Bridge Management System (BMS) Manual for Public Users

Final Draft

August 2018
PREFACE

It is a matter of great pleasure that Bridge Management System (BMS) Manuals have been developed by the consultants under the Bridge Management Capacity Development Project (BMCDP) of RHD with the cooperation of JICA.

RHD already has Bridge Maintenance Management System called BMMS constructed over 20 years ago, however it is impossible to carry out the bridge asset management developed under BMCDP because of shortage and unsuitable function of BMMS. Therefore, new system was required. Bridge Management System (BMS) has been constructed in order to carry out effective bridge asset management with “database function of bridge basic data, result of inspection and result of evaluation” and “calculation function of priority to be remedy, rough cost estimate of each bridge.”

The Bridge Management System (BMS) Manual 2018 is composed of 4 parts for each user authority level named as “for System Administrators”, “for Bridge Management Wing”, “for Inspector & Evaluator” and “for Public Users”. The manuals show how to input information into BMS, how to use data of BMS, how to set settings of system and technical note to understand BMS for each user authority level.

Together with the systematic use of this BMS, this manual will be useful to the RHD field staff responsible for direct maintenance, the policy makers of RHD in this area and also the staff who will be involved in maintenance by contract. We hope that this manual will assist in improving the understanding of the function of bridge structures and their long term durability and serviceability.

Finally, we would like to take this opportunity to thank the experts of JICA Consultant Team for their efforts in preparing the Bridge Management System (BMS) Manual 2018.

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1. INTRODUCTION

This system named **BMS (Bridge Management System)** is working as “Database of Bridge in all Bangladesh” and “Assistant System of Bridge Asset management”.

Many bridges in Bangladesh are damaged and require management and repair. In order to manage many bridges, Bridge Inspection is very important. Therefore, database function to stock bridge basic information and the result of inspection is required. At the same time, BMS can support the bridge asset management by calculating Damage score of the bridge and rough cost estimate to repair the bridge automatically.

*For Public User*

*BMS opens Bridge basic information like as bridge name, location, shape and some photos.*
2. HOW TO USE BMS FOR PUBLIC USER

2.1 Browsing of BRIDGE LIST

1. User can change number of rows to show in bridge list table. Example: 10, 25, 50, 100.

2. User can search bridge by any values of bridge data.

3. Click “Map” link to show location of the bridge on map.

4. Click bridge name to show basic information (Detailed View) of the bridge.

5. Click “Next” to see next page. Click “Previous” to see previous page.
Bridge and Culvert Type

<Concrete Bridge>

1. Small Slab Bridge (Former "Slab Culvert")
A structure comprising a slab(s) without girders supported on abutments/piers and having a length of 6.0m or less measured at right angles between the extreme vent way boundaries.

2. RC Slab Bridge
In general, the span is less than 16m

3. RC Girder Bridge
In general, the span is less than 20m. In special case It can be less than 30m

4. PC Girder Bridge
In general, the span is more than 20m

5. PC Box Girder Bridge

6. Concrete Arch Bridge
7. Cantilever Bridge with Hinge

8. Rigid Frame Bridge

9. Cable-Stayed Bridge

Section and elements of the 3rd Karnaphuli Bridge (Extradosed bridge)
10. Steel Girder Bridge

11. Steel Box Girder Bridge

12. Steel Arch Bridge

13. Truss Bridge with Steel Deck

14. Truss Bridge with RC slab

15. Truss Bridge with Timber Deck

16. Portable Steel Bridge with Steel Deck

17. Portable Steel Bridge with Timber Deck

Rodal Tiki Portable Steel Bridge in Manikganj
18. Masonry Arch Bridge

A structure where the floor, walls and deck are of monolithic construction, i.e. there are no joints or bearings within the structural unit.

