REPORT TO IMPLEMENT NEW WORKS SUPERVISION PROCESSES, GUIDELINES AND PRACTICES (FINAL)

Report No. 32

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LEA International Ltd., Canada
in joint venture with
LEA Associates South Asia Pvt. Ltd., India
in association with
Ministry of Transportation of Ontario, Canada
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<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>ADT</td>
<td>Average Daily Traffic</td>
</tr>
<tr>
<td>AE</td>
<td>Assistant Engineer</td>
</tr>
<tr>
<td>BMS</td>
<td>Bridge Management System</td>
</tr>
<tr>
<td>BOO T</td>
<td>Build Own Operate Transfer</td>
</tr>
<tr>
<td>BOT</td>
<td>Build Operate Transfer</td>
</tr>
<tr>
<td>BSSL</td>
<td>Below Single Standard Lane</td>
</tr>
<tr>
<td>CBR</td>
<td>California Bearing Ratio</td>
</tr>
<tr>
<td>CE</td>
<td>Chief Engineer</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>CRF</td>
<td>Central Road Fund</td>
</tr>
<tr>
<td>CRRI</td>
<td>Central Road Research Institute</td>
</tr>
<tr>
<td>CSR</td>
<td>Civil Service Reforms</td>
</tr>
<tr>
<td>DAO</td>
<td>Divisional Account Officer</td>
</tr>
<tr>
<td>DBC</td>
<td>Dense Bituminous Concrete</td>
</tr>
<tr>
<td>DEE</td>
<td>Deputy Executive Director</td>
</tr>
<tr>
<td>DPR</td>
<td>Detailed Project Report</td>
</tr>
<tr>
<td>DRDA</td>
<td>District Rural Development Agency</td>
</tr>
<tr>
<td>EC</td>
<td>Executive Committee</td>
</tr>
<tr>
<td>EE</td>
<td>Executive Engineer</td>
</tr>
<tr>
<td>E-in-C</td>
<td>Engineer in Chief</td>
</tr>
<tr>
<td>HDM4</td>
<td>Highway Development and Management System</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>GO</td>
<td>Government Order</td>
</tr>
<tr>
<td>GOI</td>
<td>Government of India</td>
</tr>
<tr>
<td>GoUP</td>
<td>Government of Uttar Pradesh</td>
</tr>
<tr>
<td>HQ</td>
<td>Head Quarter</td>
</tr>
<tr>
<td>HRD</td>
<td>Human Resource Development</td>
</tr>
<tr>
<td>IBRD</td>
<td>International Bank for Reconstruction and Development</td>
</tr>
<tr>
<td>IDS</td>
<td>Institutional Development Strategy</td>
</tr>
<tr>
<td>IDSP</td>
<td>Institutional Development And Strengthening Plan</td>
</tr>
<tr>
<td>IRC</td>
<td>Indian Road Congress</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>ISAP</td>
<td>Institutional Strengthening Action Plan</td>
</tr>
<tr>
<td>IS</td>
<td>Indian Standards</td>
</tr>
<tr>
<td>IRI</td>
<td>International Roughness Index</td>
</tr>
<tr>
<td>JE</td>
<td>Junior Engineer</td>
</tr>
<tr>
<td>MDR</td>
<td>Major District Roads</td>
</tr>
<tr>
<td>MLA</td>
<td>Member of Legislative Assembly</td>
</tr>
<tr>
<td>MoSRTH</td>
<td>Ministry of Shipping, Road Transport &amp; Highways</td>
</tr>
<tr>
<td>MoRTH</td>
<td>Ministry of Road Transport and Highways</td>
</tr>
<tr>
<td>MoEF</td>
<td>Ministry of Environment and Forest</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
</tr>
<tr>
<td>MIS</td>
<td>Management Information System</td>
</tr>
<tr>
<td>NITHE</td>
<td>National Institute for Training of Highway Engineers</td>
</tr>
<tr>
<td>NH</td>
<td>National Highway</td>
</tr>
<tr>
<td>NHAI</td>
<td>National Highways Authority of India</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td>PCU</td>
<td>Passenger Car Unit</td>
</tr>
<tr>
<td>PMS</td>
<td>Pavement Management System</td>
</tr>
<tr>
<td>PMGSY</td>
<td>Pradhan Mantri Gram Sadak Yojana</td>
</tr>
<tr>
<td>PPP</td>
<td>Public Private Partnership</td>
</tr>
<tr>
<td>PSP</td>
<td>Private Sector Participation</td>
</tr>
<tr>
<td>PVA</td>
<td>Polyvinyl Alcohol</td>
</tr>
<tr>
<td>PWD</td>
<td>Public Works Department</td>
</tr>
<tr>
<td>ROMDAS</td>
<td>Roughness Measurement and Data Acquisition System</td>
</tr>
<tr>
<td>SDBC</td>
<td>Semi Dense Bituminous Concrete</td>
</tr>
<tr>
<td>SDL</td>
<td>Standard Double Lane</td>
</tr>
<tr>
<td>SE</td>
<td>Superintending Engineer</td>
</tr>
<tr>
<td>SH</td>
<td>State Highway</td>
</tr>
<tr>
<td>SHA</td>
<td>State Highway Authority</td>
</tr>
<tr>
<td>SML</td>
<td>Standard Multi Lane</td>
</tr>
<tr>
<td>SPV</td>
<td>Special Purpose Vehicle</td>
</tr>
<tr>
<td>SRF</td>
<td>State Road Fund</td>
</tr>
<tr>
<td>SRP-II</td>
<td>State Road Project-II</td>
</tr>
<tr>
<td>SSL</td>
<td>Standard Single Lane</td>
</tr>
<tr>
<td>TA</td>
<td>Technical Assistance</td>
</tr>
<tr>
<td>ToR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>UP</td>
<td>Uttar Pradesh</td>
</tr>
<tr>
<td>UPSBC</td>
<td>Uttar Pradesh State Bridge Corporation</td>
</tr>
<tr>
<td>UPSHA</td>
<td>Uttar Pradesh State Highway Authority</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>VOC</td>
<td>Vehicle Operating Cost</td>
</tr>
<tr>
<td>VR</td>
<td>Village Roads</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>WBM</td>
<td>Water Bound Macadam</td>
</tr>
</tbody>
</table>
1. BACKGROUND

