

***Inception Report for Providing Services for the Independent Third Party Review
of the Quality Assurance System, Quality of Works and Safety for the OSRP***

(A World Bank Funded Project)

Submitted to

Chief Engineer (World Bank Projects)

Orissa, Bhubaneswar



**DEPARTMENT OF CIVIL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY
ROURKELA-769008
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PREFACE

Development in infrastructures has been a prime focus of Govt. of India and various state govts. Since last two decades, Roads have been considered to be an important item of infrastructure development which provides easy and fast accessibility for providing various services and resulting improvement in overall economy. Three important existing roads in Orissa state have been taken up for development by the Govt. of Orissa with the assistance of the World Bank. Ensuring quality of the road works with safety is a prime concern for everyone. Keeping this in view, the Government of Orissa through Orissa Works Department (OWD) have entrusted the work for providing services for the independent third party review of the quality assurance system, quality of works and safety for the OSRP (A World Bank Funded Project) to National Institute of Technology, Rourkela (NIT) for the three roads in the 1st Phase. This inception report mainly contains the objectives, methodology and the formats to be used for the audit work.

We specially thank the Govt. of Orissa, namely Er. S.K. Ray, EIC-cum-Secretary, Works Dept., Er. N.K. Pradhan, Chief Engineer, World Bank Projects and a number other senior engineers of the same Dept. for giving us this opportunity to take up the above assignment, and also for providing required informations to be considered in this inception report. We also thank the authorities of NIT Rourkela for permitting us to take up this work.

Mahabir Panda
09/08/11

(Prof. Mahabir Panda)

Principal Consultant

1. Introduction

The Government of Orissa through Orissa Works Department (OWD) have entrusted the work for providing services for the independent third party review of the quality assurance system, quality of works and safety for the OSRP (A World Bank Funded Project) to National Institute of Technology, Rourkela (NIT) for following three roads in 1st Phase. This report mainly contains the objectives, methodology and the formats for this work. The studies are proposed to be taken up at different locations along the stretches of roads taken up, either ongoing or completed. The NIT team shall review the documents related to quality assurance program envisaged by the contractor and the RE, and participate in sample testing at sites and NIT laboratory as required. As each audit is proposed to take place for about four days only, this study may be regarded as partial or sample audit representing a particular road, as thorough studies on the entire stretch of a given road are not possible within this short period by a small audit team.

Road		Length	Supervision Consultant
Bhawanipatna- Khariar	Y1-PO1	68 K.M.- K.M.	Supervision Team headed by Resident Engineer, P01
Chandabali-Bhadrak-Anandpur	Y-PO2	95 km	Supervision Team headed by Resident Engineer, P02
Brhampur-Taptapani	Y1-PO3	41K.M.	Supervision Team headed by Resident Engineer, P03

2. Objectives

The objective of these services is to examine conformity of the contractual specifications;

- (i) Identity non conformances and propose remedial as well as corrective actions to minimize future occurrences.

- (ii) Confirm effectiveness of the quality assurance system (QAS) adopted by the contractors as well as by the Project Supervision (interim Arrangement) headed by Resident Engineer (RE) in each of the three Packages under the interim arrangement for supervision Works.
- (iii) To confirm the effective safety measure taken by considering at various locations of the project.
- (iv) Recommend measures for rectifications and improvements in the QAS.

3. Scope of Services

The scope of Services shall cover the following:

- a. There will be two quality audits of 3 civil works contracts at approximately six months interval. The first audit shall cover all civil works done till the date of audit while the second audit reports shall cover works carried out since the first audit. The second audit report will include a review and status of remedial and corrective actions taken by the contractor/consultant on all non-conformances observed during the first audit.
- b. There will be review of all required project documents, including source approvals, material submittal requests and approvals, Inspections and Test plans, approved method statements, approved shop drawings, survey records, quality control files, Request For Inspection (RFI) files, Non conformance reports, and various correspondences among contractual parities.
- c. For the completed works, the team will review of the quality assurance testing regime adopted both by the Supervision team and the contractor, and In addition, the team will audit the completed works by participating in the required quality control tests.
- d. The audit shall include review of adopted Construction procedures, workmanship of the works, sequencing of various construction operations, contractors' work plans, contractors' work practices, storing, consumption procedures, material testing, documentation system – to ensure sound and effective techniques are being employed.
- e. There will be review of the calibration certificates of relevant testing and surveying equipment used by the contractor and PSC in carrying quality assurance and control. Wherever feasible, there will be conduct of calibrations checks on these equipments. The contractor shall provide facilities for checking of calibration.
- f. Preparation of two Independent Audit Reports.
- g. The team shall review and prepare a Status report of the remedial and corrective actions taken by the Contractors/PSCs on all non-conformances observed during the first audit.

