

Span No.3

Countermeasure classification of members

Countermeasure classification of members					Bridge name		002 Rama V		Span No.		3
Member	No.	Damage	Damage classification		Countermeasure classification	No.	Damage	Damage classification		Countermeasure classification	
			Classification	Judge				Classification	Judge		
Girder	01	Cracking, Water leakage, Free lime	c	3	3	02	Cracking, Water leakage, Free lime	c	3	3	
		Rebar exposure	a	-	5		Rebar exposure	a	-	5	
		Damages at anchorage of PC tendon	a	-	5		Damages at anchorage of PC tendon	a	-	5	
Deck	01	Rebar exposure	a		5	04	Rebar exposure	a		5	
		Pop-outs	a		5		Pop-outs	a		5	
		Deck cracking	a	N	5		Deck cracking	a	N	5	
	03	Rebar exposure	a		5	06	Rebar exposure	a		5	
		Pop-outs	a		5		Pop-outs	a		5	
		Deck cracking	a	N	5		Deck cracking	a	N	5	
Pier	01	Cracking, Water leakage, Free lime	a	-	5	02	Cracking, Water leakage, Free lime	a	-	5	
		Rebar exposure	a	-	5		Rebar exposure	a	-	5	
		Damages in substructures	a	-	5		Damages in substructures	a	-	5	
Bearings	101	Functional damage of bearings	a		5	103	Functional damage of bearings	a		5	
	102	Functional damage of bearings	a		5	104	Functional damage of bearings	a		5	
Road surface	01	Level difference of road surface	a		5	01	Damages in pavemnants	a		5	
Barriers Railing	01	Damages in barriers	c		2	03	Damages in barriers	c		2	
	02	Damages in barriers	c		2						

Estimation of repair quantity

Bridge name		002 Rama V		Span No.	3
Subject		Quantity	Remarks		
1	Span length	95.00 m	Length of 1 span		
2	Road width for pavement	21.50 m	Width for pavement area (Vehicle lane)		
3	Total road width	25.05 m	Deck width		
4	Area of bridge surface	2,379.8 m <sup>2</sup>	Span length x Total width		
5	Area of pavement	2,042.5 m <sup>2</sup>	Span length x Width for pavement		
6	Barriers & railings	01	concrete	Type of barriers & railings	
		02	concrete	Same as above	
		03	concrete	Same as above	
7	Expansion joints	01	steel	Type of expansion joint	
		-	-	Same as above	
8	Crack length		Quantity	Remarks	
	Total crack length	L	95.2 m	A of bridge surf. x 0.040	
	Girder		47.6 m	L x 1/2 (per girder)	
9	Area of rebar exposure		Quantity	Remarks	
	Total area	A	19.0 m <sup>2</sup>	A of bridge surf. x 0.008	
	Girder		9.5 m <sup>2</sup>	L x 1/2 (per girder)	
10	Repaired area of deck		Quantity	Remarks	
	01	A	522.5 m <sup>2</sup>	Deck width = 5.50 m	
	Area of rebar exposure		5.2 m <sup>2</sup>	A x 0.010	
	Area of deck cracking		26.1 m <sup>2</sup>	A x 0.050	
	03,04,06	A	318.3 m <sup>2</sup>	Deck width = 3.35 m	
	Area of rebar exposure		3.2 m <sup>2</sup>	A x 0.010	
Area of deck cracking		15.9 m <sup>2</sup>	A x 0.050		
11	Repair quantity of substructure		Quantity	Remarks	
	Cracking, Water leakage, Free lime		5.54 m	per substructure	
	Rebar exposure		2.24 m <sup>2</sup>	per substructure	
12	Concrete barrier		Quantity	Remarks	
	Rebar exposure		9.52 m <sup>2</sup>	A of bridge surf. x 0.004	

Approximate repair price for countermeasure

Bridge name		002 Rama V										Span No.		3	
Member	No.	Damage	Damage classification	Countermeasure classification	Repair method	Repair quantity	Unit	Approximate unit price (B)	Approximate repair price (B)	Approximate repair price for countermeasure classification 1 & 2 (B)	countermeasure classification 3	countermeasure classification 4	Planned repair & reconstruction		
											Repair price (B)	Repair price (B)	Repair price (B)	Life cycle	
Girder	01	Crackings/Water leakage/Free lime	c 3	a 3	Resin injection	47.6	m	5,000	238,000	-	238,000	-	15	-	30
		Rebar exposure	a 5	a 5	Patching	9.5	m <sup>2</sup>	17,500	166,300	-	-	-	15	166,300	30
		Damages at anchorage of PC tendon	a 5	a 5	Reinforcement with external PC tendon	-	Pos.	1,000,000	-	-	-	-	-	-	-
		Cracking/Water leakage/Free lime	c 3	a 3	Resin injection	47.6	m	5,000	238,000	-	238,000	-	15	-	30
Deck	02	Rebar exposure	a 5	a 5	Patching	9.5	m <sup>2</sup>	17,500	166,300	-	-	-	15	166,300	30
		Damages at anchorage of PC tendon	a 5	a 5	Reinforcement with external PC tendon	-	Pos.	1,000,000	-	-	-	-	-	-	-
		Rebar exposure	a 5	a 5	Patching	5.2	m <sup>2</sup>	17,500	91,000	-	-	-	15	-	30
		Pop-outs	a 5	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-	-
Deck	03	Deck cracking	a 5	a 5	Patching & CFR	26.1	m <sup>2</sup>	22,500	587,300	-	-	-	25	587,300	50
		Rebar exposure	a 5	a 5	Patching	3.2	m <sup>2</sup>	17,500	56,000	-	-	-	15	-	30
		Pop-outs	a 5	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-	-
		Deck cracking	a 5	a 5	CFR	15.9	m <sup>2</sup>	22,500	357,800	-	-	-	25	357,800	50
Pier	04	Rebar exposure	a 5	a 5	Patching	3.2	m <sup>2</sup>	17,500	56,000	-	-	-	15	-	30
		Pop-outs	a 5	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-	-
		Deck cracking	a 5	a 5	CFR	15.9	m <sup>2</sup>	22,500	357,800	-	-	-	25	357,800	50
		Rebar exposure	a 5	a 5	Patching	3.2	m <sup>2</sup>	17,500	56,000	-	-	-	15	-	30
Pier	01	Cracking/Water leakage/Free lime	a 5	a 5	Resin injection	15.9	m <sup>2</sup>	22,500	357,800	-	-	-	25	357,800	50
		Rebar exposure	a 5	a 5	Patching	5.54	m	5,000	27,700	-	-	-	15	-	30
		Damages in substructures	a 5	a 5	Patching & CFR	2.24	m <sup>2</sup>	17,500	39,200	-	-	-	15	39,200	30
		Cracking/Water leakage/Free lime	a 5	a 5	Foot protection	-	Pier	1,750,000	-	-	-	-	-	-	-
Bearings	02	Rebar exposure	a 5	a 5	Resin injection	5.54	m	5,000	27,700	-	-	-	15	-	30
		Damages in substructures	a 5	a 5	Patching	2.24	m <sup>2</sup>	17,500	39,200	-	-	-	15	39,200	30
		Functional damage of bearings	a 5	a 5	Foot protection	-	Pier	1,750,000	-	-	-	-	-	-	-
		Functional damage of bearings	a 5	a 5	Metal spraying	1.0	Pier	120,000	120,000	-	-	-	15	120,000	30
Road surface	101	Functional damage of bearings	a 5	a 5	Metal spraying	1.0	#	120,000	120,000	-	-	-	15	120,000	30
	102	Functional damage of bearings	a 5	a 5	Metal spraying	1.0	#	120,000	120,000	-	-	-	15	120,000	30
	103	Functional damage of bearings	a 5	a 5	Metal spraying	1.0	#	120,000	120,000	-	-	-	15	120,000	30
	104	Functional damage of bearings	a 5	a 5	Metal spraying	1.0	#	120,000	120,000	-	-	-	15	120,000	30
Barriers	01	Level difference of road surface	a 5	a 5	Pavement replacement	-	m <sup>2</sup>	5,000	-	-	-	5	20	-	20
		Damages in pavements	a 5	a 5	same as above	2,042.5	#	5,000	10,212,500	-	-	5	10	10,212,500	20
		Damages in barriers	c 2	a 2	Patching	9.52	m <sup>2</sup>	17,500	166,600	166,600	-	-	15	166,600	30
Railings	02	Damages in barriers	c 2	a 2	Patching	9.52	m <sup>2</sup>	17,500	166,600	166,600	-	-	15	166,600	30
	03	Damages in barriers	c 2	a 2	Patching	9.52	m <sup>2</sup>	17,500	166,600	166,600	-	-	15	166,600	30

