添付 5

ムンバイ市跨線橋架替えプロジェクト説明資料

Data Collection Survey on Road/Railway Bridge Sector

Explanatory Material of Reconstruction Project of ROBs in Mumbai

August 2016
Mumbai

JAPAN INTERNATIONAL COOPERATION AGENCY
Oriental Consultants Global Co., Ltd.

Contents

Ⅰ. Introduction

Based on discussion with Western Railway, MOR,
Reconstruction of several Railway Bridges
were requested.

Interim Study Result is presented by this meeting.

Ⅱ. Results of Site Inspection

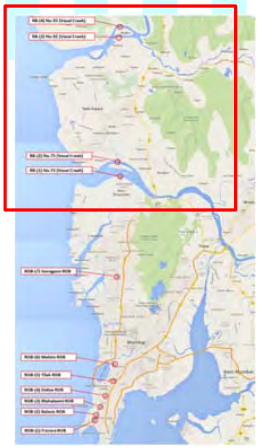
1. List of Target Damaged Bridges

Type of Bridge	Location	Number (18 Bri.)	Bridge Name
ROB	Mumbai	7	(1) Ferere ROB (No. 1) (2) Belasis ROB (No. 2) (3) Mahalaxmi ROB (No. 3) (4) Delise ROB (No. 4) (5) Tilak ROB (No. 5) (6) Mahim ROB (No. 6) (7) Goregaon ROB (No. 7)
	Vadodara	2	(8) LC No. 5/A (No. 8) (9) LC No. 2/X (No. 9)
Railway Bridge	Mumbai	4	(1)No.73 (Vasai Creek) (2)No.75(Vasai Creek) (3)No.92 (Vasai Creek) (4)No.93 (Vasai Creek)
	Ratlam	5	(5) No. 114 (6) No. 129 (7) No. 132 (8) No. R5 (9) No. R8

Ⅱ. Results of Site Inspection

ORIENTAL CONSULTANTS GLOBAL CO., LTD.

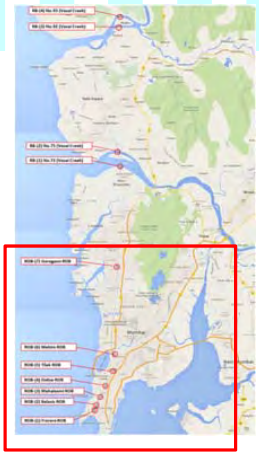
2. Location of Target Damaged Bridges



Ⅱ. Results of Site Inspection

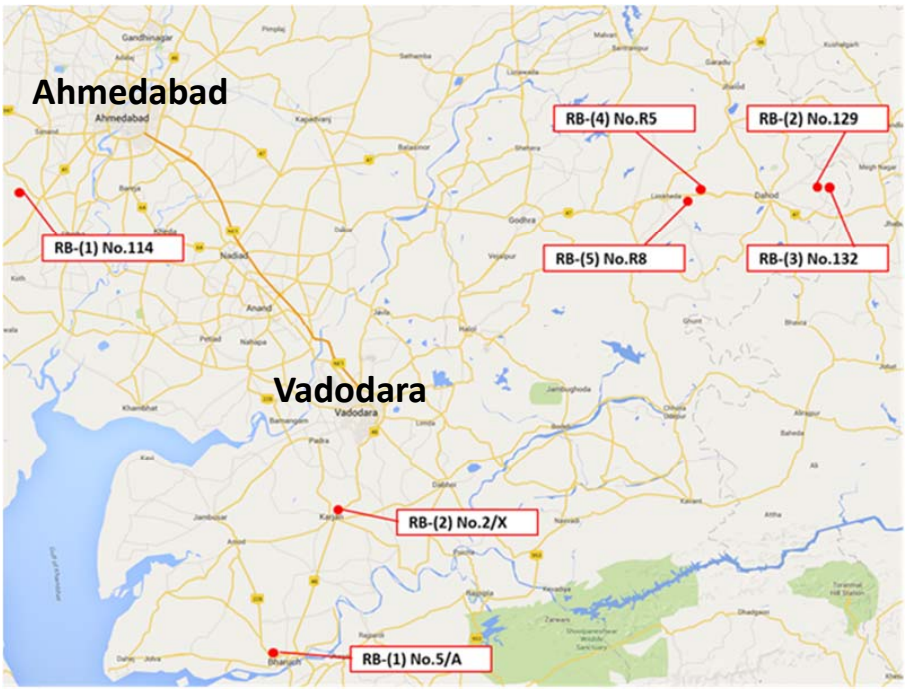
ORIENTAL CONSULTANTS GLOBAL CO., LTD.

2. Location of Target Damaged Bridges



Ⅱ. Results of Site Inspection

2. Location of Target Damaged Bridges



Ⅱ. Results of Site Inspection

3. Summary of Inspection Results (ROB)

No.	Bridge Name	Length [m]	Span No.	Const. Year	Superstructure Type	Comments/ Next Step
Road over Bridge (ROB)						
1	**Ferere ROB**	25.36	1	1921	2 Main Steel I-Girder with cross girders	Most of bridges were constructed nearly 100 years ago ⇩ Reconstruction
2	**Balasis ROB**	31.50	5	1893	Steel I-Girder	
3	**Mahalaxmi ROB**	77.00	5	1920	Steel I-Girder	
4	**Delise ROB**	63.20	3	1921	2 Main Steel I-Girder with cross girders	
5	**Tilak ROB**	226.20	3	1925	2 Main Steel I-Girder with cross girders	
6	**Mahim ROB**	80.00	3	1993	PC I-Shaped Girder	
7	**Goregaon ROB**	79.00	2	1993	PC I-Shaped Girder	
8	**LC No. 5/A**	85.00	2	2012	PC Box Girder	Non-Destructive Survey
9	**LC No. 2/A**	35.08	1	2008	PC Box Girder	

9 ROBs are selected for next step

Ⅱ. Results of Site Inspection

3. Summary of Inspection Results (Railway Bridge)

No.	Bridge Name	Length [m]	Span No.	Const. Year	Superstructure Type	Comments/ Next Step
Railway Bridge						
1	**No. 73**	1,450	29	1993	PC Box Girder	NO Next step Because of minor damage
2	**No. 75**	550	11	1993	PC Box Girder	
3	**No. 92**	380	20	1963	Steel I-Girder	
4	**No. 93**	410	22	1963	Steel I-Girder	
5	**No. 114**	80	4	1960	PC I-Shaped Girder	NO Next step Because, repaired by CFRP already
6	**No. 129**	60	3	1960	PC I-Shaped Girder	
7	**No. 132**	20	1	1960	PC I-Shaped Girder	
8	**No. R5**	20	1	1960	PC I-Shaped Girder	
9	**No. R8**	20	1	1960	PC I-Shaped Girder	

Ⅲ. Proposal for Reconstruction

1. Feature of this Project

Precondition	Required
Bridges is in the congested area and No space for diversion road	**Construction period needs to be shorten.** **Minimum negative impact on social environment.** **(Construction in the minimum space)**
Revision of Electric Supply System (DC → AC) **Clearance needs to be changed to 6.25m from 5m**	**The height of Girder need to be lower due to prevent the influence of surroundings.** **⇒ New girder height shall be as thin as possible.**

Ⅲ. Proposal for Reconstruction

2. Advanced Technology can be Adopted

Construction

- ✓ To reduce the Height of Road Surface
- ✓ To make thin the Girder Height

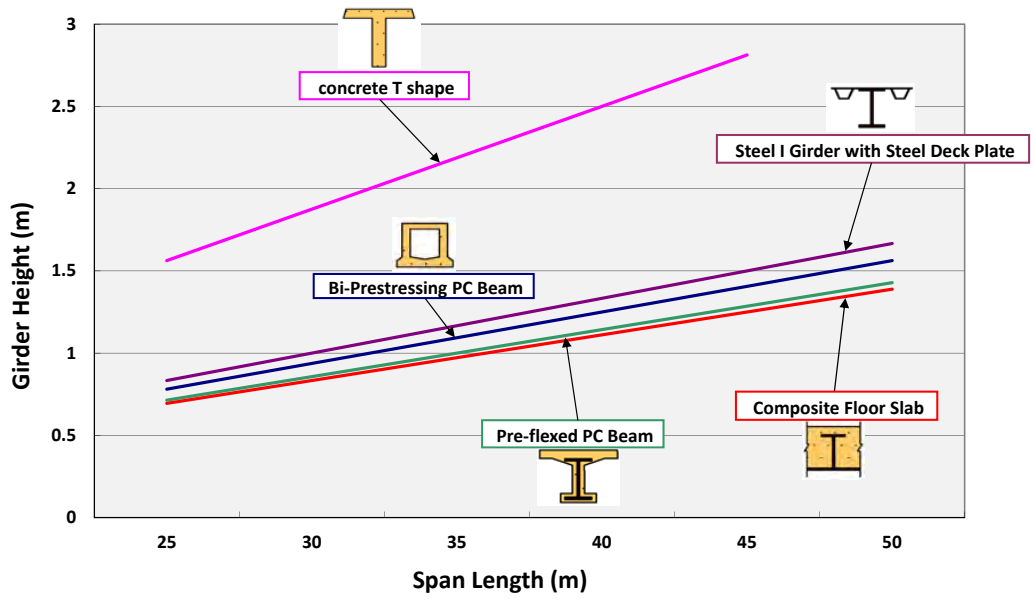
Applicable Superstructure Type

① Bi-Prestressing PC System
② Pre-flexed PC Beam
③ Composite Floor Slab
④ Steel I Girder with Steel Deck Plate
⑤ Pony Truss

Ⅲ. Proposal for Reconstruction

2. Advanced Technology can be Adopted

Type of Superstructure

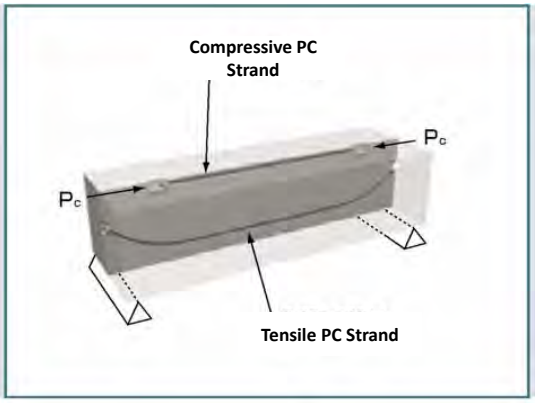


Type of Superstructure

① Bi-Prestressing PC System

This construction method is to combine a conventional prestressed method (give compressive force to concrete by pulling PC Strand) with a Post-compression method (give tension force to concrete by pushing PC strand).
It is possible to reduce girder height and extend span length.

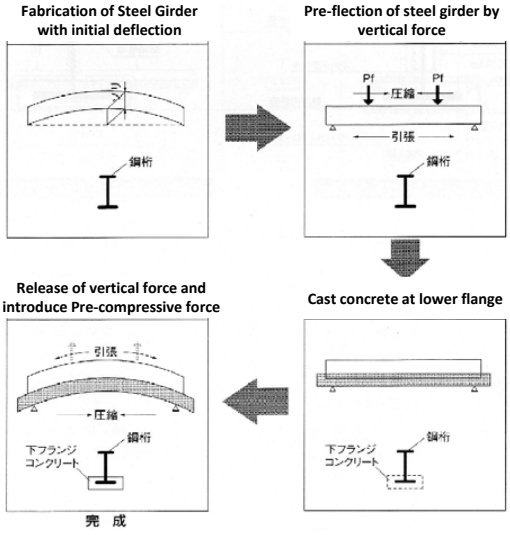
◆ Ratio of Span Length and Girder Height
= approx. 1/32



Ⅲ. Proposal for Reconstruction
ORIENTAL CONSULTANTS GLOBAL CO., LTD.
2. Advanced Technology to be Adopted

Type of Superstructure

② Pre-flexed PC Beam

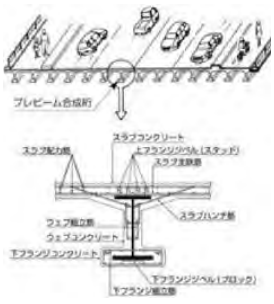


This is composite girder of steel girder and concrete.

Steel girder is added pre-flection in advance by vertical force and introduce pre-stress by release after casting concrete at lower flange.

It is possible to construct under very low girder height compared to other method.

◆ Ratio of Span Length and Girder Height
= Approx. 1/35



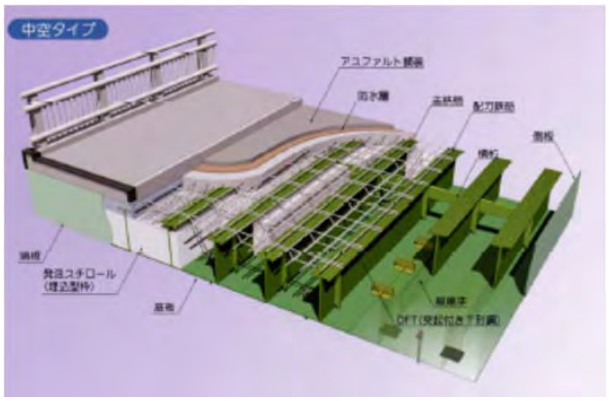
Type of Superstructure

③ Composite Floor Slab

Main girder is simple structure that comprises of T-shape steel, bottom plate and filling concrete as main cross section.

To suppress an increase in girder height by using T-shaped steel with projections as shear key.

◆ Ratio of Span Length and Girder Height = Approx. 1/30 ～ 1/42 (extremely thin structure)



Ⅲ. Proposal for Reconstruction
ORIENTAL CONSULTANTS GLOBAL CO., LTD.
2. Advanced Technology to be Adopted

Type of Superstructure

④ Steel I Girder with Steel Deck Plate

It is possible to reduce the self weight of deck slab by using steel deck plate to Steel I girder. And longitudinal reinforcing member is installed at steel deck plate. Steel deck plate bears the role as a upper flange of main girder reinforced with reinforcing member, therefore the girder height is suppressed.

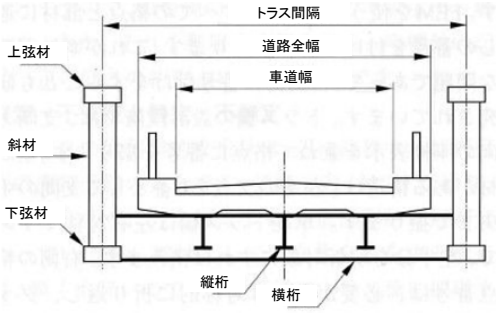
◆ Ratio of Span Length and Girder Height = Approx. 1/30

Ⅲ. Proposal for Reconstruction

2. Advanced Technology to be Adopted

Type of Superstructure

⑤ Pony Truss



This method is to reduce a structure height under road by applying pony truss type.

Only reinforcing member is installed under deck slab, therefore, regardless of span length, structure height under road is about 1m.

◆ Ratio of Span Length and Girder Height = Approx. over 75m

Ⅲ. Proposal for Reconstruction

2. Advanced Technology can be Adopted

Construction

- ✓ To reduce the space
- ✓ To save the time

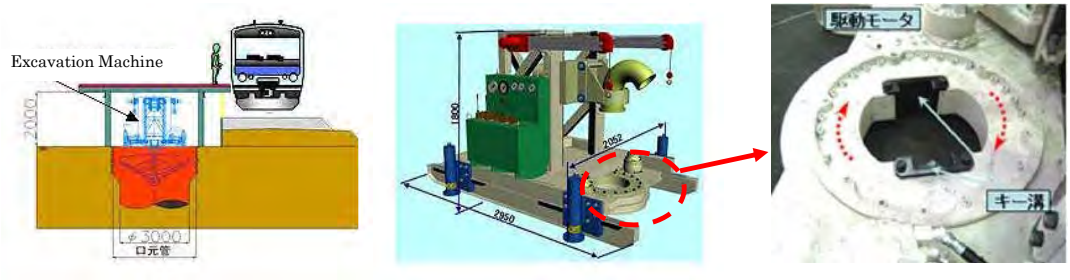
Applicable Foundation Type

① Cast-in-place Concrete Pile under low clearance
② Rotary Penetration Steel Pile
③ Steel Pipe Socket Connection Method

2. Advanced Technology to be Adopted

Applicable Foundation Type

① Cast-in-place Concrete Pile under low clearance



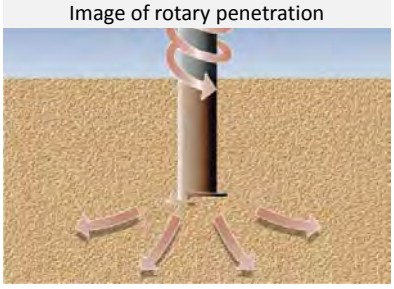
This technique employs turntable type for driving system of excavation rod. It is possible to construct at the height under 2m by combining a special type of kelly rod.

Construction of Cast-in-situ pile under low clearance (under existing bridge) becomes possible used by this special type of equipment.

Ⅲ. Proposal for Reconstruction
ORIENTAL CONSULTANTS GLOBAL CO., LTD.
2. Advanced Technology to be Adopted
Applicable Foundation Type

② Rotary Penetration Steel Pile

Image of rotary penetration



It is Steel Pipe Foundation which is welded a spiral processed steel plate (Wing) to the tip of steel pipe together. The pile penetrates/screws into the ground with propulsion of wing.

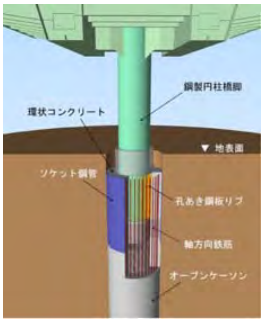
It is obtained large bearing force by the base enlarging effect of Wing. And, due to penetration method, there is no excavated soil at site. Therefore, it will be possible to be eco-friendly construction with non-emission, low-vibration and reducing pile number.

Ⅲ. Proposal for Reconstruction

2. Advanced Technology to be Adopted

Applicable Foundation Type

③ Steel Pipe Socket Connection Method



Connection part at tip of pier column

Construction of Caison Structure

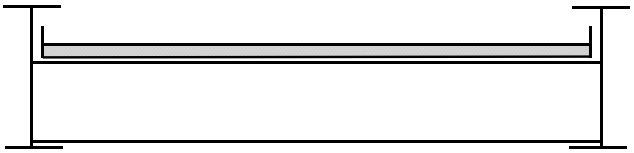
Steel Pipe Socket Connection Method is the jointing technique of inserting a Steel Column into Steel Pipe Socket which is constructed at the top of foundation, and filling up a concrete inside the gap of it. It is possible to reduce construction period by omitting Pile Cap and Anchor Frame used in conventional method.

