

# List of Proposal

#	Route Number	Structure Number	Description	Component	Project Proposal		Repairing/Retrofitting					
					Type	Structure Detail	Substructure	Deck	Girder	Riprap	Riverbed	Guide Bank
1	PHN		Phum Mul	Cambodia	New Bridge	2-PC-Slab						
2	PHN		Stung Meanchey	Japan	New Bridge	3-PC-I						
3	RN002	1	Ta Khmau1	Japan	New Bridge	3-PC-I						
4	RN002	1	Ta Khmau2	Japan	New Bridge	3-PC-I						
5	RN002	2	Prek Ho	Japan	New Bridge	4-PC-I						
6	RN003	12		Cambodia	New Bridge	1-RC-I						
7	RN003	13		Cambodia	New Bridge	3-RC-I						
8	RN003	17		Cambodia	New Bridge	1-RC-I						
9	RN003	50		Cambodia	New Bridge	1-RC-I						
10	RN003	53		Cambodia	New Bridge	1-PC-Slab						
11	RN003	54	Slakou	Japan	New Bridge	2-PC-I						
12	RN003	55		Cambodia	New Bridge	2-PC-I						
13	RN003	58		Cambodia	New Culvert	Box Culvert						
14	RN006a	1	Chruoy Changwar	Japan	Detail Inspection							
15	RN006a	2	No.1	Cambodia	Repair					1		
16	RN006a	3	No.2	Cambodia	Repair					1		
17	RN006a	4	No.3	Cambodia	Repair					1		
18	RN006a	5	No.4	Cambodia	Repair		1					
19	RN006a	6	No.5	Cambodia	Repair			1				
20	RN006a	7	No.6	Cambodia	Repair		1					
21	RN006a	9	No.7 Prek	Cambodia	Repair		1			1		
22	RN006a	10	No.8	Cambodia	Repair		1					
23	RN006a	12	No.9	Cambodia	Repair		1					
24	RN006a	15	No.10	Cambodia	Repair				1			
25	RN006a	16	No.11	Cambodia	Repair					1		
26	RN006a	17	No.12	Cambodia	Repair		1	1		1		
27	RN006a	18	No.13	Cambodia	Repair		1	1		1		
28	RN006a	20	No.14	Cambodia	Repair		1			1		
29	RN006a	21	No.15	Cambodia	Repair		1			1	1	1
30	RN006a	22	No.16	Cambodia	Repair		1			1	1	1
31	RN006a	23	No.17	Cambodia	Repair		1			1	1	1
32	RN006a	24	No.18	Cambodia	Repair		1			1	1	1
33	RN006a	25	No.19	Cambodia	Repair		1			1	1	1
34	RN006a	26	No.20	Cambodia	Repair		1			1	1	1
35	RN006a	27	No.21	Cambodia	Repair		1			1	1	1
36	RN006a	29	No.22	Cambodia	Repair		1			1	1	1
37	RN006a	30	No.23	Cambodia	Repair						1	1
38	RN011	2	Peam Ror	Japan	Bridge	4-PC-I						

