第VIII章　最適構造型式と支間の選定
および架橋候補地点の順位

1. 最適構造型式と支間の選定順序

第VII章において、Bahadurbad, Crabargaon, Sirajganj および Nagarbari の4つの架橋候補地点、100m, 150m, 250m および 350m の4つの支間長、各架橋候補地点は 2.0km, 4.2km 5.2km および 5.6 km の3つのガイドバンク間隔などを基本にして、上部工の工費と、下部工については ウェル基礎と多柱式基礎の2種について工費を求めた。

最適構造型式の選定について、上部工は支間 100m および 150m は 合開連続3径間連続トラス、支間 250m および 350m は 合開カンチレバートラス橋が経済であることは既に述べた通りである。下部工については、ウェル基礎と多柱式基礎の優劣を比較して、基礎工の型式を1つに選定する。次いで架橋候補地点別に、ガイドバンク間隔および支間長による上下部工の合計工費の比較によって最適支間を求めることができる。

2. 基礎工型式の選定

ウエル基礎と多柱式基礎の比較のために、Table VIII-4-1~2 のウエル基礎の工費と、Table VIII-5-1~2 の多柱式基礎の工費を、各架橋候補地点毎と、Case a, b 別にグラフに示すと Fig VIII-1-1~4 と Fig VIII-2-1~4 に示す通りになる。

同グラフによれば、Case a の場合、どの架橋候補地点のどの支間長でもウエル基礎の方が多柱式基礎より経済的であることが明らかである。ただし Bahadurabad と Sirajganj における、支間長 100m, ガイドバンク間隔 5.6 km の場合は両者は近似した工費となっている。なおガイドバンク間隔 4.2 km の方が 5.2 km あるいは 5.6 km の方より両者の工費の差が大きいことは注目される。

Case b の場合は、ウエル基礎では支間長が変っても同一形状寸法のウエルを用いたので、長大支間になるとウエルの基数が減るために、工費はウエルの基数に比例して減少している。多柱式基礎の場合は、ウエル程極端な変化はなく、支間長の変化に工費は必ずしも比例しないが、Case a のようにウエル基礎が多柱式基礎より大部分経済的となっているが、ガイドバンク間隔が 5.2 km あるいは 5.6 km で

支間100mの場合についてのみ多柱式基礎の方がウエル基礎より経済的となった。

以上により，基礎工の型式はCase aの場合には，ウエル基礎が適当であり，Case bの場合は大部分はウエル基礎が適当であろうという結果になった。

Fig.VII-1-1 The relation between costs and span of substructure in Case a at Bahadurabad site

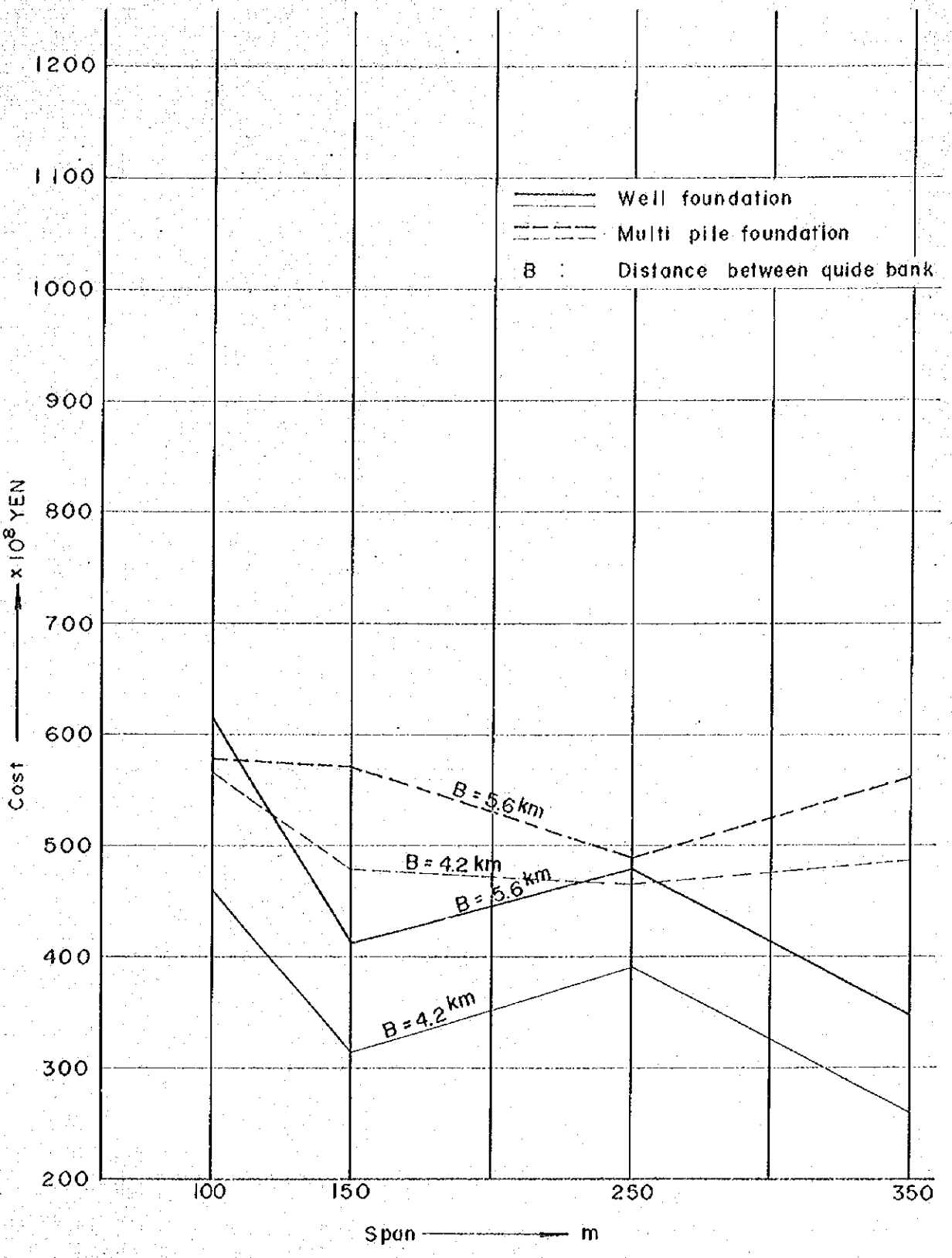


Fig VII-1-2 The relation between costs and span of substructure in Case a at Gabargaon site

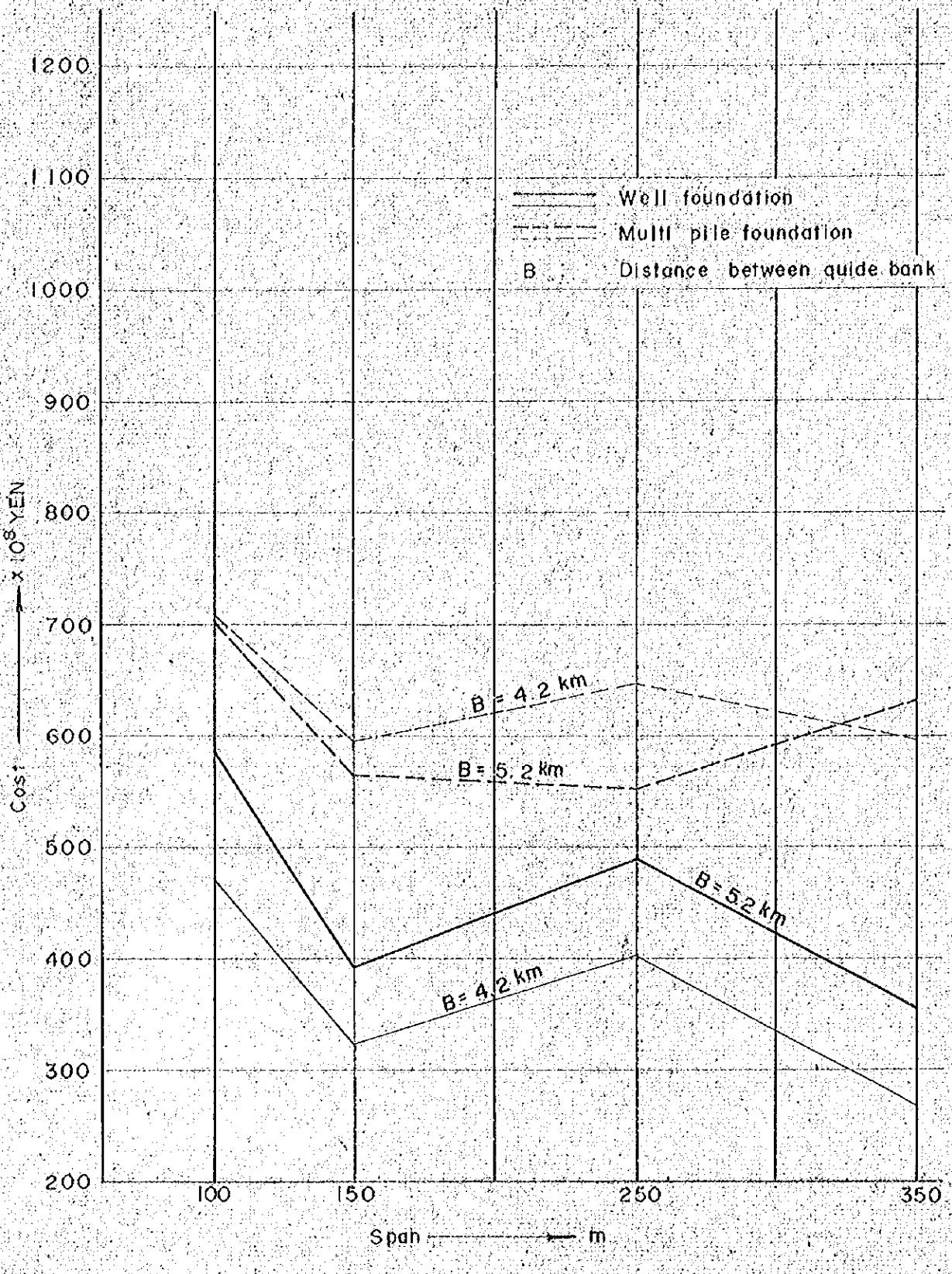


Fig.VII-1-3 The relation between costs and span of substructure in Case a at Sirajganj site

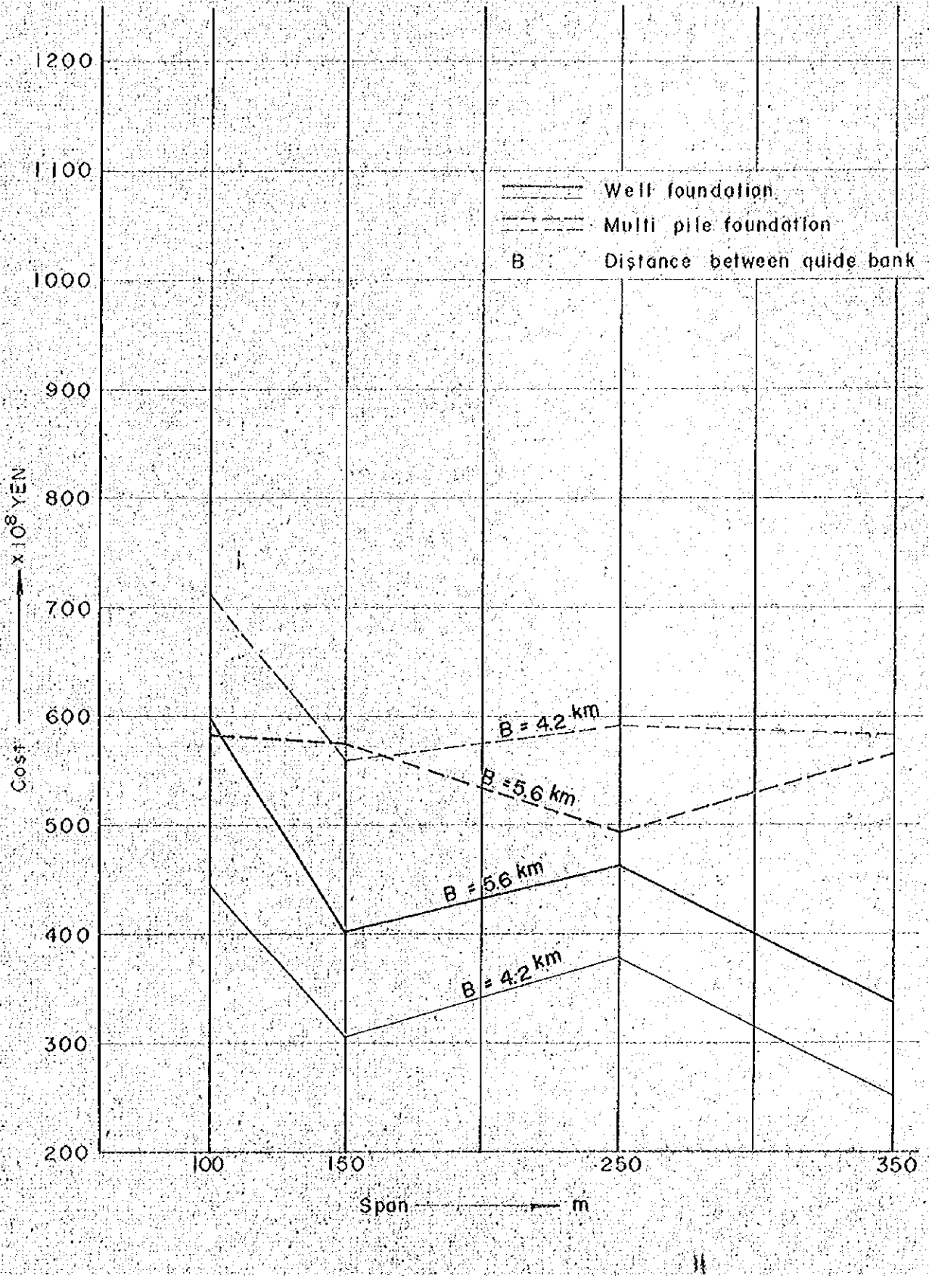


Fig.VII-1-4 The relation between costs and span of substructure in Case I a at Nagarbari site

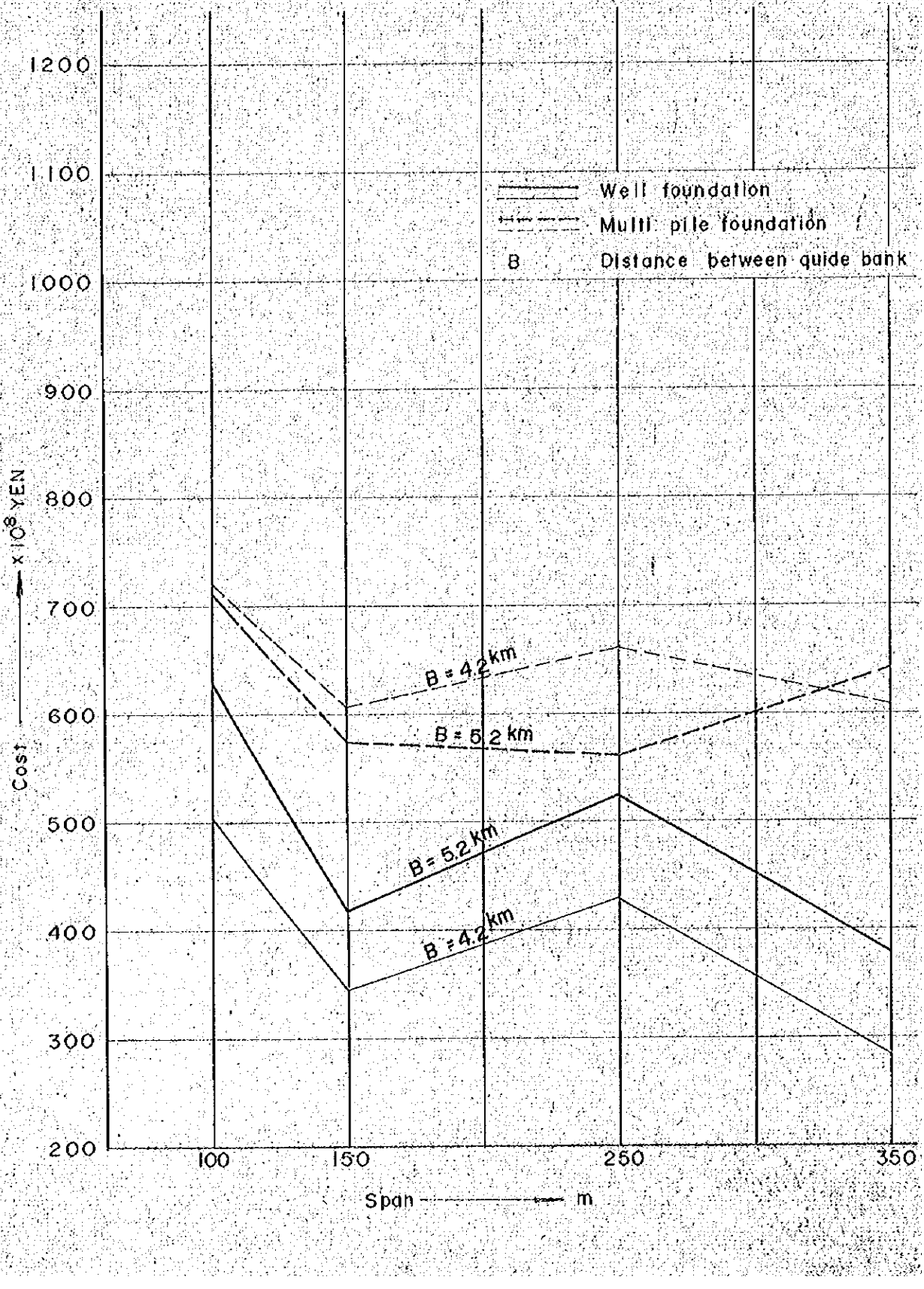


Fig. VII-2-1 The relation between costs and span of substructure in Case b at Bahadurabad site