Ⅲ. Proposal for Reconstruction

3. Construction Process

3.1 Type of Existing Superstructure

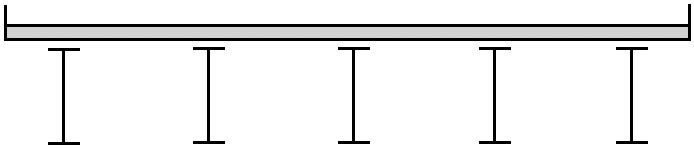
Ⓐ 2-Main Girder Type



1. Ferere ROB
4. Delise ROB
5. Tilak ROB

※ Impossible for Step Construction ⇒ Quick Construction is Required

Ⓑ Conventional I/T-Girder Type



2. Balasis ROB
3. Mahalaxmi ROB
6. Mahim ROB
7. Goregaon ROB

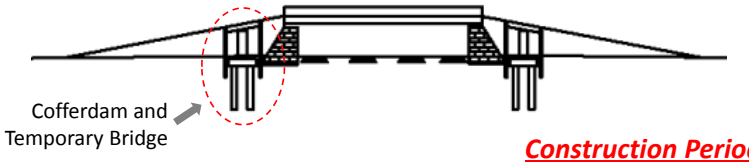
※ Possible for Step Construction

Ⅲ. Proposal for Reconstruction

3. Construction Process

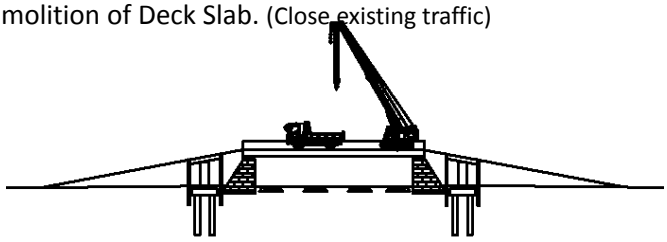
3.2 Proposal for Construction Steps for Ⓐ

Step-1 Install Cofferdam and Temporary Bridge and Construction of Abutment. (Secure existents traffic)



Construction Period: 2 – 3 months

Step-2 Demolition of Deck Slab. (Close existing traffic)



Construction Period: 1 week

Ⅲ. Proposal for Reconstruction

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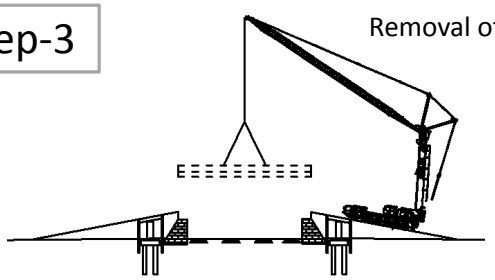
3. Construction Process

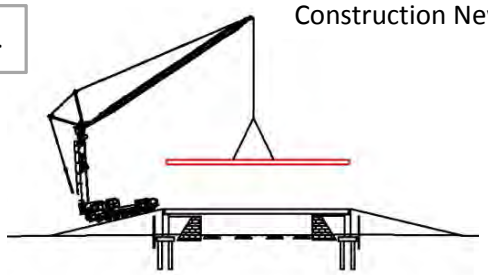
3.2 Proposal for Construction Steps for Ⓐ

Step-3 Removal of Steel Girder. (Close existing traffic)



Construction Period: 3 days

Step-4 Construction New Superstructure. (Close existing traffic)



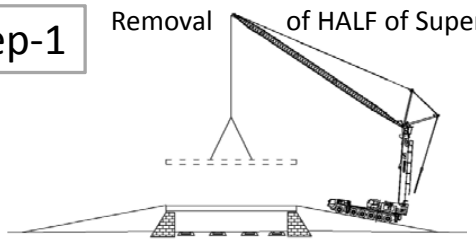
Construction Period: 10 days

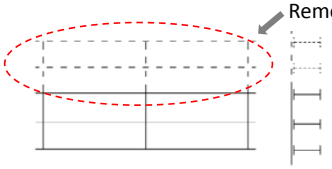
Ⅲ. Proposal for Reconstruction

3. Construction Process

3.3 Proposal for Construction Steps for (B)

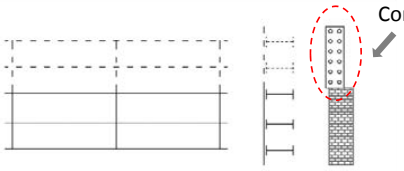
Step-1 Removal of HALF of Superstructure (Secure existing traffic, but by limited width)





Construction Period: 1 week

Step-2 Demolition of HALF of existing Abutment and Construction of HALF of New Abutment. (secure existing traffic but by limited width)



Construction Period: 2 – 3 months

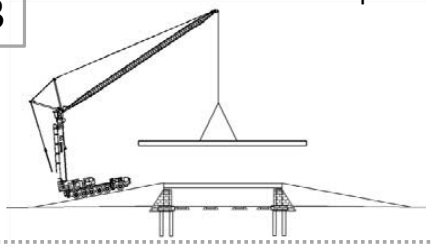
Ⅲ. Proposal for Reconstruction

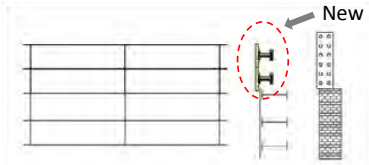
ORIENTAL CONSULTANTS GLOBAL CO., LTD.

3. Construction Process

3.3 Proposal for Construction Steps for (B)

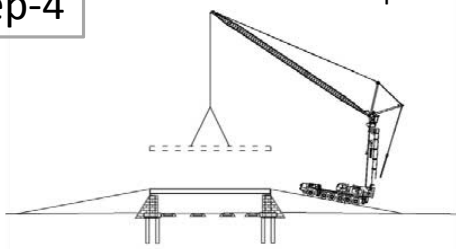
Step-3 Erection of HALF of New Superstructure. (Secure existing traffic, but by limited width)

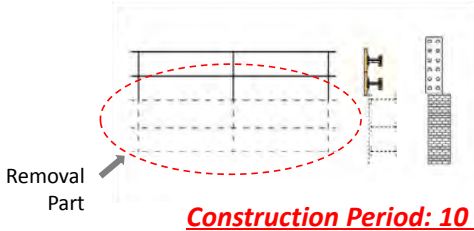




Construction Period: 3 days

Step-4 Removal of remained Superstructure. (Secure existing traffic at New Superstructure part)



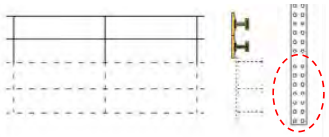


Construction Period: 10 days

3. Construction Process

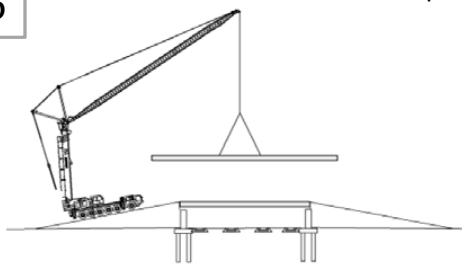
3.3 Proposal for Construction Steps for Ⓑ

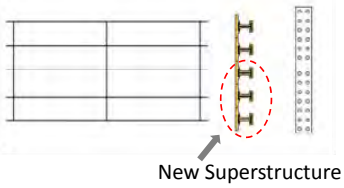
Step-5 Demolition of Remained of existing Abutment and construction of HALF of New Abutment. (Secure existing traffic but by limited width)



Construction Period: 1 week

Step-6 Erection of Remained of New Superstructure. (Secure existing traffic, but by limited width)

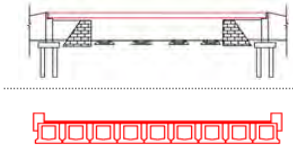
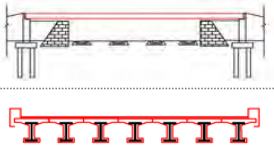
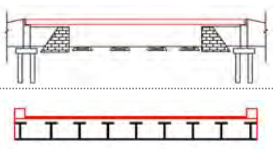




Construction Period: 2 – 3 months

3. Construction Process

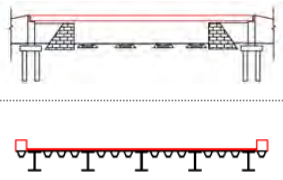
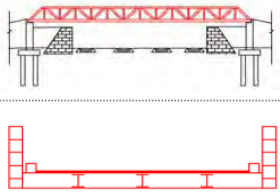
3.4 Comparison of Bridge Type

	Plan – 1 Bi - Prestressing PC Beam	**Plan - 2** Pre-fixed PC Beam	**Plan - 3** Composite Floor Slab
Side View & Cross Section			
Cost (Super Structure)	**1.17**	**1.06**	**1.03**
Comment	・Transversal Prestressing is necessary, **Step Construction is difficult. (Moderate)** ・Maintenance for re-coating is unnecessary. (Good) **・Due to requirement of high-strength concrete, fabrication shall be done at specialized factory (Bad).**	**・ Step Construction is possible. (Good)** ・ Maintenance for re-coating is unnecessary. (Good) **・ Easy for erection of girder, however, construction of cross beam and deck slab shall be done at site (Moderate).**	**・ Step Construction is possible. (Good)** ・ Re-coating is necessary only for Lower Deck Slab. (Moderate), but, by applying of weathering Steel, no maintenance work is required (Good) **・ Due to all fabricate in Factory, easy for erection at site (Good)**

Ⅲ. Proposal for Reconstruction

3. Construction Process

3.4 Comparison of Bridge Type

	Plan – 4 Steel I Girder with Steel Deck Plate	**Plan - 5** Pony Truss
Side View & Cross Section		
Cost (Super Structure)	**1.22**	**1.00**
Comment	▪ **Step Construction is possible. (Good)** ・ Re-coating is necessary for Main Girder and lower face of deck slab. (Moderate), but, by applying of weathering Steel, no maintenance work is required (Good) ▪ **Due to all fabricate in Factory, easy for erection at site (Good)**	▪ **Step Construction is impossible. (Bad)** ・ Re-coating is necessary for Truss structure. (Moderate) , but, by applying of weathering Steel, no maintenance work is required (Good) ▪ **Due to large number of members, period of work at site will be longer than other types. (Bad)**

Ⅲ. Proposal for Reconstruction

3. Construction Process

3.5 Recommendation

◆ For Bridge Type (A)

Due to an economic advantage and easy work at site is preferable for type A, because short construction period at site is required.

⇒ **Plan-3 (Composite Floor Slab) are preferable.**

◆ For Bridge Type (B)

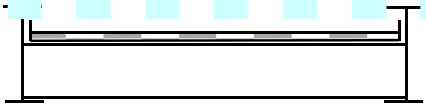
Due to an economic advantage and requirement of Step Construction for type B,

⇒ **Plan-3 (Composite Floor Slab) are preferable.**

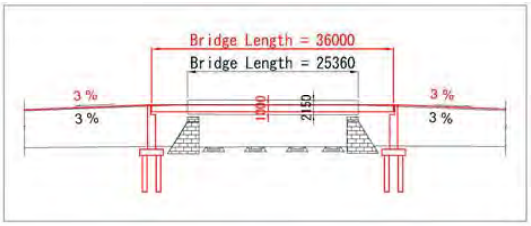
Ⅲ. Proposal for Reconstruction

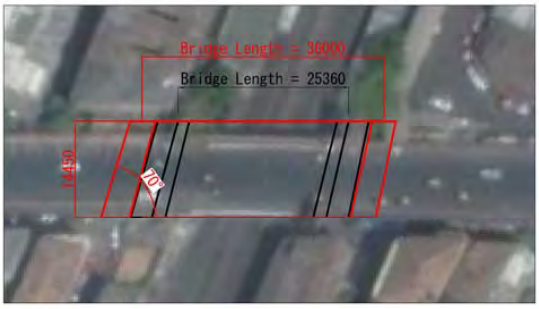
4. Case Study

4.1 For Type A

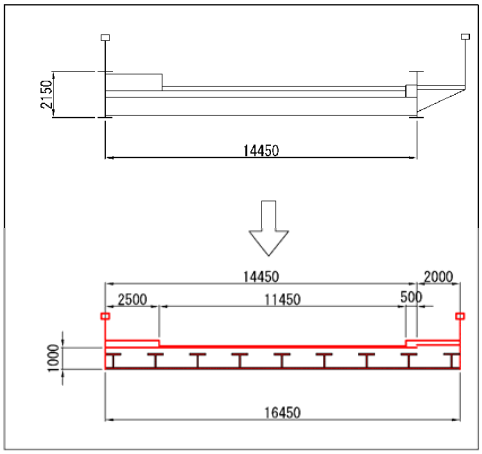


4. Delise ROB
5. Tilak ROB





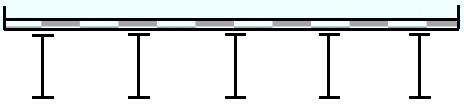
Ferere ROB : Bridge General



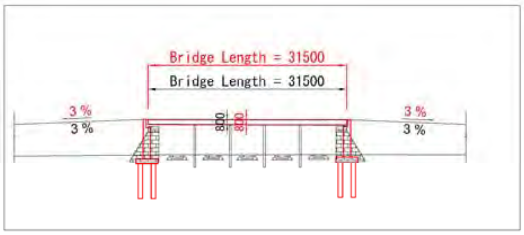
Ⅲ. Proposal for Reconstruction

4. Case Study

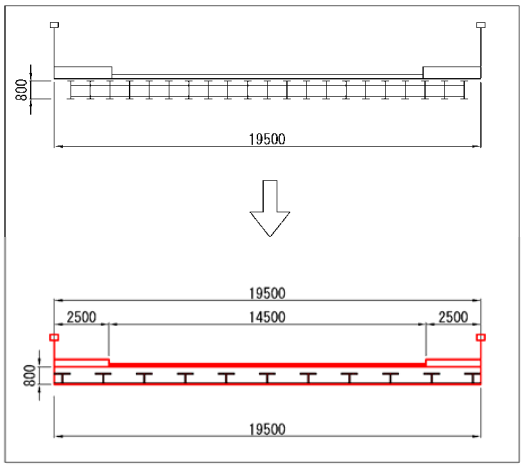
4.2 For Type B



2. Balasis ROB
3. Mahalaxmi ROB
6. Mahim ROB
7. Goregaon ROB



Balasis ROB : Bridge General



Ⅲ. Results of Site Inspection

5. Summary of Study Result

No.	Bridge Name	Proposed Plan					
		Length [m]	Width [m]	Span No.	Superstructure Type	Construction Method	Cost Estimation (Approx.)
Road over Bridge (ROB)							
1	**Ferere ROB**	36.00	19.50	1	Composite Floor Slab	One Time Construction	Rs. 260 million
2	**Balasis ROB**	31.50	19.50	5	Composite Floor Slab	Step Construction	Rs. 230 million
3	**Mahalaxmi ROB**	77.00	25.00	5	Composite Floor Slab	Step Construction	Rs. 700 million
4	**Delise ROB**	100.20	24.80	1	Composite Floor Slab	One Time Construction	Rs. 900 million
5	**Tilak ROB**	236.00	20.00	3	Composite Floor Slab	One Time Construction	Rs. 1,700 million
6	**Mahim ROB**	80.00	28.30	3	Composite Floor Slab	Step Construction	Rs. 820 million
7	**Goregaon ROB**	79.00	27.50	2	Composite Floor Slab	Step Construction	Rs. 900 million

Ⅳ. Study for Next Step

2. Non-Destructive Survey

Target Bridges for Non-Destructive Survey		
Type of Bridge	Location	Bridge Name
ROB (Concrete)	Mumbai	Mahim ROB (No.6)
	Vadodara	LC No. 5/A (No.8)
		LC No.2/X (No.9)

Ⅴ. Application of High-Elasticity CFRP

Recently, High-module CFRP is used in JAPAN.

Advantage of
High-module CFRP

↓

Can reduce
number of sheet

2 Num. (230 kN/mm2)

↓

1 Num. (640 kN/mm2)

Specification of Replakr

Elasticity

品名(品番)		目付量 (g/m²)	厚み (mm)	引張強度 (N/mm²)	引張弾性率 (KN/mm²)	含浸接着樹脂の標準使用量
リペラーク® 高強度グレード (1方向)	20タイプ(MRK-M2-20)	200	0.111	3,400	230(245)	0.6kg/m²
	30タイプ(MRK-M2-30)	300	0.167	3,400	230(245)	0.8kg/m²
	40タイプ(MRK-M2-40)	400	0.222	3,400	230(245)	1.0kg/m²
	45タイプ(MRK-M2-45)	450	0.250	3,400	230(245)	1.1kg/m²
	60タイプ(MRK-M2-60)	600	0.333	3,400	230(245)	1.2kg/m²
リペラーク® 中弾性グレード (1方向)	MMタイプ(MRK-M4-30)	300	0.165	2,900	390	0.8kg/m²
	MM2タイプ(MRK-M5-30)	300	0.163	2,400	440	0.8kg/m²
リペラーク® 高弾性グレード (1方向)	HMタイプ(MRK-M6-30)	300	0.143	1,900	640	0.8kg/m²
	HM40タイプ(MRK-M6-40)	400	0.190	1,900	640	1.0kg/m²
	HM45タイプ(MRK-M6-45)	450	0.214	1,900	640	1.1kg/m²
	HM60タイプ(MRK-M6-60)	600	0.286	1,900	640	1.4kg/m²
リペラーク® (2方向)	2方向 20タイプ(MRK-2D2-20)	200 (縦100／横100)	0.0556／0.0556	2,900	230	0.6kg/m²

High-module Type

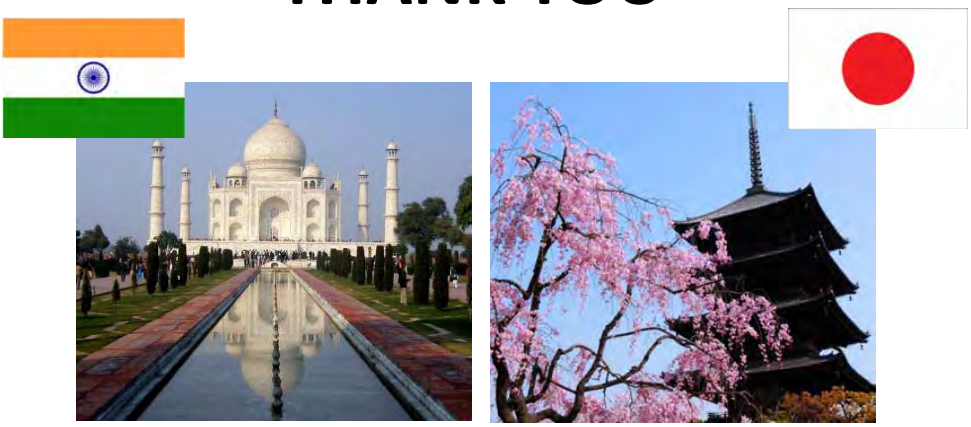
More Economical and Easy for installation.

Ⅵ. Schedule

1. Major Work Items and Schedule

Deliverables		Submission Date
Inception Report	Done	April, 2016
Interim Report	Done	July, 2016
Draft Final Report		Beginning of October, 2016
Final Report		End of November, 2016

THANK YOU



Oriental Consultants Global Co., Ltd.

