Table 4.1.5 (6/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-7	Rotally Boring Dia.46mm without Core (3)	1 day	Direction:Vertical, Depth:0~50m, Rock Type:Concrete in Tunnel

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-40	Rotary Boring Machine; 5.5 kW	daily	1	142,653	648	112,440	142,653	648	112,440	
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-J-14	Metal Crown; Dia.46mm	pcs	5.53	152,044	0	8,002	840,802	0	44,253	
	M-J-16	Core Tube; Dia.46mm x L1.5m, Single	pcs	0.21	401,625	0	21,138	84,341	0	4,439	
	M-J-19	Core Lifter Dia. 46mm	pcs	0.43	200,813	0	10,569	86,349	0	4,545	
	M-J-15	Rod & Coupling; Dia.40.5mm x L3m	pcs	0.21	745,875	0	39,257	156,634	0	8,244	
Others											
Total for		1 day						1,421,401	1,512	368,859	
Unit Cost for		1 m						133,590	142	38,827	

Note *1 : Length of Boring per 1 day

Standard Length of Boring :	45 minutes/m				
Coefficient for Depth :	1.00				
Coefficient for Direction :	1.00				
Coefficient for Condition of Site :	1.19				
Coefficient for Diameter :	1.00				
Equipment Operating Time :	9.5 hours/day				
Hence,	10.64 m				
* 2 : Metal Crown	10.64 m x	0.52	=	5.53	piece/day
* 3 : Core Tube	10.64 m x	0.02	=	0.21	piece/day
* 4 : Core Lifter	10.64 m x	0.04	=	0.43	piece/day
* 5 : Rod	10.64 m x	0.02	=	0.21	piece/day
* 6 : Electrical Charge	2.5 kWh/h x	9.5 hour/day=		23.75	kWh

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-8	Rotally Boring Dia.46mm without Core (4)	1 day	Direction:Inkline, Depth:0~50m, Rock Type:Concrete in Tunnel

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-40	Rotary Boring Machine; 5.5 kW	daily	1	142,653	648	112,440	142,653	648	112,440	
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-J-14	Metal Crown; Dia.46mm	pcs	4.9	152,044	0	8,002	745,014	0	39,211	
	M-J-16	Core Tube; Dia.46mm x L1.5m, Single	pcs	0.19	401,625	0	21,138	76,309	0	4,016	
	M-J-19	Core Lifter Dia. 46mm	pcs	0.38	200,813	0	10,569	76,309	0	4,016	
	M-J-15	Rod & Coupling; Dia.40.5mm x L3m	pcs	0.19	745,875	0	39,257	141,716	0	7,459	
Others											
Total for		1 day						1,292,623	1,512	362,081	
Unit Cost for		1 m						137,221	161	38,114	

Note *1 : Length of Boring per 1 day

Standard Length of Boring :	45 minutes/m				
Coefficient for Depth :	1.00				
Coefficient for Direction :	1.13				
Coefficient for Condition of Site :	1.19				
Coefficient for Diameter :	1.00				
Equipment Operating Time :	9.5 hours/day				
Hence,	9.42 m				
* 2 : Metal Crown	9.42 m x	0.52	=	4.9	piece/day
* 3 : Core Tube	9.42 m x	0.02	=	0.19	piece/day
* 4 : Core Lifter	9.42 m x	0.04	=	0.38	piece/day
* 5 : Rod	9.42 m x	0.02	=	0.19	piece/day
* 6 : Electrical Charge	2.5 kWh/h x	9.5 hour/day=		23.75	kWh

Table 4.1.5 (7/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-9	Rotally Boring Dia.46mm without Core (5)	1 day	Direction:Horizontal, Depth:0~50m, Rock Type:Concrete in Tunnel

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-40	Rotary Boring Machine; 5.5 kW	daily	1	142,653	648	112,440	142,653	648	112,440	
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-J-14	Metal Crown; Dia.46mm	pcs	4.5	152,044	0	8,002	684,197	0	36,010	
	M-J-16	Core Tube; Dia.46mm x L1.5m, Single	pcs	0.17	401,625	0	21,138	68,276	0	3,593	
	M-J-19	Core Lifter Dia. 46mm	pcs	0.35	200,813	0	10,569	70,284	0	3,699	
	M-J-15	Rod & Coupling; Dia.40.5mm x L3m	pcs	0.17	745,875	0	39,257	126,799	0	6,674	
Others											
Total for		1 day						1,202,831	1,512	357,355	
Unit Cost for		1 m						139,056	175	37,616	

Note *1 : Length of Boring per 1 day

Standard Length of Boring :	45	minutes/m
Coefficient for Depth :	1.00	
Coefficient for Direction :	1.23	
Coefficient for Condition of Site :	1.19	
Coefficient for Diameter :	1.00	
Equipment Operating Time :	9.5	hours/day
Hence,	8.65	m

* 2 :	Metal Crown	8.65 m	x	0.52	=	4.5	piece/day
* 3 :	Core Tube	8.65 m	x	0.02	=	0.17	piece/day
* 4 :	Core Lifter	8.65 m	x	0.04	=	0.35	piece/day
* 5 :	Rod	8.65 m	x	0.02	=	0.17	piece/day
* 6 :	Electrical Charge	2.5 kWh/h	x	9.5 hour/day	=	23.75	kWh

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-10	Rotally Boring Dia.46mm without Core (6)	1 day	Direction:Upper, Depth:0~50m, Rock Type:Concrete in Tunnel

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-40	Rotary Boring Machine; 5.5 kW	daily	1	142,653	648	112,440	142,653	648	112,440	
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-J-14	Metal Crown; Dia.46mm	pcs	4.01	152,044	0	8,002	609,695	0	32,089	
	M-J-16	Core Tube; Dia.46mm x L1.5m, Single	pcs	0.15	401,625	0	21,138	60,244	0	3,171	
	M-J-19	Core Lifter Dia. 46mm	pcs	0.31	200,813	0	10,569	62,252	0	3,276	
	M-J-15	Rod & Coupling; Dia.40.5mm x L3m	pcs	0.15	745,875	0	39,257	111,881	0	5,888	
Others											
Total for		1 day						1,097,347	1,512	351,803	
Unit Cost for		1 m						142,328	196	37,032	

Note *1 : Length of Boring per 1 day

Standard Length of Boring :	45	minutes/m
Coefficient for Depth :	1.00	
Coefficient for Direction :	1.38	
Coefficient for Condition of Site :	1.19	
Coefficient for Diameter :	1.00	
Equipment Operating Time :	9.5	hours/day
Hence,	7.71	m

* 2 :	Metal Crown	7.71 m	x	0.52	=	4.01	piece/day
* 3 :	Core Tube	7.71 m	x	0.02	=	0.15	piece/day
* 4 :	Core Lifter	7.71 m	x	0.04	=	0.31	piece/day
* 5 :	Rod	7.71 m	x	0.02	=	0.15	piece/day
* 6 :	Electrical Charge	2.5 kWh/h	x	9.5 hour/day	=	23.75	kWh

Table 4.1.5 (8/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-11	Rotally Boring Dia.46mm without Core (7)	1 day	Direction:Vertical, Depth:0~50m, Rock Type:Soft Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-40	Rotary Boring Machine; 5.5 kW	daily	1	142,653	648	112,440	142,653	648	112,440	
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-J-14	Metal Crown; Dia.46mm	pcs	5.93	152,044	0	8,002	901,619	0	47,454	
	M-J-16	Core Tube; Dia.46mm x L1.5m, Single	pcs	0.23	401,625	0	21,138	92,374	0	4,862	
	M-J-19	Core Lifter Dia. 46mm	pcs	0.46	200,813	0	10,569	92,374	0	4,862	
	M-J-15	Rod & Coupling; Dia.40.5mm x L3m	pcs	0.23	745,875	0	39,257	171,551	0	9,029	
Others											
Total for	1 day							1,511,193	1,512	373,584	
Unit Cost for	1 m							132,561	133	39,325	

Note *1 : Length of Boring per 1 day

Standard Length of Boring :	50	minutes/m
Coefficient for Depth :	1.00	
Coefficient for Direction :	1.00	
Coefficient for Condition of Site :	1.00	
Coefficient for Diameter :	1.00	
Equipment Operating Time :	9.5	hours/day
Hence,	11.4	m

* 2 :	Metal Crown	11.4 m x	0.52	=	5.93	piece/day
* 3 :	Core Tube	11.4 m x	0.02	=	0.23	piece/day
* 4 :	Core Lifter	11.4 m x	0.04	=	0.46	piece/day
* 5 :	Rod	11.4 m x	0.02	=	0.23	piece/day
* 6 :	Electrical Charge	2.5 kWh/h x	9.5 hour/day=		23.75	kWh

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-12	Rotally Boring Dia.46mm without Core (8)	1 day	Direction:Inkline, Depth:0~50m, Rock Type:Soft Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-40	Rotary Boring Machine; 5.5 kW	daily	1	142,653	648	112,440	142,653	648	112,440	
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-J-14	Metal Crown; Dia.46mm	pcs	5.25	152,044	0	8,002	798,230	0	42,012	
	M-J-16	Core Tube; Dia.46mm x L1.5m, Single	pcs	0.2	401,625	0	21,138	80,325	0	4,228	
	M-J-19	Core Lifter Dia. 46mm	pcs	0.4	200,813	0	10,569	80,325	0	4,228	
	M-J-15	Rod & Coupling; Dia.40.5mm x L3m	pcs	0.2	745,875	0	39,257	149,175	0	7,851	
Others											
Total for	1 day							1,361,329	1,512	365,697	
Unit Cost for	1 m							134,919	150	38,494	

Note *1 : Length of Boring per 1 day

Standard Length of Boring :	50	minutes/m
Coefficient for Depth :	1.00	
Coefficient for Direction :	1.13	
Coefficient for Condition of Site :	1.00	
Coefficient for Diameter :	1.00	
Equipment Operating Time :	9.5	hours/day
Hence,	10.09	m

* 2 :	Metal Crown	10.09 m x	0.52	=	5.25	piece/day
* 3 :	Core Tube	10.09 m x	0.02	=	0.2	piece/day
* 4 :	Core Lifter	10.09 m x	0.04	=	0.4	piece/day
* 5 :	Rod	10.09 m x	0.02	=	0.2	piece/day
* 6 :	Electrical Charge	2.5 kWh/h x	9.5 hour/day=		23.75	kWh

Table 4.1.5 (9/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-13	Rotally Boring Dia.46mm without Core (9)	1 day	Direction:Horizon, Depth:0~50m, Rock Type:Soft Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-40	Rotary Boring Machine; 5.5 kW	daily	1	142,653	648	112,440	142,653	648	112,440	
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-J-14	Metal Crown; Dia.46mm	pcs	4.82	152,044	0	8,002	732,851	0	38,571	
	M-J-16	Core Tube; Dia.46mm x L1.5m, Single	pcs	0.19	401,625	0	21,138	76,309	0	4,016	
	M-J-19	Core Lifter Dia. 46mm	pcs	0.37	200,813	0	10,569	74,301	0	3,911	
	M-J-15	Rod & Coupling; Dia.40.5mm x L3m	pcs	0.19	745,875	0	39,257	141,716	0	7,459	
Others											
Total for	1 day							1,278,451	1,512	361,335	
Unit Cost for	1 m							137,913	163	38,035	

Note *1 : Length of Boring per 1 day

Standard Length of Boring :	50 minutes/m				
Coefficient for Depth :	1.00				
Coefficient for Direction :	1.23				
Coefficient for Condition of Site :	1.00				
Coefficient for Diameter :	1.00				
Equipment Operating Time :	9.5 hours/day				
Hence,	9.27 m				
*2 : Metal Crown	9.27 m x	0.52	=	4.82	piece/day
*3 : Core Tube	9.27 m x	0.02	=	0.19	piece/day
*4 : Core Lifter	9.27 m x	0.04	=	0.37	piece/day
*5 : Rod	9.27 m x	0.02	=	0.19	piece/day
*6 : Electrical Charge	2.5 kWh/h x	9.5 hour/day=		23.75	kWh

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-14	Rotally Boring Dia.46mm without Core (10)	1 day	Direction:Upper Drill, Depth:0~50m, Rock Type:Soft Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-40	Rotary Boring Machine; 5.5 kW	daily	1	142,653	648	112,440	142,653	648	112,440	
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-J-14	Metal Crown; Dia.46mm	pcs	4.3	152,044	0	8,002	653,788	0	34,410	
	M-J-16	Core Tube; Dia.46mm x L1.5m, Single	pcs	0.17	401,625	0	21,138	68,276	0	3,593	
	M-J-19	Core Lifter Dia. 46mm	pcs	0.33	200,813	0	10,569	66,268	0	3,488	
	M-J-15	Rod & Coupling; Dia.40.5mm x L3m	pcs	0.17	745,875	0	39,257	126,799	0	6,674	
Others											
Total for	1 day							1,168,406	1,512	355,543	
Unit Cost for	1 m							141,453	183	37,426	

Note *1 : Length of Boring per 1 day

Standard Length of Boring :	50 minutes/m				
Coefficient for Depth :	1.00				
Coefficient for Direction :	1.38				
Coefficient for Condition of Site :	1.00				
Coefficient for Diameter :	1.00				
Equipment Operating Time :	9.5 hours/day				
Hence,	8.26 m				
*2 : Metal Crown	8.26 m x	0.52	=	4.3	piece/day
*3 : Core Tube	8.26 m x	0.02	=	0.17	piece/day
*4 : Core Lifter	8.26 m x	0.04	=	0.33	piece/day
*5 : Rod	8.26 m x	0.02	=	0.17	piece/day
*6 : Electrical Charge	2.5 kWh/h x	9.5 hour/day=		23.75	kWh

Table 4.1.5 (10/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-15	Rotally Boring Dia.46mm without Core (11)	1 day	Direction:Vertical, Depth:0~50m, Rock Type:Soft Rock in Tunnel

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-40	Rotary Boring Machine; 5.5 kW	daily	1	142,653	648	112,440	142,653	648	112,440	
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-J-14	Metal Crown; Dia.46mm	pcs	4.98	152,044	0	8,002	757,178	0	39,851	
	M-J-16	Core Tube; Dia.46mm x L1.5m, Single	pcs	0.19	401,625	0	21,138	76,309	0	4,016	
	M-J-19	Core Lifter Dia. 46mm	pcs	0.38	200,813	0	10,569	76,309	0	4,016	
	M-J-15	Rod & Coupling; Dia.40.5mm x L3m	pcs	0.19	745,875	0	39,257	141,716	0	7,459	
Others											
Total for		1 day						1,304,786	1,512	362,721	
Unit Cost for		1 m						136,199	158	38,181	

Note *1 : Length of Boring per 1 day

Standard Length of Boring :	50	minutes/m
Coefficient for Depth :	1.00	
Coefficient for Direction :	1.00	
Coefficient for Condition of Site :	1.19	
Coefficient for Diameter :	1.00	
Equipment Operating Time :	9.5	hours/day
Hence,	9.58	m

* 2 :	Metal Crown	9.58 m	x	0.52	=	4.98	piece/day
* 3 :	Core Tube	9.58 m	x	0.02	=	0.19	piece/day
* 4 :	Core Lifter	9.58 m	x	0.04	=	0.38	piece/day
* 5 :	Rod	9.58 m	x	0.02	=	0.19	piece/day
* 6 :	Electrical Charge	2.5 kWh/h	x	9.5 hour/day	=	23.75	kWh

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-16	Rotally Boring Dia.46mm without Core (12)	1 day	Direction:Inkline, Depth:0~50m, Rock Type:Soft Rock in Tunnel

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-40	Rotary Boring Machine; 5.5 kW	daily	1	142,653	648	112,440	142,653	648	112,440	
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-J-14	Metal Crown; Dia.46mm	pcs	4.41	152,044	0	8,002	670,513	0	35,290	
	M-J-16	Core Tube; Dia.46mm x L1.5m, Single	pcs	0.17	401,625	0	21,138	68,276	0	3,593	
	M-J-19	Core Lifter Dia. 46mm	pcs	0.34	200,813	0	10,569	68,276	0	3,593	
	M-J-15	Rod & Coupling; Dia.40.5mm x L3m	pcs	0.17	745,875	0	39,257	126,799	0	6,674	
Others											
Total for		1 day						1,187,139	1,512	356,529	
Unit Cost for		1 m						139,993	178	37,529	

Note *1 : Length of Boring per 1 day

Standard Length of Boring :	50	minutes/m
Coefficient for Depth :	1.00	
Coefficient for Direction :	1.13	
Coefficient for Condition of Site :	1.19	
Coefficient for Diameter :	1.00	
Equipment Operating Time :	9.5	hours/day
Hence,	8.48	m

* 2 :	Metal Crown	8.48 m	x	0.52	=	4.41	piece/day
* 3 :	Core Tube	8.48 m	x	0.02	=	0.17	piece/day
* 4 :	Core Lifter	8.48 m	x	0.04	=	0.34	piece/day
* 5 :	Rod	8.48 m	x	0.02	=	0.17	piece/day
* 6 :	Electrical Charge	2.5 kWh/h	x	9.5 hour/day	=	23.75	kWh

Table 4.1.5 (11/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-17	Rotally Boring Dia.46mm without Core (13)	1 day	Direction:Horizon, Depth:0~50m, Rock Type:Soft Rock in Tunnel

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-40	Rotary Boring Machine; 5.5 kW	daily	1	142,653	648	112,440	142,653	648	112,440	
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-J-14	Metal Crown; Dia.46mm	pcs	4.05	152,044	0	8,002	615,777	0	32,409	
	M-J-16	Core Tube; Dia.46mm x L1.5m, Single	pcs	0.16	401,625	0	21,138	64,260	0	3,382	
	M-J-19	Core Lifter Dia. 46mm	pcs	0.31	200,813	0	10,569	62,252	0	3,276	
	M-J-15	Rod & Coupling; Dia.40.5mm x L3m	pcs	0.16	745,875	0	39,257	119,340	0	6,281	
Others											
Total for		1 day						1,114,904	1,512	352,727	
Unit Cost for		1 m						143,120	194	37,129	

Note *1 : Length of Boring per 1 day

Standard Length of Boring :	50	minutes/m
Coefficient for Depth :	1.00	
Coefficient for Direction :	1.23	
Coefficient for Condition of Site :	1.19	
Coefficient for Diameter :	1.00	
Equipment Operating Time :	9.5	hours/day
Hence,	7.79	m

* 2 :	Metal Crown	7.79 m x	0.52	=	4.05	piece/day
* 3 :	Core Tube	7.79 m x	0.02	=	0.16	piece/day
* 4 :	Core Lifter	7.79 m x	0.04	=	0.31	piece/day
* 5 :	Rod	7.79 m x	0.02	=	0.16	piece/day
* 6 :	Electrical Charge	2.5 kWh/h x	9.5 hour/day=		23.75	kWh

