

XEKATAM SMALL HYDRO-ELECTRIC POWER PROJECT

LIST OF DISCHARGE MEASUREMENT

RIVER : XEKATAM

HYDROLOGIC YEAR 1991

STATION : BAN NONGHIN

SHEET ... 2 ...

Made by : Mr.Sengchanh

Approved by : Mr.Somsack PHRASONTHI

No.	DATE	GAUGE HEIGHT m	AREA sq.m	MEAN VELOCITY m/s	DISCHARGE cu.m/s	G.H CHANGE	REMARKS
29	9-10-91	1.02	22,655	1.032	23,371		
30	16-10-91	0.90	18,280	0.893	16,338		
31	23-10-91	0.76	15,635	0.629	9,849		
32	30-10-91	0.67	14,027	0.455	6,389		
33	6-11-91	0.60	12,102	0.421	5,096		
34	22-11-91	0.50	9,899	0.304	3,007		
35	4-12-91	0.46	9,366	0.270	2,537		
36	11-12-91	0.44	9,946	0.270	2,694		
37	18-12-91	0.43	8,302	0.220	1,829		
38	25-12-91	0.40	8,172	0.226	1,849		
39	2-1-92	0.38	8,603	0.206	1,780		
40	8-1-92	0.38	8,848	0.227	2,011		
41	15-1-92	0.36	8,495	0.192	1,632		
42							
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Current-Metering and Calculation of Flow

(Measurement No.1 to No.41)

Station XEKAM. 3/5/1991 (No.1)

$V = 0.698N + 0.016$

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD) Page 2

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)	
	Depth of point (0-m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s-1)			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10)=(8)x(9) (m <sup>3</sup> .s-1)		
					in the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
0,5	20-										
	60-	4	60"	0,066	0,066	0,062	0,031	0,25	0,008		
	80-										
0,53	20-	11	50"	0,22	0,169	0,145	0,105	0,545	0,057		
	60-										
	80-	8	52"	0,153	0,122						
0,57	20-	21	48"	0,432	0,321	0,306	0,225	0,55	0,123		
	60-										
	80-	19	48"	0,395	0,291						
0,57	20-	15	42"	0,319	0,238	0,228	0,262	0,57	0,152		
	60-										
	80-	14	48"	0,291	0,219						
0,63	20-	14	46"	0,304	0,228	0,183	0,205	0,60	0,123		
	60-										
	80-	17	51"	0,126	0,138						
0,58	20-	13	46"	0,282	0,212	0,156	0,169	0,605	0,102		
	60-										
	80-	7	52"	0,122	0,101						
0,70	20-	14	48"	0,291	0,219	0,199	0,127	0,64	0,113		
	60-										
	80-	11	42"	0,234	0,127						
0,56	20-	31	46"	0,673	0,485	0,1101	0,3	0,63	0,189		
	60-										
	80-	20	116"	0,1134	0,318						
0,71	20-	18	47"	0,382	0,282	0,212	0,306	0,635	0,194		
	60-										
	80-	10	55"	0,181	0,142						
0,56	20-	9	49"	0,183	0,143	0,105	0,158	0,635	0,100		
	60-										
	80-	12	52"	0,075	0,068						
0,51	20-	12	45"	0,266	0,201	0,123	0,114	0,535	0,060		
	60-										
	80-	3	69"	0,043	0,046						
0,46	20-	11	45"	0,244	0,186	0,132	0,127	0,485	0,061		
	60-										
	80-	5	52"	0,090	0,078						
0,30	20-						0,066	0,38	0,025		
	60-										
	80-			0							
	20-										
	60-										
	80-										
	20-										
	60-										
	80-										
							0,185	7,03	1,304		

$V_P = \sum Q : \sum F$

Station. LEKATAM. 8/5/1991 (No. 2)

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (x-m)	Number of rotations	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10)-(8)-(9) (m <sup>3</sup> .s <sup>-1</sup> )	
					in the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
1 0,60	20-	5	53"	0,054	0,053	0,058	0,029	0,3	0,008	T-end = 107 30' H = 0,34 m H = 0,34 m m = 40 H = 0,34 m
	60-									
	80-	3	44"	0,068	0,063					
1 0,54	20-	13	47"	0,276	0,208	0,209	0,193	0,57	0,075	
	60-									
	80-	12	43"	0,279	0,210					
1 0,58	20-	18	50"	0,36	0,267	0,274	0,211	0,56	0,131	
	60-									
	80-	16	42"	0,380	0,281					
1 0,50	20-	23	44"	0,522	0,380	0,309	0,291	0,51	0,157	
	60-									
	80-	15	47"	0,319	0,238					
1 0,70	20-	16	45"	0,372	0,275	0,190	0,219	0,60	0,119	
	60-									
	80-	6	46"	0,130	0,106					
1 0,68	20-	18	43"	0,348	0,258	0,271	0,230	0,69	0,158	
	60-									
	80-	17	44"	0,336	0,285					
1 0,55	20-	26	42"	0,619	0,448	0,439	0,355	0,61	0,216	
	60-									
	80-	25	42"	0,595	0,431					
1 0,53	20-	19	44"	0,431	0,316	0,272	0,355	0,54	0,191	Khan plot A18
	60-									
	80-	14	46"	0,304	0,228					
1 0,59	20-	8	43"	0,386	0,145	0,134	0,203	0,56	0,113	
	60-									
	80-	6	49"	0,122	0,101					
1 0,51	20-	7	45"	0,155	0,124	0,118	0,126	0,55	0,069	
	60-									
	80-	6	43"	0,129	0,113					
1 0,57	20-	14	44"	0,308	0,237	0,227	0,172	0,54	0,092	
	60-									
	80-	13	45"	0,288	0,217					
1 0,35	20-					0,046	0,136	0,46	0,062	
	60-	2	46"	0,043	0,046					
	80-									
1 0,78	20-					0,129	0,087	0,31	0,026	
	60-	7	43"	0,162	0,129					
	80-									
1 0,41	20-					-	-	-	-	
	60-		0	-	-					
	80-									
	20-									
	60-									
	80-									
								0,212	6,83	1,115

VP=10.1P 2P 1 10

Station XEKALAM. 13/5/91 (No. 3)

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (% - m)	Number of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s-1)			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)×(9) (m <sup>3</sup> .s-1)	
					to the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
0,112	20-	2	43"	0,016	0,049	0,039	0,019	0,21	0,004	T. Max. = 107.05' T. and = 104.50' H = 0.33 m H = 0.133 m S. Humphreys
	60-			0,						
	80-	1	48"	0,020	0,029					
0,155	20-	7	46"	0,152	0,122	0,092	0,065	0,185	0,031	
	60-									
	80-	3	45"	0,066	0,062					
0,116	20-	10	45"	0,222	0,170	0,133	0,112	0,505	0,056	
	60-									
	80-	5	43"	0,116	0,096					
0,156	20-	11	42"	0,333	0,248	0,225	0,179	0,51	0,091	
	60-									
	80-	12	45"	0,266	0,201					
0,148	20-	18	43"	0,148	0,308	0,264	0,211	0,52	0,126	
	60-									
	80-	13	44"	0,295	0,221					
0,154	20-	16	44"	0,363	0,269	0,202	0,233	0,51	0,118	
	60-									
	80-	8	47"	0,170	0,134					
0,158	20-	22	43"	0,541	0,372	0,285	0,213	0,56	0,136	
	60-									
	80-	12	46"	0,260	0,197					
0,113	20-	20	43"	0,165	0,340	0,324	0,304	0,505	0,153	
	60-									
	80-	18	43"	0,148	0,307					
0,150	20-	17	42"	0,395	0,291	0,238	0,326	0,165	0,151	
	60-									
	80-	11	43"	0,224	0,186					
0,155	20-	6	45"	0,133	0,108	0,078	0,203	0,525	0,106	
	60-									
	80-	2	43"	0,016	0,018					
0,149	20-	12	45"	0,377	0,279	0,220	0,119	0,52	0,037	
	60-									
	80-	9	43"	0,209	0,161					
0,154	20-	12	44"	0,278	0,205	0,158	0,189	0,515	0,097	
	60-									
	80-	6	44"	0,136	0,110					
0,135	20-					0,048	0,103	0,445	0,045	
	60-	2	43"	0,016	0,048					
	80-									
0,25	20-					0,069	0,058	0,3	0,014	
	60-	5	43"	0,116	0,069					
	80-									
	20-									
	60-									
	80-									
								0,183	6,575	1,208

VP = ΣQ.ΣF      ΣF      ΣQ

Station XEKATAM.

(No. 4)

16/5/1991

$V = 0,698N + 0,016$

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (8-p)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)×(9) (m <sup>3</sup> .s <sup>-1</sup> )	
					in the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
0,110	20-	7	115"	0,155	0,1214	0,125	0,062	0,20	0,012	T-read = 12 <sup>h</sup> 00 H = 0,145 m Khamphat 0
	60-		118"	0,159	0,126					
	80-	7	111"	0,159	0,126					
0,611	20-	7	111"	0,159	0,126	0,117	0,121	0,52	0,062	
	60-		115"	0,133	0,108					
	80-	6	113"	0,232	0,177					
0,62	20-	10	113"	0,232	0,177	0,169	0,113	0,63	0,090	
	60-		113"	0,209	0,161					
	80-	9	112"	0,571	0,441					
0,72	20-	21	112"	0,571	0,441	0,352	0,260	0,87	0,171	
	60-		113"	0,395	0,291					
	80-	17	113"	0,720	0,543					
0,72	20-	31	113"	0,720	0,543	0,420	0,102	0,72	0,289	
	60-		113"	0,441	0,323					
	80-	19	113"	0,488	0,356					
0,85	20-	21	113"	0,488	0,356	0,312	0,366	0,785	0,287	
	60-		111"	0,363	0,269					
	80-	16	111"	0,627	0,453					
0,81	20-	27	113"	0,627	0,453	0,383	0,347	0,83	0,288	
	60-		112"	0,428	0,311					
	80-	18	113"	0,511	0,372					
0,71	20-	22	113"	0,511	0,372	0,323	0,253	0,86	0,268	
	60-		113"	0,372	0,275					
	80-	16	113"	0,441	0,323					
0,67	20-	19	113"	0,441	0,323	0,331	0,227	0,69	0,225	
	60-		113"	0,465	0,340					
	80-	20	113"	0,395	0,291					
0,71	20-	17	113"	0,395	0,291	0,258	0,291	0,69	0,202	
	60-		113"	0,302	0,226					
	80-	13	113"	0,511	0,372					
0,62	20-	22	113"	0,511	0,372	0,251	0,307	0,665	0,202	
	60-		112"	0,452	0,337					
	80-	19	112"	0,261	0,198					
0,37	20-	11	112"	0,261	0,198	0,236	0,293	0,195	0,115	
	60-		113"	0,272	0,275					
	80-	16	113"	0,023	0,032					
0,115	20-	1	113"	0,023	0,032	0,032	0,134	0,11	0,054	
	60-		113"	0,023	0,032					
	80-	1	114"	0,022	0,031					
0,33	20-	1	114"	0,022	0,031	0,031	0,031	0,39	0,012	
	60-		111"	0,022	0,031					
	80-	1	111"	0,255	0,193					
0,27	20-					0,193	0,112	0,3	0,033	
	60-									
	80-	11	113"							

$VP = \frac{1}{3} \times (V_1 + V_2 + V_3)$

(No. 4-2)

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)	
	Depth of point (% - w)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) = (8) x (9) (m <sup>3</sup> .s <sup>-1</sup> )		
					in the point	mean in the vertical "yy"	average between verticals				
1	2	3	4	5	6	7	8	9 = 6(P.1)	10	11	
0.26	20-										
	60-	1	113 <sup>0</sup>	0.023	0.032	0.032	0.112	0.265	0.029		
	80-										
0.33	20-										
	60-	2	113 <sup>0</sup>	0.046	0.048	0.048	0.104	0.295	0.011		
	80-										
	20-						0.255	9.245	2.983		
	60-										
	80-										
	20-										
	60-										
	80-										
	20-										
	60-										
	80-										
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	60-										
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	20-										
	60-										
	80-										
	20-										
	60-										
	80-										
	20-										
	60-										
	80-										

