QUANTITY ESTIMATES

Section of Project				1	2	3	4	5	6	Total
Station No			Unit	0+000 - 25+300	25+300 - 46+760	46+760 - 60+000	60+000 - 79+550	79+550 - 101 +300	101+300 - 108 +630	0+000 - 108 +630
Proposed Road Length			m	25,042	20,543	13,059	19,416	21,725	7,330	107,115
Total Tunnel Length			m	0	745	0	0	0	0	745
Total Bridge Length			m	258	172	181	134	25	0	770
Total Section Length			m	25,300	21,460	13,240	19,550	21,750	7,330	108,630
Earth Work	Clearing and Grubbing		ha	48.13	38.38	20.85	30.30	36.85	7.38	182.49
	Excavation A		m^3	120,786	143,289	319,367	203,723	843,364	167,421	1,597,950
	Excavation B		m^3	2,757,124	2,492,559	516,378	1,081,222	1,859,798	198,986	8,707,067
	Finished Rolling of Subgrade		m^2	253,756	208,162	132,327	196,742	220,139	74,275	1,085,401
	Slope	Seed Spraying	m^2	20,527	15,104	41,430	55,783	75,375	25,107	233,246
		Concrete Spraying	m^2	18,184	37,113	6,660	24,475	8,229	794	95,455
		Cribworks	m^2	2,627	3,773	890	2,500	1,790		11,544
		Concrete Pitching	m^2			400	1,810			2,210
	Retaining Wall	Gravity(4m)	m	50						50
		Stone Masonry	m^2	2,947	1,230	14,373	2,823	2,869	712	24,754
		Grid Type	m^2	6,206	5,222	2,343	3,573	26,304	1,612	45,260
	Culvert	Box 3.0X3.0	m	50	50	75	40	160		375
		Box 4.0X4.0	m	35	10					45
		Pipe Φ1.0	m	1,997	1,648	1,045	1,553	1,788	584	8,560
	Disaster	Catch Netting	m^2		800		2,000	1,040		3,840
		Gabion	m		42		102			144
		Catch Fence	m	51	42			54		147
		Gabion Dam	m^3			3,764	5,211		2,179	11,154
		Shed	m		62					62
		French Drain	m						1,010	1,010
	Drainage		Km	25.0	20.5	13.1	19.5	21.7	7.3	107.1
Pavement	Subbase Course		m^2	249,048	204,300	129,872	193,092	216,055	72,897	1,065,264
	Base Course		m^2	239,657	196,536	124,975	185,811	207,908	70,148	1,025,035
	Binder Course		m^2	232,917	191,071	121,463	180,589	202,065	68,176	996,281
	Surface Course		m^2	229,010	187,867	119,426	177,550	198,675	67,033	979,571
Bridge	$\ell \geq 50^m$		Set	2	2		2			6
	$\ell < 50^m$		Set	2	2		1	1		7
Tunnel	Lining		m		120					120
	Unsupported		m		625					625
	Portal		Pcs		4					4
Others	Traffic Sign and Guard Rail		Km	25.0	20.5	13.1	19.5	21.7	7.3	107.1
	Marking		Km	25.0	20.5	13.1	19.5	21.7	7.3	107.1
Pavement	Asphalt Macadam Surface		m^2	228,082	187,106	118,941	176,841	197,871	66,762	975,603

Note : Excavation A = Excavation, used for embankment material including compaction

Excavation B = Excavation, waste soil transport

A. Quantities of Earthwork

A.1 Quantity of Clearing and Grubbing

Section	1	2	3	4	5	6	Total
Quantity(ha)	48.13	38.38	20.85	30.30	36.85	7.98	182.49

Section 1 (No.0+000 - No.25+300): 6.00(1)+4.92(2)+7.18(3)+5.60(4)+5.59(6) +6.05(7)+5.60(8)+2.14(9)=48.13ha

Section 2 (No.25+300 - No.46+760): 2.83(9) +5.12(10)+6.7(11)+4.63(12) +5.30(13)+6.00(14)+2.50(16)=38.38ha

Section 3 (No.46+760 - No.60+000): 1.80(16)+6.55(17)+5.20(18)+5.65(19) +1.65(20)=20.85ha

Section 4 (No.60+000 - No.79+550): 4.65(21)+4.28(22)+5.05(23)+5.40(24) +5.40(25)+3.80(26)+1.72(27)=30.30ha

Section 5 (No.79+550 - No.101+300): 1.82(27)+4.25(28)+4.90(29)+3.80(30) +6.38(31)+5.50(32)+6.20(33)+4.00(34) =36.85ha

Section 6 (No.101+300 - No.108+630): 0.78(34)+4.00(35)+3.20(36)=7.98ha

Note: ( ) : Drawing No.
Refer: Drawing of plan (36 sheets)
Calculation by planimeter

A.2 Quantity of Excavation Soil

Section	1	2	3	4	5	6	Total
Item							
Cutting	2,865,515	2,627,084	785,667	1,283,024	2,304,623	330,366	10,196,279
Embankment	120,489	143,289	271,514	204,155	642,126	130,381	1,511,954
Replacement			48,000			37,040	85,040
Excavation A	120,489	143,289	319,514	204,155	642,126	167,421	1,596,994
Excavation B	2,745,026	2,483,795	514,153	1,078,869	1,662,497	199,985	8,684,325

Quantity of Replacement (Improvement of Subgrade)

No. 48 - No.54 6,000m(L) X 8m(W) X 1m(t) = 48,000m3
No.104 - E.P. 4,630m(L) X 8m(W) X 1m(t) = 37,040m3

L : Road Length W : Road Wide t : Thickness

Refer: Earth Volume Calculation sheets (70 sheets)

A.3 Quantity of Rolling of Sub-grade

Unit: m^2

Section	1	2	3	4	5	6	Total
Rolling of Sub-grade	253,756	208,162	132,327	196,742	220,139	74,275	1,085,401

$A(m^2) = W(m) \times L(m)$ W : Road Wide L : Road Length

Section 1 A = 10.133 X 25,042.5 = 253,756m^2
Section 2 A = 13.133 X 20,543 = 208,162m^2
Section 3 A = 10.133 X 13,059 = 132,327m^2
Section 4 A = 10.133 X 19,416 = 196,742m^2
Section 5 A = 10.133 X 21,725 = 220,139m^2
Section 6 A = 10.133 X 7,330 = 74,275m^2

A.4 Quantity of Slope Protection

Unit:m^2

Section	1	2	3	4	5	6	Total
Item							
Seed Spraying	20,527	15,104	41,430	55,703	75,375	25,107	233,246
Concrete Spraying	18,184	37,113	6,660	24,475	8,229	794	95,455
Cribworks	2,627	3,773	890	2,500	1,790		11,544
Concrete Pitching			400	1,810			2,210

Seed Spraying All of Embankment Slope
* Refer Calculation Sheets (70 sheets)

Concrete Spraying

Section 1

No.	3+645 -	No. 3+750	1,700m^2
	4+375 -		1,305
	7+050 -	7+150	2,140
	12+600 -	12+700	2,520
	14+160 -	14+300	2,520
	16+160 -	16+255	792
	21+160		2,987
	23+ 50 -	23+150	4,220

Section 2

No.	25+950 -	No. 26+ 50	4,755m^2
	26+780 -	26+850	930
	28+845 -	29+120	13,588
	29+575 -	29+905	10,377
	31+850 -	31+950	6,550
	45+230 -		913

Section 3

No.	47+520 -		510m^2
	49+230 -	No. 49+230	3,570
	49+710 -	49+860	1,260
	57+750 -		1,320

Section 4

No.63+ 50	-	No.63+375	8,284m^2
63+850	-	63+950	1,950
66+000			184
69+110	-	69+340	6,120
69+625	-	69+700	1,267
70+250	-	70+350	3,400
70+600	-	70+750	3,270

Section 5

No.90+690	-	No.90+850	4,084m^2
99+ 10	-	99+100	2,570
99+200	-	99+270	1,575

Section 6

No.101+475	794m^2

Crib Works

Section 1

No. 0+700	240m^2
2+200	400
8+100	520
10+900	685
12+780	782

Section 2

No.29+500	1,260m^2
38+740	1,040
44+400	1,437

Section 3

No.55+500	890m^2

Section 4

No.66+500	420m^2
75+570	780
78+600	1,300

Section 5

No.84+350	1,790m^2

Concrete Pitching

Section 3

No.58+200	400m^2

Section 4

No.70+100	900m^2
77+800	910

A.5 Quantity of Retaining Wall

Item	1	2	3	4	5	6	Total
Gravity(m)	50						50
Stone Masonry(m2)	2,947	1,230	14,373	2,623	2,869	712	24,754
Grid Type(m2)	6,206	5,222	2,343	3,573	26,304	1,612	45,260

Gravity (H=4m)

Section 1 No.1+ - No.1+530 50m

Stone Masonry				Grid Type			
Section 1 No.	1+930 - No.	1+960	30m2	Section 1 No.	0+700		3,354
	2+575 -	2+640	240		1+580 - No.	1+649	578
	6+700		520		16+100 -	16+120	667
	13+890 -	14+ 50	1,050		17+380 -	17+420	250
	15+850 -	15+870	50		19+75	19+110	136
	17+250 -	17+320	150		19+130 -	19+150	88
	20+ 75 -	20+120	125		20+500 -	20+540	250
	21+540 -	21+680	467		21+950 -	21+990	388
	23+740 -	23+770	50		24+300 -	24+390	495
	24+460 -	24+540	175				
Section 2 No.	33+ 70 -	33+120	355	Section 2 No.	25+350 -	25+365	70
	33+200 -	33+250	300		33+700		1,252
	34+780 -	34+850	175		35+510 -	35+580	578
	42+710 -	42+735	50		37+240 -	37+260	829
	46+350 -	46+450	300		39+ 30		2,493
	46+700 -	46+730	50				

Section 3 No.	46+780 -	46+800	50
	50+220 -	50+900	7,280
	50+900 -	51+ 50	2,280
	51+850 -	52+300	3,375
	52+870 -	52+960	338
	54+170 -	54+270	375
	54+320 -	54+350	150
	55+510 -	55+650	525
Section 4 No.	61+270 -	61+340	263
	63+300 -	63+445	315
	66+ 50 -	66+155	263
	66+670 -	66+780	360
	76+680 -	76+730	63
	76+820 -	76+860	100
	77+470 -	77+520	188
	78+100		411
	79+470 -	79+51	630
	79+510 -	79+520	30
Section 5 No.	79+580 - No.	79+600	50
	83+145 -	83+230	300
	83+300 -	83+455	465
	83+525 -	83+630	202
	84+930 -	85+000	158
	86+530 -	86+670	525
	86+720 -	86+870	225
	87+790 -	87+850	184
	89+ 60 -	89+100	120
	89+200 -	89+235	120
	89+540 -	89+600	145
	92+180 -	92+285	375
Section 6 No.	102+475 - No.	102+520	85
	103+ 20 -	103+150	368
	104+400 -	104+440	79
	105+325 -	105+390	180

Section 3 No.	47+270		448
	49+700		1,895
Section 4 No.	66+780 - No.	66+840	490
	68+440 -		872
	74+750 -	74+790	308
	75+630 -	76+ 50	1,150
	78+380 -	78+460	640
Section 5 No.	79+855 - No.	79+900	670
	80+240 -	80+300	244
	80+350		2,012
	82+400		715
	83+650 -	83+690	290
	85+770 -	85+870	625
	89+345 -	89+470	630
	89+620 -	89+800	878
	89+980 -	90+ 50	640
	90+660 -	90+680	105
	91+250 -	91+260	93
	91+320 -	91+430	760
	91+960 -	92+ 70	1,460
	92+340 -	92+550	3,235
	92+710 -	92+760	173
	94+300 -	94+375	700
	94+470 -	94+520	740
	94+550 -	94+630	135
	97+420 -	97+490	790
	97+670 -	97+680	288
	97+730 -	97+790	908
	98+ 25 -	98+210	8,170
	98+960 -	99+ 00	433
	99+130 -	99+190	525
	99+700 -	99+745	641
	100+320 -	100+400	444
Section 6 No.	101+400 - No.	101+455	438
	101+840 -	101+855	240
	102+670 -	102+720	244
	103+150 -	103+210	282
	103+385 -	103+450	408

A.6 Quantity of Culvert

Section	1	2	3	4	5	6	Total
Item							
Box - 3.0 X 3.0	50	50	75	40	160		375
Box - 4.0 X 4.0	35	10					45
Pipe 600	3,339	2,739	1,741	2,589	2,897	977	14,282

Box Culvert

	3.0m(B) X 3.0m(H)		4.0m(B) X 4.0m(H)	
Section1	No. 20+540	L=50m	No. 14+160	L=35m
Section2	No. 28+145	L=15m	No. 30+180	L=10m
	43+700	L=35m		
Section3	No. 49+210	L=35m		
	49+685	L=40m		
Section4	No. 64+630	L=40m		
Section5	No. 96+490	L=70m		
	97+225	L=40m		
	98+420	L=50m		

Pipe Culvert

Average Interval 150^{m} Average Length 20^{m}

Section1	26,963^{m}	X 1/250^{m} X 20^{m}	=	1,997^{m}
Section2	20,543^{m}	X 1/250^{m} X 20^{m}	=	1,643^{m}
Section3	13,059^{m}	X 1/250^{m} X 20^{m}	=	1,045^{m}
Section4	19,416^{m}	X 1/250^{m} X 20^{m}	=	1,553^{m}
Section5	21,725^{m}	X 1/250^{m} X 20^{m}	=	1,738^{m}
Section6	7,300^{m}	X 1/250^{m} X 20^{m}	=	584^{m}

A.7 Quantity of Disaster

Section	1	2	3	4	5	6	Total
Item							
Catch Netting(m2)		800		2,000	1,040		3,840
Gabion (m)		42		102		144	
Catch Fence (m)	51	42			54	147	
Gabion Dam (m3)			3,764	5,211		2,179	11,154
Shed (m)		62					62
French Drain (m)						1,010	1,010

Catch Netting	Section 2	No. 35+560	800m2
	Section 4	No. 76+320	2,000m2
Gabion	Section 2	No. 33+700	42m
	Section 4	No. 76+320	102m
Catch Fence	Section 1	No. 12+780	51m
	Section 2	No. 76+320	42m
	Section 5	No. 92+900	54m
Gabion Dam	Section 3	No. 49+210	3,764m3
	Section 4	No. 68+820	1,274m3
		No. 73+890	1,098m3
	Section 6	No.103+190	2,179m3
Shed	Section 2	No. 40+300	62m
French Drain	Section 6	No.104+ 20	290m
		No.104+670	270m
		No.105+840	120m
		No.107+500	330m

A.8 Quantity of Drainage

Section 1	25 Km	Type 1+Type 2
Section 2	20.5Km	Type 1+Type 2
Section 3	13.1Km	Type 1+Type 2
Section 4	19.5Km	Type 1+Type 2
Section 5	21.7Km	Type 1+Type 2
Section 6	7.3Km	Type 1+Type 2

Type 1 : Road side drain and Top of Slope
Type 2 : Drain ditch on berm

A.9 Quantity of Pavement

Unit:m^2

Section	1	2	3	4	5	6	Total
Item							
Sub-base Course	249,048	204,300	129,872	193,092	216,055	72,897	1,065,264
Base Course	239,657	196,596	124,975	185,811	207,908	70,148	1,025,095
Binder Course	232,917	191,071	121,463	180,589	202,065	68,176	996,281
Surface Course	229,010	187,867	119,426	177,550	198,675	67,033	979,571
Asphalt Macadam	228,082	187,106	118,941	176,841	197,871	66,762	975,603

Typical cross-section

9.0m

t=5cm Surface Course
t=5cm Binder Course
t=15cm Base Course
t=15cm Sub-base Course

A = W1.L + W2.L.
A : Area W1 : Standard side W2 : Greatest widening(1.4m)
L : Road Length : Widening Portion for Road Length(5%)

Surface Course A=(9+0.075)L+(1.4X0.05)L=9.075L+0.07L=9.145L
Binder Course A=(9+0.231)L+0.07L=9.231L+0.07L=9.301L
Base Course A=(9+0.500)L+0.07L=9.500L+0.07L=0.57L
Sub-base Course A=(9+0.875)L+0.07L=9.875L+0.07=9.945L

Sub-base Course	Section 1	9.945	X	25,042.5	= 249,048m^2
	Section 2	9.945	X	20,543	= 204,300m^2
	Section 3	9.945	X	13,059	= 129,872m^2
	Section 4	9.945	X	19,416	= 193,092m^2
	Section 5	9.945	X	21,725	= 216,055m^2
	Section 6	9.945	X	7,330	= 72,897m^2
Base Course	Section 1	9.57	X	25,042.5	= 239,657m^2
	Section 2	9.57	X	20,543	= 196.596m^2
	Section 3	9.57	X	13,059	= 124,975m^2
	Section 4	9.57	X	19,416	= 185,811m^2
	Section 5	9.57	X	21,725	= 207,908m^2
	Section 6	9.57	X	7,330	= 70,148m^2
Binder Course	Section 1	9.301	X	25,042	= 232,917m^2
	Section 2	9.301	X	20,543	= 191,071m^2
	Section 3	9.301	X	13,059	= 121,463m^2
	Section 4	9.301	X	19,416	= 180,589m^2
	Section 5	9.301	X	21,725	= 202,065m^2
	Section 6	9.301	X	7,330	= 68,176m^2
Surface Course	Section 1	9.145	X	25,042	= 229,010m^2
	Section 2	9.145	X	20,543	= 187,867m^2
	Section 3	9.145	X	13,059	= 119,426m^2
	Section 4	9.145	X	19,416	= 177,550m^2
	Section 5	9.145	X	21,725	= 198,675m^2
	Section 6	9.145	X	7,330	= 67,033m^2
Asphalt Macadam	Section 1	9.108	X	25,042	= 228,082m^2
	Section 2	9.108	X	20,543	= 187,106m^2
	Section 3	9.108	X	13,059	= 118,941m^2
	Section 4	9.108	X	19,416	= 176,841m^2
	Section 5	9.108	X	21,725	= 197,871m^2
	Section 6	9.108	X	7,330	= 66,762m^2