Span No.4

Inspection result

		Damages of steel members				Damages of concrete members					Others						Span No.	4
		Corrosion	Cracking	Missing bolts	Fracture	Cracking, Water leakage, Free lime	No.	Rebar exposure	Pop-outs	Deck cracking	Damages at anchorage of PC tender	Level difference of road surface	Functional damage of bearings	Damages in substructures	Damages in pavements	Damages in expansion joints	Damages in cable	Remarks
Girder	01					a		a			a							
	02					a		a			a							
Deck	01							a	a	a								
	02							a	a	a								
	03							a	a	a								
	04							a	a	a								
	05							a	a	a								
	06							a	a	a								
Pier	01					a		a										
	02					a		a										
Bearings	101												a					
	102												a					
	103												a					
	104												a					
Road surface												a						
Pavement															a			
Barriers Railings	01															a		
	02															a		
	03															a		
Expansion joints	01																a	
Others																		

Span No.4

Countermeasure classification of members

Bridge name	002 Rama V	Span No.	4
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Member	No.	Damage	Damage classification		Countermeasure classification	No.	Damage	Damage classification		Countermeasure classification
			Classification	Judge				Classification	Judge	
Girder	01	Cracking, Water leakage, Free lime	a	-	5	02	Cracking, Water leakage, Free lime	a	-	5
		Rebar exposure	a	-	5		Rebar exposure	a	-	5
		Damages at anchorage of PC tendon	a	-	5		Damages at anchorage of PC tendon	a	-	5
Deck	01	Rebar exposure	a		5	04	Rebar exposure	a		5
		Pop-outs	a		5		Pop-outs	a		5
		Deck cracking	a	N	5		Deck cracking	a	N	5
	03	Rebar exposure	a		5	06	Rebar exposure	a		5
		Pop-outs	a		5		Pop-outs	a		5
		Deck cracking	a	N	5		Deck cracking	a	N	5
Pier	01	Cracking, Water leakage, Free lime	a	-	5	02	Cracking, Water leakage, Free lime	a	-	5
		Rebar exposure	a	-	5		Rebar exposure	a	-	5
		Damages in substructures	a	-	5		Damages in substructures	a	-	5
Bearings	101	Functional damage of bearings	a		5	103	Functional damage of bearings	a		5
	102	Functional damage of bearings	a		5	104	Functional damage of bearings	a		5
Road surface	01	Level difference of road surface	a		5	01	Damages in pavemnts	a		5
Barriers Railing	01	Damages in barriers	a		5	03	Damages in barriers	a		5
	02	Damages in barriers	a		5					
Expansion joints	01	Damages in expansion joints	a		5	-	-	-	-	-

Estimation of repair quantity

Bridge name		002 Rama V		Span No.	4
Subject		Quantity	Remarks		
1	Span length	39.00 m	Length of 1 span		
2	Road width for pavement	21.50 m	Width for pavement area (Vehicle lane)		
3	Total road width	25.05 m	Deck width		
4	Area of bridge surface	977.0 m <sup>2</sup>	Span length x Total width		
5	Area of pavement	838.5 m <sup>2</sup>	Span length x Width for pavement		
6	Barriers & railings	01	concrete	Type of barriers & railings	
		02	concrete	Same as above	
		03	concrete	Same as above	
7	Expansion joints	01	steel	Type of expansion joint	
		-	-	Same as above	
8	Crack length		Quantity	Remarks	
	Total crack length	L	39.1 m	A of bridge surf. x 0.040	
	Girder		19.5 m	L × 1/2 (per girder)	
9	Area of rebar exposure		Quantity	Remarks	
	Total area	A	7.8 m <sup>2</sup>	A of bridge surf. x 0.008	
	Girder		3.9 m <sup>2</sup>	L × 1/2 (per girder)	
10	Repaired area of deck		Quantity	Remarks	
	01	A	214.5 m <sup>2</sup>	Deck width = 5.50 m	
	Area of rebar exposure		2.1 m <sup>2</sup>	A × 0.010	
	Area of deck cracking		10.7 m <sup>2</sup>	A × 0.050	
	03,04,06	A	130.7 m <sup>2</sup>	Deck width = 3.35 m	
	Area of rebar exposure		1.3 m <sup>2</sup>	A × 0.010	
	Area of deck cracking		6.5 m <sup>2</sup>	A × 0.050	
11	Repair quantity of substructure		Quantity	Remarks	
	Cracking, Water leakage, Free lime		5.54 m	per substructure	
	Rebar exposure		2.24 m <sup>2</sup>	per substructure	
12	Concrete barrier		Quantity	Remarks	
	Rebar exposure		3.91 m <sup>2</sup>	A of bridge surf. x 0.004	

