FOREWORD

RHD MANAGEMENT PLAN

The RHD Management Plan has been developed as part of the commitment, as stated in the National Land Transport Policy, to ensure the effective planning, management and maintenance of the National Road Network.

The Management Plan has been prepared by RHD officers working through the MPITs, assisted by consultants from IDC3, SRNDP and RRMP3. The Plan covers all aspect of the Department operations and extends to all support services including human resources, financial, administration, information technology and health and safety. Care has been taken to build on existing systems and procedures.

The Management Plan is applied through the documented strategy papers, operational plans, job descriptions and procedures contained in eight volumes as follows:

- Volume 1 - RHD Management Manual
- Volume 2 - Management Services Wing Management Manual
- Volume 3 - Planning and Maintenance Wing Management Manual
- Volume 4 - Technical Services Wing Management Manual
- Volume 5 - Bridge Management Wing Management Manual
- Volume 6 - Mechanical Zone Management Manual
- Volume 7 - Zonal Operations Management Manual
- Volume 8 - Foreign Aided Projects Management Manual

Volume 1 contains the core documentation including the RHD strategy, general job descriptions, general procedures and a schedule of relevant GoB rules and regulations.

In Volumes 2 to 8, operational plans define the objectives, outputs and activities of each Wing and Circle and establish the necessary operational budgets and resource requirements. Operational procedures and specific job descriptions provide a systematic record of current practice and a framework for the further development of the management of the whole Department.

The RHD Management Plan is intended to be a live document, and will be maintained on the RHD Intranet. The implementation and future improvements of the documents will be conducted through MPITs under the overall directions of the ACE of management Services Wing.

I wish to thank and commend all of the officers of RHD who have devoted their time and energy to the preparation of this important document. I also extend my appreciation to the development partners who have actively supported this work particularly DFID, ADB and WB.

January 2004

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CHIEF ENGINEER
Roads and Highways Department
Sarak Bhaban, Ramna, Dhaka
VOLUME 5
BRIDGE MANAGEMENT WING MANAGEMENT MANUAL

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SECTION 4 - BRIDGE DESIGN CIRCLE
SECTION 5 - BRIDGE CONSTRUCTION & MAINTENANCE CIRCLE

SPECIFIC JOB DESCRIPTIONS

OPERATIONAL PROCEDURES
INTRODUCTION

OVERVIEW

The Management Manual for the Bridge Management Wing forms a part of the RHD Management Plan, which consists of strategy papers, operational plans, job descriptions and procedures within a defined framework. Figure 1 ‘RHD Documentation Framework’ shows the hierarchy of documentation required to define the RHD Management Plan.

This document must be read in conjunction with the RHD Management Manual, Volume 1 of the RHD Management Plan, which contains the core documentation for the whole of the Department as follows:

- RHD Strategy
- Office of the Chief Engineer
- General Job Descriptions
- RHD General Procedures
- Government of Bangladesh Rules and Regulations

The Chief Engineer controls the overall RHD Management Plan Policy.

The Management Manual for the Bridge Management Wing contains specific documentation that applies to the whole of the Wing, and is one of seven volumes for the Wings and Zones as follows:

- Volume 2 - Management Services Wing Management Manual
- Volume 3 - Planning & Maintenance Wing Management Manual
- Volume 4 - Technical Services Wing Management Manual
- Volume 5 - Bridge Management Wing Management Manual
- Volume 6 - Mechanical Zone Management Manual
- Volume 7 - Zonal Operations Management Manual
- Volume 8 - Foreign Aided Projects Management Manual

The Management Manuals are structured to achieve the flexibility required to control the varied activities and methods of operation of the Roads and Highways Department at the Wing/Zone level.

The Master Copies of the Management Manual documentation are filed on the RHD Intranet and the documentation will be updated on a regular basis and all amendments and additions will be advertised. Master hard copies of the documents are held in the Office of the Chief Engineer, Additional Chief Engineer –Bridge Management Services Wing, the Administration & Establishment Circle and the MIS.
& Estates Circle. The documents are regarded as live documents, and proposals for amendment, addition or deletion are encouraged, and can be logged on the RHD Intranet.

RESPONSIBILITIES

The responsibility for determining the necessary controls within the Roads and Highways Department generally lies with the Chief Engineer, except where Government of Bangladesh rules and regulations apply.

The responsibility for determining the necessary controls within the Wing, Circle, Division and Sub-Division generally lies with the respective Additional Chief Engineer, except where Government of Bangladesh rules and regulations or the RHD General Procedures contained in Volume 1 - RHD Management Manual apply.

The management of the system is a function of the Management Services Wing under the control of the Additional Chief Engineer – Management Services Wing who reports on a routine basis to the Chief Engineer.

The main responsibilities of the Additional Chief Engineer – Management Services Wing are:

- Reporting to the Senior Management Committee on all Management Plan matters.
- The overall planning, development, monitoring and reporting of all aspects of the system.
- Maintenance of the Management Plan documentation through the Superintending Engineer - Administration & Establishment Circle & Superintending Engineer - MIS & Estates Circle.
- Formal review of the adequacy and effectiveness of the Management Plan.

The master copies of the Management Plan documentation will be stored on the RHD Intranet, and will be managed by the Superintending Engineer – MIS & Estates Circle.

The main responsibilities of the Superintending Engineer – MIS & Estates Circle are:

- Liaising with the Superintending Engineer-Administration & Establishment Circle on all Management Plan documentation matters.
- Ensuring that the master documents stored on the RHD Intranet contain all current amendments and additions.
- Advertising changes to the documentation on the homepage of the RHD Intranet.
- Formal review of the adequacy and effectiveness of the Intranet documentation system.

To assist liaison, the Member-Secretary of MPIT or a member of staff will be nominated by the Additional Chief Engineer – Bridge Management Wing as required. They will be responsible for:

Liaising with the Superintending Engineer – Administration & Establishment Circle on Management Plan matters.
Liaising with the Superintending Engineer – MIS & Estates Circle on Management Plan documentation matters.

Assisting in the formal review of the adequacy and effectiveness of the Management Plan.

MANAGEMENT MANUAL COMPONENTS

The Management Manual for the Wing is structured to achieve the flexibility required controlling the varied activities and methods of operation of the Roads and Highways Department at the Wing level. It is not a static document and must be regularly updated to meet changing circumstances.

The Management Manual consists of:

- The Bridge Management Wing Strategy
- Operational Plan and Specific Job Description for the Office of the Additional Chief Engineer
- Operational Plans, Specific Job Descriptions and Operational Procedures for each Circle

BRIDGE MANAGEMENT WING STRATEGY

The Bridge Management Wing Strategy (See Section 1) sets out the overall objective, outputs and activities of the Wing and provides a summary of total personnel numbers and budget. The overall objective is as follows:

The objective of the Bridge Management Wing is to contribute to the overall strategy of RHD by providing a high level of service, in the effective planning, design and management of bridge works on the RHD road network. This involves close liaison with RHD wings and field divisions to ensure that all bridge works are well managed from conception through to physical completion and are then appropriately maintained to optimise the use of funds.

OPERATIONAL PLANS

The Operational Plans assist the planning and management in each Circle (See following Sections) by:

1. Defining the work of the Wing/Circle

   The Objectives of the Wing/Circle are established with defined Outputs. The Activities required to achieve the Outputs are listed and programmed in a logical manner in the Workplan.

2. Establishing the personnel, structure and resources to do the job:

   The required numbers of Personnel and the Organisational Structure required to manage the personnel effectively are detailed in the RHD Personnel and Organogram Databases. Resources such as transport and office equipment and the overall Budget requirements are tabulated. RHD has prepared a PCP titled "Investigation, Survey, Planning, Design and
Monitoring (ISPDM) of RHD Projects' showing budget requirements of all Wings/Circles, which is now under submission to the Planning Commission.

The Operational Plans are to be reviewed annually and an assessment made of

- Progress against the defined outputs
- Adequacy of the resources and personnel

The Operational Plan is then to be adjusted for the following year taking these factors into account, and also considering, for example, changes in priorities which may affect the overall objective, revised budget allocations and organisational changes within the RHD.

**SPECIFIC JOB DESCRIPTIONS**

In addition to the General Job Descriptions for each grade of officer, every post has specific duties and functions. These duties and functions are detailed in the Specific Job Descriptions for each post from Additional Chief Engineer to Sub-assistant Engineer.

The Specific Job Descriptions for individual posts may require modifications from time to time in order to respond to changing circumstances. Such modifications may be made with the approval of the Chief Engineer provided that all changes comply with Government rules and regulations.

**OPERATIONAL PROCEDURES**

The operational procedures relate to activities not covered by the RHD General Procedures, and are specifically for activities undertaken in the Wing, Circles and Divisions. They must not conflict with the RHD General Procedures.

The operational procedures provide an important record of the processes required to complete the activities undertaken by the Wing and Circles. The information provided by the operational procedures includes the steps in the process, responsibilities for tasks, the essential inputs and outputs, and the interactions with other departments.

The operational procedures are intended to compliment the various GoB rules and regulations, RHD manuals, standards and specifications by providing guidance on the application of these documents in a working environment. These are tools to assist officers in the execution of the work of the RHD, by encouraging consistency in the management of activities and providing continuity when officers move from one department to another.

The operational procedures are not intended to be an additional layer of regulation.

**General Procedure - GP3 - Preparation of RHD Management Plan Procedures** describes the process for preparing procedures, and aims to ensure that the procedures are produced in a consistent manner.
FIGURE 1 - RHD DOCUMENTATION FRAMEWORK
## ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AASHTO</td>
<td>American Association of State Highway &amp; Transportation Officials</td>
</tr>
<tr>
<td>ACE</td>
<td>Additional Chief Engineer</td>
</tr>
<tr>
<td>ACE-BMW</td>
<td>Additional Chief Engineer-Bridge Management Wing</td>
</tr>
<tr>
<td>ADP</td>
<td>Annual Development Programme</td>
</tr>
<tr>
<td>AE</td>
<td>Assistant Engineer</td>
</tr>
<tr>
<td>BCM/BCMC</td>
<td>Bridge Construction &amp; Maintenance Circle</td>
</tr>
<tr>
<td>BCR</td>
<td>Bridge Condition Report</td>
</tr>
<tr>
<td>BCS</td>
<td>Bangladesh Civil Service</td>
</tr>
<tr>
<td>BCS1</td>
<td>Bridge Condition Survey Form No. 1</td>
</tr>
<tr>
<td>BCS2</td>
<td>Bridge Condition Survey Form No. 2</td>
</tr>
<tr>
<td>BCS3</td>
<td>Bridge Condition Survey Form No. 3</td>
</tr>
<tr>
<td>BDC/BD</td>
<td>Bridge Design Circle</td>
</tr>
<tr>
<td>BMMS</td>
<td>Bridge Maintenance &amp; Management System</td>
</tr>
<tr>
<td>BMW</td>
<td>Bridge Management Wing</td>
</tr>
<tr>
<td>BRTA</td>
<td>Bangladesh Road Transport Authority</td>
</tr>
<tr>
<td>CE</td>
<td>Chief Engineer</td>
</tr>
<tr>
<td>CE-RHD</td>
<td>Chief Engineer-Roads &amp; Highways Department</td>
</tr>
<tr>
<td>COC</td>
<td>Conditions of Contract</td>
</tr>
<tr>
<td>EE</td>
<td>Executive Engineer</td>
</tr>
<tr>
<td>EE-BIPD</td>
<td>Executive Engineer-Bridge Inspection &amp; Planning Division</td>
</tr>
<tr>
<td>EE-BMPD</td>
<td>Executive Engineer-Bridge Maintenance Programming Division</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>Engr.</td>
<td>Engineer</td>
</tr>
<tr>
<td>ER</td>
<td>Engineer’s Representative</td>
</tr>
<tr>
<td>GoB</td>
<td>Government of Bangladesh</td>
</tr>
<tr>
<td>GP3</td>
<td>General Procedure 3</td>
</tr>
<tr>
<td>HDM</td>
<td>Highway Development &amp; Management Model</td>
</tr>
<tr>
<td>IDC3</td>
<td>Institutional Development Component 3</td>
</tr>
<tr>
<td>IEE</td>
<td>Initial Environmental Examination</td>
</tr>
<tr>
<td>IRC</td>
<td>Indian Road Congress</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>MIS</td>
<td>Management Information Systems</td>
</tr>
<tr>
<td>MoC</td>
<td>Ministry of Communications</td>
</tr>
<tr>
<td>MPIT</td>
<td>Management Plan Implementation Team</td>
</tr>
<tr>
<td>MT</td>
<td>Monitoring Team</td>
</tr>
<tr>
<td>NCP</td>
<td>New Contract Procedures</td>
</tr>
<tr>
<td>OP</td>
<td>Operational Procedures</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>P&amp;D/PDC</td>
<td>Planning &amp; Data Circle</td>
</tr>
<tr>
<td>PBI</td>
<td>Principal Bridge Inspection</td>
</tr>
<tr>
<td>PCP</td>
<td>Project Concept Paper</td>
</tr>
<tr>
<td>PD</td>
<td>Project Director/Planning &amp; Data Circle</td>
</tr>
<tr>
<td>PM</td>
<td>Periodic Maintenance</td>
</tr>
<tr>
<td>PP</td>
<td>Project Proforma</td>
</tr>
<tr>
<td>PPCP</td>
<td>Preliminary Project Concept Paper</td>
</tr>
<tr>
<td>RFP</td>
<td>Request for Proposal</td>
</tr>
<tr>
<td>RHD</td>
<td>Roads &amp; Highways Department</td>
</tr>
<tr>
<td>RHDCOP</td>
<td>Roads and Highways Committee of Purchase</td>
</tr>
<tr>
<td>RM</td>
<td>Routine Maintenance</td>
</tr>
<tr>
<td>RNCR</td>
<td>Road Network Condition Report</td>
</tr>
<tr>
<td>RNDAR</td>
<td>Road Network Database Annual Report</td>
</tr>
<tr>
<td>RRMP3</td>
<td>Road Rehabilitation &amp; Maintenance Project 3</td>
</tr>
<tr>
<td>SAE</td>
<td>Sub-Assistant Engineer</td>
</tr>
<tr>
<td>SDE</td>
<td>Sub-Divisional Engineer</td>
</tr>
<tr>
<td>SE</td>
<td>Superintending Engineer</td>
</tr>
<tr>
<td>SE-HDM</td>
<td>Superintending Engineer- HDM Circle</td>
</tr>
<tr>
<td>SE-MC</td>
<td>Superintending Engineer- Maintenance Circle</td>
</tr>
<tr>
<td>SE-PDC</td>
<td>Superintending Engineer-Planning and Data Circle</td>
</tr>
<tr>
<td>SST</td>
<td>Site Supervision Team</td>
</tr>
<tr>
<td>SJD</td>
<td>Specific Job Descriptions</td>
</tr>
<tr>
<td>TA</td>
<td>Technical Approval</td>
</tr>
<tr>
<td>TAPP</td>
<td>Technical Assistant Project Proforma</td>
</tr>
<tr>
<td>TOR</td>
<td>Terms and Reference</td>
</tr>
</tbody>
</table>
SECTION 1 STRATEGY

INTRODUCTION

The Bridge Management Wing is a new wing that combines the functions of Bridge Design and management of data collection, surveys, planning, construction and maintenance of bridges on RHD roads. The Management Plan is based on RHD Reorganisation as shown in figure 1.1

OBJECTIVE

The objective of the Bridge Management Wing is to contribute to the overall strategy of RHD by providing a high level of service, in the effective planning, design and management of bridge works on the RHD road network. This involves close liaison with other RHD wings and field divisions to ensure that all bridge works are well managed from conception through to physical completion and are then appropriately maintained to optimise the use of funds.

MAIN OUTPUTS

The main outputs of the Wing and its circles are:

♦ Up to date accurate and reliable inventory maintained including the physical attributes and conditions, of the Department’s bridges and culverts.
♦ Contribute to RHD policies and long-term development plans by using available bridge data to plan the management of the bridge stock effectively.
♦ Prioritised listings and short-term and long-term programmes for bridge maintenance and development projects designed to optimise the use of available Government finance.
♦ Quality Control and Quality Assurance schemes developed and implemented for bridge design, maintenance and construction.
♦ Undertake and procure design and other services, monitor progress and manage programmes effectively for maintenance, replacement and new construction of bridges.
♦ PCP, PP and TAPP documents drafted to be presented by the Planning & Programming Circle to the MoC and the Planning Commission.
♦ Effective and timely response to emergency situations involving bridges (floods, cyclones, earthquakes and collapses).
♦ Annual report produced on the condition of the RHD Bridge Stock.
ORGANISATION

The organogram (December 2003) for the Bridge Management Wing is as follows:

The Bridge Management Wing consists of three Circles each headed by an officer of Superintending Engineer Level. The total proposed staffing for the Wing is 275 persons comprising 42 Class I officers, 27 Class II officers, 138 Class III and 68 Class IV staff.

Certain officers in the Wing are to be designated as specialists. Specialist posts for engineers with specialist training are star marked thus, EE*

The detailed personnel figures are shown in the Personnel and Organogram Databases.
ACTIVITIES

The main activities of the Wing and its Circles are summarised below:

♦ Establish bridge design, construction and maintenance standards to be applied to all bridgeworks within the RHD.
♦ Collect, collate, review and monitor data on the entire RHD bridge stock to be included in the BMMS.
♦ Develop a systematic approach to bridge management.
♦ Procure or undertake surveys for the planning, design, maintenance and construction of bridge works.
♦ Procure (from RHD or otherwise) necessary economic studies of new and replacement bridges.
♦ Prepare recommendations for any proposed bridge replacement, major repairs and provision of new bridges including commissioning reviews of environmental, ecological, hydrological and social impacts of the proposals.
♦ Liaise with other wings, circles and field zones in relation to road safety, environmental and social issues related to Bridges.
♦ Procure consultants for the design and supervision. Check and review designs to ensure they meet all the specified requirements.
♦ Develop annual & multi-year programmes for maintenance & development of the bridge stock (including foreign aided projects) in consultation with the planning authorities in the MoC and the Planning Commission.
♦ Prepare draft PCPs, PPs and TAPPs for all proposed bridge projects.
♦ Develop annual budgets for the maintenance, replacement and new construction of bridges.
♦ Procure contractors for execution of bridge maintenance and construction works.
♦ Establish adequate funds for the operation of the Wing to meet the objectives stated above by securing budgets based on actual operational needs.
♦ Establish increased funding for bridge maintenance on a long term basis.
♦ Prepare monthly and annual reports on all bridge related activities.

Further details on the outputs and activities of the various circles are provided in the Circle Operational Plans.

INDICATIVE ANNUAL BUDGET

The total indicative budget for the Wing is shown in TABLE-1.1 Individual budgets are included in the operational plan for each Circle.
FIGURE 1.1 - ORGANOGRAM OF ROADS AND HIGHWAYS DEPARTMENT
1) RUNNING COSTS:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Rate (Taka)</th>
<th>Total Cost (Taka)</th>
<th>No. per Year</th>
<th>Annual Cost (Lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation &amp; Maintenance:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle Operation &amp; Maintenance</td>
<td>36.00</td>
<td>15000.00</td>
<td>540000.00</td>
<td>12.00</td>
<td>64.80</td>
</tr>
<tr>
<td>Stationary, Copying &amp; Consumables</td>
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<td>10000.00</td>
<td>70000.00</td>
<td>12.00</td>
<td>8.40</td>
</tr>
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<td>Computer Operations &amp; Maintenance</td>
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<td>3000.00</td>
<td>108000.00</td>
<td>12.00</td>
<td>12.96</td>
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<tr>
<td>Printing (external printers)</td>
<td>3.00</td>
<td>2000.00</td>
<td>3000.00</td>
<td>12.00</td>
<td>3.60</td>
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<td>Office Equipment Maintenance</td>
<td>46.00</td>
<td>25000.00</td>
<td>460000.00</td>
<td>12.00</td>
<td>55.20</td>
</tr>
<tr>
<td>Services (investigations, surveys etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investigation, survey, studies, designs etc.</td>
<td>1.00</td>
<td>5000.00</td>
<td>5000.00</td>
<td>12.00</td>
<td>0.60</td>
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<td>BCS3 Surveys Consultants</td>
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<td>150000.00</td>
<td>150000.00</td>
<td>7.00</td>
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<td>Feasibility Studies/proc. of consultant etc.</td>
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<td>350000.00</td>
<td>350000.00</td>
<td>65.00</td>
<td>127.50</td>
</tr>
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<td>Special Studies/inspections/visits etc.</td>
<td>2.00</td>
<td>65000.00</td>
<td>65000.00</td>
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<td>Hydrological Survey</td>
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<td>5000.00</td>
<td>5000.00</td>
<td>20.00</td>
<td>10.00</td>
</tr>
</tbody>
</table>

(d details in circle budget sheets)

**TOTAL 1: (Lacs)**

**354.26**

2) CAPITAL COSTS: (Purchase and periodic replacement of all equipment etc.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Rate (Lacs)</th>
<th>Total Cost (Lacs)</th>
<th>Life (Years)</th>
<th>Average Annual Cost (Lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles1: Jeep</td>
<td>22.00</td>
<td>25.00</td>
<td>550.00</td>
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<td>Vehicles2: Pickup</td>
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<td>15.00</td>
<td>195.00</td>
<td>10.00</td>
<td>19.50</td>
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<tr>
<td>Vehicles3: Car</td>
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<td>20.00</td>
<td>20.00</td>
<td>8.00</td>
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<tr>
<td>Computer &amp; Accessories (general office)</td>
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<td>30.00</td>
<td>4.00</td>
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<td>Computer &amp; Accessories (specialist)</td>
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<td>12.00</td>
<td>4.00</td>
<td>3.00</td>
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<td>4.00</td>
<td>12.00</td>
<td>4.00</td>
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<td>Photocopier</td>
<td>11.00</td>
<td>2.00</td>
<td>22.00</td>
<td>4.00</td>
<td>5.50</td>
</tr>
<tr>
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<td>1.00</td>
<td>8.00</td>
<td>4.00</td>
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<td>Air Conditioner</td>
<td>18.00</td>
<td>0.50</td>
<td>9.00</td>
<td>5.00</td>
<td>1.80</td>
</tr>
<tr>
<td>Specialist Equipment</td>
<td>9.00</td>
<td>5.00</td>
<td>45.00</td>
<td>5.00</td>
<td>7.50</td>
</tr>
<tr>
<td>Office Furniture &amp; Fixtures</td>
<td>9.00</td>
<td>0.50</td>
<td>4.50</td>
<td>10.00</td>
<td>0.45</td>
</tr>
<tr>
<td>Office Refurbishment</td>
<td>9.00</td>
<td>0.50</td>
<td>9.00</td>
<td>10.00</td>
<td>0.90</td>
</tr>
</tbody>
</table>

**TOTAL 2: (Lacs)**

**916.50**

**GRAND TOTAL (1 + 2)**

**476.66**

**TOTAL INDICATIVE ANNUAL BUDGET = Taka 477 Lacs**

**TOTAL INDICATIVE BUDGET - BRIDGE MANAGEMENT WING - TABLE 1.1**

(Based on 2003-2004 financial year)
SECTION 2 OFFICE OF THE ADDITIONAL CHIEF ENGINEER
OPERATIONAL PLAN

INTRODUCTION

The Office of the Additional Chief Engineer is responsible for overall Management of the Bridge Management Wing. The main outputs are shown in Section 1.