A.10 Quantity of Tunnel

Two Nos Tunnels were designed between No.35+610 and No.36+430 in this project. (See Drawing (12) and (13))

Tunnel(1)	Lining	30m + 30m = 60m
	Unsupported	300m
	Total	360m
	Portal	2 pieces
Tunnel(2)	Lining	30m + 30m = 60m
	Unsupported	325m
	Total	385m
	Portal	2 pieces
Total	Lining	120m
	Unsupported	625m
	Portal	4 pieces

A.11 Quantity of Others

Traffic Sign and Guard Rail

Traffic Sign	Type R-19	11 pieces
	Type P	22 pieces
	Identif.	11 pieces
	Destino.	11 pieces
	B.M.	21 pieces

Guard Rail All of River or Valley Side

Section 1	25.0Km
Section 2	20.5Km
Section 3	13.1Km
Section 4	19.5Km
Section 5	21.7Km
Section 6	7.3Km

Marking(W=10cm) Two straight lines for both road side one line for Road Center

Section 1	25.0Km
Section 2	20.5Km
Section 3	13.1Km
Section 4	19.5Km
Section 5	21.7Km
Section 6	7.3Km

Bridges Quantity

1. Quantity of Superstructure

		Unit	Point A	Patuni	Challa	Cascada	Alto Choro	Pto.Leon	Cajones	Chojna	San Silverio	San Lorenzo	Espiritu	Carrasco	Avaroa
Concrete	P	m³	1207.40	70.80	35.4	26.912	280.218	138.00	46.00	30.028	280.180	294.490	294.490	80.385	147.25
	A	m³	—	111.838	55.649	45.995	—	203.301	70.544	49.96	—	—	—	106.423	—
Form		m²	4193.06	(61.719) 544.218	(61.719) 272.109	(57.082) 222.597	1171.282	(97.535) 884.754	(97.535) 317.548	(65.742) 241.173	1171.282	1236.450	1236.450	(133.303) 454.848	585.640
Rainforcement Bar		ton	205.26	(0.779) 19.906	(0.779) 9.953	(0.740) 8.163	47.637	(1.265) 36.161	(1.265) 12.563	(0.826) 8.861	47.637	50.063	50.063	(1.768) 18.870	25.033
PC-Cable		kg	48296.0	4602.0	2301.0	1749.3	9807.6	8970.0	2990.0	1951.8	9807.6	10307.2	10307.2	5225.0	5153.7
Shoe		Set	4	20	10	8	8	24	8	8	8	8	8	10	4
Handrail		m	265.00	79.76	39.88	36.88	96.076	96.076	49.88	43.88	96.076	101.556	101.556	59.88	47.338
Expantion		m	22.0	24.8	24.8	22.0	23.0	23.0	22.0	22.0	23.0	23.0	23.0	27.0	23.0
Drainage		Pce	28.0	10	6	6	12	12	6	6	12	12	12	6	6
Newel Post		Set	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Erection		m³	1207.40	—	—	—	—	—	—	—	—	—	—	—	—
		ton	—	177.0	88.5	67.28	701.0	701.0	115.0	75.07	701.0	737.0	737.0	200.96	350.0

※ Quantity of I-Girder is shown in ( )

2. Quantity of Substructure

(Abutment)

	Excavation (m^3)	Concrete (m^3)	Form (m^2)	Reinforcement Bar (ton)	Leveling concrete (m^2)	Staging ($Spc.m^3$)
Point A	247.4	122.10	236.86	6.72	6.60	181.06
Patuni	851.0	147.71	236.76	8.12	12.83	195.28
Challa	279.7	159.14	262.07	8.75	8.07	265.52
Cascada	506.7	102.36	202.38	5.63	8.06	161.40
Alto Choro	534.7	167.71	283.90	9.22	7.70	217.28
Pto Leon	712.4	228.73	370.54	12.58	9.68	497.56
Cajous	161.6	154.88	266.80	8.52	7.36	295.27
Chojna	142.6	142.88	229.65	7.86	8.40	108.66
San Silverio	748.3	284.48	414.46	15.65	11.00	361.84
San Lorenzo	912.1	204.58	340.60	11.25	9.35	281.52
Espiritu	878.2	159.52	259.88	8.77	9.35	190.78
Carrasco	1962.7	370.14	545.21	20.36	15.67	540.13
Avaroa	219.2	62.86	155.30	3.46	6.26	161.40

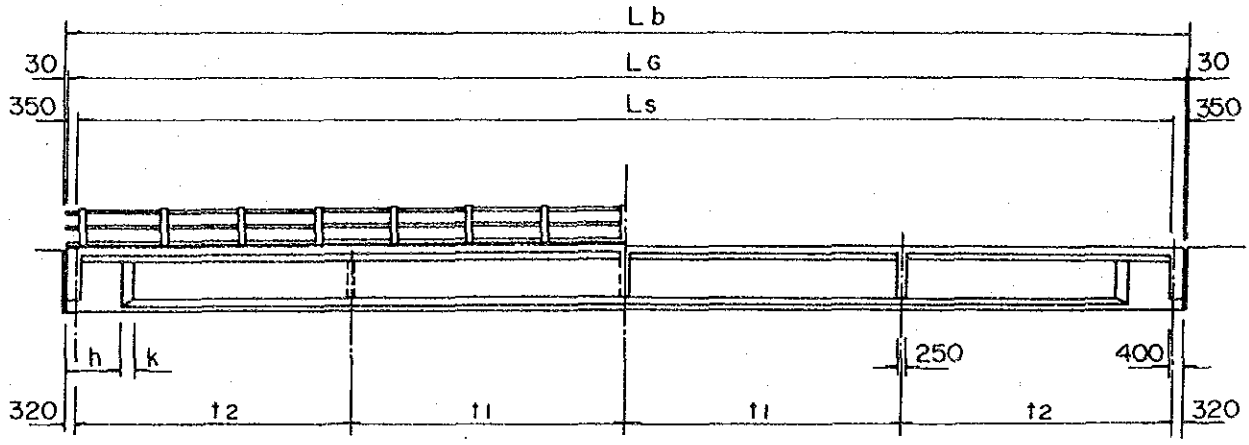
(Pire)

	Excavation (m^3)	Concrete (m^3)	Form (m^2)	Reinforcement Bar (ton)	Leveling concrete (m^2)	Staging ($Spc.m^3$)
Point A	334.0	1117.10	742.60	78.20	28.62	1287.0
Patuni	205.2	89.98	139.58	6.30	3.00	147.12
Alto Choro	113.9	83.18	129.03	5.82	3.20	136.00
Pto Leon	318.0	162.21	192.04	11.35	6.00	401.28
San Silverio	209.7	115.83	183.02	8.11	4.00	206.00
San Lorenzo	370.4	205.50	295.57	14.39	4.80	336.60
Espiritu	307.4	243.24	327.72	17.03	5.60	381.10

Quantity

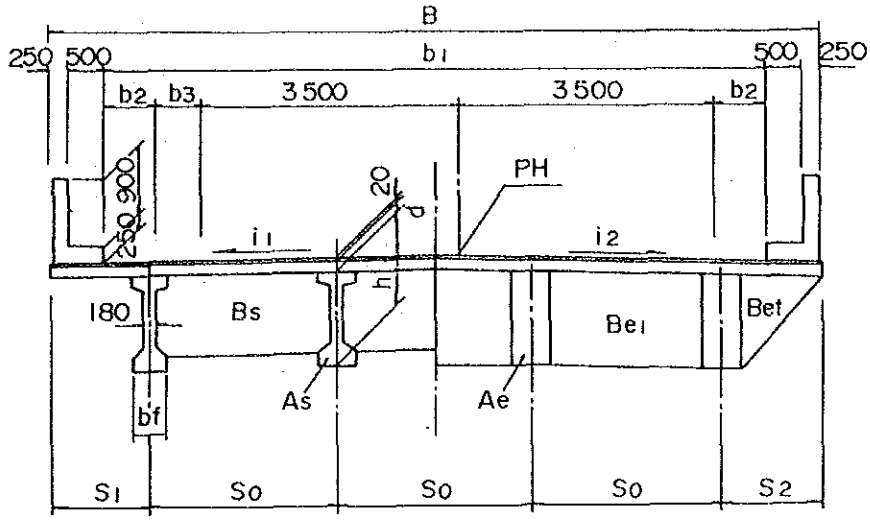
1.Superstructure

1.1 I-Girder



(Unit : ㎜)

Name of Bridges	Total Bridge Length (L_B)	Girder Length (L_G)	Span (L_S)	Cross Beam				K
				T_1	T_2	h_t	m	
Patuni	40.000	19.94×2	19.65×2	6,400	6,450	0.770	2	0.40
Challa	20.000	19.94	19.3	6,400	6,450	0.770	2	0.40
Cascada	18.500	18.44	17.8	6,140	6,150	0.770	2	0.40
Pto.Leon	75.000	24.94×3	24.65×3	6,000	6,150	0.975	3	0.40
Cajones	25.000	24.94	24.3	6,000	6,150	0.975	3	0.40
Chojña	22.000	21.94	21.3	7,100	7,100	0.870	2	0.40
Carrasco	30.000	29.94	29.3	7,350	7,300	1.115	3	0.50



Name of Bridges	Width				Spaceing of Girder			Slab	Girder		
	B	b_1	b_2	b_3	S_o	S_1	S_2	d	h	b_f	n
Patuni	11.90	10.40	0.60	2.00	2.40	0.800 ～ 1.700	1.700 ～ 0.800	0.19	1.10	0.51	5
Challa	11.90	10.40	0.60	2.00	2.40	0.64～ 1.804	1.660 ～ 0.753	0.19	1.10	0.51	5
Cascada	10.50	9.00	1.00	—	2.60	1.35	1.35	0.19	1.10	0.51	4
Pto.Leon	8.80	7.30	0.15	—	2.20	1.10	1.10	0.18	1.50	0.51	4
Cajones	10.50	9.00	1.00	—	2.60	1.35	1.35	0.19	1.50	0.51	4
Chojña	10.50	9.00	1.00	—	2.60	1.35	1.35	0.19	1.20	0.51	4
Carrasco	13.00	12.00	2.50	—	2.60	1.30	1.30	0.19	1.70	0.56	5

Cross Section Area (Unit : m^2)

	Patuni	Challa	Cascada	Pto.Leon	Cajones	Chojña	Carrasco
End of Girder (A_e)	0.561	0.561	0.561	0.772	0.772	0.612	0.962
Center of Girder (A_s)	0.317	0.317	0.317	0.412	0.412	0.337	0.472
End Cross Beam (Be_1)	2.079	2.079	2.229	2.528	3.128	2.508	3.458
End Cross Beam (Be_2)	0.602	0.602	0.602	0.821	0.821	0.657	0.862
Inner Cross Beam (B_s)	1.665	1.665	1.882	2.302	2.770	2.064	3.218

(1) Concrete Volume

1) Girder (Type P)

$$V_G = A_S \times (L_G - 2 \cdot h - 2 \cdot K) + 2 \times A_e \times h + \tfrac{1}{2}(A_S + A_e) \times K \times 2$$

2) Cross Beam (Type A)

$$V_C = 3 \times B_S \times 0.25 + 3 \times Be_1 \times 0.400 + 2 \times Be_2 \times 0.400$$

(4) (4)

3) Slab (Type A)

$$V_S = B \times d \times L_G$$

4) Pavement (Type A)

$$V_P = 0.02 \times b_1 \times L_G$$

Concrete Volume (Unit : m^3)

	Patuni	Challa	Cascada	Pto.Leon	Cajones	Chojna	Carrasco	Sub Total
V_G	(7.080) 70.800	(7.080) 35.400	(6.728) 26.912	(11.500) 138.000	(11.500) 46.000	(7.507) 30.028	(16.077) 80.385	(67.472) 472.525
V_C	11.162	11.162	9.761	13.523	16.300	10.785	25.585	98.278
V_S	40.339	40.339	32.915	49.755	49.755	35.593	73.952	322.648
V_P	4.148	4.148	3.319	4.489	4.489	3.582	6.886	31.061
Total	111.298	55.919	45.995	203.301	70.544	49.960	106.423	648.440

(2) Volume of Form Area

1) Girder (Per 1 Girder)

$$A_G = a_1 \times (L_G - 2h - 2k) + a_2 \times (h - 0.40) + \tfrac{1}{2}(a_1 + a_2) \times K + 2 \times Ae$$

2) Cross Beam

$$Ac_1 = (n-1) \times 2 \times B_S \times m + (n-1) \times (S_o - b_f) \times 0.25 \times m$$

$$Ac_2 = (n-1) \times 2 \times Be_1 \times 2 + (n-1) \times (S_o - b_f) \times 0.40 \times 2$$

$$Ac_3 = 2 \times Be_2 \times 2 \times 2 + \sqrt{(S_1 - b_f/2)^2 + h^2} + 2 \times \sqrt{(S_2 - b_f/2)^2 + h^2}$$

$$Ac = Ac_1 + Ac_2 + Ac_3$$

3) Slab

$As_1 = (n-1) \times (S_o - b_f/2) \times (L_G - 2 \times 0.40 - 0.25m)$

$As_2 = S_1 \times (L_G - 0.40 \times 2) + S_2 \times (L_G - 0.40 \times 2)$

$As_3 = (d + 0.02) \times (L_G + B) \times 2$

$As = As_1 + As_2 + As_3$

(Per 1 Span)

	Unit	Patuni	Challa	Cascada	Pto.Leon	Cajones	Chojña	Carrasco
a_1	m^2/m	3.092	3.092	3.092	3.918	3.918	3.291	4.451
a_2	m^2/m	2.710	2.710	2.710	3.510	3.510	2.910	4.018
A_G	m^2	61.719	61.719	57.082	97.535	97.535	65.742	133.303
A_C	m^2	193.458	193.458	156.470	195.039	208.983	169.080	295.571
A_S	m^2	78.651	78.651	66.127	99.715	108.565	72.093	159.277
Total	m^2	272.109	272.109	222.597	294.754	317.548	241.173	454.848

Reinforcement Bar

1) Girder (110 kg/m³)

$W_G = V_G \times 110$ / Girder

2) Cross Beam (145 kg/m³)

$W_C = V_C \times 145$

3) Slab (205 kg/ m³)

$W_S = V_S \times 205$

(Per 1 Span)

	Unit	Patuni	Challa	Cascada	Pto.Leon	Cajones	Chojña	Carrasco
W_G	t	0.779	0.779	0.740	1.265	1.265	0.826	1.768
W_C	t	1.684	1.684	1.415	1.961	2.363	1.564	3.710
W_S	t	8.269	8.269	6.748	10.200	10.200	7.297	15.160
Total	t	9.953	9.953	8.163	12.161	12.563	8.861	18.870

4) PC-Cable (65kg/m³)

$W_P = V_G \times 65$

5) Handrail

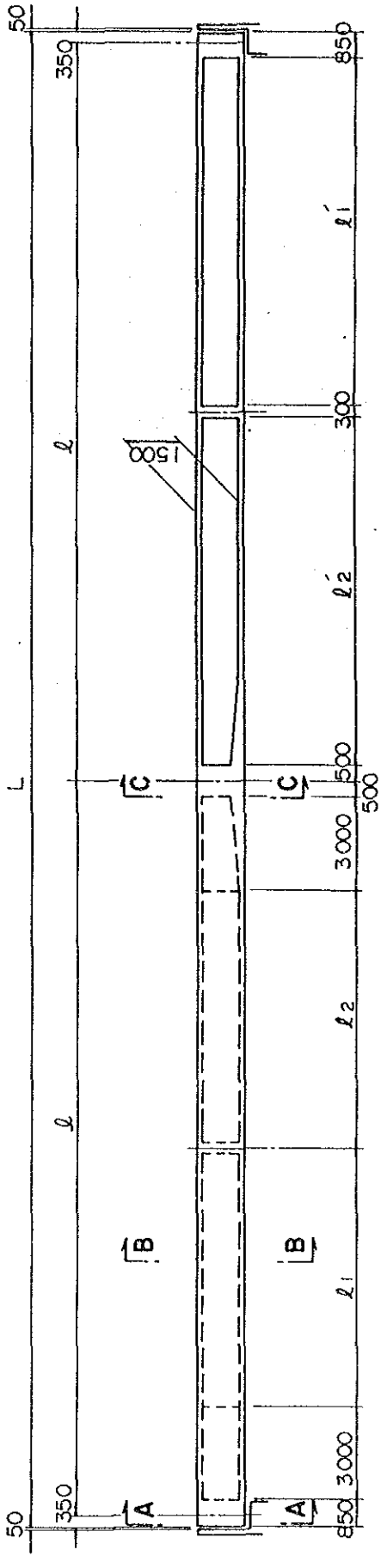
$L = L_B \times 2$

6) Expantion

$L = B \times 2$

7) Drainage (1Pce/10m)

