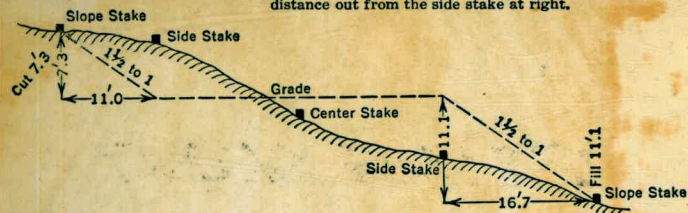


W  
6/10

**DISTANCES FROM SIDE STAKES FOR CROSS - SECTIONING  
Roadway of any Width. Side Slopes 1/2 to 1.**

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	Distance out from Side or Shoulder Stake										Cut or Fill
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

KEUFFEL & ESSER CO., N. Y.  
For Curve Tables see end of book.

# DRILLING GROUT HOLES

BOOK No. 6

MICROFILMED

JAN 13 1965

The paper in this book No. F363A  
is made of 50% high grade rag stock  
with a WATER RESISTING surface sizing.



Hole No D10-0 Top Elev 439.8 Date 6-16-42

Inspector Allen Foreman Bitzer Crew No 2 Page 2

Time		Depth		Core
From	To	hr-Min	From To	Recor.

Perc	Core	Refrill	W.O.	Time (hr-min)	
Dr-ft.	Dr-ft.	ft.	ft.	M&SU	Post.

10:30 A 4:00 P 5-30 Selling up 7.0

Machine on Block 10-

D10+0 6-16-42

D.P. Curry Betzer Richardson

4-00 PM	8:00 PM	4-00	0.0	
8-00 PM	8-30 PM	0-30	Lunch	
8-30 PM	12: M.	3-30	8.0	

				0-30
		8.0		

0.0 8.0 0.0 0.0 R

Hole No Top Elev.  
D-2-40 597.6

Date  
6-26-42

Inspector  
Beck

Foreman  
Pishner

Crew No Page  
3

Time		Depth		Core	
From	To	hr	min	From To	Recon.

Perc.	Core	Redrill	W.O.	Time (hr. Min)	
Dr-ft.	Dr-ft	ft	ft.	M&S.U.	Lost.

4:30 P 11:30 P 7-0 12.0 20.0 13.0

13.0

0.0 13.0 0.0 0.0

pl

Hole No	Top Elev	Date
D.5-40	496.3	6-27-42

Inspector	Foreman	Crew No	Page
H. Bock	Betzey	2	4

Time		Depth		Core
From	To	hr-min	From To	Recor.

Perc	Core	ReDrill	W.O.	Time (hr-min)
In. ft	In. ft	ft	ft	M&SU. Lost.

4:00 P.M	12:00	8:00	0	14
----------	-------	------	---	----

	14			
--	----	--	--	--

Elev of concrete 540  
43.0 to rock.

0.0 14.0 0.0 0.0



Hole No	Top Elev	Date
D 3+30	568.5	7-2-42

Time		Depth		Core
From	To	hr-Min	From To	Recov.

9:00 AM	12:00 N	3-00		Moving & set up.
---------	---------	------	--	------------------

12:00 N	12:30 PM	0-30		Lunch
---------	----------	------	--	-------

12:30 PM	4:00 PM	3-30		cleaning out hole.
----------	---------	------	--	--------------------

4:00 PM	8:00 PM	4:00	0.0	
---------	---------	------	-----	--

8:00 PM	8:30 PM	0:30		Lunch
---------	---------	------	--	-------

8:30 PM	12:00 AM	3:30	10.0	
---------	----------	------	------	--

Inspector	Foreman	Crew No	Page
Allen	Betzer	Betzer	6

Perc.	Core	ReDrill	W.O.	Time (hr-min)	
Dr-ft.	Dr-ft	ft	ft	M&S.U.	Lost

				3:00	
--	--	--	--	------	--

					0-30
--	--	--	--	--	------

Adolph Beck	Betzer	Richardson			
-------------	--------	------------	--	--	--

					0-30
--	--	--	--	--	------

	10.0				
--	------	--	--	--	--

0.0	10.0	0.0	0.0		
-----	------	-----	-----	--	--



Hole No 5-30 Top Elev 499.7 Date 7-8-42

D. Time		Depth		Core
From	To	hr-Min	From To	Recor.

5-30		7-8-42		
4-00 PM	8-00 PM	4-00	8.0	
8-00 PM	8-30 PM	0-30	Lunch	
8-30 PM	12-00 M.	3-30	26.0	

