C. STRUCTURE

	ka											
& KEI	ji Maruo											
PCI	Mr. Ken	1				ice	ice	ice				ice
Consultant	Team Leader	Given By				mbodian Off	mbodian Off	mbodian Off	/ Committee	/ Committee	/ Committee	mbodian Off
	2002		MPWT	MPWT	MPWT	JICA Ca	JICA Ca	JICA Ca	Advisory	Advisory	Advisory	JICA Ca
F/S	ay 2002 - 9 August 2002 eptember 2002 - 29 November	Published By	MPWT	MPWT	MPWT	JICA Cambodian Office	JICA Cambodian Office	Ministry of Economy and Finance	United Nations	United Nations	United Nations	JBIC
	5 M 16 S	Nos	1	1	1	1	1	7	1	1	-	1
Study Type	Period of Work in Cambodia	Original/Copy	Copy	Copy	Copy	Copy	Copy	Copy	Copy	Copy	Copy	Copy
	d No.1 Section)	Page										
tudy on the	f National Roa Neak Loueng	Type	Document	Document	Document	Document	Document	Document	Document	Map	Catalogue	Document
The fesibility S	Improvement of (Phnom Penh -		<sup>2</sup> roject (Hydraulic f Rural Roads)	ım Load Limit n Road oodia 1999	pair of No.15, 5A (Draft)	Cham 2002	port on NR6A	nd Practices	pment of the May 2002,	Aap		blementation of habilitation lary 2002
	Project Name	e	litation I Manual itation o	Maxim icking o of Camb	rgent Ré ll Road (	ampong tebruary	esult Re <sub>l</sub>	Policy a ttions	Develo	Route N	0	jject Imj gent Rel ort Janu
Southeast Asia	The Kingdom of Cambodia	Titl	nergency Flood Rehabii idge Design Standards sign for Flood Rehabili bruary 2002	minarDocument on the Transport Vehicle Traf twork in the Kingdom	rms of Reference for U d 17 Bridge on Nationa vil 2002	affic Volume Data in K ppon Koei., Ltd 25 F	affic Volume Survey Ro	mbodian Resettlement view and Recommenda	ian Highway pert Group Meeting on ian Highway Network ngkok	pposed Asian Highway	ian Highway Catalogue	ecial Assistance for Prc Sihanoukville Port Ur ject Draft Final Repc
Area	Country	No	1 Br Fe	2 of Ne	3 an Ap	4 Tr Ni	5 Tr.	6 Re	$\begin{array}{c} A_{\rm Ex} \\ {\rm Ex} \\ {\rm A}_{\rm S} \\ {\rm A}_{\rm S} \\ {\rm Ba} \end{array}$	Pr. 8	9 A	Sp 10 th( Pr

### C-1. List of Data and Information for Road Structures

No	Title	Type	Page	Original/Copy	Nos	Published By	Given By	
11	Bridge Design Standard, CAM PW.04.102.99, Ministry of Public Works and Transport, 1999	Document		Сору	1	MPWT	MPWT	
12	Road Design Standard, CAM PW.03.101.99, Ministry of Public Works and Transport, 1999	Document		Copy	1	MPWT	MPWT	
13	Cambodian Bridge Standards Project, Draft Inception Report, 25 Nov. 1998, AusAID	Document		Copy	1	MPWT	MPWT	
14	Manual for Assembly and Erection of Girder Spans, Australian Agency for International Development, Ministry of Public Works and	Document		Copy	1	MPWT	MPWT	
15	Manual for Assembly and Erection of Truss Spans, Australian Agency for International Development, Ministry of Public Works and	Document		Copy	1	MPWT	MPWT	
16	The Transport Master Plan of Phnom Penh Metropolitan Area, Progress Report, Nov.2000, Ministry of Public Works and Transport, Katahira & Engineers International	Document		Copy	1	MPWT	MPWT	
Note								

MPWT: Ministry of Public Works and Transport, MRC: Mekong River Cimmittee, ADB: Asia Development Bank, MOE: Ministry of Environment NICFEC: Natural and Imperial Committee for Free and Fair Election in Cambodia (Non-government Organization)

## C-2. Inventory Sheet for the Structurs





#### Structure Inventory

Structure No.: 2

Structure Name: Pipe Culvert - Prek Loung

Survey Date: 03/06/2002 Engineer: CHUM SAM ATH

		A GENERAL INFORMATIO	ON	Lingineeri eri		
(1)	Structure No	2	(2) Structure Name	Prek Loung		
(1)	Station	$P_{k} 24^{+000}$	(4) Crossing Object	Water way		
(5)	Structure Type	Steel nine	(6) Skew Angle	90°		
(7)	Length (meter) as a road	1.00m	(8) Affixed Utility	Cable ontic		
(7)	Width (meter) as a road	I eft Sidewalk- 2 50m Pavement- 6	50m Right Sidewalk-	- 1 50m	Total= 10 50m	,
(9)	Number of Lanes	2	(11) Completion Vear	Sibanouk Per	rime 1965	1
(10)	L and Limit (tf)	2 None	(11) Completion Teal	Cambodian St	tandard	
(12)	Load Linit ( ti )	B SUDEDSTDUCTUDE	(13) Design Standard	Califoodian 5	landard	
(14)	Number of Opening (With/without Geta)	L opening				
(14)	Opening Dimension	D500m (15mm THK)				
(15)	Devement Condition	Wave				
(16)	W-Waya P-Put	C-Crack P-Pothole	0–Other			
(10)	Commont	Can load capacity and adequate for traffic with	th water flow		Evaluation	C
	Top Slab Condition	Not slab (Filling by soil only)	ui watei 110w		Evaluation	C
	C-Cracking P-Pe	har Exposed S-Spalling	SC-Scale			
(17)	V-Papairad	Joan Exposed, 5–5pannig,	5C-5cale			
	Comment	None			Evaluation	
	Wall and Bottom Slab Condition	None			Evaluation	
	C-Cracking B-Re	Phar Exposed S-Spalling	SC-Scale			
(18)	X-Renaired	bui Exposed, B=5puillig,	5C-5calc			
	Comment	None				
	Guardrail Type	None				
(19)	C-Concrete S-Ste					
	Guardrail Condition	None				
(20)	C=Cracking R=Re	ebar Exposed S=Spalling	SC=Scale			
	X=Repaired.					
	Comment	None			Evaluation	
(21)	Foundation Type	Stone compaction for base of steel pipe only				
	Foundation Condition	Settled				
(22)	S=Settled, E=Pile I	Exposed - Height in meters, F=Fou	Indation Scoured			
	Comment	Pavement cracking and settled. Shoulder both	n side settled		Evaluation	С
		C. OTHERS				
(23)	Bearing Type	None				
	Bearing Condition	None				
(24)	C=Cracked Below,	N=Not Positioned Properly, D=D	Defective, R=Rusty			
	Comment	None			Evaluation	
	Bearing Seat Condition	None				
(25)	C=Cracked Below,	R=Rebar Exposed, S=Spalling,	W=Insufficient Widt	th of Seat		
	Comment	None			Evaluation	
(26)	Expansion Joint Type	None				
	Expansion Joint Condition	None				
(27)	R=Rusty, L=Loose	e, U=Uneven, C=Conce	rete Spalled			
	Comment	None			Evaluation	
	E-Illing December Condition	None				
	Falling Prevention Condition					
(28)	D=Damaged, N=N	lo device				
(28)	D=Damaged, N=N Comment	lo device None			Evaluation	
(28)	D=Damaged, N=N Comment Wing Wall Condition	o device None None			Evaluation	
(28)	D=Damaged,     N=N       Comment     Wing Wall Condition       C=Cracked,     W=W	o device None ing Wall Scoured			Evaluation	

Structure No.: 2

#### Structure Inventory

Structure Name: Pipe Culvert - Prek Loung

Survey Date: 03/06/2002 Engineer: CHUM SAM ATH

		D. RIVER CONDITION					
(30)	Flood Water Level	1.00 - 1.50m below road level					
(31)	Flow Direction	From River to Lake					
(32)	Dimension of River or Channel	Down ( $W_T$ =3.50m, $W_B$ =2.00m, H=2.00m), Up ( $W_T$ =6.00m, $W_B$ =4.00m, H=1.30m)					
(33)	River Condition (upstream, downstream)	Downstream: in dry season no water and have some forest					
	<u>.</u>	E. RIVER BANK AND APPROACH ROAD					
	River Bank Protection Type	None					
(34)	N=None, R=Riprag	p (length in meters), G=Gabion,Box C=Concrete (length in meters).	,				
	P=Piled Walls						
	River Bank Condition	D and C					
(35)	D=Damaged, S=So	coured, C=Corroded, E=Enchroachment on Stream					
I	Comment	River bank is the natural soil, so easy to damaged by rain	Evaluation	С			
	River Bed Protection Type	None					
(36)	N=None, R=Ripra	p (length in meters), G=Gabion, C=Concrete (length in meters)					
	P=Piled Walls			l			
	River Bed Condition	D					
(37)	D=Damaged, S=So	coured, C=Corroded, E=Enchroachment on Stream					
	Comment	The water can not flow easy and not do direction way to channel	Evaluation	D			
	Approach condition	None					
(38)	S= Sinking (height in cm),	AS=Scour Behind Abutment (length in meters)					
	Comment	None	Evaluation				
	Condition of Approach Slab	None					
(39)	C=Fair Condition,	A=No Slab, D=Damaged Slab					
	Comment	None	Evaluation				
	F. SLOPE PROTECTION						
	No.						
(40)	Slope Protection Type	None					
(40)	N=None, R=Ripra	p, G=Gabion, C=Concrete,					
	P=Piled Walls						
	Slope Protection Condition	D					
(41)	D=Damaged, S=So	coured, C=Corroded, E=Enchroachment on Stream					
	Comment	Damaged by water flow	Evaluation	С			
G. OV	ERALL EVLUATION	Can serviceability, but need to rehabilitation					
		H. OVERALL COMMENT					
	1- This Pipe Culvert for drainage sy	ystem in the rainning season and protection of emergency flood.					
	2- Position of steel pipe culvert is settled	, because according to the appearance which pavement have cracking, base of steel pipe by	crushed				
	stone compaction only and it was scov	red. Slope protection both side also scoured. So need to rehabilitation for availability.					
	ALC TENSOR						
		2					