OBJECTIVE

The objective of the office of the Additional Chief Engineer is to:

Manage all operations in the Bridge Management Wing in order to ensure that the Strategy for the Wing and the Plans of each Circle within the Wing are fully achieved.

ORGANISATION

The basic organisational structure of the office of the Additional Chief Engineer is as follows:

The organisation of the Office of the Additional Chief Engineer consists of the ACE, a staff officer of AE level and office support staff. The total number of personnel is 14. The detailed personnel figures are shown in the Personnel and Organogram Databases.

RESOURCES

The Office of the Additional Chief Engineer requires resources for Head Office operations and to enable the ACE to make periodic field inspection visits.

The resources required are shown in the table below:

<table>
<thead>
<tr>
<th>Item</th>
<th>Existing (2003)</th>
<th>Proposed Total Requirement</th>
<th>Additional Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inspection Vehicles</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2. Computer with printer</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3. Photocopier</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4. Air Cooler</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5. Fax Machine</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
INDICATIVE BUDGET

The indicative budget for the Office of the Additional Chief Engineer is shown in TABLE 2.1. The budget table shows both the annual operation and maintenance costs and the capital costs of purchasing new and replacing old equipment. As not all equipment will be purchased or replaced immediately the capital cost has been annualised depending on the average life of the various items of equipment. The costs shown exclude the cost of personnel who are paid for from other sources.

On this basis the annual recurring cost for the Office of the Additional Chief Engineer is Taka 11 lacs and the capital costs on an annualised basis is Taka 8 lacs. This gives a total cost of Taka 19 lacs per annum.
### 1) RUNNING COSTS:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Rate (Taka)</th>
<th>Total Cost (Taka)</th>
<th>No. per Year</th>
<th>Annual Cost (Lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation &amp; Maintenance:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle Operation &amp; Maintenance</td>
<td>2.00</td>
<td>15000.00</td>
<td>30000.00</td>
<td>12.00</td>
<td>3.60</td>
</tr>
<tr>
<td>Stationary, Copying &amp; Consumables</td>
<td>1.00</td>
<td>10000.00</td>
<td>10000.00</td>
<td>12.00</td>
<td>1.20</td>
</tr>
<tr>
<td>Computer Operations &amp; Maintenance</td>
<td>2.00</td>
<td>3000.00</td>
<td>6000.00</td>
<td>12.00</td>
<td>0.72</td>
</tr>
<tr>
<td>Printing (external printers)</td>
<td>0.00</td>
<td>10000.00</td>
<td>0.00</td>
<td>12.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Office Equipment Maintenance</td>
<td>4.00</td>
<td>10000.00</td>
<td>40000.00</td>
<td>12.00</td>
<td>4.80</td>
</tr>
<tr>
<td>Services (Investigations, surveys etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspection visit etc.</td>
<td>1.00</td>
<td>10000.00</td>
<td>10000.00</td>
<td>4.00</td>
<td>0.40</td>
</tr>
</tbody>
</table>

**TOTAL 1**: (Lacs) 10.72

### 2) CAPITAL COSTS: (Purchase and periodic replacement of all equipment etc.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Rate (Lacs)</th>
<th>Total Cost (Lacs)</th>
<th>Life (Years)</th>
<th>Average Annual Cost (Lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles1: Jeep</td>
<td>2.00</td>
<td>25.00</td>
<td>50.00</td>
<td>8.00</td>
<td>6.25</td>
</tr>
<tr>
<td>Vehicles2: Pickup</td>
<td>0.00</td>
<td>15.00</td>
<td>0.00</td>
<td>10.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Vehicles3: Car</td>
<td>0.00</td>
<td>20.00</td>
<td>0.00</td>
<td>8.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Computer &amp; Accessories (general office)</td>
<td>2.00</td>
<td>1.00</td>
<td>2.00</td>
<td>4.00</td>
<td>0.50</td>
</tr>
<tr>
<td>Computer &amp; Accessories (specialist)</td>
<td>0.00</td>
<td>2.00</td>
<td>0.00</td>
<td>4.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Specialist Computer Software</td>
<td>0.00</td>
<td>4.00</td>
<td>0.00</td>
<td>4.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Photocopier</td>
<td>1.00</td>
<td>2.00</td>
<td>2.00</td>
<td>4.00</td>
<td>0.50</td>
</tr>
<tr>
<td>Fax machine</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>4.00</td>
<td>0.25</td>
</tr>
<tr>
<td>Air Conditioner</td>
<td>2.00</td>
<td>0.50</td>
<td>1.00</td>
<td>5.00</td>
<td>0.20</td>
</tr>
<tr>
<td>Specialist Equipment</td>
<td>0.00</td>
<td>5.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Office Furniture &amp; Fixtures</td>
<td>1.00</td>
<td>0.50</td>
<td>0.50</td>
<td>10.00</td>
<td>0.05</td>
</tr>
<tr>
<td>Office Refurbishment</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>10.00</td>
<td>0.10</td>
</tr>
</tbody>
</table>

**TOTAL 2**: (Lacs) 57.50

**GRAND TOTAL (1 + 2)** 18.57

TOTAL INDICATIVE ANNUAL BUDGET = Taka 19 Lacs

**INDICATIVE BUDGET - OFFICE OF THE ACE BRIDGE MANAGEMENT - TABLE 2.1**
(Based on 2003-2004 financial year)
SECTION 3  PLANNING & DATA CIRCLE
OPERATIONAL PLAN

INTRODUCTION

The Planning & Data Circle includes two divisions: Bridge Inspection & Planning and Bridge Maintenance Programming.

OBJECTIVES

The objective of the Planning & Data Circle is to contribute to the overall strategy of the Bridge Management Wing by:

Managing the collection and processing of bridge data to enable the optimum utilisation of budgets and resources by planning the timely implementation of bridge maintenance, rehabilitation and construction works.

OUTPUTS

♦ Five-year plan and Rolling plan for bridges under RHD Sub-Sector.
♦ Programmes & budgets for bridge construction rehabilitation and maintenance.
♦ Draft PPCPs, PCPs, TAPPs and PPs for bridge projects.
♦ Report on Aid-worthy Project for bridges.
♦ Disbursement of allocated budgets to the Zones and Projects for bridge works.
♦ Annual National Bridge Condition Report.

ORGANISATION

The Planning & Data Circle is headed by a Superintending Engineer (SE) supported by 2 Executive Engineers who are each in charge of Division, namely:

♦ Bridge Inspection & Planning Division.
♦ Bridge Maintenance Programming Division.
The numbers of existing and approved personnel in the Circle are shown in the Personnel and Organogram Databases. The total proposed number of personnel in the Circle to be 52. The total proposed number of personnel of the Circle is 10 Class I, 6 Class II, 25 Class III and 11 Class IV staff.

Certain officers in the Planning & Data Circle are to be designated as specialists. Specialist posts for engineers with specialist training are star marked thus, EE*.

**ACTIVITIES**

- Manage and Maintain Bridge Databases (BMMS), including monitoring and checking data from annual bridge condition surveys, updating inspection procedures, data entry etc.
- Procurement of consultancy services required for inspection, feasibility studies and geotechnical, hydrological & topographical surveys of bridges.
- Carry out / procure regular detailed inspections of bridges as indicated by the BMMS data.
- Carry out principle inspections on bridges constructed by others (including special projects) and reporting on their acceptability for inclusion in the RHD bridge stock.
- Collect and procure all data & information for the planning and conceptual design for bridge rehabilitation and construction works.
- Prepare draft PPCP, PCP & PP for bridge rehabilitation, construction and maintenance projects (including aid worthy projects) for finalisation by the Planning and Programming Circle.
- Prepare Budgets for Bridge maintenance, rehabilitation and construction works to be included in the Revenue and ADP accounts.
- Prepare work programmes and work packages for the implementation of bridgeworks.
- Co-ordinate with other Circles on Bridge Related Matters.
- Prepare 5-year plans for bridge works including future budgetary requirements.
RESOURCES

The Planning & Data Circle requires resources for Head Quarter’s operations and to enable the Circle to undertake necessary surveys, investigations etc. using both the Circles’ own resources and local consultants.

The resources required are shown in the table below:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Computer</td>
<td>0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>2. Photocopier</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3. Fax Machine</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4. Air Conditioner</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5. Vehicle (Jeep)</td>
<td>0</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6. Scanner</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

INDICATIVE BUDGET

The indicative budget for the Planning & Data Circle is shown in TABLE 3.1. The budget table shows both the annual operation and maintenance costs and the capital costs of purchasing new, and replacing old, equipment. As not all equipment will be purchased or replaced immediately the capital cost has been annualised depending on the average life of the various items of equipment. The costs shown exclude the cost of personnel who are paid for from other sources.

Funds are required to outsource the necessary inspections, surveys and studies.

On this basis the annual recurring cost for the Circle is Taka 87 lacs and the capital cost on an annualised basis is Taka 22 lacs. A total cost of Taka 109 lacs per annum. A total of Taka 62.10 lacs out of the annual recurring costs is for bridge inspections and surveys carried out in house and through local consultants.

WORK PLAN

The work plan of the Circle for the financial year based on the activities and resources detailed above is shown in FIGURE 3.1.
1) RUNNING COSTS:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Rate (Taka)</th>
<th>Total Cost (Taka)</th>
<th>No. per Year</th>
<th>Annual Cost (Lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation &amp; Maintenance:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle Operation &amp; Maintenance</td>
<td>6.00</td>
<td>15000.00</td>
<td>90000.00</td>
<td>12.00</td>
<td>10.80</td>
</tr>
<tr>
<td>Stationary, Copying &amp; Consumables</td>
<td>1.00</td>
<td>10000.00</td>
<td>10000.00</td>
<td>12.00</td>
<td>1.20</td>
</tr>
<tr>
<td>Computer Operations &amp; Maintenance</td>
<td>8.00</td>
<td>3000.00</td>
<td>24000.00</td>
<td>12.00</td>
<td>2.88</td>
</tr>
<tr>
<td>Printing (external printers)</td>
<td>0.00</td>
<td>10000.00</td>
<td>0.00</td>
<td>12.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Office Equipment Maintenance</td>
<td>8.00</td>
<td>10000.00</td>
<td>80000.00</td>
<td>12.00</td>
<td>9.60</td>
</tr>
<tr>
<td>Services (investigations, surveys etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspection visit etc.</td>
<td>1.00</td>
<td>5000.00</td>
<td>5000.00</td>
<td>12.00</td>
<td>0.60</td>
</tr>
<tr>
<td>BCS3 Surveys Consultants</td>
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<td>150000.00</td>
<td>7.00</td>
<td>10.50</td>
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<tr>
<td>Feasibility Studies</td>
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<td>150000.00</td>
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<td>50000.00</td>
<td>50000.00</td>
<td>7.00</td>
<td>3.50</td>
</tr>
<tr>
<td>Hydrological Survey</td>
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<td>50000.00</td>
<td>50000.00</td>
<td>20.00</td>
<td>10.00</td>
</tr>
</tbody>
</table>

TOTAL 1: (Lacs) 86.58

2) CAPITAL COSTS: (Purchase and periodic replacement of all equipment etc.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Rate (Lacs)</th>
<th>Total Cost (Lacs)</th>
<th>Life (Years)</th>
<th>Average Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles1: Jeep</td>
<td>4.00</td>
<td>25.00</td>
<td>100.00</td>
<td>8.00</td>
<td>12.50</td>
</tr>
<tr>
<td>Vehicles2: Pickup</td>
<td>2.00</td>
<td>15.00</td>
<td>30.00</td>
<td>10.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Vehicles3: Car</td>
<td>0.00</td>
<td>20.00</td>
<td>0.00</td>
<td>8.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Computer &amp; Accessories (general office)</td>
<td>6.00</td>
<td>1.00</td>
<td>6.00</td>
<td>4.00</td>
<td>1.50</td>
</tr>
<tr>
<td>Computer &amp; Accessories (specialist)</td>
<td>2.00</td>
<td>2.00</td>
<td>4.00</td>
<td>4.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Specialist Computer Software</td>
<td>1.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Photocopier</td>
<td>1.00</td>
<td>2.00</td>
<td>2.00</td>
<td>4.00</td>
<td>0.50</td>
</tr>
<tr>
<td>Fax machine</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>4.00</td>
<td>0.25</td>
</tr>
<tr>
<td>Air Conditioner</td>
<td>4.00</td>
<td>0.50</td>
<td>2.00</td>
<td>5.00</td>
<td>0.40</td>
</tr>
<tr>
<td>Specialist Equipment</td>
<td>2.00</td>
<td>5.00</td>
<td>10.00</td>
<td>5.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Office Furniture &amp; Fixtures</td>
<td>1.00</td>
<td>0.50</td>
<td>0.50</td>
<td>10.00</td>
<td>0.05</td>
</tr>
<tr>
<td>Office Refurbishment</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>10.00</td>
<td>0.10</td>
</tr>
<tr>
<td>Specification (Books)</td>
<td>1.00</td>
<td>0.10</td>
<td>0.10</td>
<td>3.00</td>
<td>0.03</td>
</tr>
</tbody>
</table>

TOTALS: (Lacs Taka) 160.60 22.33

GRAND TOTAL (1 + 2) 108.91

TOTAL INDICATIVE ANNUAL BUDGET = Taka 109 Lacs

INDICATIVE BUDGET - PLANNING & DATA CIRCLE - TABLE 3.1

(Based on 2003-2004 financial year)
## Circle Work Plan

**Year:** Typical

**Wing:** Bridge Management

**Circle:** Planning & Data

<table>
<thead>
<tr>
<th>TASK / PROGRAM / ITEM</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Procure data &amp; Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Prepare PPCP, PCP &amp; PP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Prepare Budgets for ADP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Manage &amp; Maintain Bridge Database</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Procure consultancy services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Coordinate with other circles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Prepare and review Five Year Plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Prepare list of aid-worthy projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FIGURE-3.1**

Planned
SECTION 4 BRIDGE DESIGN CIRCLE OPERATIONAL PLAN

INTRODUCTION

The Bridge Design Circle existed previously in the Technical Services Wing of RHD and presently it has been relocated in the Bridge Management Wing. This circle deals with the design of all types of bridges & culverts and other road structures like retaining walls, structure for overhead road signs etc. The Bridge Design Circle has three divisions and, is organised as described below:

OBJECTIVES

The objective of the Bridge Design Circle is to contribute to the overall strategy of the Bridge Management Wing by:

Managing bridge designs for all new construction, rehabilitation and maintenance of bridges to ensure safe, sound performance whilst optimising the whole life costs of the National bridge stock.

OUTPUTS

♦ Timely delivery of safe, sound and cost-effective bridge, culvert and other structures designs and drawings.
♦ Updated Bridge Design, Construction and Maintenance Manuals, standards and specifications for bridge construction and rehabilitation.
♦ Quality assurance procedures for bridge design.
♦ New/updated software for bridge design.
♦ Specialist advice for bridge construction and maintenance.

ORGANISATION

The Bridge Design Circle is headed by a Superintending Engineer (SE) who is supported by three Executive Engineers, each in charge of Division, namely:

♦ Bridge Design Division-I
♦ Bridge Design Division-II
♦ Bridge Design Division-III
The Orgnogram for the Bridge Design Circle (December 2003) is shown as follow:

**Organogram of the Bridge Design Circle**

<table>
<thead>
<tr>
<th>Position</th>
<th>Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superintending Engineer*</td>
<td>(SE-1)</td>
</tr>
<tr>
<td></td>
<td>(AE-1, SAE-1)</td>
</tr>
<tr>
<td>Bridge Design Division - I</td>
<td>(EE*-1, SDE*-1, AE-2, SAE-3)</td>
</tr>
<tr>
<td>Bridge Design Division - II</td>
<td>(EE*-1, AE-2, SAE-2)</td>
</tr>
<tr>
<td>Bridge Design Division - III</td>
<td>(EE*-1, SDE*-1, AE-2, SAE-3)</td>
</tr>
</tbody>
</table>

The number of existing and approved personnel in the Circle are shown in the Personnel and Organogram Databases. The total proposed number of personnel to be 90. The proposed number of personnel of the Circles is 13 Class I, 9 Class II, 48 Class III and 20 Class IV staffs.

Certain officers in the Bridge Design Circle are to be designated as specialists. Specialist posts for engineers with specialist training are star marked thus, EE*.

**ACTIVITIES**

- Collect necessary additional data for detailed bridge designs.
- Procure/Develop necessary software for bridge design when required.
- Procure/Perform design for bridge and other structures for construction/rehabilitation.
- Establish and update bridge design, construction and maintenance standards and manuals.
- Review and check designs procured from outside, procure design checks as required and recommend for approval.
- Provide Specialist inputs and advice to bridge construction as and when required.
- Procure services for assessment of load carrying capacity of existing or damaged bridge as and when required.
- Establish Quality Assurance Procedures for Bridge Design.
RESOURCES

The Bridge Design Circle requires resources for Head Quarter’s operations and to enable the Circle to undertake necessary surveys, investigations etc. using the Circles’ own resources and local consultants.

The resources required are shown in table below:

<table>
<thead>
<tr>
<th>Item</th>
<th>Existing (2003)</th>
<th>Proposed Total Requirement</th>
<th>Additional Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Computer</td>
<td>14</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>2. Photocopier</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>3. Fax Machine</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4. Air Conditioner</td>
<td>6</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>5. Vehicle (Jeep)</td>
<td>5</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>6. Vehicle (Pickup/Micro/Car)</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>7. Scanner</td>
<td>-</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>8. Design Software</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: 4 computers, 1 photocopier, 1 Jeep and 1 Micro are very old and need to be replaced.

INDICATIVE BUDGET

The indicative budget for the Bridge Design Circle is shown in TABLE 4.1. The budget table shows both the annual operation and maintenance costs and the capital costs of purchasing new and replacing old, equipments. As all equipments will not be purchased or replaced immediately, the capital cost has been annualised depending on the average life of the various items of equipments. The costs shown exclude the cost of personnel who are paid for from other sources.

Funds are required for out sourcing detailed surveys and designs.

On this basis the annual recurring cost for the Circle is Taka 136 lacs and the capital cost on an annualised basis is Taka 41 lacs. A total cost of Taka 177 lacs per annum. This total amount of Taka 87.2 lacs is to cover the costs of consultancy services by local consultants and site visits.

WORK PLAN

The work plan of the Circle for the financial year based on the activities and resources detailed above is shown in FIGURE 4.1.
1) RUNNING COSTS:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Rate (Taka)</th>
<th>Total Cost (Taka)</th>
<th>No. per Year</th>
<th>Annual Cost (Lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation &amp; Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle Operation &amp; Maintenance</td>
<td>10.00</td>
<td>15000.00</td>
<td>150000.00</td>
<td>12.00</td>
<td>18.00</td>
</tr>
<tr>
<td>Stationary, Copying &amp; Consumables</td>
<td>3.00</td>
<td>10000.00</td>
<td>30000.00</td>
<td>12.00</td>
<td>3.60</td>
</tr>
<tr>
<td>Computer Operations &amp; Maintenance</td>
<td>16.00</td>
<td>3000.00</td>
<td>48000.00</td>
<td>12.00</td>
<td>5.76</td>
</tr>
<tr>
<td>Printing (external printers)</td>
<td>3.00</td>
<td>10000.00</td>
<td>30000.00</td>
<td>12.00</td>
<td>3.60</td>
</tr>
<tr>
<td>Office Equipment Maintenance</td>
<td>15.00</td>
<td>10000.00</td>
<td>150000.00</td>
<td>12.00</td>
<td>18.00</td>
</tr>
<tr>
<td>Services (investigations, surveys etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investigation, survey, studies, designs etc.</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(details in circle budget sheets)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Procurement of Bridge Design by Consultant</td>
<td>1.00</td>
<td>200000.00</td>
<td>200000.00</td>
<td>40.00</td>
<td>80.00</td>
</tr>
<tr>
<td>Site visits and inspections</td>
<td>1.00</td>
<td>15000.00</td>
<td>15000.00</td>
<td>48.00</td>
<td>7.20</td>
</tr>
<tr>
<td><strong>TOTAL 1:</strong> (Lacs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>136.16</strong></td>
</tr>
</tbody>
</table>

2) CAPITAL COSTS: (Purchase and periodic replacement of all equipment etc.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Rate (Lacs)</th>
<th>Total Cost (Lacs)</th>
<th>Life (Years)</th>
<th>Average Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles 1: Jeep</td>
<td>7.00</td>
<td>25.00</td>
<td>175.00</td>
<td>8.00</td>
<td>21.88</td>
</tr>
<tr>
<td>Vehicles 2: Pick-up</td>
<td>2.00</td>
<td>15.00</td>
<td>30.00</td>
<td>10.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Vehicles 3: Car</td>
<td>1.00</td>
<td>20.00</td>
<td>20.00</td>
<td>8.00</td>
<td>2.50</td>
</tr>
<tr>
<td>Computer &amp; Accessories (general office)</td>
<td>12.00</td>
<td>1.00</td>
<td>12.00</td>
<td>4.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Computer &amp; Accessories (specialist)</td>
<td>4.00</td>
<td>2.00</td>
<td>8.00</td>
<td>4.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Specialist Computer Software</td>
<td>2.00</td>
<td>4.00</td>
<td>8.00</td>
<td>4.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Photocopier</td>
<td>4.00</td>
<td>2.00</td>
<td>8.00</td>
<td>4.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Fax machine</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>4.00</td>
<td>0.25</td>
</tr>
<tr>
<td>Air Conditioner</td>
<td>7.00</td>
<td>0.50</td>
<td>3.50</td>
<td>5.00</td>
<td>0.70</td>
</tr>
<tr>
<td>Specialist Equipment</td>
<td>3.00</td>
<td>5.00</td>
<td>15.00</td>
<td>5.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Office Furniture &amp; Fixtures</td>
<td>2.00</td>
<td>0.50</td>
<td>1.00</td>
<td>10.00</td>
<td>0.10</td>
</tr>
<tr>
<td>Office Refurbishment</td>
<td>2.00</td>
<td>1.00</td>
<td>2.00</td>
<td>10.00</td>
<td>0.20</td>
</tr>
<tr>
<td><strong>TOTALS:</strong> (Lacs Taka)</td>
<td></td>
<td></td>
<td><strong>283.50</strong></td>
<td></td>
<td><strong>40.63</strong></td>
</tr>
</tbody>
</table>

**GRAND TOTAL (1 + 2) = 176.79**

**TOTAL INDICATIVE ANNUAL BUDGET = Taka 177 Lacs**

**INDICATIVE BUDGET - BRIDGE DESIGN CIRCLE - TABLE 4.1**

(Based on 2003-2004 financial year)
### Circle Work Plan

**Wing : Bridge Management**

**Circle : Bridge Design**

<table>
<thead>
<tr>
<th>TASK / PROGRAM / ITEM</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Collect necessary data for Bridge Design</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Procure/Perform design for bridge construction/rehabilitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Review designs procured from outside, procure design check from outside if required and recommend for approval.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Provide Specialist input to bridge construction as and when required</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Prepare/update bridge design manual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**FIGURE-4.1**
SECTION 5 BRIDGE CONSTRUCTION & MAINTENANCE CIRCLE OPERATIONAL PLAN

INTRODUCTION

The Bridge Construction & Maintenance Circle was established to be responsible for overall Bridge Construction and Maintenance within the RHD and has four separate divisions. In particular, the circle takes direct responsibility for bridges over 150m long or complex in nature.

