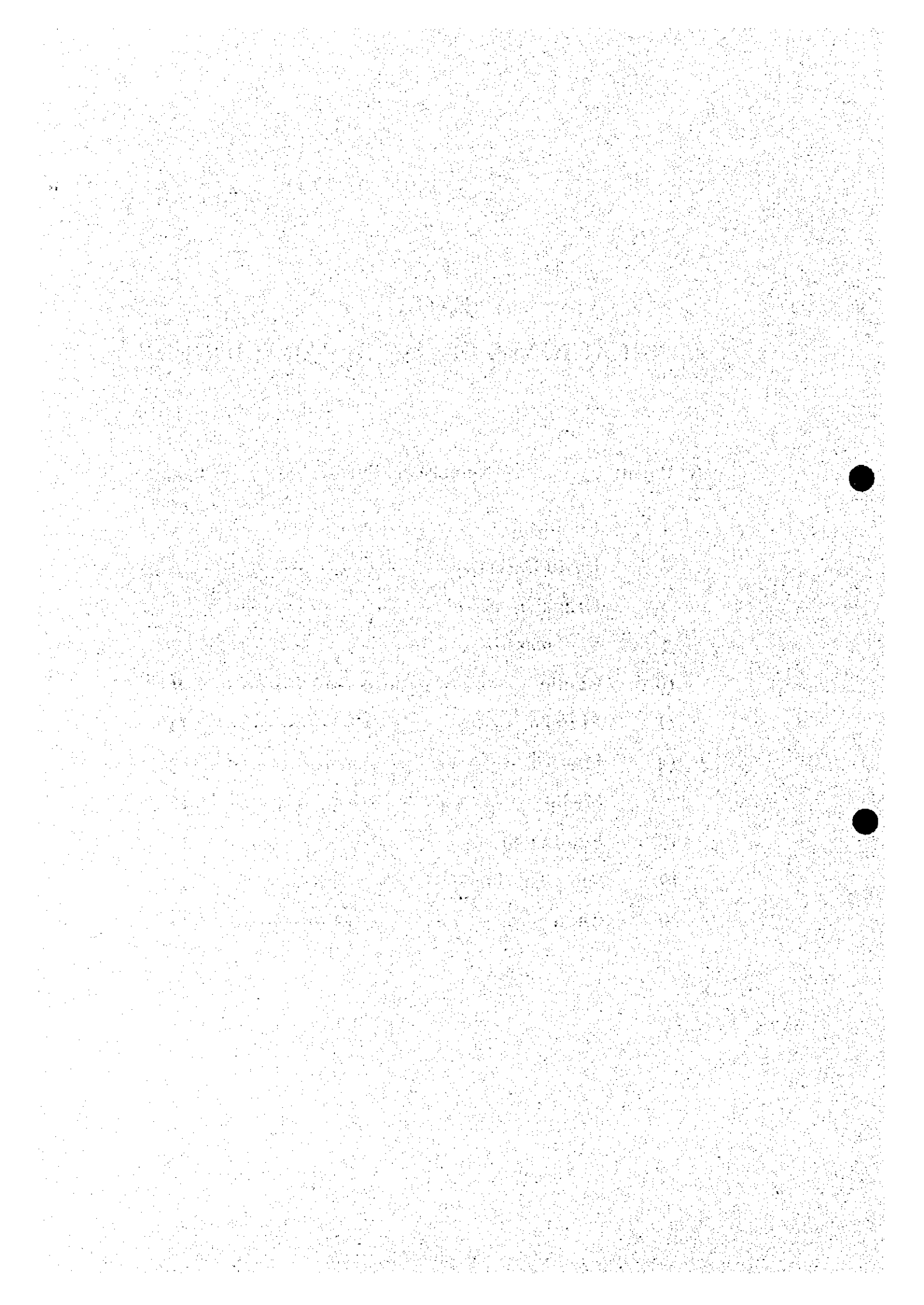


ANEXO II - 4

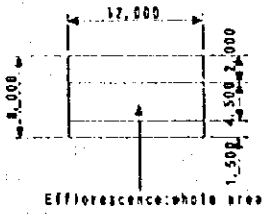
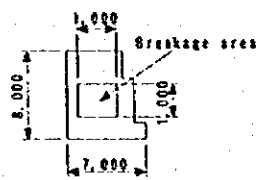
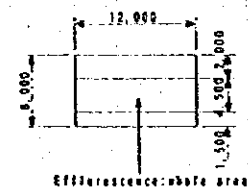
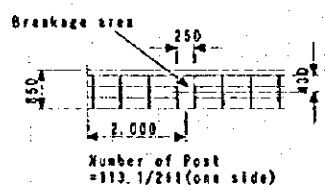
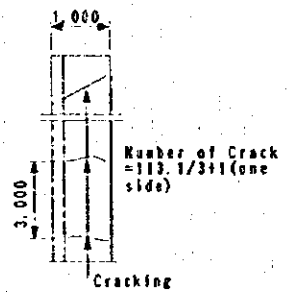
CUBICACIONES DE LAS REPARACIONES

N° Puente	Nombre del Puente	Página
1	Confluencia	1
2	David García	3
3	Granallas	5
4	Ventanas	7
10	Cautín	9
11	El Indio	11
14	Malleco	12
17	Medina	12
18	Cautín (88)	13
19	Salva Tú Alma	13
20	Quinchilca	14

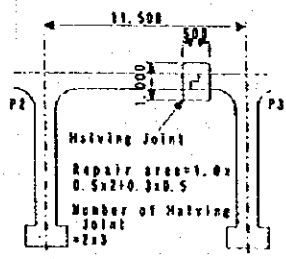
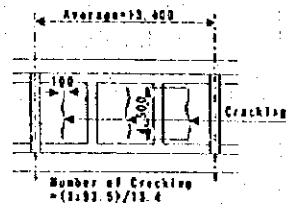
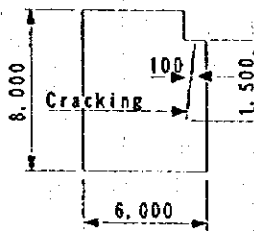
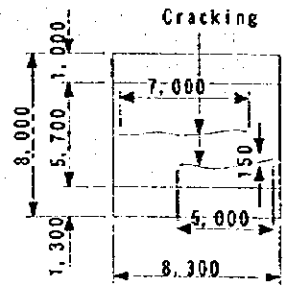


(1) Confluencia
Concrete

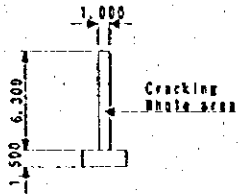
Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Cracking (Deck Slab Surface)		1.50	10.00	6	90.00
Cracking and Efflorescence (Cantilever Under-side Slab)	<p>Slab length=113.1m Crack number=113.1/0.4=283</p>	0.10	1.00	566	56.60
		1.00	113.10	2	226.20
Cracking and Efflorescence (Under-side Slab)	<p>Crack number=(6000/12/70)=42 Efflorescence whole area</p>	0.10	7.00	42	29.40
		7.00	131.00	1	917.00

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Efflorescence (A1 Abutment Front Wall)		12.00	4.50	1	54.00
Breakage (A1 Abutment side Wall)		1.00	1.00	1	1.00
Efflorescence (A2 Abutment Front Wall)		12.00	4.50	1	54.00
Breakage (Hand Railing)		0.25	0.43	116	12.47
Cracking (Side Walk)		0.15	1.00	77	11.55

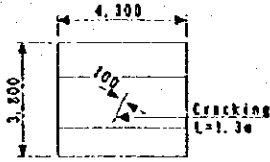
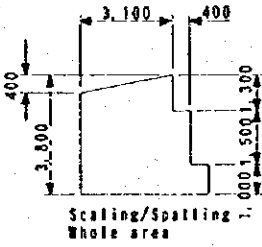
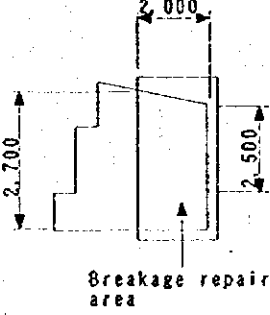
(2) David Garcia
Concrete

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Efflorescence (Beam-Halving Joint)	 <p>11.500</p> <p>1.000</p> <p>0.500</p> <p>0.300</p> <p>0.500</p> <p>Halving Joint</p> <p>Repair area=1.0x0.5x2+0.3x0.5</p> <p>Number of Halving Joint=2x3</p>	0.50	1.30	6	3.90
Cracking (Under-side Slab)	 <p>Average=12.000</p> <p>100</p> <p>Cracking</p> <p>Number of Cracking=(1.025)/12.4</p>	0.10	4.50	21	9.45
Cracking (A1 Abutment Side Wall)	 <p>8.000</p> <p>100</p> <p>Cracking</p> <p>1.500</p> <p>6.000</p>	0.10	1.50	1	0.15
Cracking (A1 Abutment Front Wall)	 <p>Cracking</p> <p>8.000</p> <p>1.300</p> <p>5.700</p> <p>7.000</p> <p>150</p> <p>5.000</p> <p>8.300</p>	0.15	12.00	1	1.80