Inspector \_\_\_\_\_ Foreman Betzer Crew No Betzer Page 7

Perc.	Core	ReDrill	W.O.	Time (hr-Min)	
Dr-ft	Dr-ft	ft	ft	M&SLU	Lost

D. R. Curry Betzer Richardson

18.0

0.0 18.0 0.0 0.0

Hole No D-10+93 Top Elev 442.2 Date 7-10-42

Time		Depth		Core
From	To	hr.	min	Recov

4:00 PM - 8:00 PM 4:00 0.0

8:00 PM - 8:30 PM 0:30 Lunch

8:30 PM - 12:00 AM 3:30 16.0

505.0

Datum Top of concrete  
 Elev 510.5 62.5' through  
 concrete to Rock. 8

Inspector I.R. Curry Foreman Betzer Crew No Richardson 8 Page

Perf	Core	ReDrill	W O	Time (hr-min)
Dr.-ft	Dr.-ft	ft	ft	M&SU Lost

0-30

16.0

0.0 16.0 0.0 0.0

pl

Hole No D-10-92 Top Elev 442.2 Date 7-11-42

Inspector ALLEN Foreman BITZEL Crew No Page 9

Time		Depth		core
From	To	hr.	Min	From To

Perc	Core	ReDrill	W.O.	Time (hr.-Min)
Dr.-ft	Dr.-ft	ft	ft	M&S.S. Lost.

8 <sup>00</sup> A	4 <sup>00</sup> P	8-0	16.0	24.5	8.5
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	8.5			
--	-----	--	--	--

0.0 8.5 0.0 0.0

pl

Hole No <sup>Rock-</sup> ~~Top~~ Elev Date  
 D-10-40 37.2 7-13-42

Inspector Foreman Crew No Page  
 ALLEN BITZER 10

Time		Depth		Core
From	To	hr.	Min	From To

Perc.	Core	ReDrill	W.O.	Time (hr. Min)	
Dr. Ft	Dr. Ft	ft	ft	1118 S.W.	Lost.

8<sup>00</sup>A 4<sup>00</sup>P 8-0 10.0 24.3 14.3

✓  
14.3

0.0 14.3 0.0 0.0

pl

Boke  
no  
D-4-30

Rock. EL -

Date -

7-14-42

Janis. N. m

Depth

C. P.

300P

400P

1-0

0.0

~~1.0~~  
2.0

1.0

ALLEN

BLITZ CT

C-D.

~~1.0~~  
2.0

0.0

2.0

0.0

0.0

pl

7106 No Rock. Ep.

D-4-40

7-14-42

Time

H. m.

Depth

C-R.

800 A

300 P

7-0

20.0

24.0

4.0

Allen

C.D.

BITZER

12

24.0

0.0

4.0

0.0

0.0

RL

Hole No	Top Elev	Date	Inspector	Foreman	Crew No	Page
5420A	506.0	7-15-42	J.R. Curry	Betzer	Richardson	3

Time		Depth		Core	Perc	Core	Redrill	W.O.	Time (hr min)	
From	To	From	To	Recor	Jr-ft	Jr-ft	ft	ft	M&S	Lost
4:00 PM	8:00 PM	4:00	0.0							
8:00 PM	8:30 PM	10:30	Lunch							0-30
8:30 PM	12:00 AM	3:30	16.0			16.0				

0.0 16.0 0.0 0.0

RL

Hole No

D-4-30

545°

7-15-42

June

DEPTH - G-R

8<sup>00</sup>A 4<sup>00</sup>P 8-0 15.0 25.0 10.0

ALLEN

C-D.

10.0

BITZER

14

0.0

10.0

0.0

0.0

px



Haleho  
D-5-20

7-16-42  
C.R

Time 74. m

Depth

800H 400P 8.0 16.0 26.0 10.0

FHLEN  
C.D

Butzer. 15

10.0

0.0 10.0 0.0 0.0

RP

Hole No Top Elev Date

Inspector Foreman Crew No Page

16

Time Depth Core  
From To hr-min From To Recor

Perc Core ReDrill W.O. Time Cor-Min  
Dr-ft Dr-ft ft ft m&SU Lost

Hole No 17-0	Top Elev (446.5)	Date 7-16-42	Inspector J.R. Curry	Foreman Betzer	Crew No Page Richardson 17
-----------------	---------------------	-----------------	-------------------------	-------------------	-------------------------------

Time		Depth		Core	Pore	Core	Retrill	W.O.	Time (hr-Min)
From	To	hr-Min	From To	Recor.	Ir ft	Ir-ft	ft	ft	m&S.L. Lost.