OBJECTIVES

The objective of the Bridge Construction & Maintenance Circle is to contribute to the overall strategy of the Bridge Management Wing by:

Providing and managing the construction, rehabilitation and maintenance of the RHD bridge stock to ensure safe, sound and optimum lifetime performance.

OUTPUTS

♦ Reports on progress and financial status of all Bridge Construction, Rehabilitation and Maintenance activities.
♦ Improved maintenance on all RHD bridges.
♦ Completed new and rehabilitated structures and their formal adoption.
♦ Agreed and approved as built drawings.
♦ Feedback to the Bridge Design Circles on design features and the use of Standard Contract Documents

ORGANISATION

The Bridge Construction & Maintenance Circle is headed by a Superintending Engineer supported by four Executive Engineers who are in-charge of each Division, namely:

♦ Bridge Construction & Maintenance Division-I
♦ Bridge Construction & Maintenance Division-II
♦ Bridge Construction & Maintenance Division-III
♦ Bridge Construction & Maintenance Division-IV
The organogram for the Bridge Construction & Maintenance Circle (December 2003) is as follows:

**Organogram of the Bridge Construction & Maintenance Circle**

The number existing and approved personnel in the Circle are shown in the Personnel and Organogram Databases. The total proposed number of personnel in the Circles to be 119. The total number of personnel in the Circle comprises 17 Class I, 12 Class II, 63 Class III and 27 Class IV staff.

Certain officers in the Bridge Construction & Maintenance Circle are to be designated as specialists. Specialist posts for engineers with specialist training are star marked thus, EE*.

**ACTIVITIES**

- Manage Bridge Construction, rehabilitation and maintenance work (Works may be executed under the supervision of the Bridge Construction and Maintenance Circle, RHD Field Zones, RHD Foreign Aided Projects or by Consultants but all works will be managed and monitored by this Circle).
- Ensure that all Bridge Construction and Rehabilitation Works are properly Executed and Supervised (quantity, quality and financial).
- Procure Contractors for Execution and Consultants for Supervision of Bridge Rehabilitation and Construction Works.
- Monitor Periodic and Routine Bridge Maintenance Works carried out by Field Zones.
- Establish and Manage Procedures to be complied with for the Formal Adoption of Structures.
- Inputs to Annual Review of Standard Contract Documents (CoC, Specifications etc.)
 dương Inputs for preparation and updating of bridge construction and maintenance procedures.

RESOURCES

The Bridge Construction & Maintenance Circle requires resources for Head Quarter’s and field operations and to enable the Circles to undertake and fulfil their duties.

The resources required are shown in table below:

<table>
<thead>
<tr>
<th>Item</th>
<th>Existing (2003)</th>
<th>Proposed Total Requirement</th>
<th>Additional Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey equipment</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Vehicle</td>
<td>0</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Computer</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Air Cooler</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Office Furniture</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Photocopier</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Fax</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

As some of the Divisions are likely to be located outside Dhaka certain items of office equipment (e.g. photocopiers) need to be duplicated).

INDICATIVE BUDGET

The indicative budget for the Bridge Construction & Maintenance Circle is shown in TABLE 5.1. It should be noted that no funds have been included in the budget for procurement of consultancy services or supervision cost, as these will form part of the overall project budget cost as given in ADP. The budget table shows both the annual operation and maintenance costs and the capital costs of purchasing new and replacing old, equipment. As not all equipment will be purchased or replaced immediately the capital cost has been annualised depending on the average life of the various items of equipment. The costs shown exclude the cost of personnel who are paid for from other sources.

On this basis the annual recurring cost for the Circle is Taka 121 lacs and the capital cost on an annualised basis is Taka 51 lacs. A total cost of Taka 172 lacs per annum. The cost of site inspections and supervision of small contracts by consultants is Taka 59.60 lacs. This sum only allows for supervision of maintenance and smaller contracts; the supervision costs for major bridge rehabilitation and construction works is expected to come from project funds.

WORK PLAN

The work plan of the Circle for the financial year based on the activities and resources detailed above is shown in FIGURE 5.1.
1) RUNNING COSTS:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Rate (Taka)</th>
<th>Total Cost (Taka)</th>
<th>No. per Year</th>
<th>Annual Cost (Lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation &amp; Maintenance:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle Operation &amp; Maintenance</td>
<td>18.00</td>
<td>15000.00</td>
<td>270000.00</td>
<td>12.00</td>
<td>32.40</td>
</tr>
<tr>
<td>Stationary, Copying &amp; Consumables</td>
<td>2.00</td>
<td>10000.00</td>
<td>20000.00</td>
<td>12.00</td>
<td>2.40</td>
</tr>
<tr>
<td>Computer Operations &amp; Maintenance</td>
<td>10.00</td>
<td>3000.00</td>
<td>30000.00</td>
<td>12.00</td>
<td>3.60</td>
</tr>
<tr>
<td>Printing (external printers)</td>
<td>0.00</td>
<td>10000.00</td>
<td>0.00</td>
<td>12.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Office Equipment Maintenance</td>
<td>19.00</td>
<td>10000.00</td>
<td>190000.00</td>
<td>12.00</td>
<td>22.80</td>
</tr>
<tr>
<td>Services (investigations, surveys etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site inspection and monitoring visits</td>
<td>1.00</td>
<td>10000.00</td>
<td>10000.00</td>
<td>96.00</td>
<td>9.60</td>
</tr>
<tr>
<td>Supervision of maintenance/ small contracts (Supervision of large contracts will be borne from the project costs)</td>
<td>1.00</td>
<td>500000.00</td>
<td>500000.00</td>
<td>10.00</td>
<td>50.00</td>
</tr>
</tbody>
</table>

TOTAL 1: (Lacs) 120.80

2) CAPITAL COSTS: (Purchase and periodic replacement of all equipment etc.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Rate (Lacs)</th>
<th>Total Cost (Lacs)</th>
<th>Life (Years)</th>
<th>Average Annual Cost (Lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles1: Jeep</td>
<td>9.00</td>
<td>25.00</td>
<td>225.00</td>
<td>8.00</td>
<td>28.13</td>
</tr>
<tr>
<td>Vehicles2: Pickup</td>
<td>9.00</td>
<td>15.00</td>
<td>135.00</td>
<td>10.00</td>
<td>13.50</td>
</tr>
<tr>
<td>Vehicles3: Car</td>
<td>0.00</td>
<td>20.00</td>
<td>0.00</td>
<td>8.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Computer &amp; Accessories (general office)</td>
<td>10.00</td>
<td>1.00</td>
<td>10.00</td>
<td>4.00</td>
<td>2.50</td>
</tr>
<tr>
<td>Computer &amp; Accessories (specialist)</td>
<td>0.00</td>
<td>2.00</td>
<td>0.00</td>
<td>4.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Specialist Computer Software</td>
<td>0.00</td>
<td>4.00</td>
<td>0.00</td>
<td>4.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Photocopier</td>
<td>5.00</td>
<td>2.00</td>
<td>10.00</td>
<td>4.00</td>
<td>2.50</td>
</tr>
<tr>
<td>Fax machine</td>
<td>5.00</td>
<td>1.00</td>
<td>5.00</td>
<td>4.00</td>
<td>1.25</td>
</tr>
<tr>
<td>Air Conditioner</td>
<td>5.00</td>
<td>0.50</td>
<td>2.50</td>
<td>5.00</td>
<td>0.50</td>
</tr>
<tr>
<td>Specialist Equipment (Survey)</td>
<td>4.00</td>
<td>5.00</td>
<td>20.00</td>
<td>8.00</td>
<td>2.50</td>
</tr>
<tr>
<td>Office Furniture &amp; Fixtures</td>
<td>5.00</td>
<td>0.50</td>
<td>2.50</td>
<td>10.00</td>
<td>0.25</td>
</tr>
<tr>
<td>Office Refurbishment</td>
<td>5.00</td>
<td>1.00</td>
<td>5.00</td>
<td>10.00</td>
<td>0.50</td>
</tr>
</tbody>
</table>

TOTAL 2: (Lacs) 415.00

GRAND TOTAL (1 + 2) 172.43

TOTAL INDICATIVE ANNUAL BUDGET = Taka 172 Lacs

INDICATIVE BUDGET - BRIDGE CONSTRUCTION & MAINTENANCE CIRCLE - TABLE 5.1
(Based on 2003-2004 financial year)
1. Manage Bridge Construction rehabilitation and maintenance work
2. Ensure that all Bridge Construction and Rehabilitation Works are properly Executed and Supervised (quantity, quality and financial)
3. Procure Contractors for Execution and Consultants for Supervision of Bridge Rehabilitation and Construction Works
4. Monitor Periodic and Routine Bridge Maintenance Works
5. Establish and manage Procedures for the Formal Adoption of Structures
6. Establish and manage Quality Assurance Procedures for Construction and Maintenance Structures
7. Inputs to Annual Review of Standard Contract Documents (CoC, Specifications etc.)
8. Inputs for preparation and updating of bridge construction and maintenance procedures.

<table>
<thead>
<tr>
<th>TASK / PROGRAM / ITEM</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage Bridge Construction rehabilitation and maintenance work</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ensure that all Bridge Construction and Rehabilitation Works are properly Executed</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>and Supervised (quantity, quality and financial)</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Procure Contractors for Execution and Consultants for Supervision of Bridge</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>Rehabilitation and Construction Works</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitor Periodic and Routine Bridge Maintenance Works</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish and manage Procedures for the Formal Adoption of Structures</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Establish and manage Quality Assurance Procedures for Construction and Maintenance</td>
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</tr>
<tr>
<td>Structures</td>
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<tr>
<td>Inputs to Annual Review of Standard Contract Documents (CoC, Specifications etc.)</td>
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<td>Inputs for preparation and updating of bridge construction and maintenance procedures.</td>
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</table>

FIGURE-5.1
SPECIFIC JOB DESCRIPTIONS

INTRODUCTION

Written Job Descriptions will help officers understand their roles in the RHD organisation, and therefore help to avoid misunderstandings. The job descriptions will also serve as a good starting point when officers are transferred between wings/zones.

The Job Descriptions will be maintained by the Administration & Establishment Division - Administration & Establishment Circle and the current updated versions will be available on the RHD Intranet. Training will be given to the Class 1 Officers to enable them to develop the job descriptions of their subordinates.

Feedback is important and all officers are encouraged to discuss their job descriptions with their Superior Officer(s).

GENERAL JOB DESCRIPTIONS

All RHD officers are delegated with defined responsibilities according to their Grade. The details of these duties and authorities are given in the General Job Descriptions. These include both administrative duties and financial authorities, and are the same for each grade of officer irrespective of the specific details of his/her current post. The General Job Descriptions are detailed in the RHD Management Manual - Volume 1 of the RHD Management Plan.

SPECIFIC JOB DESCRIPTIONS

In addition to the General Job Descriptions for each grade of officer, every post has specific duties and functions. These duties and functions are detailed in the Specific Job Descriptions for each post, which form part of the Management Manuals for each Wing, Zone and Circle.

Specific Job Descriptions for the posts from Sub-Assistant Engineer grade to Additional Chief Engineer grade within the Bridge Management Wing are included in this section:

Specific Job Descriptions for individual posts may require modification from time to time in order to respond to changing circumstances. Such modifications may be made with the approval of the Chief Engineer provided that these changes comply with Government rules.
GENERAL INFORMATION

Additional responsibilities and authorities for officers working on foreign aided projects may be modified by agreement between the Government of Bangladesh and the concerned Development Partner(s).

All the posts referred to in both the General and the Specific job descriptions are open to both male and female candidates and reference to he should always be taken to mean he or she.

The large majority of officers in the Roads and Highways Department are from the engineering cadre. Non-engineering officers have the same general duties and responsibilities as engineers of equivalent grade as described in the relevant General Job Descriptions.

The terms ‘engineer’ and ‘engineering’ apply equally to both Civil and Mechanical Engineering disciplines.
### Bridge Management Wing - Specific Job Descriptions

<table>
<thead>
<tr>
<th>Job No.</th>
<th>Job Title</th>
<th>Wing/Zone/Circle/Division</th>
<th>No. Posts</th>
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<tr>
<td>SJD/BMW/1.1</td>
<td>Additional Chief Engineer</td>
<td>Bridge Management Wing</td>
<td>1</td>
</tr>
<tr>
<td>SJD/BMW/1.2</td>
<td>Assistant Engineer</td>
<td>Bridge Management Wing</td>
<td>1</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SJD/PD/1.1</td>
<td>Superintending Engineer</td>
<td>Planning &amp; Data Circle</td>
<td>1</td>
</tr>
<tr>
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<td>Assistant Engineer</td>
<td>Planning &amp; Data Circle</td>
<td>1</td>
</tr>
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<td>Sub-Assistant Engineer</td>
<td>Planning &amp; Data Circle</td>
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</tr>
<tr>
<td>SJD/PD/2.1</td>
<td>Executive Engineer*</td>
<td>Bridge Inspection &amp; Planning Division</td>
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<tr>
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<td>SJD/BCM/1.1</td>
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<td>Bridge Construction &amp; Maintenance Circle</td>
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<td>SJD/BCM/2.2</td>
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<tr>
<td>SJD/BCM/2.4</td>
<td>Sub-Assistant Engineer</td>
<td>Bridge Construction &amp; Maintenance Divisions</td>
<td>11</td>
</tr>
</tbody>
</table>

*Specialist Training Required

*Specialist Qualification Required
RHD Specific Job Description – Bridge Management Wing

SJD/BMW/1.1 - ADDITIONAL CHIEF ENGINEER

CIRCLES WITHIN THE WING:

- Planning & Data
- Bridge Design
- Bridge Construction & Maintenance.

DIVISIONS UNDER THIS WING: 9

OFFICER UNDER THIS OFFICE:

1. Assistant Engineer 1 No.

PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of an Additional Chief Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder shall be a graduate in Civil Engineering, have worked as a SE of the Bridges Circle for at least 2 consecutive years and have received appropriate training in this subject. This position requires a sound knowledge of structural design and bridge construction and maintenance.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Additional Chief Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Ensure that data on the entire RHD bridge stock is collected and prepared for inclusion in the BMMS.

2. Ensure the bridge data is effectively managed to produce short and long-term plans for the maintenance, rehabilitation and construction of bridges.

3. Ensure the preparation of prioritised lists and short-term and long-term programmes for bridge maintenance and development to optimise use of available Government resources.

4. Advise on the preparation of PCPs, PPs and TAPPs for bridge projects.

5. Produce an annual report on the condition of the RHD Bridge stock.

6. Oversee the procurement, or undertake within the Wing, design and other bridge related services.
7. Ensure the proper supervision of all bridge maintenance, rehabilitation and construction works using the resources of the wing, through the Zonal offices or through the use of consultants.

8. Oversee the development and application of Quality Control and Quality Assurance procedures for bridge design, maintenance and construction.

9. Monitor progress (physical, quality and financial) and manage programmes for maintenance, replacement and new construction of bridges.

10. Ensure timely and effective response to emergency situations involving bridges due to floods, cyclones and earthquakes.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of an Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder should be a graduate in civil engineering or diploma in civil engineering with work experience, for at least 2 years in Bridge Management Wing.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Assistant Engineer as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Work as a staff Officer of ACE
2. Assist the ACE in disposing all letters related to technical matters on time.
3. Keeping records and maintain all technical Reports, Manuals, Documents, etc. of ACE’s Office.
4. Maintain liaison with all Circles of BMW regarding preparation and submission of technical reports, design of bridges, draft PPCPs, PCPs, PPs, etc. and to report the status of those to ACE time to time.
5. Prepare technical reports, briefing papers, etc. for ACE
6. Write minutes of the meetings chaired by ACE on matters related to BMW
7. Carry out any other activities related to ACE’s office when instructed by his superiors.
DIVISIONS UNDER THIS CIRCLE:

- Bridge Inspection & Planning
- Bridge Maintenance Programming

OFFICERS UNDER THIS OFFICE:

1. Assistant Engineer 1 No.
2. Sub-Assistant Engineer 1 No.

PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of a Superintending Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder shall be a graduate in Civil Engineering. Either he shall have at least 6 months formal training/advanced studies in Bridge Works or he shall have served in a junior post in Bridge Management Wing for a minimum 2 years.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Superintending Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Manage collection and processing of bridge inventory and condition data for inclusion in the BMMS to be used for the planning and implementation of bridge maintenance, rehabilitation and construction works.

2. Ensure Bridge design, maintenance and construction standards are provided and maintained.

3. Ensure the collection and procurement of all data & information for the planning and conceptual design of bridge rehabilitation and construction works.

4. Oversee procurement of all consultancy services required for inspections, feasibility studies and geo-technical, hydrological & topographical surveys of bridges.

5. Ensure the management and maintenance of the Bridge Database (BMMS), including monitoring and checking data from annual bridge condition surveys, updating inspection procedures, data entry etc.
6. Ensure that regular detailed inspections of bridges indicated as requiring attention by the BMMS data are carried out/procured. Monitor their condition and prepare reports concerning their strengthening/upgrading when necessary.

7. Ensure principal inspections are carried out on all bridges at the specified intervals.

8. Review and submit draft PPCPs, PCPs and PPs for bridge projects, including bridge rehabilitation, construction and maintenance projects, for finalisation by the Planning and Programming Circle. These should include projects, which might attract foreign aid.

9. Review and submit Five-year plans and Rolling plans for bridges under the RHD Sub-Sector recommend programmes & budgets for bridge construction rehabilitation and maintenance.

10. Disburse allocated budgets to the Zones and Projects for bridge works.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of an Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder should be a graduate in civil engineering or diploma in civil engineering with work experience for at least 2 years in Bridge Management Wing.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Assist in disposing all letters on technical matters addressed to SE on time.

2. Keeping records and maintain all technical reports, bridge condition survey reports, manuals of bridge design, bridge standards, etc.

3. Co-ordinate with divisions of BMW for bridge related works.

4. Write minutes of the meeting chaired by the SE on works related to P&D circle.

5. Prepare technical reports, briefing papers, etc. for SE.

6. Carry out any other activities assigned to him time to time by his seniors.

7. Supervise tasks assigned of SAEs.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of a Sub-Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

He should have received formal training in bridge related works or he should have adequate knowledge in bridge related works.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Sub-Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Keeping records of all documents, which will include measurement books, tender documents, tender notices, draft PPCPs, TAPPs, PCPs, PPs, etc.

2. Maintain Government circulars on all technical matters from MoC, CE-RHD and other offices, RHD standards & guidelines etc.

3. Maintain all office equipment under the control of Circle office.

4. Report to SE/AE on all specific duties on a regular basis.
OFFICERS UNDER THE DIVISION:

1. Sub-Divisional Engineer 1 No.
2. Assistant Engineer 2 No.
3. Sub-Assistant Engineer 3 No.

PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of an Executive Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder shall be a graduate in Civil Engineering. Either he shall have received at least 6 months formal training/undertaken-advanced studies in Bridge Design & Management or he shall have a minimum of 2 years work experience in Bridge Management Wing.

DUTIES & RESPONSIBILITIES:

In addition to the general responsibilities of the post of Executive Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Manage and maintain the Bridge Database (BMMS) including monitoring and checking data from the annual bridge condition surveys, updating inspections procedures, data entry etc.

2. Procurement of consultancy services required for inspection, feasibility studies and geo-technical, hydrological and topographical surveys of bridges.

3. Carry out / procure regular detailed inspections of bridges as indicated by the BMMS data.

4. Carry out periodic Principal Inspections on all bridges in accordance with the prescribed schedule.

5. Carry out principal inspection on bridges constructed by others (including Special Projects) and report on their acceptability for inclusion in the RHD bridge stock.

6. Collect & procure all data & information for the planning & conceptual design of bridge rehabilitation and construction work.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of a Sub-Divisional Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder shall be a graduate in Civil Engineering. Either he shall have received at least 6 months formal training in bridge related works or he shall have minimum 2 years experience in a junior position in Bridge Management Wing.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Sub-Divisional Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Responsible for maintaining the Bridge Database (BMMS) including monitoring and checking data from the annual bridge condition surveys, updating inspections procedures, data entry, etc.

2. Prepare Request for Proposal (RFP) for consultancy services required for inspection, feasibility studies and geo-technical, hydrological and topographical surveys of bridges.

3. Carry out regular detailed inspections of bridges as indicated by the BMMS data.

4. Carry out periodic Principal Inspections on all bridges in accordance with the prescribed schedule.

5. Collect & procure all data & information for the planning & conceptual design of bridge rehabilitation and construction work.

6. Check database input and interface with computer network system.

7. Supervise the assigned tasks of the AE/ SAE.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of an Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder should be a graduate in civil engineering or diploma in civil engineering with work experience for at least 2 years in Bridge Management Wing.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Responsible for maintaining the Bridge Database (BMMS) including monitoring and checking data from the annual bridge condition surveys, updating inspections procedures, data entry, etc.

