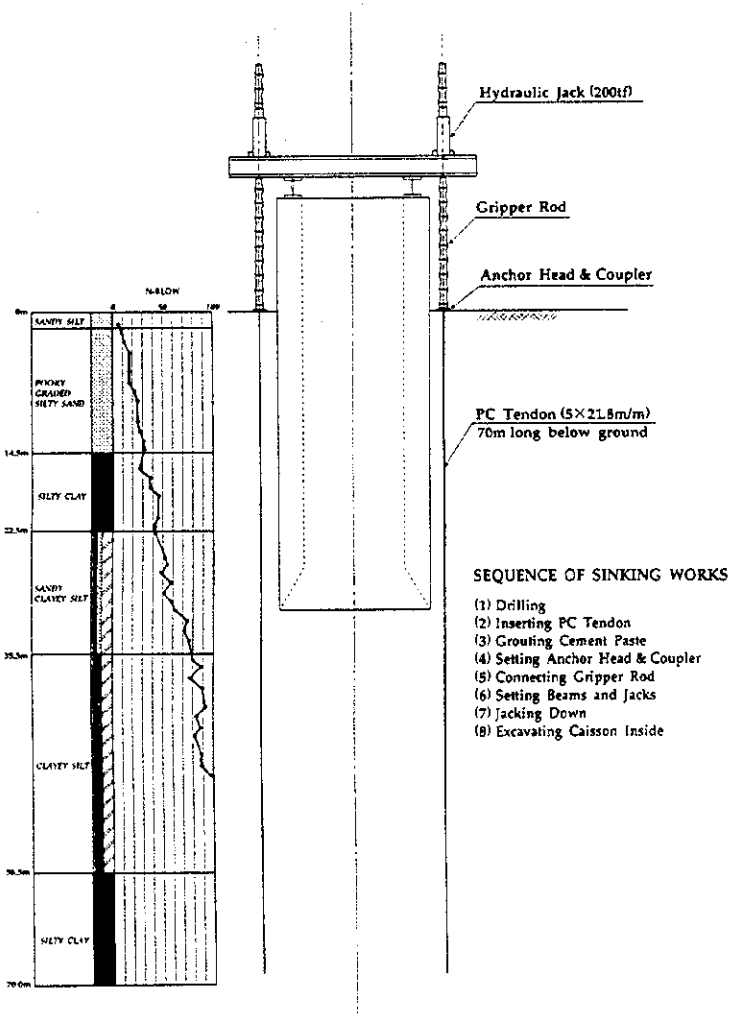
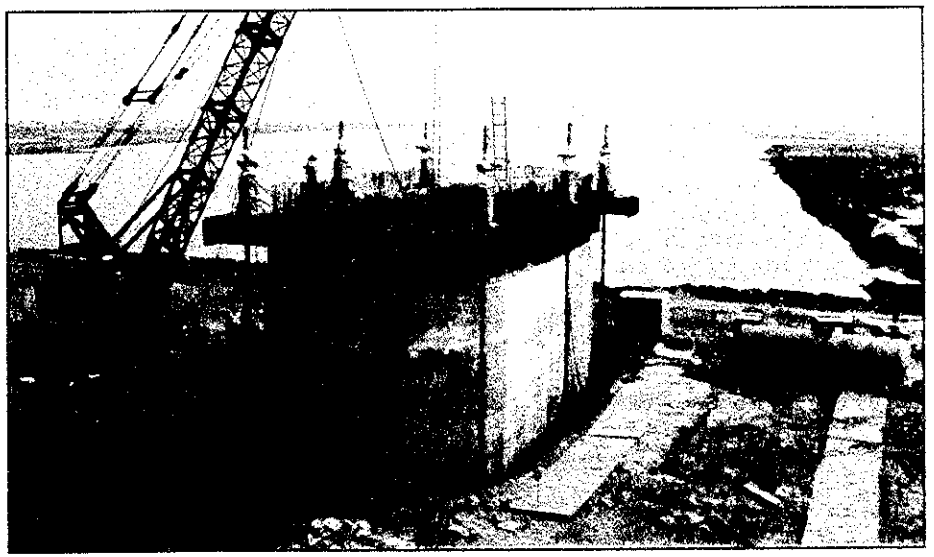
JACKDOWN SYSTEM FOR CAISSON SINKING

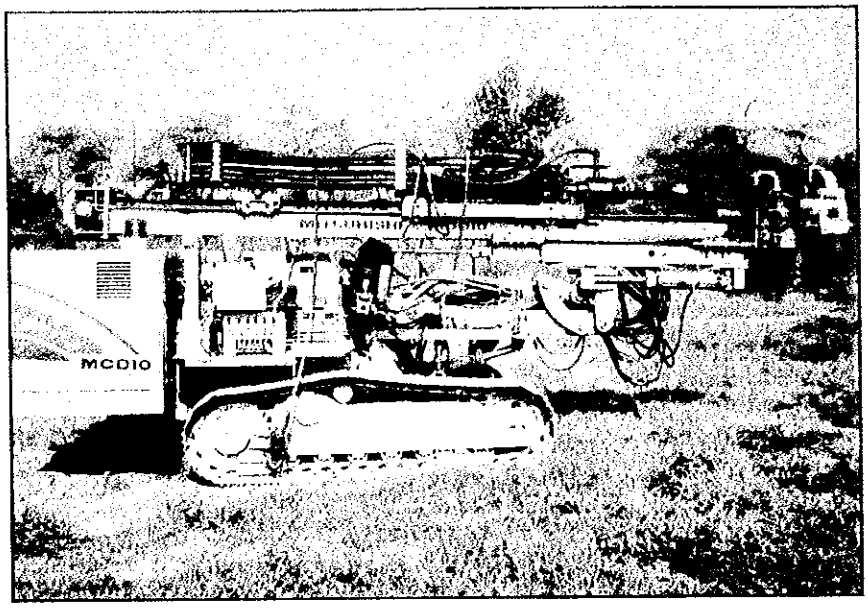
JACK DOWN METHOD FOR SINKING WORKS OF CAISSON FOUNDATION



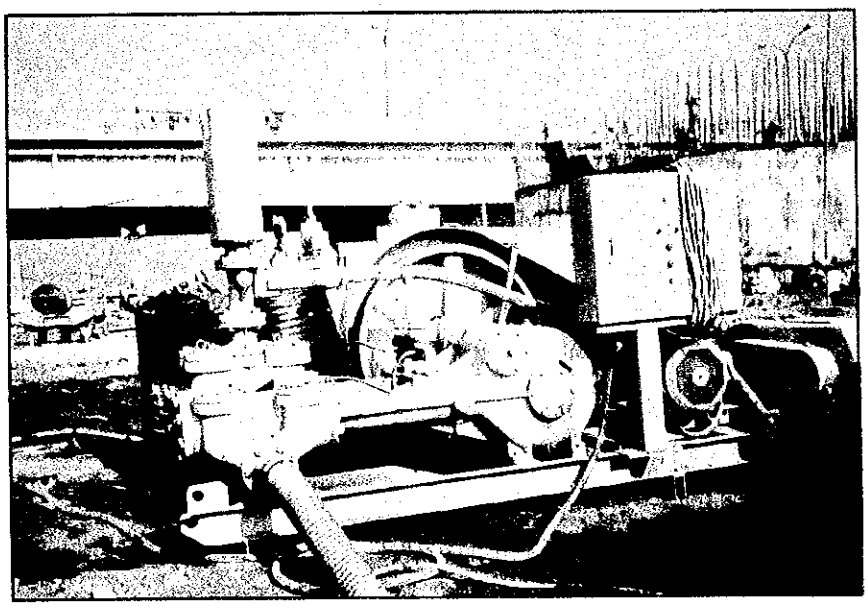
SEQUENCE OF SINKING WORKS

(1) Drilling
(2) Inserting PC Tendon
(3) Grouting Cement Paste
(4) Setting Anchor Head & Coupler
(5) Connecting Gripper Rod
(6) Setting Beams and Jacks
(7) Jacking Down
(8) Excavating Caisson Inside