## Appendix-7 Photographs of Existing Bridges Selected for Phase1

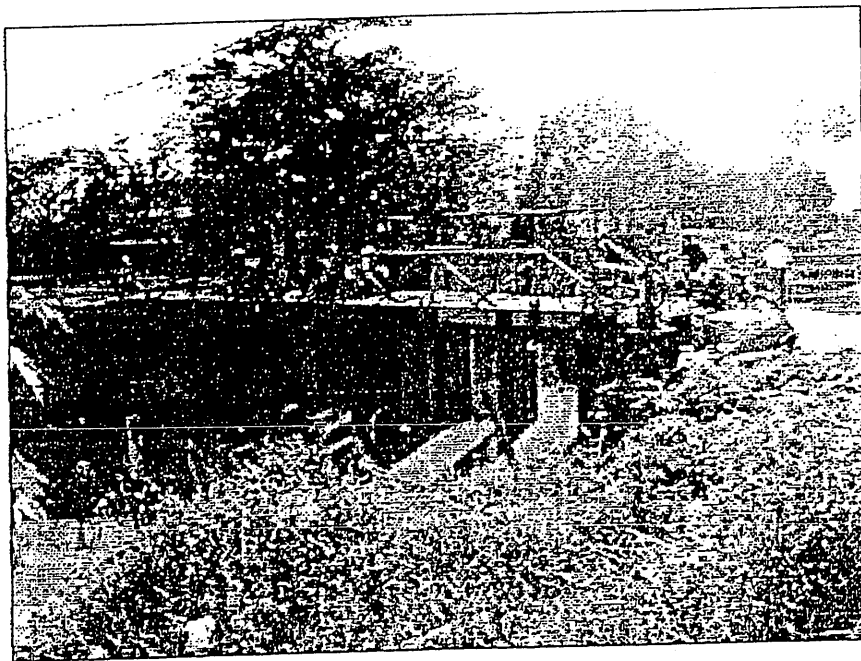


Photo 1 Phnum Mul in Phnom Penh City

This bridge is locating on Phnom Penh city arterial road that is leading to Agricultural University, Killing Field.  
Carriageway is a narrow, and a main member of bridge is destroyed.

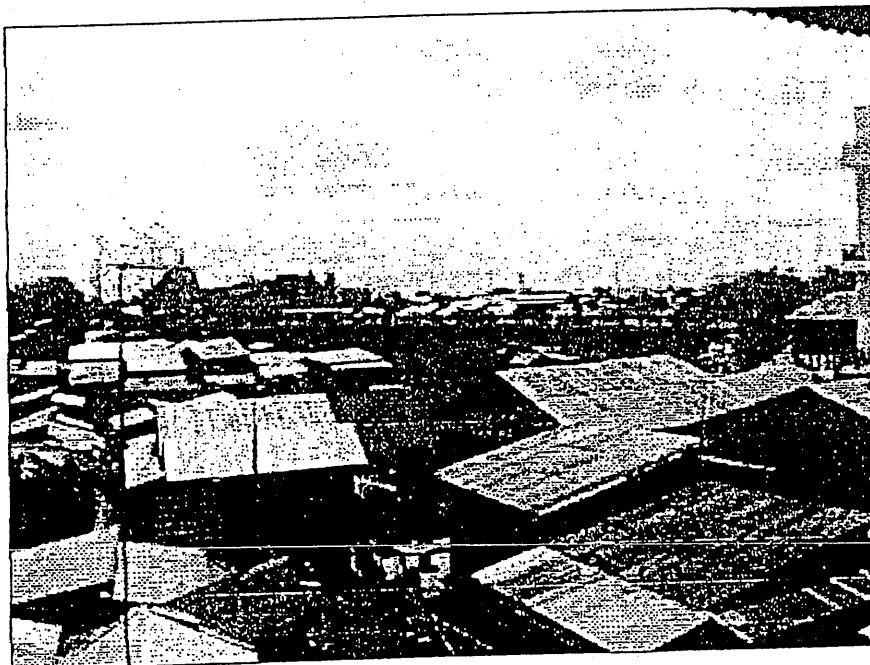


Photo2 -1 Stung Meancheay in Phnom Penh City

This Bridge is locating southwest of Phnom Penh Arterial Road that is leading to Inner Ring and Industrial Zone.



Photo 2-2 Stung Meancheay

Recently traffic jam often happens due to short of traffic capacity at this bridge  
And Truck Weight is limited as 16t that cannot be satisfied for ideal vehicle design load.