4. Methodology

A list of checklists will be submitted to the Chief Engineer (WBP), Government of Orissa, which are to be completed and filled in by the respective REs and submitted to team on their arrival at the site. The team comprised of a team leader and 3 or 4 experts (Quality engineers) listed below shall visit a particular road as per the given tentative schedule. The broad day-to-day work of the team in first two audits each will be as follows. The first audit covers all works completed and ongoing till the first audit. The second audit covers all works ongoing or completed between the first audit and the second audit. The tentative schedules during the visits of the team in first two audits are as follows.

Day 1: Study and verification of related documents at RE's Office, Contractor's Office and different laboratories: Internal meeting within the team

Requisition of documents required

Day 2: Site inspection

Conduct/ Verification of quality control (QC) tests and participation in QC tests

Collection of materials for testing at NIT as required

Calibration checking of plants and equipments

Internal meeting and further requisition if required

Day 3: Same as Day 2

Day 4: Taking up left out work if any

Compilation/collection of documents/requisitions for facilitating the audit report

In first two audits, Quality audit including tests are to be taken up only at few locations in the field on sample basis. Audit Reports will be prepared after the site visits, going through the document verifications, checklists submitted by REs and verified by the audit team, Field and laboratory investigations and other information collected. The third visit is related to compliance of all non-conformances observed during first and second audits. The schedule of visit for audit may change depending on the mutual convenience of time between the audit team and respective RE/Government.

TENTATIVE TIME SCHEDULE FOR CARRYING OUT AUDITS

Sl. No.	Item	Name of Road	Tentative Dates of Visit
1	1 st Audit	Bhawanipatna- Khariar	August 27- 30, 2011
		Chandabali-Bhadrak-Anandpur	September 9-12, 2011
		Berhampur-Taptapani	September 23-26, 2011
2	2 nd Audit	3 roads as above	To be decided later (within 6-9 months)
3	Compliance Visit	3 roads as above	To be decided later (within 9-12 months)

AUDIT TEAM COMPOSTION

Sl. No.	Team Member	Role	Function
1	Prof. Mahabir Panda	Principal Consultant (Team Leader)	Overall in-charge
2	Quality Engineers – 3 or 4 nos. 1. Pavement (Prof. P.K. Bhuyan and/or Prof. S.P. Singh/ A new faculty) 2. Structure (Prof. P. Sarkar/ Er. S.C. Choudhury) 3. Environmental /Safety (Prof. S. Jena)	Co- Consultant	Assisting Team Leader in respective expertise (area)

N.B. Another faculty member may be included in the team to assist the audit as Quality Control Engineer (Pavement).

5. Proformas

The proformas for taking up the work already stated have been classified into two categories. The first category comprises of several checklists marked as Proformas with number starting with 'A'. These are further categorized into (i) quality assurance system, (ii) quality of works and (iii) environment and safety aspects. The same are to be filled in by the Resident Engineer and submitted to the audit team for verification and their subsequent observations during the audit. Similarly, the 2nd category refers to the proformas starting with 'B' for auditing the aspects stated as above. These three aspects are represented after the proformas (A or B) in form of I, II and III respectively. All such proformas to be used are given in this report. Additional sheets if required have to appended to the respective proformas. The audit report as in Proformas B is based on studies on sample basis by the audit team. The report at the end will also give the general observations about the above work and recommendations for rectifications and improvements required if any.

6. General Observations

7. Recommendations for Improvement

Quality Engineer

Quality Engineer

Quality Engineer

Quality Engineer

Team Leader

Check List for Resident Engineer's (RE) Organization (Key Personnel)

Sl. No.	Item	Information
1	<p>Highway Engineer</p> <p>a. No. required as per contract</p> <p>b. Name, qualification and experience of incumbent at site</p> <p>c. Duration in months as per contract</p> <p>d. Duration of actual deployment with dates of joining and leaving the project</p>	
2	Bridge Engineer	
3	<p>Quantity Surveyor</p> <p>a. No. required as per contract</p> <p>b. Name, qualification and experience of incumbent at site</p> <p>c. Duration in months as per contract</p> <p>d. Duration of actual deployment with dates of joining and leaving the project</p>	
4	<p>Quality Monitor / Quantity Monitor</p> <p>a. No. required as per contract</p> <p>b. Name, qualification and experience of incumbent at site</p> <p>c. Duration in months as per contract</p> <p>d. Duration of actual deployment with dates of joining and leaving the project</p>	
5	Environment Engineer	
6	<p>Highway/Bridge Design Engineer</p> <p>a. No. required as per contract</p> <p>b. Name, qualification and experience of incumbent at site</p> <p>c. Duration in months as per contract</p> <p>d. Duration of actual deployment with dates of joining and leaving the project</p>	