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Delamination (A2 Abutment Front Wall)	<p>Delamination area (1.5x4.0)</p>	4.00	1.50	1	6.00
Cracking (A2 Abutment Front Wall)	<p>Cracking</p>	0.15	7.00	1	1.05
Efflorescence (A2 Abutment Side Wall)	<p>Efflorescence: Whole area</p>	5.50	1.00	1	39.70
		5.70	6.00	1	
Cracking (P ₆ Pier)	<p>Cracking area Number of cracking = 4/0.3 Length = 0.4 x 2 x 0.5</p>	0.10	1.30	14	1.82

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Cracking (P ₆ Pier)		1.00	6.30	2	12.60

(3) Granallas
Concrete

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Cracking (A1 Abutment Side Wall)		0.10	1.30	1	0.13
Scaling/Sapling (A1 Abutment Side wall)		3.10	0.20	1	8.66
		3.10	0.90	1	
		3.50	1.50	1	
Breakage (A2 Abutment Side Wall)		2.00	2.60	1	5.20

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Cracking (Pier Strut Wall)		0.10	2.50	3	0.75
Cracking (Pier Column)		0.50	2.00	1	1.00
Breakage (Pier Column)		1.00	0.25	1	0.25
Breakage (Pier Foundation)		5.00	0.50	1	2.50

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Breakage (Pier Foundation)		1.00	2.50	1	2.50

**(4) Ventanas
Concrete**

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Efflorescence (Beam-Span 1 ③ beam)		0.50	0.90	2	0.90
Efflorescence (Beam-Span 1 ② beam)		7.00	0.45	2	6.30
Breakage (Beam-Span 1 ② beam)		0.50	0.90	1	0.45

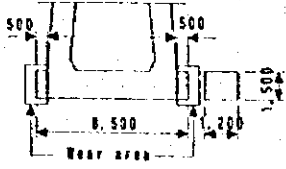
Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Scaling/Sapling (Under-side Slab)		13.60	5.40	2	146.88
Cracking (A1 Abutment Side Wall)		0.15	5.00	1	0.75
Scaling/Sapling (A1 Abutment Front Wall)		5.60	2.70	1	15.12
Scaling/Sapling (Pier Wall)		5.50	3.30	2	36.30

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Cracking (A1 Abutment Foundation)		0.10	2.00	2	0.40
Scaling/Spalling (Pier Foundation)		6.00	1.50	2	19.50
		1.50	1.00	1	

**(10) Cautin(a)
Concrete**

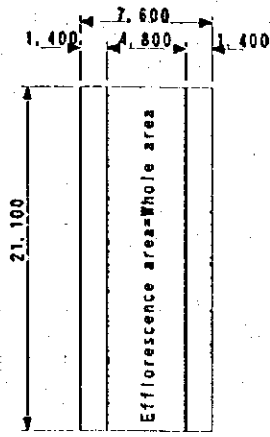
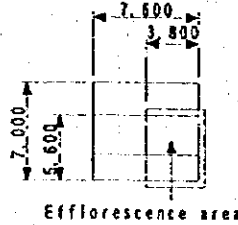
Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Delamination (Beam)		1.95	20.00	7	273.00

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Efflorescence (Beam)		0.30	2.00	84	50.40
Efflorescence (Under-side Slab)		0.15	1.50	1867	420.08
		1.50	140.00	2	420.00
Cracking (A1 Abutment Side Wall)		3.00	1.50	1	4.50
		0.15	4.00	1	0.60
Delamination (A1 Abutment Side Wall)		3.00	3.00	1	9.00

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Wear (P ₁ Pier Foundation)		2.20	1.50	2	6.60

(11) El Indio
Concrete

5 (11)

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Efflorescence (Under-side Slab)		4.80	21.10	1	101.28
Efflorescence (A1 Abutment Front Wall and Foundation)		3.80	5.60	1	21.28

(14) Malleco
Concrete

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Cracking (A1 Abutment Side Wall)		0.10	2.50	1	0.25
		0.15	2.00	1	0.30
Scaling/Spalling & Efflorescence (A1 Abutment Front Wall)		0.50	2.00	1	1.00
		4.50	1.75	1	7.88

(17) Medina
Concrete

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Scaling/Spalling (A1 Abutment Front Wall)		5.00	0.50	1	2.50
Efflorescence (A1 Abutment Side Wall)		3.00	1.60	1	4.80

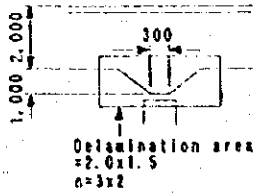
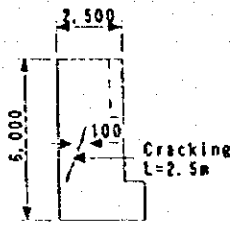
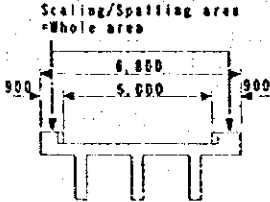
(18) Cautln 88
Concrete

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Honeycombs (A1 Abutment Side Wall)		0.75	2.20	1	1.65
Breakage (A2 Abutment Side Wall)		0.75	2.20	1	1.65

(19) Salva Tu Ahma
Concrete

Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Cracking (A2 Abutment From Wall)		0.15	2.50	1	0.38

(20) Quinchilea
Concrete

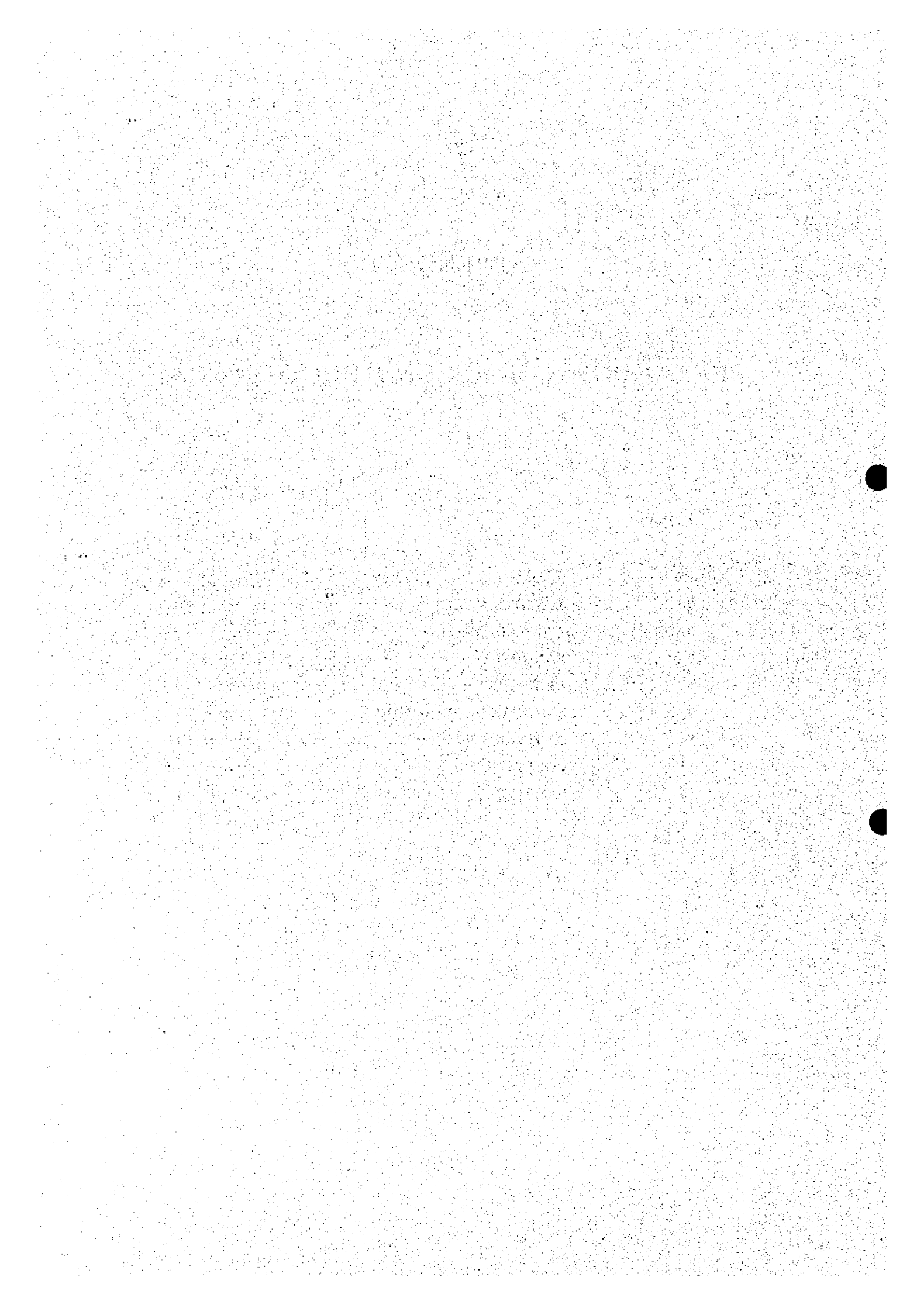
Damage	Location of Damage	Width(m)	Length(m)	Number	Quantity(m ²)
Delamination (Beam-P ₃ , P ₄ , P ₅)	 <p>Delamination area = 2.0 x 1.5 n=3x2</p>	2.00	1.50	6	18.00
Cracking (A1 Abutment Side Wall)	 <p>Cracking L=2.5m</p>	0.10	2.50	1	0.25
Scaling/Spalling (Foot Way)	 <p>Scaling/Spalling area - Whole area</p>	0.90	140.00	2	252.00