Photo-3 View of Ta Khmau Bridge on NR2 was constructed in 1927

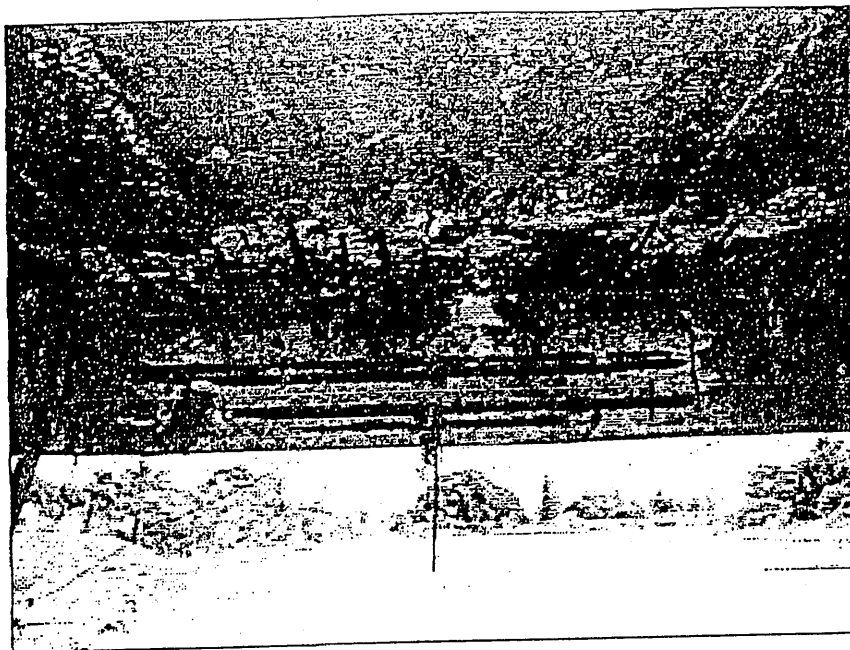


Photo-4 Ta Khmau Bridge on NR2 was constructed in 1927

This has narrow carriageway and footpath, and its slab is deteriorated.

Up to now MPWT is limiting to large vehicles pass.

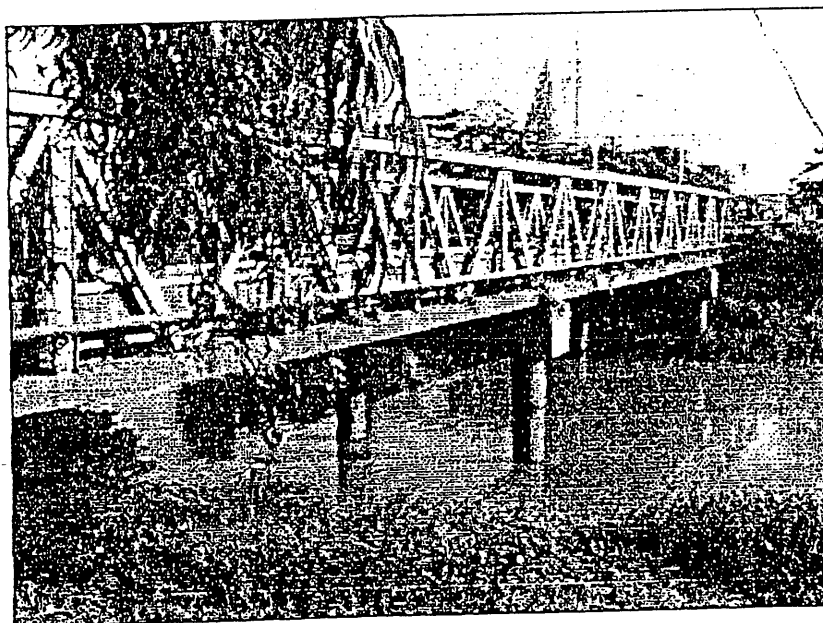


Photo-5 View of Ta Khamu Steel Truss

This bridge was temporary repaired by MPWT due to the serious rusting of steel truss and the inclination of substructure