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-18	Rotally Boring Dia.46mm without Core (14)	1 day	Direction:Upper Drill, Depth:0~50m, Rock Type:Soft Rock in Tunnel

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-40	Rotary Boring Machine; 5.5 kW	daily	1	142,653	648	112,440	142,653	648	112,440	
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-J-14	Metal Crown; Dia.46mm	pcs	3.61	152,044	0	8,002	548,878	0	28,888	
	M-J-16	Core Tube; Dia.46mm x L1.5m, Single	pcs	0.14	401,625	0	21,138	56,228	0	2,959	
	M-J-19	Core Lifter Dia. 46mm	pcs	0.28	200,813	0	10,569	56,228	0	2,959	
	M-J-15	Rod & Coupling; Dia.40.5mm x L3m	pcs	0.14	745,875	0	39,257	104,423	0	5,496	
Others											
Total for		1 day						1,019,030	1,512	347,681	
Unit Cost for		1 m						146,834	218	36,598	

Note *1 : Length of Boring per 1 day

Standard Length of Boring :	50	minutes/m
Coefficient for Depth :	1.00	
Coefficient for Direction :	1.38	
Coefficient for Condition of Site :	1.19	
Coefficient for Diameter :	1.00	
Equipment Operating Time :	9.5	hours/day
Hence,	6.94	m

* 2 :	Metal Crown	6.94 m x	0.52	=	3.61	piece/day
* 3 :	Core Tube	6.94 m x	0.02	=	0.14	piece/day
* 4 :	Core Lifter	6.94 m x	0.04	=	0.28	piece/day
* 5 :	Rod	6.94 m x	0.02	=	0.14	piece/day
* 6 :	Electrical Charge	2.5 kWh/h x	9.5 hour/day=		23.75	kWh

Table 4.1.5 (12/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-19	Pressing Water Work Dia. 66mm (1)	1 day	Case that there is center paint

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
	A-2-2-26	Grout Pressure Meter; 120 l/min	daily	1	428,848	0	230,918	428,848	0	230,918	
	A-2-4-23	Grout Data Recorder	daily	1	21,373	0	9,020	21,373	0	9,020	
	A-2-4-24	Grout Treatment Facility	daily		85,494	0	20,393	0	0	0	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-19	Grout Worker	day	1	0	0	46,900	0	0	46,900	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	None	Grout Pipes, Packer and Others	L.S.	1	134,867	216	79,889	134,867	216	79,889	*2
	M-J-21	Outer Grout Pipe Dia. 66mm L=1.5m	pcs	0.05	860,625	0	45,296	43,031	0	2,265	
	M-J-23	Inner Grout Pipe Dia. 66mm L=1.5m	pcs	0.05	745,875	0	39,257	37,294	0	1,963	
Others											
Total for		1 day						776,035	1,080	526,893	
Unit Cost for		1 Stage						163,376	227	110,925	
Unit Cost for		1 m						32,675	45	22,185	

Note : *1 : Cost of Center Plant is excluded.
*2 : 40% of sum total of Grout Pump and Grout Pressure Meter.
*3 : Grout Outer and Inner Pipes

L :	Mean length from starting point to the stage excluded final stage	25	m
L' :	Length of Pipes	1.5	m
m :	Mean length of pipes from starting point to the stage excluded final stage :	16.7	pieces
Ls :	The Length of 1.0 Stage	5	m
Te :	Equipment Operating Time	9.5	hours/day
Tp :	Work Time of Pressing Water Test	0.5	hours/stage
Ts :	Work Time of Pressing Water at 1 Stage including Preparatiry & Clearing	2	hours/stage
Sn :	The Number of Working Stage in a day	4.75	stages/day
hence,	The Number of Pieces of Grout Outer and Inner Pipes :	0.05	pieces/day

Table 4.1.5 (13/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-20	Pressing Water Work Dia. 66mm (2)	1 day	Case that there is individual paint

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
	A-2-2-26	Grout Pressure Meter; 120 l/min	daily	1	428,848	0	230,918	428,848	0	230,918	
	A-2-4-23	Grout Data Recorder	daily	1	21,373	0	9,020	21,373	0	9,020	
	A-2-4-24	Grout Treatment Facility	daily	1	85,494	0	20,393	85,494	0	20,393	
Labour											
	L-2-1	Foreman	day	0.6	0	0	48,800	0	0	29,280	
	L-2-19	Grout Worker	day	1	0	0	46,900	0	0	46,900	
	L-2-23	Common Labour	day	2	0	0	35,100	0	0	70,200	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	None	Grout Pipes, Packer and Others	L.S.	1	134,867	216	79,889	134,867	216	79,889	*2
	M-J-21	Outer Grout Pipe Dia. 66mm L=1.5m	pcs	0.05	860,625	0	45,296	43,031	0	2,265	
	M-J-23	Inner Grout Pipe Dia. 66mm L=1.5m	pcs	0.05	745,875	0	39,257	37,294	0	1,963	
Others											
Total for		1 day						861,529	1,080	587,266	
Unit Cost for		1 Stage						181,374	227	123,635	
Unit Cost for		1 m						36,275	45	24,727	

Note : *1 : Cost of Center Plant is excluded.
*2 : 25% of sum total of Grout Pump and Grout Pressure Meter.
*3 : Grout Outer and Inner Pipes

L :	Mean length from starting point to the stage excluded final stage	25	m
L' :	Length of Pipes	1.5	m
m :	Mean length of pipes from starting point to the stage excluded final stage :	16.7	pieces
Ls :	The Length of 1.0 Stage	5	m
Te :	Equipment Operating Time	9.5	hours/day
Tp :	Work Time of Pressing Water Test	0.5	hours/stage
Ts :	Work Time of Pressing Water at 1 Stage including Preparatiry & Clearing	2	hours/stage
Sn :	The Number of Working Stage in a day	4.75	stages/day
hence,	The Number of Pieces of Grout Outer and Inner Pipes :	0.05	pieces/day

Table 4.1.5 (14/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-21	Pressing Water Work Dia. 46mm (1)	1 day	Case that there is center palnt

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
	A-2-2-26	Grout Pressure Meter; 120 l/min	daily	1	428,848	0	230,918	428,848	0	230,918	
	A-2-4-23	Grout Data Recorder	daily	1	21,373	0	9,020	21,373	0	9,020	
	A-2-4-24	Grout Treatment Facility	daily		85,494	0	20,393	0	0	0	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-19	Grout Worker	day	1	0	0	46,900	0	0	46,900	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	None	Grout Pipes, Packer and Others	L.S.	1	134,867	216	79,889	134,867	216	79,889	*2
	M-J-20	Outer Grout Pipe Dia. 46mm L=1.5m	pcs	0.05	803,250	0	42,276	40,163	0	2,114	
	M-J-22	Inner Grout Pipe Dia. 46mm L=1.5m	pcs	0.05	688,500	0	36,237	34,425	0	1,812	
Others											
Total for		1 day						770,297	1,080	526,591	
Unit Cost for		1 Stage						162,168	227	110,861	
Unit Cost for		1 m						32,434	45	22,172	

Note : *1 : Cost of Center Plant is excluded.
*2 : 25% of sum total of Grout Pump and Grout Pressure Meter.
*3 : Grout Outer and Inner Pipes

L :	Mean length from starting point to the stage excluded final stage	25	m
L' :	Length of Pipes	1.5	m
m :	Mean length of pipes from starting point to the stage excluded final stage :	16.7	pieces
Ls :	The Length of 1.0 Stage	5	m
Te :	Equipment Operating Time	9.5	hours/day
Tp :	Work Time of Pressing Water Test	0.5	hours/stage
Ts :	Work Time of Pressing Water at 1 Stage including Preparatiry & Clearing	2	hours/stage
Sn :	The Number of Working Stage in a day	4.75	stages/day
hence,	The Number of Pieces of Grout Outer and Inner Pipes :	0.05	pieces/day

Table 4.1.5 (15/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-22	Pressing Water Work Dia. 46mm (2)	1 day	Case that there is individual paint

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
	A-2-2-26	Grout Pressure Meter; 120 l/min	daily	1	428,848	0	230,918	428,848	0	230,918	
	A-2-4-23	Grout Data Recorder	daily	1	21,373	0	9,020	21,373	0	9,020	
	A-2-4-24	Grout Treatment Facility	daily	1	85,494	0	20,393	85,494	0	20,393	
Labour											
	L-2-1	Foreman	day	0.6	0	0	48,800	0	0	29,280	
	L-2-19	Grout Worker	day	1	0	0	46,900	0	0	46,900	
	L-2-23	Common Labour	day	2	0	0	35,100	0	0	70,200	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	None	Grout Pipes, Packer and Others	L.S.	1	134,867	216	79,889	134,867	216	79,889	*2
	M-J-20	Outer Grout Pipe Dia. 46mm L=1.5m	pcs	0.05	803,250	0	42,276	40,163	0	2,114	
	M-J-22	Inner Grout Pipe Dia. 46mm L=1.5m	pcs	0.05	688,500	0	36,237	34,425	0	1,812	
Others											
Total for	1 day							855,791	1,080	586,964	
Unit Cost for	1 Stage							180,167	227	123,571	
Unit Cost for	1 m							36,033	45	24,714	

Note : *1 : Cost of Center Plant is excluded.
*2 : 25% of sum total of Grout Pump and Grout Pressure Meter.
*3 : Grout Outer and Inner Pipes

L :	Mean length from starting point to the stage excluded final stage	25	m
L' :	Length of Pipes	1.5	m
m :	Mean length of pipes from starting point to the stage excluded final stage :	16.7	pieces
Ls :	The Length of 1.0 Stage	5	m
Te :	Equipment Operating Time	9.5	hours/day
Tp :	Work Time of Pressing Water Test	0.5	hours/stage
Ts :	Work Time of Pressing Water at 1 Stage including Preparatiry & Clearing	2	hours/stage
Sn :	The Number of Working Stage in a day	4.75	stages/day
hence,	The Number of Pieces of Grout Outer and Inner Pipes :	0.05	pieces/day

Table 4.1.5 (16/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-23	Grout Work Dia. 66mm	1 day	Case that there is center paint

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
	A-2-2-26	Grout Pressure Meter; 120 l/min	daily	1	428,848	0	230,918	428,848	0	230,918	
	A-2-2-24	Grout Mixer; 2x200 ltr 2.3kw Yoko	daily	1	45,124	259	35,784	45,124	259	35,784	
	A-2-4-23	Grout Data Recorder	daily	1	21,373	0	9,020	21,373	0	9,020	
	A-2-4-24	Grout Treatment Facility	daily	0.2	85,494	0	20,393	17,099	0	4,079	*5
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-19	Grout Worker	day	1	0	0	46,900	0	0	46,900	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	None	Grout Pipes, Packer and Others	L.S.	1	134,867	216	79,889	134,867	216	79,889	*2
	M-J-21	Outer Grout Pipe Dia. 66mm L=1.5m	pcs	0.21	860,625	0	45,296	180,731	0	9,512	
	M-J-23	Inner Grout Pipe Dia. 66mm L=1.5m	pcs	0.21	745,875	0	39,257	156,634	0	8,244	
Working Base Cost											
	CW-10-26	Center Plant	prty dy	0.2	238,283	2,174	118,950	47,657	435	23,790	
Others											
Total for		1 day						1,142,954	1,774	604,074	
Unit Cost for		1 hour						120,311	187	63,587	
Unit Cost for		1 m						250,247	388	132,260	

Note : *1 : Cost of Center Plant is excluded.

*2 : 40% of sum total of Grout Pump and Grout Pressure Meter.

*3 : Grout Outer and Inner Pipes

L :	Mean length from starting point to the stage excluded final stage	25 m
U :	Length of Pipes	1.5 m
m :	Mean length of pipes from starting point to the stage excluded final stage :	16.7 pieces
Ls :	The Length of 1.0 Stage	5 m
Te :	Equipment Operating Time	9.5 hours/day
Tg :	Work Time of Grout	9.5 hours/day
hence,	The Number of Pieces of Grout Outer and Inner Pipes :	0.21 pieces/day

*4 :

Vg :	The Amount of Cement	20 kg/m
Dc :	Density of Cement in Cement Milk	0.08 kg/litre
Ve :	Mean Velocity of Grout Pump	2 litre/min
Tgs :	Grout Time at 1.0m	2.08 hours/m

*5 : The Average Number of Party of Grout Work : 5 parties

hence, 1 day working / 5 parties = 0.2 parties

Table 4.1.5 (17/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-24	Grout Work Dia. 44mm (1)	1 day	Case that there is a center paint

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
	A-2-2-26	Grout Pressure Meter; 120 l/min	daily	1	428,848	0	230,918	428,848	0	230,918	
	A-2-2-24	Grout Mixer; 2x200 ltr 2.3kw Yoko	daily	1	45,124	259	35,784	45,124	259	35,784	
	A-2-4-23	Grout Data Recorder	daily	1	21,373	0	9,020	21,373	0	9,020	
	A-2-4-24	Grout Treatment Facility	daily	0.2	85,494	0	20,393	17,099	0	4,079	*5
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-19	Grout Worker	day	1	0	0	46,900	0	0	46,900	
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	None	Grout Pipes, Packer and Others	L.S.	1	134,867	216	79,889	134,867	216	79,889	*2
	M-J-20	Outer Grout Pipe Dia. 46mm L=1.5m	pcs	0.21	803,250	0	42,276	168,683	0	8,878	
	M-J-22	Inner Grout Pipe Dia. 46mm L=1.5m	pcs	0.21	688,500	0	36,237	144,585	0	7,610	
Working Base Cost											
	CW-10-26	Center Plant	prty dy	0.2	238,283	2,174	118,950	47,657	435	23,790	
Others											
Total for		1 day						1,118,857	1,774	602,806	
Unit Cost for		1 hour						117,774	187	63,453	
Unit Cost for		1 m						244,971	388	131,983	

Note : *1 : Cost of Center Plant is excluded.
*2 : 40% of sum total of Grout Pump and Grout Pressure Meter.
*3 : Grout Outer and Inner Pipes

L :	Mean length from starting point to the stage excluded final stage	25	m
L' :	Length of Pipes	1.5	m
m :	Mean length of pipes from starting point to the stage excluded final stage :	16.7	pieces
Ls :	The Length of 1.0 Stage	5	m
Te :	Equipment Operating Time	9.5	hours/day
Tg :	Work Time of Grout	9.5	hours/day
hence,	The Number of Pieces of Grout Outer and Inner Pipes :	0.21	pieces/day
*4 : Vg :	The Amount of Cement	20	kg/m
Dc :	Density of Cement in Cement Milk	0.08	kg/litre
Ve :	Mean Velocity of Grout Pump	2	litre/min
Tgs :	Grout Time at 1.0m	2.08	hours/m
*5 :	The Average Number of Party of Grout Work :	5	parties
hence,	1 day working / 5 parties =	0.2	parties

Table 4.1.5 (18/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-25	Grout Work Dia. 44mm (2)	1 day	Case that there is indipendent paint

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-27	Grout Pump; 37-100 l/min 7.8kw Yoko	daily	1	110,621	864	88,638	110,621	864	88,638	
	A-2-2-26	Grout Pressure Meter; 120 l/min	daily	1	428,848	0	230,918	428,848	0	230,918	
	A-2-2-24	Grout Mixer; 2x200 ltr 2.3kw Yoko	daily	1	45,124	259	35,784	45,124	259	35,784	
	A-2-4-23	Grout Data Recorder	daily	1	21,373	0	9,020	21,373	0	9,020	
	A-2-4-24	Grout Treatment Facility	daily	1	85,494	0	20,393	85,494	0	20,393	
Labour											
	L-2-1	Foreman	day	0.6	0	0	48,800	0	0	29,280	
	L-2-19	Grout Worker	day	1	0	0	46,900	0	0	46,900	
	L-2-23	Common Labour	day	2	0	0	35,100	0	0	70,200	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	None	Grout Pipes, Packer and Others	L.S.	1	134,867	216	79,889	134,867	216	79,889	*2
	M-J-20	Outer Grout Pipe Dia. 46mm L=1.5m	pcs	0.21	803,250	0	42,276	168,683	0	8,878	
	M-J-22	Inner Grout Pipe Dia. 46mm L=1.5m	pcs	0.21	688,500	0	36,237	144,585	0	7,610	
Others											
Total for		1 day						1,139,595	1,339	635,310	
Unit Cost for		1 hour						119,957	141	66,875	
Unit Cost for		1 m						249,511	293	139,099	

Note : *1 : Cost of Center Plant is excluded.
*2 : 40% of sum total of Grout Pump and Grout Pressure Meter.
*3 : Grout Outer and Inner Pipes

L :	Mean length from starting point to the stage excluded final stage	25 m
L' :	Length of Pipes	1.5 m
m :	Mean length of pipes from starting point to the stage excluded final stage :	16.7 pieces
Ls :	The Length of 1.0 Stage	5 m
Te :	Equipment Operating Time	9.5 hours/day
Tg :	Work Time of Grout	9.5 hours/day
hence,	The Number of Pieces of Grout Outer and Inner Pipes :	0.21 pieces/day
*4 : Vg :	The Amount of Cement	20 kg/m
Dc :	Density of Cement in Cement Milk	0.08 kg/litre
Vc :	Mean Velocity of Grout Pump	2 litre/min
Tgs :	Grout Time at 1.0m	2.08 hours/m

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-26	Center Plant	1 Day	9.5hour Operation

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
		Grout Center Plant									
	A-2-2-38	Automatic 150litre/min	daily	1	1,114,557	0	470,804	1,114,557	0	470,804	
	A-2-2-5	Cement Silo; 30 ton, 20t/h	daily	1	7,768	0	3,276	7,768	0	3,276	
	A-2-3-20	Screw Conveyer; 20 t/h per	hourly	9.5	5,781	0	1,304	54,924	0	12,386	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-19	Grout Worker	day	0.5	0	0	46,900	0	0	23,450	
	L-2-23	Common Labour	day	0.5	0	0	35,100	0	0	17,550	
	L-2-5	Mechanic	day	0.1	0	0	39,000	0	0	3,900	
	L-2-4	Electrician	day	0.1	0	0	39,000	0	0	3,900	
Material											
	M-K-15	Electrical Charge	kWh	295.45	0	36	84	0	10,636	24,818	
Working Base Cost											
	CW-1-46	Excavation A	m3	6	2,361	39	1,711	14,166	234	10,266	
Others											
Total for		1 Day						1,191,415	10,870	594,750	
Unit Cost for		1 prty dy						238,283	2,174	118,950	

Note : *1 : Operating Time at a Day : 9.5 hours
*2 : Electrical Charge :

Grout Center Plant :	60 kW
Screw Conveyer :	2.2 kW
Total :	62.2
Comsumpion Rate of Electricity :	50 % of Total kW
Amout of Electrical Charge :	31.1 kWh/h