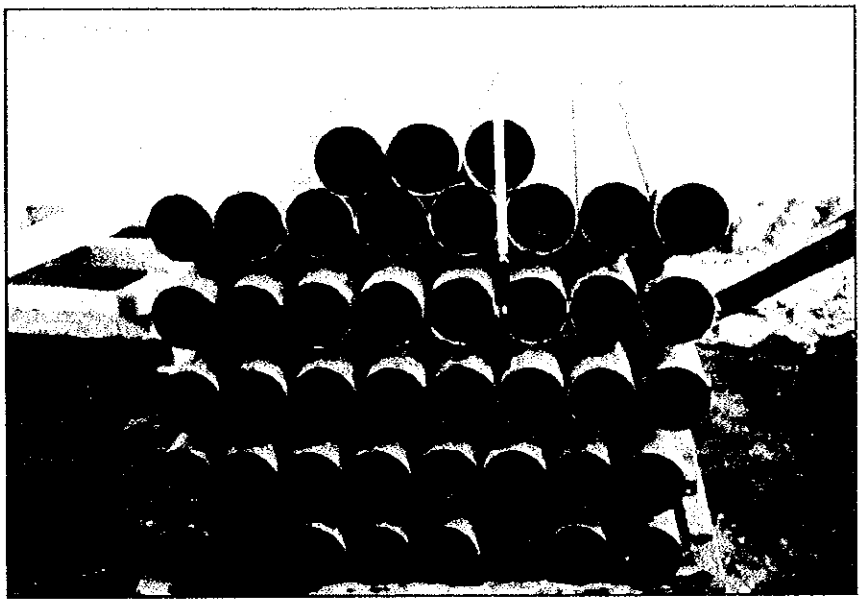




Drilling Machine



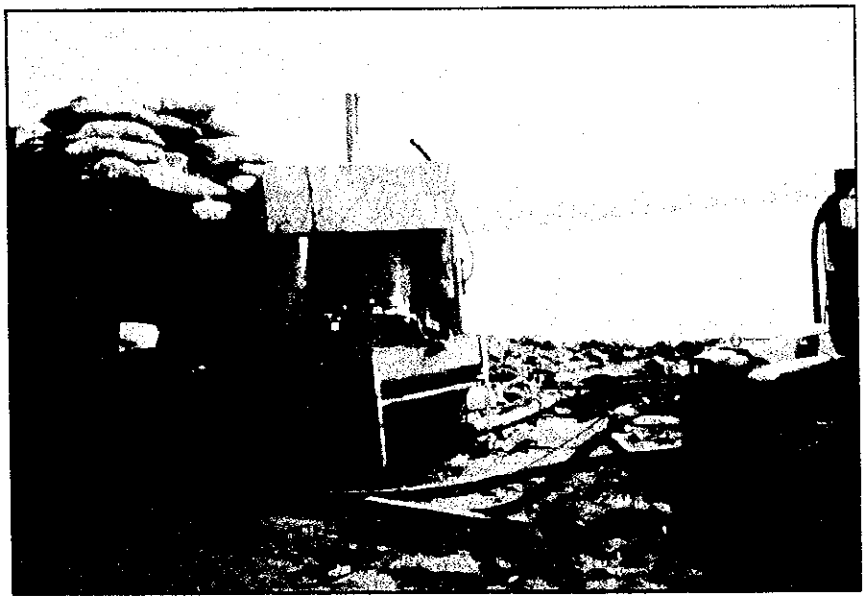
Drilling Pump



Casing Rod （ϕ 130m/m, ℓ = 1.5m）

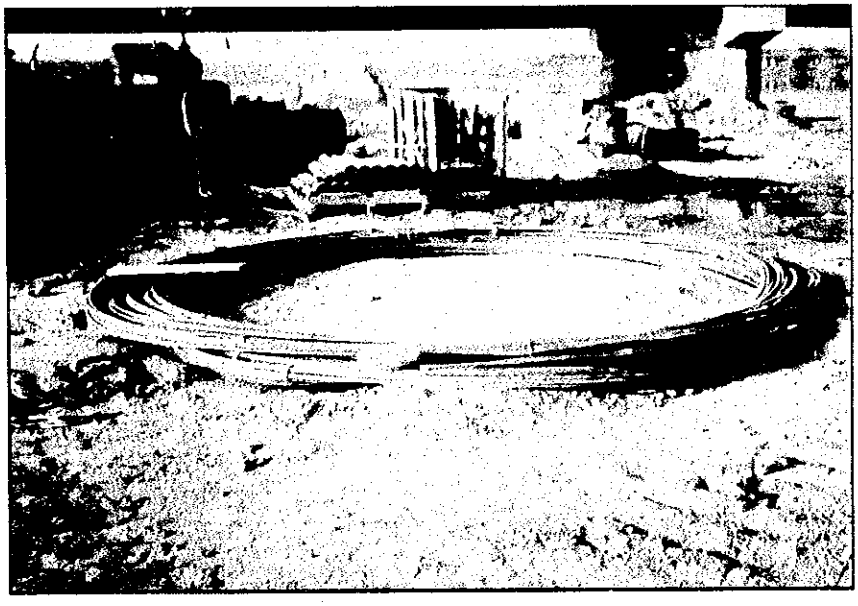
Rod Crown （ϕ 140m/m）

Drilling Operation

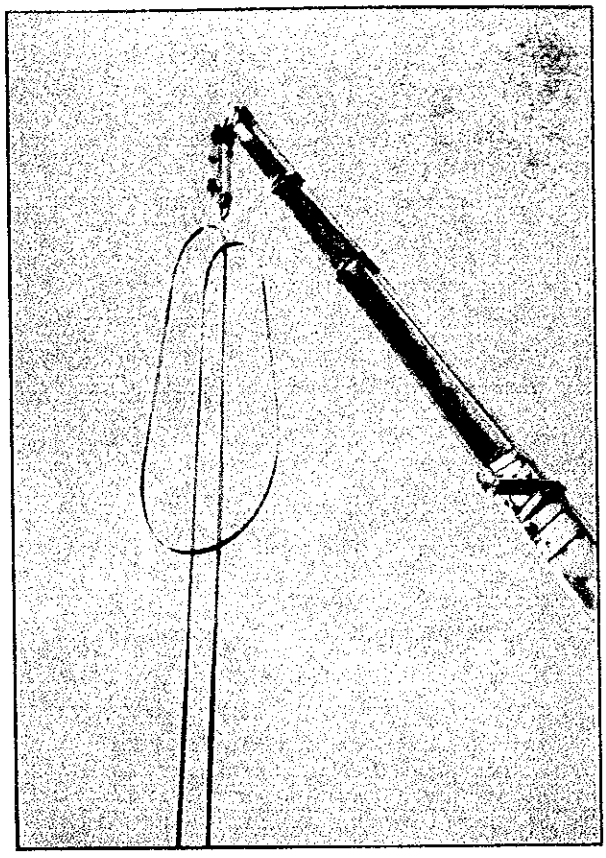


Grouting by Mortar Pump

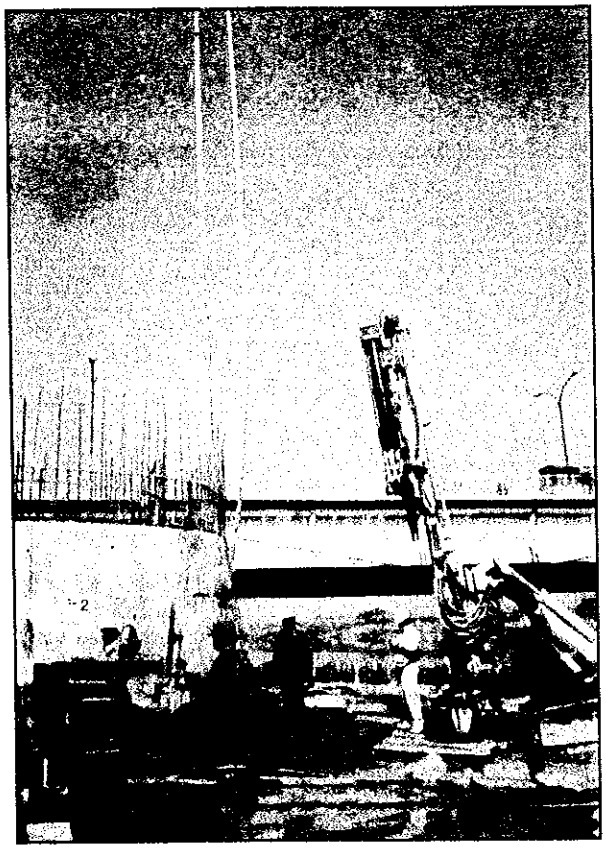
Ground Anchor Wire
(HT Strand, ϕ 21.8m/m)

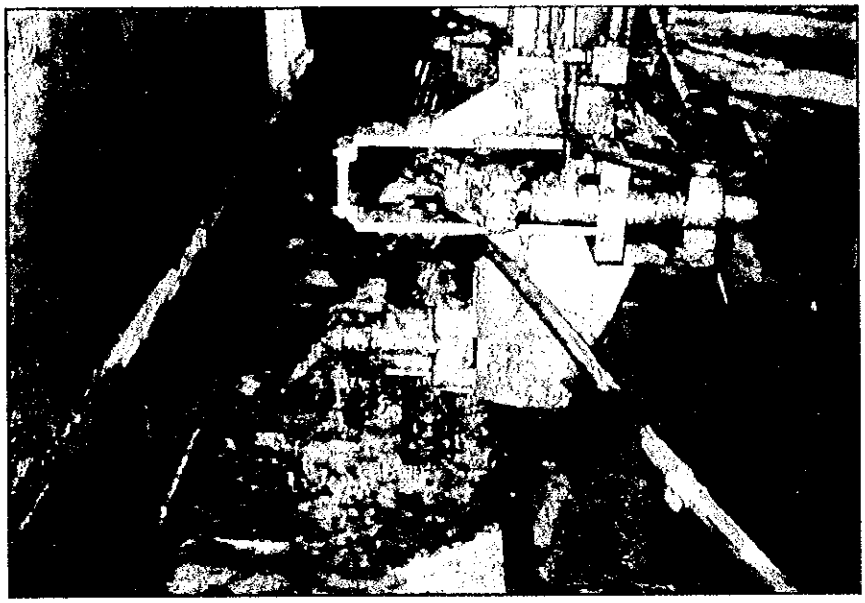


Ground Anchor Wire (HTStrand, ϕ 21.8m/m)



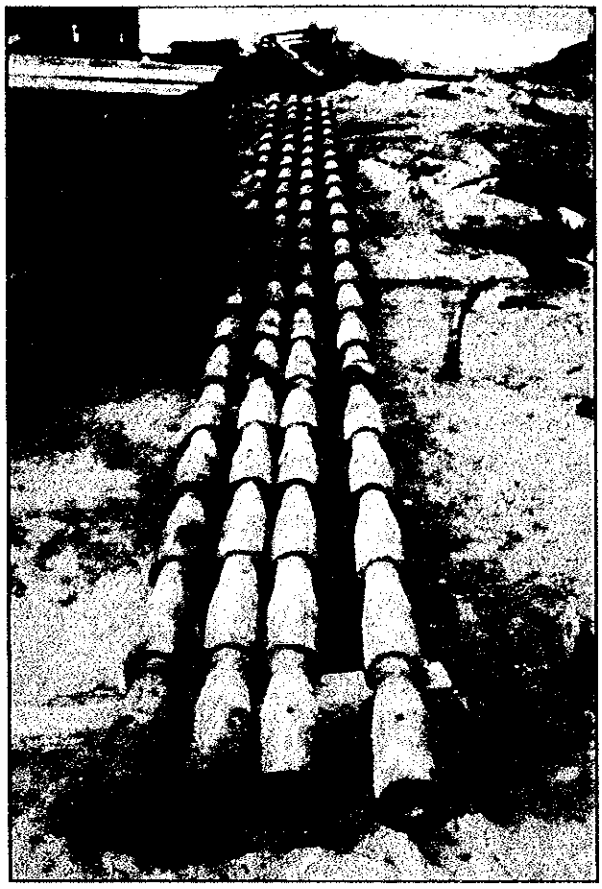
Inserting Anchar Wire





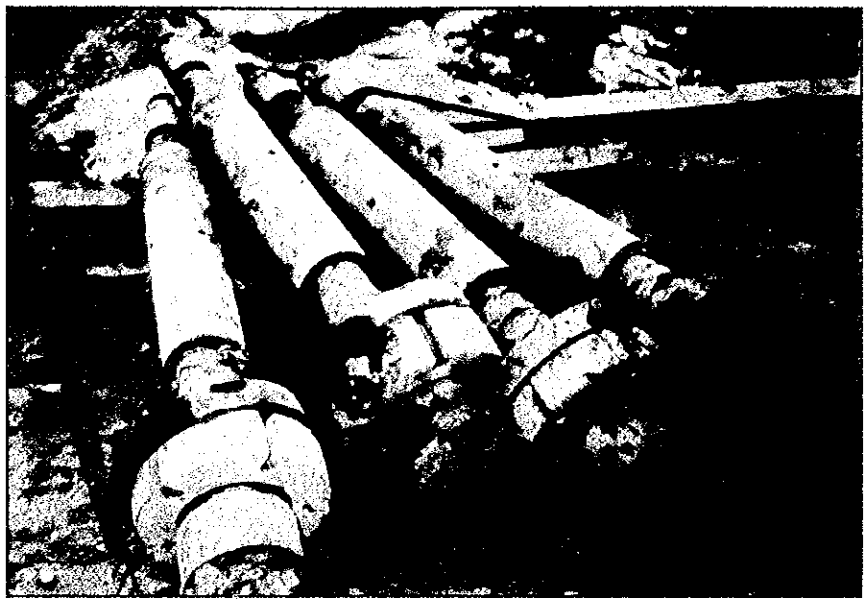
Grouting Mortor

Anchor Wire End

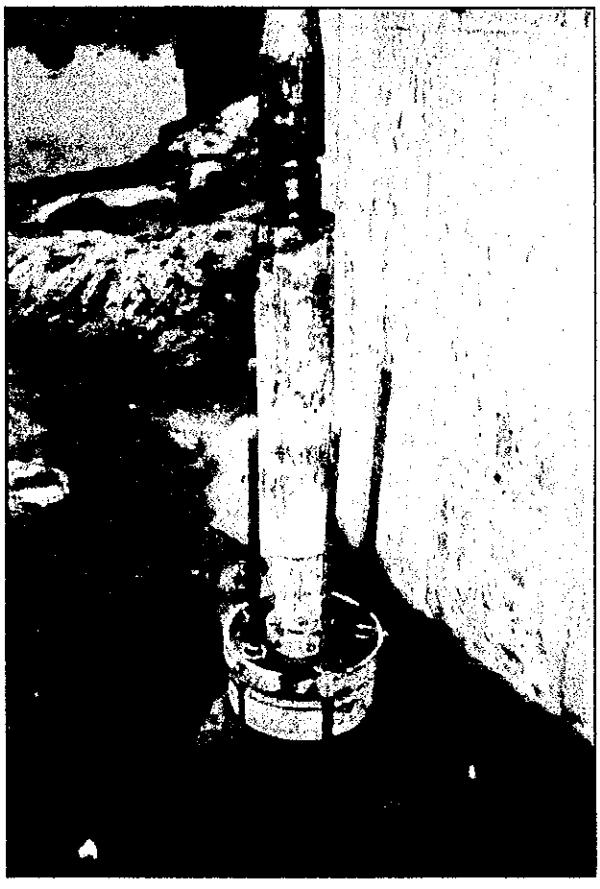


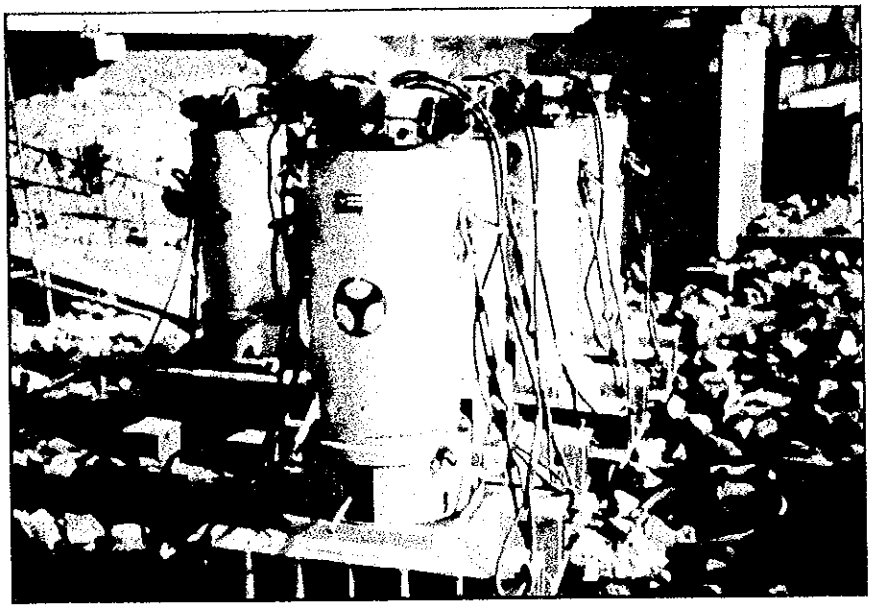
Gripper Rod
(85-130m/m)