7	<p>Site Engineer (Highway)</p> <p>a. No. required as per contract</p> <p>b. Name, qualification and experience of incumbent at site</p> <p>c. Duration in months as per contract</p> <p>d. Duration of actual deployment with dates of joining and leaving the project</p>	
8	<p>Site Engineer (Bridge)</p> <p>a. No. required as per contract</p> <p>b. Name, qualification and experience of incumbent at site</p> <p>c. Duration in months as per contract</p> <p>d. Duration of actual deployment with dates of joining and leaving the project</p>	
9	<p>Survey Engineer (Highway)</p> <p>a. No. required as per contract</p> <p>b. Name, qualification and experience of incumbent at site</p> <p>c. Duration in months as per contract</p> <p>d. Duration of actual deployment with dates of joining and leaving the project</p>	
10	<p>Survey Engineer (Bridges)</p> <p>a. No. required as per contract</p> <p>b. Name, qualification and experience of incumbent at site</p> <p>c. Duration in months as per contract</p> <p>d. Duration of actual deployment with dates of joining and leaving the project</p>	
11	<p>Junior Quantity Surveyor</p> <p>a. No. required as per contract</p> <p>b. Name, qualification and experience of incumbent at site</p> <p>c. Duration in months as per contract</p> <p>d. Duration of actual deployment with dates of joining and</p>	

	leaving the project	
12	Laboratory Technicians (Highway)	
13	Laboratory Technicians (Bridge)	
14`	(ADI) Engineer	
15	Office Manager	

Filled in by Resident Engineer

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

Check List for Contractor's Organization (Key Personnel)

Sl. No.	Item	Information
1	Project Manager a. No. required as per contract b. Name, qualification and experience of incumbent at site c. Duration in months as per contract d. Duration of actual deployment with dates of joining and leaving the project	
2	Highway Engineer a. No. required as per contract b. Name, qualification and experience of incumbent at site c. Duration in months as per contract d. Duration of actual deployment with dates of joining and leaving the project	
3	Material Engineer a. No. required as per contract b. Name, qualification and experience of incumbent at site c. Duration in months as per contract d. Duration of actual deployment with dates of joining and leaving the project	
4	Quantity Surveyor a. No. required as per contract b. Name, qualification and experience of incumbent at site c. Duration in months as per contract d. Duration of actual deployment with dates of joining and leaving the project	
5	Land Surveyor e. No. required as per contract f. Name, qualification and experience of incumbent at site	

	<p>g. Duration in months as per contract</p> <p>h. Duration of actual deployment with dates of joining and leaving the project</p>	
6	<p>Laboratory Manager</p> <p>a. No. required as per contract</p> <p>b. Name, qualification and experience of incumbent at site</p> <p>c. Duration in months as per contract</p> <p>d. Duration of actual deployment with dates of joining and leaving the project</p>	
7	<p>Mechanical Engineer</p> <p>a. No. required as per contract</p> <p>b. Name, qualification and experience of incumbent at site</p> <p>c. Duration in months as per contract</p> <p>d. Duration of actual deployment with dates of joining and leaving the project</p>	
8	Support Staff	

Filled in by (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

Check List for Documents

Sl. No.	Item	At Contractor's Office	At RE's Office
1	Approved and certified copy of contract document, construction drawings, working drawings etc.		
2	Supplier's literature, catalogues, manuals, test reports/ certificates for factory manufactured item including cement, steel, bitumen etc.		
3	Material source approvals, material submittal requests and approvals		
4	Inspections and Test plans Register/File for Inspection notes		
5	Sequencing of various construction operations, contractors' work plans and procedure		
6	Separate registers for recording test results for various items, duly signed by Lab. Technicians and Materials Engineer of consultant		
7	Records of chainages and levels surveyed jointly by contractor and consultant		
8	Method statements approved by the consultant for each and every activity which should include briefly procedure for carrying out the work, type and no. of equipment, plant and machinery used		
9	Cement register giving details of receipt/issue of cement (on weekly basis)		
10	Register for consumptions of cement on different items of works (theoretical and actual) on weekly basis		
11	Register giving details of calibration of equipment (survey, testing and plants)		
12	Register/File for daily progress report		
13	Register/File for observations/ memos issued by quality control cell		

14	Bitumen Register		
15	RFI Files and Non conformance Reports		
16	Various correspondences between contractor and employer Corrective measures/Remedial actions taken		
17	Environment related documents		
18	All documents related to safety issues		

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

Check List for Survey Control and Setting out

Sl. No.	Item	Information
1	Whether setting of work is controlled by establishing Temporary bench marks (TBMs) at every 250m interval throughout the project.	
2	Whether TBMs have been located on original ground by erecting pucca cement pillars with chainage and RL clearly on it.	
3	Whether TBM values (Chainage and RLs) are established by close traversing on different GTS bench marks and checked regularly on monthly basis.	
4	Details of horizontal curves as per original design and as per actual execution (Chainage, radius and deviation angle)	
5	No. of new horizontal curves introduced	
6	No. of horizontal curves having radii less than minimum specified.	
7	Details of vertical curves as per original design and as per actual execution. (gradients, deviation angle and curve length)	
8	No. of location where vertical profile of the road has been deviated from design	
9	Locations where gradients steeper than the minimum specified provided	
10	Whether necessary approvals of competent authority and Consultant have been taken for deviation in horizontal and vertical alignment from the designed road profile	