添付 6

西部鉄道における損傷橋梁調査シート

Bridge Survey Record (1/6)

Date & Time: 07 Jun,2016 12:30

Bridge No.	Ser.No.1	**Division**	Mumbai
Bridge Name	Ferere ROB	**Year of Construction**	1921
GPS Data	N 18° 57' 43"	**Station**	Grant Road Station
	E 72° 48' 55"		-

Bridge Length	25.36m	**Span Arrangement**	Number 1
Bridge Width	19.50m		
Type of Superstructu	2 Main Steel I-Girder with cross girders	**Type of Substructure**	Stone Masonry Abutment

Overview of the Bridge

Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 07 Jun,2016 12:30

Bridge No.	Ser.No.1	Station	Grant Road Station
Bridge Name	Ferere ROB		-

Photoes

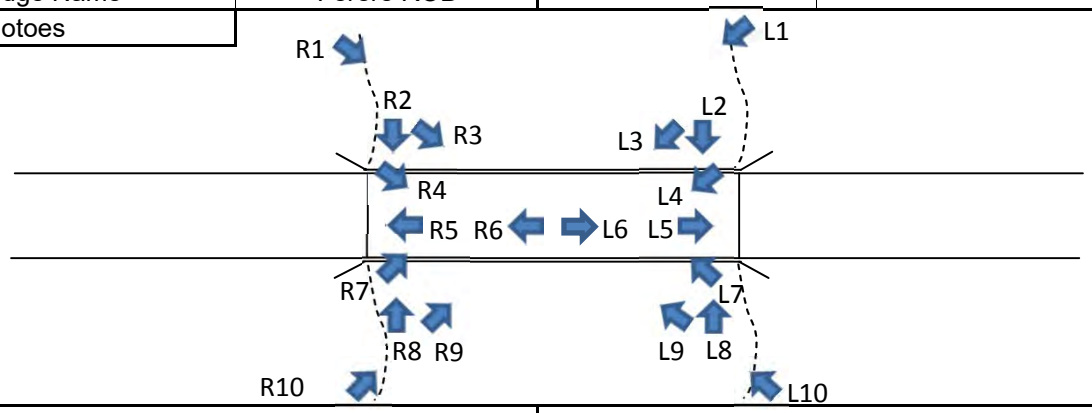


Photo R1

Photo R2

Photo R5

Photo R8

Photo R10

Photo R

Bridge Survey Record (3/6) Left Side

Date & Time: 07 Jun,2016 12:30

Bridge No.	Ser.No.1	Station	Mumbai
Bridge Name	Ferere ROB		1921

Photoes

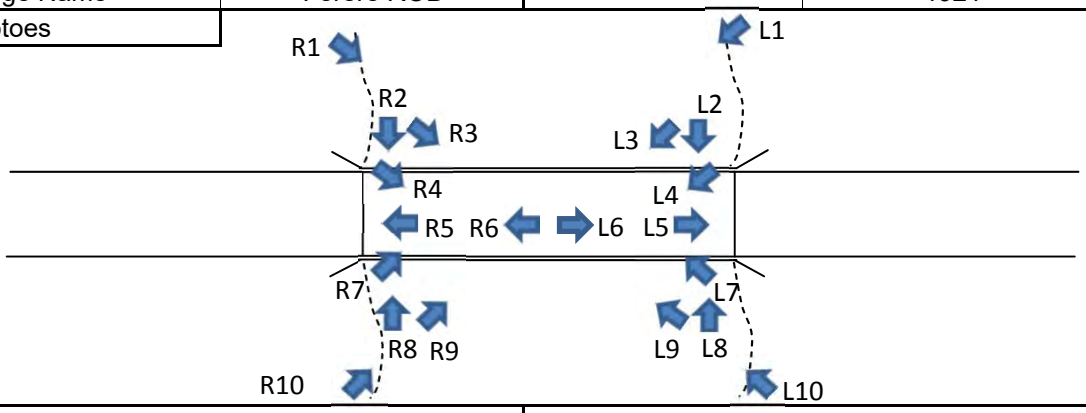


Photo L5

Photo L7

Photo L8

Photo L

Photo L

Photo L

Bridge Survey Record (4/6)

Date & Time: 07 Jun,2016 12:30

Bridge No.	Ser.No.1	**Division**	Mumbai
Bridge Name	Ferere ROB	**Year of Construction**	1921
GPS Data	N 18 °57 ' 43"	**Station**	Grant Road Station
	E 72°48 ' 55 "		-

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	**N/A**
- Girder	
- Cross Beam	
- Slab	
(2) Steel Member	
- Girder	Rusting (slightly)
- Virtical Girder (stringer)	N/A
- Cross Beam	Rusting (slightly)
- Sway Bracing	N/A
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	-
2. Substructure	
- Pier	N/A
- Abutment	Good
- Wing Wall	N/A
- Approach Road Condition	Good
- Obstruction	-
- Scouring	N/A
4.Evaluation	

Bridge Survey Record (5/6)

Date & Time: 07 Jun,2016 12:30

Bridge No.	Ser.No.1	**Division**	Mumbai
Bridge Name	Ferere ROB	**Year of Construction**	1921
GPS Data	N 18 °57 ' 43"	**Station**	Grant Road Station
	E 72°48 ' 55 "		-

Detailed Description of Damages

Object Member	
Kind of Damage	Good Condition
Sketch or Photo	

Bridge Survey Record (6/6)

Date & Time: 07 Jun,2016 12:30

Bridge No.	Ser.No.1	**Location (State)**	Mumbai
Bridge Name	Ferere ROB	**Year of Construction**	1921
GPS Data	N 18 °57 ' 43"	**Station**	Grant Road Station
	E 72°48 ' 55 "		-

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 07 Jun,2016 12:00

Bridge No.	Ser.No.2	**Division**	Mumbai
Bridge Name	Belasis ROB	**Year of Construction**	1893
GPS Data	N 18 ° 58 ' 08"	**Station**	Mumbai central
	E 72° 49 ' 06 "		-

Bridge Length	31.50m	**Span Arrangement**	Number 5
Bridge Width	19.50m		
Type of Superstructu	Steel I-Girder (15 girders)	**Type of Substructure**	Stone Masonry Abutment and Steel Pier Column

Overview of the Bridge Side View

Up View

Bridge Survey Record (2/6)　Right Side

Date & Time:　07 Jun,2016 12:00

Bridge No.	Ser.No.2	Station	Mumbai central
Bridge Name	Belasis ROB		-

Photoes

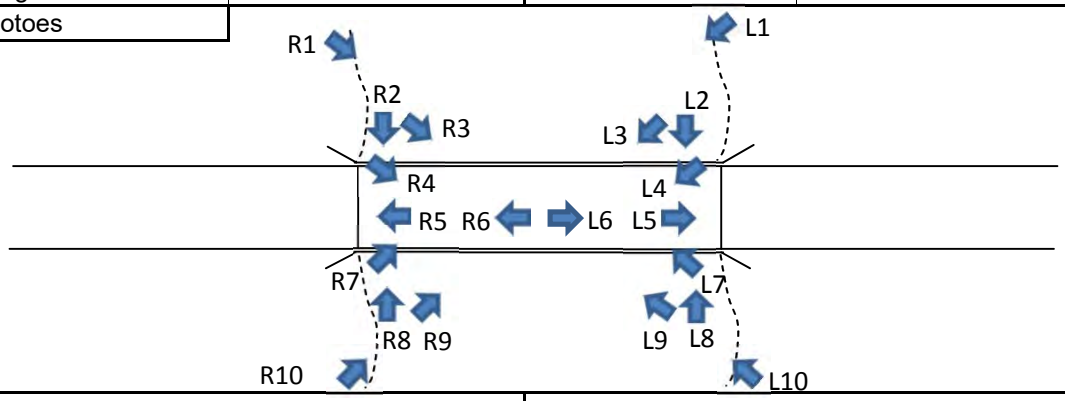


Photo R1

Photo R2

Photo R4

Photo R5

Photo R8

Photo R9

Bridge Survey Record (3/6) Left Side

Date & Time: 07 Jun,2016 12:00

Bridge No.	Ser.No.2	Station	Mumbai
Bridge Name	Belasis ROB		1893

Photoes

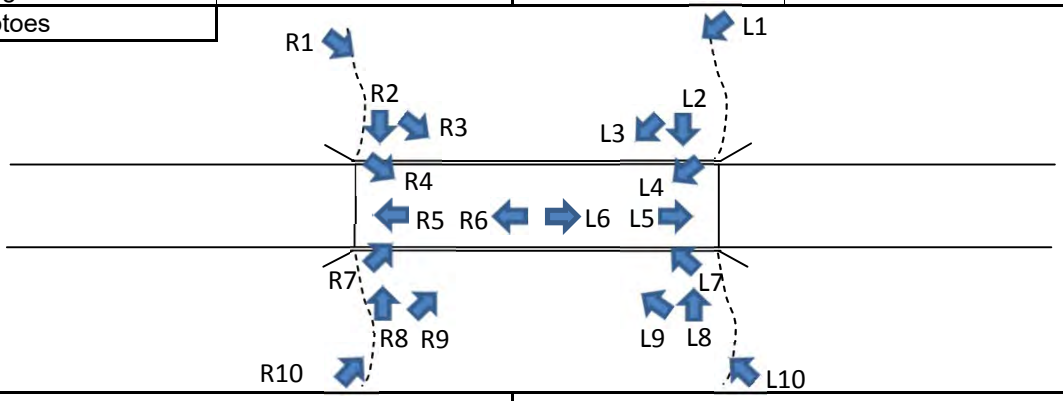


Photo L2

Photo L5

Photo L6

Photo L8

Photo L

Photo L

Bridge Survey Record (4/6)

Date & Time: 07 Jun,2016 12:00

Bridge No.	Ser.No.2	**Division**	Mumbai
Bridge Name	Belasis ROB	**Year of Construction**	1893
GPS Data	N 18 °58 ' 08"	**Station**	Mumbai central
	E 72°49 ' 06 "		-

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	**N/A**
- Girder	
- Cross Beam	
- Slab	
(2) Steel Member	
- Girder	Rusting (slightly)
- Virtical Girder (stringer)	N/A
- Cross Beam	Rusting (slightly)
- Sway Bracing	N/A
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	-
2. Substructure	
- Pier	Good
- Abutment	Good
- Wing Wall	N/A
3. Miscellaneous	
- Approach Road Condition	Good
- Obstruction	-
- Scouring	N/A
4.Evaluation	

Bridge Survey Record (5/6)

Date & Time: 07 Jun,2016 12:00

Bridge No.	Ser.No.2	**Division**	Mumbai
Bridge Name	Belasis ROB	**Year of Construction**	1893
GPS Data	N 18 °58 ' 08"	**Station**	Mumbai central
	E 72°49 ' 06 "		-

Detailed Description of Damages

Object Member	**Steel I-Girder**
Kind of Damage	**Rusting**
Sketch or Photo	

Bridge Survey Record (6/6)

Date & Time: 07 Jun,2016 12:00

Bridge No.	Ser.No.2	**Location (State)**	Mumbai
Bridge Name	Belasis ROB	**Year of Construction**	1893
GPS Data	N 18 °58 ' 08"	**Station**	Mumbai central
	E 72°49 ' 06 "		-

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 07 Jun,2016 12:00

Bridge No.	Ser.No.3	**Division**	Mumbai
Bridge Name	Mahalaxmi ROB	**Year of Construction**	1920
GPS Data	N 18 ° 58 ' 56"	**Station**	Mahalaxmi
	E 72° 49 ' 27 "		-

Bridge Length	77.00m	**Span Arrangement**	Number 5
Bridge Width	25.00m		
Type of Superstructu	Steel I-Girder (15 girders)	**Type of Substructure**	Stone Masonry Abutment and Steel Pier Column

Overview of the Bridge Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 07 Jun,2016 12:00

Bridge No.	Ser.No.3	Station	Mahalaxmi
Bridge Name	Mahalaxmi ROB		-

Photoes

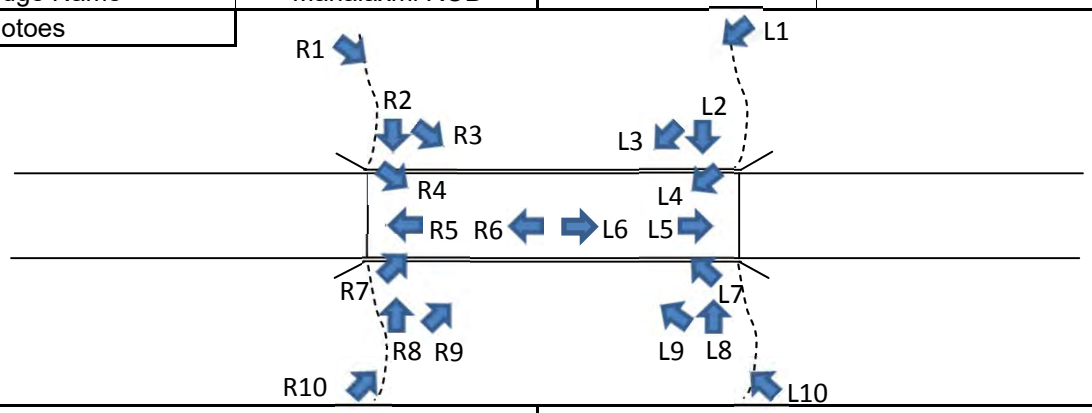


Photo R2

Photo R3

Photo R5

Photo R6

Photo R7

Photo R10

Bridge Survey Record (3/6) Left Side

Date & Time: 07 Jun,2016 12:00

Bridge No.	Ser.No.3	Station	Mumbai
Bridge Name	Mahalaxmi ROB		1920

Photoes

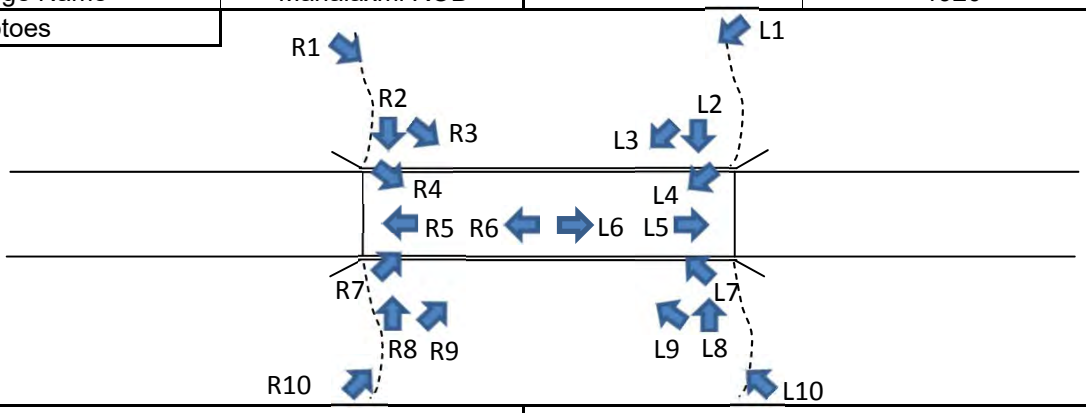


Photo L5

Photo L6

Photo L

Photo L

Photo L

Photo L

Bridge Survey Record (4/6)

Date & Time: 07 Jun,2016 12:00

Bridge No.	Ser.No.3	**Division**	Mumbai
Bridge Name	Mahalaxmi ROB	**Year of Construction**	1920
GPS Data	N 18 °58 ' 56"	**Station**	Mahalaxmi
	E 72°49 ' 27 "		-

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	**N/A**
- Girder	
- Cross Beam	
- Slab	
(2) Steel Member	
- Girder	Rusting
- Virtical Girder (stringer)	N/A
- Cross Beam	Rusting
- Sway Bracing	N/A
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	-
2. Substructure	
- Pier	Good
- Abutment	Good
- Wing Wall	N/A
3. Miscellaneous	
- Approach Road Condition	Good
- Obstruction	-
- Scouring	N/A
4.Evaluation	

Bridge Survey Record (5/6)

Date & Time: 07 Jun,2016 12:00

Bridge No.	Ser.No.3	**Division**	Mumbai
Bridge Name	Mahalaxmi ROB	**Year of Construction**	1920
GPS Data	N 18 °58 ' 56"	**Station**	Mahalaxmi
	E 72°49 ' 27 "		-

Detailed Description of Damages

Object Member	
Kind of Damage	Good Condition
Sketch or Photo	

Bridge Survey Record (6/6)

Date & Time: 07 Jun,2016 12:00

Bridge No.	Ser.No.3	**Location (State)**	Mumbai
Bridge Name	Mahalaxmi ROB	**Year of Construction**	1920
GPS Data	N 18 °58 ' 56"	**Station**	Mahalaxmi
	E 72°49 ' 27 "		-

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 07 Jun,2016 11:00

Bridge No.	Ser.No.4	**Division**	Mumbai
Bridge Name	Delise ROB	**Year of Construction**	1921
GPS Data	N 18 ° 59 ' 51"	**Station**	Lower Parel
	E 72° 49 ' 53 "		-

Bridge Length	63.20m	**Span Arrangement**	Number 3
Bridge Width	24.80m		
Type of Superstructu	2 Main Steel I-Girder with cross girders	**Type of Substructure**	Stone Masonry Abutment and Steel Pier Column

Overview of the Bridge

Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 07 Jun,2016 11:00

Bridge No.	Ser.No.4	Station	Lower Parel
Bridge Name	Delise ROB		-

Photoes

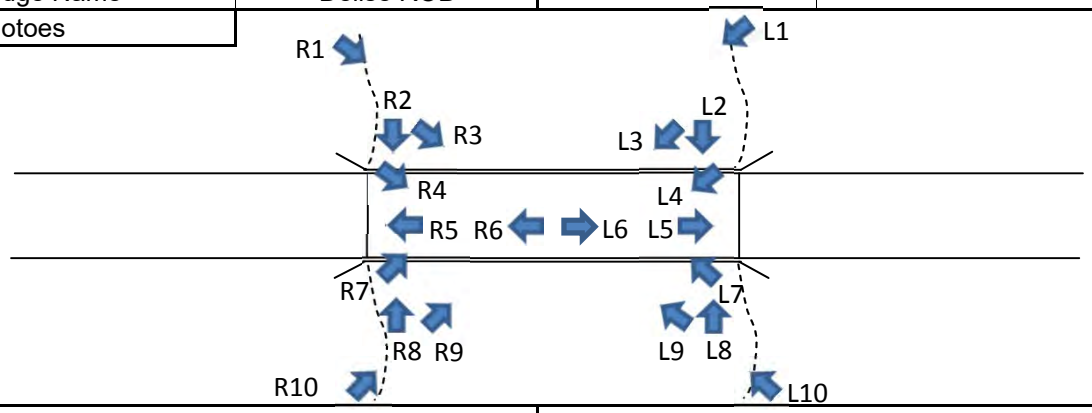


Photo R5

Photo R5

Photo R6

Photo R

Photo R

Photo R

Bridge Survey Record (3/6) Left Side

Date & Time: 07 Jun,2016 11:00

Bridge No.	Ser.No.4	Station	Mumbai
Bridge Name	Delise ROB		1921

Photoes

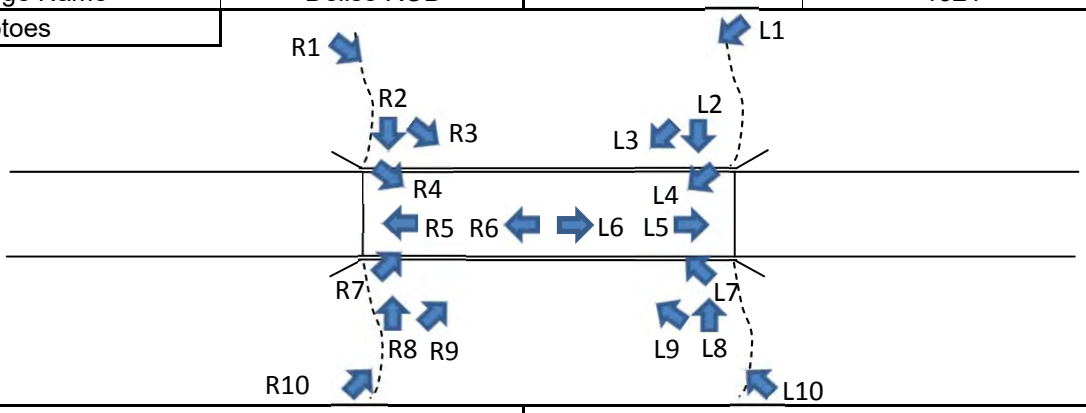


Photo L2

Photo L3

Photo L5

Photo L6

Photo 8

Photo L10

Bridge Survey Record (4/6)