2. Prepare Request for Proposal (RFP) for consultancy services required for inspection, feasibility studies and geo-technical, hydrological and topographical surveys of bridges.

3. Carry out regular detailed inspections of bridges as indicated by the BMMS data.

4. Carry out periodic Principal Inspections on all bridges in accordance with the prescribed schedule.

5. Collect & procure all data & information for the planning & conceptual design of bridge rehabilitation and construction work.

6. Check database input and interface with computer network system.

7. Supervise the assigned tasks of the SAEs.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of a Sub-Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

He should have received formal training in bridge related works or he should have adequate knowledge in bridge related works & computer.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Sub-Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Responsible for checking and entering data to Bridge Database from the annual bridge condition surveys.

2. Assist in carrying out regular detailed inspections of bridges as indicated by the BMMS data.

3. Assist in carrying out periodic Principal Inspections on all bridges in accordance with the prescribed schedule.

4. Assist in Collecting & procuring all data & information for the planning & conceptual design of bridge rehabilitation and construction work.

5. Keeping proper records of all documents of the division office.

6. Carry out any other activities assigned to him by his seniors.

7. Report to AE on all specific duties on a regular basis.
OFFICERS UNDER THE DIVISION:

1. Sub-divisional Engineer 1 No.
2. Assistant Engineer 2 No.
3. Sub-Assistant Engineer 2 No.

PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of an Executive Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder shall be a graduate in Civil Engineering. Either he shall have received at least 6 months formal training/undertaken advanced studies in Bridge works or he shall have a minimum of 2 years experience in a junior position in Bridge Management Wing.

DUTIES & RESPONSIBILITIES:

In addition to the general responsibilities of the post of Executive Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Prepare draft PPCPs, PCPs & PPs for bridge rehabilitation, construction and maintenance projects (including aid worthy projects) for finalisation by the Planning & Programming Circle.

2. Prepare Budgets for Bridge Maintenance, rehabilitation & construction works to be included in the Revenue and ADP budgets.

3. Prepare work programmes and work packages for the implementation of works within the budgets.

4. Prepare 5 Year and rolling Plans for bridge works including estimates of future budgetary requirements.
Personnel Specifications:

The post holder must meet the general requirements of a Sub-Divisional Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder shall be a graduate in Civil Engineering. Either he shall have received at least 6 months formal training in bridge related works or he shall have minimum 2 years experience in a junior position in Bridge Management Wing.

Duties and Responsibilities:

In addition to the general responsibilities of the post of Sub-Divisional Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Prepare draft preliminary project concept paper (PPCP), project concept paper (PCP), technical assistance project proforma (TAPP) and project proforma (PP) for bridge rehabilitation, construction and maintenance projects (including foreign aided projects).

2. Prepare draft budgets for Bridge maintenance, rehabilitation & construction works to be included in the Revenue and ADP budgets.

3. Prepare draft work programmes and packages for implementation of works within the budgets.

4. Prepare draft 5 year and rolling plans for bridge works including estimates of future budgetary requirements.

5. Preparing technical reports, briefing papers etc. for senior Engineers.

6. Supervise the assigned tasks of the AE/ SAE.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of an Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder should be a graduate in civil engineering or diploma in civil engineering with work experience for at least 2 years in Bridge Management Wing.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Assist in preparing draft preliminary project concept paper (PPCP), project concept paper (PCP), technical assistance project proforma (TAPP) and project proforma (PP) for bridge rehabilitation, construction and maintenance projects (including foreign aided projects).

2. Assist in preparing draft budgets for Bridge maintenance, rehabilitation & construction works to be included in the Revenue and ADP budgets.

3. Assist in preparing draft work programmes and packages for implementation of works within the budgets.

4. Assist in preparing draft 5 year and rolling plans for bridge works including estimates of future budgetary requirements.

5. Preparing technical reports, briefing papers etc. for senior Engineers

6. Supervise the assigned tasks of the SAE
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of a Sub-Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

He should have received formal training in bridge related works or he should have adequate knowledge in bridge related works & computer.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Sub-Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Keeping records of all documents which will include PPCP, PCP, PP, districts/ thanas/ mouza maps etc.

2. Maintaining Govt. circulars on all technical matters from MoC, CE-RHD and other offices, RHD standards and guidelines etc

3. Checking of arithmetical data of draft PPCP, TAPP, PCP & PP’s as instructed by SDE/AE

4. Maintaining of all office equipment under the control of the division office

5. Report to the EE/ SDE/ AE on all specific duties on a regular basis.
DIVISIONS UNDER THE CIRCLE:

- Bridge Design Division-I
- Bridge Design Division-II
- Bridge Design Division-III

OFFICERS UNDER THIS OFFICE:

1. Assistant Engineer 1 No.
2. Sub-Assistant Engineer 1 No.

PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of Superintending Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder shall be a graduate in Civil engineering. Either he must have minimum experience record of 2 years working as EE in Bridge Management Wing or he must received at least 6 months formal training/higher studies in bridge design.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Superintending Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Ensure, timely delivery of safe, sound and cost-effective bridge/culvert designs and drawings.

2. Ensure bridge design, construction and maintenance standards are regularly reviewed and amended where required.


4. Ensure Bridge Design Manuals are prepared and kept up to date.

5. Develop and apply Quality Assurance procedures to bridge design. Ensure that all external consultants and design consultants adopt these procedures.

6. Manage procurement of bridge design software.

7. Ensure all bridge designs are reviewed and checked in accordance with the defined procedures.

8. Provide specialist advice for bridge construction and rehabilitation when required.
9. Recommend all final design whether prepared in house or out-source for approval.

10. Ensure feedback on bridge designs.

11. Ensure archiving of designs and drawings following an appropriate practice.
### PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of an Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder should be a graduate in civil engineering or diploma in civil engineering with work experience for at least 2 years in Bridge Management Wing.

### DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Assist in disposing all letters on technical matters addressed to SE on time.

2. Keeping records and maintain properly all technical reports, manuals of bridge design and bridge standards, etc.

3. Co-ordinate with divisions of B D Circle for bridge related works.

4. Write minutes of the meeting chaired by the SE on works related to BD circle.

5. Prepare technical reports, briefing papers, draft of letters etc. for SE.

6. Carry out any other activities assigned to him time to time by his seniors.

7. Supervise assigned tasks of SAE.

8. Check all sorts of estimates assigned by SE.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of a Sub-Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

He should have received formal training in bridge related works or he should have adequate knowledge in bridge related works.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Sub-Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Assist in keeping records of all documents, which will include bridge design manuals, bridge standards, soil investigation reports, etc.

2. Maintain Government circulars on all technical matters from MoC, CE-RHD and other offices, RHD standards & guidelines etc.

3. Maintaining all office equipment, furniture etc. under the control of Circle office.

4. Report to SE/AE on all specific duties on a regular basis.
OFFICERS UNDER THE DIVISIONS:

<table>
<thead>
<tr>
<th>Position</th>
<th>Division-I</th>
<th>Division-II</th>
<th>Division-III</th>
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<tbody>
<tr>
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<td>2 Assistant Engineer</td>
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<tr>
<td>3 Sub-Assistant Engineer</td>
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PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of an Executive Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder shall be a graduate in Civil Engineering. Either he shall have received at least 6 months formal training/post-graduate studies in Bridge Design or he shall served at least 2 years in a junior position in a Bridge Design Circle.

DUTIES & RESPONSIBILITIES:

In addition to the general responsibilities of the post of Executive Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Managing necessary surveys and collection of data to enable detailed bridge designs.
2. Procure data as necessary for checking or any other emergency purpose.
3. Procure or develop necessary software for bridge designs as of required.
4. Prepare and procure in house, designs of bridge and other structures for construction and rehabilitation schemes.
5. Establish and update bridge design standards including contributing to the bridge related items in the RHD Standard Technical Specification.
6. Review and check designs procured from outside, procure design checks as required and recommend acceptable designs for approval.
7. Provide specialist inputs and advice to RHD bridge inspection and construction supervision personnel as and when required.
8. Procure service for, or undertake in house, assessment of load carrying capacity of existing or damaged bridges as and when required.


10. Prepare instruction manuals for the proper care and maintenance of all new and rehabilitated bridges.

11. Ensure all bridge drawings and calculations are properly stored and achieved in accordance with the required procedures.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of a Sub-Divisional Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder shall be a graduate in Civil Engineering. Either he shall have received at least 6 months formal training in bridge design or he shall have minimum 2 years experience in a Junior position in bridge design works.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Sub-Divisional Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Assist in collecting necessary data from Bridge Inspection & Planning Division.
2. Maintaining all necessary data required for design.
3. Procure assist in procuring data through necessary surveys to enable detailed bridge designs.
4. Assist in developing necessary software for bridge designs when required.
5. Carrying out designs of bridge construction and rehabilitation schemes.
6. Assist in updating bridge design standards including contributing to the bridge related items in the RHD Standard Technical Specification.
7. Assist in carrying out assessment of load carrying capacity of existing or damaged bridges as & when required.
9. Prepare draft instruction manuals for the proper care and maintenance of all new and rehabilitated bridges.
10. Supervise the assigned tasks of the AE/ SAE.
11. Inspection of proposed bridge sites for bridge design purpose and reporting to higher authority.
12. Participate in top supervision of on-going bridge construction works if necessary.
13. Responsible for archiving and storing all bridge drawings and calculation sheets in accordance with the required procedures.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of an Assistant Engineer as specified in the RHD Management Manual and as per recruitment riles.

The post holder should have work experience for at least 2 years in the Bridge Management Wing.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Procuring data through necessary surveys to enable detailed bridge designs.
2. Assist in developing necessary software for bridge designs when required.
3. Carrying out initial designs of bridges for construction and rehabilitation.
4. Assist in updating bridge design standards including contributing to the bridge related items in the RHD Standard Technical Specification.
5. Assist in carrying out assessment of load carrying capacity of existing or damaged bridges as & when required.
7. Assist in preparing instruction manuals for the proper care and maintenance of all new and rehabilitated bridges.
8. Perform all preferably works for archiving and storing all bridge drawings and calculation sheets in accordance with the required procedures.
9. Supervise the assigned tasks of the SAEs.
10. Report to EE/SDE for all specified duties assigned to him.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of a Sub-Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder should received formal training in bridge related works or he should have adequate knowledge in bridge related works.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Sub-Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Assist AE in keeping records of all documents such as, bridge design manuals, bridge standards, soil investigation reports, etc.

2. Assist in maintaining Government circulars on all technical matters from MoC, CE-RHD and other offices, RHD standards & guidelines etc.

3. Maintain in keeping all office equipment, furniture etc. under the control of division office.

4. Carry out any other activities assigned to him by his seniors.

5. Report to AE on all specific duties on a regular basis.

6. Record work done measurements of vouchers/small works and its certification (for assigned SAE of bridge design division).

7. Obtain documentary materials for reports and information on basic cost of plant, materials and labour and others as required.

8. Calculate quantities for drawings and estimates as required or when requested.
RHD Specific Job Description – Bridge Management Wing

SJD/BCM/1.1 - SUPERINTENDING ENGINEER

DIVISIONS UNDER THIS CIRCLE:

- Bridge Construction & Maintenance Division-I
- Bridge Construction & Maintenance Division-II
- Bridge Construction & Maintenance Division-III
- Bridge Construction & Maintenance Division-IV

OFFICERS UNDER THIS OFFICE:

1. Assistant Engineer 1 No.
2. Sub-Assistant Engineer 1 No.

PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of a Superintending Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder shall be a graduate in Civil engineering. Either he shall have extensive experience in bridge design, construction supervision and maintenance management or he must have received at least 6 months formal training/undertaken post-graduate studies in Management, of bridge design/construction and maintenance. He shall have served in a junior post in Bridge Management Wing for a minimum 2 years.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Superintending Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Manage the construction, rehabilitation and maintenance of the RHD bridge stock to ensure safe, sound and optimum lifetime performance.

2. Ensure that all Bridge Construction and Rehabilitation Works are properly executed and supervised (quantity, quality and financial) whether Departmentally or by external agencies.

3. Ensure services for the Supervision of bridge works are procured in accordance with the required procedures.

4. Promote the improvement of maintenance of all RHD bridges.
5. Provide the Bridge Planning Circle with information on the practical application of Standard Contract Documents and provide inputs to the Annual Review of Standard Contract Documents (CoC, Specifications etc.)

6. Provide Inputs for the preparation and regular updating of bridge construction and maintenance procedures.

7. Ensure as built drawings are prepared for all bridge works and the drawings are properly stored either physically or electronically for future reference.
PERSONNEL SPECIFICATIONS:
The post holder must meet the general requirements of an Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder should be a graduate in civil engineering or diploma in civil engineering with work experience for at least 2 years in Bridge Management Wing.

DUTIES AND RESPONSIBILITIES:
In addition to the general responsibilities of the post of Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Assist in disposing all letters on technical matters addressed to SE on time.
2. Keeping records and maintain all technical reports, manuals of bridge design, bridge standards, as built drawings, etc.
3. Co-ordinate with divisions of Bridge Construction & Maintenance Circle (BCM) for bridge related works.
4. Write minutes of the meeting chaired by the SE on works related to BCM circle.
5. Prepare technical reports, briefing papers, etc. for SE.
6. Carry out any other activities assigned to him time to time by his seniors.
7. Supervise assigned tasks of SAE.
8. Checking all sorts estimates.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of a Sub-Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

He should have received formal training in bridge related works or he should have adequate knowledge in bridge related works.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Sub-Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Assist in keeping records of all documents which will include, tender documents, tender notices, etc.
2. Assist in maintaining Government circulars on all technical matters from MoC, CE-RHD and other offices, RHD standards & guidelines etc.
3. Maintaining all office equipment and furniture under the control of Circle office.
4. Carry out any other activities assigned to him by his seniors.
5. Report to AE on all specific duties on a regular basis.
6. Prepare/check the estimates of works.
OFFICERS UNDER THE DIVISIONS:

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<tbody>
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<td>1</td>
<td>1</td>
<td>Nil</td>
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<tr>
<td>2. Assistant Engineer</td>
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<td>3. Sub-Assistant Engineer</td>
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PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of an Executive Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder shall be a graduate in Civil Engineering. Either he shall have received at least 6 months formal training/undertaken post-graduate studies in Bridge Design, Construction and Maintenance or he shall have a minimum of 2 years work experience in a junior post in Bridge Management Wing.

DUTIES & RESPONSIBILITIES:

In addition to the general responsibilities of the post of Executive Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Manage and monitor all Bridge maintenance, rehabilitation and construction works in the Division whether executed directly by the Wing, executed by field Zones or by Foreign Aided projects.

2. Ensure that all Bridge Construction, Rehabilitation and Maintenance works are properly executed and supervised in respect of quantity, quality and financial.

3. Arrange for procurement of Contractors for Execution, and Consultants for Supervision, of Bridge Rehabilitation & Construction Works.

4. Monitor Routine & Periodic Bridge Maintenance Works carried out by the field Zones.

5. Assist in the implementation of procedures to be complied with for the formal adoption of structures by RHD.

6. Prepare and maintain up to date Quality Assurance Procedures for the construction & maintenance of structures.

7. Provide inputs to the Annual review of standard Contract Documents (COC, Specifications etc.)
8. Provide inputs to the preparation and updating of standard bridge maintenance, rehabilitation and construction procedures.

9. Ensure proper records, including as built drawings, are maintained for all bridge works.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of a Sub-Divisional Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder shall be a graduate in Civil Engineering. Either he shall have received at least 6 months formal training in bridge related works or he shall have a minimum 2 years experience in Bridge Management Wing.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Sub-Divisional Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Supervise and monitor all bridge maintenance, rehabilitation and construction works assigned to his Division and ensure that all bridge works are executed properly in respect of specification, quantity, quality and financial.

2. Assist in arranging procurement of contractors for execution, and consultant for supervision, of Bridge maintenance, rehabilitation and construction works.

3. Monitor Routine & Periodic Bridge Maintenance Works carried out by the field zones.

4. Check and ensure that the as built drawings are prepared properly.

5. Ensure Quality Assurance Procedures are followed for the construction & maintenance of the structures.

6. Assist in preparing and updating of standard bridge maintenance, rehabilitation and construction procedures.

7. Supervise the assigned tasks of the AE/ SAE.

8. Carry out other duties assigned by his seniors.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of an Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

The post holder should have work experience for at least 2 years in Bridge Management Wing.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Supervise Bridge maintenance, rehabilitation and construction works of his division as assigned to him and ensure the works are properly executed in respect of specification, quantity and quality.

2. Assist in procurement of contractors for execution, and consultants for supervision, of Bridge Maintenance, Rehabilitation and Construction works.

3. Assist in monitoring Routine and Periodic Maintenance works carried out by the field zones.

4. Assist in preparing up to date Quality Assurance Procedures for the construction & maintenance of structures and ensuring its proper application in the field.

5. Preparing technical reports, briefing papers etc. for senior Engineers

6. Check and ensure the as built drawings are prepared properly.

7. Supervise the assigned tasks of the SAE.

8. Checking all sorts estimates.
PERSONNEL SPECIFICATIONS:

The post holder must meet the general requirements of a Sub-Assistant Engineer as specified in the RHD Management Manual and as per recruitment rules.

He should have received formal training in bridge related works or he should have adequate knowledge in bridge related works.

DUTIES AND RESPONSIBILITIES:

In addition to the general responsibilities of the post of Sub-Assistant Engineer, as specified in the RHD Management Manual, the specific duties relating to this position are detailed below:

1. Keeping records of all documents which will include measurement books, tender documents, tender notices, bridge design manuals, Specifications & Standards, quality assurance procedures for bridge works, all Government circulars on technical matters, as built drawings, etc.

2. Supervise all bridge works directly executed in the Construction and Maintenance Division and as instructed by his seniors.

3. Ensure quality assurance procedures are strictly followed and keep records of all field tests in connection with quality control properly.

4. Carry out any other activities assigned to him by his seniors.

5. Report to SDE/ AE on all specific duties on a regular basis.

6. Prepare all sorts of estimates of works.

7. Assist in all works of AE/SDE.
OPERATIONAL PROCEDURES

INTRODUCTION

The Operational Procedures have been developed with the RHD officers and generally represent current practice and existing processes with some adjustment where new initiatives have an impact. They should be seen as a useful aid both for existing staff, but particularly for new staff entering the Circle for the first time. The procedures should be reviewed and updated as the Circle develops in the future. Any suggestions for improvement should be communicated to the Management Plan Implementation Team for the Bridge Management Wing.

These Operational Procedures describes the key responsibilities to carry out operations of the circles/wings/zones. The Executive Engineers of each division are therefore a pivot for the procedures. However within each division the Executive Engineer will be assisted by the Sub-Divisional Engineers, Assistant Engineers, Sub-Assistant Engineers and other officers and staff under him depending on the situations and requirements, although their involvement in many of the procedures has not been explicitly stated in the “Responsibilities” para of each procedure. Many of these operational procedures also cut across the circles and divisions and require cooperation between different parts of RHD. The Operational Procedures contained in this section are as overleaf.

This is not a full list of procedures, but could be considered as a handbook to help guide key tasks and functions within the RHD. The procedures reference the main standards, guidelines, manuals, directives and Government/RHD rules and regulations that should be followed to enable RHD to achieve its main outputs and goals. It is expected that these procedures will be changed, refined and further OPs will be developed and evolve with the passage of time.
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<td>OP/BCM/2.4 Handover of Structures</td>
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1 PURPOSE AND SCOPE

This procedure describes the process for preparation of the Annual RHD Bridge Condition Report (BCR) by Planning and Data Circle and submission to HDM Circle for incorporating, as Volume 2 of the RHD Road Network Database Annual Report.

The report presents the results of analysis of bridge condition survey data in the BMMS Database. This report summarises the current condition of all bridges managed by the RHD Bridge Management Wing.

2 DEFINITIONS

RHD Road Network Database Annual Report (RNDAR) – is a summarised report containing road condition data for all the zones of the RHD.

Bridge Management and Maintenance System (BMMS) – is a database established with inventory and condition survey of all bridges and culverts of RHD road network and is used for bridge planning, design and management.

3 RESPONSIBILITIES

Additional Chief Engineer - Bridge Management Wing (ACE-BMW) – is responsible to accord approval to Annual RHD Bridge Condition Report (BCR).

Superintending Engineer - Planning & Data Circle (SE-PDC) – is responsible to ensure that the BCS forms are timely sent to field offices and survey data collected regularly by his sub-ordinate offices.

Executive Engineer - Bridge Inspection & Planning Division (EE-BIPD) – is responsible for overall managing the process of distributing the BCS forms, instruction to field offices to carry out bridge condition surveys, collecting and entering data timely and preparing the draft BCR.

Executive Engineers- Field Divisions – will ensure that the bridge condition surveys are carried out regularly, properly and the filled-up BCS forms sent to EE-BIPD timely.

Superintending Engineer - HDM Circle (SE-HDM) – is responsible to incorporate the BCR into the RNCR.
4 METHOD

4.1 PREPARATION OF DRAFT ANNUAL RHD BRIDGE CONDITION REPORT

After carried out bridge condition survey in field (see OP/ZF/1.4), data received and entered (see OP/PD/2.1) the EE-BIPD with his SDE/Assistant Engineer will operate BMMS database and prepare the draft Annual RHD Bridge Condition Report (BCR). EE-BIPD will also analyse bridge condition report of previous years, prepare the improvement trend of maintenance of RHD bridge stock over the years and include this in the BCR. The report contains the bridge condition and maintenance improvement trend of bridge stock, in each zone. This is then be submitted to SE-PDC for review.

4.2 REVIEW AND APPROVAL OF BCR

The draft BCR will be reviewed by the SE-PDC and recommended to ACE-BMW for approval. Upon approval of ACE-BMW the EE-BIPD will prepare final report and send to HDM circle to incorporate in RNDAR.

5 REFERENCES

Bridge Condition Survey Manual

6 PROCEDURE FLOWCHART

The procedure flowchart for this procedure is detailed in the next page.
Start

Survey carried out, BCS forms received EE-BIPD (see OP/ZF/1.4 & OP/PD/2.1)

Check & organise process of BMMS database EE-BIPD

Draft BCR

Prepare draft annual RHD bridge condition report EE-BIPD

Review & accept SE-PDC

No

Yes

Approve ACE-BMW

Yes

No

Final BCR EE-BIPD

Finalise BCR EE-BIPD

Send to HDM circle for incorporating in RNDAR (See OP/HDM/2.6)

End
1 PURPOSE AND SCOPE

This procedure describes the process of managing and maintaining the Bridge Management and Maintenance System (BMMS) Database including monitoring and checking data from the annual bridge condition surveys, data entry etc.

