSUE OF MATERIALS

The following materials may be issued to the tenderers vide clauses 3.27, 3.28, 3.29 at the rates & place mentioned against each. (General Conditions of Contract).

Materials	Unit	Rate	Place
1. M.S roads/ Tor rods of different categories	M.T	As per prevailing Issue Rate Or Market Rate Whichever is higher.	At .Departmental store
2.Bitumen	M.T	As per prevailing Issue Rate Or Market Rate Whichever is higher.	At .Departmental store
3. High Tensil Steel	M.T.	As per prevailing Issue Rate Or Market Rate Whichever is higher.	At .Departmental store

Before issue of the above materials to him the contractor shall furnish Bank Guarantee of any of the nationalized bank located at . . . . . for a sum equal to the cost of materials. The Bank Guarantee should be valid for the entire period of agreement. The same may be refunded to the contractor only after the materials supplied to him are fully utilized in the work & cost thereof recovered form his bill(s) in full or if the materials are partly utilized, materials are returned by him to the Deptt. in full & in good condition & receipt thereof duly acknowledged by the concerned departmental officer (vide Works Deptt. Memo No.Codes-M-19/92-13653 dt.5.6.93).

GOVT. OF ORISSA WORKS DEPTT. NO. CODE-M-19-92-2727 DT.3.2.94

As full quantity of materials required for the work is not usually issued to the contractor at the time, it would be desirable to obtain the quantum of Bank Guarantee to the extent of the cost of materials outstanding against the contractor so as to ensure that no point at time, the cost of materials exceeds the Bank Guarantee furnished.

Sd/-
F.A-cum-Joint Secretary of Govt.

CONDITIONS OF CONTRACT

Clauses of F2 Contract

Clause 1 All compensation or other sums of money payable by the contractor to Government under the terms of his contract may be deducted from, or paid by, the sale of a sufficient part of his security deposit or from the interest arising there from, or from any sums which may be due or may become due to the contractor by Government on any account whatsoever and in the event of his security deposit being reduced by reason of any deduction or sale as aforesaid, the contractor shall within 10days thereafter make good in cash or Government securities endorsed as a aforesaid any sum or sums which may have been deducted from, or raised by, sale of the security deposit or any part thereof.

Clause –2 (a) The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor and shall be reckoned from the date on which the written order to commence work is given to the contractor. The work shall through out the stipulated period of the contract, be carried on with all due diligence (time being deemed to be of essence of the contract on the part of the contractor) and the contractor shall pay as compensation, an amount equal to ½ % on the amount of the estimated cost, if the whole work as shown by the tender for every day that the work remains un-commenced, or unfinished after the proper dates. The work should not be considered finished until such date as the Executive Engineer shall certify as the date on which the work is finished after necessary rectification of defects as pointed out by the Executive Engineer or his authorized agents, are fully complied with by the contractor to the Executive Engineers satisfaction). And further, to ensure good progress during the execution of the work the contractor shall be bound, in all cases in which the time allowed for any work exceeds one month: to complete one-fourth of the whole of the work before one fourth of the whole time allowed under the contract has elapsed; one half of the work, before one half such time elapsed, and three forth of work before three fourths of such time has elapsed, in the events of the contractor failing to comply with the condition, he shall be liable to pay as compensation an amount equal to one-third percent on the said estimated cost of the whole work for everyday that the due quantity of work remains incomplete provided always that the entire amount of compensation to be paid under the provision of this clause shall not exceeds 10 percent on the estimated cost of the work as shown in the tender.

Compensation for delay

b)

i) To rescind the contract of which rescission notice is writing to the contractor under the hand of the Executive Engineer shall be conclusive evidence. 20% of the value of left over works will be realized from the contract as penalty.

ii) Security deposit of the contractor shall be refunded only **24 calender months** after the date of completion of the work provided the final bill has been paid and defects, if any rectified.

Clause –3 In any case in which any of the powers, conferred upon the Executive Engineer by clause 2 hereof shall have become exercisable and the same shall not be exercised. The non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall not withstanding be exercisable. In the event of any future case of default by the contractor of which by any clause or clauses he is declared liable to pay compensation amounting to the whole of his security deposit, and the liability of the contractor for the past and future compensation shall remain unaffected. In the event of the Executive Engineer putting in force vested him under the preceding clauses he may, if he so desire, take possession of all or any tools, plants, materials and stores, in or upon the work, or the site thereof or belonging to the contractor, or procured by him and intended to be used for the execution account at the contract rates, or in case of these not being applicable, at current market rates to be certified by the Executive Engineer whose certificate thereof, shall be final otherwise the Executive Engineer may by writing to the contractor or his clerk of the works, foreman or other authiorised be require him to remove such tools, plants, materials or store from the premises (within a time to be specified in such notice) and in the event of the contractor failing to comply with any such requisition, the Executive Engineer may remove them at the contractor's expenses or sell them by auction or private sale on account of the contractor and his risk in all respects, and the certificate of the Executive Engineer as to the expenses of any such removal and the amount of the proceeds and expense of any such sale shall be final conclusive against the contractor.

Contractor remains liable to pay compensation if action not taken under clause.

Power to take possession of or require removal of or sell contractors plants.

Clause 4 If the contractor shall desire an extension of the time for completion of the work, on the ground of his having unavoidable hindered in its execution engineer within 30 days of the date of the hindrance on account of which he desires such extension as aforesaid and the Executive Engineer shall, if in his opinion (which shall be final) reasonable grounds be shown thereon, authorize such extension of time, if any, as may in his opinion be necessary or proper. The Executive Engineer shall at the same time inform the contractor whether he claims compensation for delay.

Extension of time

Clause 5 On completion of the work, the contractor shall be furnished with a certificate by the Executive Engineer (here in after call the Engineer-in-charge) to be completed until the contractor shall have remove from the area of the premises to be distinctly marked by the Executive Engineer in the site plan on which the work shall be executed, all scaffolding, surplus materials and rubbish, and cleaned off the dirt from all wood work, doors windows, floors or other part of any building in upon or about which the work is to be executed, or of which he may have possession for the purpose of the execution thereof nor until the work shall have been measure by the officer of the Public Works Department in accordance with the rules of the department whose measurements shall be binding and conclusive against the contractor. If the contractors shall fail to comply with requirements of this clause as to removal of scaffolding, surplus materials and rubbish and cleaning off dirt on or before the date fixed for completion of the works, the Engineer-in-charge mat at the expenses of the contractor remove such scaffolding, surplus materials and rubbish and dispose of the same as he thinks fit and clean off such dirt as aforesaid, and the contractor shall forthwith pay the amount of all expenses incurred and shall have no claim in respect of any such scaffolding or surplus materials as aforesaid, except for any sum actually realized by the sale thereof.

Final Certificate

Sub-Clause 5 If in the opinion of the Engineer-in-charge, which shall be final and binding on the contractor, occupation or utilization of a portion of the work completed in no way interferes with progress of the work the same may be occupied or utilized by on behalf of the Govt. under the written order of the Engineer-in-charge and to get the defects, if any rectified by the contractor at his (contractor) own cost within six months from the date of completion of the whole work provided that the contractor will not be allowed any concession either in the shape of extension of stipulated period or any other monetary compensations account of such occupation or use.

Clause 6 A bill shall be submitted by the contractor each month on or before the date fixed by the Engineer-in-charge for all works executed in the previous month, and the Engineer-in-charge or his subordinate shall take the requisite measurement for the purpose of having the same verified and the claim, as far as admissible, adjusted, if possible before the expiry of ten days from the presentation of the bill. If the contractor does not submit the bill within the time fixed as aforesaid the Engineer-in-charge or his subordinate shall measure up the said work in the presence of the contractor whose counter signatures of the measurement list will be sufficient warrant, and the Engineer-in-charge or his subordinate shall prepare a bill from such list which shall be binding on the contractor in all respects.

Payment on intermediate certificate to be regarded as advance & Bill to be submitted.

Provided that, if any balance of the 10% security is outstanding from each such payment shall be deducted so much, not exceeding 5% as may be necessary to make up the balance of the security. All such immediate payments to the contractor shall be regarded as payments by way of advance against the final payment only and not as payments for the work actually done and completed, and shall not preclude the required of bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or re-erected, or be considered as an admission of the due performance of the contract, or any par thereof in any respect, or the actual of any claim nor shall it conducted, determine, of effect in any way the powers of the Engineer-in-charge under these conditions or any of them as to the final settlement or adjustment of the accounts or otherwise or in any other way vary or affect the contract.

Deduction of Security deposits from Contractor's bills

Clause 7 The final bill shall be prepared by the office of the Public Works Department in accordance within one month of the date fixed for completion of the work.

Clause 8 If the specification or estimate of the work provides for the use of any special description of material to be supplied from the Engineer-in-charge's store, or it is required that the contractor shall use certain stores to be provided by the Engineer-in-charge under the conditions of this contract (such materials and stores, and prices to be charged therefore as hereinafter mentioned being so far as practicable for the convinces of the contractor, but not so as in any way to control the meaning of effect of this contract are specified in the schedule or memorandum here to annexed), the contractor shall be supplied at the rates specified in the said schedule may set off or deducted from any sums then due, or thereafter to became due to the contractor under the contract or otherwise or against or from the security deposit, or the proceeds of sale thereof, if the same is held in Government securities, the same or a sufficient portion thereof being in this case sold for the purpose. All materials supplied to the contractor shall remain the absolute property of Government and shall not on any account be removed from the site of the work, and shall at all times be open to inspection by the Engineer-in-charge's store, at the prevailing market rate or at the issue rate whichever is less if by a notice in writing under his hand he shall so require, but the contractor shall not be entitled to return any such materials, unless with such consent, and shall have no claim for compensation on account of any such materials so supplied to him as aforesaid being unused by him, or for any wastage in or damaged to any such materials.

Preparation of Final Bill deposits from Contractor's bills

Store supplied by the Government

Clause 8-(a) If a contractor removes any materials or stock so supplied to him from the site of the work in contravention of the provisions of this clause with a view to dispose of the same dishonestly, he shall, in addition to any other liability, civil or criminal, arising out of this contract be liable to pay a penalty equivalent to five times the price of the said

materials of stock, according to the stipulated rate. The penalty so imposed shall be recoverable from any sum that may be then, or at any time thereafter may become due to the contractor, or from his security deposit, or the proceeds of sale thereof.

Clause 8-(b) Owing to difficulty in obtaining certain materials in the open market the Government have undertaken to supply materials specified in the schedule here to annexed. There may be delay in obtaining materials by the department and the contractor is therefore, required to keep himself in touch with the day today position requiring the supply of materials from the Engineer-in-charge and to so adjust the progress of the work that there may not remaining idle nor may there be nay other claim due to or arising from delay in obtaining the materials it should be clearly understood that no monetary claim what so ever shall entertained by the Government on account of delay in supply materials. However extension by the contractor vide also clause-5.

Clause 9 The contractor shall executive the whole and every and part of the work in the most substantial and workmen like manner and both as regards materials and otherwise in every respect in strip accordance with the specifications. The contractor shall also conform exactly fully and faithfully to the designs, drawings and instruction in writing relating to the work signed by the Engineer-in-charge and lodged in his office and to which the contractor shall be entitled to have access at such office and to work the contactor shall be entitled to have access at such office for the which the purpose of inspection during office hour and the contractor shall if he so requires be entitle at his own expenses to make or cause to be and instruction as aforesaid.

Work to be executed in accordance with specification drawing and orders etc.

Clause 10 The Engineer in charge shall have power to make any alternation on or addition to the original specifications, drawings, designs and instructions that may appear to him necessary and advisable during the progress of work and the contractor shall be bound to carry out the work in accordance with any instruction which may be given to him in writing signed by the Engineer-in-charge a such alternation shall not invalidate the contractor and any addition work which the contractor may be directed to do in the manner above speciational work as part of the work shall be carried to do in the contractor on the same condition in all respects on which he agreed to the main work. The time for the completion of the work shall be extended in the proportion. And if the addition work included any class work for which no rate is specified in this contract then such class of work shall be carried out at the rates entered in the sanctioned scheduled of rates of the locality during the period when the work is being carried on and if such last mentions last mentioned class of work is not entered in the schedule of the date of his receipt of the order to carry out the work seven days of the date of his receipt of the order to carry out the work inform the Engineer-in-charge of the rate which it is his intention to change for such class of work of work and if the Engineer-in-charge does not agree to this rate he shall by notice in writing be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner as he may consider advisable.

Alteration in specification and designs do not invalidate the contract.

Extension of time in consequence of alterations.

No deviation from the specification stipulated in the contract not addition items of work shall any altered addition or substitution work be carried out by him unless the rates of the substitution altered or additional item have been approved and fixed in within by the Engineer-in-charge. The contractor shall be bound to submit his claim for any additional work done during any month on or before the 15 days of the following month accompanied by a copy of the order in writing of the Engineer-in-charge for the additional work and that the contractor shall not be entitled to any payment in respect of such additional work if he fails to submit his claim within the aforesaid period.

Rates of work not in estimate or schedule of rate, of the district.

Provided always that if the contractor shall commence work or c\incur any expenditure in regard thereof the rates shall have been determined as lastly hereinbefore mentioned, in such case he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of the determination of the rates as aforesaid according to such rate of rates as shall be fixed by the Engineer-in-charge. In the every of a dispute, the decision of the Superintending Engineer of the circle will be final.

Clause 11 It at any item after the commencement of the work the Government of Orissa shall for any reason whatsoever not required the whole thereof as specified in the tender to be carried out the Engineer-in-charge shall give notice in writing of the fact to the contractor who shall have no claim to any payment or compensation which soever on account of any profit or advantage, which he might have derived from the execution of the work in full but which he did not derive in consequence of the full amount of the work not having been carried out neither shall be have any original specification drawings, designs and instruction which shall involve any curtailment of the work as originally contemplated.

No compensation for alteration in or restriction of work to be carried out.

Clause 12 If it shall appear to the Engineer-in-charge or his subordinate in-charge of the work, that any work has been executed with unsound, imperfect or unskillful workmanship or with materials of any inferior description, or that any materials or articles provided by him for the execution of the work and unsound or of a quality inferior to that contracted for or otherwise not in accordance with the contract, the contractor shall on demand in writing from the Engineer-in-charge specifying the work materials or articles complained of not withstanding that the same may have been inadvertently passed certified and paid for , forthwith rectify or remove and reconstruct the work so specified in whole or in part, as the case may required, or as the case may be remove the materials or articles so specified and provide other proper and suitable materials or articles at his own proper charge and cost, and in the event of his failing to do so within a period to be specified by the Engineer-in-charge in his demand aforesaid, then the contractor shall be liable to pay compensation at the rate of one percent on the amount of the estimate for every day not exceeding ten days, while his failure to do so shall continue and n the case of any such failure the Engineer-in-charge may rectify or remove, and re-executed the work or remove and replace with others, the materials or articles complained of as the case may be at the risk and expense in all respect of the contractor.

Action and compensation payable in case of bad work.

Clause 13 All work under or in course of execution or executed in pursuance of the contractor shall at all times be open to the inspection or supervision of the Engineer-in-charge and his subordinates and the contractor shall at all times during the usual working hours, and at all other times at which reasonable notice or the intention of the Engineer-in-chare or his subordinate to visit the works shall have been given to the contractor wither himself be present to receive orders and instruction have a responsible agent duly accredited in writing present for that purpose orders given to the contractors agent shall be considered to have the same force as if they had been contractor himself.

Contractor or responsible agents to be present.

Work to be open to inspection.

Clause 14 The contractor shall give not less that five day's notice in writing to the Engineer-in-charge or his subordinate-in-charge of the work before covering up or otherwise placing beyond the reach of measurement any work in order that the same may be measured and correct dimensions therefore be taken before the same is so covered up or placed beyond the reach of measurement and shall not cover up or place beyond the reach of measurement, any work without the consent in writing of the Engineer-in-charge or his subordinate –in – charge of the work and if any work shall be covered up or placed beyond the reach or measurement without such notice having been given or consent obtained, them same shall be uncovered at contractor's expense, or in default there of on payment or allowance shall be made for such work or the materials with which the same was executed.

Notice to be given before work is covered up.

Clause 15 If the contractor or his work people, or servants shall break, deface injure or destroy any part of a building, in which they may be working or any building, road, fence, enclosure, or grass land or cultivated ground continuous to the premises on which the work or any part of it is a being executed, or if any damaged shall happen to the work, while in progress from any cause whatever or any imperfection become apparent in it within 24 months from the date of final certificate of its completion shall have been given by the Engineer-in-charge, as aforesaid, the contractor shall make the same good at his expenses, or in default, the Engineer-in-charge may cause the same to be made good by other workmen, and deduct the expense (of which the certificate of the Engineer-in-charge shall be final) from any sums that may be then, or at anytime thereafter may become die to the contractor, or from his security deposit or the proceeds of sale thereof, or of a sufficient portion thereof and the contractor shall be liable to pay any part of the expenses not so recovered by the Engineer-in-charge.

Contractor liable for damage done and for imperfection for 24 (Twenty Four) months after certificate.

Clause 16 The contractor shall supply at his own cost all materials (except such special material, if any, as may in accordance with the contract, be supplied form the Engineer-in-charge's stores), plants, tolls, appliances implements, ladders cordage, tackle scaffolding the temporary works requisite or proper of the proper execution of the work whether original, altered or substituted, and whether included in the specifications or other documents forming part of the contract or referred to tin these conditions or not or which may necessary for the purpose of satisfying or complying with the requirement if the Engineer-in-charge as to any matter as to which under this conditions, he is entitled to be satisfied, which he is entitled, to require together with carriage therefore to and form the work. The contractor shall also supply without charge the requisite number of persons with the means & materials necessary of he purpose of setting out works and counting, weighting and assisting in the measurement or examination at any time & from their to time or the work or materials. Failing his so doing the same may be provided by the Engineer-in-charge at the expensive of the contractor and the expenses may be deducted from any money due to the contractor under the contractor from his security. And in liable for damages arising from non-provision of lights fencing etc. deposit or the proceeds of sale thereof, or of a sufficient portion thereof. The contractor shall also provide all necessary fencing and lights required to protect the public from accident, and shall be bound to bear the expenses of defence of every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precaution, and to pay any damaged and

Contractor to supply plant, ladders, scaffolding etc.

And is liable for damage arising from non provision of lights, fencing etc.

cost which may be awarded in any such suit, action or proceedings to any such person or which may with the consent of the contractor be paid to compromise any claim by any such person.

Clause 17 No female labour shall be employed within the limits of a cantonment. The contractor shall not employ for the purpose of his contract any person who is below the age of twelve years, and shall pay to each labour of the work done by such labour, wages not less than the wages paid for similar work in the neighborhood.

The Executive Engineer shall have the right to enquire into the decided any complaint alleging that the wages paid by the contractor to any labour of the work done by such labourer, wages not less than the wages paid for similar work in the neighborhood.

The officer-in-charge of the work shall have the right to decide whether any labourer employed any the contractor is below the age of twelve year and to refuse to allow any labourer whom de decides to be below the age of twelve years, to be employed by the contractor.

(b) The contractor shall employ one or more Engineer Graduate or Diploma holder as apprentices at his own cost if the work as shown in the tender exceeds Rs.2,50,000/-. The apprentice's will be selected by the Chief Engineer, The period of employment will commence within one month after the date of work order and would last till the date when 90% of the work is completed. The fair wage to be paid to the apprentices should be not less than Rs. 2,50,000.00, the emolument of personnel of equivalent qualification employed under Government. The number of apprentices to be employed should be fixed by the Chief Engineer in a manner so that the total expenditure does not exceed one percent of the tendered cost of the work.

(c) Special class contractor shall employ under him one Graduate Engineer and two Diploma holders belonging to the state of Orissa, like-wise 'A' class contractor shall employ under him one Graduate Engineer or two Diploma holders belonging to state of Orissa. The employment of such graduate engineers and diploma holders under the contractor shall be full time and continuous and they shall not be superannuated, retired, dismissed or removed personnel from any state government or central government service, public sector undertakings, private companies and firms or be ineligible for appointment of Govt. The contractor shall pay them monthly emoluments which shall not be less than the emoluments of the personnel of equivalent qualification employed under the state Govt. of Orissa. The Chief Engineer, Roads, Orissa may however, assist the contractor with names of such unemployed Graduate Engineer and Diploma holders if such help is sought for by the contractor. The name of such engineering personnel appointed by the contractor should be intimated to the tender received authority along with such tender as to who would be supervision the work.

Employment of Graduate Engineers and Diploma Holders

Each bill of the special class or 'A' class contractor shall be accompanied by and employment tool of the engineering personnel together with a certificate of the Graduate Engineer or Diploma holder so employed by the contractor to the effect that the work executed as per the bill has been supervised by him.

Work not be sublet.

Clause 18 The contract shall not be assigned or sublet without the written approval of the Executive Engineer. And if the contractor shall assign or subject his contract, or attempt to do so, or become insolvent or commerce any insolvency proceeding or make any composition with his creditor , or attempt to do so, or if any bride, gratuity gift, loan, perquisite reward or advantage pecuniary or other wise, shall either directly be given. Promised or offered by the contractor, or any of his servant or agents to any public officer or person in the employ of Government in any way directly or indirectly interested in the contract, the Executive Engineer may there upon by notice in waiting rescind the contract and the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the disposal of Government and the same concurrence shall ensure as if the contract had been rescinded under clause-3 hereof and in addition the contractor shall not be entitled to recover or to be paid for any work therefore actually performed under the contract.

Contract may be rescinded and security deposit forfeited for subletting briding or if contractor becomes insolvent.

Clause 19- All sums payable by way of compensation under any to the these conditions shall be considered as reasonable compensation to be applied to the use of Government without reference to the actual loss or damaged sustained, and whether or not any damage shall have been sustained.

Sum payable by way of compensation be considered as reasonable without reference to actual loss.

Clause 20 In the case of tender by partners, any change in the constitution of the firm shall be forthwith notified by the contractor to the Engineer-in-charge for his information.
In case of failure to notify the change in the constitution within fifteen days, the Engineer-in-charge may by notice in writing rescind the contracts and the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the disposal of Government and the same consequences shall

Change in constitution of firm

ensure as it the contract has been rescinded under clause –3 hereof, and in addition the contractor shall not be entitled or recover to be paid for any works therefore actually performed under the contract.

Clause 21 All works to be executed under the contract shall executed under the direction and subject to be approval in all respect of the Superintending Engineer of the circle for the time being who shall entitled to direct at what point or points and in what manner they are be commenced and from time to time carried on.

Clause 22 When the estimate on which a tender is made include lump sumps in respect of parts of the work the contractor shall be entitled to payment in respect of the items of work involved or the part of the work in question at the same rates as are payable under this contract for such items or if the part of the work in the Engineer-in-charge mat by his discretion pay the lump sum amounts entered in the estimate and the certificate in writing of the Engineer-in-charge shall be final and conclusive the provision of this clause.

Lump sums in estimate

Clause 23 In the case of any class of work for which there is no such specification as is mentioned in rule I such work shall be carried out in accordance with the circle specification and in the event if there begin no circle specification then in such case the work shall be carried out in all respect in accordance with the instruction and requirements of the Engineer-in-charge.

Action where no specification

Clause 24 The expression “work” or “works” where used in these conditions shall unless there be something either in the subject or context repugnant to such construction be construed and taken to mean the work by or virtue or permanent and whether original altered substitute or additional.

Clause 25 Government shall be entitle to recover in full from the contractor any amount that the Government may be liable to pay under workmen’s compensation Act VIII of 1923, to any workman employed in a course of executive of any part of the work covered by these contractors.

Definition of works

Clause 26 That for the purpose of jurisdiction in the event of dispute if any the contract should be deemed to have been entered into within the state of Orissa and it is agree that neither party to the contract or agreement will be competent to bring a suit in requota the matters covered by this contract at place outside the state of Orissa.

Clause 27 The department will have the right to inspect the scaffolding and centering made for the work and can reject partly or fully structure of found defective in their opinion.

Clause 28 Sanitary arrangement will be made by the contractor at this own cost for his labour camp.

Clause 29 The contractor shall bear all taxes including sales tax, income tax, cess, royalty fair weather charges and tollage where necessary.

Clause 30 After the work is finished all surplus materials and debris to be removed by the contractor and preliminary work such as GSTs, mixing platforms etc. are to be dismantled and all materials removed form site. The ground up to 30 m. (100 feet wide from the building should be cleared and dresse

Clause 31 Codal/Contractual provisions regarding Price Adjustment in works contacr as per Works Deptt. O.M. 15847dt 19.11.2019.

ANNEXURE-A

Clause 31 :- Price Adjustment

31.1 : Contract price shall be adjusted for increase or decrease in rates and price of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given in following Paras.

(a) The price adjustment shall apply for the work done from the start date given in the contract data up to end of the initial intended completion date or extensions granted by the Engineer and shall not apply to the work carried out beyond the stipulated time for reasons attributable to the contractor.

(b) The price adjustment shall be determined during each month from the formula given in following Paras

(c) Following expressions and meanings are assigned to the work done during each month:

R= Total value of work done during the month. It would include the amount of secured advance granted, if any, during the month, less the amount of secured advance recovered, if any during the month. It will exclude value for works executed for extra items under variations.