The IDS Consultant (TCE) made the following recommendations regarding strengthening PWD role and capability in the supervision of works:

Construction Operation and Supervision:

Strengthen the Construction process by introducing new technologies, systematic construction supervision and independent Quality Audits and Controls.

Based on these recommendations the GoUP included ‘strengthening PWD role and capability in the supervision of works’ as one of the objectives of the Technical Assistance under implementation of institutional reforms in the road sector of Uttar Pradesh. In this the GoUP targeted the following action milestones under the TA Consultancy Services:

1. Implement new works supervision processes, guidelines and practices
2. Determine policy for mainstream use of independent quality audit.

Report No. 32 is presented against this background and action milestone number 1 i.e. implement new works supervision processes, guidelines and practices for core network of roads for construction and maintenance operation. The word ‘Construction' in this context includes both maintenance and construction operation.
2. ACTION PLAN AND PURPOSE

In order to implement the works supervision processes, guidelines, and practices the following methodology has been adopted;

1. Overview of current guidelines and practices for construction supervision of works in UP PWD.
2. Identify weaknesses in the existing system
3. Suggest measures to improve the supervision processes and guidelines

The purpose of this report is to suggest needful guidelines for developing a model construction supervision manual applicable for construction of a typical road project.

A Construction Supervision manual is a project specific document. For an individual project a construction supervision manual compatible to project requirements is to be developed. However, a model construction supervision manual could provide a base for developing a project specific manual.
3. OVERVIEW OF CURRENT PRACTICES AND GUIDELINES IN UP PWD

In the UP PWD a Construction Supervision manual does not exist in any form. However, some circulars/Government Orders were issued by the PWD HQ which provide some guidelines/directions on construction supervision aspects of works. All these circulars/Government Orders are compiled in the book ‘PWD UP Road Related circulars (1959 to 1984)’ published by the Engineer-in-Chief PWD Lucknow.

