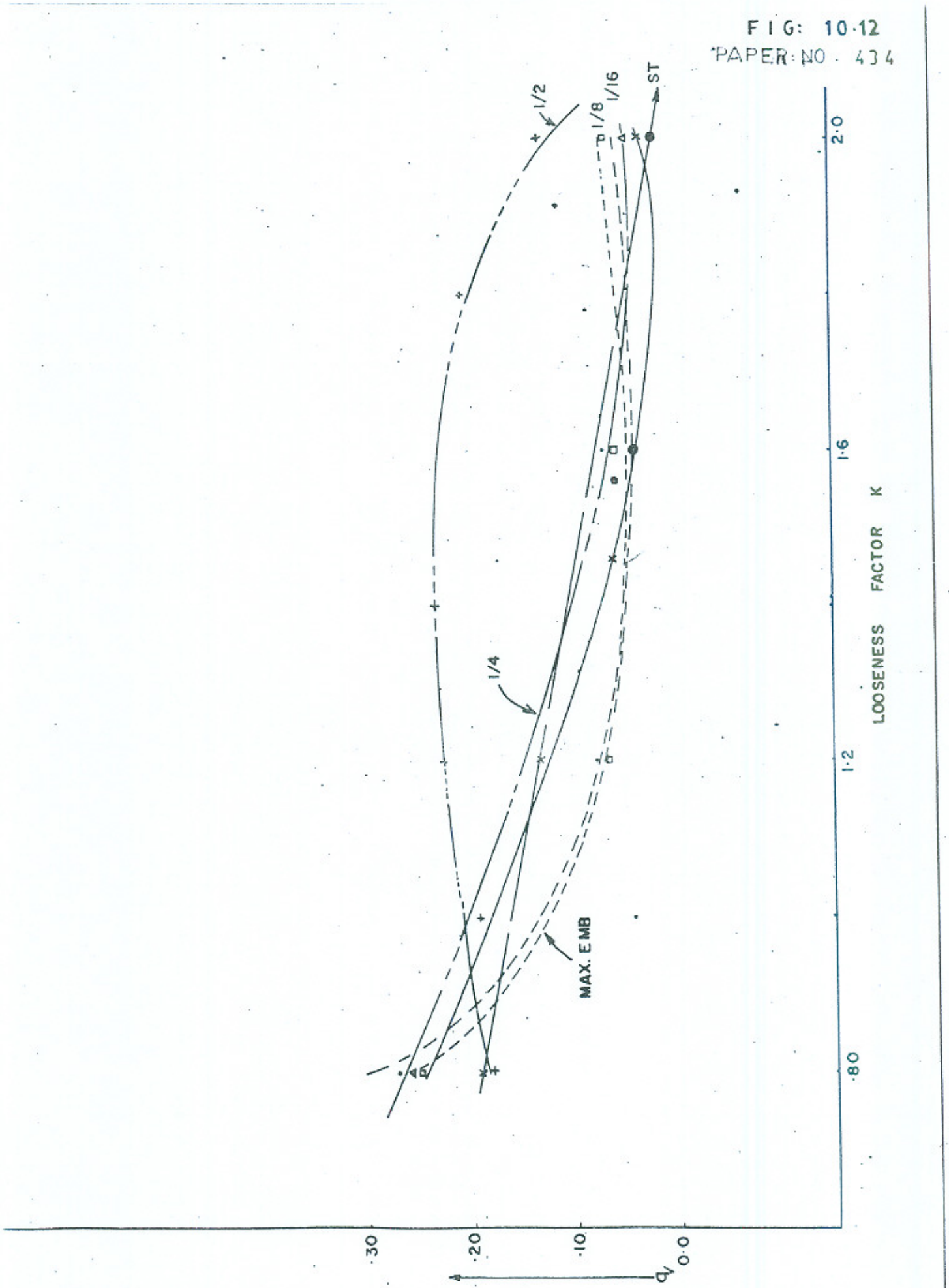
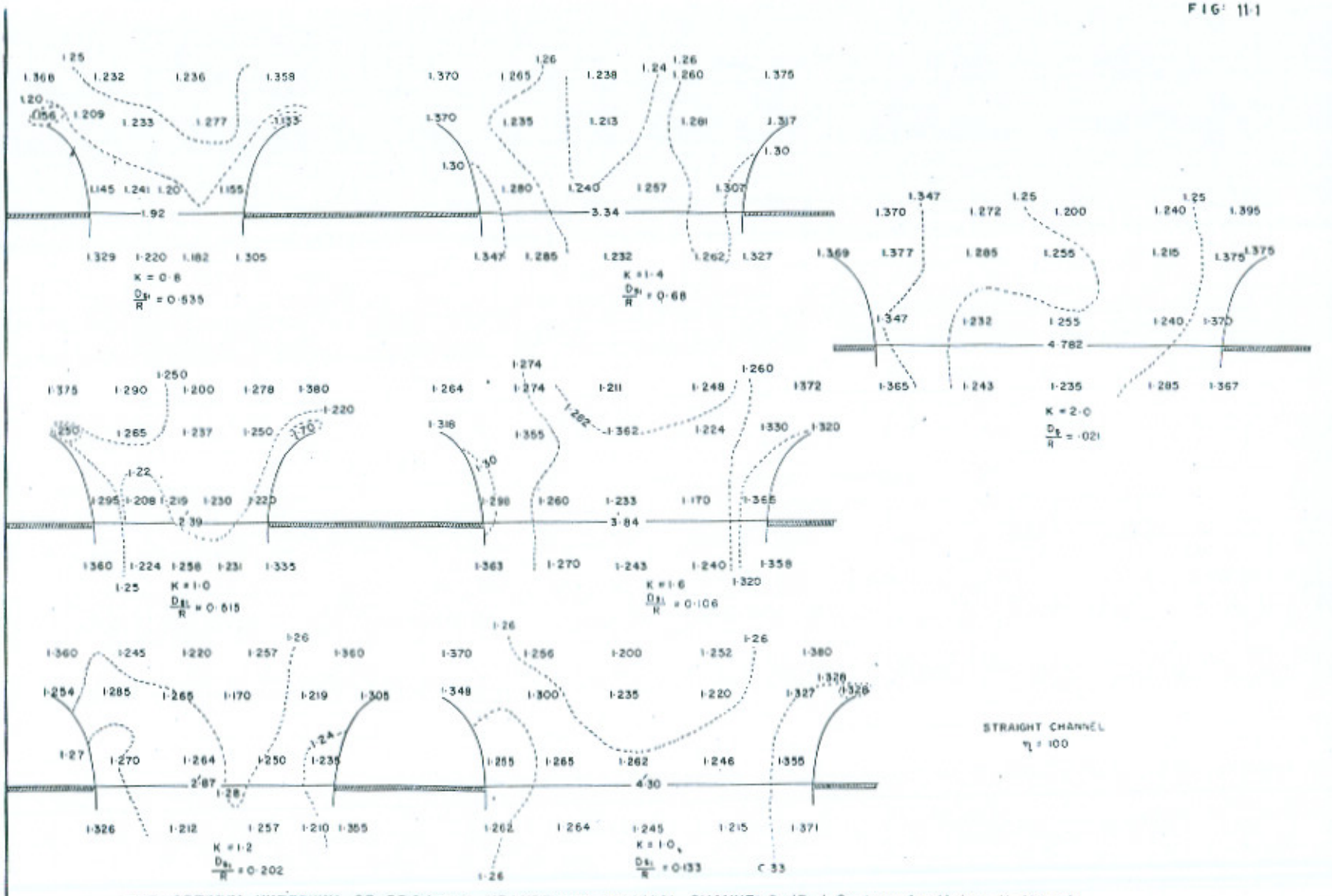
FIG: 10·12
PAPER NO. 434



MIN. DISCHARGE INTENSITY q V/S K LOOSENESS FACTOR WITH VARIOUS SINUOSITIES

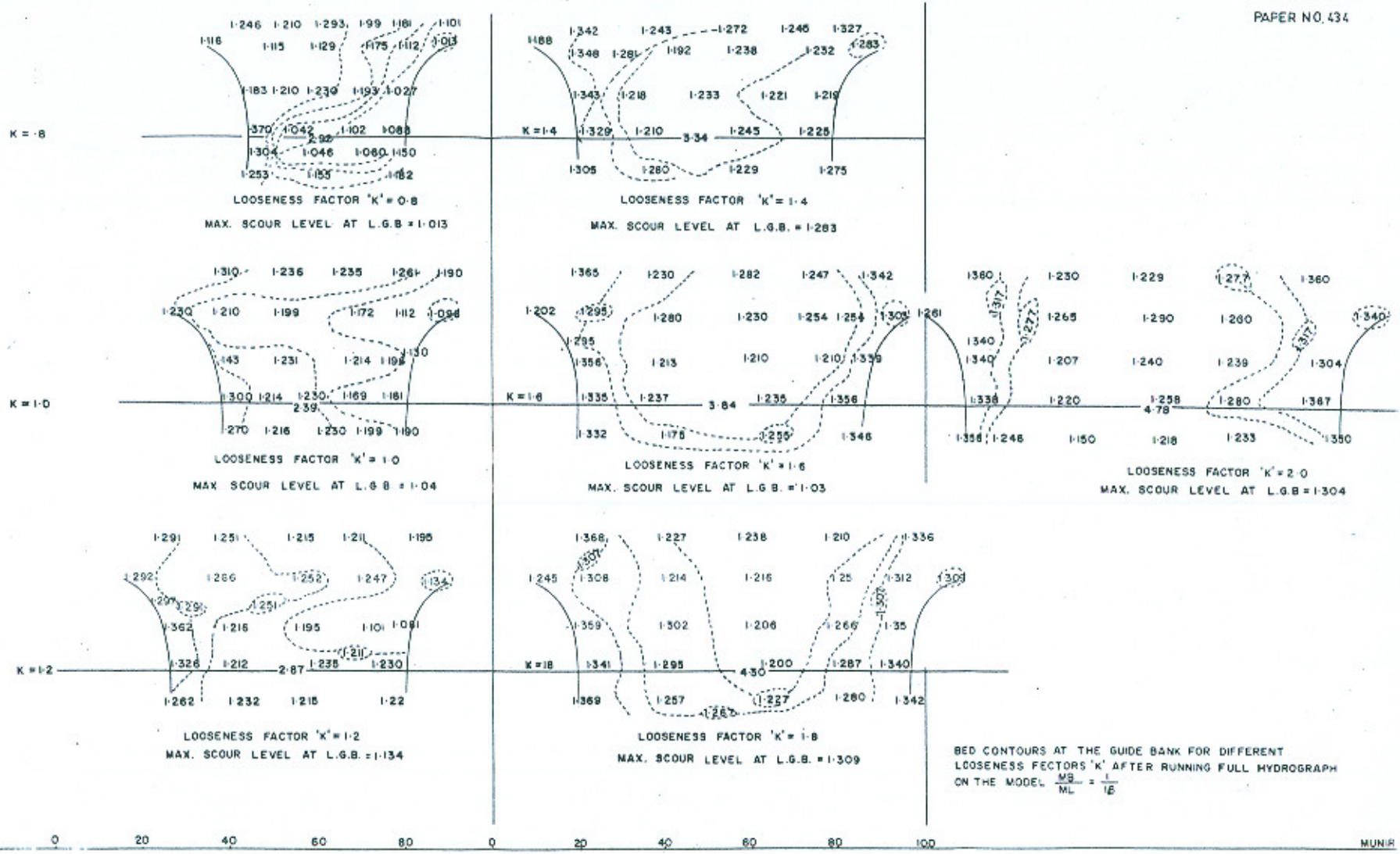
FIG: 11·1



THE OPTIMUM WATERWAY OF BRIDGE IN MEANDERING ALLUVIAL CHANNELS (Bed Contours for Various K -Values)

FIG: 11·2

PAPER NO. 434

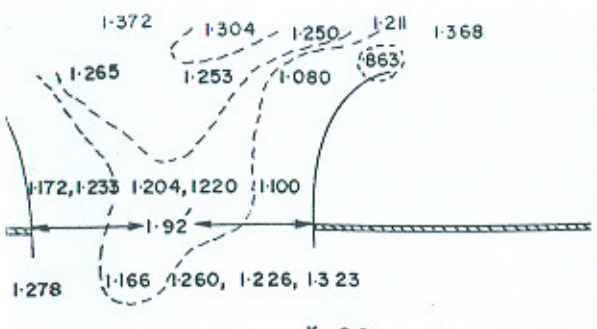


BED CONTOURS AT THE GUIDE BANK FOR DIFFERENT LOOSENESS FECTORS 'K' AFTER RUNNING FULL HYDROGRAPH ON THE MODEL $\frac{MS}{ML} = \frac{1}{16}$

MUNIR

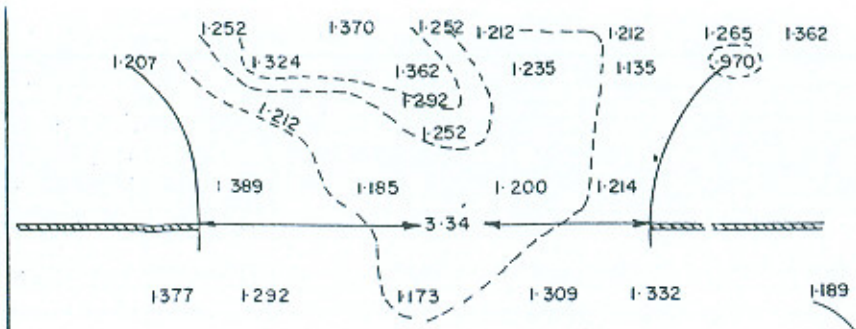
THE OPTIMUM WATER WAY OF BRIDGE IN MEANDERING ALLUVIAL CHANNELS

CONTOUR INTERVAL = 0·04



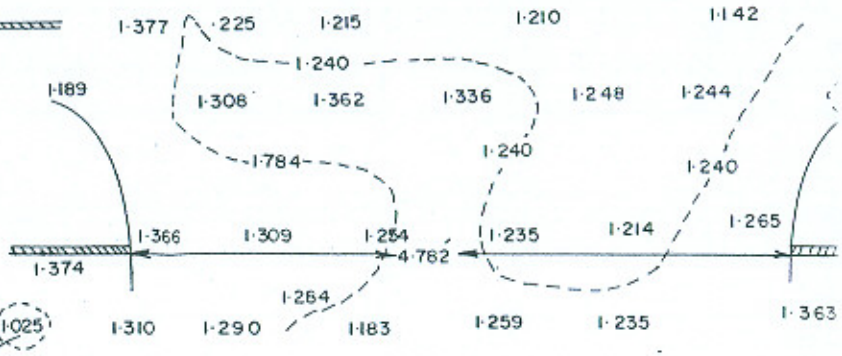
K = 0·8

MAX. SCOUR AT L.G.B = 0·863



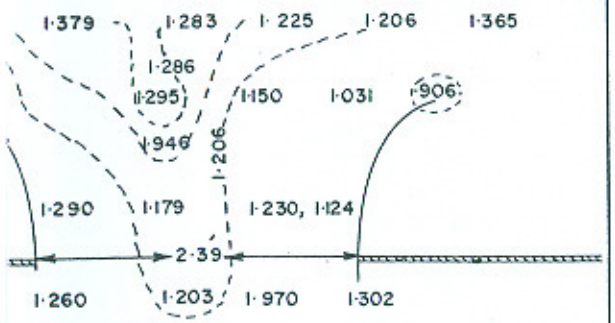
K = 1·4

MAX. SCOUR AT L.G.B = 0·970



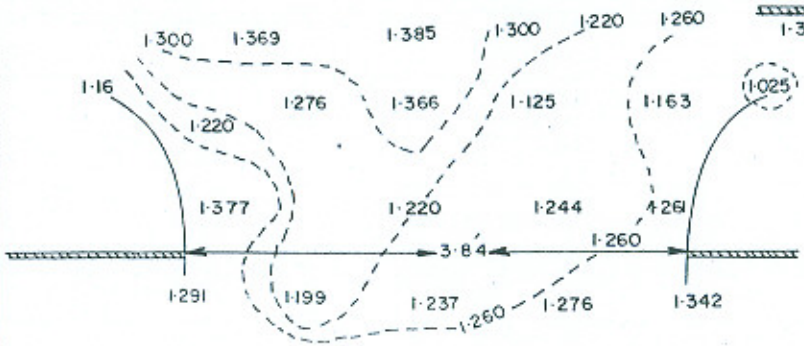
K = 2·0

MAX SCOUR AT L.G.B = 1·182



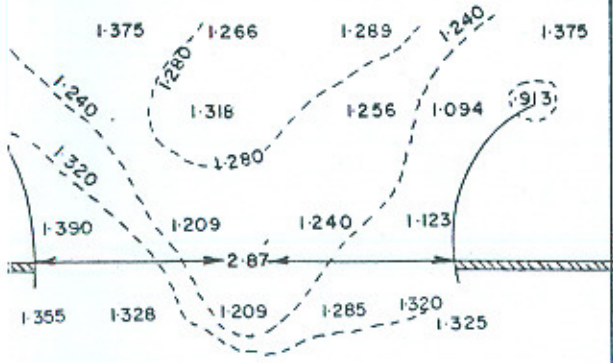
K = 1·0

MAX. SCOUR AT L.G.B = 0·906



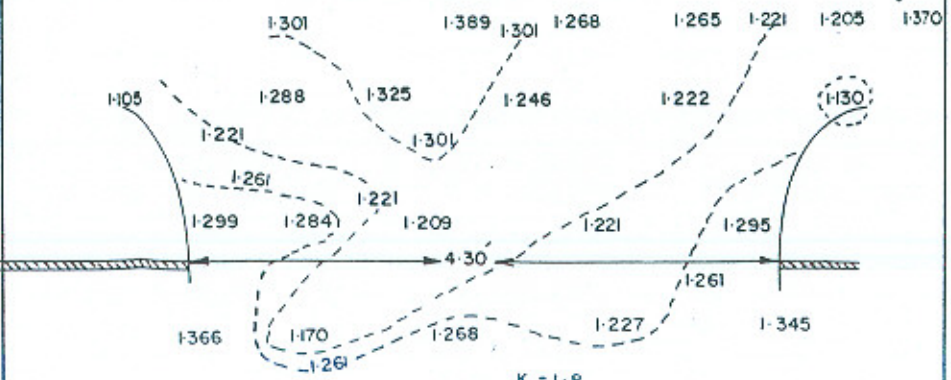
K = 1·6

MAX. SCOUR A L.G.B = 1·025



K = 1·2

MAX. SCOUR AT L.G.B = 0·913

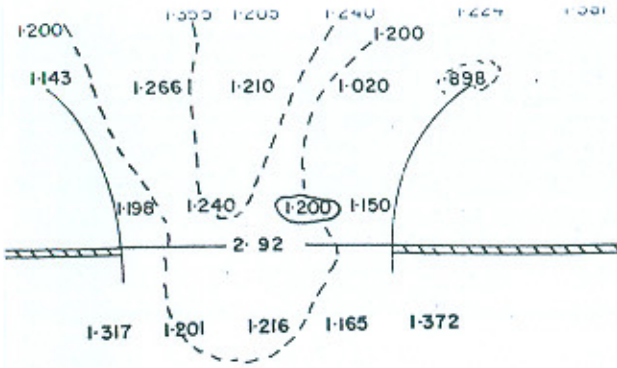


K = 1·8

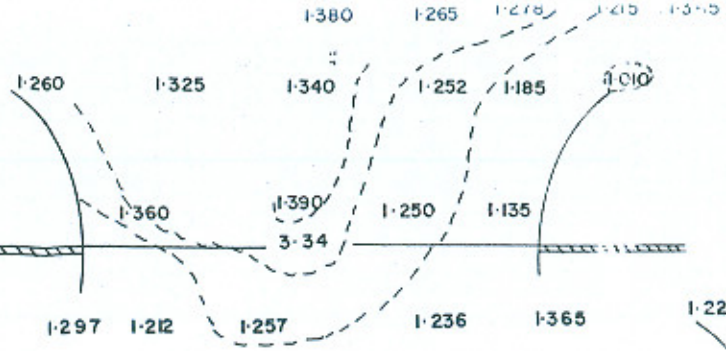
MAX. SCOUR AT L.G.B = 1·130

OPTIMUM WATERWAY OF A BRIDGE

CONTOUR INTERVAL = 004

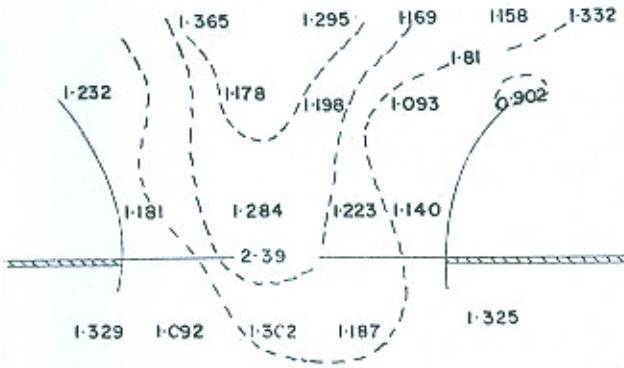


K_1 = 0·8 MAX. SCOUR AT L.G.B = 0·898

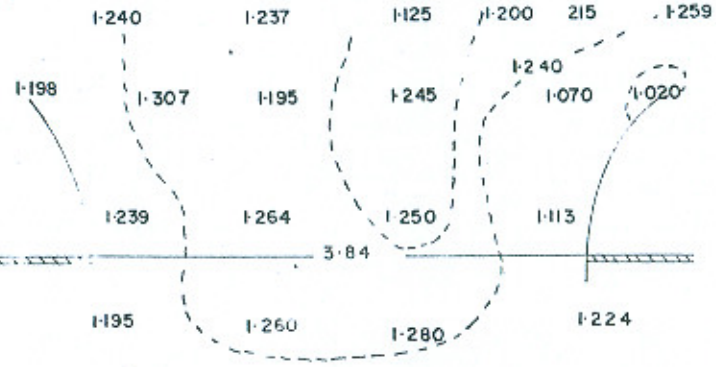


K_1 = 1·4 MAX. SCOUR AT L.G.B = 1·010

K = 2·0 MAX. SCOUR AT L.G.B = 1·015



K_1 = 1·0 MAX. SCOUR AT L.G.B = 0·902

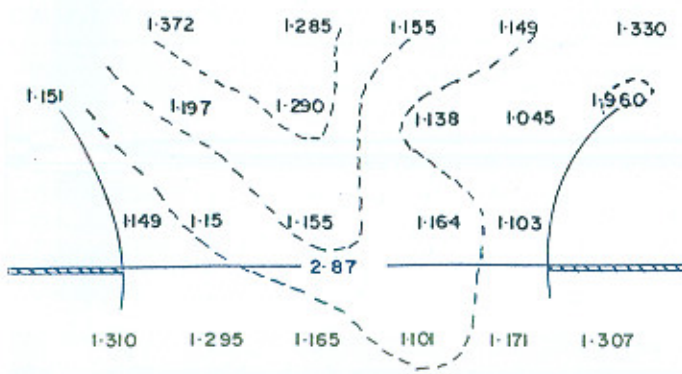


K_1 = 1·6 MAX. SCOUR AT L.G.B = 1·020

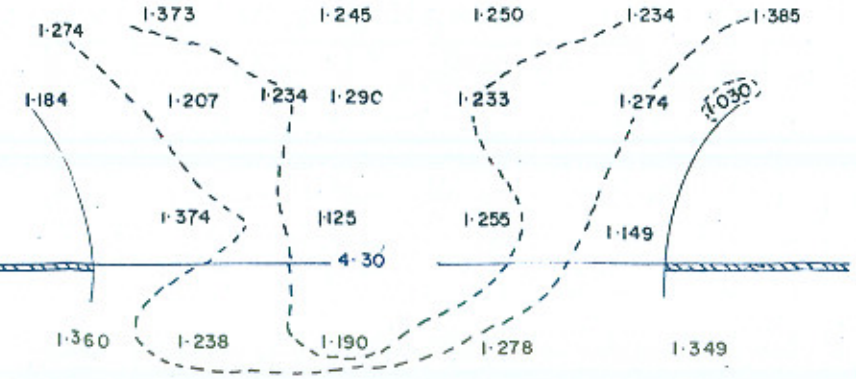
BED CONTOURS AT THE GUIDE BANK FOR DIFFERENT LOOSENESS FACTOR (K_1) AFTER RUNNING FULL HYDROGRAPH ON THE MODEL