31.2 : To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clauses in the contract, the unit rates and prices included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs

The formula (e) for adjustment of prices are:

31(a)(ii): Adjustment for Cement Component

Price adjustment for increase or decrease in the cost of cement procured by the contractor shall be paid in accordance with the following formula:

$V_c = 0.85 \times P_c/100 \times R \times (C_1 - C_0)/C_0$

V_c = Increase or decrease in the cost of work during the month under consideration due to changes in the rates for cement

C_0 = The all India wholesale price index for Ordinary Portland Cement (OPC) on 28 days preceding the date of opening of Bids as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

C_1= The all India wholesale price index for Ordinary Portland Cement (OPC) for the month under consideration as published by the Ministry of Commerce and Industry, Government of India, New Delhi.

P_c = Percentage of Cement Component of the work

31(a)(iii): Adjustment for Steel Component

(iii) Price adjustment for increase or decrease in the cost of steel procured by the contractor shall be paid in accordance with the following formula:

$V_s = 0.85 \times P_s/100 \times R \times (S_1 - S_0)/S_0$

V_s = Increase or decrease in the cost of work during the month under consideration due to changes in the rates for steel

S_0 = The all India wholesale price index for steel (Mild Steel long products) on 28 days preceding the date of opening of Bids as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

S_1= The all India wholesale price index for steel (Mild Steel long products) for the month under consideration as published by the Ministry of Commerce and Industry, Government of India, New Delhi.

P_s = Percentage of steel component of the work

Note: For the application of this clause, index of (Mile Steel long products) *has been chosen to represent steel group.*

18.11.19

31(a)(iv): Adjustment of Bitumen Component

Price adjustment for increase or decrease in the cost of bitumen shall be paid in accordance with the following formula:

$V_b = 0.85 \times P_b/100 \times R \times (B_1 - B_0)/B_0$

V_b = Increase or decrease in the cost of work during the month under consideration due to changes in the rate for bitumen.

B_0 = The official retail price of bulk bitumen at the IOC / BPCL depot at nearest center on the day 28 days prior to date of opening of Bids.

B_1 = The official retail price of bulk bitumen at IOC / BPCL depot at nearest center for the 15th day of the month under consideration.

P_b = Percentage of bitumen component of the work

31(a)(v): Adjustment towards differential cost of Pipes.

Price adjustment for increase or decrease in the cost of pipe shall be paid in accordance with the following formula:

$V_{pi} = 0.85 \times P_{pi}/100 \times R \times (P_{i1} - P_{i0})/P_{i0}$

V_{pi} = Differential cost of pipe i.e. amount of increase or decrease in rupees to be paid or recovered during the month under consideration.

P_{pi} = Percentage of pipe component of the work

P_{i1} = All India Whole sale price index of pipe for the period under consideration as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

P_{i0} = All India Whole sale price index of pipe on 28 days preceding the date of opening of Bids as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

18.11.19

31(a)(iv): Adjustment of Bitumen Component

Price adjustment for increase or decrease in the cost of bitumen shall be paid in accordance with the following formula:

$V_b = 0.85 \times P_b/100 \times R \times (B_1 - B_0)/B_0$

V_b = Increase or decrease in the cost of work during the month under consideration due to changes in the rate for bitumen.

B_0 = The official retail price of bulk bitumen at the IOC / BPCL depot at nearest center on the day 28 days prior to date of opening of Bids.

B_1 = The official retail price of bulk bitumen at IOC / BPCL depot at nearest center for the 15th day of the month under consideration.

P_b = Percentage of bitumen component of the work

31(a)(v): Adjustment towards differential cost of Pipes.

Price adjustment for increase or decrease in the cost of pipe shall be paid in accordance with the following formula:

$V_{pi} = 0.85 \times P_{pi}/100 \times R \times (P_{i1} - P_{i0})/P_{i0}$

V_{pi} = Differential cost of pipe i.e. amount of increase or decrease in rupees to be paid or recovered during the month under consideration.

P_{pi} = Percentage of pipe component of the work

P_{i1} = All India Whole sale price index of pipe for the period under consideration as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

P_{i0} = All India Whole sale price index of pipe on 28 days preceding the date of opening of Bids as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

18.11.19

31(a)(iv): Adjustment of Bitumen Component

Price adjustment for increase or decrease in the cost of bitumen shall be paid in accordance with the following formula:

$V_b = 0.85 \times P_b/100 \times R \times (B_1 - B_0)/B_0$

V_b = Increase or decrease in the cost of work during the month under consideration due to changes in the rate for bitumen.

B_0 = The official retail price of bulk bitumen at the IOC / BPCL depot at nearest center on the day 28 days prior to date of opening of Bids.

B_1 = The official retail price of bulk bitumen at IOC / BPCL depot at nearest center for the 15th day of the month under consideration.

P_b = Percentage of bitumen component of the work

31(a)(v): Adjustment towards differential cost of Pipes.

Price adjustment for increase or decrease in the cost of pipe shall be paid in accordance with the following formula:

$V_{pi} = 0.85 \times P_{pi}/100 \times R \times (P_{i1} - P_{i0})/P_{i0}$

V_{pi} = Differential cost of pipe i.e. amount of increase or decrease in rupees to be paid or recovered during the month under consideration.

P_{pi} = Percentage of pipe component of the work

P_{i1} = All India Whole sale price index of pipe for the period under consideration as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

P_{i0} = All India Whole sale price index of pipe on 28 days preceding the date of opening of Bids as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

18.11.19

31(b): Adjustment of Labour Component

Price adjustment for increase or decrease in the cost due to labour shall be paid in accordance with the following formula:

$V_L = 0.85 \times P_l/100 \times R \times (L_1 - L_0)/L_0$

V_L = Increase or decrease in the cost of work during the month under consideration due to changes in rates for local labour.

L_0 = The minimum wages for unskilled labour as Notified by Government of Odisha as prevailed on the last stipulated date of receipt of tender including extension, if any.

L_1 = The minimum wages for unskilled labour as Notified by Government of Odisha as prevailed on the last date of the Month previous to the one under consideration.

P_l = Percentage of labour component of the work.

31(c): Adjustment of POL(fuel and lubricant) Component

(v) Price adjustment for increase or decrease in cost POL(fuel and lubricant) shall be paid in accordance with the following formula:

$V_f = 0.85 \times P_f/100 \times R \times (F_1 - F_0)/F_0$

V_f = Increase or decrease in the cost of work during the month under consideration due to changes in the rates for fuel and lubricants.

F_0 = The official retail price of High Speed Diesel (HSD) at the existing consumer pumps of IOC / BPCL/ HPCL at nearest center on the day 28 days prior to the date of opening of Bids.

F_1 = The official retail price of HSD at the existing consumer pumps of IOC / BPCL/ HPCL at nearest center for the 15th day of the month under consideration.

P_f = Percentage of fuel and lubricants component of the work

Note : For the application of this clause, the price of High Speed Diesel oil has been chosen to represent fuel and lubricants group.

18.11.19

31(d): Adjustment for Plant and Machinery Spares Component

(vi) Price adjustment for increase or decrease in the cost of plant and machinery spares procured by the Contractor shall be paid in accordance with the following formula:

V_p- $0.85 \times P_p/100 \times R \times (P_1 - P_0)/P_0$

V_p- Increase or decrease in the cost of work during the month under consideration due to changes in the rates for plant and machinery spares

P_0 - The all India wholesale price index for manufacture of machinery for mining, quarrying and construction on 28 days preceding the date of opening of Bids as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

P_1 - The all India wholesale price index for manufacture of machinery for mining, quarrying and construction for the month under consideration as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

P_p- Percentage of plant and machinery spares component of the work

Note : For the application of this clause, index of manufacturing of machinery for mining, quarrying and construction *has been chosen to represent the Plant and machinery Spares group.*

Regarding wholesale price Index (WPI) for appropriate commodity for payment of price adjustment, due to change of base year of WPI from 1993-94 to 2004-05 & 2011-12, it is observed that, the commodity 'Bars and Rod', 'Cement', 'Heavy machinery and parts' included in the list of WPI 1993-94 series are not mentioned as such in the WPI 2004-05 & 2011-12 series. Therefore, the following items in the WPI 2004-05 & 2011-12 series shall be considered corresponding to items in WPI 1993-94 series:

Sl. No.	Item in WPI 1993-94 series	Item in WPI 2004-05 series	Item in WPI 2011-12 series
1.	Cement	Grey Cement	Ordinary Port land cement
2.	Bars & rods	Rebars	Mild steel long products
3.	Heavy Machinery & parts	Construction Machinery	Manufacture of machinery for mining, quarrying & construction.

31(e): APPLICATION OF ESCALATION CLAUSE:

The contractor shall for the purpose of availing reimbursement/refund of differential cost of steel, bitumen, cement, pipe, POL and wages, keep such books of account and other documents as are necessary to show that the amount of increase claimed or reduction available and shall allow inspection of the same by a duly authorized representative of Government and further, shall at the request of the Engineer-in-Charge, furnish documents to be verified in such a manner as the Engineer-in-Charge may require any document and information kept. The contractor shall within a reasonable time of 15 days of his becoming aware of any alteration in the price of such material, wages of labour and /or price of P.O.L. give notice thereof to the Engineer-in-Charge stating that the same is given pursuant to this condition along with information relating to there to which he may be in a position to supply.

Percentage Table

Sl No.	Category of works		% Component (cost wise)		
			Labour (P_l)	POL (P_f)	Steel (P_s)+ Cement (P_c)+ Bitumen (P_b) +Pipes (P_{pi}) + Plant & Machinery Spare &Component(P_p) + Other Materials*
1	R&B works (% of component)	Road Works	5	5	90
		Bridge works	5	5	90
		Building works	5	5	90
2	Irrigation works (% of component)	Structural work	5	5	90
		Earth, Canal & Embankment work	5	5	90
3	P.H. Work	Structural work	5	5	90
		Pipeline Work	5	5	Pipe- 70% *Machinery + Other material -20%
		Sewer Line	5	5	Pipe- 70% *Machinery + Other material -20%

*Note:- Further break up may be worked out considering the consumption of Cement, Steel, Bitumen, pipe and Plant & Machinery Spare Component in the concerned works and shall be provided in the bid document in shape of "**Schedule of Adjustment Data**" as an "**Appendix to Bid**". (enclosed herewith).

Appendix to Bid
Schedule of Adjustment Data

[For all works, adjustment factor for Labour and POL shall be considered @ 5% each. Steel, Cement, Pipes, other Materials and Machinery shall contribute to 90% of Price Adjustment and shall be calculated for each work separately during preparation of estimate, shall be approved by the authority during technical sanction as a "Schedule of Adjustment Data" and shall form part of the Bid Document]

Cl. No-31 of F2/ P1 Contracts Sl. No	Index description	Source of index	Base value*	Base Date*	Weightage of Item**
31 (a)(i)	Other Materials	All India Whole sale price index (all commodities) as published by the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
31 (a)(ii)	Cement	Whole sale price index for Cement (Ordinary Portland Cement) as published by the office the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
31 (a)(iii)	Steel	Whole sale price index for Steel (Mild Steel-Long Products) as published by the office of the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
31 (a)(iv)	Bitumen (VG-30)	Official retail price of bulk bitumen at the nearest IOC/ HPCL depot			
31 (a)(v)	Pipes	Whole sale price index for the type of Pipe under consideration, as published by the office the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
31 (b)	Labour	Minimum Wage notified by the Labour and Employee's State Insurance Department of Government of Odisha, India			5%
31 (c)	POL	Official retail price of HSD at nearest IOCL/ HPCL/ BPCL Consumer pump depot.			5%
31 (d)	Plant and Machinery	Whole sale price index for Manufacture of Machinery for Mining, Quarrying and Construction as published by the office the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
			Total		100%

* Values to be filled up at the time of calling of tender

**Values to be filled up in the bid document.

FAIR WAGE CLAUSE

Clause 32

(a) The contractor shall not employ for the purpose of this contract any person who is below the age of twelve years and shall pay to each labour for work done by such labour fair wages.

Explanation –" Fair Wages" means wages, whether for time or piece work prescribed by the state Public Work Department provided that where higher rates have been prescribed under the minimum wages Act,1948 wages such higher rates should constitute fair wages.

The Executive Engineer shall have the right to enquire into and decide any complaints alleging that wages paid by the contractors to pay labour for work done by such labour is less that the wages as per the sub-paragraph (a) above.

(b) The contractor shall not withstanding the provision of any contract to contrary, cause to be paid a fair wages to labourers indirectly engaged on the work including any labour engaged by his sub contractors in connection with the said work, as if the labourers had been immediately employed by him.

(c) In respect of all labour directly or indirectly employed in the works for the performance of the contractors part of this agreement, the contractor shall comply with or clause to be completed with all regulations made by Government in regard to payment of wages period deduction from wages, recovery of wages not paid and deductions unauthorized made, maintenance of wage register, wage cards, publications of scale of wages and other terms of employment, inspection and submission of periodical return and all other matters of a like nature.

(d) The Executive Engineer or Sub-divisional Officer concerned shall have the right to deduct, from the money due to the contractor, any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of no fulfillment of conditions of the contract for the benefit of the workers, nonpayment of wages or of deductions made from his or their wages, which are justified by their terms of the contract or non observance of the regulations. Money so deducted should be transferred to the workers concerned.

(e) Vis-à-vis, the Government of Orissa, the contractor shall be primarily liable for all payments to be made under and for the observance of the regulations aforesaid without prejudice to his right to claim indeminitary from his subcontractor.

(f) The regulations aforesaid shall be deemed to be a part of this contract and any breach thereof shall be breach of this contract.

<u>Orissa P.W.D Electricity Department contractor's labour Regulations.</u>

1. Short Title – These regulations may be called "The Orissa Public Works Department/ Electricity Department contractor's Regulations"

2. Definitions- In these Regulations, unless otherwise expressed or indicated the following words and expressions hall have the meaning hereby assigned to them respectively that s to say-

(1) "Labour" means works employed by a contractor of the Orissa Public Works Department/ Electricity Department directly or indirectly through a subcontractor or other person, by an agent on his behalf.

(2) "Fair wages" mean wages whether for the time of piece work described by the state Public Works Department/ Electricity Department for the area in which the work is done.

(3) "Contractor" shall include every person whether a subcontractor or headman or agent employing labour on the work taken on contract.

(4) "Wages" shall have the same meaning as defined in the payment of wages Act, and include item and piece rate wages, if any-

3. Display of notice regarding wages etc-

The contractor shall –

(a) before he commences him work on contract display and correctly maintain and continue to display and correctly maintain, in a clean and legible condition, in conspicuous places on the work, notices in English and in the local Indian Language spoken by the majority of the workers, giving the rate of wage prescribed by the state Public Works Department/ Electricity Department for the district where the work is done.

(b) Send a copy of such notice to the Engineer-in-charge of the work.

4. Payment of wages-

(1) Wages due to every worker shall be paid to him direct.

(2) All wages shall be paid in current coin or currency or in both.

5. Fixation of wages period-

(1) The contractor shall fix the wage period in respect of which the wages be payable.

(2) No wage period shall exceed one month.

(3) Wages of every workmen employed on the contract shall be paid before the expiry of the days, after the last day of the wage period in respect of which the wages are payable.

(4) When the employment of any worker is terminated by or on behalf of the contractor, the wages earned by him shall be paid before the expiry of the day successing the one on which his employment is terminated.

(5) All payments of wages shall be made on working day.

6. Wage book and wage card etc-

(1) The contractor shall maintain a wage book of each worker in such form as may be convenient but the same shall include the following particulars-

(a) Rate of daily or monthly wages.
(b) Nature or work in which employed.
(c) Total number of days worked during each wage period.
(d) Total amount payable for the work during each wage period.
(e) All deductions made format he wages with an indication in each case of the ground for which the deduction is made.
(f) Wage actually paid for each wage period.

(2) The contractor shall also maintain card for each worker employed on the work.

(3) The Executive Engineer may grant an exemption fro the maintenance of wage bond wage cards to a contractor who, in his opinion may noy directly or indirectly employ more than 10 persons of the work.

7. Fines deduction which may be made from wages-

(1) The wages of a worker shall be paid to him without any deduction of any kind except the following-

(a)Fines

(b)Deductions for absence from duty i.e. for the place or places where by the terms of his employment he is required to work. The amount of deductions shall be in proportion to the period for which he was absent.

(c)Deduction for damage to or loss of good expressly entrusted to the employed person for custody or for loss of money for which he is required to account where such damage or loss is directly attributable to his neglect or default.

(d)Any other deductions which the Orissa Government may from time to time allow.

(2) No fines shall be imposed on a worker and no deduction for damage or loss shall be made from his wages until the workers has been given an opportunity or showing cause against such fines or deduction.

(3) The total amount of fines which may be imposed in any one wage period on a work shall not exceeded an amount equal to five paisa in rupee of the wages payable to him in respect of that wage period.

(4) No fine imposed on any worker shall be recovered from him by installment, or after the expiry of 60days from the date on which it was imposed.

8. Register of fines etc-

(1) The contractor shall maintain a register of fines and of all deductions for damage or loss. Such Register shall mention the reason for which fine was imposed or deduction for damage or loss was made.

(2) The contractor shall maintain a list in English and in the local Indian language, clearly defining acts and omissions for which penalty or fine can be imposed. It shall display such list and maintain it in a clean and legible condition in conspicuous places in the work.

9. Preservation of Register –

The wage register, the wage cards and the register of fines, deduction required to be maintained under these regulations shall be preserved for 12 months after date of the last entry made in them.

10. Power of Labour Welfare Officer to make investigation or enquiry-

The Labour Welfare Officer or any other persons authorized by the Government of Orissa on their behalf shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of the fair wage clause and the provision of these regulations. He shall investigation into any complaint regarding default made by the contractor, subcontractors in regard to such provision.

11. Report of Labour Welfare Officers-

The Labour Welfare Officers or others authorized as aforesaid shall submit a report of the results of his investigation or enquiry to the Executive Engineer concerned, indicating the extent, if any, to which the default has been committed with a note that necessary deduction from the contractor's bill be made and the wages and other due be paid to the labourers concerned.

12. Appeal against the decision of Labour Welfare Officers-

Any persons aggrieved by the decision and recommendation of the Labour Welfare Officer or other person so authorized may appeal against such decision to be Labour Commissioner within 30 days from the date of decision forwarding simultaneously a copy of his appeal to the Executive Engineer concerned but subject to such appeal, the decision of the officer shall be final and binding upon the contractor.

13. Inspection of Registers –

The contractor shall allow inspection of the wage book and wage cards of his workers or to his agent at a convenient time and place after due notice is received. I or to the Labour Commissioner or any to the person authorize by the Government of Orissa on his behalf.

14. Submission of return –

The contractor shall submit periodical returns as may be specified from time to time.

15. Amendments –

The Government of Orissa may from time to time, add to or amend these regulations and on any questions as to the application, interpretation of effect of the regulations, the decision of the Labour Commissioner or any other person authorized by the Government of Orissa in that behalf shall be final.

(g) Under the provisions of the minimum wages Act, 1948 and the minimum wages (Central Rules 1950) the contractor is bound to allow or include to be allowed to the labourers directly or indirectly employed in the work one

day rest for six days continuous work and pay wages at the same rate as for duty. In the event of default the Executive Engineer or Sub-Divisional Officer concerned shall have the right to deduct the sum not paid on account of wages for weekly holiday to any labour and pay the same to the person entitled there to from any money due to the contractor.

(h) The contractor shall at his own expense provide or arrange for the provision of foot wear for any labour doing cement mixing work and black topping of roads (The contractor has undertaken to execute under this contract) to the satisfaction of the Engineer-in-charge and on his failure to do so Government shall be entitled to provide the same and recover the cost from the contractor.

(i) The contractor shall submit by the 4th & 19th of every month to the Engineer-in-charge a true statement showing in respect of the second half of the precedent month and the first half of the current month respectively (1) the number of labour employed by him on the work (2) their working hours (3) the wages paid to them (4) the accident that occurred during the said fortnight showing the circumstances under which they happened and the content of damage injury caused by them and (5) the number of female workers who have been allowed maternity benefit according the clause K and the amount paid to them failing which the contractor shall be liable to pay to Government a sum not exceeding Rs.50/- for each default to materially incorrect statement. The decision of the Executive Engineer shall be final in deducting from any bill due to contractor amount levied as fine.

(j) In respect of all labour directly or indirectly employed in the works for the performance of the contractor' part of this agreement the contractor shall comply with or cause to the complied with all the rule, framed by Government employed by the Orissa Public Works Department and its contractors. This will apply to work places having 50 or more workers.

Clause 34- The term and conditions of the agreement have been read/ explained to me and certify that clearly understand them.

DESIGN REQUIREMENT & GENERAL SPECIFICATIONS:

8.1 The rock strata at the foundation level should be got properly examined by the Geologist as per the direction of the Engineer-in-Charge & cost & expenditure there of should be borne by the contractor.

8.1.1 Plugging of the wells or concreting of the open foundation & anchoring of the foundation in the rock strata are to be done in the dry conditions under supervision of the Engineer-in-Charge unless otherwise so directed in writing by the Engineer-in-Charge & for such a type of work the contractor should bear all the costs & expenditure that may be required.

8.1.2 The foundation level should not be in any way higher than the levels indicated in departmental drawing. The foundation for the piers & abutments should be taken into hard rock strata by a minimum of 0.6 mtr. all along its periphery in case of open foundation & 0.6mtr. into hard rock in case of well foundation.

8.2 Details of drawing & specification as are not supplied with the tender for the work may be seen in the office of Executive Engineer as mentioned in column 8 of TCN during the working hours & days. Copies of specification as mentioned are available for perusal but not for sale. Complaint at future date that plans & specifications have not been seen can not be entertained.

8.2.1 If any other information regarding plans & specifications etc. are require before submission of the tender the same can be obtained from the office of Executive Engineer as mentioned in column 8 of TCN.

8.3 The detailed specification for all items of works involved in the work shall be in accordance with the following subject to the approval of Chief Engineer.

(a) I.S.I & IRC specification & Bridge Code sections I,II & III amended from time to time.

(b) Designs criteria for priestesses concrete bridge (post tensioned concrete revised & construction of priestesses concrete post tensional) bridges MOST D.O No.H-Vi 50 A dt. 2.11.83)

(c) For cast steel rollers & rockers bearing should conform to MOST (Road wing) specification for road bridge works & IRC section V.

(d) Orissa detailed standard specification.

(e) Specification for roads & bridges issued by the MOST & Govt. of India also other circulars issued by the MOST from time to time specially MOST circulars No PL 87 (16)/75 dt.26.3.75 regarding shear reinforcement.

(f) Supplements more works for design details, importance of bridge structure on NH & the centrally financed schemed MOSTNH 50 (3) Vol.II dt.13.1.88.

SHEAR REINFORCEMENT OF PRESTRESSED CONCRETE MEMBERS

(i) Clause 14 of the IRC 18-1965 with sub clause 14.1 & 14.2 inclusive shall be considered inoperative & the decision of shear reinforcement of prestresed concrete members shall further conform to the design rules laid down in circular No.PL-87 16/75 dt.26.2.75.

(ii) The applicability of the design rules or principles defined above will be strictly limited to design of shear reinforcement of priestesses concrete members only & shall supercede clause 14 of IRC 18. 1965 only without any prejudice to other stipulations of IRC codes forming part of the contract. The design of shear reinforcement of reinforced concrete members shall conform to relevant specification of IRC 21:1272 in all respects.

(g) I.S.I. specifications for plain reinforced concrete.

(h) Any other standard code or specification prescribed by the Chief Engineer, Bhubaneswar, Orissa.

In case of variation in the provisions of codes or specifications of the works referred above the decision of the Chief Engineer, Rural Works, Orissa, Bhubaneswar as regards the specification to be adopted in the work shall be final, conclusive & binding on all parties concerned. Every tenderer must examine the aforesaid specifications before submitting his tender. The Chief Engineer or his authorized subordinates reserve the right without impairing the contract to make such increase or decrease in quantities or items of work mentioned in the schedule attached to the tender notice as may be considered necessary to complete the work duly & satisfactorily. Such increase shall in no case invalidate contract. It shall be definitely understood that the Govt. does not accept any responsibility for the correctness of the quantity shown in the schedule. The schedule is liable to alternation by omission or additions, deductions. Such omissions, additions or deductions to any extent shall in no case invalidate the contract & no extra monetary compensation will be entertained.

8.4 ROADS WAYS : The bridge shall have a clear road way 7.50m. between the road kerbs to accommodate two lanes of traffic. There will be no longitudinal gradient.

The railing shall be in accordance with MOST drawing No. . . . . subject to approval of Chief Engineer, Rural Works, Bhubnaneswar, Orissa.

The architectural of the railing must be in conformity with the super structure & the surroundings.

8.5 The bridge shall have reinforcement controlled concrete of required cube strength of 150mm. cube having minimum cement dosage per cum of concrete as specified in the code of practice subject to decision by the Chief Engineer.

8.5.1 The construction of well-staining by injecting cement grout in to coarse aggregate place in position shall not be permitted.

8.5.2 Reinforcement consisting of vertical bond rod in the staining of the well shall not be less than 9Kg/ Cum. This reinforcement shall be provided on both faces of the well adequately tied up with hoop steel not less than 3.26 kg. per Cum. The cover over the bond rods shall not be less than 75mm. (3”).

8.5.3 The minimum reinforcement in well curb shall be 72 kg. per Cum & may further increased without extra cost to the deptt. if local conditions demand a more robust construction. Arrangements or reinforcement in the well curb shall be as per the design approved by the Engineer-in-Charge.

The thickness of bottom & top plug in case of well filled with sand should be as per departmental drawing.