VP = 50.2F 2F 30

Station XEKATAN. 18/5/1991 (No. 5) X=0,698N-e 0,016.  
 CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)	
	Depth of point (s-m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s-1)			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10)-(8) x (9) (m <sup>3</sup> .s-1)		
					In the point	mean in the vertical "v"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
0,21	20-										I-shaft = 114.30 I-end = 124.00
	60-		0								
	80-										
0,111	20-	1	112'	0,023	0,032	0,048	0,024	0,325	0,007	H-shaft = 0,119 m H-end = 0,119 m	
	60-	3	112'	0,031	0,065						
	80-	1	113'	0,023	0,032						
0,111	20-	1	113'	0,023	0,032	0,033	0,060	0,144	0,026		
	60-	6	112'	0,112	0,115						
	80-	0									
0,167	20-	0				0,137	0,105	0,555	0,058		
	60-	0									
	80-	0									
0,76	20-	21	112'	0,5	0,365	0,339	0,238	0,715	0,150		
	60-	18	112'	0,428	0,314						
	80-	112	112'	1	0,711						
0,76	20-	23	112'	0,587	0,397	0,555	0,1147	0,76	0,339		
	60-	29	112'	0,690	0,497						
	80-	12	112'	0,288	0,214						
0,88	20-	29	112'	0,699	0,497	0,355	0,455	0,82	0,373		
	60-	10	111'	0,2113	0,185						
	80-	23	112'	0,517	0,397						
0,85	20-	10	111'	0,2113	0,185	0,311	0,348	0,825	0,301		
	60-	23	112'	0,517	0,397						
	80-	9	112'	0,211	0,168						
0,73	20-	27	112''	0,642	0,464	0,282	0,311	0,79	0,245		
	60-	9	112'	0,211	0,168						
	80-	27	112''	0,642	0,464						
0,61	20-	21	111''	0,585	0,424	0,1114	0,363	0,685	0,248		
	60-	18	112'	0,428	0,314						
	80-	21	111''	0,585	0,424						
0,34	20-	18	112'	0,428	0,314	0,281	0,262	0,69	0,219		
	60-	14	112'	0,333	0,248						
	80-	18	112'	0,428	0,314						
0,67	20-	18	112'	0,428	0,314	0,216	0,248	0,705	0,114		
	60-	18	112'	0,428	0,314						
	80-	12	111'	0,292	0,219						
0,92	20-	26	111''	0,634	0,458	0,406	0,311	0,795	0,248		
	60-	20	111'	0,487	0,355						
	80-	2	112'	0,071	0,065						
0,63	20-	2	112'	0,071	0,065	0,065	0,235	0,775	0,182		
	60-	3	112'	0,071	0,065						
	80-	3	112'	0,071	0,065						
0,111	20-	15	112'	0,357	0,266	0,196	0,130	0,535	0,069		
	60-	7	114''	0,159	0,126						
	80-	7	114''	0,159	0,126						

VP=10.2F 2F 1 10

(No. 5-2)

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (8-m)	Nug- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s-1)			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10)=(8)×(9) (m <sup>3</sup> .s-1)	
					in the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9-6 (P.1)	10	11
0,27	20-									
	60-	6	112'	0,112	0,115	0,115	0,155	0,275	0,058	
	80-									
0,30	20-									
	60-	8	112'	0,190	0,218	0,118	0,131	0,305	0,039	
	80-									
0,25	20-									
	60-	9	111'	0,219	0,168	0,168	0,158	0,325	0,051	
	80-									
0,28	20-									
	60-		0	0	-		0,271 m/s	10,16 m <sup>2</sup>	2,826 m <sup>3</sup> /s	
	80-									
	20-									
	60-									
	80-									
	20-									
	60-									
	80-									
	20-									
	60-									
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	80-									
	20-									
	60-									
	80-									

VP=ΣQ:ΣF ΣF 1 ΣQ



Station XEKATAM. 22/5/91. (No. 6.) V = 0.698N + 0.016.

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)x(9) (m <sup>3</sup> .s <sup>-1</sup> )	
					in the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
0.58	20-	12	18 <sup>s</sup>	0.25	0.191	0.168	0.084	0.1435	0.036	T-staff = 7.4 15' H-end = 1.4 15' H-staff = 0.1 9 m
	60-									
	80-	9	19 <sup>s</sup>	0.181	0.144					
0.76	20-	9	19 <sup>s</sup>	0.181	0.144	0.111	0.142	0.167	0.095	
	60-									
	80-	5	50 <sup>s</sup>	0.1	0.085					
0.118	20-	18	16 <sup>s</sup>	0.291	0.228	0.318	0.216	0.165	0.132	
	60-									
	80-	20	11 <sup>s</sup>	0.176	0.318					
0.70	20-	32	11 <sup>s</sup>	0.727	0.527	0.378	0.318	0.585	0.207	
	60-									
	80-	11	15 <sup>s</sup>	0.311	0.233					
0.73	20-	33	15 <sup>s</sup>	0.723	0.527	0.182	0.143	0.145	0.307	
	60-									
	80-	26	13 <sup>s</sup>	0.604	0.437					
0.75	20-	28	14 <sup>s</sup>	0.626	0.459	0.305	0.393	0.711	0.290	
	60-									
	80-	9	16 <sup>s</sup>	0.195	0.152					
0.72	20-	32	13 <sup>s</sup>	0.711	0.525	0.1112	0.273	0.735	0.274	
	60-									
	80-	22	14 <sup>s</sup>	0.5	0.219					
0.17	20-					0.125	0.158	0.145	0.203	
	60-	29	14 <sup>s</sup>	0.659	0.475					
	80-									
0.70	20-	25	17 <sup>s</sup>	0.531	0.386	0.272	0.373	0.435	0.168	
	60-									
	80-	10	19 <sup>s</sup>	0.204	0.158					
0.94	20-	24	18 <sup>s</sup>	0.5	0.365	0.365	0.318	0.82	0.262	
	60-									
	80-	22	14 <sup>s</sup>	0.5	0.265					
0.71	20-	25	13 <sup>s</sup>	0.581	0.421	0.289	0.327	0.81	0.174	
	60-									
	80-	10	19 <sup>s</sup>	0.204	0.158					
0.66	20-	15	15 <sup>s</sup>	0.323	0.248	0.180	0.234	0.7	0.163	
	60-									
	80-	6	13 <sup>s</sup>	0.139	0.113					
0.57	20-	3	50 <sup>s</sup>	0.026	0.057	0.056	0.118	0.615	0.072	
	60-									
	80-	3	52 <sup>s</sup>	0.057	0.055					
0.18	20-					0.217	0.136	0.75	0.102	
	60-	13	15 <sup>s</sup>	0.288	0.217					
	80-									
0.26	20-					0.094	0.155	0.22	0.034	
	60-	5	14 <sup>s</sup>	0.113	0.094					
	80-									

VP=20.2F 2F 1 1Q

(No. 6-2)

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (times, gaugo reading etc.)
	Depth of point (m)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s-1)			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10)=(8)×(9) (m <sup>3</sup> .s-1)	
					in the point	mean th the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
1 0.23	20-									
	60-	b	11.7	0.127	0.10H	0.10H	0.099	0.215	0.024	
	80-									
2 0.19	20-									
	60-	0	0				0.052	0.12	0.021	
	80-						0.265 <sup>m/s</sup>	2.985 <sup>m<sup>2</sup></sup>	2.65H <sup>m<sup>3</sup></sup>	
	20-									
	60-									
	80-									
	20-									
	60-									
	80-									
	20-									
	60-									
	80-									
	20-									
	60-									
	80-									
	20-									
	60-									
	80-									
	20-									
	60-									
	80-									
	20-									
	60-									
	80-									

VP=ΣQ:ΣP    ΣP    ΣQ

Station XEKATAM.

27/5/1992 (No. 7)

$V = 0.898N + 0.016$

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (times, gauge reading etc.)	
	Depth of point (s-m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s-1)			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10)-(8) x (9) (m <sup>3</sup> .s-1)		
					to the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
1.5 0.52	20-		0	-	-						3403 13430 H=0.15 m H=0.13 m
	60-										
	80-		0	-	-						
1 0.81	20-	5	111'	0.113	0.09H	0.096	0.048	0.615	0.1029		
	60-										
	80-	5	112'	0.119	0.099						
1 0.115	20-	6	113'	0.129	0.113	0.095	0.095	0.58	0.055		
	60-										
	80-	11	115'	0.088	0.077						
1 0.64	20-	12	112'	0.285	0.211	0.139	0.137	0.515	0.071		
	60-										
	80-	8	113'	0.186	0.145						
1 0.56	20-	20	113'	0.1465	0.310	0.277	0.228	0.6	0.176		
	60-										
	80-	12	112'	0.285	0.211						
1 0.82	20-	31	112'	0.659	0.1185	0.367	0.322	0.69	0.222		
	60-										
	80-	15	113'	0.318	0.258						
1 0.63	20-	22	114'	0.5	0.365	0.26	0.313	0.725	0.226		
	60-										
	80-	9	115'	0.2	0.155						
1 0.62	20-	25	116'	0.543	0.395	0.33	0.295	0.625	0.184		
	60-										
	80-	15	112'	0.357	0.263						
1 0.117	20-	24	113'	0.558	0.1105	0.307	0.318	0.515	0.173		
	60-										
	80-	12	113'	0.279	0.210						
1 0.66	20-	22	114'	0.5	0.365	0.310	0.323	0.565	0.182		
	60-										
	80-	14	114'	0.1131	0.316						
1 0.60	20-	16	113'	0.372	0.275	0.266	0.303	0.63	0.198		
	60-										
	80-	15	113'	0.318	0.258						
1 0.59	20-	24	110'	0.148	0.351	0.302	0.281	0.595	0.168		
	60-										
	80-	15	111'	0.310	0.253						
1 0.311	20-	14	114'	0.318	0.237	0.201	0.251	0.465	0.116		
	60-										
	80-	9	112'	0.211	0.165						
1 0.20	20-					0.077	0.139	0.27	0.037		
	60-	11	115'	0.088	0.077						
	80-										
1 0.12	20-		0	-	-						
	60-										
	80-										

Khamphat 4

$0.210 \frac{m}{s}$      $1.115 \frac{m^2}{s}$      $1.792 \frac{m^3}{s}$   
 $VP = 20.2P$      $2P$      $2Q$

Station: XEKATM.