Approximate repair price for countermeasure

Bridge name		002 Rama V		Span No.		4		countermeasure classification 3		countermeasure classification 4		Planned repair & reconstruction				
Member	No.	Damage	Damage classification	Repair method	Repair quantity	Unit	Approximate unit price (B)	Approximate repair price (B)	Approximate repair price for countermeasure classification 1 & 2 (B)	Repair price (B)	Remaining years up to countermeasure el. 2	Repair price (B)	Remaining years up to countermeasure el. 2	Repair price (B)	Life cycle	
Girder	01	Cracking/Water leakage/Free lime	a 5	Resin injection	19.5	m	5,000	97,500	-	-	7	-	15	-	30	
		Rebar exposure	a 5	Patching	3.9	m <sup>2</sup>	17,500	68,300	-	-	7	-	15	-	68,300	30
	02	Damages at anchorage of PC tendon	a 5	Reinforcement with external PC tendon	-	Pos.	1,000,000	-	-	-	-	-	-	-	-	-
		Cracking/Water leakage/Free lime	a 5	Resin injection	19.5	m	5,000	97,500	-	-	7	-	15	-	68,300	30
Deck	01	Rebar exposure	a 5	Reinforcement with external PC tendon	3.9	m <sup>2</sup>	17,500	68,300	-	-	7	-	15	-	68,300	30
		Damages at anchorage of PC tendon	a 5	Patching	2.1	m <sup>2</sup>	17,500	36,800	-	-	7	-	15	-	-	30
	Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-	-	-	-	-
	Deck cracking	a 5	CFR	10.7	m <sup>2</sup>	22,500	240,800	-	-	12	-	25	-	240,800	50	
03	Rebar exposure	a 5	Patching	1.3	m <sup>2</sup>	17,500	22,800	-	-	7	-	15	-	-	30	
	Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-	-	-	-	
04	01	Deck cracking	a 5	CFR	6.5	m <sup>2</sup>	22,500	146,300	-	-	12	-	25	-	146,300	50
		Rebar exposure	a 5	Patching	1.3	m <sup>2</sup>	17,500	22,800	-	-	7	-	15	-	-	30
	Pop-outs	a 5	Patching	-	Pos.	10,000	-	-	-	-	-	-	-	-	-	
	Deck cracking	a 5	Patching & CFR	6.5	m <sup>2</sup>	22,500	146,300	-	-	12	-	25	-	146,300	50	
06	01	Rebar exposure	a 5	Patching & CFR	1.3	m <sup>2</sup>	17,500	22,800	-	-	7	-	15	-	-	30
		Pop-outs	a 5	Patching	-	Pos.	10,000	-	-	-	-	-	-	-	-	
	Deck cracking	a 5	CFR	6.5	m <sup>2</sup>	22,500	146,300	-	-	12	-	25	-	146,300	50	
	Cracking/Water leakage/Free lime	a 5	Resin injection	5.54	m	5,000	27,700	-	-	7	-	15	-	-	30	
Pier	01	Rebar exposure	a 5	Patching	2.24	m <sup>2</sup>	17,500	39,200	-	-	7	-	15	-	39,200	30
		Damages in substructures	a 5	Patching & CFR	-	Pier	1,750,000	-	-	-	-	-	-	-	-	-
	Cracking/Water leakage/Free lime	a 5	Resin injection	5.54	m	5,000	27,700	-	-	7	-	15	-	-	30	
	Rebar exposure	a 5	Patching	2.24	m <sup>2</sup>	17,500	39,200	-	-	7	-	15	-	39,200	30	
Bearings	101	Damages in substructures	a 5	Foot protection	-	Pier	1,750,000	-	-	-	-	-	-	-	-	
		Functional damage of bearings	a 5	Metal spraying	1.0	Pier	120,000	120,000	-	-	7	-	15	-	120,000	30
	102	Functional damage of bearings	a 5	Metal spraying	1.0	#	120,000	120,000	-	-	7	-	15	-	120,000	30
	103	Functional damage of bearings	a 5	Metal spraying	1.0	#	120,000	120,000	-	-	7	-	15	-	120,000	30
Road surface	104	Functional damage of bearings	a 5	Metal spraying	1.0	#	120,000	120,000	-	-	7	-	15	-	120,000	30
	Level difference of road surface	a 5	Pavement replacement	-	m <sup>2</sup>	5,000	-	-	-	-	5	-	10	-	20	
	Damages in pavements	a 5	same as above	838.5	#	5,000	4,192,500	-	-	5	-	10	-	4,192,500	20	
Barriers	01	Damages in barriers	a 5	Patching	3.91	m <sup>2</sup>	17,500	68,500	-	-	7	-	15	-	68,500	30
	02	Damages in barriers	a 5	Patching	3.91	m <sup>2</sup>	17,500	68,500	-	-	7	-	15	-	68,500	30
	03	Damages in barriers	a 5	Patching	3.91	m <sup>2</sup>	17,500	68,500	-	-	7	-	15	-	68,500	30
Expansion joints	01	Damages in expansion joints	a 5	change of steel exp.	25.1	m	133,400	3,341,700	-	-	7	-	15	-	3,341,700	30