8.6 The rates should cover sinking of wells through all types of soil such as sand, clay, kankar, silt, pebbles, boulders & through rock of all types using all methods of sinking including blasting etc. & any other means to reach the foundation level as per approved design & while adopting any of the procedures of sinking viz. blasting etc. the contractor should remain fully liable & make good the damage to the entire satisfaction of the Engineer-in-Charge & all cost & expenditure required for making good the damages should be borne by the contractor.

For open foundation also excavation upto this designed foundation level over the required area shall be done by all methods & in all types of strata including rock of all types & soil of all types including all costs of materials, labour & allied arrangements e.g. dewatering, blasing etc. or any other method or methods required to lay the foundation at the specified designed level. Cost of making islands, coffer dams or diversions of water making any other arrangements necessary for successful carrying out in the foundation & sub-structure & provisions of adequate safe means of inspection etc. shall be included in the rates for these works.

8.7 Removal of any trees, logs of trees or isolated boulders & other obstruction etc. in the case of open or well foundations shall be included in quotation & should be done without any extra cost to deptt.

8.7.1 The permissible tilt & shift shall not exceed 1 (horizontal) in 80 (vertical) & the shift at the well base shall not be more than 150 mm in any resultant direction.

For the well steining & well cap the permissible tolerances shall be guided by sections 1212 to 1215 of MORTH specifications for roads & bridge works (Fourth Revision)

8.7.2 The depth of sinking of well shall be measured in accordance with clause 6.21 of special condition of DTCN.

8.7.3 In case of open foundation if good sound hard rock is met with, the foundation should be taken by minimum of 0.6 mtr. inside rock & suitably anchored & properly designed. Suitable numbers of 32mm. dia anchor bars should be provided in each foundation to ensure proper embedment in rock strata.

8.7.4 The bottom of well cap shall be kept 6” higher than the low water level or sub-soil water level whichever is higher.

8.8 The cost of construction of coffer dams or islands or work of open excavation or dressing of labour of laying well centre must be borne by the contractor & no extra payment will be made for the same by the deptt.

8.9 In the event of well being rejected on account of non-compliance with permissible limits of tilt & or shift the contractor shall dismantle the rejected well to the extent required & remove the debris at his own cost. He shall further at his own risk & expense complete the bridge with modified span arrangement acceptance to the Engineer-in-Charge.

8.10 The bottom plugs of well under water should be of controlled concrete of cubes strength 150 kg/sqcm. on 28 days having a minimum cement dosage of 363 kg. per cum of concrete. These will be concreted by tremie pipe or any other approved method. Any concreting beyond the approved sump should be filled up with the controlled concrete of above quality having minimum cement dosage of 363 kg./cum of concrete at the cost of contractor.

8.11 If any case, the porosity test for testing the quality of the bottom plug is considered essential, the test shall take the shape of dewatering the well to such a depth as not to lead to the damage of the bottom plug & observance of the rate of recuperation. The rate of recuperation shall not exceed 25mm. per hour. The test should be carried out the contractor without any extra cost to the department.

8.12 To avoid any damage to the curb & staining of the wells during blasting of the rock for sinking of the wells, a steel plate shield should be provided both inside & outside the well curbs as may be directed by the Engineer-in-Charge & cost of all material & all expenses should be included in the rates quoted by the contractor. On the outside it should extend to the heights of the curb & inside it should extend 1.50m. above the top the curb. The thickness of steel plate shield should be 8mm.

8.13 No parts of the bearing for the superstructure shall be allowed to rest on the noses of the piers.

8.14 **ABUTMENTS:-** These may be of reinforced cement concrete of controlled quality of minimum cube strength of 200 kg. per sqcm at 28 days of 6" cube having minimum cement dosage of 402 kg/cum of concrete. The abutment caps should be of RCC controlled quality of minimum cubes strength 200 kg/sqcm at 28 days on 6" cubes. The reinforcement in abutments & caps will be as per IRC standard code of practice for road bridge section-III. Alternatively these may be provided as per enclosed drawing & specification.

8.15 BEARING:- Bearing proposed shall be of mild steel. The mild steel roller & rocker bearing shall conform to MOST (Roads wing) specification for road & bridges and IRC section-V and shall be designed according to the formula, acceptable to the Engineer-in-Charge. Use of segmental roller should not be permitted. Access form superstructure to roller & rocker for inspection should be provided.

8.16 If the number of rollers in an assembly of rollers exceeds two, the permissible stress on each roller shall be reduced by 20%.

8.17 Mid steel mesh reinforcement as stipulated in IRC codes shall be provided in concrete of caps of piers & abutments immediately in contract with the bearing to ensure proper distribution of heavy load.

8.18 Lugs & grooves shall be provided in the bearings to prevent them form skewing or getting out of alignment.

8.19 Inspection of bearing by the Director General of Supplies & Disposal during manufacture is essential & besides arranging & affording all facilities for the purpose of inspection & test of all or any of the components of bearing & metal used therein contractor shall have to produce necessary certificates & the inspection marks at their own cost of X-ray of Gama-rays examination & load test of bearing if casting thickness more than 8 inches and/or ribbed typed of bearing manufactured by welding shall have to be carried out at contractor's cost.

Use of RCC or motor of neoprene or rubber bearing will not be permitted.

8.20 For bearing s combination plates of different metals which are likely to result in electrolytic action shall not be permitted for example copper plates interposed between mild steel plates shall not be permitted.

8.21 In case roller or rockers are provided cut rollers will not be accepted. On no account two bearing to be provided in any pier should be of similar type. In case rocker is provided on abutment, the abutment has to be specially designed. The tenderers should indicate clearly in their drawings the type & locations of the bearings.

8.22 SUPERSTRUCTURE:- The girders of superstructure may be of RCC (controlled) or priestesses concrete.

8.23 REINFORCED CONCRETE:- For RCC standard specification & code of practice for road bridges & late sections shall be followed. Concrete for RCC or prestresed concrete work shall conform to controlled concrete as specified in IRC Bridge Code Section-III

8.24 PRESTRESSED CONCRETE:- The design criteria for priestesses concrete road bridge (post tensioned concrete of IRC Code 18/1965 shall be followed). The circular of MOST will supercede the provision of codes.

8.25 The reinforcement for shear should conform to the latest circular of MOST (No.PL 87) (16/75 dt. 26.3.75)

OTHER ITEMS

8.26 APPROACH SLABS:- RCC approach slab of 6" (150mm.) thickness reinforced with half inch (12mm.) diameter bars both a top & bottom at 6"(150mm.) centers spanning both ways at least 3.5 mtr. Long & covering the full width of formation should be provided behind the abutments.

8.27 The wearing coat shall be of 75mm. thick cement with temperature reinforcement. All the materials & workmanship should be in conformity with the relevant IRC specifications. The camber should be 1:60 or as directed by the Engineer-in-Charge.

8.28 DRAINAGE OUTLET:- There shall be sufficient number of drain holes as directed by the Engineer-in-Charge by side of the kerbs of not less than 5 inches internal diameter at the inlet increasing to 6"

diameter at the exit lined with cast iron pipes & top of holes fitted with heavy type (minimum thickness 12m.) hinged C.I. grating with drip moldings.

8.29 EXPANSION JOINTS:- To be provided as per standard design acceptable to the Engineer-in-Charge.

8.30 WING WALLS:- Suitable designed wing walls to retain earth of the approach embankment must be provided along with the abutment. Alternatively, these may be provided as per plan & specification of the enclosed drawing & schedule of quantities. No special condition with extra cost or rebate is applicable.

8.31 If tendered wishers to introduce any condition not specified by the Deptt. in the tender documents, he must invariably give the definite financial effect of each of these conditions so that if he is permitted to withdraw the conditions the financial effect of withdrawing such conditions can be assessed without making any further reference to the tenderer. Alternatively he should quote a lump sum of unconditional tender & indicate in the forwarding letter the rebates that he would be prepared to accept for withdrawing any one or more of the conditions attached to the tender. In the absence of such clarifications or such financial assessment, the tender shall be deemed to be incomplete & shall be liable to be rejected. These conditions should be submitted in separate envelopes.

8.32 It shall be presumed that the tenderer has satisfied himself as to the nature & location of works, boring date, general & local conditions, particularly these bearing on transport availability, storage & handling materials, weather conditions & current in the river, availability of sweet water etc. & has established in costs accordingly Deptt. will bear no responsibility for the lack of acquaintance of these conditions on the part of the tenderer. The consequence of the lack of such knowledge will be at the risk & cost of the tenderer.

8.33 The information & data shown in the contract documents are meant for general guidance only. The deptt. will not be responsible for the strict accuracy thereof for any deduction, interpretation or conclusion drawn there from by the tenderer.

8.34 Preparation of working plans & detailed design depend upon the strength parameter & subsoil exploration. It is the responsibility of the contractor to submit the same, wherever necessary to the Chief Engineer,Rural Works, Bhubaneswar, Orissa, for finalization of design & drawing in time. No work shall be started unless approval of the Chief Engineer, Bhubaneswar, Orissa is obtained.

8.35 After approval of the Chief Engineer, Rural Works, Bhubaneswar, Orissa, 10 copies of the approved working drawing & detailed designs shall be submitted to the Chief Engineer,Orissa, for distribution to the field Engineers & for record.

The contractor shall not claim any extra payment for the same. The non-procurement of the approval of the Chief Engineer,Rural Works.Bhubaneswar, Orissa, to these working drawing & detailed design will be entirely at the risk & cost of the contractor. Any delay in the approval of the design & drawings for reasons whatsoever on any circumstance not withstanding the fact that the designs will be the complete responsibility of the contractor. The Chief Engineer, Orissa may direct contractor any additional alternation, modification etc. in design & specification which the contractor has to carry out at his own cost.

8.36 The contractor shall submit with the time stipulated by the Engineer-in-Charge the details of actual methods that would be adopted by the contractor for the execution of each item at each of the locations supported by necessary detailed drawings & sketches including those of the plant & machinery that would be used, their locations, arrangements for covering & handling materials etc. & obtain prior approval of the Engineer-in-Charge who reserves the right to suggest modifications or make complete change in method proposed by the contractor whether accepted previously or at any stage of the work to obtain the desired accuracy, quality & progress of work which shall be final & binding on the contractor.

8.37 ERROR, OMISSIONS & DISCREPANCIES:

(a) In case of errors, omission & disagreement between written & scaled dimensions on the drawing or between the drawing & specification the following orders of preference shall apply.

(b) Between the actual scaled & written dimension or description on drawing the latter shall be adopted.

(c) Between the written & shown description or dimension on the drawing the letter shall be adopted.

(d) In all case of omissions or doubts, discrepancies with the dimensions or description of any items reference shall be made to the Engineer-in-Charge whose elucidation, elaboration or decision shall be considered as authentic. The contractor shall be held responsible for any error that may occur in the work through lack of such reference & precautions.

8.38 MATERIALS TO BE SUPPLIED BY DEPARTMENT:

The supply of materials if available by deptt. as mentioned in schedule for the actual work as well as for ancillary items certified by the Engineer-in-Charge relating to the work shall be according to the following details. The deptt. will try to supply in time to contractor's requirements of these materials, if available. But the contractor will not have any claim whatsoever if the supply is not according to his demands.

8.39 MILD STEEL AND FOR STEEL

(a) Reinforcing bars if available shall be supplied by the deptt. at the departmental stores at rates as stipulated under Appendix-A. The bars shall be supplied in length as receipt from the manufacturers & the contractor will have to bear the charges of cutting, straightening, bending, binding, tying, jointing, welding etc.

(b) The contractor shall within the period stipulated by the Engineer submit an estimate of his requirement of steel & shall intimate his firm quarterly demands for not less than six months in advance of planned use or as may otherwise be stipulated an the modes & forms as may be specified by the Engineer. Any change in total requirements of each category & size of steel items originally intimated forthwith to the Engineer himself or otherwise, the contractor shall be responsible for all consequences that may arise out of his failure to comply with these requirement or the procedures that may be laid thereof.

(c) The contractor shall make suitable arrangements for storage of the steel supplied & the Engineer or his representative shall have authority at all times to inspect the storage arrangement if any & the contractor shall comply with the same. The storage arrangement shall allow convenient inspection & check of materials.

(d) The contractor shall at all time maintain proper records showing the basis of the indents, the receipt & the utilization of the steel & the steel supplied by the deptt. & shall at all times be open for inspection by the Engineer or his authorized representatives.

(e) The indents shall as far possible be kept commensurate with actual need, if however at any time any items supplied by the deptt. are found to becomes surplus owing to any change in design or for the benefit reasons the same shall be taken back by the Engineer-in-Charge in the stores of issue. The contractor shall be entitled to payment thereof at the same rate at which they are brought by the contractor from the deptt. or at market rate which ever is lower. The return of all such steel items shall be in size & length as supplied previously to the contractor, thought the Engineer may in his discretion take over such cut piece lengths of more lengths of more than 3ft. as he may think fit.

8.40 **HIGH TENSILE STEEL** (Please refer to para 3.37 (b) Method of issue)

8.40.1 The cost of materials to be recovered from the contractor's running bills will be calculated on the basis of the material actually used upon that & not on the basis of materials issued.

In case the contractor supplied any materials, it has to be got approved by the Engineer-in-Charge both as regards to its quality, specification, strength & other test as well as its costs etc. The contractors shall carry out any test in any laboratory in India as may be directed by the Engineer-in-Charge & furnish the test result to the deptt. at his own cost. In no event any materials not approved by the Engineer can be used by the contractor & in the event of any such materials has been used by the contractor prior to approval of the Engineer-in-Charge, such materials have to be removed at the cost of contractor.

8.41 ASSISTANCE IN PROCUREMENT OF PRIORITIES PERMITS, IMPORTS LICENCES EXCHANGES FACILITIES ETC.

The Engineer on request by the contractor will, if in his opinion the requests are reasonable & in the interest of the work & its progress may assist the contractor in shape of issuing essential certificates of importing HT. Steel & accessories & necessary plant & machinery or material not locally available, but responsibility for release of foreign exchange shall not rest with the deptt. The deptt. will not, however, be

responsible for the non-availability of the facilities or delay on this behalf & no claims either in shape of cost or time on account of such failure or delays shall be against the deptt.

If the contractor removes any material or stock supplied by the deptt. form the site of work with a view to dispose of the same dishonestly, he shall in addition to pay other liabilities, civil or criminal arising out of the contract be liable to pay penalty equivalent to five times the price of the said material or stock according to the stipulated rates & the penalty so imposed be recovered from any sum that may be then or at any time thereafter be due to the contractor or his security deposit.

8.42 **OTHER MATERIALS :** The material shall conform to the I.S specification for the relevant items.

The stone to be used on the work under these specifications for obtaining coarse aggregate etc. shall be, unless otherwise specified as only of granite of sound, hard, durable & tough quality conforming to the test requirement & approved by the Engineer-in-Charge. Stone chips or stone metal for priestesses concrete, wearing coarse asphalt concrete, RCC & mass concrete should be collected from approved quarries. In either case the stone chips or metal or boulders shall be subject to the following tests & requirements & subject to the approval of the Engineer-in-Charge.

No materials form the interpretable layers or brachiated zones or other varieties of stones shall be used. The stone shall be firm or medium grained hard black in colour breaking with a clean fracture such as to make a ringing sound when struck with a hammer. The coarse grained varieties shall not be used.

The stone to be used shall be free from decay & holes, flaws crack & the detects & must as far as possible be of uniform colour & texture. Porous stones having any skin or earth cover shall not be used. The quarries from which the stones are obtained shall be got approved by the Engineer.

8.43 COARSE AGGREGATE FOR CONCRETE:

The terms coarse aggregate applies to crushed stones ranging sizes from 3/16” to 1/1.5”.

The aggregates shall be composed of clean uncoated cubic shaped pieces obtained by crushing stone approved by the Engineer-in-Charge & conforming to the specification for here in before said.

The coarse aggregates shall be free from all deleterious & objectionable matter. In case the aggregate is not considered to be free from dust, dirt etc. by Engineer, the contractor shall get the aggregate screened, washed & treated as directed.

Crushing & grinding: The stone shall be crushed in approved stone crusher & the different sizes of the crushed stone shall be separated by Mechanical screens. The croes aggregate shall be separated in to nominal size as follows:

Designation of size	Normal size range
3/8” aggregate	3/16” to 3/8”
3/4"’ aggregate	3/8” to 3/4"
1.5” aggregate	¾” to 1.5”

The coarse aggregate for concrete shall be made of crushed stone of different size in such proportions as specified or as may be advised by the Engineer from time to time. Grading of aggregate should be such as to produce a dense concrete of the specified strength which will work readily into position without segregation & without the use of excessive water content.

Care shall be taken in screening & stacking of the aggregate so as to avoid intermixture of different mixes & inclusion of foreign materials.

8.44 FINE AGGREGATE:

Fine aggregate or sand used for mortar & for concrete shall be the natural river sand. It shall be free from injurious amount of soft & flaky particles & free from vegetable or organic or clayey materials, loam, mica, salts & other deleterious substances. The sum of the percentage of all deleterious substance shall not exceed 3% by weight. However, the contents of the common salt shall be nil.

The sand shall be well graded & when tested by standard sieves shall conform to the following limits of gradation. The gradation shown in the table below are indicative only the best gradation will be determined by the Engineer after test, if necessary & the contractor shall follow the same.

A.S.T.R. standard sieve No	Percentage Passing	Percentage retained
1	**2**	**3**
No. 4	95-100	0-5
No. 8	8-90	10-20
No. 16	50-70	20-50
No. 30	50-60	40-70
No. 50	15-35	65-68
No. 100	5-10	90-95

In addition to the above gradation, the sand will have finishes modulus within the limit determined by the Engineer & shall not contain more than 10% by weight of the grains passing through No.100 sieve.

8.45 WATER :

(a) The water used in concrete & mortar & for washing any of the ingredients or surfaces coming in contract with mortar or concrete shall be sweet, portable water clean & free from earth & vegetable salt, organic, matter, acid & alkaline substance in solution or in suspension. The water used shall be that approved by the Engineer-in-Charge.

(b) Water for curing shall be sweet water only. The water used for curing shall be clean, free from salt, organic etc. & shall be as approved by the Engineer-in-Charge.

8.46 SAMPLES AND TESTING OF MATERIALS :

All materials to be used on work such as cement, sand, coarse aggregate, reinforcement etc. shall comply with the requirement of the Engineer-in-Charge & shall pass the test & analysis required by him or as specified by the IRC standard specifications & code of practice for road bridge or ISI specification acceptable to Engineer-in-Charge as equivalent there to or in the absence or such authorized specification, such requirements, tests & analysis may be specified by the Engineer-in-Charge.

The contractor shall at his risk & cost make all arrangements & shall provide for all such facilities as the Engineer may require for collecting preparing & forwarding required no of samples for test or for analysis & to such places as may be directed by the Engineer-in-Charge.

The contractor shall if & when required submit samples of materials to be tested or analysed & if so direct shall not make used or incorporate in the works any material to be represented by the samples until the required test or analysis have been made & the materials accepted by the Engineer-in-Charge.

The contractor shall establish a field laboratory to carry out all preliminary tests to work out grading & proportioning of aggregate in order to obtain & maintain uniform quality of work. Six(6) inches cubes testing machine shall be installed to ascertain the strength of concrete from time to time.

The contractor shall all material, labourers & testing machines for preparation & testing samples as required by the Engineer. The manner of tests & standard of acceptance shall be according to “Standard specification & code of practice for road & bridge Sec. III (IRC 21-1972)

Reinforced or plain concrete used on the bridge shall be got approved by the Engineer.

The correct proportions & the total amount of water for the mix will be determined by means of preliminary test & shall be got approved by the Engineer. However, such approval does not relieve the contractor from his responsibility regarding the minimum strength requirement.

All proportioning of aggregate shall be done by weight/volume as instructed by the Engineer.

All mixing shall be done by mechanical means in approved mixer unless specifically exempted.

The form work used shall be made of steel or with lining of steel unless specifically exempted by the Engineer, in which case, the form work shall be with seasoned salwood planks & bullahs with sufficient bracing & ties & made water tight & shall be made sufficiently rigid by the use of ties & bracings to prevent displacement or sagging between supports & withstand all pressure, ramming & vibration without deflection form the prescribed lines occurring during & after placing of concrete.

The concrete shall be mechanically vibrated for proper compaction by method, approved by the Engineer.

In addition, the routine tests of concrete, special test of high tensile steel reinforcement & high tensile steel wires to be carried out without extra cost to deptt. Whenever required by Engineer.

The concrete shall be cured only be sweet potable water for full 21 days after the time of its placement.

8.47 LOAD TEST ON WELLS FOR ABUTMENTS, STRUCTURES:

The contractor shall provide necessary materials, labour & make arrangement for carrying out the test as required. The load in general shall be in the form of sand bags. However, the contractor shall apply the test load in any other manner entirely at his own risk & cost. The contractor shall have to make necessary arrangements for observations, platforms for taking the deflection by deflectometer etc. at his own cost to the entire satisfaction of the Engineer-in-Charge. The test load shall be kept for at least 24 hours or as directed by the Engineer-in-Charge before removal. The application & removal of the test load shall be in increment or decrement of 20% at interval of not less than 12 hours. The deflection should be observed at salient points & compared with the computed deflections & the two should closely agree.

8.48 The Engineer-in-Charge may also instruct that a load test at no extra cost to the deptt. shall be made on any part of the bridge structure if in his opinion such a test be deemed necessary for any one or more of the reasons specified below.

(i) The work test cubes failing to attain the specified strength.
(ii) Shuttering being prematurely removed.
(iii) Concrete being improperly cured.
(iv) Any other circumstance(s) attributable to the negligence on the part of the contractor which in the opinion of Engineer-in-Charge result in the structure or part thereof being less than that of accepted strength,

8.49 After the test, the contractor shall submit a report on the result of the test. The Engineer-in-Charge shall then communicate as to whether the test has been satisfactory or not or any further tests or reconstruction or strengthening are necessary to correct any faults revealed by the test.

Any defects noticed in the structure or any damages done to the bridge at the time of testing which affects or is likely to affect the strength of the bridge shall be rectified by the contractor at his own cost by remedial measures or replacement as approved by the Engineer-in-Charge.

When the tests are declared by the Engineer-in-Charge as having been completed, the contractor shall remove all loading which might still be on the bridge as well as on the surroundings.

8.50 In the event of the load testing ordered by the Engineer-in-Charge, the contractor shall :

(i) Prepare all necessary calculation & details of arrangements for such load testing well in time. The magnitude the application of loads, duration of keeping the load, the equipment to be provided & the observations to be made during & after placing the loads in position etc. shall be provided.

(ii) Make all necessary arrangements for the observation, centering equipment etc. that may be needed for measuring the settlement, deflection etc. requirement for the test to the entire satisfaction of the Engineer-in-Charge.

(iii) Provide labour & make all observations during the test.

8.51 The contractor shall have to make & maintain all diversion including light barriers etc. as directed by the Engineer-in-Charge if construction of the bridge disturbs the traffic.

8.52 Deptt. will have the right to inspect the specifications & centering made for the work & can reject partly or fully such structure if found defective from safely or any other grounds. The contractor has to carry out any such detailed instruction from the Engineer-in-Charge or his authorized subordinates regarding such structure. All the centering & shuttering should be got approved by the Engineer-in-Charge before the concreting is done.

The detailed design & drawing of the launching girders & its components should be furnished by the contractor to the Engineer-in-Charge & should be got approved by him before use in the work. Any addition or alternation as may be required by the Engineer-in-Charge shall have to be carried out by the contractor at no extra cost to the deptt. The contractor shall remain liable for any loss or damage due to use of such launching girder & shall make good the losses at his own cost & no monetary claim what-so-ever will be entertained by the deptt.

8.53 **DRAFT SPECIFICATION FOR THE USE OF PLUMS IN CONCRETE**:

(1) It is permissible to use blocks of stone or broken cement concrete is mass concrete work with a view to effect economy. These blocks are referred to as plums & should not have sharp corner of soft materials embedded in them nor should they have earth or clay adhering to them.

(2) During concreting, first 2 to 3ft. of concrete of the specification mix should be laid at the bottom. While top layers of this concrete are still wet, the plums should be laid so that they are slightly embedded in the wet concrete. Normally these plums will sink in sufficiently under their own weight in all but dry. In order to avoid submergence in the concrete the plum should not be placed till the concrete has commenced to stiffen. Alternatively thicker layer or concrete should be provided in order that the partly submerged plums may not be too near the lower face of work. Complete submergence should be avoided.

(3) All plums should be partly visible before the next layer of the concrete is placed.

(4) The thickness of the next & successive layers should be at best thrice that of the largest plum.

(5) While placing the plums care should be taken to see that clear distance between any two plums is not more than the greatest width or thickness of either of the either of the plums.

(6) The clear distance between any plums & the finished face of the works should not be less than twice the greatest width of the plums.

(7) The total volume of the plums should not exceed 15% of that of the mass concrete.

(8) If plums of stratified stones are used, they should be laid on their natural bed.

(9) If broken concrete is used it should be free from loose pieces.

(10) Stones with hollowed faces should be laid with the concavity upward.

8.54 Calculation for foundation pressure & staining stresses accounting for the actual tilt(s) or shift(s) shall be given by the contractor & any remedial measures required to bring the stresses within permissible value (such as increase of divisions of the well cap, provision of dummy weight on the well caps, adjustment of span length etc.) shall be carried out by the contractor without claiming extra, cost to the deptt. further the contractor should pay a penalty as above.