19. Box Culvert

A structure which is in a box form (single or multiple cell) in cross-section which contains a ground slab, and where the floor, walls and deck are of monolithic construction, i.e. there are no joints or bearings within the structural unit.
Bearing seat mortar
Bearings (Main body)
Bearing bed concrete
Anchor bolts

Expansion Joint
<Steel>

<Rubber>

<Others>

Deck Surface

Total Width
Effective Width

Wheel Guard
Sidewalk
Carriageway (L)
Median
Carriageway (R)
Wheel Guard
Railing (Steel)
Curb
Pavement
Curb
Pavement
Figure   Summary of Possible Defects and Locations
1. Types of Defects and Rating

The types of defects and ratings defined in this manual are summarized as follows:

<table>
<thead>
<tr>
<th>Material</th>
<th>No.</th>
<th>Faults &amp; Defects</th>
<th>Rating of Defects</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Steel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Corrosion</td>
<td>a</td>
<td>b c d e</td>
<td></td>
<td>Depth &amp; Extent</td>
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<tr>
<td>2) Crack in Steel</td>
<td>a</td>
<td>c d e</td>
<td></td>
<td></td>
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<tr>
<td>3) Loose or Missing Bolts</td>
<td>a</td>
<td>c d e</td>
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<tr>
<td>4) Fracture</td>
<td>a</td>
<td></td>
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<tr>
<td>5) Deterioration of Paint System</td>
<td>a</td>
<td>c d e</td>
<td></td>
<td>Paint, Metal Spraying, Weathering Steel</td>
</tr>
<tr>
<td><strong>Concrete</strong></td>
<td></td>
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<tr>
<td>6) Crack</td>
<td>a</td>
<td>b c d e</td>
<td></td>
<td>Crack Width &amp; Spacing</td>
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<tr>
<td>7) Spalling /Exposed Rebar</td>
<td>a</td>
<td>c d e</td>
<td></td>
<td></td>
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<tr>
<td>8) Water leakage/ Efflorescence</td>
<td>a</td>
<td>c d e</td>
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<tr>
<td>9) Fallen out of Deck Slab</td>
<td>a</td>
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<tr>
<td>10) Cracking of Deck Slab</td>
<td>a</td>
<td>b c d e</td>
<td></td>
<td>Crack Width &amp; Spacing</td>
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<tr>
<td>11) Delamination</td>
<td>a</td>
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<tr>
<td><strong>Other Materials</strong></td>
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<tr>
<td>12) Abnormal Spacing</td>
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<td>13) Difference in Level</td>
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<td>T≧20mm or not</td>
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<td>14) Abnormal Bituminous Pavement</td>
<td>a</td>
<td>c d e</td>
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<tr>
<td>15) Functional Disorder of Bearings</td>
<td>a</td>
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<tr>
<td>16) Other Types of Defects</td>
<td>a</td>
<td></td>
<td></td>
<td>Illegal Occupation, Scrawl, Missing of Sealing material, Fire Damage etc.</td>
</tr>
<tr>
<td><strong>Common Defects</strong></td>
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<tr>
<td>17) Defects of Reinforcing Materials for Rehabilitation/Strengthening</td>
<td>a</td>
<td>c e</td>
<td></td>
<td>Steel Plate, Fiber, Concrete Member, Painting</td>
</tr>
<tr>
<td>18) Abnormal Anchorage</td>
<td>a</td>
<td>c e</td>
<td></td>
<td>Anchorage of PC Tendon</td>
</tr>
<tr>
<td>19) Discoloration/Deterioration of Materials</td>
<td>a</td>
<td></td>
<td></td>
<td>Concrete, Rubber, Plastics</td>
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<tr>
<td>20) Water Leakage/Puddle</td>
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<td>21) Abnormal Noise/Vibration</td>
<td>a</td>
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<td>22) Abnormal Deflection</td>
<td>a</td>
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<tr>
<td>23) Deformation/Break</td>
<td>a</td>
<td>c e</td>
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<td>24) Accumulation of Debris</td>
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<tr>
<td>25) Settlement/Tilt/Movement</td>
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<tr>
<td>26) Scouring</td>
<td>a</td>
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