#### Description :

Steel pipe with D=0.5m and 3.5m below of road surface was constructed in the Sihanouk regime for irrigation

#### Structure Inventory

Structu	re No.: 3	Structure Name: Pipe Culvert		Survey Dat	e: 01/06/2002		
i				Engineer: C	CHUM SAM A	TH	
	1	A. GENERAL INFORM	MATION	1			
(1)	Structure No.	3	(2) Structure Name	Lou Rahat	Kchal		
(3)	Station	Pk 24+840	(4) Crossing Object	Excavate cl	nannel in Pol F	Pot Regime	
(5)	Structure Type	Reinforced concrete	(6) Skew Angle	90°			
(7)	Length (meter) as a road	1.70m along the road	(8) Affixed Utility	Cable optic			
(9)	Width (meter) as a road	Left Sidewalk= 2.90m	Pavement= 6.70m	Right	Sidewalk= 2.9	0m	Total
(10)	Number of Lanes	2	(11) Completion Year	Pol Pot Reg	gime (1979)		
(12)	Load Limit ( tf )	None	(13) Design Standard	Chinese Sta	andard		
		B. SUPERSTRUCT	URE				
(14)	Number of Opening (With/without Gate)	1 opening					
(15)	Opening Dimension	D1000mm					
	Pavement Condition	Wave					
(16)	W=Wave, R=Rut,	C=Crack,	P=Pothole,	O=Other			
	Comment	Base of pavement no good con	npaction		Evaluation	С	
	Top Slab Condition	Good					
(17)	C=Cracking, R=R	ebar Exposed, S=Sp	alling, SC	=Scale			
(17)	X=Repaired						
	Comment	Can load capacity			Evaluation	С	
	Wall and Bottom Slab Condition	Good				-	
(10)	C=Cracking, R=R	ebar Exposed, S=Sp	alling, SC	=Scale			
(18)	X=Repaired,						
	Comment	Bottom slab and wall are good	structure, because of J	apanes's mat	erial		
(10)	Guardrail Type	None					
(19)	C=Concrete, S=St	eel					
	Guardrail Condition	None					
	C=Cracking, R=R	ebar Exposed, S=Sp	alling, SC:	=Scale			
(20)	X=Repaired,						
	Comment	Because of short spand no need	d handrail		Evaluation	С	
(21)	Foundation Type	Concrete base					
	Foundation Condition	Good					
(22)	S=Settled, E=Pile	Exposed - Height in meters,	F=Foundation	n Scoured			
	Comment	Durability			Evaluation	D	
		C. OTHERS			11		
(23)	Bearing Type	None					
~ /	Bearing Condition	None					
(24)	C=Cracked Below,	N=Not Positioned Properly,	D=Defective	e,	R=Rusty		
	Comment	None			Evaluation		
	Bearing Seat Condition	None					
(25)	C=Cracked Below,	R=Rebar Exposed,	S=Spalling,	W=Insuff	icient Width o	of Seat	
	Comment	None	1 8,		Evaluation		
(26)	Expansion Joint Type	None					
()	Expansion Joint Condition	None					
(27)	R=Rusty. L=Loos	e. U=Uneven.	C=Concrete Spa	alled			
	Comment	None			Evaluation		
	Falling Prevention Condition	None					
(28)	D=Damaged N=N	Jo device	<u> </u>	I	I		
(	Comment	None			Evaluation		
	Wing Wall Condition	W and honeycomb					
(29)	C=Cracked W=W	Ving Wall Scoured					
(	Comment	Concrete no vibration and stree	ight of plastering fair		Evaluation	C	
II	Comment	ino vioration and stree	o r			U	

NATIC	DNAL ROAD NO.1	Structure Inventory					
Structur	re No.: 3	Structure Name: Pipe Culvert	Survey Date: 01/06/2002				
			Engineer: CHUM SAM ATH				
		D. RIVER CONDITION					
(30)	Flood Water Level	Every level TWL=1.50m below road level, but in 19	96 TWL=0.20m above road level (	Flood eme			
(31)	Flow Direction	EAST to WEST (From River to Lake)	`				
(32)	Dimension of River or Channel	$(W_T = 6.00m, W_B = 4.50m), H = 1.50m$					
(33)	River Condition (unstream downstream)	In the dry season no water (down/up) but in the rain	ung season height of level of water				
(55)		E RIVER BANK AND APPROACH ROAD					
	River Bank Protection Type	None					
(34)	N=None R=Ring	n (length in meters) G=Gabion Boy	C=Concrete (length in mete	are)			
(54)	D-Diled Walls		c-concrete (lengur in mete	.13),			
	Piece Daula Canditian	D					
(25)		D	roochmont on Stroom				
(33)	D=Damaged, S=S	coured, C=Corroded, E=Ench		a			
	Comment	In dry season not repair, not prevention	Evaluation	С			
	River Bed Protection Type	None					
(36)	N=None, R=Ripra	p (length in meters), G=Gabion,	C=Concrete (length in meters)				
	P=Piled Walls						
	River Bed Condition	D					
(37)	D=Damaged, S=S	coured, C=Corroded, E=Ench	roachment on Stream				
	Comment	In dry season not repair, not prevention	Evaluation	С			
	Approach condition						
(38)	S= Sinking (height in cm),	AS=Scour Behind Abutment (length in mete	ers)				
	Comment		Evaluation				
	Condition of Approach Slab						
(39)	C=Fair Condition,	A=No Slab, D=Damaged Slab					
	Comment	,,	Evaluation				
Evaluation Evaluation							
	No						
	Slone Protection Type	None					
(40)	N=None R=Rinra	n G=Gabion C=Concrete					
	N=None, R=Riprap, G=Gabion, C=Concrete,						
	Slava Destaction Condition	D					
(41)	Slope Protection Condition		1 ( 0)				
(41)	D=Damaged, S=S	Coured, C=Corroded, E=Ench		a			
	Comment	No prevention in rainning season	Evaluation	С			
G. OV	ERALL EVLUATION	Can use for irrigation and traffic, but need to rehabili	itation				
		H. OVERALL COMMENT					
	1- For structure need to repair (recor	struction), but the river condition must be new o	construction both river bank, be	ed and			
	slope protection.						
	2- Local people said that: this culvert con	nstructed by Chinese Company (Sub-constructor) of g	overnment, not Japanese Company	'.			
	So it is Chinese Standard.						
	3- Top of water level (TWL)						
	and the second second						
	THE REAL PROPERTY OF						
		and the second se					
		1					
		5.8					
	Children and Shark	*?+					
	the second s						



### NATIONAL ROAD No. 1 Road Inventory : Pipe Culvert Field Survey

No.: <u>3 KP : 24+840 (Rohat Kchal)</u>

Survey Date : 02 . JUN . 22 Engineer : Chum Sam ath

Function : Irrigation in the Pol Pot Regime



#### Description :

Concrete pipe with D=1m and 3m below of road surface was constructed in the Pol Pot regime for irrigation

#### Structure No.: 4

#### Structure Inventory

Structure Name: New Water Gate (Prek Pol)

Survey Date : 01/06/2002

Engineer: CHUM SAM ATH A. GENERAL INFORMATION (1)Structure No. (2) Structure Name Prek Pol Pk 28<sup>+450</sup> (3) Station (4) Crossing Object New channel, but upstream have small dar (5) Structure Type Reinforced concrete (6) Skew Angle 90 (7) Length (meter) as a road 10.45m along the road (8) Affixed Utility Telephone cable on the slab (9) Width (meter) as a road Left Sidewalk= 2.95 m Pavement= 13.50 m Others= 3.55 m Total= 20.00 m (10) Number of Lanes (11) Completion Year Open ceremony on 25-05-2002 (12) Load Limit ( tf ) None (13) Design Standard Japanese Standard B. SUPERSTRUCTURE (14) Number of Opening (With/without Gate) 3 Opening with 3 Gates (15) Opening Dimension (2.75x5.00)m, (3.00x5.00)m, (2.75x5.00)m Pavement Condition Good pavement W=Wave, R=Rut C=Crack P=Pothole, O=Other (16)Good serviceability Evaluation А Comment Good condition Top Slab Condition R=Rebar Exposed, SC=Scale C=Cracking, S=Spalling, (17)X=Repaired Evaluation Comment А Wall and Bottom Slab Condition Good condition C=Cracking, R=Rebar Exposed, S=Spalling, SC=Scale (18) X=Repaired, Evaluation Α Comment Guardrail Type R.C Parapet with round steel pipe handrail (19) C=Concrete, S=Steel Good condition Guardrail Condition C=Cracking, R=Rebar Exposed, S=Spalling, SC=Scale (20) X=Repaired, Comment Evaluation A (21) Foundation Type Reinforced concrete pile (300x300)<sup>mm</sup>x12.00m, 70pcs Foundation Condition Good condition S=Settled, E=Pile Exposed - Height in meters, F=Foundation Scoured (22)Evaluation Α Comment C. OTHERS None (23) Bearing Type None Bearing Condition N=Not Positioned Properly, C=Cracked Below, D=Defective. R=Rustv (24)None Evaluation Comment Bearing Seat Condition None (25)C=Cracked Below, R=Rebar Exposed, S=Spalling, W=Insufficient Width of Seat None Evaluation Comment (26) Expansion Joint Type None Expansion Joint Condition None R=Rusty, U=Uneven, C=Concrete Spalled (27)L=Loose Evaluation None Comment Falling Prevention Condition None N=No device D=Damaged, (28) None Evaluation Comment Wing Wall Condition None C=Cracked, W=Wing Wall Scoured (29) Evaluation Comment