8.55 It must be definitely understood that the Govt. does not accept any responsibility for the correctness of level & classification of soil shown in the boring charts. During the time of execution, boring in each well should be taken to obtain undisturbed soil samples for the testing soil characteristics upto RL 1.5 D. below foundation level (where D is external diameter of the well) at an interval of (to be decided by the Engineer-in-Charge) 1.5 M/change of strata. If necessary, plate bearing test/S.P.T tests should also be conducted to ascertain safe bearing capacity of soil at the foundation as directed by the Engineer-in-Charge. The cost of all the above operation including tests of soil samples should be borne by the contractor.

8.56 All designs of bridge components shall be got approved by the Chief Engineer, or any other officer authorized, by him.

8.57 All materials including the size & type of coarse & fine aggregates shall be approved by the Chief Engineer,Rural Works, Orissa, Bhubaneswar or his representatives at work site.

8.58 All the mix design & specification of the concrete of any type required in the work is to be tested by the contractor at his own cost in the laboratory approved by the Govt. of Orissa whenever desired by the Engineer-in-Charge as per his direction.

SPECIFICATIONS FOR CULVERTS:

All reinforced cement concrete works shall conform to Standard Specification & Code of Practice for road bridges section III & IV issued by IRC.

9.1 All bridge loading etc. will be as per Standard Specifications & Code of Practice for road bridges section I & II issued by IRC.

9.2 Expansion joints should be provided near both the abutments as per standard of Ministry of Surface Transport (Road Wing)'s Drawing.

9.3 The papers as per the direction of the Engineer-in-Charge should be provided for all culverts between the top of the abutment & the bearing of the deck slab.

9.4 In addition to the above specification & other details enclosed herewith, the detailed specification for all items of work involved in this work shall be in accordance with following.

(a) I.R.C & I.S.I. specification.

(b) Orissa Detailed Standard Specification.

(c) Any other standard code of specification of works prescribed by the Chief Engineer, Rural Works, Orissa, Bhubaneswar.

9.5 In case of variations in the provision of the codes of specification of the works, the decision of the Chief Engineer, Rural Works, Orissa, Bhubaneswar shall be final, conclusive & binding on all the parties to the contract.

SPECIFICATION FOR EARTH WORK IN THE CONSTRUCTION OF EARTH EMBANKMENT FOR ROAD WORK :

SCOPE

The specification shall apply to the construction of embankment & of miscellaneous backfills with materials obtained either from excavation for road construction, borrow-pits or either selected borrow areas. All embankment shall be constructed in accordance with the specifications & in conformity with the alignment level, cross sections & dimensions shown in the plans or as started by the Engineer-in-Charge.

MATERIAL: The scope of these specifications are restricted to soil alone, being the construction material. The soil used for embankments shall be free form stumps, tree roots, rubbish or other material likely to deteriorate or effect the stability of the embankment. Only materials considered suitable by the Engineer-in-Charge shall be utilized for the construction & that considered unsuitable shall be disposed of as directed by him.

For the purpose of these specification soil will be taken to include gravel or moorum.

The selection of the materials to be used in the construction of embankment shall be made as per the directions of the Engineer-in-Charge according to soil survey & laboratory investigation conducted by him.

Quality control test such as gradation, P.I. Standard proctor test, deleterious constituents, natural M.C etc. shall be performed as directed by the Engineer-in-Charge & no extra payment will made in this regard.

EXCAVATION OF BORROW PITS:

As far as possible no borrow pits should be dug on road land. Before deciding to dig borrow pits on road land, earth for the embankment should be obtained.

(i) from cutting of nearby sections of the road.

(ii) from excavation improving sight distances at nearby curves.

(iii) by sectioning an adjacent bullah or waterway where necessary

(iv) by excavating cuts to lead drainage water away form the road

(v) by excavating side drains & catch water drains

(vi) from waste land outside the road land

(vii) from bumps above the general ground level with the road land

(viii) by excavating tanks

(ix) from land acquired temporarily outside road land

(x) from soil mounds resulting form the digging of well & borrowings from fields in the vicinity of the road

Borrow pits should be rectangular in shape with on side parallel to the central line or the road. If no road land, they could be dug as near the road boundary as possible.

No borrow pits should be dug within 6 mtr. (16 ft.) of the final section of the road embankment, after making due allowance for future development.

Borrow pits should not be dug continuously. Ridges of not less than 8 mtr. (25 ft.) width should be left at intervals not exceeding 30 mtr. (100 ft.) Small drains should be cut through the ridges, in necessary to facilitate drainage.

When it becomes necessary to borrow earth from temporarily acquired cultivatable lands, the depth of borrow pits should not exceed 45cm. (1.5 ft.). The top soil to a depth of 15cm (6”) should be stripped & stacked a side. Thereafter soil may be dug/cut to a further depth not exceeding 30 cm. (12”) & used in forming the embankment. The top soil should then be spread back on the land. It is most important to adopt this practice when soil borrowed is from rich cultivatable land.

CONSTRUCTION PRELIMINARY OBSERVATIONS:

Clearing & Grubbing: Prior to the commencement to earth work the site shall be cleared of construction, including building, fences, abandon drainage structures & vegetation such as tree, roots undergrowth, grass, rubbish etc. except where it may be desirable to retain the vegetation for appearance shade or other reasons. Complete clearance shall be carried out within the actual construction limits.

All trees & shrubs which are not expected to interfere with the construction & use of the highway should be preserved. Cost of removal or ordinary vegetation & minor jungle growth & disposal thereof as directed by the Engineer-in-Charge shall be included in the tender rate & shall not be paid for as extra.

Three stumps should be not extend more than 1ft. above the original ground nor should they be closer than 2 ft. to any sub-grade shoulder or slope surface. On areas to be cleared beyond the embankment & earthwork lines, stumps must be cut down below ground level so that appearance may not by unsightly.

The removal bush & stumps shall in cases be cleared away to waste lands preferably burnt no locations away from the road side. Materials possessing any salvage value should be stacked as directed by the Engineer-in-Charge.

Care shall be taken to see that unsuitable waste materials are disposed off in such a manner that there is no likelihood of its getting mixed with the materials proposed to be used for embankment construction.

COMPACTING ORIGINAL GROUND: In all cases where condition permit, the original ground shall be consolidated as much as reasonably possible or as directed by the Engineer-in-Charge by rolling or other means. Any empty pockets or depressions left in the soil as a result of clearing grubbing operations shall be filled & compacted. Nothing extra shall be paid for these operations.

Where so directed by Engineer-in-Charge any unsuitable materials occurring in the embankment foundation shall be removed & replaced by approved materials.

Where the embankment is to be placed on steep sloping ground the surface of the ground shall be benched in step or trenched or broken up in such manner that the new materials will have bond with existing surface & the cost thereof shall be included in the tendered rate.

Where the embankment is to be placed over an existing road surface, the surface shall be scarified, so as to provide sample bond between old & new materials.

Embankment work shall not proceed until the foundation have been inspected by the Engineer-in-Charge for satisfactory & approved.

CONSTRUCTION PLACING OF EMBANKMENT MATERIALS:

Only materials as approved by the Engineer-in-Charge shall be utilized in the embankment. The work shall be so planned & executed that the best available materials are saved for the top portion of the embankment & sub-grades. Approved materials shall be obtained from approved area.

EMBANKMENT SLOPES: The embankment shall be built to have side slopes as shown in the drawings or as directed by the Engineer-in-Charge of the work.

PLACING SOIL IN LAYERS: To obtain adequate compaction, the embankment shall not be placed until the layer under construction has been thoroughly compacted to satisfy the requirements laid down here after.

To ensure correctness, the execution of the toe-lines on the embankment shall be marked carefully with pages at close interval. The profile with due allowance for settlement shall be set up with the help of bamboos & string. The earth work of the embankment will be carried on uniformly in layer according to these profiles. Due care shall be exercised to ensure the loose thickness of each layer does not exceed the specified limit.

Layers exceeding 9” in loose depth shall be permitted only when the Engineer-in-Charge is satisfied that the compaction plant proposed to be used will achieve the specified compaction throughout the whole depth of the layer. Provided further that when a sheep foot roller is used the thickness of the loose layer shall not exceed the length of the tamping feet by more than 2”. The embankment materials shall be deposited in layer not more than 9” loose thickness unless otherwise specified & compacted to 100% proctor density at O.M.C with P.R.R.

The facilitate proper planning & compaction of earth work a sub-chapter on profile making has been separately enclosed for strict compliance in this regard.

Unless otherwise directed, the soil shall be spread uniformly over the entire width of the embankment.

If the soil shall less than the desired moisture content water shall be added to it either in the borrow pits before excavation is made, or after the soil is spread loosely on embankment without any extra charge. Addition of water may be made in the former case through flooding or irrigating the borrow area & in the letter case through sprinkling the water either directly from a hose line or form a truck mounted water tank.

If the soil as delivered to the road formation is too wet, it shall be dried, by aeration & exposure to Sun, till the moisture content is acceptable for compaction.

Should circumstances arise where owing to wet weather the moisture content of certain soil can not the reduced to the appropriate amount by aeration, the compaction of these soils shall be suspended.

After adjusting the moisture content the soil shall be processed by the means of graders, borrows rotary mixers or other suitable equipment, until the layers are uniformly wet without any cost of Govt.

Clods or hard lumps of earth shall be broken down to size preferably of the order of 5 cm. (2”) but under no circumstances shall be maximum size of such clods exceed 15cm. (5”) when being placed in the body of the embankment & the maximum size shall not exceed 6 cm. (2.5”) when being place on the top to a depth of 50 cm. (18”) of the embankment.

MOISTURE CONTENT & DENSITY:

The moisture content of each layer of soil at the time of compaction should be as directed by the Engineer-in-Charge. The M.C. of each layer of soil at the time of compaction should be at O.M.C . However, the tolerance limits for this MC of the soil with respect of OMC are between 1% above the optimum & 2% below the optimum value. The soil spread in layers shall be thoroughly compacted to the required densities & stipulated by IRC in their code 31.32 para 15.3, 15.4, 15.5 & 16. Each layer will be tested in field, for density & pronounced accepted by the Engineer-in-Charge before the next layer is laid.

The surface of the embankment shall at all times during construction be maintained as such a cross fall as will shed water & prevent pounding.

EMBANKMENT AROUND STRUCTURES

The filling around & over culverts & other structures in the embankment area shall be carried out independently of the work on the main embankment. The embankment shall be brought up simultaneously in equal layer on each side of the structure to avoid displacement & unequal pressure.

The soil in such cases shall be deposited in layers not exceeding 6" loose thickness & shall be compacted thoroughly & to the satisfaction of the Engineer-in-Charge. Where it may be impracticable to use power rollers or other heavy equipment, the compaction shall be carried out be mechanical tampers or other approved methods.

COMPACTION CONTROL :

PRELIMINARY INVESTIGATION: Preliminary investigations shall be made by the contractor at his own cost as per direction given by the Engineer-in-Charge to determine the most economical procedure to be adopted to obtain the specified degree of compaction & the necessary field control (as a result of the suggested investigations it is generally found that it is sufficient to ensure that the soil laid in layers of the specified thickness, with the specified moisture, & is rolled with the number of passes of the compaction equipment which are found to produce the specified degree of compaction).

The compaction control on the work in the field will be exercised by the deptt through frequent moisture content & density determination. The following control test shall be made on the borrow materials.

Serial No.	Test	Test Method	Min.desirable frequency
1	Gradation	I.S. 2720 Pt. IV	1-2 tests per 300ccm of soil
2	P.I	I.S. 2720 Pt. V	-do-
3	Standard Proctor test	I.S. 2720 Pt. VII	-do-
4	Deleterious constituents	I.S. 2720 Pt. XXVII	As required
5	Natural M.C	I.S. 2720 Pt. II	One test for 250 ccm of soil
6	Dry density	I.S. 2720 Pt. XXVII	Generally at least one test per 100cm of compacted area for the body of embankment to be increased to one test 500-1000cm of compacted area for the top sub grade layers of 50cm or 1-2 tests for 3000 ccm of soil.

ANALYSIS & ACCEPTANCE OF DENSITY RESULTS

Except otherwise directed, at least one measurement of density shall be made for each 1000 m^2 (10000 sqft.) compacted area. Test locations shall be chosen only through predetermined random sampling techniques. Control shall not be based on the result of any one test but on the mean value of 5-10 density determination. The number of tests in one set of measurements shall be 5 as long as it was felt that sufficient control over borrow materials & the method of compaction was being exercised, but if there was any doubt about this control, or considerable variations were observed between individual density result the minimum number of tests in one set of measurement shall

forthwith be increased to 10. The acceptance of results shall be subject to condition that the mean dry density equals or exceeds the specified density & the standard deviation for any set of result in below 0.88 gm. Per cc (5 lb per cu. Ft.)

In general, the control at top sub-grade layers of the formation shall be more strict, with density measurements being done as stated above, at the rate of test per 500-1000 sq.ft. (50-100) sqm. Of compacted area. Further for the determination of mean density & standard deviation, the number of tests in one set of measurements shall not be less than 10. In other respects, the control will be similar to as spelt out in the previous para.

If for any reason it has not been found possible to conduct the minimum number of test mentioned above, the test value obtained from fewer tests shall be used only as an aid to judgment & as a proof of the quality of the work.

The value of the "Standard deviation" shall be calculated from the formula:

$$Q = \frac{1}{n}\sqrt{nEx2}(Ex)2$$

Q = standard deviation in gm/cc/ (lb/cu. Ft.)

n = total number of density measurement, &

x = value of dry density in gm per cc (lb/cu ft.)

REMOVAL OF SOFT AREAS:

When density measurements reveal any soft areas in the embankment, the Engineer-in-Charge shall direct that these areas should be compacted further & nothing extra shall be paid. In spite of that, it the specified compaction is not achieved, the materials in the soft areas shall be directed to be removed & replaced by approved materials, compacted to the satisfaction of the Engineer-in-Charge.

COMPACTION IN ORDINARY WAY

The Engineer-in-Charge shall indicate the portion of the earthwork which are not required to be compacted to a specified degree of density & moisture content. The embankment in such portion shall be carried out as specified above, each layer being consolidated as far possible with the help of iron rammers, ordinary light rollers or sheep foot roller, if available. The layers shall be laid concave slopping from the edges toward the centre. The earth shall be laid form the sides to the centre & not vice versa. It the earthwork remains suspended for some time & the surface becomes hard, the latter shall be roughened & slightly moisture before resumption of work without any extra charge go Govt.

FINISHING OPERATIONS:

After the earthwork is completed & consolidated, sectioning shall be done to bring it to its true final shape. The embankment shall be finished in conformity with the alignment levels, cross sections & dimensions shown on the plans. Where the alignment of the road is in a curve, the tops of the embankment shall be formed with the supervention & the increased widths shown on the drawing or as the Engineer-in-Charge may direct without any extra cost to Govt.

Finishing operation shall include the work of shaping & dressing the shoulders road bed & the side slopes to conform to the typical cross section shown on the plane & shall be paid extra. Both the upper an lower ends of the side slopes shall be rounded off to improve appearance & to merge the embankment with a adjacent terrain.

When the earth work operations have been substantially complete the road way area shall be cleaned of all the debris & ugly scars existing near the coming areas etc. Every reasonable effort shall be made to aviate objectionable appearance without any extra payment.

SPECIFICATION FOR MOORUM SUB-BASE:

MATERIALS: Moorum shall be composed of large, coarse grains, sharp & gritty. Moorum should not contain lumps of soil, foreign matters, it should not contain stones greater than ¾" in guage. It should show a uniform C.B.R value which should not be less than 20 for sub-base. The P.I. should not be more than 9.

PROCESSING & CONSTRUCTION

The sub-grade shall be checked for line grade & cross section as shown in the drawing or as directed by the Engineer-in-Charge. Soft & yielding places & ruts shall be corrected & rolled uniform. It shall be laid in layers from 6" to 9" thickness. It shall be well watered & compacted with PRR or other suitable machinery as directed by the Engineer-in-Charge to obtain the desired compaction form.

Rolling shall commence at the edges, progressing gradually towards the centre, parallel to the centre line of the road except at supper elevated portions where it shall proceed from the inner edge to the outer.

The finished surface shall be checked for line, level & irregularity as directed by the Engineer-in-Charge.

Irregularities present in the finished surface beyond the tolerance of 20mm. shall be rectified as mentioned in 10.12.5 below.

Where the finished surface of the sub grade is too high if shall be trimmed & suitably compacted & where the same is too low, the deficiency shall be corrected by adding fresh materials. The degree of compaction & the type of materials to be used shall conform to the specification & requirement.

Control tests & their frequencies:

Quality control tests on the materials & work be as indicated below:

Sl.No.	Type of Construction	Test	Frequently
1	Water bound macadam	(i) Aggregate impact value loss Angles test abrasion value	One test per 200 cum
		(ii) Grading	One test per 100 cum
		(iii) Flakiness index	One test per 200 cum
		(iv) Non-Plastic binding materials	One test per 25 cum
		(v) Proctor test	One test per 200 cum
		(vi)Deleterious constituents	As required
		(vii) M.C	One test per 250 sqm
		(viii) D.D of compacted layer	One test per 1000 sqm
		(ix) C.B.R test	One test per 1000 sqm
2	Bituminos construction	(i) Aggregating impact value/ Los angle	One test per 50 cum of aggregate
		(ii) Flakiness Index	-do-
		(iii) Grading of aggregate	One test per 25 cum
		(iv) Temperature of binder application	At regular close intervals
		(v) Rate of spread of mixed materials	Regular control through checks on materials & layer thickness.

11 SPECIFICATION FOR TURFING

11.1 DESCRIPTION: This work shall consist of supplying & laying live sods on the slopes & other locations as required by the Engineer-in-Charge, in accordance with the following specifications.

11.2 MATERIALS: The sods shall consist of dense well rooted growth of permanent & desirable grasses, indigenous to the general locality where it is to be used, & shall be practically free form weeds or undesirable grasses. At the time the sold is out, the grass on sod shall have a length of approximately 2 inches; if longer, the grass shall be cut to approximately this length & the sod shall has been raked from debris.

The sod shall be cut in uniform strips not larger than it is convenient for handling & transport. The thickness of the sod shall be as uniform as possible approximately ¾ inches or more, depending on the nature, of the sod, so that practically all the dense root system of the grasses will be retained but exposed in the sod strip & so that the sod can be handled without undue tearing breaking.

In the event the sod which is to be cut is in dry condition, so as to cause crumbling or breaking during cutting operations, the contractor, at his own expense, shall at least 12 hours before cutting the sod, apply water to the same in sufficient quantities to provide a well moistened condition of the sod to the depth to which it is to be cut.

Top soil of the area to be turned shall consist of soils adopted to the sustenance of plant life.

11.3 CONSTRUCTION METHOD

11.3.1 **PREPARATION OF THE EARTH BED:** All areas desired to be covered with sod shall be fine dressed to required contour, to an extent such that the finished work after laying sod with necessary to soil incorporated in the bed will be in accordance with required lines grades, slopes & cross section.

The area to be sodden shall be free from stones, roots or other undesirable foreign materials.

The soil of the area to be sodden shall be loosened to a depth of approximately not less than one inch, by means of rakes adopted to the purpose & top soil shall be spread evenly over the prepared bed to a depth of 2 inches & the clods lumps shall be broken down to provide a uniform texture to the sod.

11.3.2 **PLACING THE SOD:** The earth bed upon which the sod is to be place shall be moistened to the depth, manipulated, if naturally not sufficiently moist, & the sod shall be place thereon within approximately 24 hours after the same has been cut & shall be properly protected & sprinkled with water until firmly rooted.

Unless otherwise required the sod on slopes shall be laid in horizontal, strips beginning the bottom of the slopes & working upwards. When placing sods the length of strips shall be laid at right angles to the direction of flow of water. Sods shall be laid so that the joints caused by abutting ends of sod strips & not continuous. Each sod strips shall be so laid as to about against the strip previously laid.

11.3.3 As the sod is being laid to shall be firmly & lightly tamped with suitable wooden or metal tampers to press the sod into the under laying soil. After tamping, the sod shall present a smooth even surface free from bumps or depressions. At such points, where water will start flowing over a sodden area, the upper edge of the sod strip shall be turned into the soil & layer of earth placed over this, which earth shall be thoroughly compacted to conduct the surface water over the upper edge of the sod. No sods shall be laid normally during the dry months of March to June.

11.3.4 **WATERING:** The sod shall be thoroughly watered immediately after placing & shall be kept thoroughly wet for a period of at least seven days after laying & shall be maintained in satisfactory condition.

11.3.5 **METHODS OF MEASUREMENT & PAYMENT:** Sod shall be measured by units of 100 sqm. & will be paid for at the contract unit price of 100 sqm. of sod in place which price shall be full compensation for preparing the earth bed, for furnishing, placing, top dressing & watering the sod & for all labour, equipment tools & incidentals necessary to complete the work in accordance with contract.

Collection of top soil for the area to be turned will be paid for as earthwork in excavation.

No separate payment will be allowed for spreading & incorporating the top soil in the bed.

STANDARD SPECIFICATION & CODE OF PRACTICE FOR WATER BOUND MACADAM

INTRODUCTION: The standard is a code of practice intended to indicate what is considered to be a good practice for the construction of water bound macadam & surface treated water bound macadam.

12.1 DESCRIPTION

Water bound macadam shall consist of clean crushed coarse aggregate mechanically interlocked by rolling & voids thereof filled with screenings & binding material with the assistance of water laid on a prepared sub-base, base or existing payment as the case may be water bound macadam may be used as sub-base, base coarse or surfacing course. In each case, it shall be constructed in accordance with the specification given & below in conformity with the lines, grades & cross sections shown on the drawing or as otherwise directed.

12.2 MATERIALS

12.2.1 Coarse aggregate General Requirements.

12.2.2 Coarse aggregate shall be either crushed or broken stone, crushed slag, over burnt metal or naturally occurring aggregate such a kankar or literate or requisite quality as stated here in after. The aggregate shall conform to the physical requirements set forth in Table-1.

12.2.3 Crushed or broken stone.

Crushed or broken stone shall be hard, durable & generally free from flat, elongated soft & disintegrated particles. It shall also not have excess or dirt or other objectionable matter.

12.2.4 Table – 1: Physical requirements or coarse aggregate for water bound macadam.
(I.R.C 19. 1972)

Sl.No.	Type of construction	Test	Test Method	Requirement
1	Sub-base	Los Angles Abrasion value * or Aggregate Impact Value*	IS: 2386 (part-IV) IS: 2386 (part-IV) Or IS: 5640	Max. 50% Max. 40%
2	Base course with bituminous surfacing	(a) Los Angles Abrasion value* or Aggregate Impact value* (b) Flakness Index*	IS: 2386 (part-IV) IS: 2386 (part-IV) IS: 5640 IS:2386 (part-I)	Max. 50% Max. 40%
3	Surfacing course	(a) Los Angles Abrasion value* or Aggregate Impact value* (b) Flakness Index*	IS:2386 (part-IV) IS: 5640 (part-IV) IS:5640 IS:2386 (part-IV)	Max. 40% Max. 40% Max. 15%

NOTE:- * Aggregate may satisfy the requirements of either the loss angles test or aggregate impact value test.

** Aggregate like brick, metal, kankar & literate which get softened in presence of water, should invariably be tested for impact value in wet condition accordance with IS:5640.

*** The requirement of frankness index shall be enforced only in the case of crushed stone & crushed slag.
Samples for tests shall be representative of the materials to be used collected in accordance with the procedure set forth in IS:2430.

12.2.5 **CRUSHED SLAG :** Crushed slag shall be manufactured from air-cooled blast furnaces slag. It shall be angular shape, reasonably uniform in quality & density, & generally free from any thin, elongated & soft pieces, dirt or other objectionable matter. Crushed slag shall not weigh less than 1120 kg. ccm & the percentage of glossy materials in it shall not be in excess of 20%. Water absorption (IS:2386 part-III) of slag shall not exceed 10%.

12.2.6 **OVER BURNT BRICK METAL:** Brick metal shall be made out of over burnt bricks of bats & be free dust & other foreign matter.

12.2.7 **KANKAR :** Kankar shall be tough, having a blue almost opalescent fracture. It shall not contain any clay cavities between nodules.

12.2.8 **LATERITE :** Laterite shall be hard, compact, heavy & of dark colour. Light coloured sandy laterites as also those containing a good bit on clay shall not be utilized.

12.2.9 COURSE AGGREGATE: SIZE & GRANDING REQUIREMENTS

12.2.10 As far as possible coarse aggregates shall conform to one of the grading given in Table-2. Grading 1 is more suitable for sub-base course, but it is not tenable for a compacted layer thickness or less than 90mm.

12.2.11 The size of aggregate to be used in a given case would depend on the type of aggregate available & compacted thickness of the layer. The use of grading-1 shall how ever, be restricted to sub-base courses only.

12.2.12 For crushable type aggregate like brick metal, kankar & laterite, the grading given in Table-2 are not so relevant & need not be strictly enforced but the material should generally be within the size range indicated.