Date & Time: 07 Jun,2016 11:00

Bridge No.	Ser.No.4	**Division**	Mumbai
Bridge Name	Delise ROB	**Year of Construction**	1921
GPS Data	N 18 °59 ' 51"	**Station**	Lower Parel
	E 72°49 ' 53 "		-

General Description of Damages

Member	**Kind of the Damage** **Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.**
1. Superstructure	
(1) Concrete Member	
- Girder	**N/A**
- Cross Beam	**N/A**
- Slab	**Crecking and Spalling**
(2) Steel Member	
- Girder	Rusting
- Virtical Girder (stringer)	N/A
- Cross Beam	Rusting
- Sway Bracing	N/A
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	-
2. Substructure	
- Pier	Good
- Abutment	Stone Masonary
- Wing Wall	N/A
3. Miscellaneous	
- Approach Road Condition	Good
- Obstruction	-
- Scouring	N/A
4.Evaluation	

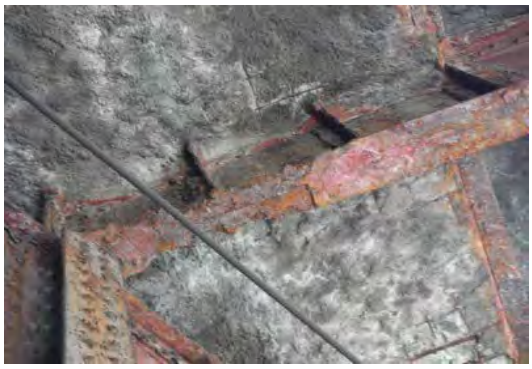
Bridge Survey Record (5/6)

Date & Time: 07 Jun,2016 11:00

Bridge No.	Ser.No.4	**Division**	Mumbai
Bridge Name	Delise ROB	**Year of Construction**	1921
GPS Data	N 18 °59 ' 51"	**Station**	Lower Parel
	E 72°49 ' 53 "		-

Detailed Description of Damages

Object Member	RC Slub
Kind of Damage	Spalling and exposed Rebar
Sketch or Photo	






Bridge Survey Record (5/6)

Date & Time: 07 Jun,2016 11:00

Bridge No.	Ser.No.4	**Division**	Mumbai
Bridge Name	Delise ROB	**Year of Construction**	1921
GPS Data	N 18 °59 ' 51"	**Station**	Lower Parel
	E 72°49 ' 53 "		-

Detailed Description of Damages

Object Member	**Concrete Base**
Kind of Damage	**Cracking and spalling**
Sketch or Photo	

Bridge Survey Record (5/6)

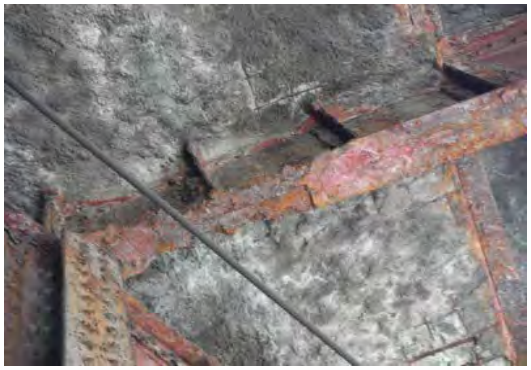
Date & Time: 07 Jun,2016 11:00

Bridge No.	Ser.No.4	**Division**	Mumbai
Bridge Name	Delise ROB	**Year of Construction**	1921
GPS Data	N 18 °59 ' 51"	**Station**	Lower Parel
	E 72°49 ' 53 "		-

Detailed Description of Damages

Object Member	Cross Bream
Kind of Damage	Runsting
Sketch or Photo	



Bridge Survey Record (6/6)

Date & Time: 07 Jun,2016 11:00

Bridge No.	Ser.No.4	**Location (State)**	Mumbai
Bridge Name	Delise ROB	**Year of Construction**	1921
GPS Data	N 18 °59 ' 51"	**Station**	Lower Parel
	E 72°49 ' 53 "		-

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 08 Jun,2016 10:30

Bridge No.	Ser.No.5	**Division**	Mumbai
Bridge Name	Tilak ROB	**Year of Construction**	1925
GPS Data	N 19° 01 ' 13"	**Station**	Dadar
	E 72° 50 ' 38 "		-

Bridge Length	226.20m	**Span Arrangement**	Number 3
Bridge Width	20.00m		
Type of Superstructu	2 Main Steel I-Girder with cross girders	**Type of Substructure**	Stone Masonry Abutment and Steel Pier Column

Overview of the Bridge Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 08 Jun,2016 10:30

Bridge No.	Ser.No.5	Station	Dadar
Bridge Name	Tilak ROB		-

Photoes

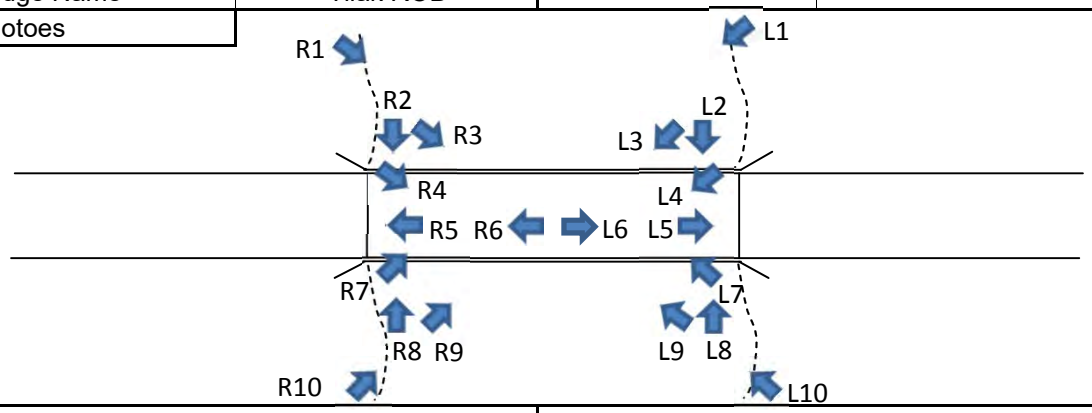


Photo R2

Photo R6

Photo R4

Photo R7

Photo R8

Photo R9

Bridge Survey Record (3/6) Left Side

Date & Time: 08 Jun,2016 10:30

Bridge No.	Ser.No.5	Station	Mumbai
Bridge Name	Tilak ROB		1925

Photoes

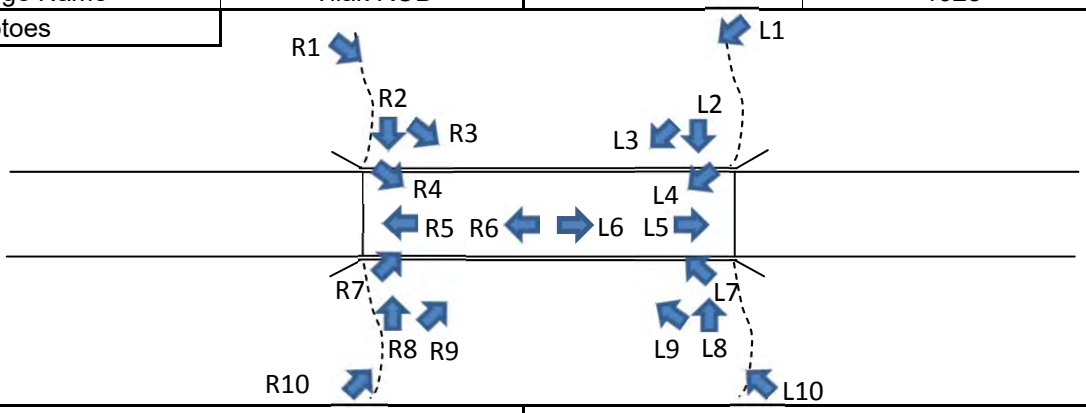


Photo L3

Photo L6

Photo L8

Photo L9

Photo L

Photo L

Bridge Survey Record (4/6)

Date & Time: 08 Jun,2016 10:30

Bridge No.	Ser.No.5	**Division**	Mumbai
Bridge Name	Tilak ROB	**Year of Construction**	1925
GPS Data	N 19 °01 ' 13"	**Station**	Dadar
	E 72°50 ' 38 "		-

General Description of Damages

Member	**Kind of the Damage** **Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.**
1. Superstructure	
(1) Concrete Member	**N/A**
- Girder	
- Cross Beam	
- Slab	
(2) Steel Member	Good
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	No check
(4) Drainage Pipe	No check
(5) Others	-
2. Substructure	
- Pier	N/A
- Abutment	Good
- Wing Wall	Good
3. Miscellaneous	
- Approach Road Condition	
- Obstruction	
- Scouring	N/A
4.Evaluation	

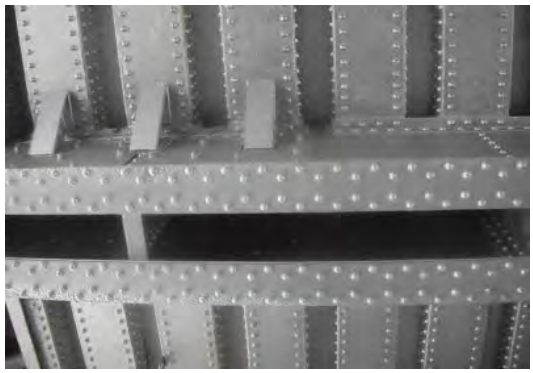
Bridge Survey Record (5/6)

Date & Time: 08 Jun,2016 10:30

Bridge No.	Ser.No.5	**Division**	Mumbai
Bridge Name	Tilak ROB	**Year of Construction**	1925
GPS Data	N 19 °01 ' 13"	**Station**	Dadar
	E 72°50 ' 38 "		-

Detailed Description of Damages

Object Member	
Kind of Damage	Good Condition
Sketch or Photo	



Bridge Survey Record (6/6)

Date & Time: 08 Jun,2016 10:30

Bridge No.	Ser.No.5	**Location (State)**	Mumbai
Bridge Name	Tilak ROB	**Year of Construction**	1925
GPS Data	N 19 °01 ' 13"	**Station**	Dadar
	E 72°50 ' 38 "		-

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 08 Jun,2016 11:40

Bridge No.	Ser.No.6	**Division**	Mumbai
Bridge Name	Mahim ROB	**Year of Construction**	1993
GPS Data	N 19° 02 ' 41"	**Station**	Mahim Junction
	E 72° 50 ' 41 "		-

Bridge Length	80.00m	**Span Arrangement**	Number 3
Bridge Width	28.30m		
Type of Superstructu	PC I-Shaped Girder	**Type of Substructure**	RC Abutment and RC Pier Column

Overview of the Bridge Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 08 Jun,2016 11:40

Bridge No.	Ser.No.6	Station	Mahim Junction
Bridge Name	Mahim ROB		-

Photoes

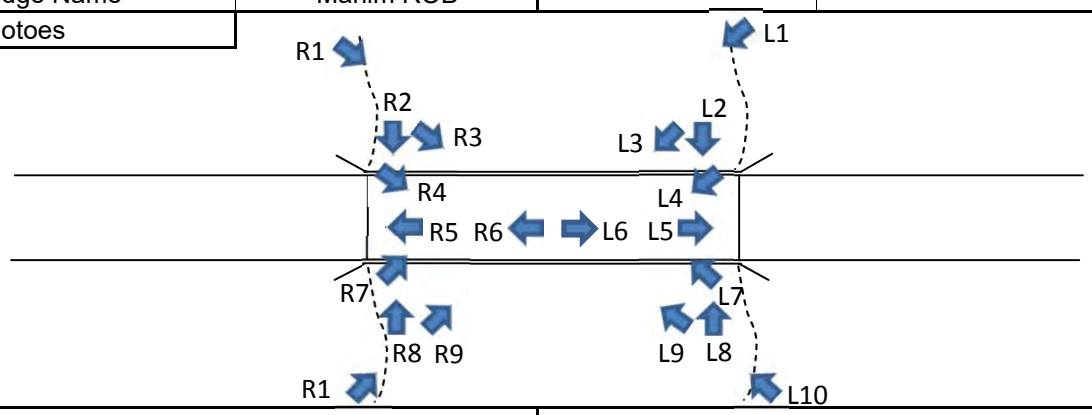


Photo R3

Photo R6

Photo R4

Photo R7

Photo R8

Photo R10

Bridge Survey Record (3/6) Left Side

Date & Time: 08 Jun,2016 11:40

Bridge No.	Ser.No.6	Station	Mumbai
Bridge Name	Mahim ROB		1993

Photoes

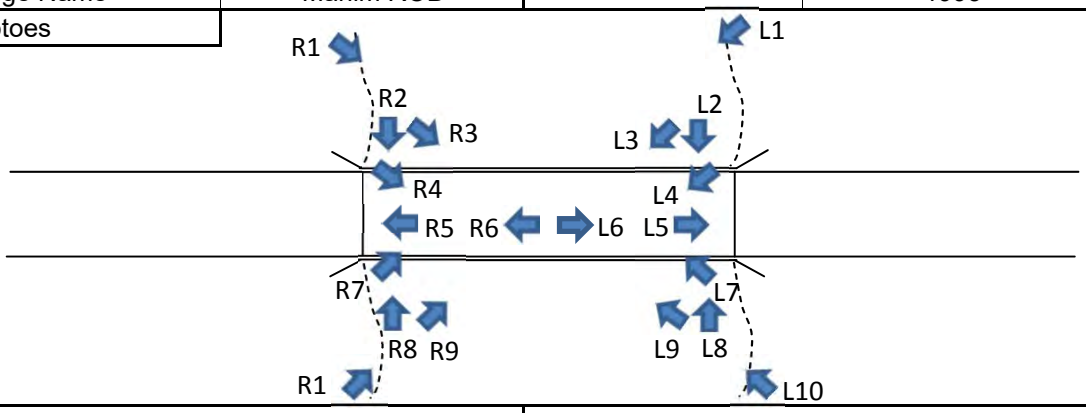


Photo L3

Photo L5

Photo L7

Photo L9

Photo L

Photo L

Bridge Survey Record (4/6)

Date & Time: 08 Jun,2016 11:40

Bridge No.	Ser.No.6	**Division**	Mumbai
Bridge Name	Mahim ROB	**Year of Construction**	1993
GPS Data	N 19 °02 ' 41"	**Station**	Mahim Junction
	E 72°50 ' 41 "		-

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	
- Girder	**Spalling**
- Cross Beam	**Spalling**
- Slab	**Spalling**
(2) Steel Member	N/A
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	No Check
(4) Drainage Pipe	None
(5) Others	
2. Substructure	
- Pier	Cracking and Spalling
- Abutment	Good
- Wing Wall	N/A
3. Miscellaneous	
- Approach Road Condition	
- Obstruction	
- Scouring	N/A
4.Evaluation	

Bridge Survey Record (5/6)

Date & Time: 08 Jun,2016 11:40

Bridge No.	Ser.No.6	**Division**	Mumbai
Bridge Name	Mahim ROB	**Year of Construction**	1993
GPS Data	N 19 °02 ' 41"	**Station**	Mahim Junction
	E 72°50 ' 41 "		-

Detailed Description of Damages

Object Member	PC I-Girder and RC slub
Kind of Damage	Spalling
Sketch or Photo	

Bridge Survey Record (5/6)

Date & Time: 08 Jun,2016 11:40

Bridge No.	Ser.No.6	**Division**	Mumbai
Bridge Name	Mahim ROB	**Year of Construction**	1993
GPS Data	N 19 °02 ' 41"	**Station**	Mahim Junction
	E 72°50 ' 41 "		-

Detailed Description of Damages

Object Member	**PC cable**
Kind of Damage	**Fracture**
Sketch or Photo	

Bridge Survey Record (5/6)

Date & Time: 08 Jun,2016 11:40

Bridge No.	Ser.No.6	**Division**	Mumbai
Bridge Name	Mahim ROB	**Year of Construction**	1993
GPS Data	N 19 °02 ' 41"	**Station**	Mahim Junction
	E 72°50 ' 41 "		-

Detailed Description of Damages

Object Member	**RC Pier**
Kind of Damage	**Cracking and Spalling**
Sketch or Photo	

Bridge Survey Record (6/6)

Date & Time: 08 Jun,2016 11:40

Bridge No.	Ser.No.6	**Location (State)**	Mumbai
Bridge Name	Mahim ROB	**Year of Construction**	1993
GPS Data	N 19 °02 ' 41"	**Station**	Mahim Junction
	E 72°50 ' 41 "		-

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 08 Jun,2016 15:10

Bridge No.	Ser.No.7	**Division**	Mumbai
Bridge Name	Goregaon ROB	**Year of Construction**	1993
GPS Data	N 19 ° 10 ' 26"	**Station**	Goregaon
	E 72° 50 ' 56 "		Malad

Bridge Length	79.00m	**Span Arrangement**	Number 2
Bridge Width	27.50m		
Type of Superstructu	PC I-Shaped Girder	**Type of Substructure**	RC Abutment and RC Pier Column

Overview of the Bridge Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 08 Jun,2016 15:10