APPENDIX II-5

BREAKDOWN OF RECONSTRUCTION COSTS

CONTENTS

Bridge No.	Bridge Name	Page
2	DAVID GARCIA -----	1
3	GRANALLAS -----	3
5	SAN JOSE -----	5
6	PUANGUE -----	7
7	SAN JOSE DE MARCHIHUE -----	9
8	ANTIVERO No. 2 -----	11
13	POCULON -----	13
16	SAN JUAN -----	15



Appendix II-5
Reconstruction cost

No.	Bridge name	Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
		Item	Item						
2 - 1	DAVID GARCIA	Superstructure							
			P.C. Beam manufacturing						
			Concrete	m3	87.08	\$ 59,400	\$ 5,172,552		
			Reinforcing bar	kg	8709.33	\$ 500	\$ 4,354,665		
			Prestressing steel	kg	2490.00	\$ 3,000	\$ 7,470,000		
			Formwork	m2	595.12	\$ 5,800	\$ 3,451,696		
			Transportation	L.s.	1.00	\$ 1,226,935	\$ 1,226,935		
			Main Girder erection						
			Bearing shoes	each	40.00	\$ 761,700	\$ 30,468,000		
			Erection	L.s.	1.00	\$ 5,112,228	\$ 5,112,228		
			Deck slab construction						
			Concrete	m3	188.40	\$ 58,500	\$ 11,021,400		
			Reinforcing bar	kg	21107.18	\$ 500	\$ 10,553,590	A63-42H	
			formwork	kg	1191.45	\$ 430	\$ 512,324	A44-28H	
			formwork	m2	388.19	\$ 5,800	\$ 2,251,502		
			Approach slab	m2	9.00	\$ 5,800	\$ 52,200		
			Concrete	m3	20.00	\$ 58,500	\$ 1,170,000		
			Reinforcing bar	kg	915.80	\$ 500	\$ 457,900		
			Pavement and accessories						
			Hand rail	m	68.00	\$ 34,900	\$ 2,373,200		
			Expansion joint	m	20.80	\$ 91,200	\$ 1,896,960		
			Drainage	L.s.	1.00		\$ -		
			Pavement	m2	352.60	\$ 51,600	\$ 18,194,160		
			Approach road construction						
			Earth work	m3	385.00	\$ 4,600	\$ 1,771,000		
			Pavement	m2	400.00	\$ 51,600	\$ 20,640,000		
			Base coarse	m3	80.00	\$ 6,800	\$ 544,000		
			Sub total				\$128,694,312		

No.	Bridge name		Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
	2 - 2	DAVID GARCIA	Substructure	Item						
				Pier and Abutment construction						
				Foundation	m3	2328.00	\$ 1,700	\$ 3,957,600		
				excavation						
				Base concrete	m3	40.60	\$ 41,400	\$ 1,680,840		
				Pier concrete	m3	613.63	\$ 58,500	\$ 35,897,355		
				Abutment concrete	m3	360.41	\$ 58,500	\$ 21,083,985		
				Reinforcing bar	kg	74831.09	\$ 500	\$ 37,415,545		
				Formwork	m2	367.70	\$ 5,800	\$ 2,132,660		
				Scaffolding	m3	773.52	\$ 2,000	\$ 1,547,040		
				Revetment work						
				Bank protection	m2	200.00	\$ 23,200	\$ 4,640,000		
				Scoring protection	m2	200.00	\$ 22,600	\$ 4,520,000		
Sub total										
Total									\$112,875,025	
				Miscellaneous (Total, etc. x 32.6%)					\$241,569,337	
				Tax = 18% of Construction Cost					\$ 87,448,100	
				Contingency = 5% of Construction Cost						
				Overhead = 5% of Construction Cost						
				Miscellaneous = 4.6% of Construction Cost						
				Total						
				Total amount					\$329,017,436	

Appendix II-5
Reconstruction cost

No.	Bridge name	Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
		Item	Item						
3	I GRANALLAS	Superstructure							
			P.C. Beam manufacturing						
			Concrete	m3	77.28	\$ 59,400	\$ 4,590,432		
			Reinforcing bar	kg	7009.33	\$ 500	\$ 3,504,665		
			Pressressing steel	kg	2220.00	\$ 3,000	\$ 6,660,000		
			Formwork	m2	534.81	\$ 5,800	\$ 3,101,898		
			Transportation	L.s.	1.00	\$ 1,071,420	\$ 1,071,420		
			Main Girder erection						
			Bearing shoes	each	16.00	\$ 761,700	\$ 12,187,200		
			Erection	L.s.	1.00	\$ 4,464,249	\$ 4,464,249		
			Deck slab construction						
			Concrete	m3	116.13	\$ 58,500	\$ 6,793,605		
			Reinforcing bar	kg	54283.64	\$ 500	\$ 27,141,820	A63-42H	
			formwork	kg	630.80	\$ 430	\$ 271,244	A44-28H	
			formwork	m2	611.30	\$ 5,800	\$ 3,545,540		
			Approach slab	m2	7.50	\$ 5,800	\$ 43,500		
			Concrete	m3	14.00	\$ 58,500	\$ 819,000		
			Reinforcing bar	kg	640.90	\$ 500	\$ 320,450		
			Pavement and accessories						
			Hand rail	m	112.00	\$ 34,900	\$ 3,908,800		
			Expansion joint	m	18.80	\$ 91,200	\$ 1,714,560		
			Drainage	L.s.		\$ -	\$ -		
			Pavement	m2	392.00	\$ 51,600	\$ 20,227,200		
			Approach road construction						
			Earth work	m3	0.00	\$ 4,600	\$ -		
			Pavement	m2	56.00	\$ 51,600	\$ 2,889,600		
			Base coase	m3	0.00	\$ 6,800	\$ -		
			Sub total				\$ 103,255,182		

No.	Bridge name	Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
		Structure	Item						
3 • 2	GRANALLAS								
		Substructure							
			Pier and Abutment construction						
			Foundation	m3	1816.50	\$ 1,700	\$ 3,088,050		
			excavation						
			Base concrete	m3	5.80	\$ 41,400	\$ 240,120		
			Pier concrete	m3	125.90	\$ 58,500	\$ 7,365,150		
			Abument concrete	m3	268.49	\$ 58,500	\$ 15,706,665		
			Reinforcing bar	kg	28708.46	\$ 500	\$ 14,354,230		
			Formwork	m2	230.50	\$ 5,800	\$ 1,336,900		
			Scaffolding	m3	470.00	\$ 2,000	\$ 940,000		
			Rebetment work						
			Bank protection	m2	200.00	\$ 23,200	\$ 4,640,000		
			Scoring protection	m2	200.00	\$ 22,600	\$ 4,520,000		
			Miscellaneous (Total, etc. x 32.6%)	L.s.			\$ 52,191,115	\$ 155,446,297	
								56,271,560	
			Total amount				\$ 211,717,857		

Appendix II-5
Reconstruction cost

No.	Bridge name	Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
		Item	Item						
5 - 1	SAN JOSE	Superstructure							
			P.C. Beam manufacturing	Concrete	m3	98.35	\$ 59,400	\$ 5,841,990	
				Reinforcing bar	kg	9157.48	\$ 500	\$ 4,578,740	
				Prestressing steel	kg	2870.00	\$ 3,000	\$ 8,610,000	
				Formwork	m2	683.35	\$ 5,800	\$ 3,963,430	
			Transportation		L.s.	1.00	\$ 1,379,650	\$ 1,379,650	
			Main Girder erection	Bearing shoes	each	30.00	\$ 761,700	\$ 22,851,000	
				Erection	L.s.	1.00	\$ 5,748,540	\$ 5,748,540	
			Deck slab construction						
				Concrete	m3	112.84	\$ 58,500	\$ 6,601,140	
				Reinforcing bar	kg	20959.38	\$ 500	\$ 10,479,690	A63-42H
				formwork	kg	1076.91	\$ 430	\$ 463,071	A44-28H
				formwork	m2	1091.53	\$ 5,800	\$ 6,330,874	
			Approach slab	Formwork	m2	9.00	\$ 5,800	\$ 52,200	
				Concrete	m3	20.00	\$ 58,500	\$ 1,170,000	
				Reinforcing bar	kg	915.80	\$ 500	\$ 457,900	
			Pavement and accessories						
				Hand rail	m	168.10	\$ 34,900	\$ 5,866,690	
				Expansion joint	m	24.00	\$ 91,200	\$ 2,188,800	
				Drainage	L.s.		\$ -	\$ -	
				Pavement	m2	840.50	\$ 51,600	\$ 43,369,800	
			Approach road construction						
				Earth work	m3	4077.10	\$ 4,600	\$ 18,754,660	
				Pavement	m2	1480.00	\$ 51,600	\$ 76,368,000	
				Base course	m3	296.00	\$ 6,800	\$ 2,012,800	
				Sub total				\$27,088,975	