12.2.13 Table-2: SIZE & GRADING REQUIREMENT OF COURSE AGGREGATE FOR W.B.M.

Granding No.	Size of screenings	Sieve Designation (IS:460)	Percent by weight Passing the Service
1	90mm. to 45mm.	125 mm.	100
		90 mm.	90 – 100
		63 mm.	25 – 60
		45 mm.	0 – 15
		22.4 mm.	0 – 5
2	63mm. to 45mm.	90 mm.	100
		63 mm.	90 – 100
		53 mm.	25 – 75
		45 mm.	0 – 15
		22.4 mm.	0 – 5
3	53mm. to 22.4m.	63 mm.	100
		53 mm.	95 – 100
		45 mm.	65 – 90
		22.4 mm.	0 – 10
		11.2 mm.	0 – 5

12.3 SCREENINGS :

12.3.1 Screening to fill voids in the coarse aggregate shall generally be of the same materials as the coarse aggregates. However, from economic considerations, predominantly non-plastic material such as kankar nodules, moorum or gravel (other than river borne rounded aggregate) may also be utilized for this purpose provided that the liquid limit & plasticity index of such material is below 20 & 6 respectively & the fraction passing 57 micron sieve does not exceed 10%

12.3.2 As far as possible, screenings shall conform to the grading shown in Table-3. Screenings of type A in Table 3 shall be used in conjunction with coarse aggregate of grading-II. With coarse aggregate of grading-2 either type A or type B screenings may be used. For screenings like moorum & gravel the grading given in Table-3 shall not be regarded as binding. Type B screenings shall be used with coarse aggregate.

12.3.3 The use of screenings may be dispensed with in the case of crushable type coarse aggregate such as brick metal, kankar & laterite.

12.3.4 TABLE -3 : GRADING REQUIREMENTS OF SCREENINGS FOR W.B.M.

Grading Classification	Size of screenings	Sieve Designation (IS :460)	Percent by weight Passing the Service
A	13.2 mm.	13.2 mm.	100
		11.2 mm.	95 - 100
		5.6 mm.	15 - 35
		180 micron	0 - 10
B	11.2 mm.	11.2 mm.	100
		5.6 mm.	10 - 100
		180 micron	15 - 35

12.3.5 BINDING MATERIALS: Binding materials to prevent reveling of water bound macadam shall consist of the fine grained materials possessing P.I. value of 49 when the WBM is to be used as a surfacing course & upto 6 when the WBM is being adopted as a sub-base/ base course with bituminous surfacing. It lime stone formations are available nearby lime stone dust or kankar nodules may be usefully employed for this purpose.

12.3.6 Application of binding material may not be necessary where the screening consist of crushable type material like moorum or gravel. However, for WBM used as a surfacing course, where the P.I of crushable type screening is less than 4, application of a small amount of binding material having P.I. of 4 to 9 would be required at the top. The quantity of screening could be reduced slightly on this account.

12.3.7 QUANTITIES OF MATERIAL : Approximate quantities, of coarse aggregate & screening required for 100 mm. compacted thickness of WBM. Sub-base course are shown in Table-4, likewise rough quantities of materials for WBM base of surfacing course for a compacted thickness 75 mm. are given in Table-5.

12.3.8 The quantity of binding material where it is to be used (see para 12.3.5) will depend on the type of screenings & function of WBM. Generally, the quantity required for 75 impacted thickness will be 0.06 to 0.09 ccm per 10 mm. in the case of WBM sub-base.

TABLE-4 APPROXIMATE QUANTITIES OF COURSE AGGREGATES & SCREENINGS REQUIRED FOR 100 MM. COMPACTED THICKNESS OF W.B.M. SUB-BASE COARSE FOR 10 MM.

Coarse Aggregates			Screenings			
Classification	Size range	Loose quantity	Stone screenings		Crushable type such as moorum or gravel	
			Grading/ Classification & Size	Loose Qnty.	Grading/ Classification & Size	Loose Qnty.
1	2	3	4	5	6	7
Grading	90 to 45 mm.	1.21 to 1.49 ccm	Type A 13.2 mm.	0.27 to 0.30 ccm	Not uniform	0.30 to 0.32 ccm

TABLE-5 APPROXIMATE QUANTITIES OF COURSE AGGREGATES & SCREENINGS REQUIRED FOR 75 MM. COMPACTED THICKNESS OF W.B.M. SUB-BASE COARSE/ SURFACING COURSE FOR 10 MM.

Coarse Aggregates			Screenings				
Classification	Size range	Loose quantity	Stone screenings		Crushable type such as moorum or gravel **		
			Grading/ classification & size	For WBM sub-base / base course	For WBM surfacing course *	Grading/ classification & size	All cases
1	2	3	4	5	6	7	8
Grading-2	63 to 45 mm.	0.92 to 1.07 ccm	Type A 13.2 mm.	2.12 to 0.15 ccm	0.11 to 0.17 ccm	Not uniform	0.22 to 0.24 ccm
-do-	-do-	-do-	Type B 11.2 mm.	0.20 to 0.22 ccm	0.24 to 0.26 ccm	-do-	-do-
Grading-3	53 to 22.4 mm.	-do-	-do-	0.18 to 0.21 ccm	0.22 to 0.24 ccm	-do-	-do-

* Quantities in col. 6 are 80% of those in col 5 as larger quantity of binding material will need to be used when the WBM is to act as a surfacing course.
** Base course & 0.10 to 0.15 ccm/ 10 ccm when the WBM is to function as a surfacing course. For 100 mm. thickness the quantity needed respectively will be 0.08 to 0.10 ccm/ 10 ccm. & 0.12 to 0.16 ccm/ 10 mm.

The above mentioned quantities should be taken as guide only for estimation of quantities for construction etc. & not for the purpose of payment which should be made as per actual.

12.4 CONSTRUCTION PROCEDURE

12.4.1 **PREPARATION OF FOUNDATION OF RECEIVING THE WBM COURSE:** The sub-grade, sub-base to receive the water bound macadam course shall be prepared to the required grade & camber & cleaned all dust, dirt & other extraneous matter. Any rust or soft yielding places that have appeared due to improper drainage service or under traffic or other reasons shall be corrected & rolled until firm.

12.4.2 Where the water bound macadam is to be laid on existing un-surfaced road, the surface shall be scarified & re-shaped to the required grade & camber as necessary. Weak place shall be strengthened corrugations removed & depressions & pot holes made good with suitable material before spreading the coarse aggregate for WBM.

12.4.3 Where existing road surface is black topped, 50 mm. x 50 mm. furrows shall be cut in the existing surface at 1 mtr. Intervals at 45 degree to centre line of the carriage way before proceeding with the laying of coarse aggregates.

12.4.4 In all cases the foundation shall be kept well drained during the construction operations.

12.4.5 **PROVISION OF LATERAL CONFINEMENT OF AGGREGATE:** Before starting with WBM construction, necessary arrangements shall be made for the lateral confinement of aggregates. One method is to construct side shoulder in advance to a thickness corresponding to the compacted layer of the WBM coarse. After shoulders are ready, their inside edge may be trimmed vertical & the included area cleaned of all spoiled material there by setting the stage for spread of coarse aggregates. The practice of construction WBM in a trench section, excavated in the finished formation must be completely avoided.

12.4.6 **SPREADING COARSE AGGREGATE:** The coarse aggregates shall be spread uniformly & evenly upon the prepared base in required quantities from premature stack piles along the side of the road or directly from vehicles. In no case shall these be dumped in heaps directly on the area where are to be laid nor shall their hauling over a partly completed base be permitted. The aggregates shall be spread to proper profile by using templates placed across the road about 6 mtr. apart. Where possible approved mechanical device shall be used to spread the aggregates uniformly so as to minimize the need for manipulation by hand.

12.4.7 The WBM course shall normally be constructed in layers of not more than 75 mm. compacted thickness. However for aggregates of grading table-2, the compacted thickness of layer may go up to 100 mm. Each layer shall be tested by depth blocks. No segregations of large & fine practices shall be allowed in the coarse aggregates as spreading shall be of uniform gradation with no pockets of fine materials.

12.4.8 The coarse aggregate shall not normally be spread in length exceeding three days average work ahead of rolling & binding the proceeding section.

12.5 ROLLING

12.5.1 After the laying of coarse aggregate, there shall be compacted to full width by rolling with either three wheel power roller of 6 to 10 tones capacity or an equivalent vibratory roller. The weight of the roller shall depend on the type of the aggregates.

12.5.2 The rolling shall begin from edges with roller running forward & backward until the edges have been compacted. The roller shall then progress gradually form the edges towards the centre parallel to the centre line of the road, uniformly lapping preceding rear wheel track by one half width. Rolling shall be discontinued when the aggregates are partially compacted with sufficient voids space in time top permit application of screenings. However where screenings are not to be applied, as in the case of crushable aggregates like brick metal, laterite & kankar, compaction shall be continued until the aggregates are thoroughly keyed or interlocked with no creeping of stones ahead of the roller. Slight sprinkling of water may be done during rolling if necessary.

12.5.3 On super elevated portion of the road, rolling shall commence from the lower edge & progress gradually towards the upper edge of the pavement.

12.5.4 Rolling shall not be done when the sub-grade is soft or yielding nor when it causes a wave like motion in the base course/sub-grade. If irregularities develop during rolling which exceeds 10 mm. when tested with

a 3 mtr. straight edge the surface shall be loosened & aggregates added or removed as required before rolling again so as to achieve uniform surface conforming to the desired cross section & grade. The surface shall also be checked transversely the template for camber & any irregularities corrected in the manner described above. In no case shall the used of screenings to make up depressions be permitted.

12.6 APPLICATION OF SCREENINGS

12.6.1 After coarse aggregates have been rolled as para 12.5 screenings to fill the interstices shall be applied gradually over the surface. Dry rolling shall be done when the screening are being spread so that the jarring effect or roller causes them to settle into the voids of the coarse aggregates. The screenings shall not be dumped in piles but applied uniformly in successive thin layers either by the spreading motion on hand shovels, mechanical spreaders or directly from the trucks playing over the base course to spread screenings that shall be equipped with pneumatic tires & so operated as not to disturb the coarse aggregates.

12.6.2 The screenings shall be applied at a slow rate in three or more applications as necessary. This shall be accompanied by rolling an brooming either by mechanical brooms/ hand brooms or both than may be used. In no case shall the screening be applied so fast & thick as to form cakes or ridges on the surface making the filling of voids difficult or preventing the direct bearing of roller on the coarse aggregates. The spreading rolling & brooming of screening shall be taken up on sections which can be completed within one day's operation. Damp & wet screenings shall not be used in any circumstances.

12.7 SPRINKLING & GROUTING

12.7.1 After application of screenings the surface shall be copiously sprinkled with water swept & rolled. Hand brooms shall be used to sweep the screening into the voids & distribute them evenly. The sprinkling, sweeping the rolling operations shall be continued & additional screenings applied where necessary until the coarse aggregate are well bound & firmly set & a grout has been formed of screenings. Care shall be taken that the base or sub-grade does not get damage due to addition of excessive quantities of water during the construction.

12.8 APPLICATION OF BINDING MATERIAL

12.8.1 After the application of screenings as per paras 12.6 & 12.7 binding materials where it is required to be used (see para above) shall be applied at the uniform & slow rate in two or more successive thin layer. After each application of binding material, the surface shall be copiously sprinkled with water & resulting slurry swept in with hand brooms, mechanical brooms or both so as to fill the voids properly. This shall be followed by rolling with a 6 to 10 ton roller during which water shall be applied to the wheels to wash down the binding material, that may get stuck to them. The spreading of binding material, sprinkling of water sweeping with brooms & rolling shall continue until the slurry of binding material an water forms and wave ahead of the wheels of moving roller.

12.9 SETTING & DRYING

12.9.1 After final compaction of the course, the road shall be allowed to cure overnight next morning the hungry spots shall be filled with screening or binding materials lightly sprinkled with water if necessary & rolled. No traffic shall be allowed till the macadam sets.

12.9.2 In case of water bound macadam base course to be provided with bituminous surfacing, the latter shall be laid only after the WBM course it completely dry & before allowing any traffic on it.

12.10 PLAYING OF CONSTRUCTION TRAFFIC

12.10.1 In general construction traffic may ply over compacted portion of the WBM course provided move over its full width avoiding any rutting or uneven compaction. However, Engineer-in-Charge shall have full authority to stop the passage of construction traffic when in his opinion this is leading to excessive damage.

SURFACE EVENNESS OF WBM COURSE COMPLETED

The surface evenness of complete WBM course in longitudinal & transverse directions shall be within the tolerances indicated in Table-6

TABLE – 6 PERMITTED TOLERANCES OF SURFACES EVENNESS FOR WBM COURSE

Sl.No.	Size range of coarse aggregates	Longitudinal profile (Maximum permissible undulation when measured with a 3 mtr. straight edge)	Cross profile (Maximum permissible variation from specific profile when measured with a camber template)
1	40 to 90 mm.	15 mm.	10 mm.
2	25 to 50 mm. or 40 to 63 mm.	12mm. 12mm.	8 mm. 8 mm.

The longitudinal profile shall be checked with 3 mtr. long straight edge at the middle of each traffic lane along a line parallel to the centre line of the road. The transverse profile shall be checked with a series of three camber boards at intervals of 10 mtr.

RECTIFICATION OF DEFECTIVE CONSTRUCTION

14.1 Where the surface irregularity of the WBM course exceeds the tolerance given in Table-6, where the course is otherwise defective due to sub-grade soil mixing with the aggregates, the layer to its full thickness shall be scarified over the affected area, reshaped with added material or removed the replaced with freshed materials as applicable & recomputed in accordance with para 12.5. The depressions be filled up with screenings or binding materials

CONSTRUCTION OF WBM NARROW WIDTHS

Where the WBM course is to be constructed in narrow widths for widening an existing pavement, the following sequences of operations should be adopted.

(i) The existing shoulder should be excavated to their full depth & width upto the sub-grade soil except where the widening the widening specification envisages laying of stabilized soil sub-base using in situ operations in which case same should be removed only upto the sub-base level.

(ii) Before proceeding with laying of WBM course, shoulders be rebuilt in layer in reduced width depending on the extent of widening. The compacted thickness of each layer should correspond to the compacted layer of WBM course to be laid adjacent to it. After compaction the inside edges of shoulder should be trimmed vertical & the included area cleared of all spilled materials and

(iii) The construction of WBM layer should then follow the usual manner.

MAINTENANCE OF WBM WEARING COURSE.

16.1. The successful performance of WBM as a surfacing course depends to a large extent on wearing maintenance. Maintenance measures for this can be considered under three heads, periodic patching of pot holes along with removal of ruts & depression, blinding of the surface the surface renewal.

16.2. **PATCHING POT-HOLES & RUTS**:- Pot holes, ruts & other depression should be drained of water & cut to regular shape with vertical sides. All the loose & disintegrated materials shall be removed & the exposed surface swept clean. The holes, depression shall then be filled with salvaged coarse aggregates mixed with sufficient quantity of fresh aggregates & re-compacted as normal. W.B.M. Operations described in para 12.5 so that the patched area merge with the adjoining surface. Where the area so treated is small, hand rammers may be used for compaction instead of rollers.

16.3. **BLINDING OF SURFACE:-** Blinding of the surface shall be resorted to periodically as soon as the blinding material applied has been eroded away due to traffic or weather action & the surface has started showing signs of disintegration. Blinding operations shall consist of application of blinding material in this layers & grouting in accordance with the procedure given in previous para.

16.4. SURFACE REVEWAL

16.4.1 WBM wearing course shall be renewal when the surface is worn out, corrugated & badly damaged or has profusions of pot-holes & depression which can not be treated economically with patching or blinding operation.

16.4.2 For renewal, the existing surface shall be scarified to a depth of 75 mm. & the resulting materials removed to beams for screening to salvage the useable coarse aggregates. The exposed pavement shall be scarified against at high spots so as to ensure proper grade & camber. The salvaged coarse aggregates are mixed with sufficient quantity of fresh aggregates. Usually between one half to one third of the quantity of salvaged aggregates shall be used for construction of new WBM course in accordance with para 16.2.

RECONSTRUCTION DAMAGED MACADAM

If any time sub-grade material should get mixed with the base course materials, the mixture shall be removed an the sub-grade shaped & compacted. The materials removed shall then be placed with clean aggregate, which shall be rolled until satisfactory compaction is achieved. If any irregularities develop in the sub-grade during or after rolling of the sub-coarse, they shall be corrected by lessening the surface & removing or adding coarse aggregates as may be require, after which the entire area shall be rolled, screenings & water applied & rolling continued until the repaired based in compacted to uniform surface. The finished surface shall have no variation greater than 12 mm. (1/2 in) from 3 mtr. (10 ft.) long straight edge laid parallel to the centre line of the road & be true to the typical cross section.

MULTIPLE LAYERED COURSE

When it is necessary to construct to course in more than one layer to conform to the lines, grades & cross sections indicated on the plans, or as directed by the Engineer-in-Charge, each layer shall be constructed as described above. The same degree of requirement shall be made in forming the surface of all component layers & the smoothness & uniformity of the surface of each layer shall conform closely to the requirements for surface to the final layer.

PROTECTION

In general, hauling equipment may be routed over completed portion of the WBM course, provided such equipment is routed over the full width of the course avoiding rutting or uneven compaction. However, Engineer-in-Charge have full & specific authority to stop all hauling over completed or partially completed course when, in his opinion such hauling is causing excessive damage.

During the placing, spreading & compacting of coarse aggregate & screenings, care shall be exercised to prevent the incorporation of sub-grade, sub-base or shoulder material into these macadam materials.

N.B: * Plasticity index not more than 9 in base of WBM & 6 in case of surface treated WBM.

PROFILE MARKING

Marking of alignment:- Centre line of the alignment should be laid out according to the sanctioned plan with the help of ranging rods, flags or theodolite. Permanent brick pillars 10” x 10” should be fixed 660 ft. apart on one side of the alignment at a constant distance of about 50 to 75 ft. away from the centre line depending upon the land width. These pillars would then form a line parallel to the centre line of the alignment but side shifted by about 50 to 75 ft. These pillars shall show the formation level of the earth work bank & the chainage of the alignment as per sanctioned plan & longitudinal sections. These shall be legibly marked.

Marking the profile: The profile should be marked at intervals not exceeding 200 or so except at curves where closer profile shall be necessary. The toe line of the embankment should be fixed first. These can be calculated on the basis of the slope (1:2 or 1:3) & the height of the embankment as per sanctioned plan at the particular section. Two sal bullahs or bamboo piles well embedded in the ground should be fixed at the toe lines & top of the poles should be kept in one level with the help of leveling instruments. These poles should have alternate 6” thickness printed black & white to show the layer or consolidated earth to be done. Such sets of poles should be fixed at distances not exceeding 20 ft. along the alignment.

SEQUENCE OF OPERATION FOR EARTH WORK & FIXING PROFILES AT VARIOUS LAYERS: The various sequence of operation for making profiles & various layers are shown in diagrammatic sketches in Fig-2 to 2(c) (enclosed) The figures shown are 1:2 side slope but similarly distance can be worked out for other slopes.

FIRST LAYER:

Horizontal string S1-S2 should be tied at height of 9" (i.e. after one & half mark on the pole) joining poles A&B. Two small pegs (about 18" long) should be fixed in ground (capable of being taken out fairly easily (K1, K2 at distance of 18" for 1:2 slope) from poles A&B respectively & sloping string S4 (metting point of pages K1 & K2 with horizontal string S1-S2 & S5 (to line) should be tied. These string profiles S5-S4, S4-S5 marked over 220 ft. would give the profile for loose earth work to be done in each layer. This is shown in the Fig 2(a) where the broken lines shown the proposed final embankment & thin firm lines show the first layer of loose earth work. Uniform spreading of earth in between shall be ensured by longitudinal strings.

After first layer is rolled to layer 1-1, the profile for the second layer will be similarly fixed by typing to the horizontal string 9" above the compacted layer & refixing the small pegs K1 K2 at about 30" form the poles A&B (Fig. 2(b).

Profiles or further layers will similarly fixed as shown in Fig.2(c).

The sub-grade soil i.e. the layer 2" to 12" below the road crust, may be of imported soil if approved in the estimated & for this reason, it is necessary that the top most layer made of local earth i.e. earth form the adjoining borrow pit should be made true to the final required profile & camber. This would result in providing uniform thickness of imported soils which is normally expensive. This should by checked be templates. The standards of compaction of the 1st. two layers will be more rigid.

The top most layers below the payment (road crust) shall be very carefully done till the final profile & tolerances required in the specifications are obtained. These should be again checked with templates.

This layer will be laid when road crust is almost ready to be put on. The standard of compaction as well as finished shall stricter & most rigid.

Above the sub-grade the formation of the road crust (soling or base course metal consolidation etc.) shall proceed simultaneously with the side.

No box for providing road crust is permissible when part embankment has been done earlier.

When earth work was done before but not up to the full formation height & specially inadequately compacted, the sequence of work is an explained below & shown diagrammatically in Fig. 3 (a) to (c) enclosed.

Poles at the toe line & at edges, shall be fixed as shown in Fig (a). The top of the existing earth work shall be put to depth 1' – 6" to 2'-o" & earth spreading in the usual layer or thickness to the sides to form the slope & the sides & adequately compacted at OMC, thus forming horizontal top surface. The top layer shall therefore be rolled to the required compaction at OMC etc. & further earth work done as explained in sketches Fig.2(b) to 2(c).

OPERATION WHEN THE EXISTING EARTH WORKS NEARLY UPTO THE FORMATION LEVEL.

Where the existing earth work is nearly up to the full formation level & not adequately compacted, the pegs & poles shall be fixed at the toe lines & at the edge lines of the formation width to which strings tied would indicate the profile. In such case the formation level shown in the sanctioned drawings shall be taken to the level of top of sub-base over with additional thickness or crust inclusive of any sub-base stabilized soil etc. is to the added. Top 6" to 9" layer of earth work should be scrapped & this earth should be used to build up the side & the slopes.

This thickness may be increased at the discretion of the Executive Engineer where compaction is very poor or where bad work is to be rectified.

The next 9" to 12" layer at the top should be properly compacted to the required degree of compaction.

Further layers as necessary should then be added as indicated in sub-para 2.2

TENTATIVE SPECIFICATION FOR BITUMINOUS MACADAM (BASE & BINDER COURSE)

21.1 DESCRIPTION :

Bituminous macadam shall consist of the construction of one more course or compacted crushed aggregates premixed with a bituminous binder, laid immediately after mixing.

It is an opened graded construction suitable for base & binder course & should not be used as a wearing courses, as such it may be used a temporary riding surface when covered with an appropriate seal coat.

21.2 MATERIALS:

21.2.1 Bituminous Materials: The bituminous materials shall conform to the requirements as specified & provided for in the proposal & satisfy the related specification of ISI standard 72,215,217 & 454. The grades of binder to be used would depend upon the climatic conditions. Paving bitumen of 30/40, 60/70 & 80/100, penetration road tars of grade RT-4, approved cut backs or emulsions are normally suitable for the bituminous macadam.

For the tack coat RT-3 or 80/100 bitumen or approved cut back or emulsions are suggested.

21.2.2 AGGRAGATES

The aggregates shall consist of crushed stone, crushed slag crushed gravel. Shingle or other stones as specified. The aggregate shall have clean, strong durable & fairly cubical fragments free from disaggregated pieces, organic & other deleterious matter & adherent coatings. The aggregates shall preferably be hydrophobic or of very low porosity.

21.2.2.1 PHYSICAL REQUIREMENTS: The aggregates shall satisfy the following physical requirements.

	Base Course	Binder Course
Aggregate Impact Value Maximum	35 %	30%
Los Angles Impact Value Maximum	50%	40%
For slag weight shall not be less than	1220 KG./ PER CCM	(70 lb/cu. Ft.)
Loss site sodium soleplate for five cycles maximum		12%
Flakiness index Maximum		15%
Striping test (CRRI) Maximum		25%

Where all or some of those conditions can not be satisfied, if is left to the Engineer-in-Charge to allow reasonable variations.

The use of low grade aggregate by improving their qualities shall also be considered.

21.2.2.2 GRADING OF AGGREGATES: The aggregates for the bituminous macadam for different thickness shall conform to the grading given in Table 1 & 2.

TABLE- 1: 75 MM. (3 in) compounded thickness

Sieve designation (IS)	Percentage by weight passing sieve
45 mm.	100
26.5 mm.	75-100
22.4 mm.	60-95
11.2 mm.	30-55
5.6 mm.	15-35
2.8 mm.	5-20
90 micron	0-5

TABLE- 2: 50 MM. (2 in) compounded thickness

Sieve designation (IS)	Percentage by weight passing sieve
26.5 mm.	100
22.4 mm.	75-100

11.2 mm.	50-85
5.6 mm.	20-40
2.8 mm.	5-20
90 micron	0-5

21.2.2.3 The binder content for premixing shall be 4 pc weight of the total mix except when otherwise directed by the Engineer-in-Charge.

The quantities of aggregates to be used shall be sufficient to yield the specified thickness after compaction.

21.3 QUANTITIES OF MATERIALS REQUIRED FOR 10 MM (100 SQFT.) OR ROAD SURFACE

21.3.1 AGGREGATES: The approximate quantity of aggregates required in ccm for 10 mm. (100 sqft.) of bituminous macadam should be 0.06 to 0.75 cum (20 to 25 cuft.) & 0.90 to 1.10 cum (30-35 cuft.) for compact thickness of 50mm. (2") & 75 mm. (3") respectively.

21.3.2 TACK COAT: If & when required the quantities of binder needed for the tack coat shall be between 5 to 7.5 kg. per 10 sqm. (10-15 lbs for 100 sqft.) for bitumen treated surface & 7.5 to 10 kg. per 10 sqm. (15-20 Lbs for 100 sqft.) for untreated water bound macadam surface.