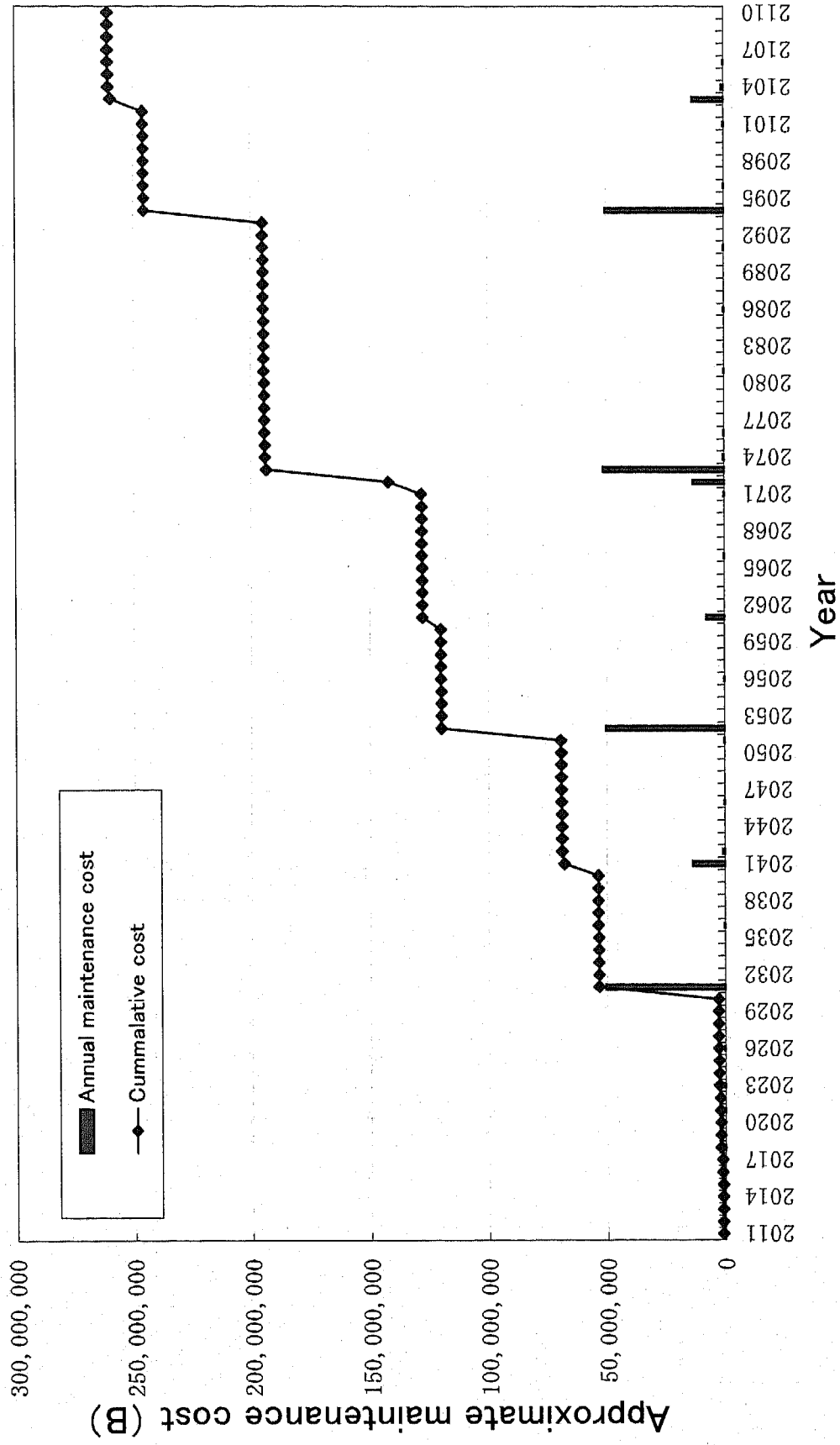
Approximate total repair cost

Year	Annual repair cost (B)								Bridge total	Cumulative cost (B)
	Span No.1	Span No.2	Span No.3	Span No.4	Span No.5	Span No.6	Span No.7	Periodic inspection + reserve for unexpected matters		
2011	-	-	-	333,200	-	499,800	-	233,400	1,066,400	1,066,400
2012	-	-	-	-	-	-	-	-	-	1,066,400
2013	-	-	-	-	-	-	-	-	-	1,066,400
2014	-	-	-	-	-	-	-	-	-	1,066,400
2015	-	-	-	-	-	-	-	-	-	1,066,400
2016	-	-	-	-	-	-	-	233,400	233,400	1,299,800
2017	-	-	-	-	-	-	-	-	-	1,299,800
2018	-	-	-	238,000	-	476,000	-	-	714,000	2,013,800
2019	-	-	-	-	-	-	-	-	-	2,013,800
2020	-	-	-	-	-	-	-	-	-	2,013,800
2021	-	-	-	-	-	-	-	233,400	233,400	2,247,200
2022	-	-	-	-	-	-	-	-	-	2,247,200
2023	-	-	-	-	490,500	-	-	-	490,500	2,737,700
2024	-	-	-	-	-	-	-	-	-	2,737,700
2025	-	-	-	-	-	-	-	-	-	2,737,700
2026	-	-	-	-	-	-	-	233,400	233,400	2,971,100
2027	-	-	-	-	-	-	-	-	-	2,971,100
2028	-	-	-	-	-	-	-	-	-	2,971,100
2029	-	-	-	-	-	-	-	-	-	2,971,100
2030	-	-	-	-	-	-	-	-	-	2,971,100
2031	3,225,000	4,300,000	4,300,000	10,212,500	13,975,000	10,212,500	4,192,500	233,400	50,650,900	53,622,000
2032	-	-	-	-	-	-	-	-	-	53,622,000
2033	-	-	-	-	-	-	-	-	-	53,622,000
2034	-	-	-	-	-	-	-	-	-	53,622,000
2035	-	-	-	-	-	-	-	-	-	53,622,000
2036	-	-	-	-	-	-	-	233,400	233,400	53,855,400
2037	-	-	-	-	-	-	-	-	-	53,855,400
2038	-	-	-	-	-	-	-	-	-	53,855,400
2039	-	-	-	-	-	-	-	-	-	53,855,400
2040	-	-	-	-	-	-	-	-	-	53,855,400
2041	4,163,200	909,000	909,000	1,057,600	1,697,700	891,000	4,242,200	233,400	14,103,100	67,958,500
2042	-	-	-	333,200	-	499,800	-	-	833,000	68,791,500
2043	-	-	-	-	-	-	-	-	-	68,791,500
2044	-	-	-	-	-	-	-	-	-	68,791,500
2045	-	-	-	-	-	-	-	-	-	68,791,500
2046	-	-	-	-	-	-	-	233,400	233,400	69,024,900
2047	-	-	-	-	-	-	-	-	-	69,024,900
2048	-	-	-	-	-	-	-	-	-	69,024,900
2049	-	-	-	-	-	-	-	-	-	69,024,900
2050	-	-	-	-	-	-	-	-	-	69,024,900
2051	-	-	-	-	-	-	-	233,400	233,400	69,258,300
2052	3,225,000	4,300,000	4,300,000	10,212,500	13,975,000	10,212,500	4,192,500	-	50,417,500	119,675,800
2053	-	-	-	-	-	-	-	-	-	119,675,800
2054	-	-	-	-	-	-	-	-	-	119,675,800
2055	-	-	-	-	-	-	-	-	-	119,675,800
2056	-	-	-	-	-	-	-	233,400	233,400	119,909,200
2057	-	-	-	-	-	-	-	-	-	119,909,200
2058	-	-	-	-	-	-	-	-	-	119,909,200
2059	-	-	-	-	-	-	-	-	-	119,909,200
2060	-	-	-	-	-	-	-	-	-	119,909,200
2061	524,300	699,900	699,900	1,660,700	1,786,500	1,660,700	679,700	233,400	7,945,100	127,854,300
2062	-	-	-	-	-	-	-	-	-	127,854,300
2063	-	-	-	-	-	-	-	-	-	127,854,300
2064	-	-	-	-	-	-	-	-	-	127,854,300
2065	-	-	-	-	-	-	-	-	-	127,854,300
2066	-	-	-	-	-	-	-	233,400	233,400	128,087,700
2067	-	-	-	-	-	-	-	-	-	128,087,700
2068	-	-	-	-	-	-	-	-	-	128,087,700
2069	-	-	-	-	-	-	-	-	-	128,087,700
2070	-	-	-	-	-	-	-	-	-	128,087,700
2071	-	-	-	-	-	-	-	233,400	233,400	128,321,100
2072	4,163,200	909,000	909,000	1,057,600	1,697,700	891,000	4,242,200	-	13,869,700	142,190,800
2073	3,225,000	4,300,000	4,300,000	10,545,700	13,975,000	10,712,300	4,192,500	-	51,250,500	193,441,300
2074	-	-	-	-	490,500	-	-	-	490,500	193,931,800
2075	-	-	-	-	-	-	-	-	-	193,931,800
2076	-	-	-	-	-	-	-	233,400	233,400	194,165,200
2077	-	-	-	-	-	-	-	-	-	194,165,200
2078	-	-	-	-	-	-	-	-	-	194,165,200
2079	-	-	-	-	-	-	-	-	-	194,165,200
2080	-	-	-	-	-	-	-	-	-	194,165,200
2081	-	-	-	-	-	-	-	233,400	233,400	194,398,600
2082	-	-	-	-	-	-	-	-	-	194,398,600
2083	-	-	-	-	-	-	-	-	-	194,398,600
2084	-	-	-	-	-	-	-	-	-	194,398,600
2085	-	-	-	-	-	-	-	-	-	194,398,600
2086	-	-	-	-	-	-	-	233,400	233,400	194,632,000
2087	-	-	-	-	-	-	-	-	-	194,632,000
2088	-	-	-	-	-	-	-	-	-	194,632,000
2089	-	-	-	-	-	-	-	-	-	194,632,000
2090	-	-	-	-	-	-	-	-	-	194,632,000
2091	-	-	-	-	-	-	-	233,400	233,400	194,865,400
2092	-	-	-	-	-	-	-	-	-	194,865,400
2093	-	-	-	-	-	-	-	-	-	194,865,400
2094	3,225,000	4,300,000	4,300,000	10,212,500	13,975,000	10,212,500	4,192,500	-	50,417,500	245,282,900
2095	-	-	-	-	-	-	-	-	-	245,282,900
2096	-	-	-	-	-	-	-	233,400	233,400	245,516,300
2097	-	-	-	-	-	-	-	-	-	245,516,300
2098	-	-	-	-	-	-	-	-	-	245,516,300
2099	-	-	-	-	-	-	-	-	-	245,516,300
2100	-	-	-	-	-	-	-	-	-	245,516,300
2101	-	-	-	-	-	-	-	233,400	233,400	245,749,700
2102	-	-	-	-	-	-	-	-	-	245,749,700
2103	4,163,200	909,000	909,000	1,057,600	1,697,700	891,000	4,242,200	-	13,869,700	259,619,400
2104	-	-	-	333,200	-	499,800	-	-	833,000	260,452,400
2105	-	-	-	-	-	-	-	-	-	260,452,400
2106	-	-	-	-	-	-	-	233,400	233,400	260,685,800
2107	-	-	-	-	-	-	-	-	-	260,685,800
2108	-	-	-	-	-	-	-	-	-	260,685,800
2109	-	-	-	-	-	-	-	-	-	260,685,800
2110	-	-	-	-	-	-	-	-	-	260,685,800



Estimation of LCC

Estimation of LCC  
Rama V



1.5.3 Rama 7

Span No.1

Inspection result

		Damages of steel members				Damages of concrete members						Others						Span No.	1
		Corrosion	Cracking	Missing bolts	Fracture	Cracking, Water leakage, Free lime	No.	Rebar exposure	Pop-outs	Deck cracking	Damages at anchorage of PC tender	Level difference of road surface	Functional damage of bearings	Damages in substructures	Damages in pavements	Damages in expansion joints	Damages in cable	Remarks	
Girder	01					c	4	a			a								
	02					c	4	a			a								
Deck	01							a	a	c									
	02							a	a	a									
	03							a	a	c									
	04							a	a	a									
	05							a	a	a									
	06							a	a	c									
Pier	01					a		a											
	02					a		a											
Bearings	101												a						
	102												a						
	103												a						
	104												a						
Road surface												a							
Pavement															a				
Barriers Railings	01																c		
	02																c		
	03																c		
Expansion joints	01																c		
Others																			