No.	Bridge name	Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
		Item	Item						
5 - 2	SAN JOSE								
		Substructure							
			Pier and Abutment construction						
			Foundation		m3	1557.10	\$ 1,700	\$ 2,647,070	
			excavation						
			Base concrete		m3	6.60	\$ 41,400	\$ 273,240	
			Pier concrete		m3	469.94	\$ 58,500	\$ 27,491,490	
			Abutment concrete		m3	325.60	\$ 58,500	\$ 19,047,600	
			Reinforcing bar		kg	60670.94	\$ 500	\$ 30,335,470	
			Formwork		m2	1327.31	\$ 5,800	\$ 7,698,398	
			Scaffolding		m3	542.40	\$ 2,000	\$ 1,084,800	
			Rebetment work						
			Bank protection		m2	200.00	\$ 23,200	\$ 4,640,000	
			Scoring protection		m2	200.00	\$ 22,600	\$ 4,520,000	
								\$ 97,738,068	
	Sub total							\$324,827,043	
	Total		Miscellaneous (Total, etc. x 32.6%)		L.s.			105,893,616	
	Total amount							\$430,720,659	

Appendix II-5
Reconstruction cost

No.	Bridge name	Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
		Structure	Item						
6 - 1	PUANGE	Superstructure							
			P.C. Beam manufacturing						
			Concrete	m3	108.45	\$ 59,400	\$ 6,441,930		
			Reinforcing bar	kg	9803.12	\$ 500	\$ 4,901,560		
			Pressressing steel	kg	3200.00	\$ 3,000	\$ 9,600,000		
			Formwork	m2	762.34	\$ 5,800	\$ 4,421,572		
			Transportation	L.s.	1.00	\$ 1,521,904	\$ 1,521,904		
			Main Girder erection						
			Bearing shoes	each	40.00	\$ 761,700	\$ 30,468,000		
			Erection	L.s.	1.00	\$ 6,341,266	\$ 6,341,266		
			Deck slab construction						
			Concrete	m3	126.46	\$ 58,500	\$ 7,397,910		
			Reinforcing bar	kg	23163.20	\$ 500	\$ 11,581,600	A63-42H	
				kg	1158.40	\$ 430	\$ 498,112	A44-28H	
			Formwork	m2	429.80	\$ 5,800	\$ 2,492,840		
			Formwork	m2	9.00	\$ 5,800	\$ 52,200		
			Approach slab						
			Concrete	m3	20.00	\$ 58,500	\$ 1,170,000		
			Reinforcing bar	kg	915.80	\$ 500	\$ 457,900		
			Pavement and accessories						
			Hand rail	m	240.10	\$ 34,900	\$ 8,379,490		
			Expansion joint	m	24.80	\$ 91,200	\$ 2,261,760		
			Drainage	L.s.		\$ -	\$ -		
			Pavement	m2	1200.50	\$ 51,600	\$ 61,945,800		
			Approach road construction						
			Earth work	m3	4548.10	\$ 4,600	\$ 20,921,260		
			Pavement	m2	1387.00	\$ 51,600	\$ 71,569,200		
			Base course	m3	276.80	\$ 6,800	\$ 1,882,240		
			Sub total				\$ 254,306,543		

No.	Bridge name	Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
		Structure	Item						
6 - 2	PUANGE								
		Substructure							
			Pier and Abutment construction						
			Foundation						
			excavation	m3	1712.63	\$ 1,700	\$ 2,911,471		
			Base concrete	m3	43.30	\$ 41,400	\$ 1,792,620		
			Pier concrete	m3	727.15	\$ 58,500	\$ 42,538,275		
			Abument concrete	m3	365.52	\$ 58,500	\$ 21,382,920		
			Reinforcing bar	kg	89669.26	\$ 500	\$ 44,834,630		
			Formwork	m2	230.50	\$ 5,800	\$ 1,336,900		
			Scaffolding	m3	1027.60	\$ 2,000	\$ 2,055,200		
			Rebetment work						
			Bank protection	m2	200.00	\$ 23,200	\$ 4,640,000		
			Scoring protection	m2	200.00	\$ 22,600	\$ 4,520,000		
							\$126,012,016		
							\$380,318,559		
			Miscellaneous (Total, etc. x 32.6%)	L.s.			123,983,850		
							\$504,302,410		

Appendix II-5
Reconstruction cost

No.	Bridge name	Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
		Item	Item						
7 - 1	SAN JOSE DE MARCHIHUE								
		Superstructure							
			P.C. Beam manufacturing	Concrete	m3	72.1	\$ 59,400	\$ 4,283,928	
				Reinforcing bar	kg	6,723.8	\$ 500	\$ 3,361,880	
				Prestressing steel	kg	2,060.0	\$ 3,000	\$ 6,180,000	
				Formwork	m2	494.3	\$ 5,800	\$ 2,866,940	
			Transportation		L.s.	1.0	\$ 1,001,565	\$ 1,001,565	
			Main Girder erection						
				Bearing shoes	each	48.0	\$ 761,700	\$ 36,561,600	
				Erection	L.s.	1.0	\$ 4,173,187	\$ 4,173,187	
			Deck slab construction						
				Concrete	m3	79.7	\$ 58,500	\$ 4,663,620	
				Reinforcing bar	kg	15,399.5	\$ 500	\$ 7,699,750	A63-42H
					kg	613.2	\$ 430	\$ 263,680	A44-28H
				Formwork	m2	256.2	\$ 5,800	\$ 1,485,670	
			Approach slab		m2	7.5	\$ 5,800	\$ 43,500	
				Concrete	m3	14.0	\$ 58,500	\$ 819,000	
				Reinforcing bar	kg	640.9	\$ 500	\$ 320,450	
			Pavement and accessories						
				Hand rail	m	324.1	\$ 34,900	\$ 11,311,090	
				Expansion joint	m	18.0	\$ 91,200	\$ 1,641,600	
				Drainage	L.s.		\$ -	\$ -	
				Pavement	m2	1,134.4	\$ 51,600	\$ 58,532,460	
			Approach road construction						
				Earth work	m3	1,128.0	\$ 4,600	\$ 5,188,800	
				Pavement	m2	497.0	\$ 51,600	\$ 25,645,200	
				Base course	m3	99.4	\$ 6,800	\$ 675,920	
				Sub total				\$ 176,719,840	

Appendix II-5
Reconstruction cost

No.	Bridge name	Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
		Item	Item						
8 - 1	ANTIVERO	Superstructure	P.C. Beam manufacturing	Concrete	m3	101.6	\$ 59,400	\$ 6,036,822	
				Reinforcing bar	kg	9,109.9	\$ 500	\$ 4,554,965	
				Prestressing steel	kg	2,980.0	\$ 3,000	\$ 8,940,000	
				Formwork	m2	707.6	\$ 5,800	\$ 4,104,080	
				Transportation	L.s.	1.0	\$ 1,418,152	\$ 1,418,152	
				Main Girder erection					
				Bearing shoes	each	40.0	\$ 761,700	\$ 30,468,000	
				Erection	L.s.	1.0	\$ 5,908,967	\$ 5,908,967	
				Deck slab construction					
				Concrete	m3	110.5	\$ 58,500	\$ 6,466,590	
		Reinforcing bar	kg	20,428.3	\$ 500	\$ 10,214,160	A63-42H		
			kg	852.8	\$ 430	\$ 366,704	A44-28H		
		formwork	m2	364.0	\$ 5,800	\$ 2,111,374			
		Formwork	m2	8.5	\$ 5,800	\$ 49,300			
		Concrete	m3	18.0	\$ 58,500	\$ 1,053,000			
		Reinforcing bar	kg	824.2	\$ 500	\$ 412,100			
		Pavement and accessories							
		Hand rail	m	232.1	\$ 34,900	\$ 8,100,290			
		Expansion joint	m	22.8	\$ 91,200	\$ 2,079,360			
		Drainage	L.s.		\$ -	\$ -			
Pavement	m2	1,044.5	\$ 51,600	\$ 53,893,620					
Approach road construction									
Earth work	m3	322.6	\$ 4,600	\$ 1,483,960					
Pavement	m2	288.0	\$ 51,600	\$ 14,860,800					
Base course	m3	57.6	\$ 6,800	\$ 391,680					
Sub total				\$	\$ 162,913,924				

No.	Bridge name	Structure		Construction Item	unit	Quantity	U. Price (\$)	Price (\$)	Remarks
		Item	Item						
8 - 2	ANTVERO								
		Substructure							
			Pier and Abutment construction						
			Foundation						
			excavation	m3	2,059.2	\$ 1,700	\$ 3,500,623		
			Base concrete	m3	33.8	\$ 41,400	\$ 1,399,320		
			Pier concrete	m3	484.9	\$ 58,500	\$ 28,368,990		
			Abutment concrete	m3	259.4	\$ 58,500	\$ 15,177,240		
			Reinforcing bar	kg	65,102.5	\$ 500	\$ 32,551,270		
			Formwork	m2	183.0	\$ 5,800	\$ 1,061,400		
			Scaffolding	m3	738.8	\$ 2,000	\$ 1,477,520		
			Rebetment work						
			Bank protection	m2	200.0	\$ 23,200	\$ 4,640,000		
			Scoring protection	m2	200.0	\$ 22,600	\$ 4,520,000		
							\$ 92,696,363		
							\$ 255,610,287		
			Miscellaneous (Total, etc. x 32.6%)	L.s.			\$ 83,328,953		
			Total amount				\$ 338,939,240		