CONSTRUCTION MERTHODS:

Weather & seasonal limitations: Bituminous macadam shall not be laid or placed during rainy weather or when the sub-grade or base course is damp or wet unless emulsion is used or normally when the atmospheric temperature in the shade is 160C (600F) or below.

EQUIPMENT: All equipment necessary for the proper constn of work shall be on the site of the work in good condition.

ARRANGEMENT FOR TRAFFIC: Adequate provisions for the movement of traffic shall be made as far as possible so as not to interfere with constn operation on the road.

PREPARATION OF UNDER LYING COURSE: The under lying course on which bituminous macadam is to be laid shall be prepared shaped & conditioned to a uniform grade & section as specified. Any depressions or pot holes should be properly made up & thoughly compacted sufficiently in advance. The surface of the underlying course shall be thoroughly swept & scraped clean & from dust & foreign materials.

APPLICATION OF TACK COAT: The binder shall be heated to its appropriate application temperature except in case of emulsions & applied to the base at the rate give in para 21.3.2. It is preferable to use a sprayer but if it is not available, pouring may be used. The binder shall be applied uniformly.

The tack coat shall be applied just ahead of spreading of permitted macadam.

PREPARATION OF PREMIX: Mechanical mixers shall be used for mixing the aggregate & the bitumen binder. Improved hand mixing drums may be used only with the approval of the Engineer-in-Charge.

The bituminous materials except emulsions shall heated to the appropriate application temperature in tank so designed as to avoid local over heated & provide a continuous supply. The aggregates shall be dry & suitably warm or heated as required before it is paced in the mixer except in the case or emulsions. When it is delivered to the mixer it shall be at a temperature which is consistent with proper mixer & laying.

After about 15 seconds of dry mixing the hot bituminous materials shall be distributed over the aggregate at the rate specified in Table-1&2 & para mentioned above & at the temperature as directed by the Engineer-in-Charge with tolerance or plus of minus 100 C. The mixing shall be continued till homogeneous mixture is obtained in which all particles of the aggregates are coated uniformly.

The mixtures shall be transported from the mixing plant to the point of use in suitable vehicles or wheel borrows.

SPREADING : The mix shall be spread immediately after mixing properly by mechanical pavers, spreaders or grades. Manual spreading shall be done only with the approval of the Engineer-in-Charge with rakes to the desired thickness & to the correct camber. Uneven areas shall be brought to camber.

ROLLING : As soon as sufficient length of bituminous macadam has been laid rolling shall be done by 8 to 10 ton power rollers. Rolling shall commence at the edges, progress towards the centre longitudinally except that in super elevated curves where rolling shall progress from the lower to the upper edge parallel to the centre line of the pavement & uniformly lapping each preceding track until the entire surface has been rolled & all roller marks are eliminated & no more compaction or crushing of aggregates takes place. The roller wheels shall be kept damp.

When the roller has passed once over the whole area any high spot or depressions which become apparent shall be corrected by removing or adding fresh mixture.

The edge along & transverse of the macadam laid & compacted shall be cut full depth so that the exposed face shall be pained with thin such coat of appropriate binder before the mix is placed against it.

FINISHED SURFACE: The compacted surface shall be uniform & conform of the lines, grades & typical cross section indicated on the plans & shall present a satisfactory surface. When tested with a template & straight edge, the finished surface shall show no variation grater than 6mm. (1/4") over 3m. (10ft.) length.

RECOMMENDED PRACTICE FOR 2 CM THICK BITUMEN & TAR CARPETS.

INTRODUCTION: For all purposes, Metric Units invariably should be used. Figures given in brackets in foot point units are only approximate.

SCOPE: This recommended practice is for laying 2cm. (3/4") thick bitumen & tar carpets. The type & grade of binder is left to the discretion of the Engineer-in-Charge, so as to be in conformity with climatic, traffic & terrain condition & based on past successful practices.

A. TWO CM THICK BITUMEN CARPET:

A.1. MATERIALS.

A.11. BINDER : The binder shall be one of the following.

(i) a straight run bitumen of suitable penetration grade complying with IS 73-1961.

(ii) a cut back bitumen of suitable viscosity complying with IS 217-1961 or IS 454-1961 or other approved cut back.

A.1.2. Coarse Aggregates: The aggregates shall consist of angular fragments & be clean, hard, touch, durable & of uniform quality thought out. They shall be crushed granite rock, gravel, river shingle or slag & should be free of elongated or flaky pieces, soft & disintegrated material, vegetable & other deleterious matter. The aggregates shall also satisfy the following properties.

	Property	Value	Method Test
	1	2	3
1	Abrasion value, using loss angle machine or Aggregate impact value	Max. 35% Max 35%	IS: 2386)Part-IV) IS: 2386 (Part-IV)
2	Flakiness index	Max 23%	IS: 2386 (Part-I)
3	Stripping value	Max 25%	CRRI *
4	Water absorption (except in case of slags)	Max 10%	IS: 2386 (Part-III)
5	Soundness, loss with sodium sulphate 5 cycle (in case of slag only)	Max 12%	IS: 2386 (Part-V)
6	Unit weight or bulk density (in case of slag only)	Max 1120 kg. per ccm (70 Lbs per cut ft.)	IS: 2386 (Part-iii)

Uncrushed & rounded river gravel or shingle can also be used but the quantity of binder would be different in their case from that given under para A-2. Where such rounded aggregate are used it may be necessary to add sufficient quantity of coarse sand & an appropriate quantity of hot bitumen to make the mixture suitable for which purpose such a mix will have to be designed for binder content depending on individuals.

STATE WATER IMMERRION TEST, CRRI

This test is used for a qualitative estimation of stripping of binder from a freshly coated aggregates in the presence of water. This is carried out with clean & dry aggregates & binders like penetration grade bitumen, fluxed bitumen as well as road tar.

300-400 grams of aggregates of size passing 25mm. (1") sieve & retained on 12.5 mm. (1/2") sieve are mixed with 5% binder by weight of aggregates, the conditions for mixing being as specified which, for example normally at a temperature of 120^0C to 150^0C or 100^0C- 110^0C respectively for the aggregate & road tar of grade R.T. 3 after complete coating, the mixture is allowed to cool to room temperature in a clean dry beaker. Distilled water is then added to immerse the coated aggregate. The breaker is covered & kept undisturbed in a thermostatic water bath at a temperature of 400^0 C (1040^0 F) for a period of 24 hours. The extend of stripping is then evaluated while the specimen is under water in the beaker & after cooling it to room temperature & expressed as the average percent in area of aggregate surface uncoated.

** In the absence of proper design facilities, the proportion of sand to be added may be worked out as under.

One cubic foot wooden box is filled to the top with gravel & weight after repeated shaking to allow for more gravel to be added. The coarse sand which is proposed to be used is added on to this box & robbed so as to allow for as much coarse coarse sand as possible to get in the voids of the gravel. The top is then struck off & the box is weight again, these two weightings give the proportion of sand to be added with proportion, suitable & gravel bituminous mixtures are made with varying bitumen contents from 4 to 6 percent by weight & tested for strength. That binder content which gives maximum strength of stability is the bitumen content to be used.

A.1.3. **Fine aggregates or sand**: The fine aggregates or sand shall consist of clean, hard durable, uncoated coarse dry particles & be free from injurious amounts of dust soft or l\flaky particles or organic matter or other deleterious substances.

A.2 QUANTITIES OR MATERIALS REQUIRED.

A.2.1 Aggregates

A.2.1.1 For carpet

	Per 10 mm of Road surface	Per 100 sqft of road surface
(a) Stone chippings 13.2mm. size passing 22.4mm. Sieve & retained in 11.2mm. sieve	0.18 ccm	6 cft.
(b) Stone chippings 11.2 mm. size, passing through 13.2mm/ sieve & retained on 5.6mm. sieve	0.09 ccm	3 cft.
	0.27 ccm.	9 cft.

A.2.1.2 For seal cost.

(c) Liquid seal coat: crushed fine aggregates 6.7mm. Size passing through IS 9.5mm.	0.06 ccm	2 cft.
(d) Premix seal coat: coarse sand or stone grit passing IS 2.36mm. sieve retained on 180 micro sieve	0.06 ccm	2 cft.

* In case emulsions are used, the quantity will be 50%

A.2.2 BINDER

	Per 10 mm. of road surface

A.2.2.1 FOR TACK COAT

(a) On water bound macadam	6.5 to 7.5 kg.
(b) On existing black top surface	4.5 to 5.5 kg.

Note: For emulsions complying with IS 3117-1955, the same quantities as given above may be used. In case the existing black top surface which is extremely rich in binder or fatty. The tack coat be eliminated in hot climatic regions at the discretion of the Engineer-in-Charge if a good bond between the existing surface & the super imposed layer can be ensured.

A.2.2.2 For premixing

(a) For 0.18 ccm of 13.2mm. size stone chippings @ 52 kg. per ccm.	9.5 kg.
(b) For 0.09 ccm. Of 11.2mm. size stone chippings @ 56 kg. per ccm.	5.1 kg.
	14.6 kg.

A.2.2.3 For seal coat.

(a) Low rainfall areas (under 150 cm. per year)	6.8 kg.	15 Lb.
(b) High rainfall areas (over 100 cm per year)	9.8 kg.	20 Lb

A.3 CONSTRUCTION

A.3.1 **PREPARATION OF BASE**: Before the carpet is applied to the existing base the road must be free from dust or caked mud; where the existing base is pot-holed or rotted, these irregularities must be corrected with premixed chips or coated macadam, depending upon the depth of the pot hole, laid after applying a tack coat of binder & well rammed thereafter. Where the existing base is extremely porous & absorptive, a suitable primer (vide IRC Tentative specification for priming of base course with bituminous primers) shall be applied. The surface should be cleaned by:-

(a) Removing caked earth & other foreign matter with wire brushes.

(b) Sweeping with brooms &

(c) Dusting with sack.

A.3.2 **TACK COAT:** The binder should be heated, wherever required to the appropriate temperature as indicated by the manufacturer & applied to the base at the rate specified in. It is best to use a sprayer. The binder should be evenly brushed, if needed. If the emulsions are used, quantity required will be 50% of what is indicated. The tack coat should be applied just ahead of the spreading of the premix.

A.3.3 **PREPARATION OF PREMIX**: Mechanical mixer should be preferred. When only improved hand mixing drums are available for premixing, place 0.028 ccm (1cft) of 12.5 mm. (1/2") chippings & 0.01 ccm (1/2 cft) of 10mm. (3/8") chipping in the mixing drums & mix dry thoroughly. The aggregates should be suitably heated prior to the adding of bitumen.

And 2.24 kg. (5 Lb) of the binder as per quantities given in para A.2.2 heated where required to a temperature suitable to the grade of bitumen used & mix until the chippings are thoroughly coated with the binder.

Empty the premix on to the stretcher or wheel barrows & carry to site. The quantities of chippings & binder per batch as given may be proportionately increased if proper coating is possible in one operation.

A.3.4 **SPREADING PREMIX:-** Immediately after applying the tack coat spread the premix with rakes to the desired thickness & camber or distribute evenly by means of a drag spreader, check camber by means of a camber board & even out inequalities.

A.3.5 Rolling as soon as sufficient length say 15 mtr. of the premix have been laid rollers should commence with smooth wheeled rollers (6 to 9 tonnes) or pneumatic tired rollers. Rolling should commence at the edges & progress towards the centre longitudinally except in the case of superheated sections where this should commence at the inner edge & proceed towards the outer edge of the curve.

When the roller has passed once over the whole area any high spots or depressions. Which becomes apparent should be corrected by removing or adding premixed chipping. Where this has been done, roll to compaction. Avoid excessive rolling as this serves no useful purpose & may spoil the carpets.

Moist the roller wheel to prevent the premix from a adhering to the wheels & being picked up.

A.3.6 **APPLICATION OF SEAL COAT:** In low rainfall areas, i.e. those having under 150 cm. (60") per year a premixed sand seal coat mixed preferably in a mechanical mixer after heating the same should be applied immediately & rolled. Materials required for this seal coat are given in paras A2.1.2 & 2.2.3.

In high rainfall area, i.e. those having rainfall over 150 cm. (60") per year a seal coat preferably with stone chippings mixed with coarse sand can be used & should be applied after laying of the carpet. The binder heated to the permitted temperature should be applied to the cleaned surface, blinded with chipping & rolled.
Materials required are given in para A.2.2.3

The finished surface shall be uniform & conform to the lines, grades & typical cross sections specified. When tested with a template & straight edge, the finished surface shall not show variation greater than 6.3mm. (1/4") over a 3m. (10ft.) length.

A.4. **OPENING TO TRAFFIC**: Traffic may be allowed on the road preferably 24 hours after providing the seal coat. This should be considered the minimum period when cut back or emulsion is used.

B. **TWO CM. THICK TAR CARPET**

B.1. **MATERIALS:**

B1.1 **BINDER:** The binder shall be road tar or grade RT 3 or RT4 (No. IS: 215-1961).

B.1.2 **COARSE AGGREGATES:** The aggregates shall consist of angular fragments & be clean hard, tough, durable & of uniform quality throughout. They shall be crushed rock, gravel, river shingle or slag & should be free of elongated or flaky pieces, soft & disintegrated materials & other deleterious matter. The aggregates shall satisfy the following properties.

	Property	Value	Method Test
	1	2	3
1	Abrasion value, using loss angle machine or Aggregate impact value	Max. 35% Max 35%	IS: 2386 (Part-IV) IS: 2386 (Part-IV)
2	Flakiness index	Max 23%	IS: 2386 (Part-I)
3	Stripping value	Max 25%	CRRI *
4	Water absorption (except in case of slags)	Max 10%	IS: 2386 (Part-III)
5	Soundness, loss with sodium sulphate 5 cycle (in case of slag only)	Max 12%	IS: 2386 (Part-V)
6	Unit weight or bulk density (in case of slag only)	Max 1120 kg. per ccm (70 Lbs per cut ft.)	IS: 2386 (Part-iii)

B.1.3 ~~Fine aggregate or sand as in para A.1.3~~

B.2. QUANTITIES OF MATERIALS REQUIRED

B.2.1 Aggregates

B.2.1.1 For carpet:

	Per 10 mm of Road surface	Per 100 sqft of road surface
Stone chippings 13.2mm. size passing 22.4mm. Sieve & retained in 11.2mm. sieve	0.18 ccm	6 cft.
Stone chippings 11.2 mm. size, passing through 13.2mm/ sieve & retained on 5.6mm. sieve	0.09 ccm	3 cft.
	0.27 ccm.	9 cft.

Coarse sand or stone graft, passing 2.36 mm. Sieve & retained in 180 micro sieve	0.060 ccm	2 cft.

B.2.2 BINDER

(a) For premixing coat on water bound macadam surface		
(b) For low porosity surface	7.3 to 9.8 kg.	
(c) For medium porosity surface	8.9 to 12.2 kg.	
(d) For high porosity surface	12.2 to 14.6 kg.	
(e) For tack coat (on an existing black topped surface)	7 kg to 10 kg	(15 to 20 lb)
(f) For seal coat	9.8 kg.	(20 lb)
(g) For premixing	19.6 kg.	(40.5 lb @ @ 4.5 lb) per cft

B.3. **CONSTRUCTION**

B.3.1 Preparation of base : As in para A.3.1.

B.3.2. Tack coat: The binder should be heated to 105^0C/ (220^0F to $24C^0$F) & should be applied at the rates specified in para B.2.2. to $1/5^0$C

It is best to use a sprayer. The binder should be evenly brushed, if need be. The tack coat should be laid just ahead of the spreading of the premix.

B.3.3 **PREPARATION OF PREMIX:** Mechanical mixers should be preferred. When only improvised hand mixing drums are available for premixing place 0.028ccm (1 cft.) of 12.5 mm. (1/2") chippings & 0.014m. (1/2 cft.) of 10mm. (3/8") chipping in the mixing drum & mix thoroughly dry. Add 3 kg. (6.75 lb) of road tar heated to 105^0C105^0C/ (220^0F to $24C^0$F) & mix until chippings, preheated if necessary are thoroughly heated with the binder. Empty the premix on to stretchers or wheel barrows & carry to site. The quantities of chipping & binder per batch may be proportionately increased if proper coating is possible in one operation.

B.3.4 **SPREADING PREMIX** : As in para A.3.4.

B.3.5 **ROLLING:** As in para A.3.5.

B.3.6 **APPLICATION OF SEAL COAT**: Immediately after laying the carpet, the seal coat should be applied in the manner detailed below.

Road tar IS grade RT.3. heated to 105^0C should be spread evenly at 9.8 kg. per 10 sqm. or 20 lb per (100 sft.) & then it should be blinded evenly with medium coarse day sand as fine grit at the rate of 0.06 ccm. Per 10mm. (2 cft. Per 100 sft.)

The finished surface shall be uniform & conform to the lines, grades & typical cross sections. When tested with a template & a straight edge, the finished surface shall show no variation greater than 6.3mm. (1/4") over a 3m. (10ft.) length.

B.4. **OPENING TO TRAFFIC:**
The traffic may be allowed on the road 24 hours after providing the seal coat.

Copy of letter no.RWP/16 (3)/84 dt.1.1.85 from the S.E, Govt. of India, Ministry of Shipping & Transport (road wing) Transport Bhavan, New Delhi addressed to all the Chief Engineers of the States & Union Territories, dealing with National Highways.

Sub:- Use of Hot mix plant on National Highways works.

1. It has been observed that sometimes Hot Mix Plants used on National Highways works are not properly equipped with arrangements for gradation control of aggregate, measuring of bitumen & mineral filler feeds which are essential to mix of desired specifications & ensure quality of aspartic road works.

2. It has there fore, been decided that while inviting tenders & allotting works to contractors, it may be specified that Hot mix plants should conform to comfort to component arrangements as per Annexure attached. This should also form part of the contract documents. The work should not be allowed to be executed by contractors, with the plant which do not fulfill these minimums requirements.

3. Similarly, Departmental Hot Mix Plants which already have the essential features should be used on works as such without putty in disuse or eroding any of the components.
Please acknowledge the receipt of this letter.

ANNEXURE.

MINISTRY OF SHIPPING & TRANSPORT
(Roads Wing)

Enclosure to letter
No.RWP/16(3)/84
Dt. The 1st. Jan. 1985

TECHNICAL REQUIREMENT OF HOT MIX PLANT TO BE USED IN NATIONAL HIGHWAYS WORKS

COMPOSITION OF PLANT: The hot mix plant shall conform generally to IS specifications No.IS 30 6/1965 as amended from time to time & shall be equipped with the following arrangements.

COLD AGGREGATE FREEDER: The cold aggregate feeder shall have minimum three independent bins or compartments, each proved with accurate mechanical means for feeding the aggregate at uniform & predetermined rate to the cold elevator or to some intermediate conveyer or directly into the dryer. The feeder shall provide for the adjustment of total & proportional feed & shall be capable of being locked in any setting.

DRYER: The dryer shall be capable of continuously agitating the aggregates while heated to desired temperature. At discharge end of the dryer or any other suitable location, means shall be proved for ascertaining the temperature of the heated aggregate.

SCREENING UNIT & GRANDATION CONTROL: The dried aggregate shall be screened into less three sizes. The plants shall include means for accurately proportioning each bin size of aggregate either by weight or by volumetric measurement. When the gradation control is by volume, the unit shall include a feeder mounted under the compartment bins, each bin shall have an accurately controlled, individual gate to from an orifice for proportioning the materials drawn from each respective bin compartment. The orifice shall have positive mechanical adjustment & provide with a lock indicators on each gate opening in centimeters.

MIXER UNIT: The plant shall include a mixer of an approved twin shaft pug mill type capable of providing a uniform mix. If not enclosed, the mixer box shall be equipped with adjust head to prevent loss of fines.

MINERAL FILLER SUPPLY UNITS: There shall be an independent arrangement to feed mineral filler directly into the pug mill. The hopper to bin for mineral filler shall provide for the adjustment to proportion the feed with the aggregate & bitumen feeds & shall be capable of being locked in any setting.

BITUMEN HEATING: A heating system for bitumen always with effective & positive control of temperature shall be provided to maintain proper temperature & for allowing continuous circulation between storage tank & proportioning units during the entire operating circulating period. Suitable arrangements shall be provided for recording the temperature at the tank & in the circulating system.

SYNCHRONISATION: For synchronization of aggregate, bitumen & filler feeds, satisfactory means shall be provided to afford inter locking control between the flow of aggregate from the bins or compartment, flow of bitumen from the tank & flow of mineral filler.

Copy of letter No.RW/RD/33047/486/NH (Std.) New Delhi-1, the 10th Nov 1987 from the Chief Engineer, (Bridges) for Director General (Road Development) Govt. of India Ministry of Surface Transport (Roads Wing) to the Chief Engineers of State P.W.Ds & Union Territories dealing with National Highways & other centrally Financed Roads etc.

Sub:- Providing special condition in the Contract Documents for bridge works on National Highways & other Centrally Financed Roads with view to introducing new techniques & cutting down delays.

It has been noticed that there has been very slow progress in the introduction of new technologies/ construction methods in the execution of bridge works on National Highways & under other Centrally Financed Schemes. Further, there has been delay in the timely completion of a number of bridge works due to certain lacunae in the contract documents. Keeping the above factors in view, it has been decided that suitable special conditions as given here under should be provided in the contract documents for bridge works-

SPECIAL CONDITION:

TOOLS & PLANTS: The tendered shall give detailed list of tools & plants (along with all relevant data) to be used by him for the execution of the bridge work.

DESIGN CAPABILITY: The tendered shall indicate whether design, wherever required as per conditions of bid, will be carried out in house or with the help of the consultants. If in house, the details of designs carried out over the past 5 years should be indicated. It designs are to be prepared by back-up consultants, the following data shall be furnished.

1. Name of the company.
2. Key personnel alongwith their professional qualifications, present position held in the company & total experience.
3. Number of engineering staff under each category of specification.
4. Details of design assignments handled during the past 5 years.

NUMBER OF SETS OF STAGING & SHUTTERING: Depending upon the quantum of work, it should be clearly stipulated that the contractor shall have to arrange certain minimum number of sets of staging & shuttering for the work of foundation, sub-structure & superstructure.

A sample clause for including in the Contractor Documents is enclosed at Appendix-I.

TIME SCHEDULE FOR SUBMISSION & APPROVAL OF DESIGNS & DRAWINGS: A strict time schedule for submission & approval of designs & detailed workings should be stipulated & there should be provision in the Contractor Documents for suitable penalty for the contractor delaying the submission of designs & drawings.

A sample clause for including in the Contractor Documents is enclosed at Appendix-II.

UNACCEPTABLE TYPE OF STRUCTURE: The following types or bridge structures or structural components shall not be acceptable. 6 to be incorporated, if needed.

USE OF BATCHING PLANTS & PUMPING OF CONCRETE:

(To be incorporated for major bridge having over all length of more than 200mtr.)

Concrete shall be efficiently transported to the point of delivery by using suitable concrete pumps of adequate capacity or self propelled concrete transport equipment. The method of transportation of concrete shall be clearly outlined by the tenderer at the time of submission of tenders. It shall be ensured that the contractors use concrete batching & mixing plant having time control device.

It is requested that the contents of this circular may please be brought to the notice of field officers for information & strict compliance in future.
Copy forwarded for information to:-

1. All Regional Officers & Engineer Liaison Officers

2. All Technical Officers in the Bridges Directors with the request that suitable guidelines should be incorporated in the Technical Notes accompanying sanction letters for bridge works. They should also ensure at the time of vetting the NITS for bridge works that the above mentioned special conditions are incorporated.

GOVERNMENT OF ORISSA
OFFICE OF THE CHIEF ENGINEER
NATIONAL HIGHWAYS & PROJECTS,
BHUBANESWAR

Memo No. 51109 (31) dt. BBSR the 28th Dec. 1987.

WVM 20.84,
Copy alongwith copy of appendix-I & II forwarded to all Superintending Engineers/ Executive Engineers for information & they are requested for follow to action with a view to incorporate in the DTCN so far NH bridge & roads are concerned alongwith other centrally financed roads bridges.

Sd/-
For Chief Engineer

Memo No. 51110 (4) dt. 28.12.1987.
Copy alongwith copy of appendix-I & II forwarded to the Executive Engineer (D&P) I/II/III/IV/ Asst. to Chief Engineer-I/II for information & necessary action.

Sd/-
For Chief Engineer

Encl: As above

APPENDIX – I

Enclosure to Lr.No.RW/RD/30047/4/86/NH (Std.) dt.10.11.1987.
Clause No. _____ Minimum requirement of set of _____
_____ _____ _____ staging & shuttering.

In order to ensure completion of the bridge within the stipulated, period, the contractor shall have to arrange a minimum number of sets of staging & shuttering for different components as stipulated here under :-

(i) For well foundation _____ Nos.

(ii) For other items of substructure _____ Nos.

(iii) For superstructure _____ Nos.

Use of slip form shuttering wherever feasible will be preferred.

APPENDIX – I
Enclosure to Lr.No.RW/RD/30047/4/86/NH (Std.) dt.10.11.1987.