4:00 PM	8:00 PM	4:00	Moving & set up						& cleaning out 23' of sand &
8:00 PM	8:30 PM	0:30	Lunch						Gravel. 0-30
8:30 PM	11:00 PM	2:30	Cleaning out						hole
11:00 PM	12:00 M	1:00	0.0	1.0		1.0			

0.0 1.0 0.0 0.0

Note -

no  
D-7-0

Time

DATE -

7-17-42

Depth - C-R

Allen

C-D

Bitzer

18

800A 400P 8-0 1.0 8.0 8.0

8.0

Transferred to book 609  
- D.W.L.

~~0 8.0 8.0 8.0~~

Hole No	Top Elev	Date		Inspector	Foreman	Crew No	Page
D-2-0	446.5	7-18-42		ALLEN	BITZER		19

Time		Depth		Core	Perc.	Core	ReDrill	W.O.	Time, hr.-min.		
From	To	hr	Min	From	To	Recov.	Dr-ft	Dr-ft	ft	ft	M&S.U. Lost.

8 <sup>00</sup> A	4 <sup>00</sup> P	8-0	16.0	24.5	8.5						
-------------------	-------------------	-----	------	------	-----	--	--	--	--	--	--

8.5

0.0 8.5 0.0 0.0

pl

Hole No D-3-20 Top Elev. 580.9 ✓ Date 7-20-42 Inspector ALLEN Foreman BUSK Crew No 20 Page 20

Time		Depth		Core	Fore.	Core	ReDrill	W.O.	Time (hr Min)	
From	To	hr-Min	From To	Recov.	In. Ft	In. Ft	ft	ft	M&SU	Lost

8:00 A	4:00 P	8-0	0.0 11.0	11.0						
--------	--------	-----	----------	------	--	--	--	--	--	--

0.0 11.0 0.0 0.0

ll

Hole No D-3-30 Top Elev 580.9 ✓ Date 7-21-42

Inspector ALLCN Foreman Bitzer Crew Notage 21

Time		hr-Min	Depth		Core Recor
From	To		From	To	

Perf. In. Ft	Core In. Ft	ReDrill Ft	W.O. Ft	Time (hr.-Min)	
				M&S	U. Lost.

	8 <sup>00</sup> A	4 <sup>00</sup> P	8-0	31.0	26.5	5.5					
--	-------------------	-------------------	-----	------	------	-----	--	--	--	--	--

	5				5.5						
--	---	--	--	--	-----	--	--	--	--	--	--

0.0 5.5 0.0 0.0

RF

Hole# Top Elev Date  
D-10-20 442.6 7-22-42

Inspector Foreman Crew #  
Adolph Bock Betzer 2 (22)

Time		Depth	
From	To	hr. min	From to
4. P.M	8:00 P.M	4-00	17 25

Cord  
Dr. ft.

8.0

For record of drilling  
from 0 - 17, see pg. 24  
- D.W.L.

0.0 8.0 0.0 0.0

DL



Hole # Top Elev Date  
D-10-18-6 441.7 7-22-42

Inspector. Foreman  
Adolph Bock Betzey

(23)

Time			Depth	
From	to	hr. Min	From	to
8:00 P.M.	10:30 <sup>p.m</sup>	2:30	0	
10:30 P.M.	12:00	1:30	0	3.0

Core  
Dr. ft

move + set up.

3.0

0.0 3.0 0.0 0.0

pl

No. e No

D-10-277

Time

DATE -

7-22-42

Depth

C. T.

8:00 A

4:00 P

8-0

0.0

17.0

17.0

Ahken

C-D.

Bitzer

24

17.0

0.0

17.0

0.0

0.0

pl

Time  
no D-10-18<sup>6</sup>  
Tune

DATE -  
7-23-42  
DEPTH C.P.

8:00 A 4:00 P 8.0 9.0 17.0 14.0

4:00 P.M 8:00 P.M 4.0 14.0 24.0

Ahhen  
C.D.