MB/ML = 1/4

NOTE :- CONTOURS ARE GIVEN IN GAUGE READINGS



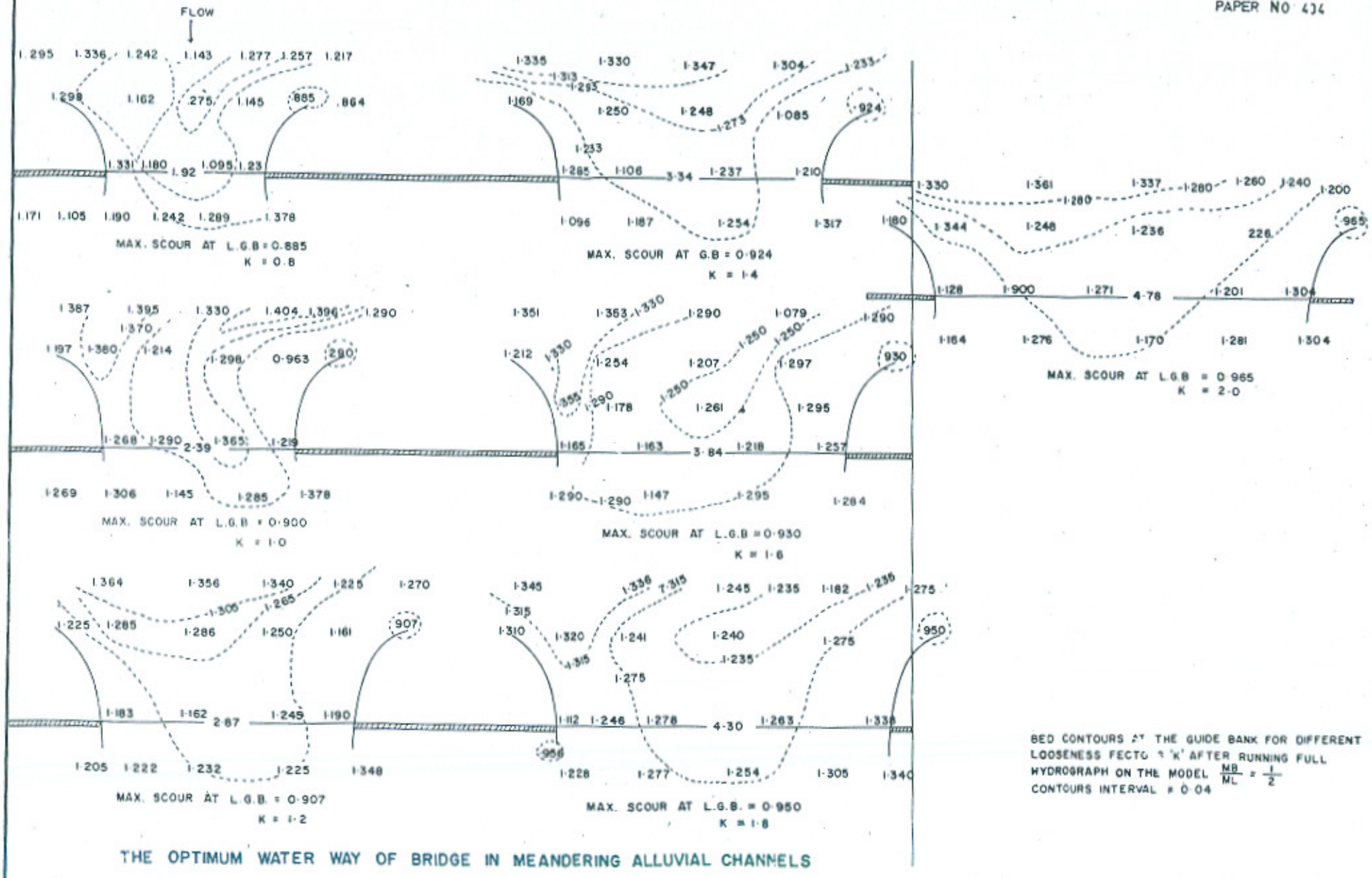
K = 1·2 MAX. SCOUR AT L.G.B = 0·960



K = 1·8 MAX. SCOUR AT L.G.B = 1·030

OPTIMUM WATERWAY OF BRIDGE

FIG: 11·5
PAPER NO 434

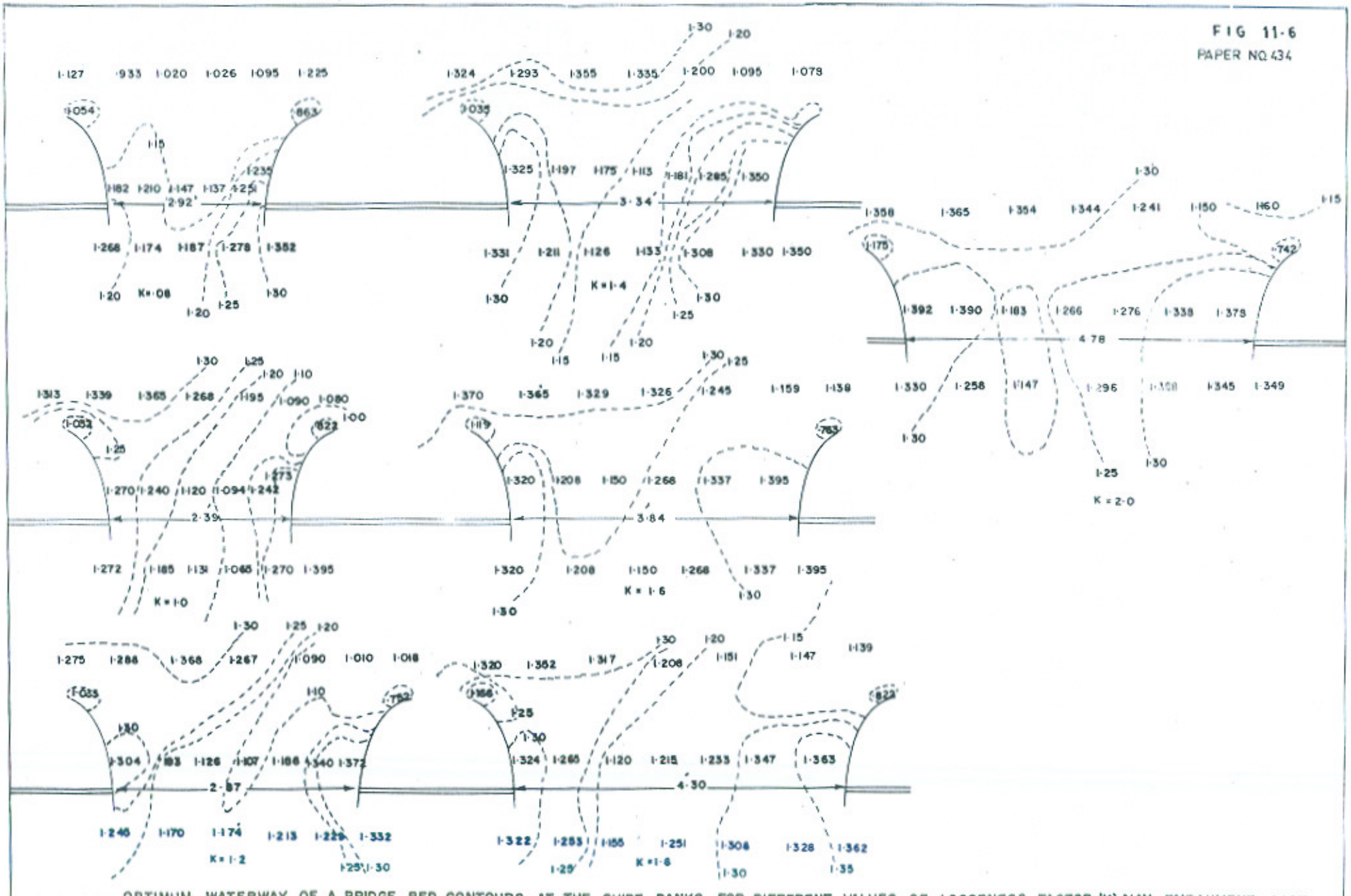


BED CONTOURS AT THE GUIDE BANK FOR DIFFERENT LOOSENESS FECTO ? 'K' AFTER RUNNING FULL HYDROGRAPH ON THE MODEL $\frac{MB}{ML} = \frac{1}{2}$
CONTOURS INTERVAL = 0·04

THE OPTIMUM WATER WAY OF BRIDGE IN MEANDERING ALLUVIAL CHANNELS

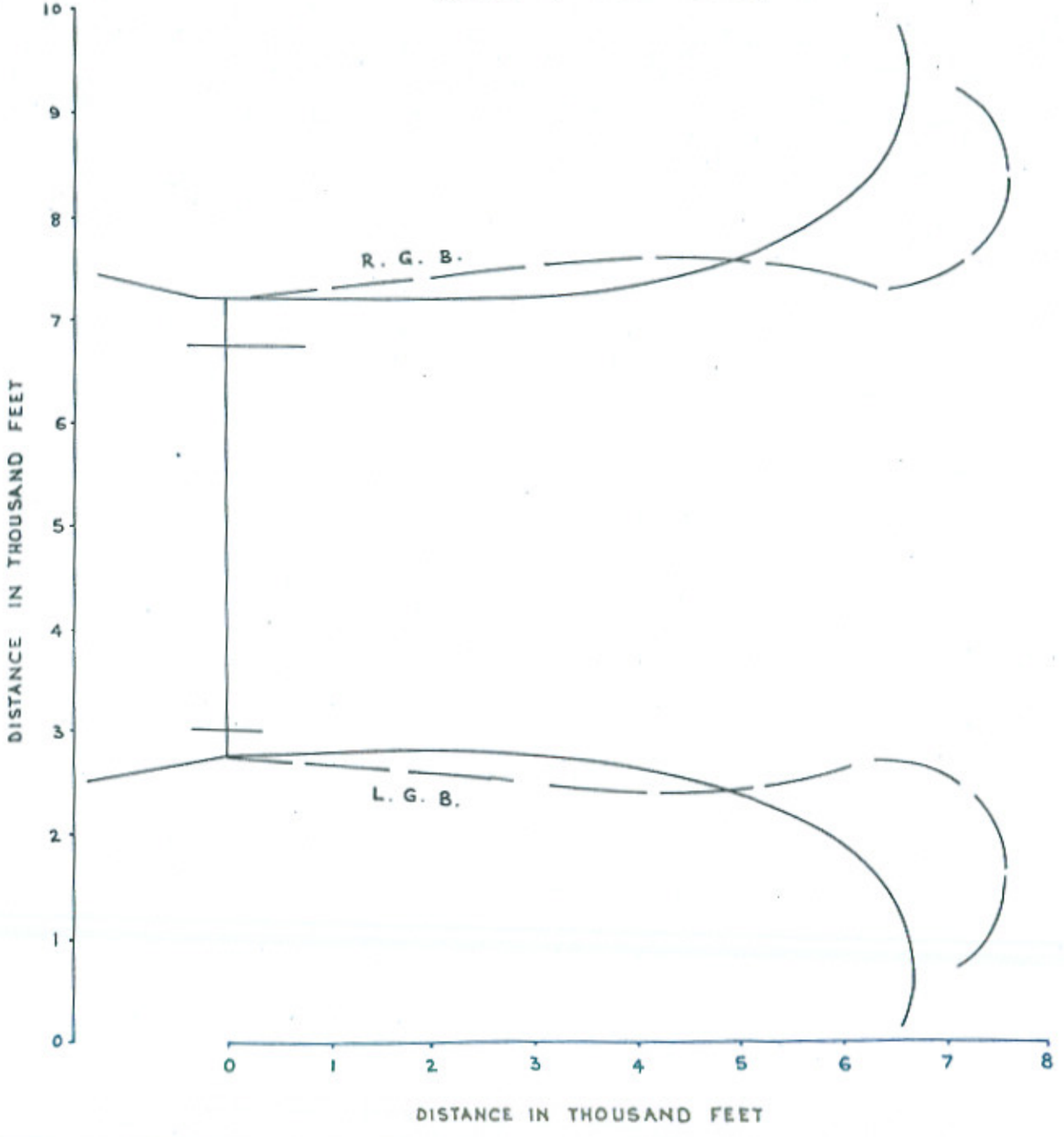
MUNIR

FIG 11·6
PAPER NO 434



OPTIMUM WATERWAY OF A BRIDGE BED CONTOURS AT THE GUIDE BANKS FOR DIFFERENT VALUES OF LOOSENESS FACTOR (K) MAX. EMBAKMENT CASE

MODEL OF GUDDU BARRAGE



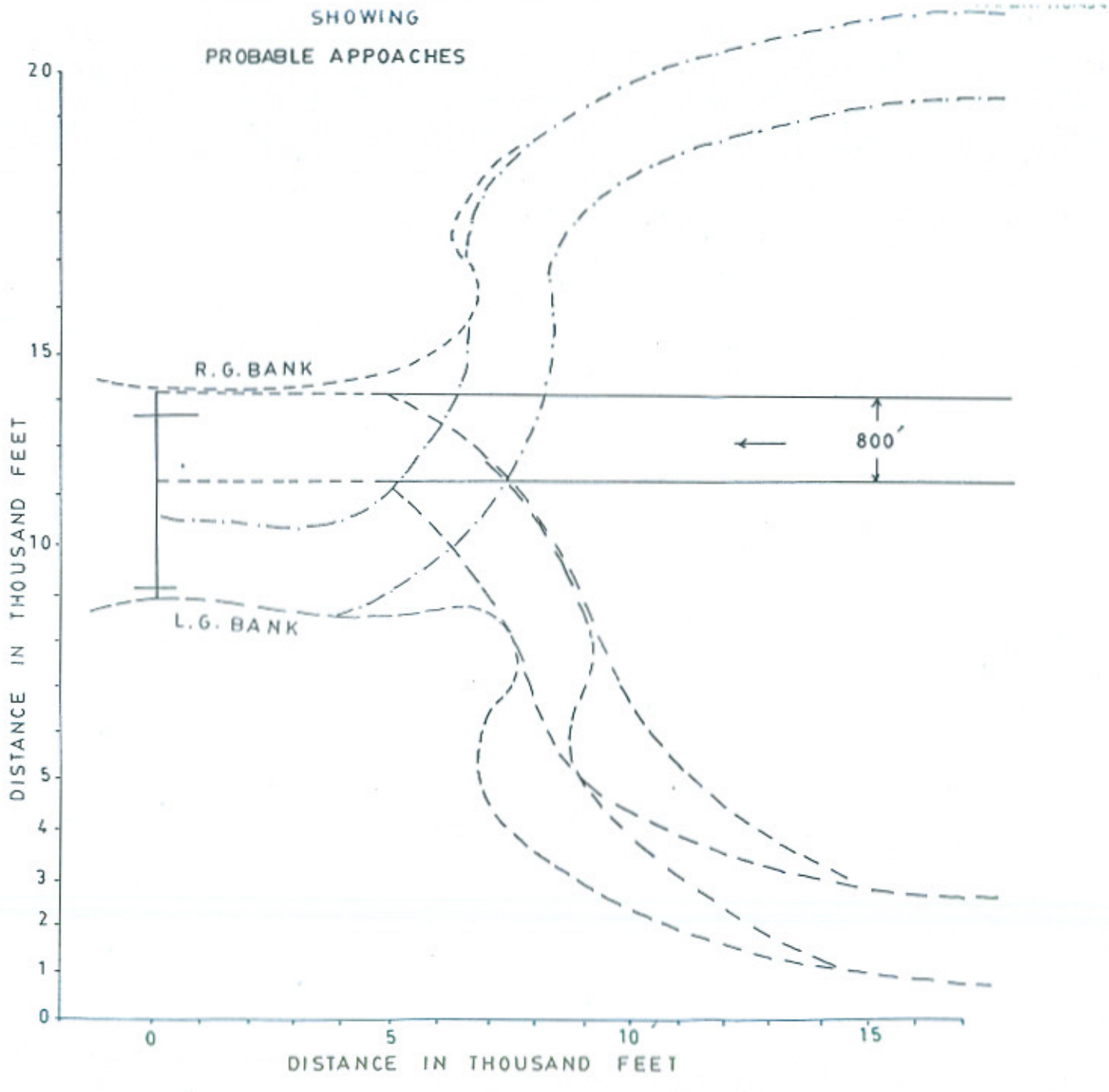
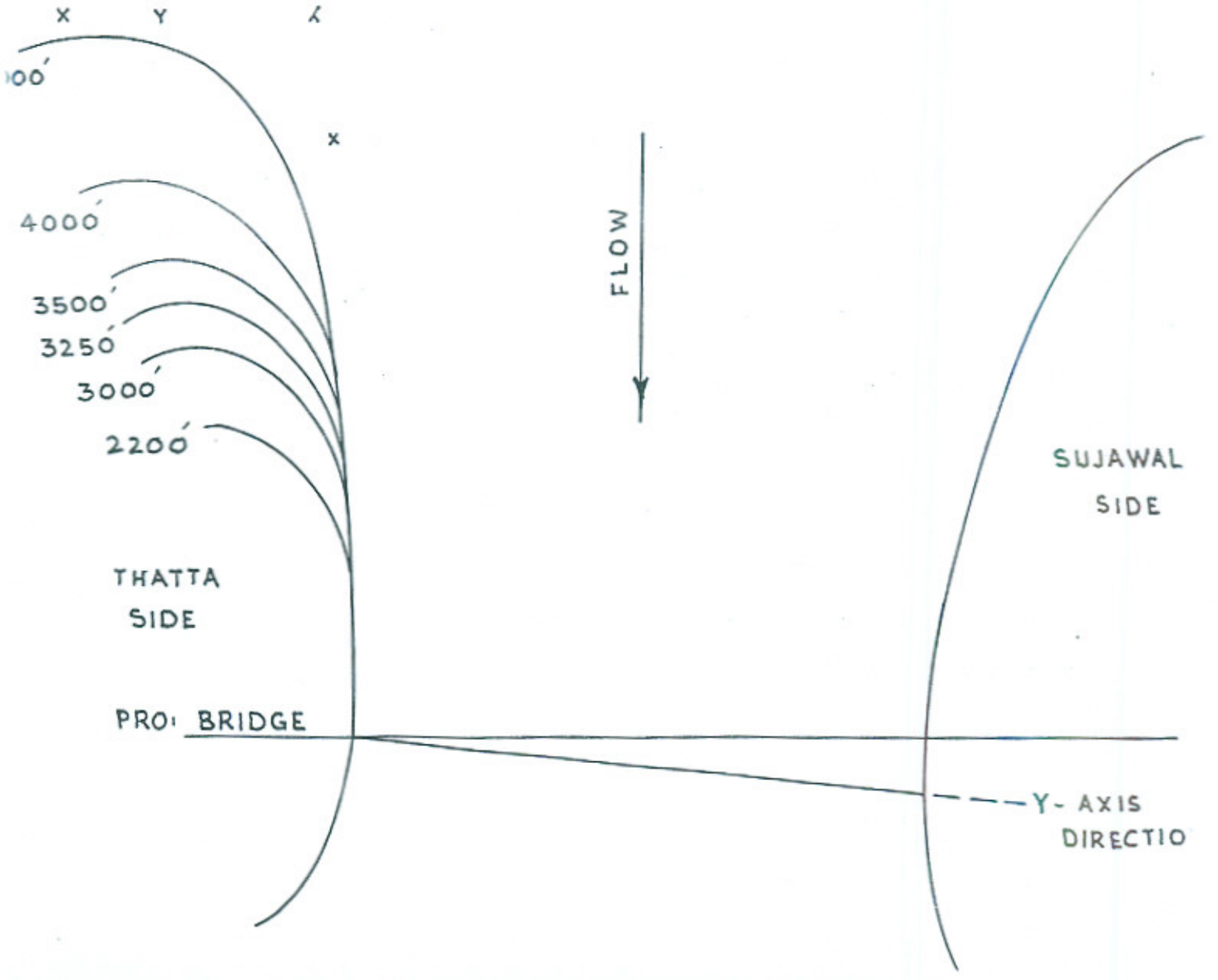