Span No.1

Countermeasure classification of members

Bridge name	003Rama VII	Span No.	1
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Member	No.	Damage	Damage classification		Countermeasure classification	No.	Damage	Damage classification		Countermeasure classification
			Classification	Judge				Classification	Judge	
Girder	01	Cracking, Water leakage, Free lime	c	-	3	02	Cracking, Water leakage, Free lime	c	-	3
		Rebar exposure	a	-	5		Rebar exposure	a	-	5
		Damages at anchorage of PC tendon	a	-	5		Damages at anchorage of PC tendon	a	-	5
Deck	01	Rebar exposure	a		5	04	Rebar exposure	a		5
		Pop-outs	a		5		Pop-outs	a		5
		Deck cracking	c	-	3		Deck cracking	a	N	5
	03	Rebar exposure	a		5	06	Rebar exposure	a		5
		Pop-outs	a		5		Pop-outs	a		5
		Deck cracking	c	-	3		Deck cracking	c	-	3
Pier	01	Cracking, Water leakage, Free lime	a	-	5	02	Cracking, Water leakage, Free lime	a	-	5
		Rebar exposure	a	-	5		Rebar exposure	a	-	5
		Damages in substructures	a	-	5		Damages in substructures	a	-	5
Bearings	101	Functional damage of bearings	a		5	104	Functional damage of bearings	a		5
	102	Functional damage of bearings	a		5	105				
	103	Functional damage of bearings	a		5	106				
Road surface	01	Level difference of road surface	a		5	01	Damages in pavemnts	a		5
Barriers Railing	01	Damages in barriers	c		2	03	Damages in barriers	c		2
	02	Damages in barriers	c		2					
Expansion joints	01	Damages in expansion joints	c		2	-	-	-	-	-

Estimation of repair quantity

Bridge name		003Rama VII		Span No.	1
Subject		Quantity	Remarks		
1	Span length	85.00 m	Length of 1 span		
2	Road width for pavement	21.50 m	Width for pavement area (Vehicle lane)		
3	Total road width	28.90 m	Deck width		
4	Area of bridge surface	2,456.5 m <sup>2</sup>	Span length x Total width		
5	Area of pavement	1,827.5 m <sup>2</sup>	Span length x Width for pavement		
6	Barriers & railings	01	concrete	Type of barriers & railings	
		02	concrete	Same as above	
		03	concrete	Same as above	
		-	-	Same as above	
7	Expansion joints	01	steel	Type of expansion joint	
		-	-	Same as above	
8	Crack length	Quantity	Remarks		
	Total crack length L	98.3 m	A of bridge surf. x 0.040		
	Girder	49.1 m	L x 1/2 (per girder)		
9	Area of rebar exposure	Quantity	Remarks		
	Total area A	19.7 m <sup>2</sup>	A of bridge surf. x 0.008		
	Girder	9.8 m <sup>2</sup>	L x 1/2 (per girder)		
10	Repaired area of deck	Quantity	Remarks		
	01,06 A	378.3 m <sup>2</sup>	Deck width = 4.45 m		
	Area of rebar exposure	3.8 m <sup>2</sup>	A x 0.010		
	Area of deck cracking	18.9 m <sup>2</sup>	A x 0.050		
	03,04 A	229.5 m <sup>2</sup>	Deck width = 2.70 m		
	Area of rebar exposure	2.3 m <sup>2</sup>	A x 0.010		
	Area of deck cracking	11.5 m <sup>2</sup>	A x 0.050		
11	Repair quantity of substructure	Quantity	Remarks		
	Cracking, Water leakage, Free lime	5.54 m	per substructure		
	Rebar exposure	2.24 m <sup>2</sup>	per substructure		
12	Concrete barrier	Quantity	Remarks		
	Rebar exposure	9.83 m <sup>2</sup>	A of bridge surf. x 0.004		

Approximate repair price for countermeasure

Bridge name		003Rama VII		Span No.		I							
Member	No.	Damage	Damage classification	Repair method	Repair quantity	Unit	Approximate unit price (B)	Approximate repair price (B)	Approximate repair price for countermeasure classification 1 & 2 (B)	countermeasure classification 3	countermeasure classification 4	Planned repair & reconstruction	
										Repair price (B)	Repair price (B)	Repair price (B)	
										Remaining years up to countermeasure measure cl. 2	Remaining years up to countermeasure measure cl. 2	Life cycle	
Girder	01	Cracking/Water leakage/Free lime	c 3	Resin injection	49.1	m	5,000	245,500	-	245,500	7	-	30
		Rebar exposure	a 5	Patching	9.8	m <sup>2</sup>	17,500	171,500	-	-	7	171,500	30
	02	Damages at anchorage of PC tendon	a 5	Reinforcement with external PC tendon	-	Pos.	1,000,000	-	-	-	-	-	-
		Cracking/Water leakage/Free lime	c 3	Resin injection	49.1	m	5,000	245,500	245,500	245,500	7	-	30
Deck	01	Rebar exposure	a 5	Patching	9.8	m <sup>2</sup>	17,500	171,500	-	-	7	171,500	30
		Damages at anchorage of PC tendon	a 5	Reinforcement with external PC tendon	-	Pos.	1,000,000	-	-	-	-	-	-
	03	Rebar exposure	a 5	Patching	3.8	m <sup>2</sup>	17,500	66,500	-	-	7	-	30
		Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-
	04	Deck cracking	c 3	CFR	18.9	m <sup>2</sup>	22,500	425,300	425,300	425,300	12	425,300	50
		Rebar exposure	a 5	Patching	2.3	m <sup>2</sup>	17,500	40,300	-	-	7	-	30
	06	Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-
		Deck cracking	c 3	CFR	11.5	m <sup>2</sup>	22,500	258,800	258,800	258,800	12	258,800	50
	01	Rebar exposure	a 5	Patching	2.3	m <sup>2</sup>	17,500	40,300	-	-	7	-	30
		Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-
02	Deck cracking	c 3	CFR	11.5	m <sup>2</sup>	22,500	258,800	258,800	258,800	12	258,800	50	
	Rebar exposure	a 5	Patching	3.8	m <sup>2</sup>	17,500	66,500	-	-	7	-	30	
01	Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-	
	Deck cracking	c 3	CFR	18.9	m <sup>2</sup>	22,500	425,300	425,300	425,300	12	425,300	50	
Pier	01	Cracking/Water leakage/Free lime	a 5	Resin injection	5.54	m	5,000	27,700	-	-	7	-	30
		Rebar exposure	a 5	Patching	2.24	m <sup>2</sup>	17,500	39,200	-	-	7	-	30
02	01	Damages in substructures	a 5	Foot protection	-	Pier	1,750,000	-	-	-	-	-	-
		Cracking/Water leakage/Free lime	a 5	Resin injection	5.54	m	5,000	27,700	-	-	7	-	30
Bearings	101	Rebar exposure	a 5	Patching	2.24	m <sup>2</sup>	17,500	39,200	-	-	7	39,200	30
		Damages in substructures	a 5	Foot protection	-	Pier	1,750,000	-	-	-	-	-	-
	102	Functional damage of bearings	a 5	Metal spraying	1.0	Pier	120,000	120,000	-	-	7	120,000	30
		Functional damage of bearings	a 5	Metal spraying	1.0	"	120,000	120,000	-	-	7	120,000	30
Road surface	01	Functional damage of bearings	a 5	Metal spraying	1.0	"	120,000	120,000	-	-	7	120,000	30
		Functional damage of bearings	0 0	Metal spraying	1.0	"	120,000	120,000	120,000	120,000	7	-	20
Barriers	01	Level difference of road surface	a 5	Pavement replacement	-	m <sup>2</sup>	5,000	-	-	5	-	-	20
		Damages in pavements	a 5	same as above	1,827.5	"	5,000	9,137,500	-	-	5	9,137,500	20
		Damages in barriers	c 2	Patching	9.83	m <sup>2</sup>	17,500	172,100	172,100	172,100	7	172,100	30
Expansion joints	01	Damages in barriers	c 2	Patching	9.83	m <sup>2</sup>	17,500	172,100	172,100	172,100	7	172,100	30
		Damages in expansion joints	c 2	Patching	9.83	m <sup>2</sup>	17,500	172,100	172,100	172,100	7	172,100	30
Expansion joints	01	Damages in expansion joints	c 2	change of steel exp.	28.9	m	133,400	3,855,300	3,855,300	3,855,300	7	3,855,300	30