*3 : The Average Number of Party of Grout Work : 5 parties

Table 4.1.5 (19/19) UNIT RATE CALCULATION TABLE OF DRILLING AND GROUT WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-10-27	Displacement Measuring System	1 place	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
		Observation Equipment	L.S.	1	500,000	0	500,000	500,000	0	500,000	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	Installation & Removal
	L-2-23	Common Labour	day	2	0	0	35,100	0	0	70,200	Installation & Removal
Material											
	None	Cement Milk	m3	0.170973	0	0	100,000	0	0	17,097	
Others											
Total for		1 place						500,000	0	611,697	
Unit Cost for		1 place						500,000	0	611,697	

Note : *1 : Amount of Cement Milk 0.033 m x 0.033 m x 3.14 x 50 m long = 0.170973 m3

Table 4.1.6 (1/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-1	RippingWork by Bulldozer of 21ton	100 m3	Work Volume : less than 20,000m3/month

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-24	Bulldozer, 21 ton with Ripper	hourly	0.71	158,277	3,720	149,900	112,376	2,641	106,429	
Others		Miscellaneous						624	359	571	
Total for	100 m3							113,000	3,000	107,000	
Unit Cost for	1 m3							1,130	30	1,070	

Note : *1 : The Number of Ripper : 2 pieces
*2 : Area of a Ripper : (a) : 0.28
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.45
*5 : Working Time at 1 cycle(Cm) Cm = (1/24) x L + 0.25 = 1 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times a \times L \times E}{Cm}$
hence, Q = 140 m3/hour
hence, T1 = 0.71 hour/1000m3
*7 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-2	RippingWork by Bulldozer of 32ton	100 m3	Work Volume : less than 20,000m3/month

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-29	Bulldozer, 32 ton with Ripper	hourly	0.40	237,733	5,280	223,921	95,093	2,112	89,568	
Others		Miscellaneous						907	888	432	
Total for	100 m3							96,000	3,000	90,000	
Unit Cost for	1 m3							960	30	900	

Note : *1 : The Number of Ripper : 3 pieces
*2 : Area of a Ripper : (a) : 0.5
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.45
*5 : Working Time at 1 cycle(Cm) Cm = (1/24) x L + 0.25 = 1 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times a \times L \times E}{Cm}$
hence, Q = 250 m3/hour
hence, T1 = 0.40 hour/1000m3
*7 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-3	Clay Excavation by Bulldozer of 21ton - 1	100 m3	Bulldozer : with Ripper, Original Soil, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-24	Bulldozer, 21 ton with Ripper	hourly	1.19	158,277	3,720	149,900	188,349	4,427	178,381	
Others		Miscellaneous						651	573	619	
Total for	100 m3							189,000	5,000	179,000	
Unit Cost for	1 m3							1,890	50	1,790	

Note : *1 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 1.000
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.65 Original Clay, common
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.320 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 84.2 m3/hour
hence, T1 = 1.19 hour/1000m3
*7 : Unit is the volume of original

Table 4.1.6 (2/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-4	Clay Excavation by Bulldozer of 21ton - 2	100 m3	Bulldozer : with Ripper, Original Soil, L=30m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-24	Bulldozer; 21 ton with Ripper	hourly	1.43	158,277	3,720	149,900	226,336	5,320	214,357	
Others		Miscellaneous						664	680	643	
Total for	100 m3							227,000	6,000	215,000	
Unit Cost for	1 m3							2,270	60	2,150	

Note : *1 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 — 1.000
*3 : Distances at 1 cycle (L) : 30 m
*4 : Work Efficiency (E) : 0.65 Original Clay, common
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.590 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 69.91 m3/hour
hence, T1 = 1.43 hour/1000m3
*7 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-5	Cobble Excavation by Bulldozer of 21ton - 1	100 m3	Bulldozer : with Ripper, Original Soil, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-24	Bulldozer; 21 ton with Ripper	hourly	1.72	158,277	3,720	149,900	272,236	6,398	257,828	
Others		Miscellaneous						764	602	172	
Total for	100 m3							273,000	7,000	258,000	
Unit Cost for	1 m3							2,730	70	2,580	

Note : *1 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 — 1.000
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.45 origonal cobble, common
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.320 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 58.3 m3/hour
hence, T1 = 1.72 hour/1000m3
*7 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-6	Cobble Excavation by Bulldozer of 21ton - 2	100 m3	Bulldozer : with Ripper, Original Soil, L=30m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-24	Bulldozer; 21 ton with Ripper	hourly	2.07	158,277	3,720	149,900	327,633	7,700	310,293	
Others		Miscellaneous						367	300	707	
Total for	100 m3							328,000	8,000	311,000	
Unit Cost for	1 m3							3,280	80	3,110	

Note : *1 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 — 1.000
*3 : Distances at 1 cycle (L) : 30 m
*4 : Work Efficiency (E) : 0.45 origonal cobble, common
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.590 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 48.4 m3/hour
hence, T1 = 2.07 hour/1000m3
*7 : Unit is the original volume

Table 4.1.6 (3/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-7	Loosed Soft Rock Excavation by Bulldozer of 21ton - 1	100 m3	Bulldozer : with Ripper, Loosed Rock, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-24	Bulldozer, 21 ton with Ripper	hourly	1.54	158,277	3,720	149,900	243,746	5,729	230,846	
Others		Miscellaneous						254	271	154	
Total for	100 m3							244,000	6,000	231,000	
Unit Cost for	1 m3							2,440	60	2,310	

Note : *1 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 — 1.000
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.5 loosed soft rock, common
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.320 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 64.77 m3/hour
hence, T1 = 1.54 hour/1000m3
*7 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-8	Loosed Soft Rock Excavation by Bulldozer of 21ton - 2	100 m3	Bulldozer : with Ripper, Loosed Rock, L=30m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-24	Bulldozer, 21 ton with Ripper	hourly	1.86	158,277	3,720	149,900	294,395	6,919	278,814	
Others		Miscellaneous						605	81	186	
Total for	100 m3							295,000	7,000	279,000	
Unit Cost for	1 m3							2,950	70	2,790	

Note : *1 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 — 1
*3 : Distances at 1 cycle (L) : 30 m
*4 : Work Efficiency (E) : 0.5 loosed soft rock, common
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 2 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 53.77 m3/hour
hence, T1 = 1.86 hour/1000m3
*7 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-9	Clay Excavation by Bulldozer of 32ton - 1	100 m3	Bulldozer : with Ripper, Original Soil, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-29	Bulldozer, 32 ton with Ripper	hourly	0.73	237,733	5,280	223,921	173,545	3,854	163,462	
Others		Miscellaneous						455	146	538	
Total for	100 m3							174,000	4,000	164,000	
Unit Cost for	1 m3							1,740	40	1,640	

Note : *1 : Excavation at 1 cycle (q) : 4.64 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 hence, 1.000
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.65 clay, common
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.320 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 137.09 m3/hour
hence, T1 = 0.73 hour/1000m3
*7 : Unit is the volume of original

Table 4.1.6 (4/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-10	Clay Excavation by Bulldozer of 32ton - 2	100 m3	Bulldozer : with Ripper, Original Soil, L=30m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-29	Bulldozer, 32 ton with Ripper	hourly	0.88	237,733	5,280	223,921	209,205	4,646	197,050	
Others		Miscellaneous						795	354	950	
Total for	100 m3							210,000	5,000	198,000	
Unit Cost for	1 m3							2,100	50	1,980	

Note : *1 : Excavation at 1 cycle (q) : 4.64 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 hence, 1.0
*3 : Distances at 1 cycle (L) : 30 m
*4 : Work Efficiency (E) : 0.65 Clay Common
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.590 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 113.81 m3/hour
hence, T1 = 0.88 hour/1000m3
*7 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-11	Cobble Excavation by Bulldozer of 32ton - 1	100 m3	Bulldozer : with Ripper, Original Soil, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-29	Bulldozer, 32 ton with Ripper	hourly	1.05	237,733	5,280	223,921	249,620	5,544	235,117	
Others		Miscellaneous						380	456	883	
Total for	100 m3							250,000	6,000	236,000	
Unit Cost for	1 m3							2,500	60	2,360	

Note : *1 : Excavation at 1 cycle (q) : 4.64 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 hence, 1.000
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.45 origonal cobble, common
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.320 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 94.91 m3/hour
hence, T1 = 1.05 hour/1000m3
*7 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-12	Cobble Excavation by Bulldozer of 32ton - 2	100 m3	Bulldozer : with Ripper, Original Soil, L=30m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-29	Bulldozer, 32 ton with Ripper	hourly	1.27	237,733	5,280	223,921	301,921	6,706	284,380	
Others		Miscellaneous						79	294	620	
Total for	100 m3							302,000	7,000	285,000	
Unit Cost for	1 m3							3,020	70	2,850	

Note : *1 : Excavation at 1 cycle (q) : 4.64 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 1.000
*3 : Distances at 1 cycle (L) : 30 m
*4 : Work Efficiency (E) : 0.45 origonal cobble, common
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.590 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 78.79 m3/hour
hence, T1 = 1.27 hour/1000m3
*7 : Unit is the original volume

Table 4.1.6 (5/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-13	Loosed Soft Rock Excavation by Bulldozer of 32ton - 1	100 m3	Bulldozer : with Ripper, Loosed Rock, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-29	Bulldozer, 32 ton with Ripper	hourly	0.95	237,733	5,280	223,921	225,846	5,016	212,725	
Others		Miscellaneous						154	984	275	
Total for	100 m3							226,000	6,000	213,000	
Unit Cost for	1 m3							2,260	60	2,130	

Note : *1 : Excavation at 1 cycle (q) : 4.64 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 hence, 1
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.5 Loosed Soft Rock, common
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 105.45 m3/hour
hence, T1 = 0.95 hour/1000m3
*7 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-14	Loosed Soft Rock Excavation by Bulldozer of 32ton - 2	100 m3	Bulldozer : with Ripper, Loosed Rock, L=30m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-29	Bulldozer, 32 ton with Ripper	hourly	1.14	237,733	5,280	223,921	271,016	6,019	255,270	
Others		Miscellaneous						984	981	730	
Total for	100 m3							272,000	7,000	256,000	
Unit Cost for	1 m3							2,720	70	2,560	

Note : *1 : Excavation at 1 cycle (q) : 4.64 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 1.00
*3 : Distances at 1 cycle (L) : 30 m
*4 : Work Efficiency (E) : 0.5 Loosed Soft Rock, common
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.59 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 87.55 m3/hour
hence, T1 = 1.14 hour/1000m3
*7 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-15	Combined Excavation ; Ripper Bull : 21ton	100 m3	Ripping & Excavation

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-24	Bulldozer, 21 ton with Ripper	hourly	0.75	158,277	3,720	149,900	118,708	2,790	112,425	Ripping & Excavation
	A-2-1-24	Bulldozer, 21 ton with Ripper	hourly	1.50	158,277	3,720	149,900	237,415	5,580	224,850	Excavation
Others		Miscellaneous						877	630	725	
Total for	100 m3							357,000	9,000	338,000	
Unit Cost for	1 m3							3,570	90	3,380	

Rippping
*1 : The No. of Ripper Bulldozer 1 ripper bulldozer
*2 : The Number of Ripper : 2 pieces
*3 : Area of a Ripper : (a) : 0.28 m2
*4 : Distances at 1 cycle (L) : 20 m
*5 : Work Efficiency (E) : 0.45
*6 : Working Time at 1 cycle(Cm) Cm = (1/24) x L + 0.25 = 1.08 minutes
*7 : Work Volume at 1 hour (Q) : $QR = \frac{60 \times a \times L \times E}{Cm}$
hence, QR = 140 m3/hour

Excavation
*8 : The Number of Bulldozer(N) 3 ripper bulldozer They includes one bulldozer which also work for ripping.
(1+2)
*9 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*10 : Exchange Rate for Soil (f) : 1 soft rock hence, 1.00
*11 : Distances at 1 cycle (L) : 20 m
*12 : Work Efficiency (E) : 0.5 Loosed Soft Rock, common
*13 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.32 minutes
*14 : Work Volume at 1 hour (Q) : QB = Qb = $\frac{60 \times q \times f \times E}{Cm}$
hence, QB = Qb = 64.77 m3/hour
*15 : Combined Time (QN) : $QN = \frac{QR \times (QB + (N-1) \times Qb)}{QR + QB}$
hence, QN = 133 m3/hour
TN = 0.75 hour/100m3
*16 : Unit is the volume of original

Table 4.1.6 (6/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-16	Combined Excavation ; Ripper Bull : 32ton	100 m3	Ripping & Excavation

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-24	Bulldozer; 21 ton with Ripper	hourly	0.45	158,277	3,720	149,900	71,225	1,674	67,455	Ripping & Excavation
	A-2-1-24	Bulldozer; 21 ton with Ripper	hourly	0.90	158,277	3,720	149,900	142,449	3,348	134,910	Excavation
Others		Miscellaneous						326	978	635	
Total for	100 m3							214,000	6,000	203,000	
Unit Cost for	1 m3							2,140	60	2,030	

Rippping

*1 : The No. of Ripper Bulldozer 1 ripper bulldozer

*2 : The Number of Ripper : 3 pieces

*3 : Area of a Ripper : (a) : 0.5 m2

*4 : Distances at 1 cycle (L) : 20 m

*5 : Work Efficiency (E) : 0.45

*6 : Working Time at 1 cycle(Cm) Cm = (1/24) x L + 0.25 = 1.08 minutes

*7 : Work Volume at 1 hour (Q) : $QR = \frac{60 \times a \times L \times E}{Cm}$

hence, QR = 250 m3/hour

Excavation

*8 : The Number of Bulldozer(N) 3 ripper bulldozer (1+2) They includes one bulldozer which also work for ripping.

*9 : Excavation at 1 cycle (q) : 4.64 m3/cycle

*10 : Exchange Rate for Soil (f) : 1 1.00

*11 : Distances at 1 cycle (L) : 20 m

*12 : Work Efficiency (E) : 0.5 Loosed Soft Rock, common

*13 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.32 minutes

*14 : Work Volume at 1 hour (Q) : QB = Qb = $\frac{60 \times q \times f \times E}{Cm}$

hence, QB = Qb = 105.45 m3/hour

*15 : Combined Time (QN) : $QN = \frac{QR \times (QB + (N-1) \times Qb)}{QR + QB}$

hence, QN = 223 m3/hour

TN = 0.45 hour/100m3

*16 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-17	Bench Cutting for Dam Bench : 2.5m (1)	100 m3	Soft Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-45	Crawler Drill; 150 kg	hourly	4.5	420,361	1,116	270,407	1,891,625	5,022	1,216,831	
	A-2-1-28	Bulldozer; 32 ton for Rock	hourly	0.5	472,235	4,680	421,566	236,118	2,340	210,783	
Labour											
	L-2-1	Foreman	day	0.9	0	0	48,800	0	0	43,920	
	L-2-10	Drill Worker	day	1.8	0	0	39,000	0	0	70,200	
	L-2-23	Common Labour	day	2.1	0	0	35,100	0	0	73,710	
Material											
	M-J-1	Dynamite	kg	1.4	16,352	0	861	22,893	0	1,205	
	M-J-2	AN-FO	kg	25.6	2,747	0	145	70,326	0	3,701	
	M-J-3	Electrical Detonator	pcs	13	9,811	0	516	127,545	0	6,713	
	M-J-5	Bit; Dia.65mm	pcs	0.37	1,015,538	0	53,449	375,749	0	19,776	
	M-J-7	Rod; Dia.38mm	pcs	0.16	860,625	0	45,296	137,700	0	7,247	
	M-J-9	Shank Rod	pcs	0.16	442,693	0	23,300	70,831	0	3,728	
	M-J-10	Sleeve	pcs	0.2	177,010	0	9,316	35,402	0	1,863	
Others		Miscellaneous						812	638	322	
Total for	100 m3							2,969,000	8,000	1,660,000	
Unit Cost for	1 m3							29,690	80	16,600	

Table 4.1.6 (7/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-18	Bench Cutting for Dam Bench : 2.5m (2)	100 m3	Hard Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-45	Crawler Drill; 150 kg	hourly	5.2	420,361	1,116	270,407	2,185,878	5,803	1,406,116	
	A-2-1-28	Bulldozer; 32 ton for Rock	hourly	0.5	472,235	4,680	421,566	236,118	2,340	210,783	
Labour											
	L-2-1	Foreman	day	1	0	0	48,800	0	0	48,800	
	L-2-10	Drill Worker	day	2.1	0	0	39,000	0	0	81,900	
	L-2-23	Common Labour	day	2.4	0	0	35,100	0	0	84,240	
Material											
	M-J-1	Dynamite	kg	1.5	16,352	0	861	24,528	0	1,291	
	M-J-2	AN-FO	kg	27.5	2,747	0	145	75,546	0	3,976	
	M-J-3	Electrical Detonator	pcs	14	9,811	0	516	137,356	0	7,229	
	M-J-5	Bit; Dia.65mm	pcs	0.53	1,015,538	0	53,449	538,235	0	28,328	
	M-J-7	Rod; Dia.38mm	pcs	0.27	860,625	0	45,296	232,369	0	12,230	
	M-J-9	Shank Rod	pcs	0.22	442,693	0	23,300	97,392	0	5,126	
	M-J-10	Sleeve	pcs	0.31	177,010	0	9,316	54,873	0	2,888	
Others		Miscellaneous						706	857	93	
Total for	100 m3							3,583,000	9,000	1,893,000	
Unit Cost for	1 m3							35,830	90	18,930	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-19	Bench Cutting for Dam Bench : 5.0m (1)	100 m3	Soft Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-45	Crawler Drill; 150 kg	hourly	2.6	420,361	1,116	270,407	1,092,939	2,902	703,058	
	A-2-1-28	Bulldozer; 32 ton for Rock	hourly	0.8	472,235	4,680	421,566	377,788	3,744	337,253	
Labour											
	L-2-1	Foreman	day	0.6	0	0	48,800	0	0	29,280	
	L-2-10	Drill Worker	day	1	0	0	39,000	0	0	39,000	
	L-2-23	Common Labour	day	1.4	0	0	35,100	0	0	49,140	
Material											
	M-J-1	Dynamite	kg	0.5	16,352	0	861	8,176	0	430	
	M-J-2	AN-FO	kg	26.5	2,747	0	145	72,799	0	3,832	
	M-J-3	Electrical Detonator	pcs	4.9	9,811	0	516	48,075	0	2,530	
	M-J-5	Bit; Dia.65mm	pcs	0.25	1,015,538	0	53,449	253,884	0	13,362	
	M-J-7	Rod; Dia.38mm	pcs	0.11	860,625	0	45,296	94,669	0	4,983	
	M-J-9	Shank Rod	pcs	0.11	442,693	0	23,300	48,696	0	2,563	
	M-J-10	Sleeve	pcs	0.14	177,010	0	9,316	24,781	0	1,304	
Others		Miscellaneous						93	54	65	
Total for	100 m3							2,021,900	6,700	1,186,800	
Unit Cost for	1 m3							20,219	67	11,868	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-20	Bench Cutting for Dam Bench : 5.0m (2)	100 m3	Hard Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-45	Crawler Drill; 150 kg	hourly	3	420,361	1,116	270,407	1,261,083	3,348	811,221	
	A-2-1-28	Bulldozer; 32 ton for Rock	hourly	0.8	472,235	4,680	421,566	377,788	3,744	337,253	
Labour											
	L-2-1	Foreman	day	0.7	0	0	48,800	0	0	34,160	
	L-2-10	Drill Worker	day	1.2	0	0	39,000	0	0	46,800	
	L-2-23	Common Labour	day	1.7	0	0	35,100	0	0	59,670	
Material											
	M-J-1	Dynamite	kg	0.6	16,352	0	861	9,811	0	516	
	M-J-2	AN-FO	kg	28.4	2,747	0	145	78,018	0	4,106	
	M-J-3	Electrical Detonator	pcs	5.2	9,811	0	516	51,018	0	2,685	
	M-J-5	Bit; Dia.65mm	pcs	0.36	1,015,538	0	53,449	365,594	0	19,242	
	M-J-7	Rod; Dia.38mm	pcs	0.18	860,625	0	45,296	154,913	0	8,153	
	M-J-9	Shank Rod	pcs	0.15	442,693	0	23,300	66,404	0	3,495	
	M-J-10	Sleeve	pcs	0.21	177,010	0	9,316	37,172	0	1,956	
Others		Miscellaneous						99	8	42	
Total for	100 m3							2,401,900	7,100	1,329,300	
Unit Cost for	1 m3							24,019	71	13,293	