SHOWING
PROBABLE APPOACHES
R.G.BANK
L.G.BANK
800'
DISTANCE IN THOUSAND FEET
DISTANCE IN THOUSAND FEET
0
1
2
3
4
5
10
15
20
0
5
10
15

Fig:-13·1
PAPER:NO434

THATTA-SUJAWAL ROAD BRIDGE ACCROSS RIVER INDUS

PLAN SHOWING LENGTHS OF R.G.B TESTED ON MODEL



MODEL OF THATTA SUJAWAL ROAD BRIDGE

PLAN SHOWING DIFFERENT SHAPES OF GUIDE BANK

TESTED ON THE MODEL

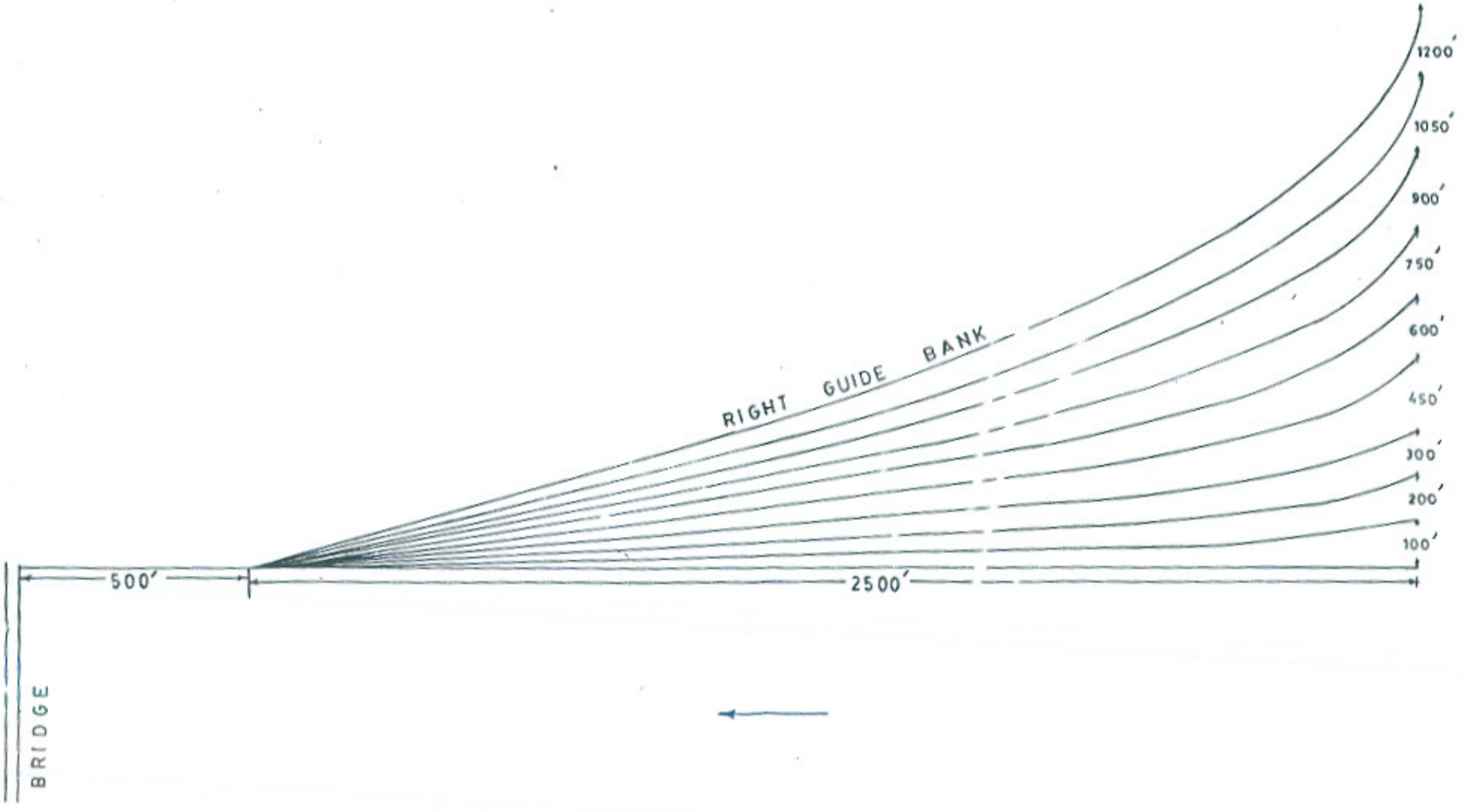
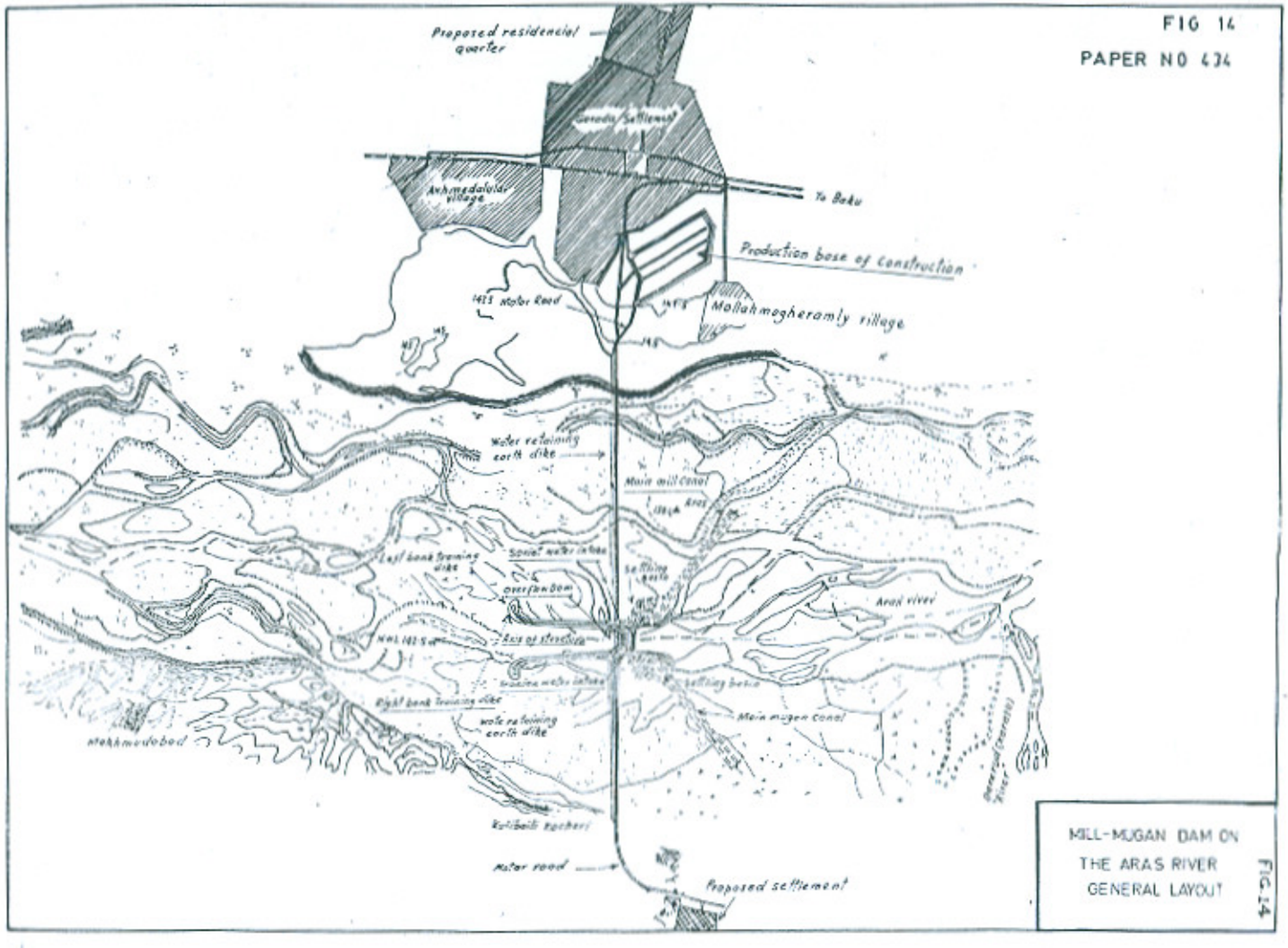