Appendix II-5
Reconstruction cost

No.	Bridge name	Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
		Item	Item						
13 - 1	POCULON	Superstructure							
			P.C. Beam manufacturing						
			Concrete	m3	36.9	\$ 59,400	\$ 2,191,461		
			Reinforcing bar	kg	4,698.5	\$ 500	\$ 2,349,235		
			Prestressing steel	kg	1,410.0	\$ 3,000	\$ 4,230,000		
			Formwork	m2	330.1	\$ 5,800	\$ 1,914,348		
			Transportation	L.s.	1.0	\$ 641,103	\$ 641,103		
			Main Girder erection						
			Bearing shoes	each	24.0	\$ 761,700	\$ 18,280,800		
			Erection	L.s.	1.0	\$ 2,671,261	\$ 2,671,261		
			Deck slab construction						
			Concrete	m3	58.9	\$ 58,500	\$ 3,446,820		
			Reinforcing bar	kg	8,172.3	\$ 500	\$ 4,086,145	A63-42H	
			Formwork	kg	570.6	\$ 430	\$ 245,362	A44-28H	
			Formwork	m2	280.0	\$ 5,800	\$ 1,624,000		
			Approach slab	m2	8.5	\$ 5,800	\$ 49,300		
			Concrete	m3	16.0	\$ 58,500	\$ 936,000		
			Reinforcing bar	kg	824.2	\$ 500	\$ 412,100		
			Pavement and accessories						
			Hand rail	m	80.0	\$ 34,900	\$ 2,792,000		
			Expansion joint	m	18.0	\$ 91,200	\$ 1,641,600		
			Drainage	L.s.	1.0	\$ -	\$ -		
			Pavement	m3	280.0	\$ 51,600	\$ 14,448,000		
			Approach road construction						
			Earth work	m3	11,388.7	\$ 4,600	\$ 52,388,020		
			Pavement	m2	574.0	\$ 51,600	\$ 29,618,400		
			base course	m3	114.8	\$ 6,800	\$ 780,640		
			Sub total				\$ 144,746,595		

Appendix II-5
Reconstruction cost

No.	Bridge name	Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
		Structure	Item						
16 - 1	SAN JUAN	Superstructure							
			Steel girder						
				Structural steel	ton	44.15	\$ 941,000	\$ 41,548,265	A52-34ES
				Structural steel	ton	4.46	\$ 811,772	\$ 3,624,343	A42-27ES
				Shop painting	m2	344.37	\$ 3,800	\$ 1,308,606	
			Transportation			1.00	\$ 2,788,873	\$ 2,788,873	
			Main Girder erection						
				Bearing shoes	each	8.00	\$ 867,000	\$ 6,936,000	
				Erection	L.s.	1.00	\$ 11,620,303	\$ 11,620,303	
			Deck slab construction						
				Concrete	m3	126.57	\$ 58,500	\$ 7,404,345	
				Reinforcing bar	kg	26,377.68	\$ 500	\$ 13,188,840	A63-42H
					kg	867.29	\$ 430	\$ 372,935	A44-28H
				formwork	m2	473.38	\$ 5,800	\$ 2,745,604	
			Approach slab						
				Formwork	m2	8.00	\$ 5,800	\$ 46,400	
				Concrete	m3	16.00	\$ 58,500	\$ 936,000	
				Reinforcing bar	kg	732.60	\$ 500	\$ 366,300	
			Pavement and accessories						
				Hand rail	m	68.00	\$ 34,900	\$ 2,373,200	
				Expansion joint	m	20.80	\$ 91,200	\$ 1,896,960	
				Drainage	L.s.		\$ -	\$ -	
				Pavement	m2	353.60	\$ 51,600	\$ 18,245,760	
			Approach road construction						
				Earth work	m3	617.40	\$ 4,600	\$ 2,840,040	
				Pavement	m2	909.60	\$ 51,600	\$ 46,935,360	
				Base course	m3	181.90	\$ 6,800	\$ 1,236,920	
								\$ 166,415,053	
			Sub total						

No.	Bridge name	Structure		Construction Item	unit	Quantity	U.Price (\$)	Price (\$)	Remarks
		Item	Item						
16 - 2	SAN JUAN								
		Substructure							
			Pier and Abutment construction						
			Foundation		m3	804.76	\$ 1,700	\$ 1,368,092	
			excavation						
			Base concrete		m3	9.70	\$ 41,400	\$ 401,580	
			Pier concrete		m3		\$ 58,500	\$ -	
			Abutment concrete		m3	214.18	\$ 58,500	\$ 12,529,530	
			Reinforcing bar		kg	13,497.42	\$ 500	\$ 6,748,710	
			Formwork		m2	925.88	\$ 5,800	\$ 5,370,104	
			Scaffolding		m3	507.88	\$ 2,000	\$ 1,015,760	
			Rebetment work						
			Bank protection		m2	200.00	\$ 23,200	\$ 4,640,000	
			Scoring protection		m2	200.00	\$ 22,600	\$ 4,520,000	
								\$ 36,593,776	
	Sub total							\$ 203,008,829	
	Total							66,180,878.38	
			Miscellaneous (Total, etc. x 32.6%)		L.s.				
	Total amount							\$ 269,189,708	

APPENDIX II-6

BREAKDOWN OF REPAIR COSTS

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APPENDIX II-6-A

BREAKDOWN OF UNIT REPAIR COSTS

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Concrete Structure

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Steel Structure

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Appendix II-6-A
 2. Repair unit cost for Sealing/Spalling

No.	Repair Method	Unit	Superstructure		Substructure		Remarks
			Slab, pavement, handrail Unit Cost	Slab bottom, beam, Side wall Unit Cost	Pier, Abutment, Foundation Unit Cost		
	Caulking						
	Injection						
	Jacketing						
	Dry-pack						
	Schotcrete/Gunite	m ²	6,000	0	4,400		
	Patching	m ²	68,225	34,025	34,975		
	Coating	m ²	5,125	2,850	2,600		
	Grinding and Overlay	m ²	5,033	4,667	3,367		
	Stitching						
	External prestressing						
	Pre-pack	m ²	20,200				
	Concrete Replacement	m ²	131,300	97,700	95,300		
	Resurfacing	m ²	5,900	4,750	4,650		
	Total	m ²	241,783	143,992	145,292		
	Average	m ²	34,500	24,000	20,800		

Appendix II-6-A
 3. Repair unit cost for Delamination

No.	Repair Method	Unit	Superstructure		Substructure		Remarks
			Slab, pavement, handrail Unit Cost	Slab bottom, beam, Side wall Unit Cost	Pier, Abutment, Foundation Unit Cost		
	Caulking						
	Injection						
	Jacketing						
	Dry-pack	m ²	20,300	0	19,800		
	Schotcrete/Gunite	m ²	6,000	0	4,400		
	Patching	m ²	68,225	34,025	34,975		
	Coating						
	Grinding and Overlay						
	Stitching						
	External prestressing						
	Pre-pack	m ²	20,200	0	0		
	Concrete Replacement	m ²	131,300	97,700	95,300		
	Resurfacing	m ²	5,900	4,750	4,650		
	Total	m ²	251,925	136,475	159,125		
	Average	m ²	42,000	45,500	31,800		

Appendix II-6-A

4. Repair unit cost for Honeycombs

No.	Repair Method	Unit	Superstructure		Remarks
			Slab, pavement, handrail Unit Cost	Slab bottom, beam, Side wall Unit Cost	
			Substructure		
			Pier, Abutment, Foundation	Unit Cost	
	Caulking				
	Injection				
	Jacketing				
	Dry-pack	m ²	20,300	0	19,800
	Schotcrete/Gumite	m ²	6,000	0	4,400
	Patching	m ²	68,225	34,025	34,975
	Coating				
	Grinding and Overlay				
	Stitching				
	External prestressing				
	Pre-pack	m ²	20,200	0	0
	Concrete Replacement	m ²	131,300	97,700	95,300
	Resurfacing	m ²	5,900	4,750	4,650
	Total	m ²	251,925	136,475	159,125
	Average	m ²	42,000	45,500	31,800

Appendix II-6-A
 5. Repair unit cost for Efflorescence

No.	Repair Method	Unit	Superstructure		Substructure		Remarks
			Slab, pavement, handrail Unit Cost	Slab bottom, beam, Side wall Unit Cost	Pier, Abutment, Foundation Unit Cost		
	Caulking						
	Injection						
	Jacketing						
	Dry-pack						
	Schotcrete/Gunite	m ²	6,000	0	4,400		
	Patching	m ²	68,225	34,025	34,975		
	Coating	m ²	5,125	2,850	2,600		
	Grinding and Overlay	m ²	5,033	4,667	3,367		
	Stitching						
	External prestressing						
	Pre-pack						
	Concrete Replacement						
	Resurfacing	m ²	5,900	4,750	4,650		
	Total	m ²	84,383	41,542	45,342		
	Average	m ²	16,900	10,400	9,100		