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

Check List for Earthwork and Subgrade

Sl. No.	Item	Information
1	Quantity of earthwork in embankment (excluding subgrade) as per BOQ (Cum)	
2	Quantity of earthwork in embankment actually executed (Cum)	
3	Quantity of earthwork in subgrade as per BOQ (Cum)	
4	Quantity of earthwork in subgrade actually executed (Cum)	
5	No. of samples of borrow area soils tested for sand content, plasticity and density	
6	No. of samples of borrow area soils tested for CBR	
7	No. of samples of borrow area soils tested for deleterious content	
8	No. of samples of borrow area soils tested for moisture content	
9	No. of samples of borrow area soils failed first time due to low MDD and/or high swelling characteristic	
10	No. of samples of embankment tested for field compaction and no. of samples failed first time due to poor compaction (relative compaction <95%)	
11	No. of samples of subgrade tested for field compaction	
12	No. of samples of subgrade failed first time due to poor compaction (relative compaction <97%)	
13	No. of samples of subgrade soils tested for CBR	
14	No. of samples of subgrade soils failed for poor CBR (<6%)	
15	Layer thickness of embankment	
16	Layer thickness of subgrade	
17	Whether levels of subgrade have been taken on a grid of points placed at 6.25m longitudinally and 3.5m transversely and no. of locations where presumed tolerances of +20mm and -25mm has been exceeded giving total number of measurements made.	

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Signature

Check List for Granular Sub base (GSB)

Sl. No.	Item	Information
1	Quantity of granular sub base (GSB) as per BOQ (Cum)	
2	Quantity of GSB actually executed (Cum)	
3	No. of samples tested for gradation and Atterberg limits	
4	No. of samples tested for field density	
5	No. of samples tested for 10% fines	
6	No. of samples tested for water absorption of coarse aggregates	
7	No. of samples failed due to 10% fine value less than 50 kN	
8	No. of samples of failed due to water absorption of coarse aggregates more than 2%	
9	No. of samples of subgrade tested for field compaction	
10	No. of samples failed due to LL>25 & PI>6% of material passing 425 micron sieve.	
11	No. of samples failed due to CBR less than specified	
12	Layer thickness (mm)	
13	Total thickness of GSB (mm)	

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

Check List for Wet Mix Macadam (WMM)

Sl. No.	Item	Information
1	Quantity of WMM as per BOQ (Cum)	
2	Quantity of WMM actually executed (Cum)	
3	No. of samples tested for gradation	
4	No. of samples tested for Aggregate Impact Value	
5	No. of samples tested for flakiness and elongation indices	
6	No. of samples tested for Atterberg limits of portion of aggregates passing 425 micron sieve	
7	No. of samples tested for compaction tests (Proctor)	
8	No. of samples tested for specific gravity and water absorption	
9	No. of samples tested for density of compacted layer	
10	No. of samples tested for moisture content before compaction	
11	No. of samples failed due to poor compaction (<98% of MDD)	
12	No. of samples failed due to lack of moisture control during compaction (M/C outside the range of OMC +1% to OMC -2%)	
13	No. of samples failed due to aggregate Impact Value less than 30%	
14	No. of samples failed due to combined flakiness and elongation indices greater than 30%	
15	No. of samples failed due to water absorption of coarse aggregates greater than 2%	
16	No. of samples failed due to material passing 425 micron having PI than 6%	
17	No. of samples failed due to material not satisfying gradation requirement	
18	Layer thickness (mm)	
19	Total thickness of WMM (mm)	

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Signature

Check List for Dense graded Bituminous Macadam (DBM)

Sl. No.	Item	Information	
1	Quantity of DBM as per BOQ (Cum)		
2	Quantity of DBM actually executed (Cum)		
3	Whether job-mix formula has been approved by the Engineer in advance		
4	Whether job-mix formula has been based on approved source and location of all materials and whether it has been revised as and when a change in source of materials has taken place		
5	Pl. furnish copy of all approved job-mix formula including revised ones if applicable		
6	Whether plant trials have been conducted and variations of individual percentages of various components in the actual mix from job-mix formula have been checked for permissible tolerances.		
7	Whether laying trials have been carried out with the methodology and machinery actually used for laying and compacting DBM layer of specified thickness		
8	Whether Engineer has approved laying trials in writing and permitted any variations subsequently.		
9	Indicate type of Binder (including its grade) used for DBM work		
10	Indicate total number of samples tested for the following tests along with no. of failed samples. <ul style="list-style-type: none"> a. Quality of binder b. Aggregate impact value c. Flakiness and elongation indices d. Stripping value e. Mix grading f. Marshall stability g. Binder content 	Total	Failed

	h. Density of compacted layer	
11	Layer thickness DBM (mm)	
12	Total thickness of DBM (mm)	

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Signature

Check List for Bituminous Concrete (BC)