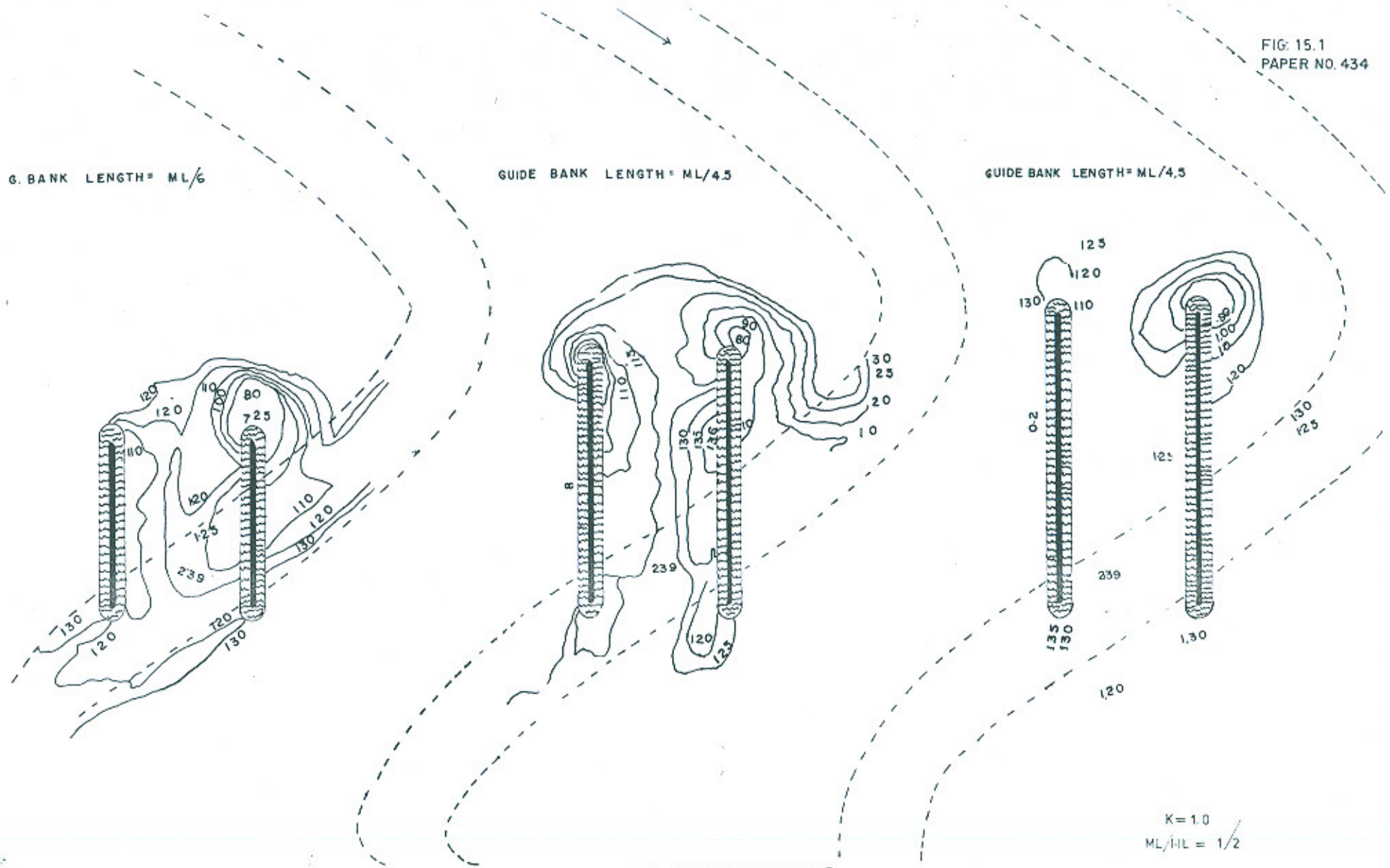
FIG 14

PAPER NO 434

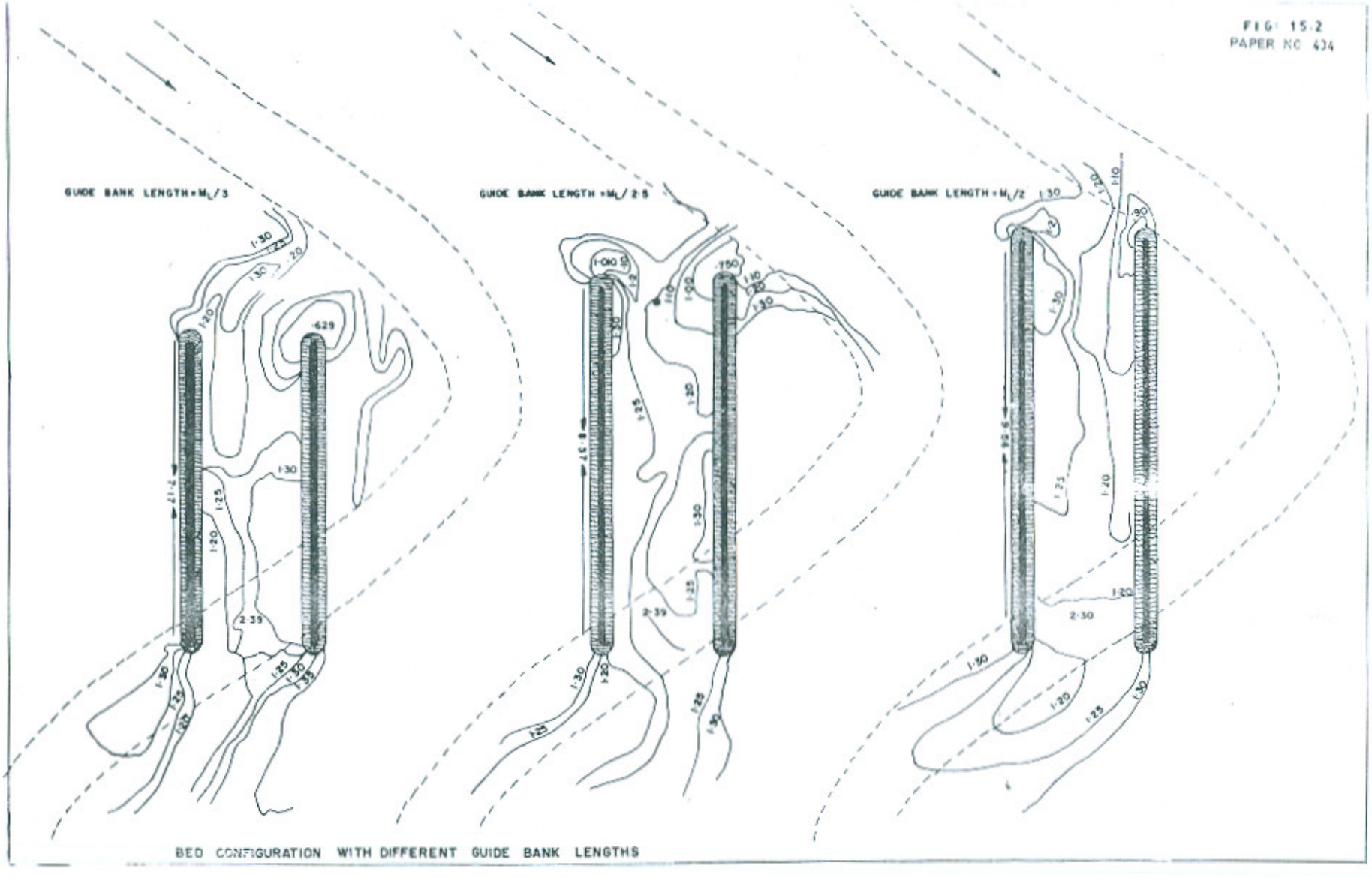


MIL-MUGAN DAM ON THE ARAS RIVER GENERAL LAYOUT

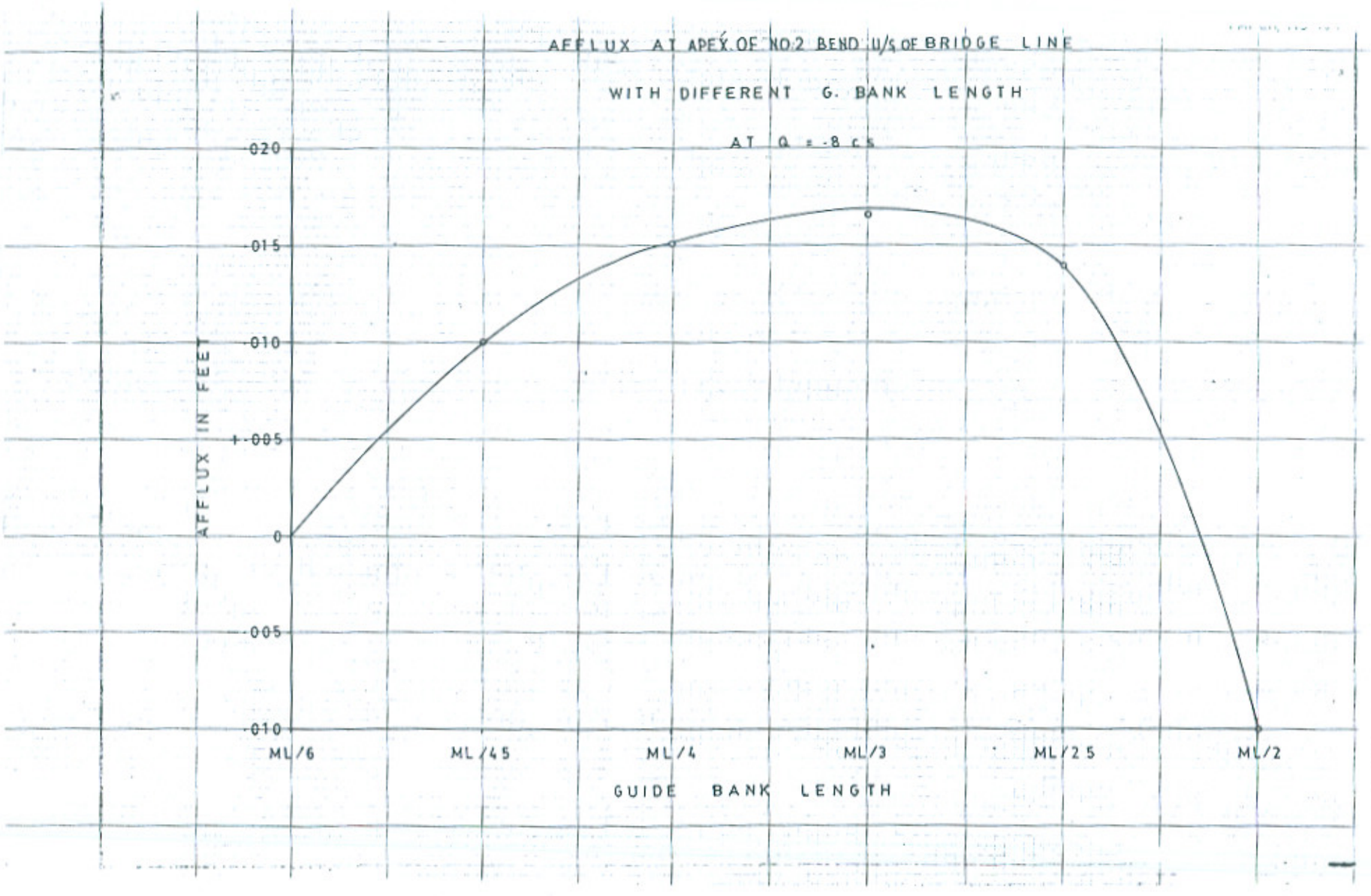
FIG.14

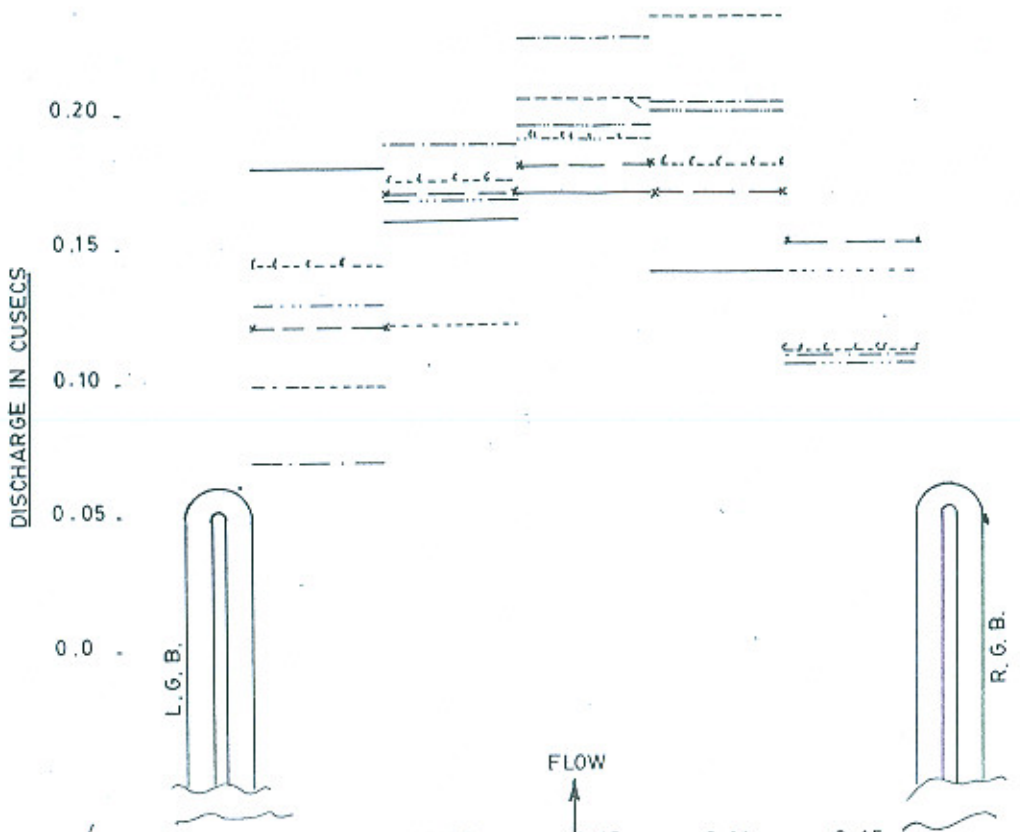


BED CONFIGURATION WITH DIFFERENT GUIDE BANK LENGTHS



BED CONFIGURATION WITH DIFFERENT GUIDE BANK LENGTHS

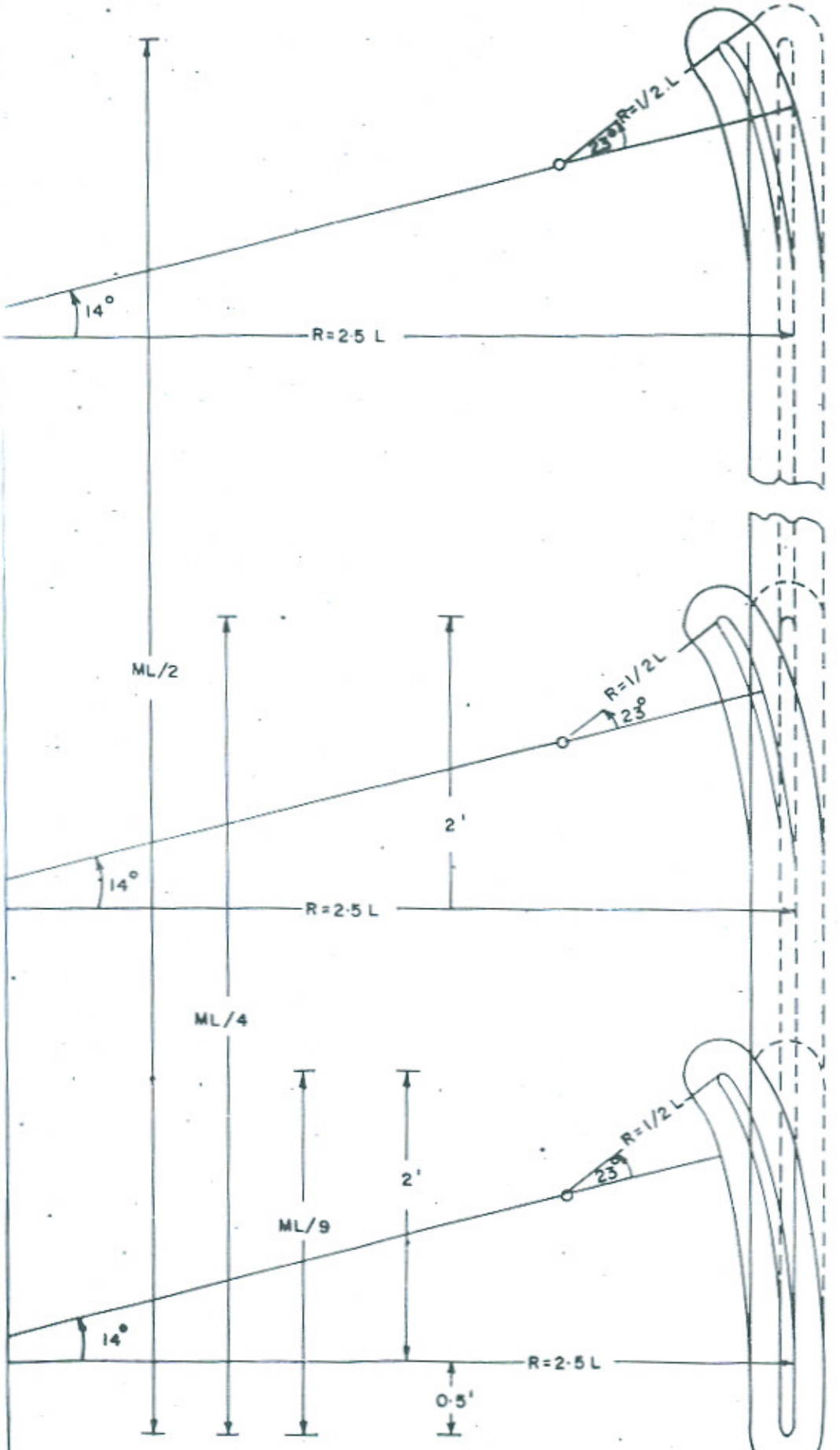

AFFLUX AT APEX OF NO.2 BEND U/S OF BRIDGE LINE
WITH DIFFERENT G. BANK LENGTH
AT Q = -8 cs
AFFLUX IN FEET
020
015
010
+.005
0
005
010
ML/6
ML/45
ML/4
ML/3
ML/25
ML/2
GUIDE BANK LENGTH



———	ML/2.0	0.16	0.16	0.17	0.14	0.15 cs.
← — — →	ML/2.5	0.12	0.17	0.18	0.17	0.15 "
— . — . —	ML/3.0	0.07	0.187	0.277	0.205	0.106 "
—··—··—	ML/4.0	0.128	0.167	0.195	0.202	0.106 "
– – – – –	ML/4.5	0.097	0.122	0.205	0.236	0.139 "
←–·–·–→	ML/6	0.144	0.175	0.191	0.180	0.110 "

DISCHARGE DISTRIBUTION WITH DIFFERENT LENGTHS OF GUIDE BANK.

