

A. BRIDGE MANAGEMENT SYSTEM

1) INDIAN BRIDGE MANAGEMENT SYSTEM (IBMS) – MoRTH

a) Indian Bridge Management System

A bridge asset management system manual along with software application was developed , based on IRC SP35 and best of the international practices of US & Europe in 2014. Presently it is being implemented with the field work of inventory along with condition survey , inspection and testing offfield work as a fully digitized system and data transmitted to central server for analysis of data at the Bridge management center, for the first time in the country, by IDDC Engineers Pvt ltd for 1,72, 545 bridges & culvert assets of N H A I.

Outcome of IBMS:

Basic data of all bridges along with bridges identified for all types of major repairs, minor repairs & reconstruction is available with the department and necessary interventions have been initiated by various custodians for restoring the bridges to safe / performance level of operations. The full potential of the system is yet to be utilized. Lessons learnt and moving forward within and external front:



IMPROVEMENTS MADE IN 5 YEARS FOR MIGRATING FROM IBMS TO UBMS



A. Within : Revised Inventory Data Digitization of Inspection Data Validation of Inventory Rating at inspection Stage Validation of Inspection Ratings at Testing Stage Improvement of Deterioration Model Inclusion of Design drawings, Hydraulic data etc Improved Server Interface Providing Training to the Bridge Inspectors. The system has been improved based on the learning's of this first work along with the functional and operational needs of different users for utilization of the system to full potential in deliverance of objectives of the system

- Maintain bridge inventory and network in an efficient manner
- Guarantee safety of the users for specified risks

- Determine the inspection and maintenance needs
- Ensure level of service
- Predict future needs of funds
- Optimize fund utilization
- Prioritize asset for maintenance needs
- Predict balance service life and optimize it's life cycle costs
- Predict accurate and real time information of the asset to the users and owners



B. External :

a. Trained certified bridge inspectors :



We don't have any certified bridge inspectors in the country unlike other developed nations, where Bridge Management System mandates that only certified bridge inspectors are to be deputed for the field work as the authenticity of field data input is critical for the system.

We have facilitated availability of Australian Road Research Board (ARRB) of Australia to provide training in India and also certify bridge inspectors

b. Institutionalization of the System :

IRC SP 40 for testing revised to meet the current requirements of testing. IRC SP35 is being updated

with inclusion of Bridge Management System IDDC Engineers Pvt Ltd has supported in providing all the info for this documentation

Conclusion : IBMS /UBMS is a MISSION for IDDC to protect Indian Bridges .

Client: Ministry of Road Transport &Highways(MoRTH)

Principal Client: NHAI

Value : Rs. 7,00,00,000

Duration: 2015-2021– DATA PROGRESS

2.UNIFIED BRIDGE MANAGEMENT SYSTEM (UBMS) - L&T IDPL & INVIT

Improved Bridge Management System to meet the requirement of LPTIDPL & INVIT with totally digitized inspection module with facility for data sorting, filtering etc. introduction of cause rating systems, integrating the data with existing SAP operations for efficient structural & non structural maintenance system adding up elemental rating system for structural & non structural elements apart from component rating system for better maintenance decision making.

3.BRIDGE INSPECTION / TESTING

Bridge Condition Survey, Inspection, Testing , Detailed condition report along with quantified rehabilitation proposal including specifications and costing for various projects .

IDDC Engineers Pvt. Ltd. provided professional engineering services for Bridge Condition Survey, Inspection, Testing , Detailed condition report along with quantified rehabilitation proposal including specifications and costing in India. The project included



Bridge inventory has been done as per standard requirements of collating data related to engineering properties of the bridge feature crossed, overall geometry of the bridge, age, number of lanes, etc.

Structural Condition Assessment: Based on condition of the Deck, Super structure, Sub structure , foundation, scour approaches condition ratings and also testing and detailed inspection requirement were defined.