Clause No. _____ submission & approval of _____

_____ designs drawings.

1. Within sixty (60) days form the receipt of the letter of acceptance of this tender, the contractor shall submit to the Engineer six sets of signed detailed designs & working drawings for the first set of foundation of the bridge for scrutiny & approval. The detailed designs & working drawings for the various balance items of work, including temporary works, shall there after be submitted progressively in six sets, within a period of two hundred & forty (240) days from the receipt of the letter of acceptance.

2. All detailed designs & workings drawings submitted by Contractor shall be bold, legible, clear, self-explanatory & self contained in all respects with suitable references to technical literature properly mentioned in general, & complete of the same enclosed alongwith to facilitate expeditious scrutiny & approval by the Engineer.

3. Approval to the working drawings shall, if found to be in order, be accorded by the Engineer within 30)thirty) days from the date of receipt of such lot submitted by the contractor. Otherwise, the Engineer shall within the above mentioned period apprise the contractor of his comments in writing on all such designs & drawings for compliance by the contractor in accordance with the basic design date & performance specification and/or codal provisions or principles of sound engineering practice.

4. Within 30 (thirty) days form the date of receipt of the comments of the Engineer mentioned in sub-clause (3) hereof, the contractor shall ensure that the revised designs & drawings, duly modified in the light of the comments, alongwith parawise replies to the same as submitted to the Engineer for necessary technical approval. The engineer shall within 30 (thirty) days form the date of receipt of the modified designs & drawings, arrange to accord his approval to all such revised working drawings arrange to accord his approval to all such revised working drawings after taking due cognizance to the extent possible, of the contractors reply/ clarifications to the comments earlier received by the contractor & if required incorporation there in all additional modifications that may still be necessary, in the opinion of the Engineer in the light of the above.

5. The contractor shall irrespective of the estimated quantities and/or dimensioned details furnished by him in the designs, notes, calculations, unit priced Bill of Quantities or the out line drawings accompanying his tender after the work, carry out all changes that may, during the scrutiny & approval of the detailed designs & drawings, be considered necessary in the opinion of the Engineer or compliance with the basic design data & performance specification or codal provisions as specified in the contract, as principle of sound engineering practice as laid down or as directed by the Engineer. Without any variation in the contract price & no extra charges consequent on any misunderstanding what-so-ever or otherwise shall be allowed entertained.

6. Not with standing the approval by the Engineer to designs & drawings submitted by him, the overall responsibility for the method of construction and/or stability of the structure shall vast entirely with the contractor in accordance with the provisions of the contract & the approval accorded by the engineer shall not absolve the contractor of his responsibility for the safely of the structure designed & constructed by him.

7. On receipt of approval to the contractor's design & drawings contractor shall arrange to supply to the engineer, within a period of 14 (fourteen) days from the date of receipt of such communications twelve signed copies of the approved working drawings for the use of the Engineer & his representative at site. Four sets of all such drawings shall be which two sets shall be returned to the contractor.

8. One set of the authenticated drawings furnished to the contractor, after approval as aforesaid shall be kept by the contractor at the site & the same shall at all reasonable times, be available for inspection & use by the engineer & the engineer's representative or by any other person authorized by the Engineer in writing.

9. On completion of the works, the contractor shall arrange to furnish to the Employer two bound sets of all "as constructed" working drawings for every component of the works, all such copies being on pollster film or quality to be approved by the Engineer or his authorized representative. The certificate of completion of works as per the provision of clause _____ hereof shall not be issued by the Engineer in the event of the contractor's failure to furnish the aforesaid "as constructed" drawings for the entire works.

10. If, by reason of any failure or inability of the contractor to issue or supply with the time period mentioned aforesaid, the initial/ modified approved sets of detailed designs or working designs, as the case may be,

in accordance with sub-clause(1), (4) & (7) of this clause, the contractor shall becomes liable to pay fixed & agreed liquidated damages, but not as penalty, for all such delays & the engineer shall in consequence thereof, be entitled to deduct (without prejudice to any other remedy available to it under the law to deduct from any moneys due or which may become due to the contractor under this contract) the amount of such damages at the rate of 0.05% of the whole works per week or each such delay, irrespective of the actual damages that may have been sustained by the employer. The total amount of such liquidated damages stipulated is this sub-clause shall not exceed on percent of the contractor price of the whole work.

11. If by reason of any failure or inability of the Engineer to issue within a time reasonable in all circumstances & drawing or order requested by the contractor in accordance with sub-clause (3) & (4) of this clause, the contractor suffers delays, then the Engineer shall take such delays in to accounts in determining any extensions of time which the contractor is entitled under clause _____ hereof.

GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROAD WING)

Telegrams
‘ Roading’
No. RW/NH-33045/1/38 DOII

Transport Bhavan
No. I Parliament Street,
New Delhi, the 3rd. August 1988

To

The Chief Engineers of State PWDs, & Union Territories dealing with
National Highways & other Centrally Financed Roads etc.

Sub:- Special Conditions to be incorporated in the Contract Documents for roads & bridges works
In National Highways & other Centrally Financed works regarding.

Sri,

It has been observed that the existing contract documents for execution of National Highway & other centrally financed road bridge works do not fully meet the requirements, to a achieve the goals of quality assurance as envisaged in various ministry’s circulars & ministry’s specification for road & bridge work (2nd. Revision an dare also silent in respect of some important requirements of contract management. In order to have a comprehensive tender document to ensure fulfillment of the various requirements a model tender document for National Highway & centrally aided works was circulated inviting comments with a view to finalizing it. The various comments received are under examination & it may take something it issue to final tender documents for adoption. Till such time the following conditions should be incorporated in the present tender document with immediate effect. This will be applied only to the works to be put to the tender hence for the shall not apply to the already contracted works.)

2. **SPECIAL CONDITION**:

(A) Applicable in case of both Road & Bridge works

(1) **Construction Equipment.**

1.1 The methodology & equipment to be used on the project shall be furnished by the contractor to the Engineer well in advance or commencement or work & approval of the Engineer obtained prior to its adoption & use.

1.2 The contractor shall give a trial run of the equipment for establishing its capability to achieve the laid down specifications & tolerance to the satisfaction of the Engineer before commencement of work, if so desired by the Engineer.

1.3 All equipment provided shall be of proven efficiency & shall be operated & maintained at all times in a manner acceptance to the Engineer.

1.4 No equipment of personal will be removed form site without permission of the Engineer.

(2) **Work programme & methodology of construction**.

The contractor shall furnish his programme of construction for execution of the work within the stipulated time schedule together with methodology of construction of each type of work & obtain the approval of the Engineer prior to actual commencement of work.

(3) **Revised programme of work in case slippage**

In case of slippage from the approved work programme at any stage, the contractor shall furnish revised programme to make upto slippage within the stipulated time schedule & obtain the approval of the Engineer to the revised programme.

(4) **Action in case of disproportionate progress**

In case of extremely poor progress of the work or any item at any stage of work which in the opinion of the Engineer can not be made good by the contractor considering his available resources the Engineer will get it accelerated to make up the lost time through any other agency & recover the additional cost incurred, if any, in getting the work done from the contractor after information him in writing about the action envisaged by him.

(5) **Setting out**

Setting out the work as spelt out in clause-109 of Ministry's Specifications for road & bridge works (2nd. Revision) will be carried out by the contractor.

(6) **Public Utilities**.

Action in respect of public utilities will be taken by the contractor as envisaged in clause-110 of Ministry's Specification for road & bridge works (2nd. Revision-I)

(7) **Arrangement for traffic during construction**

Action for arrangement for traffic during construction will be taken by the contractor envisaged in the contractor documents spelt out in clause-112 of Ministry's Specifications road & bridge works (2nd. Revision)

(8) **Quality control**

The onus of achieving quality for work will be on the contractor who will take actions as stipulated in section 200 of of Ministry's Specifications road & bridge works (2nd. Revision)

(9) **Ministry's Specifications for Road & Bridge works (2nd. Revision)**

The ministry's Specifications for road & bridge works (2nd. Revision) will form part of the contract documents & the contract will be legally bound to the various stipulations made there in unless & otherwise specifically relaxed or waived wholly or partly through a special clause in the contract document.

(10) **Documentation**:

The contractor will prepare drawing(s) of the work as constructed & will supply original with three copies to the Engineer who will verify an certify these drawings. Final as constructed drawing(s) shall then be prepared by the contractor & supplied in triplicate along with a micro film of the same to the Engineer for record & reference purposes.

(B) Applicable in case of road works only:

To be incorporated as a special condition only where it is applicable & for works put up for tendering upto 31st. March 1990. The details of the paver specified in the clause 504.3.5 will be relaxed in the case of bituminous macadam (clause 504) where it is going to be covered by any wearing course other than semi-dense bituminous concrete (clause 510) bituminous concreter (clause512) or by a base course of Dense

Bituminous macadam (clause 507) with the provision that it can be laid by means of self propelled mechanical paver with suitable seeds callable of spreading, tamping & finishing the mixture to the specified lines/ grades & cross sections.

(C) Applicable in case of bridge work only:

(to be incorporated as a special condition, wherever applicable)

(1) Design capability:

The tendered shall indicate whether design, wherever required as per conditions of bid, will be carried in house or with the help of consultants. In in house, the details of designs carried out over the part 5 years should be indicated, if designs are to be prepared by back-up consultants, the following data shall be furnished:

(i) Name of the company

(ii) Key personnel along with their professional qualifications, present position held in the company & total experience.

(iii) Number of Engineering staff under each category of specification.

(iv) Details of design assignment handled during the past 5 years.

(2) Number of sets of staging & shuttering & the equipment:

Depending upon the quantum of work involved & the time frame envisaged in the contract, it should be clearly stipulated that the contractor shall have to arrange certain minimum number of sets of staging & shuttering as well as the equipment of certain size & number which will have to be fully justified with the time cycle for use from erection till release stage for the work of foundations, substructure & super structure. In case of the deptt. designs, State PWDs will have to mention these requirements & for contractor's own designs the numbers required shall have to be mentioned any fully justified.

A sample clause for inclusion in the contract documents is enclosed at Appendix-I.

(3) Time Schedule for submission & approval of designs & drawings

A strict time schedule for submission & approval of designs & detailed working drawings should be stipulated & there should be a provision in the contract documents for suitable penalty if the contractor delays the submission of designs & drawings.

sample clause for inclusion in the contract documents is enclosed at Appendix-II

(4) Unacceptable or preferred type of structural agreement:

The following are some of the examples of unacceptable or preferred types of bridge structures or structural arrangement (to be incorporated, if needed):-

(i) Drop in spans with halved joints (articulations) shall not be permitted.

(ii) For cantilever construction, preference be given to box type cross-section with diaphragm provided at supports & without allowing any sudden change in depth.

(iii) For long span bridges having beam & slab type of superstructure, the number of longitudinal shall not be less than 3.

(iv) Multi span deck continuity may be preferred unless soil conditions dictate otherwise e.g. deltaic regions areas with soft foundation strata etc. where it may not be suitable.

(v) Trestle type frames from substructures shall be allowed.

(vi) Pile foundations shall not be accepted within the flood zone of the river.

(5) USE OF BATCHING PLANTS & PUMPING OF CONCRETE:
(To be incorporated for major bridge having over all length of more than 200mtr.)

Concrete shall be efficiently transported to the point of delivery by using suitable concrete pumps of adequate capacity or self propelled concrete transport equipments. The method of transportation of concrete shall be clearly outlined by the tendered at the time of submission of tenders. It shall be ensured that the contractors use concrete batching & mixing plant having time control device.

It is requested that the contents of this circular may please be brought to the notice of field officers for information & strict compliance in future.

The special conditions circulated with this Ministry's Lr.No.RW/KD/3304/4/86/NH (Stds) dt. 10.11.1987 for inclusion of Bridge Contract documents are superceded by this circular.

Sd/- R.K.Saxena
Chief Engineer (Roads) Standard & Research
For Director General (Road Development)

Copy to :

1. All Regional Officers & Engineer Liaison Officers
2. All Technical Officers upto the level of Asst. Engineer
3. Indian Road Congress, Jamnagar House, New Delhi
4. Addl. Director, IN THE, 147 Lobagh, New Delhi
5. Library
6. Deck Officer (10 spare copies)

Sd/- R.K.Saxena
Chief Engineer (Roads) Standard & Research
For Director General (Road Development)

GOVERNMENT OF ORISSA
OFFICE OF THE CHIEF ENGINEER
NATIONAL HIGHWAYS & PROJECTS,
BHUBANESWAR

Memo No. 33047 (18) dt. 23.8.1998.

Copy to all Superintending Engineers, NH/ Executive Engineers, NH Divisions for information & necessary action.

Sd/-
For Chief Engineer

Memo No. 33048 (10) dt. 23.8.1988.

Copy to all Branch Officers for information & necessary action.

Sd/-
For Chief Engineer

APPENDIX – I

Enclosure to Lr.No.RW/RD/30047/1/88- Do II dt. 3.8.88.

Clause No. _____Minimum requirement of set of staging & shuttering as well as ……..Equipment.

In order to ensure completion of the bridge within the stipulated, period, the contractor shall have to arrange a minimum number of sets of staging & shuttering for different components as stipulated here under :-

(i) For well foundation	(a) Staging & shuttering * _____ Nos.
	(b) Equipment (indicate * _____ Nos. size)
(ii) For other items of substructure	(a) Staging & shuttering * _____ Nos.
	(b) Equipment (indicate * _____ Nos. size)
(iii) For superstructure	(a) Staging & shuttering * _____ Nos.
	(b) Equipment (indicate * _____ Nos. size)

Use of slip form shuttering wherever feasible will be preferred.

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* Note :

1.

APPENDIX – I

Enclosure to Lr.No.RW/RD/30047/4/86/NH (Std.) dt.10.11.1987.
Clause No. _____ submission & approval of _____
_____ designs drawings.

Within sixty (60) days form the receipt of the letter of acceptance of this tender, the contractor shall submit to the Engineer six sets of signed detailed designs & working drawings for the first set of foundation of the bridge for scrutiny & approval.

The detailed designs & working drawings for the various balance items of work, including temporary works, shall there after be submitted progressively in six sets, within a period of two hundred & forty (240) days from the receipt of the letter of acceptance.

All detailed designs & workings drawings submitted by Contractor shall be bold, legible, clear, self-explanatory & self contained in all respects with suitable references to technical literature properly mentioned in general, & complete of the same enclosed alongwith to facilitate expeditious scrutiny & approval by the Engineer.

Approval to the working drawings shall, if found to be in order, be accorded by the Engineer within 30)thirty) days from the date of receipt of such lot submitted by the contractor. Otherwise, the Engineer shall within the above mentioned period apprise the contractor of his comments in writing on all such designs & drawings for compliance by the contractor in accordance with the basic design date & performance specification and/or codal provisions or principles of sound engineering practice.

Within 30 (thirty) days form the date of receipt of the comments of the Engineer mentioned in sub-clause (3) hereof, the contractor shall ensure that the revised designs & drawings, duly modified in the light of the comments, alongwith parawise replies to the same as submitted to the Engineer for necessary technical approval. The engineer shall within 30 (thirty) days form the date of receipt of the modified designs & drawings, arrange to accord his approval to all such revised working drawings arrange to accord his approval to all such revised working drawings after taking due cognizance to the extent possible, of the contractors reply/ clarifications to the comments earlier received by the contractor & if required incorporation there in all additional modifications that may still be necessary, in the opinion of the Engineer in the light of the above.

5. The contractor shall irrespective of the estimated quantities and/or dimensioned details furnished by him in the designs, notes, calculations, unit priced Bill of Quantities or the out line drawings accompanying his tender after the work, carry out all changes that may, during the scrutiny & approval of the detailed designs & drawings, be considered necessary in the opinion of the Engineer or compliance with the basic design data & performance specification or codal provisions as specified in the contract, as principle of sound engineering practice as laid down or as directed by the Engineer, without any variation in the contract price & no extra charges consequent on any misunderstanding what-so-ever or otherwise shall be allowed entertained.

6. Not with standing the approval by the Engineer to designs & drawings submitted by him, the overall responsibility for the method of construction and/or stability of the structure shall vast entirely with the contractor in accordance with the provisions of the contract & the approval accorded by the engineer shall not absolve the contractor of his responsibility for the safely of the structure designed & constructed by him.

7. On receipt of approval to the contractor's design & drawings contractor shall arrange to supply to the engineer, within a period of 14 (fourteen) days from the date of receipt of such communications twelve signed copies of the approved working drawings for the use of the Engineer & his representative at site. Four sets of all such drawings shall be which two sets shall be returned to the contractor.

One set of the authenticated drawings furnished to the contractor, after approval as aforesaid shall be kept by the contractor at the site & the same shall at all reasonable times, be available for inspection & use by the engineer & the engineer's representative or by any other person authorized by the Engineer in writing.

On completion of the works, the contractor shall arrange to furnish to the Employer following:-

(a) two bound sets of all "as constructed" working drawings for every component of the works, all such copies being on pollster, film or quality to be approved by the Engineer or his authorized representative.

(b) A set of finally approved design calculation on polyester film of approved quality for each component of the bridge.

The certificate of completion of works as per the provision of clause _____ hereof shall not be issued by the Engineer in the event of the contractor's failure to furnish the aforesaid "as constructed" drawings for the entire works.

If, by reason of any failure or inability of the contractor to issue or supply with the time period mentioned aforesaid, the initial/ modified approved sets of detailed designs or working designs, as the case may be, in accordance with sub-clause(1), (4) & (7) of this clause, the contractor shall becomes liable to pay fixed & agreed liquidated damages, but not as penalty, for all such delays & the engineer shall in consequence thereof, be entitled to deduct (without prejudice to any other remedy available to it under the law to deduct from any moneys due or which may become due to the contractor under this contract) the amount of such damages at the rate of 0.05% of the whole works per week or each such delay, irrespective of the actual damages that may have been sustained by the employer. The total amount of such liquidated damages stipulated is this sub-clause shall not exceed on percent of the contractor price of the whole work.

If by reason of any failure or inability of the Engineer to issue within a time reasonable in all circumstances & drawing or order requested by the contractor in accordance with sub-clause (3) & (4) of this clause, the contractor suffers delays, then the Engineer shall take such delays in to accounts in determining any extensions of time which the contractor is entitled under clause _____ hereof.

Copy of letter No.RW/NH-33045/1/88 DO II dt. 7.11.88 from the Director General (RD) Govt. of India, Ministry of Surface Transport (Road Wing) New Delhi, addressed to the Chief Engineers of State PWDs, Union Territories dealing with National Highways & other Centrally Financed Roads.

Sub:- Special Condition to be incorporated in the Contract Documents for Road & Bridge works in National Highways & other Centrally financed works-regarding.

It has been decided to relax the requirement of paver specified in clause 504.3.5 of Ministry's specifications of Road & Bridge works, 2nd. Revision, in respect of 25 m. semi-dense bituminous concrete (SDBC) wearing course clause 511 on bituminous macadam base course for works put up of tendering upto 31st. March 1990 25mm. SDBC can be laid be means of self propelled mechanical paver with suitable screeds capable of spreading, tamping & finishing the mixture to the specified lines, grades & cross sections.

(B) Applicable in case of road works only:

To be incorporated as a special condition only where it is applicable & for works put up for tendering upto 31st. March 1990. The details of the paver specified in the clause 504.3.5 will be relaxed in the case of bituminous macadam (clause 504) where it is going to be covered by any wearing course including 25mm. Semi-dense bituminous concrete (clause 510) bituminous concreter (clause5102) or by a base course of Dense Bituminous macadam & 25mm. with the provision that bituminous macadam & 25mm. Semi-dense bituminous concrete can be laid by means of self propelled mechanical paver with suitable seeds callable of spreading, tamping & finishing the mixture to the specified lines/ grades & cross sections.

GOVERNMENT OF ORISSA
OFFICE OF THE CHIEF ENGINEER
NATIONAL HIGHWAYS, BHUBANESWAR

Memo No.39646 (16) dt.19.11.88

Copy forwarded to all Superintending Engineer/ Executive Engineers dealing with NH for information & necessary future guidance.

Sd/-
For Chief Engineer

Copy of the letter No.RW/NH-31043/II/90-DO-II dt.6.4.1990 from the Superintending Engineer, Director General (Road Development) Govt. of India Ministry of Surface Transport (Roads Wing) New Delhi, addressed to the Chief Engineer all the State PWDs

Sub:- Ministry of Surface Transport Specifications for Road & Bridge works (2nd. Revision1988) Specification of paver Finishers for use on Bituminous works.

1. Please refer to this Ministry's letter NoRW/33035/1/87 NH-Stds/DO-II dt.14th March 1988, 13th June 1988 & 7th Nov. 1988 relating to the relaxation for use of paver finishers on bituminous works on National Highways.

2. The question of permitting only such pavers on NH works ,which conform to clause 50435 of the Ministry's Specifications for Road & Bridge works (2nd. Revision) has been further reviewed by the Ministry keeping in view the technological needs on one hand, & the availability of bituminous paving equipment in the country, on other, the following consolidated guidelines are laid down for the use of pavers on NH jobs with immediate effect.

(a) Ordinary self propelled mechanical pavers with suitable screeds, capable of tamping & finishing the mixture to the specified lines, grades & cross section may be used for specification items such as LBM (type B clause 50.2.3.2) BM, Miss Seal premix carpet & 25 mm. thick Semi dense bituminous concrete. The relaxation will be available only for works costing less than Rs.3.00 crores & upto 31st March 1993.

b) Dence bituminous macadam clause 507 semi-dense bituminous concrete of thickness more that 25mm. clause-511 & bituminous concrete clause-512 shall however be laid only with paver finishers having the essential features as spell out in clause-504.3.5.

(c) For works put to tender from 1st. May 1990 onwards all jobs coating Rs.3.00 crores & above, consisting of bituminous works, including those mentioned at 2(a) above on relaxation shall be available & paver finishers must conform to clause 504.3.5. This requirement shall be clearly indicated in the tender to beer invited with immediate effect.

3. Regardless of above, the above relaxation is not applicable on externally aided projects under the World Bank or Asian Development Bank where only the pavers conforming to clause 504.3.5 shall be allowed to be used.

4. It may be emphasized further that in the long run, the Ministry wants to completely switch over to pavers conforming to Ministry's specification. Moving in that direction with effect from 1.4.1993, the use of conventional self propelled mechanical pavers will be allowed only on smaller jobs costing less than rupees one crore involving specification as mentioned in para2 (a) above.

5. It is requested that the above policy may be brought to the notice of all contractors in your state.

Office of the Chief Engineer, National Highways, Bhubaneswar.

Memo._____ Dt._____

Copy to Superintending Engineer/ Executive Engineer/ Asst. Engineer in this office for information & necessary action.

Chief Engineer

Memo._____ Dt._____

Copy to Superintending Engineer/ Executive Engineer/ Asst. Engineer in this office for information & necessary action.

Chief Engineer

HIRE CHARGES OF CENTRAL MACHINERIES

The recovery of Hire charges of machineries stipulating there in that the recovery will be effected as per the actual use or on the out-turn basis as stipulated in the analysis or S/R which ever is higher.

It is as per proceeding of the monthly review meeting of Superintending Engineers held in the office room of the Chief Engineer, NH, Orissa, Bhubaneswar on 24.5.1985 communicated to subordinate offices vide Chief Engineer's Memo No.23949 dt.30.6.85.

SPECIAL CONDITIONS

1. Collection of materials should be so planned that it is commensurate with the physical progress to the time schedule.

2. Bitumen to be used for the work shall be heated in boilers only & not in open fire. Spraying of bitumen where ever necessary shall be done only with mechanical sprayer attached to tar boiler & premixing of bitumen & stone aggregates should be done only in Hot Plant separate drying & mixing unit.

3. The materials to be used in the work should conform to the stipulated physical requirement & other property.

4. During the course of execution, the traffic should be regulated in accordance with guidelines laid down vide ministry's Lr.No.III-33 -12672 dt.20.3.73.

5. NEW CLAUSE: " The rates for earthwork & concrete items wherever dewatering shall mean the execution or operation of the items due to standing water as well as due to percolation of water. The quoted rates will be inclusive of this."

BASE & WEARING COURSES (BITUMINOUS)

C: SEMI DENSE BITUMINOUS CONCRETE (SDBC)

C.1 SCOPE:
This work shall consist of construction in a single course of 25mm./40mm. thick semi-dense bituminous concrete on a previously prepared bituminous base to the requirement of these specifications, to serve as wearing course.

C.2. MATERIALS:

C.2.1 Binder:- Clause 504.2.1 shall apply.

C.2.2 Course aggregate:- Clause 504.2.2 shall apply. The aggregates shall satisfy the physical requirement as given in table 500.4 except that the maximum values of flakiness index & water adsorption should be 30% & 1% respectively. However water absorption upto a maximum of 2% may be permitted in exception cases only.

C.2.3 Fine aggregate:- Clause 507.2.3 shall apply.

C.2.4. Filler:- Clause 507.2.4 shall apply.

C.2.5. Aggregate gradation:- The mineral aggregates including filler shall be so graded or combined as to conform to the grading set forth in table 500.2.

Table 500: Aggregate Gradation for semi-dense bituminous concrete (SDBC)

Sieve designation	Percent by weight passing the sieve		
	Grading-I	Grading-II	Grading-III
22.4 mm.	---	100	100
13.2 mm.	100	85-100	79-100
11.2 mm.	88-100	70-92	68-90
5.6 mm.	42-64	42-64	33-55
2.88 mm.	22-38	22-38	22-38
710 micro	11-24	11-24	6-22
355 micro	7-18	7-18	4-14
180 micro	5-13	5-13	2-9
90 micro	3-9	3-9	0-5

C.3 Mix Design:

C.3.1 Requirement of semi-dense bituminous concrete mix shall be properly designed so as to satisfy the criteria laid down in Table 500-22

Note: Grading shall be adopted for 25mm. compacted thickness & regarding 2 or 3 for 40mm. compacted thickness.