30/5/1991 (No. 8) V = 0.698 N + 0.016

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)	
	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8) <sup>3</sup> (9) (m <sup>3</sup> .s <sup>-1</sup> )		
					in the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
0.30	20-		0	-	-						13.6 20
	60-										11.2 00
	80-		0	-	-						
0.55	20-	5	112'	0.119	0.099	0.081	0.0110	0.1125	0.017	H <sub>1</sub> =0.112 <sup>m</sup> H <sub>2</sub> =0.442 <sup>m</sup>	
	60-										
	80-	3	113'	0.069	0.0611						
0.63	20-	9	111'	0.2011	0.158	0.127	0.1011	0.59	0.061		
	60-										
	80-	5	113'	0.116	0.096						
0.65	20-	11	113'	0.325	0.2121	0.236	0.181	0.61	0.115	Khamphat	
	60-										
	80-	13	112'	0.309	0.231						
0.71	20-	17	113'	0.325	0.291	0.271	0.225	0.68	0.173		
	60-										
	80-	15	113'	0.318	0.258						
0.69	20-	26	113'	0.6011	0.1137	0.351	0.312	0.7	0.218		
	60-										
	80-	15	112'	0.357	0.265						
0.56	20-	28	113'	0.657	0.1170	0.359	0.355	0.625	0.221		
	60-										
	80-	14	112'	0.323	0.218						
0.65	20-	25	113'	0.581	0.1121	0.315	0.327	0.605	0.203		
	60-										
	80-	12	113'	0.279	0.210						
0.59	20-	27	112'	0.612	0.1161	0.377	0.316	0.62	0.211		
	60-										
	80-	17	113'	0.395	0.291						
0.60	20-	14	112'	0.333	0.218	0.229	0.303	0.595	0.180		
	60-										
	80-	12	113'	0.279	0.210						
0.61	20-	10	112'	0.238	0.182	0.163	0.196	0.62	0.121		
	60-										
	80-	8	113'	0.186	0.115						
0.110	20-	22	112'	0.523	0.381	0.311	0.238	0.52	0.123		
	60-										
	80-	14	112'	0.333	0.218						
0.118	20-	7	111'	0.159	0.126	0.110	0.212	0.135	0.092		
	60-										
	80-	5	111'	0.113	0.091						
0.110	20-					0.029	0.069	0.135	0.030		
	60-	1	118'	0.020	0.029						
	80-										
0.21	20-					0.091	0.061	0.61	0.037		
	60-	5	111'	0.113	0.091						
	80-										
					0.222 <sup>m/s</sup>	8.102 <sup>m<sup>2</sup></sup>	1.805 <sup>m<sup>3</sup></sup>				

Station: XEKATAM 5/16/1991 (No. 9)

V = 0,698N + 0,016

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Verti- cal (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauging reading etc.)					
	Depth of point (% m)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10)-(8) x (9) (m <sup>3</sup> .s <sup>-1</sup> )						
					in the point	mean in the vertical "V"	average between verticals								
1	2	3	4	5	6	7	8	9=6(P.1)	10	11					
1,5	0,23	20-							0,173		H. depth = 0,11 m L. width = 0,11 m T. end = 11 m M. 50				
		60-		0	0										
		80-													
1	0,48	20-	1	112'	0,023	0,032	0,041	0,021	0,355	0,006	Remarks: $Q_2 = \frac{F_1 + F_2}{2} \times V$ $Q_{15} = \frac{F_1 + F_2 + F_3}{3} \times V$				
		60-													
		80-	2	112'	0,018	0,019									
1	0,68	20-	7	112'	0,167	0,133	0,116	0,079	0,580	0,046					
		60-													
		80-	5	112'	0,119	0,099									
1	0,88	20-	11	112'	0,262	0,199	0,191	0,151	0,520	0,082					
		60-													
		80-	10	112'	0,238	0,182									
1	0,67	20-	11	111'	0,311	0,254	0,210	0,221	0,525	0,106					
		60-													
		80-	9	112'	0,214	0,165									
1	0,81	20-	21	112'	0,511	0,415	0,307	0,259	0,705	0,183					
		60-													
		80-	11	112'	0,262	0,199									
1	0,71	20-	22	113'	0,512	0,373	0,236	0,272	0,711	0,201					
		60-													
		80-	5	112'	0,119	0,099									
1	0,86	20-	24	112'	0,511	0,415	0,332	0,281	0,765	0,185					
		60-													
		80-	11	112'	0,333	0,218									
1	0,116	20-	22	112'	0,524	0,382	0,282	0,207	0,51	0,157					
		60-													
		80-	10	112'	0,238	0,182									
1	0,112	20-	18	114'	0,409	0,301	0,295	0,289	0,711	0,127					
		60-													
		80-	16	111'	0,390	0,288									
1	0,66	20-	15	117'	0,319	0,239	0,169	0,232	0,511	0,125					
		60-													
		80-	5	112'	0,119	0,099									
1	0,57	20-	18	111'	0,4139	0,322	0,191	0,182	0,615	0,112					
		60-													
		80-	3	112'	0,071	0,066									
1	0,119	20-	11	113'	0,256	0,195	0,189	0,192	0,53	0,102					
		60-													
		80-	10	112'	0,238	0,182									
1	0,33	20-							0,111						
		60-	0												
		80-													
1	0,211	20-													
		60-	10	112'	0,238	0,182	0,182	0,186	0,285	0,065					
		80-													

VP = Σ Q.F      Σ F      Σ Q

Station: XE KATAM. 13/6/1991 (No. 10)  $V = 0.698 N \cdot P \cdot 0.016$

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Distance between verticals (m)

Distance between verticals (m)	Results of current-metering					Calculation of velocities and of flow					Notes (time, gauge reading etc.)	
	Vertical (Max. depth in m)	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)·(9) (m <sup>3</sup> .s <sup>-1</sup> )		
						in the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11		
0.00	20-											H end = 0.55 m K end = 15.4 m Time end = 15.4 m Q = $\frac{10 \cdot 15.4}{2} = 77$ Q = $\frac{10 \cdot 15.4}{2} = 77$
1	0.16	60-	02	00				0.08				
1	0.18	80-										
1	0.18	20-						0.17				
1	0.18	60-	02	00								
1	0.18	80-										
1	0.42	20-						0.2				
1	0.42	60-	02	00								
1	0.42	80-										
1	0.42	20-	8	43"	0.186	0.146						
1	0.42	60-					0.140	0.107	0.142	0.029		
1	0.42	80-	7	42"	0.167	0.133						
1	0.66	20-	10	44"	0.227	0.171		0.154	0.154	0.083		
1	0.66	60-					0.167					
1	0.66	80-	9	44"	0.205	0.159						
1	0.83	20-	10	45"	0.222	0.171		0.166	0.1745	0.124		
1	0.83	60-					0.165					
1	0.83	80-	9	44"	0.205	0.159						
1	0.70	20-	37	43"	0.860	0.616		0.379	0.365	0.290		
1	0.70	60-					0.592					
1	0.70	80-	34	43"	0.790	0.567						
1	0.74	20-	44	43"	1.093	0.779		0.629	0.72	0.453		
1	0.74	60-					0.665					
1	0.74	80-	33	43"	0.767	0.557						
1	1.01	20-	38	44"	0.863	0.618		0.614	0.875	0.537		
1	1.01	60-					0.563					
1	1.01	80-	31	44"	0.705	0.508						
1	0.91	20-	44	44"	1.00	0.714		0.554	0.95	0.532		
1	0.91	60-					0.544					
1	0.91	80-	22	43"	0.511	0.373						
1	0.77	20-	29	43"	0.535	0.389		0.453	0.811	0.381		
1	0.77	60-					0.362					
1	0.77	80-	20	44"	0.455	0.334						
1	0.16	20-						0.287	0.465	0.180		
1	0.16	60-	25	44"	0.568	0.412						
1	0.16	80-					0.112					
1	0.84	20-	23	44"	0.523	0.381		0.367	0.5	0.184		
1	0.84	60-					0.321					
1	0.84	80-	15	43"	0.349	0.260						
1	1.00	20-	20	44"	0.455	0.334		0.276	0.92	0.254		
1	1.00	60-					0.280					
1	1.00	80-	15	42"	0.357	0.265						
1	0.79	20-	30	43"	0.697	0.502		0.346	0.895	0.310		
1	0.79	60-					0.462					
1	0.79	80-	25	43"	0.581	0.422						

VP=2Q:1P 2P 1 2Q

(No. 10-2)

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Distance  
between  
verticals  
(m)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow						Notes (time, gauge reading etc.)
	Depth of point (%m)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s-1)			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10)-(8)×(9) (m <sup>3</sup> .s-1)		
					to the point	mean th the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9-6(P.1)	10	11	
1	20-	18	12"	0,1119	0,315	0,214	0,355	0,265	0,272		
	60-										
	80-	10	13'	0,233	0,179						
1	20-							0,175			
	60-	00									
	80-										
1	20-	22	12'	0,5211	0,382	0,271	0,261	0,25	0,095		
	60-										
	80-	9	12'	0,2111	0,165						
1	20-					0,097	0,186	0,265	0,019		
	60-	5	13'	0,116	0,097						
	80-										
1	20-	17	12"	0,1105	0,299	0,299	0,198	0,33	0,057		
	60-										
	80-										
1,10	20-							0,21			
	60-	00	00	0							
	80-										
	20-					0,333 m/s	11,19 m <sup>2</sup>	3,826 m <sup>3</sup> /s			
	60-										
	80-										
	20-										
	60-										
	80-										
	20-										
	60-										
	80-										
	20-										
	60-										
	80-										
	20-										
	60-										
	80-										

VP=ΣQ:ΣF    ΣF    ΣQ

Station *XEKATAM* 18/6/1991 (No. 11)  $V = 0,698 \pm 0,016$   
**CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)**

Distance between verticals (m)	Results of current-metering					Calculation of velocities and of flow					Notes (time, gauge reading etc.)	
	Vertical (Max. depth in m)	Depth of point (s.m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) = (8) x (9) (m <sup>3</sup> .s <sup>-1</sup> )		
						In the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9 = 6(P.1)	10	11		
1	0,50	20-	11	113"	0,093	0,080	0,071	0,009	1,00	0,009	H shaft = 0,188 m H end = 0,188 m Time shaft = 11 4 05 Time end = 11 4 15	
		60-										
		80-	3	115"	0,067	0,062						
1	0,63	20-	6	111"	0,111	0,096	0,096	0,084	0,565	0,087		
		60-										
		80-	5	111"	0,111	0,096						
1	0,70	20-	6	112"	0,113	0,116	0,121	0,11	0,665	0,073		
		60-										
		80-	7	112"	0,167	0,132						
1	0,70	20-	31	113"	0,720	0,518	0,101	0,263	0,70	0,181		
		60-										
		80-	17	111"	0,386	0,285						
1	0,81	20-	31	113"	0,720	0,518	0,133	0,117	0,77	0,221		
		60-										
		80-	20	112"	0,176	0,318						
1	0,77	20-	21	113"	0,188	0,357	0,271	0,252	0,805	0,283		
		60-										
		80-	11	115"	0,241	0,186						
1	0,82	20-	28	112"	0,667	0,181	0,337	0,304	0,795	0,242		
		60-										
		80-	12	114"	0,255	0,194						
1	0,85	20-	21	113"	0,188	0,357	0,287	0,309	0,835	0,258		
		60-										
		80-	12	111"	0,273	0,206						
1	0,31	20-	10	111"	0,227	0,174	0,181	0,256	0,595	0,152		
		60-										
		80-	21	111"	0,177	0,319						
1	0,83	20-	11	112"	0,262	0,199	0,274	0,224	0,585	0,131		
		60-										
		80-	16	111"	0,361	0,270						
1	0,91	20-	8	116"	0,171	0,137	0,203	0,239	0,87	0,208		
		60-										
		80-	24	113"	0,558	0,105						
1	0,66	20-	5	113"	0,116	0,097	0,251	0,227	0,785	0,178		
		60-										
		80-	3	111"	0,068	0,063						
1	0,51	20-	11	111"	0,25	0,190	0,126	0,189	0,6	0,113		
		60-										
		80-	10	113"	0,233	0,179						
1	0,37	20-	10	113"	0,233	0,179	0,153	0,185	0,070	0,070		
		60-										
		80-	11	112"	0,262	0,199						
2	0,20	20-	11	112"	0,262	0,199	0,139	0,189	0,57	0,108		
		60-										
		80-	8	111"	0,182	0,143						

$V = 0,698 \pm 0,016$   
 $0,222 \pm 0,016$  11.135  $0,202 \pm 0,016$



Station XEKATAM 26/6/1951 (No. 12)  $V = 0.698m + 0.016$   
**CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)**

Distance between verticals (m)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow						Notes (time, gauge reading etc.)			
	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m/s)			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8) <sup>2</sup> (9) (m <sup>3</sup> .s <sup>-1</sup> )					
					In the point	mean in the vertical "v"	average between verticals							
1	2	3	4	5	6	7	8	9=6(P.I)	10	11				
0.00	20-	9	11"	0.285	0.159	0.114	0.102	0.63	0.0115	H staff = 0.68 m H end = 0.68 m Time staff = 14 20 Time end = 14 45				
0.36	60-													
	80-	7	13"	0.163	0.129									
0.72	20-	18	13"	0.119	0.208	0.278	0.211	1.24	0.262					
	60-													
80-	15	16"	0.333	0.248										
1.08	20-	60	11"	1.364	0.968	0.778	0.528	2.00	1.056					
	60-													
80-	36	11"	0.818	0.587										
1.44	20-	51	11"	1.227	0.872	0.599	0.689	1.91	1.357					
	60-													
80-	20	15"	0.444	0.326										
1.80	20-	36	11"	0.818	0.587	0.488	0.544	1.77	0.963					
	60-													
80-	23	13"	0.525	0.389										
2.16	20-	25	11"	0.568	0.412	0.265	0.427	1.82	0.777					
	60-													
80-	19	11"	0.432	0.317										
2.52	20-	23	13"	0.525	0.389	0.406	0.386	1.54	0.594					
	60-													
80-	25	13"	0.581	0.422										
2.88	20-	32	11"	0.727	0.523	0.436	0.421	1.14	0.180					
	60-													
80-	21	11"	0.477	0.349										
3.24	20-	27	11"	0.614	0.444	0.373	0.405	1.06	0.429					
	60-													
80-	18	11"	0.409	0.301										
3.60	20-	11	15"	0.244	0.186	0.186	0.280	0.405	0.113					
	60-													
80-	7	16"	0.152	0.122										
0.00	20-					0.122	0.154	0.345	0.058					
60-														
80-														
20-														
60-														
80-														
20-														
60-														
80-														