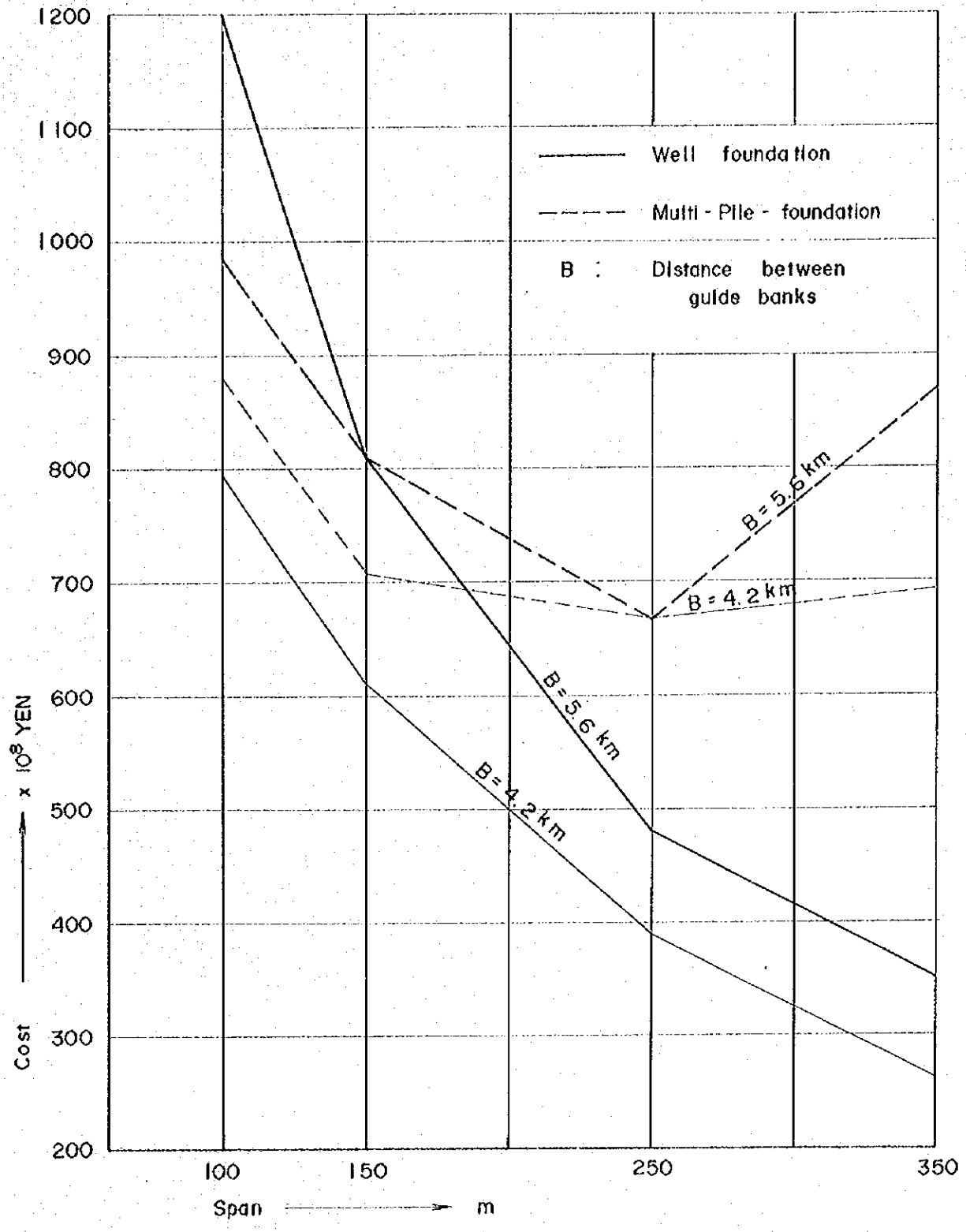


Fig.VII-2-2 The relation between costs and span of substructure in Case b at Gabargaon site

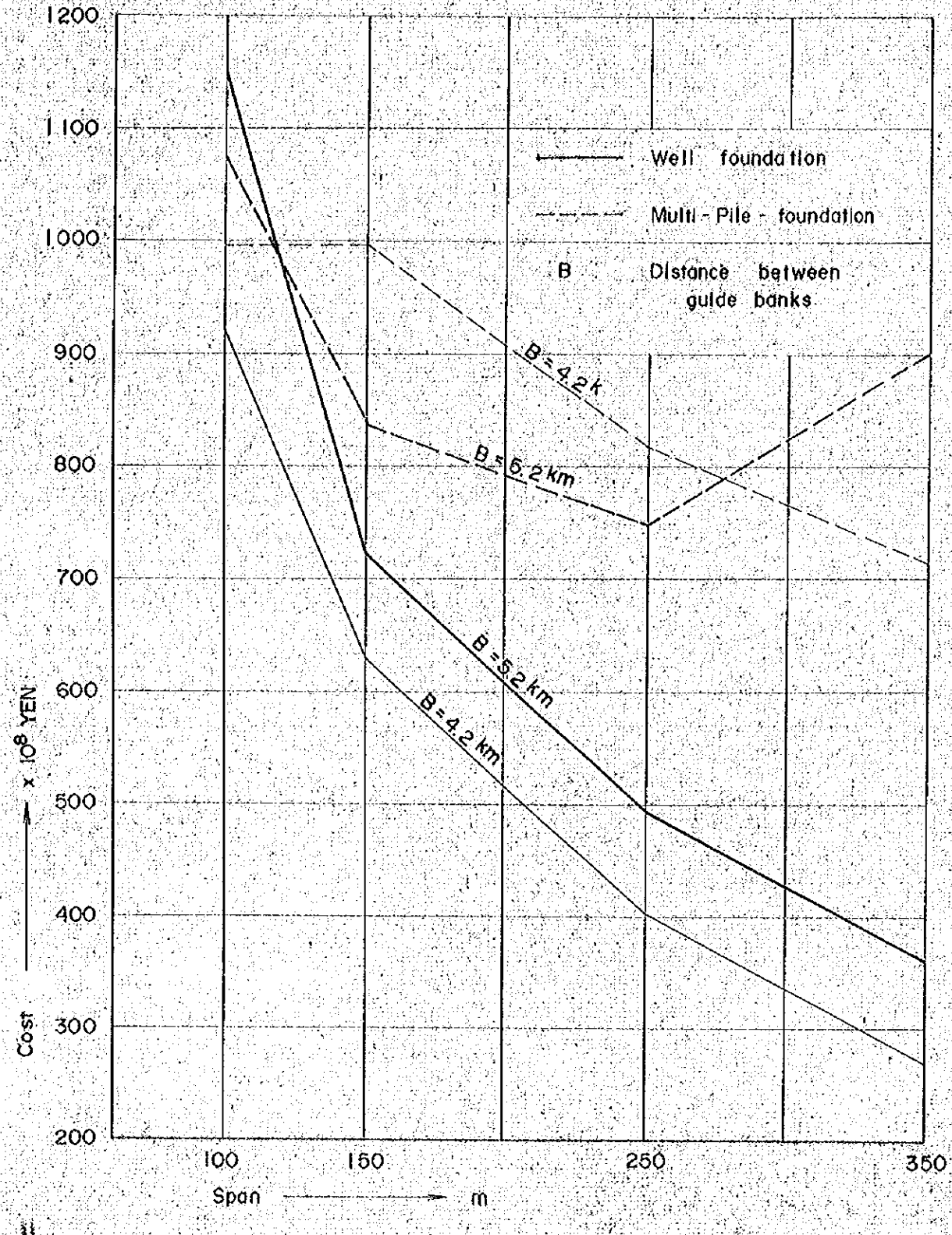


Fig.VII-2-3 The relation between costs and span of substructure in Case b at Sirajganj site

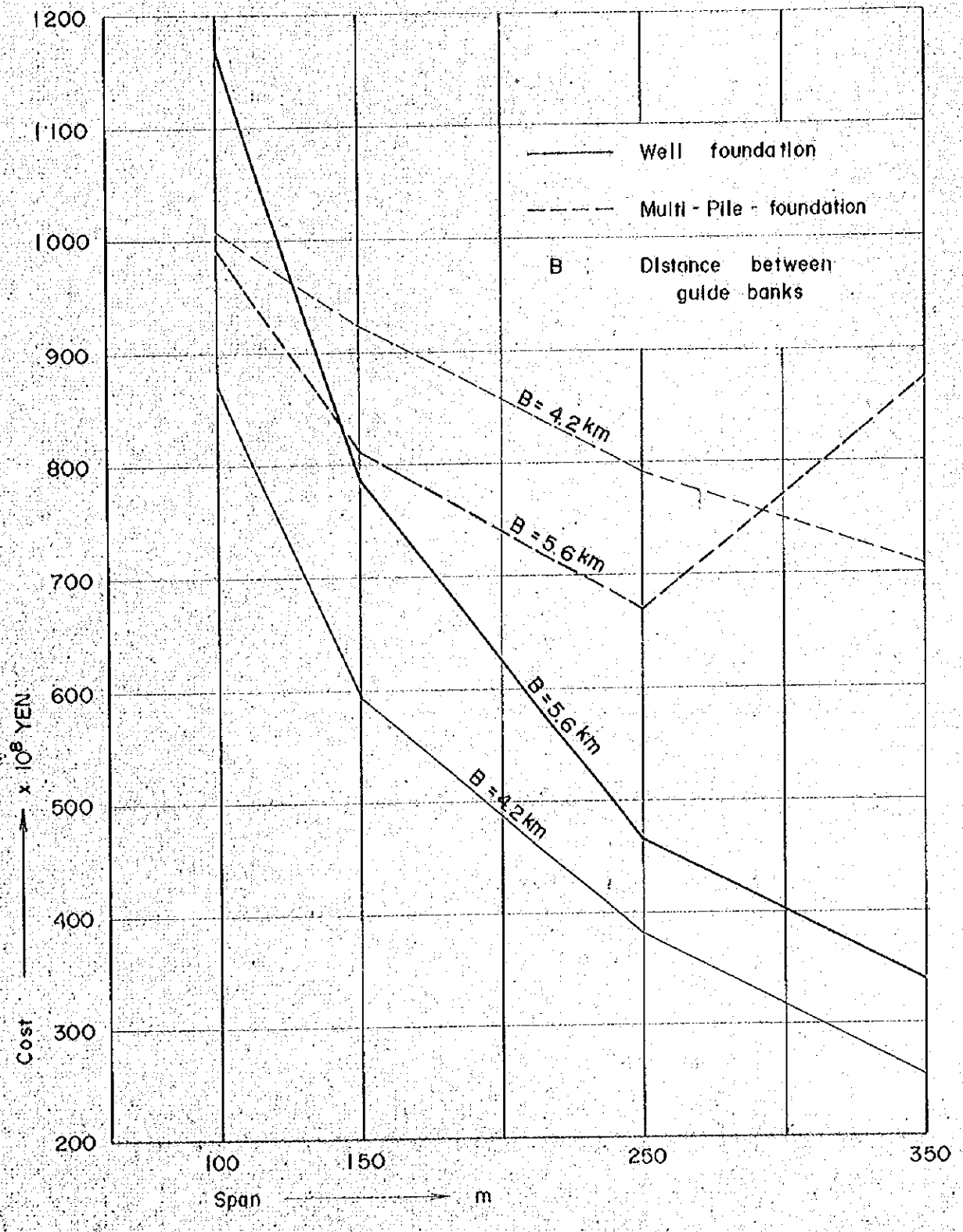


Fig.VII-2-4 The relation between costs and span of substructure in Case b at Nagarbari site

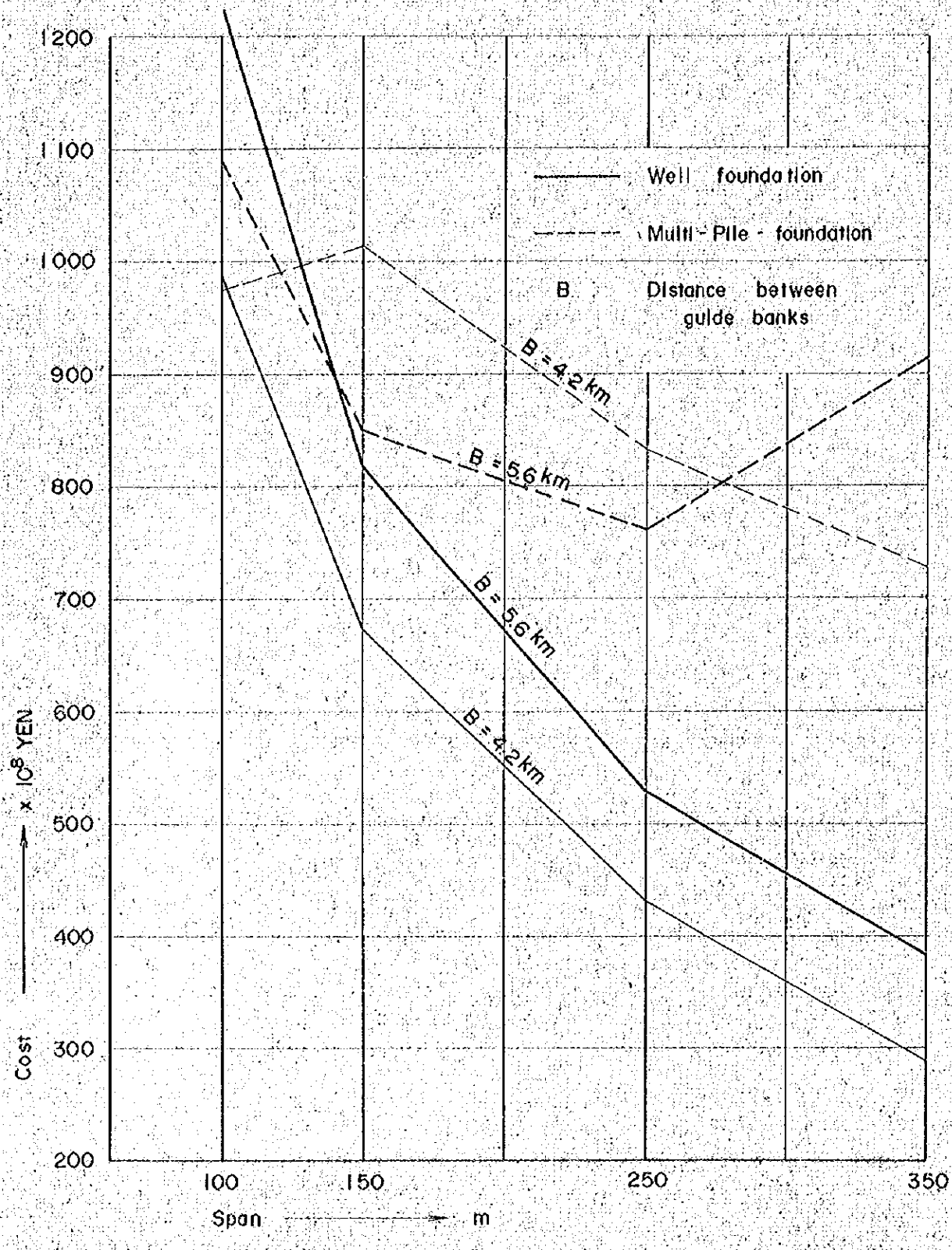


Fig. VII - 3 - 1 The relation between construction costs and span of bridge with well foundation in Case a