Pressuriging Beam

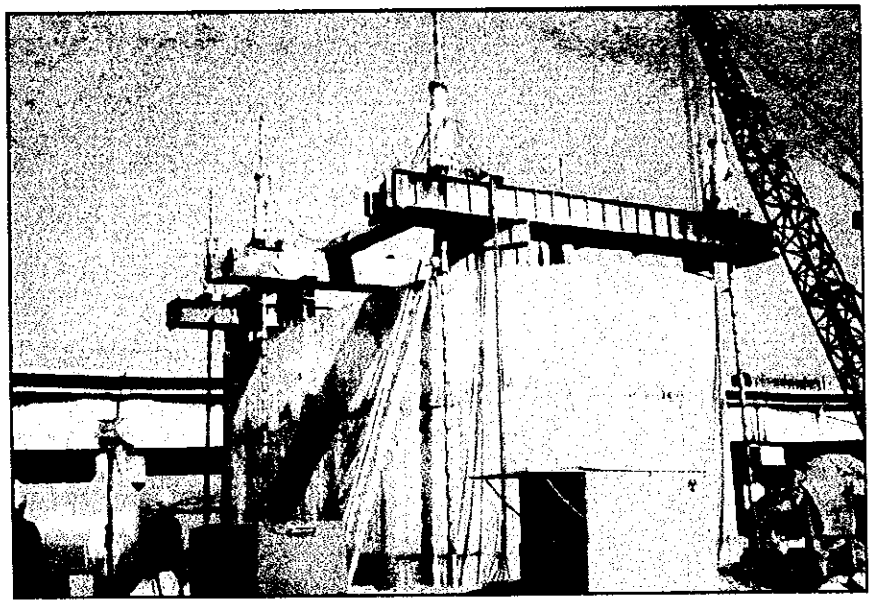


Adjustment Coupler
and
Adjustment Rod





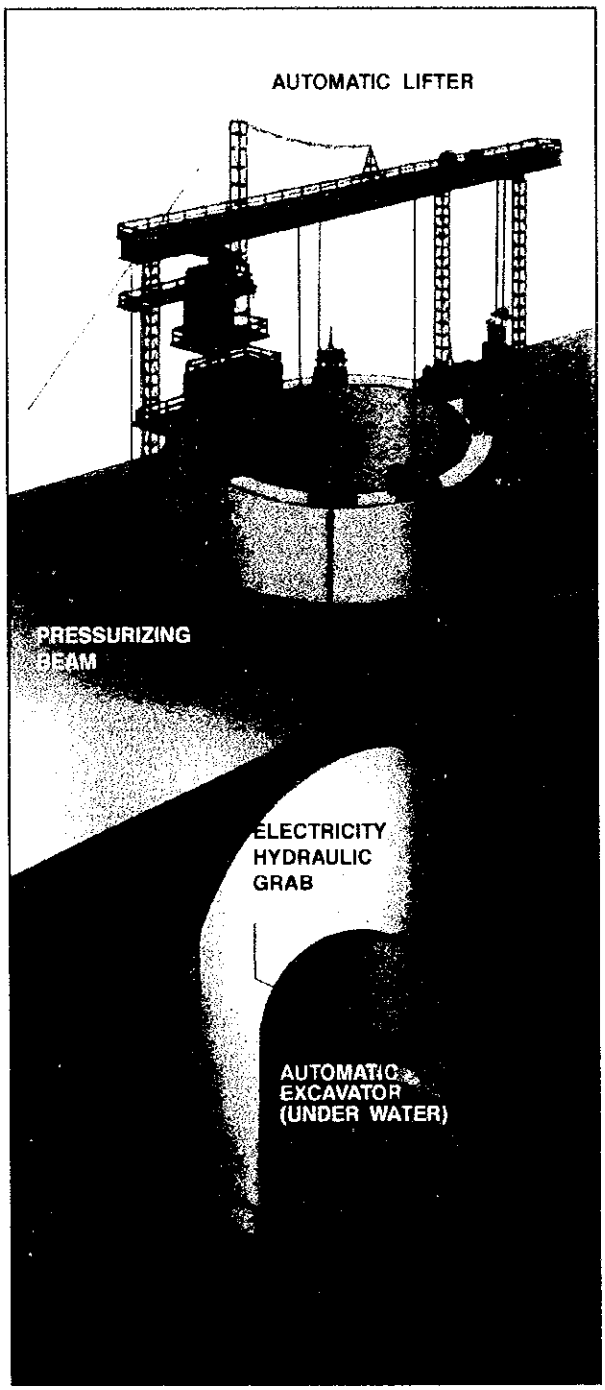
Hydraulic Jack (200 Ton)



Jackdown Operation

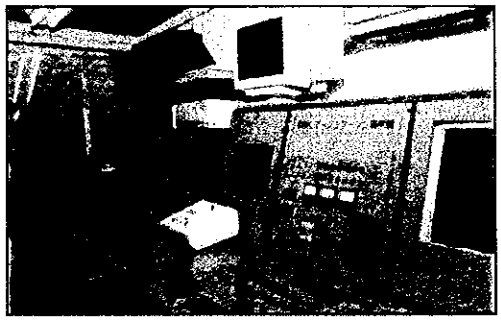
AUTOMATIC EXCAVATION AND SINKING CAISSON METHOD

OPERATION AND EQUIPMENT FOR AUTOMATIC EXCAVATION OF CAISSON



COMMAND OPERATION

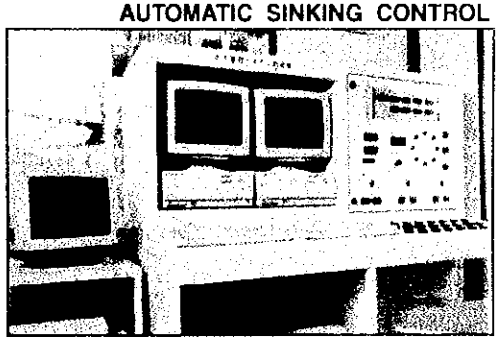
COMMAND OPERATION



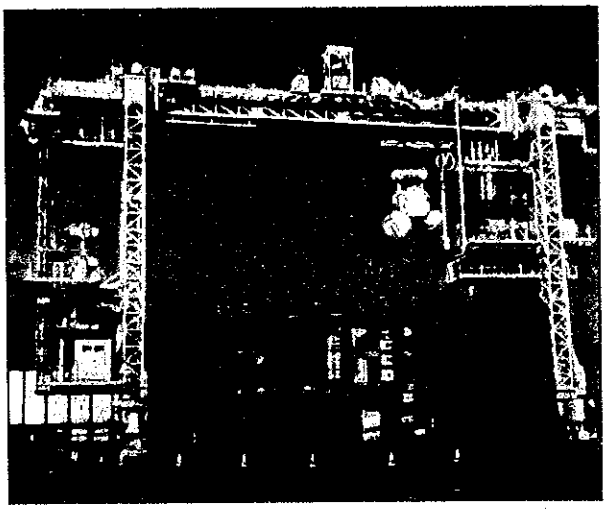
EXCAVATION AND LIFTING DATA

AUTOMATIC SINKING CONTROL

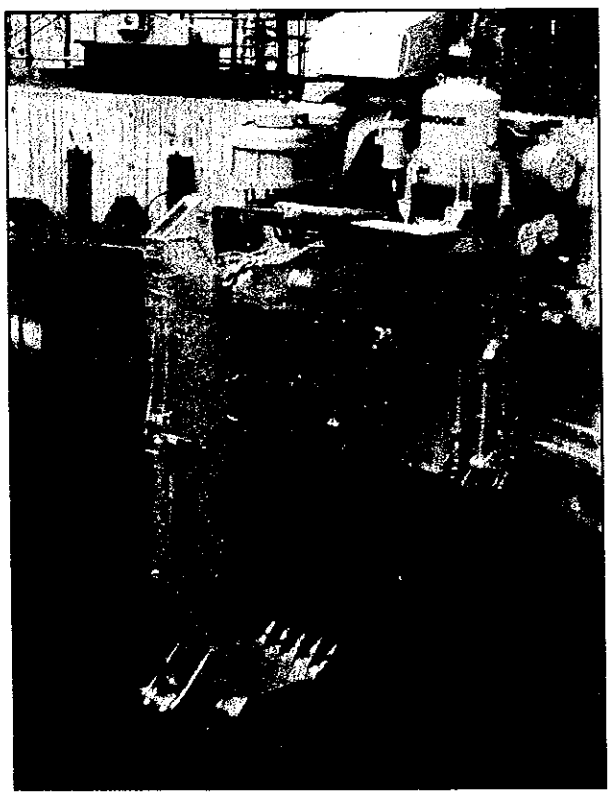
AUTOMATIC SINKING CONTROL



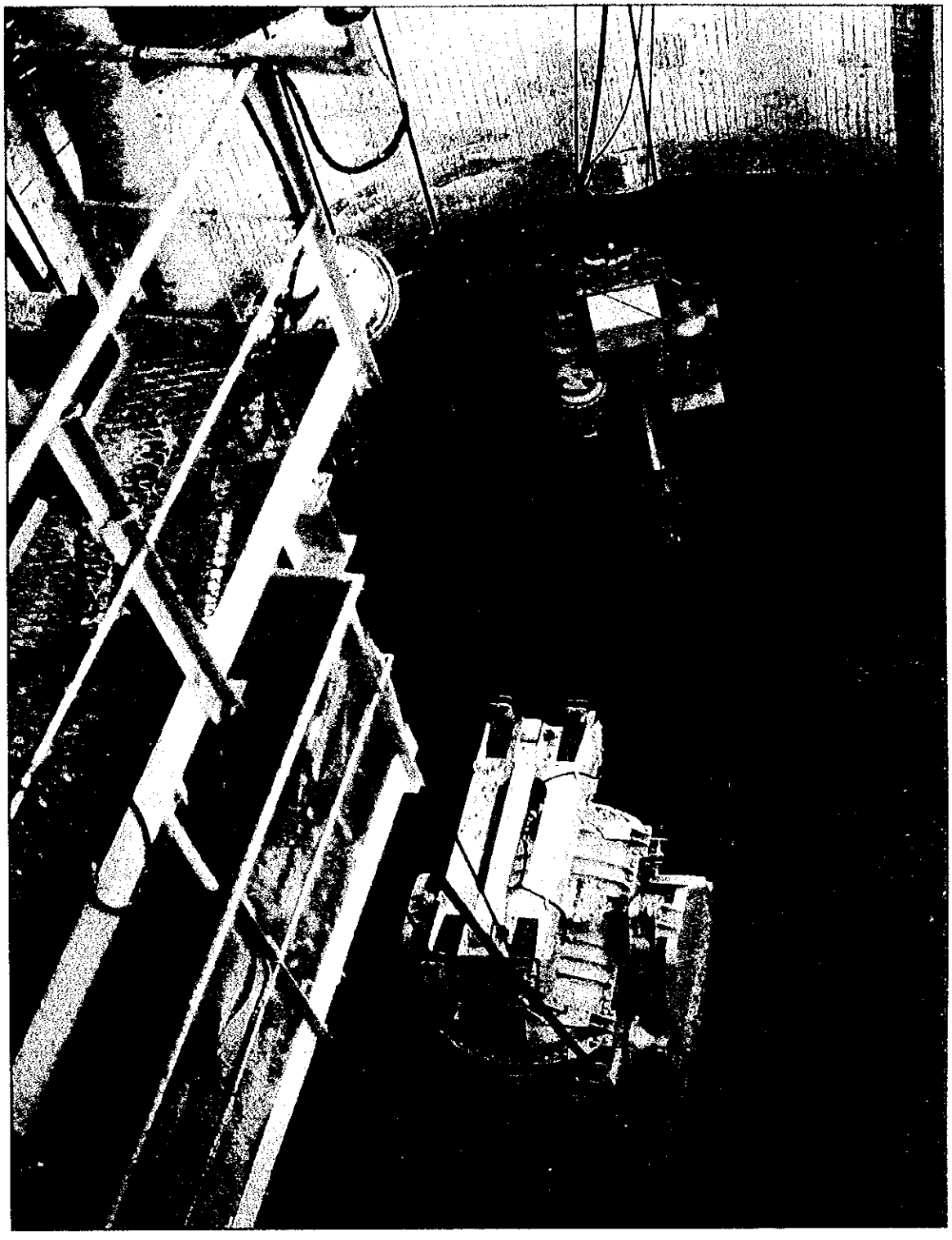
AUTOMATIC EXCAVATION AND LIFTING SYSTEM



AUTOMATIC LIFTER



AUTOMATIC EXCAVATOR
BY REMOTE CONTROL
The excavator moves on the rails
which are built-on the concrete
of the caisson stein.



AUTOMATIC CAISSON SINKING METHOD

The Feasibility Study
on The Can Tho Bridge Construction in
Socialist Republic of Viet Nam

ANNEXURE 13

ALTERNATIVES OF MAIN BRIDGE

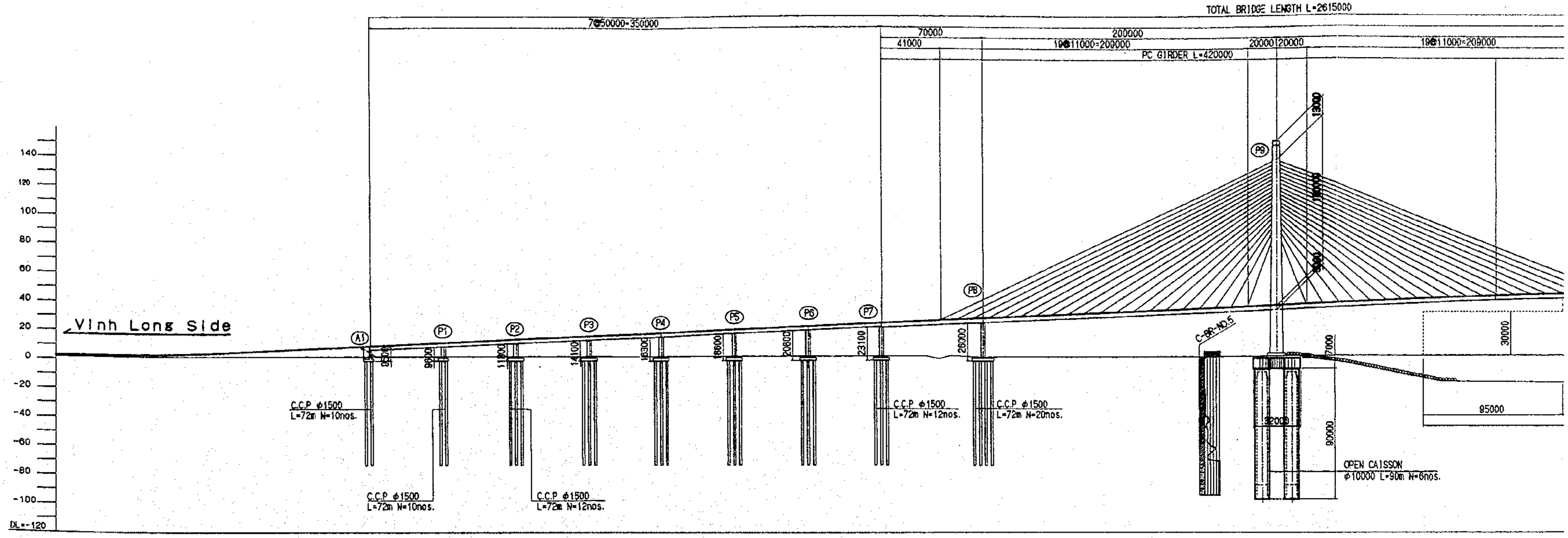
13.1 Alternatives of Main Bridge

The Study Team recommended the "Hybrid Cable Stayed Bridge" in the Report, and indicates the following two types of Cable Stayed Bridge as the alternatives, referring with the request of Vietnamese side in Steering Committee Meeting in 9th July 1998.