$n = LB/10 + 1$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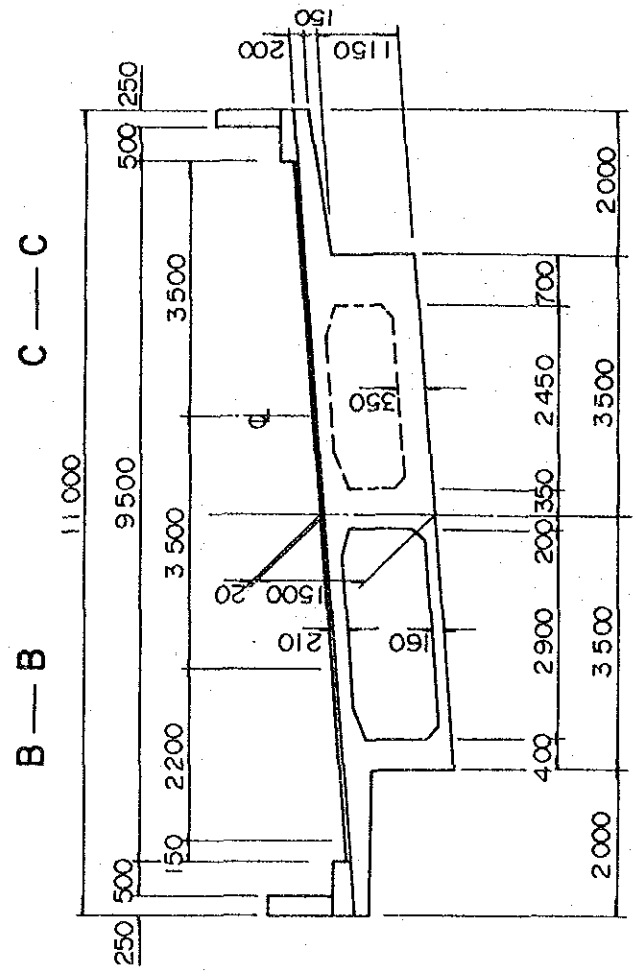
L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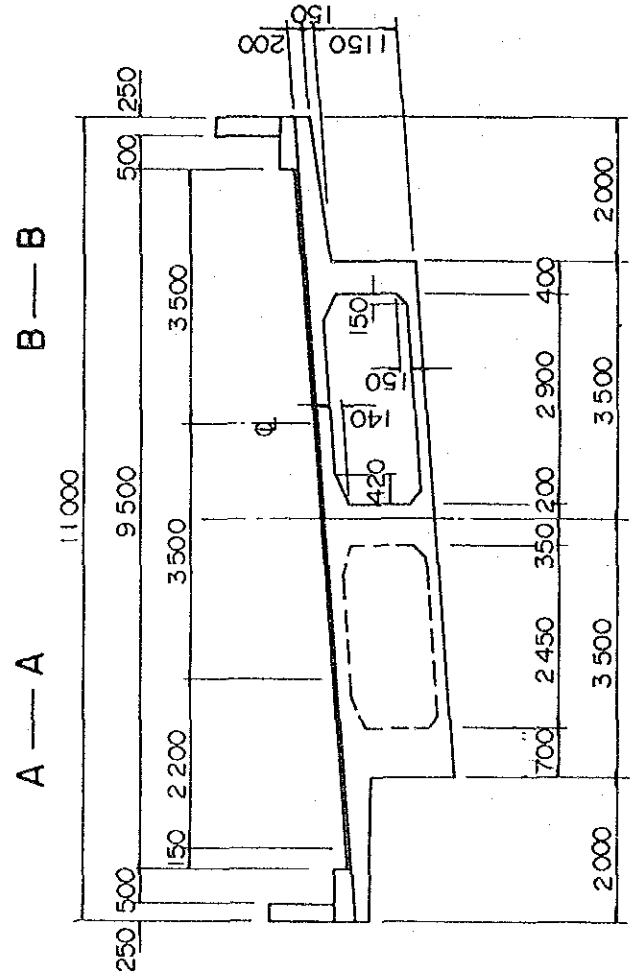
B — B
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200
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2450
700
2000
3500
3500
3500
150
150
140
420
d

Name of Bridge	Bridge Length	Center of Girder (m²)				Areas (m²)		
		L	ℓ	ℓ_1	ℓ_2	A_1 (A-A)	A_2 (B-B)	A_3 (C-C)
Alto Choro	50.000	48.038	23.669	8.400	8.269	6.226	5.209	7.157
San Silverio	50.000	48.038	23.669	8.400	8.269	6.226	5.209	7.157
San Lorenzo	52.000	50.778	25.039	9.100	8.939	6.226	5.209	7.157
Espiritu	52.000	50.778	25.039	9.100	8.939	6.226	5.209	7.157
Avaroa	25.00	24.019	23.319	8.160	8.160	6.226	5.209	———

1. Concrete Volumes

1) Girder (V_A)

$V_1 = A_1 \times 0.85$

$V_2 = 1/2 \times (A_1 + A_2) \times 3.00$

$V_3 = A_1 \times (\ell_1 + \ell_2)$

$V_4 = 1/2 \times (A_2 + A_3) \times 3.00$

$V_5 = A_3 \times 0.50$

$$V_A = V_1 + V_2 + V_3 + V_4 + V_5$$

2) Cross Beam (V_B)

$V_1 = \{1.13 \times 2.45 \times 2 - (a+b)\} \times 0.85$

$V_2 = \{1.13 \times 2.90 \times 2 - (a+b)\} \times 0.30$

$V_3 = \{0.94 \times 2.45 \times 2 - (a+b)\} \times 0.50$

$a = 1/2 \times 0.14 \times 0.42 \times 4 = 0.118 \ (m^2)$

$b = 1/2 \times 0.15 \times 0.15 \times 4 = 0.045 \ (m^2)$

$$V_B = V_1 + V_2 + V_3$$

$$\Sigma V = V_A + V_B$$

Name of Bridge	Per 1 Span		Per Bridge		
	V_A	V_B	V_A	V_B	ΣV
Alto Choro	131.402	8.707	262.804	17.414	280.218
San Silverio	131.402	8.707	262.804	17.414	280.218
San Lorenzo	138.538	8.707	277.076	17.414	294.490
Espiritu	138.538	8.707	277.076	17.414	294.490
Avaroa	138.538	8.707	138.538	8.707	147.245

2. Form Areas

Upper Slab (A_a)

$$a_1 = (0.20+\sqrt{0.15^2+2.00^2})\times L/2 \times 2$$
$$a_2 = 1/2\times\{(2.45-2\times0.42)+(2.90-2\times0.42)\times 3.00\times4$$
$$a_3 = (2.90-2\times0.42)\times(\ell_1+\ell_2-0.3)\times2$$
$$a_4 = \sqrt{0.14^2+0.42^2}\times(2\times3.0+\ell_1+\ell_2-0.3)\times4$$
$$A_a = a_1+a_2+a_3+a_4$$

Web (A_b)

$$a_1 = 1.15\times L/2\times2$$
$$a_2 = 0.84\times(3.00+\ell_1+\ell_2-0.3)\times4$$
$$a_3 = 1/2\times(0.84+0.65)\times3.00\times4$$
$$a_4 = \sqrt{0.15^2+0.15^2}\times(2\times3.00+\ell_1+\ell_2-0.3)\times4$$
$$A_b = a_1+a_2+a_3+a_4$$

Lower Slab (A_c)

$$A_c = 7.00\times L/2$$

Cross Beam (A_d)

$$a_1 = (1.13\times2.45-1/2\times0.14\times0.42\times2-1/2\times0.15^2\times2)\times2$$
$$a_2 = (1.13\times2.90-1/2\times0.14\times0.42\times2-1/2\times0.15^2\times2)\times4$$
$$a_3 = (0.94\times2.45-1/2\times0.14\times0.42\times2-1/2\times0.15^2\times2)\times2$$
$$A_d = a_1+a_2+a_3$$

End of Girder (A_e)

$$a_1 = 1/2(0.20+0.35)\times2.0\times2$$
$$a_2 = 1.50\times7.00$$
$$A_e = a_1+a_2$$

$$\Sigma A = A_a+A_b+A_c+A_d+A_e$$

Name of Bridge	For 1 Span						For Bridge
	A_a	A_b	A_c	A_d	A_e	ΣA	ΣA
Alto Choro	235.063	148.245	168.133	22.600	11.600	585.641	585.641 × 2 = 1171.282
San Silverio	235.063	148.245	168.133	22.600	11.600	585.641	585.641 × 2 = 1171.282
San Lorenzo	249.141	157.161	177.723	22.600	11.600	618.225	618.225 × 2 = 1236.450
Espiritu	249.141	157.161	177.723	22.600	11.600	618.225	618.225 × 2 = 1236.450
Avaroa	235.063	148.245	168.133	22.600	11.600	585.641	585.641 × 1 = 585.641

3) Reinforcement Bar (170kg/m³)
W = ΣV × 0.170 (ton)

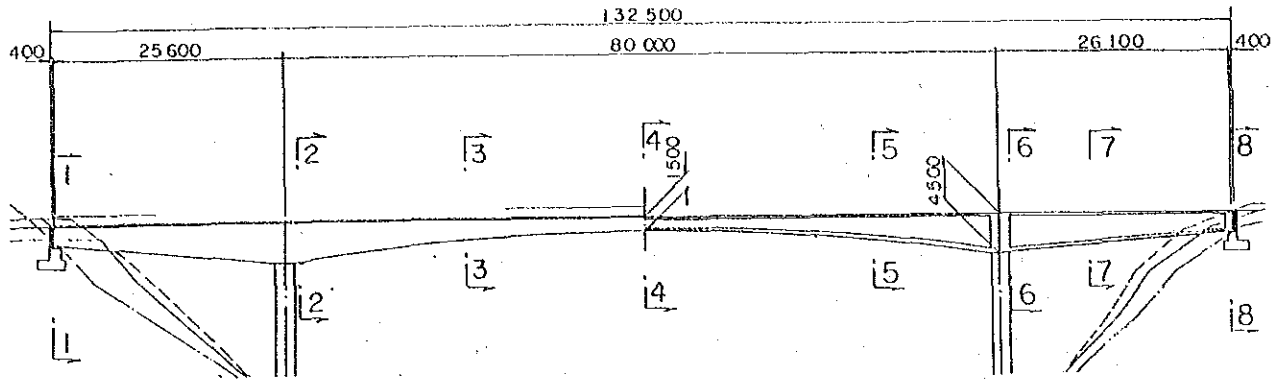
4) PC-Cable (35kg/m³)
W = ΣV × 35 (kg)

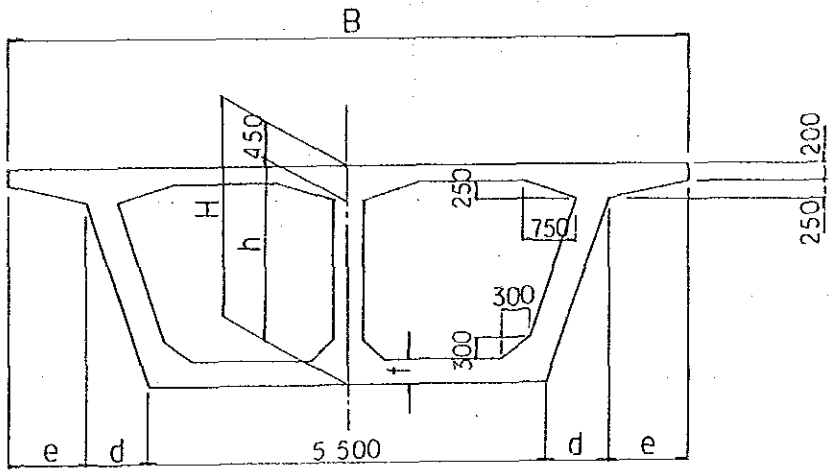
5) Handrail
L = L × 2 (m)

6) EXpantion
L = 11.0×2 = 22.0m

7) Drainage (1Pce/10m)
n = L/10 + 1

1.3 Point A Bridge





Cross Section	B	H	h	d	e	f	l
1 – 1	11.000	2.500	2.05	0.683	2.067	0.300	25.60
2 – 2	11.000	4.500	4.05	1.350	1.400	0.500	20.00
3 – 3	8.800	3.038	2.588	0.863	0.787	—	20.00
4 – 4	8.800	1.500	1.05	0.350	1.300	0.350	27.10
5 – 5	8.800	3.585	3.135	1.045	0.605	—	12.90
6 – 6	10.219	4.500	4.05	1.350	1.400	0.500	7.10
7 – 7	11.000	3.934	3.483	1.161	1.589	—	19.00
8 – 8	11.000	2.500	2.05	0.683	2.067	0.300	

(1) Concrete

1) Upper Slab

V_1 = 11.00×25.60 ×0.20+½(11.00+8.80) ×20×0.20+8.80×20.0×0.20
+8.80×27.10 ×0.20+½(8.80 +10.219) ×12.90 ×0.2 +(10.219 + 11.00) ×7.10×0.20
+11.00 ×19.00 ×0.20 = 257.664

V_2 =½×0.250 ×0.750 ×131.70×4 = 49.388

V_3 =½(2.067+1.400)×25.60 ×0.25+½(1.400+0.787)×20.00 ×0.25
+½(0.787+1.300)×20.0×0.25+½(1.300+0.605)×27.10 ×0.25
+½(0.605+1.400)×12.90 ×0.25+½(1.400+1.589)×7.10×0.25
+½(1.589+2.067)×19.00 ×0.25 = 44.551 ×2 = 89.102

V_U = 396.154m³

2) Lawer Slab

V_1 = 5.50 ×80.0×(0.35 +0.50) ×½ = 187.0

V_2 = 5.50 ×25.6×(0.30 +0.50) ×½ = 56.32

V_3 = 5.50 ×26.1×(0.30 +0.50) ×½ = 57.42

V_4 = 0.30²×½×131.7 ×4 = 23.706

V_L = 324.446m³

3) Web

V_1 = (0.95+3.80) ×0.40×40×½×2 +½(3.80 +2.0)×25.60 × 0.40
+½(3.80 +2.0)×26.10 × 0.40 = 97.972

V_2 =½(0.95 +3.80) ×½(0.422+0.738)×40×½×2 ×2
+½(3.80 +2.0)×0.738 ×25.60 ×2 +½(3.80 +2.0)×26.10 ×0.738 ×2 = 223.818

V_W = 321.790m³

4) Cross Beam

V_1 =½(1.812+2.495)×2.0 ×1.5 ×4 = 25.842

V_2 =½(1.812+3.162)×3.8 ×3.0 ×4 = 113.407

V_C = 139.249m³

5) Pavement

V_P = 257.664×1/10 V_P = 25.766m³

Total V = 1207.4 m³

(2) Form

1) Upper Slab

$A_1 = \frac{1}{2}(2.60 + 1.60) \times 40.0 \times 4 = 336.0$

$A_2 = \frac{1}{2}(2.60 + 1.933) \times (25.6 + 26.1) \times 2 = 234.356$

$A_3 = \frac{1}{2}(2.067 + 1.400) \times 25.60 + \frac{1}{2}(1.40 + 0.787) \times 20.0 + \frac{1}{2}(0.787 + 1.30) \times 20.0$
$+ \frac{1}{2}(1.30 + 0.605) \times 27.10 + \frac{1}{2}(0.605 + 1.40) \times 12.90 + \frac{1}{2}(1.40 + 1.589) \times 7.10$
$+ \frac{1}{2}(1.589 + 2.067) \times 19.0 = 171.206 \times 2 = 342.411$

$A_4 = \sqrt{0.25^2 + 0.75^2} \times 131.70 \times 4 = 416.472$

$A_S = 1329.239 m^2$

2) Web

$A_1 = \frac{1}{2}(3.25 + 0.40) \times 40 \times 2 \times 2 = 292.0$

$A_2 = \frac{1}{2}(3.25 + 1.45) \times (26.1 + 25.6) \times 2 = 242.99$

$A_3 = \frac{1}{2}(\sqrt{1.35^2 + 4.05^2} + \sqrt{1.05^2 + 0.35^2}) \times 40 \times 2 \times 2 = 430.070$

$A_4 = \frac{1}{2}(\sqrt{1.35^2 + 4.05^2} + \sqrt{2.05^2 + 0.683^2}) \times (26.1 + 25.6) \times 2 = 332.434$

$A_5 = \frac{1}{2}(\sqrt{1.35^2 + 3.25^2} + \sqrt{0.40^2 + 0.35^2}) \times 40 \times 2 \times 2 = 324.059$

$A_6 = \frac{1}{2}(\sqrt{1.35^2 + 3.25^2} + \sqrt{1.45^2 + 0.35^2}) \times (26.1 + 25.6) \times 2 = 259.062$