The guidelines/directions contained in Circulars/Government Orders generally relate to administration, specification and planning aspects of roads.

Rules and regulations regarding financial aspects of works have been elaborated in UP PWD Manual of Orders Volume Nos. 1 and 2. Some of the forms, which are often used by the Supervisory Engineers, have been standardized.

Performa and forms which are essentially to be used in respect of technical matters during construction supervision process have not been standardized.

Supervisory Engineers in UP PWD generally discharge the responsibilities of construction supervision of works based on their subjective judgement, experience, and in accordance with the directions issued by the superior authorities. Construction supervision of works is mainly based on the stipulations contained in the Contract Documents: Conditions of Contract, Specifications, Bill of Quantities, and Drawings. The methodology for executing any items of works is seldom developed either by the Contractor or the PWD. The works are executed by the Contractors in the traditional manner without any documented methodology or planning.

The quality of works is often adversely affected by the absence of a well defined methodology for executing the work items.

On projects funded by the World Bank the Construction Supervision Consultants have developed a construction supervision manual to be used on World Bank financed project.

For implementation of PMGSY works an Operational Manual has been published by Government of India. This operational manual covers some aspects of monitoring and construction supervision of works.
4. WEAKNESSES IN THE EXISTING SYSTEM

4.1 GUIDELINES ON CONSTRUCTION SUPERVISION OF WORK

Each construction project is “custom built” due to many variables caused by weather, topography, local conditions, and design considerations. It is important to provide the necessary decisions in the shortest possible time on the several problems which are likely to occur during the construction phase. A delay in giving a decision might cause unnecessary cost overruns to the PWD as well as to the contractor. To achieve maximum efficiency in producing a quality project the proper supervision of works executed by the contractor is vital. Under the PWD system no other individual position is so important for the proper functioning of the PWD as the position of Divisional Engineer (Executive Engineer) in charge of the execution of works. An EE is charged with a heavy responsibility, since he represents the PWD in dealing with the Contractor, coordinating with Governmental agencies, the travelling public, and the tax payer. Unfortunately for discharging such important responsibilities no guidelines or manual pertaining to technical matters concerning to works is available within the PWD for guiding officers in dealing with the construction supervision of works.

4.2 PAYMENTS TO THE CONTRACTOR

The construction industry is a fast-moving and fast-changing business. Large amounts of capital are necessary for undertaking construction operations and it is therefore important that the Contractor be reimbursed for work completed in accordance with the Specifications without undue delay. The invoice for works executed by the Contractor is generally prepared by the JE on the basis of measurements recorded by him in the measurement books.

In addition, accounting procedures are continually reviewed and modernized to the maximum extent possible to provide swift payment of invoices, so necessary for an economical operation. It is therefore important for the EE to ensure that all monies due to the Contractor are paid to the fullest extent possible within the payment period stipulated in the Contract.

The prevailing system of invoicing and discharging payments is cumbersome and time consuming. This system needs simplification and standardization.

4.3 METHODOLOGY OF CONSTRUCTION

In order to successfully implement a highway project the Contractor and the Supervisory Engineer must be conversant with the detailed construction methodology, including the plant and mechanical equipment it is proposed to use, the scheduling of all the various activities, safety aspects, traffic patterns and the possible interruptions to same.

Although the 'Specifications for Road and Bridge Works' (MoSRTH) 2001, Clause 115 specifically covers methodology and sequence of work this is not currently being applied in UP PWD on normal works.
Time and cost overruns, coupled with the poor quality of the completed project, are some of the maladies often observed on projects executed without having a sound, and approved, construction methodology or programme in place.

4.4 TRAINING OF SUPERVISORY ENGINEERS

Currently there is no system in place for providing training to the PWD Engineers in the field of construction supervision of works. It is of the utmost importance to conduct training programmes or refresher courses which update the knowledge of the PWD staff engaged in construction supervision.
5. RECOMMENDATIONS

5.1 CONSTRUCTION SUPERVISION MANUAL

The aforesaid weaknesses in project implementation may be overcome if the supervisory staff had available a project specific construction supervision manual for guidance during the execution stage of projects.