Table 4.1.6 (8/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-21	Small Bench Cutting for Dam (1)	100 m3	Soft Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-32	Leg Hammer; 40 kg	daily	2.7	45,409	0	16,027	122,603	0	43,272	
	A-2-2-6	Compressor; 10.5-11 m3/min	daily	0.91	319,521	11,520	248,930	290,764	10,483	226,526	
	A-2-1-28	Bulldozer; 32 ton for Rock	hourly	0.9	472,235	4,680	421,566	425,012	4,212	379,409	
Labour											
	L-2-1	Foreman	day	0.6	0	0	48,800	0	0	29,280	
	L-2-10	Drill Worker	day	2.7	0	0	39,000	0	0	105,300	
	L-2-23	Common Labour	day	3	0	0	35,100	0	0	105,300	
Material											
	M-J-1	Dynamite	kg	25	16,352	0	861	408,797	0	21,516	
	M-J-3	Electrical Detonator	pcs	40	9,811	0	516	392,445	0	20,655	
	M-J-5	Bit; Dia.65mm	pcs	0.8	1,015,538	0	53,449	812,430	0	42,759	
	M-J-7	Rod; Dia.38mm	pcs	0.6	860,625	0	45,296	516,375	0	27,178	
Others		Miscellaneous						74	5	5	
Total for	100 m3							2,968,500	14,700	1,001,200	
Unit Cost for	1 m3							29,685	147	10,012	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-22	Small Bench Cutting for Dam (2)	100 m3	Hard Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-32	Leg Hammer; 40 kg	daily	3.2	45,409	0	16,027	145,308	0	51,285	
	A-2-2-6	Compressor; 10.5-11 m3/min	daily	1.05	319,521	11,520	248,930	335,497	12,096	261,376	
	A-2-1-28	Bulldozer; 32 ton for Rock	hourly	0.9	472,235	4,680	421,566	425,012	4,212	379,409	
Labour											
	L-2-1	Foreman	day	0.6	0	0	48,800	0	0	29,280	
	L-2-10	Drill Worker	day	3.1	0	0	39,000	0	0	120,900	
	L-2-23	Common Labour	day	3.4	0	0	35,100	0	0	119,340	
Material											
	M-J-1	Dynamite	kg	27	16,352	0	861	441,501	0	23,237	
	M-J-3	Electrical Detonator	pcs	45	9,811	0	516	441,501	0	23,237	
	M-J-5	Bit; Dia.65mm	pcs	1.3	1,015,538	0	53,449	1,320,199	0	69,484	
	M-J-7	Rod; Dia.38mm	pcs	0.9	860,625	0	45,296	774,563	0	40,766	
Others		Miscellaneous						21	92	85	
Total for	100 m3							3,883,600	16,400	1,118,400	
Unit Cost for	1 m3							38,836	164	11,184	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-23	Excavation for Gallary (1)	100 m3	Soft Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-32	Leg Hammer; 40 kg	daily	3.1	45,409	0	16,027	140,767	0	49,682	
	A-2-2-6	Compressor; 10.5-11 m3/min	daily	1.03	319,521	11,520	248,930	329,107	11,866	256,397	
	A-2-1-8	Backhoe; 0.6 m3 for Rock	hourly	2.9	138,097	2,040	99,246	400,482	5,916	287,812	
Labour											
	L-2-1	Foreman	day	1.1	0	0	48,800	0	0	53,680	
	L-2-10	Drill Worker	day	1.9	0	0	39,000	0	0	74,100	
	L-2-23	Common Labour	day	1.1	0	0	35,100	0	0	38,610	
Material											
	M-J-1	Dynamite	kg	18	16,352	0	861	294,334	0	15,491	
	M-J-2	AN-FO	kg	12	2,747	0	145	32,965	0	1,735	
	M-J-3	Electrical Detonator	pcs	32	9,811	0	516	313,956	0	16,524	
	M-J-5	Bit; Dia.65mm	pcs	1	1,015,538	0	53,449	1,015,538	0	53,449	
	M-J-7	Rod; Dia.38mm	pcs	0.7	860,625	0	45,296	602,438	0	31,707	
Others		Miscellaneous						14	18	11	
Total for	100 m3							3,129,600	17,800	879,200	
Unit Cost for	1 m3							31,296	178	8,792	

Table 4.1.6 (9/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-24	Excavation for Gallary (2)	100 m3	Hard Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-32	Leg Hammer; 40 kg	daily	3.8	45,409	0	16,027	172,553	0	60,901	
	A-2-2-6	Compressor; 10.5-11 m3/min	daily	1.27	319,521	11,520	248,930	405,792	14,630	316,141	
	A-2-1-8	Backhoe; 0.6 m3 for Rock	hourly	2.9	138,097	2,040	99,246	400,482	5,916	287,812	
Labour											
	L-2-1	Foreman	day	1.4	0	0	48,800	0	0	68,320	
	L-2-10	Drill Worker	day	2.3	0	0	39,000	0	0	89,700	
	L-2-23	Common Labour	day	1.4	0	0	35,100	0	0	49,140	
Material											
	M-J-1	Dynamite	kg	18	16,352	0	861	294,334	0	15,491	
	M-J-2	AN-FO	kg	12	2,747	0	145	32,965	0	1,735	
	M-J-3	Electrical Detonator	pcs	32	9,811	0	516	313,956	0	16,524	
	M-J-5	Bit; Dia.65mm	pcs	1	1,015,538	0	53,449	1,015,538	0	53,449	
	M-J-7	Rod; Dia.38mm	pcs	0.7	860,625	0	45,296	602,438	0	31,707	
Others		Miscellaneous						43	54	79	
Total for	100 m3							3,238,100	20,600	991,000	
Unit Cost for	1 m3							32,381	206	9,910	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-25	Excavation at Quarry Site: Bench; 8m high (1)	100 m3	Soft Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-46	Crawler Drill; 180 kg	hourly	1.8	477,530	1,440	307,871	859,554	2,592	554,168	
	A-2-1-28	Bulldozer; 32 ton for Rock	hourly	0.7	472,235	4,680	421,566	330,565	3,276	295,096	
Labour											
	L-2-1	Foreman	day	0.5	0	0	48,800	0	0	24,400	
	L-2-10	Drill Worker	day	0.7	0	0	39,000	0	0	27,300	
	L-2-23	Common Labour	day	1.1	0	0	35,100	0	0	38,610	
Material											
	M-J-1	Dynamite	kg	0.3	16,352	0	861	4,906	0	258	
	M-J-2	AN-FO	kg	26.7	2,747	0	145	73,348	0	3,860	
	M-J-3	Electrical Detonator	pcs	2.8	9,811	0	516	27,471	0	1,446	
	M-J-5	Bit; Dia.65mm	pcs	0.22	1,015,538	0	53,449	223,418	0	11,759	
	M-J-7	Rod; Dia.38mm	pcs	0.1	860,625	0	45,296	86,063	0	4,530	
	M-J-9	Shank Rod	pcs	0.1	442,693	0	23,300	44,269	0	2,330	
	M-J-10	Sleeve	pcs	0.12	177,010	0	9,316	21,241	0	1,118	
Others		Miscellaneous						65	32	25	
Total for	100 m3							1,670,900	5,900	964,900	
Unit Cost for	1 m3							16,709	59	9,649	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-26	Excavation at Quarry Site: Bench; 8m high (2)	100 m3	Hard Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-46	Crawler Drill; 180 kg	hourly	2	477,530	1,440	307,871	955,060	2,880	615,742	
	A-2-1-28	Bulldozer; 32 ton for Rock	hourly	0.7	472,235	4,680	421,566	330,565	3,276	295,096	
Labour											
	L-2-1	Foreman	day	0.6	0	0	48,800	0	0	29,280	
	L-2-10	Drill Worker	day	0.8	0	0	39,000	0	0	31,200	
	L-2-23	Common Labour	day	1.3	0	0	35,100	0	0	45,630	
Material											
	M-J-1	Dynamite	kg	0.3	16,352	0	861	4,906	0	258	
	M-J-2	AN-FO	kg	28.7	2,747	0	145	78,842	0	4,150	
	M-J-3	Electrical Detonator	pcs	2.9	9,811	0	516	28,452	0	1,497	
	M-J-5	Bit; Dia.65mm	pcs	0.31	1,015,538	0	53,449	314,817	0	16,569	
	M-J-7	Rod; Dia.38mm	pcs	0.15	860,625	0	45,296	129,094	0	6,794	
	M-J-9	Shank Rod	pcs	0.13	442,693	0	23,300	57,550	0	3,029	
	M-J-10	Sleeve	pcs	0.18	177,010	0	9,316	31,862	0	1,677	
Others		Miscellaneous						52	44	77	
Total for	100 m3							1,931,200	6,200	1,051,000	
Unit Cost for	1 m3							19,312	62	10,510	

Table 4.1.6 (10/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-27	Excavation at Quarry Site; Bench; 15m high (1)	100 m3	Soft Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-46	Crawler Drill; 180 kg	hourly	0.3	477,530	1,440	307,871	143,259	432	92,361	
	A-2-1-30	Bulldozer; 44 ton for Rock	hourly	0.5	621,061	6,000	553,803	310,531	3,000	276,902	
Labour											
	L-2-1	Foreman	day	0.2	0	0	48,800	0	0	9,760	
	L-2-10	Drill Worker	day	0.1	0	0	39,000	0	0	3,900	
	L-2-23	Common Labour	day	0.6	0	0	35,100	0	0	21,060	
Material											
	M-J-1	Dynamite	kg	0.1	16,352	0	861	1,635	0	86	
	M-J-2	AN-FO	kg	30.9	2,747	0	145	84,886	0	4,468	
	M-J-3	Electrical Detonator	pcs	0.4	9,811	0	516	3,924	0	207	
	M-J-4	Bit; Dia.100mm	pcs	0.05	1,497,488	0	78,815	74,874	0	3,941	
	M-J-8	Rod; Dia.44mm x L6m	pcs	0.01	3,541,544	0	186,397	35,415	0	1,864	
	M-J-9	Shank Rod	pcs	0.02	442,693	0	23,300	8,854	0	466	
	M-J-10	Sleeve	pcs	0.03	177,010	0	9,316	5,310	0	279	
Others		Miscellaneous						11	68	6	
Total for	100 m3							668,700	3,500	415,300	
Unit Cost for	1 m3							6,687	35	4,153	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-28	Excavation at Quarry Site: Bench; 15m high (2)	100 m3	Hard Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-46	Crawler Drill; 180 kg	hourly	0.4	477,530	1,440	307,871	191,012	576	123,148	
	A-2-1-30	Bulldozer; 44 ton for Rock	hourly	0.5	621,061	6,000	553,803	310,531	3,000	276,902	
Labour											
	L-2-1	Foreman	day	0.3	0	0	48,800	0	0	14,640	
	L-2-10	Drill Worker	day	0.2	0	0	39,000	0	0	7,800	
	L-2-23	Common Labour	day	0.8	0	0	35,100	0	0	28,080	
Material											
	M-J-1	Dynamite	kg	0.1	16,352	0	861	1,635	0	86	
	M-J-2	AN-FO	kg	32.9	2,747	0	145	90,380	0	4,757	
	M-J-3	Electrical Detonator	pcs	0.4	9,811	0	516	3,924	0	207	
	M-J-4	Bit; Dia.100mm	pcs	0.07	1,497,488	0	78,815	104,824	0	5,517	
	M-J-8	Rod; Dia.44mm x L6m	pcs	0.02	3,541,544	0	186,397	70,831	0	3,728	
	M-J-9	Shank Rod	pcs	0.03	442,693	0	23,300	13,281	0	699	
	M-J-10	Sleeve	pcs	0.04	177,010	0	9,316	7,080	0	373	
Others		Miscellaneous						1	24	64	
Total for	100 m3							793,500	3,600	466,000	
Unit Cost for	1 m3							7,935	36	4,660	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-29	Small Breaks of Rock by Giant Breaker	100 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-8	Backhoe; 0.6 m3 for Rock	hourly	7.8	138097.2	2040	99245.57	1,077,158	15,912	774,115	
	A-2-4-1	Breaker; 1300 kg	daily	1.3	665211.4	0	266697.7	864,775	0	346,707	
Labour											
	L-2-1	Foreman	day	1	0	0	48800	0	0	48,800	
	L-2-23	Common Labour	day	1.3	0	0	35100	0	0	45,630	
Material											
	M-J-40	Tizel 1,300kg class	piece	0.2	6885000	0	362368.4	1,377,000	0	72,474	
Others		Miscellaneous						67	88	74	
Total for	100 m3							3,319,000	16,000	1,287,800	
Unit Cost for	1 m3							33,190	160	12,878	

Table 4.1.6 (11/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-30	Small Breaks of Rock by Blasting	100 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-32	Leg Hammer; 40 kg	daily	5.1	45,409	0	16,027	231,584	0	81,735	
	A-2-2-6	Compressor; 10.5-11 m3/min	daily	2.6	319,521	11,520	248,930	830,755	29,952	647,217	
Labour											
	L-2-1	Foreman	day	2.6	0	0	48,800	0	0	126,880	
	L-2-10	Drill Worker	day	5.1	0	0	39,000	0	0	198,900	
	L-2-23	Common Labour	day	5.1	0	0	35,100	0	0	179,010	
Material											
	M-J-1	Dynamite	kg	10	16,352	0	861	163,519	0	8,606	
	M-J-2	AN-FO	kg	34	2,747	0	145	93,402	0	4,916	
	M-J-3	Electrical Detonator	pcs	0.3	9,811	0	516	2,943	0	155	
	M-J-4	Bit; Dia.100mm	pcs	0.2	1,497,488	0	78,815	299,498	0	15,763	
	M-J-8	Rod; Dia.44mm x L6m	pcs	0.01	3,541,544	0	186,397	35,415	0	1,864	
Others		Miscellaneous						84	48	54	
Total for	100 m3							1,657,200	30,000	1,265,100	
Unit Cost for	1 m3							16,572	300	12,651	

Table 4.1.6 (12/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-31	Loading by Wheel Loader 3.1m3 (1)	100 m3	Soil

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-100	Wheel Loader, 3.1 m3 for Ro	hourly	0.86	271,635	3,600	217,608	233,606	3,096	187,143	
Others		Miscellaneous						394	904	857	
Total for	100 m3							234,000	4,000	188,000	
Unit Cost for	1 m3							2,340	40	1,880	

Note : *1 : The Volume at 1 cycle (q) : 2.57 m3
*2 : Exchange Rate for Soil (f) : 1 hence, 1.00
*3 : Work Efficiency (E) : 0.5 Loosed Clay or Cobble
*4 : Working Time at 1 cycle(Cm): Cm = 40 seconds
*5 : Work Volume at 1 hour (Q) : $Q = \frac{3,600 \times q \times f \times E}{Cm}$
hence, Q = 115.65 m3/hour
hence, T1 = 0.86 hour/100m3
*6 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-32	Loading by Wheel Loader 3.1m3 (2)	100 m3	Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-100	Wheel Loader, 3.1 m3 for Ro	hourly	1.24	271,635	3,600	217,608	336,828	4,464	269,834	
Others		Miscellaneous						172	536	166	
Total for	100 m3							337,000	5,000	270,000	
Unit Cost for	1 m3							3,370	50	2,700	

Note : *1 : The Volume at 1 cycle (q) : 2.57 m3
*2 : Exchange Rate for Soil (f) : 1 1.00
*3 : Work Efficiency (E) : 0.35 Breaked Rock, Common
*4 : Working Time at 1 cycle(Cm): Cm = 40 seconds
*5 : Work Volume at 1 hour (Q) : $Q = \frac{3,600 \times q \times f \times E}{Cm}$
hence, Q = 80.96 m3/hour
hence, T1 = 1.24 hour/100m3
*6 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-33	Loading by Wheel Loader 5.4m3 (1)	100 m3	Soil

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-102	Wheel Loader, 5.4 m3 for Ro	hourly	0.49	688,319	5,760	537,966	337,276	2,822	263,603	
Others		Miscellaneous						724	178	397	
Total for	100 m3							338,000	3,000	264,000	
Unit Cost for	1 m3							3,380	30	2,640	

Note : *1 : The Volume at 1 cycle (q) : 4.51 m3
*2 : Exchange Rate for Soil (f) : 1 1.00
*3 : Work Efficiency (E) : 0.5 Loosed Clay or Cobble
*4 : Working Time at 1 cycle(Cm): Cm = 40 seconds
*5 : Work Volume at 1 hour (Q) : $Q = \frac{3,600 \times q \times f \times E}{Cm}$
hence, Q = 202.95 m3/hour
hence, T1 = 0.49 hour/100m3
*6 : Unit is the volume of original condition

Table 4.1.6 (13/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-34	Loading by Wheel Loader 5.4m3 (2)	100 m3	Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-102	Wheel Loader, 5.4 m3 for Roc	hourly	0.70	688,319	5,760	537,966	481,823	4,032	376,576	
Others		Miscellaneous						177	968	424	
Total for	100 m3							482,000	5,000	377,000	
Unit Cost for	1 m3							4,820	50	3,770	

Note : *1 : The Volume at 1 cycle (q) : 4.51 m3
*2 : Exchange Rate for Soil (f) : 1 hence, 1.00
*3 : Work Efficiency (E) : 0.35 Breaked Rock, Common
*4 : Working Time at 1 cycle(Cm): Cm = 40 seconds
*5 : Work Volume at 1 hour (Q) : $Q = \frac{3,600 \times q \times f \times E}{Cm}$
hence, Q = 142.07 m3/hour
hence, T1 = 0.70 hour/100m3
*6 : Unit is the volume of original condition