$0.110 \frac{m^3}{s}$   
 $13.95 \frac{m^3}{s}$   
 $6.134 \frac{m^3}{s}$   
 $VP = \sum Q \cdot \sum F$      $\sum F$      $\sum Q$

Station *DEKATAM*

*11/2/1992 (NO. 13) V = 0,698 N + 0,016*

**CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)**

distance  
between  
verticals  
(m)

	Results of current-metering					Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Verti- cal (Max. depth in m)	Depth of point (m)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s-1)			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8) <sup>3</sup> (9) (m <sup>3</sup> .s-1)	
						In the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
1	0,60	20-	11	112'	0,333	0,248	0,223	0,112	1,2	0,134	H end = 0,77 m H end = 0,77 m time head = 12,4 SD time head = 13,4 SD 912 = $\frac{62+53}{2} \cdot 12$
		60-									
2	4,04	20-	57	112'	0,262	0,198	0,1788	0,506	1,64	0,830	
		60-									
2	4,23	20-	57	110'	1,357	0,863	0,905	0,847	2,27	1,923	
		60-									
2	4,00	20-	50	111'	1,122	0,799	0,739	0,822	2,23	1,833	
		60-									
2	0,88	20-	62	111'	0,854	0,612	0,758	0,749	1,88	1,408	
		60-									
2	1,02	20-	27	111'	1,512	1,071	0,587	0,673	1,90	1,279	
		60-									
2	0,62	20-	36	111'	0,614	0,445	0,714	0,651	1,64	1,068	
		60-									
2	0,56	20-	39	111'	0,878	0,629	0,784	0,749	1,78	0,884	
		60-									
1	0,42	20-	43	111'	1,049	0,748	0,609	0,49	0,298	0,298	
		60-									
1	0,54	20-	22	111'	0,951	0,679	0,426	0,413	0,48	0,206	
		60-									
1	0,37	20-	30	111'	1,15	0,819	0,271	0,349	0,455	0,159	
		60-									
1	0,30	20-	19	111'	0,659	0,476	0,152	0,212	0,335	0,065	
		60-									
2	0,18	20-	8	111'	0,537	0,391	-	-	0,18	-	
		60-									
0,50	0,22	20-	50	00	-	-	-	-	0,015	-	
		60-									
		20-									
		60-									
		80-									

B = 24,50 m

$\frac{0,622^{114}}{VP=2Q:3P}$   $\frac{16,225^{23}}{2P}$   $\frac{10,087^{118}}{3Q}$

Station XEKATAM 2/7/1991 (No. 14)  $V = 0.698 \text{ m} \cdot \text{s}^{-1}$

**CURRENT-METERING AND CALCULATION OF FLOW** (1-2-3 POINTS METHOD)

Distance between verticals (m)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (times, gauge reading etc.)	
	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) = (8) x (9) (m <sup>3</sup> .s <sup>-1</sup> )		
					to the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9 = 6(P.1)	10	11	
2	20-										H end = 0.69m Time start = 54.30 Time end = 54.50 9.0 = $\frac{V \cdot H}{V_0}$
	60-	5	12"	0.119	0.099	0.099	0.050	0.36	1.08		
	80-										
2	20-	15	13"	1.048	0.787	0.511	0.32	1.21	0.387		
	60-										
	80-	20	11"	0.185	0.334						
2	20-	50	12"	1.064	0.759	0.678	0.609	1.95	1.188		
	60-										
	80-	10	18"	0.823	0.597						
2	20-	60	15"	1.333	0.916	0.59	0.634	2.01	1.274		
	60-										
	80-	15	18"	0.713	0.234						
2	20-	30	12"	0.714	0.514	0.168	0.529	1.87	0.989		
	60-										
	80-	25	13"	0.581	0.422						
2	20-	30	16"	0.652	0.471	0.337	0.1103	2.01	0.810		
	60-										
	80-	15	36"	0.268	0.203						
2	20-	35	13"	0.814	0.584	0.528	0.1432	1.71	0.719		
	60-										
	80-	30	11"	0.682	0.492						
2	20-	20	16"	0.135	0.319	0.24	0.389	1.16	0.451		
	60-										
	80-	10	18"	0.208	0.161						
2	20-					0.1103	0.392	0.87	0.280		
	60-	25	15"	0.555	0.403						
	80-										
2	20-					0.182	0.293	0.76	0.154		
	60-	10	12"	0.238	0.182						
	80-										
1.50	20-							0.293			
	60-	00	00	-	-						
	80-										

0.444 m/s  
 $\Sigma P = \Sigma Q \cdot \Sigma P$   
 $\Sigma P = 1$   
 $\Sigma Q = 6.3 \frac{m^3}{s}$

Station: Xe Katam (B. Honghin) 19/7/91 (No. 15)

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow						Notes (time, gauge reading etc.)
	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s-1)			Flow area between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)·(9) (m <sup>3</sup> .s-1)		
					to the point	mean in the vertical "v <sub>v</sub> "	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
	20-										
	60-										
	80-										
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							m/s	m <sup>2</sup>	m <sup>3</sup> /s	m	
							0.584	16.822	9.832	0.81	

Note) Detailed data of measurement No. 15 to 26 could not be listed in this Appendix. They are available at executive agency of Lao.

VP=ΣQ:ΣP    ΣP    ΣQ    5/4

Station: Xe Katam (B. Nonghin) 24/7/91 (No.16)

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)	
	Depth of point (m)	Nug- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)·(9) (m <sup>3</sup> .s <sup>-1</sup> )		
					to the point	mean in the vertical "yy"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
	20-										
	60-										
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								<i>m/s</i>	<i>m<sup>2</sup></i>	<i>m<sup>3</sup>/s</i>	<i>m</i>
								1.178	28.05	33.029	1.14

(3) Note on sheet of measurement No.15.

VP-20:2F

2F 1 2Q

G.H.

Station: Xe Katam (B. Honghin) 31/7/91 (No. 17)

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (% - p)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s-1)			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10)=(8)x(9) (m <sup>3</sup> .s-1)	
					in the point	mean in the vertical "v"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
	20--									
	60--									
	80--									
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	80--									
							m/s	m <sup>2</sup>	m/s	m
							0.865	22.35	19.322	0.96

c.f) Note on sheet of measurement No. 15.

VP=IQ:IP      IP      IQ      F.H.

Station: Xe Katam (B. Honghin) 7/8/91 (No. 18)

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vert. cal (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow				Notes (time, gauge reading etc.)		
	Depth of point (8-m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s-1)			Flow area "P" between verticals (m <sup>2</sup> )		Flow "Q" (10) = (8) x (9) (m <sup>3</sup> .s-1)	
					to the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9 = 6 (P.1)	10	11	
	20										
	60										
	80										
	20										
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	80										
								m/s	m <sup>2</sup>	m <sup>3</sup> /s	m
								0.843	21.575	18.186	0.94

(f) Note on sheet of measurement No. 15.

VP=IQ:IP IP 1 IQ 5.11





Station: Xe Katam (B. Honghin) 17/8/91 (No. 20)

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)	
	Depth of point (g-m)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10)-(8)x(9) (m <sup>3</sup> .s <sup>-1</sup> )		
					In the point	mean in the vertical "v" "	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
20-											
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							n/s	m <sup>2</sup>	m/s	m	
							1.275	31.45	40.080	1.24	

(f) Note on sheet of measurement No. 15.

VP=ΣQ:ΣP ΣP ΣQ 8.H.

Station Xe Kalam (B. Nonghin) 20/8/91 (No. 21)

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (times, gauge reading etc.)	
	Depth of point (S-P)	Nun- ber of rota- tions	Time: partiel and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "F" between Verticals (m <sup>2</sup> )	Flow "Q" (10)=(8)x(9) (m <sup>3</sup> .s <sup>-1</sup> )		
					to the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
	20-										
	60-										
	80-										
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							m/s	m <sup>2</sup>	m <sup>3</sup> /s	m	
							1.465	32.70	47.894	1.28	

(c) Note on sheet of measurement No. 15.

VP=ΣQ:ΣF ΣF 1 ΣQ 4.11.

Station : Xe Katani (B. Hinghin) 27/8/91 (No. 22)

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10)=(8)x(9) (m <sup>3</sup> .s <sup>-1</sup> )	Notes (times, gauge reading etc.)
	Depth of point (%-M)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )					
					In the point	mean in the vertical "V <sub>v</sub> "	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
	20--									
	60--									
	80--									
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	60--									
	80--									
	20--									
	60--									
	80--									

(f) Note on sheet of measurement No. 15.

m/s  
1.189  
 m<sup>2</sup>  
27.875  
 m<sup>3</sup>/s  
33.158  
 m  
1.15  
 VP=ΣQ:ΣP    ΣP    1    ΣQ    6.17

Station: Xe Katam (B. Hongh'a) 29/8/91 (No. 23)

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10) = (8) x (9) (m <sup>3</sup> .s <sup>-1</sup> )	
					In the point	mean in the vertical "v"	average between verticals			
1	2	3	4	5	6	7	8	9 = 6(P.1)	10	11
	20-									
	60-									
	80-									
	20-									
	60-									
	80-									
	20-									
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	20-									
	60-									
	80-									

(f) Note on sheet of measurement No. 15.

$\frac{m}{s}$   
 1.270  
 $\frac{m^2}{s}$   
 27.85  
 $\frac{m^3}{s}$   
 35.361  
 1.16  
 6.H.

Station : Xe Katam (B. Kongsin) 3/9/91 (No 24)

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)	
	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10)=(8)x(9) (m <sup>3</sup> .s <sup>-1</sup> )		
					In the point	mean in the vertical "v"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
20--											
60--											
80--											
20--											
60--											
80--											
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20--											
60--											
80--											
								m/s	m <sup>2</sup>	m <sup>3</sup> /s	m
								0.934	20.15	18.817	0.96

(1) Note on sheet of measurement No. 15.

$\Sigma V \times \Sigma P = \Sigma Q$        $\Sigma P \times 1 = \Sigma Q$       9.4.

Station: Xe Katam (B. Honghin) 15/9/91 (No. 25)

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Page 2

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow				Notes (times, gauge reading etc.)	
	Depth of point (x-w)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s-1)			Flow area "F" between verticals (m <sup>2</sup> )		Flow "Q" (10)=(8)x(9) (m <sup>3</sup> .s-1)
					In the point	mean in the vertical "v <sub>v</sub> "	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
	20-									
	60-									
	80-									
	20-									
	60-									
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	60-									
	80-									

$\frac{m}{s}$        $m^2$        $\frac{m^3}{s}$        $m$   
 0.869      19.85      17.259      0.93  
 VP=ΣQ:ΣF      ΣF      1      ΣQ      G.H.

cf) Note on sheet of measurement No. 15.