Since each project has different characteristics it may not be possible, or feasible, to develop a rigid Construction Supervision Manual that can be used for all projects. Instead the objective should to develop a model document which can be amended to suit each specific project. Many of the items would no doubt be the same for all projects with allowances for variations to suit specific projects.

The Construction Supervision Manual should describe the organizational and operational structure of the Construction Supervisory Engineer and his staff, most of whom are engaged in either in the executing wing of the PWD or by the appointed Supervision Consultants. The Manual should present the general procedures and guidelines to be followed by the organization in carrying out various aspects of the construction supervision tasks related to the implementation of the contract works.

The Construction Supervision Manual should, therefore, delineate organizational responsibilities, lines of communications, regulations, and limitations of authority of the supervision staff. The Manual should also include procedures for carrying out tasks related to inspection, testing, reporting, and general correspondence. Although the existing documentation provides standard procedures for dealing with contractual issues, such as variation orders and time extensions that arise during implementation of the works, it does not deal with the day to day technical requirements, nor does it propose solutions to technical problems, since these technical issues should be covered by the Specifications and other Contract Documents.

Every endeavour should be made to develop a Construction Supervision Manual so that adherence to its guidelines will result in efficient, safe, reliable and consistent supervision of the works in strict conformance to the Specification and other contractual requirements.

The basic framework of the manual should relate to construction supervision procedures consistent with standard practices for highway strengthening, widening, and new construction in conformance those at the national level as dealt with by MORT&H, IS and IRC.

It is vital that all users of the Manual understand that the Contract Documents, including the Specification, are legally binding on all parties and are therefore the controlling documents for the construction supervision process.

All construction supervision staff assigned to the projects should use the Construction Supervision Manual.
The Construction Supervision Manual is to be used as a guide by field personnel. The Manual is not a set of specifications. Its purpose is to clarify the Standard Specifications and to suggest uniform procedures in the highway construction field work. The Standard Specifications, Supplemental Specifications, plans, proposals, special provisions, and all supplementary documents are all legally binding parts of the Contract. Nothing in the Construction Supervision Manual should change a contract. The Construction Supervision Manual must be compatible with, and complimentary to, the Conditions of Contract, Specification, and other Contract Documents.

5.2 STRUCTURE OF CONSTRUCTION SUPERVISION MANUAL

The structure of Construction Supervision manual should comprise of following:

1. Organizational Structure of the appointed Supervisory Engineer
   Organizational chart of the PWD personnel involved in implementation and supervision of the project is presented under this section.

2. Roles and functions of various officials in the project hierarchy
   The functions of the designated ‘Engineer’ in terms of civil construction contract and supervisory staff of PWD along with the tasks and work activities which he is require to perform are highlighted here.

3. Supervision Guidelines and procedures
   This section mainly deals with following aspects:
   - Internal and External Communications (letters)
   - Office administration - filing system and records
   - Works Requests (Inspection/Approval Request Forms)
   - Work order book - Site instructions
   - Site Inspections, Daily Reports, and Diaries
   - Mechanical Plant and Machineries
   - Contractor’s personnel
   - Weather records
   - As built drawings
   - Final Documentation for Project completion

4. Variation Orders

5. Surveying guidelines and procedures

6. Quantity Survey guidelines and procedures

7. Quality Assurance and Quality Control Guidelines and procedures
8. Environmental monitoring


10. Sequence of Work, Programme, as set out in Clause 115 of MORT&H Standard Specifications.

11. Performa and forms to be used in Execution of works Check lists

12. Labour regulations and laws

13. Work zone safety

14. Traffic Management
6. ACTION PLAN

The indicative Action plan to develop a Construction Supervision Manual for UP PWD is given below:

a. Form a fully resourced dedicated cell manned by Senior PWD Engineers, conversant with and experienced in contract management, charged with developing a Construction Supervision Manual.
b. Provide training to the personnel mobilized in the cell.
c. Develop a model Construction Supervision Manual for Road Project.
d. Provide training in its use and application to all Supervisory Engineers.
e. Test the use of this Manual on selected construction works on pilot project basis.
f. Based on feedback received from the pilot projects revise or modify the Construction Supervision Manual.
7. RESOURCES

The following resources are proposed for developing the Construction Supervision Manual.