Sl. No.	Item	Information	
1	Quantity of BC as per BOQ (Cum)		
2	Quantity of BC actually executed (Cum)		
3	Whether job-mix formula has been approved by the Engineer in advance		
4	Whether job-mix formula has been based on approved source and location of all materials and whether it has been revised as and when a change in source of materials has taken place		
5	Pl. furnish copy of all approved job-mix formula including revised ones if applicable		
6	Whether plant trials have been conducted and variations of individual percentages of various components in the actual mix from job-mix formula have been checked for permissible tolerances.		
7	Whether laying trials have been carried out with the methodology and machinery actually used for laying and compacting BC layer of specified thickness		
8	Whether Engineer has approved laying trials in writing and permitted any variations subsequently.		
9	Indicate type of Binder (including its grade) used for DBM work		
10	Indicate total number of samples tested for the following tests along with no. of failed samples. <ul style="list-style-type: none"> a. Quality of binder b. Aggregate impact value c. Flakiness and elongation indices d. Stripping value e. Mix grading f. Marshall stability g. Binder content 	Total	Failed

	h. Density of compacted layer	
11	Layer thickness BC (mm)	
12	Total thickness of BC (mm)	

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Quality Engineer

Name: Mahabir Panda

Signature

Team Leader

Check List for Primer Coat and Tack Coat

Sl. No.	Item	Information	
1	Quantity as per BOQ (Kg) a. Primer Coat b. Tack coat		
2	Quantity actually executed (Kg) a. Primer Coat b. Tack coat		
3	Type of Binder used for a. Primer Coat b. Tack coat		
4	Whether quality of Binder tested. If yes, give no. of samples tested. a. Primer Coat b. Tack coat		
5	No. of tests carried out for checking rate of spread and no. of samples tested. a. Primer Coat b. Tack coat	Total	Failed
6	Temperature at which Binder was spread a. Primer Coat b. Tack coat		
7	Equipment used for spreading of binder		

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Signature

Check List for Plant and Machinery

Sl. No.	Item	Information
1	<p>Hot mix plant</p> <p>a. No. of Hot mix plants, their make, capacity, type, location and date of commissioning</p> <p>b. No. of hours the plants have actually been in the project</p>	
2	<p>Paver</p> <p>a. No. of Pavers, their makes, type and capacity and date of commissioning</p> <p>b. Whether electronic sensor provided</p> <p>c. No. of hours the plants have actually been in the project</p>	
3	<p>Roller</p> <p>a. No. of rollers, their makes, type, weight and pressure</p> <p>b. Whether vibratory rollers used. If yes, for which pavement courses</p> <p>c. Whether pneumatic type rollers used. If yes, for which pavement courses</p>	
4	<p>Concrete mixer</p> <p>a. No. of concrete mixers, their makes, type and capacity</p> <p>b. Whether automatic water measuring system and integral weigher provided</p>	
5	<p>Concrete batching plant</p> <p>a. No. of concrete batching plant, their makes, type, capacity, location and date of commissioning</p> <p>b. Whether the batching plant has been calibrated. If yes, at what frequency</p> <p>c. No. of hours the batching plant has actually been in the project</p>	
6	<p>Motor grader</p>	

	No. of motor graders, their make, type and capacity	
7	Aggregate crushing-cum-screening plant No. of crushers, their make, type and capacity	
8	Vibrating equipment for structural concrete No., their make, type and capacity	

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Signature

Check List for Culverts

Sl. No.	Item	Information
1	No. of culverts, their location and type as per contract	
2	No. of culverts, their location and type as per contract as per actual execution	
3	Whether approval of Engineer and competent authority taken for change in location or type of culverts	
4	RCC slab culvert and box culverts a. No. of concrete cubes tested and no. of samples failed in crushing strength b. Type of reinforcing steel used c. Whether reinforcing steel has been checked for tensile stress, chemical composition, 1% elongation. If yes, furnish copy of results d. Method of compaction of concrete done e. Method of curing of concrete done and Number of days for curing f. Whether steel reinforcement is checked before concreting. g. The type of formwork used	
5	Pipe culverts Type of pipe used and Pipe diameter	

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

Check List for Road Work

(If necessary tests carried out in 15 days period can be grouped together)

Sl. No.	Material	Tests	Provisions as per contract/specifications	Dates/Periods of Test	No. of samples tested	% of samples tested	% Failure	Follow-up/corrective action	Reference of memos issued
1	Borrow areas	a. Gradation test b. Plasticity Index Test c. Modified Proctor test d. CBR test e. Moisture content							
2	Compaction Control	a. Moisture content before compaction b. Dry density of compacted layer							
3	Granular Sub base	a. Gradation test b. Atterberg limits c. Natural moisture content d. Density of compacted layer e. CBR test							