(1/2)

#### Structure No.: 4

#### Structure Inventory

Structure Name: New Water Gate (Prek Pol)

(2/2) Survey Date : 01/06/2002

Engineer: CHUM SAM ATH

		D. RIVER CONDITION		
(30)	Flood Water Level	1.50 m below road level		
(31)	Flow Direction	From EAST to WEST (River to Irrigation)		
(32)	Dimension of River or Channel	(W <sub>T</sub> =23.80m, W <sub>B</sub> =10.80m), H=4.20m		
(33)	River Condition (upstream, downstream)	Upstream, downstream: have slope protection, channel from river		
		E. RIVER BANK AND APPROACH ROAD		
	River Bank Protection Type	Upstream: 11.30 m for gabion box, 5.00 m for concrete wall		
		Downstream: 20.00 m for concrete wall, 30.00 m for gabion box		
(34)	N=None R=Ripr	an (length in meters) G=Gabion Box C=Concrete (length in met	ers).	
	P=Piled Walls			
	River Bank Condition	Good but some place of G wire mesh have corrotion and cracking in the joint with Rin	iran	
(35)	D=Damaged S=S	Scoured C=Corroded E=Enchroachment on Stream	iup	
(55)	Comment	Need some renair	Evaluation	в
	River Bed Protection Type	Unstream: 5.00 m for gabion box, 11.30 m for concrete slab	Evaluation	Б
	River bed Hoteetion Type	Deumetraceu: 16.20 m far concrete cleb. 22.70 m far gebien ber		
(36)	N-Nono D-Ding	an (length in meters) C=Cohien C=Concrete (length in meters)		
	N=None, K=Ripr	ap (length in meters), G=Gabion, C=Concrete (length in meters)		
	P=Piled walls			
	River Bed Condition	Good		
(37)	D=Damaged, S=S	Scoured, C=Corroded, E=Enchroachment on Stream		_
	Comment	Possible to protect against heavy water flow	Evaluation	Α
	Approach condition	Good		
(38)	S= Sinking (height in cm),	AS=Scour Behind Abutment (length in meters)		
	Comment		Evaluation	Α
	Condition of Approach Slab	None		
(39)	C=Fair Condition,	A=No Slab, D=Damaged Slab		
	Comment		Evaluation	
		F. ABUTMENT SLOPE PROTECTION		
	No.	Phnom Penh side Neak Loueng side		
(40)	Slope Protection Type	Gabion with wire mesh cover, Riprap with cement mortar joint		
(40)	N=None, R=Ripr	ap, G=Gabion, C=Concrete,		
	P=Piled Walls			
	Slope Protection Condition	Good condition		
(41)	D=Damaged, S=S	Scoured, C=Corroded, E=Enchroachment on Stream		
	Comment		Evaluation	А
			4	
G. OV	ERALL EVALUATION	A (Good durability, Serviceability)		
		H. OVERALL COMMENT		
	1 - This Water Gate is very importan	t for regular water flow in the rainy season and flood protection for NR1.		
	2 - This plays an important role in th	e dry season to keep the water in low-lying area with the gate shut down.		
	3 - Road width is enough for future	traffic volume.		
	4 - As to gabion box for slope protect	tion and river bank protection, wire mesh were corroded. Repair is required		
	+ The to gubion box for slope protect	and find the bulk protection, whe mesh were corroded. Repair is required.		
	in the second	in all		
	LAN CALLAND	and the second se		
	COST AND AND AND ADDRESS			
	Station of the local division of the			
	CALIFORNIA WITCH STRAND			
	A CONTRACTOR OF			
	1			



Structure No.: 5

#### Structure Inventory

Structure Name: Water Gate (New)

(1/2)

Survey Date : 02/06/2002

I							Eligin	eer . entowi sal	MAIII
-		A. GEI	NERAL INFC	RMATION	1				
(1)	Structure No.	5			(2) Structure Na	ame	Prek Takac	)	
(3)	Station	Pk 31 <sup>+120</sup>			(4) Crossing Ob	oject	Both side s	tream are channe	əl
(5)	Structure Type	Reinforced conc	erete		(6) Skew Angle	;	70°		
(7)	Length (meter) as a road	10.55m			(8) Affixed Util	lity	Telephone	cable	
(9)	Width (meter) as a road	Left Sidewalk=	10.00 m I	avement= 13.	50 m Right	Sidewalk=	0.00 m	Total= 23.50 m	
(10)	Number of Lanes	2			(11) Completion	n Year	2002		
(12)	Load Limit ( tf )	None			(13) Design Sta	ndard	Japanese S	tandard	
		B. 5	SUPERSTRU	CTURE					
(14)	Number of Opening (With/without Gate)	3 Openings with	a 3 Gates						
(15)	Opening Dimension	(2.75x5.10)m, (3	3.00x5.10)m, (	2.75x5.10)m					
	Pavement Condition	Good condition							
(16)	W=Wave, R=Rut,	C=Crack,	P	Pothole,	O=Other				
	Comment	Good serviceabi	lity					Evaluation	Α
	Top Slab Condition	Good condition							
(17)	C=Cracking, R=Rebar I	Exposed,	S=Spallin	g,	SC=Scale				
(17)	X=Repaired								
	Comment							Evaluation	Α
	Wall and Bottom Slab Condition	Cracking (Filled	with cement	nortar in P-co	n form work)			•	-
	C=Cracking, R=Rebar I	Exposed,	S=Spallin	g,	SC=Scale				
(18)	X=Repaired,								
	Comment	Already repaired	and in good	condition				Evaluation	А
	Guardrail Type	R.C Parapet with	h round steel r	ipe handrail					
(19)	C=Concrete S=Steel	1		1					
	Guardrail Condition	Vertical crack. F	-con not to be	filled with mo	ortar after remov	al of separ	aters		
(20)	C=Cracking. R=Rebar I	Exposed.	S=Spallin	<u>p</u>	SC=Scale				
	X=Repaired	<b>r</b> ,		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
	Comment	Need repair wor	ks					Evaluation	В
(21)	Foundation Type	R.C pile (300x3)	$(00)^{mm} \times 12.00n$	84pcs					
( )	Foundation Condition	Good condition		) - <b>I</b>					
(22)	S=Settled, E=Pile Expo	sed - Height in m	eters,	F=Founda	tion Scoured				
	Comment							Evaluation	Α
			C. OTHER	S					-
(23)	Bearing Type	None							
. ,	Bearing Condition	None							
(24)	C=Cracked Below, N=1	Not Positioned Pr	operly,	D=Defec	ctive,	R=Rusty			
. ,	Comment	None	,		,			Evaluation	
	Bearing Seat Condition	None							
(25)	C=Cracked Below. R=F	Rebar Exposed.	S=S	palling.	W=Insuff	icient Widt	th of Seat		
(-)	Comment	None		r Où				Evaluation	
(26)	Expansion Joint Type	None							-
(=*)	Expansion Joint Condition	None							
(27)	R=Rusty, L=Loose	U=Unev	en,	C=Concrete	Spalled				
()	Comment	None	7					Evaluation	
	Falling Prevention Condition	None							
(28)	D=Damaged N=No dep	vice			I			I	
(20)	Comment	None						Evaluation	
	Wing Wall Condition	None							4
(29)	C=Cracked W=Wing W	Wall Scoured			I I		I		
(_))	Comment							Evaluation	Δ
1	Comment	1							л

#### Structure No.: 5

#### Structure Inventory

Structure Name: Water Gate (New)

Survey Date : 02/06/2002 Engineer : CHUM SAM ATH

		D RIVER CONDITION		
(30)	Flood Water Level	2 70m below road level		
(31)	Flow Direction	From EAST to WEST (River to Irrigation)		
(31)	Dimension of Biver or Chennel	(W = 23.50 m  W = 14.30 m)  H = 4.30 m		
(32)	Dimension of River of Channel	Unstream downstream: have slope protection, channel from river		
(55)	River Condition (upsiteani, downsiteani)	E DIVED DANK AND ADDOACH DOAD		
	River Bank Protection Type	Luctram: 11.45 m for gobien boy, 5.00 m for concrete well		
	River Bank Protection Type	Deserved and 11.45 in for gabion box, 5.00 in for concrete wait		
(34)	N-Nono D-Diprop (lo	noth in matera)		
	N=None, R=Riprap (ie.	ngin in meters), G=Gabion,Box C=Concrete (tengin in met	ers),	
(25)				
(35)	D=Damaged, S=Scoure	ea, C=Corroded, E=Enchroachment on Stream	<b>P</b> 1 <i>c</i>	<del>.</del>
	Comment		Evaluation	A
	River Bed Protection Type	Upstream: 5.00 m for gabion box, 11.45 m for concrete slab		
(36)		Downstream: 26.45 m for concrete slab, 23.55 m for gabion box		
	N=None, R=Riprap (le	ngth in meters), G=Gabion, C=Concrete (length in meters)		
	P=Piled Walls			
	River Bed Condition	Good condition		
(37)	D=Damaged, S=Scoure	ed, C=Corroded, E=Enchroachment on Stream		<del></del>
	Comment	Possible to protect against heavy water flow	Evaluation	Α
	Approach condition	Good condition		
(38)	S= Sinking (height in cm),	AS=Scour Behind Abutment (length in meters)		<del></del>
	Comment		Evaluation	Α
	Condition of Approach Slab	None		
(39)	C=Fair Condition, A=N	lo Slab, D=Damaged Slab		<del></del>
	Comment		Evaluation	
		F. ABUTMENT SLOPE PROTECTION		
	No.	Phnom Penh side Neak Loueng side		
(40)	Slope Protection Type	Gabion with wire mesh cover, Riprap with cement mortar joint		
()	N=None, R=Riprap,	G=Gabion, C=Concrete,		
	P=Piled Walls			
	Slope Protection Condition	Some cracks occur at the joint with Riprap.		
(41)	D=Damaged, S=Scoure	ed, C=Corroded, E=Enchroachment on Stream		
	Comment	Need following inspection	Evaluation	В
G. OV	ERALL EVLUATION	A (Good durability, Serviceability)		
		H. OVERALL COMMENT		
	1 - This Water Gate is very important for regul	ar water flow in the rainy season and flood protection for NR1.		
	2 - This plays an important role in the dry sease	on to keep the water in low-lying area with the gate shut down.		
	3 - Road width is enough for future traffic volu	me.		
	4 - As to gabion box for slope protection and ri	ver bank protection, wire mesh were corroded. Repair is required.		
	ALL PROPERTY AND AND A			
	A DESCRIPTION OF THE OWNER.	and the second se		
	STATE OF THE OWNER OF THE OWNER			
	and the second se	tie has		
	and the second s			
-	-			