Appendix II-6-A
 6. Repair unit cost for Breakage

No.	Repair Method	Unit	Superstructure		Substructure		Remarks
			Slab, pavement, handrail Unit Cost	Slab bottom, beam, Side wall Unit Cost	Pier, Abutment, Foundation Unit Cost		
	Caulking						
	Injection						
	Jacketing						
	Dry-pack	m ²	20,300	0	19,800		
	Schotcrete/Gunitite						
	Patching	m ²	68,225	34,025	34,975		
	Coating						
	Grinding and Overlay						
	Stitching						
	External prestressing						
	Pre-pack	m ²	20,200	0	0		
	Concrete Replacement	m ²	131,300	97,700	95,300		
	Resurfacing						
	Total	m ²	240,025	131,725	150,075		
	Average	m ²	60,000	65,900	50,000		

Appendix II-6-A

7. Repair unit cost for Wear

No.	Repair Method	Unit	Superstructure		Substructure		Remarks
			Slab, pavement, handrail Unit Cost	Slab bottom, beam, Side wall Unit Cost	Pier, Abutment, Foundation Unit Cost		
	Caulking						
	Injection						
	Jacketing						
	Dry-pack	m ²	20,300	0	19,800		
	Schotcrete/Gunite						
	Patching						
	Coating						
	Grinding and Overlay	m ²	5,033	4,667	3,367		
	Stitching						
	External prestressing						
	Pre-pack	m ²	20,200	0	0		
	Concrete Replacement	m ²	131,300	97,700	95,300		
	Resurfacing	m ²	5,900	4,750	4,650		
	Total	m ²	182,733	107,117	123,117		
	Average	m ²	45,700	35,700	30,800		

Summary of Unit Repair Cost
Steel Structure

Damage Type	Unit	Superstructure			Substructure
		Underside of Bridge Beam, Shoes	Surface of Bridge Handrail, Expansion Joint		
High pollution and Coastal	pesos/m ²	6,500	5,600		5,800
Mid Climate	pesos/m ²	6,300	5,400		5,600
Minor Repainting	pesos/m ²	6,200	5,300		5,500
Average	pesos/m ²	6,300	5,400		5,600

**Appendix II-6-A Unit Repair Cost
Steel Structure**

rusting/aging of coat

Item No.	Name of Rehabilitation Beam, etc	Description	Unit	Quantity	Price	Total (Peso)	Remarks
	1. High polution and coastal						
		Material					
		Primer: Inorganic Zinc	kg	12	\$ 5,000	\$ 60,000	100m2/day
		Intermediate: Epoxy	kg	10	\$ 3,520	\$ 35,200	
		Top coat: Epoxy	kg	10	\$ 3,780	\$ 37,800	
		Labour					
		Engineer	person	0.5	\$ 20,000	\$ 10,000	
		Forman	person	3	\$ 11,000	\$ 33,000	
		Skilled Labor	person	3	\$ 8,500	\$ 25,500	
		Common Labor	person	6	\$ 5,500	\$ 33,000	
		Equipment					
		Blaster	each	1	\$ 32,000	\$ 32,000	
		Air Compressor	each	1	\$ 32,000	\$ 32,000	
		Wire Brush	each	12	\$ 1,000	\$ 12,000	
		Generator	each	1	\$ 40,000	\$ 40,000	
		Painting Tools	L.s	3	\$ 1,500	\$ 4,500	
		Scaffolding	m3	250	\$ 250	\$ 62,500	
		Transportation					
			each	3	\$ 15,000	\$ 45,000	
		Sub Total				\$ 462,500	
		Miscellaneous					
			L.s	1	\$ 185,000	\$ 185,000	
		Total				\$ 647,500	
		Total/m2				\$ 6,500	

Appendix II-6-A Unit Repair Cost
Steel Structure

Item No.	Name of Rehabilitation Beam, etc	Description	Unit	Quantity	Price	Total (Peso)	Remarks
	2. Mid climate						
		Material					
		Primer: Organic Zinc	kg	12	\$ 18,120	\$ 217,440	
		Intermediate:Epoxy	kg	10	\$ 3,520	\$ 35,200	
		Top coat: Epoxy	kg	10	\$ 3,780	\$ 37,800	100m2/day
		Labour					
		Engineer	person	0.5	\$ 20,000	\$ 10,000	
		Forman	person	3	\$ 11,000	\$ 33,000	
		Skilled Labor	person	3	\$ 8,500	\$ 25,500	
		Common Labor	person	6	\$ 5,500	\$ 33,000	
		Equipment					
		Blaster	each	1	\$ 32,000	\$ 32,000	
		Air Compressor	each	1	\$ 32,000	\$ 32,000	
		Wire Brush	each	12	\$ 1,000	\$ 12,000	
		Generator	each	1	\$ 40,000	\$ 40,000	
		Painting Tools	Ls	3	\$ 1,500	\$ 4,500	
		Scaffolding	m3	250	\$ 250	\$ 62,500	
		Transportation	each	3	\$ 15,000	\$ 45,000	
	Sub Total					\$ 619,940	
		Miscellaneous	Ls	1	\$ 247,976	\$ 247,976	
	Total					\$ 867,916	
	Total/m2					\$ 8,700	

Appendix II-6-A Unit Repair Cost
Steel Structure

Item No.	Name of Rehabilitation	Description	Unit	Quantity	Price	Total (Peso)	Remarks
	Beam, etc						
	3. Miner repainting						
		Material					
		Primer: Inorganic Zinc	kg	10	\$ 3,520	\$ 35,200	100m2/day
		Intermediate: Epoxy	kg	10	\$ 3,780	\$ 37,800	
		Top coat: Epoxy	kg	10	\$ 3,780	\$ 37,800	
		Labour					
		Engineer	person	0.5	\$ 20,000	\$ 10,000	
		Forman	person	3	\$ 11,000	\$ 33,000	
		Skilled Labor	person	3	\$ 8,500	\$ 25,500	
		Common Labor	person	6	\$ 5,500	\$ 33,000	
		Equipment					
		Blaster	each	1	\$ 32,000	\$ 32,000	
		Air Compressor	each	1	\$ 32,000	\$ 32,000	
		Wire Brush	each	12	\$ 1,000	\$ 12,000	
		Generator	each	1	\$ 40,000	\$ 40,000	
		Painting Tools	L.s	3	\$ 1,500	\$ 4,500	
		Scaffolding	m3	250	\$ 250	\$ 62,500	
		Transportation					
			each	3	\$ 15,000	\$ 45,000	
	Sub Total					\$ 440,300	
		Miscellaneous					
			L.s	1	\$ 176,120	\$ 176,120	
	Total					\$ 616,420	
	Total/m2					\$ 6,200	

Appendix II-6-A Unit Repair Cost
Steel Structure

Item No.	Name of Rehabilitation Handrail, etc.	Description	Unit	Quantity	Price	Total (Peso)	Remarks
	1. High polution and coastal						
		Material					
		Primer: Inorganic Zinc	kg	12	\$ 5,000	\$ 60,000	100m ² /day
		Intermediate: Epoxy	kg	10	\$ 3,520	\$ 35,200	
		Top coat: Epoxy	kg	10	\$ 3,780	\$ 37,800	
		Labour					
		Engineer	person	0.5	\$ 20,000	\$ 10,000	
		Forman	person	3	\$ 11,000	\$ 33,000	
		Skilled Labor	person	3	\$ 8,500	\$ 25,500	
		Common Labor	person	6	\$ 5,500	\$ 33,000	
		Equipment					
		Blaster	each	1	\$ 32,000	\$ 32,000	
		Air Compressor	each	1	\$ 32,000	\$ 32,000	
		Wire Brush	each	12	\$ 1,000	\$ 12,000	
		Generator	each	1	\$ 40,000	\$ 40,000	
		Painting Tools	L.s	3	\$ 1,500	\$ 4,500	
		Scaffolding	m3	0	\$ 250	\$	
		Transportation					
			each	3	\$ 15,000	\$ 45,000	
		Sub Total					
						\$ -400,000	
		Miscellaneous					
			L.s	1	\$ 160,000	\$ 160,000	
		Total				\$ 560,000	
		Total/m²				\$	5,600

**Appendix II-6-A Unit Repair Cost
Steel Structure**

Item No.	Name of Rehabilitation	Description	Unit	Quantity	Price	Total (Peso)	Remarks
	Rusting/Aging of Coat						
	Handrail, etc.						
	2. Mid climate						
		Material					
		Primer: Organic Zinc	kg	12	\$ 18,120	\$ 217,440	
		Intermediate:Epoxy	kg	10	\$ 3,520	\$ 35,200	
		Top coat: Epoxy	kg	10	\$ 3,780	\$ 37,800	100m2/day
		Labour					
		Engineer	person	0.5	\$ 20,000	\$ 10,000	
		Foreman	person	3	\$ 11,000	\$ 33,000	
		Skilled Labor	person	3	\$ 8,500	\$ 25,500	
		Common Labor	person	6	\$ 5,500	\$ 33,000	
		Equipment					
		Blaster	each	1	\$ 32,000	\$ 32,000	
		Air Compressor	each	1	\$ 32,000	\$ 32,000	
		Wire Brush	each	12	\$ 1,000	\$ 12,000	
		Generator	each	1	\$ 40,000	\$ 40,000	
		Painting Tools	Ls	3	\$ 1,500	\$ 4,500	
		Scaffolding	m3	0	\$ 250	\$ -	
		Transportation	each	3	\$ 15,000	\$ 45,000	
		Sub Total				\$ 557,440	
		Miscellaneous	Ls	1	\$ 222,976	\$ 222,976	
		Total				\$ 780,416	
		Total/m2				\$ 7,800	