Recommended Structure:	Hybrid Cable Stayed Bridge
Alternative – 1:	Steel Cable Stayed Bridge
Alternative – 2:	PC Cable Stayed Bridge

The general view of above 3 types is shown from 12.2 to 12.4 in the following.

SIDE ELEVATION SCALE 1:3000

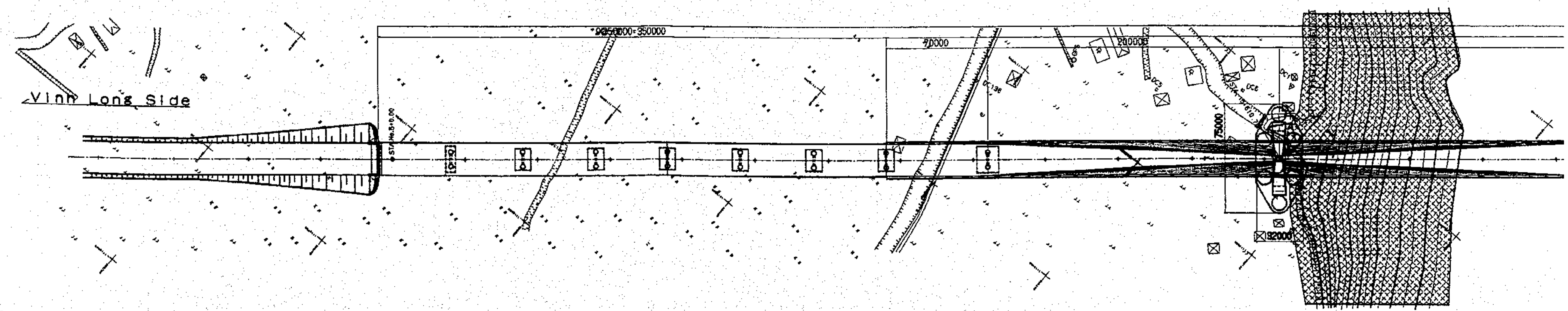


GRADE: 2.500 — i=4.500%

STATION	PROPOSED HEIGHT	GROUND HEIGHT	DISTANCE
4+800.0	2.500	1.02	4800.000
4+853.3	3.006	1.02	4853.333
4+900.0	4.800	0.79	4900.000
(A1) 4+990.0	8.650	1.03	4990.000
5+ 0.0	9.100	1.03	5000.000
(P1) 5+ 40.0	10.900	1.03	5040.000
(P2) 5+ 90.0	13.150	1.07	5090.000
5+100.0	13.600	1.07	5100.000
(P3) 5+140.0	15.400	1.16	5140.000
(P4) 5+190.0	17.650	1.15	5190.000
5+200.0	18.100	1.15	5200.000
(P5) 5+240.0	19.900	1.25	5240.000
(P6) 5+290.0	22.150	1.24	5290.000
5+300.0	22.600	1.24	5300.000
(P7) 5+340.0	24.400	1.26	5340.000
5+400.0	27.100	0.91	5400.000
5+410.0 (P8)	27.550	1.18	5410.000
5+500.0	31.600	1.23	5500.000
5+600.0	36.100	1.83	5600.000
5+610.0 (P9)	36.550	1.83	5610.000
5+700.0	40.600	-12.00	5700.000
5+710.0	41.050	-12.20	5710.000
5+800.0	44.163	-16.62	5800.000