#### Structure Inventory

Structure No.: 8

#### Structure Name: Water Gate (New)

Survey Date: 03/06/2002

Engineer: CHUM SAM ATH A. GENERAL INFORMATION (1)Structure No. (2) Structure Name Prek Chrey (3) Station Pk 38+923 (4) Crossing Object Both side stream are channel (5) Structure Type Reinforced concrete (6) Skew Angle (7) Length (meter) as a road 10.40m (8) Affixed Utility Telephone cable (9) Width (meter) as a road Left Sidewalk= 10.00 m Pavement= 13.50 m Right Sidewalk=0.00 m Total= 23.50 m (10) Number of Lanes (11) Completion Year 2002 (12) Load Limit (tf) None (13) Design Standard Japanese standard B. SUPERSTRUCTURE (14) Number of Opening (With/without Gate) 3 Openings with 3 Gates (15) Opening Dimension (2.75x5.00)m, (3.00x5.00)m, (2.75x5.00)m Good condition Pavement Condition W=Wave, R=Rut, C=Crack, P=Pothole, O=Other (16) Good serviceability Evaluation А Comment Top Slab Condition Good condition SC=Scale R=Rebar Exposed, C=Cracking. S=Spalling, (17) X=Repaired Evaluation Comment А Wall and Bottom Slab Condition Cracking (Filled with cement mortar in P-con form work) C=Cracking, R=Rebar Exposed, S=Spalling, SC=Scale (18) X=Repaired, Comment Already repaired and in good condition Evaluation А Guardrail Type R.C Parapet with round steel pipe handrail (19) C=Concrete, S=Steel Good condition Guardrail Condition C=Cracking, R=Rebar Exposed, S=Spalling, SC=Scale (20) X=Repaired, Comment Evaluation A (21) Foundation Type Reinforced concrete pile (300x300)<sup>mm</sup>x12.00m, 84pcs Foundation Condition Good condition S=Settled. E=Pile Exposed - Height in meters, F=Foundation Scoured (22) Comment Evaluation Α C. OTHERS None (23) Bearing Type None Bearing Condition C=Cracked Below, N=Not Positioned Properly, D=Defective, R=Rustv (24)None Evaluation Comment Bearing Seat Condition None (25)C=Cracked Below, R=Rebar Exposed, S=Spalling, W=Insufficient Width of Seat Evaluation Comment None (26) Expansion Joint Type None Expansion Joint Condition None U=Uneven, C=Concrete Spalled (27)R=Rusty, L=Loose None Evaluation Comment Falling Prevention Condition None N=No device (28) D=Damaged, None Evaluation Comment Wing Wall Condition None C=Cracked, W=Wing Wall Scoured (29) Evaluation Comment

(1/2)

Structure No.: 8

#### Structure Inventory

Structure Name: Water Gate (New)

Survey Date: 03/06/2002

Date: 03/06/2002

(2/2)

	Engineer: CHUM SAM ATH								
		D. RIVER CONDITION							
(30)	Flood Water Level	1.55m below road level							
(31)	Flow Direction	From EAST to WEST (River to Irrigation)							
(32)	Dimension of River or Channel	$(W_T = 23.00m, W_B = 11.50m), H = 4.00m$							
(33)	River Condition (upstream, downstream)	Upstream, downstream: have slope protection, channel from river							
		E. RIVER BANK AND APPROACH ROAD							
	River Bank Protection Type	Upstream: 11.15 m for gabion box, 5.00 m for concrete wall							
(24)		Downstream: 20.00 m for concrete wall, 30.00 m for gabion box							
(34)	N=None, R=Ripr	ap (length in meters), G=Gabion,Box C=Concrete (length in mete	rs),						
	P=Piled Walls								
	River Bank Condition	Good condition							
(35)	D=Damaged, S=S	coured, C=Corroded, E=Enchroachment on Stream							
	Comment		Evaluation	Α					
	River Bed Protection Type	Upstream: 5.00 m for gabion box, 11.15 m for concrete slab							
(36)		Downstream: 26.15 m for concrete slab, 23.85 m for gabion box							
(50)	N=None, R=Ripr	ap (length in meters), G=Gabion, C=Concrete (length in meters)							
	P=Piled Walls								
	River Bed Condition	Good condition							
(37)	D=Damaged, S=S	coured, C=Corroded, E=Enchroachment on Stream							
	Comment	Possible to protect against heavy water flow	Evaluation	Α					
	Approach condition	Good condition							
(38)	S= Sinking (height in cm),	AS=Scour Behind Abutment (length in meters)		_					
	Comment		Evaluation	Α					
	Condition of Approach Slab	None							
(39)	C=Fair Condition,	A=No Slab, D=Damaged Slab		_					
	Comment		Evaluation						
		F. ABUTMENT SLOPE PROTECTION							
	No.	Phnom Penh side Neak Loueng side							
(40)	Slope Protection Type	Gabion with wire mesh cover, Riprap with cement mortar joint							
	N=None, R=Ripr	ap, G=Gabion, C=Concrete,							
	P=Piled Walls								
	Slope Protection Condition	Good condition							
(41)	D=Damaged, S=S	coured, C=Corroded, E=Enchroachment on Stream	<u> </u>						
	Comment		Evaluation	A					
~ ~ ~ ~									
G. OV	ERALL EVLUATION	A (Good durability, Serviceability)							
<u> </u>	1 This Water Cote is your immediate f	H. UVERALL CUMINENT							
	<ol> <li>This water Gate is very important for</li> <li>This plays an important role in the dry</li> </ol>	regular water now in the ramy season and mode protection for INK1.							
	<ol> <li>Pood width is arough for future traffic</li> </ol>	season to keep the water in low-tying area with the gate shut down.							
	4 During the rainy seasons river water t	, volume.	diraathy						
	to this irrigation channel. The alignme	now int the Island located near the intake of channel and their its rebounded water comes in the channel downstream is curve and subject to the direct attack of flood flow. Hence, f	he gates						
	must be closed to prevent direct flow a	with collanse of river bank and river hed protections	ic gates						
	(In general, the gate must be onened d	iring the rainy seasons )							
	To provide enough retarding capacity	slope protection type is to be investigated against flood flow							
		stope protection type is to be investigated against flood flow.							
1	An and a second s								



#### Structure Inventory

Structure Name: Old Water Gate

Structure No.: 9

#### Survey Date: 05/06/2002

				Engineer: CH	IUM SAM ATH	
		A. GENERAL INFORMATION	ON			
(1)	Structure No.	9	(2) Structure Name	Samrong Khe	er	
(3)	Station	Pk 41 <sup>+040</sup>	(4) Crossing Object	Channel		
(5)	Structure Type	Reinforced concrete	(6) Skew Angle	90°		
(7)	Length (meter) as a road	12.00 m	(8) Affixed Utility	Cable optic o	on the slab	
(9)	Width (meter) as a road	Left Sidewalk= 0.00 m Pavement= 7.1	10 m Right Sidewalk=	0.00 m	Total= 7.10 m	
(10)	Number of Lanes	2	(11) Completion Year	1977 in Pol F	Pot Regime	
(12)	Load Limit ( tf )	None	(13) Design Standard	Chinese Stan	dard	
. ,		B. SUPERSTRUCTURE				
(14)	Number of Opening (With/without Gate)	3 Openings without Gate				
(15)	Opening Dimension	(W=2.00m, H=4.50m)				
	Pavement Condition	Wave and pothole				
(16)	W=Wave, R=Rut	C=Crack, P=Pothole,	O=Other			
	Comment	Less serviceability			Evaluation	В
	Top Slab Condition	Rebar exposed, and cracking				
	C=Cracking, R=R	ebar Exposed, S=Spalling,	SC=Scale			
(17)	X=Repaired					
	Comment	Need repair work. Load capacity is restricted			Evaluation	D
	Wall and Bottom Slab Condition	There are some cracks on the wall Re-bar ex	posed on slab and beam			
	C=Cracking R=R	ebar Exposed S=Spalling	SC=Scale			
(18)	X=Repaired					
	Comment	Need to repair above cracking line on the wa	11		Evaluation	D
	Guardrail Type	Reinforced concrete			Evuluation	D
(19)	C=Concrete S=St					
	Guardrail Condition	Cracking Partially renaired				
	C=Cracking R=R	ehar Exposed S=Spalling	SC=Scale			
(20)	X=Renaired	eou Exposed, 5 Spannig,	Se Seale			
	Comment	Bad serviceability need renair work			Evaluation	D
(21)	Foundation Type	R C (Because only ground slab can see and f	oundation can not see)			
()	Foundation Condition	Settled	,			
(22)	S=Settled. E=Pile	Exposed - Height in meters. F=Fo	oundation Scoured			
( )	Comment	Need repair works			Evaluation	С
	comment	C. OTHERS				
(23)	Bearing Type	None				
(23)	Bearing Condition	None				
(24)	C=Cracked Below.	N=Not Positioned Properly. D=	Defective. R=Rus	stv		
( )	Comment	None		.,	Evaluation	
	Bearing Seat Condition	None				<u> </u>
(25)	C=Cracked Below	R=Rebar Exposed S=Spalling	W=Insufficient W	/idth of Seat		
(20)	Comment	None		ium of Sour	Evaluation	
(26)	Expansion Joint Type	None			L'indución	
(20)	Expansion Joint Condition	None				
(27)	R=Rusty L=Loos	e U=Uneven C=Con	crete Snalled			
(27)	Comment	None	erete spaned		Evaluation	T
	Ealling Prevention Condition	None			L'induction	<u> </u>
(28)	D=Damaged N=P	No device				
(20)	Comment	None			Evaluation	
	Wing Wall Condition	Cracked Scoured			L'valuation	L
(29)	C=Cracked W-W	Jing Wall Scoured				
(27)	Commont W=W	Not durability			Evaluation	0
	Comment				Evaluation	C