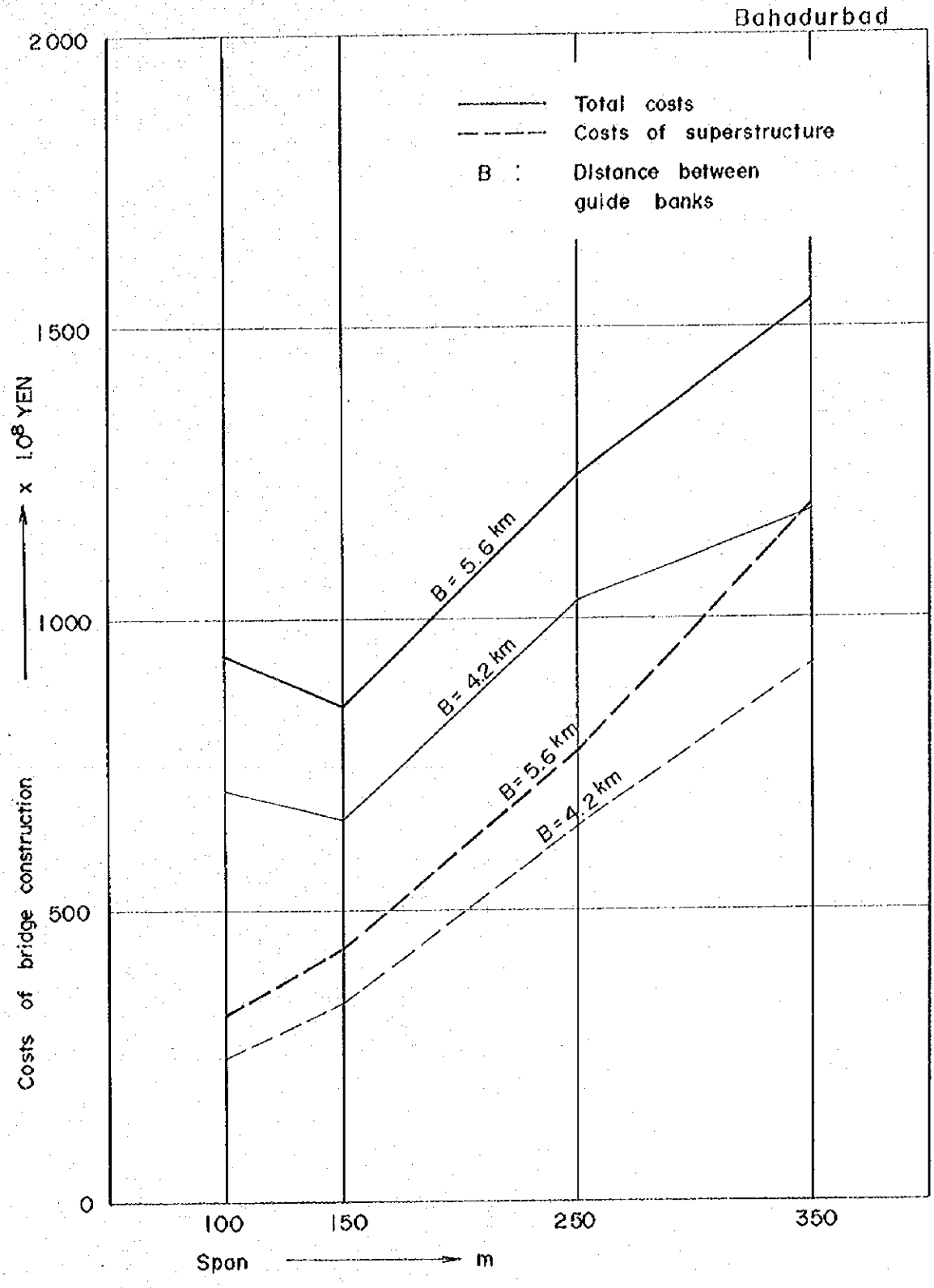


Fig. VII - 3 - 2 The relation between construction costs and span of bridge with well foundation in Case a

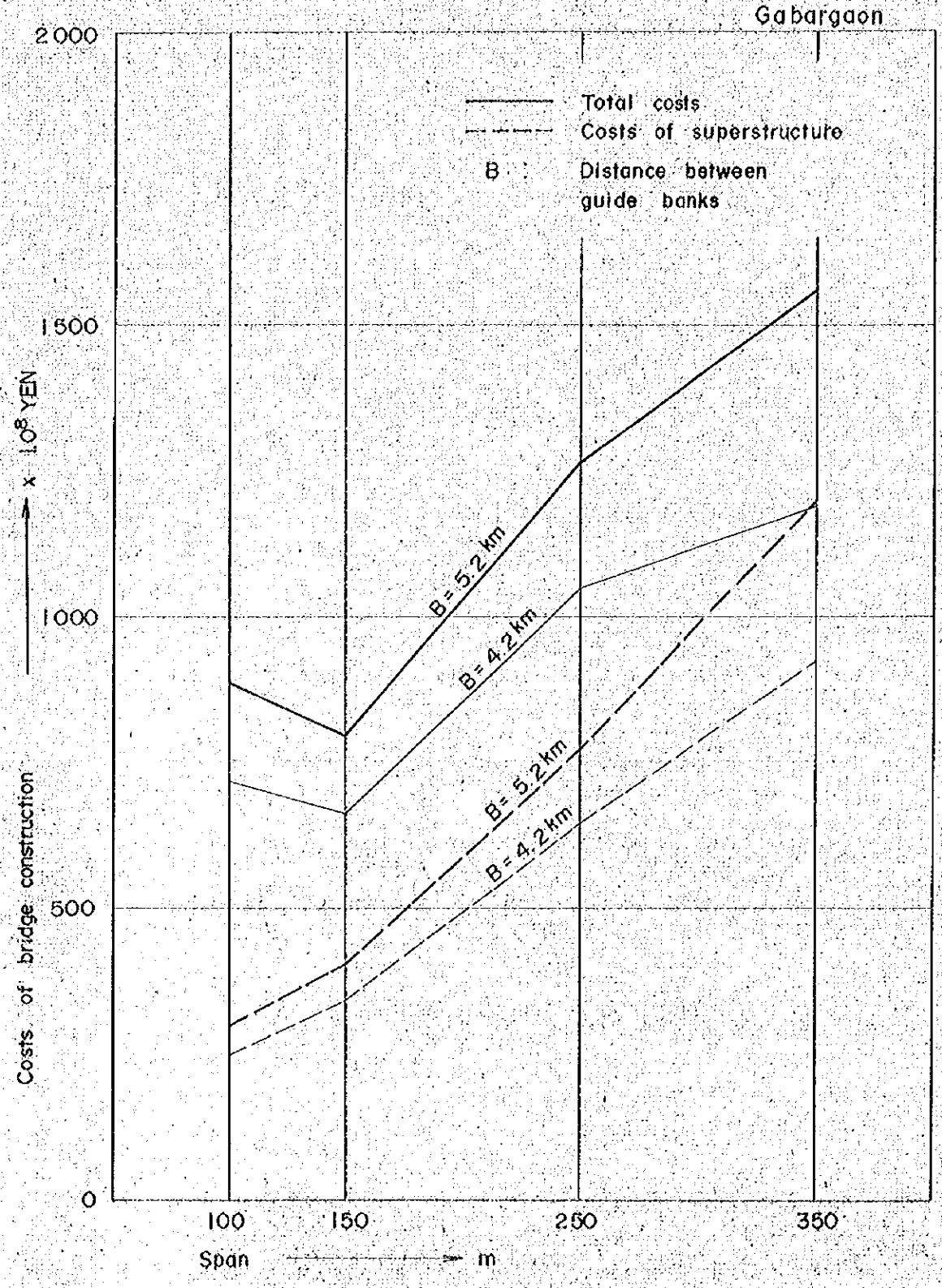


Fig. VII - 3 - 3 The relation between construction costs and span of bridge with well foundation in Case a

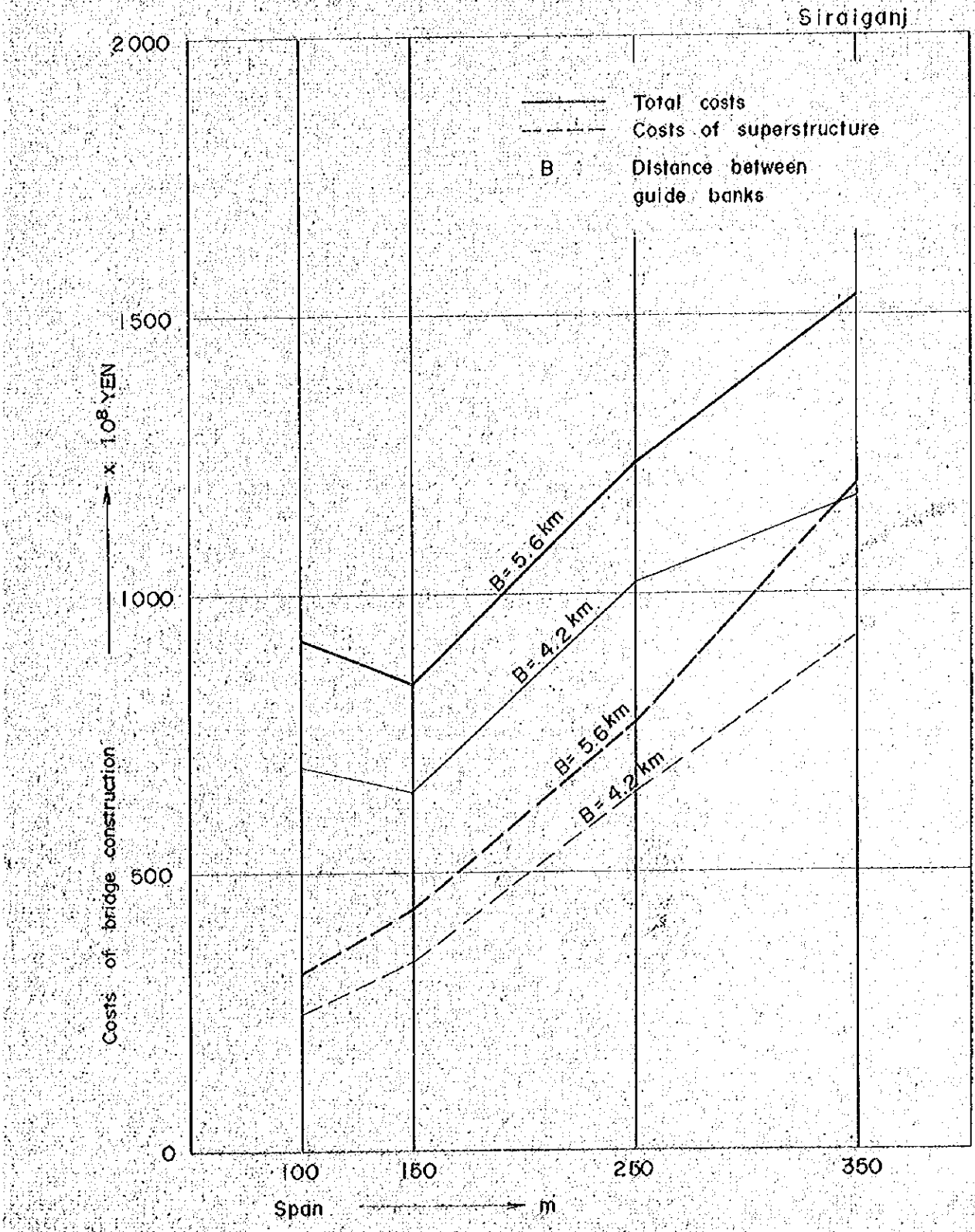


Fig. VII - 3 - 4 The relation between construction costs and span of bridge with well foundation in Case a

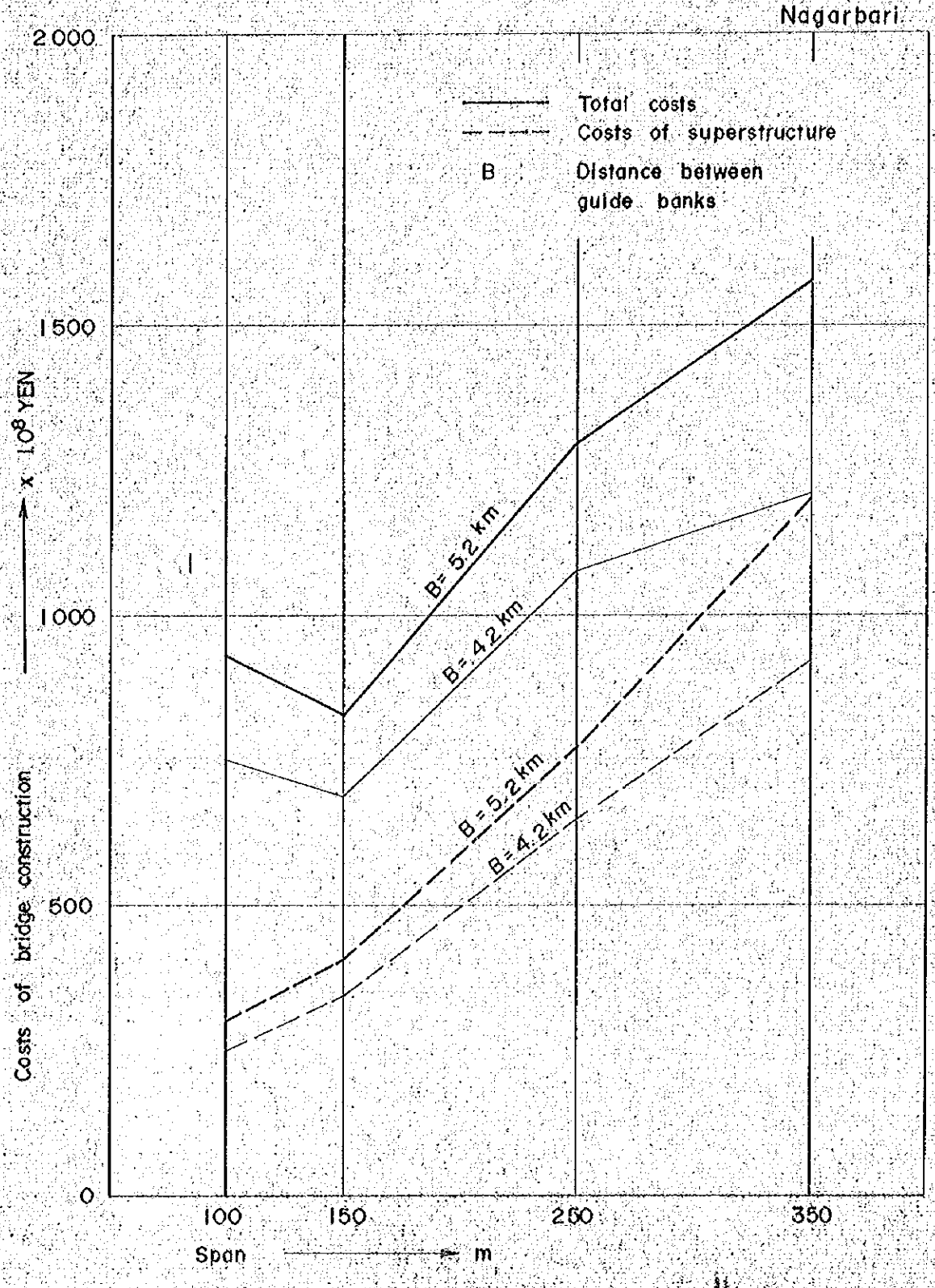


Fig. VII-4-1 The relation between construction costs and span of bridge with well foundations in Case b

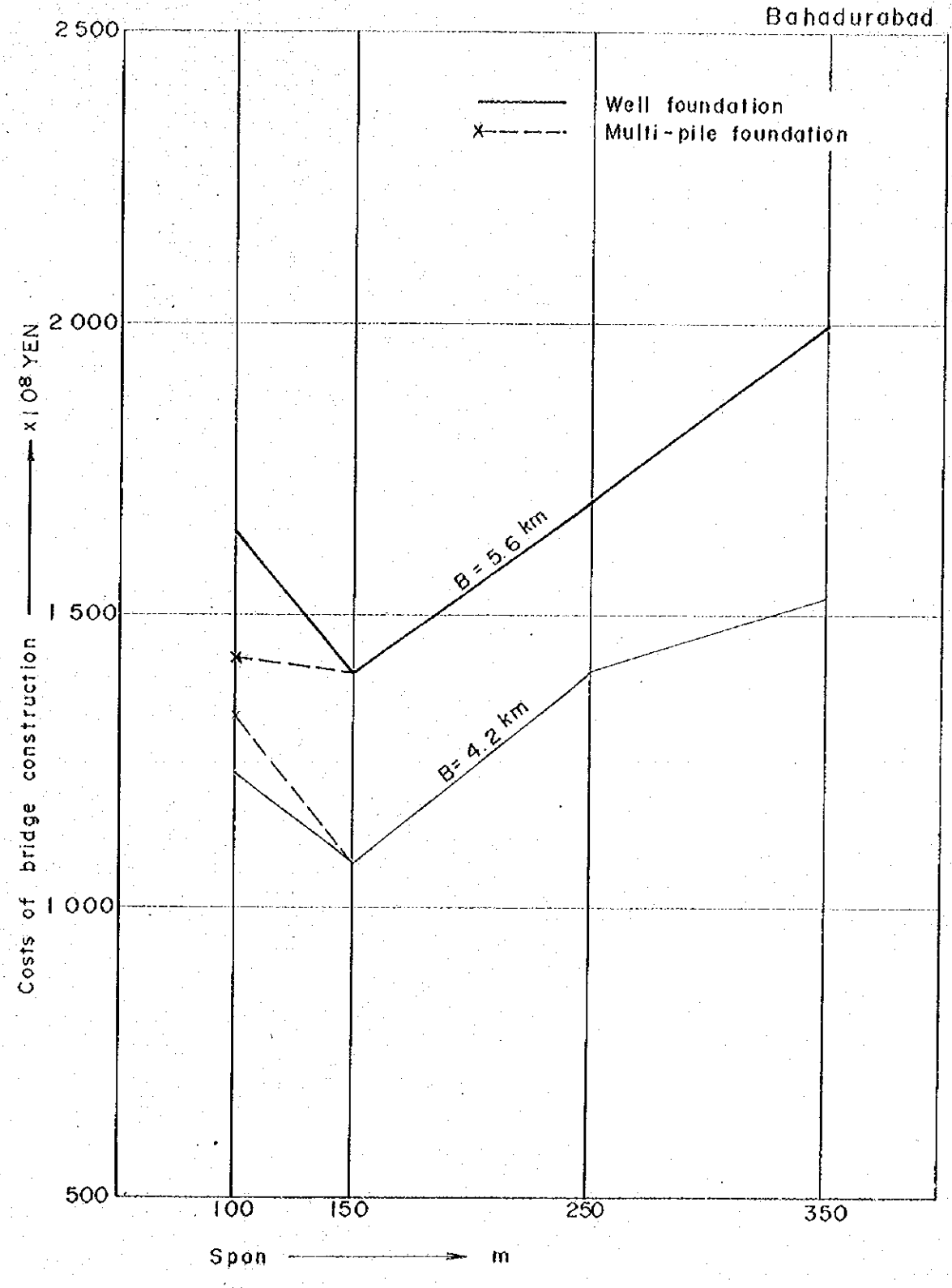


Fig. VII-4-2 The relation between construction costs and span of bridge with well foundations in Case . b