2 DEFINITIONS

Bridge Management and Maintenance System (BMMS) – is a database established with condition survey of all bridges and culverts of RHD road network and is used in bridge planning, design and management role.

Form BCS-1 – is used to report the basic condition of all bridges and culverts on RHD road network and the following details of the structure are recorded:

- Section 1 Location
- Section 2 Structure Type
- Section 3 Superstructure Details
- Section 4 Substructure Details
- Section 5 Foundation Type
- Section 6 Abutment protection & Approach Drainage
- Section 7 Observations (Condition Report)
- Section 8 Structure Total Score

From the structure total score, condition category of the structure is determined.

Form BCS-2 – contains a summary of BCS-1 data. The purpose of this form is to allow the Sub-Divisional and Executive Engineer to make comment on the severity of the condition on each bridge. This is a major and important step in assessing the need for maintenance resources.

Form BCS-3 – is used to provide sufficient information to make a preliminary cost estimate of the structure in question and the following details of the structure are recorded:

- Section 1 Location
- Section 2 Summary of Proposed Rehabilitation Works
- Section 3 Summary of Overall Bridge Condition
- Section 4 Routine & Periodic Maintenance Assessment
- Section 5 Length of shortest Diversion
- Section 6 Acceptance of the Assessment by the Executive Engineer
The information will be collected for all damaged structures, and will be used for budgetary purposes in future project formulation and to prioritise rehabilitation programmes.

**Principal Bridge Inspection (PBI)** – A full detail inspection of a structure, viewing each key structural components, bearings, hinges, joints etc. from no more than 1 metre.

### 3 RESPONSIBILITIES

**Superintending Engineer - Planning & Data Circle (SE-PDC)** – is responsible for overall management of BMMS.

**Executive Engineer - Bridge Inspection & Planning Division (EE-BIPD)** – is responsible for organising collection of filled-up BCS forms from field offices regularly, necessary site inspection, data entry etc. through his SDE/Assistant Engineer. Through Compliance monitoring support and scrutiny of the data in the field he will validate as far as possible the quality of data received.

**Executive Engineer - Field Divisions** – is responsible for managing and satisfies himself of the quality of information being provided for the annual bridge condition survey through their SDEs/SAEs.

### 4 METHOD

#### 4.1 DISTRIBUTION & INSTRUCTION TO FILL UP BCS FORMS

Every year not later than September EE-BIPD will send the latest BCS-1,2 & 3 forms to all field Sub-Divisions with clear instruction to carry out the bridge condition survey as soon as the rainy season is over, record the data in the BCS forms and submit timely.

#### 4.2 ANNUAL BRIDGE/CULVERT CONDITION SURVEY

After the rainy season, when the water levels have receded sufficiently to allow the inspection of the deck soffit and river bed the Sub-Assistant Engineers (SAEs) of field road Sub-Divisions will undertake the survey of all bridges and culverts and record the condition in BCS-1 form. After completing the BCS-1 form the SAEs will compile the BCS-1 data in BCS-2 forms and submit to their respective SDEs.

SDEs and EEs of field divisions will review the BCS-1 & 2 forms and on the basis of their findings from these forms field survey of the damaged bridges will be conducted in order to complete the BCS-3 form for onward submission to EE-BIPD.

#### 4.3 COMPLIANCE MONITORING AND SUPPORT

To add credibility to the data received from the field the Bridge Planning and Inspection Division will undertake monitoring and support inspection of at least 1% of all structures spread through the
country. The focus is on support of the field teams and to address any misinterpretation of data input from the field. Each site inspection will be concluded with a report to the SE Bridge Planning and Data Circle who, if required will take any necessary action.

### 4.4 Scrutinizing and Data Entry

Upon receipt of the BCS-1, 2 & 3 forms from the field offices the EE-BIPD will transmit those to his the Sub-Divisional Engineer/Assistant Engineer to scrutiny whether the forms are filled up correctly. He may ask for clarification or may inspect the site for additional information.

Upon satisfied with the information data entry in the BMMS database will be organised by the Sub-Divisional Engineer/Assistant Engineer. He also, while organising data entry, will take into account the PBI report.

### 4.5 Updating the Database

The bridge database is not a fixed set of data and must be constantly updated with accurate and reliable condition information submitted annually from the field offices.

### 5 REFERENCES


### 6 Procedure Flowchart

The procedure flowchart for this procedure is detailed in the next page.
Compliance Monitoring EE BPI Division arranges Monitor and support inspections by Bridge Planning Inspection Division of 1% of the structures spread throughout the network Report to SE-PD Circle

Start

Send latest BCS 1, 2 & 3 form to field each year EE-BIPD

BCS Survey carried out (see OP/ZF/1.4)

Receives BCS 1, 2 & 3 forms EE-BIPD

Amended

Scrubinate the BCS form SDE/Asstt. Engineer BIPD

Yes

Data of BCS form OK

Yes

survey data for year complete

OP/PD/3.2 Preparation of Annual Bridge Maintenance Programme and Budget

Entry data in database SDE/Asstt. Engineer BIPD

Operate BMMS Database for planning, design & budgeting for maintenance, rehabilitation & construction of bridges and culverts PDC

Update the database every year

End

Respective field offices/site inspection BIPD

No

Bridge condition data in BCS 1, 2 & 3 forms Established by conducting survey by field offices

PBI Report

Compliance Monitoring EE BPI Division arranges Monitor and support inspections by Bridge Planning Inspection Division of 1% of the structures spread throughout the network Report to SE-PD Circle
1 PURPOSE AND SCOPE

An essential purpose of the Bridge Management Wing is to improve the standard of bridges and culverts on the RHD road Network. Over and above routine inspections by zonal field teams it is prudent for detail inspections by a structural engineer to ensure the structure is performing as designed and individual essential component are properly functioning and that any latent defect is identified. The scope of this procedure is all structures on the RHD network.

2 DEFINITIONS

Structural Engineer - For the purpose of this procedure means a bridge engineer who has had experience in identifying bridge maintenance, strengthening and repair and can be considered an expert in the this field. The Structural Engineer may be RHD staff or a Consultant.

Principal Bridge Inspection - A full detail inspection of a structure, viewing each key structural components, bearings, hinges, joints etc. from no more than 1 metre.

BCS1, BCS2 and BCS3 - Bridge Condition Survey Form 1, 2 and 3 which gives details of the structure and its condition. These are used as input to the Bridge Maintenance Management System, the RHD Bridge maintenance database (see OP/PD/2.1).

3 RESPONSIBILITIES

Superintending Engineer - Planning & Data Circle - Reviews the Principal Bridge Inspection Report and decides on any necessary course of action.

Executive Engineer - Bridge Inspection & Planning Division - Carries out or arranges to be carried out a Principal Bridge Inspection including any specialist surveys necessary to complete the inspection. Once satisfied with the report’s the findings he submits to the Superintending Engineer.

Field Team - To provide any necessary support to the Inspection including means of access, safety equipment and flagmen and make any necessary arrangements with any other authority e.g. Railway and Utility Authorities/Companies to ensure a smooth unhindered inspection.

4 METHOD

4.1 THE INSPECTION

This is a detail inspection of a structure to establish it's structural state, latent defects, the integrity of bank protection as it affects the bridge structure. The inspection is carried out at no more than 1 metre
from each component part of the structure including bearings, hinges joints and any other mechanical joint. Crack, spalling, rusting, excessive deflections or deformation, scour and any other abnormality are described including the severity of the condition and the reason for the defect. The Inspection Report should include a prioritised recommended action to overcome the defect and recommend any additional inspection/monitoring regime until the defect is full repaired and otherwise dealt with.

It may be necessary on some structures specialist surveys, such as under water diving surveys, these should be included in the inspection.

The Executive Engineer shall ensure that details of the PBI are included on the Bridge Maintenance System.

4.2 Frequency

Principal Bridge Inspections shall be carried on all bridges of total span of 100m at least a 6-year cycle. Inspections shall be carried out on other structures on a random basis or where specific potential & problems are identified either during surveys or from any other source that the SE Bridge Planning Data Circle agrees is worthy of further investigation.

5 REFERENCES - None.

6 PROCEDURE FLOWCHART - None.
1 PURPOSE AND SCOPE

This procedure describes the process for collecting data for bridge projects having length more than 150m and submission to the Bridge Design Division for designing the same.

Design data for all culverts and bridges of length 150m or less will be collected by the respective field divisions by engaging relevant departmental staff for topographical survey and hydrological information and for soil investigation either through BRRL or through out sourcing. The data collected will directly be sent to Bridge Design Division and copied to Planning and Data Circle.

2 DEFINITIONS

Project Concept Paper (PCP) - is a proposal in a concise form, that is submitted to the MoC for project approval for inclusion in the Annual Development Programme (ADP). A PCP is required for any investment project. It should include civil works, consulting services (if any), equipment purchase, acquisition of land, manpower etc. It also includes the total estimated cost and a detailed description of the project in a prescribed format.

Project Proforma (PP) - following approval of the PCP, the PP is prepared within a specific period of time. The PP is a more detailed version of the PCP, prepared in a prescribed format.

Annual Development Programme (ADP) - is the operational document of the GoB’s 5-year plan and includes all types of GoB funded and foreign aided projects, which are ongoing and newly included. The ADP consists of the main investment programme, technical assistance programme and self-financed programme, which are sub-divided into the different government sectors. The ADP is published in June each year and is available to the public.

Design Data - includes the topographical survey of the area of proposed location of the bridge, cross-sections of the river/channel, hydrological data, geo-technical investigation and interpretative report.

3 RESPONSIBILITIES

Superintending Engineer - Planning & Data Circle (SE-PDC) – is responsible for preparing the list of projects for which design data are to be collected by consulting PCP/PP, ADP & other information.

Additional Chief Engineer - Bridge Management Wing (ACE-BMW) – will give final approval to the list of projects for collecting design data.

Executive Engineer - Bridge Inspection & Planning Division (EE-BIPD) – is responsible for engaging consultants for collecting design data following the operational procedure for procurement of consultants, OP/PD/2.5.
4 METHOD

4.1 PREPARATION OF PROJECT LIST FOR COLLECTING DESIGN DATA

The SE-PDC will consult the PCP/PP, ADP and other information, if any, of bridge projects to be included in ADP and prepare a list for which design data are to be collected. This list will then be submitted to ACE-BMW for approval. ACE-BMW may ask for additional information or clarification.

4.2 ENGAGEMENT OF CONSULTANT FOR SURVEY & INVESTIGATION WORK

Upon approval of the final list of bridge projects the EE-BIPD will select consultants for conducting different survey and investigation work required for designing bridge projects. In selecting the consultants he will follow all the steps of the procedure for procurement of consultants laid down in the operational procedure, OP/PD/2.4.

4.3 DRAFT SURVEY REPORTS

Upon receipt of the notice to proceed the consultants will carry out their work as per ToR. The consultants will prepare draft survey and investigation report after completing their works and submit to EE-BIPD for review and approval.

4.4 REVIEW AND APPROVAL OF DRAFT REPORTS

The EE-BIPD receives all the draft reports and reviews the reports along with his SDE/Assistant Engineer. He may ask additional information or clarification from the consultants. Being satisfied with the submission he recommends to SE-PDC.

4.5 FINAL REPORTS

When the SE-PDC is satisfied, that the reports contain all the information required for designing the bridge projects then the reports are finally approved and submitted to the Executive Engineer-Bridge Design Division.

5 REFERENCES

Project Concept Paper (PCP)/ Project Proforma (PP)
Annual Development Programme (ADP)
OP/PD/2.4

6 PROCEDURE FLOWCHART

The procedure flowchart for this procedure is detailed in the next page.
Start

List of Projects

Identify & prepare list of Projects which need data for Design (SE-BPDC)

Approval (ACE-BMW)

Yes

Engage Consultants (EE-BIPD)

See OP/PD/2.4

No

Projects as per PCP/PP need design important projects likely to be included in ADP & need design

Notice to proceed Contract Agreement

Draft Reports of all Survey Works

Work carried out by the Consultant & Draft Reports (Submitted to EE-BIPD by Consultant)

Draft Reports Reviewed (SE, PD, EE-BIPD)

Yes

Submits to EE Bridge Design Division

End

No

Final Reports containing all Design Data

Approval (SE-PD)
1 PURPOSE AND SCOPE

This procedure describes the process of procurement of consultancy services required for inspection, feasibility studies and geo-technical, hydrological & topographical surveys of bridges.

2 DEFINITIONS

Standard Guidelines for procuring consultancy services - are deemed to include all the standard guidelines that have been approved for use in Bangladesh by GoB and development partners.

Request for Proposal (RFP) - includes a brief description of the project, the scope of work, the scope of consultancy services, terms of reference (TOR), instruction for preparing proposal, evaluation criteria etc.

RHD Committee of Purchase (RHDCOP) - is a central committee that meets at regular intervals to vet and recommend RHD procurement contracts, which require the approval of Chief Engineer (CE) or higher authority. The committee is formed by the CE and the composition is approved by the MoC.

3 RESPONSIBILITIES

Additional Chief Engineer - Bridge Management Wing (ACE-BMW) - is responsible for final review and recommendation of RFP, ToR, Evaluation Report etc from Bridge Management Wing’s point of view.

Superintending Engineer - Planning & Data Circle (SE-PDC) - organises the preparation of all the documents required for procuring consultancy services.

Executive Engineer - Bridge Inspection & Planning Division (EE-BIPD) - prepares the RFP, ToR, Contract Documents etc with the assistance of his Sub-Divisional Engineer/Assistant Engineer.

4 METHOD

4.1 PREPARATION OF PROCUREMENT DOCUMENTS

The EE-BPID will finalise the projects, which require consultancy services in consultation with SE-PDC. He then prepares the draft procurement documents comprising RFP (including ToR, scope of work, scope of consultancy services, contract documents etc) following the standard guidelines for procurement of consultancy services with the assistance of his Sub-Divisional Engineer/Assistant Engineer. This is submitted to the SE-PDC for review.
4.2 **Submission of Draft Documents to RHD COP**

Upon receipt of the draft documents the SE-PDC will review with ACE-BMW. They may ask for additional information or clarification.

When they are satisfied with the submission, the draft procurement documents will be submitted to the CE, RHD for approval. The CE will review the documents and recommend to MoC for approval. When approval is received the final RFP, including all procurement documents, will be finalised.

4.3 **Advertisement**

After receiving the approved RFP the EE-BIPD will prepare a draft advertisement notice to be posted on the notice boards of relevant RHD offices, the RHD web-site and in national daily newspapers. This advertisement should contain the following information:

- Name of work with location
- The anticipated commencement date and duration of works
- The funding agency
- The location where the RFP can be purchased, together with their (non refundable) cost
- The location and deadline for submission of RFP (in sealed envelopes)

Upon completion of the draft notice the EE-BIPD will submit this to SE-PDC for approval/(and for approval by the funding agency if required).

Subject to any amendments required by SE-PDC/(or funding agency), the EE-BIPD will prepare a final version of the advertisement notice and submit this to the Information Ministry, as per prevailing GoB rules, for publishing in the national daily newspapers.

4.4 **Evaluation of Proposals**

The proposals submitted by the consulting firms on due date will be evaluated as per criteria indicated in the RFP by EE-BIPD, or a committee constituted by CE/ACE-BMW.

Upon completion of the evaluation of the proposal a draft evaluation report indicating the ranking of the consulting firm will be submitted to ACE-BMW through SE-PDC for review and onward submission to CE, RHD with their recommendation. The CE will endorse the evaluation report to RHDCOP for review.

After reviewing the evaluation report RHDCOP submits the report with its recommendation to CE for approval.

Upon approval of the evaluation report by the competent authority (as per financial limit) the contract agreement will be signed and notice to proceed will be issued to the top ranking consulting firm.
5 REFERENCES

Standard Guidelines for Procurement of Consultancy Services.

6 PROCEDURE FLOWCHART

The procedure flowchart of this procedure is detailed in the next page.
Start
Prepare Draft Request for Proposal (RFP) (EE-BIPD)
Review the draft RFP (SE-BPDC)
ACE-BMW Recommendation
CE-RHD Recommendation
Final RFP
Advertisement Notice for Submitting Proposal
Advertise in newspaper, web site etc. (EE-BIPD)
Receive Proposal from Consultants (EE-BIPD)
Draft Evaluation Report
Evaluation of Proposal (EE-BIPD/Committee)
ACE-BMW Recommendation
RHDCOP Recommendation
Yes
Yes
Yes
Yes
No
No
No
No
Yes
Yes
Yes
End

Standard Guidelines for Procurement of consultancy Services

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1 PURPOSE AND SCOPE

This procedure describes how to prepare the Annual RHD Bridge Maintenance and Rehabilitation Needs Report, which is a prioritised list of all structures in RHD Road Network. This is prepared by the Bridge Maintenance & Programming Division for onward submission to SE Maintenance Circle (for revenue budget) and SE Planning & Programming Circle (for development budget).

2 DEFINITIONS

Annual RHD Bridge Maintenance and Rehabilitation Needs Report – is the prioritised list of all bridges and culverts on the RHD Road Network which require maintenance/rehabilitation to bring back the serviceability condition to their original position. The list includes routine maintenance, periodic maintenance and rehabilitation works prioritised by operating the computerised Bridge Maintenance & Management System (BMMS).

Bridge Management and Maintenance System (BMMS) - is a database established with condition survey of all bridges and culverts of RHD road network and is used in bridge planning, design and management role.

Routine Maintenance (RM) - works of bridges & culverts include regular cleaning of the structure, minor repair of approaches, clearing small obstructions in the channel, replacing damaged guide posts, railing, signboards, etc.

Periodic Maintenance (PM) - works of bridges and culverts will include (1) major repair and protective works up to a value set by the CE, RHD annually and (2) replacement works up to a value set by the CE annually.

Rehabilitation - works will include any work exceeding the set value mentioned in (1) and (2) above.

3 RESPONSIBILITIES

Additional Chief Engineer - Bridge Management Wing (ACE-BMW) - approves the Needs Report

Superintending Engineer - Planning & Data Circle (SE-PDC) - is responsible for recommending the report to ACE-BMW for approval.

Executive Engineer - Bridge Maintenance Programming Division (EE-BMPD) - is responsible for preparing the Needs Report by operating and analysing the BMMS with the assistance of his SDE/Assistant Engineer.
4  METHOD

4.1  PREPARATION OF NEEDS REPORT

Upon receipt of instruction from SE-PDC, EE-BPMD (with the assistance from his SDE/Assistant Engineer) will operate the BMMS to establish the prioritised list of bridges & culverts, which require routine, periodic maintenance and rehabilitation. He will ensure that latest data of bridge condition is used. He will collect the information of on-going and new schemes from Monitoring and Planning & Programming Circle. Then he will prepare the needs report showing separately the works to be done through revenue and development budget. Revenue budget will generally include the works of routine maintenance (RM) and periodic maintenance (PM) up to a value set by the CE and development budget will include PM works exceeding the set value and all rehabilitation works as described in the definitions above. Both the list of maintenance works (revenue) and development works (replacement) will be prioritised using criteria defined within the BMMS (see OP/PD/3.3).

4.2  REVIEW AND APPROVAL

SE-PDC reviews this needs report, amends the report if necessary in consultation with EE-BMPD and submits to ACE-BMW. Once satisfied with the submission ACE-BMW will approve the needs report and transmit to SE-Maintenance Circle (for revenue budget) and to SE-Planning & Programming Circle (for development budget).

4.3  REVIEW OF BUDGET AND ROAD NEEDS REPORTS TOGETHER

A co-ordination committee needs to be established to ensure ADP and maintenance works are clearly based on prioritised road and bridge needs reports in a clearly co-ordinated manner. It is important for the Bridge Management Wing to have equal voting and representation on this committee. This should make sure that:

- Prioritised roads projects include bridge maintenance/replacements necessary to ensure improved access is achieved.
- Prioritised bridge projects include any required approach road works.
- Conflicts between bridge and road replacements and maintenance are resolved (e.g. don’t plan to overlay road and then replace culvert afterwards; don’t plan to be maintenance on road (bridge that is planned to be replaced).

5  REFERENCES - None.
6  PROCEDURE FLOWCHART

The procedure flowchart for this procedure is detailed below:

Start

BMMS Operate by EE-BMPD

Update survey data processed & input to BMMS database OP/PD/2.1

Prepare Needs report EE-BMPD

Prioritised list of bridges require RM, PM & Replacement

Review needs report SE-PDC OK?

Yes

Review needs report ACE-BMW OK?

Yes

Needs report to receive Revenue budget sent to SE-MC

Needs report to receive Development budget sent to SE-PPC

End

A mend

A mend

Link OP/MC/1.2

Link OP/PPC/3.2
1 PURPOSE AND SCOPE

The purpose of this procedure is to describe the steps to be followed in preparing the draft programme and budget for the ADP listed bridge projects (development budget) and bridges/culverts to be maintained under revenue budget, in a particular fiscal year. The steps in this procedure will be limited to the submission of the draft budget for bridges to SE-Planning & Programming and SE-Maintenance Circle. The remaining steps for finalizing the budget will rest with SE-P&P and SE-Maintenance Circle (see OP/PPC/3.2).

2 DEFINITIONS

Annual Development Programme (ADP) – is the operational document of the GoB’s 5-year plan and includes all types of GoB funded and foreign aided projects: both ongoing and newly included. The ADP consists of the main investment, technical assistance and self-financed programmes, sub-divided into the different government sectors. The ADP is published in June each year and is available to the public.

Budget – is the allocation of fund in a particular fiscal year for implementing a project/maintenance work. Expenditure of all ADP projects is made under development budget while expenditure of maintenance works are generally made under revenue budget.

Project Concept Paper (PCP) – is a proposal in a concise form, submitted to the MoC for project approval for inclusion in the Annual Development Programme (ADP). A PCP is required for any investment project. It should include civil works, consulting services (if any), equipment purchase, acquisition of land, manpower etc. It also includes the total estimated cost and a detailed description of the project in a prescribed format.

Project Proforma (PP) – following approval of the PCP, the PP is prepared within a specific period of time. The PP is a more detailed version of the PCP, prepared in a prescribed format.

Bridge Management and Maintenance System (BMMS) – is a database-storing inventory and condition survey data for all bridges and culverts on the RHD road network. It is used in bridge planning, design and management role.

3 RESPONSIBILITIES

Additional Chief Engineer – Bridge Management Wing (ACE-BMW) - reviews the draft budget and ensures is realistic considering the overall fund constraints.
Superintending Engineer- Planning & Data Circle (SE-PDC) - is responsible for managing the whole process of preparing the draft budget within the Planning & Data Circle.