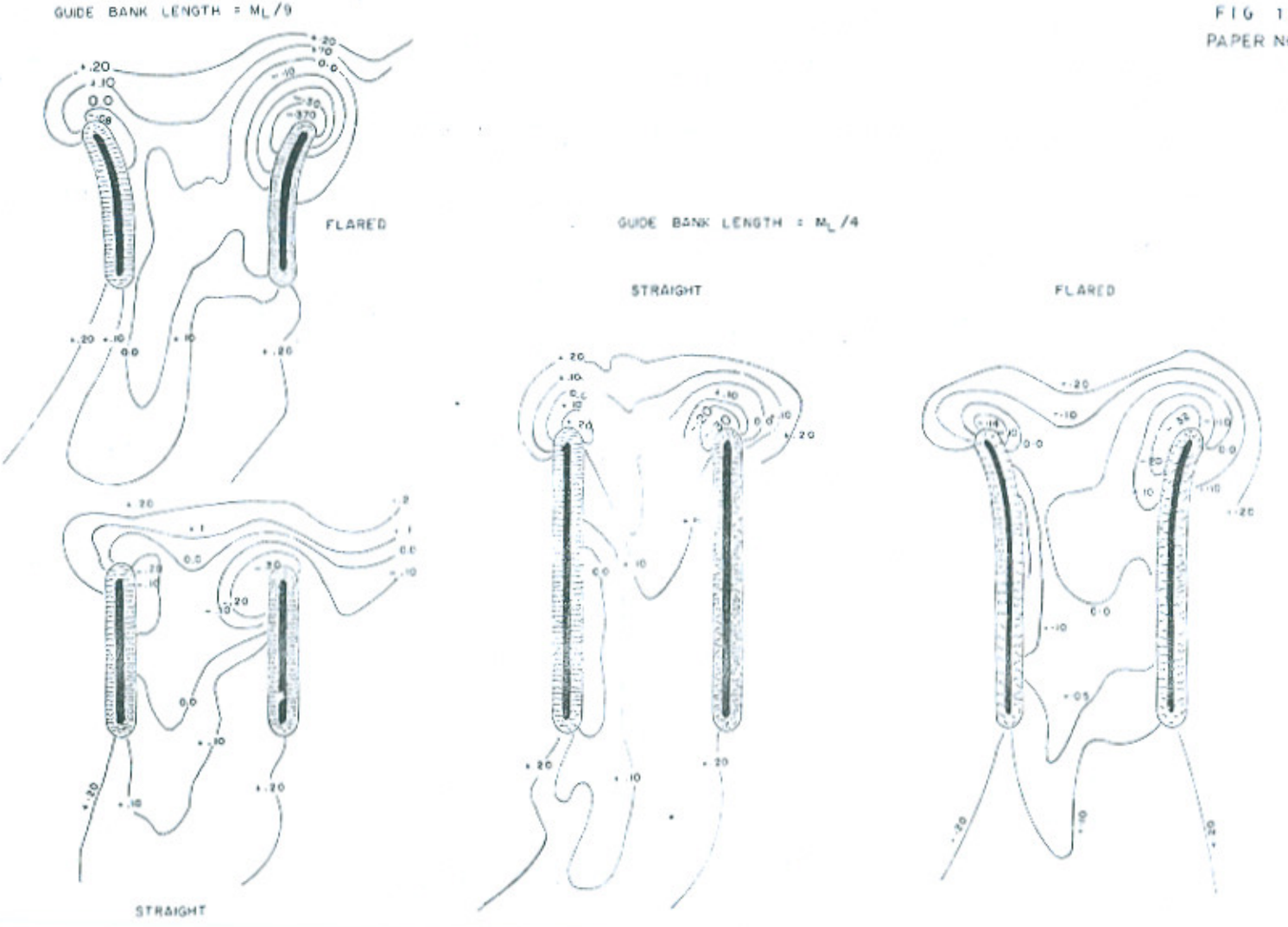
FIG: 16·1
PAPER NO 434



STRAIGHT & ANGLED GUIDE BANK NOSE

OPTIMUM WATERWAY OF A BRIDGE

FIG 16-2
PAPER NO. 434

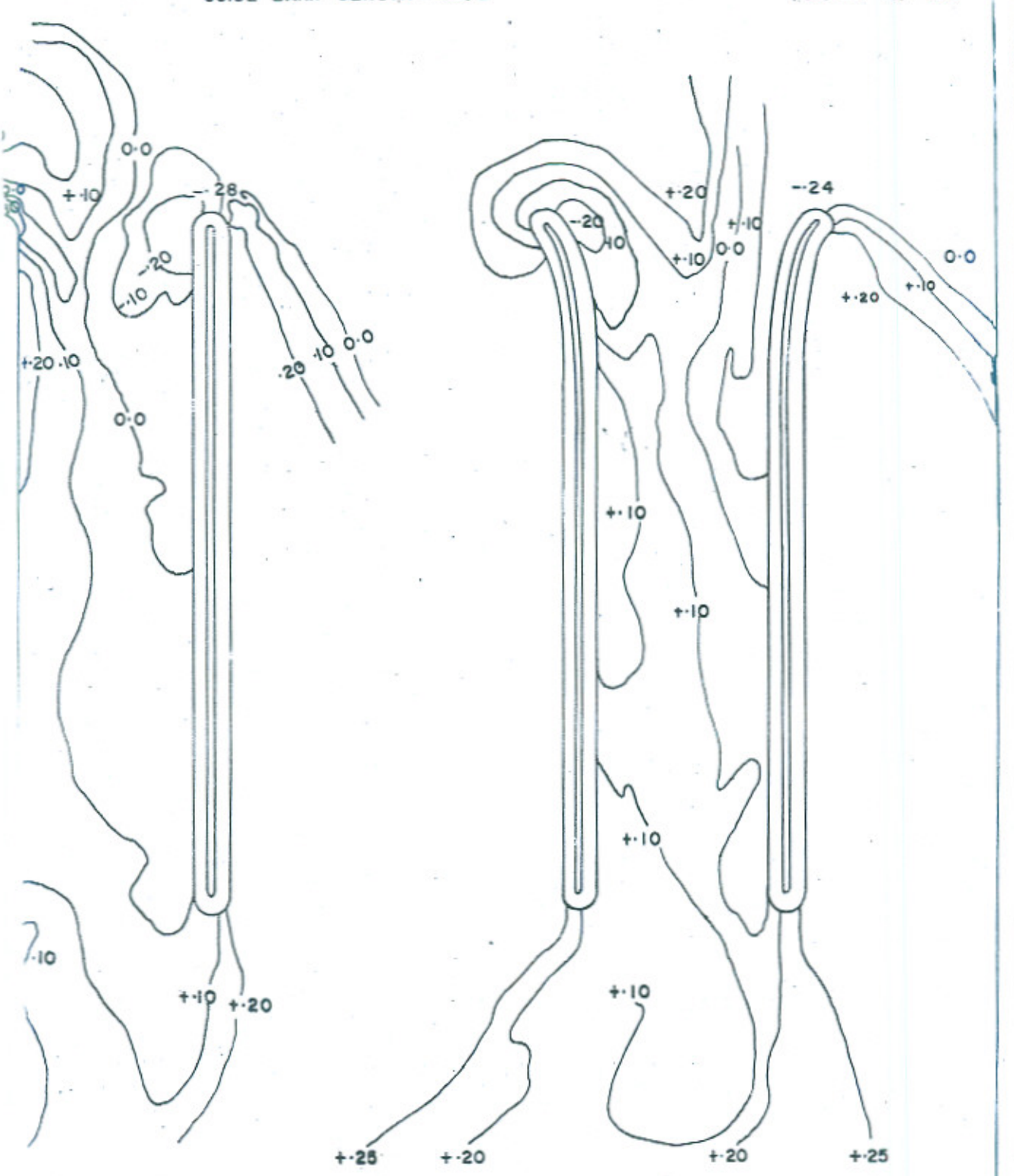


BED CONDITION WITH STRAIGHT AND FLARED GUIDE BANK

NIGHT

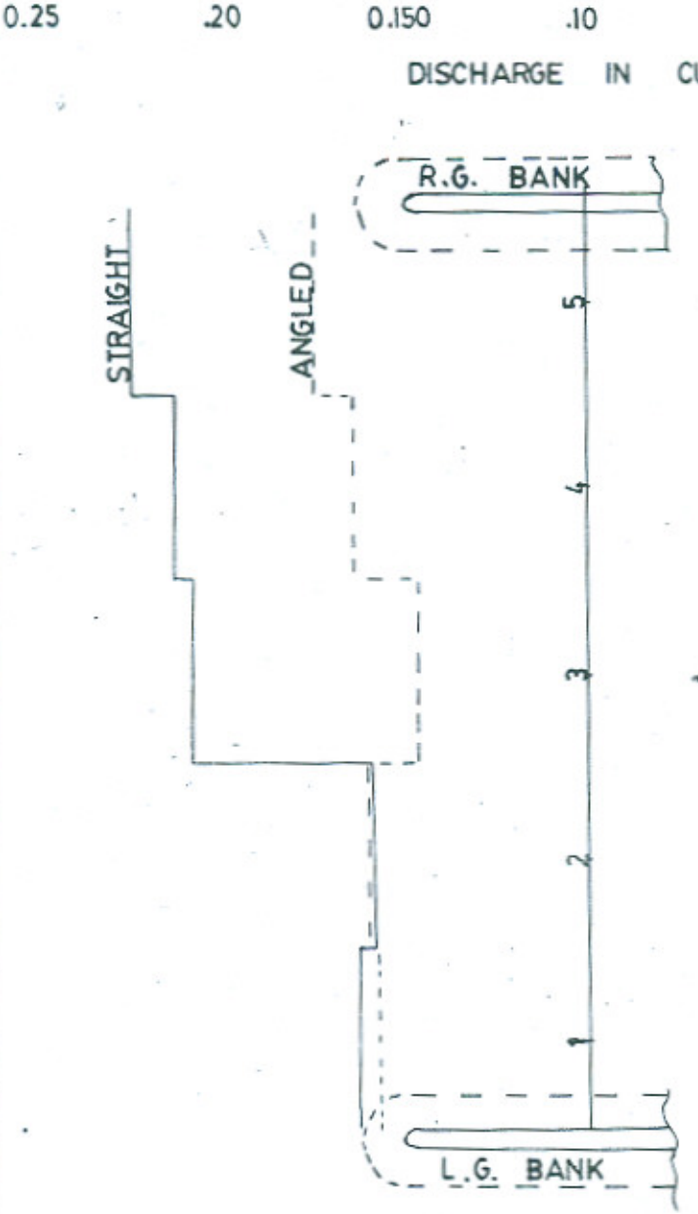
FLARED

GUIDE BANK LENGTH = ML/2



BED CONDITION WITH STRAIGHT & FLARED GUIDE BANKS

FIG. 16.4
PAPER NO. 434

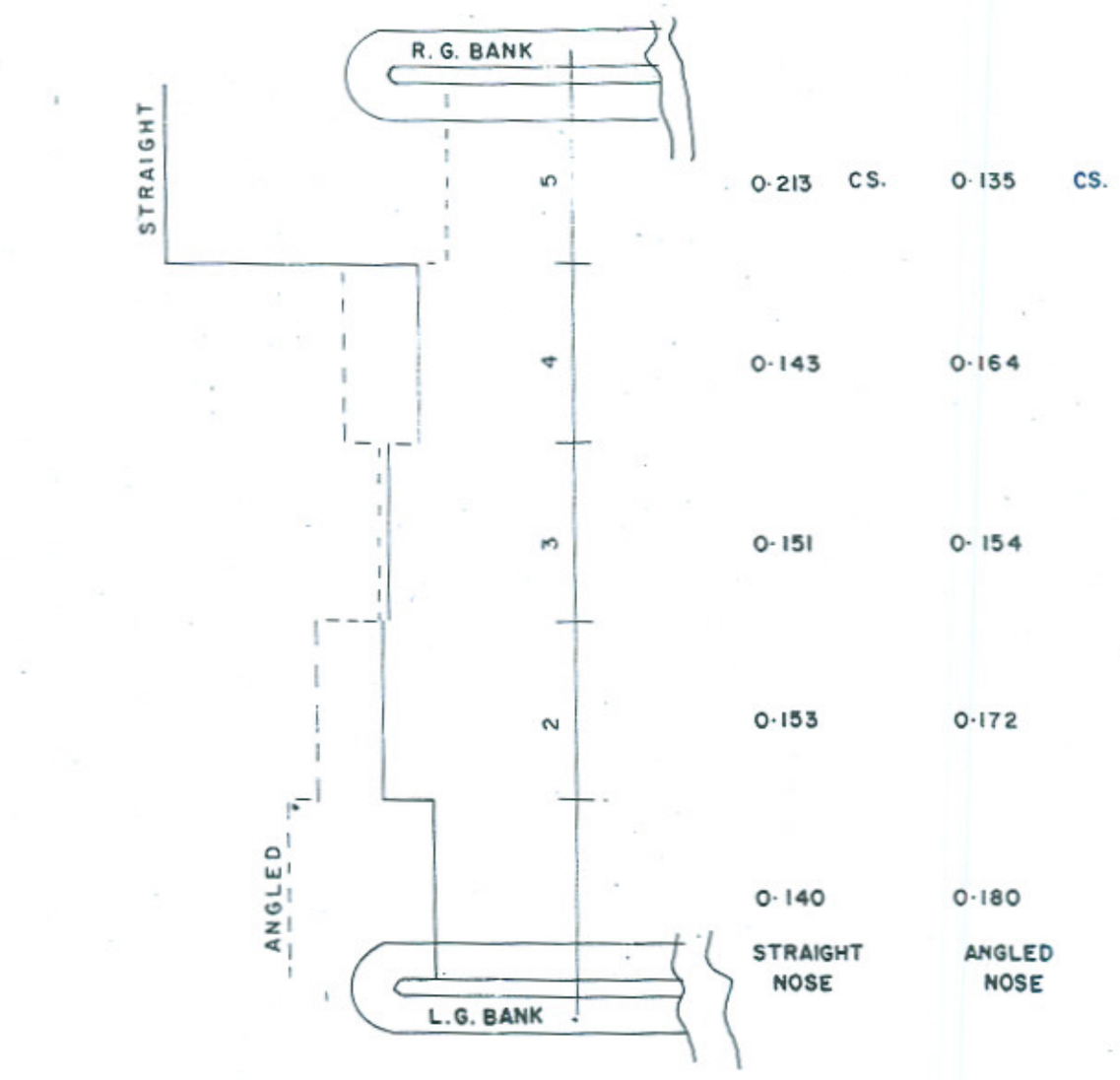


	ST. NOSE	ANGLED NOSE
5	0.223 CS:	0.174 CS:
4	0.213	00.163
3	0.207	0.146
2	0.159	0.160
1	0.161	0.158

DISCHARGE DISTRIBUTION AT THE BRIDGE WITH STRAIGHT AND ANGLED GUIDE BANK NOSE FOR GUIDE BANK.
LENGTH = ML/9

OPTIMUM WATERWAY OF A BRIDGE

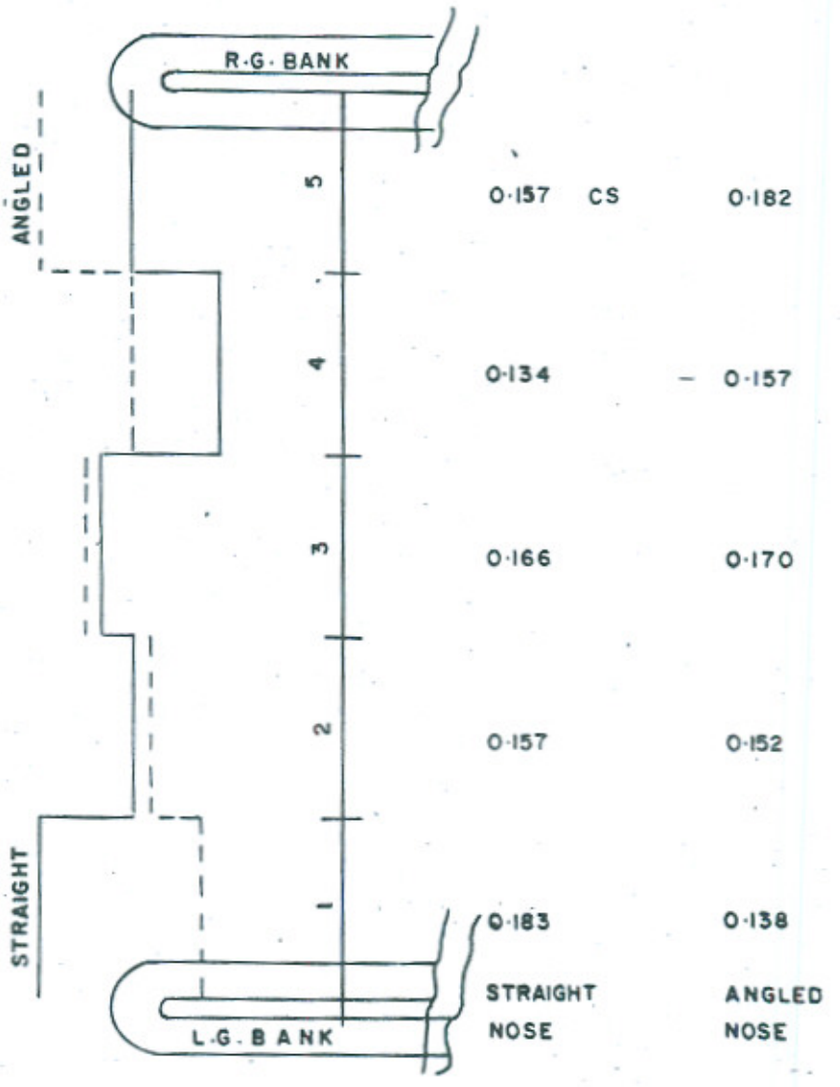
FIG: 16.5
PAPER: NO.434



DISCHARGE DISTRIBUTION AT THE BRIDGE WITH STRAIGHT & ANGLED GUIDE BANK NOSE FOR GUIDE BANK LENGTH = ML/4

OPTIMUM WATERWAY OF A BRIDGE

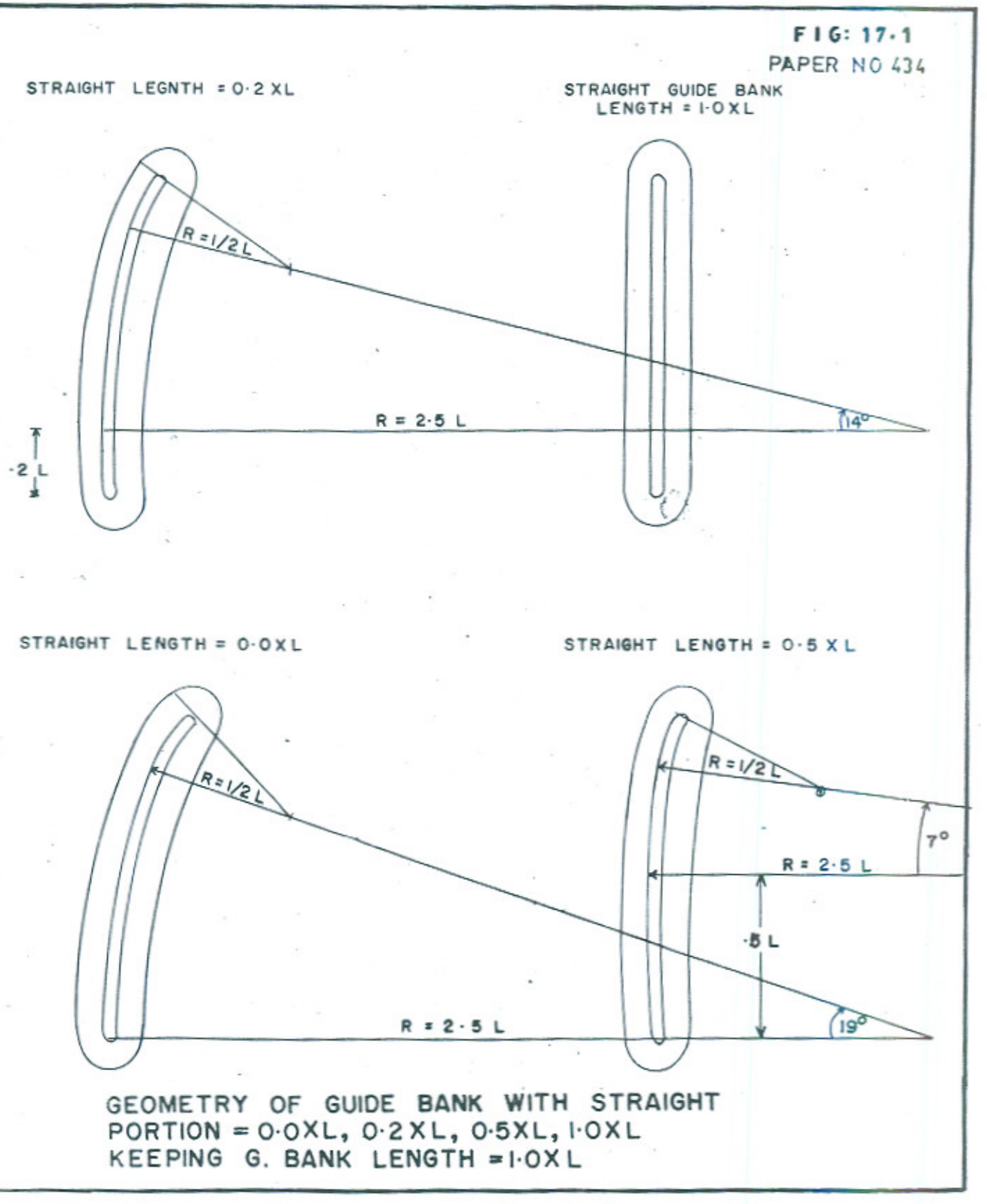
FIG: 16·6
PAPER: NO.434



DISCHARGE DISTRIBUTION AT THE BRIDGE WITH STRAIGHT & ANGLED GUIDE BANK NOSE FOR GUIDE BANK LENGTH = ML/2

OPTIMUM WATERWAY OF A BRIDGE

FIG: 17·1
PAPER NO 434



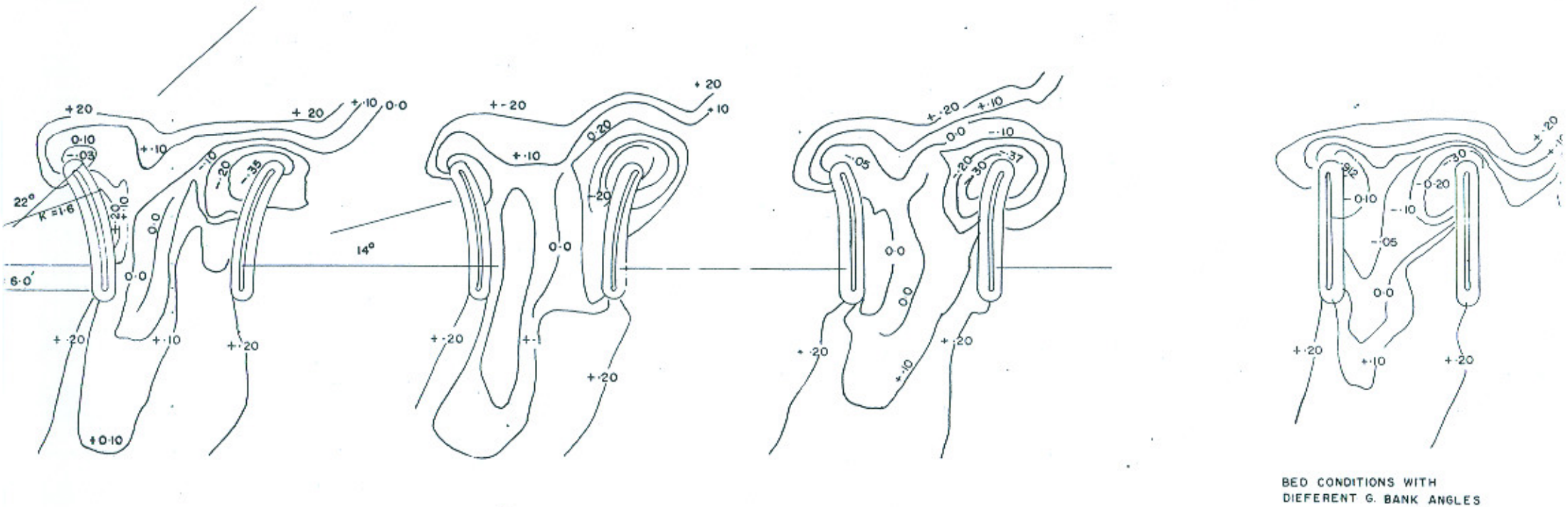
GEOMETRY OF GUIDE BANK WITH STRAIGHT PORTION = 0·0XL, 0·2XL, 0·5XL, 1·0XL KEEPING G. BANK LENGTH = 1·0XL

St. LENGTH = 0 x W
ANGLE = 19°

St. LENGTH = 0·2 W
ANGLE = 14°

St. LENGTH = 0·5 W
ANGLE = 7°

St. G. BANK LENGTH = 1·0 W
ANGLE = STRAIGHT



BED CONDITIONS WITH
DIEFERENT G. BANK ANGLES

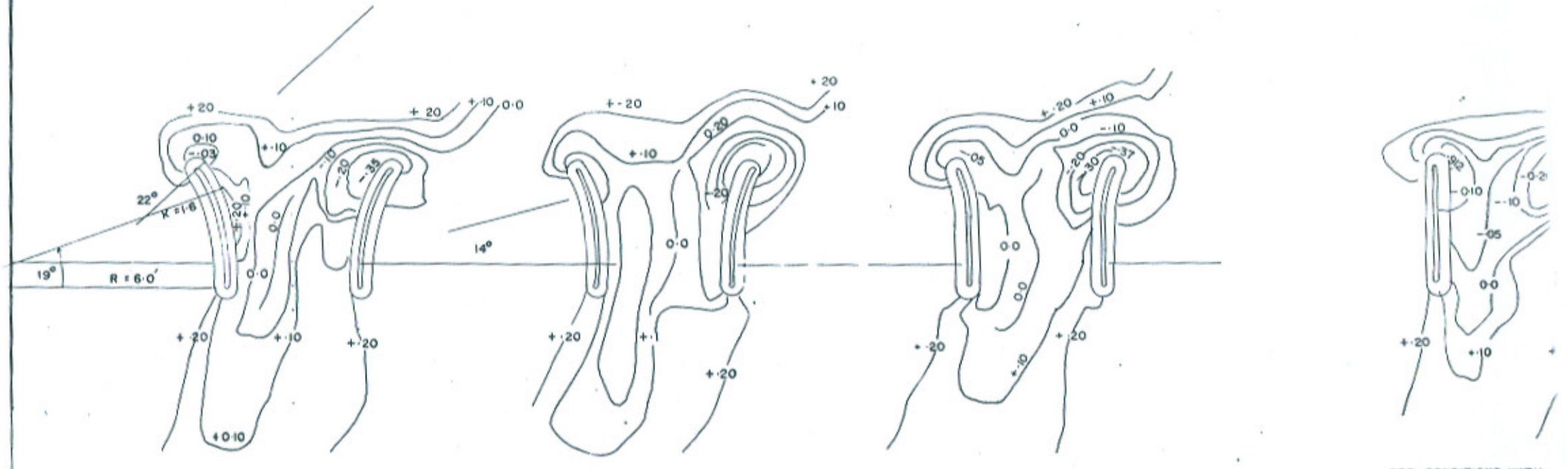
OPTIMUM WATERWAY OF A BRIDGE

St. LENGTH = 0 x W
ANGLE = 19°

St. LENGTH = 0·2 W
ANGLE = 14°

St. LENGTH = 0·5 W
ANGLE = 7°

St. G. BANK LENGTH
ANGLE = STRAI

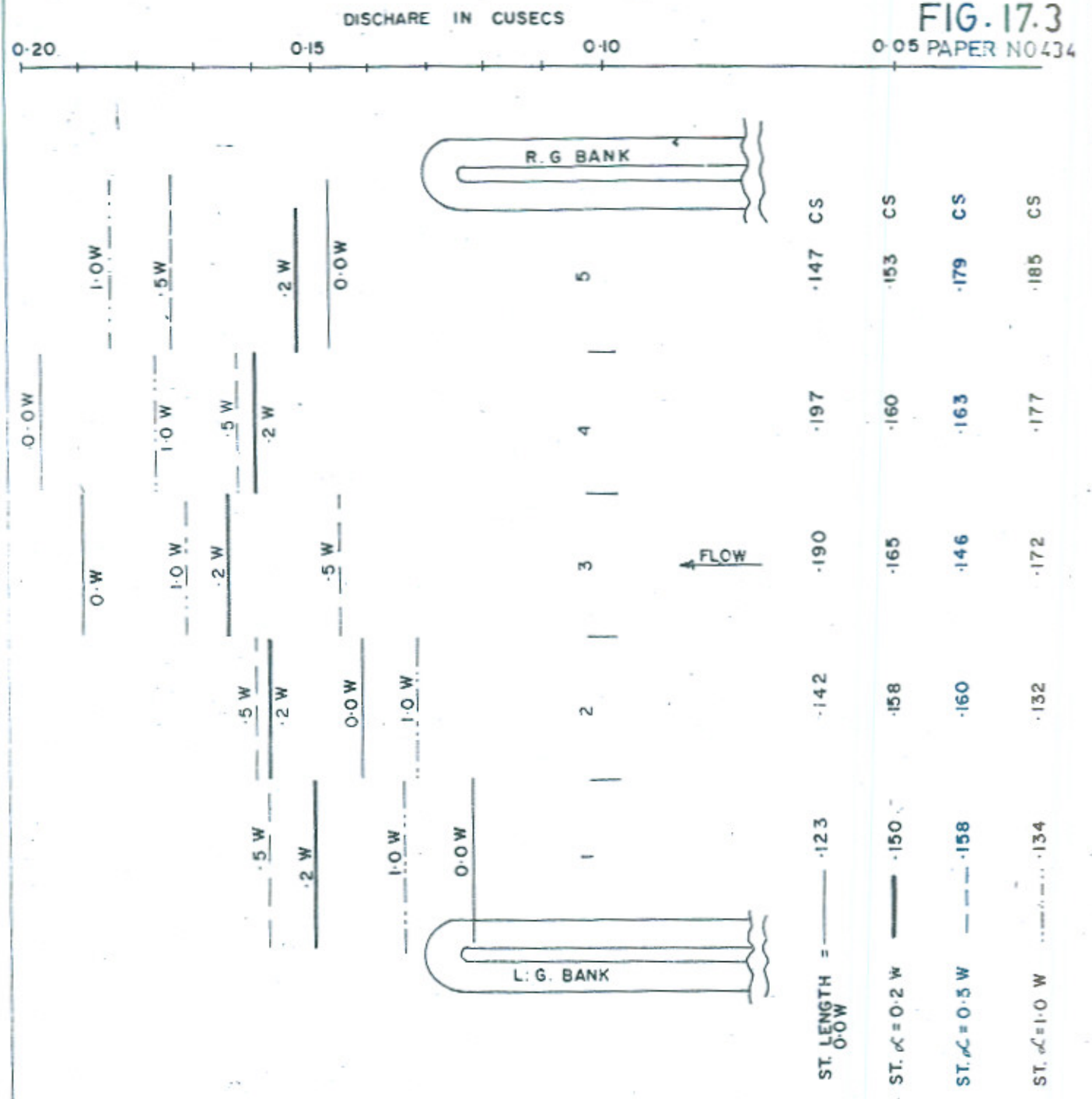


BED CONDITIONS WITH
DIEFERENT G. BANK ANG

OPTIMUM WATERWAY OF A BRIDGE

FIG. 17.3

PAPER NO 434



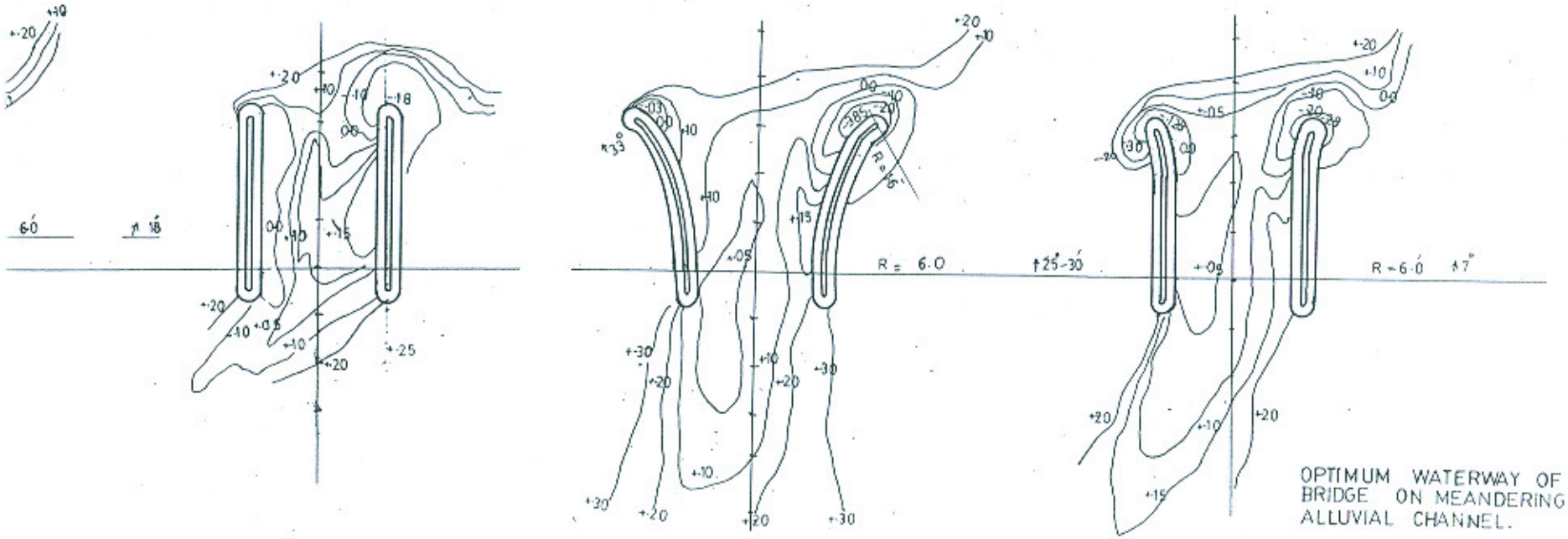
DISCHARGE DISTRIBUTION AT THE BRIDGE WITH DIFFERENT GUIDE BANK FLARES KEEPING G.B. LENGTH = 1·0 W

FIG. 18.1
PAPER. NO 434

St. LENGTH = 1.5 W
DIV: ANGLE = 0°

St. LENGTH = 0.2 W
DIV: ANGLE = 25°- 30'

St. LENGTH = 1.0W
DIV: ANGLE = 7°



OPTIMUM WATERWAY OF A BRIDGE ON MEANDERING ALLUVIAL CHANNEL.

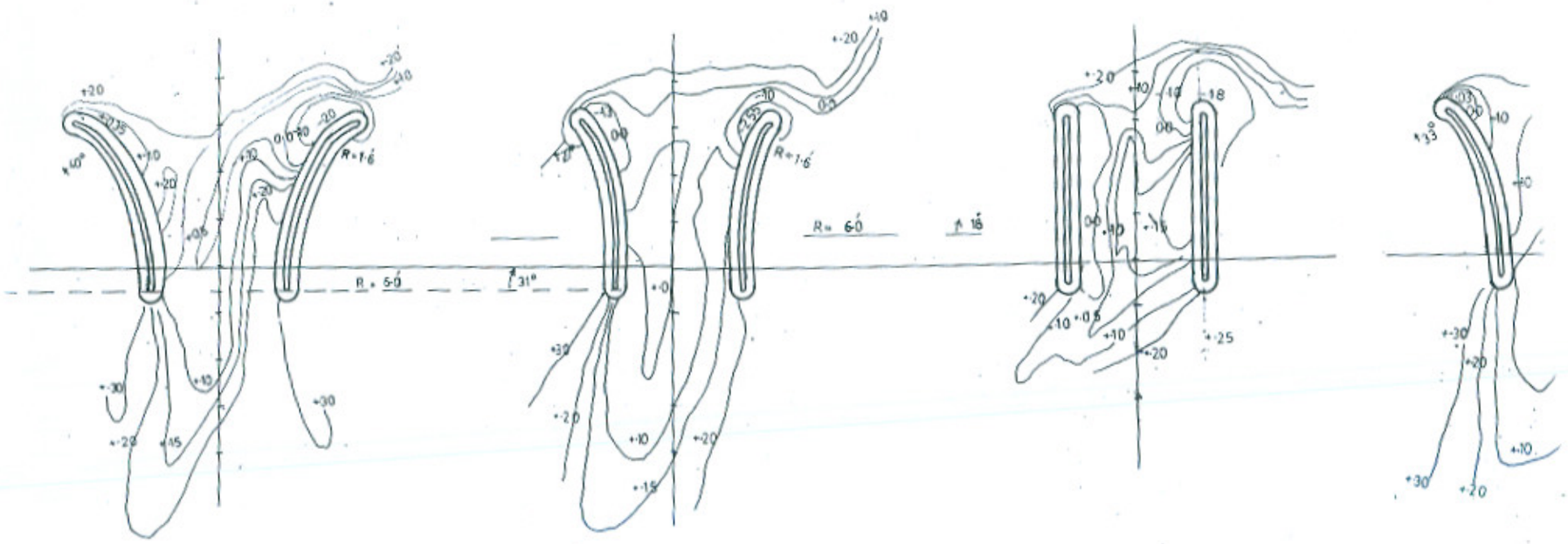
BED CONFIGURATION AFTER MODEL RUN WITH DIFFERENT GUIDE BANK ANGLES KEEPING G. BANK LENGTH = 1.5 W = ML/65