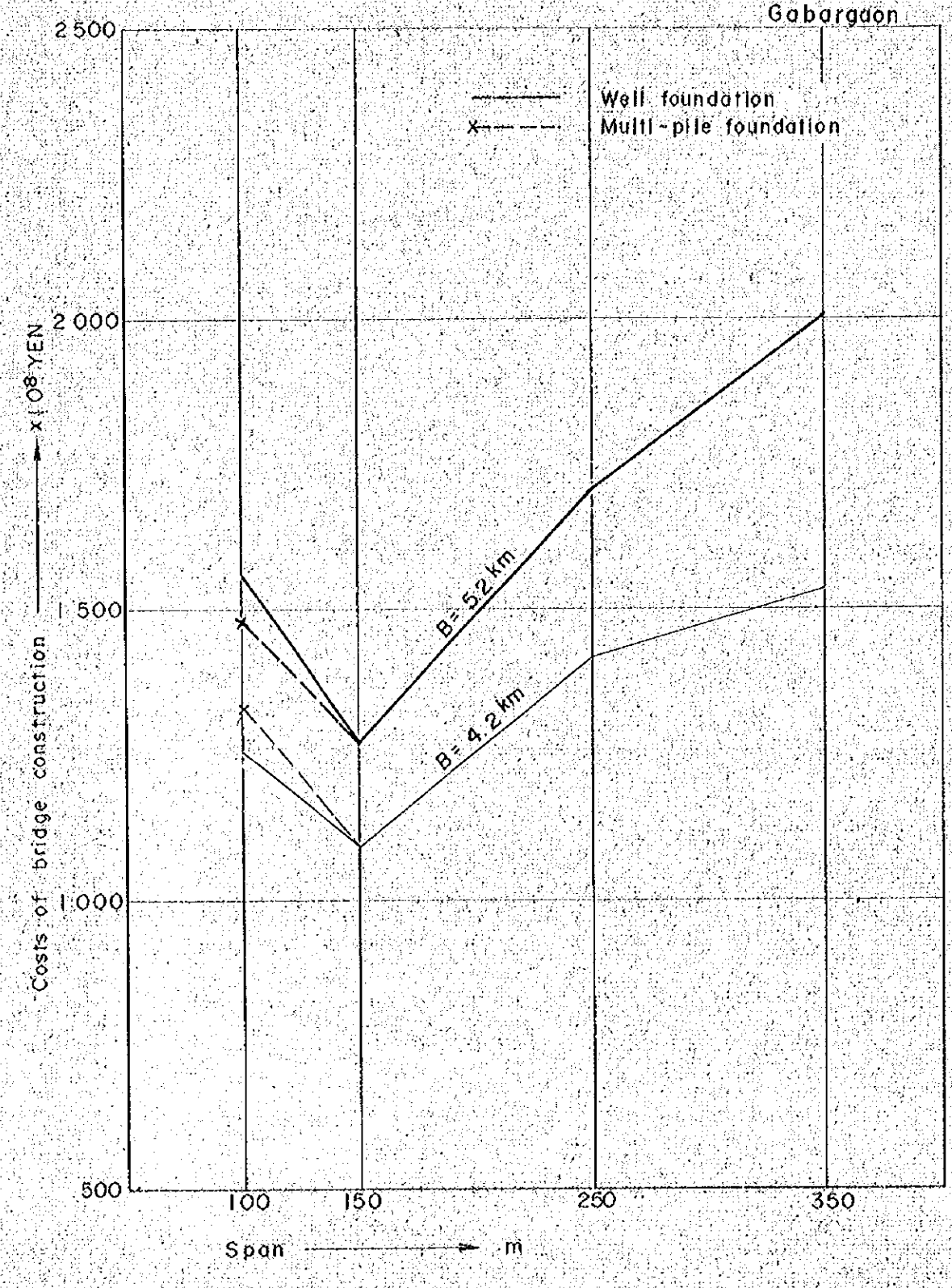


Fig. VII-4-3 The relation between construction costs and span of bridge with well foundations in Case b

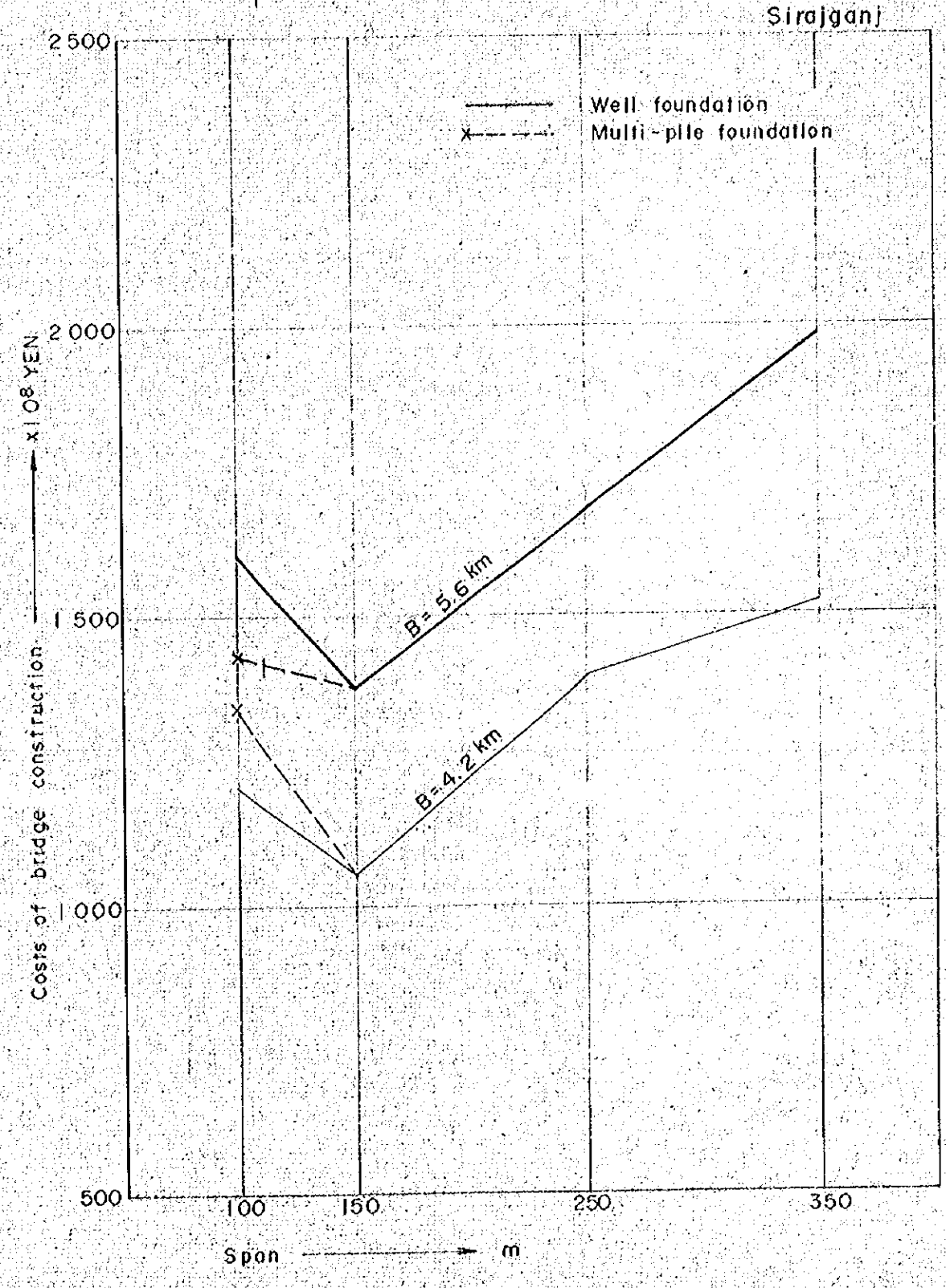
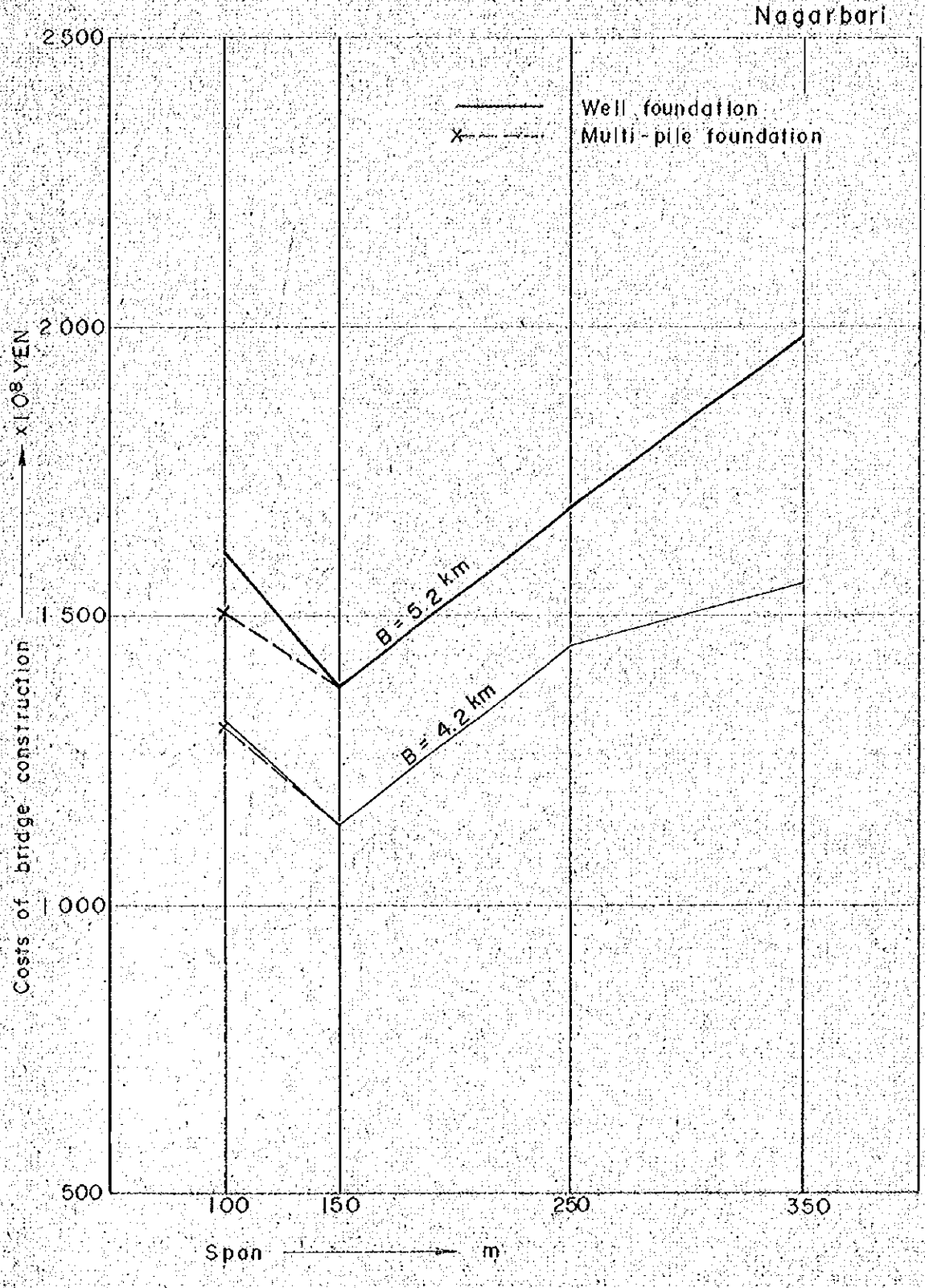


Fig. VII-4-4 The relation between construction costs and span of bridge with well foundations in Case b



3. 最適支間の決定および総工費

一般に上部工の工費は、縦軸に工費、横軸に支間長をとったグラフに示すと、支間長が長くなるに従って急カーブで増大する。また下部工も、その一基ずつは上部工の径間が長くなると規模が大きくなる。しかし下部工の工費の増加は上部工の工費の増加に比して少ない。今、ある定まった橋長を持つ多径間の橋梁を考えた場合、上部工の総工費は、径間が増大するにしたがって増すが、下部工の基数は径間が長くなると減少するので、下部工の総工費は支間の増加に従ってゆるいカーブで減少する。この両者を合算したとき、そのカーブは一般に下向きに凸となる。この凸部に位置する支間長の橋梁が経済的に最小のものとなり、これを最適径間とすることができる。我々は4種の径間に対して、この検討を加えた結果、Case a については Fig VIII-3-1~4, Case b については Fig VIII-4-1~4 が得られた。

上図から明らかなように、Case a, b および各架橋候補地点のいずれも支間長 150m 前後がもっとも経済的であると判断できる。この場合、上部工の型式は3径間連続トラスであり、下部工の型式はウェル基礎である。し

したがって、この First stage においては、150m の径間を最適径間として、サイト選定の基礎資料とする。

次に4つの支間について、ガイドバンク間隔 4.2 km の場合の橋梁の概略一般図を Fig VIII-5-1～4 に示す。

Fig II-4 の分類により、Jamuna River Bridge の範囲の統工費を一括して示すと Table VIII-1 の通りになる。Table VIII-1 には、Case 別、サイト別、ガイドバンクの間隔別に、上部工、下部工、取付道路および輸送費の合計を示したものである。ただし主橋梁の上部工は支間 150m の合開3径間連続トラス、下部工はウェル基礎である。

Table VIII-1 Rough estimate of bridge construction costs

(10^8 in YEN)

Case	Site proposed for bridge const.	Distance btw. guide banks	Super-structure	Sub-structure	Approach Road	Subtotal	Transpor-tation costs	Total
a	Bahadurabad	4.2 km	269	314	139	722	83	805
		5.6 km	343	415	143	901	108	1,009
	Gabargaon	4.2 km	269	323	143	735	84	819
		5.2 km	319	392	147	858	101	959
	Sirajganj	4.2 km	269	305	147	721	81	802
		5.6 km	343	402	159	904	102	1,008
	Nagarbari	4.2 km	269	345	179	793	85	878
		5.2 km	319	419	183	921	103	1,024
b	Bahadurabad	4.2 km	366	612	278	1,256	163	1,419
		5.6 km	467	809	283	1,559	208	1,767
	Gabargaon	4.2 km	366	630	283	1,279	158	1,437
		5.2 km	434	722	287	1,443	230	1,673
	Sirajganj	4.2 km	366	594	293	1,253	167	1,420
		5.6 km	467	785	299	1,551	214	1,765
	Nagarbari	4.2 km	366	673	320	1,359	149	1,508
		5.2 km	434	817	325	1,576	211	1,787

4. 架橋候補地点の順位

主桁部の最適構造型式および最適支間により求めた各架橋候補地点の工事費は Table VIII-1 に示したが、この表から最適架橋候補地点の順位を求めると、Table VIII-2 のようになる。

Table VIII-2 Evaluation of the proposed sites in regard to bridge construction costs

Case	a		b	
Site \ Distance btw. guide banks	4.2 km	5.2 km or 5.6 km	4.2 km	5.2 km or 5.6 km
Bahadurabad	2	3	2	3
Gabargaon	3	1	3	1
Sirajganj	1	2	1	2
Nagarbari	4	4	4	4

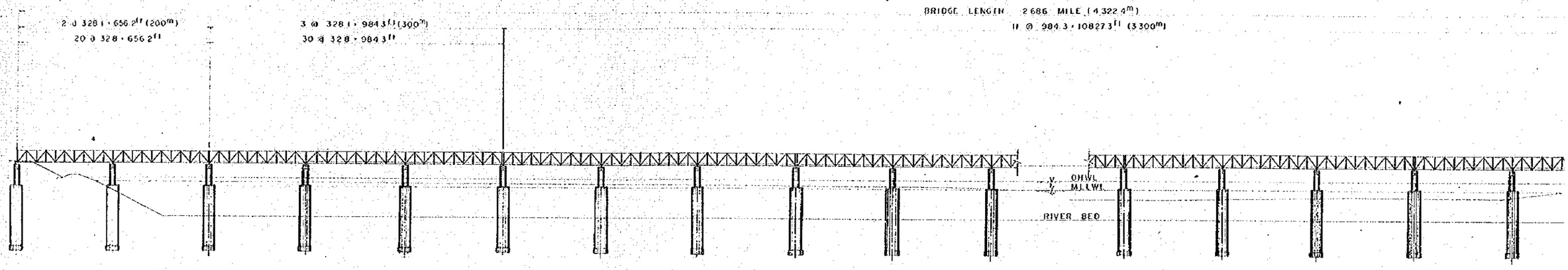
Fig. VIII-5-1 GENERAL VIEW OF JAMUNA RIVER BRIDGE

RAIL-CUM-HIGWAY

CONTINUOUS TRUSS

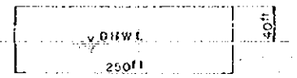
DISTANCE BETWEEN GUIDE BANKS 2.610 MILE (4.2 KM)