Executive Engineer – Bridge Maintenance Programming Division (EE-BMPD) - is responsible for processing the data from BMMS, PBI, PCP/PP of ongoing/new projects, field and PDs offices, 5-year plan etc, and preparing the draft budget for both development and revenue budgets.

4 METHOD

4.1 PREPARATION OF DEVELOPMENT BUDGET

The EE-BMPD with the assistance of his Sub-Divisional Engineer/Assistant Engineer will collect PCPs/PPs of ongoing and new bridge projects included in the ADP from EE-Planning Division, Planning Programming Circle. He will prepare the annual programme of work including the budget required to implement the work and clearing liabilities. While preparing this he will review the Planning Commission Guidelines in order to identify any new instruction that affect the preparation of ADP.

4.2 PREPARATION OF REVENUE BUDGET

The EE-BMPD will analyse the BMMS database and determine the cost required to maintain the bridges and culverts on RHD road network. He will also obtain additional information for maintenance of bridges and culverts from field offices. He will then with the assistance of his sub-ordinate officers prepare annual work programme including the budget to carry out the work.

4.3 SUBMISSION OF DRAFT BUDGET (DEVELOPMENT & REVENUE)

Upon preparing the annual budget both for development and revenue the EE-BMPD will submit them to SE-PDC for his review.

4.4 REVIEW BY SUPERINTENDING ENGINEER - PLANNING & DATA CIRCLE

The SE-PDC reviews the draft budget. He may ask for additional information or clarification.

When the SE-PDC is satisfied, that the draft budget is realistic and contains all the necessary information, he submits the draft budget to ACE-BMW for review.

4.5 RECOMMENDATION BY THE ADDITIONAL CHIEF ENGINEER - BMW

The Additional Chief Engineer–BMW receives the draft budget and after comprehensive review with SE-PDC he recommends it and returns to SE-PDC with instruction that the final draft budget be
transmitted to SE-P&P Circle (for development budget) and SE-Maintenance Circle (for revenue budget) for onward submission to Chief Engineer, RHD from their ends.

5 REFERENCES

Annual Development Programme (ADP) published by the Planning Commission
Planning Commission Guidelines published by the Planning Commission
BMMS database
PCP/PPs of ongoing and new bridge projects

6 PROCEDURE FLOWCHART

The procedure flowchart for this procedure is detailed in the next page.
Start

- List of National Road
- List of Regional Road
- List of District Road
- List of ADP Projects showing budget for Maintenance Rehabilitation & Construction Work separately

Process & Prepare list of all Category Structure including Cost Estimates (EE-BMPD)

Review the List and Budget by (SE-P&D)

Site Visit by EE-BMPD

Yes

- Recommend to ACE

No

- Site Visit by EE-BMPD

Yes

Review List & Agree with the List & Budget (ACE)

No

Final Draft Budget and the List

Yes

Returns to SE, PDC for Onward Submission to SE, P&P for development Budget & SE Maintenance Circle for Revenue Budget

End

Data from BMMS PBI PCP/PP of on-going/New projects Field & PD’s Offices Last Years Budget Five Years Plan

See OP/PCC/3.2 Budget Process for ADP Projects

OP/PD/2.1 Management of Bridge Database
1 PURPOSE AND SCOPE

The Bridge Management Wing, through liaison with RHD Wings and Field Divisions, has an objective to ensure all bridges are “appropriate maintained to optimise use of funds”.

The aim of maintenance is to ensure that bridges are safe, able to carry the imposed traffic loading and that preventive measures are taken to reduce or eliminate future large-scale maintenance or replacement costs. However this has to be achieved within a limited budget requiring an effective prioritisation of expenditure.

This procedure sets out how the BMMS is used to enable engineering judgement, to be the basis for systematic prioritisation for bridge maintenance and rehabilitation, for all damaged bridges and box or slab culverts on the RHD Network.

2 DEFINITIONS

Bridge Management and Maintenance System (BMMS) – is a database established containing condition survey of all bridges and culverts of RHD road network and is used in bridge planning, design and management role. The system has provision for prioritising maintenance and replacement needs based on a number of set parameters.¹

Routine Maintenance (RM) – works of bridges & culverts include regular cleaning of the structure, minor repair of approaches, clearing small obstructions in the channel, replacing damaged guide posts, railing, signboards, etc.

Periodic Maintenance (PM) – works of bridges and culverts will include (1) major repair and protective works up to a value set by the CE, RHD annually and (2) replacement works up to a value set by the CE annually. These works will generally be carried out through Revenue Budget.

Rehabilitation – (replacement) works will include any work exceeding the set value mentioned in (1) and (2) above.

The following definitions of Probability, Consequence and Risk of failure are for the purposes of this procedure:

Probability of Failure – is a number derived from various factors indicating the susceptibility of total structural failure, relative to other RHD structures assessed in the same manner- how likely failure is.

¹ This prioritization facility will be integrated within facility BMMS during 2004/2005
Consequence of Failure - is a number derived from various weighted factors indicating the overall consequence of total structural failure, relative to other RHD structures assessed in the same manner—how bad failure would be for Bangladesh.

Risk – is defined as Probability of Failure multiplied by Consequences of failure.

Weighting - is the relative sensitivity of different factors (% variation). Factors with a higher weighting will have greater influence on the Risk calculated.

3 RESPONSIBILITIES

Additional Chief Engineer - Bridge Management Wing (ACE-BMW) – Agrees the factors to be used in both Probability of Failure and Consequences of Failure for systematic prioritising of bridge and culvert maintenance and bridge replacement.

Superintending Engineer - Planning & Data Circle (SE-PDC) – Presents to the ACE-BMW proposals for factors to be used to calculate the Probability of Failure and Consequences of Failure and the Weightings used in assessing Risk.

Executive Engineer - Bridge Maintenance Programming Division (EE-BMPD) – Based on the various factors and weightings, runs a pilot study and (in consultation with the pilot division) based on prioritisation, recommends any revision to the factors and weightings to SE-PDC that he believes appropriate.

4 METHOD

4.1 PRIORITISED SYSTEM

To define and quantify Risk it is necessary to quantify Probability of Failure, Consequence of Failure and the Weighting between the various consequences of failure.

4.2 PROBABILITY OF FAILURE

The probability of failure of a structure is a function of a number of factors. Such factors include:

- used Condition of the structure
- Age and live loads imposed on the structure
- Materials in construction
- Exposure to saline attack, common in coastal areas (some materials)
There may be more factors that could be considered. However, the above are readily available, and adequate for the purposes of prioritising.

As these factors are independently related to the probability of failure, they have been multiplied together to give an overall probability of failure. The weighting of each has been determined by basing the variation of each factor by its likely effect in real terms (e.g. an old heavily loaded bridge is move likely to fail than a lightly loaded new bridge).

The factors are included on the database shall be reviewed once a year prior to prioritisation and agreed.

### 4.3 Consequences of Failure

The Overall Consequences of Failure is considered as the sum of a number of different consequences:

- Direct Human impact – death or injury as a result of structure failure
- Effect on Local Access (in direct human impact)
- Effect on National Road Network (economic impact of diversion)
- Replacement cost (to RHD)
- Effect on access to areas prone to disaster (i.e. there is a need to put some priority on reliable access from the main centres to areas prone to cyclone, flood or earthquake disaster) - disaster management impact
- Effect on the poor – a factor should be included to recognise the increased vulnerability of the poorer areas.

The relative weighting given to these different factors is sensitive. The range of values used for each factor should first be agreed, and then the weighting between these agreed. Factors considered not important should be given a value of 1.0 throughout.

### 4.4 Input into BMMS

The agreed factors and weightings should be set up on BMMS and tested using data for a pilot division. The results should then be checked to see if they are reasonable: represent a good prioritisation based on engineering judgement.

This will be discussed between the EE-BMPD and with the Field Division and if necessary modifications to the factors and weightings made. Once this is completed and agreed with the SE-PDC and approved by the ACE-BMW these factors and weightings shall be used throughout RHD as the basis of prioritising bridge maintenance and bridge replacement. In the case of Bridge Replacement under ADP, the priority lists will require a more detail review and economic assessment.
Based on this prioritisation the Annual RHD Bridge Maintenance and Rehabilitation Needs Report shall be prepared OP/PD/3.1.

4.5 **NEEDS REPORT FINALISED**

This prioritises the “long-list” (not grouped by division or linked to road priorities) of the annual bridge maintenance and rehabilitation needs report. This should not be used to prioritise maintenance verses replacement expenditure. This “long-list” is then split into two lists: replacement and repair lists. The top preliminary items on each list should be considered first.

These lists give a preliminary prioritisation, not the final basis for prioritising bridge replacement. Final prioritisation needs to consider bridges and roads together (See PD/3.1). After this, inclusion of bridge replacement in either the ADP or the periodic maintenance budgets will need a separate economic feasibility/appraisal study.

5 **REFERENCES** - None.

6 **PROCEDURE FLOWCHART**

The procedure flowchart for this procedure is detailed in the next page.
SE-PDC discusses and agrees with ACE-BMW pilot factors and weightings to be used in "Probability of Failure" and "Consequence of Failure"

EE-PD reviews with pilot divisions. Is the prioritisation sensible?

EE-PD Apply the proposed factors to Bridges on pilot divisions

Review and adjust weightings (EE-PD)

Yes

Reports findings (EE-PD)

Review by SE-PDC and ACE-BMW Acceptable?

No

Adjust weightings

Yes

Agreement on all factors and weighting

End

Bridge Maintenance and Bridge Replacement needs report (use agreed factors and weightings in Prioritising)

See also OP/PD/3.1
1 PURPOSE AND SCOPE

Bridges and other major structures are expensive investments in the infrastructure of the nation. Inadequate design can lead to expensive changes during construction and a potential major loss of investment during the life of the structure. To minimise the risk of poor design this Technical Approval operational procedure has been adopted. The procedure covers all bridges, culverts and other structures including gantries and large signboards.

2 DEFINITIONS

Final Engineering Report – The report includes:

1. The design brief,
2. Reference documents including surveys, topographical, soils and hydrological and hydrographical.
3. Any necessary assumptions during the design.
4. The design calculations,
5. Proposed maintenance requirements.

Designs – are Final Engineering Report, detail drawings, and additional clause to the Technical Specification (Volume 3 of NCP) to be included in the Special Technical Specification in the Contract Documents. All designs drawings and specification to be completed to a standard that they can be constructed without modification.

Design Engineer – any engineer with structural engineering experience who in the opinion of the EE-BD in consultation with SE-Bridge Design Circle is sufficiently competent to carry out the particular design required.

Bridge Design Team – In the case of RHD the Division carrying out the design. In the case of a Consultant the team headed by a Senior Structural Engineer carrying out the design.

Complex Bridge or structure – a bridge or structure, whose design, in the opinion of the Superintending Engineer-Bridge Design merits specialist attention. Examples of this might be construction over fast flowing rivers, railways, designs in dense urban areas or structures of specialist designs. This list of examples is not exhaustive.

TA Category A: Structure Less than 150m total span with individual spans not more than 43m and not a Complex Bridge or structure.
TA Category B: Structure of 150m or more total span with individual spans not more than 43m or a Complex Bridge or structure

TA Category C: Structure containing at least one individual span greater than 43m but less than 50m

TA Category D: Structure containing at least one individual span of 50m or more.

3 RESPONSIBILITIES

Additional Chief Engineer – Bridge Management Wing – Approval of in-house Design and acceptance of Consultants Design.

Superintending Engineer – Bridge Design Circle

1. Decides on whether the design is of a Complex Bridge or Structure,
2. Ensures that Technical Approval procedures are adhered to for all bridge and other structures design including structural maintenance,
3. Ensure that provision is made for designs requiring Technical Approval checks through outsourcing,
4. Reviews designs and when satisfied recommends for approval to ACE-Bridge Management Wing.

Executive Engineer – Bridge Design Divisions

1. Ensure the quality of work undertaken by his staff and that Designs are properly prepared and collated for the checker.
2. Carry out checks on Designs prepared by his staff on structures after any necessary amendment sign the Design as Checked.
3. Carry out checks as instructed by the Superintending Engineer-Bridge Design Circle and after any necessary amendment sign the Design as Checked,
4. Assist the Superintending Engineer as necessary in his duties.
4 METHOD

The flowchart sets out procedure to be adopted. The tasks set out in the flowchart are more fully explained below.

4.1 COLLATE DOCUMENTS

The Designer must collate all relevant documents used or prepared in the design of the bridge or structure. These must include the following (most of which would be included in the Final Engineering Report):

- Design Brief,
- Reason for choice of structure, if no specific type of structure stated in brief,
- Soils investigation report
- Accepted soil interpretation data with design parameters clearly set out and accepted,
- Design calculations – to ASAHTO supplemented by reference to the RHD’s Bridge Designer’s handbook and its supplement.
- Design drawings – sufficient detail for construction
- Any special specifications clauses necessary to achieve the parameters used in the design,
- Requirement of Utility companies
- Basis of Earthquake design parameters
- Bridge loading
- Proximity of adjacent structures
- Notes for the Engineers Representative where special attention is necessary in the supervision of the Works,
- Definitive list of the final design parameters that may be used by the Contractor in preparing his method statement.

Additional items might include:

- Construction method
- Details of the bridge to be replaced and reason for failure
- Special requirements of the Bangladesh Inland Water Transport Authority,
- Special Requirements of Bangladesh Rail Authority,
- Special environmental issues and reports
- Landscaping reports as they affect
- Hydrological, and Hydrographical reports
Neither of the above lists is exhaustive – the designer and checker must be satisfied that all relevant documentation is included with the Design.

4.2 INDEPENDENT CHECKING

Checking means to carry out all of the following:

1. Check the design meets the requirements of the brief.

2. A full study of all relevant documents, ensuring there is sufficient information to undertake the design.

3. A check on the overall concept of the design and whether all information has been taken into consideration.

4. Check that structures are consistent with the Bridge Design Standard. The Bridge Design Handbook and its supplement should be used appropriately,

5. Check Validation and verification of any computer programme or Spreadsheet template, used in the design, has been carried out to the checkers satisfaction,

6. A full check of all calculations – in some cases this may be achieved by independent calculations,

7. A full check of the drawings.

8. A full check as to whether all requirements of the design are included either in the Technical Specification (Volume 3 of NCP) or in the additional Specification clauses identified in the design.

9. Review design parameters that may be made available to the Contractor and any advisory notes given to the Engineer’s Representative.

10. Once all the above has been checked amended and re-checked to the satisfaction of the checker, the checker will sign the designs including the drawings and calculations.

11. The checked documents should be submitted to the Superintending Engineer who shall accept them with a recommendation for approval to the Additional Chief Engineer for approval or require changes to be carried out. If changes are carried out they must follow the checking procedure described above.

4.3 APPROVAL/ACCEPTANCE

In the case of designs carried out by RHD staff the ACE BMW approves the design; in the case of designs carried out by consultants he accepts the designs as conforming to RHD standards.
5 REFERENCES

RHD Bridge Design Standards

AASHTO version as specified in RHD Bridge Design Standards

Indian Road Conference – IRC Bridge Design Standards

RHD’s Bridge Designer’s Handbook and its supplement.

6 PROCEDURE FLOWCHART

The procedure flowchart for this procedure is detailed in the next page.
**RHD Operational Procedure – Bridge Management Wing**

**OP/BD/1.1 - Technical Approval**

**Bridge Design Circle**

### TA Category A
- Independent Check by EE-BD or above (i.e. EE-BD does not check his own work - checker resolves if possible technical issues with designer.
- If designed by Consultant an independent check by a Bridge Engineer other than the designer.

- Report to SE-BDC

**Designer amends**

- No: SE-BDC Recommend/Approved/Acceptance* to ACE-BMW
  - Yes: End

- Yes: SE-BDC Recommend/Approved/Acceptance* to ACE-BMW
  - No: ACE-BMW Accepts/Approves* Design
    - Yes: End
    - No: SE-BDC Recommend to ACE-BMW

### TA Category B
- Independent Check by EE-BD or above, in a separate team from the design team.
- If designed by Consultant an independent check by a Bridge Engineer from a team other than the design team.
- Checker resolves if possible technical issues with designer.

- Report and formal presentation to SE-BDC

**Designer amends**

- No: SE-BDC Recommend/Approved/Acceptance* to ACE-BMW
  - Yes: End

- Yes: SE-BDC Recommend/Approved/Acceptance* to ACE-BMW
  - No: ACE-BMW Accepts/Approves* Design
    - Yes: End
    - No: SE-BDC Recommend to ACE-BMW

### TA Category C
- Independent Check by Consultant Bridge Engineer from team other than the design team.
- Report and formal presentation to SE-BDC

**Designer amends**

- No: SE-BDC Recommend to ACE-BMW
  - Yes: End

- Yes: SE-BDC Recommend to ACE-BMW
  - No: ACE-BMW Accepts Design
    - Yes: End
    - No: SE-BDC Recommend to ACE-BMW

### TA Category D
- Independent third party check by another firm of consultants totally independent and with no legal or family attachments to the design consultant.

- Report and formal presentation to SE-BDC

**Designer amends**

- No: SE-BDC Recommend to ACE-BMW
  - Yes: End

- Yes: SE-BDC Recommend to ACE-BMW
  - No: ACE-BMW Accepts Design
    - Yes: End
    - No: SE-BDC Recommend to ACE-BMW

### Notes:
- *Approves if RHD design
- *Accepts if Consultant's Design

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**Issue 1**

**December 2003**

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1 PURPOSE AND SCOPE

This procedure covers the general management and procurement of IT in the Bridge Design Circle. Computer software if selected and managed properly can be an asset to a design team. If selected and managed badly can lead to catastrophic error and or poor inefficient design. The use of ad hoc spreadsheets can be very useful and effective but if not verified and validated can be the source of major error and may lead to the accusation of a negligent approach to design. The procedures do not deal with bespoke software, as there is believed to be sufficient design software on the market without the need to have programmes written specially for the Circle.

2 DEFINITIONS

**Software** – computer programmes.

**Bespoke software** – Computer software specially written to meet of RHD Bridge Design Circle.

**Spreadsheets Templates** – a master spreadsheet with inbuilt cell calculations used in design process where no other check or verification is carried out.

**Local hard drive** – In relation to this procedure refers to the any hard drive on individual computers in the Circle.

**The Network** – is the RHD computer network.

3 RESPONSIBILITIES

**Additional Chief Engineer – Bridge Management Wing** – approves or rejects the justification for new IT software for submission to the Chief Engineer.

**Superintending Engineer – Bridge Design Circle** – Has an overview role in determining the appropriate use of computer software in the Circle. In the case of proposed software procurement reviews in principle and in detail the justification and approve or reject for onward transmission to the Additional Chief Engineer Bridge Management Wing. Approves the use of Spreadsheet Templates for use in design.

**Executive Engineer – Bridge Design Divisions** – Ensures that the software in the Division is being used appropriately and efficiently for each design under his control. In the case of proposed procurement identifies, compares and justifies and during the procurement process verifies, validates and judges user friendliness of software proposals. Likewise with Spreadsheets Templates used by the Division he must ensure that they are justified, validated and verified, archived and secured.
4  METHOD

4.1  CARE IN USE OF COMPUTER SOFTWARE IN DESIGN

Approval for the use of computer software by the Circle does not relieve the designer or the checker from the responsibility of ensuring that the software is appropriate for use in a particular design situation. Therefore the designer must clearly demonstrate that validity of using any software in his design. This validly check may be short on some of the regularly used software, but must be recorded that it has been carried out in the formal calculations for a design.

Computer software often produces clear and apparently accurate results and there can be a tendency to accept these results without question. First the input data must be meticulously checked both in quantity and units. It is essential that the user and checker reviews the end results by carrying out a “reality check” i.e. are the results as anticipated? Are the results reasonable with analysis carried out on other structures? It is essential that this reality check be carried out, as there have been many classic failures as a result of “believing” the computer printout.

4.2  APPROVAL OF SPREADSHEETS TEMPLATES FOR USE IN THE CIRCLE

Any Ad hoc Spreadsheet containing any manipulation or in-built calculation used in design should be considered as a template.

Only approved spreadsheets templates shall be used for bridge design. Unapproved spreadsheets may be used in the Circle for other purposes but strictly prohibited in the actual design of a structure.

Paragraph 6.1 shows the procedure to be adopted to authorise a spreadsheet. An approved spreadsheet must be in the form of a template with all cells except input cells locked and sheet(s) protected. Input cells must be clearly identifies. Any limitations on the spreadsheet use must be clearly identified. Each Template must clearly identify its name, version and last release date both on the screen and on all printout sheets.

4.3  PROCUREMENT OF SPECIALIST IT SOFTWARE

The procurement for IT software differs from other procurements in RHD as there are many programmes on the market which may not be cost affective for RHD or worse inappropriate for designs being carried out by the Circle, public safety and security of the investment in a structure depend on the correctness of the design. In order to ensure that appropriate software is procured its use must be properly justified prior to procurement and during procurement process the software must be subject to rigorous validity and validation checks. In addition it must be simple to use with the avoidance of
ambiguity in input and output. The additions to RHD procurement procedures are given in flowchart in paragraph 6.2.

4.4 STORAGE OF DESIGN FILES AND DRAWINGS

All computer files must be stored on the Network. From time to time it may be necessary to temporarily bring files to the Local Drive for manipulation, in which case they must be transferred by cut and paste rather than copy and paste. (This prevents 2 people updating a file at the same time). At the close of work each day all files copied onto the Local drive must be Cut and Pasted onto the Network. No duplicate file shall be kept on the Local Drive. The need for this ruling is that the Network has a strict back-up procedure, Local Drives do not.(Never assume that you are the only person wishing to amend any file).

On completion of a design all files must be properly archived on the Network and at least 2 copy CDs made storing the files in a logical manner with a clear marking of Final Versions.