7.1 PERSONNEL

Chief Engineer (Quality Management) –as Head of Cell (part-time)

Superintending Engineer – as Deputy Head of Cell (full-time)

Executive Engineer - 2 No.

Clerk

Computer Operator

Office Boy

7.2 FACILITIES

- Accommodation - fully furnished office accommodation - 150 sqm.
- Office Equipment:
  i. Desk top Computers – 4 No.
  ii. Printer
  iii. Photocopier
  iv. Scanner
  v. Telephones - 2 No.
8. PROCEDURE FOR IMPLEMENTATION

Development of Construction Supervision Manual should be the responsibility of the Cell created especially for this task. It is anticipated that this work will be completed in 6 months assuming that the Cell is fully resourced. However training, implementation, and any subsequent revisions to the Manual are not included in this 6 month period.

Immediately after creation of the Cell the personnel for efficient functioning of the cell staff should be deployed. All the technical staff deployed in the Cell should be required to satisfactorily complete a training programme.

The Cell would obtain necessary feedback from the field staff, i.e. EE/AE /JE, about the difficulties and problems faced by them during project execution. A period of 3 months, following completion of the prescribed training programme, is probably adequate for development of the Construction Supervision Manual.

In conjunction with the HRD and Training Unit the Cell should also develop a training module for field personnel undertaking Construction Supervision of works as per guidelines contained in construction supervision of work.

On completion of training of selected field personnel of PWD the cell created for development of Construction Supervision manual should be disbanded with the training programme becoming part of the standard training programmes run by the HRD and Training Cell.

The activity of conducting construction supervision of projects on pilot basis in accordance with the guidelines set out in the Manual would be performed by the field staff under the guidance of the Quality Management Cell. Any revisions or modifications felt necessary on the basis of feedback obtained on pilot project would be undertaken by Quality Management Cell.
9. IMPLEMENTATION SCHEDULE

The implementation schedule is given in Figure No. 1.

Figure No. 1: Implementation Plan

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Description</th>
<th>Year 07</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Create cell for preparation of Construction supervision manual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Provide training to the personnel mobilized in the cell</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Develop Model Construction Supervision Manual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Implement Manual on Pilot Projects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Analyse feedback from Pilot Projects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Revise/Modify Construction Supervision Manual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Develop Training Programmes for all Supervisory Staff</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Write/Develop training material</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Training to the supervisory staff</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10. FINANCIAL IMPLICATIONS

Financial estimates for preparation of construction supervision manual are projected in Table No. 1 as given below. It should be noted that the estimates given in Table No. 1 do not include office accommodation or costs of furnishing same.

It is assumed that the Out-sourced Specialist appointed to the Quality Management Unit will oversee this work.