Appendix II-6-A Unit Repair Cost
Steel Structure

Item No.	Rusting/Aging of Coat Name of Rehabilitation	Description	Unit	Quantity	Price	Total (Peso)	Remarks
	Handrail, etc.						
	3. Miner repainting						
		Material					
		Primer: Inorganic Zinc	kg	10	\$ 3,520	\$ 35,200	100m2/day
		Intermediate: Epoxy	kg	10	\$ 3,780	\$ 37,800	
		Top coat: Epoxy	kg	10	\$ 3,780	\$ 37,800	
		Labour					
		Engineer	person	0.5	\$ 20,000	\$ 10,000	
		Forman	person	3	\$ 11,000	\$ 33,000	
		Skilled Labor	person	3	\$ 8,500	\$ 25,500	
		Common Labor	person	6	\$ 5,500	\$ 33,000	
		Equipment					
		Blaster	each	1	\$ 32,000	\$ 32,000	
		Air Compressor	each	1	\$ 32,000	\$ 32,000	
		Wire Brush	each	12	\$ 1,000	\$ 12,000	
		Generator	each	1	\$ 40,000	\$ 40,000	
		Painting Tools	L.s	3	\$ 1,500	\$ 4,500	
		Scaffolding	m3	0	\$ 250	\$ -	
		Transportation	each	3	\$ 15,000	\$ 45,000	
	Sub Total					\$ 377,800	
		Miscellaneous	L.s	1	\$ 151,120	\$ 151,120	
	Total					\$ 528,920	
	Total/m2					\$ 5,300	

Appendix II-6-A Unit Repair Cost
Steel Structure

Item No.	Name of Rehabilitation Abutment, Pier	Description	Unit	Quantity	Price	Total (Peso)	Remarks
	1. High pollution and coastal	Material					
		Primer: Inorganic Zinc	kg	12	\$ 5,000	\$ 60,000	100m2/day
		Intermediate: Epoxy	kg	10	\$ 3,520	\$ 35,200	
		Top coat: Epoxy	kg	10	\$ 3,780	\$ 37,800	
		Labour					
		Engineer	person	0.5	\$ 20,000	\$ 10,000	
		Forman	person	3	\$ 11,000	\$ 33,000	
		Skilled Labor	person	3	\$ 8,500	\$ 25,500	
		Common Labor	person	6	\$ 5,500	\$ 33,000	
		Equipment					
		Blaster	each	1	\$ 32,000	\$ 32,000	
		Air Compressor	each	1	\$ 32,000	\$ 32,000	
		Wire Brush	each	12	\$ 1,000	\$ 12,000	
		Generator	each	1	\$ 40,000	\$ 40,000	
		Painting Tools	Ls	3	\$ 1,500	\$ 4,500	
		Scaffolding	m3	50	\$ 250	\$ 12,500	
		Transportation					
			each	3	\$ 15,000	\$ 45,000	
	Sub Total				\$	\$ 412,500	
		Miscellaneous					
			Ls	1	\$ 165,000	\$ 165,000	
	Total				\$	\$ 577,500	
	Total/m2				\$	\$ 5,800	

Appendix II-6-A Unit Repair Cost
Steel Structure

Item No.	Rusting/Aging of Coat Name of Rehabilitation Abutment, Pier	Description	Unit	Quantity	Price	Total (Peso)	Remarks
	2. Mid climate	Material					
		Primer: Organic Zinc	kg	12 \$	18,120 \$	217,440	
		Intermediate: Epoxy	kg	10 \$	3,520 \$	35,200	
		Top coat: Epoxy	kg	10 \$	3,780 \$	37,800	100m2/day
		Labour					
		Engineer	person	0.5 \$	20,000 \$	10,000	
		Forman	person	3 \$	11,000 \$	33,000	
		Skilled Labor	person	3 \$	8,500 \$	25,500	
		Common Labor	person	6 \$	5,500 \$	33,000	
		Equipment					
		Blaster	each	1 \$	32,000 \$	32,000	
		Air Compressor	each	1 \$	32,000 \$	32,000	
		Wire Brush	each	12 \$	1,000 \$	12,000	
		Generator	each	1 \$	40,000 \$	40,000	
		Painting Tools	L.s	3 \$	1,500 \$	4,500	
		Scaffolding	m3	50 \$	250 \$	12,500	
		Transportation	each	3 \$	15,000 \$	45,000	
	Sub Total					569,940	
		Miscellaneous	L.s	1 \$	227,976 \$	227,976	
	Total					797,916	
	Total/m2					8,000	

Appendix II-6-A Unit Repair Cost
Steel Structure

Rusting/Aging of Coat

Item No.	Name of Rehabilitation	Description	Unit	Quantity	Price	Total (Peso)	Remarks
	Abutment, Pier						
	3. Miner repainting						
		Material					
		Primer: Inorganic Zinc	kg	10	\$ 3,520	\$ 35,200	100m2/day
		Intermediate: Epoxy	kg	10	\$ 3,780	\$ 37,800	
		Top coat: Epoxy	kg	10	\$ 3,780	\$ 37,800	
		Labour					
		Engineer	person	0.5	\$ 20,000	\$ 10,000	
		Foreman	person	3	\$ 11,000	\$ 33,000	
		Skilled Labor	person	3	\$ 8,500	\$ 25,500	
		Common Labor	person	6	\$ 5,500	\$ 33,000	
		Equipment					
		Blaster	each	1	\$ 32,000	\$ 32,000	
		Air Compressor	each	1	\$ 32,000	\$ 32,000	
		Wire Brush	each	12	\$ 1,000	\$ 12,000	
		Generator	each	1	\$ 40,000	\$ 40,000	
		Painting Tools	Ls	3	\$ 1,500	\$ 4,500	
		Scaffolding	m3	50	\$ 250	\$ 12,500	
		Transportation					
		Transportation	each	3	\$ 15,000	\$ 45,000	
	Sub Total				\$	\$ 390,300	
		Miscellaneous					
		Miscellaneous	Ls	1	\$ 156,120	\$ 156,120	
	Total				\$	\$ 546,420	
	Total/m2				\$	\$ 5,500	



APPENDIX II-6-B
BREAKDOWN OF UNIT REPAIR COSTS

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APPENDIX II-6-B
 BREAKDOWN OF UNIT REPAIR COSTS
 1. Confluencia

No.	Damage Item	Unit	Superstructure						Substructure			Total	
			Slab/Bottom, Beam, Side wall		Slab Top, pavement, handrail		Quantity	Unit Cost	Cost	Quantity	Unit Cost		Cost
			Quantity	Unit Cost	Quantity	Unit Cost							
	Cracking	m ²	97.5	35,700	3,480,750	90.0	24,000	2,160,000		24,000	0	5,640,750	
	Sealing/Spalling	m ²		34,500	0		24,000	0		20,800	0	0	
	Delamination	m ²		42,000	0		45,500	0		31,800	0	0	
	Efflorescence	m ²	1,143.2	16,900	19,320,080		10,400	0		108	9,100	982,800	20,302,880
	Honeycombs	m ²		42,000	0		45,500	0		31,800	0	0	
	Breakage	m ²	12.5	60,000	748,200		65,900	0			50,000	0	748,200
	Wear	m ²		45,700	0		35,700	0		1	30,800	30,800	30,800
	Total of repair cost												26,722,600

APPENDIX II-6-B
 BREAKDOWN OF UNIT REPAIR COSTS

2. David Garcia

No.	Damage Item	Unit	Superstructure						Substructure			Total
			Slab Bottom. Beam. Side wall		Slab Top. pavement, handrail		Quantity	Unit Cost	Quantity	Unit Cost	Cost	
			Quantity	Unit Cost	Quantity	Unit Cost						
	Cracking	m ²	9.5	35,700	337,365	24,000	0	17.42	24,000	418,080	755,445	
	Scaling/Spalling	m ²		34,500	0	24,000	0		20,800	0	0	
	Delamination	m ²		42,000	0	45,500	0	6	31,800	190,800	190,800	
	Efflorescence	m ²	3.9	16,900	65,910	10,400	0	39.7	9,100	361,270	427,180	
	Honeycombs	m ²		42,000	0	45,500	0		31,800	0	0	
	Breakage	m ²		60,000	0	65,900	0		50,000	0	0	
	Wear	m ²		45,700	0	35,700	0		30,800	0	0	
	Total of repair cost										1,373,400	