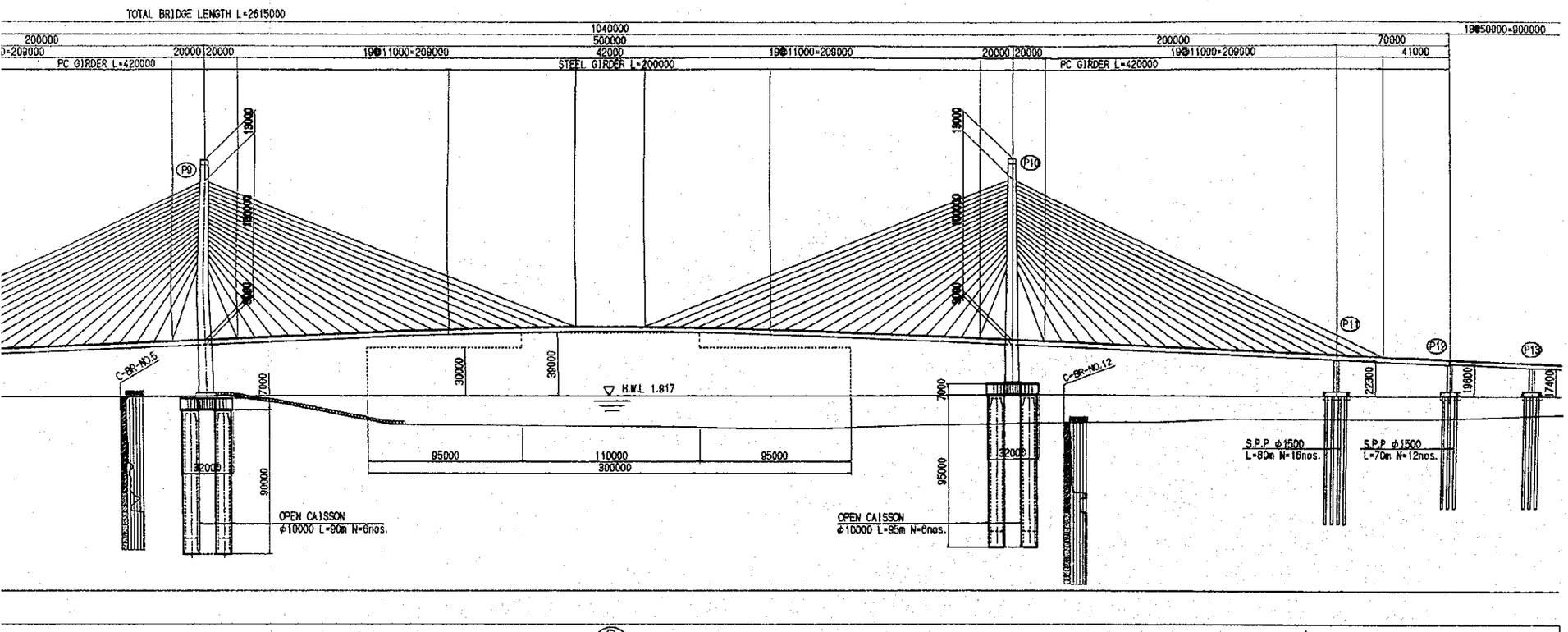
CURVE ELEMENT

PLAN SCALE 1:3000

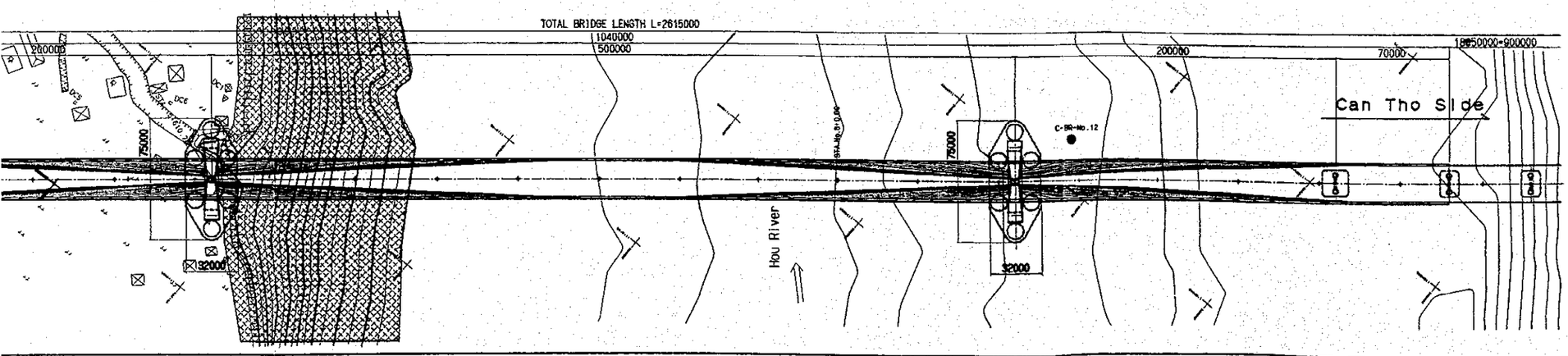


GENERAL VIEW OF HYBRID CABLE STYED TYPE

SIDE ELEVATION SCALE 1:3000

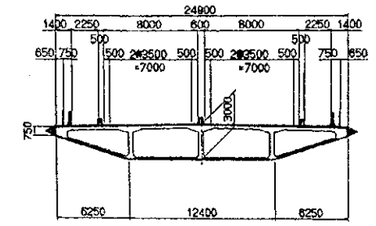


PLAN SCALE 1:3000

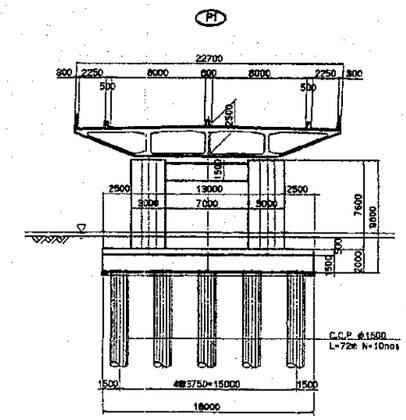


MAIN BRIDGE

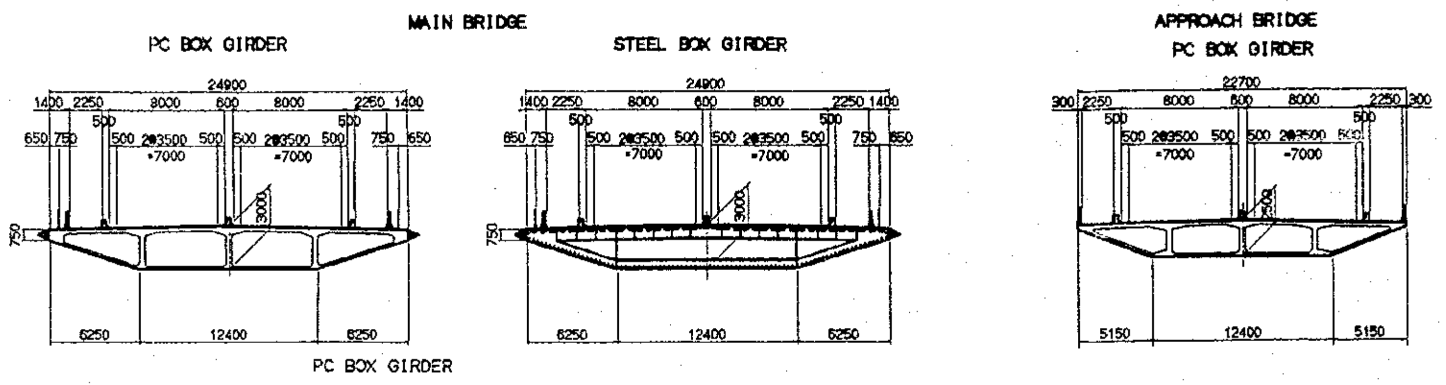
PC BOX GIRDER



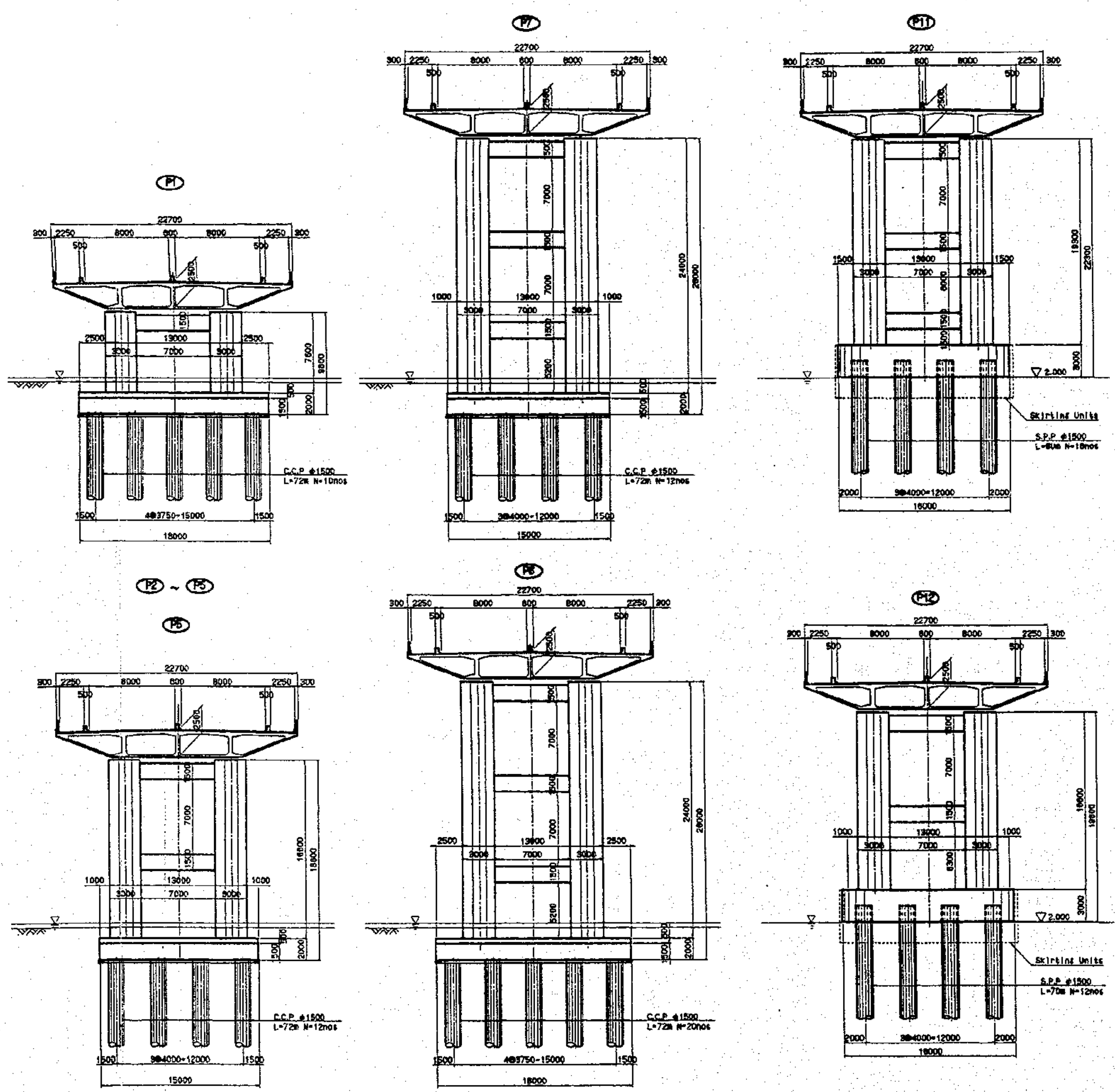
PC BOX GIRDER



SUPER STRUCTURE SCALE 1:500



SUBSTRUCTURE SCALE 1:500



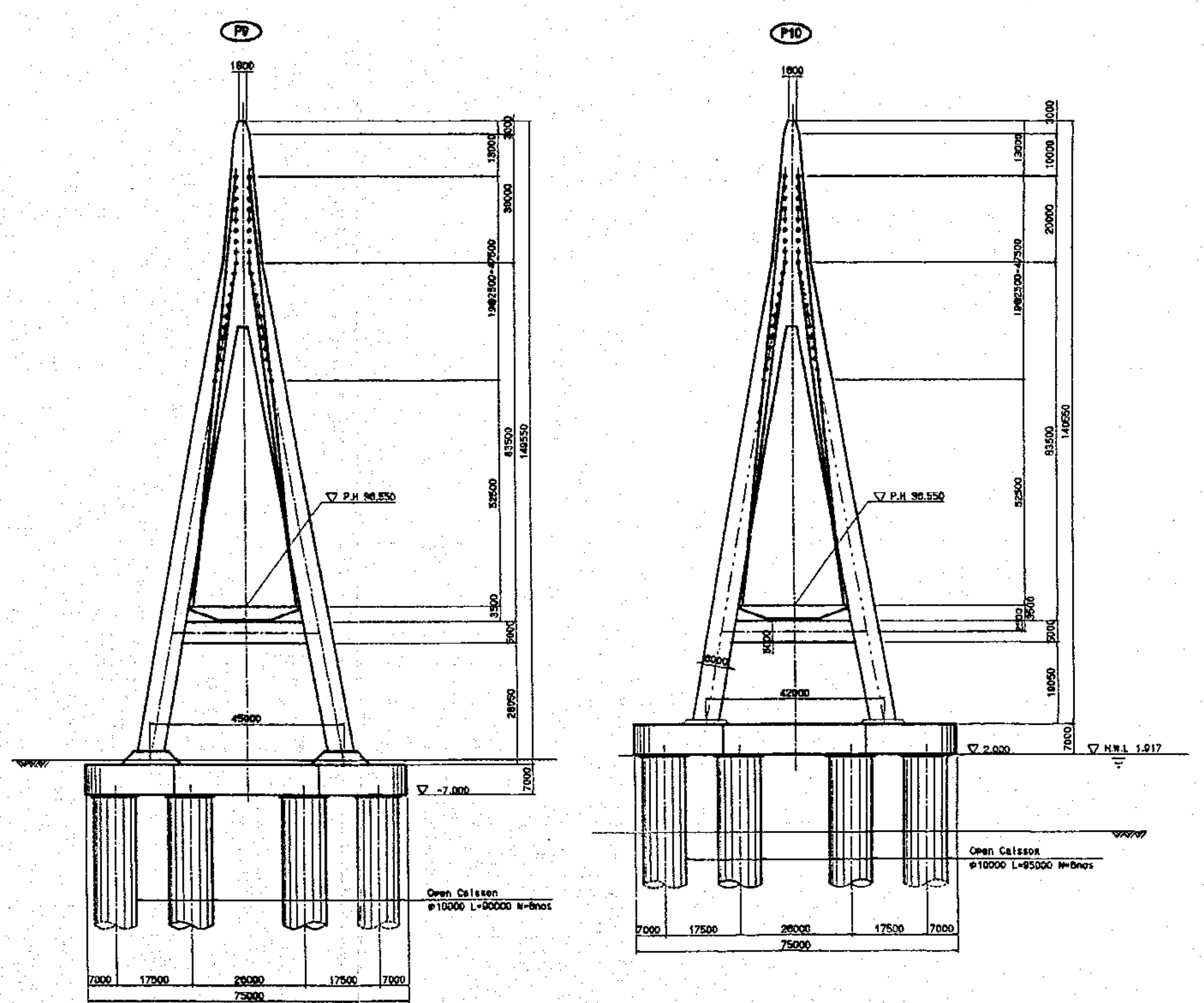
DESIGN CRITERIA

TYPE	MAIN BRIDGE	HYBRID CABLE STYED BRIDGE
	APPROACH BRIDGE	CONTINUOUS PC BOX GIRDER
BRIDGE LENGTH	MAIN BRIDGE	L=1040.0m
	APPROACH BRIDGE	L= 350.0m
SPAN LENGTH	MAIN BRIDGE	70m+200m+500m+200m+70.0m
	APPROACH BRIDGE	7@50m
WIDTH	CARRIAGEWAY 2@5.0m-16.0m SIDEWALK 2@2.25-4.5m	
DESIGN LOAD	H30(VIETNAM STANDARD) . B-LIVE(JRA STANDARD) SIDEWALK LIVE LOAD=350kgf/m2	
RADIUS OF CURVATURE	R= ∞	
LONGITUDINAL SLOPE	4.5% 4.5% V.C.L=300m(R=9300m)	

MATERIALS

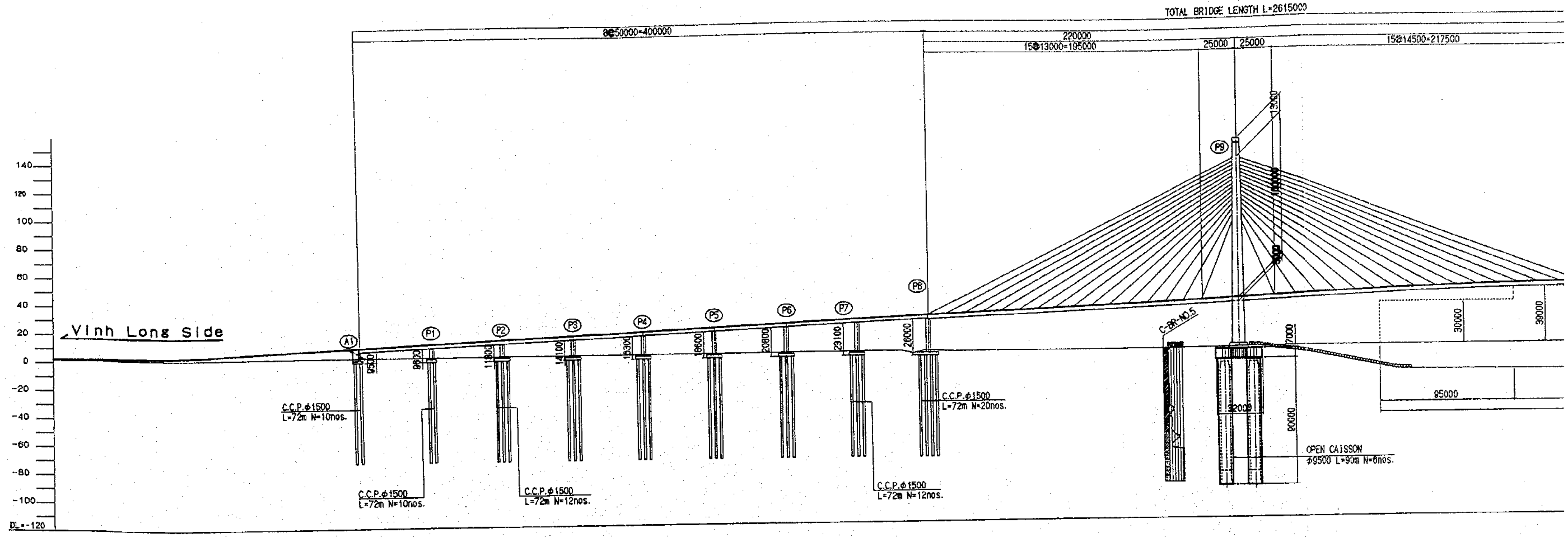
CONCRETE	SUPERSTRUCTURE	σck=500kgf/cm² . σck=400kg/cm²	
	SUBSTRUCTURE	σck=240kgf/cm²	
	PILE CAP	σck=240kgf/cm²	
	FOUNDATION	σck=240kgf/cm²	
STRUCTURAL STEEL	SS400	MINI. TENSILE STRENGTH 400~510N/mm2	
	SM490	MINI. TENSILE STRENGTH 490~610N/mm2	
	SM570	MINI. TENSILE STRENGTH 570~710N/mm2	
PC STEEL	INNER CABLE	12S15.2B & 12S12.7B	
	STAY CABLE	H system	
REINFORCEMENT BAR		SD295	YIELD POINT STRENGTH 295~390N/mm2
		SD345	YIELD POINT STRENGTH 345~440N/mm2

SUBSTRUCTURE SCALE 1:1500



JAPAN INTERNATIONAL COOPERATION AGENCY	THE FEASIBILITY STUDY ON THE CAN THO BRIDGE CONSTRUCTION IN SOCIALIST REPUBLIC OF VIET NAM	GENERAL VIEW OF HYBRID CABLE STYED TYPE	SCALE AS SHOWN	DWG.No.

SIDE ELEVATION SCALE 1:3000



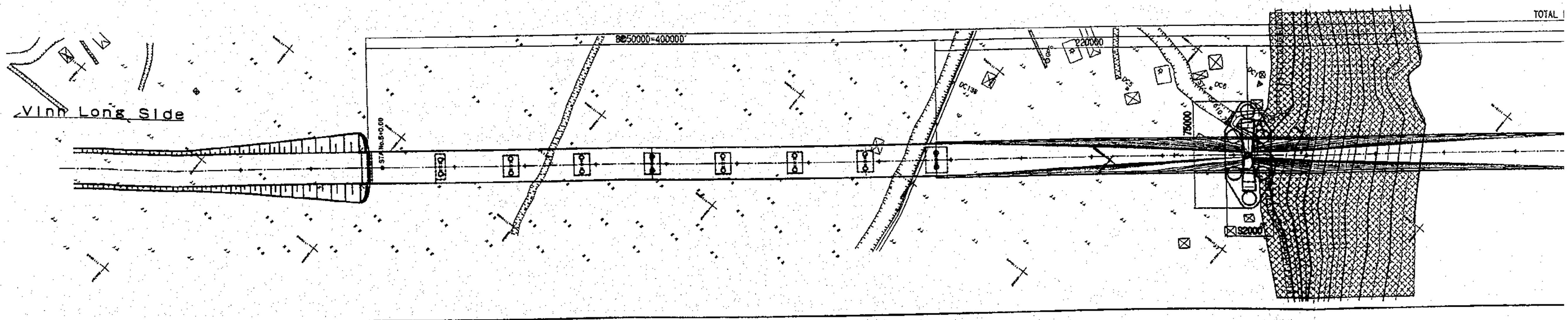
GRADE: 2.500 — I=4.500%

PROPOSED HEIGHT	2.500	3.006	4.600	8.650	9.100	10.900	13.150	13.600
GROUND HEIGHT	1.02	1.02	0.79	1.03	1.03	1.03	1.07	1.07
DISTANCE	4800.000	4853.333	4900.000	4990.000	5000.000	5040.000	5090.000	5100.000
STATION	4+800.0	4+853.3	4+900.0	(A1) 4+990.0	5+ 0.0	(P1) 5+ 40.0	(P2) 5+ 90.0	5+100.0
CURVE ELEMENT								

PROPOSED HEIGHT	15.400	17.650	18.100	19.900	22.150	22.600	24.400	27.100
GROUND HEIGHT	1.16	1.15	1.15	1.25	1.24	1.24	1.26	0.91
DISTANCE	5140.000	5190.000	5200.000	5240.000	5290.000	5300.000	5340.000	5400.000
STATION	(P3) 5+140.0	(P4) 5+190.0	5+200.0	(P5) 5+240.0	(P6) 5+290.0	5+300.0	(P7) 5+340.0	5+400.0
CURVE ELEMENT								