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-35	Loading by Wheel Loader 10.0m3 (1)	100 m3	Soil

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-98	Wheel Loader, 10 m3 for Roc	hourly	0.26	1,344,991	11,040	1,050,337	349,698	2,870	273,087	
Others		Miscellaneous						302	130	913	
Total for	100 m3							350,000	3,000	274,000	
Unit Cost for	1 m3							3,500	30	2,740	

Note : *1 : The Volume at 1 cycle (q) : 8.62 m3
*2 : Exchange Rate for Soil (f) : 1 1.00
*3 : Work Efficiency (E) : 0.5 Loosed Clay or Cobble
*4 : Working Time at 1 cycle(Cm): Cm = 40 seconds
*5 : Work Volume at 1 hour (Q) : $Q = \frac{3,600 \times q \times f \times E}{Cm}$
hence, Q = 387.9 m3/hour
hence, T1 = 0.26 hour/100m3
*6 : Unit is the volume of original condition

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-36	Loading by Wheel Loader 10.3m3 (2)	100 m3	Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-98	Wheel Loader, 10 m3 for Roc	hourly	0.37	1,344,991	11,040	1,050,337	497,647	4,085	388,625	
Others		Miscellaneous						353	915	375	
Total for	100 m3							498,000	5,000	389,000	
Unit Cost for	1 m3							4,980	50	3,890	

Note : *1 : The Volume at 1 cycle (q) : 8.62 m3
*2 : Exchange Rate for Soil (f) : 1 1.00
*3 : Work Efficiency (E) : 0.35 Breaked Rock, Common
*4 : Working Time at 1 cycle(Cm): Cm = 40 seconds
*5 : Work Volume at 1 hour (Q) : $Q = \frac{3,600 \times q \times f \times E}{Cm}$
hence, Q = 271.53 m3/hour
hence, T1 = 0.37 hour/100m3
*6 : Unit is the volume of original condition

Table 4.1.6 (14/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-37	Loading by Backfoe 1.2m3 (1)	100 m3	Soil

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-15	Backhoe; 1.2 m3	hourly	1.51	217,180	3,480	157,167	327,942	5,255	237,322	
Others		Miscellaneous						58	745	678	
Total for	100 m3							328,000	6,000	238,000	
Unit Cost for	1 m3							3,280	60	2,380	

Note : *1 : The Volume at 1 cycle (q) : 1.18 m3
*2 : Exchange Rate for Soil (f) : 1 hence, 1.00
*3 : Work Efficiency (E) : 0.5 Loosed Clay or Cobble
*4 : Working Time at 1 cycle(Cm): Cm = 32 seconds 135 degree
*5 : Work Volume at 1 hour (Q) : $Q = \frac{3,600 \times q \times f \times E}{Cm}$
hence, Q = 66.38 m3/hour
hence, T1 = 1.51 hour/100m3
*6 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-38	Loading by Backfoe 1.2m3 (2)	100 m3	Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-16	Backhoe; 1.2 m3 for Rock	hourly	1.51	238,898	3,480	171,491	360,736	5,255	258,952	
Others		Miscellaneous						264	745	48	
Total for	100 m3							361,000	6,000	259,000	
Unit Cost for	1 m3							3,610	60	2,590	

Note : *1 : The Volume at 1 cycle (q) : 1.18 m3
*2 : Exchange Rate for Soil (f) : 1 1.00
*3 : Work Efficiency (E) : 0.5 Breaked Rock, Common
*4 : Working Time at 1 cycle(Cm): Cm = 32 seconds 135 degree
*5 : Work Volume at 1 hour (Q) : $Q = \frac{3,600 \times q \times f \times E}{Cm}$
hence, Q = 66.38 m3/hour
hence, T1 = 1.51 hour/100m3
*6 : Unit is the volume of original

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-39	Hauling of Soil Material for Disposal : 1km	100 m3	Soil, Distance: 1km

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-48	Dumptruck; 10 ton	hourly	7.00	77,269	3,060	70,744	540,883	21,420	495,209	
Others		Miscellaneous						117	580	791	
Total for	100 m3							541,000	22,000	496,000	
Unit Cost for	1 m3							5,410	220	4,960	

Note : *1 : The Volume at 1 cycle (q) : 5.5 m3
*2 : Exchange Rate for Soil (f) : 1 1.00
*3 : Work Efficiency (E) : 0.9
*4 : Hauling Distance (L) : 1 km (one way)
*5 : Working Time at 1 cycle(Cm): Cm = $4.8 \times L + \alpha$
α = 16 minutes, hence, Cm = 20.8 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 14.28 m3/hour
hence, T1 = 7.00 hour/100m3
*7 : Unit is the volume of original

Table 4.1.6 (15/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-40	Hauling of Dam Material for Core : 2km	100 m3	for Core from Stockpile

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-48	Dumptruck; 10 ton	hourly	7.38	77,269	3,060	70,744	570,245	22,583	522,092	
Others		Miscellaneous						755	417	908	
Total for	100 m3							571,000	23,000	523,000	
Unit Cost for	1 m3							5,710	230	5,230	

Note : *1 : The Volume at 1 cycle (q) : 5.5 m3
*2 : Exchange Rate for Soil (f) : 1.456 tf/m3 in sotck pile Average Original Soil 1.70 tf/m3
*3 : Work Efficiency (E) : 0.9
*4 : Hauling Distance (L) : 2 km (one way)
*5 : Working Time at 1 cycle(Cm) Cm = 4.8 x L + α
α = 16 minutes, hence, Cm = 25.6 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 13.55 m3/hour
hence, T1 = 7.38 hour/100m3
*7 : Unit is the hauling volume

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-41	Hauling of Dam Material ; Coarse Aggregate: 25km	100 m3	for Core and Filter Embankment and Concrete from Quarry

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-48	Dumptruck; 10 ton	hourly	25.06	77,269	3,060	70,744	1,936,361	76,684	1,772,848	
Others		Miscellaneous						639	316	152	
Total for	100 m3							1,937,000	77,000	1,773,000	
Unit Cost for	1 m3							19,370	770	17,730	

Note : *1 : The Volume at 1 cycle (q) : 4 m3
*2 : Exchange Rate for Soil (f) : 1.6 loosed sand or others hence, 2.50 m3/s
*3 : Work Efficiency (E) : 1
*4 : Hauling Distance (L) : 25 km (one way)
*5 : Working Time at 1 cycle(Cm) Cm = 4.7 day/100m3 of 5.5m3
1.0 day 6.06 hours diriving
*6 : Work Volume at 1 hour (Q) : $Qt = \frac{100 \times 4 / 5.5}{4.7 \times 6.06}$
hence, Qt = 3.989761 m3/hour
hence, T1 = 25.06 hour/100m3
*7 : Unit is the hauling volume

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-42	Hauling of Filter Material : 2km	100 m3	for Core and Filter Embankment from stockpile site

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-48	Dumptruck; 10 ton	hourly	7.73	77,269	3,060	70,744	597,289	23,654	546,852	
Others		Miscellaneous						711	346	148	
Total for	100 m3							598,000	24,000	547,000	
Unit Cost for	1 m3							5,980	240	5,470	

Note : *1 : The Volume at 1 cycle (q) : 4 m3
*2 : Exchange Rate for Soil (f) : 1.63 tf/m3 Fine Aggregate Original Rock 2.50 m3/s
*3 : Work Efficiency (E) : 0.9
*4 : Hauling Distance (L) : 2 km (one way)
*5 : Working Time at 1 cycle(Cm) Cm = 4.8 x L + α
α = 16 minutes, hence, Cm = 25.6 minutes
*6 : Work Volume at 1 hour (Q) : $Qt = \frac{60 \times q \times f \times E}{Cm}$
hence, Qt = 12.94 m3/hour
hence, T1 = 7.73 hour/100m3
*7 : Unit is the hauling volume

Table 4.1.6 (16/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-43	Hauling of Fine Aggregate for Concrete : 25km	100 m3	for Concrete Work from Quarry

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-48	Dumptruck; 10 ton	hourly	26.63	77,269	3,060	70,744	2,057,673	81,488	1,883,916	
Others		Miscellaneous						327	512	84	
Total for	100 m3							2,058,000	82,000	1,884,000	
Unit Cost for	1 m3							20,580	820	18,840	

Note : *1 : The Volume at 1 cycle (q) : 4 m3
*2 : Exchange Rate for Soil (f) : 1.7 loosed sand or others hence, 2.50 m3/s
*3 : Work Efficiency (E) : 1
*4 : Hauling Distance (L) : 25 km (one way)
*5 : Working Time at 1 cycle(Cm) Cm = 4.7 day/100m3 of 5.5m3
1.0 day 6.06 hours diriving
*6 : Work Volume at 1 hour (Q) : Qt = 100 x 4 / 5.5 / 4.7 x 6.06
hence, Qt = 3.755069 m3/hour
hence, Tl = 26.63 hour/100m3
*7 : Unit is the hauling volume

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-44	Hauling of Dam Material ; Hard Rock : 25km	100 m3	for Rock Embankment from Quarry

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-49	Dumptruck; 10 ton for Rock	hourly	39.16	84,996	3,210	77,195	3,328,439	125,704	3,022,937	
Others		Miscellaneous						561	296	63	
Total for	100 m3							3,329,000	126,000	3,023,000	
Unit Cost for	1 m3							33,290	1,260	30,230	

Note : *1 : The Volume at 1 cycle (q) : 4 m3
*2 : Exchange Rate for Soil (f) : 2.5 loosed sand or others hence, 2.50 m3/s
*3 : Work Efficiency (E) : 1
*4 : Hauling Distance (L) : 25 km (one way)
*5 : Working Time at 1 cycle(Cm) Cm = 4.7 day/100m3 of 5.5m3
1.0 day 6.06 hours diriving
*6 : Work Volume at 1 hour (Q) : Qt = 100 x 4 / 5.5 / 4.7 x 6.06
hence, Qt = 2.553447 m3/hour
hence, Tl = 39.16 hour/100m3
*7 : Unit is the hauling volume

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-45	Final Excavation for Dam Foundation	100 m2	Soft Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-35	Pick Hammer	daily	16	5,717	0	2,030	91,471	0	32,481	
	A-2-2-9	Compressor; 7.5 m3/min	daily	4	226,296	8,640	178,225	905,185	34,560	712,901	
Labour											
	L-2-1	Foreman	day	4	0	0	48,800	0	0	195,200	
	L-2-10	Drill Worker	day	20	0	0	39,000	0	0	780,000	
	L-2-23	Common Labour	day	24	0	0	35,100	0	0	842,400	
Others		Miscellaneous						45	40	18	
Total for	100 m2							996,700	34,600	2,563,000	
Unit Cost for	1 m2							9,967	346	25,630	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-46	Foundation Rocks Cleaning	100 m2	Soft Rock

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-2-9	Compressor; 7.5 m3/min	daily	4	226,296	8,640	178,225	905,185	34,560	712,901	
	A-2-2-45	Submergible pump; D 50 mm; 0.75 kW	daily	8	6,576	0	3,322	52,611	0	26,574	
Labour											
	L-2-1	Foreman	day	4	0	0	48,800	0	0	195,200	
	L-2-10	Drill Worker	day	12	0	0	39,000	0	0	468,000	
	L-2-23	Common Labour	day	48	0	0	35,100	0	0	1,684,800	
Others		Miscellaneous						5	40	25	
Total for	100 m2							957,800	34,600	3,087,500	
Unit Cost for	1 m2							9,578	346	30,875	

Table 4.1.6 (17/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-47	Hauling of Dam Material ; Soft Rock : 25km	100 m3	for Rock Embankment from Quarry

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-49	Dumptruck; 10 ton for Rock	hourly	37.60	84,996	3,210	77,195	3,195,846	120,696	2,902,514	
Others		Miscellaneous						154	304	486	
Total for	100 m3							3,196,000	121,000	2,903,000	
Unit Cost for	1 m3							31,960	1,210	29,030	

Note : *1 : The Volume at 1 cycle (q) : 4 m3
*2 : Exchange Rate for Soil (f) : 2.4 loosed sand or others hence, 2.50 m3/s
*3 : Work Efficiency (E) : 1
*4 : Hauling Distance (L) : 25 km (one way)
*5 : Working Time at 1 cycle(Cm): Cm = 4.7 day/100m3 of 5.5m3
1.0 day 6.06 hours diriving
*6 : Work Volume at 1 hour (Q) : $Qt = \frac{100 \times 4 / 5.5}{4.7 \times 6.06}$
hence, Qt = 2.65984 m3/hour
hence, T1 = 37.60 hour/100m3
*7 : Unit is the hauling volume

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-48	Hauling of Dam Material ; Hard Rock : 0.5km	100 m3	for Aggregate from Excavation Site to Products Site

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-49	Dumptruck; 10 ton for Rock	hourly	8.52	84,996	3,210	77,195	724,165	27,349	657,697	
Others		Miscellaneous						835	651	303	
Total for	100 m3							725,000	28,000	658,000	
Unit Cost for	1 m3							7,250	280	6,580	

Note : *1 : The Volume at 1 cycle (q) : 4 m3
*2 : Exchange Rate for Soil (f) : 1 1.00
*3 : Work Efficiency (E) : 0.9
*4 : Hauling Distance (L) : 0.5 km (one way)
*5 : Working Time at 1 cycle(Cm): Cm = $4.8 \times L + \alpha$
α = 16 minutes, hence, Cm = 18.4 minutes
*6 : Work Volume at 1 hour (Q) : $Qt = \frac{60 \times q \times f \times E}{Cm}$
hence, Qt = 11.74 m3/hour
hence, T1 = 8.52 hour/100m3
*7 : Unit is the original volume

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-49	Hauling of Dam Material ; Soft Rock : 0.5km	100 m3	for Aggregate from Excavation Site to Products Site

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-49	Dumptruck; 10 ton for Rock	hourly	8.18	84,996	3,210	77,195	695,266	26,258	631,451	
Others		Miscellaneous						734	742	549	
Total for	100 m3							696,000	27,000	632,000	
Unit Cost for	1 m3							6,960	270	6,320	

Note : *1 : The Volume at 1 cycle (q) : 4 m3
*2 : Exchange Rate for Soil (f) : 2.4 loosed sand or others hence, 2.50
*3 : Work Efficiency (E) : 0.9
*4 : Hauling Distance (L) : 0.5 km (one way)
*5 : Working Time at 1 cycle(Cm): Cm = $4.8 \times L + \alpha$
α = 16 minutes, hence, Cm = 18.4 minutes
*6 : Work Volume at 1 hour (Q) : $Qt = \frac{60 \times q \times f \times E}{Cm}$
hence, Qt = 12.23 m3/hour
hence, T1 = 8.18 hour/100m3
*7 : Unit is the original volume

Table 4.1.6 (18/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-50	Top Soil Excavation and Disposal at Quarry	10 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-11-3	Clay Excavation by Bulldozer of 21ton - 1	m3	10	1,890	50	1,790	18,900	500	17,900	
	CW-11-37	Loading by Backfoe 1.2m3	m3	10	3,280	60	2,380	32,800	600	23,800	
	CW-11-39	Hauling of Soil Material for Disposal : 1km	m3	10	5,410	220	4,960	54,100	2,200	49,600	
Others		Miscellaneous	L.S.					0	0	0	
Total for	10 m3							105,800	3,300	91,300	
Unit Cost for	1 m3							10,580	330	9,130	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-51	Top Soft Rock Excavation and Disposal at Quarry	10 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-11-15	Combined Excavation ; Ripper Bull : 21ton	m3	10	3,570	90	3,380	35,700	900	33,800	
	CW-11-37	Loading by Backfoe 1.2m3	m3	10	3,280	60	2,380	32,800	600	23,800	
	CW-11-39	Hauling of Soil Material for Disposal : 1km	m3	10	5,410	220	4,960	54,100	2,200	49,600	
Others		Miscellaneous	L.S.					400	300	800	
Total for	10 m3							123,000	4,000	108,000	
Unit Cost for	1 m3							12,300	400	10,800	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-52	Soft Rock for Rock Material of Dam	100 m3	Cost at Dam Site

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-11-50	Top Soil Excavation and Disposal at Quarry	m3	33	10,580	330	9,130	349,140	10,890	301,290	
	CW-11-51	Top Soft Rock Excavation and Disposal at Quarry	m3	8	12,300	400	10,800	98,400	3,200	86,400	
	CW-11-25	Excavation at Quarry Site: Bench; 8m high (1)	m3	10	16,709	59	9,649	167,090	590	96,490	
	CW-11-27	Excavation at Quarry Site: Bench; 15m high (1)	m3	90	6,687	35	4,153	601,830	3,150	373,770	
	CW-11-13	Loosed Soft Rock Excavation by Bulldozer of 32ton - 1	m3	20	2,260	60	2,130	45,200	1,200	42,600	
	CW-11-38	Loading by Backfoe 1.2m3	m3	100	3,610	60	2,590	361,000	6,000	259,000	
	CW-11-47	Hauling of Dam Material ; Soft Rock : 25km	m3	100	31,960	1,210	29,030	3,196,000	121,000	2,903,000	
Others		Royalities	m3	100			2,000			200,000	
		Miscellaneous	L.S.					340	970	450	
Total for	100 m3							4,819,000	147,000	4,263,000	
Unit Cost for	1 m3							48,190	1,470	42,630	

Note : *1 : Volume of Gathering Rocks : 20% of Total Volume
*2 : Proportion of Bench : 10% of 8m Bench 90% of 15m Bnech

Table 4.1.6 (19/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-53	Hard Rock for Rock Material of Dam	100 m3	Cost at Dam Site

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-11-50	Top Soil Excavation and Disposal at Quarry	m3	33	10,580	330	9,130	349,140	10,890	301,290	
	CW-11-51	Top Soft Rock Excavation and Disposal at Quarry	m3	8	12,300	400	10,800	98,400	3,200	86,400	
	CW-11-25	Excavation at Quarry Site: Bench; 8m high (1)	m3	10	16,709	59	9,649	167,090	590	96,490	
	CW-11-27	Excavation at Quarry Site: Bench; 15m high (1)	m3	90	6,687	35	4,153	601,830	3,150	373,770	
	CW-11-13	Loosed Soft Rock Excavation by Bulldozer of 32ton - 1	m3	20	2,260	60	2,130	45,200	1,200	42,600	Gathering
	CW-11-38	Loading by Backfoe 1.2m3	m3	100	3,610	60	2,590	361,000	6,000	259,000	
	CW-11-44	Hauling of Dam Material ; Hard Rock : 25km	m3	100	33,290	1,260	30,230	3,329,000	126,000	3,023,000	
Others		Royalties	m3	100			2,000			200,000	
		Miscellaneous	L.S.					340	970	450	
Total for	100 m3							4,952,000	152,000	4,383,000	
Unit Cost for	1 m3							49,520	1,520	43,830	