BITZ OF

(25)

~~17.0~~ 14.0

Bock

~~10.0~~ 7

0.0 21.0 0.0 0.0

RL

7404 e. no

D-4-20

Tonia

DATE

7-28-42

Depth - 0.12

800A

400P

8-0

20.0

28.5

8.5

Allen

C.D.

Bilzer

26

8.5

00

8.5

0.0

0.0

Note-no

D-3-0

June

DATE

7-29-42

Depth - C-P

800 ft 400 ft 8.0 4.0 17.0 7.0

10' of core stuck in hole -

Allen

Bitzer

27

C-D-

13.0

~~17.0~~

0.0 13.0 0.0 0.0

Hole#

5-10 D

ELW.

516.5

7-31-42

Time

4:00 P.M.

12 M

From

To

11

24.5

Adolph Bock

28

Core Dr.

13.5

0.0 13.5 0.0 0.0

Hole #	Elev.	Date	Time	Hr. Min.	Depth	Core
18-277		8-7-42	From	to	From to	Recoy
			8:00 AM	12:00	4.00	14.0 19.0 2.5
					19.0 23.0 2.2	
					23.0 25.0 1.8	
					25.0 26.0 1.0	
					26.0 30.0 2.0	
			12:30 PM		30.0 40.0 5.0	
					40.0 43.0 2.0	
					43.0 54.0 10.0	

9-7-42						
4:00	8:00	4:00	54.0	60.0	6.0	
			60.0	64.0	3.5	
			64.0	67.0	2.5	
			67.0	73.0	3.0	
	8:00	4:00	73.0	76.0	2.3	
8:00	8:30	0:30	Lunch			
8:30			76.0	83.0	4.6	
			83.0	85.0	1.0	
	10:30	2:00	85.0	90.0	2.5	

Betzer 29  
Adolph Boek

Core	Drift
5.0 ✓	Core recovered in short pieces.
4.0 ✓	1" to 5" long.
2.0 ✓	
7.0 ✓	
4.0 ✓	
10.0 ✓	
3.0 ✓	
11.0 ✓	

D.P. Curry	Betzer	Richardson
6.0 ✓	Good core	
4.0 ✓	" "	
3.0 ✓	Fair core	
6.0 ✓	Poor core	
3.0 ✓	Core broken in short pieces.	0:30
7.0 ✓		
2.0 ✓		
5.0 ✓	Core very Broken.	

0.0 76.0 0.0 0.0

RL

Hole #

D.9-0

Date

8-10-42

Adolph Bock

30

Time

From to

8:00 AM 4:00 P.M.

Depth

From to

17 20

Core  
Dr. ft

11.0

00 11.0 0.0 00





Hole #

D-11-0

Elev.

450.2

Date

Aug 11, 1942

Adolph Bock

Betzey 31

Time

From to

Depth

From to

Core

dr. ft.

8:00 AM 4:00 PM

0 13.0

13.0

4:00 PM 12:00 PM

13.0 25.0

12.0

0.0 25.0 0.0 0.0

Hole #  
10-27.7

Date  
8-12-42

Time  
From to

Depth  
From to

8:00 AM. 12:00 N

90 95 12

Betzey 32

Adolph Bock

Core  
Dr. ft.

5.0

Core recovered  
in short pieces

0.0 5.0 0.0 0.0



Hole #  
18-33.1

Date  
8-14-42

Time  
From to

Depth  
From to Acc.

8:00 AM

520 67.0 1.0

67.0 70.0 1.1

4:00 PM

70.0 74.0 3.3

74.0 77.0 3.0

77.0 86.0 2.3

86.0 89.0 2.25

11:00<sup>pm</sup> 7:00 89.0 93.0 0.8

11:00 12:00 1:00 out of Bits.

Betzer. 34

Adolph Bock

Core  
Dr. ft.

15.0 ✓ Just a few short pieces recovered.

3.0 ✓ All in short pieces.

D.R. Carvy

4.0 ✓ Richardson.  
soft & short.

3.0 ✓ Broken short

9.0 ✓ Broken in very small pieces.

3.0 ✓ Good core

4.0 ✓ Broken in very small pieces.