Inspection

The second task of inspection is to ascertain the condition ratings. The inbuilt validation of data is collected by observing the bridge parameters and the environment and traffic condition existing at bridge location, the ratings are noted. The condition of the structure is identified .Inspection is carried out in a detailed manner which would be inclusive of identifying the causes of distress and deterioration. Inspection engineer made a professional assessment of the deterioration or defect . In this process repair works are carried out or full structural investigation to parts or whole structure, detailed inspection with rating for all structural members are recorded taking into consideration the cracks, spalls, crazing, water seepage, corrosion, scouring, settlements, deflection, tilt, warping deformities etc. These defects will be noted on the observation sheets.



Testing

Testing Engineer validated cause rating provided by bridge inspector. Based on cause and distress the testing regime is suggested. On basis of testing results and cause of distress repair/rehabilitation was done.

Recent Projects:

1) Client: Safe Ways Gujarat

Conducting Structure investigation with required Non Destructive Testing at Bridge preparation of Detail bridge Report which briefly describes about the identification of defects observed during investigation. It summarizes the test results and recommendations for further repair and strengthening.

Value : 1,373,749.92



2) Client: Cube Highways West Bengal (FRHL)



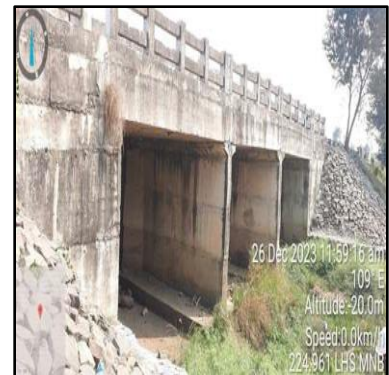
Visual inspection and Non Destructive testing of bridge was carried out at site by our team of Engineers. The main purpose was to inspect the total structure and assess the structural integrity of superstructure, check for corrosion and other distress like Delamination, carbonation of concrete etc. Conducting Detail Condition Survey with required Non Destructive Testing at Bridge (Length of Bridge 1 x 6.9m) & preparation of Detail Project Report & Detail Estimate regarding repair, rehabilitation and strengthening of the bridge at district Malda in West bengal state.

Value : 1,846,700.00

3) Client: Cube Highways West Bengal (BFHL)

INSPECTION & TESTING, MINOR BRIDGE "Inspection and testing of Minor bridges for assesment of effects, damages and deficiencies including in-depth inspection of Bearings, Expansion Joints and other deterioration of concrete surfaces Inspection of pavement quality and estimation of repair works required for Minor bridge, Approach Road, Service Road and cross road at the minor bridge . Submission of report summarising all the findings and observations as mentioned above including submission of estimate cost of the repair works required along with complete Bill of Quantities of activities".

Value : 3,546,759.63



4) Client: Cube Highways(JMTL) Rajasthan

"Inspection and testing of ROB at Km 178.025 for assessment of defects, damages and deficiencies including in-depth inspection of Bearings, Expansion Joints and other deterioration of concrete surfaces. Visual & Detailed Inspection, Testing , Route Cause Definition, carrying out NDT, Preparing detailed report based on NDT results; that contains



Bridge rating, extent of distress and repair and rehabilitation methodology and related BOQ. Submission of report summarizing all the findings and observations as mentioned above including submission of estimated cost of the repair works required along with complete Bill of Quantities of activities. The details of ROB including the drawing is also attached. Conducting Detail Condition Survey with required Non Destructive Testing at Dausa ROB (Length of Bridge 17.0m) & preparation of Detail Project Report & Detail Estimate regarding repair, rehabilitation and strengthening of the bridge at Dausa district in Rajasthan state.

Value : 389400.00

5) Client : Walayar to Vadakkencherry Expressways Pvt Ltd ,Palakkad kerala

Conducting Detail Condition Survey with required Non Destructive Testing at Walayar Bridge (Length of Bridge 3 x 9.15m) & preparation of Detail Project Report & Detail Estimate regarding repair, rehabilitation and strengthening of the bridge at district Palakkad in Kerala state.