Note : *1 : Volume of Gathering Rocks : 20% of Total Volume
*2 : Proportion of Bench : 15% of 8m Bench 85% of 15m Bnech

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-54	Soft Rock from Damsite for Inner Rock Material	100 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-16	Backhoe; 1.2 m3 for Rock	hourly	3	238,898	3,480	171,491	716,694	10,440	514,474	Excavation & Loading
	A-2-1-49	Dumptruck; 10 ton for Rock	hourly	8.62	84,996	3,210	77,195	732,665	27,670	665,417	
Labour											
	L-2-23	Common Labour	day	2	0	0	35100	0	0	70,200	
Others		Miscellaneous	L.S.					641	890	910	
Total for	100 m3							1,450,000	39,000	1,251,000	
Unit Cost for	1 m3							14,500	390	12,510	

Note : *1 : The Volume at 1 cycle (q) : 5.5 m3
*2 : Exchange Rate for Soil (f) : 1 1.00 tf/m3
*3 : Work Efficiency (E) : 0.9
*4 : Hauling Distance (L) : 2 km (one way)
*5 : Working Time at 1 cycle(Cm) Cm = 4.8 x L + α
α = 16 minutes, hence, Cm = 25.6 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 11.6 m3/hour
hence, T1 = 8.62 hour/100m3
*7 : Unit is the hauling volume
*8 : Work Volume of Backhoe 200 m3/day
hence, 33.333 m3/hour
3 hours/100m3

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-55	Hard Rock Excavation & Hauling for Aggregate Product	100 m3	Cost at Products Site

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-11-26	Excavation at Quarry Site: Bench; 8m high (2)	m3	15	19,312	62	10,510	289,680	930	157,650	
	CW-11-28	Excavation at Quarry Site: Bench; 15m high (2)	m3	85	7,935	36	4,660	674,475	3,060	396,100	
	CW-11-13	Loosed Soft Rock Excavation by Bulldozer of 32ton - 1	m3	20	2,260	60	2,130	45,200	1,200	42,600	Gathering
	CW-11-29	Small Breaks of Rock by Giant Breaker	m3	8	33,190	160	12,878	265,520	1,280	103,024	
	CW-11-30	Small Breaks of Rock by Blasting	m3	2	16,572	300	12,651	33,144	600	25,302	
	CW-11-38	Loading by Backfoe 1.2m3	m3	100	3,610	60	2,590	361,000	6,000	259,000	
	CW-11-49	Hauling of Dam Material ; Soft Rock : 0.5km	m3	100	6,960	270	6,320	696,000	27,000	632,000	
Total for	100 m3							2,365,019	40,070	1,615,676	
Unit Cost for	1 ton		2.5	ton/m3				9,460	160	6,463	
Others		Miscellaneous	L.S.					10	10	7	
Unit Cost for	1 ton							9,470	170	6,470	

Note : *1 : Volume of Gathering Rocks : 20% of Total Volume
*2 : Proportion of Bench : 15% of 8m Bench 85% of 15m Bnech
*3 : Unit Weight of Breaked Rock 2.5 tf/m3

Table 4.1.6 (20/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-56	Crushed Coarse Aggregate from Quarry	100 ton	Cost at Stockpile Site

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-11-50	Top Soil Excavation and Disposal at Quarry	m3	13.2	10,580	330	9,130	139,656	4,356	120,516	
	CW-11-51	Top Soft Rock Excavation and Disposal at Quarry	m3	3.2	12,300	400	10,800	39,360	1,280	34,560	
	CW-11-55	Hard Rock Excavation & Hauling for Aggregate	ton	115	9,470	170	6,470	1,089,050	19,550	744,050	Gathering
	CW-13-1	Production of Aggregate (>5.0mm)	ton	100	10,557	152	8,009	1,055,674	15,248	800,887	
Total for	100 ton							2,323,740	40,434	1,700,013	
Unit Cost for	1 m3		1.6	ton/m3				37,180	647	27,200	
		Royalities	m3	1			2,000			2,000	
	CW-11-41	Hauling of Dam Material ; Coarse Aggregate: 25km	m3	1	19,370	770	17,730	19,370	770	17,730	
Others		Miscellaneous	L.S.					0	3	10	
Unit Cost for	1 m3							56,550	1,420	46,940	

Note : *1 : Volume of Top Soil Excavatic 33 m3/100m3 of Hard Rock Excavation
*2 : Volume of Top Soil Excavatic 8 m3/100m3 of Hard Rock Excavation
*3 : Unit Dry Weight of Breaked Rock : 2.5 tf/m3
*4 : Unit Dry Weight of Coarse Aggregate : 1.6 tf/m3
*5 : Loss of Excavation : 15%

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-57	Purchased Sand	100 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-23	Common Labour	day	1	0	0	35,100	0	0	35,100	
Material											
	M-B-8	Sand for Dam Embankment	m3	100	0	1,350	25,650	0	135,000	2,565,000	
Others		Miscellaneous	L.S.					0	0	0	
Total for	100 m3							0	135,000	2,600,100	
Unit Cost for	1 m3							0	1,350	26,001	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-58	Spreading of Stockpile for Core by Bulldozer of 21t	100 m3	Bulldozer : 21ton, Loosed Soil, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-22	Bulldozer, 21 ton	hourly	1.03	294,009	3,480	264,728	302,829	3,584	272,670	
Others		Miscellaneous						171	416	330	
Total for	100 m3							303,000	4,000	273,000	
Unit Cost for	1 m3							3,030	40	2,730	

Note : *1 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 — 1.000
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.75
*5 : Working Time at 1 cycle(Cm) Cm = 0.027 x L + 0.78 = 1.320 minutes
*6 : Work Volume at 1 hour (Q) :

$$Q = \frac{60 \times q \times f \times E}{Cm}$$

hence, Q = 97.16 m3/hour
hence, T1 = 1.03 hour/1000m3

Table 4.1.6 (21/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-59	Mixing of Stockpile for Core by Bulldozer of 21ton	100 m3	Bulldozer : 21ton, Loosed Soil, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-22	Bulldozer, 21 ton	hourly	1.10	294,009	3,480	264,728	323,410	3,828	291,200	
Others		Miscellaneous						590	172	800	
Total for	100 m3							324,000	4,000	292,000	
Unit Cost for	1 m3							3,240	40	2,920	

Note : *1 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 — 1.000
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.7
*5 : Working Time at 1 cycle(Cm): Cm = 0.027 x L + 0.78 = 1.320 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 90.68 m3/hour
hence, T1 = 1.10 hour/1000m3

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-60	Spreading of Stockpile for Filter by Bulldozer of 21t	100 m3	Bulldozer : 21ton, Loosed Soil, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-22	Bulldozer, 21 ton	hourly	0.86	294,009	3,480	264,728	252,848	2,993	227,666	
Others		Miscellaneous						152	7	334	
Total for	100 m3							253,000	3,000	228,000	
Unit Cost for	1 m3							2,530	30	2,280	

Note : *1 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 — 1.000
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.9
*5 : Working Time at 1 cycle(Cm): Cm = 0.027 x L + 0.78 = 1.320 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 116.59 m3/hour
hence, T1 = 0.86 hour/1000m3

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-61	Mixing of Stockpile for Filter by Bulldozer of 21ton	100 m3	Bulldozer : 21ton, Loosed Soil, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-22	Bulldozer, 21 ton	hourly	0.91	294,009	3,480	264,728	267,548	3,167	240,902	
Others		Miscellaneous						452	833	98	
Total for	100 m3							268,000	4,000	241,000	
Unit Cost for	1 m3							2,680	40	2,410	

Note : *1 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*2 : Exchange Rate for Soil (f) : 1 — 1.000
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.85
*5 : Working Time at 1 cycle(Cm): Cm = 0.027 x L + 0.78 = 1.320 minutes
*6 : Work Volume at 1 hour (Q) : $Q = \frac{60 \times q \times f \times E}{Cm}$
hence, Q = 110.11 m3/hour
hence, T1 = 0.91 hour/1000m3

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-62	Stockpiling for Filter Material	100 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour	L-2-23	Common Labour	day	2	0	0	35100	0	0	70,200	
Working Base Cost	CW-11-60	Spreading of Stockpile for Filter by Bulldozer of 21ton	m3	100	2530	30	2280	253,000	3,000	228,000	
Others		Miscellaneous	L.S.					0	0	800	
Total for	100 m3							253,000	3,000	299,000	
Unit Cost for	1 m3							2,530	30	2,990	

Table 4.1.6 (22/22) UNIT RATE CALCULATION TABLE OF EXCAVATION AND HAULING FOR DAM EARTH WORK

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-63	Stockpiling for Core Material	100 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-23	Common Labour	day	2	0	0	35100	0	0	70,200	
Working Base Cost											
	CW-11-58	Spreading of Stockpile for Core by Bulldozer of 21ton	m3	100	3030	40	2730	303,000	4,000	273,000	
Others		Miscellaneous	L.S.					0	0	800	
Total for	100 m3							303,000	4,000	344,000	
Unit Cost for	1 m3							3,030	40	3,440	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-64	Mixing, Loading and Hauling of Filter to Embankment Site	100 m3	from Stockpile Site (2km)

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-23	Common Labour	day	2	0	0	35100	0	0	70,200	
Working Base Cost											
	CW-11-61	Mixing of Stockpile for Filter by Bulldozer of 21ton	m3	100	2680	40	2410	268,000	4,000	241,000	
	CW-11-38	Loading by Backfoe 1.2m3	m3	100	3610	60	2590	361,000	6,000	259,000	
	CW-11-42	Hauling of Filter Material :	m3	100	5980	240	5470	598,000	24,000	547,000	
Others		Miscellaneous	L.S.					0	0	800	
Total for	100 m3							1,227,000	34,000	1,118,000	
Unit Cost for	1 m3							12,270	340	11,180	

ID No.	Working Name	Calculation Quantity	Remarks
CW-11-65	Mixing, Loading and Hauling of Core to Embankment Site	100 m3	from Stockpile Site (2km)

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-23	Common Labour	day	2	0	0	35100	0	0	70,200	
Working Base Cost											
	CW-11-59	Mixing of Stockpile for Core by Bulldozer of 21ton	m3	100	3240	40	2920	324,000	4,000	292,000	
	CW-11-38	Loading by Backfoe 1.2m3	m3	100	3610	60	2590	361,000	6,000	259,000	
	CW-11-40	Hauling of Dam Material for Core : 2km	m3	100	5710	230	5230	571,000	23,000	523,000	
Others		Miscellaneous	L.S.					0	0	800	
Total for	100 m3							1,256,000	33,000	1,145,000	
Unit Cost for	1 m3							12,560	330	11,450	

Table 4.1.7 (1/6) UNIT RATE CALCULATION TABLE OF EMBANKMENTWORK FOR DAM CONSTRUCTION

ID No. CW-12-1 | Working Name: Slurry Treatment | Calculation Quantity Remarks: 100 m2

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-1	Foreman	day	0.6	0	0	48800	0	0	29,280	
	L-2-23	Common Labour	day	3.3	0	0	35100	0	0	115,830	
Working Base Cost											
	CW-12-2	Product of Slurry	m3	0.2	19400	800	17800	3,880	160	3,560	
Others		Miscellaneous	L.S.					120	840	330	
Total for	100 m2							4,000	1,000	149,000	
Unit Cost for	1 m2							40	10	1,490	

Note : *1 : Slurry Volume : 2 mm x 100 m2 = 0.2 m3

ID No. CW-12-2 | Working Name: Product of Slurry | Calculation Quantity Remarks: 10 m3

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-11-41	Hauling of Dam Material ; Coarse Aggregate: 25km	m3	10	19370	770	17730	193,700	7,700	177,300	
Others		Miscellaneous	L.S.					300	300	700	
Total for	10 m3							194,000	8,000	178,000	
Unit Cost for	1 m3							19,400	800	17,800	

ID No. CW-12-3 | Working Name: Small Scale Compaction at Core by Air Tamper (1) | Calculation Quantity Remarks: 100 m3 Thickness : 5cm, Horizontal Area

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-4	Backhoe; 0.35 m3 for Rock	hourly	10	78423.1	1200	56526	784,231	12,000	565,260	
	A-2-4-25	Air Tamper 18kg Class	daily	15	14354.7	1320	10406.7	215,321	19,800	156,100	
Labour											
	L-2-1	Foreman	day	8	0	0	48800	0	0	390,400	
	L-2-2	Operator	day	15	0	0	46900	0	0	703,500	
	L-2-23	Common Labour	day	49	0	0	35100	0	0	1,719,900	
Others		Miscellaneous	L.S.					48	0	39	
Total for	100 m3							999,600	31,800	3,535,200	
Unit Cost for	1 m3							9,996	318	35,352	

ID No. CW-12-4 | Working Name: Small Scale Compaction at Core by Air Tamper (2) | Calculation Quantity Remarks: 100 m3 Thickness : 5cm, Inkline Area

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-4	Backhoe; 0.35 m3 for Rock	hourly	10	78423.1	1200	56526	784,231	12,000	565,260	
	A-2-4-25	Air Tamper 18kg Class	daily	25	14354.7	1320	10406.7	358,868	33,000	260,167	
Labour											
	L-2-1	Foreman	day	17	0	0	48800	0	0	829,600	
	L-2-2	Operator	day	25	0	0	46900	0	0	1,172,500	
	L-2-23	Common Labour	day	114	0	0	35100	0	0	4,001,400	
Others		Miscellaneous	L.S.					1	0	72	
Total for	100 m3							1,143,100	45,000	6,829,000	
Unit Cost for	1 m3							11,431	450	68,290	

ID No. CW-12-5 | Working Name: Small Scale Compaction at Core by Air Tamper (3) | Calculation Quantity Remarks: 100 m3 Thickness : 10cm, Inkline Area

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-4	Backhoe; 0.35 m3 for Rock	hourly	10	78423.1	1200	56526	784,231	12,000	565,260	
	A-2-4-25	Air Tamper 18kg Class	daily	10	14354.7	1320	10406.7	143,547	13,200	104,067	
Labour											
	L-2-1	Foreman	day	10	0	0	48800	0	0	488,000	
	L-2-2	Operator	day	10	0	0	46900	0	0	469,000	
	L-2-23	Common Labour	day	89	0	0	35100	0	0	3,123,900	
Others		Miscellaneous	L.S.					22	0	73	
Total for	100 m3							927,800	25,200	4,750,300	
Unit Cost for	1 m3							9,278	252	47,503	

Table 4.1.7 (2/6) UNIT RATE CALCULATION TABLE OF EMBANKMENTWORK FOR DAM CONSTRUCTION

ID No.	Working Name	Calculation Quantity	Remarks
CW-12-6	Small Scale Compaction at Core by Tamper	100 m3	Thickness : 10cm, Horizontal Area

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-4	Backhoe; 0.35 m3 for Rock	hourly	10	78423.1	1200	56526	784,231	12,000	565,260	
	A-2-2-51	Tamper; 60-100 kg	daily	8	35108.6	1080	16858.8	280,868	8,640	134,870	
Labour											
	L-2-1	Foreman	day	5	0	0	48800	0	0	244,000	
	L-2-2	Operator	day	8	0	0	46900	0	0	375,200	
	L-2-23	Common Labour	day	26	0	0	35100	0	0	912,600	
Others		Miscellaneous	L.S.					1	60	69	
Total for	100 m3							1,065,100	20,700	2,232,000	
Unit Cost for	1 m3							10,651	207	22,320	

ID No.	Working Name	Calculation Quantity	Remarks
CW-12-7	Spreading for Rock Embankment; Bull : 21t (1)	1000 m3	Bulldozer :21ton, Loosed Soft Rock, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-23	Bulldozer; 21 ton for Rock	hourly	12.87	323,410	3,480	289,808	4,162,283	44,788	3,729,835	
Others		Miscellaneous						717	212	165	
Total for	1000 m3							4,163,000	45,000	3,730,000	
Unit Cost for	1 m3							4,163	45	3,730	

Note : *1 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*2 : Exchange Rate for Soil (λ) : 1.2 soft rockII
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.5
*5 : Working Time at 1 cycle(Cm Cm = 0.027 x L + 0.78 = 1.32 minutes
*6 : Work Volume at 1 hour (Qc) $Qc = \frac{60 \times q \times \lambda \times E}{Cm}$
hence, Qc = 77.73 m3/hour
hence, T1 = 12.87 hour/1000m3
*7 : Unit is the volume after Compaction

ID No.	Working Name	Calculation Quantity	Remarks
CW-12-8	Spreading for Rock Embankment; Bull : 21t (2)	1000 m3	Bulldozer :21ton, Loosed Hard Rock, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-23	Bulldozer; 21 ton for Rock	hourly	11.88	323,410	3,480	289,808	3,842,108	41,342	3,442,925	
Others		Miscellaneous						892	658	75	
Total for	1000 m3							3,843,000	42,000	3,443,000	
Unit Cost for	1 m3							3,843	42	3,443	

Note : *1 : Excavation at 1 cycle (q) : 2.85 m3/cycle
*2 : Exchange Rate for Soil (λ) : 1.3 Hard rock
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.5
*5 : Working Time at 1 cycle(Cm Cm = 0.027 x L + 0.78 = 1.32 minutes
*6 : Work Volume at 1 hour (Qc) $Qc = \frac{60 \times q \times \lambda \times E}{Cm}$
hence, Qc = 84.2 m3/hour
hence, T1 = 11.88 hour/1000m3
*7 : Unit is the volume after Compaction

Table 4.1.7 (3/6) UNIT RATE CALCULATION TABLE OF EMBANKMENTWORK FOR DAM CONSTRUCTION

ID No. CW-12-9 | Working Name: Spreading for Rock Embankment; Bull : 32t (1) | Calculation Quantity: 1000 m3 | Remarks: Bulldozer : 32ton, Loosed Rock, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-28	Bulldozer; 32 ton for Rock	hourly	7.90	472,235	4,680	421,566	3,730,660	36,972	3,330,371	
Others		Miscellaneous						340	28	629	
Total for	1000 m3							3,731,000	37,000	3,331,000	
Unit Cost for	1 m3							3,731	37	3,331	

Note : *1 : Excavation at 1 cycle (q) : 4.64 m3/cycle
*2 : Exchange Rate for Soil (λ) : 1.2 soft rockll hence,
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.5
*5 : Working Time at 1 cycle(Cm Cm = 0.027 x L + 0.78 = 1.32 minutes
*6 : Work Volume at 1 hour (Qc) $Qc = \frac{60 \times q \times \lambda \times E}{Cm}$
hence, Qc = 126.55 m3/hour
hence, T1 = 7.90 hour/1000m3
*7 : Unit is the volume after Compaction

ID No. CW-12-10 | Working Name: Spreading for Rock Embankment; Bull : 32t (2) | Calculation Quantity: 1000 m3 | Remarks: Bulldozer : 32ton, Loosed Rock, L=20m