0.0 4.0 0.0 0.0 ✓



Hole No	Top Elev	Date
D-5-0		8-18-42

Inspector	Foreman	Crew No	Page
Adolph Back	Betzey		36

Time		Depth		Core
From	To	Hr-Min	From To	Recov

4:00 PM 11:00

11:00 12:00

0 1.0

Perf	Core	Redrill	W.O.	Time (Hr Min)
Dr-ft	Dr-ft	ft	ft	M&S <sup>h</sup> Lost

moving and setting up.

1.0

0.0 1.0 0.0 0.0

Hole No. Top Elev Date  
 D5+0 ----- 8:21:42 -----

Inspector Foreman Crew No Page  
 H.R. Curry Betser Tomlinson 37

Time Depth Core  
 From To Hr-Min From To Recov

Per Core ReDrill W.O. Time (Hr Min)  
 Dr-ft Dr-ft. ft ft m&u Lost.

11:00 a.m. 4:00 p.m. 8.0 18.0

10.0

4:00 p.m. 12:00 m. 18.0 24.7

6.7

0.0 16.7 0.0 0.0





Hole No 76-0 Top Elev. 491.5 Date 8:24:42

Inspector Curry Foreman Betzer Crew No Betzer Page 39

Time		Depth		Core
From	To	Hr.-Min	From To	Recor

Perc. Dr.-ft	Core Dr.-ft	Re Drill ft	W.O. ft	Time (Hr.-min)	
				M&SL	Lost

8:00 AM	12:00 N	4:00	5.0		
12:00 N	12:30	0:30	Lunch		0:30
12:30	4:00	3:30	10.0	5.0	

Note Piece of steel in the hole. Core Barrell's still in hole.

4:00 PM	8:00 PM	4:00	Removed core Barrell		
8:00 PM	8:30 PM	0:30	Lunch		0:30
8:30 PM	12:00 AM	3:30	chopped out	5.0' of core	

Note: Was not able to do any drilling. Could not get core Barrell back in hole.

		Back	Betzer	Tomlinson	
0.0	5.0	0.0	0.0		

Hole No Top Elev Date  
11-18.6 ----- 8-28-42 -----

Inspector Foreman Crew No Page  
T. R. Curry Betzer Betzer. 40

Time		Depth		Core
From	To	hr-Min	From To	Recor

Perc.	Core	Reelril	W.O.	Time (hr-Min)	
Dr-Ft.	Dr-Ft.	Ft.	Ft.	M&S.D.	Lost.

8:00 AM	12:00 N	4:00	12.0						
12:00 N	12:30 PM	0:30	Lunch-						0-30
12:30 PM	4:00 PM	3:30	24.33			12.33			

40 12.3 0.0 0.0

Hole No	Top Elev	Date	Inspector	Foreman	Crew No	Page
7711-9.3	452.7	8:28:42	Curry	Betzer	Betzer	41

Time		Depth		Core	Perc. core	Redrill	W.O.	Time (Hr. Min)
From	To	From	To	Recol	Dr.-ft.	Dr.-ft	ft.	M&SU. Lost.

8:00am	11:00am	3:00		Moving & Set up.				3-00
11:00 am	12:00 N	1:00		0.0				
12:00 N	12:30 PM	0:30		Lunch				0-30
12:30 PM	4:00 PM	3:30			8.0			

Note Driller reports  
62.67' to rock

0.0	8.0	0.0	0.0
-----	-----	-----	-----

Hole #  
D-11-9.3

Date  
8-31-42

Inspector  
Adolph Bock

Foreman  
Betzer 42

Time  
From to

Depth  
From to

8:00 A.M. 4:00 P.M.

8.0 15.0

Core  
Dr. ft.

7.0

some trouble  
pulling core barrel  
out of hole.

0.0 7.0 0.0 0.0

Hole No 11-279 Top Elev ----- Date 9:3:42

Inspector Rock Foreman Betzer Crew No Betzer Page 43

Time		Depth		Core
From	To	Hr-Min	From To	Recon

Core	Core	Retrill	W.O.	Time (Hr-Min)	
Dr-ft	Dr-ft	ft	ft	M&SU	Lost

12:30 PM 4:00 PM 3:30 12.0 21.0  
3' of core Left in hole

9.0 ✓

9:3:42  
4:00 PM 7:00 PM 3-chopping core  
7:00 PM 8:00 PM 1:00 21.0 24.0

Curry Betzer Betzer

3.0 ✓

Note Driller reports  
62.5' to Rock

0.0 12.0 0.0 0.0

Hole #  
D 11-27.9

Date  
Sept. 4, 42.