PROFILE SCALE 1:4000

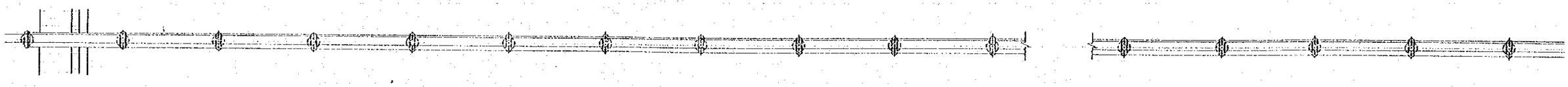


NAVIGATION CLEARANCE SCALE 1:2000

PLAN SCALE 1:4000



CASE - a



CASE - b

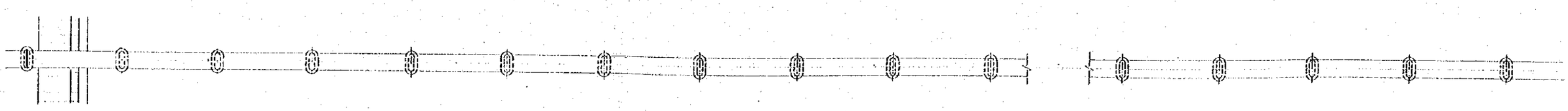


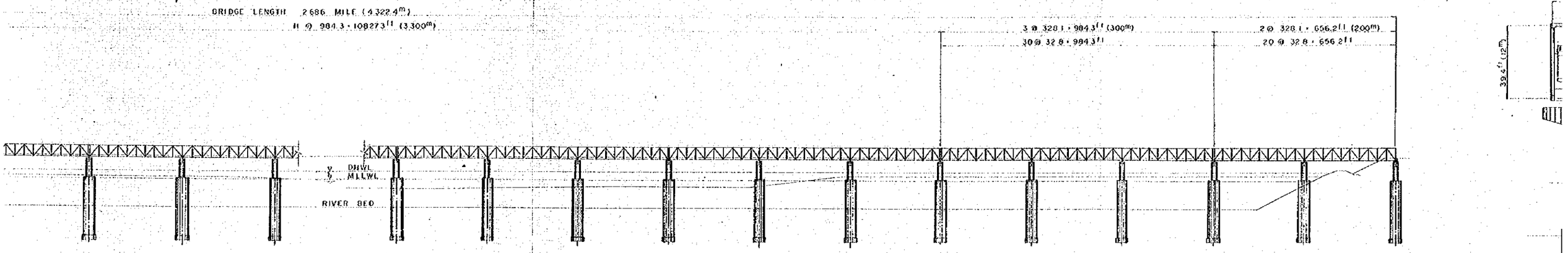
Fig. VIII - 5 - 1 GENERAL VIEW OF JAMUNA RIVER BRIDGE

RAIL - CUM - HIGWAY

CONTINUOUS TRUSS

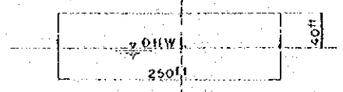
DISTANCE BETWEEN GUIDE BANKS 2.610 MILE (4.2 KM)

PROFILE SCALE 1:4000

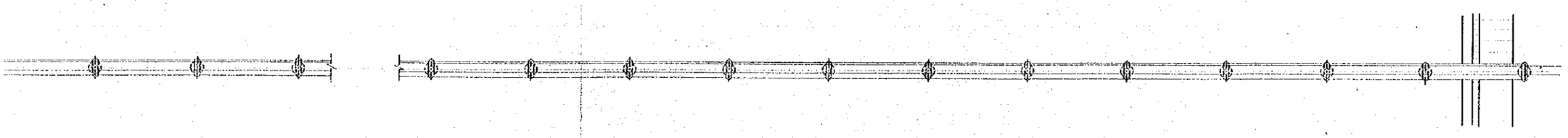


NAVIGATION CLEARANCE SCALE 1:2000

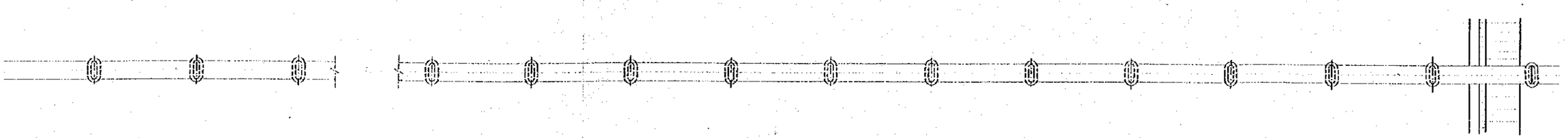
PLAN SCALE 1:4000



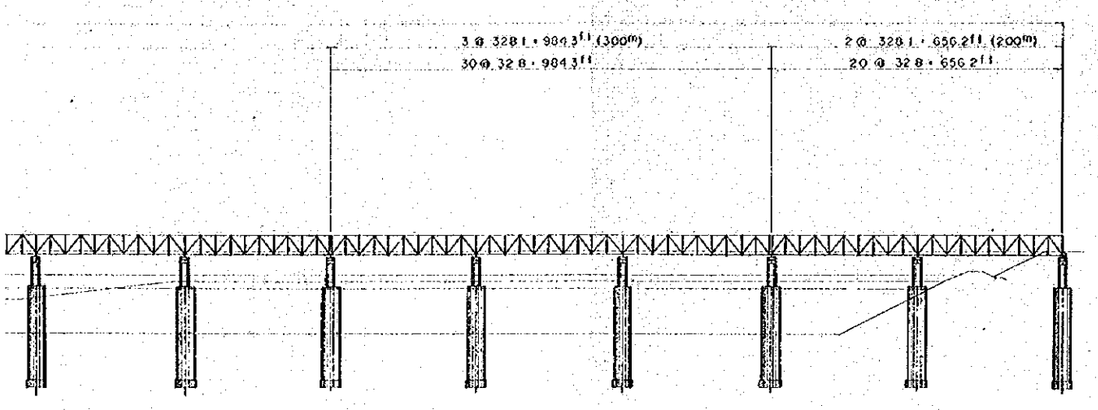
CASE - a

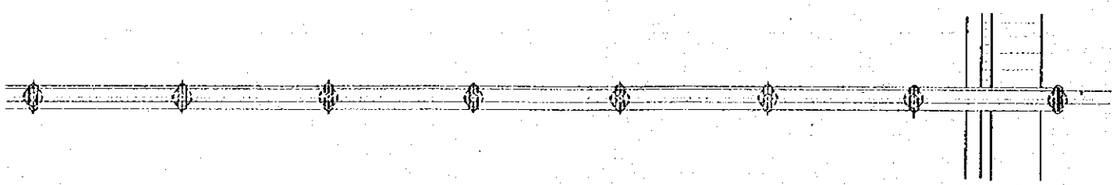


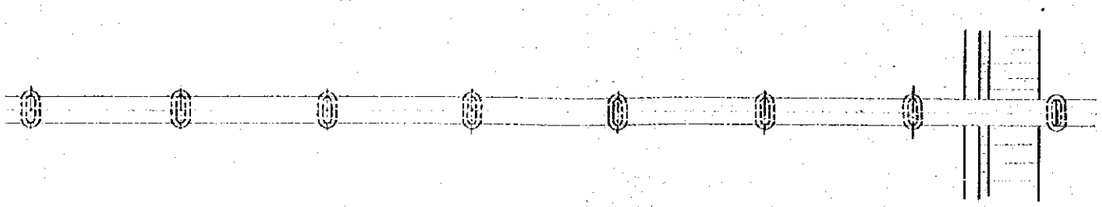
CASE - b



M)

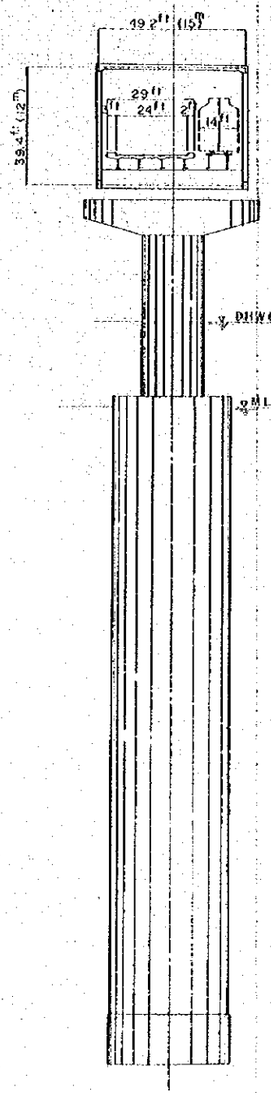






TYPICAL CROSS SECTION SCALE 1:600

CASE - a



CASE - b

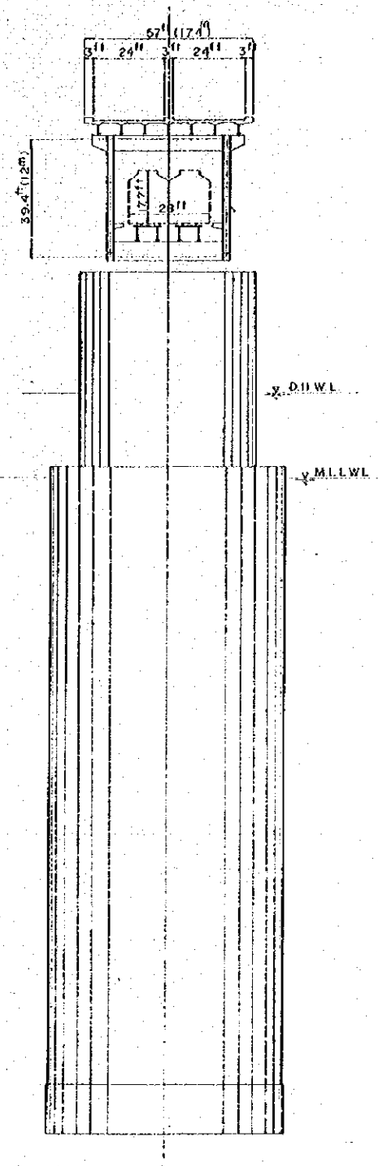
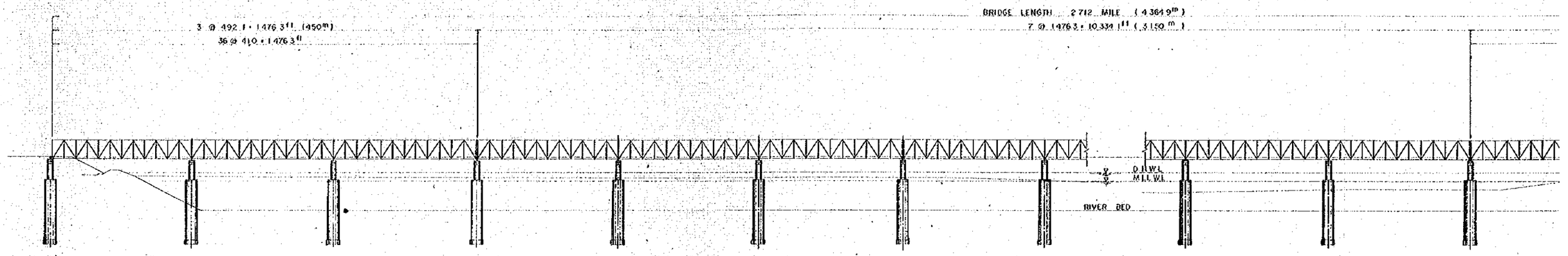
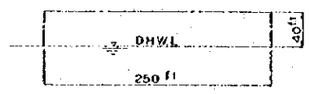


Fig. VII-5-2 GENERAL VIEW OF JAMUNA RIVER BRIDGE
(RAIL - CUM - HIGHWAY)
CONTINUOUS TRUSS
DISTANCE BETWEEN GUIDE BANKS 26.0 MILE (42 KM)

PROFILE SCALE 1:4000

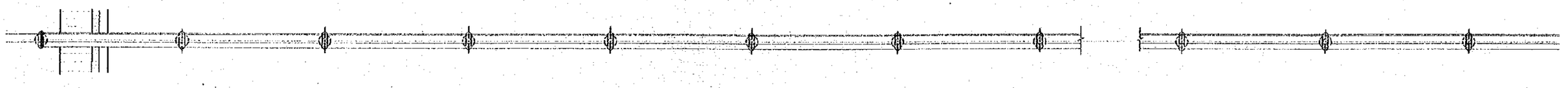


NAVIGATION CLEARACE SCALE



PLAN SCALE 1:4000

CASE - a



CASE - b

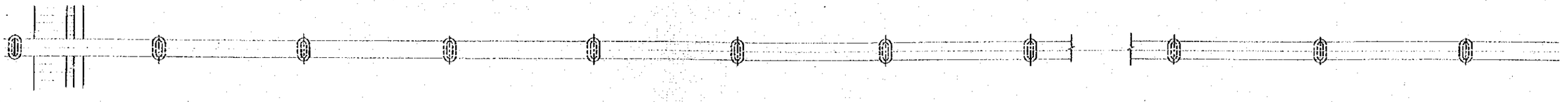


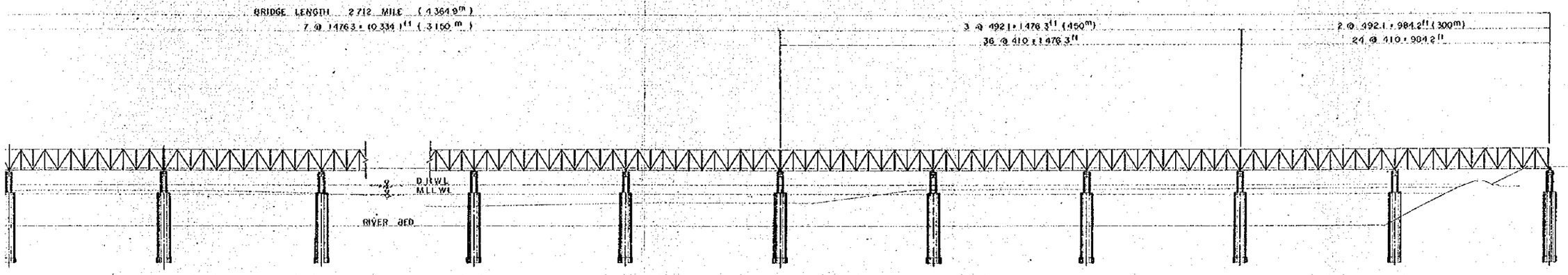
Fig. VII-5-2 GENERAL VIEW OF JAMUNA RIVER BRIDGE

(RAIL - CUM - HIGHWAY)

CONTINUOUS TRUSS

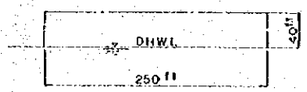
DISTANCE BETWEEN GUIDE BANKS 2610 MILE (4.2 KM)