Structure No.: 9

#### Structure Inventory

Structure Name: Water Gate (Old)

Survey Date: 06/06/2002

(2/2)

Engineer: CHUM SAM ATH

			Eligineer. CHOW SAW ATH
		D. RIVER CONDITION	
(30)	Flood Water Level	2.5m below road level	
(31)	Flow Direction	From EAST to WEST	
(32)	Dimension of River or Channel	(W <sub>T</sub> =11.50m, W <sub>B</sub> =6.50m), H=1.50m	
(33)	River Condition (upstream, downstream)	Upstream: now the water can't flow, because have a factory 逆庐	向きでは
		E. RIVER BANK AND APPROACH ROAD	
	River Bank Protection Type	None	
(34)	N=None, R=Ripr	ap (length in meters), G=Gabion,Box C=C	Concrete (length in meters),
L	P=Piled Walls		
	River Bank Condition	Damaged, corroded, encroachment on stream	
(35)	D=Damaged, S=S	scoured, C=Corroded, E=Enchroachment c	on Stream
	Comment		Evaluation C
	River Bed Protection Type	None	
(36)	N=None, R=Ripra	ap (length in meters), G=Gabion, C=Concr	rete (length in meters)
	P=Piled Walls		
Γ	River Bed Condition	Damaged and Corroded	
(37)	D=Damaged, S=S	scoured, C=Corroded, E=Enchroachment c	on Stream
	Comment	Bad serviceability, Dirty surface	Evaluation C
	Approach condition	Good	
(38)	S= Sinking (height in cm),	AS=Scour Behind Abutment (length in meters)	
	Comment		Evaluation A
	Condition of Approach Slab	None	
(39)	C=Fair Condition,	A=No Slab, D=Damaged Slab	
	Comment		Evaluation
		F. SLOPE PROTECTION	
	No.	Al	A2
(40)	Slope Protection Type	None	one
	N=None, R=Ripra	ap, G=Gabion, C=Concrete,	
	P=Piled Walls	1 <u></u>	
	Slope Condition	Damaged and Scoured	
(41)	D=Damaged, S=S	scoured, C=Corroded, E=Enchroachment o	on Stream
<u> </u>	Comment	Protection required	Evaluation B
		1	
G. Uv	ERALL EVELUATION	D (Not enough on durability and serviceability)	
		IL OVED ALL COMMENT	
	1 This structure was built in 1077 i	in Del Det Degime, so avanthing became demograd	
	1- This subclure was built in 1777 in 2 There are some problem with loc	a Pol Pol Regline, so everything became damaged	a ish of formar in the rainy season) 音叱不
	2- There are some problem with local 3 On the left bank (unstream), chai	al people, because downshearn nee new can not job (Late	5 JOD OF farmer in the famy season) as whether
1	Oli lile ich vank (upsivani), enn     Downstream telephone cable on	the slab	
	4- Downstream terephone cable on t	.ne siao.	
4			









Bridge No. 10

#### Bridge Inventory Sheet No.1

Bridge	No. 10	Bridge Name: No name / Just Bui	ld	Survey Date: 05/ Engineer: CHUN	06/2002 4 SAM ATH		
		A. GENERAL INFO'	RMATION				
(1)	Structure No.	10	(2) Bridge Name		No name (Just bu	ild)	
(3)	Station	42+850	(4) River Name				
(5)	Bridge Type	Bailey Bridge	(6) Skew Angle		90°		
(7)	Length (meter)	99m	(8) Affixed Utility	y	Telephone line		
(9)	Width (meter)	Left Sidewalk= Pavement=	3.8m Right Sid	ewalk= Tot	al=3.8m		
(10)	Number of Lanes	2	(11) Completion	Year	2000		
(12)	Load Limit (tf)	16 ton	(13) Design Stand	lard	U.S.A. Standard		
· · ·		B. SUPERSTRUC	TURE				
(14)	Span No.	S! S2	S3				
(15)	Span Length	32.50 m 34.00 m	32.50 m			·	
(16)	Number of Main Girders	22	2				
	Pavement Condition	Good condition					
(17)	W=Wave R=Rut	C=Crack	P=Pothole	O=Other			
	Comment	No pavement, Steel deck			Evaluat	ion	Α
	Girder Condition	Good condition but with load cap	acity 16 ton, Steel gir	der			
(18)	(Concrete) C=Cra	cking, R=Rebar Exposed,	X=Repaired				
(10)	(Steel) C=Crac	cking, R=Rusty,	D=Deformed,	X=Repaired	<u> </u>		
	Comment				Evaluat	ion	D
(19)	Slab Type	Steel plate					
	Slab Condition	Good structure					
(20)	C=Cracking, R=Reba	ir Exposed, S=Spalling,	X=Repaired,	O=Other			
	Comment	<u> </u>			Evaluat	ion	Α
(21)	Guardrail Type	Steel (Girders serve as guard rails	.)				
(21)	C=Concrete, S=Steel						
	Guardrail Condition	Good					
(22)	D=Damaged	<del>.                                    </del>					
	Comment	None			Evaluat	ion	
		C. SUBSTRUCT	URE				
(23)	Abutment/Pier No.	No Abutments and 2 Piers	· · · · · · · · · · · · · · · · · · ·				
(24)	Abutment/Pier Type	Existing ground with local compa	ction for Abutment, H	I-steel Pier	·	• •1	
]	Abutment/Pier Condition	Existing ground for Abutment wa	s eroded by floods an	d under retill and	compaction, H-stee	el piles v	vere tilt
(25)	C.C. lad D-Date			. 10.1			
	C=Cracked, K=Kedar	Exposed, I=Inted,	S=Spalled on Veru	ical Side			- T-
(20)		D	Evaluation .				
(26)	Foundation Type	Double 1 steel	Dilas wara avpos	-1 due te secur			
(77)	Foundation Condition	Bad condition with the piles for r	er. riles were expose	a due to scour.			
(27)	S-Settled, E-Inc EA	sposed-mergin in meters, 1-	*Foundation Scource		Evaluat	ion	л
(28)	Comment Descring Type	Nana	<u> </u>	1	Evaluat	1011	U
(26)	Bearing Type	None		ł			
	C=Cracked Relow	Inone	D-Defective	P=Puetv	<u> </u>		
(29)		None	J-Delective,	K-Rusty	I		<u> </u>
	Comment	None			Evaluat	ion	1
	Pooring Seat Condition	None	<u> </u>	1	<del></del>		L
	C=Cracked Below R	=Pehar Exposed S=Spallin	w=Insuff	icient Width of Se	l l l		
(30)		None	3, 11 1100	clent what of 50	at		<u> </u>
	Comment	None			Evaluat	ion	1
1.0	Comment				1		<u> </u>
(31)	Expansion Joint Type	None				1	
(31)	Expansion Joint Type	None	<u> </u>				
(31)	Expansion Joint Type Expansion Joint Condition R=Rusty L=Loose	None None U=Uneven C=Con	erete Snalled at End o	of Span			
(31)	Expansion Joint Type Expansion Joint Condition R=Rusty, L=Loose,	None       None       U=Uneven,     C=Con       None	crete Spalled at End c	of Span			
(31)	Expansion Joint Type Expansion Joint Condition R=Rusty, L=Loose, Comment	None       None       U=Uneven,       C=Con       None	crete Spalled at End o	of Span	Evaluati	ion	
(31)	Expansion Joint Type Expansion Joint Condition R=Rusty, L=Loose, Comment Falling Prevention Condition	None       None       U=Uneven,       C=Con       None	crete Spalled at End o	of Span	Evaluati	ion	
(31)	Expansion Joint Type Expansion Joint Condition R=Rusty, L=Loose, Comment Falling Prevention Condition D=Damaged. N=No of	None       None       U=Uneven,       C=Con       None       Invice	crete Spalled at End o	of Span	Evaluati	ion	
(31) (32) (33)	Expansion Joint Type Expansion Joint Condition R=Rusty, L=Loose, Comment Falling Prevention Condition D=Damaged, N=No o	None       None       U=Uneven,       None       None       levice       None	crete Spalled at End o	of Span	Evaluat	ion	
(31) (32) (33)	Expansion Joint Type Expansion Joint Condition R=Rusty, L=Loose, Comment Falling Prevention Condition D=Damaged, N=No of Comment	None       None       U=Uneven,       C=Con       None       levice       None	crete Spalled at End o	of Span	Evaluat Evaluat	ion	
(31) (32) (33)	Expansion Joint Type Expansion Joint Condition R=Rusty, L=Loose, Comment Falling Prevention Condition D=Damaged, N=No of Comment Wing Wall Condition	None       None       U=Uneven,       None       None       levice       None       None	crete Spalled at End o	of Span	Evaluat Evaluat	ion	
(31) (32) (33)	Expansion Joint Type Expansion Joint Condition R=Rusty, L=Loose, Comment Falling Prevention Condition D=Damaged, N=No of Comment Wing Wall Condition C=Cracked, W=Wing	None       None       U=Uneven,       C=Con       None       levice       None       !vone       !vone       !vone       !vone       !vone       !vone	crete Spalled at End o	of Span	Evaluat Evaluat	ion	
(31) (32) (33) (34)	Expansion Joint Type Expansion Joint Condition R=Rusty, L=Loose, Comment Falling Prevention Condition D=Damaged, N=No of Comment Wing Wall Condition C=Cracked, W=Wing	None       None       U=Uneven,       C=Con       None       levice       None       !vone       !vone	crete Spalled at End o	of Span	Evaluat Evaluat	ion	