St. LENGTH = 0.0W
DIVERGENCE ANGLE = 31°

St. LENGTH = 0.5W
DIV: ANGLE = 18°

St. LENGTH = 1.5W
DIV: ANGLE = 0°

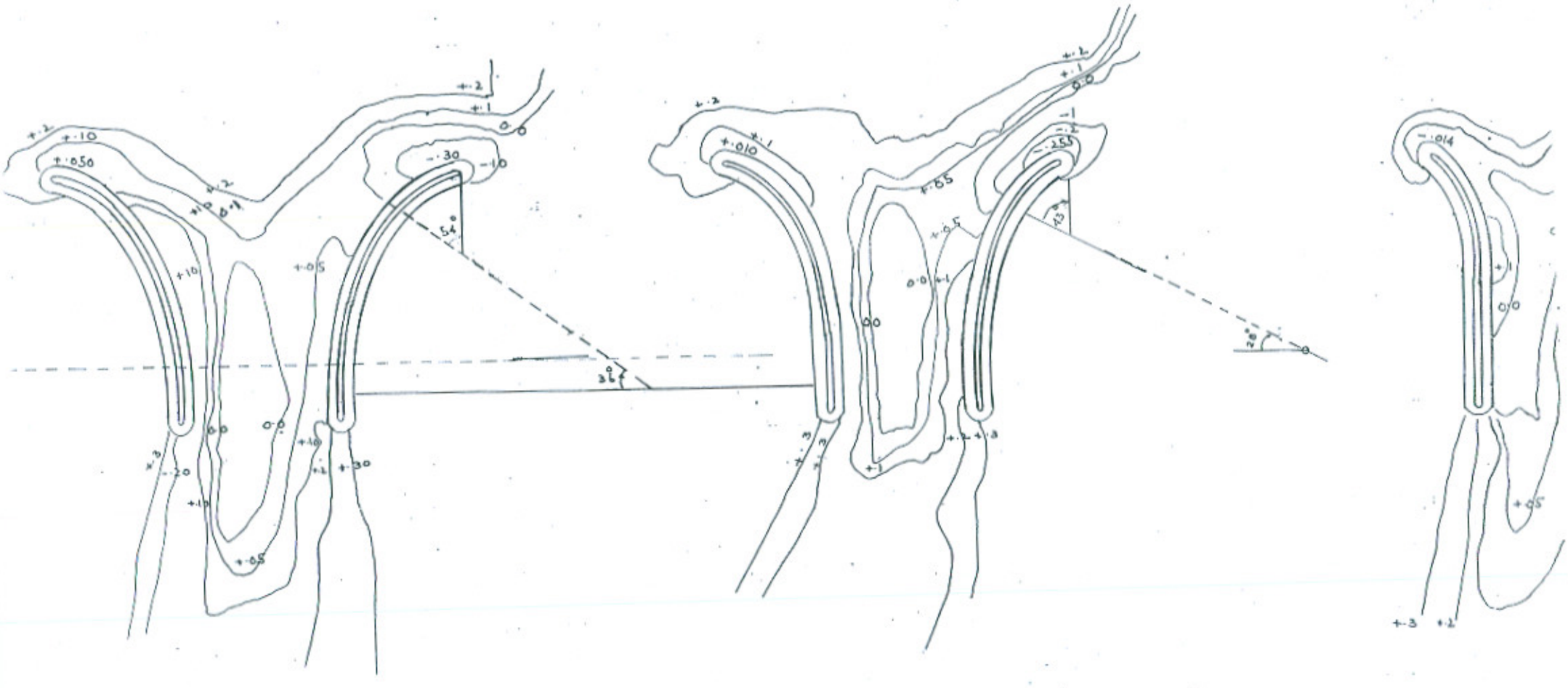
St.
DIV



ST: LENGTH 0.2 W
G. BANK LENGTH = ML/4.5
= 2.0 W
DIV. ANGLE = 36°

ST: LENGTH = 0.5 W
G. BANK LENGTH = 2.0 W = ML/4.5
DIVERGENCE ANGLE = 28°

ST: LEN
G. BANK LE
DIVERGE

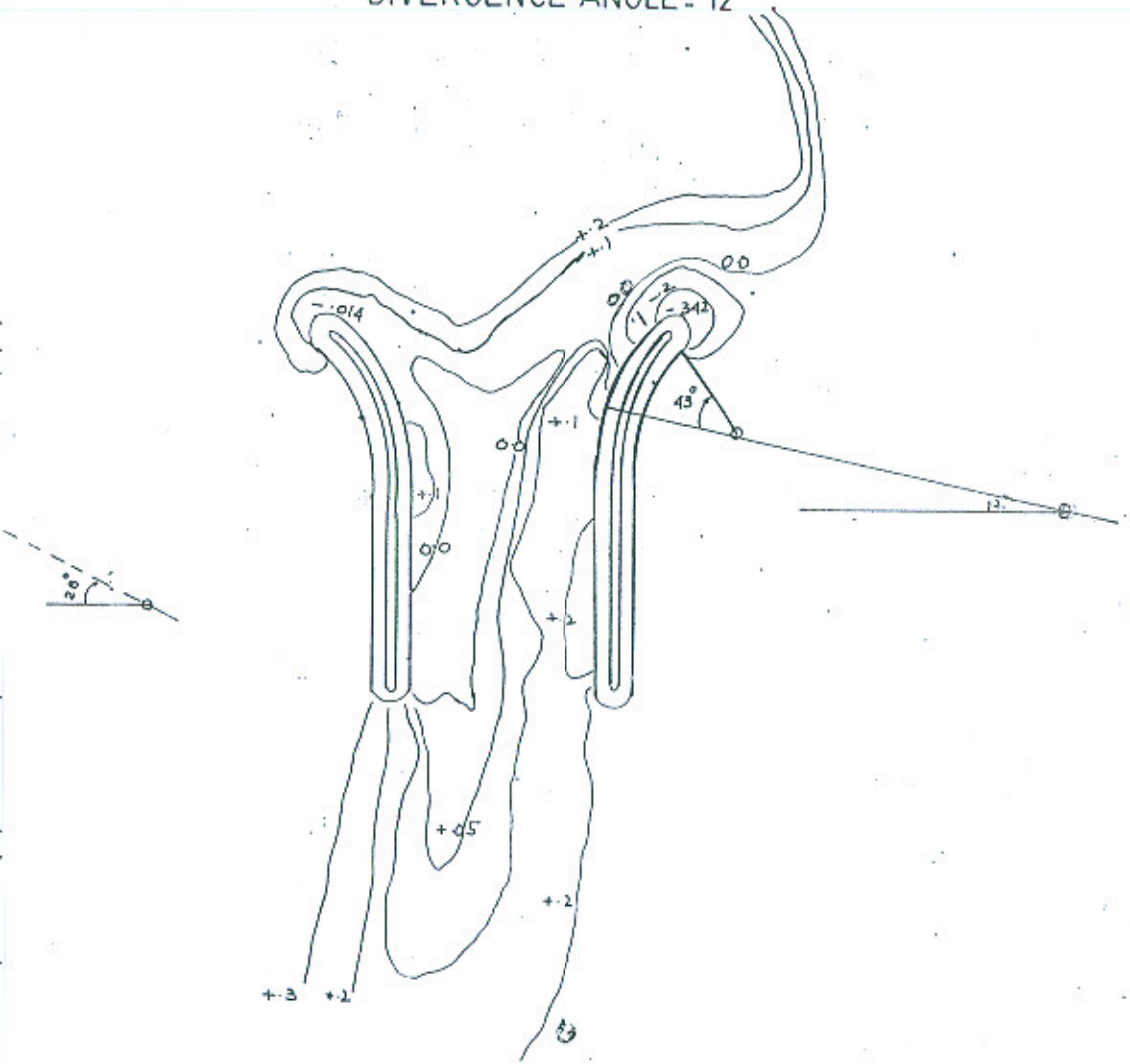


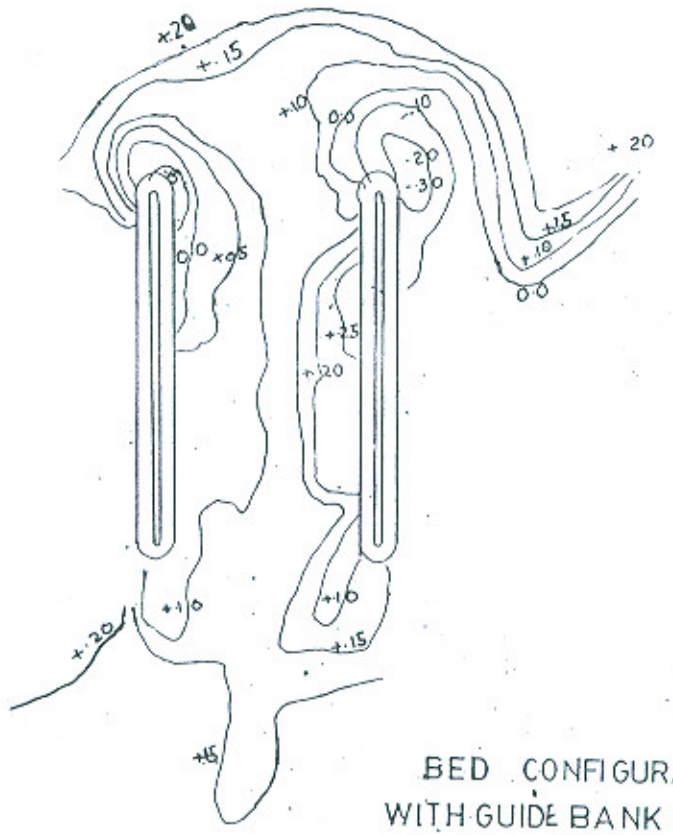
ST: LENGTH = 1.0 W
G. BANK LENGTH = ML/4.5 = 2.0 W
DIVERGENCE ANGLE = 12°

ST: LENGTH = 2.0 W
G. BANK LENGTH = ML/4.5

FIG 19.1

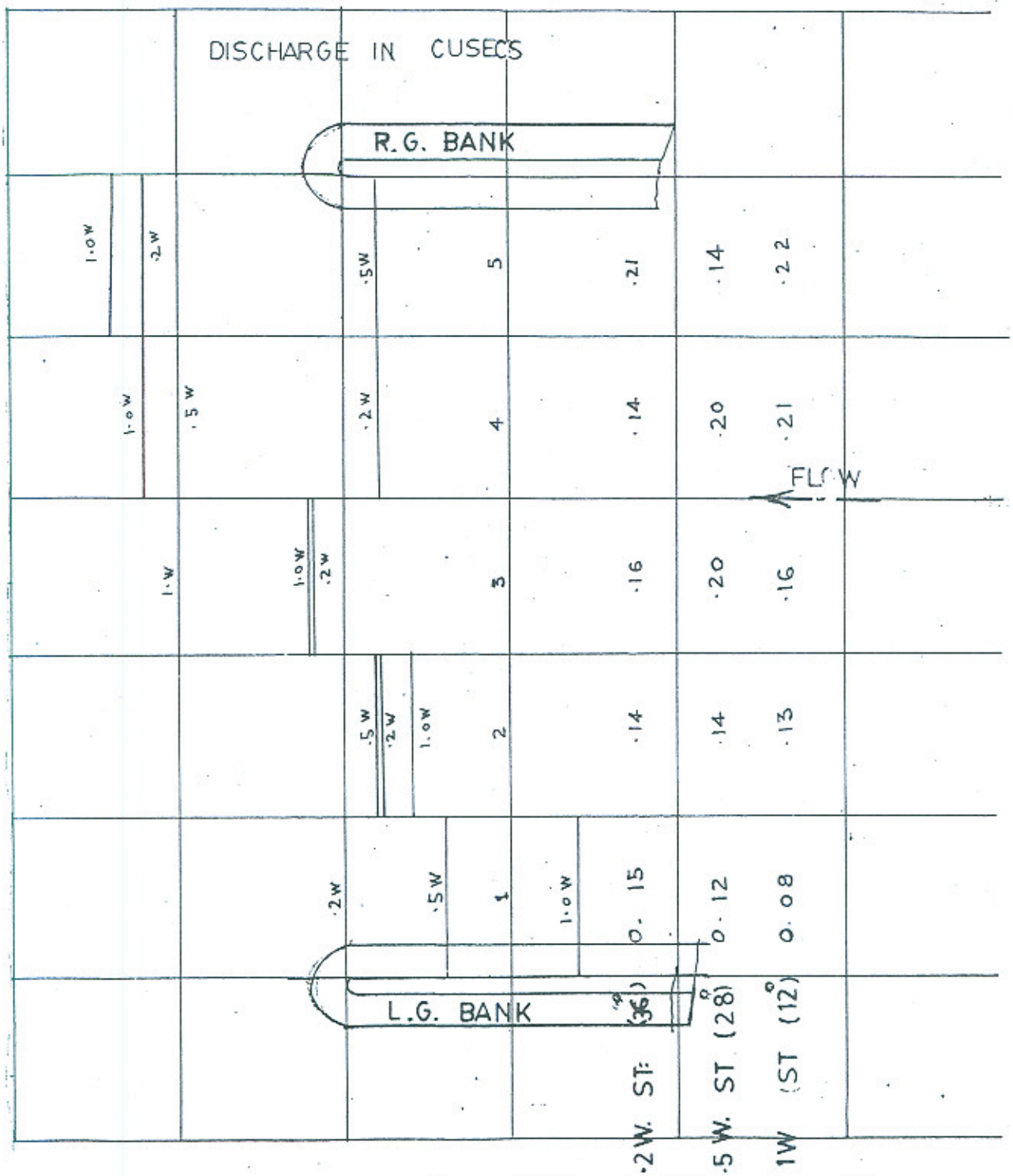
PAPER NO. 434





BED CONFIGURATION
WITH GUIDE BANK LENGTH = 2.0 W
FOR DIFFERENT DIVERGENCE ANGLES

FIG: 19.2
PAPER:NO. 434



DISCHARGE DISTRIBUTION AT THE BRIDGE WITH DIFFERENT DIVERGENCE ANGLES
GUIDE BANK LENGTH = 2.0W

MODEL OF THATTA SUJAWAL ROAD BRIDGE FIG 20.1
ON RIVER INDUS
WIDTH OF BRIDGE = 4000
WITH STRAIGHT APPROACH

PAPER : NO. 434

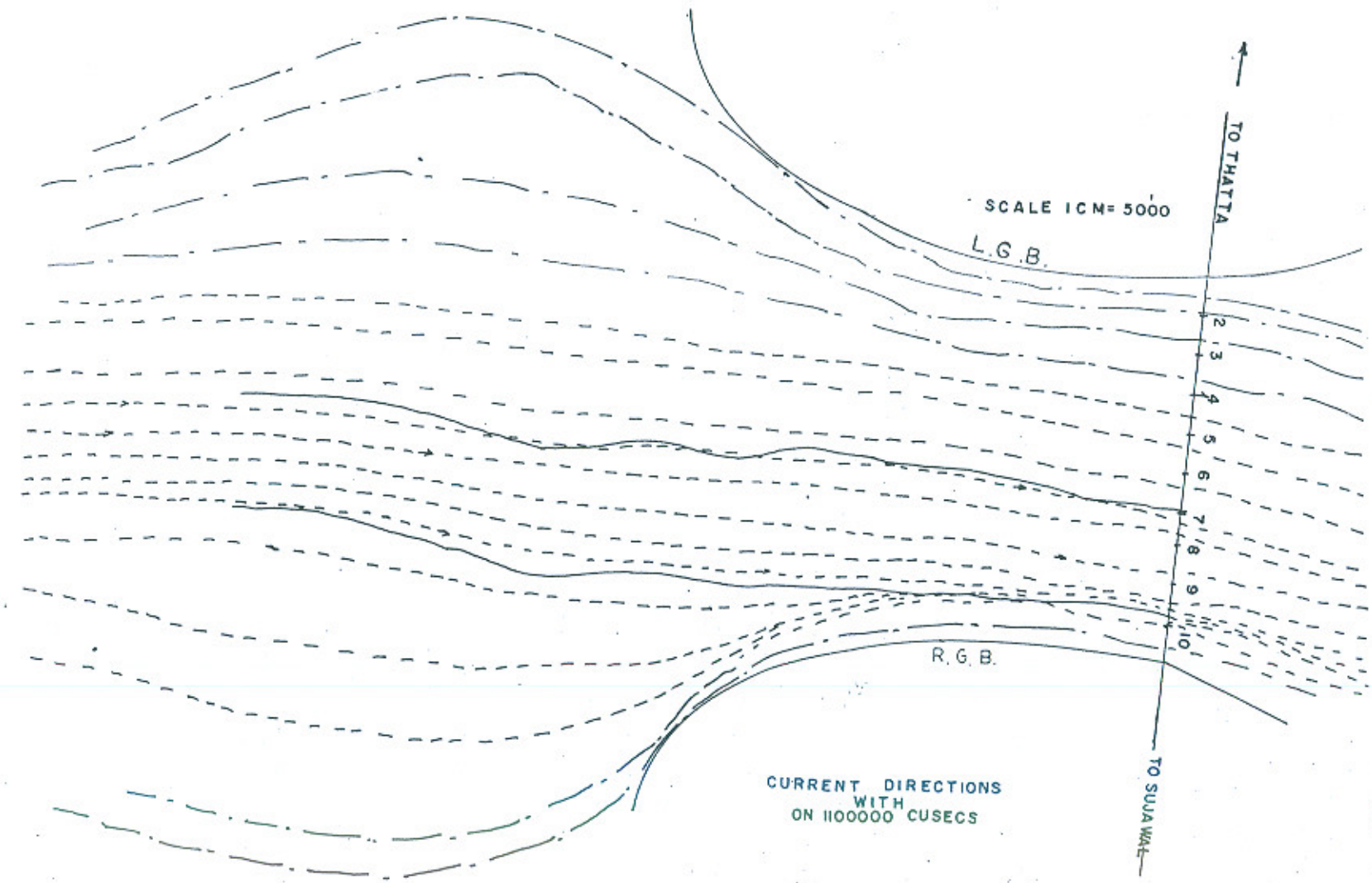


FIG. 20.2
PAPER NO. 434

MODEL OF THATTA SUJAWAL BRIDGE
ON RIVER INDUS
BRIDGE WITH 3600FT:-
CURRENT DIRECTIONS
Qn = 5,00,000 CS:-
Scale :- 1 cm = 500 ft:

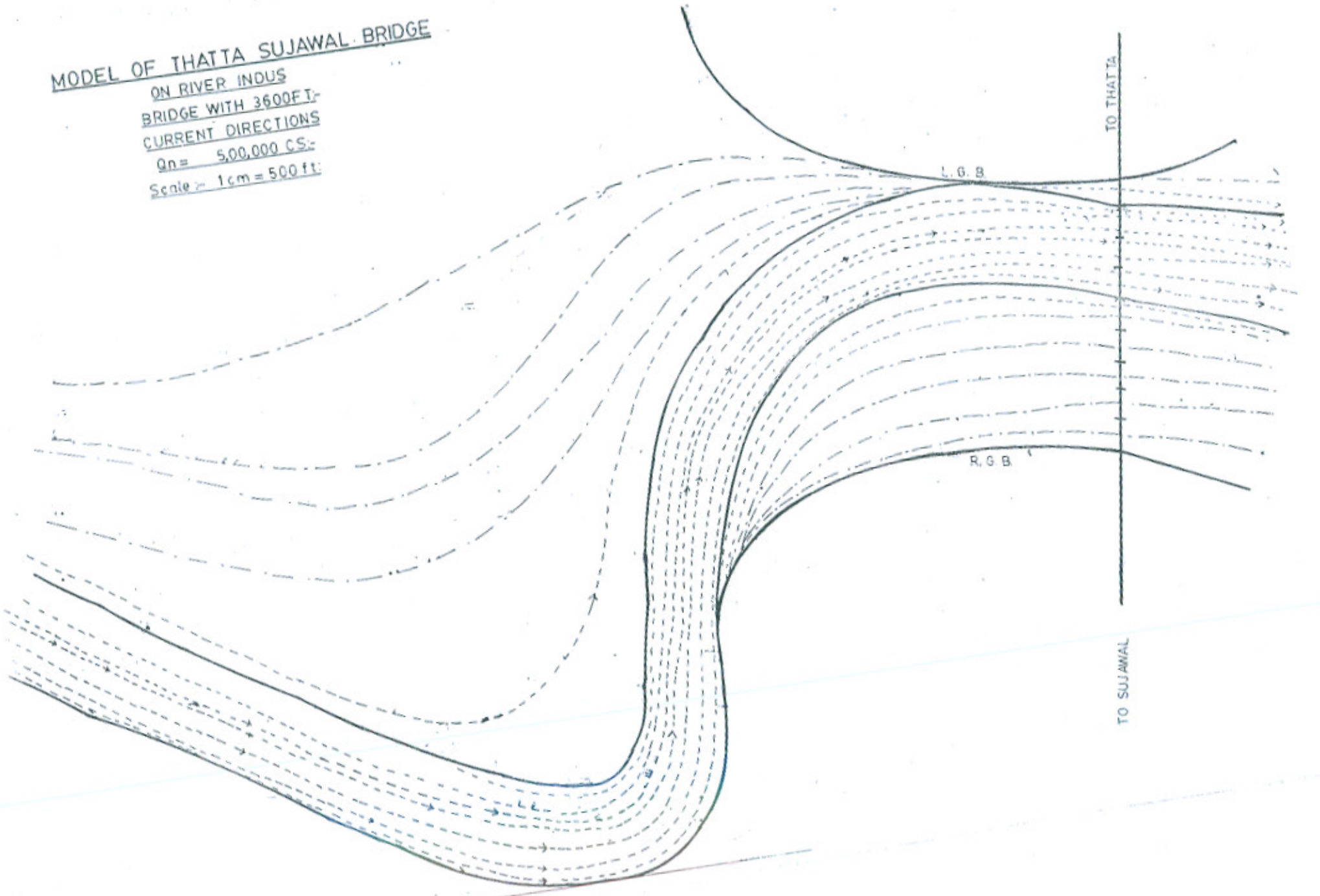
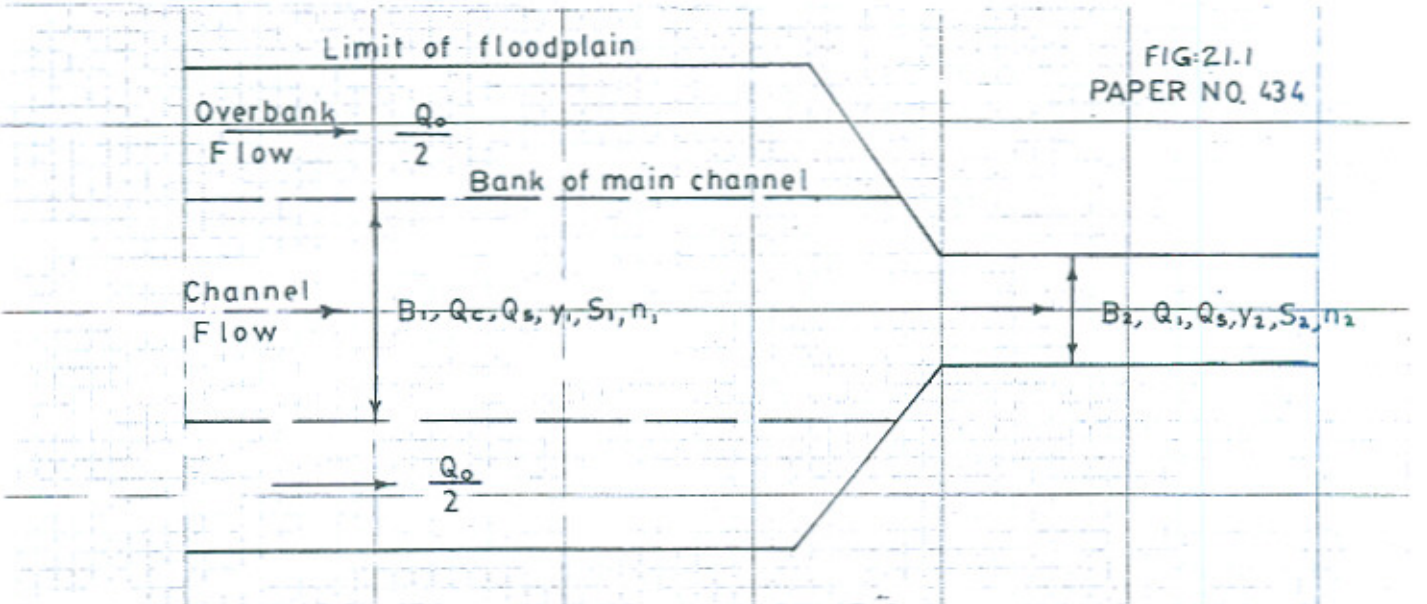