Station: XEKATAM 25.9.91 (No. 27)  $V = 0.698 N + 0.016$   
**CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)**

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (m)	Nun- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8) <sup>3</sup> (9) (m <sup>3</sup> .s <sup>-1</sup> )	
					in the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
2.5	20-	50	40"	1.25	0.833	0.735	0.293	1.625	2.246	Station: 0.94 m time: 11.45 time: 14.25 time: 12.05
	60-									
	80-	40	42"	0.952	1.650					
2	20-	25	40"	1.875	1.325	0.995	0.89	1.60	1.424	
	60-									
	80-	40	43"	0.930	0.665					
2	20-	25	40"	2.325	1.674	1.557	1.291	2.40	3.098	
	60-									
	80-	35	40"	2.125	1.499					
2	20-	90	40"	2.25	1.587	1.185	1.386	2.70	3.702	
	60-									
	80-	45	41"	1.092	0.782					
2	20-	65	40"	1.625	1.150	1.063	1.124	2.70	2.035	
	60-									
	80-	55	40"	1.325	0.976					
2	20-	30	40"	0.75	0.540	0.487	0.75	2.55	1.913	
	60-									
	80-	90	44"	0.455	0.334					
2	20-	70	43"	1.625	1.152	0.99	0.714	2.55	1.821	
	60-									
	80-	50	43"	1.163	0.828					
2	20-	65	40"	1.625	1.150	0.738	0.864	2.10	1.874	
	60-									
	80-	20	45"	0.444	0.326					
2	20-	55	43"	1.272	0.909	0.899	0.810	1.40	1.107	
	60-									
	80-	50	40"	1.25	0.833					
2	20-	30	40"	0.75	0.540	0.54	0.720	1.38	0.994	
	60-									
	80-	30	40"	0.75	0.540					
3.05	20-						0.27	1.159	0.321	
	60-									
	80-									
	20-									
	60-									
	80-									
	20-									
	60-									
	80-									

$b = 23.55 m$

$VP = \Sigma Q \cdot \Sigma F$        $\Sigma F$        $\Sigma Q$



Distance between verticals (m)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s-1)			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)×(9) (m <sup>3</sup> .s-1)	
					In the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
1.70	20-	95	43'	2.229	1.358	1.803	0.602	1.58	0.903	H. level = 4.73 m. I. level = 4.43 m. J. level = 4.15 m. K. level = 3.85 m. L. level = 3.55 m. M. level = 3.25 m. N. level = 2.95 m. O. level = 2.65 m. P. level = 2.35 m. Q. level = 2.05 m. R. level = 1.75 m. S. level = 1.45 m. T. level = 1.15 m. U. level = 0.85 m. V. level = 0.55 m. W. level = 0.25 m.
	60-									
	80-	50	48"	1.190	0.842					
1.25	20-	120	42'	2.825	1.023	1.870	1.537	3.525	5.019	
	60-									
	80-	100	41'	2.459	1.718					
1.75	20-	120	44'	2.927	2.057	1.827	1.849	4.15	0.598	
	60-									
	80-	95	42"	2.262	1.555					
1.30	20-	115	41'	2.525	1.974	1.761	1.794	4.525	8.288	
	60-									
	80-	90	41'	2.155	1.878					
1.40	20-	55	48'	1.202	0.930	0.791	1.816	0.108	0.065	
	60-									
	80-	35	41'	0.854	0.612					
1.70	20-	75	42'	1.756	1.763	1.114	0.893	3.90	2.457	
	60-									
	80-	45	42'	1.171	0.764					
1.75	20-	50	40'	1.25	0.889	0.845	0.999	2.375	3.455	
	60-									
	80-	45	40'	1.125	0.811					
1.70	20-						0.083	1.838	0.277	
	60-									
	80-									
1.70	20-									
	60-									
	80-									
1.70	20-									
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1.70	20-									
	60-									
	80-									
1.70	20-									
	60-									
	80-									

VP=1000 IF 1 30

Station: XEKATIN 9/10/91 (No. 29)  $V = 0,698N + 0,016$   
**CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)**

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point ( $\times$ -m)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8) <sup>3</sup> (9) (m <sup>3</sup> .s <sup>-1</sup> )	
					in the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
2,50	20-	55	40"	1,995	0,976	0,9845	0,423	1,00	0,423	H end: 1,62 m Junc Half 11°30' Junc end: 12°00'
	60-									
	80-	40	40"	1,00	0,714					
2	20-	80	40"	2,00	1,412	0,932	0,889	2,00	1,978	
	60-									
	80-	25	40"	0,825	0,452					
2	20-	115	42"	2,938	1,927	1,61	1,271	2,55	3,241	
	60-									
	80-	75	41"	1,829	1,293					
2	20-	100	42"	2,381	1,678	1,442	1,526	2,65	2,044	
	60-									
	80-	80	41"	1,207	1,207					
2	20-	85	40"	2,152	1,499	1,380	1,411	2,20	3,81	
	60-									
	80-	75	42"	1,286	1,262					
2	20-	40	42"	0,952	0,680	0,551	0,966	2,20	2,608	
	60-									
	80-	25	43"	0,581	0,422					
2	20-	75	40"	1,925	1,325	1,054	0,803	2,25	2,208	
	60-									
	80-	45	41"	1,097	0,782					
2	20-	70	40"	1,75	1,238	1,019	1,037	2,25	2,333	
	60-									
	80-	45	40"	1,125	0,801					
2	20-	55	40"	1,375	0,926	0,804	0,912	1,55	1,414	
	60-									
	80-	35	42"	0,833	0,632					
2	20-	45	40"	1,125	0,801	0,758	0,781	1,40	1,093	
	60-									
	80-	40	40"	1,00	0,714					
3,40	20-						0,329	1,105	0,419	
	60-									
	80-									
	20-									
	60-									
	80-									
	20-									
	60-									
	80-									

B = 23,90 m

1,032 m/s  
 $V = 20 \cdot 2F$   
 22,655 m<sup>2</sup>  
 23,371 m<sup>3</sup>  
 2F 1 2Q

Station *XE KATAM* 16. 10. 91 (No. 30) V. 0.698N + 0.016  
**CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)**

Distance  
between  
verticals  
(m)

	Results of current-metering					Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Vertical (Max. depth in m)	Depth of point (% - m)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s-1)			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10)-(8)+(9) (m <sup>3</sup> .s-1)	
						to the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
2.46	0.5	20-	110	42"	0.952	0.680	0.673	0.837	0.6	0.702	Head: 0.90m Time end: 11:45 11:45
		60-									
		80-	110	43"	0.930	0.665					
2	1.00	20-	80	42"	1.560	1.814	1.014	0.843	1.5	1.760	
		60-									
		80-	110	40"	1.500	0.714					
2	1.20	20-	95	40"	2.125	1.499	1.325	1.169	2.25	2.522	
		60-									
		80-	65	40"	1.625	1.150					
2	1.50	20-	90	42"	2.143	1.512	1.157	1.241	2.25	2.165	
		60-									
		80-	45	40"	1.125	0.801					
2	1.80	20-	70	40"	1.725	1.838	1.043	1.1	2.55	2.805	
		60-									
		80-	50	42"	1.150	0.847					
2	1.95	20-	30	40"	0.75	0.510	0.444	0.740	2.05	1.823	
		60-									
		80-	20	42"	0.476	0.348					
2	0.80	20-	65	42"	1.508	1.097	1.037	0.704	2.05	1.519	
		60-									
		80-	55	40"	1.375	0.976					
2	0.80	20-	55	40"	1.375	0.976	0.671	0.854	1.6	1.566	
		60-									
		80-	25	40"	0.5	0.365					
2	0.50	20-	45	40"	1.125	0.801	0.714	0.693	1.3	0.5:1	
		60-									
		80-	35	40"	0.825	0.627					
2	0.40	20-	30	40"	0.75	0.539	0.539	0.627	0.40	0.84	
		60-									
		80-									
2.90		20-						0.970	0.58	0.157	
		60-									
		80-									
		20-									
		60-									
		80-									
		20-									
		60-									
		80-									

B=23.20m

VP=2Q.2P    SF    1    2Q

Station XEKAMH 23.10.91 (No. 31) V = 0.69817 + 0.016  
**CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)**

Distance between verticals (m)

1	Results of current-metering					Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	2	3	4	5	Velocity (m.s <sup>-1</sup> )			9 = 6(P.1)	10		
					6	7	8				
2.15	20-	14	42"	0.233	0.248	0.215	0.109	0.995	0.059	H Shank: 0.76m H end: 0.76m Time start: 12:30 Time end: 13:04	
	60-										
	80-	10	42"	0.238	0.182						
2	20-	57	42"	1.333	0.946	0.977	1.492	1.86	0.825		
	60-										
	80-	35	41"	0.850	0.619						
2	20-	57	40"	1.425	1.010	0.938	0.858	1.74	1.452		
	60-										
	80-	50	44"	1.219	0.867						
2	20-	62	44"	1.502	1.092	1.510	0.849	1.94	1.744		
	60-										
	80-	35	40"	0.825	0.627						
2	20-	76	44"	0.518	0.582	0.521	0.696	1.74	1.211		
	60-										
	80-	27	44"	0.658	0.425						
2	20-	43	44"	1.009	0.748	0.646	0.589	1.94	1.142		
	60-										
	80-	31	44"	0.256	0.500						
2	20-	46	44"	1.122	0.792	0.748	0.692	2.05	1.429		
	60-										
	80-	39	40"	0.925	0.696						
2	20-	43	44"	1.109	0.748	0.612	0.68	1.40	0.952		
	60-										
	80-	27	44"	0.659	0.426						
2	20-	30	40"	0.75	0.500	0.466	0.539	1.04	0.520		
	60-										
	80-	22	44"	0.537	0.391						
2	20-	19	43"	0.442	0.375	0.298	0.382	0.92	0.351		
	60-										
	80-	15	44"	0.366	0.321						
1.4	20-						0.149	0.85	0.042		
	60-										
	80-										
	20-										
	60-										
	80-										
	20-										
	60-										
	80-										
	20-										
	60-										
	80-										
	20-										
	60-										
	80-										

B = 21.55 m

0.69817  
 15.135 m<sup>2</sup>  
 9.8119 m<sup>3</sup>  
 VP = ΣQ · TP    TP    ΣQ

Station ~~REKATA~~ 30.10.1997 (No 32) V=0.698m/s  
**CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)**

Distance between verticals (m)

Vertical (Max. depth in m)	Results of current-metering					Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (%-m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)·(9) (m <sup>3</sup> .s <sup>-1</sup> )		
					to the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
1.05	20-										Hend. 0.67 m Fine Mast: 10" 25' Fine Mast: 10" 25' 14.20
	60-	12	40"	0.30	0.23	0.23	0.115	0.189	0.222		
	80-										
1.059	20-	8	40"	0.20	0.16						
	60-					0.102	0.166	0.175	0.149		
	80-	2	45"	0.05	0.04						
1.052	20-	36	40"	0.90	0.64						
	60-					0.428	0.265	0.555	0.147		
	80-	11	40"	0.25	0.21						
1.082	20-	24	40"	0.60	0.435						
	60-					0.341	0.385	0.67	0.258		
	80-	13	40"	0.33	0.246						
1.086	20-	42	40"	1.05	0.749						
	60-					0.714	0.529	1.80	0.111		
	80-	33	40"	0.95	0.879						
1.106	20-	68	40"	1.70	1.203						
	60-					0.906	0.81	0.96	0.778		
	80-	34	40"	0.85	0.609						
1.096	20-	42	40"	1.35	1.307						
	60-					0.759	0.833	1.01	0.841		
	80-	12	43"	0.28	0.211						
1.100	20-	55	40"	1.38	0.979						
	60-					0.658	0.709	0.98	0.695		
	80-	19	41"	0.46	0.337						
1.100	20-	30	44"	0.72	0.526						
	60-					0.376	0.517	1.00	0.517		
	80-	13	43"	0.30	0.225						
1.081	20-	33	40"	0.83	0.595						
	60-					0.567	0.472	0.905	0.487		
	80-	30	40"	0.75	0.539						
1.092	20-	45	40"	0.67	0.486						
	60-					0.376	0.472	0.865	0.408		
	80-	18	45"	0.40	0.295						
1.113	20-	23	40"	0.58	0.421						
	60-					0.303	0.339	1.025	0.307		
	80-	10	42"	0.24	0.184						
1.091	20-	35	40"	0.88	0.62						
	60-					0.503	0.423	1.02	0.431		
	80-	26	41"	0.63	0.452						
1.088	20-										
	60-	17	40"	0.48	0.351						
	80-					0.351	0.28	0.605	0.277		
1.086	20-										
	60-	15	41"	0.28	0.274						
	80-					0.274	0.313	0.37	0.16		

VP=10.2F 2P 1 2Q

(No. 32-2)

# CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (m)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8) <sup>2</sup> (9) (m <sup>3</sup> .s <sup>-1</sup> )	
					to the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
1 1.59	20-	22	46"	0.80	0.574	0.455	0.255	0.475	0.169	
	60-									
	80-	16	40"	0.40	0.295					
1 0.46	20-					0.128	0.252	0.525	0.148	
	60-	7	44"	0.16	0.128					
	80-		4"							
1 1.50	20-	26	40"	0.65	0.469	0.393	0.211	0.48	0.185	
	60-									
	80-	18	42"	0.43	0.316					
1 0.48	20-					0.186	0.239	0.475	0.110	
	60-	11	39"	0.10	0.086					
	80-									
1 0.30	20-					0.107	0.297	0.575	0.036	
	60-	6	48"	0.13	0.107					
	80-									
1.25	20-						0.054	0.158	0.010	
	60-									
	80-									
20-										
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B = 21.20 m

$\sum V = 14.077$   
 $\sum P = 14.077$   
 $\sum Q = 0.589$

Station XEKOTAN L: 11.91 (No. 33) V: 0.698N4 0.016

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Distance between verticals (m)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)	
	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)·(9) (m <sup>3</sup> .s <sup>-1</sup> )		
					in the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
1.1	20-										H. depth = 0.60 m H. end = 0.60 m H. time. depth = 10" 15" H. time. end = 11" 05" $Q = \frac{F \cdot V}{2}$
	60-	0	0								
	80-										
1	20-										
	60-	8	40"	0.90	0.152	0.156	0.078	0.40	0.021		
	80-										
1	20-	28	40"	0.90	0.1565						
	60-					0.152					
	80-	23	41"	0.561	0.1407						
1	20-	13	43"	0.302	0.222						
	60-					0.220					
	80-	12	41"	0.998	0.221						
1	20-	19	40"	1.225	0.1871						
	60-					0.174					
	80-	31	40"	0.778	0.1557						
1	20-	46	40"	1.15	0.1819						
	60-					0.1749					
	80-	38	40"	0.95	0.1679						
1	20-	39	40"	0.928	0.1696						
	60-					0.1548					
	80-	22	40"	0.55	0.140						
1	20-	37	40"	0.928	0.1662						
	60-					0.1590					
	80-	30	41"	0.722	0.1527						
1	20-	27	40"	0.678	0.1487						
	60-					0.1367					
	80-	14	42"	0.333	0.1248						
1	20-	27	40"	0.928	0.1662						
	60-					0.1653					
	80-	26	40"	0.90	0.1444						
1	20-	21	41"	0.512	0.1273						
	60-					0.1369					
	80-	20	40"	0.50	0.1265						
1	20-	23	41"	0.511	0.1407						
	60-					0.1357					
	80-	17	40"	0.415	0.1306						
1	20-	32	40"	0.82	0.1374						
	60-					0.1495					
	80-	23	40"	0.578	0.1417						
1	20-										
	60-	12	41"	0.293	0.122						
	80-					0.1220					
1	20-										
	60-	0	0								
	80-										

$VP = \frac{1}{2} Q \cdot \Sigma F$

(No. 33-2)

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow						Notes (time, gauge reading etc.)
	Depth of point (8-m)	Nun- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8) <sup>3</sup> *(9) (m <sup>3</sup> .s <sup>-1</sup> )		
					to the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
0.55	20-	23	40"	0.575	0.417	0.291	0.273	0.144	0.120		
	60-										
	80-	7	42"	0.214	0.165						
0.36	20-					0.184	0.188	0.145	0.186		
	60-	4	44"	0.097	0.084						
	80-										
0.32	20-					0.203	0.198	0.134	0.167		
	60-	17	40"	0.425	0.313						
	80-										
0.30	20-					0.199	0.256	0.21	0.279		
	60-	11	42"	0.262	0.199						
	80-										
2.11	20-						0.10	0.30	0.03		
	60-										
	80-										
	20-										
	60-										
	80-										
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	60-										
	80-										

B = 21.10 m

0.421 m/s  
17.107 m<sup>2</sup>  
5.096 m<sup>3</sup>/s  
VP=ΣQ:ΣF ΣF 1 ΣQ



Station XEKAM 27.11.91 (No. 34) V = 0.698 m/s 0.016  
**CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)**

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauging reading etc.)	
	Depth of point (% - m)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)(9) (m <sup>3</sup> .s <sup>-1</sup> )		
					to the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
1.7 0.45	20-										H shaft: 0.5 m. D.S.M. Time shaft 1.2 m. 17th 17'
	60-	5	41"	0.122	0.101	0.101	0.051	0.252	0.020		
	80-										
1 0.51	20-	12	40"	0.30	0.225		0.151	0.48	0.072		
	60-					0.201					
	80-	9	39"	0.231	0.177						
1 0.69	20-	7	40"	0.175	0.138		0.161	0.60	0.097		
	60-					0.121					
	80-	5	40"	0.125	0.103						
1 0.61	20-	36	40"	0.90	0.644		0.374	0.65	0.843		
	60-					0.627					
	80-	34	40"	0.35	0.609						
1 0.72	20-	43	40"	1.075	0.766		0.64	0.666	0.476		
	60-					0.653					
	80-	30	40"	0.75	0.539						
1 0.65	20-	29	40"	0.725	0.522		0.329	0.635	0.336		
	60-					0.329					
	80-	7	41"	0.171	0.135						
1 0.82	20-	29	45"	0.644	0.466		0.312	0.735	0.229		
	60-					0.294					
	80-	6	40"	0.15	0.121						
1 0.77	20-	23	40"	0.575	0.413		0.29	0.795	0.231		
	60-					0.286					
	80-	8	39"	0.205	0.159						
1 0.58	20-	29	40"	0.725	0.522		0.333	0.675	0.259		
	60-					0.479					
	80-	24	40"	0.60	0.435						
1 0.79	20-	21	40"	0.525	0.382		0.449	0.635	0.228		
	60-					0.418					
	80-	27	43"	0.624	0.454						
1 0.95	20-	20	40"	0.50	0.365		0.361	0.87	0.294		
	60-					0.304					
	80-	13	40"	0.325	0.243						
1 0.48	20-	20	38"	0.576	0.383		0.301	0.715	0.215		
	60-					0.292					
	80-	11	39"	0.282	0.213						
1 0.26	20-	4	40"	0.10	0.086		0.192	0.37	0.071		
	60-					0.086					
	80-										
1 0.22	20-	4	45"	0.089	0.078		0.052	0.80	0.030		
	60-					0.078					
	80-										
1 0.36	20-	10	40"	0.25	0.191		0.135	0.29	0.039		
	60-					0.191					
	80-										

VP=2Q:ZF ZF 1 ZQ

(No. 34-2)

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (m)	Number of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)×(9) (m <sup>3</sup> .s <sup>-1</sup> )	
					in the point	mean in the vertical "yy"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
C. 28	20-									
	60-	7	42	0.167	0.133	0.133	0.162	0.32	0.032	
	80-									
C. 30	20-									
	60-	8	39	0.25	0.159	0.159	0.146	0.29	0.142	
	80-									
C. 24	20-									
	60-	2	40	0.05	0.051	0.051	0.105	0.27	0.028	
	80-									
1.5	20-							0.026	0.18	0.005
	60-									
	80-									
	20-									
	60-									
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	20-									
	60-									
	80-									

B = 20.0"

$0.314 \frac{m}{s}$   $0.877 \frac{m}{s}$   $3.007 \frac{m^3}{s}$   
 VP = 2Q.XF    XF    XQ

Station ~~XXXXXXXX~~ 04.12.51 (No. 35) V=0.678N+0.016  
**CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)** Page 2

Distance between verticals (m)

	Results of current-metering					Calculation of velocities and of flow					Notes (times, gauge reading etc.)
	Vertical (Max. depth in m)	Depth of point (x-n)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s-1)			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10)-(8)·(9) (m <sup>3</sup> .s-1)	
						in the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9-6(P.1)	10	11	
1.72	0.42	20-									H staff = 0.46 m Time staff = 10' 4.5"
		60-	5	40"	0.875	0.068	0.068	0.034	0.361	0.012	
		80-									
1	0.32	20-									H staff = 0.46 m Time staff = 10' 4.5"
		60-	5	42"	0.719	0.099	0.099	0.084	0.37	0.031	
		80-									
1	0.64	20-	6	45"	0.133	0.109		0.102	0.48	0.049	H staff = 0.46 m Time staff = 10' 4.5"
		60-	8				0.104				
		80-	5	40"	0.119	0.099					
1	0.80	20-	30	40"	0.75	0.539		0.318	0.72	0.229	H staff = 0.46 m Time staff = 10' 4.5"
		60-					0.537				
		80-	29	40"	0.775	0.522					
1	0.70	20-	40	40"	1.00	0.714		0.531	0.75	0.398	H staff = 0.46 m Time staff = 10' 4.5"
		60-					0.537				
		80-	19	40"	0.425	0.347					
1	0.71	20-	95	42"	0.595	0.431		0.419	0.705	0.295	H staff = 0.46 m Time staff = 10' 4.5"
		60-					0.307				
		80-	10	42"	0.238	0.182					
1	0.68	20-	76	40"	0.65	0.469		0.372	0.645	0.217	H staff = 0.46 m Time staff = 10' 4.5"
		60-					0.317				
		80-	9	42"	0.214	0.165					
1	0.72	20-	19	40"	0.475	0.348		0.297	0.70	0.208	H staff = 0.46 m Time staff = 10' 4.5"
		60-					0.276				
		80-	11	41"	0.268	0.203					
1	0.68	20-	74	41"	0.585	0.424		0.318	0.70	0.223	H staff = 0.46 m Time staff = 10' 4.5"
		60-					0.360				
		80-	16	40"	0.40	0.298					
1	0.82	20-	18	40"	0.45	0.330		0.333	0.75	0.250	H staff = 0.46 m Time staff = 10' 4.5"
		60-					0.306				
		80-	16	42"	0.380	0.281					
1	0.62	20-	16	40"	0.40	0.295		0.297	0.72	0.214	H staff = 0.46 m Time staff = 10' 4.5"
		60-					0.287				
		80-	15	40"	0.275	0.228					
1	0.44	20-									H staff = 0.46 m Time staff = 10' 4.5"
		60-	17	40"	0.425	0.313		0.30	0.53	0.159	
		80-					0.313				
2	0.86	20-									H staff = 0.46 m Time staff = 10' 4.5"
		60-	4	40"	0.10	0.086	0.086	0.20	0.70	0.14	
		80-									
1	0.86	20-									H staff = 0.46 m Time staff = 10' 4.5"
		60-	13	40"	0.325	0.243	0.243	0.165	0.76	0.043	
		80-									
1	0.86	20-									H staff = 0.46 m Time staff = 10' 4.5"
		60-	1	40"	0.025	0.033	0.033	0.138	0.86	0.036	
		80-									

VP=ΣQ·IF    IF    ΣQ

(No. 35-2)

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) = (8) x (9) (m <sup>3</sup> .s <sup>-1</sup> )	
					to the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9 = 6 (P.1)	10	11
1, 2, 31	20-									
	60-	4	40"	0,110	0,086	0,086	0,060	0,285	0,017	
	80-									
2, 45	20-									
	60-						0,043	0,380	0,016	
	80-									
	20-									
	60-									
	80-									
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	20-									
	60-									
	80-									

B = 20, 17 m

$0,970 \frac{m^3}{s}$      $0,366 \frac{m^3}{s}$      $2,537 \frac{m^3}{s}$   
 VP = 2Q:3P    2P    1    2Q