4	Wet Mix Macadam	<ul style="list-style-type: none"> a. Aggregate Impact Value b. Grading c. Flakiness Index d. Density of compacted layer e. Atterberg Limits 							
5	Bituminous Materials	<ul style="list-style-type: none"> a. Quality of Binder b. Aggregate Impact Value c. Mix Grading d. Flakiness Index e. Stripping value f. Stability of mix g. Density of compacted layer 							

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

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Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

Check List for Workmanship (Road Work)

(If necessary tests carried out in 15 days period can be grouped together)

Sl. No.	Tests	Provisions as per contract/ specifications	Dates/ Periods of Test	No. of checks/ tests	% of checks/ tests made	% Failure	Follow-up/ corrective action	Reference of memos issued
1	Control of layout, line and levels							
2	Control of grade, camber and thickness of each layer							
3	Control of surface finish (RI)							
4	Control of temperature of binder in boiler and mix, before laying							
5	Control of Binder content and gradation in mix at plant site							
6	Rate of spread of mixed materials							
7	Control of surface regularity finish							
8	Bitumen extraction test							

9	Post construction check of thickness of each compacted layer							
10	Rolling passes check at each stage							

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

Check List for Bridges/Flyovers/Culverts

1. *Test on Cement (To be reported for each change of source)*

Sl. No.	Tests	Provisions as per contract/specifications	Dates/Periods of Test	No. of samples / tests	% of samples / tests made	% Failure	Follow-up/corrective action	Reference of memos issued
1	Initial and Final setting time							
2	Normal Consistency							
3	Compressive strength							
4	Soundness							
5	Fineness							

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

**2. Tests on Coarse Aggregates (As per IS 2386, tests carried out in
15 days period can be grouped together)**

Sl. No.	Tests	20mm			12.5/10mm			Reference of memos issued
		Dates/ Periods of Test	No. of samples/ tests	% Failure	Dates/ Periods of Test	No. of samples/ tests	% Failure	
1	Gradation							
2	Impact Value							
3	Flakiness Index							
4	Water Absorption							

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

*3. Tests on Fine Aggregates (As per IS 2386, tests carried out in
15 days period can be grouped together)*

Sl. No.	Tests	Dates/ Periods of Test	No. of samples/ tests	% Failure	Follow-up/ corrective action	Reference of memos issued
1	Fineness Modulus					
2	Silt content					

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Signature

**4. Mix Design (Compressive Strength of Cubes tested as per
design in field to be carried out for each mix design)**

Sl. No.	Grade of Mix	Dates/Periods of Test	No. of samples/ tests	% Failure	Follow-up/ corrective action	Reference of memos issued
1	M-15					
2	M-20					
3	M-25					
4	M-30					
5	M-35					
6	M-40					

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

5. Compressive Strength of Concrete Cubes (As per IS 456/MOST)

(Cubes of one grade cast in one week can be grouped together)

Sl. No.	Grade of Concrete	Dates/ Periods of Test	No. of samples/ tests	% Failure	Follow-up/ corrective action	Reference of memos issued
1	M-15					
2	M-20					
3	M-25					
4	M-30					
5	M-35					
6	M-40					

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Quality Engineer

Name: Mahabir Panda

Signature

Team Leader

6. Slump Test for Concrete (As per IS 456) (Samples tested in one week of one grade can be grouped together)

Sl. No.	Grade of Concrete	Dates/Periods of Test	No. of samples/ tests	% Failure	Follow-up/ corrective action	Reference of memos issued
1	M-15					
2	M-20					
3	M-25					
4	M-30					
5	M-35					
6	M-40					

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Signature

7. Tests on Bored Piles (As per IS 1100)

Sl. No.	Type of Test	Dates/ of Test	No. of piles tested	Comments of engineer on result	Follow-up/ corrective action	Reference of memos issued
1	Initial Load Test					
2	Routine Load Test					

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Signature

8. Tests of HYSD bar reinforcement (As per IS 1600) (for each new lot)

Sl. No.	Diameter	Dates/ Periods of Test	Total No. of samples/ tests	% Failure in		Follow-up/ corrective action	Reference of memos issued
				Weight per unit	Tensile strength		
1	8 mm						
2	10 mm						
3	12 mm						
4	16 mm						
5	20 mm						
6	25 mm						
7	Any other dia						

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

9. Tests of High tensile steel (As per IS 1000 and 1800) (for each new lot)

Sl. No.	Diameter	Dates/ Periods of Test	Total No. of samples/ tests	% Failure in Tensile strength	Follow-up/ corrective action	Reference of memos issued
1	Tensile Strength					
2						
3						

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Quality Engineer

Name: Mahabir Panda

Signature

Team Leader

10. Tests on Water (to be done every six months)

Sl. No.	Source of Water	Dates/ of Test	No. of samples tested	Comments of engineer on result	Follow-up/ corrective action	Reference of memos issued
1						
2						

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Signature

11. Tests on High concrete pipes NP-3 (As per IS 458) (for each new lot)

Sl. No.	Diameter	Dates/Periods of Test	Total No. of samples/ tests	% Failure as per dimensions	% Failure against pressure	Follow-up/ corrective action	Reference of memos issued
1	1200mm						
2	1000mm						
3	900mm						
4	750mm						
5	Any other						