FIG:21.1
PAPER NO. 434



DEFINATION SKETCH OF A LONG CONTRACTION

DEPTH OF SCOUR IN A LONG CONTRACTION

FIG:21.2

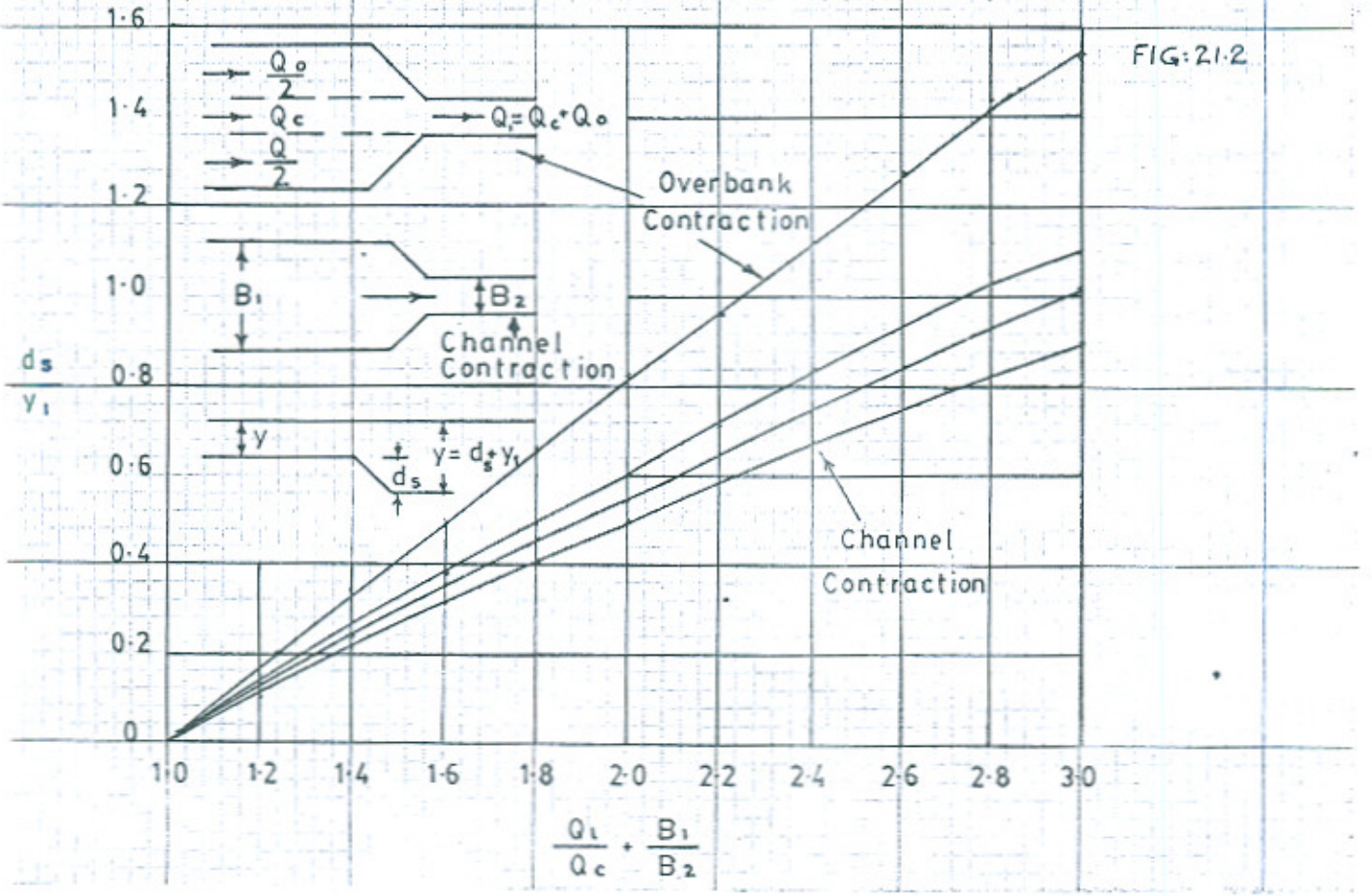
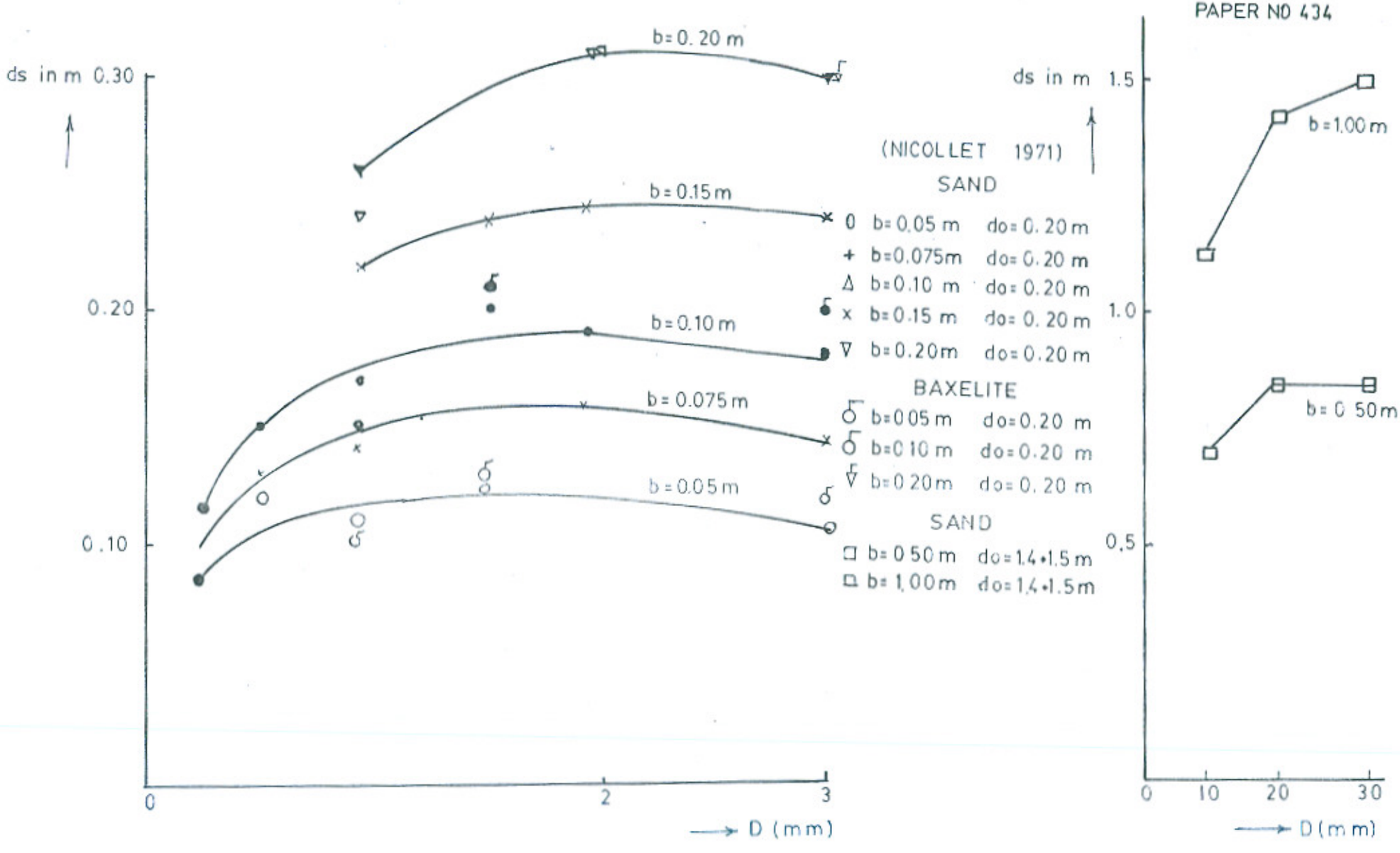


FIG: 22
PAPER NO 434



INFLUENCE OF GRAIN SIZE AND PILE DIAMETER (NIC) LET 1971

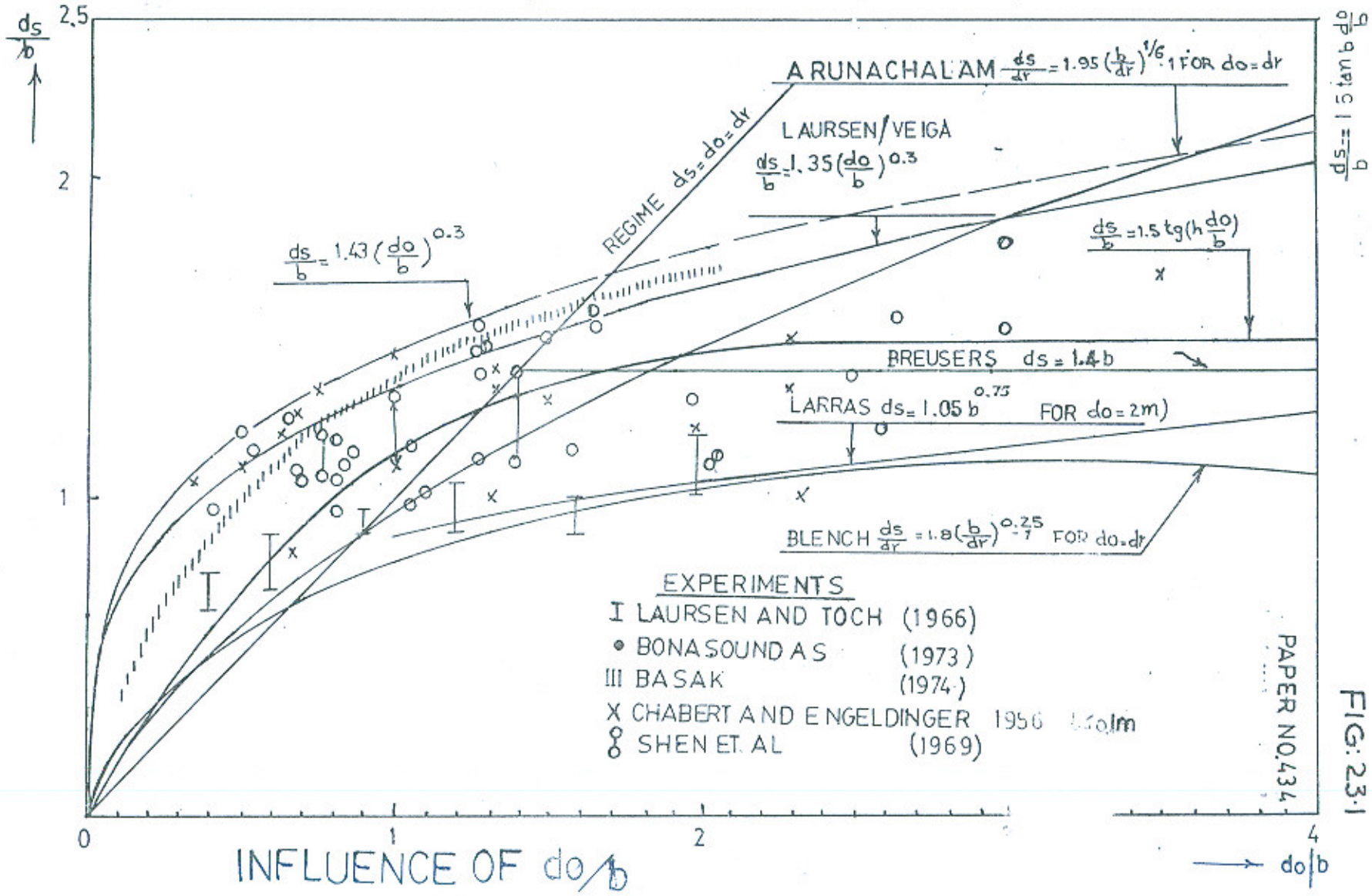
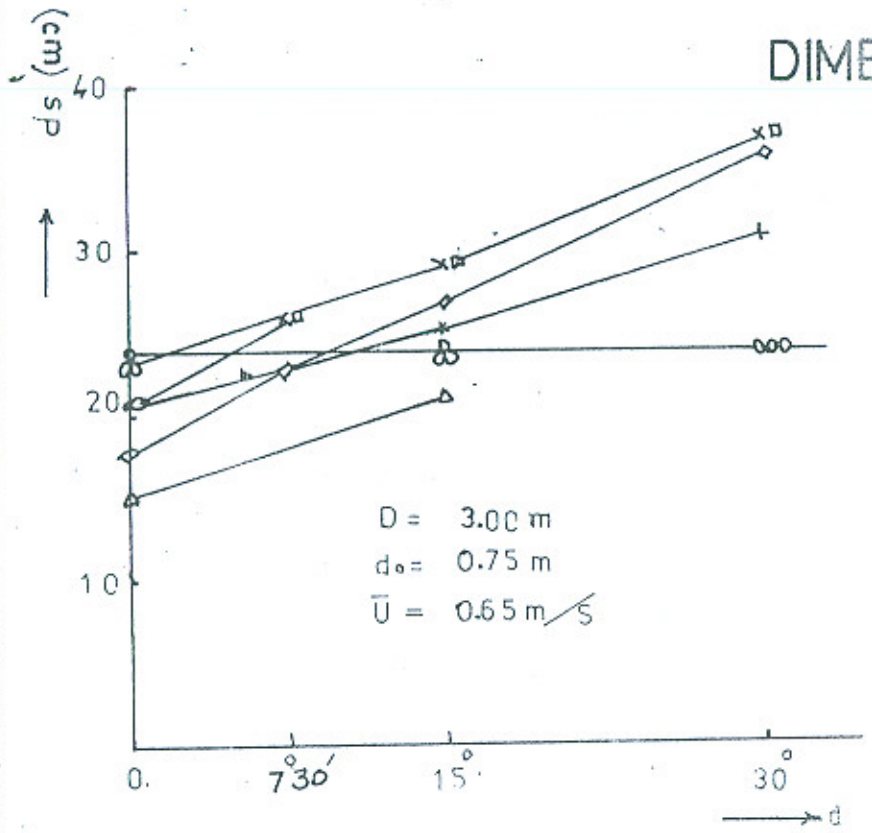
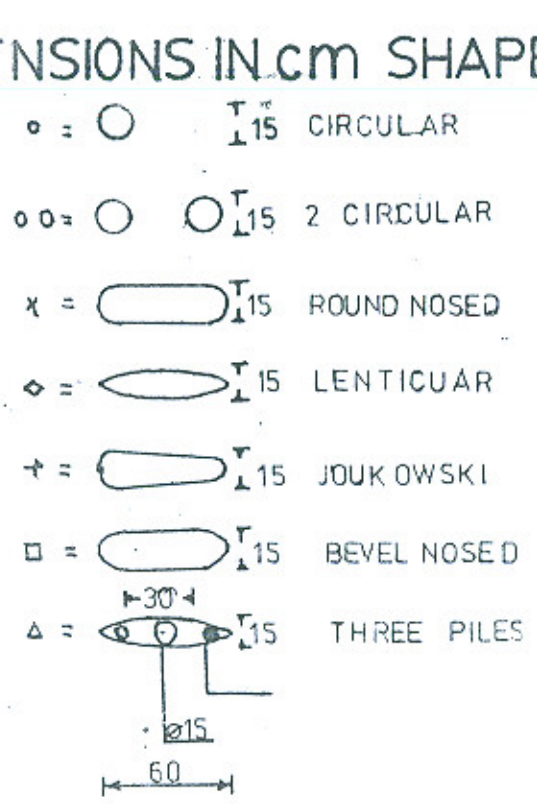

ds/b
2.5
2
1
0
1
2
4
do/b
INFLUENCE OF do/b
ARUNACHALAM ds/dr = 1.95 (h/dr)^1/6 - 1 FOR do = dr
LAURSEN/VEIGA
ds/b = 1.35 (do/b)^0.3
REGIME ds = do = dr
ds/b = 1.43 (do/b)^0.3
ds/b = 1.5 tg(h do/b)
BREUSERS ds = 1.4 b
LARRAS ds = 1.05 b^0.75 FOR do = 2m)
BLENCH ds/dr = 1.8 (b/dr)^0.25 FOR do = dr
EXPERIMENTS
I LAURSEN AND TOCH (1966)
• BONASOUNDAS (1973)
III BASAK (1974)
X CHABERT AND ENGELDINGER 1956
SHEN ET AL (1969)
PAPER NO. 43.4
FIG. 23.1

FIG: 23.2
PAPER NO.434





INFLUENCE OF PILE SHAPE AND ANGLE OF ATTACK (CHABERT AND ENGEL DINGER 1956)

NOSE FORM	LENGTH-WIDTH	SHAPE	SHAPE COEFFICIENT
RECTANGULAR			1.00
SEMICIRCULAR			0.90
ELLIPTIC	2 : 1		0.80
	3 : 1		0.75
LENTICULAR	2 : 1		0.80
	3 : 1		0.70

SHAPE COEFFICIENT AFTER LAURSEN (1961)

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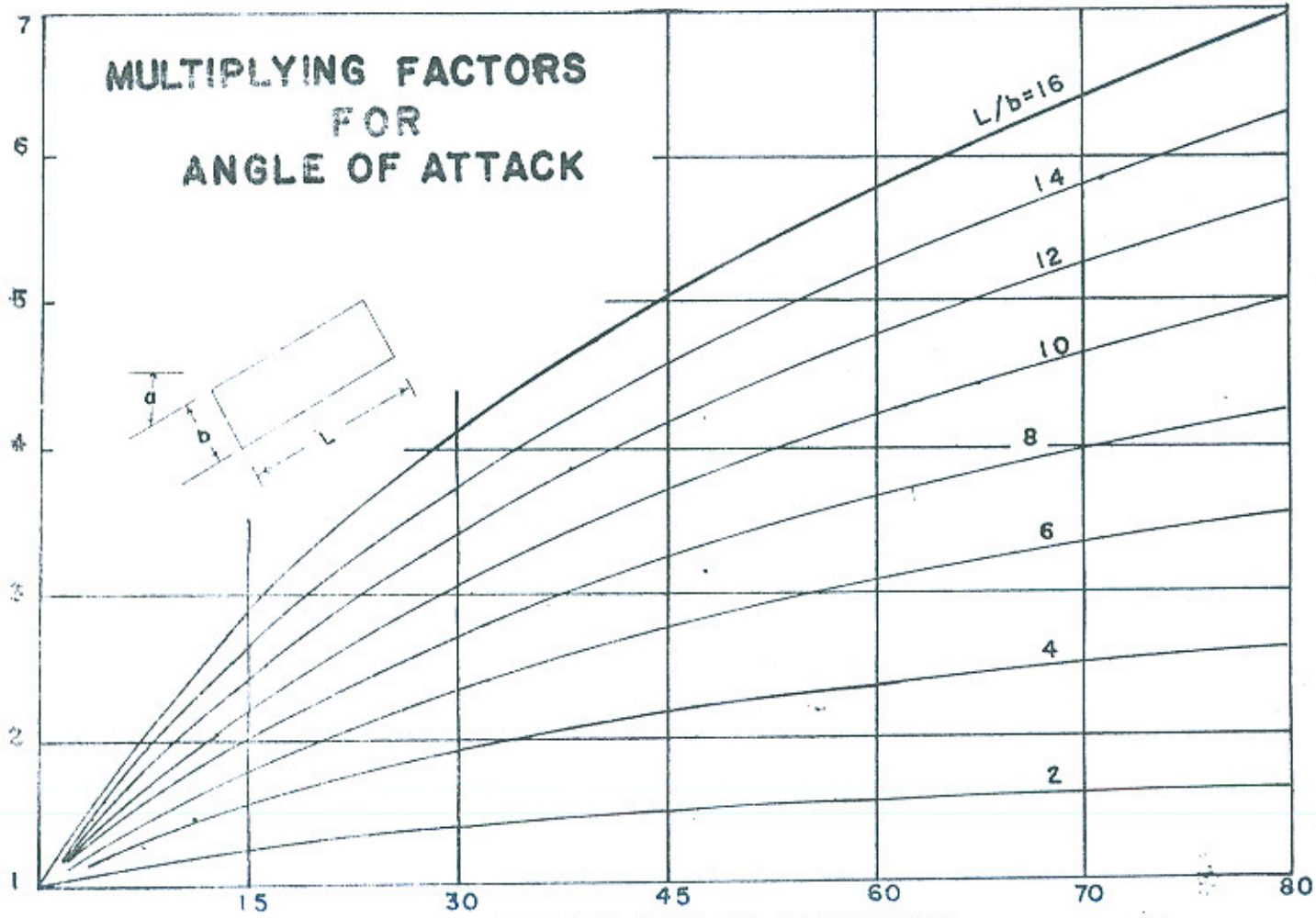
FIG: 23.3