5 REFERENCES - None.

6 PROCEDURE FLOWCHART

The procedure flowcharts for this procedure are detailed in the next pages.
6.1 **Approval of Spreadsheets Templates**

Start

1. **Justification Note**
   - EE Review need and carries out manage check

2. **OK**
   - Yes
   - **Spreadsheet Template**
   - Prepared Spreadsheet Template
   - **Verify and Validate against manual calculations**
   - Yes
   - EE Recommends acceptance to SE
   - SE approves Spreadsheet Template for use
   - Approved Spreadsheet Template must be saved on the network and included in backup procedures. In addition a CD shall be kept and secured in the Circle along with all backup calculations and checks

3. **Justification of Need**
   - No
   - **Reject**
   - No
   - Amend

End
6.2 PROCUREMENT OF SPECIALIST IT SOFTWARE

Start

List Available Software

Check Availability EE-BD

Identify need

Obtain Specifications and cost

Compare EE-BD

need met reasonable cost

Prepare Justification Report EE-BD

Justification Report

Amend Justification Report EE BD

Approve in Principle SE-BD

Approve in detail SE-BD

Approve by ACE with recommendation

Obtain in accordance with RHD procurement procedures OP/PC/2.1&2.4 with the following checks:
Verification: Does it do what it says it does?
Validations: is it appropriate for the Bridge Design Circles needs?
User Friendly: is the programme simple to use and is the output clearly understandable?

End
1 PURPOSE AND SCOPE

Bridges are the most expensive individual assets on a road network. Bridges must be designed to last many years with a minimum of maintenance. Incorrect design may lead to inappropriate structures, high maintenance cost and shorter than planned life. The following sets out the procedure to minimise error or bad judgement that may result in poor bridge designs being constructed.

This procedure is for the in-house design of bridges and other structures to be carried out by the Bridge Design Divisions.

2 DEFINITIONS

**Final Engineering Design Report** – The report includes:

1. The design brief,
2. Reference documents including surveys, topographical, soils and hydrological and hydrographical.
3. Any necessary assumptions during the design.
4. The design calculations,
5. Proposed maintenance requirements.

**Designs** – are Final Engineering Report, detail drawings, and additional clause to the Technical Specification (Volume 3 of NCP) to be included in the Special Technical Specification in the Contract Documents. All designs drawings and specification to be completed to a standard that they can be constructed without modification.

**Design Engineer** – any engineer with structural engineering experience who in the opinion of the EE-BD in consultation with SE-Bridge Design Circle is sufficiently competent to carry out the particular design required.

**Site Specific Data** – These *must include* soil survey, soils interpretative report, topographical survey, traffic flow motorised and non-motorised, environmental reports as required by OP/SE/3.1.

In addition these *must include as appropriate*, condition survey of any adjacent structure, hydrological survey, hydrographical survey, Resettlement Plan.

*(If any of this information is not immediately available arrangements must be made to obtain the surveys/reports before agreement in principle is given)*
Special Requirements of – These are the requirements of Local Authorities, Bangladesh Railway Authority, Bangladesh Inland Water Transport Authority, Civil Aviation Authority Utility Companies, any other concerned statutory authority or body that may be affected by the proposed works. RHD Environmental standards in accordance with OP/SE/3.4.


Constructability – The ability to construct the works within the site restraints, depth of excavation next to other structures or existing roads, includes provision of workspace, dealing with existing traffic during construction, safety of the public and the work force.

3 RESPONSIBILITIES

Additional Chief Engineer – Bridge Management Wing – approves the Design.

Superintending Engineer – Bridge Design Circle

1. Decides on whether the design is of a Complex Bridge or Structure.
2. Accept and sign off the Design and recommend approval to ACE-Bridge Management Wing.

Executive Engineer – Bridge Design Divisions

1. Decide in consultation with SE-Bridge Design Circle the suitability of his staff to perform the duty of Design Engineer for a specific design,
2. Take on the role of Design Engineer if directed by the Superintending Engineer-Bridge Design Circle,
3. Ensure the quality of work undertaken by his staff and that Designs are properly prepared and collated for the checker,
4. Advise the Design Engineer,
5. Carry out checks on Designs prepared by his staff on structures less than 150 metre total span and not complex. After any necessary amendment sign off the Design as Checked.
6. Carry out checks as instructed by the Superintending Engineer-Bridge Design Circle and after any necessary amendment sign off the Design as Checked.
7. Ensure that all documents are properly stored and archived.

4 METHOD

At the outset of the design it is essential that the base data is sufficiently robust for a reliable design and construction leading to a bridge with a reasonable chance of achieving its design life. It is important that the Designer understands the site, flood levels, scour potential, vulnerability to river course change, potential construction restrictions and the affect on traffic during construction.

The design should take into account the need to preserve the bridge for the future and ensure if it is constructed over water that during periods of floodwater is directed under the bridge. Floodwater brings down much debris, designers should consider this when determining clearance and the ability of the bridge to accept later loads imposed during floods.

Earthquake design is also an important feature of design in Bangladesh. It is important that the Bridge Design Circle keeps up to date on current design and detailing (particularly reinforcement) related to earthquakes protection and incorporates them into their designs.

During the design the Designer shall be aware of the NCP Standard Technical Specification and where necessary develop Special Specification Clauses to ensure the structure is constructed as the designed.

The use of computer programmes and spreadsheets in design is given in OP/BD/1.2.

Any standard bridge designs shall be accompanied by full design calculations and only authorised standards approved by the Superintending Engineer Bridge Design Circle will be acceptable.

After Technical Approval to OP/BD/1.1 all documents shall be properly archived.

5 REFERENCES - See Paragraph 2 above.

6 PROCEDURE FLOWCHART

The procedure flowchart for this procedure is detailed in the next page.
**RHD Operational Procedure – Bridge Management Wing**

**OP/BD/2.1 - In-house Bridge design**

**Bridge Design Circle - Bridge Design Divisions**

**Approved:**

- **Start**
  - Collected by EE-BD
  - SE-BD arranges with SE-RD&S Circle to carry out road design, preparation designs and the road element of the Final Engineering Design Report
  - EE-BD checks Adequacy of Site Data OK?
  - Yes
    - EE-BD and Design Engineer initial site inspection to identify any restrictions in construction and to assist on choice of structure type and spans
    - Prepare draft layouts of structure in consultation with EE-BD considering all special requirements, constructability and comparative costs
    - Initial Road layout from Road Design & Safety Circle
    - Review by Road Safety Division OK?
    - Yes
      - Review with EE and SE-BD the options and choose which should continue to detail design-agree detail design approach
      - Lay out and design approach Approve in principle by SE OK?
      - Yes
        - Design Engineer re-check against plan profile and cross section road alignments, and special requirements including consultations with Utility companies and appropriate authorities any rerouting of services both permanent and temporary and consultation with the local Zone, Circle and Division as necessary and ensure requirements can be met (also noting approximate Utility costs)
        - Final Engineering Design Report Designs
        - Design Engineer prepares Design to BMW Standards in consultation with EE and at all times ensuring Constructability
      - No
        - Amend
  - No
    - Amend

**Notes:**

Word in Bold Type on this page are defined in serial 2 of this procedure.

During reviewing & preparing Design Engineer should make a number of site visits reconfirming both design and method of construction. A visit both in the monsoon season and during the dryer months would add to the Design Engineers knowledge of the site.

Each visit should be accompanied by a site visit note.
1 PURPOSE AND SCOPE

Bridges are the most expensive individual assets on a road network. Bridges must be designed to last many years with a minimum of maintenance. Incorrect design may lead to inappropriate structures, high maintenance cost and shorter than planned life. The following sets out the procedure to minimise error or bad judgement that may result in poor bridge designs being constructed.

The role of the Bridge Design Circle when an outside party, normally a consultant, carries out the design is to ensure that the best structural form is selected for the purpose, the designs are robust and fully comply with RHD Standards. The work will normally be carried out under a Project Director with whom the Bridge Design Circle must assist as technical experts.

This procedure sets out the role of the Bridge Design Circle when designs are prepared externally; normally by consultants both on GOB and Foreign aided projects.

2 DEFINITIONS

**Final Engineering Design Report** – The report includes:

1. The design brief,
2. Reference documents including surveys, topographical, soils and hydrological and hydrographical.
3. Any necessary assumptions during the design.
4. The design calculations,
5. Proposed maintenance requirements.

**Designs** – are Final Engineering Report, detail drawings, and additional clause to the Technical Specification (Volume 3 of NCP) to be included in the Special Technical Specification in the Contract Documents. All designs drawings and specification to be completed to a standard that they can be constructed without modification.

**Project Director (PD)** – for the purposes of this procedure is the person in charge of the project.(whether formally appointed as the Project Director or not).

**Site Specific Data** – These must include soil survey, soils interpretative report, topographical survey, traffic flow motorised and non-motorised, Environmental Impact Assessment OP/SE/3.1(required if new build or rehabilitation).

In addition these must include as appropriate, condition survey of any adjacent structure, hydrological survey, hydrographical survey, Resettlement Plan.
(If any of this information is not immediately available arrangements must be made to obtain the surveys/reports before agreement in principle is given).

**Special Requirements** – These are the requirements of Local Authorities, Bangladesh Railway Authority, Bangladesh Inland Water Transport Authority, Civil Aviation Authority Utility Companies, any other concerned statutory authority or body that may be affected by the proposed works.


**Constructability** – The ability to construct the works within the site restraints, depth of excavation next to other structures or existing roads, includes provision of workspace, dealing with existing traffic during construction, safety of the public and the work force.

### 3 RESPONSIBILITIES

**Additional Chief Engineer – Bridge Management Wing** – accept the Design on behalf of RHD.

**Project Director** – Direct the project and manage the consultant.

**Superintending Engineer – Design Circle** –

1. Technical advisor of PD.
2. Review base data and comment on designs from outside and when satisfied recommend acceptance of designs,
3. Undertake duties described in OP/BD/1.1.

**Executive Engineer - Bridge Design Divisions**

1. Assist SE BD as necessary.
2. At the end of the commission ensure that all documents are properly stored and archived.

### 4 METHOD

#### 4.1 PREPARATION OF TOR FOR CONSULTANTS

Prior to the preparation of the Terms of Reference (TOR) for the consultancy services to design a bridge the PD reviews and agrees with the SE Bridge Design Circle the extent of any necessary survey data needed for a robust design. The PD then includes this in the Terms of Reference or arranges for other means of collection of data. Designs should be carried out to RHD Bridge Standards. The PD in preparation of the TOR should include any requirements for services necessary to comply with BMW procedures particularly compliance with The Technical Approval procedure OP/BD/1.1. The PD should
where Technical Approval requires a 3rd Party checker procure the services of an appropriate consultant to undertake this check.

4.2 **SITE VISIT REVIEWS BY SE BRIDGE DESIGN CIRCLE**

It is suggested that the SE-Bridge Design Circle, or, if he is not able, a nominee should view the site and record the site visit with a note for the file with, if possible some photographs. The purpose of the visit is to form a first hand opinion on constructability, dealing with traffic during construction and aesthetics. The SE-Bridge Design Circle may wish to make a number of visits to site as the design progresses enabling informed, site-specific advice to the PD.

4.3 **ACCEPTANCE OF BASE INFORMATION FOR DESIGN**

In the design preparation the consultant should present the base information on which he proposes to carry out the design. Should the consultant request additional surveys, over and above that already available he must justify to the PD and his advisor SE-Bridge design Circle. The PD should then approve or disapprove and take or instruct any necessary action.

4.4 **BRIDGE TYPE OPTIONS**

On completion of preliminary bridge type options the consultant shall report and present each option comparing, aesthetic form, how any Special requirements will be met, constructability, method of dealing with traffic during construction, construction costs, whole life costing and any relevant information necessary to choose an option. In his presentation the consultant should also highlight any risks associated with the design. The PD and SE-Bridge Design Circle will review the report and attend the presentation. Once satisfied with the report and presentation the PD and SE-Bridge Design Circle shall decide which option should be taken forward to detail design.

4.5 **APPROVAL OF BRIDGE TYPE AND ACCEPTANCE OF DESIGN**

Following completion of the design and Technical Approval Procedures the SE-Bridge Design Circle recommends APPROVAL of the type of the structure and recommends ACCEPTANCE of the design to ACE-Bridge Management Wing. This APPROVAL and ACCEPTANCE is submitted to the PD.

4.6 **ARCHIVING**

When designs are complete all design documents, including the Final Engineering Design Report, drawings (both hard copy and on compact disc) etc. must be archived by the Bridge design Circle for possible future reference.
5 REFERENCES

OP/BD/1.1   Technical Approval
OP/SE/3.2   EIA Report

6 PROCEDURE FLOWCHART

The procedure flowchart for this procedure is detailed in the next page.
Start

PD with SE decide on the extent of any additional surveys

PD makes provision. If necessary for 3rd party checking

Relevant Procurement procedure

Consultants demonstrate sufficient information on which to base their design

pd/SE Agree

PD/SE Agree

Consultants submits his Bridge Options Report and Presents with Recommendation

SE reviews options with PD

Option Chosen by PD and SE jointly

Design by Consultant

Approved bridge form and accepted design

On recommendation from SE, the ACE-BMW accepts the design that has been prepared to RHD standards and has been shown to have undergone full TA procedures and is a form acceptable to RHD

Final Design Report, the Design and all Drawings submitted to BD Circle by PD and are archived by EE-BD

End

Notes:
- SE on this chart mean SE - Bridge Design Circle
1 PURPOSE AND SCOPE

Maintenance is essential to minimise the whole life cost of a structure. To make best use of limited funds the Bridge Design Circle produces and maintains a Bridge Maintenance Manual covering all bridges and culverts on the Network.

As part of the design and construction process all new bridges have their own Maintenance Plan.

This procedure sets out the process for producing and maintaining a Bridge Maintenance Manual and how guidelines for preparing Maintenance Plans for specific structures.

2 DEFINITIONS

**Bridge Maintenance Manual** – a document produced and maintained by the Bridge Management Wing to assist those in the field on best practices in bridge maintenance.

**Bridge Maintenance Plan** – a document initiated at the time of design and updated after completion, setting out an inspection and maintenance regime necessary to maximise whole life costing of a structure.

3 RESPONSIBILITIES

**Additional Chief Engineer – Bridge Management Wing** – approves the Maintenance Manual.

**Superintending Engineer – Bridge Design Circle**

1. Recommends Maintenance Manual for approval.

2. Carries out an annual Review of the Maintenance Manual and amends as necessary.

3. Ensures that there is a Maintenance Plan for all new structures.


**Executive Engineer – Bridge Design Divisions**

1. Selected EE prepares Maintenance Manual in consultation with other EEs in the Circle and EEs from the BMW and as necessary from Field Divisions.

2. Assists the SE in the Annual Review.
4 METHOD

4.1 BRIDGE MAINTENANCE MANUALS

The Superintending Engineer allocates one of his EE’s to lead a Team to prepare a Bridge Maintenance Manual. The team should include experienced representatives from the other Circles in the Wing and, if appropriate, some representatives from the Field.

A clear, full definition of Routine and Periodic Maintenance for bridgework should be identified in this document. Much routine maintenance is preventative maintenance and if carried out early can result in major cost savings – the manual will clearly identify this with examples of preventative maintenance work. This will be instructive to those in the Field on how to inspect and carry out effective cleaning of key elements of each structure, preventative measures to be taken and repair. The descriptions should include materials, equipment and safety measures necessary to protect both the public and the workforce.

On issues of safety the document will give a timescale from identification to completion for temporary repair to ensure safety. For permanent repair it should give guidelines on timescales for repair. (It is appreciated that the latter may be dependent on budget.)

Once the selected EE has prepared the Bridge Maintenance Manual he shall present it to the Superintending Engineer for review, who will recommend it for formal approval from the ACE-BMW. Once approved, the maintenance manual will be registered as a BMW standard and sent to all Divisions for implementation and feedback.

Annually thereafter the document will be reviewed by the Superintending Engineer and his EEs based on feedback and monitoring by the Bridge Construction & Maintenance Circle.

4.2 BRIDGE MAINTENANCE PLAN

These documents are specific to a structure, or structure type and should be prepared at the design stage and updated on Completion of the Works. These give specific guidance for bridge inspection, including detailing what should be inspected/monitored and frequency. These documents will include details of bearings, joints and hinges, and their tolerance for movement. They must be copied to the Field Division and a master set registered and kept by the Bridge Design Circle for reference.

5. REFERENCES

RHD Bridge Maintenance Manual (to be developed).

6. PROCEDURE FLOWCHART - None.
1 PURPOSE AND SCOPE

This procedure describes how the approved design drawings, design calculations and as-built drawings of all structures on RHD Road Network are filed and archived by the Bridge Design Divisions for possible future reference. These drawings may be required for major repair, rehabilitation and protection works of structures.

2 DEFINITIONS

Drawings and Calculations – will include all items included in the approved Final Engineering Report (see OP/BD/1.1).

As-Built Drawings – are the drawings prepared by the contractor after completion of construction, incorporating all the changes made during construction, and checked and approved by “Engineer” to the contract (see OP/BCM/2.3).

Filing – is storing where easily accessible for on-going work & correspondence.

Archiving – is registering, labelling and storing items for future reference.

3 RESPONSIBILITIES

Superintending Engineer – Bridge Design Circle (SE-BDC) – ensures that proper facilities are provided for archiving drawings and calculations.

Executive Engineer – Bridge Design Divisions (EE-BD) – responsible for overall management of archiving all drawings and calculations through his subordinate officers.

Superintending Engineer – Bridge Construction & Maintenance Circle and Field Circles – responsible for submission of as-built drawings to Bridge Design Divisions for archiving.

4 METHOD

4.1 FILING

All calculations and drawings completed for a project should be numbered and filed sequentially to ease cross-reference. This will generally include the ID No. for the bridge/culvert structure being designed. When files are achieved this number is used in the archive register and to label the storage containing drawings/calculations.
4.2 ARCHIVING

The Bridge Design Circle will establish one archiving filing system and maintain archiving register of all the structures either designed or involved in the design process by either Bridge Design Division. Once the Final Engineering Report of a structure receives technical approval, the EE-BD will put ID No., name of zone, name of road, name of bridge on each drawing and calculation and enter in the Archiving Register. The as-built drawings received from Bridge Construction & Maintenance Division and field divisions will also be entered in the Archiving Register in the same way. The EE- BD will then ensure that both the approved and as-built drawings are archived together in the store properly labelled and indexed. (The method of storage (e.g. boxes or large files) should be numbered and stored sequentially. The number of the box each drawing/calculation is stored in should be entered in the register. The contents of each box (file should be listed on its outside & front (top).

Drawings and calculations should be stored until the structure is replaced. For archiving beyond seven years after the construction works, other methods of archiving may be considered.

5 REFERENCES - None.

6 PROCEDURE FLOWCHART

The procedure flowchart for this procedure is detailed in the next page.
Start

Ensure all drawings/calculations use ID No. (e.g. Bridge No.) and are labelled & filled sequentially (EEs-BD)

Establish Bridge Project Archiving filling system (EEs-BD)

Check/Add ID No. zones, road name, bridge name is on all drawings and calculations (SDE-BD/AE-BD)

Put drawing/calculations into archive register and storage. Make sure storage & register cross reference (SDE-BD/AE-BD)

Archive the drawings & calculation together in a safe store clearly labelled & indexed (SAE-BD)

End

Filling System Established and used

Archive Register established

Approved As-built drawings for each bridge project

Approved drawings & calculations for each bridge projects
1 PURPOSE AND SCOPE

The purpose of the Bridge Construction & Maintenance Circle is to improve construction of bridges and culverts. In order for this to be achieved contract documentation and specifications need to be kept up-to-date and supported by good construction and maintenance practice, and conform to current design criteria. Feedback from the field and through monitoring (OP/BCM/2.1) may suggest a variety of improvements.

2 DEFINITIONS


Special Specification - A special specification related to specific contracts.

Monitoring Team (MT) - Experts selected and headed by an Executive Engineer Bridge Construction and Management. It may include, as necessary, experts from outside the Division.

Engineer’s Representative (ER) Report - A report made on a monthly basis by the ER at the same time as the Monthly Certificate giving a brief report of progress, any problems encountered and how they have been dealt with. It should also indicate potential difficulties that need to be monitored or on which technical assistance may be necessary. It should also include an assessment of the progress against the Contractual programme.

Monitoring Report - A report prepared by the MT, submitted to the Superintending Engineer-Bridge Construction & Maintenance Circle, to review and take any required action for improvement in construction and maintenance of bridges and culverts.

Final Engineering Report - The report includes:

1. The design brief,
2. Reference documents including surveys, topographical, soils and hydrological and hydrographical.
3. Any necessary assumptions during the design.
4. The design calculations,
5. Proposed maintenance requirements.

Final Handover Report - The report prepared by the Engineer to the Contract prior to the handover by the Contractor to the Employer of all bridges or other major structures, excluding box or slab culverts. This report fully describes the construction of the works and shall include as an appendix of all site
records including approval and record forms, testing reports and progress reports. It will also include, with reference to the Final Engineering Design Report details for future maintenance of the structure. A copy of the report shall be sent to the EE of BCM Division for archive and future reference.

3 RESPONSIBILITIES

Additional Chief Engineer – Bridge Management Wing – endorses proposed amendments, addition and deletions to be submitted to ACE-Planning & Maintenance Wing.

Superintending Engineer – Bridge Construction & Maintenance Circle - chairs and forms a panel of experts including all the EE in the Circle, representatives of the Bridge Design Circle and any special invitees, Project Directors or field EE’s he feels fit to assist in the review of the Technical Specification. He appoints a panel secretary to manage the documentation.

Panel Secretary – the EE appointed by the SE-BCM to undertake the collation of documents and draft amendments agreed by the Panel.

4 METHOD

4.1 ANNUAL REVIEW

An annual review of the contract documents is carried out by the Planning & Maintenance Wing, (OP/PC/3.2). This procedure sets out how the Bridge Management Wing makes its recommendation for amendment to this annual review.

The Superintending Engineer-Bridge Construction & Maintenance Circle forms a panel of experts to review possible improvements to the Technical Specification.

During the previous year there will have been a number of requests to use Special Specification Clauses, all these should be reviewed to establish consistency in specification requirements and or measurement and payment methods. The panel should in addition peruse all Final Design Engineering Reports, Monitoring Reports, and as necessary ER Reports and Final Handover Reports to identify new common Specification Clauses, changes to existing clauses, deletion of existing clause and decide what improvements, if any should be made to RHD’s standard Technical Specification (NCP Volume 3).

The panel will review all the information and draft new Specifications, Method of Measurement and payment methods that they believe appropriate to be included in reviewed RHD Technical Specification. The Superintending Engineer-BCM Circle will submit the recommended changes to
ACE-Bridge Management Wing for endorsement prior to submission to the ACE-Planning & Maintenance Wing for the formal review and recommendation to the Chief Engineer. (Ref OP/PC/3.2).

5 REFERENCES - None.

6 PROCEDURE FLOWCHART

The procedure flowchart for this procedure is detailed below.
1 PURPOSE AND SCOPE

An essential purpose of the Bridge Construction and Maintenance Circle through each division is to improve the construction of bridges and culverts on the RHD road Network. A major function of this circle is to improve construction supervision of the Zonal Divisions and consultants. This procedure sets out how the Circle shall improve the quality of bridge construction.