Bridge No.	Ser.No.7	Station	Goregaon
Bridge Name	Goregaon ROB		Malad

Photoes

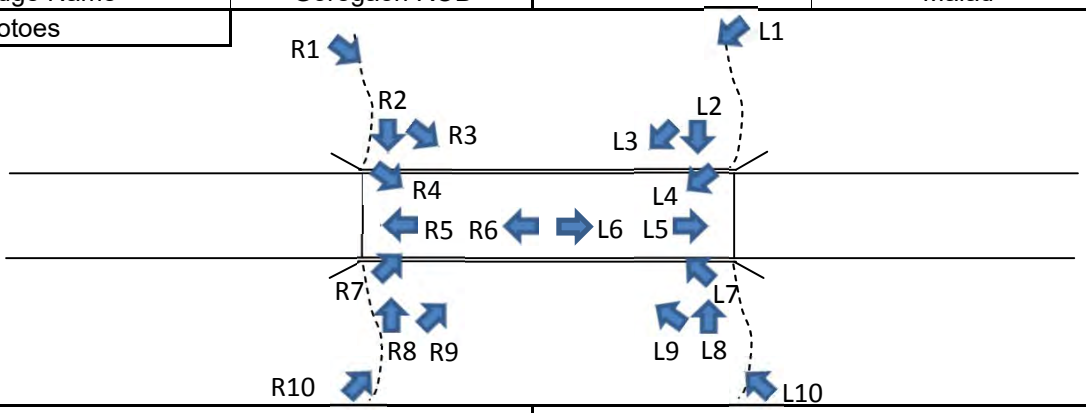


Photo R1

Photo R6

Photo R8

Photo R9

Photo R

Photo R

Bridge Survey Record (3/6) Left Side

Date & Time: 08 Jun,2016 15:10

Bridge No.	Ser.No.7	Station	Mumbai
Bridge Name	Goregaon ROB		1993

Photoes

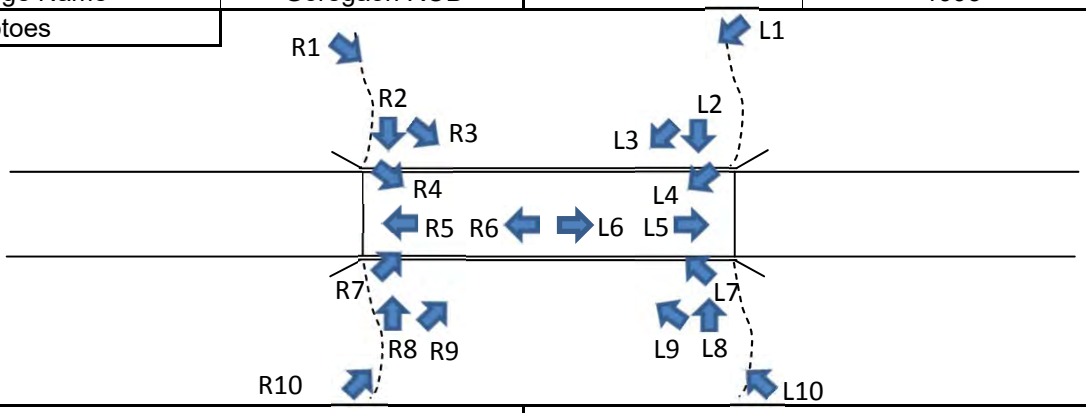


Photo L5

Photo L7

Photo L8

Photo L

Photo L

Photo L

Bridge Survey Record (4/6)

Date & Time: 08 Jun,2016 15:10

Bridge No.	Ser.No.7	**Division**	Mumbai
Bridge Name	Goregaon ROB	**Year of Construction**	1993
GPS Data	N 19 °10 ' 26"	**Station**	Goregaon
	E 72° 50 ' 56 "		Malad

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	**Good**
- Girder	
- Cross Beam	
- Slab	
(2) Steel Member	N/A
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	
2. Substructure	
- Pier	Good
- Abutment	Good
- Wing Wall	N/A
3. Miscellaneous	
- Approach Road Condition	Bad
- Obstruction	
- Scouring	N/A
4.Evaluation	

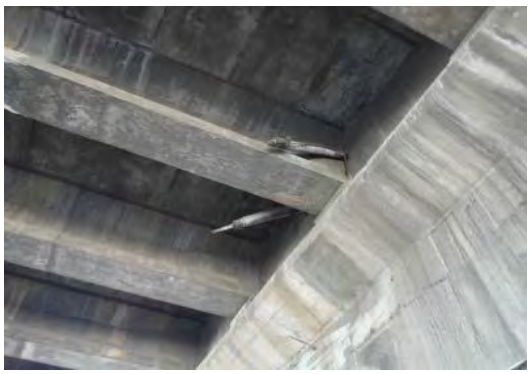
Bridge Survey Record (5/6)

Date & Time: 08 Jun,2016 15:10

Bridge No.	Ser.No.7	**Division**	Mumbai
Bridge Name	Goregaon ROB	**Year of Construction**	1993
GPS Data	N 19 °10 ' 26"	**Station**	Goregaon
	E 72° 50 ' 56 "		Malad

Detailed Description of Damages

Object Member	
Kind of Damage	Good Condition
Sketch or Photo	



Bridge Survey Record (6/6)

Date & Time: 08 Jun,2016 15:10

Bridge No.	Ser.No.7	**Location (State)**	Mumbai
Bridge Name	Goregaon ROB	**Year of Construction**	1993
GPS Data	N 19 °10 ' 26"	**Station**	Goregaon
	E 72° 50 ' 56 "		Malad

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 13 Jun,2016 12:30

Bridge No.	Ser.No.8	**Division**	Vadodara
Bridge Name	LC No.5/A	**Year of Construction**	2011-2012
GPS Data	N 21 ° 42 ' 20"	**Station**	Bharuch
	E 72° 57 ' 59 "		Sami

Bridge Length	85.00m	**Span Arrangement**	Number 2
Bridge Width	27.50m		
Type of Superstructu	PSC Box Type	**Type of Substructure**	RC Abutment and RC Pier Column

Overview of the Bridge

Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 13 Jun,2016 12:30

Bridge No.	Ser.No.8	Station	Bharuch
Bridge Name	LC No.5/A		Sami

Photoes

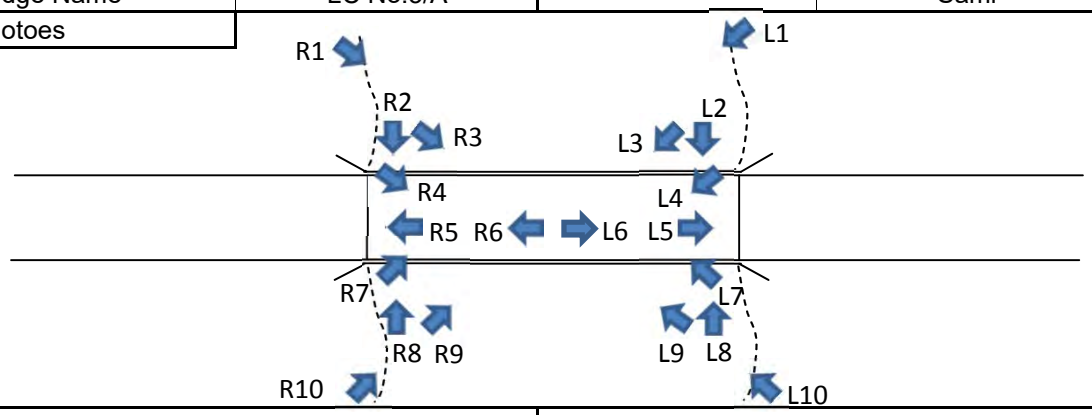


Photo R3

Photo R6

Photo R

Photo R

Photo R

Photo R

Bridge Survey Record (3/6) Left Side

Date & Time: 13 Jun,2016 12:30

Bridge No.	Ser.No.8	Station	Vadodara
Bridge Name	LC No.5/A		2011-2012

Photoes

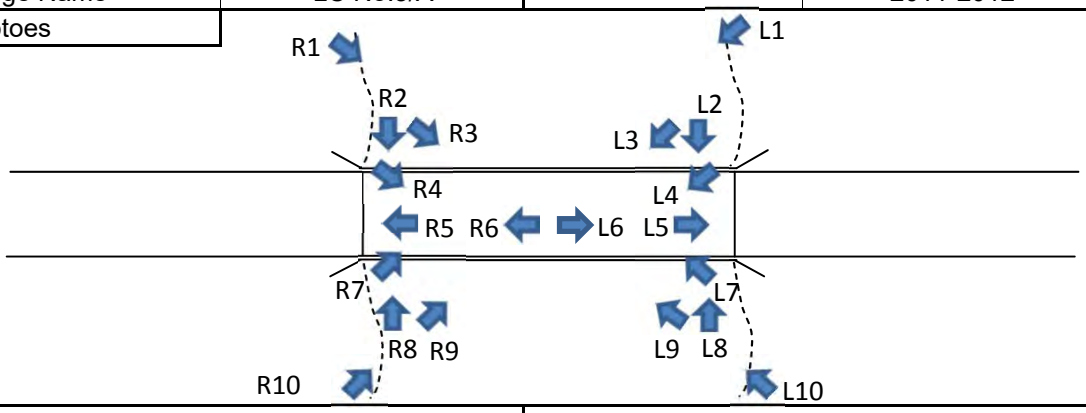


Photo L2

Photo L3

Photo L4

Photo L5

Photo L10

Bridge Survey Record (4/6)

Date & Time: 13 Jun,2016 12:30

Bridge No.	Ser.No.8	**Division**	Vadodara
Bridge Name	LC No.5/A	**Year of Construction**	2011-2012
GPS Data	N 21 °42 ' 20"	**Station**	Bharuch
	E 72° 57 ' 59 "		Sami

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	
- Girder	**N/A**
- Cross Beam	**N/A**
- Slab	**Cracking**
(2) Steel Member	N/A
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	No Check
(4) Drainage Pipe	No Check
(5) Others	
2. Substructure	
- Pier	Good
- Abutment	N/A
- Wing Wall	N/A
3. Miscellaneous	
- Approach Road Condition	Good
- Obstruction	
- Scouring	N/A
4.Evaluation	

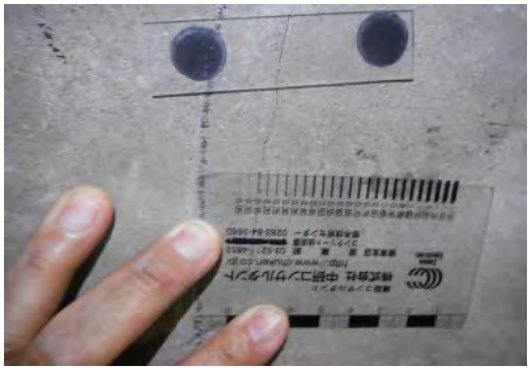
Bridge Survey Record (5/6)

Date & Time: 13 Jun,2016 12:30

Bridge No.	Ser.No.8	**Division**	Vadodara
Bridge Name	LC No.5/A	**Year of Construction**	2011-2012
GPS Data	N 21 °42 ' 20"	**Station**	Bharuch
	E 72° 57 ' 59 "		Sami

Detailed Description of Damages

Object Member	**PSC Box**
Kind of Damage	**Cracking**
Sketch or Photo	



Bridge Survey Record (6/6)

Date & Time: 13 Jun,2016 12:30

Bridge No.	Ser.No.8	**Location (State)**	Vadodara
Bridge Name	LC No.5/A	**Year of Construction**	2011-2012
GPS Data	N 21 °42 ' 20"	**Station**	Bharuch
	E 72° 57 ' 59 "		Sami

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 13 Jun,2016 09:30

Bridge No.	Ser.No.9	**Division**	Vadodara
Bridge Name	LC No.2/X (North)	**Year of Construction**	2008
GPS Data	N 22 ° 03 ' 22"	**Station**	Miyagam
	E 73° 07 ' 46 "		Daboi-Malsar

Bridge Length	35.08m	**Span Arrangement**	Number 1
Bridge Width	6.35m		
Type of Superstructu	PSC Box Type	**Type of Substructure**	RC Abutment and RC Pier Column

Overview of the Bridge

Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 13 Jun,2016 09:30

Bridge No.	Ser.No.9	Station	Miyagam
Bridge Name	LC No.2/X (North)		Daboi-Malsar

Photoes

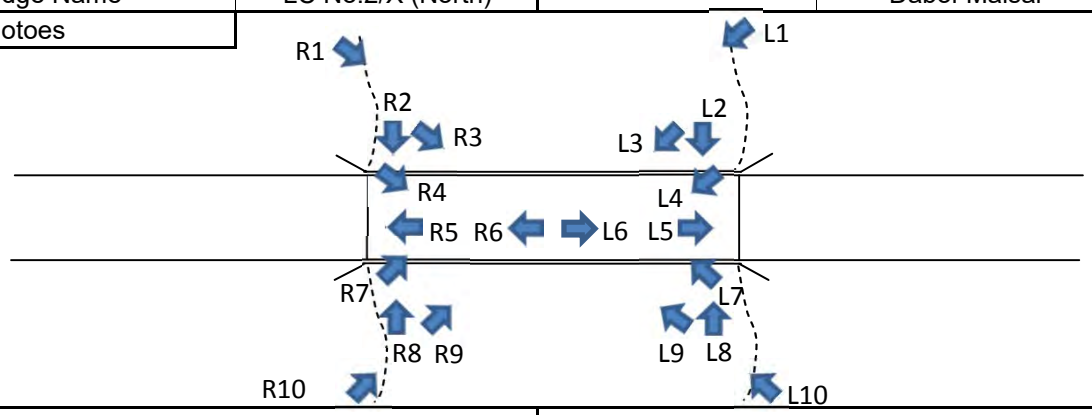


Photo R2

Photo R3

Photo R5

Photo R6

Photo R8

Photo R

Bridge Survey Record (3/6) Left Side

Date & Time: 13 Jun,2016 09:30

Bridge No.	Ser.No.9	Station	Vadodara
Bridge Name	LC No.2/X (North)		2008

Photoes

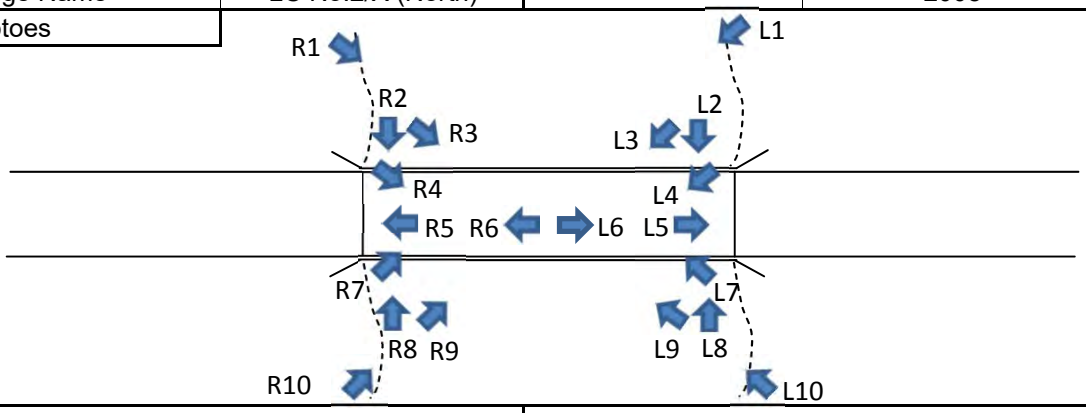


Photo L2

Photo L3

Photo L5

Photo L6

Photo L8

Photo L10

Bridge Survey Record (4/6)

Date & Time: 13 Jun,2016 09:30

Bridge No.	Ser.No.9	**Division**	Vadodara
Bridge Name	LC No.2/X (North)	**Year of Construction**	2008
GPS Data	N 22 °03 ' 22"	**Station**	Miyagam
	E 73° 07 ' 46 "		Daboi-Malsar

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	
- Girder	**N/A**
- Cross Beam	**N/A**
- Slab	**Repair for Cracking**
(2) Steel Member	N/A
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	
2. Substructure	
- Pier	No Check
- Abutment	Good
- Wing Wall	Good
3. Miscellaneous	
- Approach Road Condition	Bad
- Obstruction	
- Scouring	N/A
4.Evaluation	

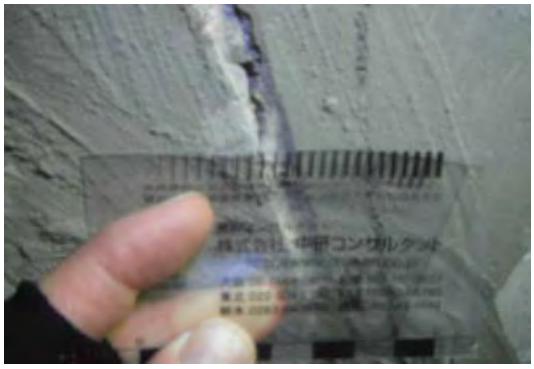
Bridge Survey Record (5/6)

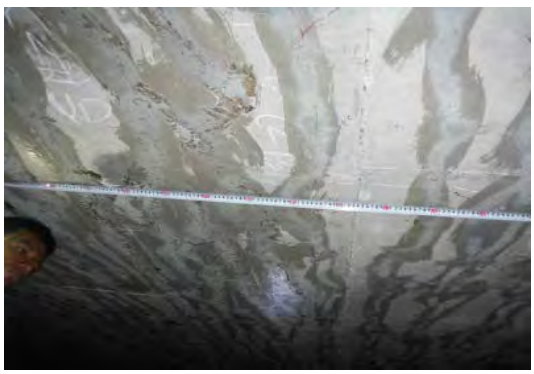
Date & Time: 13 Jun,2016 09:30

Bridge No.	Ser.No.9	**Division**	Vadodara
Bridge Name	LC No.2/X (North)	**Year of Construction**	2008
GPS Data	N 22 °03 ' 22"	**Station**	Miyagam
	E 73° 07 ' 46 "		Daboi-Malsar

Detailed Description of Damages

Object Member	**Deck Slab**
Kind of Damage	**Repair Work for Cracking**
Sketch or Photo	





Bridge Survey Record (6/6)

Date & Time: 13 Jun,2016 09:30

Bridge No.	Ser.No.9	**Location (State)**	Vadodara
Bridge Name	LC No.2/X (North)	**Year of Construction**	2008
GPS Data	N 22 °03 ' 22"	**Station**	Miyagam
	E 73° 07 ' 46 "		Daboi-Malsar

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 13 Jun,2016 09:30

Bridge No.	Ser.No.9	**Division**	Vadodara
Bridge Name	LC No.2/X (South)	**Year of Construction**	2008
GPS Data	N 22 ° 02 ' 14"	**Station**	Miyagam
	E 73° 07 ' 24 "		Daboi-Malsar

Bridge Length	35.08m	**Span Arrangement**	Number 1
Bridge Width	6.35m		
Type of Superstructu	PSC Box Type	**Type of Substructure**	RC Abutment and RC Pier Column