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-28	Bulldozer; 32 ton for Rock	hourly	7.29	472,235	4,680	421,566	3,442,596	34,117	3,073,216	
Others		Miscellaneous						404	883	784	
Total for	1000 m3							3,443,000	35,000	3,074,000	
Unit Cost for	1 m3							3,443	35	3,074	

Note : *1 : Excavation at 1 cycle (q) : 4.64 m3/cycle
*2 : Exchange Rate for Soil (λ) : 1.3 Hard Rock
*3 : Distances at 1 cycle (L) : 20 m
*4 : Work Efficiency (E) : 0.5
*5 : Working Time at 1 cycle(Cm Cm = 0.027 x L + 0.78 = 1.32 minutes
*6 : Work Volume at 1 hour (Qc) $Qc = \frac{60 \times q \times \lambda \times E}{Cm}$
hence, Qc = 137.09 m3/hour
hence, T1 = 7.29 hour/1000m3
*7 : Unit is the volume after Compaction

ID No. CW-12-11 | Working Name: Spreading for Core Embankment; Bull : 21t | Calculation Quantity: 1000 m3 | Remarks: Bulldozer : 21ton, Loosed Soil

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-22	Bulldozer; 21 ton	hourly	9.27	294,009	3,480	264,728	2,725,462	32,260	2,454,026	
Others		Miscellaneous						538	740	974	
Total for	1000 m3							2,726,000	33,000	2,455,000	
Unit Cost for	1 m3							2,726	33	2,455	

Note : *1 : Thickness of 1 Layer (D) : 0.2 m/layer
*2 : Work Efficiency (E) : 0.65
*3 : Work Volume at 1 hour (Qc) Qc = 10 x E x (18 x D + 13)
hence, Qc = 107.9 m3/hour
hence, T1 = 9.27 hour/1000m3
*4 : Unit is the volume after Compaction

ID No. CW-12-12 | Working Name: Spreading for Filter Embankment; Bull : 21t | Calculation Quantity: 1000 m3 | Remarks: Bulldozer : 21ton, Loosed Soil

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-22	Bulldozer; 21 ton	hourly	7.62	294,009	3,480	264,728	2,240,347	26,518	2,017,225	
Others		Miscellaneous						653	482	775	
Total for	1000 m3							2,241,000	27,000	2,018,000	
Unit Cost for	1 m3							2,241	27	2,018	

Note : *1 : Thickness of 1 Layer (D) : 0.4 m/layer
*2 : Work Efficiency (E) : 0.65
*3 : Work Volume at 1 hour (Qc) Qc = 10 x E x (18 x D + 13)
hence, Qc = 131.3 m3/hour
hence, T1 = 7.62 hour/1000m3
*4 : Unit is the volume after Compaction

Table 4.1.7 (4/6) UNIT RATE CALCULATION TABLE OF EMBANKMENTWORK FOR DAM CONSTRUCTION

ID No.	Working Name	Calculation Quantity	Remarks
CW-12-13	Compaction for Rock Embankment	1000 m3	Vibratong Roller : 8~18ton

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-90	Vibrating Roller; 15-18 ton	hourly	1.45	300,975	2,640	261,373	436,414	3,828	378,991	
Others		Miscellaneous						586	172	9	
Total for	1000 m3							437,000	4,000	379,000	
Unit Cost for	1 m3							437	4	379	

Note : *1 : Compaction Speed (V) : 2500 m/hour
*2 : Compaction Width (B) : 2.54 m/time
Overlapped Width (b) : 0.2 m/each
Effective Compaction Width (W) : 2.3 m
Thickness (D) : 1 m/layer
Work Efficiency (E) : 0.6
The number of Comapction (N) : 5 times
*3 : 'ork Volume at 1 hour (Qc) : $Qc = \frac{V \times W \times D \times E}{N}$
hence, Qc = 690 m3/hour
hence, T1 = 1.45 hour/1000m3
*4 : Unit is the volume after Compaction

ID No.	Working Name	Calculation Quantity	Remarks
CW-12-14	Compaction for Filter Embankment	1000 m3	Vibratong Roller : 8~18ton

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-90	Vibrating Roller; 15-18 ton	hourly	3.29	300,975	2,640	261,373	990,209	8,686	859,917	
Others		Miscellaneous						791	314	83	
Total for	1000 m3							991,000	9,000	860,000	
Unit Cost for	1 m3							991	9	860	

Note : *1 : Compaction Speed (V) : 3000 m/hour
*2 : Compaction Width (B) : 2.54 m/time
Overlapped Width (b) : 0.2 m/each
Effective Compaction Width (W) : 2.3 m
Thickness (D) : 0.4 m/layer
Work Efficiency (E) : 0.55
The number of Comapction (N) : 5 times
*3 : 'ork Volume at 1 hour (Qc) : $Qc = \frac{V \times W \times D \times E}{N}$
hence, Qc = 303.6 m3/hour
hence, T1 = 3.29 hour/1000m3
*4 : Unit is the volume after Compaction

ID No.	Working Name	Calculation Quantity	Remarks
CW-12-15	Compaction for Core Embankment	1000 m3	Vibratong Roller : 8~18ton

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment	A-2-1-90	Vibrating Roller; 15-18 ton	hourly	16.53	300,975	2,640	261,373	4,975,124	43,639	4,320,497	
Others		Miscellaneous						876	361	503	
Total for	1000 m3							4,976,000	44,000	4,321,000	
Unit Cost for	1 m3							4,976	44	4,321	

Note : *1 : Compaction Speed (V) : 3000 m/hour
*2 : Compaction Width (B) : 2.45625 m/time
Overlapped Width (b) : 0.3 m/each
Effective Compaction Width (W) : 2.2 m
Thickness (D) : 0.2 m/layer
Work Efficiency (E) : 0.55
The number of Comapction (N) : 12 times
*3 : 'ork Volume at 1 hour (Qc) : $Qc = \frac{V \times W \times D \times E}{N}$
hence, Qc = 60.5 m3/hour
hence, T1 = 16.53 hour/1000m3
*4 : Unit is the volume after Compaction

Table 4.1.7 (5/6) UNIT RATE CALCULATION TABLE OF EMBANKMENTWORK FOR DAM CONSTRUCTION

ID No. CW-12-16 | Working Name: Riprap Works | Calculation Quantity Remarks: 100 m2

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-12	Backhoe; 0.8 m3 for Rock	hourly	4.9	177410	2640	127575	869,307	12,936	625,117	
	A-2-1-28	Bulldozer; 32 ton for Rock	hourly	1.2	472235	4680	421566	566,683	5,616	505,879	
Labour											
	L-2-1	Foreman	day	1	0	0	48800	0	0	48,800	
	L-2-11	Mason	day	0.6	0	0	39000	0	0	23,400	
	L-2-23	Common Labour	day	1.3	0	0	35100	0	0	45,630	
Others		Miscellaneous	L.S.					11	48	73	
Total for	100 m2							1,436,000	18,600	1,248,900	
Unit Cost for	1 m2							14,360	186	12,489	

ID No. CW-12-17 | Working Name: Laking | Calculation Quantity Remarks: 1000 m3

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-1-22	Bulldozer; 21 ton	hourly	7.14	294,009	3,480	264,728	2,099,223	24,847	1,890,156	Lakedoozer
Labour											
	L-2-23	Common Labour	day	2	0	0	35100	0	0	70,200	
Others		Miscellaneous						777	153	644	
Total for	1000 m3							2,100,000	25,000	1,961,000	
Unit Cost for	1 m3							2,100	25	1,961	

Note : *1 : Area of a Lake : (a) : 0.28 m2
*2 : Distances at 1 cycle (L) : 20 m
*3 : Work Efficiency (E) : 0.45
*4 : Working Time at 1 cycle(Cm Cm = (1/24) x L + 0.25 = 1.08 minutes
*5 : Work Volume at 1 hour (Q) $Q = \frac{60 \times a \times L \times E}{Cm}$
*6 : hence, Q = 140 m3/hour
hence, T1 = 7.14 hour/1000m3
*7 : Unit is the volume of original

ID No. CW-12-18 | Working Name: Oversize Disposal | Calculation Quantity Remarks: 1000 m3

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-11-38	Loading by Backfoe 1.2m3 (	m3	1000	3610	60	2590	3,610,000	60,000	2,590,000	
	CW-11-39	Hauling of Soil Material for I	m3	1000	5410	220	4960	5,410,000	220,000	4,960,000	
Others		Miscellaneous	L.S.					0	0	0	
Total for	1000 m3							9,020,000	280,000	7,550,000	
Unit Cost for	1 m3							9,020	280	7,550	

ID No. CW-12-19 | Working Name: Transition Embankment Work | Calculation Quantity Remarks: 100 m3

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-11-56	Crushed Coarse Aggregate from Quarry	m3	62.34	56,550	1,420	46,940	3,525,327	88,523	2,926,240	
	CW-11-53	Hard Rock for Rock Material of Dam	m3	39.17	49,520	1,520	43,830	1,939,698	59,538	1,716,821	
	CW-11-60	Spreading of Stockpile for Filter by Bulldozer of 21ton	m3	101.51	2,530	30	2,280	256,820	3,045	231,443	
	CW-11-61	Mixing of Stockpile for Filter by Bulldozer of 21ton	m3	96.68	2,680	40	2,410	259,102	3,867	232,999	
	CW-12-10	Spreading for Rock Embankment; Bull : 32t (2)	m3	100	3,443	35	3,074	344,300	3,500	307,400	
	CW-12-13	Compaction for Rock Embankment	m3	100	437	4	379	43,700	400	37,900	
Others		Miscellaneous	L.S.					52	126	198	
Total for	100 m3							6,369,000	159,000	5,453,000	
Unit Cost for	1 m3							63,690	1,590	54,530	

Note : *1 : Loss of Material 3%

Table 4.1.7 (6/6) UNIT RATE CALCULATION TABLE OF EMBANKMENTWORK FOR DAM CONSTRUCTION

ID No.	Working Name	Calculation Quantity	Remarks
CW-12-20	Small Transition Embankment Work	100 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-11-56	Crushed Coarse Aggregate from Quarry	m3	86.56	56,550	1,420	46,940	4,894,968	122,915	4,063,126	
	CW-11-57	Purchased Sand	m3	54.42	0	1,350	26,001	0	73,467	1,414,974	
	CW-11-60	Spreading of Stockpile for Filter by Bulldozer of 21ton	m3	140.98	2,530	30	2,280	356,679	4,229	321,434	
	CW-11-61	Mixing of Stockpile for Filter by Bulldozer of 21ton	m3	134.27	2,680	40	2,410	359,844	5,371	323,591	
	CW-12-12	Spreading for Filter Embankment; Bull : 21t	m3	100	2,241	27	2,018	224,100	2,700	201,800	
	CW-12-14	Compaction for Filter Embankment	m3	100	991	9	860	99,100	900	86,000	
Others		Miscellaneous	L.S.					309	418	74	
Total for	100 m3							5,935,000	210,000	6,411,000	
Unit Cost for	1 m3							59,350	2,100	64,110	

Note : *1 : Loss of Material 5%

ID No.	Working Name	Calculation Quantity	Remarks
CW-12-21	Excavated Fine Material from Dam Site	100 m3	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-24	Light Labour	day	2	0	0	29300	0	0	58,600	
Others		Miscellaneous	L.S.					0	0	400	
Total for	100 m3							0	0	59,000	
Unit Cost for	1 m3							0	0	590	

Note : *1 : The Volume at 1 cycle (q) : 6.25 m3

*2 : Exchange Rate for Soil (f) : 1.6 t/m3(wet) 1.00

*3 : Work Efficiency (E) : 0.9

*4 : Hauling Distance (L) : 0.1 km (one way)

*5 : Working Time at 1 cycle(Cm Cm = 4.8 x L + α

α = 16 minutes, hence, Cm = 16.48 minutes

*6 : Work Volume at 1 hour (Q) $Q = \frac{60 \times q \times f \times E}{Cm}$

hence, Q = 20.48 m3/hour

hence, T1 = 4.88 hour/100m3

*7 : Unit is the volume of original

Table 4.1.8 (1/22) UNIT RATE CALCULATION TABLE OF AGGREGATE PRODUCTION CONCRETE WORKS FOR MAIN DAM STRUCTURES

ID No.	Working Name	Calculation Quantity	Remarks
CW-13-1	Production of Aggregate (>5.0mm)	564 ton	Productivity: 564ton/day

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-13-2	Maintenance & Inspection of Facilities	hour	5.5	0	0	25,620	0	0	140,910	
	CW-13-3	Primary Breaking Facilities	hour	5.41	326,000	4,000	201,000	1,763,660	21,640	1,087,410	
	CW-13-4	Secondary Breaking Facilitie	hour	4.9	855,000	13,000	671,000	4,189,500	63,700	3,287,900	
Others		Miscellaneous	L.S.					840	660	780	
Total for	564	ton						5,954,000	86,000	4,517,000	
Unit Cost for	1	ton						10,557	152	8,009	

Note *1 : Productivity of Facilitites : 564 ton/day

ID No.	Working Name	Calculation Quantity	Remarks
CW-13-2	Maintenance & Inspection of Facilities	1 hour	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Labour											
	L-2-1	Foreman	day	0.11	0	0	48,800	0	0	5,368	
	L-2-23	Common Labour	day	0.11	0	0	35,100	0	0	3,861	
	L-2-5	Mechanic	day	0.11	0	0	39,000	0	0	4,290	
	L-2-4	Electrician	day	0.11	0	0	39,000	0	0	4,290	
	L-2-1	Foreman	day	0.16	0	0	48,800	0	0	7,808	
Others		Miscellaneous	L.S.					0	0	3	
Total for	1	hour						0	0	25,620	
Unit Cost for	1	hour						0	0	25,620	

ID No.	Working Name	Calculation Quantity	Remarks
CW-13-3	Primary Breaking Facilities	1 hour	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-3-15	Plate Feader; 200 t/h	hourly	1	57,257	0	26,479	57,257	0	26,479	
	A-2-3-14	Jaw Crusher; ST 600 x 900	hourly	1	187,114	0	85,761	187,114	0	85,761	
	A-2-3-2	Belt Conveyer; W 450 mm per 10m(~15m)	hourly	1	23,775	7	5,390	23,775	7	5,390	
	A-2-3-4	Belt Conveyer; W 750 mm per 10m(~15m)	hourly	1	39,836	12	9,031	39,836	12	9,031	
Labour											
	L-2-23	Common Labour	day	0.44	0	0	35,100	0	0	15,444	
	L-2-2	Operator	day	0.14	0	0	46,900	0	0	6,566	
Material											
	M-K-15	Electrical Charge	kWh	60.1	0	36	84	0	2,164	5,048	
Working Base Cost											
	CW-13-5	Gurizuri Bar	hour	1	4,440	120	10,150	4,440	120	10,150	
	CW-13-6	Supporting of Belt Conveyer for Primary Breaking	hour	1	9,590	770	22,950	9,590	770	22,950	
	CW-13-7	Cat Walk of Belt Conveyer for Primary Breaking	hour	1	3,970	490	13,470	3,970	490	13,470	
Others		Miscellaneous	L.S.	1				19	437	711	
Total for	1	hour						326,000	4,000	201,000	
Unit Cost for	1	hour						326,000	4,000	201,000	

Table 4.1.8 (2/22) UNIT RATE CALCULATION TABLE OF AGGREGATE PRODUCTION CONCRETE WORKS FOR MAIN DAM STRUCTURES

ID No.	Working Name	Calculation Quantity	Remarks
CW-13-4	Secondary Breaking Facilities	1 hour	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-3-21	Vibrating Feader, 65 t/h	daily	0.375	27,169	0	12,590	10,188	0	4,721	
	A-2-4-27	Inkline Vibrating Sieve 1200x3000 2-floor	hourly	1	51,479	0	23,345	51,479	0	23,345	
	A-2-3-10	Corn Crusher, 1000 mm	hourly	1	237,187	0	109,916	237,187	0	109,916	
	A-2-4-28	Vibrating Sieve 1200x3000 2-floor	hourly	1	56,719	0	25,918	56,719	0	25,918	
	A-2-3-7	Classifyer; 900 x 6500 mm	hourly	1	68,167	0	31,243	68,167	0	31,243	
	A-2-3-4	Belt Conveyer; W 750 mm per 10m(~15m)	hourly	1.5	39,836	12	9,031	59,753	18	13,546	
	A-2-4-31	Belt Conveyer; W 600 mm per 10m(~30m)	hourly	1.5	15,744	0	3,550	23,616	0	5,325	
	A-2-3-3	Belt Conveyer; W 600 mm per 10m(~15m)	hourly	1.5	30,643	10	6,950	45,964	15	10,424	
	A-2-4-30	Belt Conveyer; W 600 mm per 10m(~30m)	hourly	1.5	13,525	0	3,050	20,288	0	4,575	
	A-2-4-33	Belt Conveyer; W 600 mm per 10m(~50m)	hourly	2	9,943	0	2,242	19,886	0	4,484	
	A-2-4-36	Belt Conveyer; W 600 mm per 10m(>50m)	hourly	5	7,344	0	1,656	36,719	0	8,280	
	A-2-3-2	Belt Conveyer; W 450 mm per 10m(~15m)	hourly	1.5	23,775	7	5,390	35,662	11	8,086	
	A-2-4-29	Belt Conveyer; W 450 mm per 10m(~30m)	hourly	1.5	11,095	0	2,502	16,642	0	3,753	
	A-2-4-32	Belt Conveyer; W 450 mm per 10m(~50m)	hourly	2	8,421	0	1,899	16,843	0	3,798	
	A-2-4-35	Belt Conveyer; W 450 mm per 10m(>50m)	hourly	5	6,403	0	1,444	32,016	0	7,219	
Labour											
	L-2-2	Operator	day	0.31	0	0	46,900	0	0	14,539	
	L-2-23	Common Labour	day	0.75	0	0	35,100	0	0	26,325	
	L-2-3	Assistant Operator	day	0.13	0	0	31,200	0	0	4,056	
Material											
	M-K-15	Electrical Charge	kWh	140	0	36	84	0	5,040	11,760	
Working Base Cost											
	CW-13-8	Screen Tower	hour	1	60,210	1,860	150,410	60,210	1,860	150,410	
	CW-13-9	Supporting of Belt Conveyer for Secondary Breaking	hour	1	35,900	1,490	100,790	35,900	1,490	100,790	
	CW-13-10	Cat Walk of Belt Conveyer for Secondary Breaking	hour	1	23,070	3,300	82,780	23,070	3,300	82,780	
	CW-13-11	Rock Laddar	hour	1	3,800	90	10,210	3,800	90	10,210	
	CW-13-12	Screen Shoot	hour	1	40	250	4,150	40	250	4,150	
	CW-13-13	Screen Hopper	hour	1	210	20	930	210	20	930	
Others		Miscellaneous	L.S.					640	906	416	
Total for	1 hour							855,000	13,000	671,000	
Unit Cost for	1 hour							855,000	13,000	671,000	