2 DEFINITIONS

Bridge Management Wing (BMW) Standard Approval Forms - Standard Forms approved by the Bridge Management Wing for use in the approval of Works as acceptable for inclusion in the permanent Works. These must be signed by a person authorised in writing to do so by the Engineer.

Bridge Management Wing (BMW) Standard Record Forms - Standard Forms approved by the Bridge Management Wing for use in the recording, both technical and progress, of Works. These must be signed by a person authorised in writing by the Engineer.

Site Supervision Team (SST) - Engineer’s Representatives and his team authorised in writing by the Engineer to supervise the Works. The Engineer’s Representative in addition should have full delegated powers from the Engineer to act on his behalf on certain clauses of the Contract.

Monitoring Team (MT) - Experts selected and headed by an Executive Engineer-Bridge Construction & Maintenance Division. It may include as necessary experts outside the Division.

Engineer’s Representative (ER) Report - A report made on a monthly basis by the ER at the same time as the Monthly Certificate giving a brief report of progress, any problems encountered and how they have been dealt with. It should also indicate potential difficulties in the forthcoming months that need to be monitored or on which technical assistance may be necessary. The report should also include an assessment of how far the works are behind or ahead of Contractual programme.

Monitoring Report - A report prepared by the MT, is submitted to the Superintending Engineer-Bridge Construction & Maintenance Circle to review and take any required action to ensure improvement in construction and maintenance of bridges and culverts.

Final Engineering Report - The report includes:

1. The design brief,

2. Reference documents including surveys, topographical, soils and hydrological and hydrographical.
3. Any necessary assumptions during the design.

4. The design calculations,

5. Proposed maintenance requirements.

Final Handover Report - The report prepared by the Engineer to the Contract prior to the handover by the Contractor to the Employer of all bridges or other major structures, excluding box or slab culverts. This report fully describes the construction of the works and shall include as an appendix of all site records including approval and record forms, testing reports and progress reports. It will also include, with reference to the Final Engineering Design Report and future maintenance of the structure. A copy of the report shall be sent to the EE of BMC Division for archive and future reference.

Environmental Impact Assessment (EIA) - Environmental Impact Assessment is the systematic study, assessment and reporting of the impacts of a proposed programme, plan or project, including a management plan for dealing with negative impacts. EIA is prepared at the feasibility level and include quantification and valuation of the impacts.

3 RESPONSIBILITIES

Additional Chief Engineer – Bridge Management Wing – Guides and develops the Circle/Division in improving the construction and maintenance of RHD bridges on the network. Approves BMW standard Approval and Record Forms for construction supervision, When the Engineer to a Contract is a Superintending Engineer or when no agreement has been achieved between the staff of the Bridge Construction Circle/Division and the Engineer, he agrees the level of supervision to be employed on bridgeworks. When requested to do so he assists the SE in dealing with matters arising out of the Monitoring Reports. He reviews and takes action on the Annual Report from the Bridge Construction and Maintenance Circle.

Superintending Engineer - Bridge Construction & Maintenance Circle – Directs the divisions in improving the construction and maintenance of RHD bridges on the network. Recommends the approval of BMW Standard Approval and record Forms. He agrees the level of construction supervision to be employed on in supervision of bridgeworks. He ensures that bridgeworks are effectively monitored and reviews the Monitoring Reports and takes action as necessary to improve the standards of construction and maintenance on all RHD bridges. Prepares and submits an Annual Report of the work of the Circle and its Divisions in improving the Construction and maintenance of Bridges.
Executive Engineer - Bridge Construction & Maintenance Divisions - the EE is the prime operator in this section of work, details of responsibilities are included in the flow charts in paragraph 6 of this procedures.

4 METHOD

4.1 THE OVERALL APPROACH

To achieve the purpose of the teams directly responsible for preparation of Contracts and/or supervising contracts containing bridges are required to:

a) Submit a full set of well prepared contract documents conforming to RHD standards and RHD Tender Documents particularly related to bridge and culvert works to the Circle no later than that of tender notice,

b) Agree a suitable level of supervision both in terms of quality and resources with ACE-Bridge Management Wing, SE-Bridge Construction & Maintenance Circle or EE-Bridge Construction & Maintenance Divisions (depending on seniority of the Engineer of the particular Contract),

c) Provide a robust approval and recording systems

d) Provide an effective reporting systems.

The Circle, through its divisions will provide:

a) A review of contract documents prior to tender, with advice, and if necessary instruction,

b) BMW Standard Approval and Record Forms,

c) Sound advice and assistance to RHD and consultant staff on Technical Specifications and measurement as it relates to Bridge and culvert construction,

d) Sound advice and assistance to RHD and consultant staff to achieve the standards expected of contractors and,

e) Undertake inspections and preparation of an independent Monitoring Reports for SE-Bridge Construction & Maintenance Circle who will address any persistent short coming, or major concern at a senior management level,

f) In its annual report to the ACE-Bridge Management Wing an assessment of how Bridge construction has improved illustrating the assessment and suggesting further improvement targets for future years.
### 4.2 Pre Contract Review of Contract Documents

There are number of methods of procurement of bridge contracts or bridges. The duties of the BMC for each method are shown Table 1 overleaf. Any option omitted from the table below shall be assessed on the same principles and the Leader of the preparation team informed in writing of the role the BCM Circle will take on a particular Project or Contract.

<table>
<thead>
<tr>
<th>Options</th>
<th>Contract Preparation and Procurement</th>
<th>Bridge Construction and Management Circle/Division duties</th>
</tr>
</thead>
</table>
| In-house design | Field Zones (always request design service from BMW). | • Receive design package from Bridge Design Circle.  
| All bridges less than 150m total length and not complex. | | • Other support as required.  
| | | • Review Contract Documents before Tender  
| | | • Review Tender Evaluation.  
| In-house design | BCM Division | | • Prepare Contract Documents.  
| Bridge over 150m total length or complex. | | | • Pre-qualify contractors.  
| | | | • Tender Evaluate and Award.  
| Outsource designs by Bridge Management Wing. Except where designated Project Director e.g. FAP. (Any length of bridge). | Consultant Designs and Contract Prepared. | | • Procure Consultants.  
| | | | • Receive Design package from Consultants and review in consultation with Bridge Design Circle.  
| | | | • Review Contract Documents from Consultant (include other documents as required).  
| | | | • Procure Contractor  
| Outsource designs by a Project Director (outside BMW) | Consultant Design and Contract prepared. | | • Review Contract Documents before Tender.  
| | | | • Review shortlist (comments to Project Director).  
| | | | • Review Tender Evaluation.  

4.3 **POST AWARD**

There are number of methods of supervision of bridge contracts or contracts with bridges, the duties of the BCMC for each is shown below. Any option omitted from the table below shall be assessed on the same principles and the Leader of the preparation team informed in writing of the role the BCM Circle will take on a particular Project or Contract.

<table>
<thead>
<tr>
<th>Options (continuing from above)</th>
<th>Contract Supervision by</th>
<th>Bridge Construction and Maintenance Circle/Division duties</th>
</tr>
</thead>
</table>
| Supervision of bridges less than 150m total length and not complex. | Field/Zone/ Circle / Division | • Receive a full set of Contract Documents from the SST.  
• To help and support the zones/ Circle / Divisions as necessary.  
• MT carry out random Monitoring inspections and reports to SE BCM.  
• Agree level of site Supervision. |
| Supervision of bridge over 150m total length or complex. | BCM Division | A BCM Division carries out supervision to a very high standard  
MT from another BCM Division carries out Monitoring inspections and reports to SE BCM. |
| Outsource Supervision by BCM Division (over 150m total length or complex). | Consultants | Procure Consultants  
MT carry out random Monitoring inspections and report to SE-BCM. |
| Supervision of Bridges on Foreign Aided Projects. | Consultants | MT carry out random Monitoring inspections and report to SE-BCM |

All contracts containing bridges shall undergo monitoring procedures at least once per year.
4.4 **ANNUAL REPORT TO ACE-BMW**

The Bridge Construction & Maintenance Circle shall submit to the ACE-BMW an annual report summarising their work during the year, an assessment of all the monitoring taken place and comment on the improvement/ deterioration in bridge construction.

5 **REFERENCES**

OP/SE/3.1 Preparation of IEE and EIA Report
OP/BD/1.1 Technical Approval

6 **PROCEDURE FLOWCHART**

The procedure flowcharts for this procedure are detailed below and in the next pages.

6.1 **APPROVED STANDARD APPROVAL AND RECORD FORMS**

Flow chart procedure for approval of Bridge Management Wing Standard Record and Approval Forms:
6.2 **Contract Preparation and Short Listing of Tenderers by Others**

Flow chart procedure for monitoring and controlling quality of Contracts documentation related to bridge construction.

![Flow chart](image)

**Notes:**
* Where Tender Documents are submitted to ACE-BMW, replace SE-BCM with ACE-BMW.
** Where Prequalification shortlist is submitted to ACE-BMW, replace SE-BCM with ACE-BMW.
6.3 **Contracts Prepared by Bridge Construction & Maintenance Divisions**

The flow chart below sets out the procedure to be adopted by the BCM Divisions when contracts are prepared by one of the Divisions within BCM.
6.4 **Level of Supervision of Construction Sites Involving a Bridge or Bridges.**

Flow chart to be used in agreeing level of supervision of works containing bridges.

```
Start

Inputs level of Construction Supervision required

Guidelines given in Zonal procedure OP/ZF/2.8 on Cons. Supervision for different bridge types & sizes

Specific Contract Documents and Drawings

EE-BCM, SE-BCM or ACE, BCM (as appropriate) to agree level of site supervision with the Engineer to the Contract

No

Agreed level of site Supervision

Yes

Failure to agree to be referred to the next seniority level

End

§ 6.2
```
6.5 **Monitoring Bridge Construction Works**

The flowchart below illustrates the monitoring procedures to be adopted whether the Works are supervised by a Zone, Circle, Zonal Division, Consultant or a Division within the Bridge construction Circle. In the case of the latter the monitoring will be undertaken by a Monitoring team from another division with increased supervision by the SE BCM.

```
Start
EE-BCM Select Monitoring Team (MT) and prepares his inspection plan

MT visits site identifies proper use is made of both BMW Standard Approval and Standard Record Forms are being used and used effectively OK?

Yes
Instruct and assist as necessary the SST in what is expected in terms of quality and finish. Include in Monitor Report to ACE-BMW both the failure and action taken. Plan a further inspection of the site to ensure compliance.

No
Instruct the Site Supervision Team (SST) as necessary to how complete correctly. Include in Monitor Report to ACE-BMW both the failure and action taken. Plan a further inspection of the site to ensure compliance. Note also to be included in Final Handover Report.

MT Inspects the laboratory and materials test reporting system OK?

Yes
Instruct and assist the team as necessary in how improved testing and reporting should be achieved. Include in Monitor Report to ACE-BMW both the failure and action taken. Inadequacies at the inspection date to be included in the Final Handover Report.

No
Specific Contract Documents including drawings, Final Engineering Design Reports and Environmental Impact Report

Yes
Instruct the Site Supervision Team (SST) as necessary to how complete correctly. Include in Monitor Report to ACE-BMW both the failure and action taken. Plan a further inspection of the site to ensure compliance.

No
Continued on next page
```
MT Review progress monitoring system in place, OK?

No

Instruct and where necessary assist the SST as necessary in how to improve progress monitoring. Include in Monitor Report to ACE-BMW both the failure and action taken. Plan a further inspection of the site to ensure compliance.

Yes

MT Review management of contract changes OK?

No

Advise team as necessary. Include in Monitor Report to ACE-BMW both the failure and action taken. Plan a further inspection of the site to ensure compliance.

End

MT identifies any feedback from the SST. MT reviews changes made to contract to enable feedback to the Bridge Design Circle. MT identifies any changes made to future Technical Specifications. MT include the above in the Monitor Report.

List for review for changes or additional to Technical Specification

EE-BCM Prepares Monitor Report and submits to SE-BCM for his approval

List of feedback to Bridge Design Circle

Submit Monitor Report to ACE-Bridge Management Wing for action as he sees fit. Copy of report of ACE, SE in respective Zone and Circle, EE in Zonal Division responsible for the Works and to the SST for their respective action to improve quality of bridge construction, recording and reporting.
1 PURPOSE AND SCOPE

This procedure covers the process for preparation of RHD Annual Bridge Routine and Periodic Maintenance Plan based on approved budget for the work within each zone.

2 DEFINITIONS

Annual RHD Bridge Maintenance and Rehabilitation Needs Report – is the prioritised list of all bridges and culverts on the RHD Road Network which require maintenance/replacement to bring back the serviceability condition to their original position. The list includes routine maintenance, periodic maintenance and rehabilitation (replacement) works prioritised by operating the computerised Bridge Maintenance & Management System (BMMS).

Routine Maintenance (RM) – works of bridges & culverts include regular cleaning of the structure, minor repair of approaches, clearing obstructions in the channel, replacing damaged guide posts, railing, signboards, etc.

Periodic Maintenance (PM) – works of bridges and culverts will include (1) major repair and protective works up to a value set by the CE-RHD annually and (2) replacement works up to a value set by the CE annually. These works will generally be carried out through Revenue Budget.

3 RESPONSIBILITIES

Additional Chief Engineer – Bridge Management Wing (ACE-BMW) – recommends the Annual Bridge Routine and Periodic Maintenance Plan for approval by the Chief Engineer, RHD.

Superintending Engineer – Planning & Data Circle (SE-PDC) – is responsible for instructions to carry out bridge maintenance, which has been re-prioritised based on the approved budget, by using the BMMS.

Executive Engineer – Bridge Maintenance Programming Division (EE-BMPD) – is responsible for re-prioritising the bridge maintenance needs based on approved budget by operating and analysing the BMMS with the assistance of his SDE/Assistant Engineer.

Superintending Engineer – Bridge Construction & Maintenance Circle (SE-BCM) – ensures through EEs-BCMD that the annual bridge routine and periodic maintenance plan prepared by field offices is within the approved budget.
Additional Chief Engineer – Zones – are responsible for managing the preparation of the annual routine & periodic bridge maintenance plans based on approved budget and prioritised needs report and timely submission to all concerned offices through his SEs & EEs.

Superintending Engineer – Maintenance Circle (SE-MC) – has the overall responsibility for compilation, processing, and approval by CE-RHD, and distributing the approved plan to respective offices.

4 METHOD

4.1 PREPARATION OF ANNUAL BRIDGE ROUTINE AND PERIODIC MAINTENANCE PLAN

Upon receipt of the RHD Revenue Allocation from MoC, SE-MC will separate the share of bridge maintenance portion from the total allocation and communicate this to SE-PDC to re-prioritise the annual bridge maintenance and rehabilitation needs report (prepared earlier) on the basis of approved budget allocation for bridge maintenance. SE-PDC, with the assistance from his sub-ordinate offices, will operate the BMMS and prepare budget allocation of routine & periodic maintenance of bridges, broken down into zones, circles and divisions. Each zone will be supplied with the relevant section of this re-prioritised list along with budget allocation.

On the basis of this list and the updated bridge condition, each division will prepare an annual plan for bridge maintenance. This should be the optimum quantity of repair works that can be achieved within the allocated budget. This plan will then be transmitted to SE-BCM through the respective zonal offices.

The SE-BCM will review the plan along with his EEs to ensure the overall plan is within the allocated budget. Once satisfied with the submission, and receiving recommendation from ACE-BMW, SE-BCM will submit the plan to SE-MC for following the approval procedure through OP/MC/2.1 &3.1.

5 REFERENCES

Annual RHD Bridge Maintenance and Rehabilitation Needs Report

BMMS User Manual – to be prepared

Annual RHD Revenue Budget Allocation for Bridges

6 PROCEDURE FLOWCHART

The procedure flowchart for this procedure is detailed in the next page.
RHD Operational Procedure – Bridge Management Wing

OP/BCM/2.2 - Annual Bridge Routine and Periodic Maintenance Plan

Start

RHD Revenue Budget Allocation for bridges informed by (SE-MC)

Re-prioritise the Needs Report (see OP/BPD/3.1) based on approved budget using BMMS. (SE-PDC, EE-BMPD)

Prepare budget allocation for Field Divisions for bridge routine & periodic maintenance (EE-BMPD)

Integrate Road and Bridge Maintenance Plans (see OP/MC/2.1 & 3.1) (SE-MC, SE-PDC)

Prepare annual routine & periodic maintenance plan of bridges based on approved budget (Field Divisions)

SE-BCM Collates & reviews the plan against approved budget (SE-BCM, EE-BCMD)

Follow the OP/MC/2.1 & 3.1 for approval and sends the approved plan to respective Field Divisions with copy to SE-PDC & SE-BCM (SE-MC)

Draft Annual Bridge Routine & Periodic Maintenance Plans

Final Annual Bridge Routine & Periodic Maintenance Plans

End
1 PURPOSE AND SCOPE

This procedure describes how to prepare as-built drawings of a structure after completion of construction work. As-built drawings are prepared by the bridge project contractor, checked and accepted by the respective “Engineer” to the contract.

As-built drawings should be prepared for all repaired and new structures on the RHD Road Network and archived for future reference.

2 DEFINITIONS

As-Built Drawings – are drawings prepared by the contractor after completion of construction. These need to incorporate all changes made during construction in the original drawings, and will be subsequently checked and approved by “Engineer” to the contract.

“Engineer” – is the official Engineer for each construction contract, in accordance with the RHD New Contracting Procedures.

3 RESPONSIBILITIES

“Engineer” – is responsible for ensuring as-built drawings are prepared by the contractor to reflect the actual works constructed.

4 METHOD

4.1 PREPARATION OF AS-BUILT DRAWINGS

When construction of a structure is complete and accepted by “Engineer” the contractor should prepare as-built drawings. The contractor will collate all the official notes regarding any change in the design issued during construction period and will incorporate these in the as-built drawings. The contractor must also visit site to ensure all such changes are reflected in the drawings. Once the drawings have been prepared, they will be sent to the respective “Engineer” to the contract for review and approval.

4.2 APPROVAL OF AS-BUILT DRAWING

Upon receipt of the as-built drawing, “Engineer” will verify the drawings with the official notes issued time to time regarding any change of design and office record of actual construction accomplished. These drawings should also be checked on site against the bridge/culvert as constructed. He may ask
for any clarification or modification. Once satisfied with the submission, The “Engineer” will accept these drawings, keep record in his office and send to the EE- BD for archiving.

5 REFERENCES - None.

6 PROCEDURE FLOWCHART

The procedure flowchart for this procedure is detailed below.
1 PURPOSE AND SCOPE

An essential purpose of the Bridge Management Wing is to improve the standard of bridges and culverts on the RHD road Network. This procedure sets out the system of acceptance of a newly constructed bridge on the RHD network. The scope covers all new bridges and culverts.

2 DEFINITIONS

Principal Bridge Inspection - A full detail inspection of a structure, viewing each key structural components, bearings, hinges, joints etc. from no more than 1 metre.

Completion Certificate - as defined in the Conditions of Contract Clause 60 of the New Contract Procedures NCP Volume 2

Defects Liability Certificate - as defined in the Conditions of Contract Clause 41 of the New Contract Procedures NCP Volume 2

Superintending Officer - as defined in the Conditions of Contract Clause 1 of the New Contract Procedures NCP Volume 2

"Engineer" - as defined in the Conditions of Contract, Clause 1 of the New Contract Procedures NCP Volume 2

Final Handover Report - The report prepared by the Engineer to the Contract prior to the handover by the Contractor to the Employer of all bridges or other major structures, excluding box or slab culverts. This report fully describes the construction of the works and shall include as an appendix of all site records including approval and record forms, testing reports and progress reports. It will also include, with reference to the Final Engineering Design Report and future maintenance of the structure. A copy of the report shall be sent to the EE of BMC Division for archive and future reference.

BCS1 and BCS2 - Bridge Condition Survey Form 1 and 2, which gives details of the structure and its condition. These are used as input to the Bridge Maintenance and Management System, the RHD Bridge maintenance database.

3 RESPONSIBILITIES

Superintending Engineer - Bridge Construction & Maintenance Circle - Accepts or rejects the structure as suitable to be included on the RHD road network.

Executive Engineer - Bridge Construction & Maintenance Divisions - Carries out or arranges to be carried out a PBI and reports the findings to the Superintending Engineer.
Engineer - Reviews the PBI Report and the acceptance or rejection of the SE-BCM and decides if any the liability lies with the Contractor before finalising the snagging list included in the Completion Certificate.

Superintending Officer - Requests Bridge Construction & Maintenance Circle to inspect the bridge(s) at least 2 weeks prior to the anticipated Completion Date of the Contract. Arranges for any necessary work, identified by the SE-BCM that is not covered under the Defects Liability of the Works Contract.

4 METHOD

4.1 ACCEPTANCE BY RHD FOR INCLUSION ON NETWORK

Each new bridge, culvert or structure constructed for RHD must be accepted by RHD for inclusion on RHD road network. All bridges and culverts must include a condition survey before acceptance. For bridges in excess of 20m span this condition survey is carried out as a PBI. This procedure gives the mechanism of acceptance.

Small structures of 20m or less can be accepted by the Superintending Officer to the Contract after a satisfactory BCS1 and BCS2 survey and he is satisfied that they have been designed and constructed properly, are safe and ready for use.

Larger structures must be subjected to BCS and a more thorough inspection using the PBI Procedures. The flowchart for the process is shown in serial-6 of this procedure.

The Executive Engineers-Bridge Construction & Maintenance Divisions shall be responsible for ensuring the safe, retrievable archiving of the Final Handover Report, the PBIs and BCS forms. He is also responsible for ensuring that the relevant information is included on the BMMS database and if the bridge or culvert is a replacement for that the original bridge details are removed from the current database.

4.2 INSPECTION PRIOR TO THE EXPIRY OF THE DEFECTS LIABILITY PERIOD

In addition a PBI shall be carried out prior to the expiry of the Defects Liability Period of the Works Contract to ensure that there are no latent defects that need to addressed by the Engineer and before the Contractor is relieved of his responsibilities under the Contract. Dependent on the findings of the Inspection the Engineer, Superintending Officer, SE-BCM or any combination ensure that any necessary identified work is carried out to ensure the life and safety of the structure.
5 REFERENCES - None.

6 PROCEDURE FLOWCHART

The procedure flowchart for this procedure is detailed in the next page.