Span No.2

Inspector result

Span No. 2

		Damages of steel members				Damages of concrete members						Others					Remarks	
		Corrosion	Cracking	Missing bolts	Fracture	Cracking, Water leakage, Free lime	No.	Rebar exposure	Pop-outs	Deck cracking	Damages at anchorage of PC tender	Level difference of road surface	Functional damage of bearings	Damages in substructures	Damages in pavements	Damages in expansion joints		Damages in cable
Girder	01					a		a			a							
	02					a		a			a							
Deck	01							a	a	a								
	02							a	a	a								
	03							a	a	a								
	04							a	a	a								
	05							a	a	a								
	06							a	a	a								
Pier	01					a		a										
	02					a		a										
Road surface											a							
Pavement														a				
Barriers Railings	01															c		
	02															c		
	03															c		
Others																		

Span No.2

Countermeasure classification of members					Bridge name	003Rama VII	Span No.	2		
Member	No.	Damage	Damage classification		Countermeasure classification	No.	Damage	Damage classification		Countermeasure classification
			Classification	Judge				Classification	Judge	
Girder	01	Cracking, Water leakage, Free lime	a	-	5	02	Cracking, Water leakage, Free lime	a	-	5
		Rebar exposure	a	-	5		Rebar exposure	a	-	5
		Damages at anchorage of PC tendon	a	-	5		Damages at anchorage of PC tendon	a	-	5
Deck	01	Rebar exposure	a		5	04	Rebar exposure	a		5
		Pop-outs	a		5		Pop-outs	a		5
		Deck cracking	a	N	5		Deck cracking	a	N	5
	03	Rebar exposure	a		5	06	Rebar exposure	a		5
		Pop-outs	a		5		Pop-outs	a		5
		Deck cracking	a	N	5		Deck cracking	a	N	5
Pier	01	Cracking, Water leakage, Free lime	a	-	5	02	Cracking, Water leakage, Free lime	a	-	5
		Rebar exposure	a	-	5		Rebar exposure	a	-	5
		Damages in substructures	a	-	5		Damages in substructures	a	-	5
Road surface	01	Level difference of road surface	a		5	01	Damages in pavements	a		5
Barriers Railing	01	Damages in barriers	c		2	03	Damages in barriers	c		2
	02	Damages in barriers	c		2					

Estimation of repair quantity

Bridge name		003 Rama VII		Span No.	2
Subject		Quantity	Remarks		
1	Span length	120.00 m	Length of 1 span		
2	Road width for pavement	21.50 m	Width for pavement area (Vehicle lane)		
3	Total road width	28.90 m	Deck width		
4	Area of bridge surface	3,468.0 m <sup>2</sup>	Span length x Total width		
5	Area of pavement	2,580.0 m <sup>2</sup>	Span length x Width for pavement		
6	Barriers & railings	01	concrete	Type of barriers & railings	
		02	concrete	Same as above	
		03	concrete	Same as above	
		-	-	-	
7	Expansion joints	01	steel	Type of expansion joint	
		-	-	Same as above	
Crack length		Quantity	Remarks		
8	Total crack length L	138.7 m	A of bridge surf. x 0.040		
	Girder	69.4 m	L x 1/2 (per girder)		
Area of rebar exposure		Quantity	Remarks		
9	Total area A	27.7 m <sup>2</sup>	A of bridge surf. x 0.008		
	Girder	13.9 m <sup>2</sup>	L x 1/2 (per girder)		
Repaired area of deck		Quantity	Remarks		
10	01,06 A	534.0 m <sup>2</sup>	Deck width = 4.45 m		
	Area of rebar exposure	5.3 m <sup>2</sup>	A x 0.010		
	Area of deck cracking	26.7 m <sup>2</sup>	A x 0.050		
	03,04 A	324.0 m <sup>2</sup>	Deck width = 2.70 m		
	Area of rebar exposure	3.2 m <sup>2</sup>	A x 0.010		
	Area of deck cracking	16.2 m <sup>2</sup>	A x 0.050		
Repair quantity of substructure		Quantity	Remarks		
11	Cracking, Water leakage, Free lime	5.54 m	per substructure		
	Rebar exposure	2.24 m <sup>2</sup>	per substructure		
Concrete barrier		Quantity	Remarks		
12	Rebar exposure	13.87 m <sup>2</sup>	A of bridge surf. x 0.004		



Approximate repair price for countermeasure

Bridge name		003Rama VII		Span No.		2							
Member	No.	Damage	Damage classification	Repair method	Repair quantity	Unit	Approximate unit price (B)	Approximate repair price (B)	Approximate repair price for countermeasure classification 1 & 2 (B)	countermeasure classification 3	countermeasure classification 4	Planned repair & reconstruction	
										Repair price (B)	Repair price (B)	Repair price (B)	
										Remainng years up to counter measure cl. 2	Remainng years up to counter measure cl. 2	Life cycle	
Girder	01	Cracking/Water leakage/free lime	a 5	Resin injection	69.4	m	5,000	347,000	-	7	15	-	
		Rebar exposure	a 5	Patching	13.9	m <sup>2</sup>	17,500	243,300	-	7	15	243,300	
	02	Damages at anchorage of PC tendon	a 5	Reinforcement with external PC tendon	-	Pos.	1,000,000	-	-	-	-	-	-
		Cracking/Water leakage/free lime	a 5	Resin injection	69.4	m	5,000	347,000	-	7	15	-	30
		Rebar exposure	a 5	Patching	13.9	m <sup>2</sup>	17,500	243,300	-	7	15	243,300	30
		Damages at anchorage of PC tendon	a 5	Reinforcement with external PC tendon	-	Pos.	1,000,000	-	-	-	-	-	-
Deck	01	Rebar exposure	a 5	Patching	5.3	m <sup>2</sup>	17,500	92,800	-	7	15	-	
		Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	
	02	Deck cracking	a 5	CFR	26.7	m <sup>2</sup>	22,500	600,800	-	12	25	600,800	
		Rebar exposure	a 5	Patching	3.2	m <sup>2</sup>	17,500	56,000	-	7	15	-	
	03	Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	
		Deck cracking	a 5	CFR	16.2	m <sup>2</sup>	22,500	364,500	-	12	25	364,500	
Pier	04	Rebar exposure	a 5	Patching	3.2	m <sup>2</sup>	17,500	56,000	-	7	15	-	
		Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	
	05	Deck cracking	a 5	CFR	16.2	m <sup>2</sup>	22,500	364,500	-	12	25	364,500	
		Rebar exposure	a 5	Patching	5.3	m <sup>2</sup>	17,500	92,800	-	7	15	-	
	06	Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	
		Deck cracking	a 5	CFR	26.7	m <sup>2</sup>	22,500	600,800	-	12	25	600,800	
Road surface	01	Cracking/Water leakage/free lime	a 5	Resin injection	5.54	m	5,000	27,700	-	7	15	-	
		Rebar exposure	a 5	Patching	2.24	m <sup>2</sup>	17,500	39,200	-	7	15	39,200	
	02	Damages in substructures	a 5	Foot protection	-	Pier	1,750,000	-	-	-	-	-	
		Cracking/Water leakage/free lime	a 5	Resin injection	5.54	m	5,000	27,700	-	7	15	-	
	03	Rebar exposure	a 5	Patching	2.24	m <sup>2</sup>	17,500	39,200	-	7	15	39,200	
		Damages in substructures	a 5	Foot protection	-	Pier	1,750,000	-	-	-	-	-	
Barriers	01	Level difference of road surface	a 5	Pavement replacement	-	m <sup>2</sup>	5,000	-	-	5	10	-	
		Damages in pavements	a 5	same as above	2,580.0	μ	5,000	12,900,000	-	5	10	12,900,000	
	02	Damages in barriers	c 2	Patching	13.87	m <sup>2</sup>	17,500	242,800	242,800	-	7	15	242,800
		Damages in barriers	c 2	Patching	13.87	m <sup>2</sup>	17,500	242,800	242,800	-	7	15	242,800
	03	Damages in barriers	c 2	Patching	13.87	m <sup>2</sup>	17,500	242,800	242,800	-	7	15	242,800
		Damages in barriers	c 2	Patching	13.87	m <sup>2</sup>	17,500	242,800	242,800	-	7	15	242,800