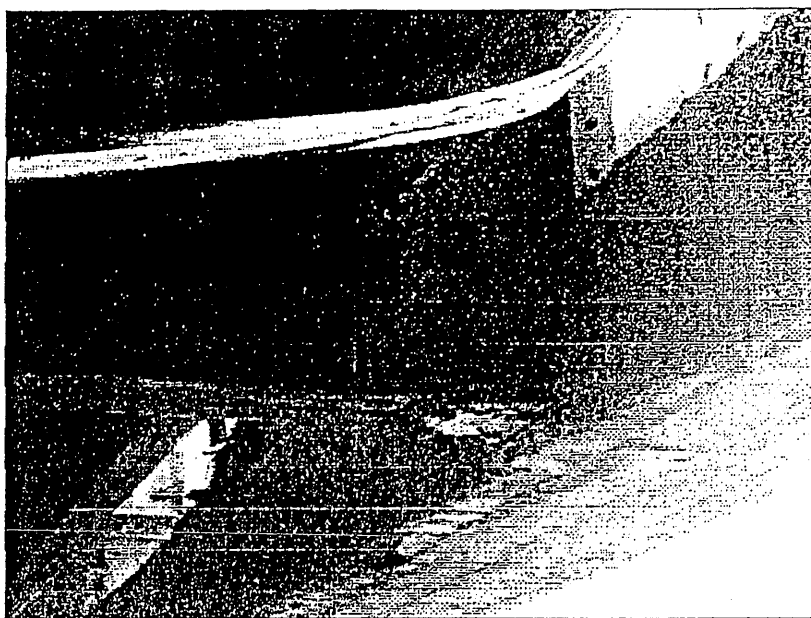


Photo-5-1 Retrofitting on Steel Lower Stringer



Photo-6 Ta Khamu Steel Truss, a deterioration on RC deck

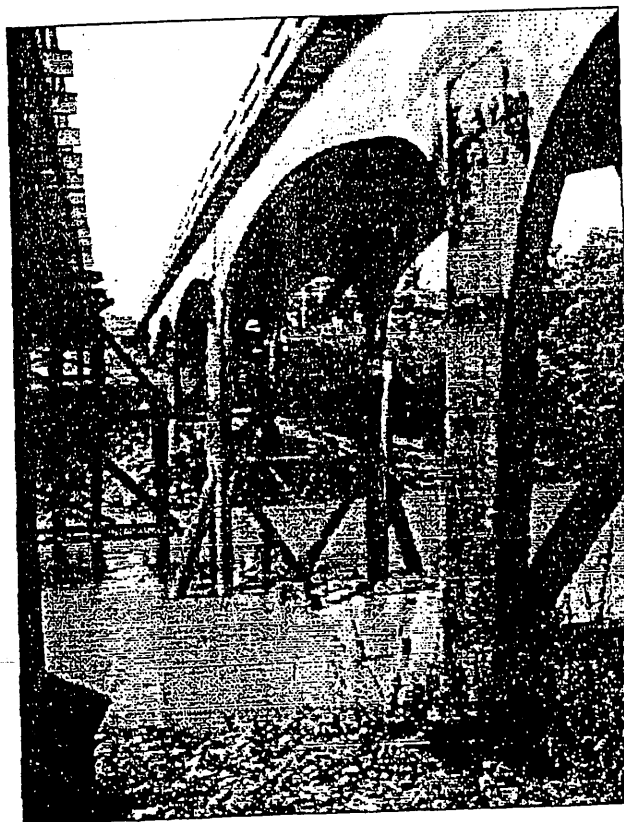
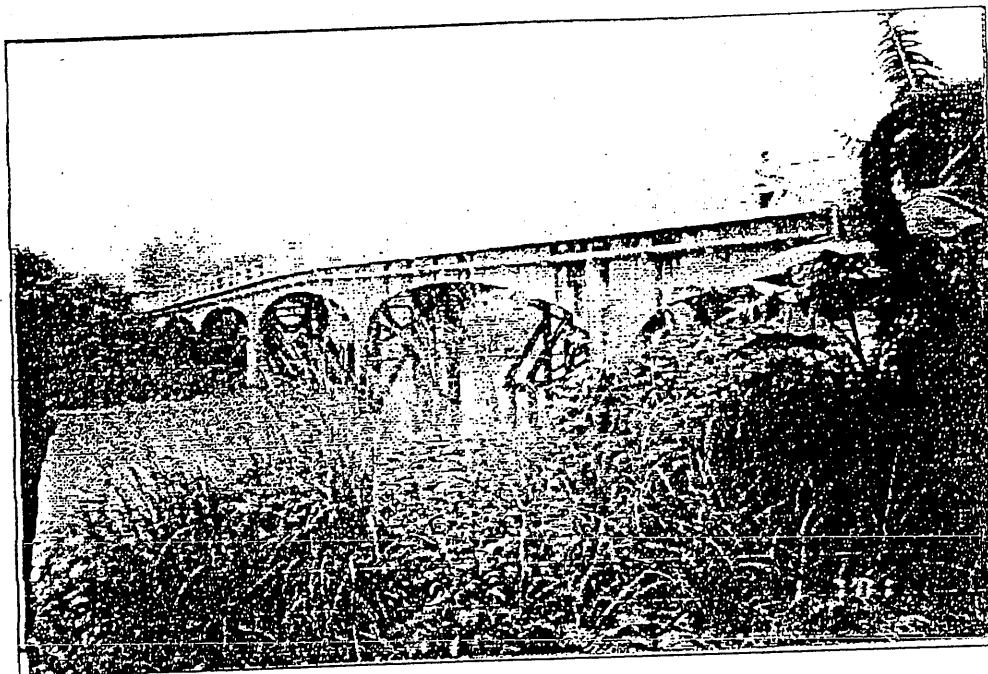