FIG: 23.4
PAPER NO. 434



CHABERT AND ENGEL-
DINGER L/b = 4
X VARZELIOTIS L/b=6

FIG:23.4 DESIGN FACTORS FOR PIERS NOT ALIGNED WITH FLOW (LAURSEN AND TOCH 1956)

FIG 23·5

PAPER NO, 434

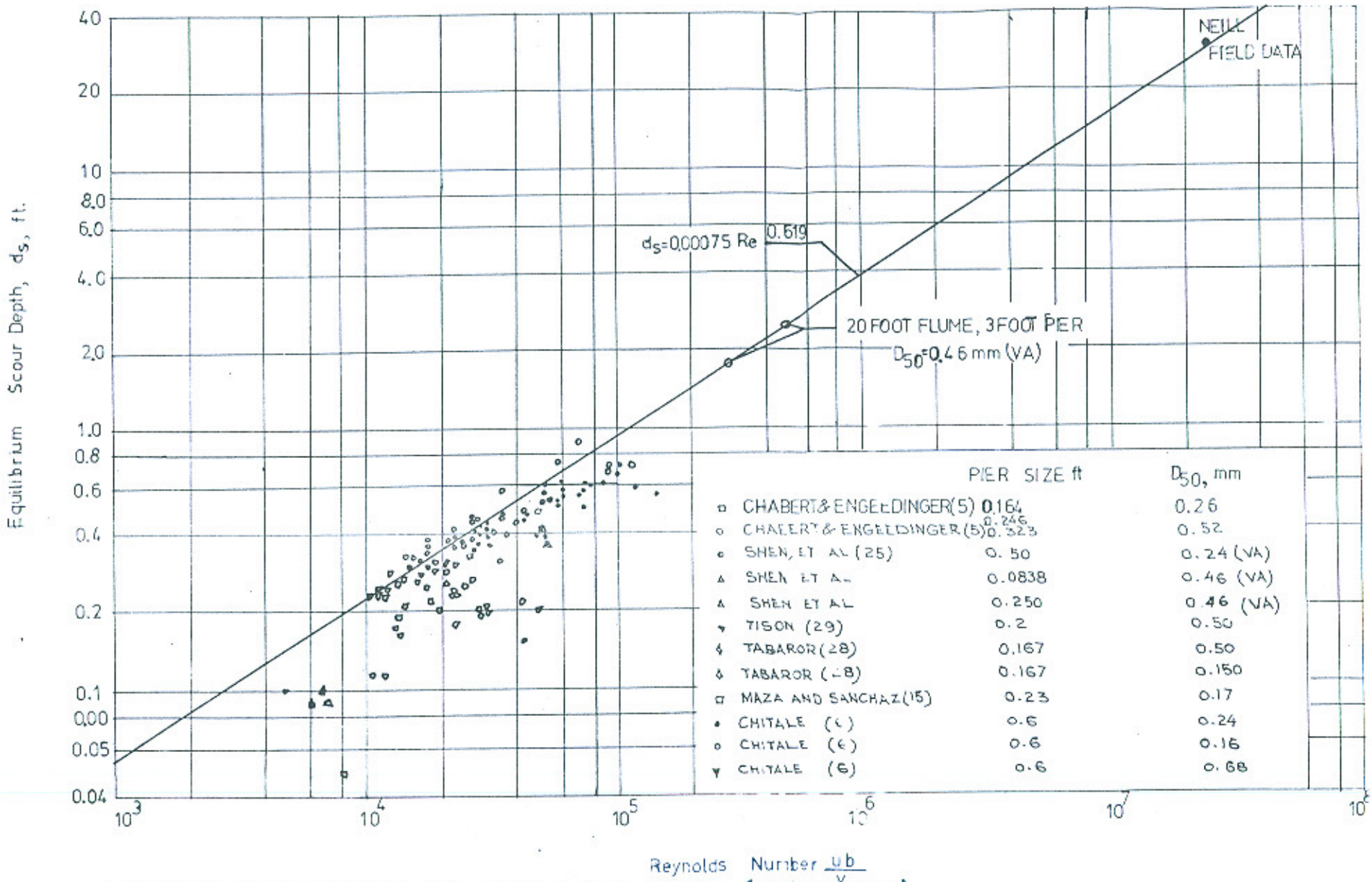


FIG. 23.5 COMPARISON OF AVAILABLE DATA (SHEN 1969)

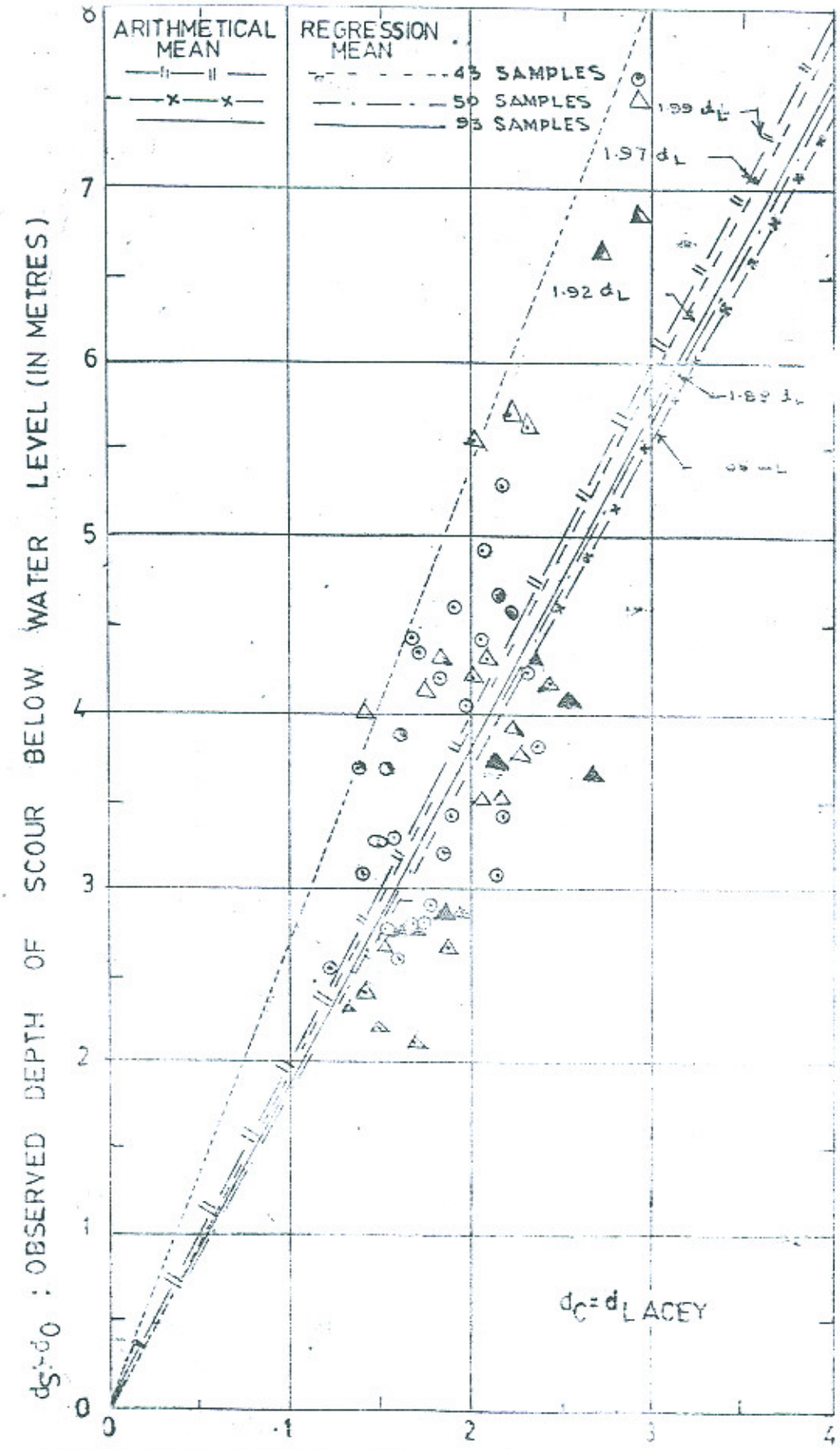


FIG:24-1

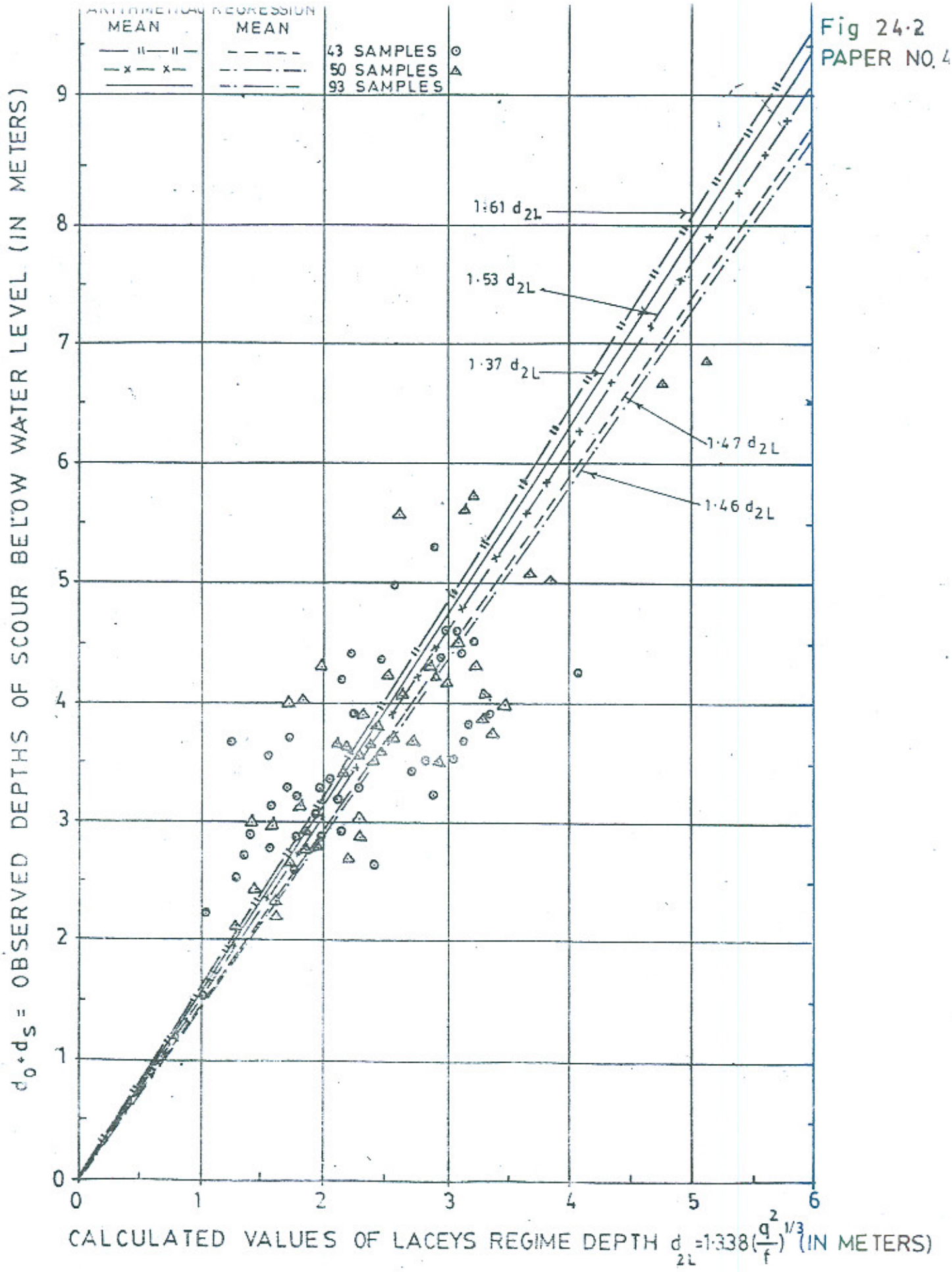
PAPER NO. 434

ALCULATED VALUES OF LACEY'S REGIM DEPTH $d_L = 0.47(\frac{Q}{f})^{1/3}$ (IN METRES)

ALUES SHOWING OBSERVED DEPTH OF SCOUR VERSUS REGIME DEPTH

ALCULATED FROM TOTAL DISCHARGE INTENSITY.

Fig 24·2
PAPER NO. 4



VALUES SHOWING OBSERVED DEPTH OF SCOUR VERSUS REGIME DEPTH CALCULATED FROM LOCAL DISCHARGE INTENSITY

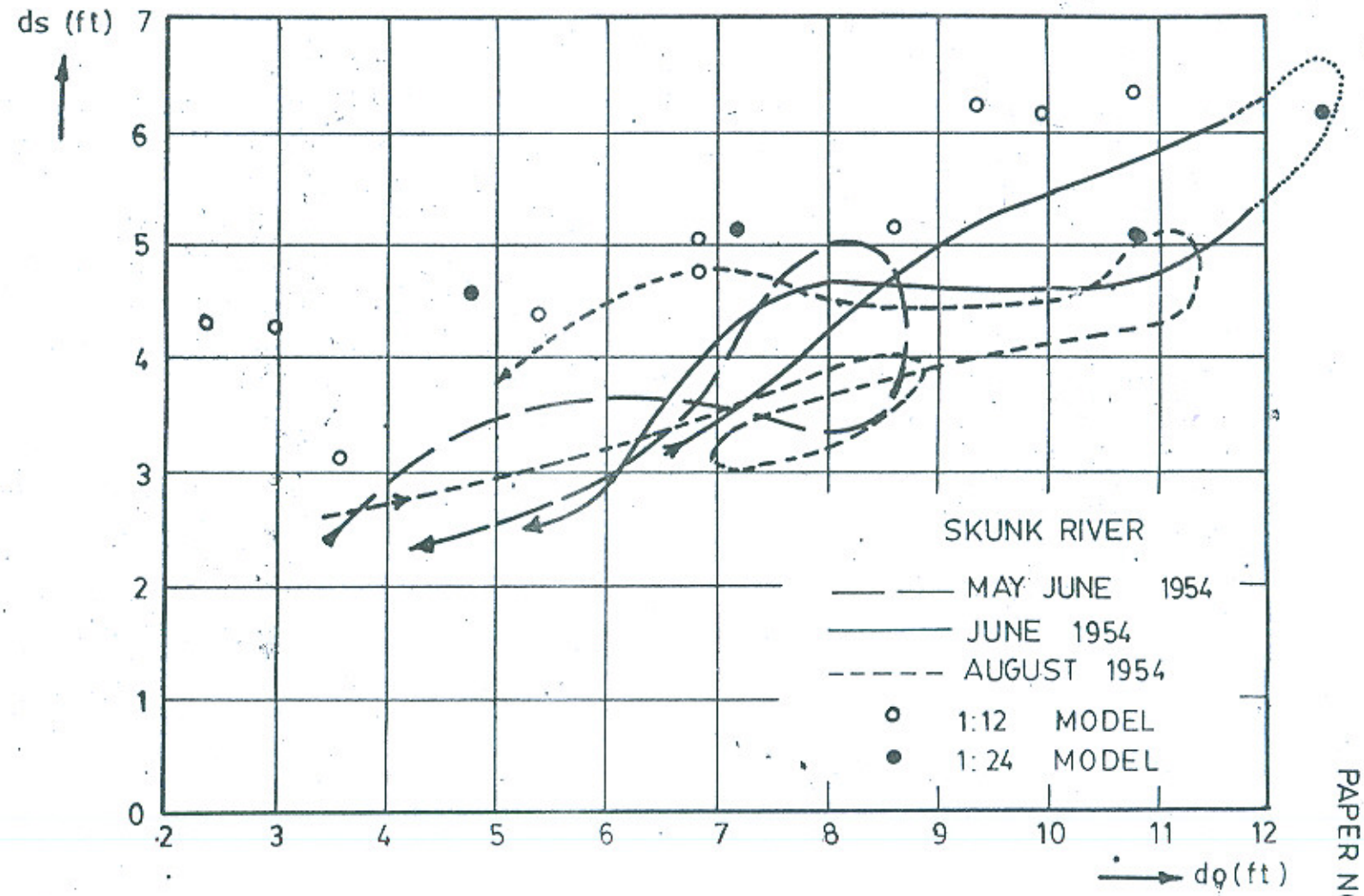


FIG. 25
PAPER NO. 434

COMPARISON OF MODEL AND PROTOTYPE RESULTS
(LAURSEN AND TOCH 1956)

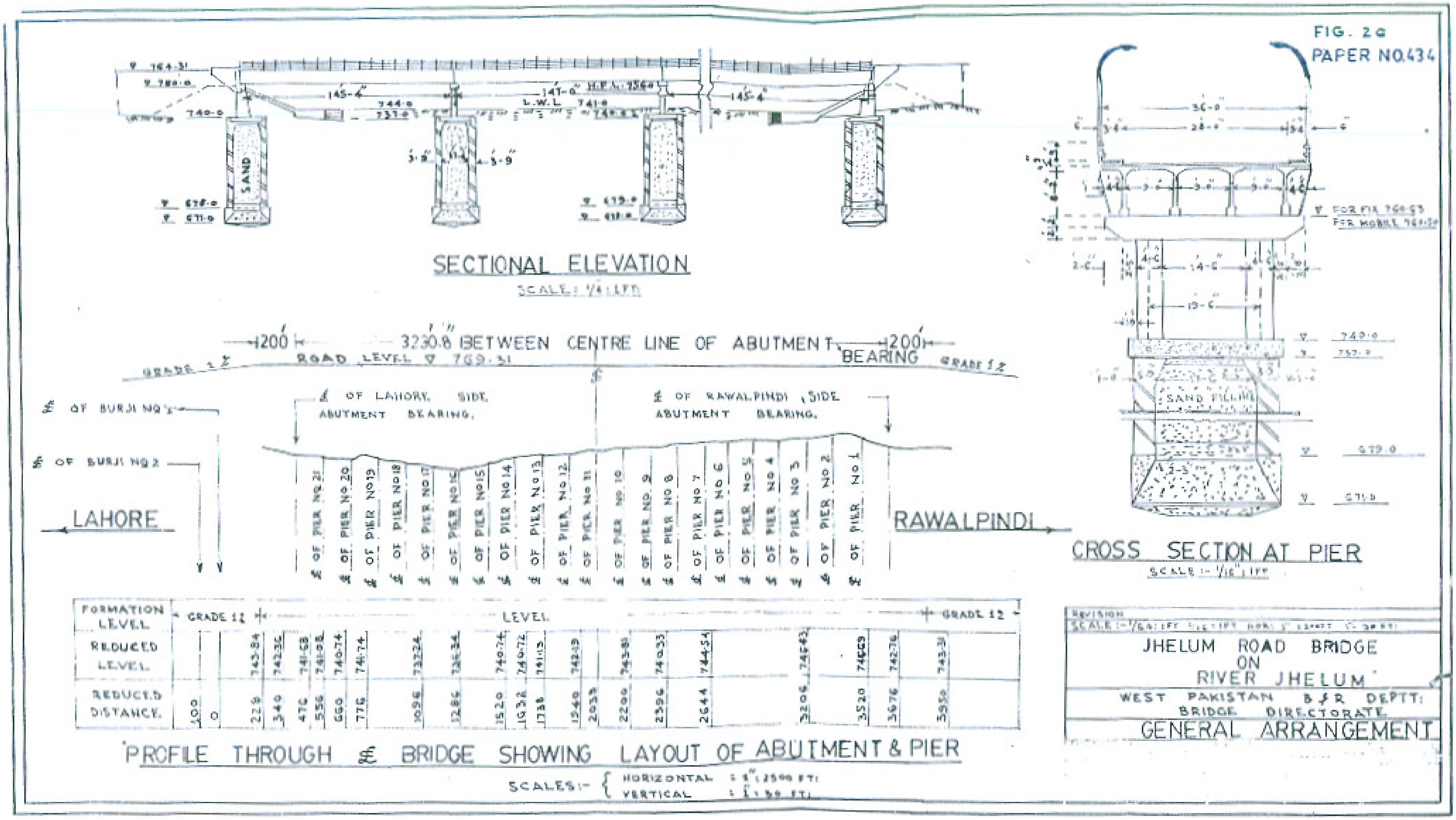


FIG. 2c
PAPER NO.434
SECTIONAL ELEVATION
SAND
H.F.L.
L.W.L.
3230.8 BETWEEN CENTRE LINE OF ABUTMENT BEARING
ROAD LEVEL ∇ 769.31
GRADE 1%
℄ OF BURJI NO 1
℄ OF BURJI NO 2
℄ OF LAHORE SIDE ABUTMENT BEARING.
℄ OF RAWALPINDI SIDE ABUTMENT BEARING.
LAHORE
RAWALPINDI
℄ OF PIER NO 21
℄ OF PIER NO 20
℄ OF PIER NO 19
℄ OF PIER NO 18
℄ OF PIER NO 17
℄ OF PIER NO 16
℄ OF PIER NO 15
℄ OF PIER NO 14
℄ OF PIER NO 13
℄ OF PIER NO 12
℄ OF PIER NO 11
℄ OF PIER NO 10
℄ OF PIER NO 9
℄ OF PIER NO 8
℄ OF PIER NO 7
℄ OF PIER NO 6
℄ OF PIER NO 5
℄ OF PIER NO 4
℄ OF PIER NO 3
℄ OF PIER NO 2
℄ OF PIER NO 1
FORMATION LEVEL
REDUCED LEVEL
REDUCED DISTANCE
LEVEL
PROFILE THROUGH ℄ BRIDGE SHOWING LAYOUT OF ABUTMENT & PIER
SCALES:- HORIZONTAL VERTICAL
CROSS SECTION AT PIER
SAND FILLING
REVISION
JHELUM ROAD BRIDGE
ON
RIVER JHELUM
WEST PAKISTAN B&R DEPTT:
BRIDGE DIRECTORATE
GENERAL ARRANGEMENT