Overview of the Bridge

Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 13 Jun,2016 09:30

Bridge No.	Ser.No.9	Station	Miyagam
Bridge Name	LC No.2/X (South)		Daboi-Malsar

Photoes

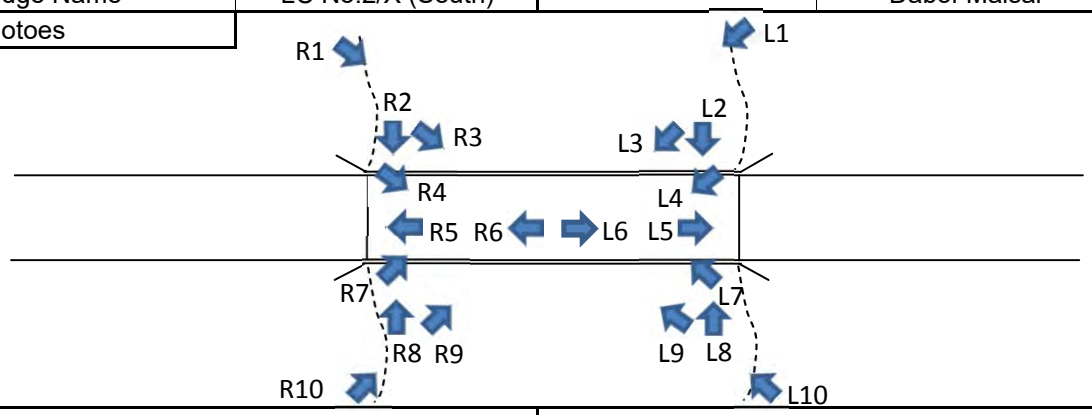


Photo R2

Photo R5

Photo R6

Photo R8

Photo R10

Photo R

Bridge Survey Record (3/6) Left Side

Date & Time: 13 Jun,2016 09:30

Bridge No.	Ser.No.9	Station	Vadodara
Bridge Name	LC No.2/X (South)		2008

Photoes

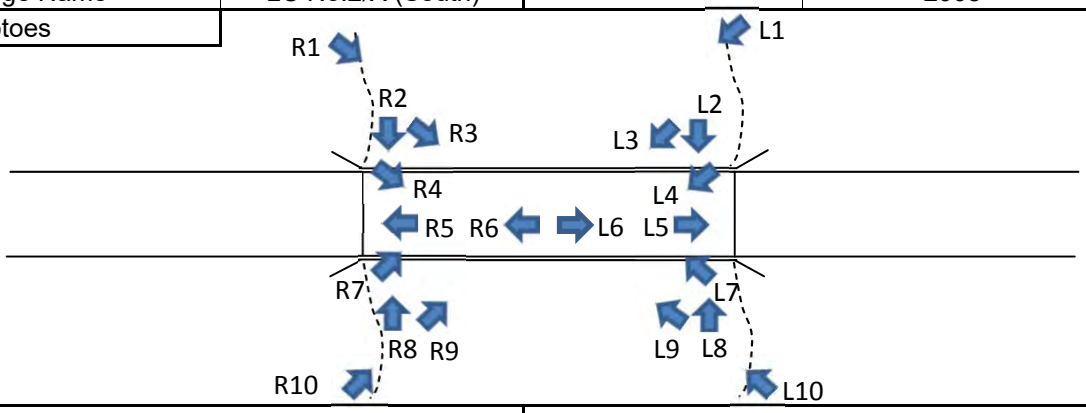


Photo L1

Photo L2

Photo L5

Photo L6

Photo L8

Photo L10

Bridge Survey Record (4/6)

Date & Time: 13 Jun,2016 09:30

Bridge No.	Ser.No.9	**Division**	Vadodara
Bridge Name	LC No.2/X (South)	**Year of Construction**	2008
GPS Data	N 22 °02 ' 14"	**Station**	Miyagam
	E 73° 07 ' 24 "		Daboi-Malsar

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	
- Girder	**N/A**
- Cross Beam	**N/A**
- Slab	**Cracking**
(2) Steel Member	N/A
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	-
2. Substructure	
- Pier	No Check
- Abutment	Good
- Wing Wall	Good
3. Miscellaneous	
- Approach Road Condition	Good
- Obstruction	-
- Scouring	N/A
4.Evaluation	

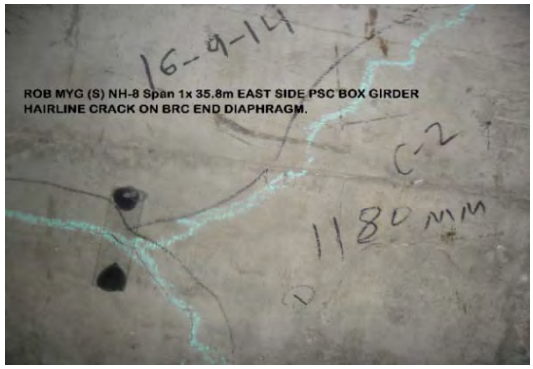
Bridge Survey Record (5/6)

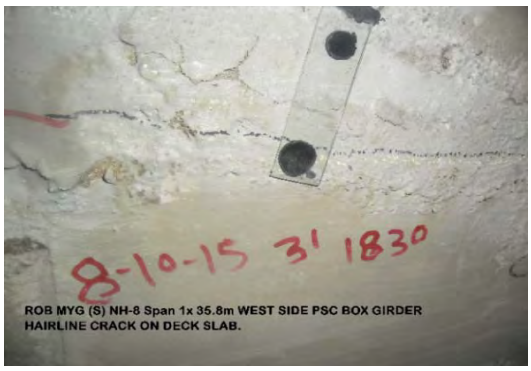
Date & Time: 13 Jun,2016 09:30

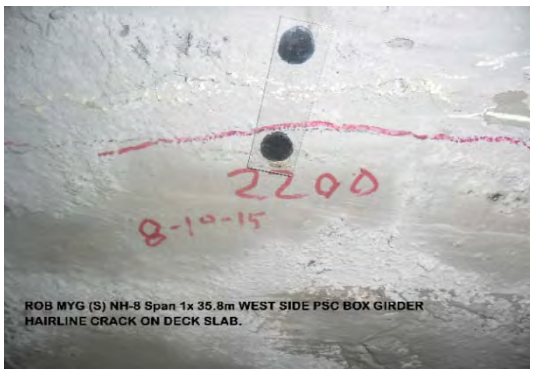
Bridge No.	Ser.No.9	**Division**	Vadodara
Bridge Name	LC No.2/X (South)	**Year of Construction**	2008
GPS Data	N 22 °02 ' 14"	**Station**	Miyagam
	E 73° 07 ' 24 "		Daboi-Malsar

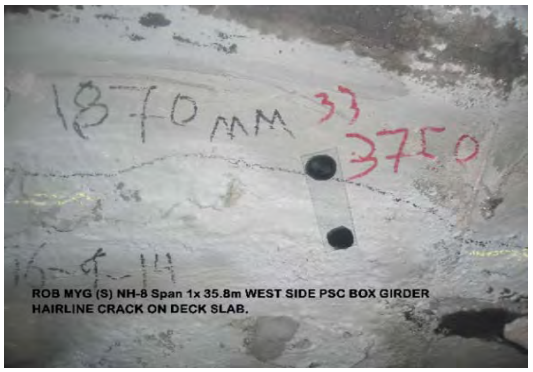
Detailed Description of Damages

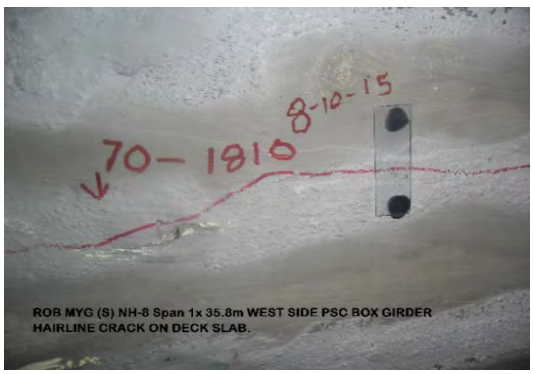
Object Member	**Deck Slab**
Kind of Damage	**Cracking**
Sketch or Photo	

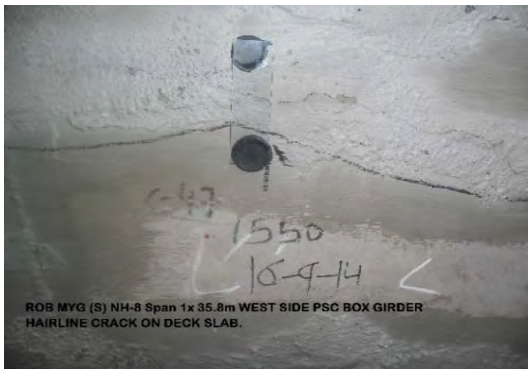












Bridge Survey Record (6/6)

Date & Time: 13 Jun,2016 09:30

Bridge No.	Ser.No.9	**Location (State)**	Vadodara
Bridge Name	LC No.2/X (South)	**Year of Construction**	2008
GPS Data	N 22 °02 ' 14"	**Station**	Miyagam
	E 73° 07 ' 24 "		Daboi-Malsar

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 09 Jun,2016 11:00

Bridge No.	73	**Division**	Mumbai
Bridge Name	-	**Year of Construction**	1993
GPS Data	N 19 ° 19 ' 20"	**Station**	Bhayandar
	E 72° 59 ' 08 "		Naigaon

Bridge Length	1450m	**Span Arrangement**	Number 29
Bridge Width	6.7 m		
Type of Superstructu	PC Box Girder	**Type of Substructure**	RC Abutment and RC Pier Column

Overview of the Bridge Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 09 Jun,2016 11:00

Bridge No.	73	Station	Bhayandar
Bridge Name	-		Naigaon

Photoes

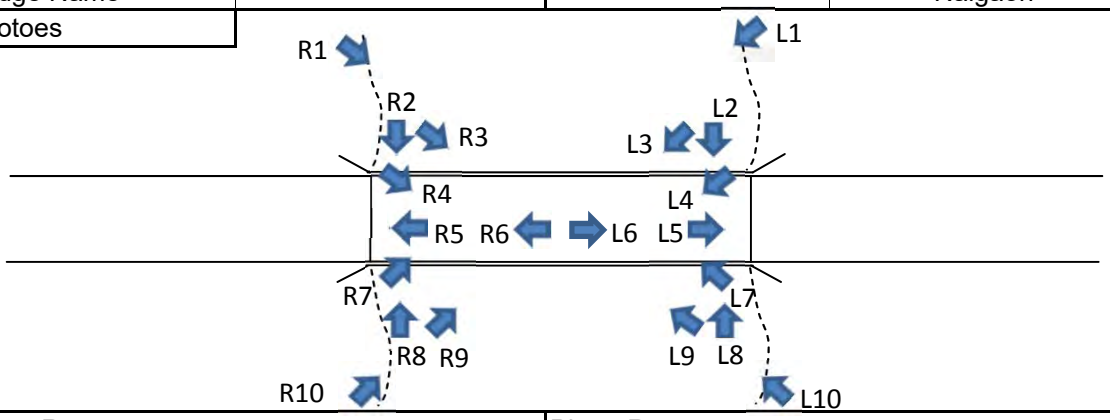


Photo R

Photo R

Photo R

Photo R

Photo R

Photo R

Bridge Survey Record (3/6)　Left Side

Date & Time:　09 Jun,2016 11:00

Bridge No.	73	Station	Mumbai
Bridge Name	-		1993

Photoes

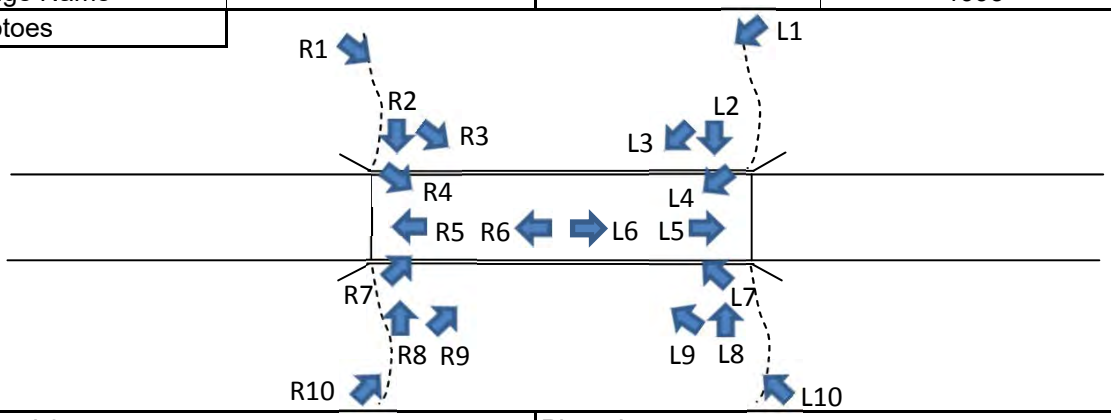


Photo L3

Photo L5

Photo L9

Photo L6

Photo L7

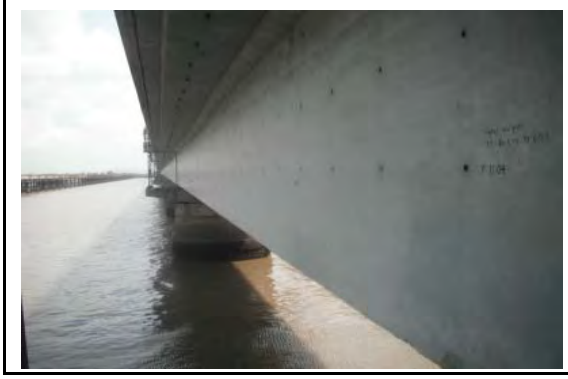


Photo L

Bridge Survey Record (4/6)

Date & Time: 09 Jun,2016 11:00

Bridge No.	73	**Division**	Mumbai
Bridge Name	-	**Year of Construction**	1993
GPS Data	N 19 °19 ' 20"	**Station**	Bhayandar
	E 72°59 ' 08 "		Naigaon

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	
- Girder	**Cracking**
- Cross Beam	**N/A**
- Slab	**Good**
(2) Steel Member	N/A
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	-
2. Substructure	
- Pier	No Check
- Abutment	Good
- Wing Wall	N/A
3. Miscellaneous	
- Approach Road Condition	Good
- Obstruction	-
- Scouring	
4.Evaluation	

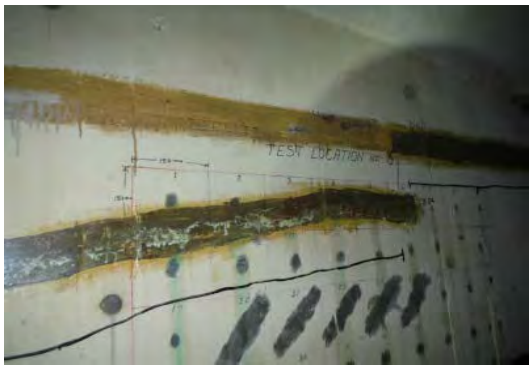
Bridge Survey Record (5/6)

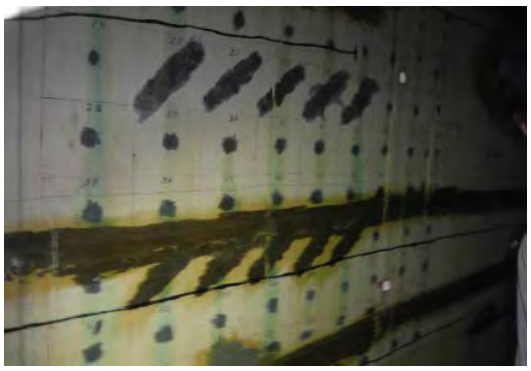
Date & Time: 09 Jun,2016 11:00

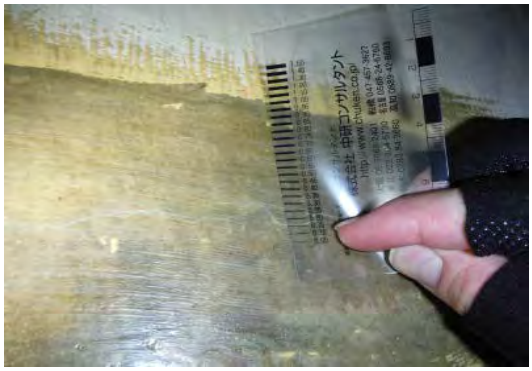
Bridge No.	73	**Division**	Mumbai
Bridge Name	-	**Year of Construction**	1993
GPS Data	N 19 °19 ' 20"	**Station**	Bhayandar
	E 72°59 ' 08 "		Naigaon

Detailed Description of Damages

Object Member	**PSC Box Girder**
Kind of Damage	Horizontal and Inclined Cracks in Web
Sketch or Photo	







Bridge Survey Record (6/6)

Date & Time: 09 Jun,2016 11:00

Bridge No.	73	**Location (State)**	Mumbai
Bridge Name	-	**Year of Construction**	1993
GPS Data	N 19 °19 ' 20"	**Station**	Bhayandar
	E 72°59 ' 08 "		Naigaon

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 09 Jun,2016

Bridge No.	75	**Division**	Mumbai
Bridge Name	-	**Year of Construction**	1993
GPS Data	N 19 °20 ' 24"	**Station**	Bhayandar
	E 72°51 ' 01 "		Natgaon

Bridge Length	550m	**Span Arrangement**	Number 11
Bridge Width	- m		
Type of Superstructure	PC Box Girder	**Type of Substructure**	RC Abutment and RC Pier Column

Overview of the Bridge

Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 09 Jun,2016

Bridge No.	75	Station	Bhayandar
Bridge Name	-		Natgaon

Photoes

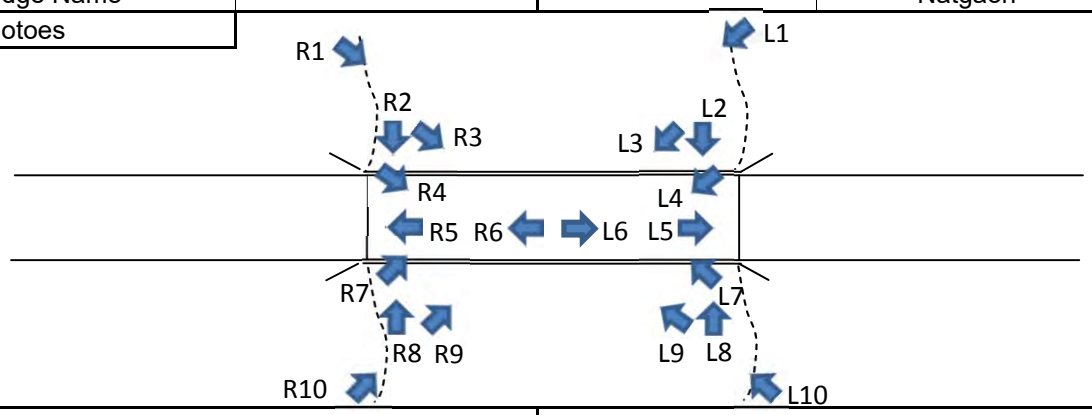


Photo R2	Photo R3
Photo R5	Photo R
Photo R	Photo R

Bridge Survey Record (3/6) Left Side

Date & Time: 09 Jun,2016

Bridge No.	75	Station	Mumbai
Bridge Name	-		1993

Photoes

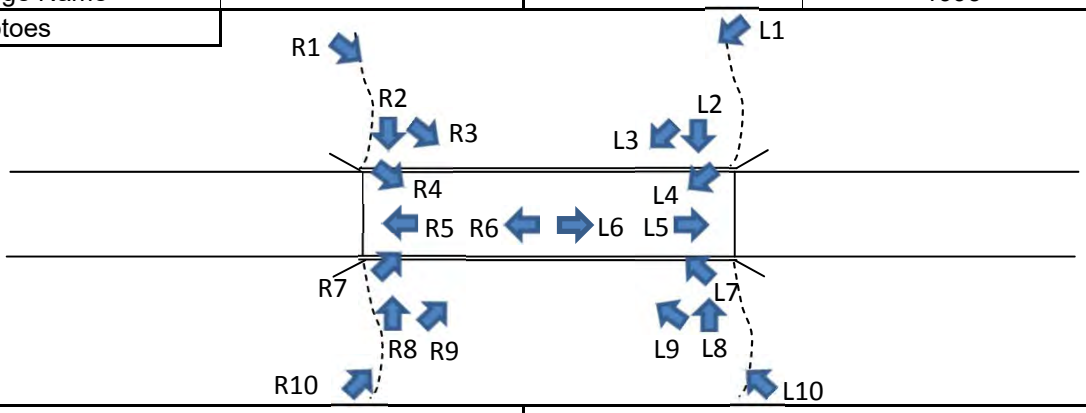


Photo L2	Photo L5
Photo L6	Photo L8
Photo L	Photo L

Bridge Survey Record (4/6)