Value: 4142980.00

6) Client: kanupur Bridge (U.P)



IDDC Engineers Pvt. Ltd. obtained the responsibility to assess the condition of the I-girder bridge which connects the Auraiya to Jalaun on Yamuna River.

Conducting Condition Survey at Shergrah Ghat Yamuna Bridge on Yamuna River Length of Bridge 870m (29 spans X 30meters) & preparation of Project Report & Detail Estimate (as per MORTH analysis/Government Organization SOR) regarding repair, rehabilitation and strengthening of the bridge at district Auraiya in Uttar Pradesh.

Value: 3,287,405.00

7) Client:Shastri Bridge (U.P)

IDDC Engineers Pvt. Ltd. obtained the responsibility to assess the condition of the I-girder bridge which connects the Prayagraj (Allahabad) to Varanasi in District Prayagraj and passed over Ganga River. Conducting Detail Condition Survey with required Non Destructive Testing at Sasthri Bridge on river Ganga (Length of Bridge 2 x 2184m) & preparation of Detail Project Report&Detail Estimate (as per MORTH analysis/Government Organization SOR) regarding repair, rehabilitation and strengthening of the bridge at district Prayagraj in Uttar Pradesh.

This report is entitled “Conducting Detailed Condition Survey & Non Destructive Testing Report of Sasthri Bridge across Ganga River at Prayagraj (Allahabad) Uttar Pradesh” deals with study of available documents, visual inspection and Non-Destructive Testing of said bridge carried out by IDDC Engineers Pvt.Ltd under the guidance of UP Bridge Corporation.

Value : 58,75,834



8) Client: CCIL Piparwar Jharkhand



Conducting Detailed Condition Survey with required Non Destructive Testing at Damodar Bridge (Length of Bridge 6 x 24m) & preparation of Detail Project Report & Detail Estimate regarding repair, rehabilitation and strengthening of the bridge over Damodar river near PO Office Ashok OCP under Piparwar area, Ranchi district in Jharkhand state.

Value:5,00,000

9) Client: Ceinsys Tech Ltd

Inventory, condition survey, NDT testing for distressed bridges and report submission for 13496.4mts length for National Highways in two states Uttar Pradesh & Bihar. The work involved conducting inventory of all structures as per IBMS protocol, definition of ratings for each structure to define the level of possible distress. Based on the seratings, detailed inspection of each bridge to ascertain the rating and define the possible deterioration in the bridges and detailed testing of the structures

Value : Rs. 67,18,354

Condition Survey of structure	U.O.M	Qty
Bridge	R.mts	11278.4
Culverts	Numbers	524
ROB	R.mts	1652
Under Passes	Numbers	42
Culverts	Numbers	61
ROB	R.mts	1084.9
Under Passes	Numbers	8
Bridge	R.mts	1062.28
Culverts	Numbers	124
ROB	R.mts	145.719
Under Passes	Numbers	16
NDT	U.O.M	Qty
NDT	R.mts	1260

List of Structures

1. Major Bridge - 27 nos.
2. Minor Bridge - 75 nos.
3. Road Over/ Under bridges - 19 nos.
4. Over/ Under passes - 58 nos.
5. Culverts - 706 nos.

10) Client: VR Techniche Principal Client: NHAI



Inventory, Carrying out condition survey and NDT of bridges in AP and Gujarat. The total structures are Major structures of 381 and culverts of 1404 numbers. The work involved conducting inventory of all structures as per IBMS protocol, definition of ratings for each structure to define the level of possible stress. Based on the ratings, detailed inspection of each bridge to ascertain the rating and define the possible deterioration in the bridges and detailed testing of the structures.

Value : Rs. 1,11,70,367.

Major Structures- 381 nos.