$A_7 = \sqrt{0.30^2 + 0.30^2} \times 131.70 \times 4 = 223.502$

$A_W = 2114.117 m^2$

3) Lower Slab

$A_1 = 5.50 \times 131.70 = 724.35 m^2$

$A_2 = \frac{1}{2} \times (5.50 + 6.866) \times 2.05 \times 2 = 25.350 m^2$

$A_L = 749.70 m^2$

Total A = $4193.056 m^2$

(3) Reinforcement Bar (170kg/m³)

W = 1207.4 × 0.170 = 205.26 t

(4) PC-Cable (40kg/m³)

W = 1207.4 × 40 = 48296 kg

(5) Handrail

L = 132.5 × 2 = 265 m

(6) Expantion

L = 11.0 × 2 = 22 m

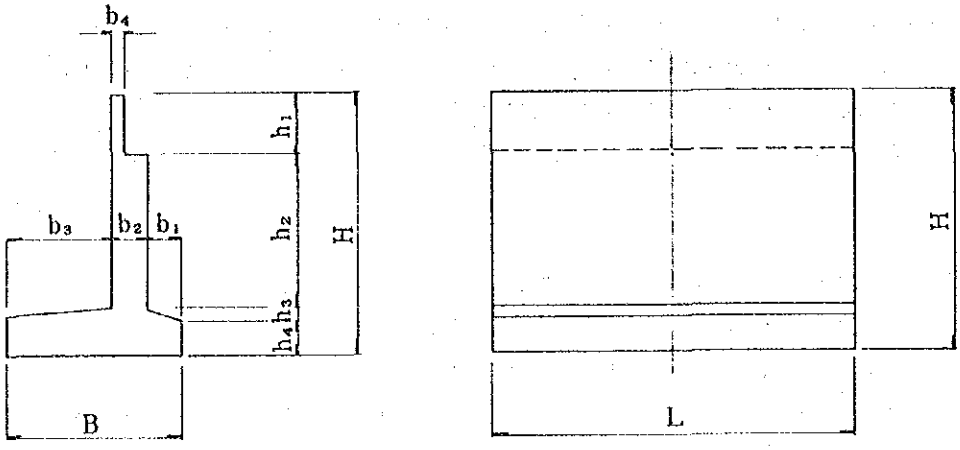
(7) Drainage (1pce/10m)

n = 14pce × 2 = 28 pce

2. Substructure

2-1 Abutment

(1) Type 1



unit : m

A1-Abut.											
	H	h1	h2	h3	h4	B	b1	b2	b3	b4	L
Point A	5.00	2.86	1.14	—	1.00	3.00	0.5	1.00	1.50	0.50	11.00
Patuni	6.00	1.20	3.80	—	1.00	4.00	1.00	1.00	2.00	0.30	12.29
Challa	6.00	1.50	3.50	—	1.00	4.00	1.00	1.00	2.00	0.30	12.29
Casdaca	5.00	1.35	2.45	0.20	1.00	3.00	0.50	1.00	1.50	0.30	11.56
Alto Choro	6.00	1.61	3.19	0.20	1.00	3.50	0.80	1.00	1.70	0.30	11.00
Pto.Leon	8.50	1.72	5.58	0.20	1.00	5.00	1.20	1.20	2.60	0.40	8.80
Cajones	5.40	1.75	2.45	0.20	1.00	3.50	0.80	1.00	1.70	0.40	10.50
San Silverio	8.50	1.81	5.69	0.20	1.00	5.00	1.20	1.20	2.60	0.40	11.00
San Lorenzo	8.00	1.61	5.19	0.20	1.00	5.00	1.20	1.00	2.80	0.30	11.00
Espiritu	6.70	1.61	4.09	—	1.00	3.50	0.80	1.00	1.50	0.30	11.00
Carrasco	8.00	1.95	4.85	0.20	1.00	4.50	1.00	1.00	2.50	0.40	13.98
A2-Abut.											
	H	h1	h2	h3	h4	B	b1	b2	b3	b4	L
Point A	5.00	2.86	1.14	—	1.00	3.00	0.50	1.00	1.50	0.50	11.00
Patuni	5.00	1.20	2.80	—	1.00	3.00	0.50	1.00	1.50	0.30	12.92
Challa	5.50	1.50	3.00	—	1.00	3.30	0.80	1.00	1.50	0.30	12.92
Alto Choro	6.00	1.61	3.19	0.20	1.00	3.50	0.80	1.00	1.70	0.30	11.00
Pto.Leon	10.00	1.72	7.08	0.20	1.00	6.00	1.50	1.20	3.30	0.40	8.80
Cajones	6.30	1.75	3.35	0.20	1.00	3.50	0.80	1.00	1.70	0.40	10.50
San Silverio	8.50	1.81	5.69	0.20	1.00	5.00	1.20	1.20	2.60	0.40	11.00
San Lorenzo	6.56	1.61	3.95	—	1.00	3.50	0.80	1.00	1.50	0.30	11.00
Espiritu	8.00	1.61	5.19	0.20	1.00	5.00	1.20	1.00	2.80	0.30	11.00
Carrasco	10.00	1.95	6.85	0.20	1.00	5.00	1.20	1.20	2.50	0.40	13.98

1) Concrete (210Kg/cm²)

$V=(B \times h_4+1/2 \times b_3 \times h_3+1/2 \times b_1 \times h_3+b_2 \times (h_2+h_3)+b_4 \times h_1) \times L \quad (m^3)$

2) Form

$A_1=(2 \times h_1+2h_2+2h_4) \times L$

$A_2=(1/2(b_2+B) \times h_3+B \times h_4+b_2 \times h_2+b_4 \times h_1) \times 2$

$\Sigma A=A_1+A_2 \quad (m^2)$

3) Reinforcement Bar (55Kg/m³)

$W=V \times 0.055$ (ton)

4) Leveling Concrete (t=10cm)

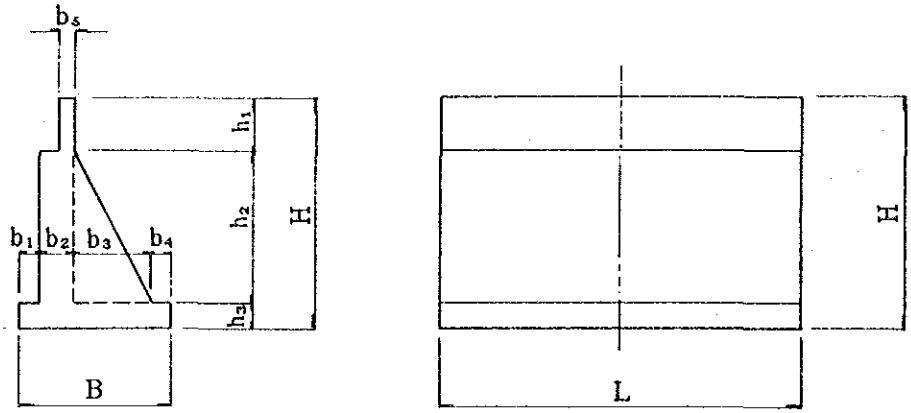
$Ve=B \times L \times 0.10 \quad (m^3)$

5) Staging (Spc. m³)

6) Quantity (Abutment;Type1) unit : m

	Concrete (m^3)	Form (m^2)	Reinforcement Bar (ton)	Leveling Concrete (m^3)	Staging (spc.m^3)
A_1-Abut.					
Point A	61.050	118.432	3.358	3.30	90.53
Patuni	79.23	120.45	4.358	6.08	107.17
Challa	86.426	139.02	4.753	4.11	136.11
Casdaca	70.93	124.73	3.901	4.05	90.53
Alto Choro	83.853	141.95	4.612	3.85	108.64
Pto.Leon	102.925	169.472	5.661	4.40	222.82
Cajones	82.163	143.75	4.519	3.68	165.86
San Silverio	142.241	207.23	7.823	5.50	180.92
San Lorenzo	135.641	195.03	7.460	5.50	166.72
Espiritu	71.403	152.69	3.927	3.85	126.30
Carrasco	172.34	242.69	9.479	7.28	211.83
A_2-Abut.					
Point A	61.050	118.432	3.358	3.30	90.53
Patuni	68.48	116.31	3.766	6.75	88.11
Challa	72.713	123.05	3.999	3.96	129.41
Alto Choro	83.853	141.95	4.612	3.85	108.64
Pto.Leon	125.805	201.072	6.919	5.28	274.74
Cajones	72.713	123.05	3.999	3.68	129.41
San Silverio	142.241	207.23	7.823	5.50	180.92
San Lorenzo	68.935	145.57	3.791	3.85	114.80
Espiritu	88.121	107.19	4.847	5.50	64.48
Carrasco	199.80	302.52	10.989	8.39	328.30

(2) Type 2



unit : m

A1-Abut.											
	H	h1	h2	h3	B	b1	b2	b3	b4	b5	L
Chojna	3.80	1.45	1.35	1.00	2.50	0.30	0.90	0.80	0.50	0.30	12.12
Avaroa	3.50	1.70	1.30	0.50	2.50	0.30	1.00	0.70	0.50	0.40	13.65
A2-Abut.											
Cascada	3.00	1.35	1.15	0.50	2.00	0.30	0.90	0.50	0.30	0.30	11.59
Chojna	4.00	1.45	1.55	1.00	2.50	0.30	0.90	0.80	0.50	0.30	12.12
Avaroa	3.50	1.70	1.30	0.50	2.50	0.30	1.00	0.70	0.50	0.40	12.29

1) Conctete (210Kg/cm²)

$V=(B \times h_3+b_2\times h_2+b_5\times h_1+1/2 \times b_3\times h_2) \times L$ (m³)

2) Form

$A_1=(2\cdot h_1 +h_2+h_3+\sqrt{b_3^2 +h_2^2})\times L$

$A_2=(B\times h_3+b_2\times h_2+b_5\times h_1+1/2 \times b_3\times h_2) \times 2$

$\Sigma A=A_1+A_2$ (m²)

3) Reinforcement Bar (55Kg/m³)

$W=V\times 0.055$ (ton)

4) Leveling Concrete

$Ve=B \times L \times 0.10$ (m³)

5) Staging (Spc. m³)

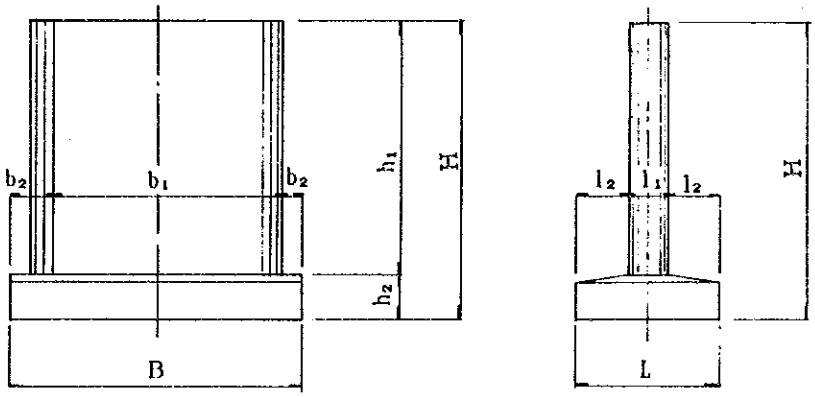
(See Type 1)

6) Quantity (Abutment:Type2)

A_1-Abut.					
	Concrete (m^3)	Form (m^2)	Reinforcement Bar (ton)	Leveling Concrete (m^3)	Staging (Spc.m^3)
Chojna	73.108	111.14	4.021	4.20	98.89
Avaroa	31.43	77.65	1.729	3.13	90.53
A_2-Abut.					
Cascada	31.43	77.65	1.729	4.01	70.87
Chojna	69.773	118.51	3.838	4.20	89.77
Avaroa	31.43	77.65	1.729	3.13	70.87

2-2 Pier

(1) Type 1



P1-Pier									
	B	b_1	b_2	L	l_1	l_2	H	h_1	h_2
Point A	9.50	5.50	2.00	10.70	2.00	4.35	21.00	15.00	6.00
Alto Choro	8.00	6.80	0.50	4.00	1.00	1.50	8.00	6.80	1.20
San Silverio	8.00	6.80	0.50	5.00	1.00	2.00	15.00	10.30	1.20
San Lorenzo	8.00	7.00	0.50	6.00	1.20	2.40	18.00	16.50	1.50
Espiritu	8.00	7.00	0.50	7.00	1.30	2.85	20.00	18.50	1.50
P2-Pier									
Point A	9.50	5.50	2.00	10.70	2.00	4.35	26.00	18.00	8.00

1) Concrete (210kg/cm²)

$V = (b_1-l_1)\times h_1\times l_1 + 1/4 \times \pi \times l_1^2 \times h_1 + B\times L \times h_2 (m^3)$

2) Form

$A = (b_1-l_1)\times h_1 + 2\times \pi \times l_1 \times h_1 + 2\cdot(B+L)\times h_2 \ (m^2)$

3) Reinforcement Bar (70kg/m³)

$W = V\times 0.070$ (ton)

4) Leveling Concrete

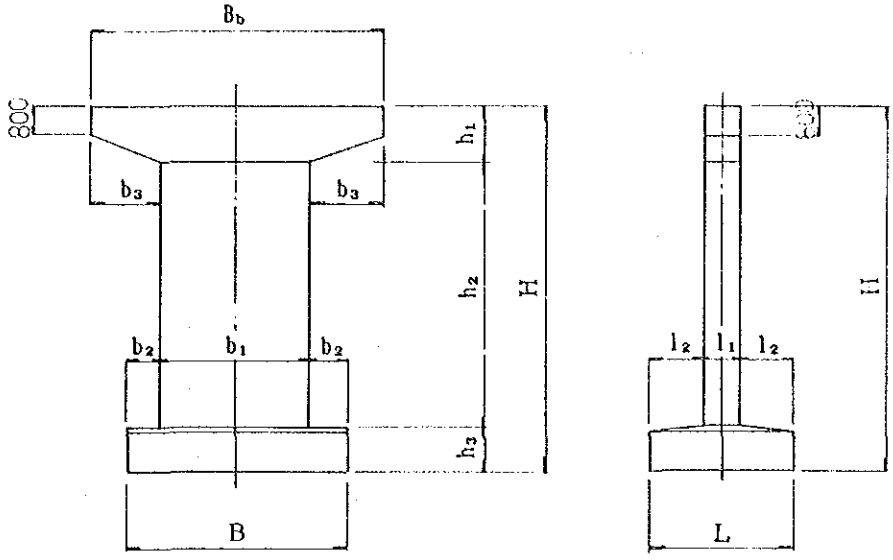
$V_e = B \times L \times 0.10 \ (m^3)$

5) Staging(Spc.m³)

6) Quantity (Pier : Type 1)

P_1 - Pier					
	Concrete (m^3)	Form (m^3)	Reinforcement Bar (ton)	Leveling Control (m^3)	Staging ($Spc\cdot m^3$)
Point A	483.50	338.90	33.85	13.50	562.5
Alto Choro	83.18	129.03	5.81	3.20	136.0
San Sliverio	115.83	183.02	8.11	4.00	206.0
San Lorenzo	205.50	295.57	14.39	4.80	336.0
Espiritu	243.24	327.72	17.03	5.60	381.10
P_2 - Pier					
Point A	633.60	403.70	44.35	15.12	724.5

(2) Type 2



	B	b_1	b_2	b_3	L	l_1	l_2	H	h_1	h_2	h_3	B_b
Patuni	6.00	5.00	0.50	2.75	5.00	1.20	1.90	14.00	1.50	10.91	1.20	10.50
Pto.Leon	6.00	4.00	1.00	2.00	5.00	1.20	1.90	10.00	1.50	7.30	1.20	8.00

1) Concrete (210kg/m³)

$V = \frac{1}{2}(0.80 + h_1) \times b_3 \times h_1 + b_1 \times (h_1 + h_2) \times b_3 + B \times L \times h_3$ (m³)

2) Form

$A_1 = 2 \times (0.80 + h_1) + b_1 \times (h_1 + h_2) \times 2 + 0.80 \times \ell_1 \times 2 + \sqrt{(h_1 - 0.8)^2 + b_3^2} \times \ell_1 \times 2$

$+ b_2 \times h_2 \times 2 + 2 \times (B + L) \times h_3$ (m²)

3) Reinforcement Bar (70kg/m³)

$W = V \times 0.070$ (ton)

4) Leveling Concrete

$V = B \times L \times 0.10$

5) Staging (Spc·m³)

See : Type-1

6) Quantity (Pire : Type 2)

		Concrete (m³)	Form (m²)	Reinforcement Bar (ton)	Leveling Concrete (m³)	Staging (Spc·m³)
Patuni		89.98	139.58	6.299	3.00	147.12
Pto:Leon	P_1	81.104	96.02	5.677	3.00	200.64
	P_2	81.104	96.02	5.677	3.00	200.64