Photo-7 Preak Ho Bridge on NR2 was constructed in 1922.

Several Piers have been suffered due to ageing and heavy loaded truck

MPWT has fixed damaged members in these days and constructed one temporary bridge to solve a traffic jam at this point



Photo-8 Temporary Bailey Bridge Along NR3

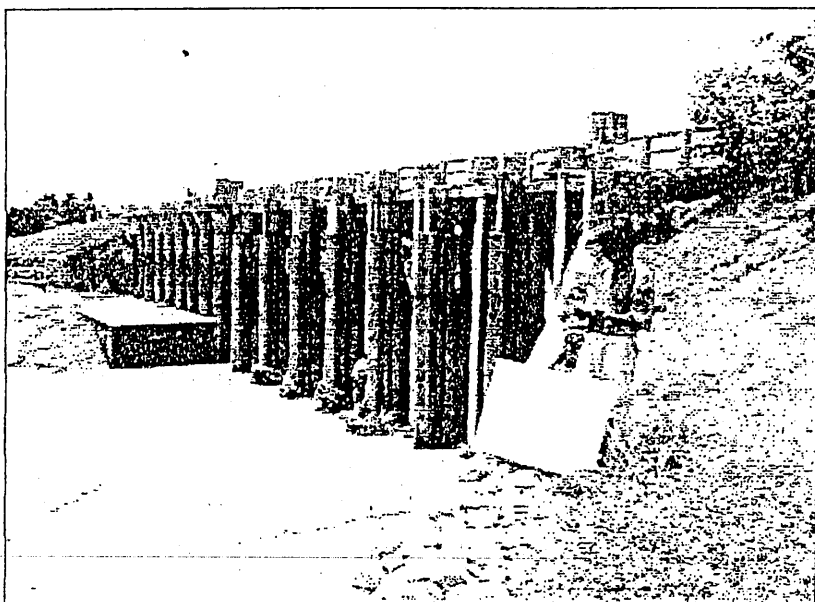


Photo-9 Slakou Regulator is a joint structure of NR3 Road Bridge



Photo-10 Slakou Bridge and Flash water in Rainy Season



Photo-11 Collapsed substructure of Slakou Bridge NR3



Photo-12 Peam Ror Bridge on NR11

Peam Ror was repaired at northern abutment, which was destroyed by 2000 Flood.  
Now RGC repaired this abutment and installed temporary bailey bridge again.

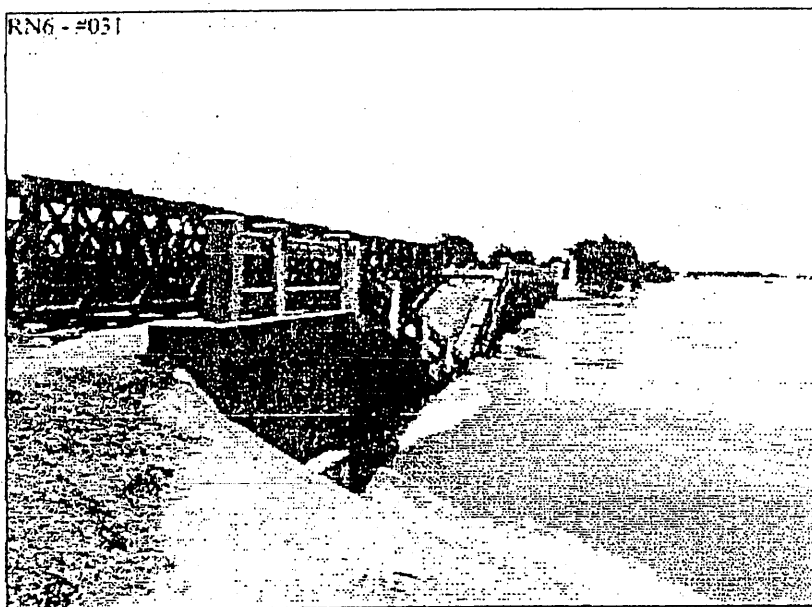


Photo-13 No.24 Bridge Collapsed in Aug 2001

This bridge was constructed in 1960's same as other bridges along 6a.  
Causes of collapse are mainly due to deteriorations on steel pipe substructures,  
and other influences of overloaded vehicles and flood are not negligible