Table No. 1 : Estimates for preparation of construction supervision manual

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Description</th>
<th>No.</th>
<th>Duration</th>
<th>Monthly Cost (in Rs.)</th>
<th>Total Cost (in Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>PERSONNEL - Staff Resources</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Chief Engineer - from Quality Management Unit</td>
<td>1</td>
<td>6</td>
<td>55,000</td>
<td>330,000</td>
</tr>
<tr>
<td>A2</td>
<td>Superintending Engineer – Head of Cell</td>
<td>1</td>
<td>6</td>
<td>50,000</td>
<td>600,000</td>
</tr>
<tr>
<td>A3</td>
<td>Executive Engineer</td>
<td>2</td>
<td>6</td>
<td>15,000</td>
<td>90,000</td>
</tr>
<tr>
<td>A4</td>
<td>Clerk</td>
<td>1</td>
<td>6</td>
<td>8,000</td>
<td>48,000</td>
</tr>
<tr>
<td></td>
<td>Sub-Total Resources (A)</td>
<td></td>
<td></td>
<td></td>
<td>1,158,000</td>
</tr>
<tr>
<td>B1</td>
<td>OFFICE EQUIPMENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7</td>
<td>Desk top computer (hire charges)</td>
<td>4</td>
<td>6</td>
<td>2,000</td>
<td>48,000</td>
</tr>
<tr>
<td>B8</td>
<td>Printer (hire charges)</td>
<td>1</td>
<td>6</td>
<td>1,000</td>
<td>6,000</td>
</tr>
<tr>
<td>B9</td>
<td>Photocopier (hire charges)</td>
<td>1</td>
<td>6</td>
<td>3,000</td>
<td>18,000</td>
</tr>
<tr>
<td>B10</td>
<td>Scanner (Lump sum)</td>
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<td></td>
<td></td>
<td>5,000</td>
</tr>
<tr>
<td>B11</td>
<td>Telephone</td>
<td>2</td>
<td>6</td>
<td>1,500</td>
<td>18,000</td>
</tr>
<tr>
<td>B12</td>
<td>Networking</td>
<td>1</td>
<td></td>
<td>24,000</td>
<td>24,000</td>
</tr>
<tr>
<td>B13</td>
<td>Stationery, etc, including running costs</td>
<td>1</td>
<td>6</td>
<td>20,000</td>
<td>120,000</td>
</tr>
<tr>
<td></td>
<td>Sub-Total Office Equipment (B)</td>
<td></td>
<td></td>
<td></td>
<td>259,000</td>
</tr>
<tr>
<td>C14</td>
<td>Vehicle (hire charges)</td>
<td>1</td>
<td>6</td>
<td>25,000</td>
<td>150,000</td>
</tr>
<tr>
<td>C15</td>
<td>Travel Allowances</td>
<td></td>
<td></td>
<td></td>
<td>50,000</td>
</tr>
<tr>
<td></td>
<td>Sub-Total Transportation (C)</td>
<td></td>
<td></td>
<td></td>
<td>200,000</td>
</tr>
<tr>
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The estimated cost for production of Construction Supervision Manual and associated training material is Rs.1, 617,000 or 16.17 lacs.
11. FOCUS GROUP MEETING

The Focus Group meeting was convened on 18th and 19th February 2008.

In the meeting held on 18th February 2008 the following members participated:

**Participants from PWD**

- Mr. Virendra Yati Superintending Engineer
- Mr. Vinod Chandra Director Research
- Mr. Tirath Raj Executive Engineer
- Mr. Anaya Kumar Srivastava Assistant Engineer

**Participants from TA Consultant**

- Mr. Alan Stanbury Team Leader
- Mr. S.K. Pancholy Procurement Specialist

On 19th February 2008 a meeting was held with chairman Focus Group, the following members were present:

**Participants from PWD**

- Mr. D. V. S. Sarawat MD UPSBC
- Mr. Goyal UPSBC

**Participants from TA Consultant**

- Mr. S.K. Pancholy Procurement Specialist
- Miss Janhabi Shome Environment and Social Specialist

1. The Focus Group (FG) members opined that a standard Construction Supervision (CS) manual which can provide guidelines to the supervisory engineers of the department should definitely be in place. The FG members pointed out that the methodology for some of the work items is already available with UP PWD, which should be included in the proposed Construction Supervision manual.

2. FG desired that the CS manual should define the task and responsibilities for all the supervisory engineers of the PWD including the designated ‘Engineer’.

3. The FG was of the view that the CS manual should include the task and responsibilities of supervisory engineers in respect of quality assurance measures, recording and checking of measurements of work done by the contractor.
4. The TA Consultant is in agreement with the opinion of the FG members. While preparing the Construction Supervision Manual the views of FG member should be incorporated by the cell responsible for preparing the manual.

5. The FG approved the draft of Report No.32 therefore this is issued as a Final Report.
12. PRESENTATION TO PROJECT STEERING COMMITTEE
Report No. 32 - Implement new works supervision processes, guidelines and practices

PWD Focus Group - I

D.V.S. Sarawat  MD UPSBC
Surendra Kumar  Jt. M.D., U.P. State Bridge Corporation, Lucknow
Arun Kumar  EE, CD-1, Aligarh
Rajan Mittal  EE, PD, Saharanpur
Anurag Asthana  AE, UPRRDA, Lucknow
Navin Kumar  AE, TY. DCU (NH), Lucknow
Anay Kumar Srivastava  AE, IDS Cell, Lucknow
Sandeep Saxena  AE, IDS Cell, Lucknow

LEA International Ltd. & LEA Associates South Asia Pvt. Ltd.