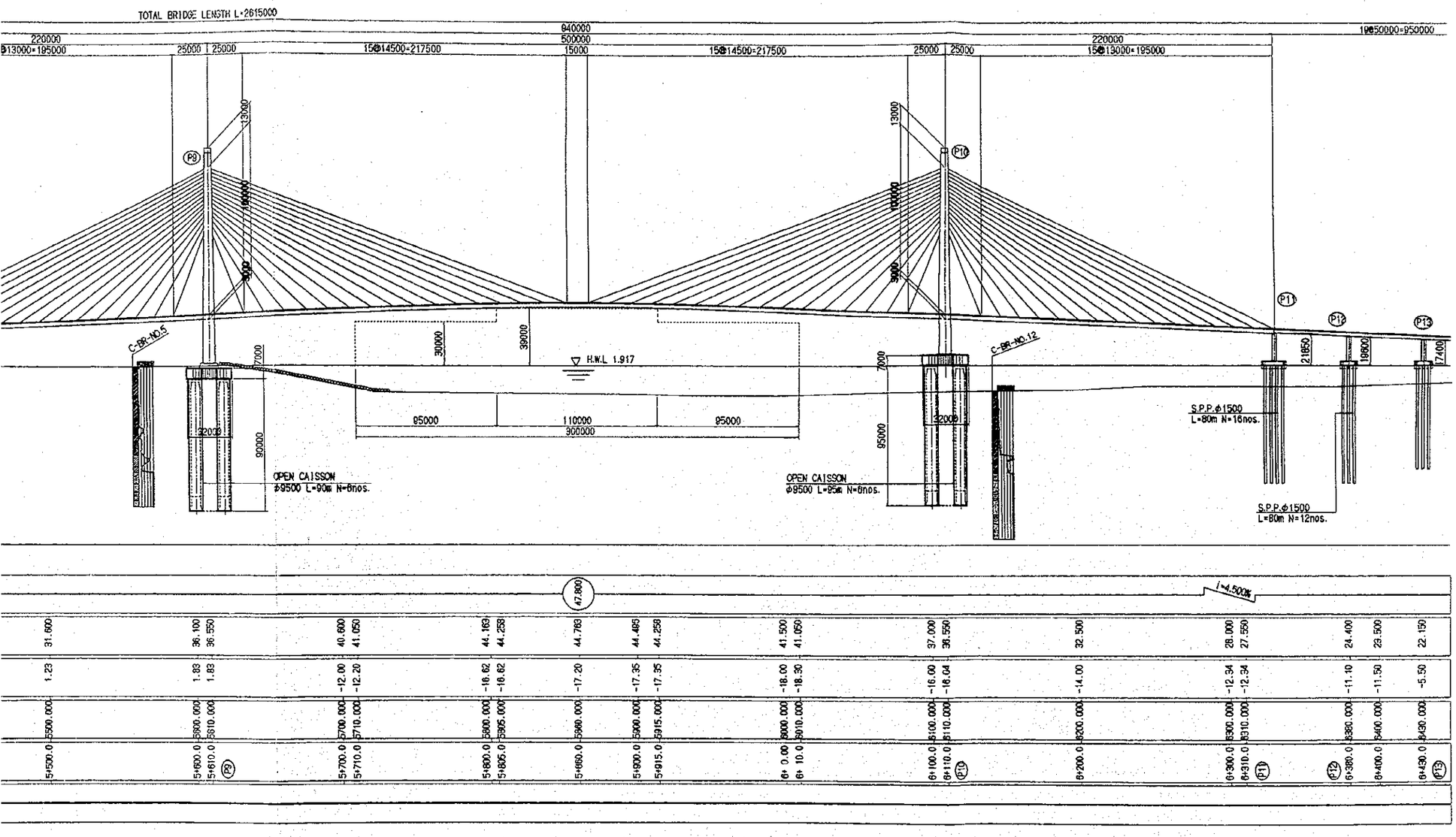
PROPOSED HEIGHT	27.550	31.600	36.100	36.550	40.600	41.050	44.163	44.258
GROUND HEIGHT	1.18	1.23	1.83	1.83	-12.00	-12.20	-16.62	-16.62
DISTANCE	5410.000	5500.000	5600.000	5610.000	5700.000	5710.000	5800.000	5805.000
STATION	5+410.0 (P8)	5+500.0	5+600.0	5+610.0 (P9)	5+700.0	5+710.0	5+800.0	5+805.0
CURVE ELEMENT								

PLAN SCALE 1:3000

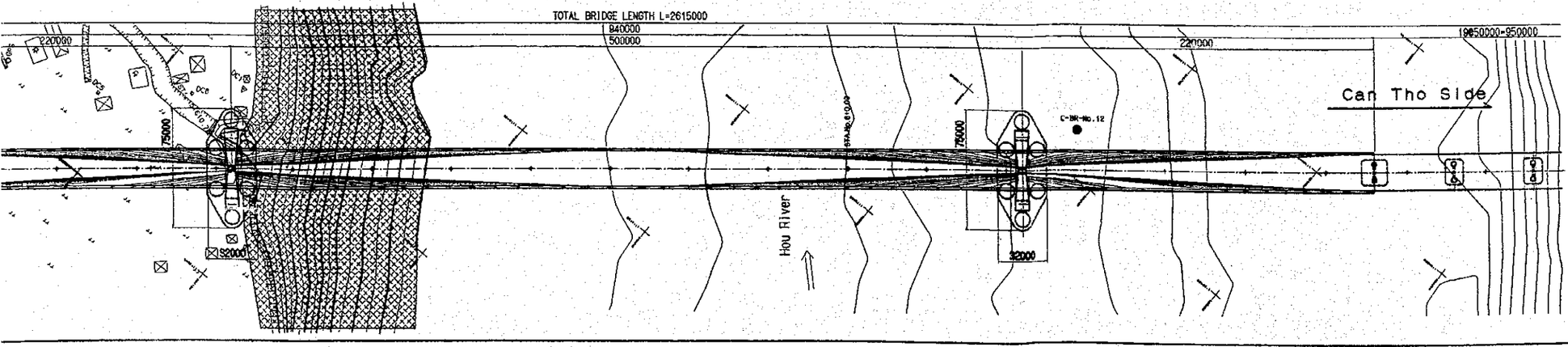


GENERAL VIEW OF STEEL CABLE STAYED BRIDGE

SIDE ELEVATION SCALE 1:9000

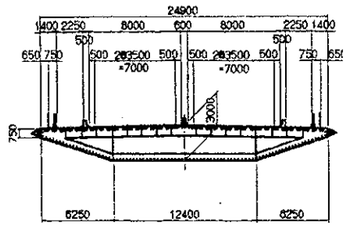


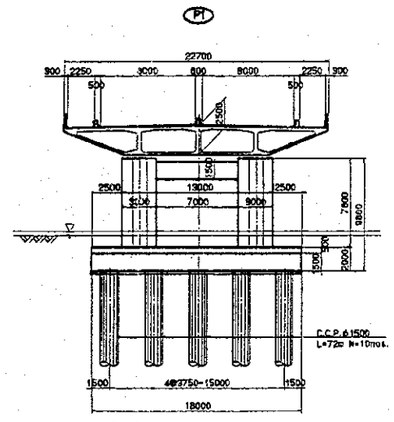
PLAN SCALE 1:3000

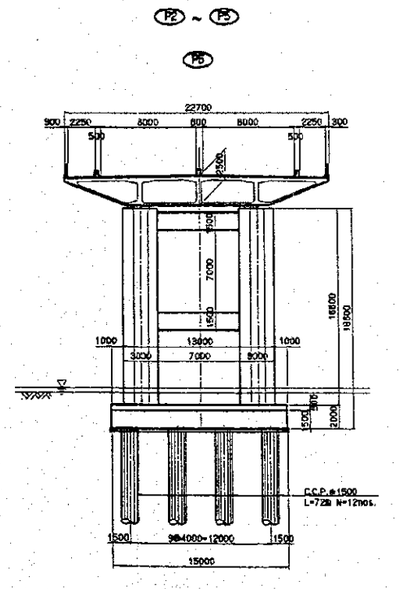


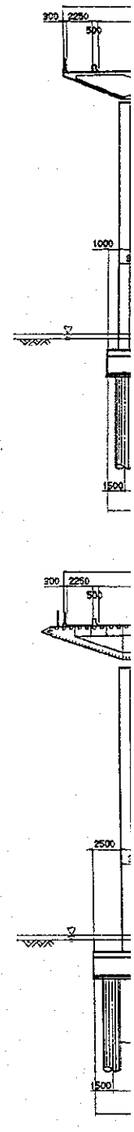
SUPE

MAIN BRIDGE
STEEL BOX GIRDER



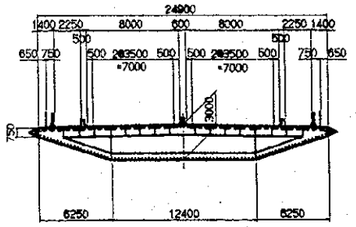




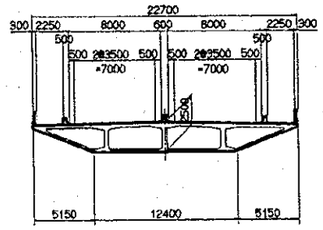


SUPER STRUCTURE SCALE 1:500

MAIN BRIDGE
STEEL BOX GIRDER



APPROACH BRIDGE
PC BOX GIRDER



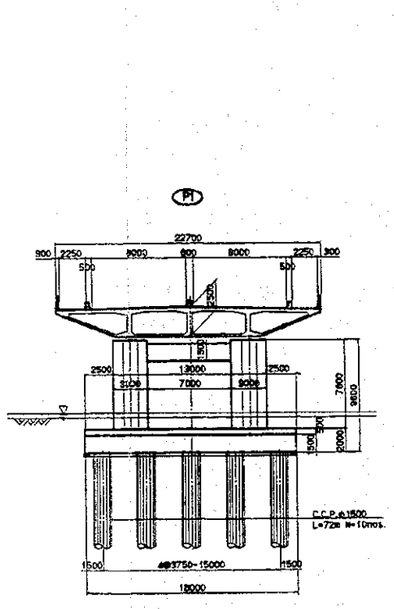
DESIGN CRITERIA

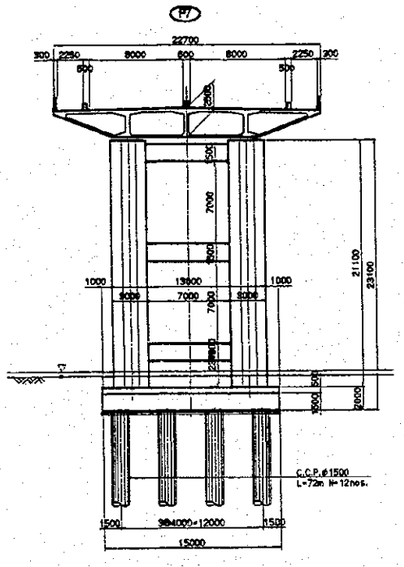
TYPE	MAIN BRIDGE	STEEL CABLE STAYED BRIDGE
	APPROACH BRIDGE	CONTINUOUS PC BOX GIRDER
BRIDGE LENGTH	MAIN BRIDGE	L=940.0m
	APPROACH BRIDGE	L=400.0m
SPAN LENGTH	MAIN BRIDGE	220m+500m+220m
	APPROACH BRIDGE	80m
WIDTH	CARRIAGEWAY 2@8.0m=16.0m SIDEWALK 2@2.25=4.5m	
DESIGN LOAD	H30(VIETNAM STANDARD) , B-LIVE(JRA STANDARD) SIDEWALK LIVE LOAD=350kgf/m2	
RADIUS OF CURVATURE	R= CO	
LONGITUDINAL SLOPE	4.5% ⟋ ⟍ 4.5% V.C.L=300m(R=9300m)	

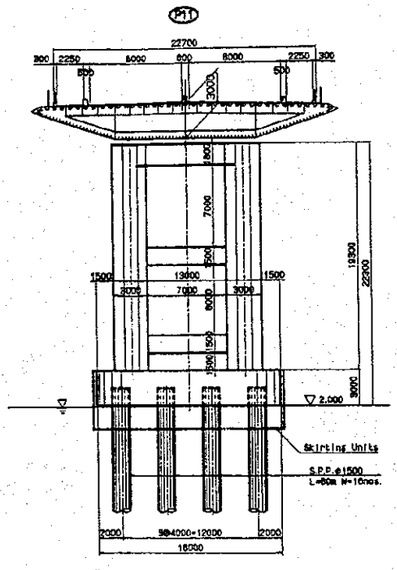
MATERIALS

CONCRETE	SUPERSTRUCTURE	σck=500kgf/cm² , σck=400kgf/cm²
	SUBSTRUCTURE	σck=240kgf/cm²
	PILE CAP	σck=240kgf/cm²
	FOUNDATION	σck=240kgf/cm²
STRUCTURAL STEEL	SS400	MIN. TENSILE STRENGTH 400~510N/mm2
	SM490	MIN. TENSILE STRENGTH 490~610N/mm2
	SM570	MIN. TENSILE STRENGTH 570~710N/mm2
PC STEEL	INNER CABLE	12ϕ15.2B & 12ϕ12.7B
	STAY CABLE	H system
REINFORCEMENT BAR		SD295 YIELD POINT STRENGTH 295~390N/mm2
		SD345 YIELD POINT STRENGTH 345~440N/mm2