Appendix 6-2 Prices of Principal; Materials and Equipments

LABOUR COST

US$

Item	Unit	L.C.		F.C.	Total	Remark
		Duties	Other			
Foreman	PRS	1.91	1.75		19.06	
Mechanic of Heavy Equipmemt	PRS	2.73	24.53		27.26	
Operator of Heavy Equipment	PRS	1.88	16.91		18.79	
Operator of Light Equipment	PRS	1.63	14.67		16.30	
Operator Assistant	PRS	1.63	14.67		16.30	
Operator of Crusher Plant Operator of Asphalt Plant	PRS	1.88	16.91		18.79	
Measurer	PRS	1.63	14.67		16.30	
Driver	PRS	1.44	12.94		14.38	
Technician of Explosive	PRS	1.70	15.30		17.00	
Perfortor	PRS	1.63	14.67		16.30	
Carpenter Formworker	PRS	1.64	14.75		16.39	
Reinforcement Worker	PRS	1.37	12.31		13.68	
Masonry Worker	PRS	1.37	12.31		13.68	
Plasterer	PRS	1.38	12.45		13.83	
Electrician, Welder	PRS	1.37	12.31		13.68	
Surveyor	PRS	1.32	11.90		13.22	
Skilled Worker	PRS	1.88	16.91		18.79	
Administrator	PRS	1.32	11.90		13.22	
Normal Worker	PRS	0.92	8.32		9.24	
Cook	PRS	1.22	10.94		12.16	
Cook Assistant	PRS	1.08	9.76		10.84	
Guard Man	PRS	1.25	11.27		12.52	

MATERIAL COST

US$

Item	Size & Type	Unit	L.C.		F.C.	Total	Remark
			Duties	Other			
Cement	Portland	50Kg	0.48	5.70	-	6.18	
Reinforcement	Detemed	Kg	0.21	0.04	0.65	0.90	
Reinforcement	Mild	Kg	0.21	0.04	0.62	0.87	
Timber	For Bridge	m^3	31.39	269.10	-	300.49	
Timber	For Bridge	m^2	0.38	3.02	-	3.40	
Timber	Normal	m^3	8.97	103.15	-	112.12	
Timber	Normal	m^2	0.29	2.34	-	2.65	
Steel Plate	t=2mm	m^2	20.42	0.58	61.32	81.32	
Steel Plate		Kg	0.43	0.04	1.30	1.77	
Separating Agent		ℓ	0.25	0.04	-	0.29	
Vinyl Chloride Pipe	PVC φ4"	m	0.59	4.70	-	5.29	
Nail		Kg	0.31	0.04	0.94	1.29	
Binding Wire		Kg	0.30	0.04	0.90	1.24	
Wire Mesh	1.3Kg/m^2	m^2	0.39	0.05	1.17	1.61	
Admixture		Kg	0.61	-	1.83	2.44	
Anchor Bolt	φ16 ℓ=400mm	Pcs	0.13	0.03	0.39	0.55	
Extra Anchor Bort	φ9 ℓ=200mm	Pcs	0.02	0.01	0.06	0.09	
Detonator		No	0.09	0.01	0.30	0.40	
Dynamite		Kg	0.40	0.04	1.20	1.64	
Bit+Rod		No	22.37	1.47	40.92	64.76	
Seed		Kg	0.70	6.30	-	7.00	
Soil Improving Grass		m^3	9.40	84.60		94.00	
Filler		ton	0.73	0.96	2.73	3.00	
Prestressing Bar		Kg	0.63	0.06	1.91	2.60	

MATERIAL COST

US$

Item	Size & Type	Unit	L.C.		F.C.	Total	Remark
			Duties	Other			
Gasoline		ℓ	0.03	0.28	-	0.31	
Disel	10w40	ℓ	0.03	0.23	-	0.26	
Engine Oil	SEA 30	ℓ	0.09	0.79	-	0.88	
		ℓ	0.08	0.73	-	0.81	
Hydraulic Oil	φ60cm	ℓ	0.12	1.05	-	1.17	
Conrete Pipe Culver		m	6.00	54.00	-	60.00	
Cut-back Asphalt		ton	84.94	31.13	255.06	371.13	
Seal Carpet		ton	74.94	31.13	225.06	331.13	
Guard Rail	20.1Kg/m	m	.95	0.75	14.87	20.57	
Traffic Marking	w=10cm	m	0.02	0.18	-	0.20	
Bolt, Nut		Kg	0.19	0.15	0.66	1.00	
Propan Gas		Kg	0.02	0.19		0.21	
Concrete Pipe	φ=0.6m	m	6.00	54.00		60.00	
Concrete Pipe	φ1.0m	m	11.65	104.86		116.50	

OPERATION COST

US$

Item	Size & Type	Unit	L.C.		F.C.	Total	Remark
			Duties	Other			
Bulldozer	D6		12.61	13.35	42.52	68.48	A -13
Bulldozer	D7		15.26	11.89	52.00	79.15	-15
Bulldozer (Attach Ripper)	D8		28.84	14.28	102.64	145.76	-14
Track Crane	10~11Ton		9.28	5.99	32.72	47.99	-16
Track Crane	4Ton		3.74	4.49	12.25	120.48	-17
Excavator (Back hoe)	0.6m³		9.87	7.77	34.19	51.83	-18
Macadam Roller	10~12Ton		6.15	9.83	19.14	35.12	-21
Tire Roller	20Ton		7.93	9.69	25.93	43.55	-22
Vibrator Roller	10Ton		10.74	10.79	36.13	57.66	-23
Road Sprinkler	6,000 ℓ		3.81	4.41	12.60	20.82	-24
Crusher Plant	60m³/h		35.27	10.56	129.76	175.59	-25
Asphalt Finisher	W=3.6m		13.75	5.19	50.13	69.07	-26
Asphalt Plant	60Ton/h		14.97	10.61	53.04	78.62	-27
Motor Grader	W=3.7m		8.62	8.37	29.16	46.15	-28
Tire Roller	10Ton		6.25	9.32	19.72	35.29	-29
Tractor Shovel	1.6m³		2.37	3.33	0.76	6.46	-11
Dump Track	6m³		4.83	3.57	16.81	25.21	-12
Small Track	3.5Ton		1.61	3.40	4.59	9.60	-19
Distributer	4,000 ℓ		5.21	5.09	17.64	27.94	-20

Construction Equipment			Unit	Bulldozer	Bulldozer	Bulldozer	Motor Scraper	Motor Grader	Motor Grader	Vibrator Roller
Type				D6	D8	D-7	10.7m³	3.7m	4.0m	9.7ton
Engine Power			PS	141	319	250	330	125	180	127
Weight			Ton	15.0	32.0	18.5	30.2	11.5	15.1	11
Life Time			Years	6	6	6	6	6	6	6
Working Time per Year			Hours	1100	1200	1200	1200	1100	1000	750
Working Day per Year			Days	170	180	170	170	155	150	150
Depreciation Rate per Hour			10^{-6}	352	352	325	268	324	353	471
CIF of La Paz			$	120800	291600	160000	190000	90000	122000	62600
Customs Duties			$	31770	76690	42080	49970	23670	32086	16464
Transportation (Construction Site) and Other Cost			$	767	1548	895	825	431	635	532
Purchase Price			$	153337	369838	202975	240795	114101	154721	79596
F.C. Depreciation			$/hr	42.52	102.64	52.00	50.92	29.16	43.07	33.30
L.C.	Duties	Income Tax	$/hr	11.18	26.99	13.68	13.39	7.67	11.33	8.76
		Fuel	$/hr	0.46	1.03	0.81	1.05	0.25	0.36	0.42
		Lube. Cost	$/hr	0.09	0.21	0.16	0.21	0.05	0.07	0.08
		Sub Total	$/hr	11.73	28.23	14.65	14.65	7.97	11.76	9.26
	Others	Transportation	$/hr	0.27	0.54	0.29	0.22	0.14	0.22	0.28
		Fuel	$/hr	3.65	8.27	6.48	8.40	2.01	2.89	3.32
		Lube. Cost	$/hr	0.73	1.65	1.30	1.68	0.40	0.58	0.66
		Sub Total	$/hr	4.65	10.46	8.07	10.30	2.55	3.69	4.26
Totai (per hour)			$/hr	58.90	141.33	74.72	75.87	39.68	58.52	46.82

NOTE: F.C. = Foreign Currency, L.C. = Local Currency

Construction Equipment			Unit	Vibrator Roller	Tire Roller	Macadam Roller	Tractor Shovel	Tractor Shovel	Tractor Shovel	Tractor Shovel
Type				11t	10ton	20ton	10 ~12ton	0.6m³	0.8m³	1.6m³
Engine Power			PS	118	145	165	158	46	65	100
Weight			Ton	11.0	8.5	11	10	3.9	7.0ton	9.5ton
Life Time			Yers	6	7	7	7	6	6	6
Working Time per Year			Hours	800	900	900	900	800	900	1000
Working Day per Year			Days	160	150	150	150	120	135	150
Depreciation Rate per Hour			10^{-6}	446	348	348	348	370	411	370
CIF of La Paz			$	81000	56670	74500	55000	52800	57000	41000
Customs Duties			$	21303	14904	19594	14465	13886	14991	10783
Transportation (Construction Site) and Other Cost			$	532	411	532	484	189	339	459
Purchase Price			$	102835	71985	94626	49949	66875	72330	52242
F.C. Depreciation			$/hr	36.13	19.72	25.93	19.14	19.54	23.43	15.17
L.C.	Duties	Income Tax	$/hr	9.50	5.19	6.82	5.03	5.14	6.16	3.99
		Fuel	$/hr	0.39	0.24	0.28	0.29	0.11	0.23	0.24
		Lube. Cost	$/hr	0.08	0.05	0.06	0.06	0.02	0.05	0.05
		Sub Total	$/hr	9.97	5.48	7.16	5.38	5.27	6.44	4.28
	Others	Transportation	$/hr	0.24	0.14	0.19	0.17	0.07	0.14	0.17
		Fuel	$/hr	3.09	1.95	2.22	2.35	0.88	1.86	1.92
		Lube. Cost	$/hr	0.62	0.39	0.44	0.47	0.18	0.37	0.38
		Sub Total	$/hr	3.95	2.48	2.85	2.99	1.13	2.37	2.47
Total (per hour)			$/hr	50.05	27.68	35.94	27.51	25.94	32.24	21.92

NOTE: F.C. = Foreign Currency, L.C. = Local Currency

Construction Equipment			Unit	Wheel Loader	Tractor Shovel	Excavator	Excavator	Small Truck	Truck	Large Truck
Type				1.4m³	2.1m³	0.6m³	1.0m³	3.5t	6.0m³	8.0m³
Engine Power			PS	107	125	105	175	140	160	244
Weight			Ton	12.7	12.2	18.0	30	1.9	5.2	7.1
Life Time			Years	6	6	5	5	5	5	5
Working Time per Year			Hours	1100	1200	1300	1300	1700	1500	1600
Working Day per Year			Days	165	170	185	195	220	200	215
Depreciation Rate per Hour			10^{-6}	359	325	304	308	255	367	328
CIF of La Paz			$	95800	195000	111000	206000	17660	45800	53550
Customs Duties			$	25195	51285	29193	54178	4734	12045	14084
Transportation (Construction Site) and Other Cost			$	614	908	870	1451	42	156	163
Purchase Price			$	121609	247193	104436	261629	22776	58096	67977
F.C. Depreciation			$/hr	34.39	63.38	34.19	63.45	4.59	16.81	17.56
L.C.	Duties	Income Tax	$/hr	9.05	16.67	8.99	16.69	1.21	4.42	4.62
		Fuel	$/hr	0.38	0.30	0.35	0.58	0.15	0.16	0.16
		Lube. Cost	$/hr	0.08	0.06	0.07	0.12	0.03	0.03	0.03
		Sub Total	$/hr	9.51	17.03	9.41	17.39	1.39	4.61	4.81
	Others	Transportation	$/hr	0.22	0.30	0.26	0.45	0.01	0.06	0.05
		Fuel	$/hr	3.06	2.40	2.80	4.66	1.21	1.31	1.31
		Lube. Cost	$/hr	0.61	0.48	0.56	0.93	0.24	0.26	0.26
		Sub Total	$/hr	3.89	3.18	3.62	6.04	1.46	1.63	1.62
Total (per hour)			$/hr	47.79	83.59	47.22	86.88	7.44	23.05	23.99

Construction Equipmet			Unit	Road Sprinkler	Dump Truck	Truck Crane	Truck Crane	Truck Crane	Truck Crane	Truck Crane
Type				6000 l	11t(8.0m³)	Cap.carga 4t grua 2.9t	10 - 11t	15 - 16t	25t	35t
Engine Power			PS	160	281	140	225	236	255	302
Weight			Ton	11.0	9.2	6.1	13.5	18	29.0	39.0
Life Time			Years	5	5	5	6	6	5	6
Working Time per Year			Hours	1100	1700	1300	1100	1100	1100	1100
Working Day per Year			Days	180	225	175	160	160	160	160
Depreciation Rate per Hour			$\times 10^{-6}$	336	509	308	271	271	271	271
CIF of La Paz			$	37500	62000	39000	115000	145000	212000	244400
Customs Duties			$	9863	16306	10257	30245	38135	55756	64277
Transportation (Construction Site) and Other Cost			$	121	156	114	453	540	818	965
Purchase Price			$	47484	78462	49257	145698	183135	268574	309642
F.C. Depreciation			$/hr	12.60	19.56	12.01	31.16	39.30	57.45	66.23
L.C.	Duties	Income Tax	$/hr	3.31	5.04	3.16	8.20	10.33	15.11	17.42
		Fuel	$/hr	0.17	0.16	0.15	0.20	0.21	0.23	0.37
		Lube. Cost	$/hr	0.03	0.03	0.03	0.04	0.04	0.05	0.07
		Sub Total	$/hr	3.51	5.23	3.34	8.44	10.58	15.39	17.86
	Others	Transportation	$/hr	0.04	0.05	0.04	0.12	0.15	0.22	0.26
		Fuel	$/hr	1.38	1.31	1.21	1.62	1.70	1.84	3.67
		Lube. Costs	$/hr	0.28	0.26	0.24	0.32	0.34	0.37	0.73
		Sub Total	$/hr	1.70	1.62	1.49	2.06	2.19	2.43	4.66
Total (per hour)			$/hr	17.81	26.41	16.84	41.66	52.07	75.27	88.75

NOTE: F.C. = Foreign Currency, L.C. = Local Currency, (**) = Gasoline, (*) = Per day

Construction Equipmet			Unit	Selection Plant	Concrete Pump	Concrete Pump	Concrete Cutter	Concrete Mixer Car	Asphalt Plant
Type				50t/hr	18m³/hr	45m³/h	tcc- 3	3.5m³	60 t/h
Engine Power			PS	60	25	145	8	195	227
Weight			Ton	3.0	3.0	7.3	0.13	7.5	79
LifeT Time			Years	6	4	4	3	5	6
Working Time per Year			Hours	2000	900	1300	—	1000	900
Working Day per Year			Days		110	190	100	165	170
Depreciation Rate per Hour			$\times 10^{-6}$	255	531	419	1333	360	365
CIF of La Paz			$	60000	28500	96580	2570	55440	145325
Customs Duties			$	15780	7496	25400	676	14581	38220
Transportation Construction Site) and Other Cost			$	145	145	353	6	161	3820
Purchase Price			$	75925	36141	122333	3252	70384	187365
F.C. Depreciation			$/hr	15.30	15.13	40.47	3.43	19.96	53.04
L.C.	Duties	Income Tax	$/hr	4.02	3.98	10.64	0.90	5.25	13.95
		Fuel	$/hr	0.14	0.05	0.30	0.23 (**)	0.23	—
		Lube. Cost	$/hr	0.03	0.01	0.06	0.05	0.05	—
		Sub Total	$/hr	4.19	4.04	11.00	1.18	5.35	13.95
	Others	Transportation	$/hr	0.04	0.08	0.15	0.01	0.06	1.39
		Fuel	$/hr	1.15	0.43	2.47	1.86 (**)	1.83	—
		Lube. Cost	$/hr	0.23	0.09	0.49	0.37	0.37	—
		Sub Total	$/hr	1.42	0.60	3.11	2.24	2.26	1.39
Total (per hour)			$/hr	20.91	19.77	54.58	6.85	27.57	68.38

NOTE: F.C. = Foreign Currency, L.C. = Local Currency, (*)= Per day

Construction Equipmet			Unit	Crusher Plant	Asphalt Finisher	Engine Sprayer	Pile Driver	Concrete Mixer	Compaction Roller(*)	Drill Jambo
Type				60m³/hr	3.6	200 l	3.5t	600Lts	60 - 100kg	7t
Engine Power			PS	172	34	3.5	106	30	4	49
Weight			Ton	46.5	8.0	0.17	49	2.6	0.078	7.0
Life Time			Years	6	7	3	5	4	3	6
Working Time per Year			Hours	4500	600	600	1200			550
Working Day per Year			Days	500	100	150	170	120	140	140
Depreciation Rate per Hour			10^{-6}	2333	474	525	354	3750	4167	258
CIF of La Paz			$	556200	105760	1840	807000	11000	2200	120800
Customs Duties			$	146281	27815	484	212241	2893	579	31770
Transportation (Construction Site) and Oather Cost			$	2249	387	8	2370	126	4	767
Purchase Parice			$	704730	133962	2332	1021611	14019	2783	153337
F.C. Depreciation			$/hr	129.76	50.13	0.97	285.68	41.25	9.17	42.52
L.C.	Duties	Income Tax	$/hr	34.08	13.18	0.25	75.13	10.85	2.41	11.18
		Fuel	$/hr	0.54	0.08	0.009	0.14	0.22	0.14 **	0.46
		Lube. Cost	$/hr	0.11	0.02	0.002	0.03	0.04	0.03	0.09
		Sub Total	$/hr	34.73	13.28	0.26	75.30	11.11	2.58	11.73
	Others	Transportation	$/hr	0.52	0.18	0.01	0.84	0.47	0.02	0.27
		Fuel	$/hr	4.29	0.68	0.07	1.09	1.80	1.11 **	3.65
		Lube. Cost	$/hr	0.86	0.14	0.01	0.22	0.36	0.22	0.73
		Sub Total	$/hr	5.67	1.00	0.09	2.15	2.63	1.35	4.65
Total (per hour)			$/hr	170.16	64.41	1.32	363.13	54.99	13.10	58.90