Span No.3

Inspector result

		Damages of steel members				Damages of concrete members					Others						Span No.	3
		Corrosion	Cracking	Missing bolts	Fracture	Cracking, Water leakage, Free lime	No.	Rebar exposure	Pop-outs	Deck cracking	Damages at anchorage of PC tender	Level difference of road surface	Functional damage of bearings	Damages in substructures	Damages in pavements	Damages in expansion joints	Damages in cable	Remarks
Girder	01					c	4	a			a							
	02					c	4	a			a							
Deck	01							a	a	c								
	02							a	a	a								
	03							a	a	a								
	04							a	a	a								
	05							a	a	a								
	06							a	a	a	c							
Pier	01					a		a										
	02					a		a										
Bearings	101											a						
	102											a						
	103											a						
	104											a						
Road surface											a							
Pavement														a				
Barriers Railings	01															c		
	02															c		
	03															c		
Expansion joints	01																a	
Others																		

Span No.3

Countermeasure classification of members

Bridge name	003Rama VII	Span No.	3
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Member	No.	Damage	Damage classification		Countermeasure classification	No.	Damage	Damage classification		Countermeasure classification
			Classification	Judge				Classification	Judge	
Girder	01	Cracking, Water leakage, Free lime	c	-	3	02	Cracking, Water leakage, Free lime	c	-	3
		Rebar exposure	a	-	5		Rebar exposure	a	-	5
		Damages at anchorage of PC tendon	a	-	5		Damages at anchorage of PC tendon	a	-	5
Deck	01	Rebar exposure	a		5	04	Rebar exposure	a		5
		Pop-outs	a		5		Pop-outs	a		5
		Deck cracking	c	-	3		Deck cracking	a	N	5
	03	Rebar exposure	a		5	06	Rebar exposure	a		5
		Pop-outs	a		5		Pop-outs	a		5
		Deck cracking	a	N	5		Deck cracking	c	-	3
Pier	01	Cracking, Water leakage, Free lime	a	-	5	02	Cracking, Water leakage, Free lime	a	-	5
		Rebar exposure	a	-	5		Rebar exposure	a	-	5
		Damages in substructures	a	-	5		Damages in substructures	a	-	5
Bearings	101	Functional damage of bearings	a		5	104	Functional damage of bearings	a		5
	102	Functional damage of bearings	a		5	105				
	103	Functional damage of bearings	a		5	106				
Road surface	01	Level difference of road surface	a		5	01	Damages in pavements	a		5
Barriers Railing	01	Damages in barriers	c		2	03	Damages in barriers	c		2
	02	Damages in barriers	c		2					
Expansion joints	01	Damages in expansion joints	a		5	-	-	-	-	-

Estimation of repair quantity

Bridge name		003 Rama VII		Span No.	3
Subject		Quantity	Remarks		
1	Span length	85.00 m	Length of 1 span		
2	Road width for pavement	21.50 m	Width for pavement area (Vehicle lane)		
3	Total road width	28.90 m	Deck width		
4	Area of bridge surface	2,456.5 m <sup>2</sup>	Span length x Total width		
5	Area of pavement	1,827.5 m <sup>2</sup>	Span length x Width for pavement		
6	Barriers & railings	01	concrete	Type of barriers & railings	
		02	concrete	Same as above	
		03	concrete	Same as above	
		-	-	-	
7	Expansion joints	01	steel	Type of expansion joint	
		-	-	Same as above	
8	Crack length		Quantity	Remarks	
	Total crack length	L	98.3 m	A of bridge surf. x 0.040	
	Girder		49.1 m	L x 1/2 (per girder)	
9	Area of rebar exposure		Quantity	Remarks	
	Total area	A	19.7 m <sup>2</sup>	A of bridge surf. x 0.008	
	Girder		9.8 m <sup>2</sup>	L x 1/2 (per girder)	
10	Repaired area of deck		Quantity	Remarks	
	01,06	A	378.3 m <sup>2</sup>	Deck width = 4.45 m	
	Area of rebar exposure		3.8 m <sup>2</sup>	A x 0.010	
	Area of deck cracking		18.9 m <sup>2</sup>	A x 0.050	
	03,04	A	229.5 m <sup>2</sup>	Deck width = 2.70 m	
	Area of rebar exposure		2.3 m <sup>2</sup>	A x 0.010	
Area of deck cracking		11.5 m <sup>2</sup>	A x 0.050		
11	Repair quantity of substructure		Quantity	Remarks	
	Cracking, Water leakage, Free lime		5.54 m	per substructure	
	Rebar exposure		2.24 m <sup>2</sup>	per substructure	
12	Concrete barrier		Quantity	Remarks	
	Rebar exposure		9.83 m <sup>2</sup>	A of bridge surf. x 0.004	