PROFILE SCALE 1:4000

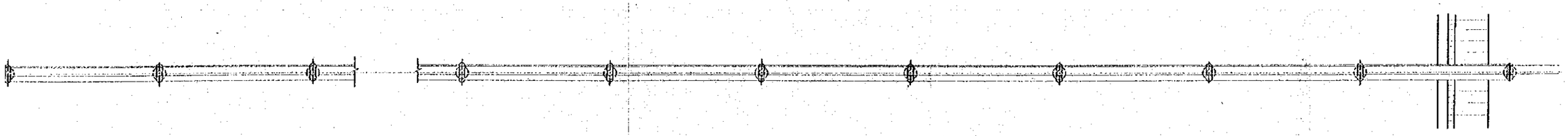


NAVIGATION CLEARACE SCALE 1:2000

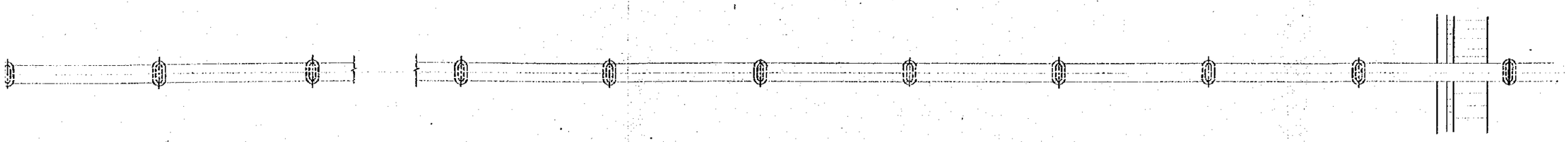
PLAN SCALE 1:4000

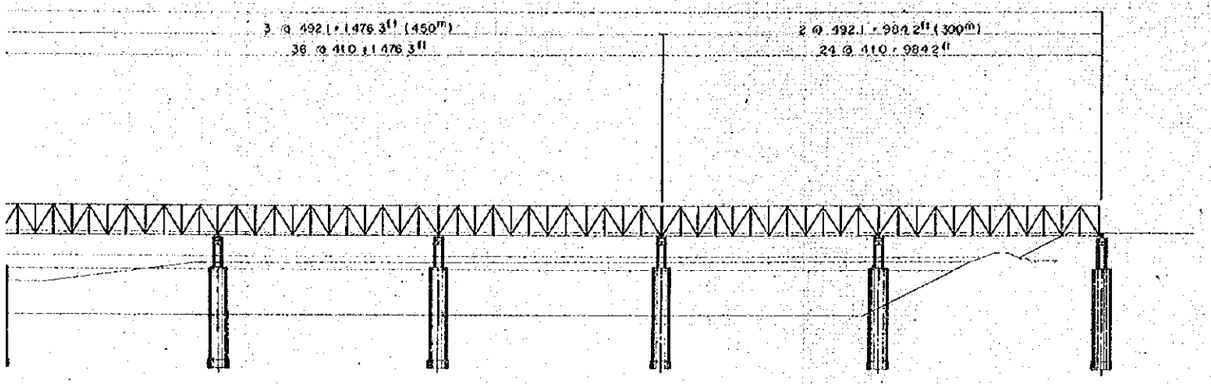


CASE - a

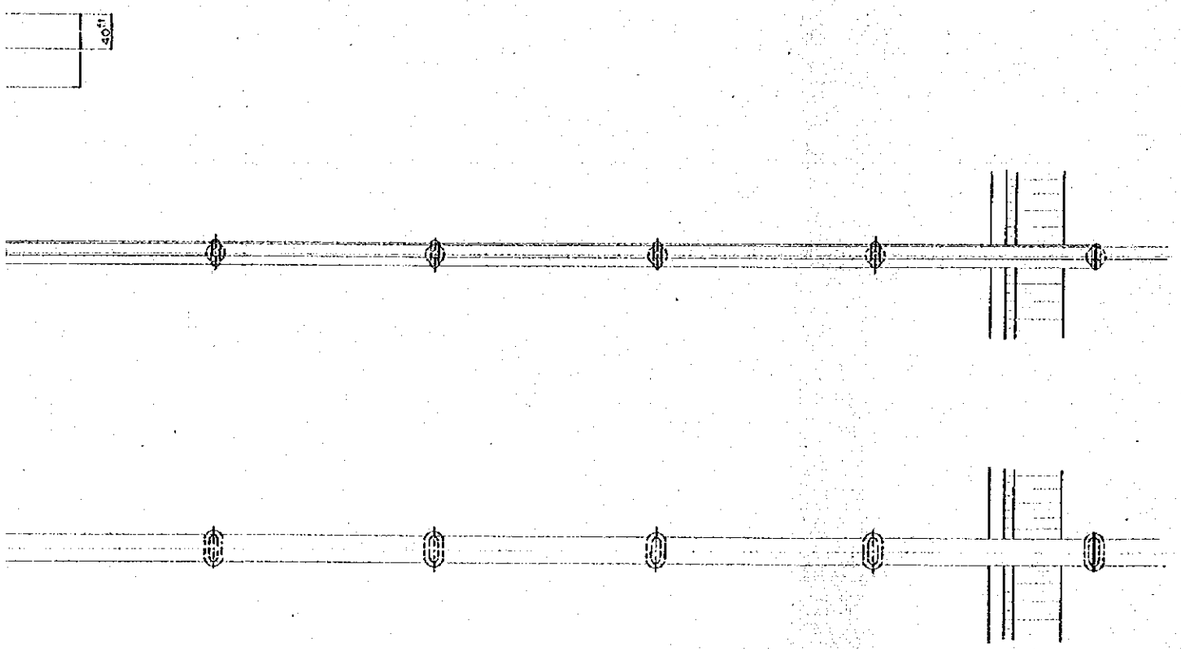


CASE - b



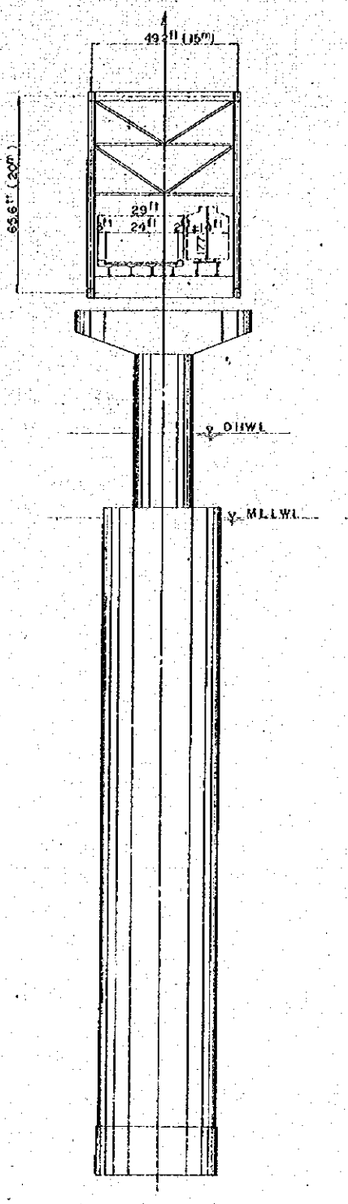


RACE SCALE 1:2000



TYPCAL CROSS SECTION SCALE 1:600

CASE - a



CASE - b

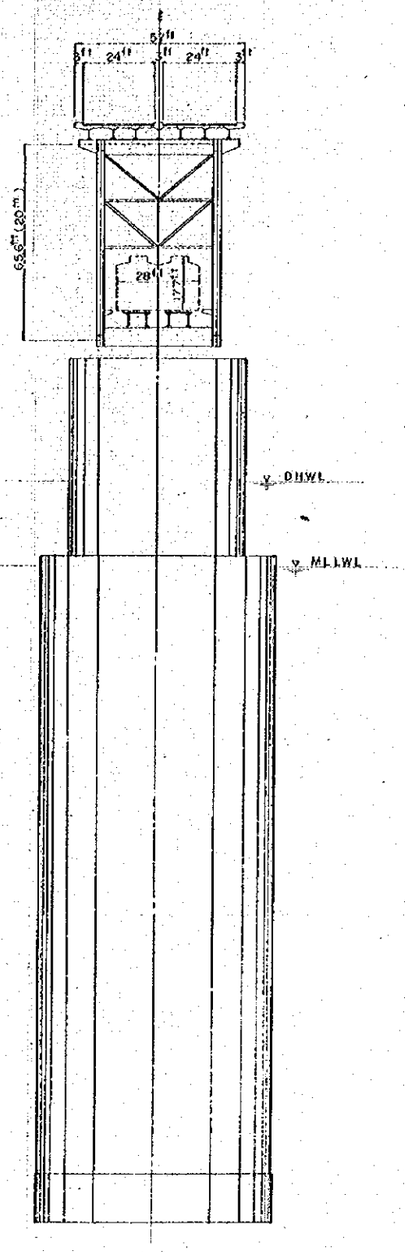
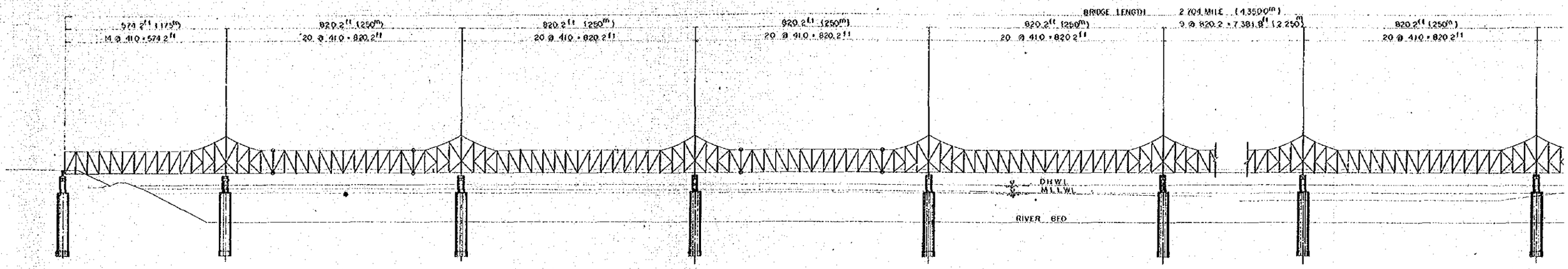


Fig. VII-5-3 GENERAL VIEW OF JAMUNA RIVER BRIDGE
(RAIL-CUM-HIGHWAY)

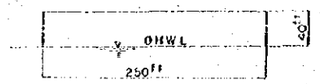
CANTILEVER

DISTANCE BETWEEN GUIDE BANKS 2.610 MILE (4.2KM)

PROFILE SCALE 1:4000

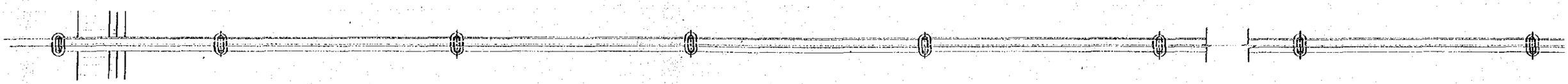


NAVIGATION CLEARANCE SCALE 1:2



PLAN SCALE 1:4000

CASE - a



CASE - b

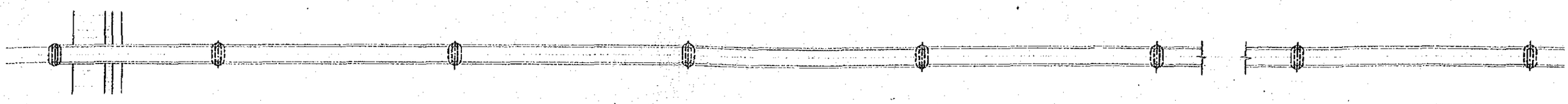


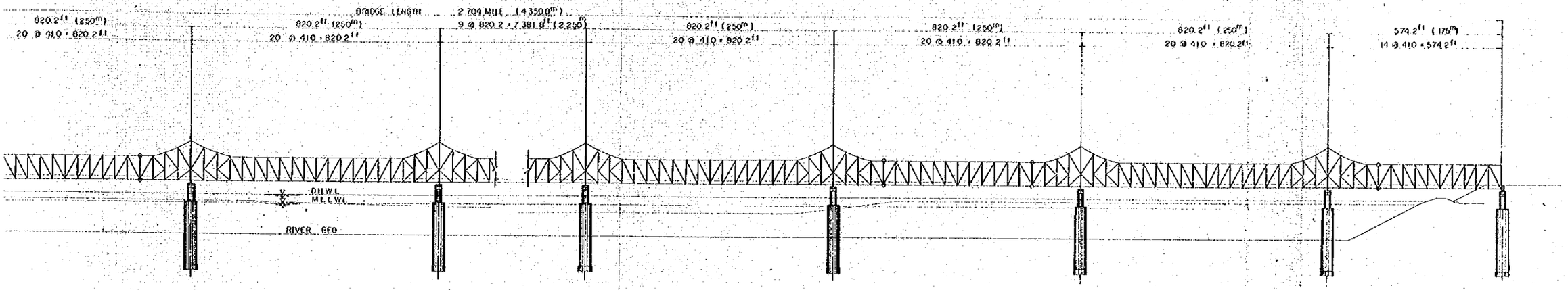
Fig. VII-5-3 GENERAL VIEW OF JAMUNA RIVER BRIDGE

(RAIL - CUM- HIGHWAY)

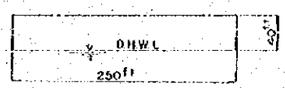
CANTILEVER

DISTANCE BETWEEN GUIDE BANKS 2.610 MILE (4.2KM)