NOTE: F.C. = Foreign Currency, L.C. = Local Currency

Construction Equipment			Unit	Tamper	Stressing(*) Equipment	(*) Compressor	(*) Compressor	Electri (*) Ventilator	(*) Generator	(*) Generator
Type				60 - 100kg	Freyssinett	20m³/min	10m³/min	40m³/min	75kw	110KW
Engine Power			PS	4	—	252	140	60	100	120
Weight			Ton	0.078	0.15	5.5	2.7	0.46	2.3	2.6
Life Time			Year	3	8	6	6	6	6	6
Working Time per Year			Hours		—	-	-	-	—	-
Working Day per Year			Days	140	—	140	140	200	140	140
Depreciation Rate per Hour			$\times 10^{-6}$	4167	2500	2500	2500	1500	1893	1905
CIF of La Paz			$	2200	31000	64500	50500	4400	15000	25000
Customs Duties			$	579	8153	16964	13282	1157	3945	6575
Transportation (Construction Site) and Other Cost			$	4	7	266	131	22	111	126
Purchase Price			$	2783	39160	81730	63913	5579	19056	31701
F.C. Depreciation			$/hr	9.17	77.50	161.25	126.25	6.60	28.39	47.63
L.C.	Duties	Income Tax	$/hr	2.41	20.38	42.41	33.21	1.74	7.47	12.53
		Fuel	$/hr	0.14 **	—	0.91	0.50	0.18	0.35	0.42
		Lube. Cost	$/hr	0.03	—	0.18	0.10	0.04	0.07	0.08
		Sub Total	$/hr	2.58	20.38	43.5	33.81	1.96	7.89	13.03
	Others	Transportation	$/hr	0.02	0.02	0.67	0.33	0.03	0.21	0.24
		Fuel	$/hr	1.11 **	—	7.26	4.03	1.47	2.81	3.37
		Lube. Cost	$/hr	0.22	—	1.45	0.81	0.29	0.56	0.67
		Sub Total	$/hr	1.35	0.02	9.38	5.17	1.79	3.58	4.28
Total (per hour)			$/hr	13.10	97.90	214.13	165.23	10.35	39.86	64.94

Construction Equipment			Unit	Generator	Earth (*) Drill	Small (*) Breaker	Drop (*) Hammer	Drill	Water (*) Pump	Welder (*)
Type				256KW	-	40Kg	600 ~800Kg	-	φ8	-
Engine Power			PS	350	5.5KW	-	-	-	35	-
Weight			Ton	4.8	0.54	0.039	0.78	0.008	0.92	0.23
Life Time			Years	7	6	2	2	2	5	7
Working Time per Year			Hours	-	-	-	-	-		-
Working Day per Year			Days	140	140	150	150	150	135	200
Depreciation Rate per Hour			10^{-6}	1905	2464	4500	4500	4500	3630	1378
CIF of La Paz			$	39587	83000	3900	3520	1370	9142	5860
Customs Duties			$	10411	21829	1026	926	360	2404	1541
Transportation (Construction Site) and Other Cost			$	232	26	2	38	1	44	11
Purchase Price			$	50230	104855	4928	4484	1731	11590	7412
F.C. Depreciation			$/hr	75.41	204.51	17.55	15.84	6.17	33.19	8.08
F.C.	Duties	Income Tax	$/hr	19.83	53.79	2.53	4.17	1.62	8.73	2.12
		Fuel	$/hr	1.23	-	-	-	-	1.41	-
		Lube. Cost	$/hr	0.25	-	-	-	-	0.28	-
		Sub Total	$/hr	21.31	53.79	2.53	4.17	1.62	10.42	2.12
	Others	Transportation	$/hr	0.44	0.06	0.06	0.17	0.01	0.16	0.02
		Fuel	$/hr	9.83	-	-	-	-	11.29	-
		Lube. Cost	$/hr	1.97	-	-	-	-	2.26	-
		Sub Total	$/hr	12.24	0.06	0.06	0.17	0.01	13.71	0.02
Total (per hour)			$/hr	108.96	258.36	20.14	20.18	7.80	57.32	10.22

Construction Equipment			Unit	Water (*) Pump	Vibrator (*)	Weighing Machine	Oil (*) Jacky	Hydraulic (*) Pump	Winch (*)	Belt (*) Conveyer	Leg (*) Hammer
Type				ϕ = 4"	1.2"	Cap. 1000kg	Freyssinett	Freyssinett	1 t	7 m	600 - 800Kg
Engine Power			PS	3.7	4.5		—	-	7.5km	3.0	-
Weight			Ton	0.10	0.045		0.10	0.15	0.50	0.23	0.78
Life Time			Years	3	4	0.20	8	8	7	3	2
Working Time per Year			Hours	—	—		—	-	—	—	—
Working Day per Year			Days	180	130		—	-	140	130	150
Depreciation Rate per Hour			$\times 10^{-6}$	1850	3462	2153	1929	2500	2990	4487	4500
CIF of La Paz			$	1600	1320	3260	31000	31000	28900	2300	31000
Customs Duties			$	421	347	857	8153	8153	7601	605	8153
Transportation (Construction Site) and Other Cost			$	5	2	8	5	7	24	11	38
Purchase Price			$	2026	1669	4125	39158	39160	36525	2916	39191
F.C. Depreciation			$/hr	2.96	4.57	7.02	59.80	77.50	86.41	10.32	139.5
L.C.	Duties	Income Tax	$/hr	0.78	1.20	1.85	15.73	20.38	22.73	2.71	36.69
		Fuel	$/hr	0.15	0.26	—	—	-	—	0.02	-
		Lube. Cost	$/hr	0.03	0.05	—	—	-	—	0.00	-
		Sub Total	$/hr	0.96	1.51	1.85	15.73	20.38	22.73	2.74	36.69
	Others	Transportation	$/hr	0.01	0.01	0.02	0.01	0.02	0.07	0.05	0.17
		Fuel	$/hr	1.19	2.11	—	—	-	—	0.14	-
		Lube. Cost	$/hr	0.23	0.42	—	—	-	—	0.03	-
		Sub Total	$/hr	1.43	2.54	0.02	0.01	0.02	0.07	0.22	0.17
Total (per Hour)			$/hr	5.35	8.62	8.89	75.54	97.90	109.21	13.28	176.36

Appendix 6-3 Unit Cost for Construction

UNIT COST FOR CONSTRUCTION

US$

Item	Cost		Unit	L.C.		F.C.	Total	Remarks
				Duties	Others			
Earth Work	Clearing and Grubbing		ha	2,789	2,599	9,460	14,845	A-31
	Excavation A		m^3	1.40	1.30	2.07	4.50	38
	Excavation B		m^3	1.42	1.38	4.72	7.52	39
	Finished Rolling of Subgrade		m^2	0.01	0.02	0.04	0.07	37
	Slope	Seed Spraying	m^2	0.13	1.13		1.23	73
		Concrete Spraying	m^2	3.29	11.97	7.59	22.85	65
		Cribworks	m^2	6.95	4.58	15.71	47.24	111
		Concrete Pitching	m^2	5.15	13.68	13.12	31.95	112
	Retaining Wall	Gravity(4m)	m	35.12	224.54	50.02	309.77	69
		Stone Masonry	m^2	4.12	27.66	4.69	36.47	63
		Grid Type	m^2	17.07	67.07	30.87	115.01	61
	Culvert	Box 3.0X3.0	m	202	488	523	1,213	71
		Box 4.0X4.0	m	282	696	730	1,708	72
		Pipe Φ1.0m	m	17.58	131.21	12.43	161.22	70
	Disaster	Catch Netting	m^2	2.00	1.59	5.95	9.54	113
		Gabion	m	11.56	25.22	29.94	66.72	114
		Catch Fence	m	20.48	39.02	53.30	112.80	115
		Gabion Dam	m^3	12.78	28.54	35.45	76.77	116
		Shed	m	1,565.36	2,904.05	4,444.72	8,914.13	117
		French Drain	m	3.54	7.63	10.44	21.61	118
	Drainage		Km	4,530	29,637	5,826	39,993	74
Pavement	Subbase Course		m^2	0.36	0.30	1.28	1.94	87
	Base Course		m^2	0.74	1.17	2.40	4.31	88
	Binder Course		m^2	1.06	0.93	3.67	5.68	82
	Surface Course		m^2	1.28	0.88	4.04	6.20	83
Bridge	$\ell \geq 50^m$		Set					
	$\ell < 50^m$		Set					
Tunnel	Lining		m	1,022	3,180	2,713	6,915	92
	Unsupported		m	751	2,076	2,038	4,865	91
	Portal		Pcs	2,827	9,317	7,176	19,320	93
Others	Traffic Sign and Guard Rail		Km	5,910	1,740	14,050	21,700	104
	Marking		Km	47.50	427.50	-	475	105
Pavement	Macadam Asphalt		m^2	0.70	0.97	1.97	3.64	89

CONSTRUCTION COST

US$

Item	Size & Type	Unit	L.C.		F.C.	Total	Remark
			Duties	Other			
Concrete Class.B	210Kg/cm²	m³	13.49	49.85	34.71	98.05	A -41
Concrete Class.C	160Kg/cm²	m³	5.51	37.33	8.10	50.94	-42
Concrete Class.D	-	m³	5.27	34.35	8.14	47.76	-43
Concrete Mixing		m³	0.84	5.71	0.78	7.33	-48
Concrete Placing (A)	by Man Power	m³	0.43	3.91	-	4.34	-49
Concrete Placing (B)	by Piping	m³	0.75	3.15	1.51	5.41	-49
Concrete Placing (C)	by Crane	m³	1.48	1.65	4.58	7.71	-49
Form Work		m²	0.67	6.23	0.04	6.94	-51
Reinforcement Work		Ton	228.62	105.46	689.13	1,023.21	-52
Scaffolding Work		m³	0.61	4.50	0.45	5.56	-54
Loading Cost		m³	0.24	0.33	0.76	1.33	-11
Transportation Cost		m³	0.09	0.07	0.33	0.49	-12
Transportation Cost		Ton	0.04	0.03	0.13	0.20	-12
Sand	From Swapi	m³	8.04	6.75	29.07	43.86	-45
Sand	From Site	m³	1.20	1.43	3.99	6.62	-45
Gravel	From Alt. Ben:	m³	7.28	6.53	26.02	39.83	-45
Gravel	From Site	m³	1.79	2.26	5.89	9.94	-45
Drainage	Type 1	m	1.36	8.41	1.95	11.72	-75
Drainage	Type 2	m	1.82	12.82	19.19	16.55	-76
Excavation for Tunnel		m³	5.36	12.41	15.63	33.40	-94
Mortar Spray for Tunnel	t=15cm	m²	3.36	15.92	7.93	27.48	-97
Anchor Works for Tunnel		Pcs	14.06	54.88	43.04	111.98	-98
Lining Concrete for Tunnel	t=45cm	m	240.30	929.69	550.49	1,720.48	-101

Unit Cost for Bridge Constructiion							
Name of Work	Size and Type	Unit	L.C.		F.C.	Total	Remarks
			Duties	Others			
Excavation	For Structure	m^3	1.65	6.98	3.31	11.94	B-32
Concrete	Type -P	m^3	16.22	67.28	38.51	122.01	B-29
Concrete	Type -A	m^3	15.08	58.71	37.00	110.79	B-30
Concrete	Type -D	m^3	5.27	34.35	8.14	47.76	A-43
Concrete Mixing		m^3	0.84	5.71	0.78	7.33	A-48
Concrete Placing		m^3	0.75	3.15	1.51	5.41	A-49
Form (hard)		m^2	0.98	7.87	0.24	9.09	B-12
Form (simple)		m^2	0.67	6.23	0.04	6.94	A-51
Reinforcement Bar		Ton	233.81	127.98	694.18	1055.97	B-26
PC-Assembiling		Kg	1.41	0.42	4.61	6.44	B-3
Slab		m^3	69.02	145.12	176.22	390.36	B-4
Cross Beam		m^3	48.71	122.24	120.49	291.44	B-5
Shoe	neopren	Pce	42.66	15.36	126.77	184.79	B-6
Shoe (Box)	neopren	Pce	79.91	15.72	240.26	335.89	B-6
Expansion Joint		m	9.12	3.60	25.00	37.72	B-8
Drenage		Pce	0.58	5.02	-	5.60	B-9
Handrail		m	16.66	35.43	42.38	94.47	B-10
Newel Post		Br.	107.17	63.08	788.83	959.08	B-11
I-Girder		m^3	142.55	177.84	416.83	737.22	B-1
Main Girder (Box)		m^3	109.73	137.75	319.08	566.56	B-2
Staging		Sec•m^3	0.61	4.50	0.45	5.56	B-31
Erection	Girder	ton	4.40	1.26	18.04	23.70	
Erection		m^3	19.7	2.09	55.3	77.09	C-

Appendix 6-4 Breakdown of Bridge construction Costs

1. Unit : $

Name of Bridges		L. C.		F. C.	Total
		Duties	Others		
Point A Br.	Spr.S (B)	174074	195257	516789	886120
	Sub.S (A)	4125	12273	10146	26544
(ℓ =132.5m)	(P)	37114	89325	97655	224094
	Subtotal	215313	296855	624590	1136758
Putini Br.	Spr.S (B)	21502	34974	62124	118600
	Sub.S (A)	4612	18446	14121	37179
(ℓ = 40.0m)	(P)	3368	9156	8478	21002
	Subtotal	29482	62576	84723	176781
Challa Br.	Spr.S (I)	10839	17006	31660	59505
	Sub.S (A)	5287	15470	13714	34471
(ℓ = 20.0m)	Subtotal	16126	32476	45374	93976
Cascada Br.	Spr.S (I)	8877	14953	25813	49643
	Sub.S (A)	3973	12531	9459	25963
(ℓ = 18.0m)	Subtotal	12850	27484	35272	75606
Alto Choro	Spr.S (B)	41236	53891	128976	224103
Br.	Sub.S (A)	5930	17769	14547	38246
(ℓ = 50.0m)	(P)	2989	7949	7587	18525
	Subtotal	50155	79609	151110	280874
Pto Leon Br.	Spr.S (B)	40733	65842	117659	224234
	Sub.S (A)	8169	24891	19871	52931
(ℓ = 75.0m)	(P)	6030	16404	15170	37604
	Subtotal	54932	107137	152700	314769
Cajones Br.	Spr.S (I)	13612	21701	39678	74991
	Sub.S (A)	4725	14555	12383	31663
(ℓ = 25.0m)	Subtotal	18337	36256	52061	106654
Chojna Br.	Spr.S (I)	9528	15165	27768	52461
	Sub.S (A)	4492	12598	11341	28431
(ℓ = 22.0m)	Subtotal	14020	27763	39109	80892
San Silverio	Spr.S (B)	41236	53891	128976	224103
Br.	Sub.S (A)	9740	28516	24135	62391
(ℓ = 50.0m)	(P)	4258	11507	10742	26507
	Subtotal	55234	93914	163853	313001
San Lorenzo	Spr.S (B)	43347	56709	135550	235606
Br.	Sub.S (A)	7669	23526	18614	49809
(ℓ = 52.0m)	(P)	7602	18473	19305	45380
	Subtotal	58618	98708	173469	330795

2.