S.K. Pancholy  Contract & Procurement Specialist
Report No. 32 - Implement new works supervision processes, guidelines and practices

Background:

IDS Consultant’s (TCE) Recommendation:

Construction Operation and Supervision
“Strengthen the Construction process by introducing new technologies, systematic construction supervision and independent Quality Audits and Controls”

Objective of Technical Assistance under implementation reforms:

“Strengthen PWD role and capability in the Supervision of Works”

Action Milestone targeted by Government of UP:

“Implement new works supervision guidelines and practices”
Purpose and Action Plan

Purpose:
Frame needful guidelines for developing a model construction supervision manual.

Action Plan:
1. Overview of prevailing guidelines and practices for construction supervision of works in UP PWD.
2. Identify weaknesses in the existing system
3. Suggest measures to improve the supervision processes and guidelines
Report No. 32 - Implement new works supervision processes, guidelines and practices

Overview of Prevalent Practices

Construction Supervision based on Circulars and Government orders relating to administration, specifications and planning aspects. Manual for Construction Supervision does not exist.

**Manual of Orders**

Elaborates the financial aspects of works and standardization of form often used is done. However, profoma and forms in respect of technical matters have not been standardized.
Implement new works supervision processes, guidelines and practices

(Over view Continued…)

Supervisory Engineers discharges responsibility of construction supervision based on:
- experience,
- subjective judgement,
- guidelines given by superiors,
- contract document including Specifications, bill of quantities and drawings;

The World Bank Funded Projects
Construction Supervision manual developed by the Construction Supervision Consultants.

PMGSY
Operational Guidelines published by GOI for monitoring and supervision of works.
Weaknesses in the Existing System:

1. Elaborate guidelines or manual regarding construction supervision of works at field level does not exist.

2. Invoicing and discharging payments to the contractors is cumbersome and time consuming needs simplification and standardization.

3. Methodology of work items or method statement is not developed

4. Lack of Training to the supervisory engineers.
Recommendations

Develop a model construction supervision of works manual.

The structure of Construction Supervision manual shall comprise of:

1. Organizational structure of the supervisory Engineer
2. Roles and functions of various officials in the project hierarchy.
3. Supervision guidelines and procedures
4. Variation orders
5. Surveying guidelines and procedures
Recommendations (Contd…)

6. Quantity Survey guidelines and procedures
7. Quality assurance and Quality Control guidelines and procedures
8. Environmental monitoring
9. Methodology or methods statements of works items.
10. Sequence of work and programme
11. Performa and forms used in works and checklists
12. Labour regulations and laws
13. Work Zone Safety
14. Traffic Management
Report No. 32 - Implement new works supervision processes, guidelines and practices

Action Plan

a) Form a fully resourced cell manned by Senior PWD Engineers for developing Construction Supervision manual.

b) Provide training to official deployed in the cell

c) Cell to Develop Construction Supervision manual

d) Provide Training to supervisory engineers on use and application of manual

e) Test the use of manual on selected Construction works on pilot project basis

f) Revise the manual on basis of feedback obtained from pilot project.
Report No. 32 - Implement new works supervision processes, guidelines and practices

Resources:

Personnel:
CE (QM) – Part time
SE – Full time
EE- Full time 2 No
Ancillary staff

Facilities:
Fully furnished and equipped office
Report No. 32 - Implement new works supervision processes, guidelines and practices

Procedure for Implementation

Construction Supervision Manual shall be developed by the PWD cell created for this purpose. The implementation of construction supervision manual on pilot project will be undertaken by the concerned Divisional Engineer.

Total time period for development of Construction Supervision manual shall be 6 months.
Report No. 32 - Implement new works supervision processes, guidelines and practices

Cost Estimates: Rs.17.00 lacs