APPENDIX II-6-B
 BREAKDOWN OF UNIT REPAIR COSTS
 3. Granallas

No.	Damage Item	Unit	Supersubstructure						Substructure			Total
			Slab Bottom, Beam, Side wall		Slab Top, pavement, handrail		Quantity	Unit Cost	Quantity	Unit Cost	Cost	
			Quantity	Unit Cost	Quantity	Unit Cost						
	Cracking	m ²		35,700	0		24,000	0	1.9	24,000	45,120	45,120
	Sealing/Spalling	m ²		34,500	0		24,000	0	8.7	20,800	180,128	180,128
	Delamination	m ²		42,000	0		45,500	0		31,800	0	0
	Efflorescence	m ²		16,900	0		10,400	0		9,100	0	0
	Honeycombs	m ²		42,000	0		45,500	0		31,800	0	0
	Breakage	m ²		60,000	0		65,900	0	10.5	50,000	522,500	522,500
	Wear	m ²		45,700	0		35,700	0		30,800	0	0
	Total of repair cost											747,700

APPENDIX II-6-B
 BREAKDOWN OF UNIT REPAIR COSTS
 4. Ventanas

No.	Damage Item	Unit	Superstructure						Substructure			Total
			SlabBottom, Beam, Side wall		Slab Top, pavement, handrail		Pier, Abutment	Quantity	Unit Cost	Cost		
			Quantity	Unit Cost	Quantity	Unit Cost						
	Cracking	m ²		35,700	0		24,000	0	1.2	24,000	27,600	27,600
	Sealing/Spalling	m ²	146.9	34,500	5,067,360		24,000	0	70.9	20,800	1,475,136	6,542,496
	Delamination	m ²		42,000	0		45,500	0		31,800	0	0
	Efflorescence	m ²	7.2	16,900	121,680		10,400	0		9,100	0	121,680
	Honeycombs	m ²		42,000	0		45,500	0		31,800	0	0
	Breakage	m ²	0.5	60,000	27,000		65,900	0		50,000	0	27,000
	Wear	m ²		45,700	0		35,700	0		30,800	0	0
	Total of repair cost											6,718,800

APPENDIX II-6-B
 BREAKDOWN OF UNIT REPAIR COSTS
 10. Cautin (a)

No.	Damage Item	Unit	Superstructure						Substructure			Total	
			Slab/Bottom, Beam, Side wall		Slab Top, pavement, handrail		Quantity	Unit Cost	Cost	Quantity	Unit Cost		Cost
			Quantity	Unit Cost	Quantity	Unit Cost							
	Cracking	m ²		35,700	0		24,000	0		24,000	122,400	122,400	
	Scaling/Spalling	m ²		34,500	0		24,000	0		20,800	0	0	
	Delamination	m ²	273.0	42,000	11,466,000		45,500	0		31,800	286,200	11,752,200	
	Efflorescence	m ²	470.5	16,900	7,951,112		10,400	0		9,100	0	7,951,112	
	Honeycombs	m ²		42,000	0		45,500	0		31,800	0	0	
	Breakage	m ²		60,000	0		65,900	0		50,000	0	0	
	Wear	m ²		45,700	0		35,700	0		30,800	203,280	203,280	
	Total of repair cost											20,029,000	

APPENDIX II-6-B
 BREAKDOWN OF UNIT REPAIR COSTS
 11. El Indio

No.	Damage Item	Unit	Superstructure						Substructure			Total	
			Slab Bottom, Beam, Side wall		Slab Top, pavement, handrail		Pier, Abutment	Quantity	Unit Cost	Cost			
			Quantity	Unit Cost	Quantity	Unit Cost					Quantity		Unit Cost
	Cracking	m ²		35,700	0		24,000		0.6	24,000		13,200	13,200
	Scaling/Spalling	m ²		34,500	0		24,000		1.0	20,800		0	0
	Delamination	m ²		42,000	0		45,500			31,800		0	0
	Efflorescence	m ²	101.3	16,900	1,711,632		10,400		29.2	9,100		265,356	1,976,988
	Honeycombs	m ²		42,000	0		45,500			31,800		0	0
	Breakage	m ²		60,000	0		65,900			50,000		0	0
	Wear	m ²		45,700	0		35,700			30,800		0	0
	Total of repair cost												1,990,200

APPENDIX II-6-B
 BREAKDOWN OF UNIT REPAIR COSTS
 14. Malleco

No.	Damage Item	Unit	Superstructure						Substructure			Total
			Slab Bottom, Beam, Side wall		Slab Top, pavement, handrail		Quantity	Unit Cost	Pier, Abutment	Unit Cost	Cost	
			Quantity	Unit Cost	Quantity	Unit Cost						
	Cracking	m ²		35,700	0		24,000	0	0.6	24,000	13,200	13,200
	Scaling/Spalling	m ²		34,500	0		24,000	0	1.0	20,800	20,800	20,800
	Delamination	m ²		42,000	0		45,500	0		31,800	0	0
	Efflorescence	m ²		16,900	0		10,400	0	7.9	9,100	71,708	71,708
	Honeycombs	m ²		42,000	0		45,500	0		31,800	0	0
	Breakage	m ²		60,000	0		65,900	0		50,000	0	0
	Wear	m ²		45,700	0		35,700	0		30,800	0	0
	Total of repair cost											105,700

APPENDIX II-6-B
 BREAKDOWN OF UNIT REPAIR COSTS
 17. Medina

No.	Damage Item.	Unit	Superstructure						Substructure			Total	
			Slab/Bottom. Beam. Side wall		Slab Top. pavement, handrail		Quantity	Unit Cost	Cost	Quantity	Unit Cost		Cost
			Quantity	Unit Cost	Quantity	Unit Cost							
	Cracking	m ²		35,700	0		24,000			2.5	24,000	60,000	60,000
	Scaling/Spalling	m ²		34,500	0		24,000				20,800	0	0
	Delamination	m ²		42,000	0		45,500				31,800	0	0
	Efflorescence	m ²		16,900	0		10,400			4.8	9,100	43,680	43,680
	Honeycombs	m ²		42,000	0		45,500				31,800	0	0
	Breakage	m ²		60,000	0		65,900				50,000	0	0
	Wear	m ²		45,700	0		35,700				30,800	0	0
	Total of repair cost												103,700

APPENDIX II-6-B
 BREAKDOWN OF UNIT REPAIR COSTS
 18. Cautin 88

No.	Damage Item	Unit	Superstructure						Substructure			Total		
			Slab Bottom, Beam, Side wall		Slab Top, pavement, handrail		Quantity	Unit Cost	Cost	Quantity	Unit Cost		Cost	
			Quantity	Unit Cost	Quantity	Unit Cost								Quantity
	Cracking	m ²		35,700	0		24,000	0		24,000	0		0	0
	Scaling/Spalling	m ²		34,500	0		24,000	0		20,800	0		0	0
	Delamination	m ²		42,000	0		45,500	0		31,800	0		0	0
	Efflorescence	m ²		16,900	0		10,400	0		9,100	0		0	0
	Honeycombs	m ²		42,000	0		45,500	0	1.7	31,800	52,470		52,470	52,470
	Breakage	m ²		60,000	0		65,900	0	1.7	50,000	82,500		82,500	82,500
	Wear	m ²		45,700	0		35,700	0		30,800	0		0	0
	Total of repair cost													135,000

APPENDIX II-6-B
 BREAKDOWN OF UNIT REPAIR COSTS
 19. Salva Tu Alma

No.	Damage Item	Unit	Superstructure						Substructure			Total	
			SlabBottom, Beam, Side wall		Slab Top, pavement, handrail		Pier, Abutment	Quantity	Unit Cost	Cost			
			Quantity	Unit Cost	Quantity	Unit Cost					Quantity		Unit Cost
	Cracking	m ²		35,700	0		24,000	0	0.4	24,000		9,120	9,120
	Scaling/Spalling	m ²		34,500	0		24,000	0		20,800		0	0
	Delamination	m ²		42,000	0		45,500	0		31,800		0	0
	Efflorescence	m ²		16,900	0		10,400	0		9,100		0	0
	Honeycombs	m ²		42,000	0		45,500	0		31,800		0	0
	Breakage	m ²		60,000	0		65,900	0		50,000		0	0
	Wear	m ²		45,700	0		35,700	0		30,800		0	0
	Total of repair cost												9,100

APPENDIX II-6-B
 BREAKDOWN OF UNIT REPAIR COSTS
 20. Quinchilca

No.	Damage Item	Unit	Superstructure						Substructure			Total		
			Slab Bottom, Beam, Side wall		Slab Top, pavement, handrail		Quantity	Unit Cost	Cost	Pier, Abutment				
			Quantity	Unit Cost	Quantity	Unit Cost				Quantity	Unit Cost		Cost	
	Cracking	m ²		35,700	0		24,000			0.3	24,000		6,000	6,000
	Scaling/Spalling	m ²		34,500	0		24,000			252.0	20,800		5,241,600	5,241,600
	Delamination	m ²		42,000	0		45,500			18.0	31,800		572,400	572,400
	Efflorescence	m ²		16,900	0		10,400				9,100		0	0
	Honeycombs	m ²		42,000	0		45,500				31,800		0	0
	Breakage	m ²		60,000	0		65,900				50,000		0	0
	Wear	m ²		45,700	0		35,700				30,800		0	0
	Total of repair cost													5,820,000