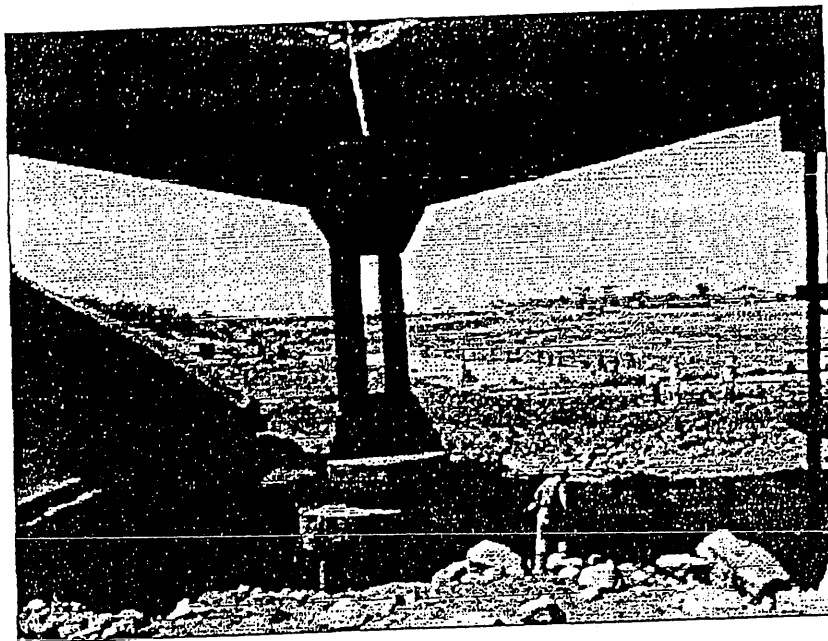


Photo-14 Collapsed No.24 Bridge  
Middle spans of Steel Piles collapsed



Photo-14 Serious Scoring at No.15 Bridge on NR6a

Those types of deteriorations can be seen easily at neighbor bridges  
Due to riverbed scoring, the substructures may be unstable condition.  
Masonry broken by floodwater can be seen on front side.