Note : *1 : Length of Belt Conveyer; W=750 100 m
W=600 100 m
W=450 100 m

ID No.	Working Name	Calculation Quantity	Remarks
CW-13-5	Gurizuri Bar	1 piece	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-E-9	H-beam (Purchasing), SS41	kg	1400	5,225	0	275	7,315,000	0	385,000	
	M-E-7	Steel Plate SS41	kg	1800	5,225	0	275	9,405,000	0	495,000	
	M-E-26	Galvanized Steel Pipe, Dia. 150mm	m	1	71,250	0	3,750	71,250	0	3,750	
	M-E-27	Galvanized Steel Pipe, Dia. 50mm	m	1	14,250	0	750	14,250	0	750	
	M-E-1	Reinforcing Bar, Round U-	kg	3	0	2,500	2,500	0	7,500	7,500	
	M-G-18	Rubber Sheet, 400x100x	pcs	2	0	220,000	220,000	0	440,000	440,000	
	Supplemental Material		%	7				1,176,385	31,325	93,240	
Labour			hour	200			30,000	0	0	6,000,000	
Indirect Cost											
		Factory Cost	%	100						25,885,950	
		General Expense	%	15						7,765,785	
Total for	1 piece							17,981,885	478,825	41,076,975	
Unit Cost for	1 hour							4,440	118	10,142	
		Miscellaneous						0	2	8	
Unit Cost for	1 hour							4,440	120	10,150	

Note : *1 : Total Operating Time 5.4 hours/day x 250 days/year x 3 years = 4050

Table 4.1.8 (3/22) UNIT RATE CALCULATION TABLE OF AGGREGATE PRODUCTION CONCRETE WORKS FOR MAIN DAM STRUCTURES

ID No. CW-13-6 | Working Name: Supporting of Belt Conveyer for Primary Breaking Facilities | Calculation Quantity Remarks: 1 set

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-E-11	L-beam (Purchasing), SS41	kg	6200	5,225	0	275	32,395,000	0	1,705,000	
	M-E-78	C-beam (Purchasing), SS41	kg	145	5,225	0	275	757,625	0	39,875	
	M-E-7	Steel Plate SS41	kg	600	5,225	0	275	3,135,000	0	165,000	
	M-E-51	Anchor	pcs	470	0	2,100	4,900	0	987,000	2,303,000	
	M-E-36	Bolt and Nut	kg	120	0	12,375	28,875	0	1,485,000	3,465,000	
	Supplemental Material		%	7				2,540,134	173,040	537,451	
Labour			hour	200			30,000	0	0	6,000,000	
Working Base Cost	CW-2-89	Polishing and 2times Shiny Painting	m2	116	0	3,800	21,600	0	440,800	2,505,600	
Indirect Cost		Factory Cost	%	100						58,634,525	
		General Expense	%	15						17,590,358	
Total for	1 set							38,827,759	3,085,840	92,945,809	
Unit Cost for	1 hour							9,587	762	22,950	
		Miscellaneous						3	8	0	
Unit Cost for	1 hour							9,590	770	22,950	

Note : *1 : Total Operating Time 5.4 hours/day x 250 days/year x 3 years = 4050

ID No. CW-13-7 | Working Name: Cat Walk of Belt Conveyer for Primary Breaking Facilities | Calculation Quantity Remarks: 1 set

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-E-11	L-beam (Purchasing), SS41	kg	2600	5,225	0	275	13,585,000	0	715,000	
	M-E-78	C-beam (Purchasing), SS41	kg	145	5,225	0	275	757,625	0	39,875	
	M-E-1	Reinforcing Bar, Round U-Expansion Joint, Steel	kg	300	0	2,500	2,500	0	750,000	750,000	
	M-E-32	Profile L-75x6mm	m	90	7,367	0	388	663,053	0	34,898	
	M-E-36	Bolt and Nut	kg	15.6	0	12,375	28,875	0	193,050	450,450	
	Supplemental Material		%	7				1,050,397	66,014	139,316	
Labour			hour	200			30,000	0	0	6,000,000	
Working Base Cost	CW-2-89	Polishing and 2times Shiny Painting	m2	250	0	3,800	21,600	0	950,000	5,400,000	
Indirect Cost		Factory Cost	%	100						31,544,677	
		General Expense	%	15						9,463,403	
Total for	1 set							16,056,075	1,959,064	54,537,618	
Unit Cost for	1 hour							3,964	484	13,466	
		Miscellaneous						6	6	4	
Unit Cost for	1 hour							3,970	490	13,470	

Note : *1 : Total Operating Time 5.4 hours/day x 250 days/year x 3 years = 4050

ID No. CW-13-8 | Working Name: Screen Tower | Calculation Quantity Remarks: 1 set

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-E-9	H-beam (Purchasing), SS41	kg	4000	5,225	0	275	20,900,000	0	1,100,000	
	M-E-78	C-beam (Purchasing), SS41	kg	25000	5,225	0	275	130,625,000	0	6,875,000	
	M-E-11	L-beam (Purchasing), SS41	kg	2500	5,225	0	275	13,062,500	0	687,500	
	M-E-7	Steel Plate SS41	kg	11500	5,225	0	275	60,087,500	0	3,162,500	
	M-E-1	Reinforcing Bar, Round U-Steel Pile, Dia.38mm	kg	200	0	2,500	2,500	0	500,000	500,000	
	M-E-14	(1.5ch), incl. Coating &	m	50	11,475	0	604	573,750	0	30,197	
	M-E-51	Anchor	pcs	24	0	2,100	4,900	0	50,400	117,600	
	M-E-36	Bolt and Nut	kg	450	0	12,375	28,875	0	5,568,750	12,993,750	
	M-E-7	Steel Plate SS41	kg	500	5,225	0	275	2,612,500	0	137,500	
	Supplemental Material		%	7				15,950,288	428,341	1,792,283	
Labour			hour	3000			30,000	0	0	90,000,000	
Working Base Cost	CW-2-89	Polishing and 2times Shiny Painting	m2	250	0	3,800	21,600	0	950,000	5,400,000	
Indirect Cost		Factory Cost	%	100						374,105,359	
		General Expense	%	15						112,231,608	
Total for	1 set							243,811,538	7,497,491	609,133,297	
Unit Cost for	1 hour							60,200	1,851	150,403	
		Miscellaneous						10	9	7	
Unit Cost for	1 hour							60,210	1,860	150,410	

Note : *1 : Total Operating Time 5.4 hours/day x 250 days/year x 3 years = 4050

Table 4.1.8 (4/22) UNIT RATE CALCULATION TABLE OF AGGREGATE PRODUCTION CONCRETE WORKS FOR MAIN DAM STRUCTURES

ID No. CW-13-9 — Working Name: Supporting of Belt Conveyer for Secondary Breaking Facilities — Calculation Quantity: 1 set — Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-E-11	L-beam (Purchasing), SS41	kg	18000	5,225	0	275	94,050,000	0	4,950,000	
	M-E-78	C-beam (Purchasing), SS41	kg	1500	5,225	0	275	7,837,500	0	412,500	
	M-E-7	Steel Plate SS41	kg	6500	5,225	0	275	33,962,500	0	1,787,500	
	M-E-51	Anchor	pcs	150	0	2,100	4,900	0	315,000	735,000	
	M-E-36	Bolt and Nut	kg	200	0	12,375	28,875	0	2,475,000	5,775,000	
	Supplemental Material		%	7				9,509,500	195,300	956,200	
Labour			hour	2000			30,000	0	0	60,000,000	
Working Base Cost											
	CW-2-89	Polishing and 2times Shiny Painting	m2	800	0	3,800	21,600	0	3,040,000	17,280,000	
Indirect Cost											
		Factory Cost	%	100						243,281,000	
		General Expense	%	15						72,984,300	
Total for	1 set							145,359,500	6,025,300	408,161,500	
Unit Cost for	1 hour							35,891	1,488	100,781	
		Miscellaneous						9	2	9	
Unit Cost for	1 hour							35,900	1,490	100,790	

Note : *1 : Total Operating Time 5.4 hours/day x 250 days/year x 3 years = 4050

ID No. CW-13-10 — Working Name: Cat Walk of Belt Conveyer for Secondary Breaking Facilities — Calculation Quantity: 1 set — Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-E-11	L-beam (Purchasing), SS41	kg	16000	5,225	0	275	83,600,000	0	4,400,000	
	M-E-78	C-beam (Purchasing), SS41	kg		5,225	0	275	0	0	0	
	M-E-1	Reinforcing Bar, Round U-Expansion Joint, Steel	kg	1600	0	2,500	2,500	0	4,000,000	4,000,000	
	M-E-32	Profile L-75x6mm	m	500	7,367	0	388	3,683,625	0	193,875	
	M-E-36	Bolt and Nut	kg	253.7	0	12,375	28,875	0	3,139,538	7,325,588	
	Supplemental Material		%	7				6,109,854	499,768	1,114,362	
Labour			hour	1200			30,000	0	0	36,000,000	
Working Base Cost											
	CW-2-89	Polishing and 2times Shiny Painting	m2	1500	0	3,800	21,600	0	5,700,000	32,400,000	
Indirect Cost											
		Factory Cost	%	100						192,166,609	
		General Expense	%	15						57,649,983	
Total for	1 set							93,393,479	13,339,305	335,250,416	
Unit Cost for	1 hour							23,060	3,294	82,778	
		Miscellaneous						10	6	2	
Unit Cost for	1 hour							23,070	3,300	82,780	

Note : *1 : Total Operating Time 5.4 hours/day x 250 days/year x 3 years = 4050

ID No. CW-13-11 — Working Name: Rock Laddar — Calculation Quantity: 1 set — Remarks

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-E-11	L-beam (Purchasing), SS41	kg	1600	5,225	0	275	8,360,000	0	440,000	
	M-E-78	C-beam (Purchasing), SS41	kg	150	5,225	0	275	783,750	0	41,250	
	M-E-7	Steel Plate SS41	kg	1000	5,225	0	275	5,225,000	0	275,000	
	M-E-51	Anchor	pcs	20	0	2,100	4,900	0	42,000	98,000	
	M-E-36	Bolt and Nut	kg	2	0	12,375	28,875	0	24,750	57,750	
	Supplemental Material		%	7				1,005,813	4,673	63,840	
Labour			hour	220			30,000	0	0	6,600,000	
Working Base Cost											
	CW-2-89	Polishing and 2times Shiny Painting	m2	70	0	3,800	21,600	0	266,000	1,512,000	
Indirect Cost											
		Factory Cost	%	100						24,799,825	
		General Expense	%	15						7,439,948	
Total for	1 set							15,374,563	337,423	41,327,613	
Unit Cost for	1 hour							3,796	83	10,204	
		Miscellaneous						4	7	6	
Unit Cost for	1 hour							3,800	90	10,210	

Note : *1 : Total Operating Time 5.4 hours/day x 250 days/year x 3 years = 4050

Table 4.1.8 (5/22) UNIT RATE CALCULATION TABLE OF AGGREGATE PRODUCTION CONCRETE WORKS FOR MAIN DAM STRUCTURES

ID No. CW-13-12 | Working Name: Screen Shoot | Calculation Quantity Remarks: 1 set

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-E-11	L-beam (Purchasing), SS41	kg	20	5,225	0	275	104,500	0	5,500	
	M-E-7	Steel Plate SS41	kg	2	5,225	0	275	10,450	0	550	
	Supplemental Material		%	7				8,047	0	424	
Labour			hour	35			30,000	0	0	1,050,000	
Working Base Cost											
	CW-2-89	Polishing and 2times Shiny Painting	m2	260	0	3,800	21,600	0	988,000	5,616,000	
Indirect Cost											
		Factory Cost	%	100						7,783,470	
		General Expense	%	15						2,335,041	
Total for	1 set							122,997	988,000	16,790,985	
Unit Cost for	1 hour							30	244	4,146	
		Miscellaneous						10	6	4	
Unit Cost for	1 hour							40	250	4,150	

Note : *1 : Total Operating Time 5.4 hours/day x 250 days/year x 3 years = 4050

ID No. CW-13-13 | Working Name: Screen Hopper | Calculation Quantity Remarks: 1 set

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-E-7	Steel Plate SS41	kg	150	5,225	0	275	783,750	0	41,250	
	Supplemental Material		%	7				54,863	0	2,888	
Labour			hour	25			30,000	0	0	750,000	
Working Base Cost											
	CW-2-89	Polishing and 2times Shiny Painting	m2	15	0	3,800	21,600	0	57,000	324,000	
Indirect Cost											
		Factory Cost	%	100						2,013,750	
		General Expense	%	15						604,125	
Total for	1 set							838,613	57,000	3,736,013	
Unit Cost for	1 hour							207	14	922	
		Miscellaneous						3	6	8	
Unit Cost for	1 hour							210	20	930	

Note : *1 : Total Operating Time 5.4 hours/day x 250 days/year x 3 years = 4050

ID No. CW-13-14 | Working Name: Production of Aggregate (<5.0mm) | Calculation Quantity Remarks: 253 ton Productivity: 253ton/day

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Working Base Cost											
	CW-13-2	Maintenance & Inspection of Facilities	hour	2.4	0	0	25,620	0	0	61,488	
	CW-13-3	Primary Breaking Facilities	hour	2.4	326,000	4,000	201,000	782,400	9,600	482,400	
	CW-13-4	Secondary Breaking Facilitie	hour	2.2	855,000	13,000	671,000	1,881,000	28,600	1,476,200	
	CW-13-15	Aggregate (<5.0mm) Product Facilities	hour	8.7	973,000	8,000	446,000	8,465,100	69,600	3,880,200	
Others		Miscellaneous	L.S.					500	200	712	
Total for	253 ton							11,129,000	108,000	5,901,000	
Unit Cost for	1 ton							43,988	427	23,324	

Note *1 : Productivity of Facilitites : 253 ton/day

Table 4.1.8 (6/22) UNIT RATE CALCULATION TABLE OF AGGREGATE PRODUCTION CONCRETE WORKS FOR MAIN DAM STRUCTURES

ID No.	Working Name	Calculation Quantity	Remarks
CW-13-15	Aggregate (<5.0mm) Product Facilities	1 hour	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Equipment											
	A-2-3-21	Vibrating Feader; 65 t/h	daily	0.125	27,169	0	12,590	3,396	0	1,574	
	A-2-3-16	Rod Mill; 2100 x 3600 mm	hourly	1	473,476	0	219,416	473,476	0	219,416	
	A-2-3-6	Classifyer; 1050 x 7500 mm	hourly	1	80,444	0	36,813	80,444	0	36,813	
	A-2-4-4	Sand Bin	daily	0.125	404,049	0	85,063	50,506	0	10,633	
	A-2-3-2	Belt Conveyer; W 450 mm per 10m(~15m)	hourly	1.5	23,775	7	5,390	35,662	11	8,086	
	A-2-4-29	Belt Conveyer; W 450 mm per 10m(~30m)	hourly	1.5	11,095	0	2,502	16,642	0	3,753	
	A-2-4-32	Belt Conveyer; W 450 mm per 10m(~50m)	hourly	0.8	8,421	0	1,899	6,737	0	1,519	
	A-2-4-35	Belt Conveyer; W 450 mm per 10m(>50m)	hourly	0	6,403	0	1,444	0	0	0	
	A-2-3-2	Belt Conveyer; W 450 mm per 10m(~15m)	hourly	0	23,775	7	5,390	0	0	0	
	A-2-4-29	Belt Conveyer; W 450 mm per 10m(~30m)	hourly	0	11,095	0	2,502	0	0	0	
	A-2-3-2	Belt Conveyer; W 450 mm per 10m(~15m)	hourly	1.5	23,775	7	5,390	35,662	11	8,086	
	A-2-4-29	Belt Conveyer; W 450 mm per 10m(~30m)	hourly	1.5	11,095	0	2,502	16,642	0	3,753	
	A-2-4-32	Belt Conveyer; W 450 mm per 10m(~50m)	hourly	2	8,421	0	1,899	16,843	0	3,798	
	A-2-4-35	Belt Conveyer; W 450 mm per 10m(>50m)	hourly	4.8	6,403	0	1,444	30,736	0	6,931	
Labour											
	L-2-23	Common Labour	day	0.32	0	0	35,100	0	0	11,232	
	L-2-2	Operator	day	0.14	0	0	46,900	0	0	6,566	
Material											
	M-J-7	Rod; Dia.38mm	pcs	0.2	860,625	0	45,296	172,125	0	9,059	
	M-K-15	Electrical Charge	kWh	113	0	36	84	0	4,068	9,492	
Working Base Cost											
	CW-13-16	Supporting of Belt Conveyer for Sand Product Facilities	hour	1	25,540	1,900	76,980	25,540	1,900	76,980	
	CW-13-17	Cat Walk of Belt Conveyer for Sand Product Facilities	hour	1	7,670	1,080	27,520	7,670	1,080	27,520	
Others		Miscellaneous	L.S.					918	930	790	
Total for	1 hour							973,000	8,000	446,000	
Unit Cost for	1 hour							973,000	8,000	446,000	

Note : *1 : Length of Belt Conveyer; W=450-1 48.4 m
W=450-2 8 m
W=450-3 98 m

ID No.	Working Name	Calculation Quantity	Remarks
CW-13-16	Supporting of Belt Conveyer for Sand Product Facilities	1 set	

Major Item	ID No.	Description	Unit	Quantity	Unit Cost PF/C	Unit Cost IF/C	Unit Cost L/C	Cost PF/C	Cost IF/C	Cost L/C	Remarks
Material											
	M-E-11	L-beam (Purchasing), SS41	kg	13000	5,225	0	275	67,925,000	0	3,575,000	
	M-E-78	C-beam (Purchasing), SS41	kg	800	5,225	0	275	4,180,000	0	220,000	
	M-E-7	Steel Plate SS41	kg	4700	5,225	0	275	24,557,500	0	1,292,500	
	M-E-51	Anchor	pcs	80	0	2,100	4,900	0	168,000	392,000	
	M-E-36	Bolt and Nut	kg	400	0	12,375	28,875	0	4,950,000	11,550,000	
	Supplemental Material		%	7				6,766,375	358,260	1,192,065	
Labour			hour	1400			30,000	0	0	42,000,000	
Working Base Cost											
	CW-2-89	Polishing and 2times Shiny Painting	m2	580	0	3,800	21,600	0	2,204,000	12,528,000	
Indirect Cost											
		Factory Cost	%	100						183,858,700	
		General Expense	%	15						55,157,610	
Total for	1 set							103,428,875	7,680,260	311,765,875	
Unit Cost for	1 hour							25,538	1,896	76,979	
		Miscellaneous						2	4	1	
Unit Cost for	1 hour							25,540	1,900	76,980	

Note : *1 : Total Operating Time 5.4 hours/day x 250 days/year x 3 years = 4050