NATIONAL ROAD NO.1

(2/2)

Bridge	No. 10	Bridge Name: No name / Just Build	Survey Date: 05/06/2002 Engineer: CHUM SAM ATH				
		D. RIVER CONDITION					
(35)	Flood Water Level	1.00m below road level					
(36)	Flow Direction	From EAST to WEST (From River to Fields)					
(30)	Dimension of River or Channel	No dimension, because there is no canal					
(37)	Dimension of River of Channel	No dimension, because there is no canar					
(38)	River Condition (upstream, downstream)	E DIVER DANK AND ADDROACH DOAD					
		E. RIVER BANK AND APPROACH ROAD					
(20)	River Bank Protection Type						
(39)	N=None, G=Gabion,	P=Piled Walls					
	C=Concrete (Length in meters)	O=Other (Length in meters)					
	River Bank Condition	None (River doesn't exist.)					
(40)	D=Damaged, S=Scour	ed, C=Corroded, E=Encroachment on	Stream				
	Comment		Evaluation				
	River Bed Protection Type	None (River doesn't exist.)					
(41)	N=None, R=Riprap (L	ength in meters), G=Gabion, P=Piled	Walls				
	C=Concrete (Length in meters)						
	River Bed Condition	Seriosly scoured					
(42)	D=Damaged, S=Scour	ed, C=Corroded, E=Encroachment on	Stream				
	Comment	River bed protection is required.	Evaluation D				
	Approach Condition	Scoured					
(43)	S=Sinking (height in cm),	AS=Scour Behind Abutment (length in meters)					
, ,	Comment		Evaluation D				
	Condition of Approach Slab	None					
(44)	C=Fair Condition A=1	No Slab D=Damaged Slab					
()	Comment	to Shub, D Duniuged Shub	Evaluation				
	Comment	E ABUTMENT SLOPE PROTECTION	Evaluation				
	A hutmont No		A2				
	Slope Protection Type	None (Cabien her is under construction for slone	None (Cabien her is under construction for slope				
(45)	Slope Protection Type	none (Gabion box is under construction for slope	none (Gabion box is under construction for stope				
(43)	N-N	C-C-bin C-C-name					
	N=None, K=Kiprap,	G=Gabion, C=Concrete, P=Pilo	ed wans,				
	0=Other						
	Slope Protection Condition	Eroded, Scoured					
(46)	D=Damaged, S=Scour	ed, C=Corroded, E=Encroachment on	Stream				
	Comment		Evaluation D				
G. 01							
G. OV	ERALL EVALUATION	D (This bridge is subject to load limit. Road width is n	ot enough for future traffic. This structure type is				
		not appropriate against flood effect.)					
		H. OVERALL COMMENT					
	<ol> <li>There was a box culvert before. H</li> </ol>	Iowever, due to serious flood damage, the Gover	nment cut the embankment here and construc				
	a BaileyBridge.						
	2 - Load capacity 16 ton and speed li	mit of 5km/h					
	3 - Serious flood damages around this	s bridge every year.					
	4 - This bridge is reconstructed by Minist	ry of Public Work and Transport (MPWT)					
	and the second sec						
	Carl and Car						
	B. C. M. C. M. L. M. F. M. L.						
	SUNDER DEPENDENT	11					
	- MILLINE						
		5					
	Contraction of the local division of the loc	The second second					
	All the second second and the second second						
	AND THE REAL PROPERTY OF						
	A CONTRACTOR OF	and the second se					



NATIC Structur	DNAL ROAD NO.1 re No.: 11	Structure Inventory Structure Name: Water Gate (New)		Survey Date: 06/06/2002 Engineer: CHUM SAM ATH	(1/2)
<u> </u>		A GENERAL INFORMATI	ON	Engineer. errori z	
(1)	Structure No		(2) Structure Name	Drok Thmay	
(1)	Structure No.	11 Dl: 45+776	(4) Crossing Object	Poth side stream are channel	
(5)	Station Structure Type	PK 437770 DC Water Cate	(4) Clossing Object		
(3)	Structure Type	N.C. Water Gate	(0) SKEW Angle	70 T-lonhono ochla	
(7)	Length (meter) as a road	10.40 m along the road 1  of Sidewalk = 2.05  m Payament = 13	(8) Affixed Utility 50  m Others= 3.55 m	Total= 20.00 m	
(9)	Width (meter) as a road	Left Sluewark- 2.95 m ravement- 15.	(11) Completion Veer	10tai= 20.00 m	
(10)	Number of Lanes	2	(11) Completion real	Open ceremony on 25/05/2002	
(12)	Load Limit ( tī )		(13) Design Standard	Japanese Standard	
(14)		B. SUPERSTRUCTURE			
(14)	Number of Opening (With/without Gate)	3 Opening with 3 Gates			
(15)	Opening Dimension	(2.75x4.90)m, (3.00x4.90)m, (2.75x4.90)m			
	Pavement Condition	Good pavement			
(16)	W=Wave, R=Rut,	, C=Crack, P=Pothole	, O=Other		
<u> </u>	Comment	Good serviceability		Evaluation	А
	Top Slab Condition	Good condition			
(17)	C=Cracking, R=R	Lebar Exposed, S=Spalling,	SC=Scale		
(17)	X=Repaired				
	Comment			Evaluation	А
	Wall and Bottom Slab Condition	Cracking (Filled with cement mortar in P-co	n form work)		
(18)	C=Cracking, R=R	Lebar Exposed, S=Spalling,	SC=Scale		
(10)	X=Repaired,				
	Comment	Already repaired and in good condition		Evaluation	А
(10)	Guardrail Type	R.C Parapet with round steel pipe handrail			
(19)	C=Concrete, S=St	teel			
	Guardrail Condition	Good condition			
(20)	C=Cracking, R=R	Rebar Exposed, S=Spalling,	SC=Scale		
(20)	X=Repaired,	-			
	Comment			Evaluation	А
(21)	Foundation Type	R C nile (300x300) <sup>mm</sup> x12.00m, 70pcs		I	
· · ·	Foundation Condition	Good condition, not settled, not foundation s	scoured		
(22)	S=Settled, E=Pile	Exposed - Height in meters, F=F	oundation Scoured		
	Comment			Evaluation	A
	Comment	C. OTHERS			
(23)	Rearing Type	None			
(23)	Bearing Condition	None			
(24)	C=Cracked Below	N=Not Positioned Properly D=	Defective R=Rust	tv	
(21)	Commant	Nona	Delective, it is	Evaluation	
	Comment	None		Lvaluation	
(25)	C=Creaked Below	P-Dahar Exposed S=Spalling	W=Insufficient W	7: Jth of Cont	
(23)	C-Clacked Below,	K=Kevai Exposed, 5=5pannig,	W-msumeren w	Idln 01 Seat	
(20)		None		Evaluation	
(26)	Expansion Joint Type	None			
(27)	Expansion Joint Condition	None	. 0 11 1		
(27)	R=Rusty, L=Loos	ie, U=Uneven, U=Con	icrete Spalled		
	Comment	None	· · · · ·	Evaluation	
	Falling Prevention Condition	None			
(28)	D=Damaged, N=N	No device			
	Comment	None		Evaluation	
	Wing Wall Condition	None			
(29)	C=Cracked, W=	Wing Wall Scoured		<u>.</u>	
1	Comment			Evaluation	

Structure No.: 11

#### Structure Inventory

Structure Name: Water Gate (New)

Survey Date: 06/06/2002

Engineer: CHUM SAM ATH

(2/2)