PROFILE SCALE 1:4000

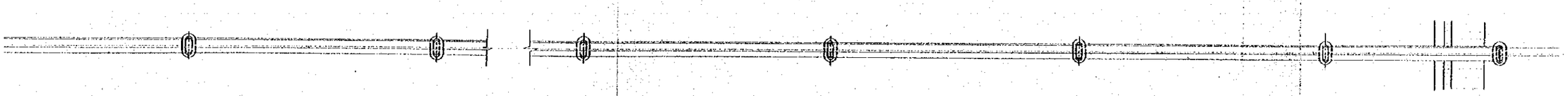


NAVIGATION CLEARANCE SCALE 1:2000

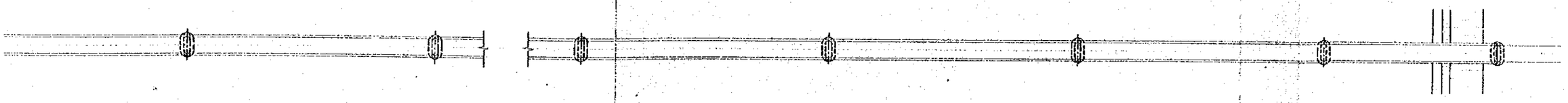


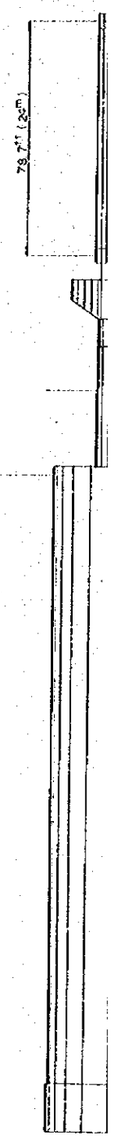
PLAN SCALE 1:4000

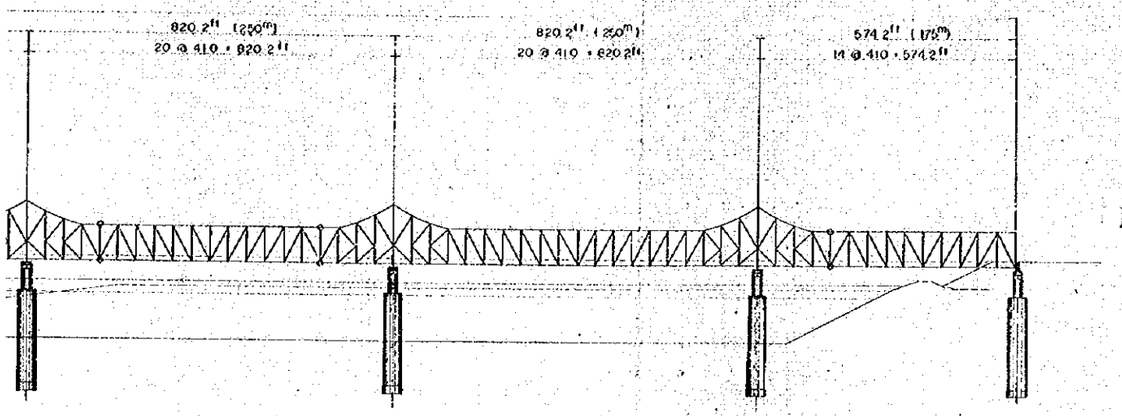
CASE - a



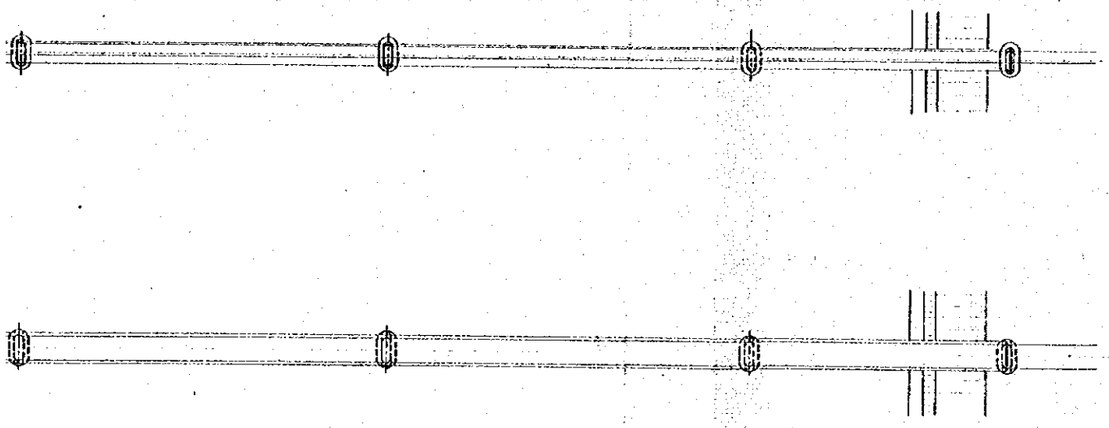
CASE - b





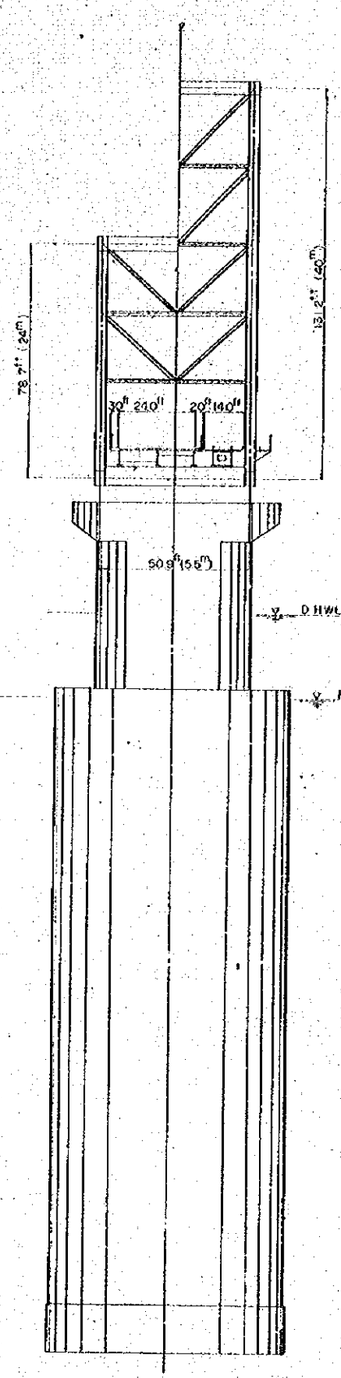


E 1:2000



TYPICAL CROSS SECTION SCALE 1:600

CASE - a



CASE - b

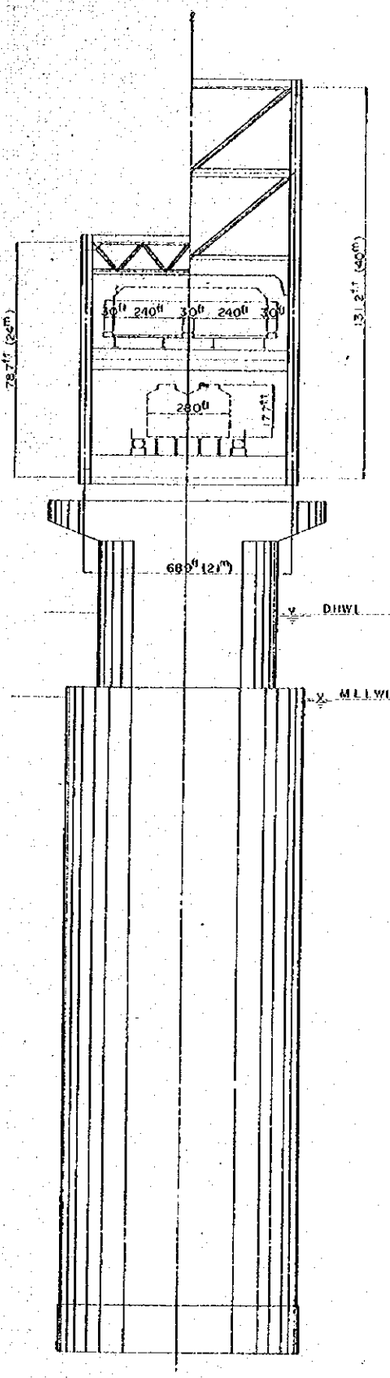


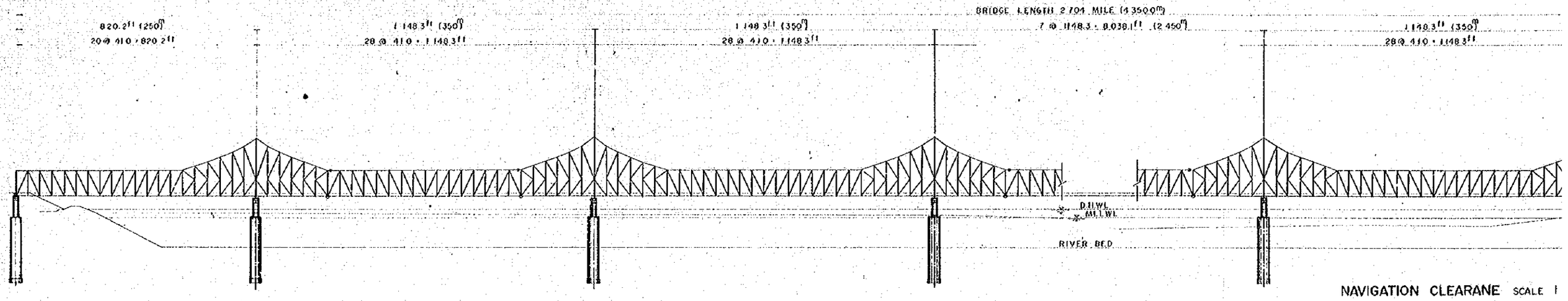
Fig. VII -5-4 GENERAL VIEW OF JAMUNA RIVER BRIDGE

(RAIL - CUM - HIGHWAY)

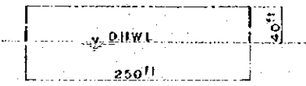
CANTILEVER TRUSS

DISTANCE BETWEEN GUIDE BANKS 2.610 MILE (4.2 KM)

PROFILE SCALE 1:4000

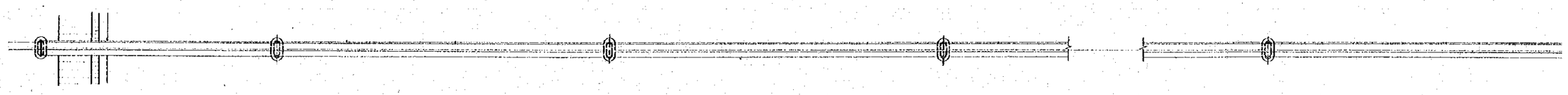


NAVIGATION CLEARANE SCALE 1



PLAN SCALE 1:4000

CASE - a



CASE - b

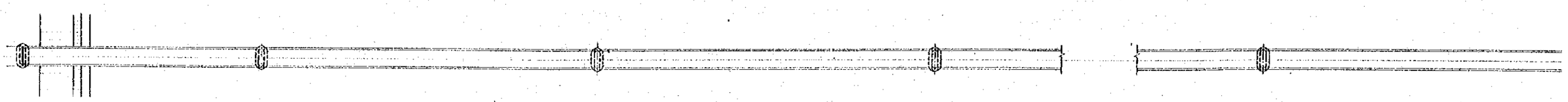


Fig. VII-5-4 GENERAL VIEW OF JAMUNA RIVER BRIDGE

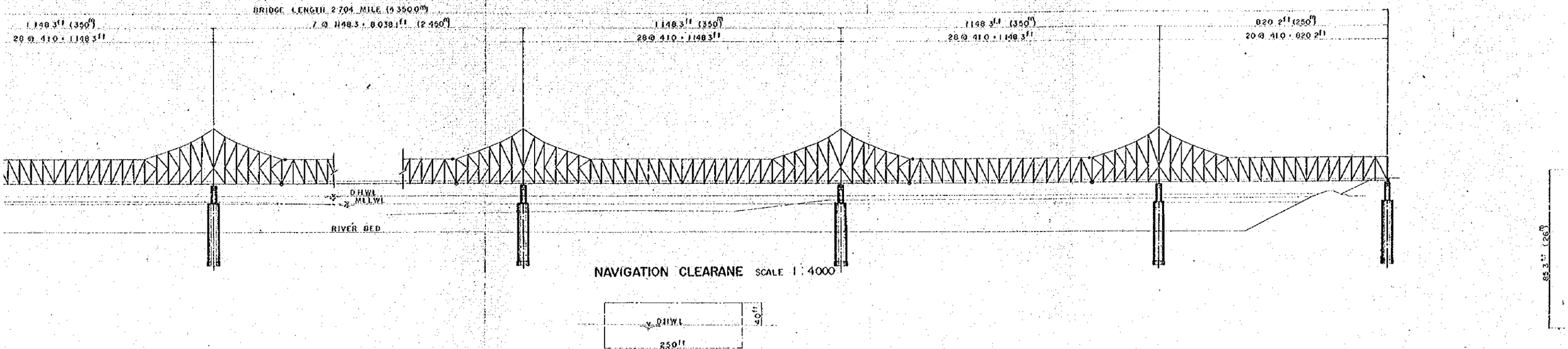
(RAIL-CUM-HIGHWAY)

CANTILEVER TRUSS

DISTANCE BETWEEN GUIDE BANKS 2.610 MILE (4.2 KM)

PROFILE SCALE 1:4000

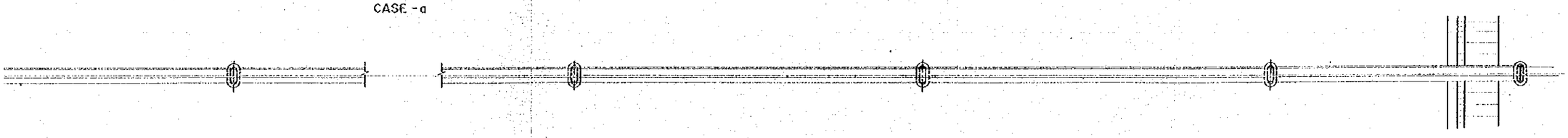
BRIDGE LENGTH 2.704 MILE (4350.0[m])



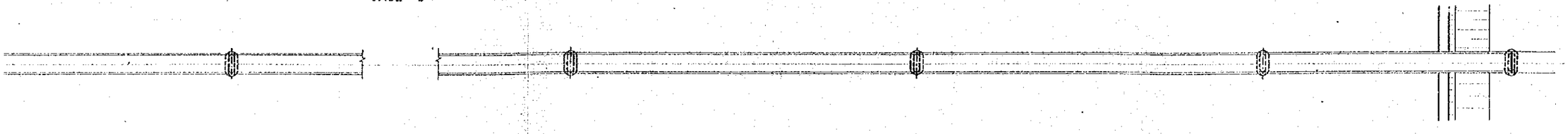
NAVIGATION CLEARANE SCALE 1:4000

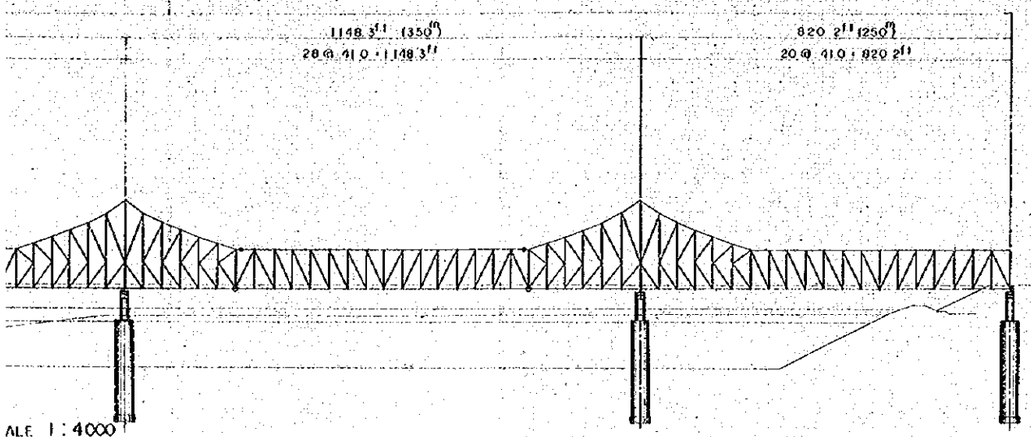
PLAN SCALE 1:4000

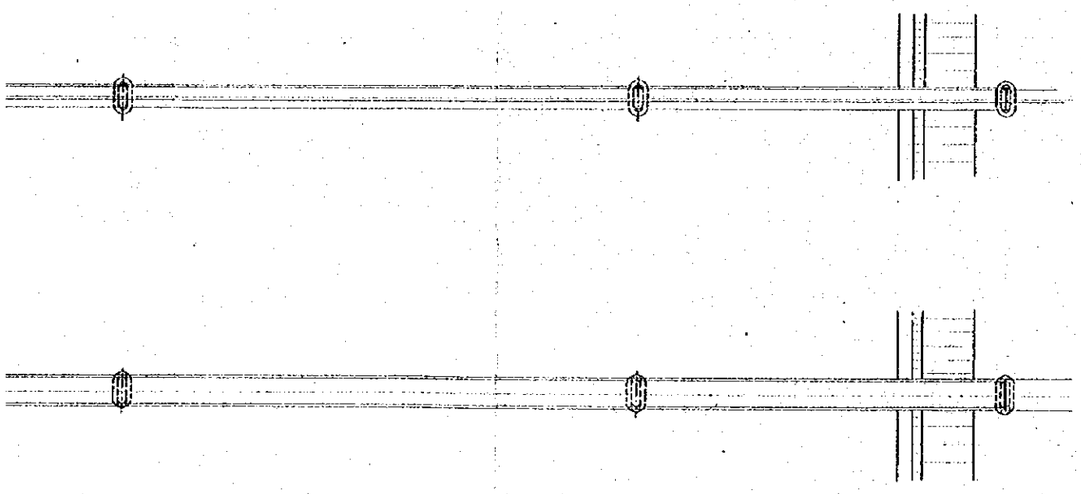
CASE - a



CASE - b

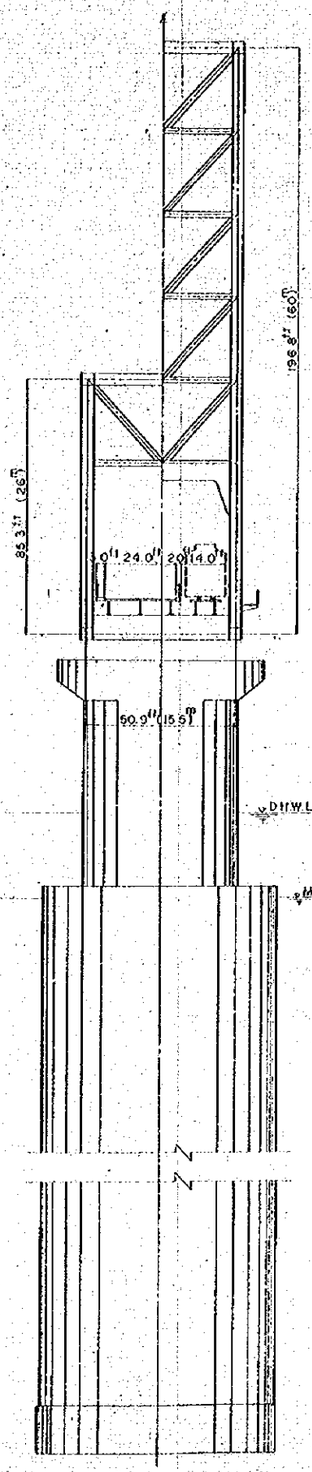




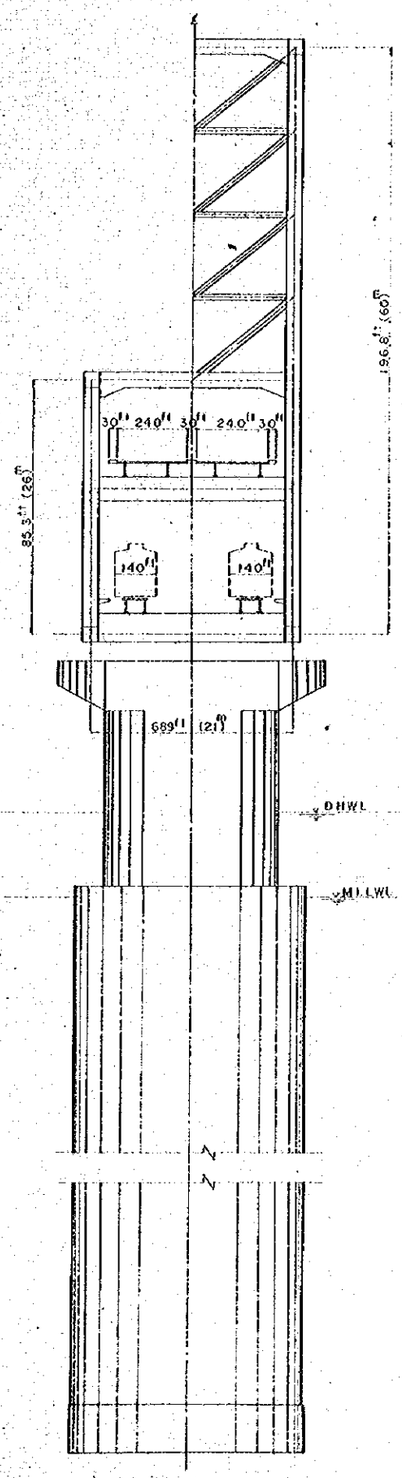


TYPICAL CROSS SETION SCALE 1 : 600

CASE - a



CASE - b



第IX章　接続部の橋梁

鉄道接続部および道路接続部の区間に含まれるスパン300ft以上の橋梁はTable II-1, Table II-2に示したが、それらに架設する橋梁の上部構造型式は、すべてPC橋とした。スパン割については次の点から決められる。それは架橋を要する河川の航路限界と、全工費を最小にする配慮である。後者の配慮は、基礎にウェルを用いるか、くいを用いるかによってスパン割りが変ることになる。前述したように局部洗掘があるところではウェル基礎とし、他の場所ではくい基礎として計画した。

鉄道接続部の橋梁の型式とスパン割りについてTable IX-1, 道路接続部の橋梁の形式とスパン割りについてTable IX-2にそれぞれ示した。これらの型式とスパン割りについて工事費を算出すると、鉄道接続部はTable IX-3に示すものとなり、道路接続部はTable IX-4に示す通りである。

Sirajganj サイトの接続部は左岸でDhaleswari Riを横過するので、Dhaleswari河は閉鎖して下流の分派川を後渠するが、これに要する費用は道路接続部の工費に組込まれる。この費用は大略、締切工

Table IX-2 Miscellaneous Data of Bridge (≧100m) in the Domain of Highway Access (in meter)

Name of Site	Name of Bridge	Side of River Bank	Total Bridge Length (m)	Span Length (m)	Type of Superstructure	Type of Sub-structure
1 BAHADURABAD	1 – 1	Right	300	9 @ 33	P.C. Simple – G	R.C. Pile
	1 – 2	"	200	6 @ 33	"	"
	1 – 3	Left	100	5 @ 20	R.C. Simple – G	"
2 GABARGAON	2 – 1	Right	100	3 @ 33	P.C. Simple – G	"
	2 – 2	"	300	9 @ 33	"	"
	2 – 3	Left	100	5 @ 20	R.C. Simple – G	"
	2 – 4	"	400	7 @ 57	P.C. 7-Cont. Box – G	Open Caisson
	2 – 5	"	100	5 @ 20	R.C. Simple – G	R.C. Pile
3 SIRAJGANJ	3 – 1	"	150	7 @ 21	R.C. Simple – G	R.C. Pile
4 NAGARBARI	4 – 1	Right	600	10 @ 60	P.C. 3-Cont. Box-G	Open Caisson
	4 – 2	"	300	15 @ 20	R.C. Simple – G	R.C. Pile
	4 – 3	Left	200	10 @ 20	"	"
	4 – 4	"	100	5 @ 20	"	"