1. Major Bridge - 35 nos.
2. Minor Bridge - 243 nos.
3. Vehicular Under Pass - 64 nos.
4. Pedestrian Under Pass - 18 nos.
5. Cattle Under Pass - 3 nos.
6. Rail Over/ Under Bridges - 16 nos.

Culverts- 1404 nos.

1. Slab Culverts - 288 nos.
2. Pipe Culverts - 788 nos.
3. Box Culverts - 328 nos.

11) Client: Satra Group



IDDC was given the responsibility to Carry out condition survey, NDT of bridges and submission of reports for TOT Bundle-2 project in Orissa, West Bengal & Bihar states. Collection and Analysis of culvert condition and culvert inventory data for the purpose of box, pipe, etc., culvert on nh 005 as per rfp in the State of Odisha, West Bengal & Bihar. Providing and executing pressure grouting for all cracks with grout nipples at specified distance as per design. Providing and fixing connecting pipes from grout tank to nipple's including main and secondary pipes.

Pressure grouting using cement slurry along with approved polymer based chemical etc. complete all as indicated / directed by Client/Consultant. The Bridge structure was investigated

for all spans i.e.3 nos. Each element within the section was observed for a range of defects such as cracks, spalls, crazing, corrosion, seepage (water) etc. The tests carried out comprised of:

1. Ultra Pulse Velocity test to evaluate integrity of the concrete.
2. Rebound Hammer test to evaluate surface strength of concrete.
3. Half-Cell Potential test to define the corrosion potential of the rc section.
4. Carbonation Depth test to identify the depth of carbonation.
5. Transient Dynamic Response test to determine the state and behaviour of concrete structure.
6. Infrared Thermography test to identify distress in the deck slab

Value : Rs. 1,18,24,000

Description	Unit	Quantity
Carrying out condition survey, NDT of bridges and submission of reports for TOT Bundle-2 project in Orissa, West Bengal & Bihar states	Km	1054.8

List of Structures

1. Major Bridge - 44 nos.
2. Minor Bridge - 212 nos.
3. Road Over/ Under bridges - 14 nos.
4. Over/ Under passes - 124 nos.
5. Culverts - 575 nos.

12) Bridge Load Test

IDDC was given the responsibility to Carry out load test Bridge Load Test and NDT at Rapanapalli. Load Test is a method of assessing the in-situ load capacity of span of bridge. The test can be applied to any type concrete, whether plain or reinforced, light weight or conventional. It is based on measuring deflection in reference to temperature at site. Improper decision in deciding the point of deflection will not represent the variation in theoretical deflection. Refer IRC SP 51 -1999 “Guideline for load testing of bridges”.



The Bridge structure was investigated for all spans i.e.3 nos. Each element within the section was observed for a range of defects such as cracks, spalls, crazing, corrosion, seepage (water) etc. The tests carried out comprised of:

1. Ultra Pulse Velocity Test to evaluate integrity of the concrete.
2. Rebound Hammer Test to evaluate surface strength of concrete.
3. Half-Cell Potential Test to define the corrosion potential of the RC section.
4. Carbonation Depth Test to identify the depth of carbonation.

Value : Rs. 4,24,800

Other Projects:

a) Indian Bridge Management System

Sl. No.	Name of the client organization	Brief Scope of Work	Date
1	Safe Ways Gujarat	Conducting Structure investigation with required Non Destructive Testing at Bridge preparation of Detail bridge condition and maintenance .	2023
2	Cube Highways West Bengal (FRHL)	Detail Condition Survey with required Non Destructive Testing at Bridge (Length of Bridge 1 x 6.9m)	2023
3	Cube Highways West Bengal (BFHL)	Inspection and testing of Minor bridges for assessment of effects, damages, Approach Road, Service Road and cross road .	2023
4	Cube Highways(JMTL) Rajasthan	"Inspection and testing of ROB at Km 178.025.Defects, damages and deficiencies including in-depth inspection of Bearings, Expansion Joints and other deterioration of concrete surfaces.	2022
5	Walayar to Vadakkencherry Expressways Pvt Ltd ,Palakkad kerala	Conducting Detail Condition Survey with required Non Destructive Testing at Walayar Bridge (Length of Bridge 3 x 9.15m)	2021
6	kanupur Bridge (U.P)	Condition Survey at Shergrah Ghat Yamuna Bridge on Yamuna River Length of Bridge 870m (29 spans X 30meters) ,maintenance and management survey.	2021
7	Shastri Bridge (U.P)	Inspection, NDT test and condition assessment for high level bridge over Damodar river	2021
8	CCIL Piparwar Jharkhand	Detail Estimate regarding repair, rehabilitation and strengthening of the bridge over Damodar river	2021
9	Ceinsys Tech Ltd	Inventory, condition survey, NDT testing for distressed bridges of 13496.4mts length for National Highways in two states Uttar Pradesh & Bihar.	2021
10	VR TechnichePrincipal Client: NHAI	Inventory, Carrying out condition survey and NDT of bridges in AP and Gujarat. The total structures are Major structures of 381 and culverts of 1404 numbers.	2021
11	Satra Group	Defects such as cracks, spalls, crazing, corrosion, seepage (water) etc. The tests carried out comprised	2019
12	Bridge Load Test	Defects such as cracks, spalls, crazing, corrosion, seepage (water) etc. The tests carried out for bridge load .	2019

13	L&t infrastructure Development projects limited	Design, development, supply, installation, testing and commissioning of Bridge Management System	2019
14	IndInfravit Trust	Design, development, supply, installation, testing and commissioning of Bridge Management System	2019
15	Mantena Constructions Pvt. Ltd.	Bridge span load test & NDT at Rapanapalli	2019
16.	Ceinsys Tech Ltd.	Condition survey of bridges, culverts, ROB & underpasses	2018
17	Satra Infrastructure Management Services Ltd.	Consultancy services for preparation of a report on physical condition of the National Highways stretches for TOT model	2018
18	Himachal Pradesh Power Corporation Ltd.	Inspection of 3 bridges & carrying out NDT, structural analysis & submission of report.	2018
19	Western UP Tollway Ltd.	Consultancy service for bridge inspection for defects & deficiencies & providing repair / maintenance methodology	2018
20	V. R. Techniques	Carrying out condition survey & NDT of bridges in AP & Gujarat	2017
21	Morth	Providing developing & implementing BMS for National Highways in India .	2015
22	PWD, Diu	Structural stability / load test on bridge at Tad Check Post	2012
23	PWD, Daman	Post monsoon Inspection of old Damanganga Bridge.	2012
24	PWD, Daman	Pre Monsoon inspection of old Damanganga Bridge	2011
25	PWD, Daman	Inspection of Zari Causeway	2011
26	PWD, Silvassa	Repairs & Retrofitting of Chauda bridge damage due to floods.	2011
27	MCGM, Mumbai	Consultancy for detailed investigation of 10 bridges in Mumbai	2010
28	PWD, Daman	Detail Bridge inspection of New Damanganga bridge for safety & structural stability	2009
29	OIDC, Daman	Consultancy for detail inspection of old Damanganga bridge	2009
30	MCGM, Mumbai	Preliminary inspection of 72 bridges in western suburbs of Mumbai	2009
31	PWD, Diu	Ascertaining structural stability of bridge connecting Diu and Ghoghla	2009
32	PWD, Daman	Inspection of Patalia, Bamanpuja, old Varkund, Zari Causeway & Ambawadi bridge – 5 Nos.	2009
33	PWD, Pune	Structural investigation of bridge at Pargaon on river Bhima.	2008
34	MCGM, Mumbai	Preliminary inspection of 57 bridges in city area, Mumbai	2008
35	OIDC, Daman	Load testing for Darotha bridge on Silvassa – Bhilad Road.	2008
36	OIDC, Daman	Load testing for bridge at Varkund, Daman.	2008