-		D. BIVED CONDITION		<u> </u>			
(20)	T1 1117 / T 1						
(30)	Flood Water Level 3.2m below road level						
(31)	Flow Direction From EAS1 to WEST (Kiver to Infiguron)						
(32)	Dimension of River or Channel (W <sub>T</sub> =20.20m, w <sub>B</sub> =8.80m), H=4.00m						
(33)	River Condition (upstream, downstream)	Upstream, downstream: have slope protection, channel from river					
	E. RIVER BANK AND APPROACH ROAD						
	River Bank Protection Type	Upstream: 11.15 m for gabion box, 5.00 m for concrete wall					
(34)		Downstream: 20.00 m for concrete wall, 30.00 m for gabion box					
(0.1)	N=None, R=Riprap (length in meters), G=Gabion,Box C=Concrete (length in meters),						
	P=Piled Walls						
	River Bank Condition	Good, but some place of G wire mesh have corrotion and cracking in the joint with Ripr	ap				
(35)	D=Damaged, S=S	Scoured, C=Corroded, E=Enchroachment on Stream					
	Comment	Need some repair	Evaluation	В			
	River Bed Protection Type	Upstream: 5.00 m for gabion box, 11.15 m for concrete slab					
00		Downstream: 26.15 m for concrete slab, 23.85 m for gabion box					
(30)	N=None, R=Ripr	ap (length in meters), G=Gabion, C=Concrete (length in meters)					
	P=Piled Walls						
	River Bed Condition	Good condition					
(37)	D=Damaged, S=	Scoured, C=Corroded, E=Enchroachment on Stream					
, ,	Comment	Good serviceability for water flow	Evaluation	А			
	Approach condition	Good					
(38)	S = Sinking (height in cm)	AS=Scour Behind Abutment (length in meters)					
(00)	Comment	· · · · · · · · · · · · · · · · · · ·	Evaluation	А			
	Condition of Approach Slab	None					
(39)	C=Fair Condition	A=No Slab D=Damaged Slab					
(37)	Comment		Evaluation				
	Comment	E ADUTMENT SLODE DEOTECTION	Evaluation				
	No	Dhaom Danh sida					
	NO.	Cabian with wire mach acuar Dinran with compart marter isint					
(40)	N=Nana R=Binr	Cachon with with the mesh cover, Kipiap with cement mortal joint					
	D=Dilad Walls	ap, 0-Gabion, C-Concrete,					
		Conditions (come Comercian comerciant)					
(41)	Slope Protection Condition	Good condition (some G mesh wire corroded)					
(41)	D=Damaged, S=	Scoured, C=Corroded, E=Encircoachment on Stream	E 1 C	<b>—</b>			
	Comment		Evaluation	A			
G. OV	ERALL EVLUATION	A (Good durability, Serviceability)					
		H. OVERALL COMMENT					
	1 - This Water Gate is very important for	regular water flow in the rainy season and flood protection for NR1.					
	2 - This plays an important role in the dry	y season to keep the water in low-lying area with the gate shut down.					
	3 - Road width is enough for future traffic volume.						
	4 - As to gabion box for slope protection and river bank protection, wire mesh were corroded. Repair is required.						
	and the second second						
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	tind we share						
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Bridge No. 12

# Bridge Inventory Bridge Name: O. CHHOUK

Survey Date: 06/06/2002 Engineer: CHUM SAM ATH

		A. G	ENERAL INFOR	MATION				
(1)	Structure No.	12		(2) Bridge Name		O. CHHOUK		
(3)	Station	Pk 47+967		(4) River Name		O. CHHOUK		
(5)	Bridge Type	Bailey bridge		(6) Skew Angle		90°		
(7)	Length (meter)	66m		(8) Affixed Utility		Both side are agricu	ltural fie	ld
(9)	Width (meter)	Left Sidewalk= 0.	.00m Pave	ement= 4m I	Right Sidewalk=	= 0.00m Tota	al= 4m	
(10)	Number of Lanes	2		(11) Completion Ye	ar	2000		
(12)	Load Limit (tf)	16 ton		(13) Design Standar	d	U.S.A. Standard		
. ,		E	B. SUPERSTRUCT	TURE				
(14)	Span No.	S1	S2					
(15)	Span Length	33.0 m	33.0 m					
(16)	Number of Main Girders	2	2			<del></del>		
	Pavement Condition	Good condition						
(17)	W=Wave R=Rut	C=Crack	P=Pe	othole C	=Other			
	Comment	No pavement, Ste	el deck			Evaluation	n	Α
	Girder Condition	Good condition b	ut with load capac	ity 16 ton, Steel girde	r			
	(Concrete) C=Crackin	g, R=Rebai	Exposed, S=S	palling,	X=Repaired			
(18)	(Steel) C=Crackin	ig, R=Rusty	, D=D	Deformed, X	K=Repaired			
	Comment	, 	,	,	Ĩ	Evaluation	n	D
(19)	Slab Type	Steel plate						<u> </u>
	Slab Condition	Good structure						
(20)	C=Cracking, R=Rebar Ex	xposed, S=	Spalling,	X=Repaired,	O=Other			
	Comment		1 0,	1 /		Evaluation	n	Α
	Guardraill Type	Steel (Girders ser	ve as guard rails)					<u> </u>
(21)	C=Concrete, S=Steel	, ,	0 /					
	Guardrail Condition	Good						
(22)	D=Damaged							
	Comment None Evaluation							
		•	C. SUBSTRUCT	URE				
(23)	Abutment/Pier No.	No Abutment and	1 Pier					
(24)	Abutment/Pier Type	Existing ground v	vith local compact	ion for Abutment, H-	steel Pier			
	Abutment/Pier Condition	Existing ground f	or Abutment was e	eroded by floods and	under refill and	compaction, H-steel	piles we	re tilt for
(25)		Pier.						
(25)	C=Cracked, R=Rebar Ex	posed, T=	Tilted, S=	Spalled on Vertical S	Side			
	Comment					Evaluation	n	D
(26)	Foundation Type	Double I steel						
	Foundation Condition	Bad condition wit	h tilt piles for Pier	. Piles were exposed	due to scour.			
(27)	S=Settled, E=Pile Exspos	ed-Height in meter	rs, F=Fou	ndation Scoured				
	Comment					Evaluation	n	D
(28)	Bearing Type	None						
	Bearing Condition	None						
(29)	C=Cracked Below, N=No	ot Positioned Prope	erly, D=D	efective, R=	Rusty			
	Comment	None				Evaluation	n	
	Bearing Seat Condition	None						
(30)	C=Cracked Below, R=Re	bar Exposed,	S=Spalling,	W=Insufficien	t Width of Seat			
	Comment	None				Evaluation	n	
(31)	Expansion Joint Type	None						
	Expansion Joint Condition	None						
(32)	R=Rusty, L=Loose,	U=Uneven,	C=Concrete	Spalled at End of Sp	an			
	Comment	None				Evaluation	n	
	Falling Prevention Condition	None						
(33)	D=Damaged, N=No devi	ce						
	Comment	None				Evaluation	n	
	Wing Wall Condition	None						
(34)	C=Cracked, W=Wing W	all Scoured						
	Comment	None				Evaluation	n	

NATIONAL ROAD NO.1		Bridge Inventory		(2/2)	
Bridge No. 12		Bridge Name: O. CHOUK	Survey Date: 06/06/2002		
			Engineer: CHUM SAM ATH		
		D. RIVER CONDITION			
(35)	Flood Water Level	1.50 m below road level			
(36)	Flow Direction From EAST to WEST (From River to Fields)				
(37)	Dimension of River or Channel No dimension, because there is no canal				
(38)	River Condition (upstream, downstream)	No channel. Field both upstream and downstream			
(50)	raver condition (upoteani, do moteani)	E. RIVER BANK AND APPROACH ROAD			
	River Bank Protection Type	None			
(39)	N=None, R=Riprap (Len	gth in meters), G=Gabion, P=Piled Wa	alls		
()	C=Concrete (Length in meters).	O=Other (Length in meters)			
	River Bank Condition	None (River doesn't exist.)			
(40)	D=Damaged. S=Scoured	. C=Corroded. E=Encroachment on Stu	ream		
	Comment	,	Evaluation		
	River Bed Protection Type	None (River doesn't exist.)			
(41)	N=None R=Riprap (Len	gth in meters) G=Gabion P=Piled Wa	alls		
()	C=Concrete (Length in meters)	S,			
	River Bed Condition	Seriosly scoured			
(42)	D=Damaged S=Scoured	C=Corroded E=Encroachment on Stu	ream		
()	Comment	River bed protection is required	Evaluation	D	
	Approach Condition	Scoured			
(43)	S=Sinking (height in cm)	AS=Scour Behind Abutment (length in meters)			
()	Comment		Evaluation	D	
	Condition of Approach Slab	None			
(44)	C=Fair Condition. A=No	Slab. D=Damaged Slab			
	Comment		Evaluation		
		F. ABUTMENT SLOPE PROTECTION			
	Abutment No.	A1	A2		
	Slope Protection Type	None (Gabion box is under construction for slope	None (Gabion box is under construction for sl	ope	
(45)	1 51	protection)	protection)		
	N=None, R=Riprap,	G=Gabion, C=Concrete, P=Piled	Walls,		
	O=Other				
	Slope Protection Condition	Eroded, Scoured			
(46)	D=Damaged, S=Scoured	, C=Corroded, E=Encroachment on Str	ream		
	Comment		Evaluation	D	
	•				
0.01	TRALL FULL HATION	D (This bridge is subject to load limit. Road width is n	ot enough for future traffic. This structure type is r	not	
G. 01	VERALL EVALUATION	appropriate against flood effect.)			
		H. OVERALL COMMENT			
	1 - There was a box culvert before. Ho	wever, due to serious flood damage, the Governn	nent cut the embankment here and constructe	ed	
	a BaileyBridge.				
	2 - Load capacity 16 ton and speed lim	iit of 5km/h			
	3 - Serious flood damages around this	bridge every year.			
	C C	0			
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#### Structure Inventory

Structure Name: Old Water Gate

Structure No.: 13

#### Survey Date: 07/06/2002

(1/2)