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

**12. Workmanship (By reviewing Inspection notes, instruction and observations
in Site order book by Engineers and his representatives)**

Sl. No.	Items to be watched	Dates/ Period of Inspection	Inspecting Officer	Reference of inspection note/ memos issued	Compliance by contractor	Is the defect rectified (By Er.)
1	Centering and shuttering					
2	1000mm					
3	900mm					
4	750mm					
5	Any other					

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

Check List for Environment

Sl. No.	Item	Information
1	Approved EMP availability	
2	Pollution Control Board Permission	
3	Visit of Environmental Engineer	
4	Regular monitoring of pollutants	
5	Implementation of EMP	
6	Disposal methods adopted for waste bitumen and other waste materials	
7	Construction camp management	
8	Top soil preservation	
9	Borrow and Quarry management	
10	Dust Control	
11	Atmospheric (Air) Pollution monitoring and control	
12	Preservation of road side trees and vegetation (Details about tree cutting and plantation measures)	
13	Compensatory afforestation	
14	Drainage rehabilitation	
15	Transportation of construction materials	
16	Material stacking	
17	Water pollution	
18	Noise Pollution	
19	Damage to aquatic life	

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Signature

Check List for Safety

Sl. No.	Item	Information
1	Approved safety plan and programme	
2	Traffic management	
3	Traffic safety measures in work zones	
4	Road Maintenance	
5	Fire safety practices	
6	Electrical safety practices	
7	Mechanical safety practices	
8	Worker's safety	
9	Safety in construction camps	
10	First Aid and Emergency Response arrangements	
11	Under pass or crossing sites for animals/wild life	

Filled in by Team Leader of Project Supervision Consultant (RE)

Name:

Signature:

Date:

REMARKS

Name:

Signature

Name: Mahabir Panda

Signature

Quality Engineer

Team Leader

Audit for Supervision Consultant's (RE) Organisation (Key Personnel)

Sl. No.	Description of non-conformity	Cause Analysis	Corrective Action
1			
2			
3			
4			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Contractor's Organisation (Key Personnel)

Sl. No.	Description of non-conformity	Cause Analysis	Corrective Action
1			
2			
3			
4			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Documents

Sl. No.	Description of non-conformity	Cause Analysis	Corrective Action
1			
2			
3			
4			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Survey Control and Setting out

Location:

Sl. No.	Description of non-conformity	Cause Analysis	Corrective Action
1			
2			
3			
4			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Earthwork and Subgrade

Location:

Sl. No.	Description of non-conformity	Cause Analysis	Corrective Action
1			
2			
3			
4			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Granular Sub base (GSB)*Location:*

Sl. No.	Description of non-conformity	Cause Analysis	Corrective Action
1			
2			
3			
4			

REMARKS

Signature

Name:**Quality Engineer**

Signature

Name: Mahabir Panda**Team Leader**

Audit for Wet Mix Macadam (WMM)

Location:

Sl. No.	Description of non-conformity	Cause Analysis	Corrective Action
1			
2			
3			
4			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Dense graded Bituminous Macadam (DBM)*Location:*

Sl. No.	Description of non-conformity	Cause Analysis	Corrective Action
1			
2			
3			
4			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Bituminous Concrete (BC)*Location:*

Sl. No.	Description of non-conformity	Cause Analysis	Corrective Action
1			
2			
3			
4			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Primer Coat and Tack Coat

Location:

Sl. No.	Description of non-conformity	Cause Analysis	Corrective Action
1			
2			
3			
4			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Plant and Machinery

Sl. No.	Description of non-conformity	Cause Analysis	Corrective Action
1			
2			
3			
4			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Culverts

Location:

Sl. No.	Description of non-conformity	Cause Analysis	Corrective Action
1			
2			
3			
4			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Road Work

Location:

Sl. No.	Material	Tests	Description of non-conformity	Cause Analysis	Corrective Action
1	Borrow areas	<ul style="list-style-type: none"> • Gradation test • Plasticity Index Test • Modified Proctor test • CBR test • Moisture content 			
2	Compaction Control	<ul style="list-style-type: none"> • Moisture content before compaction • Dry density of compacted layer 			
3	Granular Sub base	<ul style="list-style-type: none"> • Gradation test • Atterberg limits • Natural moisture content • Density of compacted layer • CBR test 			
4	Wet Mix Macadam	<ul style="list-style-type: none"> • Aggregate Impact Value • Grading • Flakiness Index • Density of compacted layer 			

		<ul style="list-style-type: none"> • Atterberg Limits 			
	Bituminous Materials	<ul style="list-style-type: none"> • Quality of Binder • Aggregate Impact Value • Mix Grading • Flakiness Index • Stripping value • Stability of mix • Density of compacted layer 			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Workmanship (Road Work)*Location:*