Date & Time: 09 Jun,2016

Bridge No.	75	**Division**	Mumbai
Bridge Name	-	**Year of Construction**	1993
GPS Data	N 19 °20 ' 24"	**Station**	Bhayandar
	E 72°51 ' 01 "		Natgaon

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	
- Girder	
- Cross Beam	
- Slab	
(2) Steel Member	
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	
(4) Drainage Pipe	
(5) Others	
2. Substructure	
- Pier	
- Abutment	
- Wing Wall	
3. Miscellaneous	
- Approach Road Condition	
- Obstruction	
- Scouring	
4.Evaluation	

Bridge Survey Record (5/6)

Date & Time: 09 Jun,2016

Bridge No.	75	**Division**	Mumbai
Bridge Name	-	**Year of Construction**	1993
GPS Data	N 19 °20 ' 24"	**Station**	Bhayandar
	E 72°51 ' 01 "		Natgaon

Detailed Description of Damages

Object Member	
Kind of Damage	
Sketch or Photo	

Bridge Survey Record (6/6)

Date & Time: 09 Jun,2016

Bridge No.	75	**Location (State)**	Mumbai
Bridge Name	-	**Year of Construction**	1993
GPS Data	N 19 °20 ' 24"	**Station**	Bhayandar
	E 72°51 ' 01 "		Natgaon

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 09 Jun,2016 13:30

Bridge No.	92	**Division**	Mumbai
Bridge Name	-	**Year of Construction**	1963
GPS Data	N 19° 31' 28"	**Station**	Vaitama
	E 72° 51' 02"		Saphale

Bridge Length	380m	**Span Arrangement**	Number 20
Bridge Width	-m		
Type of Superstructu	Type: Steel I-Girder	**Type of Substructure**	AbutmentRC Abutment and RC Pier Column

Overview of the Bridge

Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 09 Jun,2016 13:30

Bridge No.	92	Station	Vaitama
Bridge Name	-		Saphale

Photoes

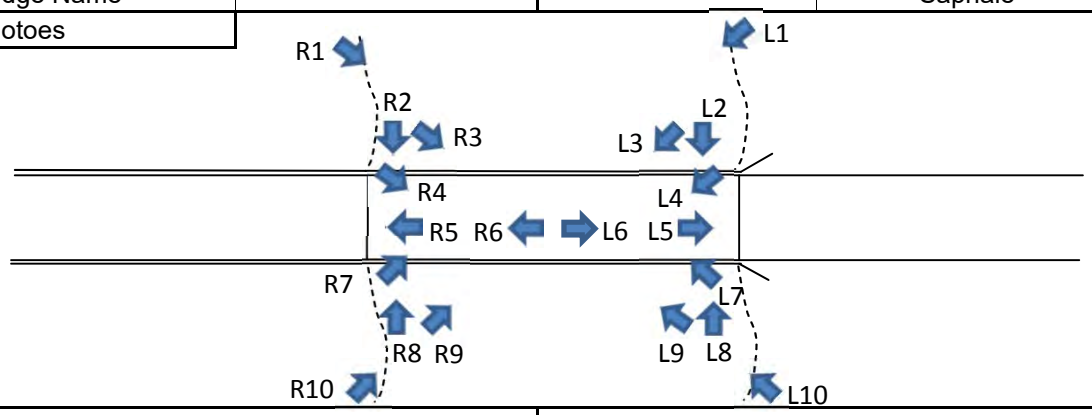


Photo R2

Photo R3

Photo R5

Photo R

Photo R

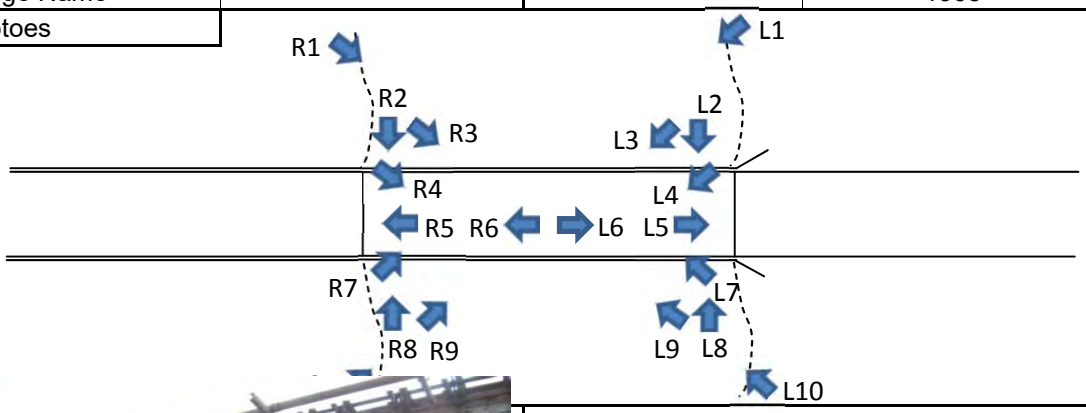
Photo R

Bridge Survey Record (3/6) Left Side

Date & Time: 09 Jun,2016 13:30

Bridge No.	92	Station	Mumbai
Bridge Name	-		1963

Photoes



Pr

Photo L5

Photo L6

Photo L8

Photo L

Photo L

Bridge Survey Record (4/6)

Date & Time: 09 Jun,2016 13:30

Bridge No.	92	**Division**	Mumbai
Bridge Name	-	**Year of Construction**	1963
GPS Data	N 19 °31 ' 28"	**Station**	Vaitama
	E 72°51 ' 02 "		Saphale

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	**N/A**
- Girder	
- Cross Beam	
- Slab	
(2) Steel Member	
- Girder	Good
- Virtical Girder (stringer)	N/A
- Cross Beam	N/A
- Sway Bracing	N/A
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	-
2. Substructure	
- Pier	Cracking
- Abutment	Good
- Wing Wall	Good Condition
3. Miscellaneous	
- Approach Road Condition	Good
- Obstruction	-
- Scouring	No Check
4.Evaluation	

Bridge Survey Record (5/6)

Date & Time: 09 Jun,2016 13:30

Bridge No.	92	**Division**	Mumbai
Bridge Name	-	**Year of Construction**	1963
GPS Data	N 19 °31 ' 28"	**Station**	Vaitama
	E 72°51 ' 02 "		Saphale

Detailed Description of Damages

Object Member	**Pier**
Kind of Damage	**Cracking**
Sketch or Photo	

Bridge Survey Record (6/6)

Date & Time: 09 Jun,2016 13:30

Bridge No.	92	**Location (State)**	Mumbai
Bridge Name	-	**Year of Construction**	1963
GPS Data	N 19 °31 ' 28"	**Station**	Vaitama
	E 72°51 ' 02 "		Saphale

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 09 Jun,2016

Bridge No.	93	**Division**	Mumbai
Bridge Name	-	**Year of Construction**	1963
GPS Data	N 19 °32 ' 20"	**Station**	Vaitama
	E 72°51 ' 05 "		Saphale

Bridge Length	410 m	**Span Arrangement**	Number 22
Bridge Width	-m		
Type of Superstructure	Type: Steel I-Girder	**Type of Substructure**	AbutmentRC Abutment and RC Pier Column

Overview of the Bridge

Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 09 Jun,2016

Bridge No.	93	Station	Vaitama
Bridge Name	-		Saphale

Photoes

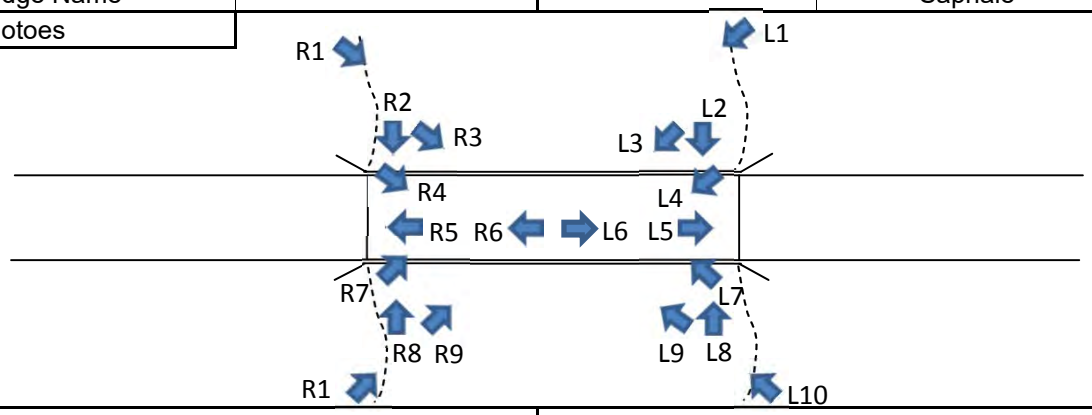


Photo R1	Photo R2
Photo R5	Photo R8
Photo R10	Photo R

Bridge Survey Record (3/6) Left Side

Date & Time: 09 Jun,2016

Bridge No.	93	Station	Mumbai
Bridge Name	-		1963

Photoes

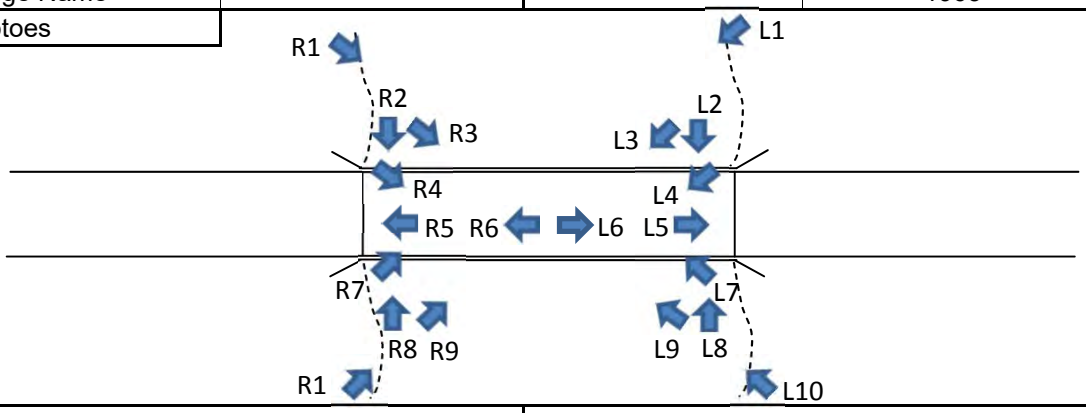


Photo L5	Photo L7
Photo L8	Photo L
Photo L	Photo L

Bridge Survey Record (4/6)

Date & Time: 09 Jun,2016

Bridge No.	93	**Division**	Mumbai
Bridge Name	-	**Year of Construction**	1963
GPS Data	N 19 °32 ' 20"	**Station**	Vaitama
	E 72°51 ' 05 "		Saphale

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	
- Girder	
- Cross Beam	
- Slab	
(2) Steel Member	
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	
(4) Drainage Pipe	
(5) Others	
2. Substructure	
- Pier	
- Abutment	
- Wing Wall	
3. Miscellaneous	
- Approach Road Condition	
- Obstruction	
- Scouring	
4.Evaluation	

Bridge Survey Record (5/6)

Date & Time: 09 Jun,2016

Bridge No.	93	**Division**	Mumbai
Bridge Name	-	**Year of Construction**	1963
GPS Data	N 19 °32 ' 20"	**Station**	Vaitama
	E 72°51 ' 05 "		Saphale

Detailed Description of Damages

Object Member	
Kind of Damage	
Sketch or Photo	

Bridge Survey Record (6/6)

Date & Time: 09 Jun,2016

Bridge No.	93	**Location (State)**	Mumbai
Bridge Name	-	**Year of Construction**	1963
GPS Data	N 19 °32 ' 20"	**Station**	Vaitama
	E 72°51 ' 05 "		Saphale

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 14 Jun,2016 12:20

Bridge No.	114	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 ° 50 ' 46" 06	**Station**	Dahod
	E 74° 17 ' 30 "		Dhamarda

Bridge Length	80.00m	**Span Arrangement**	Number 4
Bridge Width	4.30m		
Type of Superstructu	PSC I-Girder	**Type of Substructure**	Stone Masonry Abutment

Overview of the Bridge Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 14 Jun,2016 12:20

Bridge No.	114	Station	Dahod
Bridge Name	-		Dhamarda

Photoes

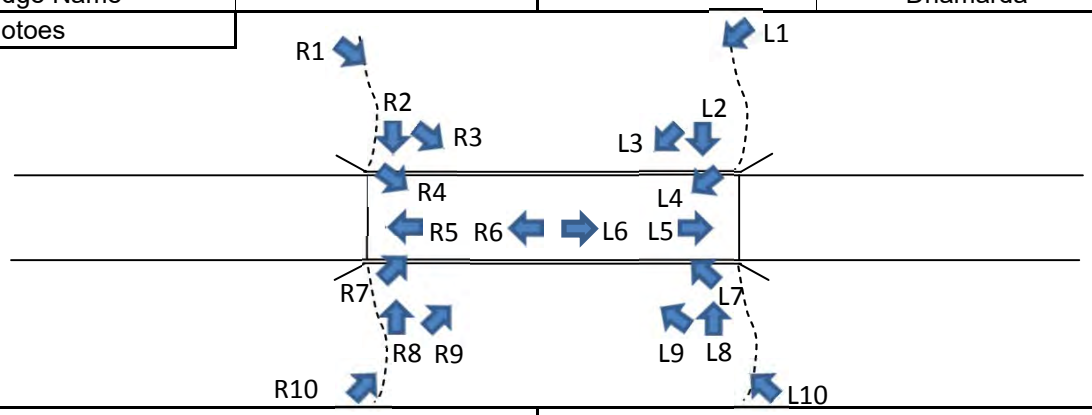


Photo R	Photo R
Photo R	Photo R
Photo R10	Photo R

Bridge Survey Record (3/6) Left Side

Date & Time: 14 Jun,2016 12:20

Bridge No.	114	Station	Ratlam
Bridge Name	-		1958-60

Photoes

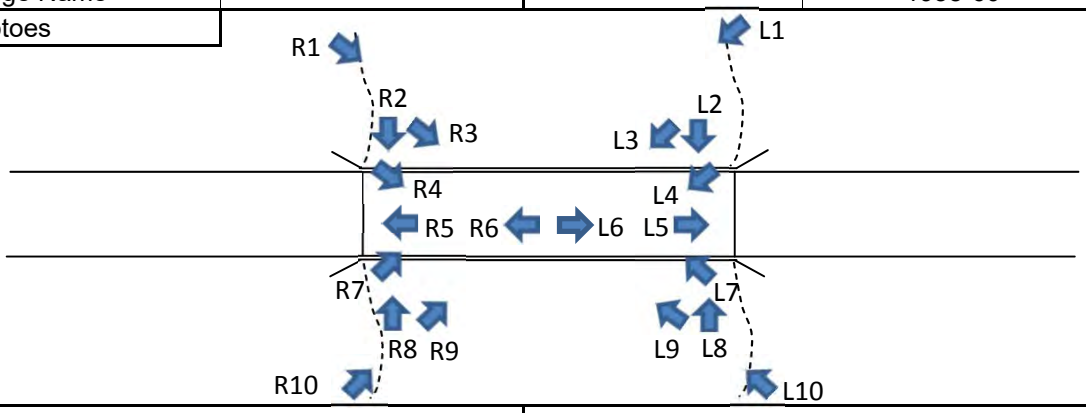


Photo L1

Photo L2

Photo L5

Photo L6

Photo L8

Photo L

Bridge Survey Record (4/6)

Date & Time: 14 Jun,2016 12:20

Bridge No.	114	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °50 ' 46" 06	**Station**	Dahod
	E 74°17 ' 30 "		Dhamarda

General Description of Damages

Member	**Kind of the Damage** **Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.**
1. Superstructure	
(1) Concrete Member	**Good**
- Girder	
- Cross Beam	
- Slab	
(2) Steel Member	N/A
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	-
2. Substructure	
- Pier	No Check
- Abutment	Good
- Wing Wall	Good
3. Miscellaneous	
- Approach Road Condition	Good
- Obstruction	-
- Scouring	N/A
4.Evaluation	

Bridge Survey Record (5/6)

Date & Time: 14 Jun,2016 12:20

Bridge No.	114	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °50 ' 46" 06 E 74°17 ' 30 "	**Station**	Dahod Dhamarda

Detailed Description of Damages

Object Member	**Prestressed I-Girder**
Kind of Damage	**After Repairing CFRP, Now in Good Condition**
Sketch or Photo	

Bridge Survey Record (6/6)

Date & Time: 14 Jun,2016 12:20

Bridge No.	114	**Location (State)**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °50 ' 46" 06	**Station**	Dahod
	E 74°17 ' 30 "		Dhamarda

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 14 Jun,2016 11:40

Bridge No.	129	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °51 ' 54"	**Station**	Bordi
	E 74°22 ' 32 "		Anas

Bridge Length	60.00m	**Span Arrangement**	Number 3
Bridge Width	4.30m		
Type of Superstructure	PSC I-Girder	**Type of Substructure**	Stone Masonry Abutment