Engineer: CHUM SAM ATH

		A GENERAL INFORMAT	ION	Engineer: erre		
(1)	Structure No	13	(2) Structure Name	Prok Bak Kam	nong Phnom	
(1)	Station	Pk 50+015	(4) Crossing Object	Channel	polig i illolli	
(5)	Station Structure Type	Painforgad appareta	(4) Crossing Object	00° with contor	ofrond	
(3)	L an eth (mater) as a mod	12.20m	(0) Skew Aligie	Gable antie an	the clob	
(/)	Length (meter) as a road	12.30m	(8) Allixed Utility		T-t-1- 5 90m	
(9)	Width (meter) as a road	Left Sidewalk= 0.00m Pavement=	5.80m Right Sidewark	= 0.00m	1 otal= 5.80m	
(10)	Number of Lanes	2	(11) Completion Year	1976 Pol Pot R	egime	
(12)	Load Limit ( tf )	None	(13) Design Standard	Chinese Standa	ırd	
	Γ	B. SUPERSTRUCTURE				
(14)	Number of Opening (With/without Gate)	3 Openings without Gate				
(15)	Opening Dimension	(W=2.10m, H=4.00m)				
	Pavement Condition	Wave, Big hole covered by steel plate for tr	affic			
(16)	W=Wave, R=Rut	C=Crack, P=Pothol	e, O=Other			
	Comment	Bad serviceability, Need rehabilitation		]	Evaluation	C
	Top Slab Condition	Cracking, Rebar exposed, Big hole covered	by steel plate for traffic			
(17)	C=Cracking, R=R	ebar Exposed, S=Spalling,	SC=Scale			
(17)	X=Repaired					
	Comment	Need repair work, Load capacity is restricted	d	]	Evaluation	D
	Wall and Bottom Slab Condition	Cracking and rebar exposed, Gun shot hole	on bottom slab			
(10)	C=Cracking, R=R	ebar Exposed, S=Spalling,	SC=Scale			
(18)	X=Repaired,					
	Comment	Less durability		]	Evaluation	С
(10)	Guardrail Type	Reinforced concrete				
(19)	C=Concrete, S=St	eel				
	Guardrail Condition	Cracking, Repaired partially				
	C=Cracking, R=R	ebar Exposed, S=Spalling,	SC=Scale			
(20)	X=Repaired,					
	Comment	Bad serviceability		]	Evaluation	С
(21)	Foundation Type	R.C (Because only ground slab can see and	foundation can not see)			
	Foundation Condition	Foundation scoured				
(22)	S=Settled, E=Pile	Exposed - Height in meters, F=1	Foundation Scoured			
	Comment	Bad serviceability		]	Evaluation	В
		C. OTHERS				
(23)	Bearing Type	None. Rigid with abutments and columns				
(==)	Bearing Condition	None				
(24)	C=Cracked Below.	N=Not Positioned Properly. D	=Defective. R=Rust	tv		
	Comment	None		1	Evaluation	
	Bearing Seat Condition	None		I		L
(25)	C=Cracked Below	R=Rebar Exposed S=Spalling	W=Insufficient W	idth of Seat		
(20)	Comment	None	, , , , , , , , , , , , , , , , , , , ,		Evaluation	
(26)	Expansion Joint Type	None Rigid with abutments and columns			L'unuuron	L
(20)	Expansion Joint Condition					
(27)	R=Rusty I=Loos	e U=Uneven C=Co	ncrete Snalled			
(27)	Commont	Nona	nerete Spaned	1	Evaluation	
	Ealling Prevention Condition	None		I	Evaluation	
(20)	D=Damagad	No device				
(20)		Nono		I.	Evolution	
┣───	Ving Wall Condition			I	Evaluation	L
(20)		U W				
(29)	C=Cracked, W=W	Ning wall Scoured			E1	-
	Comment	ineeu renadimation		1	Evaluation	В

#### Structure Inventory

Survey Date: 07/06/2002

Structure No.: 13 Structure Name: Old Water Gate Engineer: CHUM SAM ATH D. RIVER CONDITION Flood Water Level (30) 1.50 m below road level (31) Flow Direction From EAST to WEST (From River to Fields) (32) Dimension of River or Channel Upstream: (4.5+8.5) x 2.5, Downstream: (7.5+13.0) x 2.0 (33) River Condition (upstream, downstream) Damaged on both upstream and downstream E. RIVER BANK AND APPROACH ROAD River Bank Protection Type None (34) N=None, R=Riprap (length in meters), G=Gabion,Box C=Concrete (length in meters), P=Piled Walls River Bank Condition Damaged, corroded, encroachment on stream (35) D=Damaged, S=Scoured, C=Corroded, E=Enchroachment on Stream Evaluation С Comment River Bed Protection Type None R=Riprap (length in meters), G=Gabion, C=Concrete (length in meters) (36)N=None, P=Piled Walls Damaged River Bed Condition (37) D=Damaged, S=Scoured, C=Corroded, E=Enchroachment on Stream Bad serviceability, Dirty surface Evaluation Comment С Approach condition Good S= Sinking (height in cm), AS=Scour Behind Abutment (length in meters) (38) Comment Evaluation А Condition of Approach Slab None (39) C=Fair Condition, A=No Slab, D=Damaged Slab Evaluation Comment F. ABUTMENT SLOPE PROTECTION A2 No. A1 Slope Protection Type None None (40) R=Riprap, N=None, G=Gabion, C=Concrete, P=Piled Walls Slope Condition Damaged (41) D=Damaged, S=Scoured, C=Corroded, E=Enchroachment on Stream В Protection required Evaluation Comment D (Not enough on durability and serviceability) G. OVERALL EVLUATION H. OVERALL COMMENT 1- This Water Gate is an old structure which was constructed in the Pol Pot Regime for irrigation drainage to the rice field and also flood emergency protection in the rainy season. 2- Slab of structure was gun shoting hole, now close by steel plate. 3- Upstream small canal presents only in flood seasons.

(2/2)





### C-3. Photographs of Existing Conditions for Road Structures



Photograph - Existing Conditions of Road Structures on NR	No.1 for Project	No.2
	Pk 9+100 Damaged Pavement at Shoulder	
	Pk 13+900 Local Commercial Area Hospital Pavement Width 6m	
	Pk 18+000 Critical Damaged Pavement Area and Heavy Vehicle	
	Pk 20+640 Sdav anlaing Culvert Location from Interview Res There was pipe culvert in past time (Not Found)	ult

No.3



#### Photograph - Existing Conditions of Road Structures on NR No.1 for Project









Pk 32+800 Prek Takeo

Culvert Location from Interview Result (Not found currently) There was pipe culvert(1.0m) before 1979 Pipe culvert was collapsed by flood in 1979 Detour road was constructed by Vietnam Soldier. (Now road is S-curve)

No.4

#### Pk 36+900 Spean Dek

There was steel bridge (10-15m) in past time. In 1994, the bridge was demolished, and embanked at this location. Detour Road at Up-stream side

#### Pk 38+923

Water Gate (3) by Japan Grant Aid, 2002

Carriage Way Width 13.5m (New Pavement)

#### Pk 41+040

Water Gate, Pol Pot Regime, 1977

Pavement Width 5m (Carriage Way Width 7.1m) Housing Site at Up-stream Side (No Function for Water way)

#### Photograph - Existing Conditions of Road Structures on NR No.1 for Project





Most Flood Area in year 2000 Candidate Location for Structure

#### Pk 42+850

Bailey Bridge, Length 99m, Width 4m

Under Improvement for Pier, River-bed (Traffic using Detour Road)

Temporary Opened in year 2000

#### Pk 45+776

Water Gate(3)

by Japan Grant Aid, 2002

Pavement Width 13.5m

#### Pk 47+967

Bailey Bridge, Length 66m, Width 4m

Under Improvement for Pier, River-bed (Traffic using Detour Road)

Temporary Opened in year 2000





No.5

#### Photograph - Existing Conditions of Road Structures on NR No.1 for Project



### Photograph - Existing Conditions of Road Structures on Other Projects

No.7



NR1 (C-2) Stoeng Slot Br.

Constructed 1986 Pre-stressed Concrete Girder for 2 lanes



Steel Bridge Narrow width



Steel Bridge Narrow width

#### NR 11

Road Conditions Not paved

# Photograph - Existing Conditions of Road Structures on Other Projects

No.8



#### C-4. Study on Girder Structure above Piers

Proposed bridge has PC I-shaped girder for superstructure. It could be spliced above piers or left as simple girder as it is. Method to splice the girders is by cast-in-situ RC with PC cable crosswise. This appendix compares features between simple girder and splice girder for the project.

Conditions for the comparison are shown below:

- Main girder has same structure (length, height, width etc.) in both methods.
- Bearing is same in both methods. It will be rubber pad bearing.
- Horizontal force against earthquake and temperature are supported by only one pier of the Splice Girder Bridge.
- Splice girder needs to be calculated with statistically indicated force (creep, shrinkage etc.)
- Method to splice girder is by cast-in-situ RC with PC cable crosswise.
- Splice girder can be considered as continuous girder after the splice work is done. Loading for designing differs in splice girder. Main dead load (main girder, cross beam, slab etc.)
- Cost estimation is done on bridge No.2 (L = 4@25.0 meters)

Features in both methods are described in the table below.

	Simple Girder	Splice Girder
Structure	Each girder is individual. Each girder is supported by move and fix bearings Expansion joint is required between girders.	Girders are spliced and surface is continuous. Supported by rubber pad bearings. Anchor bar adjusts the movement. All girders are supported on one pier horizontally. Expansion joint is not required between girders.
Designing Loading as simple beam		Loading as simple beam before splicing Loading as continuous beam after splicing. Dead load (girder, cross beam, slab etc.): simple beam Dead load (pavement, splice cross beam): continuous girder Live load : continuous girder Statistically indicated force is loaded.
Ease of construction	Installing expansion joint is required.	Extra pre-stressed cable work is required for splicing (Crosswise above piers)
Construction cost	US\$ 1,801,800 / bridge	US\$ 1,806,500 / bridge
Construction Period	Slightly shorter	Slightly longer
Ease of Maintenance	Maintenance of expansion joint is required.	Easy, no maintenance of expansion joint above piers is required.
Smoothness of surface	Not good for expansion joint	Very good
Environmental aspect	Noise and vibration on expansion joint	Quite and sound
Evaluation	Not good	Good

It can be concluded that the splice girder has superior system for the project road, especially after the completion of construction. No requirement for expansion joint can save maintenance fond and make vehicles comfortable to run across.