Approximate repair price for countermeasure

Bridge name		003Rama VII		Spart No.		3		Planned repair & reconstruction					
Member	No.	Damage	Damage classification	Repair method	Repair quantity	Unit	Approximate unit price (B)	Approximate repair price (B)	Approximate repair price for countermeasure classification 1 & 2 (B)	countermeasure classification 3	countermeasure classification 4	Life cycle	
			Countermeasure classification						Repair price (B)	Remaining years up to countermeasure measure cl. 2	Repair price (B)	Remaining years up to countermeasure measure cl. 2	
Girder	01	Cracking/Water leakage/Free lime	c 3	Resin injection	49.1	m	5,000	245,500	-	7	245,500	7	15
		Rebar exposure	a 5	Patching	9.8	m <sup>2</sup>	17,500	171,500	-	7	-	-	15
	02	Damages at anchorage of PC tendon	c 3	Reinforcement with external PC tendon	-	Pos.	1,000,000	-	-	-	-	-	-
		Cracking/Water leakage/Free lime	a 5	Resin injection	49.1	m	5,000	245,500	-	7	245,500	-	15
01	01	Rebar exposure	a 5	Patching	9.8	m <sup>2</sup>	17,500	171,500	-	7	-	-	15
		Damages at anchorage of PC tendon	a 5	Reinforcement with external PC tendon	-	Pos.	1,000,000	-	-	-	-	-	-
	03	Rebar exposure	a 5	Patching	3.8	m <sup>2</sup>	17,500	66,500	-	7	-	-	15
		Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-
Deck	01	Deck cracking	c 3	CFR	18.9	m <sup>2</sup>	22,500	425,300	-	12	425,300	12	25
		Rebar exposure	a 5	Patching	2.3	m <sup>2</sup>	17,500	40,300	-	7	-	-	15
	03	Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-
		Deck cracking	a 5	CFR	11.5	m <sup>2</sup>	22,500	258,800	-	12	-	-	25
04	04	Rebar exposure	a 5	Patching	2.3	m <sup>2</sup>	17,500	40,300	-	7	-	-	15
		Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-
	06	Deck cracking	a 5	CFR	11.5	m <sup>2</sup>	22,500	258,800	-	12	-	-	25
		Rebar exposure	a 5	Patching	3.8	m <sup>2</sup>	17,500	66,500	-	7	-	-	15
01	01	Pop-outs	a 5	Patching & CFR	-	Pos.	10,000	-	-	-	-	-	-
		Deck cracking	c 3	CFR	18.9	m <sup>2</sup>	22,500	425,300	-	12	425,300	-	25
	02	Cracking/Water leakage/Free lime	a 5	Resin injection	5.54	m	5,000	27,700	-	7	-	-	15
		Rebar exposure	a 5	Patching	2.24	m <sup>2</sup>	17,500	39,200	-	7	-	-	15
Bearing	101	Damages in substructures	a 5	Foot protection	-	Pier	1,750,000	-	-	-	-	-	-
		Cracking/Water leakage/Free lime	a 5	Resin injection	5.54	m	5,000	27,700	-	7	-	-	15
	102	Rebar exposure	a 5	Patching	2.24	m <sup>2</sup>	17,500	39,200	-	7	-	-	15
		Damages in substructures	a 5	Foot protection	-	Pier	1,750,000	-	-	-	-	-	-
Road surface	01	Functional damage of bearings	a 5	Metal spraying	1.0	Pier	120,000	120,000	-	7	-	-	15
		Level difference of road surface	a 5	Pavement replacement	-	m <sup>2</sup>	5,000	-	-	-	-	-	10
	02	Damages in pavements	a 5	same as above	1,827.5	#	5,000	9,137,500	-	5	-	-	20
		Damages in barriers	c 2	Patching	9.83	m <sup>2</sup>	17,500	172,100	-	7	172,100	-	15
Expansion joints	01	Damages in barriers	c 2	Patching	9.83	m <sup>2</sup>	17,500	172,100	-	7	-	-	15
		Damages in expansion joints	a 5	change of steel exp.	28.9	m	133,400	3,855,300	-	7	-	-	15

Approximate total repair cost

Year	Annual repair cost (B)					Cumulative cost (B)
	Span No.1	Span No.2	Span No.3	Periodic inspection + reserve for unexpected matters	Bridge total	
2011	4,491,600	728,400	636,300	233,400	6,089,700	6,089,700
2012	-	-	-	-	-	6,089,700
2013	-	-	-	-	-	6,089,700
2014	-	-	-	-	-	6,089,700
2015	-	-	-	-	-	6,089,700
2016	-	-	-	233,400	233,400	6,323,100
2017	-	-	-	-	-	6,323,100
2018	491,000	-	491,000	-	982,000	7,305,100
2019	-	-	-	-	-	7,305,100
2020	-	-	-	-	-	7,305,100
2021	-	-	-	233,400	233,400	7,538,500
2022	-	-	-	-	-	7,538,500
2023	1,109,400	-	850,600	-	1,960,000	9,498,500
2024	-	-	-	-	-	9,498,500
2025	-	-	-	-	-	9,498,500
2026	-	-	-	233,400	233,400	9,731,900
2027	-	-	-	-	-	9,731,900
2028	-	-	-	-	-	9,731,900
2029	-	-	-	-	-	9,731,900
2030	-	-	-	-	-	9,731,900
2031	9,137,500	12,900,000	9,137,500	233,400	31,408,400	41,140,300
2032	-	-	-	-	-	41,140,300
2033	-	-	-	-	-	41,140,300
2034	-	-	-	-	-	41,140,300
2035	-	-	-	-	-	41,140,300
2036	-	-	-	233,400	233,400	41,373,700
2037	-	-	-	-	-	41,373,700
2038	-	-	-	-	-	41,373,700
2039	-	-	-	-	-	41,373,700
2040	-	-	-	-	-	41,373,700
2041	781,400	565,000	4,636,700	233,400	6,216,500	47,590,200
2042	4,371,600	728,400	516,300	-	5,616,300	53,206,500
2043	-	-	-	-	-	53,206,500
2044	-	-	-	-	-	53,206,500
2045	-	-	-	-	-	53,206,500
2046	-	-	-	233,400	233,400	53,439,900
2047	-	-	-	-	-	53,439,900
2048	-	-	-	-	-	53,439,900
2049	-	-	-	-	-	53,439,900
2050	-	-	-	-	-	53,439,900
2051	-	-	-	233,400	233,400	53,673,300
2052	9,137,500	12,900,000	9,137,500	-	31,175,000	84,848,300
2053	-	-	-	-	-	84,848,300
2054	-	-	-	-	-	84,848,300
2055	-	-	-	-	-	84,848,300
2056	-	-	-	233,400	233,400	85,081,700
2057	-	-	-	-	-	85,081,700
2058	-	-	-	-	-	85,081,700
2059	-	-	-	-	-	85,081,700
2060	-	-	-	-	-	85,081,700

Year	Annual repair cost (B)					Cummalative cost (B)
	Span No.1	Span No.2	Span No.3	Periodic inspection + reserve for unexpected matters	Bridge total	
2061	258,800	1,930,600	517,600	233,400	2,940,400	88,022,100
2062	-	-	-	-	-	88,022,100
2063	-	-	-	-	-	88,022,100
2064	-	-	-	-	-	88,022,100
2065	-	-	-	-	-	88,022,100
2066	-	-	-	233,400	233,400	88,255,500
2067	-	-	-	-	-	88,255,500
2068	-	-	-	-	-	88,255,500
2069	-	-	-	-	-	88,255,500
2070	-	-	-	-	-	88,255,500
2071	-	-	-	233,400	233,400	88,488,900
2072	901,400	565,000	4,756,700	-	6,223,100	94,712,000
2073	13,509,100	13,628,400	9,653,800	-	36,791,300	131,503,300
2074	1,109,400	-	850,600	-	1,960,000	133,463,300
2075	-	-	-	-	-	133,463,300
2076	-	-	-	233,400	233,400	133,696,700
2077	-	-	-	-	-	133,696,700
2078	-	-	-	-	-	133,696,700
2079	-	-	-	-	-	133,696,700
2080	-	-	-	-	-	133,696,700
2081	-	-	-	233,400	233,400	133,930,100
2082	-	-	-	-	-	133,930,100
2083	-	-	-	-	-	133,930,100
2084	-	-	-	-	-	133,930,100
2085	-	-	-	-	-	133,930,100
2086	-	-	-	233,400	233,400	134,163,500
2087	-	-	-	-	-	134,163,500
2088	-	-	-	-	-	134,163,500
2089	-	-	-	-	-	134,163,500
2090	-	-	-	-	-	134,163,500
2091	-	-	-	233,400	233,400	134,396,900
2092	-	-	-	-	-	134,396,900
2093	-	-	-	-	-	134,396,900
2094	9,137,500	12,900,000	9,137,500	-	31,175,000	165,571,900
2095	-	-	-	-	-	165,571,900
2096	-	-	-	233,400	233,400	165,805,300
2097	-	-	-	-	-	165,805,300
2098	-	-	-	-	-	165,805,300
2099	-	-	-	-	-	165,805,300
2100	-	-	-	-	-	165,805,300
2101	-	-	-	233,400	233,400	166,038,700
2102	-	-	-	-	-	166,038,700
2103	901,400	565,000	4,756,700	-	6,223,100	172,261,800
2104	4,371,600	728,400	516,300	-	5,616,300	177,878,100
2105	-	-	-	-	-	177,878,100
2106	-	-	-	233,400	233,400	178,111,500
2107	-	-	-	-	-	178,111,500
2108	-	-	-	-	-	178,111,500
2109	-	-	-	-	-	178,111,500
2110	-	-	-	-	-	178,111,500

Estimation of LCC

Estimation of LCC  
Rama VII