(note) P.C. : Prestressed Concrete
R.C. : Reinforced Concrete
3-Cont. : 3 Span Continuous
G. : Girder
* : Rail-cum-Highway Bridge

Table. IX-1 Miscellaneous Data of Bridge (≧100m) in the Domain of Railway Access (in mater)

Name of Site	Name of Bridge	Side of River Bank	Total Bridge Length (m)	Span Length (m)	Type of Superstructure	Type of Sub-Structure
1 BAHADURABAD	1 - A	Right	300	9 @ 33	P.C. Simple - G	R.C. Pile
	1 - B		200	6 @ 33	"	"
2 GABARGAON	2 - A	Right	100	3 @ 33	"	"
	2 - B		100	3 @ 33	"	"
	2 - C		150	5 @ 30	"	"
	2 - D		100	3 @ 33	"	"
	2 - E	Left	400	7 @ 57	P.C. 3-Cont. Box-G	Open Caisson
	2 - F		150	7 @ 21	P.C. Simple - G	R.C. Pile
	2 - G		150	7 @ 21	"	"
3 SIRAJGANJ	3 - A	Left	100	5 @ 20	"	"
	3 - B		200	10 @ 20	"	"
	3 - C		100	5 @ 20	"	"
	3 - D		200	6 @ 33	"	"
	3 - E		300	9 @ 33	"	"
	3 - F		300	9 @ 33	"	"
4 NAGARBARI	4 - A	Right	100	5 @ 20	"	"
	4 - B		200	10 @ 20	"	"
	4 - C		600	30 @ 20	"	"
	4 - D		300	5 @ 60	P.C. 3-Cont. Box-G	Open Caisson
	4 - E	Left	200	10 @ 20	P.C. Simple - G	R.C. Pile
	4 - F		1 150	20 @ 57.5	P.C. 3-Cont Box-G	Open Caisson
	4 - G		100	5 @ 20	P.C. Simple - G	R.C. Pile
	4 - H		250	5 @ 50	P.C. 3-Cont. Box-G	Open Caisson
	4 - I		150	3 @ 50	"	"

(note) P.C. : Prestressed Concrete 3-Cont. : 3-Span Continuous
R.C. : Reinforced Concrete G : Girder

Table IX-3 Rough Estimated Cost of Bridge Constructions in the Domain of Railway Access

Site Proposed for Br. Const.	Name of Bridge	Name of the River	Total Bridge Length (m)	Cost ($\times 10^6$ YEN) Super Structure	Sub-Structure	Amount	Unit Price YEN/m
Bahadurabad	1-A	Bangali	300	240	150	390	1,320,000
	1-B	Bangali	200	160	110	270	
Gabargaon	2-A	Huresagar	100	80	60	140	1,390,000
	2-B	Karatoya	100	80	60	140	
	2-C	Bangali	150	120	80	200	
	2-D	Bangali	100	80	60	140	
	2-E	Chatal	400	330	350	680	
	2-F		150	90	60	150	
	2-G		150	90	60	150	
Sirajganj	3-A	Lohatang	100	60	40	100	1,210,000
	3-B	Futjani	200	120	80	200	
	3-C	Bansi	100	60	40	100	
	3-D		200	160	110	270	
	3-E	Turag	300	240	150	390	
	3-F	Tungi	300	240	150	390	
Nagarbari	4-A	Chikunai	100	60	40	100	2,010,000
	4-B	Rukunai	200	120	80	200	
	4-C	Baral	600	350	230	580	
	4-D	Hurasagari	300	540	360	900	
	4-E	Old-Dhaleswari	200	120	80	200	
	4-F	Dhaleswari	1,150	2,100	1,400	3,500	
	4-G		100	60	40	100	
	4-H	Bansi	250	210	140	350	
	4-I	Turag	150	120	90	210	

Table IX-4 Rough Estimated Cost of Bridge Constructions in the Domain of Highway Access

Site proposed for Br. Const.	Name of Bridge	Name of the River	Total Bridge Length (m)	Cost ($\times 10^6$ YEN)			UNIT PRICE YEN/m
				Super Structure	Sub-Structure	Amount	
Bahadurabad	1-1	Bangali	300	180	100	280	970,000
	1-2	Bangali	200	120	70	190	
	1-3		100	53	52	110	
Gabargaon	2-1	Karatoya	100	59	50	110	1,530,000
	2-2	Bangali	300	180	120	300	
	2-3		100	53	52	110	
	2-4	Chatal	400	450	450	900	
	2-5		100	53	52	110	
Sirajganj	3-1		150	89	56	150	1,000,000
Nagarbari	4-1	Hurasagar	600	680	650	1,330	1,620,000
	4-2		300	160	140	300	
	4-3	Old-Dhaleswari	200	110	90	200	
	4-4	Old-Dhaleswari	100	53	52	110	

19億円，浚渫工 44億円の計 63億円である．

ANNEX-1 Contents of Accumulated Data

NO	DATA	SOURCE	GIVEN LENT BUY	REMARKS
1	Roads and Highways Directnate Schedule of Rate for Construction of BRIDGE	Road & Highways M.O.C.	Given	
2	Roads and Highways Directnate Schedule of Rate for Road Works	"	"	
3	Monthly Rainfall Statement on Sirajganj at 1973.		"	
4	Daily Report Sheets MITSUI-OHBAYASHI J.V.	OHBAYASHI Office	"	
5	Report of the National Pay Commission		Buy	
6	Plan and Profile of Dacca-Aricha Highway Bridge. Mirpur Br. Bangshi Br. Kaliganga Br.	R.&H. M.O.C.	Given	
7	Sinking Record of Caisson of KALIGANGA Br.	"	"	
8	Sinking Report of No.4 Caisson of Sitarakya Br.	OHBAYASHI office	"	
9	Road Map of Bangladesh scale 1 inch=8 miles	R & H M.O.C.	"	
10	Bangladesh Land & People		Buy	
11	1st 5 years Plan		"	
12	General Rules and Schedules for Working of the Chittagong Port (Railway) from January 1959	Chittagong Port Trust	Buy	
13	Manual of Standard Bridge Design (East Pakistan)		"	
14	Power Development in Bangladesh		Given	
15	Law of Evidence & Limitation		Buy	
16	Constitutional Law in Bangladesh		"	
17	Law of Tort		"	
18	Interim Report on Remedial Works Required to Harding Bridge & King George V Br.	Jamuna Br, Survey Office	Given	

NO	DATA	SOURCE	GIVEN LENT BUY	REMARKS
19	Re-Openning of King George V Bridge over the Meghna	Jamuna Br. Survey Of.	Given	
20	The Harding Bridge over the Lower Ganges at Sara	Bangladesh Railway (Paksey)	"	
21	Modern Road Construction Procedures	R&H,M.O.C.	"	
22	Bangladesh Consultants Limited		"	Consultin Firm
23	Associated Consulting Engineers Ltd.		"	"
24	Prachi Prakaushali Sangstha Limited		"	"
25	Prakaushali Sangsad Limited		"	"
26	M essrs Rahman & Associated Ltd.		"	"
27	Engineering Consultants & Associated Ltd.		"	"
28	Brixton & Brixton Ltd. Consulting Engineers		"	"
29	Bureau of Consulting Engineers LTD.		"	"
30	Associated Architects and Engineers Ltd.		"	"
31	Bangladesh Survey Organization Ltd.		"	Land Survey
32	The Engineers Ltd.		"	Construction Firm
33	Bengal Development Corporation Ltd.		"	"
34	Stonevill Engineers Ltd.		"	"
35	National Builders & Engineers Ltd.		"	"
36	Delta Constructions Ltd.		"	"
37	Harding Bridge-Section of Scouring Taken at Centre Line from July to December 1973	Bridge Engineer, West Paksey	"	

ANNEX-2

BANGLADESH RAILWAY.

No.XEN/J/G/74. Dated:- 28 - 1 - 1974.

From:- XEN/J.B.S/Dacca. To:- The Director,
Jamuna Bridge Survey/DA.

Sub:- Confirmation of Datas.

Mr.Tezuka,Leader of Bridge Planning Team wanted confirmation of the following datas in connection with designing of Bridge Girders of proposed Jamuna Bridge.

1. Bridge Girders to be designed as per Main Line loading of Indian Railway Bridge Code.

2. All structures to be designed keeping the provision of Electrification in future.

The above Datas are hereby confirmed.

Executive Engineer,
Jamuna Bridge Survey,
Bangladesh Railway,Dacca.

Copy to ENC/CRB for information. Since the Team wanted the confirmation of the above Datas by 31.1.74,so the undersigned confirmed the above Datas on behalf of Bangladesh Railway.

Sd/-

Executive Engineer,
Jamuna Bridge Survey,
Bangladesh Railway, Dacca.

ANNEX-3

MATTERS TO BE DETERMINED PRIOR TO THE PLANNING OF THE JAMUNA RIVER BRIDGE

THE FEASIBILITY STUDY TEAM

The Feasibility Study Team for the Jamuna River Bridge Construction Project wishes to obtain a consent of the Government of Bangladesh on the following items.

I. Measuring Units

Metric System will be applied to all engineering quantities except some important quantities which will be converted in Foot-Pound System.

II. Bridge Specifications

The following specifications will be applied to the design of the Jamuna River Bridge.

a. Superstructure.

(a) Highway Bridge.

(1) Loads.

All loads to be used for design will be specified by the Standard Specifications for Highway Bridges adopted by AASHO.

(2) Construction gauge.

The construction gauge will be specified by the Standard Specifications for Highway Bridges adopted by AASHO.

(3) Structures.

All structures will be designed by the Standard Specifications for Highway Bridges adopted by the Japan Road Association.

(4) Materials.

All materials to be used for design will be specified by the Japanese Industrial Standard.

(b) Railway Bridge.

(1) Loads

All loads to be used for design will be specified by the Bridge Code for Indian Railways.

(2) Construction gauge.

The construction gauge will be specified by the Bridge Code for Indian Railways.

(3) Structures.

All structures will be designed by the Standard Specifications for Railway Bridges adopted by the Japan Society of Civil Engineers.

(4) Materials.

Same as above.

(c) Highway/Railway Bridge.

(1) Loads.

All loads to be used for the design of highway floor will be specified by the Standard Specifications for Highway Bridge adopted by AASHO.
All loads to be used for the design of railway floor will be specified by the Bridge Code for Indian Railways.

(2) Construction gauge.

The construction gauge for highway part will be specified by the Standard Specifications for Highway Bridges adopted by AASHO, and, for railway part, will be specified by the Bridge Code for Indian Railways.

(3) Structures.

All structures will be designed by the Standard Specifications for Highway Bridges adopted by the Japan Road Association except railway floor system.
The railway floor system will be designed by the Standard Specifications for Railway Bridges adopted by the Japan Society of Civil Engineers.

(4) Materials.

Same as above.

b. Substructure.

All substructures will be designed by the Standard Specifications for Reinforced Concrete adopted by the Japan Society of Civil Engineers.

MINUTES OF THE MEETING HELD BETWEEN THE JAPANESE FEASIBILITY STUDY TEAM FOR THE JAMUNA BRIDGE PROJECT AND THE RAILWAY DEPARTMENT, GOVERNMENT OF BANGLADESH.

****

The following members from the Japanese Feasibility Study Team and the Railway Department held the meeting on 8th August, 1973 in the chamber of Joint Secretary and discussed the matters to be determined prior to the planning of the Jamuna River Bridge according to the Agenda (ANNEX attached herewith) presented by the Study Team.

The matters mentioned in the Agenda were agreed between both the parties with the following addendum :

MEMBERS FROM FEASIBILITY STUDY TEAM:

1. Dr. S. Inose : Leader.
2. Mr. I. Kawasaki : Adviser to the team.
3. Mr. I. Iizuka : "
4. Dr. S. Sato : Member of the team.
5. Mr. J. Ooihara : Director of the Jamuna Bridge Survey Office.

MEMBERS FROM RAILWAY DEPARTMENT:

1. Mr. Ahmed Ibrahim : Additional Secretary.
2. Mr. M.A.Ghafour : Member/Engineering, Railway Board.
3. Mr. M. Rahman : Engineer-in-Chief, Railway.
4. Mr. Syed Hossain : Bridge Engineer.

1. The gauge length to be used for design shall be 5' 6".

2. The Japanese Study Team will present the following copies to the Railway Department for reference translating some important articles into English :

   a. The Standard Specifications for Railway Bridges adopted by the Japan Society of Civil Engineers.

   b. The Standard Specifications for Reinforced Concrete adopted by the Japan Society of Civil Engineers.

c. The Japanese Industrial Standard for structural steel.

The Japanese Feasibility Study Team for Jamuna River Bridge Construction.

Leader Shizuo Inose
Dr. S. INOSE.

The Railway Department, Government of Bangladesh.

Leader M. A. Chafur
(Mr A. Chafur.)
Member(Engineering),
Bangladesh Rly Board,
Rail Bhaban, Ramna,
Dacca.

MINUTES OF THE MEETING HELD BETWEEN THE JAPANESE FEASIBILITY STUDY TEAM FOR THE JAMUNA BRIDGE PROJECT AND THE ROADS AND HIGHWAYS DIRECTORATE, GOVERNMENT OF BANGLADESH.

****

The following members from the Japanese Feasibility Study Team and the Roads and Highways Directorate, Government of Bangladesh held a meeting on 9th August, 1973 in the chamber of Deputy Chief Engineer, Roads and Highways Directorate, Government of Bangladesh and discussed the matters to be determined prior to the planning of the Jamuna River Bridge according to the Agenda (ANNEX attached herewith) presented by the Study Team.

The matters mentioned in the Agenda were agreed between both the parties except the following :

MEMBERS FROM FEASIBILITY STUDY TEAM:

1. Dr. S. Inose : Leader.
2. Mr. I. Kawasaki : Adviser to the team.
3. Mr. I. Iizuka : "
4. Dr. S. Sato : Member of the team.
5. Mr. J. Ishihara : Director of the Jamuna Bridge Survey Office.

MEMBERS FROM ROADS & HIGHWAYS DIRECTORATE:

1. Mr. Md. Shafiullah : Deputy Chief Engineer.
2. Mr. Anwar Hossain : Executive Engineer.
3. Mr. A. Samad : Senior Structural Designer.

1. Article a. Superstructure in the Agenda

(a) Highway Bridge

(1) Loads

Live load to be used for design will be specified by the I.R.C. Standard Vehicle Class A.

(2) Construction gauge

The construction gauge will be specified by I.R.C.

(c) Highway/Railway Bridge

(1) Loads

Live load to be used for design of highway floor will be specified by I.R.C. Standard Vehicle Class A.

(2) Construction gauge

The construction gauge for highway part will be specified by I.R.C.

2. The Japanese Study Team will present the following copies to the Roads and Highways Directorate for reference translating some important articles into English.

a. The standard specifications for Highway Bridges adopted by the Japan Road Association.

b. The standard specifications for Reinforced Concrete adopted by the Japan Society of Civil Engineers.

c. The Japanese Industrial Standard for structural steel.

Dr. S. INOSE
Leader of the
Japanese Feasibility Study
Team for Jamuna River Bridge
Project.

M.D. SHAHJAHAN
Deputy Chief Engineer,
Roads & Highways Directorate,
Government of Bangladesh,
Dacca.

P 249

ANNEX-4

Grams : AUTHORITY
Phones : 245251-55

বাংলাদেশ অভ্যন্তরীণ নৌ-পরিবহন কর্তৃপক্ষ
BANGLADESH INLAND WATER TRANSPORT AUTHORITY

ডিআইটি ভবন (এনেক্স)
পোষ্ট বক্স ১৬, ঢাকা-২
বাংলাদেশ

DIT BUILDING (ANNEXE)
POST BOX 76, DACCA-2
BANGLADESH

Memo.No.CE/JB/J-AID/ 3160 Dated: ~~January~~ Feb 5, 1974.

Mr. Junji Ebihara,
Director, Jamuna Bridge Survey Office,
703, Dhanmondi R.A., Road No.19,
Dacca-5.

Sub : Jamuna Bridge - Minimum horizontal and vertical clearances to meet navigational requirements.

Ref : Your letter No.BI/TA-II/241/74 dated 20.1.74 addressed to Chairman, BI/TA.

Dear Sir,

The undersigned is directed to refer to your above mentioned letter addressed to Chairman, BI/TA and to inform that the following are the minimum navigational requirements in so far as the proposed rail-cum-road bridge across the Jamuna is concerned:

1. Minimum horizontal clearance between two piers ... 250(two hundred and fifty) feet.

2. Minimum vertical clearance under the soffit of the girders ... 40 (forty) feet.

(Anwar Hossain)
Secretary.

Memo.No.CE/JB/J-AID/ Dated: ~~January~~ Feb 5, 1974.

Copy forwarded for information to :-

1. Secretary to the Govt. of the People's Republic of Bangladesh, Ministry of Shipping, IWT & Aviation, Bangladesh Secretariat, Dacca-2.
2. Secretary to the Govt. of the People's Republic of Bangla Ministry of Communications, Bangladesh Secretariat, Dacca