Overview of the Bridge

Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 14 Jun,2016 11:40

Bridge No.	129	Station	Bordi
Bridge Name	-		Anas

Photoes

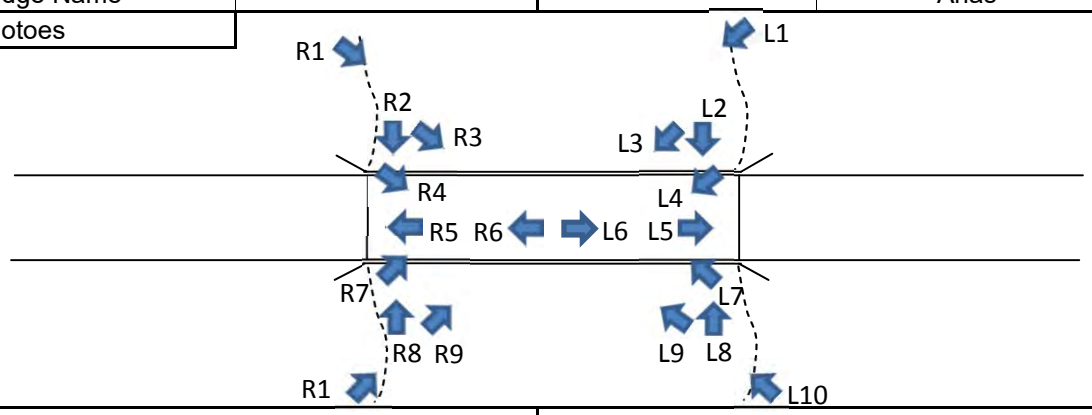


Photo R

Photo R

Photo R

Photo R

Photo R

Photo R

Bridge Survey Record (3/6) Left Side

Date & Time: 14 Jun,2016 11:40

Bridge No.	129	Station	Ratlam
Bridge Name	-		1958-60

Photoes

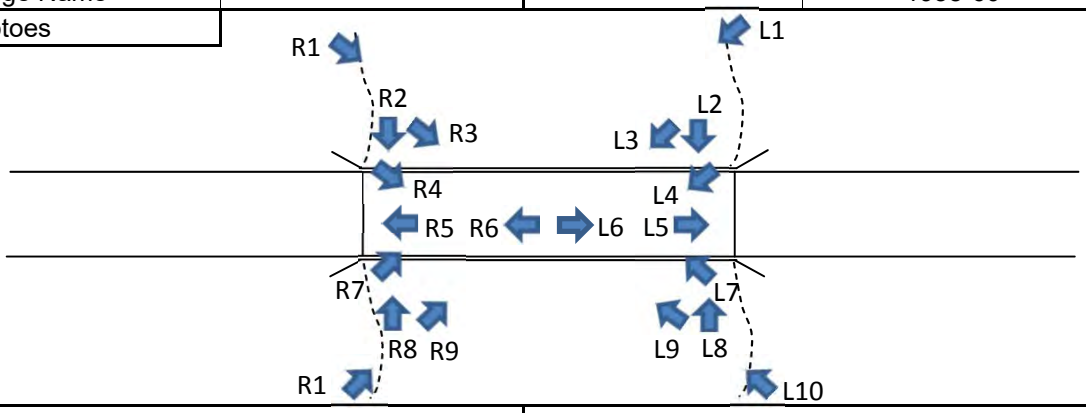


Photo L1

Photo L2

Photo L3

Photo L7

Photo L8

Photo L9

Bridge Survey Record (4/6)

Date & Time: 14 Jun,2016 11:40

Bridge No.	129	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °51 ' 54"	**Station**	Bordi
	E 74°22 ' 32 "		Anas

General Description of Damages

Member	**Kind of the Damage** **Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.**
1. Superstructure	
(1) Concrete Member	**Good**
- Girder	
- Cross Beam	
- Slab	
(2) Steel Member	N/A
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	-
2. Substructure	
- Pier	N/A
- Abutment	Good
- Wing Wall	Good
3. Miscellaneous	
- Approach Road Condition	Good
- Obstruction	-
- Scouring	N/A
4.Evaluation	

Bridge Survey Record (5/6)

Date & Time: 14 Jun,2016 11:40

Bridge No.	129	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °51 ' 54"	**Station**	Bordi
	E 74°22 ' 32 "		Anas

Detailed Description of Damages

Object Member	**Prestressed I-Girders**
Kind of Damage	**After Repairing CFRP, Now in Good Condition**
Sketch or Photo	

Bridge Survey Record (6/6)

Date & Time: 14 Jun,2016 11:40

Bridge No.	129	**Location (State)**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °51 ' 54"	**Station**	Bordi
	E 74°22 ' 32 "		Anas

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 14 Jun,2016 10:40

Bridge No.	132	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °52 ' 06"	**Station**	Bordi
	E 74°23 ' 35 "		Anas

Bridge Length	20.00m	**Span Arrangement**	Number 1
Bridge Width	4.30m		
Type of Superstructure	PSC I-Girder	**Type of Substructure**	Stone Masonry Abutment

Overview of the Bridge Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 14 Jun,2016 10:40

Bridge No.	132	Station	Bordi
Bridge Name	-		Anas

Photoes

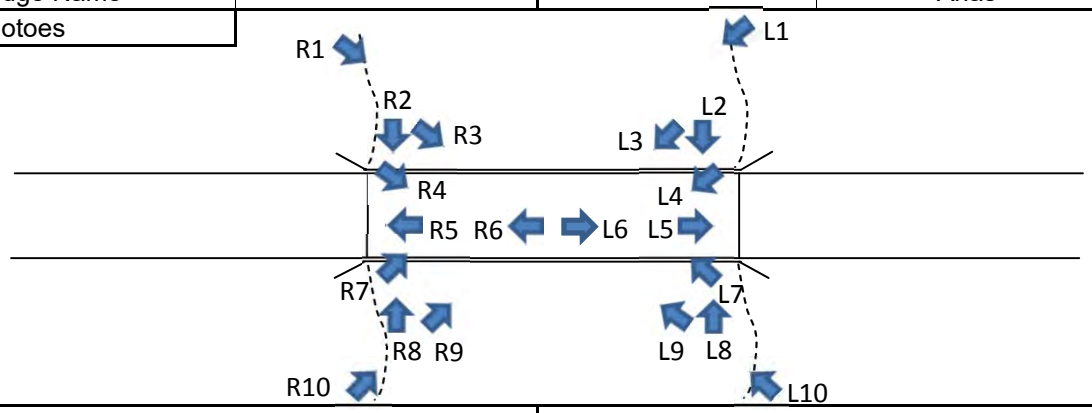


Photo R1

Photo R2

Photo R3

Photo R5

Photo R8

Photo R10

Bridge Survey Record (3/6) Left Side

Date & Time: 14 Jun,2016 10:40

Bridge No.	132	Station	Ratlam
Bridge Name	-		1958-60

Photoes

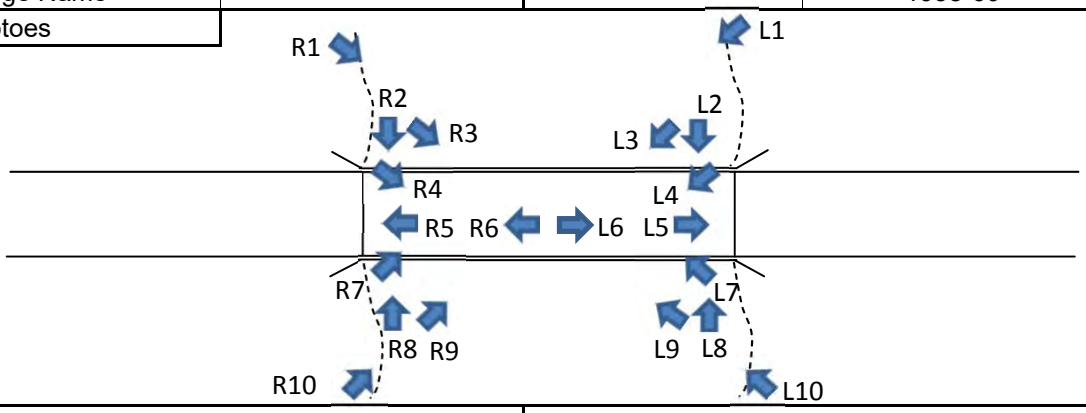


Photo L2

Photo L6

Photo L6

Photo L8

Photo L10

Photo L

Bridge Survey Record (4/6)

Date & Time: 14 Jun,2016 10:40

Bridge No.	132	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °52 ' 06"	**Station**	Bordi
	E 74°23 ' 35 "		Anas

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	**Good**
- Girder	
- Cross Beam	
- Slab	
(2) Steel Member	N/A
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	-
2. Substructure	
- Pier	N/A
- Abutment	Good
- Wing Wall	Good
3. Miscellaneous	
- Approach Road Condition	Good
- Obstruction	-
- Scouring	N/A
4.Evaluation	

Bridge Survey Record (5/6)

Date & Time: 14 Jun,2016 10:40

Bridge No.	132	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °52 ' 06"	**Station**	Bordi
	E 74°23 ' 35 "		Anas

Detailed Description of Damages

Object Member	**Prestressed I-Girders**
Kind of Damage	**After Repairing CFRP, Now in Good Condition**
Sketch or Photo	

Bridge Survey Record (6/6)

Date & Time: 14 Jun,2016 10:40

Bridge No.	132	**Location (State)**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °52 ' 06"	**Station**	Bordi
	E 74°23 ' 35 "		Anas

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 15 Jun,2016 10:40

Bridge No.	R5	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22° 49' 18"	**Station**	Limkheda
	E 74° 02' 38"		Mangal Mahudi

Bridge Length	20.00m	**Span Arrangement**	Number 1
Bridge Width	4.30m		
Type of Superstructu	PSC I-Girder	**Type of Substructure**	Stone Masonry Abutment

Overview of the Bridge Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 15 Jun,2016 10:40

Bridge No.	R5	Station	Limkheda
Bridge Name	-		Mangal Mahudi

Photoes

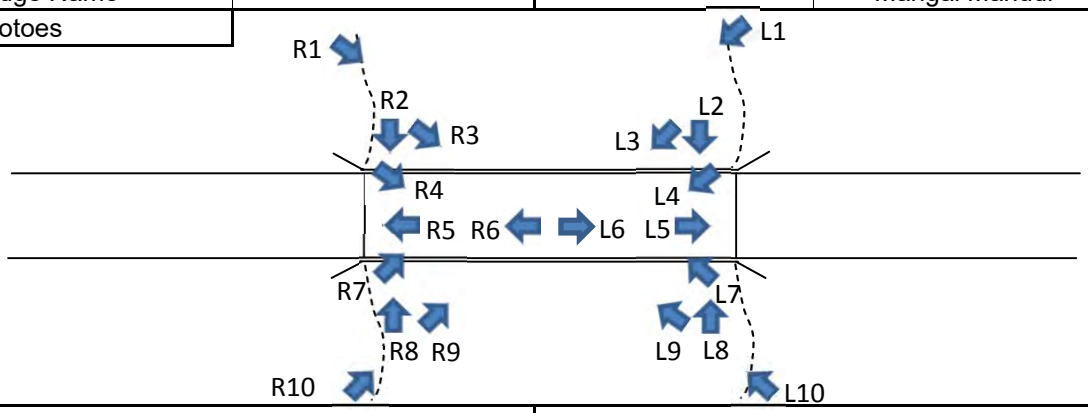


Photo R2

Photo R5

Photo R6

Photo R7

Photo R10

Photo R

Bridge Survey Record (3/6) Left Side

Date & Time: 15 Jun,2016 10:40

Bridge No.	R5	Station	Ratlam
Bridge Name	-		1958-60

Photoes

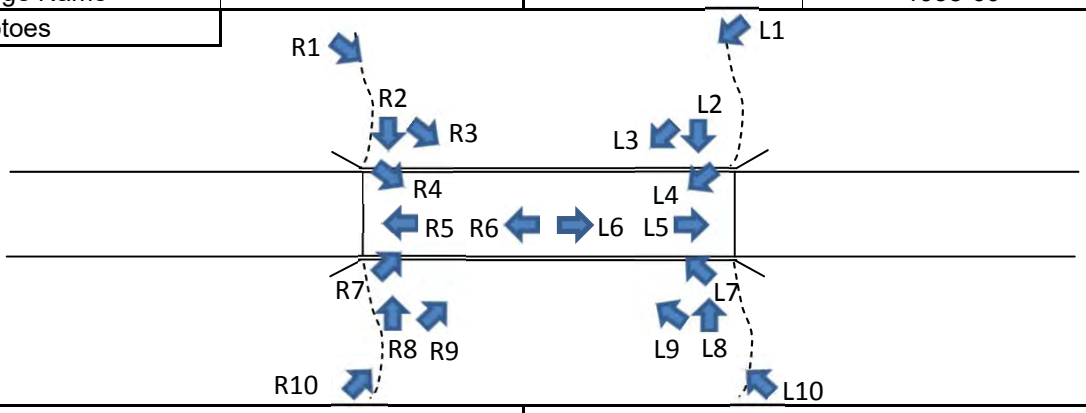


Photo L1

Photo L2

Photo L6

Photo L7

Photo L8

Photo L10

Bridge Survey Record (4/6)

Date & Time: 15 Jun,2016 10:40

Bridge No.	R5	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °49 ' 18"	**Station**	Limkheda
	E 74°02 ' 38 "		Mangal Mahudi

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	
- Girder	**Cracking**
- Cross Beam	**Good**
- Slab	**Cracking , Reinforcement Bar Exposed**
(2) Steel Member	N/A
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	-
2. Substructure	
- Pier	N/A
- Abutment	Good
- Wing Wall	Good
3. Miscellaneous	
- Approach Road Condition	Good
- Obstruction	-
- Scouring	N/A
4.Evaluation	

Bridge Survey Record (5/6)

Date & Time: 15 Jun,2016 10:40

Bridge No.	R5	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °49 ' 18"	**Station**	Limkheda
	E 74°02 ' 38 "		Mangal Mahudi

Detailed Description of Damages

Object Member	**Prestressed I-Girders**
Kind of Damage	**Cracking**
Sketch or Photo	

Bridge Survey Record (6/6)

Date & Time: 15 Jun,2016 10:40

Bridge No.	R5	**Location (State)**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °49 ' 18"	**Station**	Limkheda
	E 74°02 ' 38 "		Mangal Mahudi

Evaluation index

1	Cosistency with the upper plan, verification og Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects

Bridge Survey Record (1/6)

Date & Time: 15 Jun,2016 11:40

Bridge No.	R8	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °49 ' 40"	**Station**	Limkheda
	E 74°03 ' 20 "		Mangal Mahudi

Bridge Length	20.00m	**Span Arrangement**	Number 1
Bridge Width	4.30m		
Type of Superstructure	PSC I-Girder	**Type of Substructure**	Stone Masonry Abutment

Overview of the Bridge

Side View

Up View

Bridge Survey Record (2/6) Right Side

Date & Time: 15 Jun,2016 11:40

Bridge No.	R8	Station	Limkheda
Bridge Name	-		Mangal Mahudi

Photoes

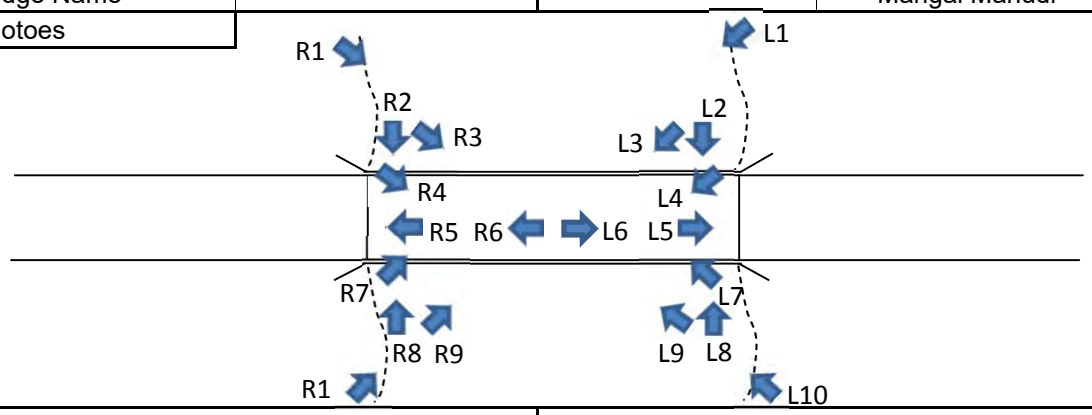


Photo R1

Photo R2

Photo R5

Photo R6

Photo R8

Photo R10

Bridge Survey Record (3/6) Left Side

Date & Time: 15 Jun,2016 11:40

Bridge No.	R8	Station	Ratlam
Bridge Name	-		1958-60

Photoes

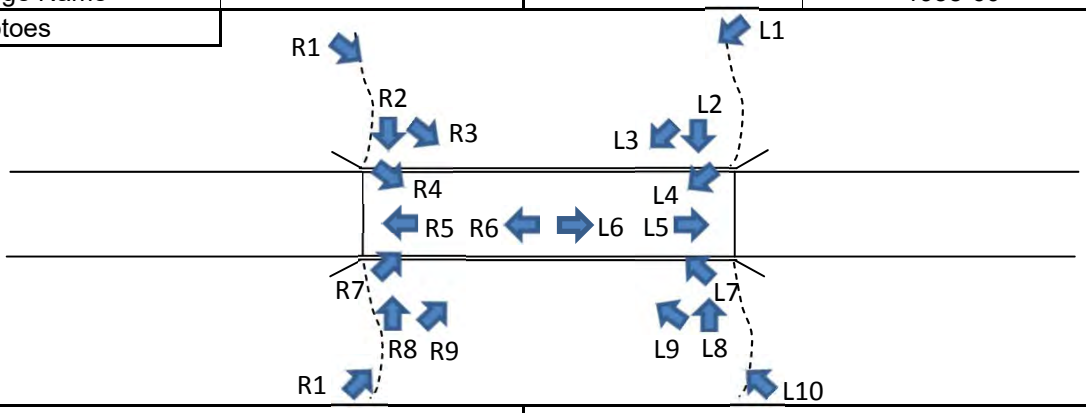


Photo L1

Photo L2

Photo L5

Photo L6

Photo L8

Photo L9

Bridge Survey Record (4/6)

Date & Time: 15 Jun,2016 11:40

Bridge No.	R8	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °49 ' 40"	**Station**	Limkheda
	E 74°03 ' 20 "		Mangal Mahudi

General Description of Damages

Member	**Kind of the Damage**
	Ex. Concrete : Cracking, Spalling, etc. Steel : Cracking, Rusting, Fracture, etc.
1. Superstructure	
(1) Concrete Member	
- Girder	**Cracking**
- Cross Beam	**Good**
- Slab	**Cracking , Reinforcement Bar Exposed**
(2) Steel Member	N/A
- Girder	
- Virtical Girder (stringer)	
- Cross Beam	
- Sway Bracing	
(3) Bearing Shoe	No Check
(4) Drainage Pipe	N/A
(5) Others	-
2. Substructure	
- Pier	N/A
- Abutment	Good
- Wing Wall	Good
3. Miscellaneous	
- Approach Road Condition	Good
- Obstruction	-
- Scouring	N/A
4.Evaluation	

Bridge Survey Record (5/6)

Date & Time: 15 Jun,2016 11:40

Bridge No.	R8	**Division**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °49 ' 40" E 74°03 ' 20 "	**Station**	Limkheda Mangal Mahudi

Detailed Description of Damages

Object Member	**Prestressed I-Girders**
Kind of Damage	**Cracking**
Sketch or Photo	

Bridge Survey Record (6/6)

Date & Time: 15 Jun,2016 11:40

Bridge No.	R8	**Location (State)**	Ratlam
Bridge Name	-	**Year of Construction**	1958-60
GPS Data	N 22 °49 ' 40"	**Station**	Limkheda
	E 74°03 ' 20 "		Mangal Mahudi

Evaluation index

1	Cosistency with the upper plan, verification of Indian Railway priority bridges	Yes No
2	Application of Japanese advanced technology	See below
3	Confirmation of other projects by Japanese ODA	Yes No
4	Confirmation of other donor's projects and local project	Yes No
5	Impact on the surrounding society and economy	Much Less
6	Access to the bridge sites	Good Not Good
7	Collecting information from japanese companies, and estimation of project effects	See below

2 Application of Japanese advanced technology

7 Collecting information from japanese companies, and estimation of project effects