Distance between vertical (m)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)	
	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)·(9) (m <sup>3</sup> .s <sup>-1</sup> )		
					in the point	mean in the vertical	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
1.58 0.40	20-										H read: 0.04 m J read: 0.04 m Time read: 11.35
	60-	5	40"	0.125	0.103	0.103	0.051	0.316	0.016		
	80-										
0.46 E.46	20-										
	60-	4	45"	0.089	0.078	0.078	0.090	0.43	0.039		
	80-										
1.62 0.62	20-	5	40"	0.125	0.103						
	60-					0.108	0.093	0.54	0.05		
	80-	6	43"	0.139	0.113						
0.70 0.70	20-	29	40"	0.725	0.572						
	60-					0.572	0.315	0.68	0.214		
	80-	29	40"	0.725	0.572						
1.76 0.76	20-	34	40"	0.85	0.609						
	60-					0.530	0.326	0.75	0.39		
	80-	25	40"	0.625	0.452						
1.77 0.77	20-	20	42"	0.476	0.308						
	60-					0.249	0.389	0.765	0.30		
	80-	8	49"	0.190	0.109						
1.73 0.73	20-	24	41"	0.555	0.424						
	60-					0.312	0.481	0.75	0.21		
	80-	11	49"	0.222	0.199						
1.72 0.72	20-	20	40"	0.5	0.365						
	60-					0.293	0.303	0.725	0.22		
	80-	12	41"	0.293	0.220						
1.61 0.61	20-	26	40"	0.65	0.469						
	60-					0.307	0.381	0.665	0.25		
	80-	26	40"	0.65	0.469						
1.70 0.70	20-	20	44"	0.455	0.332						
	60-					0.332	0.400	0.655	0.26		
	80-	18	40"	0.45	0.330						
0.91 0.91	20-	16	42"	0.381	0.282						
	60-					0.268	0.30	0.805	0.24		
	80-	14	41"	0.341	0.254						
1.68 0.68	20-	22	40"	0.55	0.397						
	60-					0.353	0.311	0.795	0.24		
	80-	17	41"	0.415	0.316						
0.84 0.84	20-										
	60-	6	45"	0.133	0.109	0.109	0.239	0.06	0.11		
	80-										
0.40 0.40	20-										
	60-	8	43"	0.181	0.146	0.146	0.278	0.164	0.18		
	80-										
0.24 0.24	20-										
	60-	3	45"	0.167	0.113	0.113	0.105	0.32	0.03		
	80-										

VP=ΣQ:ΣP    ΣP    ΣQ

(No. 36-2)

# CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Verti- cal (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gaugo reading etc.)
	Depth of point (% - m)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s-1)			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10) = (8) x (9) (m <sup>3</sup> .s-1)	
					to the point	mean in the vertical "yy"	average between verticals			
1	2	3	4	5	6	7	8	9 = 6(P.1)	10	11
0.26	20-									
	60-	4	40"	0.10	0.086	0.086	0.075	0.25	0.02	
	80-									
0.20	20-									
	60-	3	50"	0.16	0.058	0.058	0.072	0.23	0.02	
	80-									
1.70	20-									
	60-						0.029	0.17	0.005	
	80-									
20-										
60-										
80-										
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20-										
60-										
80-										

6: 20, 28

0.27 m/s    9.946 m<sup>3</sup>    2.694 m<sup>3</sup>/s  
 VP = ΣQ:ΣF    ΣF    ΣQ

Station *XEKATIM* 18.12.91 (No. 37)  $V = 0.698N + 0.016$   
**CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)**

Distance between vertical (m)

	Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
		Depth of point (8-m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s-1)			Flow area "F" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)·(9) (m <sup>3</sup> .s-1)	
						In the point	mean in the vertical "V"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
1.60	20-										
	60-	6	42'	0.143	0.116	0.116	0.058	0.304	0.018	Head 0.03 m Time head 10.4 sec Time head 11.6 sec	
	80-										
1	20-										
	60-	4	41'	0.094	0.084	0.084	0.1	0.405	0.014		
	80-										
1	20-	9	46'	0.106	0.153		0.11	0.49	0.054		
	60-					0.137					
	80-	6	40'	0.15	0.120						
1	20-	2.6	40'	0.65	0.469			0.307	0.505	0.155	
	60-					0.476					
	80-	27	40"	0.675	0.487						
1	20-	32	42"	0.762	0.548			0.455	0.56	0.255	
	60-					0.477					
	80-	18	42'	0.428	0.375			0.332	0.63	0.209	
1	20-	18	42'	0.428	0.375						
	60-					0.232					
	80-	9	42'	0.191	0.169			0.27	0.38	0.157	
1	20-	24	40'	0.6	0.435						
	60-					0.309					
	80-	10	42'	0.238	0.182			0.205	0.57	0.117	
1	20-	18	40'	0.45	0.157						
	60-					0.161					
	80-	2	48'	0.042	0.015						
1	20-	26	42'	0.634	0.459			0.232	0.55	0.128	
	60-					0.362					
	80-	15	40'	0.357	0.265			0.311	0.595	0.185	
1	20-	18	40"	0.45	0.330						
	60-					0.26					
	80-	10	40'	0.25	0.191			0.237	0.775	0.184	
1	20-	14	41'	0.347	0.254						
	60-					0.214					
	80-	10	44'	0.227	0.174			0.205	0.765	0.157	
1	20-	19	44'	0.463	0.339						
	60-					0.195					
	80-	2	40'	0.05	0.05						
1	20-							0.139	0.435	0.06	
	60-	5	42"	0.096	0.083	0.083					
	80-							0.119	0.42	0.05	
2	20-										
	60-	8	40'	0.2	0.156	0.156					
	80-							0.136	0.19	0.026	
1	20-										
	60-	0	-	-	-	0.117					
	80-										

VP=ΣQ·IF    IF    ΣQ

(No. 37-2)

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (s-m)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s-1)			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) = (8) x (9) (m <sup>3</sup> .s-1)	
					in the point	mean in the vertical "yy"	average between verticals			
1	2	3	4	5	6	7	8	9 = 6(P.1)	10	11
1 0.25	20-									
	60-	4	44"	0.09	0.079	0.079	0.098	0.215	0.021	
	80-									
2,50 <sup>m</sup>	20-									
	60-						0.04	0.273	0.013	
	80-									
	20-									
	60-									
	80-									
	20-									
	60-									
	80-									
	20-									
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	60-									
	80-									
	20-									
	60-									
	80-									
	20-									
	60-									
	80-									

B = 20, 10 m

0.22 m/s 2.302 m 1.929 m/s  
VP = ΣQ.FP ΣF ΣQ



Station: XEKAJAH 25.12.91 (No. 38)

V = 0,69814 + 0,016

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Distance between verticals (m)

Vertical (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (times, gauge reading etc.)	
	Depth of point (m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) = (8) x (9) (m <sup>3</sup> .s <sup>-1</sup> )		
					in the point	mean in the vertical "v"	average between verticals				
1	2	3	4	5	6	7	8	9 = 6(P.1)	10	11	
1,58	20-										+1 Meter = 0,100 m. +2 end : 0,100 m +3 end : 11 4,18'
	60-	2	43"	0,163	0,112	0,13	0,065	0,292	0,019		
	80-										
1	20-	3	40"	0,075	0,068		0,099	0,395	0,029		
	60-					0,068					
	80-	3	40"	0,075	0,268						
1	20-	8	40"	0,2	0,156		0,101	0,5	0,052		
	60-					0,139					
	80-	6	40"	0,15	0,221						
1	20-	26	42"	0,619	0,448		0,297	0,495	0,147		
	60-					0,453					
	80-	26	41"	0,634	0,458						
1	20-	27	40"	0,675	0,497		0,498	0,565	0,247		
	60-					0,422					
	80-	20	41"	0,498	0,356						
1	20-	13	40"	0,325	0,242		0,302	0,715	0,216		
	60-					0,18					
	80-	6	41"	0,446	0,177						
1	20-	13	40"	0,325	0,203		0,186	0,625	0,116		
	60-					0,191					
	80-	7	40"	0,175	0,138						
1	20-	18	42"	0,429	0,315		0,223	0,56	0,125		
	60-					0,255					
	80-	11	43"	0,256	0,194						
1	20-	28	42"	0,667	0,481		0,339	0,56	0,19		
	60-					0,423					
	80-	20	40"	0,5	0,365						
1	20-	20	40"	0,5	0,365		0,376	0,585	0,22		
	60-					0,327					
	80-	16	41"	0,39	0,288						
1	20-	12	40"	0,30	0,225		0,27	0,73	0,197		
	60-					0,212					
	80-	11	42"	0,262	0,198						
1	20-	19	41"	0,463	0,339		0,217	0,655	0,142		
	60-					0,221					
	80-	5	40"	0,425	0,103						
1	20-						0,152	0,39	0,059		
	60-	4	42"	0,095	0,082						
	80-					0,082					
2	20-						0,078	0,43	0,034		
	60-	11	48"	0,085	0,074						
	80-					0,074					
1	20-						0,079	0,20	0,016		
	60-										
	80-					0,083					

VP = ΣQ.ΣP ΣP 1 ΣQ

(No. 38-2)

CURRENT - METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Verti- cal (Max. depth in m)	Results of current-metering				Calculation of velocities and of flow					Notes (time, gauge reading etc.)
	Depth of point (%m)	Num- ber of rota- tions	Time: partial and total (seconds)	Rota- tions per second (rps)	Velocity (m.s-1)			Flow area "P" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8) <sup>2</sup> *(9) (m <sup>3</sup> .s-1)	
					In the point	mean in the vertical "yy"	average between verticals			
1	2	3	4	5	6	7	8	9=6(P.1)	10	11
1 0.23	20--	5	146'	0.109	0.092	0.092	0.092	0.19	0.017	
	60--									
	80--									
2.48	20--						0.206	0.285	0.013	
	60--									
	80--									
	20--									
	60--									
	80--									
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	60--									
	80--									
	20--									
	60--									
	80--									

B = 20,06 m

0.226 m/s  
8.172 m<sup>3</sup>/s  
1.909 m<sup>3</sup>/s

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Distance between verticals (m)

1	2	Results of current-metering				Calculation of velocities and of flow					11
		3	4	5	Velocity (m.s <sup>-1</sup> )			9=6(P.1)	10		
					6	7	8				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
1.58	0.22	20-									Hand: 0.38 m Time start 8.30 Time end 9.40
		60-	5	42"	0.119	0.099	0.099	0.049	0.253	0.012	
		80-									
1	0.40	20-									
		60-	2	42"	0.049	0.049	0.049	0.074	0.36	0.027	
		80-									
1	0.58	20-	13	45"	0.289	0.217					
		60-					0.165			0.051	
		80-	6	43"	0.139	0.113					
1	0.66	20-	18	43"	0.419	0.308					
		60-					0.328			0.15	
		80-	20	42"	0.476	0.348					
1	0.57	20-	26	40"	0.65	0.469					
		60-					0.364			0.213	
		80-	15	43"	0.349	0.259					
1	0.53	20-	20	40"	0.5	0.365					
		60-					0.222			0.161	
		80-	4	44"	0.091	0.079					
1	0.63	20-	16	43"	0.372	0.276					
		60-					0.186			0.118	
		80-	5	43"	0.116	0.097					
1	0.64	20-	13	40"	0.325	0.243					
		60-					0.215			0.127	
		80-	10	41"	0.244	0.186					
1	0.54	20-	22	43"	0.628	0.454					
		60-					0.34			0.164	
		80-	13	43"	0.302	0.227					
1	0.75	20-	14	42"	0.333	0.248					
		60-					0.224			0.182	
		80-	11	42"	0.262	0.195					
1	0.81	20-	16	42"	0.381	0.282					
		60-					0.232			0.178	
		80-	10	42"	0.238	0.182					
1	0.68	20-	13	44"	0.295	0.222					
		60-					0.169			0.139	
		80-	6	42"	0.143	0.116					
3	0.25	20-	6	40"	0.15	0.12					
		60-					0.12			0.18	
		80-	1	41"	0.211	0.183					
2	0.21	20-									
		60-								0.069	
		80-									
1		20-									
		60-								0.029	
		80-									

B = 18.58 m

0.206 m<sup>3</sup>/s  
18.603 m<sup>2</sup>  
1.78 m<sup>3</sup>/s  
VP=0.5P 5P 20

Station XEKATION. 8. 1. 92. (No. 40)  $V = 0,69814 + 0,016$

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Distance between verticals (m)