Unit : $

Name of Bridges		L. C.		F. C.	Total
		Duties	Others		
Espiritu Br.	Spr.S (B)	43347	56709	135550	235606
	Sub.S (A)	6245	19416	15069	40730
(ℓ = 52.0m)	(P)	8639	22555	22069	53263
	Subtotal	58231	98680	172688	329599
Carrasco Br.	Spr.S (I)	21917	34423	64125	120465
	Sub.S (A)	14358	43862	34718	92938
(ℓ = 30.0m)	Subtotal	36275	78285	98843	213403
Avaroa Br.	Spr.S (I)	20878	27006	65476	113360
	Sub.S (A)	2354	7572	5583	15509
(ℓ = 25.0m)	Subtotal	23232	34578	71059	128869

note Spr.S : Superstructure
Sub.S : Substructure
I : PCI-compsite Girder
B : Box Girder
A : Abutment
P : Pier

I. Superstructure

Point A

Name of Work	Size and Type	Unit	Volume	Unit Cost			Costos			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Concrete	Type P	m^3	1207.40	16.22	67.28	38.51	19584.03	81233.87	46496.97	
Rainforcement	Grade 60	Ton	205.26	233.81	127.98	694.18	47991.84	26269.17	142487.39	
PC-Cable	270G	Kg	48296	1.41	0.42	4.61	68097.36	20284.32	222644.56	
Form		m^2	4193.06	0.98	7.87	0.24	4109.20	32999.38	1006.33	
Shoe		Set	4	15.72	240.26	719.19	62.88	961.04	2876.76	
Handrail		m	265.0	16.66	35.43	42.38	4414.9	9388.95	11230.70	
Expansion		m	22.0	9.12	3.60	25.00	200.64	79.2	550	
Drainage		set	28	0.58	5.02	-	16.24	140.56	-	
Newel Post		set	1.0	107.17	63.08	788.83	106.17	63.08	788.83	
Erection(Center)		m^3	531.43	19.7	2.09	55.3	10469.17	1110.69	29388.08	
Erection(Side)		m^3	675.97	4.40	1.26	18.04	2974.27	4231.57	12194.50	
Caring		m^2	1305.7	0.17	0.57	0.11	221.97	744.25	143.63	
Miscellaneous	10%	set	1.0				15824.87	17750.61	46980.98	
Total							174073.5	195256.7	516788.5	

Patuni Bridge (ℓ=40.0m)

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
I-Girder	Type-P	m^3	70.8	142.55	177.84	416.83	10092.54	12591.07	29511.56	
Cross Beam	Type-A	m^3	22.324	48.71	122.24	120.49	1087.40	2728.89	2689.82	
Slab	Type-A	m^3	88.974	70.61	153.98	178.50	6282.45	13700.22	15881.86	
Erection		Ton	177	10.99	15.66	45.11	1945.23	2771.82	7984.47	
Shoe		Set	10	42.66	15.36	126.77	426.6	153.6	1267.7	
Handrail		m	79.76	16.66	35.43	42.38	1328.80	2825.90	3380.23	
Expansion Joint		m	24.8	9.12	3.60	25.00	226.18	89.28	620.0	
Drainage		Set	10	0.58	5.02	-	5.8	50.2	-	
Newel Post		Set	1.0	107.17	63.08	788.83	107.17	63.08	788.83	
Total							21502.0	34974.0	62124.0	

Challa Bridge (ℓ=20.0m)

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
I- Girder	Type-P	m^3	35.4	142.55	177.84	416.83	5046.27	6295.54	14755.78	
Cross Beam	Type-A	m^3	11.162	48.71	122.24	120.49	543.70	1364.44	1344.91	
Slab	Type-A	m^3	40.339	70.61	153.98	178.50	2848.34	6211.40	7200.51	
Shoe		Set	10	42.66	15.36	126.77	426.6	153.6	1267.7	
Handrail		m	39.88	16.66	35.43	42.38	664.40	1412.95	1690.11	
Expansion Joint		m	24.8	9.12	3.60	25.00	226.18	89.28	620.0	
Drainage		Set	6	0.58	5.02	-	3.48	30.12	-	
Newel Post		Set	1	107.17	63.08	788.83	107.17	63.08	788.83	
Erection		Ton	88.5	10.99	15.66	45.11	972.62	1385.91	3992.24	
Total							10839.0	17006.0	31660.0	

Cascada Bridge (ℓ=18.5m)

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
I-Girder	Type-P	m^3	26.912	142.55	177.84	416.83	3836.30	4786.03	11217.73	
Cross Beam	Type-A	m^3	9.761	48.71	122.24	120.49	475.46	1193.18	1176.10	
Slab	Type-A	m^3	36.234	70.61	153.98	178.50	2558.48	5579.31	6467.77	
Shoe		Set	8	42.66	15.36	126.77	341.28	122.88	1014.16	
Handrail		m	36.88	16.66	35.43	42.38	614.42	1306.66	1562.97	
Expansion Joint		m	22.0	9.12	3.60	25.00	200.64	79.20	550.0	
Drainage		Set	6	0.58	5.02	-	3.48	30.12	-	
Neswel		Set	1.0	107.17	63.08	788.83	107.17	63.08	788.83	
Erection		Ton	67.28	10.99	15.66	45.11	739.41	1793.01	3035.0	
Total							8877.0	14953.0	25813.0	

Alto Choro Bridge (ℓ=50m)

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Main Girder	Type-P	m^3	280.218	109.73	137.75	319.08	30748.32	38600.03	89411.96	
Pavement		m^2	9.13	15.38	61.57	37.73	140.42	562.13	344.47	
Shoe		set	9	79.91	15.72	240.26	719.19	141.48	2162.34	
Handrail		m	96.076	16.66	35.43	42.38	1600.63	3403.97	4071.70	
Exponsion Joint		m	23.0	9.12	3.60	25.00	209.76	82.8	575.0	
Drainage		set	12	0.58	5.02	-	6.96	60.24	-	
Newel Post		set	1.0	107.17	63.08	788.83	107.17	63.08	788.83	
Erection		Ton	701	10.99	15.06	45.11	7703.99	10977.66	31622.11	
Total							41236.0	53891.0	128976.0	

Pto Leon Bridge (ℓ=75.0m)

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
I-Girder	Type-P	m^3	138.0	142.55	177.84	416.83	19671.90	24541.92	57522.54	
Cross Beam	Type-A	m^3	40.569	48.71	122.24	120.49	1976.12	4959.15	4888.16	
Slab	Type-A	m^3	162.732	70.61	153.98	178.50	11490.51	25057.47	29047.66	
Shoe		Set	24	42.66	15.36	126.77	1023.84	368.64	3042.48	
Handrail		m	149.64	16.66	35.43	42.38	2993.00	5301.75	6341.74	
Expansion Joint		m	18.60	9.12	3.60	25.00	169.63	66.96	465.0	
Drainage		Set	16	0.58	5.02	-	9.28	80.32	-	
Neswel		Set	1.0	107.17	63.08	788.83	107.17	63.08	788.83	
Erection		Ton	345	10.99	15.66	45.11	3791.55	5402.70	15562.95	
Total							40733.0	65842.0	117659.0	

Cajones Bridge (ℓ=25.0m)

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
I-Girder	Type-P	m^3	46.0	142.55	177.84	416.83	6557.30	8180.64	19174.18	
Cross Beam	Type-A	m^3	16.30	48.71	122.24	120.49	793.973	1992.51	1963.99	
Slab	Type-A	m^3	49.775	70.61	153.98	178.50	3514.61	7664.35	8884.84	
Shoe		Set	8	42.66	15.36	126.77	341.28	122.88	1014.16	
Handrail		m	49.88	16.66	35.43	42.38	831.00	1767.25	2113.91	
Expansion Joint		m	22.0	9.12	3.60	25.00	200.64	79.2	550.0	
Drainage		Set	6	0.58	5.02	-	3.48	30.12	-	
Neswel		Set	1.0	106.17	63.08	788.83	106.17	63.08	788.83	
Erection		Ton	115	10.99	15.66	45.11	1263.85	1800.9	5187.65	
Total							13612.0	21701.0	39678.0	

Chojña Bridge (ℓ=22.0m)

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
I-Girder	Type-P	m^3	30.028	142.55	177.84	416.83	4280.49	5340.18	12516.57	
Cross Beam	Type-A	m^3	10.785	48.71	122.24	120.49	525.34	1318.36	1299.48	
Slab	Type-A	m^3	35.593	70.61	153.98	178.50	2513.22	5480.61	6353.35	
Shoe		Set	8	42.06	15.36	126.77	341.28	122.88	1014.16	
Handrail		m	43.88	16.66	35.43	42.38	731.04	1554.67	1859.63	
Expansion Joint		m	22.0	9.12	3.60	25.00	200.64	79.20	550.0	
Drainage		Set	6	0.58	5.02	-	3.48	30.12	-	
Neswel		Set	1.0	107.17	63.08	788.83	107.17	63.08	788.83	
Erection		Ton	75.07	10.99	15.66	45.11	825.02	1175.60	3386.41	
Total							9528.0	15165.0	27768.0	

San Silverio Bridge (ℓ=50m)

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Main Girder	Type-P	m^3	280.218	109.73	137.75	319.08	30748.32	38600.03	89411.96	
Pavement		m^2	9.13	15.38	61.57	37.73	140.42	562.13	344.47	
Shoe		set	9	79.91	15.72	240.26	719.19	141.48	2162.34	
Handrail		m	96.076	16.66	35.43	42.38	1600.63	3403.97	4071.70	
Exponsion Joint		m	23.0	9.12	3.60	25.00	209.76	82.8	575.0	
Drainage		set	12	0.58	5.02	-	6.96	60.24	-	
Newel Post		set	1.0	107.17	63.08	788.83	107.17	63.08	788.83	
Erection		Ton	701	10.99	15.06	45.11	7703.99	10977.66	31622.11	
Total							41236.0	53891.0	128976.0	

San Lorenzo Bridge (ℓ=50m)

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Main Girder	Type-P	m^3	294.94	109.73	137.75	319.08	32363.77	40627.99	94109.46	
Pavement		m^2	9.65	15.38	61.57	37.73	148.42	594.15	364.09	
Shoe		set	9.00	79.91	15.72	240.26	719.19	141.48	2162.34	
Handrail		m	101.556	16.66	35.43	42.38	1691.92	3598.13	4303.94	
Exponsion Joint		m	23.0	9.12	3.60	25.0	209.76	82.8	575	
Drainage		set	12	0.58	5.02	-	6.96	60.24	-	
Newel Post		set	1.0	107.17	63.08	788.83	107.17	63.08	788.83	
Erection		Ton	737	10.99	15.66	45.11	8099.63	11541.42	33246.07	
Total							43347.0	56709.0	135550.0	

Espiritu Bridge (ℓ=50m)

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Main Girder	Type-P	m^3	294.94	109.73	137.75	319.08	32363.77	40627.99	94109.46	
Pavement		m^2	9.65	15.38	61.57	37.73	148.42	594.15	364.09	
Shoe		set	9.00	79.91	15.72	240.26	719.19	141.48	2162.34	
Handrail		m	101.556	16.66	35.43	42.38	1691.92	3598.13	4303.94	
Exponsion Joint		m	23.0	9.12	3.60	25.0	209.76	82.8	575	
Drainage		set	12	0.58	5.02	-	6.96	60.24	-	
Newel Post		set	1.0	107.17	63.08	788.83	107.17	63.08	788.83	
Erection		Ton	737	10.99	15.66	45.11	8099.63	11541.42	33246.07	
Total							43347.0	56709.0	135550.0	

Carrasco Bridge (ℓ=30.0m)

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
T-Girder	Type-P	m^3	80.385	142.55	177.84	416.83	11458.88	14295.67	33506.88	
Cross Beam	Type-A	m^3	25.585	48.71	122.24	120.49	1246.25	3127.51	3082.74	
Slab	Type-A	m^3	73.952	70.61	153.98	178.50	5221.75	11387.13	13200.43	
Shoe		Set	10	42.06	15.36	126.77	426.6	153.6	1267.7	
Handrail		m	59.88	16.66	35.43	42.38	997.60	2121.55	2537.71	
Expansion Joint		m	27.0	9.12	3.60	25.00	246.24	97.2	675.0	
Drainage		Set	6	0.58	5.02	-	3.48	30.12	-	
Newel Post		Set	1.0	107.17	63.08	788.83	107.17	63.08	788.83	
Erection		Ton	200.96	10.99	15.66	45.11	2208.55	3147.03	9065.31	
Total							21917.0	34423.0	64125.0	

Avaroa Bridge (ℓ=25m)

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Main Girder	Type-P	m^3	140.109	109.73	137.75	319.08	15374.16	19300.01	44705.98	
Pavement		m^2	4.50	15.38	61.57	37.73	69.21	277.07	169.79	
Shoe		set	6	79.91	15.72	240.06	479.46	94.32	1441.56	
Handrail		m	47.338	16.66	35.43	42.38	788.65	1677.19	2006.18	
Exponsion Joint		m	23.0	9.12	3.60	25.00	209.76	82.8	575.0	
Drainage		set	6	0.58	5.02	-	3.48	30.12	-	
Newel Post		set	1	107.17	63.08	788.83	107.17	63.08	788.83	
Erection		Ton	350	10.99	15.66	45.11	3846.5	5481.0	15788.50	
Total							20878.0	27006.0	65476.0	

II. Substructure

Point A Abutment

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	247.4	1.65	6.98	3.31	408.21	1726.85	818.89	
Concrete	Type-A	m^3	122.10	13.49	49.85	34.71	1647.13	6086.69	4238.09	
Leveling Concrete	Type-D	m^3	6.60	5.27	34.35	8.14	34.78	226.71	53.72	
Concrete Mixing		m^3	122.10	0.84	5.71	0.78	102.56	697.19	95.24	
Concrete Placing		m^3	122.10	0.75	3.15	1.51	91.58	384.62	184.37	
Reinforcement Bar		Ton	6.72	233.81	127.98	694.18	1571.20	860.03	4664.89	
Form		m^2	236.86	0.67	6.23	0.04	158.70	1475.64	9.47	
Staging		Spc·m^3	181.06	0.61	4.50	0.45	110.45	814.77	81.48	
Total							4125.0	12273.0	10146.0	

Point A Pier

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	334.00	1.65	6.98	3.31	551.10	2331.32	1105.54	
Concrete	Type-A	m^3	1117.10	13.49	49.85	34.71	15069.68	55687.44	38774.54	
Leveling Concrete	Type-D	m^3	28.62	5.27	34.35	8.14	150.83	983.10	232.97	
Concrete Mixing		m^3	1117.10	0.84	5.71	0.78	938.36	6378.64	871.34	
Concrete Placing		m^3	1117.10	0.75	3.15	1.51	837.83	3518.87	1686.82	
Reinforcement Bar		Ton	78.20	233.81	127.98	694.18	18283.34	10008.04	54284.88	
Form		m^2	742.60	0.67	6.23	0.04	497.54	4626.40	29.70	
Staging		Spc·m^3	1287.00	0.61	4.50	0.45	785.07	5791.50	579.15	
Total							37114.0	89325.0	97655.0	

Patuni Abutment

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	851.00	1.65	6.98	3.31	1404.15	5939.98	2816.81	
Concrete	Type-A	m^3	147.71	13.49	49.85	34.71	1992.61	7363.34	5127.01	
Leveling Concrete	Type-D	m^3	12.83	5.27	34.35	8.14	67.61	440.71	104.40	
Concrete Mixing		m^3	147.71	0.84	5.71	0.78	124.08	843.42	115.21	
Concrete Placing		m^3	147.71	0.75	3.15	1.51	110.78	465.29	223.04	
Reinforcement Bar		Ton	8.12	233.81	127.98	694.18	1898.54	1039.20	5636.74	
Form		m^2	236.76	0.67	6.23	0.04	158.63	1475.01	9.47	
Staging		Spc•m^3	195.28	0.61	4.50	0.45	119.12	878.76	87.88	
Total							4612.0	18446.0	14121.0	

Patuni Pier

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	205.20	1.65	6.98	3.31	338.58	1432.30	679.21	
Concrete	Type-A	m^3	89.98	13.49	49.85	34.71	1213.83	4485.50	3123.21	
Leveling Concrete	Type-D	m^3	3.00	5.27	34.35	8.14	15.81	103.05	24.42	
Concrete Mixing		m^3	89.98	0.84	5.71	0.78	75.58	513.79	70.18	
Concrete Placing		m^3	89.98	0.75	3.15	1.51	67.49	283.44	135.87	
Reinforcement Bar		Ton	6.30	233.81	127.98	694.18	1473.00	806.27	4373.33	
Form		m^2	139.58	0.67	6.23	0.04	93.52	869.58	5.58	
Staging		Spc•m^3	147.12	0.61	4.50	0.45	89.74	662.04	66.20	
Total							3368.0	9156.0	8478.0	

Challa Abutment

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	279.70	1.65	6.98	3.31	461.51	1952.31	925.81	
Concrete	Type-A	m^3	159.14	13.49	49.85	34.71	2146.80	7933.13	5523.75	
Leveling Concrete	Type-D	m^3	8.07	5.27	34.35	8.14	42.53	227.20	65.69	
Concrete Mixing		m^3	159.14	0.84	5.71	0.78	133.68	908.69	124.13	
Concrete Placing		m^3	159.14	0.75	3.15	1.51	119.36	501.29	240.30	
Reinforcement Bar		Ton	8.75	233.81	127.98	694.18	2045.84	1119.83	6074.08	
Form		m^2	262.07	0.67	6.23	0.04	175.59	1632.70	10.48	
Staging		Spc•m^3	265.52	0.61	4.50	0.45	161.97	1194.84	119.48	
Total							5287.0	15470.0	13714.0	

Cascada Abutment

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	506.70	1.65	6.98	3.31	836.06	3536.77	1617.18	
Concrete	Type-A	m^3	102.36	13.49	49.85	34.71	1380.84	5102.65	3552.92	
Leveling Concrete	Type-D	m^3	8.06	5.27	34.35	8.14	42.48	276.86	65.61	
Concrete Mixing		m^3	102.36	0.84	5.71	0.78	85.98	584.48	79.84	
Concrete Placing		m^3	120.36	0.75	3.15	1.51	76.77	322.43	154.56	
Reinforcement Bar		Ton	5.63	233.81	127.98	694.18	1316.35	720.53	3908.23	
Form		m^2	202.38	0.67	6.23	0.04	135.59	1260.83	8.10	
Staging		Spc•m^3	161.40	0.61	4.50	0.45	98.45	726.30	72.63	
Total							3973.0	12531.0	9459.0	