Table 500-22 Requirement of semi-dense bituminous concrete (SDBC)

Sl.No.	Description	Requirement
1	Marshall stability (ASTM designation D-1959) Determined on Marshall specimens compacted with 50 compaction blow on each end.	340 kg. minimum
2	Marshall flow (mm)	2-4
3	Percentage voids in mix	5-10
4	Percentage voids in mineral aggregates filled with bitumen	55-75
5	Binder content percent by weight of mix	4.45-60

Note: 1. Higher stability values consistent with other requirements should be achieved as far as possible.
2. At bus stops, parking area & round about near minimum flow value should be adopted.
3. Attempt should be to have well graded aggregate & the percent voids in the mix closer to the lower limit.

C.3.2 Binder content: The binder content shall be so fixed as to achieve the requirements of the mix set forth in Table 500-22. Marshall method for arriving at the binder content shall be adopted.

C.3.3 Job mix formula: Clause 507.3.3 shall apply except that the requirement of semi-dense bituminous concrete mix shall be as table 500.22.

C.3.4 Permissible variation form job mix formula: The contractor shall have the responsibility of ensuring proper proportioning of materials in accordance with the approved job mix formula & producing a uniform mix. The permissible variations of the individual percentages of the various ingredients in the actual mix from the job mix formula may be within the limits specified in the Table 500-23. These variations are intended to apply to individual specimen taken for quality control test vide section-90.

Table 500:23 Permissible variation from job mix formula.

Sl.No.	Description of ingredient	Permissible variation by weight of

		total mix in percentage
1	Aggregate passing 13.2 mm. sieve & large	(+) / (-) 6
2	Aggregate passing 11.2 mm. sieve & 5.6 mm.	(+) / (-) 7
3	Aggregate	

C.4 Construction operations.

C.4.1 Weather one seasonal limitations clause 504.3.1 shall apply.

C.4.2 Preparation of base: The base on which semi-dense bituminous concrete is to be laid shall be prepared, shaped & conditioned to the specified lines grades & cross sections in accordance with clause 501 or as directed by the Engineer.

C.4.3 Tack coat : A tack coat as per clause 503 shall be applied on the base.

C.4.4 Priding of mix clause 507.4.5 shall apply.

C.4.5 Spreading of mix clause 507.4.5 shall apply

C.4.6 Rolling: Clause 507.4.6 shall apply except that the density achieved for semi-dense bituminous concrete shall be at least 98% of that of laboratory Marshall specimen.

C.5 Opening to traffic: Traffic may be allowed after completion of the final rolling when the mix has cooled down to the surrounding temperature.

DENSE BITUMINOUS MACADAM

Scope : The work shall consist of construction in a single course of 40 & 75 mm. thick base binder course to the following specifications on a previously prepared base.

D.1 Materials :

D.2.1 Binder : Clause 504.21 shall apply.

D.2.2 Course aggregates : The course aggregates shall conform to clause 504.21.

D.2.3 Fine aggregates shall be of the fraction passing 2.8 mm. sieve & retained on 90 micro sieve consisting of crusher run screenings natural sand or a mixture of both. These shall be clean hard durable uncoated dry & free from any injurious soft or flaky places & organic or other deleterious substances.

D.2.4 Filler: The filler shall be an inert material, the whole of which passes 710 micro sieve at least 90% passing 180 micro sieve & not less than 70% passing 90 micro sieve. The filler shall be stone dust, cement hydrated lime fly ash or any other non-plastic mineral approved by the Engineer.

D.2.5 Aggregate gradation: The mineral aggregates including minor filler shall be so graded or combined as to conform to the gratings set forth in Table 500.10. For 40-50 mm. compacted layer thickness grading-1 and for 51.75mm. compacted layer thickness Grading-II shall used.

TABLE 500.10 AGGREGATE GRADATION FOR DENSE BITUMINOUS MACADUM

Sieve Designation	Percentage passing the sieve by weight	
	Grading-I (40-50) mm	Grading-II (51-75) mm
37.5 mm	-	160
26.5 mm	100	85-00
22.4 mm	93.100	79-98
13.2 mm	63.82	58-82

11.2 mm	57.78	55-78
5.6 mm	43.59	39-54
2.8 mm	31.47	30-45
710mc	16.29	16-29
355 mc	9.23	9-23
180 mc	6.16	6-16
90 mc	3.10	3-10

D.3 Mix Design :

D.3.1 Requirement of Mix: Apart from conformity with grading and quality requirements of individual ingredients, the mix shall meet the requirement set out in Table 500-11.

Sl No.	Description	Requirement
1	Marshall stability (ASTM, designation D-1959) determined on Marshall specimens compacted by 50 compaction blow on each end.	340 Kg minimum
2	Marshall flow-mm	2-4
3	Percent voids in mix	5-10
4	Percent voids in mineral aggregates filled with bitumen	55-75
5	Binder content percent by weight of total mix.	45-60

D.3.2 Binder Content: The binder content shall be so fixed as to achieve the requirements of the mix set out in Table 500-12. For aggregates grading, Table 500-10 & Marshall method for arriving at the binder content shall be adopted. The bitumen content for grading-II, Table 500-10, shall be determined by Marshall method replacing the aggregates retained on 26.5 mm, sieve by the aggregates passing 26.5 mm, sieve and retained on 19.0 mm sieve.

D.3.3 Job Mix Formula: The contractor shall intimate to the Engineers in writing at least 20 days before the start of the work the job mix formula proposed to be used by him for the work and shall give the following details :

Source and location of all materials.
Proportions of all materials expressed as follows where each is applicable.
Binder as percentage by weight of total mix
Course aggregated as percentage by weight of total aggregate including
Fine aggregate and Mineral filler.

Mineral filler

A single definite percentage passing each sieve for the mixed aggregate.

The results of test enumerated in table 500-11 as obtained by the contractor

Test results of physical characteristics of aggregate to be used.

For whole working out the job mix formula the contractor shall ensure that it is based on a correct and truly representative sample of the materials that will actually be sued in the work and that the mix and its different ingredients satisfy the physical and strength requirements of these specifications.

Approval of the job mix formula shall be based on independent testing by the Engineer for which samples of all ingredients of the mix shall be furnished by the contractor as required by the Engineer.

The approval job mix formula shall be remain effective unless and until modified by the Engineer. Should a change in the source of materials be proposed a new job mix formula shall be established and got approved from the Engineer before actually using the same.

D.3.4 PERMISSIBLE VARIATION FROM JOB MIX

Formula: It shall be the responsibility of the contractor to produce a uniform mix conforming to the approved job mix formula, subject to the permissible variations of the individual percentages of the various ingredients in the actual mix from the job mix formula to be used within the limits as specified in Table 500.12 These relations are intended to apply to individual specimens taken for quality control test vide section 900.

TABLE 500.12 PERMISSIBLE VARIATIONS FROM THE JOB MIX FORMULA

Sl No.	Description of ingredients	Permissible variation by weight of total mix in percent.
1	Aggregate passing 13.2 mm sieve and large	8
2	Aggregate passing 9.5 mm sieve and 4.75 mm sieve	7
3	Aggregate passing 2.36 mm sieve	6
4	Aggregate passing 600 mc sieve	5
5	Aggregate passing 150 mc sieve	4
6	Aggregate passing 75 mc sieve	3
7	Binder	0.5

D.4 Construction Operations:

D.4.1 Weather and reasonal limitations : (Clause 5023 shall apply)

D.4.2 Preparation of base: The base on which Dense Bituminous Macadam is to be laid shall be prepared, shaped and conditioned to the specified line, grades and cross sections in accordance with Clause 501 or as directed by the Engineer. A priming coat where needed, shall be applied in accordance with clause 502 or as directed by the Engineer.

D.4.3 Tack Coat over the base shall be applied as per Clause 503.

Preparation of mix: Hot mix plant of adequate capacity and capable of producing a proper and uniform quality mix shall be used for preparing the mix. The plant may be either a weigh batch type or volumetric proportioning continuous or drum mix type. The plant shall have co-ordinate set of essential units capable or producing uniform mix as per the job mix formula such as spelt out in Clause 504.3.4. (a) to (i).

The temperature of binder at the time of mixing shall be in the range of 150^0 – 177^0C and of aggregates in the range of 155^0 – 166^0 C provided in no case shall the difference in temperature between the aggregates and binder exceeds 14^0.

Mixing shall be through to ensure that a homogeneous mixture is obtained in which all particulars of the mineral aggregates are coated uniformly.

The mix shall be trans ported from the mixed plant to the point of use in suitable tipper vehicles. The vehicles employed for transport shall be clean and be covered in transit if so directed by the Engineer.

D.4.5 Spreading : The mix transported from the hot mix plant to the site shall be spread by means of a self propelled mechanical paver with suitable screeds capable of spreading tamping and finishing the mix to specified grade, lines and cross section. Paver finisher shall have the essential features as spelt out in clause 504.3.5 However, in restricted locations and in narrow width where the available equipment can not be operated in the Opinion of the Engineer, he may permit manual laying of the mix.

The temperature of mix at the time of laying shall be in the range of 120^0C 16^0C.

Longitudinal joints and edges shall be constructed true to the delineating lines parallel to the centre line of the road. Longitudinal joints shall be effected by atleast 150mm from those in the lower course. All joints

shall be cut vertical to the full thickness of the previously laid mix and the surface painted with hot bitumen before placing fresh material.

D.4.6 **Rolling :** After the spreading of mix by paver, it shall be thoroughly compacted by rolling with a set of rollers moving at the speed not more than 5 Kg, hour, immediately following close to the paver. The initial or breakdown rolling shall be with 8 to 12 tonnes. Three wheeled steam roller and the finished rolling and breakdown rolling shall be preferably followed by any intermediate rolling with smooth wheel pneumatic roller of 15 to 30 tonne having a tire pressure of 7 Kg/ cum. All the compaction operation i.e. breakdown rolling, intermediate rolling and finished rolling can be accomplished by using vibratory roller of 8 to 10 tonne, static weight. During the initial or break down rolling and joist and edges shall be rolled with a 8 to 10 tonne, three wheeled static roller.

The wheels of roller shall be kept moist to prevent the mix from adhering to them. But in no case shall fuel/ lubricating oil be used for this purpose. No excessive water poured on the wheels ; Rolling shall commence longitudinally from edge and proceed towards the center, except that on super elevated portions, it shall progress from the lower to upper edge parallel to the centre line of the pavement. The roller shall proceed on the fresh materials with rear or fixed wheel leading so as to minimize the pushing of the mix and each pass of the roller shall overlap the proceeding one by half the width of the rear wheel, Rolling shall be continued till the density achieved is at least 95 percent of that of laboratory. Marshall specimen and all roller marks are eliminated. Rolling operations shall be competed in all respects before the temperature of the mix falls below 100^0 C.

D.5 **Opening to traffic :**

Traffic may be allowed after completion of the final rolling. When the mix has cooled down to the surrounding temperature, the dense Bituminous macadam shall be provided with an appropriate wearing course without delay prior to regular opening to normal traffic.

D.6 **Surface finish and quality control of work :**

The surface finish of construction shall conform to the requirements of clause 902. Control on the quality of materials and work shall be exercised by the Engineer, in accordance with section 900.

D.7 **Arrangements of traffic :**

During the period of construction, arrangements for the traffic should be done as per clause 112.

504.3.4. Preparation and transport of mix : Bituminous macadam mix shall be prepared in a mix plant of adequate capacity and capable to yield a mix of proper and uniform quality with thoroughly coated aggregates. The plant may be either a weigh batch or volumetric proportioning continuous or drum mix type and the plant shall have co-ordinate set of essential units capable of producing uniform mix within the job mix formula such as :

a. Cold aggregate feed system for providing blended aggregate in the correct proportion (Called cold bin-feed arrangement).

b. Rotating cylindrical dryer fitted with approved type of thermometric instruments at appropriate places so as to indicate or automatically record/ register the temperature of heated aggregate before adding/ mixing the binder.

c. The dryer units shall be fitted with approved type of thermometric instruments at appropriate places so as to indicate or automatically record/ register the temperature of heated aggregate before adding/ mixing the binder.

d. Gradation control except in case of drum mix plant other two types of mentioned above shall have :

   (i) A screening unit for accurate sizing of hot aggregate and feedings the same to mixing unit by weight or volume control as per the specified job mix formula.

   (ii) Paddle mixer unit shall be capable of producing a homogenous mix with uniform coating of all particles of the mineral aggregate with binder.

e. In case of drum mix plant the cold feed system shall have variable speed belt conveyers/ or other suitable sieves for regulating the accurate proportioning of aggregate into an even feed flow automatically form a central operating/ control cabin.

f. Bitumen control unit : Capable of measuring/ metering and spraying required quantity of bitumen at specified temperature with automatic synchronization of bitumen and aggregate feed.

g. Filler system and fines feeder system suitable to receive bagged or bulk supply of filler material and its incorporation to them mix in the correct quantity shall be a necessary auxiliary.

h. Dust Control ; A suitable built in dust control equipment for the dryer to contain the exhaust of fine dust into atmosphere for environmental control wherever so specified by the Engineer.

i. Suitable auxiliary bitumen boiler of adequate capacity with self heating arrangement and temperature control device. The boiler should be fitted with temperature indicating instruments.

The temperature of binder at the time of mixing shall be in the range of 150^0C to 165^0C and that of the aggregate in the range of 125^0C to 150^0C provided that the difference in temperature between the binder and binder and aggregate at no time exceed 25^0C.

Mixing shall be thorough to ensure that homogeneous mixture is obtained in which all particles of the aggregate are coated uniformly and the discharge temperature of mix shall be between 130^0C to 160^0C. The mixture shall be transported from the mixture plant to the point of use in suitable tipper vehicles. The vehicles employed for transport shall be clean and the covered over in transit if so directed by the Engineer.

504.3.5. **Spreading** : The mix transferred from the tipper at site to the paver shall be spread immediately by means of self propelled mechanical paver with suitable screeds capable of spreading temping and finishing the mixture to the specified lines grades and cross sections. The paver finisher shall have following essential features.

a. Loading hoppers and suitable distributing mechanism.

b. All drivers having hydrostatic drive/ control.

c. The machine shall have a hydraulically extendable screed for appropriate width requirement.

d. The screed shall have tamping and vibrating arrangement for initial compaction to the layer as it is spread without rutting or otherwise marring the surface. It shall have adjustable amplitude and infinitely variable frequency.

e. The paver shall been equipped with necessary control mechanism so as to ensure that the finished surface is free from surface blemishes.

f. The paver shall be fitted with an electronic sensing device for automatic leveling and profile control within the specified tolerances.

g. The screed shall have the internal heating arrangement. However in restricted locations and in narrow widths where the available plant can not be operated in the opinion of the Engineer he may permit manual laying of the mix.

The temperature of the mix at the time of laying shall be in the range of 120^0C to 135^0C. In multi-layer construction the longitudinal joint in one layer shall effect in the layer below by about 150mm. However the joint in the top most layer shall be at the centre line of the pavement.

Longitudinal joint and edges shall be constructed true to the delineating line parallel to the central line of the road. All joints shall be cut vertical to the full thickness of the previously laid mix and the surface painted with hot bitumen before placing fresh materials.

Copy of letter No. RW-2 4011/2/89 RMP. Dt. 22.09.89 from Director General (Road Development) Ministry of Surface Transport (Road Wing), New Delhi addressed to all Chief Engineers dealing with National Highway an others.

Sub : Technical Requirement of Drum Mix Plants for use on National Highways Works.

Sir,

You are aware that this Ministry is keen on introduction of Modern Road Construction Methodology and New-Generation machine for the construction of National Highways. Keeping this in view Drum Mix Plants are now being used for bituminous works in addition to conventional Hot Mix Plants. Few indigenous manufactures have already started manufacturing and marketing such machines in the country.

2. Drum Mix Plants are more economical to use for production of quality bituminous mix. The technology of Drum Mix Plants incorporates certain essential arrangements to ensure continuous productions of designed mix. It is therefore, felt that the plants being introduced on NH works should be of standard type satisfying the minimum desirable requirements as adopted in advanced countries.

3. Up to now no IS Specifications is available to indicate the broad minimum requirement of essential components of drum mix plant so as to ensure quality of mix expected from a modern machine. To avoid sub standard machines being introduced on NH works it is requested that only those Drum-Mix Plants which comply with the technical requirements as indicated in Appendix-A to this letter may only be permitted for use on NH works. This stipulation may also be incorporated in the contract documents for all future works.

4. It is further requested that these instructions may be circulated to all concerned officers.

Sd/-
Chief Engineer (Mech.)
For Director General (Road Development)

Encl: Appendix 'A"

APPENDIX 'A' TO LETTER NO. RW/24011/2/89-RMP DATED 29.09.89 FROM THE DIRECTOR GENERAL (ROAD DEVELOPMENT) MINISTRY OF SURFACE TRANSPORT (ROAD WING), NEW DELHI.

TECHINICAL REQUIREMENTS OF DRUM MIX PLANT TO BE USED ON NATIONAL HIGHWAYS WORKS.

GENERAL :

The drum mix plant should be of reputed make and proven designing, sturdy in structure and capable of producing desired quality of mix as per specification for laying bituminous road surface and should have following essential arrangements.

1. COLD AGGREGATE FEEDER :

The cold aggregate feeder arrangement should have minimum 3 bins of sufficient capacity capable of storing different sizes of aggregate and fines to ensure continuous interrupted supply of aggregate matching the capacity of the plant. Each bin should have independent belt feeder system driven by a variable speed motor and control gate to ensure accurate aggregates feed to meet design mix formula. It is pre-requisite that only properly screened and graded materials are fed to one bin.
There should be a gathering conveyor to receive and transport materials discharged form bins with separate drive arrangement.

There should be a screen or a suitable arrangement like baffle plate at the discharges end of gathering conveyance for dejection of any over-size metal above the permissible limit. The conveyor should be fitted with suitable electronic weigh bridge device for weighing quantity of cold aggregate being fed to dryer drum.

The plant should have a mineral filler arrangement with suitable control device to accurately proportion the flow of filler material into sprayer drum at appropriate stage.

2. DRYER DRUM.

It should be thermo-drum type with smooth rotation arrangement to give rate output and capable or reducing the moisture content of the aggregate to desirable limit of 2% to 6% and achieving hot mix temperature up to 160^0C as per requirement with such design that no blue smoke is emitted from the exhaust. The drum may have optional arrangement for feeding reclaimed material. There should be arrangement to restrict burner flame up to certain length in the drum before bitumens injected.

It should be fitted with positive displacement bitumen pump driven variable speed motor automatically controlled from control cabin, capable of feeding desired quantity of bitumen synchronised with aggregate

feed system. Thermic fluid system or hot oil circulation system should be an in built feature to keep bitumen pump and pipes sufficiently hot to avoid clogging of pipes.

3. BURNER :

The burner used should be capable of burning the fuel efficiently and develop the required temperature. It should be fitted with remote control system to detect flame failure and also electric spark ignition system or some other suitable arrangement. Burner operation should have the results in control of flame within the specified temperature range.

4. BITUMEN HEATER :

It should consist of an insulted think of adequate capacity fitted with effective and positive control of temperature for allowing continuous circulation of bitumen between bitumen heater and proportioning units, suitable arrangements should be provided for recording the temperature at the back and in circulating system.

5. FUEL SYSTEM:

Fuel tanks should be of sufficient capacity and fitted up to suitable type of fuel pump to receive the fuel from storage tank and supply to line heater and burner.

6. CYCLONE SYSTEM:

Cyclone unit is required to control dust discharge within the admissible standard of pollution level.

7. OPERATING CONTROL UNIT:

The drum mix plant must centralized system with operation from a control cabin located adjacent to the drum mix plant. The control system should be capable of following.

(i) Automatic control of speed of each bin feeder conveyor & gate, so as to control & regulate the flow of various grades of materials to ensure constant & accurate proportion of aggregates.

(ii) Pre-set & control the percentage of aggregate & asphalt required as per design mix.

(iii) Automatic detection of plant operation failure display or aggregate temperature asphalt & mix temperature aggregate flow etc. Fully automatic aggregate a blending bitumen/aggregate ratio control & burner control system.

(iv) Control for pre-setting the misroute content of aggregate displayed digitally.

(v) Entire control system should be such that if desired it would be operated manually also.

8. SURGE SILO:

The plant may have optional arrangement to store hot mix material for a least equivalent to 80% of rated capacity to cater for any delay in loading the tippers. Temporary storage silo should have adequate automatic hydraulic unloading arrangement operated either form the control cabin or manual with necessary safely control.

Copy of letter No RW/RMP/16 (3) 84 dt.18.3.88 form the Director General (Road Development) Ministry of Surface Transport (Road Wing) New Delhi aggressed to all Chief Engineers dealing with NHs.

Sub:- Use of secondary gradation control unit in hot mix plant.

Ref:- Ministry's Lr.No.RW/RMP/16(3)/84 dt.1.1.85.

Sir,

1. Kindly refer to the Ministry's letter mentioned above (copy enclosed for ready reference) vide which the technical specifications & component arrangement for the Hot Mix Plants to be used on NH works were laid down.

2. In para 2 of the letter, it was also requested that those should form a part of the contract document & the work should not be allowed to be executed with the plants which do not fulfill those minimum requirement whether the plants belong to the contractors or State PWDs or to Ministry.

3. However, it has been observed that some of the plants of the Ministry. State PWD & contractor which are being utilized on NH works do not confirm to these technical specifications of the Hot Mix Plant. One of the major deficiency noticed in that the Secondary gradations control unit has been removed & not fitted with the Hot Mix Plant. This is affecting the quality of the Mix & there by the works executed defective.

4. The Ministry had constituted a ground of officers to study the problems being faced in using the gradation control unit & suggest improvement/ modifications if any in the existing system. The group of officers after detailed deliberations & study of the problems recommended that use of secondary gradation control unit is a must for achieving proper quality mix for NH works. A copy of the report is enclosed herewith.

5. It would be seen that the group of officers has also emphasized that the steps should be taken to produce the aggregates of required sizes & grading. The group also highlighted the difficulties being experienced & solutions suggested thereto.

6. It is requested that suitable instructions may kindly be issued to all concerned so that the Hot Mix Plants of technical specifications & component arrangements as specified in the Ministry's letter dt.1.1.85 mentioned above are used for execution of NH works.

7. It is suggested that this should form a part of contractor documents & technical specification of the Hot Mix Plant should be specified in it.
Please acknowledge the receipt of this letter & Ministry may be informed of the action taken in the matter.

Copy of letter No RW/24011/2/089 RMP dt.12.2.1991 form the Director General (Road Development) Ministry of Surface Transport (Road Wing) New Delhi aggressed to the Secretaries of all State PWDs (Dealing with National Highways) & others.

Sub:- Use of Hot Mix Plant for NH works- Technical specification reg.

Sir,

1. Your attention is invited towards the Ministry's Lr.No.RW/RMP/16(3)/84 dt.1.1.85 & No. RW/RMP-16(3)/84 dt.16.3.88 vide which technical requirements of Hot Mix Plants to be used on NH works were indicated & it was requested that the same may be clearly mentioned in the tender/ contract documents. Subsequently the main features of Hot Mix Plants were incorporated in the revised specifications for Road & Bridge works which becomes effective from 1.6.88. From this it follows that all the NH works after 1.6.88 should be executed with the use of Hot Mix Plants meeting the technical requirements laid down in the Ministry's specification.

2. It is however, observed that despite ample time having been given, in many cases the Hot Mix Plants being used on NH works are not meeting the prescribed requirements. It has therefore been decided that if NH works are executed with the use of Hot Mix Plants not conforming to the laid down specifications this Ministry will be constrained to withhold the reimbursement of expenditure incurred on such works to the State PWDs.

3. It is therefore reiterated once again that suitable instructions be issued to all concerned for strict compliance of the Ministry's instructions & not to allow the use of substandard Hot Mix Plants on NH works.

4. Ministry's ROs & Regional Superintending Engineer (Mech.) have been instructed to carry out inspection of each & every Hot Mix Plants/ Drum Mix Plants being used/ proposed to be used on works in their respective jurisdiction & report violations, if any to the Ministry for taking further necessary action in regard to with holding the reimbursements of State PWDs in terms of the revised National Highway Rules. It would be advisable to carry out joint inspection of the plants by State PWDs Officers & Ministry's ROs/SEs (Mech.) for verifying the fitness of the Hot Mix Plants before commencement of the works.

5. The receipt of this letter may kindly be acknowledged.

Sd/-
Superintending Engineer (Mech.)
For Director General (Road Development)

BIDDERS CONTACT INFORMATION

Name of the Bidder : _____

Class : _____

Address : **At-** _____
P.O. _____
Dist: - _____
Pin: - _____

Telephone No. : _____

Mobile No. : _____

E-mail Id : _____

** **(- attached to the last page of the bid documents in Cover - 1)**

Approved for 104 (One Hundred Four) Pages only.

Sd/-

Superintending Engineer
Rural Works Division-II,Bhadrak

Signature Not Verified
Digitally signed by RANJAN KUMAR NAYAK
Date: 2026.05.20 11:46:32 IST
Location: Odisha-OD