Vert. depth in m	Results of current-metering					Calculation of velocities and of flow				Notes (time, gauge reading etc.)	
	Depth of point (%-m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	Velocity (m.s <sup>-1</sup> )			Flow area "A" between verticals (m <sup>2</sup> )	Flow "Q" (10) <sup>3</sup> =(8)×(9) (m <sup>3</sup> .s <sup>-1</sup> )		
					to the point	mean in the vertical "V"	average between verticals				
1	2	3	4	5	6	7	8	9=6(P.1)	10	11	
1,58	20-										+ Max 0,38 m + end 0,38 m
	60-	7	42"	0,167	0,133	0,133	0,066	0,268	0,017		
	80-										
1	20-										+ Max 0,38 m + end 0,38 m
	60-	7	48"	0,146	0,148	0,118	0,126	0,38	0,048		
	80-										
1	20-	18	43"	0,419	0,308						+ Max 0,38 m + end 0,38 m
	60-					0,262	0,19	0,49	0,093		
	80-	12	42"	0,286	0,216						
1	20-	20	42"	0,476	0,308						+ Max 0,38 m + end 0,38 m
	60-					0,373	0,317	0,61	0,193		
	80-	23	42"	0,547	0,398						
1	20-	27	41"	0,658	0,475						+ Max 0,38 m + end 0,38 m
	60-					0,403	0,388	0,64	0,218		
	80-	19	42"	0,452	0,331						
1	20-	14	42"	0,333	0,248						+ Max 0,38 m + end 0,38 m
	60-					0,182	0,292	0,6	0,175		
	80-	6	42"	0,143	0,115						
1	20-	14	44"	0,341	0,254						+ Max 0,38 m + end 0,38 m
	60-					0,174	0,178	0,61	0,108		
	80-	5	44"	0,114	0,095						
1	20-	17	43"	0,395	0,291						+ Max 0,38 m + end 0,38 m
	60-					0,245	0,209	0,625	0,13		
	80-	11	42"	0,262	0,195						
1	20-	26	42"	0,619	0,448						+ Max 0,38 m + end 0,38 m
	60-					0,387	0,376	0,62	0,196		
	80-	19	43"	0,442	0,325						
1	20-	19	42"	0,452	0,331						+ Max 0,38 m + end 0,38 m
	60-					0,248	0,318	0,675	0,215		
	80-	9	42"	0,214	0,165						
1	20-	12	42"	0,286	0,215						+ Max 0,38 m + end 0,38 m
	60-					0,198	0,223	0,8	0,178		
	80-	10	42"	0,238	0,182						
1	20-	18	42"	0,429	0,315						+ Max 0,38 m + end 0,38 m
	60-					0,216	0,207	0,685	0,142		
	80-	6	41"	0,146	0,118						
3	20-										+ Max 0,38 m + end 0,38 m
	60-	8	42"	0,19	0,148						
	80-					0,148	0,182	1,185	0,215		
2	20-										+ Max 0,38 m + end 0,38 m
	60-	2	47"	0,012	0,045						
	80-					0,045	0,096	0,52	0,05		
1	20-										+ Max 0,38 m + end 0,38 m
	60-										
	80-						0,022	0,14	0,003		

$b = 18,58 \text{ m}$

$0,227 \cdot 18,58^2 = 8,808 \text{ m}^3/\text{s}$   
 $VP = \Sigma Q_i \cdot \Sigma F_i$

Station XEKOTAN 15.1.92 (No. 41)

V = 0,698 m/s ± 0,016

CURRENT-METERING AND CALCULATION OF FLOW (1-2-3 POINTS METHOD)

Distance between verticals (m)

1	Results of current-metering					Calculation of velocities and of flow					11
	2	3	4	5	Velocity (m.s <sup>-1</sup> )			9	10	11	
					6	7	8				
Max. Depth in m)	Depth of float (s-m)	Number of rotations	Time: partial and total (seconds)	Rotations per second (rps)	In the point	mean in the vertical "VV"	average between verticals	Flow area "VV" between verticals (m <sup>2</sup> )	Flow "Q" (10) = (8) × (9) (m <sup>3</sup> .s <sup>-1</sup> )	Notes (time, gauge reading etc.)	
1,58	20-										Hand - 0,36 m Time and 11" 40"
	60-	5	48"	0,104	0,088	0,088	0,104	0,26	0,011		
	80-										
0,37	20-										Hand - 0,36 m Time and 11" 40"
	60-	2	40"	0,05	0,05	0,05	0,069	0,35	0,024		
	80-										
0,58	20-	10	41"	0,244	0,186		0,094	0,475	0,025		Hand - 0,36 m Time and 11" 40"
	60-					0,139					
	80-	5	45"	0,111	0,093						
0,69	20-	15	40"	0,275	0,278		0,222	0,635	0,141		Hand - 0,36 m Time and 11" 40"
	60-					0,204					
	80-	18	40"	0,45	0,33						
0,60	20-	23	41"	0,561	0,408		0,318	0,645	0,205		Hand - 0,36 m Time and 11" 40"
	60-					0,331					
	80-	14	44"	0,341	0,254						
0,54	20-	15	40"	0,375	0,278		0,218	0,57	0,141		Hand - 0,36 m Time and 11" 40"
	60-					0,164					
	80-	2	41"	0,049	0,05						
0,65	20-	14	41"	0,341	0,254		0,170	0,595	0,101		Hand - 0,36 m Time and 11" 40"
	60-					0,177					
	80-	5	42"	0,119	0,099						
0,62	20-	14	41"	0,341	0,254		0,183	0,635	0,146		Hand - 0,36 m Time and 11" 40"
	60-					0,188					
	80-	6	40"	0,15	0,121						
0,52	20-	27	40"	0,675	0,487		0,286	0,57	0,163		Hand - 0,36 m Time and 11" 40"
	60-					0,283					
	80-	15	40"	0,375	0,278						
0,72	20-	16	45"	0,355	0,263		0,223	0,62	0,2		Hand - 0,36 m Time and 11" 40"
	60-					0,262					
	80-	14	40"	0,25	0,260						
0,79	20-	11	41"	0,288	0,203		0,215	0,785	0,162		Hand - 0,36 m Time and 11" 40"
	60-					0,168					
	80-	7	42"	0,167	0,133						
0,57	20-	15	42"	0,366	0,271		0,164	0,68	0,111		Hand - 0,36 m Time and 11" 40"
	60-					0,161					
	80-	2	40"	0,05	0,05						
3	20-										Hand - 0,36 m Time and 11" 40"
	60-	7	41"	0,171	0,135		0,178	1,135	0,175		
	80-					0,135					
2	20-										Hand - 0,36 m Time and 11" 40"
	60-	1	45"	0,022	0,021		0,083	0,42	0,035		
	80-					0,021					
1	20-										Hand - 0,36 m Time and 11" 40"
	60-						0,015	0,10	0,002		
	80-										

B = 18,58 m.

0,42 m<sup>2</sup>  
 9,495 m<sup>2</sup>  
 1,632 m<sup>3</sup>

Daily Gauge Height Records at Ban Nonghin

(Jan.1991 to Dec.1991)

WATER LEVEL

RIVER : XEKATAM

HYDROLOGIC YEAR 1994

STATION : BAN NONGHIN

SHEET : .....1.....

Observed by : Mr.Khamphet

MONTH . JANUARY

Approved by : Mr.Somsack PHRASONTHI

FEBRUARY

DAY	MORNING	EVENING	REMARKS	DAY	MORNING	EVENING	REMARKS
1				1	0,32	0,32	
2				2	0,32	0,32	
3				3	0,32	0,32	
4				4	0,32	0,32	
5				5	0,32	0,32	
6				6	0,32	0,32	
7				7	0,32	0,32	
8				8	0,31	0,31	
9				9	0,31	0,30	
10				10	0,30	0,30	
11				11	0,30	0,31	
12				12	0,30	0,30	
13				13	0,30	0,30	
14				14	0,30	0,30	
15				15	0,30	0,30	
16				16	0,30	0,30	
17				17	0,29	0,28	
18				18	0,28	0,28	
19				19	0,28	0,28	
20				20	0,28	0,28	
21				21	0,27	0,27	
22				22	0,27	0,27	
23				23	0,27	0,27	
24	0,33	0,33		24	0,27	0,27	
25	0,23	0,33		25	0,27	0,24	
26	0,33	0,33		26	0,28	0,21	
27	0,32	0,32		27	0,28	0,28	
28	0,32	0,32		28	0,28	0,28	
29	0,32	0,32		29			
30	0,32	0,32		30			
31	0,33	0,33		31			

## WATER LEVEL

RIVER : XEKATAM  
STATION : BAN NONGHIN

HYDROLOGIC YEAR 199 A  
SHEET ... 2 .....

Observed by : Mr. Khamphet  
Approved by : Mr. Somsack PHRASANTHI

MONTH ... MARCH...  
... APRIL.....

DAY	MORNING	EVENING	REMARKS	DAY	MORNING	EVENING	REMARKS
1	0,28	0,28		1	0,26	0,28	
2	0,28	0,29		2	0,28	0,27	
3	0,30	0,30		3	0,27	0,27	
4	0,33	0,30		4	0,26	0,29	
5	0,33	0,30		5	0,29	0,28	
6	0,34	0,35		6	0,27	0,27	
7	0,30	0,31		7	0,27	0,31	
8	0,29	0,31		8	0,31	0,38	
9	0,28	0,29		9	0,33	0,32	
10	0,28	0,28		10	0,32	0,30	
11	0,28	0,28		11	0,29	0,28	
12	0,28	0,28		12	0,28	0,29	
13	0,28	0,28		13	0,29	0,28	
14	0,27	0,27		14	0,27	0,27	
15	0,26	0,27		15	0,27	0,26	
16	0,26	0,26		16	0,26	0,26	
17	0,26	0,26		17	0,26	0,26	
18	0,26	0,27		18	0,26	0,26	
19	0,27	0,29		19	0,27	0,26	
20	0,31	0,29		20	0,27	0,29	
21	0,28	0,27		21	0,30	0,29	
22	0,28	0,28		22	0,29	0,27	
23	0,29	0,30		23	0,27	0,27	
24	0,29	0,29		24	0,27	0,26	
25	0,27	0,27		25	0,26	0,27	
26	0,27	0,27		26	0,29	0,29	
27	0,27	0,26		27	0,31	0,31	
28	0,27	0,27		28	0,29	0,28	
29	0,26	0,26		29	0,29	0,30	
30	0,26	0,26		30	0,30	0,28	
31	0,26	0,26		31			

WATER LEVEL

RIVER : XEKATAM  
STATION : BAN NONGHIN

HYDROLOGIC YEAR 1994  
SHEET .....3.....

Observed by : Mr. Khamphet  
Approved by : Mr. Somsack PHRASONTHI

MONTH ...May.....  
          ...June.....

DAY	MORNING	EVENING	REMARKS	DAY	MORNING	EVENING	REMARKS
1	0.40	0.38		1	0.38	0.38	
2	0.44	0.39		2	0.37	0.40	
3	0.35	0.34		3	0.39	0.40	
4	0.34	0.36		4	0.40	0.40	
5	0.34	0.33		5	0.40	0.39	
6	0.35	0.33		6	0.44	0.50	
7	0.31	0.32		7	0.45	0.46	
8	0.37	0.34		8	0.45	0.45	
9	0.32	0.31		9	0.44	0.46	
10	0.31	0.34		10	0.46	0.45	
11	0.32	0.32		11	0.47	0.46	
12	0.32	0.34		12	0.46	0.48	
13	0.33	0.38		13	0.51	0.57	
14	0.45	0.42		14	0.56	0.53	
15	0.45	0.42		15	0.51	0.50	
16	0.45	0.46		16	0.48	0.47	
17	0.51	0.52		17	0.46	0.48	
18	0.50	0.52		18	0.48	0.48	
19	0.53	0.53		19	0.47	0.46	
20	0.58	0.56		20	0.46	0.46	
21	0.54	0.53		21	0.45	0.44	
22	0.50	0.49		22	0.48	0.46	
23	0.48	0.47		23	0.62	0.58	
24	0.44	0.45		24	0.62	0.63	
25	0.44	0.44		25	0.72	0.72	
26	0.43	0.44		26	0.68	0.66	
27	0.43	0.42		27	0.64	0.60	
28	0.42	0.42		28	0.58	0.50	
29	0.41	0.43		29	0.52	0.53	
30	0.43	0.40		30	0.58	0.59	
31	0.40	0.39		31			