## Appendix-8 Draft Cost Estimation

### 1. Bridge Construction

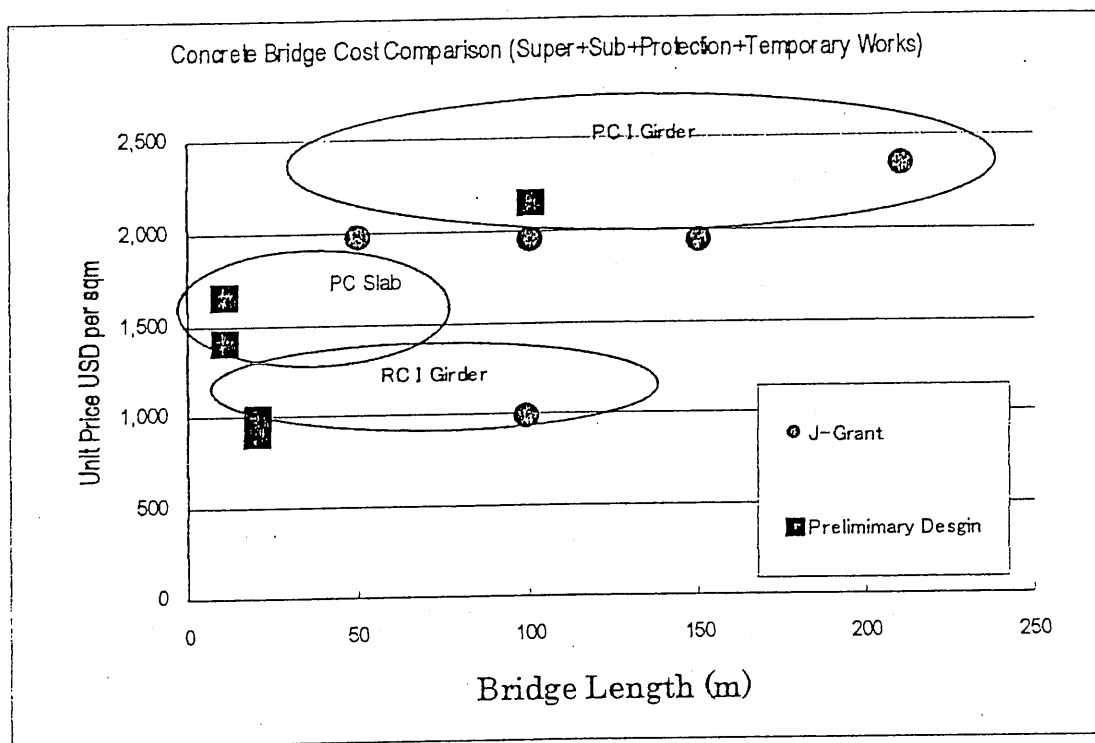


Figure-1 Unit Price of Bridges

Figure-1 shows Bridge Construction Direct Cost that is collected from Japan Grant Project and the Cambodia Standard Bridge Preliminary Design.

Preliminary Unit Prices are shown as following table. Prices are including main structure construction, riprap and riverbed protection.

Type	Applicable Length m	Foundation	Abutment	Pier	Unit Price USD/sqm
RC-I Girder	10m<L<15m	Prefabricated Piles	RC wall	RC Column	1000
PC-Slab	L<12m	Prefabricated Piles	RC wall	RC Column	1500
PC-I Girder	25m<L<40m	Site Casting Piles	RC wall	RC wall	2300

Note) PC-slab will be applicable for the case of that clearance is not sufficient to water channel.

### 2. Pavement

Both Pavement of bridge and approach road is taken account. Approach road is total 100m for each bridge and pavement width is 10m

Bridge Pavement is some 4000 sqm and approach road is 10m x 100m x 14 locations equal

14000 sqm

### 3. Miscellaneous Works

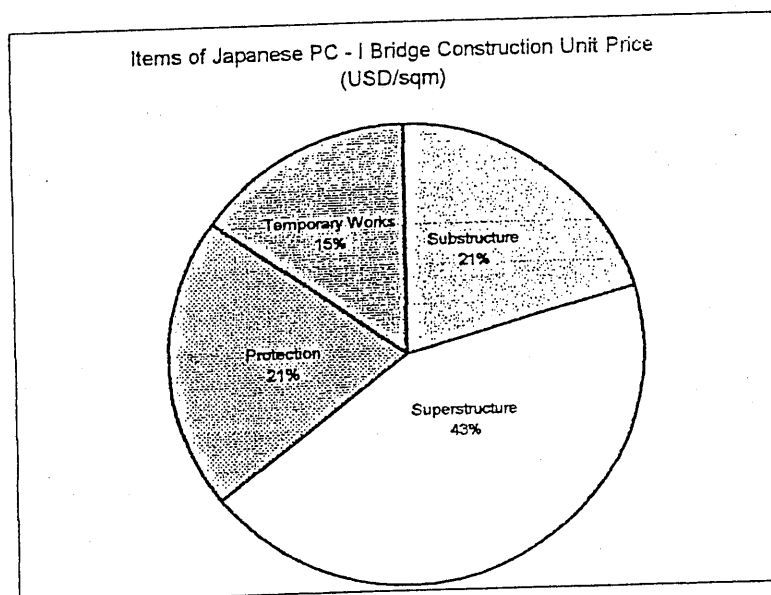
Miscellaneous Works should be taken account as following items

- Build and demolish of detour road
- Demolish of existing structures
- Preparatory Works for construction site and
- Small maintenance works on construction site

Unit Price is given as a ratio for main bridge construction cost of Japan Grant Projects.

Temporary works cost ratio is 15% divide 85% equal 0.176

Thus temporary works can be determined as 17.6 % of bridge construction cost.