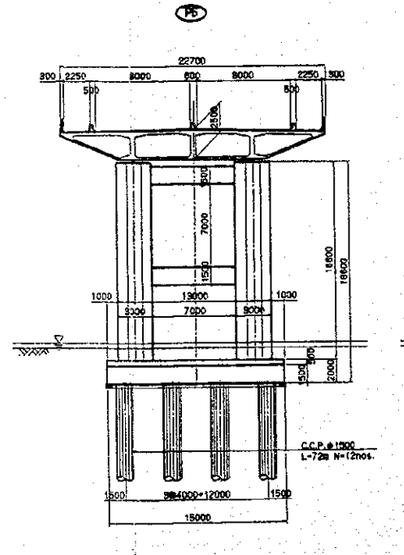
SUBSTRUCTURE SCALE 1:500

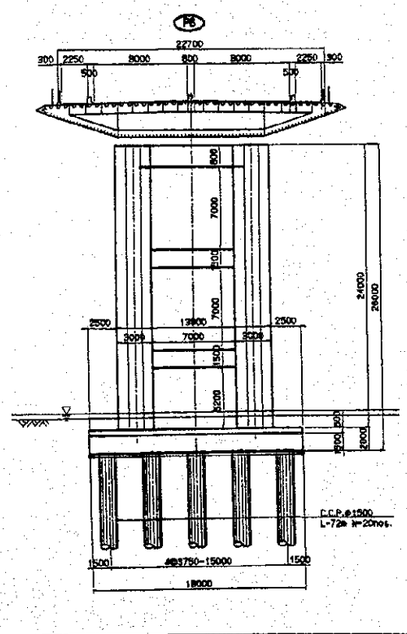


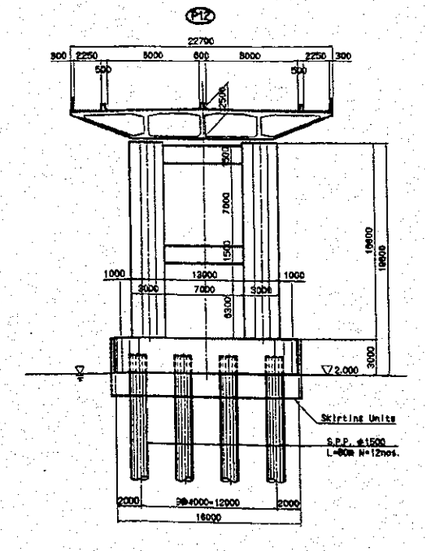




P2 ~ P5



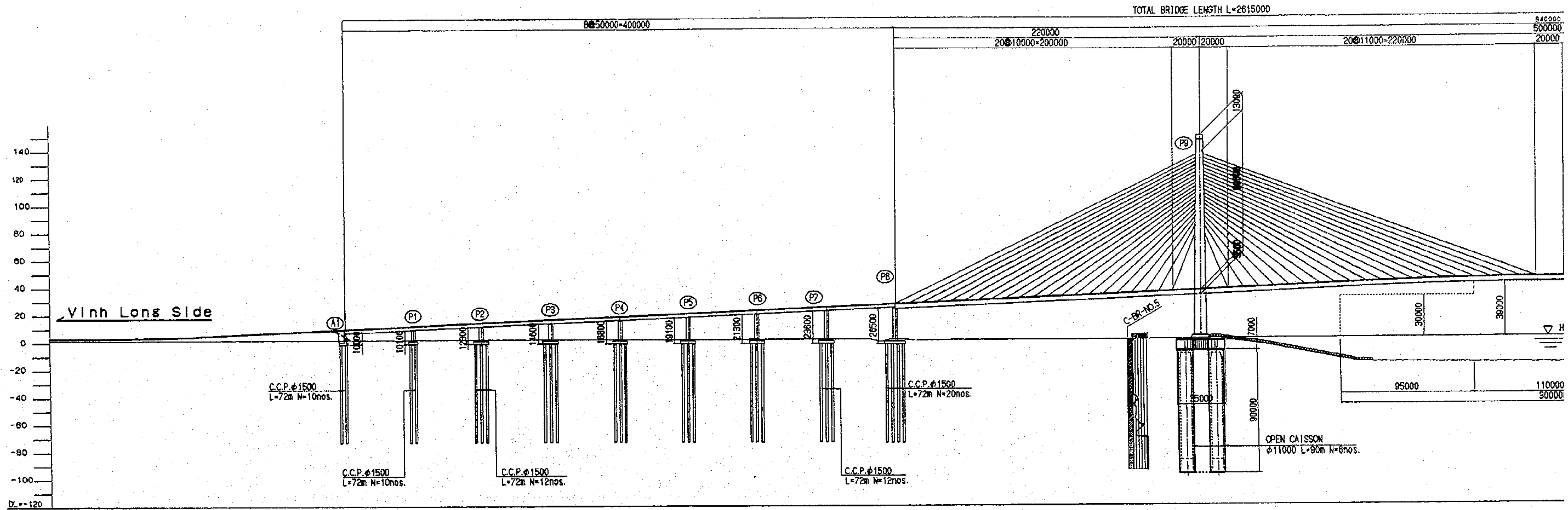




SUBSTRUCTURE SCALE 1:1500

JAPAN INTERNATIONAL COOPERATION AGENCY	THE FEASIBILITY STUDY ON THE CAN THO BRIDGE CONSTRUCTION IN SOCIALIST REPUBLIC OF VIET NAM	GENERAL VIEW OF STEEL CABLE STAYED BRIDGE	SCALE: AS SHOWN DWG.No.

SIDE ELEVATION SCALE 1:3000

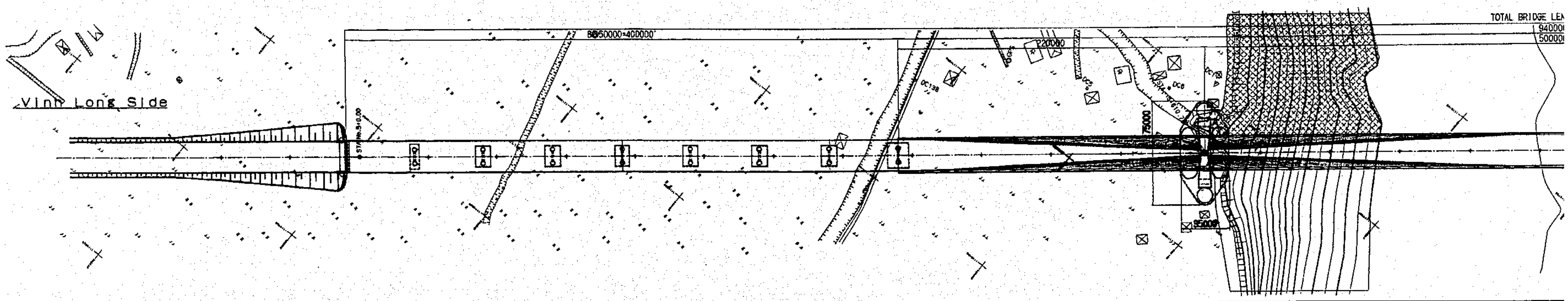


GRADE: 3.000 — I=4.500% — 48.300

STATION	DISTANCE	PROPOSED HEIGHT	GROUND HEIGHT
4+800.0	4800.000	3.000	1.02
4+853.3	4853.333	3.506	1.02
4+900.0	4900.000	5.100	0.79
(A1) 4+990.0	4990.000	9.150	1.03
5+ 0.0	5000.000	9.600	1.03
(P1) 5+ 40.0	5040.000	11.400	1.03
(P2) 5+ 90.0	5090.000	13.650	1.07
5+100.0	5100.000	14.100	1.07
(P3) 5+140.0	5140.000	15.900	1.16
(P4) 5+190.0	5190.000	18.150	1.15
5+200.0	5200.000	18.600	1.15
(P5) 5+240.0	5240.000	20.400	1.25
(P6) 5+290.0	5290.000	22.650	1.24
5+300.0	5300.000	23.100	1.24
(P7) 5+340.0	5340.000	24.900	1.26
5+400.0	5400.000	27.600	0.91
5+410.0 (P8)	5410.000	28.050	1.18
5+500.0	5500.000	32.100	1.23
5+600.0	5600.000	36.600	1.83
5+610.0 (P9)	5610.000	37.050	1.83
5+700.0	5700.000	41.100	-12.00
5+710.0	5710.000	41.550	-12.20
5+800.0	5800.000	44.663	-16.62
5+805.0	5805.000	44.758	-16.62
5+860.0	5860.000	45.263	-17.20