Sl. No.	Tests	Description of non-conformity	Cause Analysis	Corrective Action
1	Control of layout, line and levels			
2	Control of grade, camber and thickness of each layer			
3	Control of surface finish (RI)			
4	Control of temperature of binder in boiler and mix, before laying			
5	Control of Binder content and gradation in mix at plant site			
6	Rate of spread of mixed materials			
7	Control of surface regularity finish			
8	Bitumen extraction test			
9	Post construction check of thickness of each compacted layer			
10	Rolling passes check at each stage			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Bridges/Flyovers/Culverts/Concrete Pavement

Location:

1. Tests on Cement

Sl. No.	Tests	Description of non-conformity	Cause Analysis	Corrective Action
1	Initial and Final setting time			
2	Normal consistency			
3	Compressive strength			
4	Soundness			
5	Fineness			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

2. Tests on Coarse Aggregates (As per IS 2386)

Sl. No.	Tests	Description of non-conformity	Cause Analysis	Corrective Action
1	Gradation			
2	Impact Value			
3	Flakiness Index			
4	Water Absorption			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

3. Tests on Fine Aggregates (As per IS 2386)

Sl. No.	Tests	Description of non-conformity	Cause Analysis	Corrective Action
1	Sieve Analysis			
2	Fineness Modulus			
3	Silt content			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

4. Mix Design (Compressive Strength of Cubes tested as per design for each mix design)

Sl. No.	Grade of Mix	Description of non-conformity	Cause Analysis	Corrective Action
1	M-15			
2	M-20			
3	M-25			
4	M-30			
5	M-35			
6	M-40			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

5. Compressive Strength of Concrete Cubes (As per IS 456/MOST)

Sl. No.	Grade of Concrete	Description of non-conformity	Cause Analysis	Corrective Action
1	M-15			
2	M-20			
3	M-25			
4	M-30			
5	M-35			
6	M-40			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

6. Slump Test for Concrete (As per IS 456)

Sl. No.	Grade of Concrete	Description of non-conformity	Cause Analysis	Corrective Action
1	M-15			
2	M-20			
3	M-25			
4	M-30			
5	M-35			
6	M-40			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

7. Tests on Bored Piles (As per IS 1100)

Sl. No.	Type of Test	Description of non-conformity	Cause Analysis	Corrective Action
1	Initial Load Test			
2	Routine Load Test			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

8. Tests of HYSD bar reinforcement (As per IS 1600)

Sl. No.	Diameter	Description of non-conformity	Cause Analysis	Corrective Action
1	8 mm			
2	10 mm			
3	12 mm			
4	16 mm			
5	20 mm			
6	25 mm			
7	Any other dia			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

9. Tests of High tensile steel

Sl. No.	Diameter	Description of non-conformity	Cause Analysis	Corrective Action
1	Tensile Strength			
2				
3				

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

10. Tests on Water

Sl. No.	Source of Water	Description of non-conformity	Cause Analysis	Corrective Action
1				
2				

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

11. Tests on High concrete pipes NP-3 (As per IS 458)

Sl. No.	Diameter	Description of non-conformity	Cause Analysis	Corrective Action
1	1200mm			
2	1000mm			
3	900mm			
4	750mm			
5	Any other			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

12. Workmanship (By reviewing Inspection notes, instructions, observations
in Site order book by Engineers and his representatives)

Sl. No.	Items to be watched	Description of non-conformity	Cause Analysis	Corrective Action
1	Centering and shuttering			
2	1000mm			
3	900mm			
4	750mm			
5	Any other			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Environment

Sl. No.	Items	Description of non-conformity	Cause Analysis	Corrective Action
1	Approved EMP availability			
2	Pollution Control Board Permission			
3	Visit of Environmental Engineer			
4	Regular monitoring of pollutants			
5	Implementation of EMP			
6	Disposal methods adopted for waste bitumen and other waste materials			
7	Construction camp management			
8	Top soil preservation			
9	Borrow and Quarry management			
10	Dust Control			
11	Atmospheric (Air) Pollution monitoring and control			
12	Preservation of road side trees and vegetation (Details about tree cutting and plantation measures)			
13	Compensatory afforestation			
14	Drainage rehabilitation			

15	Transportation of construction materials			
16	Material stacking			
17	Water pollution			
18	Noise Pollution			
19	Damage to aquatic life			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

Audit for Safety*Location:*

Sl. No.	Items	Description of non-conformity	Cause Analysis	Corrective Action
1	Approved safety plan and programme			
2	Traffic management			
3	Traffic safety measures in work zones			
4	Road Maintenance			
5	Fire safety practices			
6	Electrical safety practices			
7	Mechanical safety practices			
8	Worker's safety			
9	Safety in construction camps			
10	First Aid and Emergency Response arrangements			
11	Under pass or crossing sites for animals/wild life			

REMARKS

Signature

Name:

Quality Engineer

Signature

Name: Mahabir Panda

Team Leader