#### 4. Detail Inspection

SIB- MPWT estimated detail Inspection Cost as following

ITEM	QTY	UNIT	UNIT PRICE (¥)	AMOUNT (¥)
<b>Direct Cost</b>				
1. Mobilisation and Demobilisation	1	L.S		12,000
2. Preparation Works	1	L.S		8,000
3. Traffic Controlling	1	L.S		45,000
4. Transportation / Field works				
a). Driver	3	Prs.Mth	12,500	37,500
b). Vehicle	3	Vhl.Mth	(Supp. by MPWT)	0
c). Petrol and oil	3	Vhl.Mth	10,500	31,500
d). Small boat and owner (hire)	25	Bt.Days	3,150	78,750
5. Local Staffs				
a). Administration	3	Prs.Mth	25,000	75,000
b). Manager	3	Prs.Mth	45,000	135,000
c). Senior engineer	3	Prs.Mth	35,000	105,000
d). Team leaders	6	Prs.Mth	25,000	150,000
e). Local engineers	6	Prs.Mth	25,000	150,000
f). Local inspectors	12	Prs.Mth	22,000	264,000
g). Local draftsman	4	Prs.Mth	16,000	64,000
h). Computing Operator	4	Prs.Mth	16,000	64,000
6. Local/Overseas Consumables				
a). Film and Processing	1	L.S		36,500
b). B&W and Colour Copying	1	L.S		12,000
c). Cover Trim & Bind-Tape	1	L.S		8,500
d). Office stationery	1	L.S		65,000
e). Others	3	Mth	12,000	36,000
7. Computer accessories/Software				
a). Print Heads(B&W, Colour)	1	L.S		18,500
b). Printer Cartridge(B&W, Col.)	1	L.S		12,500
c). Disk	1	L.S		5,500
8. Assorted Tools				
a). Rigging Rope	2	Set	2,800	5,600
b). Safety Rope	2	Set	7,500	15,000
c). Binocular	2	Each	25,000	50,000
d). Camera	2	Each	45,000	90,000
e). Sounding line	2	Set	1,500	3,000
f). Industrial First Aid Kit	2	Set	8,000	16,000
g). Inspection Mirror	2	Each	2,500	5,000
h). Testing Hammer	2	Each	950	1,900
i). Strength Test Hammer	1	Each	125,000	125,000
j). Light	2	Set	1,200	2,400
9. Specialist Services / Equipment				
a). Ladder	2	Set	12,500	25,000
b). Scaffold (Hire)	2	Set.Mth	55,000	110,000
c). Crane (Hire)	1	Mth	120,000	120,000
d). Generator and Light (hire)	1	Mth	22,000	22,000
10. Special Waterway Survey				
a). Special Boat (survey Team)	7	Day	52,000	364,000
b). Report Production	1	Set	150,000	150,000
Sub Total Direct Cost				2,519,150
<b>Indirect Cost</b>				
1. Technical Instructors Expenses	1	L.S		1,304,560
2. On Site Expenses	1	L.S		822,200
Sub Total Indirect Cost				2,126,760
Mark-up	5.2	%		254,090
Total				4,900,000
			1\$=120yen	41,000USD

## 5. Repairing Works

Items			Price	Unit
BR0001	Steel Jacketting	USD	5,833	for One Pier
BR0002	Deck Repair	USD	1,167	Lump Sum
BR0003	Girder Repair	USD	1,750	Lump Sum
BR0004	Rip Rap	USD	76	per sqm
BR0005	Riverbed Protection	USD	35	per sqm
BR0006	Guide Bank	USD	5000	Lump Sum

## 6. Preliminary Project Cost Estimation

Direct cost for bridges Construction	Includes protection Works	7,070,400
Earthworks and Pavement	200%	3,457,600
Miscellaneous Works	17.6%	1,852,928
Detail Inspection	Japan Bridge Inspection	41,000
Repairing Works	6a	1,551,000
Indirect cost	30%	3,726,578
Sub-Total	Sub-Total	17,699,506
Soft Component	DD and Project Management	3,000,000
Grand Total	Grand Total	20,699,506
	1\$	=120
Approximately		2,483,940,768
		2,500,000,000