Alto Choro Abutment

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	534.70	1.65	6.98	3.31	882.26	3732.21	1769.86	
Concrete	Type-A	m^3	167.71	13.49	49.85	34.71	2262.41	8360.34	5821.21	
Leveling Concrete	Type-D	m^3	7.70	5.27	34.35	8.14	40.58	264.50	62.68	
Concrete Mixing		m^3	167.71	0.84	5.71	0.78	140.88	957.62	130.81	
Concrete Placing		m^3	167.71	0.75	3.15	1.51	125.78	528.29	253.24	
Reinforcement Bar		Ton	9.22	233.81	127.98	694.18	2155.73	1179.98	6400.34	
Form		m^2	283.90	0.67	6.23	0.04	190.21	1768.70	11.36	
Staging		Spc·m^3	217.28	0.61	4.50	0.45	132.54	977.76	97.78	
Total							5930.0	17769.0	14547.0	

Alto Choro Pier

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	113.90	1.65	6.98	3.31	187.94	795.02	377.01	
Concrete	Type-A	m^3	83.18	13.49	49.85	34.71	1122.10	4146.52	2887.18	
Leveling Concrete	Type-D	m^3	3.20	5.27	34.35	8.14	16.86	109.92	26.05	
Concrete Mixing		m^3	83.18	0.84	5.71	0.78	69.87	474.96	64.88	
Concrete Placing		m^3	83.18	0.75	3.15	1.51	62.39	262.02	125.60	
Reinforcement Bar		Ton	5.82	233.81	127.98	694.18	1360.77	744.84	4040.13	
Form		m^2	129.03	0.67	6.23	0.04	86.45	803.86	5.16	
Staging		Spc·m^3	136.00	0.61	4.50	0.45	82.96	612.00	61.20	
Total							2989.0	7949.0	7587.0	

Pto Leon Abutment

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	712.40	1.65	6.98	3.31	1175.46	4972.55	2358.04	
Concrete	Type-A	m^3	228.73	13.49	49.85	34.71	3085.57	11402.19	7939.22	
Leveling Concrete	Type-D	m^3	9.68	5.27	34.35	8.14	51.01	332.51	78.80	
Concrete Mixing		m^3	228.73	0.84	5.71	0.78	192.13	1306.05	178.41	
Concrete Placing		m^3	228.73	0.75	3.15	1.51	171.55	720.50	345.38	
Reinforcement Bar		Ton	12.58	233.81	127.98	694.18	2941.33	1609.99	8732.78	
Form		m^2	370.54	0.67	6.23	0.04	248.26	2308.46	14.82	
Staging		Spc·m^3	497.56	0.61	4.50	0.45	303.51	2239.02	223.90	
Total							8169.0	24891.0	19871.0	

Pto Leon Pier

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	318.00	1.65	6.98	3.31	524.70	2219.64	1052.58	
Concrete	Type-A	m^3	162.21	13.49	49.85	34.71	2188.21	8086.17	5630.31	
Leveling Concrete	Type-D	m^3	6.00	5.27	34.35	8.14	31.62	206.10	48.87	
Concrete Mixing		m^3	162.21	0.84	5.71	0.78	136.26	926.22	126.52	
Concrete Placing		m^3	162.21	0.75	3.15	1.51	121.66	510.96	244.94	
Reinforcement Bar		Ton	11.35	233.81	127.98	694.18	2653.74	1452.57	7878.94	
Form		m^2	192.04	0.67	6.23	0.04	128.67	1196.41	7.68	
Staging		Spc·m^3	401.28	0.61	4.50	0.45	244.78	1805.76	180.58	
Total							6030.0	16404.0	15170.0	

Cajoñes Abutment

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	161.60	1.65	6.98	3.31	266.64	1127.97	543.90	
Concrete	Type-A	m^3	154.88	13.49	49.85	34.71	2089.33	7720.77	5375.88	
Leveling Concrete	Type-D	m^3	7.36	5.27	34.35	8.14	38.79	252.82	59.91	
Concrete Mixing		m^3	154.88	0.84	5.71	0.78	130.10	884.36	120.81	
Concrete Placing		m^3	154.88	0.75	3.15	1.51	116.16	487.87	233.87	
Reinforcement Bar		Ton	8.52	233.81	127.98	694.18	1992.06	1091.39	5914.41	
Form		m^2	266.80	0.67	6.23	0.04	178.76	1662.16	10.67	
Staging		Spc·m^3	295.27	0.61	4.50	0.45	180.11	1328.72	132.87	
Total							4992.0	14555.0	12383.0	

Chojña Abutment — Por pilote

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	142.60	1.65	6.98	3.31	235.29	995.35	472.01	
Concrete	Type-A	m^3	142.88	13.49	49.85	34.71	1927.45	7122.57	4959.36	
Leveling Concrete	Type-D	m^3	8.40	5.27	34.35	8.14	44.27	288.54	68.38	
Concrete Mixing		m^3	142.88	0.84	5.71	0.78	120.02	815.84	111.45	
Concrete Placing		m^3	142.88	0.75	3.15	1.51	107.16	450.07	215.75	
Reinforcement Bar		Ton	7.86	233.81	127.98	694.18	1837.75	1005.92	5456.25	
Form		m^2	229.65	0.67	6.23	0.04	153.86	1430.72	9.19	
Staging		Spc·m^3	108.66	0.61	4.50	0.45	66.28	488.97	48.90	
Total							4492.0	12598.0	11341.0	

San Silverio Abutment

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	748.30	1.65	6.98	3.31	1234.70	5223.13	2476.87	
Concrete	Type-A	m^3	284.48	13.49	49.85	34.71	3837.64	14181.33	9874.30	
Leveling Concrete	Tpye-D	m^3	11.00	5.27	34.35	8.14	57.97	377.85	89.54	
Concrete Mixing		m^3	284.48	0.84	5.71	0.78	238.96	1624.38	221.89	
Concrete Placing		m^3	284.48	0.75	3.15	1.51	213.36	896.11	429.56	
Reinforcement Bar		Ton	15.65	233.81	127.98	694.18	3659.13	2002.89	10863.92	
Form		m^2	414.46	0.67	6.23	0.04	277.69	2582.09	16.58	
Staging		Spc•m^3	361.84	0.61	4.50	0.45	220.72	628.28	162.83	
Total							9740.0	28516.0	24135.0	

San Silverio Pier

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	209.70	1.65	6.98	3.31	346.01	1463.71	694.11	
Concrete	Type-A	m^3	115.83	13.49	49.85	34.71	1562.55	5774.13	4020.46	
Leveling Concrete	Type-D	m^3	4.00	5.27	34.35	8.14	21.08	137.40	32.56	
Concrete Mixing		m^3	115.83	0.84	5.71	0.78	97.30	661.39	90.35	
Concrete Placing		m^3	115.83	0.75	3.15	1.51	86.87	364.86	174.90	
Reinforcement Bar		Ton	8.11	233.81	127.98	694.18	1896.20	1037.92	5629.80	
Form		m^2	183.02	0.67	6.23	0.04	122.62	1140.21	7.32	
Staging		Spc•m^3	206.00	0.61	4.50	0.45	125.66	927.00	92.70	
Total							4258.0	11507.0	10742.0	

San Lorenzo Abutment

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	912.10	1.65	6.98	3.31	1504.80	6365.76	3018.72	
Concrete	Type-A	m^3	204.58	13.49	49.85	34.71	2759.78	10198.31	7100.97	
Leveling Concrete	Type-D	m^3	9.35	5.27	34.35	8.14	49.27	321.17	76.11	
Concrete Mixing		m^3	204.58	0.84	5.71	0.78	171.85	1168.15	159.57	
Concrete Placing		m^3	204.58	0.75	3.15	1.51	153.44	644.43	308.92	
Reinforcement Bar		Ton	11.25	233.81	127.98	694.18	2630.36	1439.78	7809.53	
Form		m^2	340.60	0.67	6.23	0.04	228.20	2121.94	13.62	
Staging		Spc•m^3	281.52	0.61	4.50	0.45	171.73	1266.84	126.68	
Total							7669.0	23526.0	18614.0	

San Lorenzo Pier

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	370.40	1.65	6.98	3.31	611.16	2585.39	1226.02	
Concrete	Type-A	m^3	205.50	13.49	49.85	34.71	2772.20	10244.18	7132.91	
Leveling Concrete	Type-D	m^3	4.80	5.27	34.35	8.14	25.30	164.88	39.07	
Concrete Mixing		m^3	205.50	0.84	5.71	0.78	172.62	1173.41	160.29	
Concrete Placing		m^3	205.50	0.75	3.15	1.51	154.13	647.33	310.31	
Reinforcement Bar		Ton	14.39	233.81	127.98	694.18	3364.53	1841.63	9989.25	
Form		m^2	295.57	0.67	6.23	0.04	296.24	301.80	295.61	
Staging		Spc•m^3	336.60	0.61	4.50	0.45	205.33	1514.70	151.47	
Total							7602.0	18473.0	19305.0	

Espiritu Abutment

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	878.20	1.65	6.98	3.31	1449.03	6129.84	2906.84	
Concrete	Type-A	m^3	159.52	13.49	49.85	34.71	2151.92	7952.07	5536.94	
Leveling Concrete	Type-D	m^3	9.35	5.27	34.35	8.14	49.27	321.17	76.11	
Concrete Mixing		m^3	159.52	0.84	5.71	0.78	134.00	910.86	124.43	
Concrete Placing		m^3	159.52	0.75	3.15	1.51	119.64	502.49	240.88	
Reinforcement Bar		Ton	8.77	233.81	127.98	694.18	2050.51	1122.38	6087.96	
Form		m^2	259.88	0.67	6.23	0.04	174.12	1619.05	10.40	
Staging		Spc•m^3	190.78	0.61	4.50	0.45	116.38	858.51	85.85	
Total							6245.0	19416.0	15069.0	

Espiritu Pier

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	307.40	1.65	6.98	3.31	507.21	2145.65	1017.49	
Concrete	Type-A	m^3	243.24	13.49	49.85	34.71	3281.31	12125.51	8442.86	
Leveling Concrete	Type-D	m^3	5.60	5.27	34.35	8.14	29.51	192.36	45.58	
Concrete Mixing		m^3	243.24	0.84	5.71	0.78	204.32	1388.90	189.73	
Concrete Placing		m^3	243.24	0.75	3.15	1.51	182.43	766.21	367.29	
Reinforcement Bar		Ton	17.03	233.81	127.98	694.18	3981.78	2179.50	11821.89	
Form		m^2	327.72	0.67	6.23	0.04	219.57	2041.70	13.11	
Staging		Spc•m^3	381.10	0.61	4.50	0.45	232.47	1714.95	171.50	
Total							8639.0	22555.0	22069.0	

Carasco Abutment

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	1962.70	1.65	6.98	3.31	3238.46	13699.65	6496.54	
Concrete	Type-A_m	m^3	370.14	13.49	49.85	34.71	4993.19	18451.48	12847.56	
Leveling Concrete	Type-D	m^3	15.67	5.27	34.35	8.14	82.58	538.26	127.55	
Concrete Mixing		m^3	370.14	0.84	5.71	0.78	310.92	2113.50	288.71	
Concrete Placing		m^3	370.14	0.75	3.15	1.51	277.61	1165.94	558.91	
Reinforcement Bar		Ton	20.36	233.81	127.98	694.18	4760.37	2605.67	14133.50	
Form		m^2	545.21	0.67	6.23	0.04	365.29	3396.66	21.81	
Staging		Spc·m^3	540.13	0.61	4.50	0.45	329.48	2430.59	243.06	
Total							14358.0	43862.0	34718.0	

Avaroa Abutment

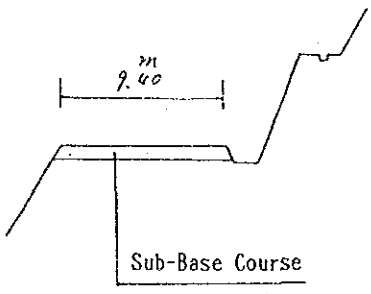
Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Duties	Others		
Excavation		m^3	219.20	1.65	6.98	3.31	361.68	1530.02	725.55	
Concrete	Type-A	m^3	62.86	13.49	49.85	34.71	847.98	3133.57	2181.87	
Leveling Concrete	Type-D	m^3	6.26	5.27	34.35	8.14	32.99	215.03	50.96	
Concrete Mixing		m^3	62.86	0.84	5.71	0.78	52.80	358.93	49.03	
Concrete Placing		m^3	62.86	0.75	3.15	1.51	47.15	198.01	94.92	
Reinforcement Bar		Ton	3.46	233.81	127.98	694.18	808.98	442.81	2401.86	
Form		m^2	155.30	0.67	6.23	0.04	104.05	967.52	6.21	
Staging		Spc·m^3	161.40	0.61	4.50	0.45	98.45	726.30	72.63	
Total							2354.0	7572.0	5583.0	

Appendix 6-5 Maintenance Cost

B-201

Gravel Road Maintenance

Name of Work	Size and Type	Unit	Volume	Unit Cost L.C. Duties	Unit Cost L.C. Others	Unit Cost F.C.	Cost L.C. Ditoes	Cost L.C. Others	Cost F.C.	Remarks
Clearing of Surface		Km	107	299	1,187	635	31,993	127,009	67,945	B-203
Clearing of Structure		Total	1.00	1,070	5,423	1,763	1,070	5,423	1,763	-204
Rehabilitation of Shoulder		Km	107	19	46	54	2,033	4,922	5,778	-05
Patrol		Total	1.00	3,098	10,292	7,298	3,098	10,292	7,298	-206
Sub Total							38,194	147,646	82,784	
Contingeucy		%	5.00				1,910	7,382	4,139	
Rehabilitaion of Surface	2 Times/ Year	Km	107×2 214	406	430	1,375	86,884	92,020	294,250	473,154 207
Total							126,988	247,048	381,173	755,209
Per Km	108.63Km						1,169	2,274	3,509	(6,952)

Condition	Calculation	Remarks
		

B-202

Asphalt Road Maintenance

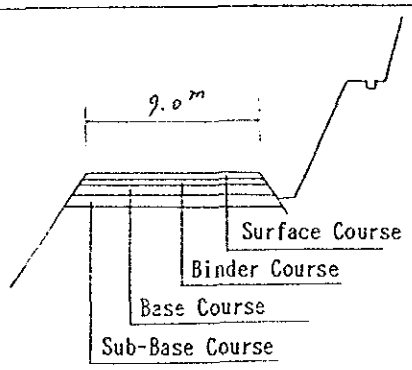
Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Ditoes	Others		
Clearing of Surface		Km	107	299	1,187	635	31,993	127,009	67,945	B-203
Clearing of Structure		Total	1.00	1,070	5,423	1,763	1,070	5,423	1,763	-204
Rehabilitation of Shoulder		Km	107	19	46	54	2,033	4,922	5,778	-05
Patrol		Total	1.00	3,098	10,292	7,298	3,098	10,292	7,298	-206
Sub Total							38,194	147,646	82,784	
Contingeucy		%	5.00				1,910	7,382	4,139	
Rehabilitaion of Surface		Km	107	118.75	123	364.5	12,706	13,161	39,001	209
Total							52,810	168,189	125,924	346,923
Per Km	108.63Km						486	1,548	1,159	(3,193)

Condition	Calculation	Remarks

A-213

Asphalt Macadam Road Maintenance

Name of Work	Size and Type	Unit	Volume	Unit Cost			Cost			Remarks
				L.C.		F.C.	L.C.		F.C.	
				Duties	Others		Ditoes	Others		
Clearing of Surface		Km	107	299	1,187	635	31,993	127,009	67,945	A-203
Clearing of Structure		Total	1.00	1,070	5,423	1,763	1,070	5,423	1,763	-204
Rehabilitation of Shoulder		Km	107	19	46	54	2,033	4,922	5,778	-205
Patrol		Total	1.00	3,098	10,292	7,298	3,098	10,292	7,298	-206
Sub Total							38,194	147,646	82,784	
Contingeucy		%	5.00				1,910	7,382	4,139	
Rehabilitaion of Surface		Km	107	621	932	1,797	66,447	99,724	192,279	-212
Total							106,551	254,752	279,202	640,505
Per Km	108.63Km						981	2,345	2,570	(5,896)

Condition	Calculation	Remarks
		

Appendix 6-6 Compensation Costs

(Local Currency, Dthers)

Unit : US$

	Unit	Unit Costo	Section 1		Section 2		Section 3	
			Volumen	Costo	Volumen	Costo	Volumen	Costo
Houses	hou,	1,500	36	54,000	23	34,500	13	19,500
Farm & Orchard	ha	477	3.0	1,431	3.9	1,860	4.6	2,194
Total				55,431		36,360		21,694

	Unit	Unit Costo	Section 4		Section 5		Section 6		Total
			Volumen	Costo	Volumen	Costo	Volumen	Costo	
Houses	hou,	1,500	15	22,500	1	1,500	3	45,000	136,500
Farm & Orchard	ha	477	6.3	3,005	1.1	525	0.3	143	9,158
Total				25,505		2,025		4,643	145,658