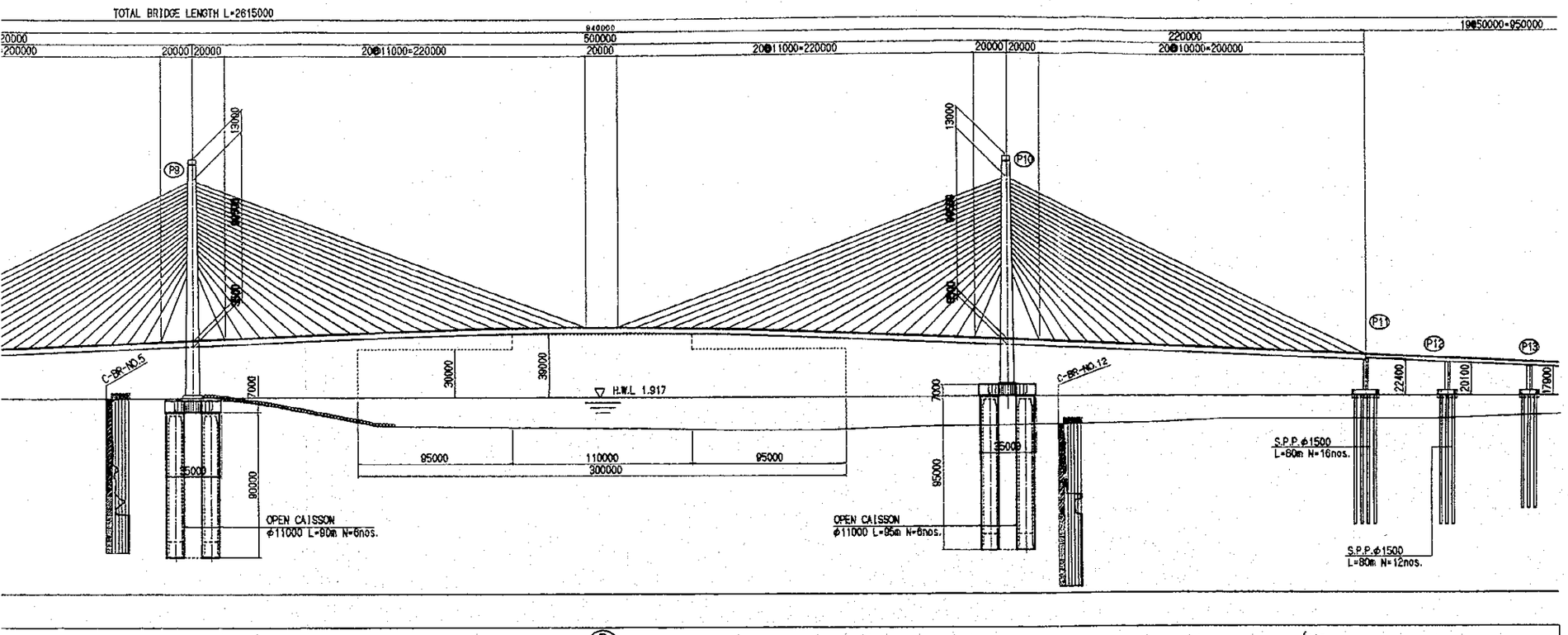
CURVE ELEMENT

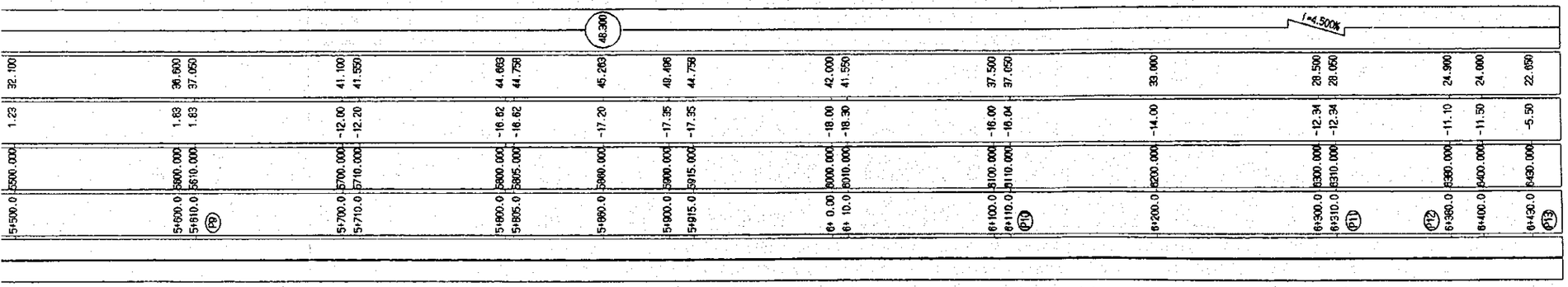
PLAN SCALE 1:3000



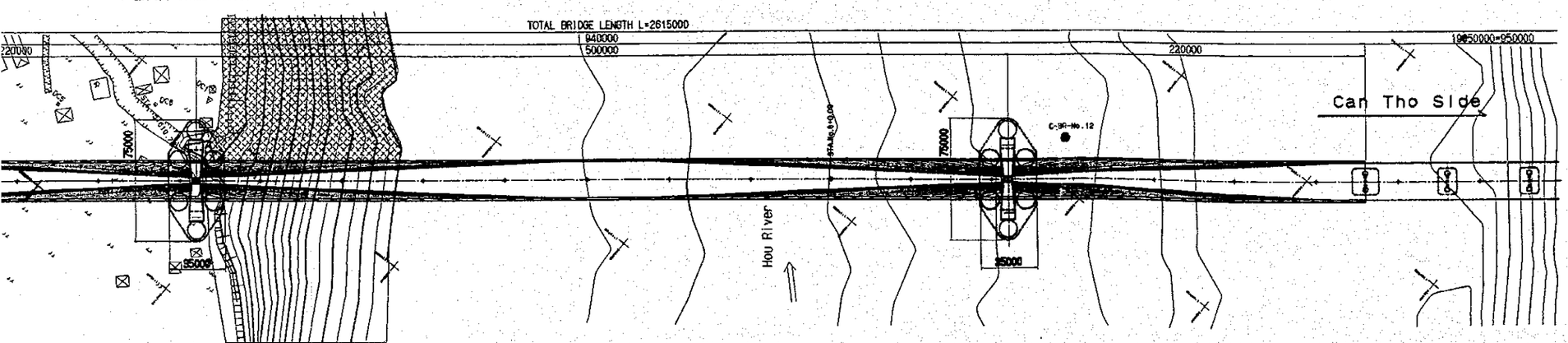
GENERAL VIEW OF PC CABLE STAYED BRIDGE

SIDE ELEVATION SCALE 1:3000



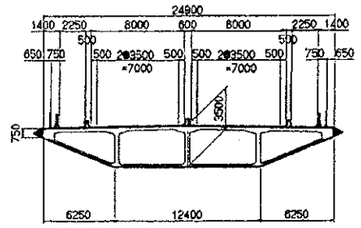


PLAN SCALE 1:3000



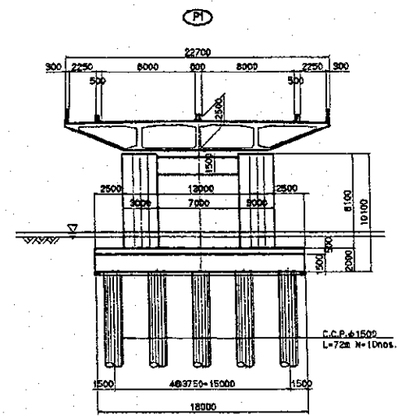
SUPER

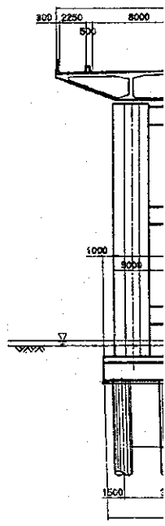
MAIN BRIDGE
PC BOX GIRDER



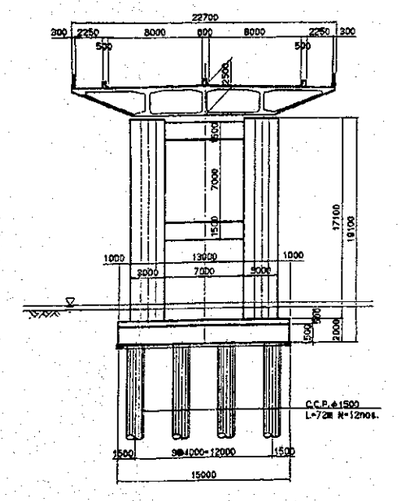
PC BOX GIRDER

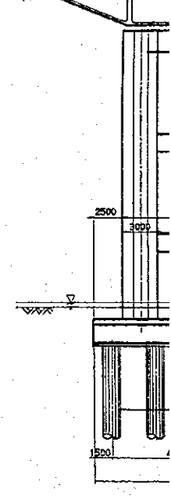
SUBS





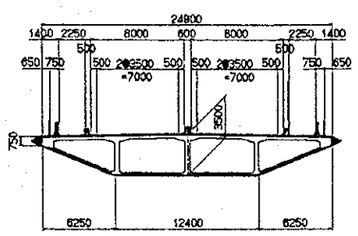
P2 ~ P5



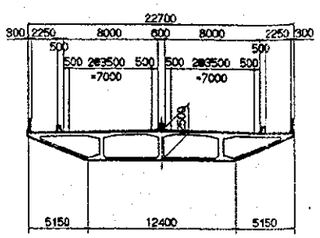


SUPER STRUCTURE SCALE 1:500

MAIN BRIDGE
PC BOX GIRDER

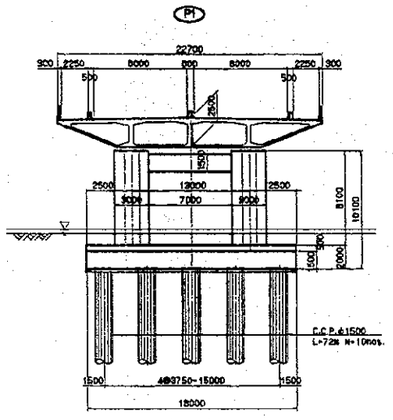


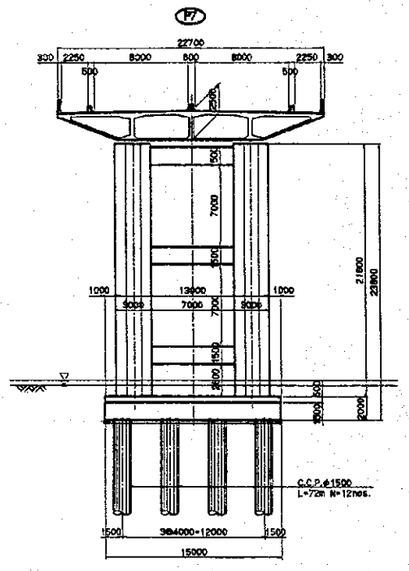
APPROACH BRIDGE
PC BOX GIRDER

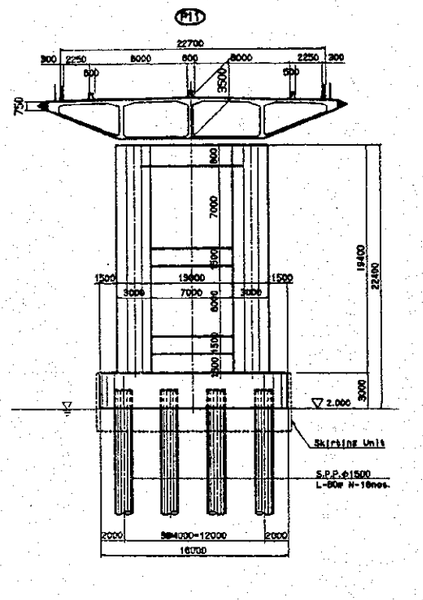


PC BOX GIRDER

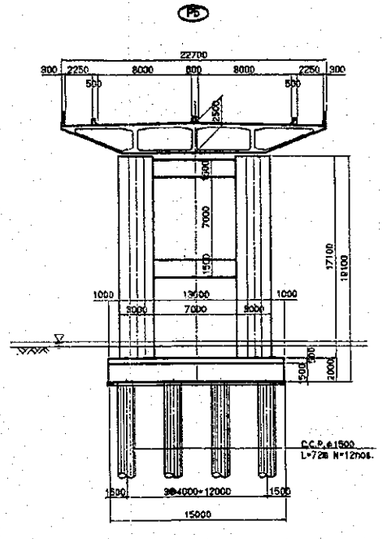
SUBSTRUCTURE SCALE 1:500

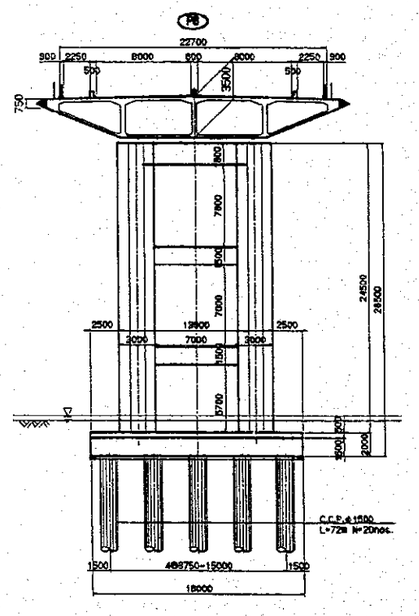


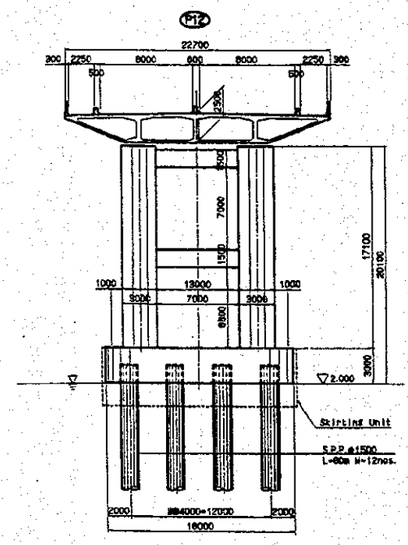




P2 ~ P5







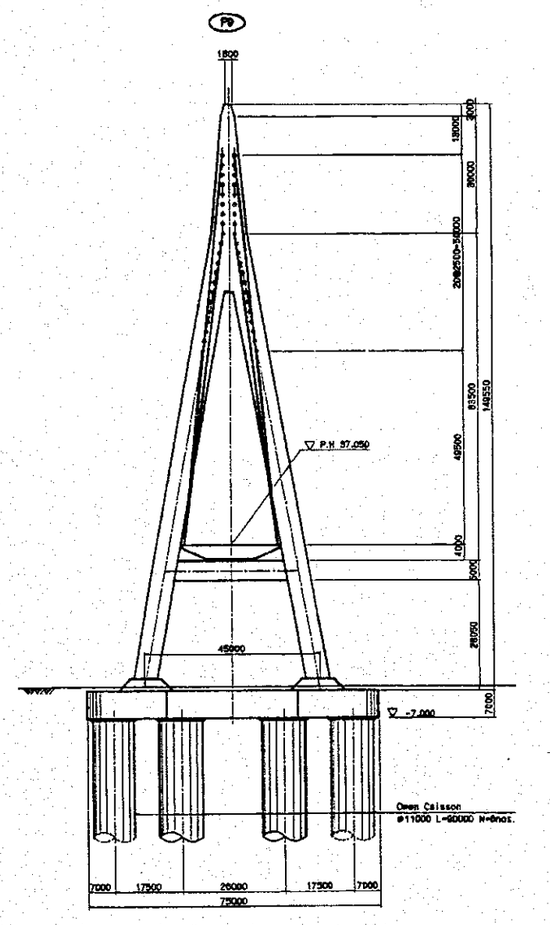
DESIGN CRITERIA

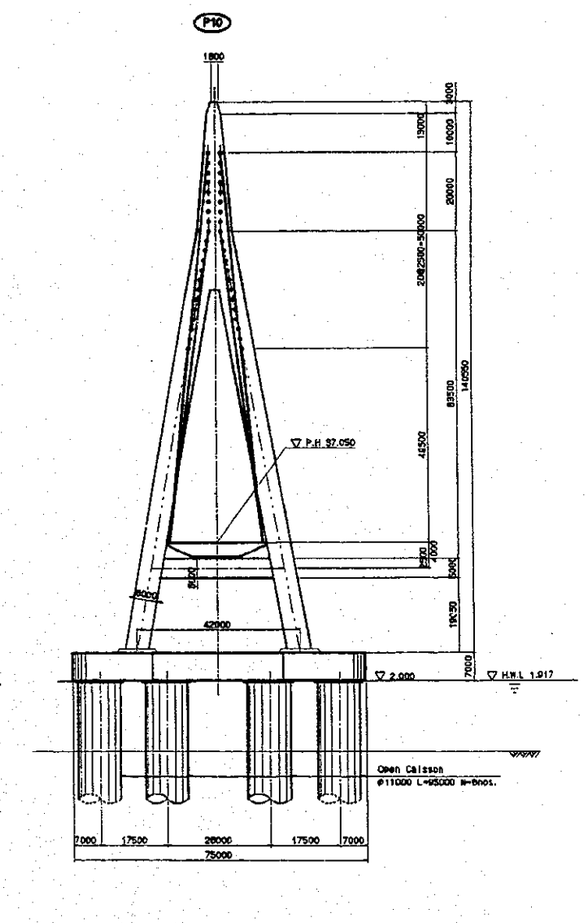
TYPE	MAIN BRIDGE	PC CABLE STAYED BRIDGE
	APPROACH BRIDGE	CONTINUOUS PC BOX GIRDER
BRIDGE LENGTH	MAIN BRIDGE	L=940.0m
	APPROACH BRIDGE	L=400.0m
SPAN LENGTH	MAIN BRIDGE	220m+500m+220m
	APPROACH BRIDGE	8@50m
WIDTH	CARRIAGEWAY 2@8.0m=16.0m SIDEWALK 2@2.25=4.5m	
DESIGN LOAD	H30(VIETNAM STANDARD) , B-LIVE(JAPANESE STANDARD) SIDEWALK LIVE LOAD=360kgf/m2	
RADIUS OF CURVATURE	R= ∞	
LONGITUDINAL SLOPE	4.5% 4.5% V.C.L=300m(R=8300m)	

MATERIALS

CONCRETE	SUPERSTRUCTURE	σck=500kgf/cm², σck=400kgf/cm²
	SUBSTRUCTURE	σck=240kgf/cm²
	PILE CAP	σck=240kgf/cm²
	FOUNDATION	σck=240kgf/cm²
PC STEEL	INNER CABLE	12S15.2B & 12S12.7B
	STAY CABLE	H system
REINFORCEMENT BAR		SD295 YIELD POINT STRENGTH 295~390N/mm²
		SD345 YIELD POINT STRENGTH 345~440N/mm²

SUBSTRUCTURE SCALE 1:1500





JAPAN INTERNATIONAL COOPERATION AGENCY	THE FEASIBILITY STUDY ON THE CAN THO BRIDGE CONSTRUCTION IN SOCIALIST REPUBLIC OF VIET NAM	GENERAL VIEW OF PC CABLE STAYED BRIDGE	SCALE AS SHOWN	DWG.No.