Time  
From to

Depth  
From to

8:00 AM 4:00 PM.

24.0 25.0

Insp  
Adolph Bock

Foreman  
Betzler. 40

Core  
dr. ft.

1.0

0.0 1.0 0.0 0.0

Hole #

D-11-37.2

ELEV.

457.4

Date

9-5-42

From To

0 8.0

8:00 AM 4:00 PM

IOSP

Adolph Bock

Foreman

Betzer

45

8.0

0.0

8.0

0.0

0.0

Hole #  
D-11-37.2

Date  
9-8-42

Time  
From to  
8:00 A.M. 4:00 P.M.

Depth  
From to  
8.0 26.5

Adolph Bock

Betzey

46

Core  
Dr. ft.  
~~16.5~~  
18.5

0.0 18.5 0.0 0.0



Hole #

D12-0

Time

12:00 A 8:00 P.M.

Date

9-11-42

Depth

From to

0.0 1.0

Adolph Bock

Betzer

47

Core

Dr. ft.

1.0

0.0 1.0 0.0 0.0



Hole No D-12-0 Top Elev ----- Date 9-14-42

Inspector J.R. Curry Foreman Betzer Crew No Belzer Page 49

Time ----- Depth ----- Core -----  
 From ----- To ----- Hr.-Min From ----- To ----- Recov -----

Perc ----- Core ----- Redrill ----- W.O. ----- Time (hr-min) -----  
 Dr-ft. ----- Hr-ft. ----- ft. ----- ft. ----- M&SU. ----- Lost. -----

8:00AM 12:00N 4:00 15.0  
 12:00N 12:30PM 0-30 Lunch  
 12:30PM 1:30PM 1-00 25.5

10.5 0-30

0.0 10.5 0.0 0.0

18-375

Date 9/22/42

Time

Depth

From

To

Hr-Min.

From

To

3:30 PM

0

25

Inspector  
Curry

50

Perc. Dr.

Cora  
Dr.

Redr.

Wb.

25'

0.0

0.0

0.0

25.0





Hole No A-17-23 Top Eker \_\_\_\_\_ Date 9-25-42

Inspector Curry Foreman Betzer Crew No Betzer Page 53

Time		Depth		Core
From	to	From	To	Recov

Perc. Dr. ft.	Core Dr. ft.	ReDrill ft.	W O ft.	Time (Hr.-Min)	
				M&SU.	Lost.

8:00 AM 1:15 PM 5:15 72.0 78.0 3.0

6.0 1 piece of core 5" long  
the rest was from 1/2" to 2" long.

0.0 6.0 0.0 0.0

Hole # <sup>33.1</sup>  
18-31-2

Top Elev

Date

Sept. 30, 42

Time

Depth

Core

From to Hr. min

From To

Recor

8:00 AM 3:30 PM

0 60.0

Inspector

Adolph Bock

Foreman

Betzer

54

Redrill

ft.

60.0

Note: This hole started in the original hole, then at 5.0' it started into the rock so that at 10.0' they had a full core of rock then it started the other way again so that at 17.0' the drill was back in the original hole. From then on to a depth of 60.0' it stayed in the old hole.

0.0

0.0

60.0

0.0



Hole # 33.1  
18-312

Top ELEV.

DATE

Oct. 1, 1942

TIME

From To  
9<sup>00</sup> AM 12<sup>00</sup> AM

DEPTH

From To  
60.0 94.0

CORE

RECOV.  
0

60.0 93.0

93.0 94.0

INSPECTOR

Dickinson

Betzer - Foreman

55

Redrilled <sup>34.0</sup>  
~~33.0~~

Note: Wash water appeared to  
be grout grindings - No  
rock struck until depth  
of ~~94.0~~ Last foot drilled  
in rock

Perf. Dr.	Core Dr.	Redr.	W.O.
--------------	-------------	-------	------

33.0

1.0

0.0

1.0

33.0

0.0

Hole #	Top Elev	Date
A-18-29	577.4	10-5-42

Time	Depth		Core Recov.
	From	to	
9:00 AM	0	1.5	
	<del>1.5</del> 6.0	11.0	4.2
	11.0	15.0	3.5
	15.0	20.0	1.9
	20.0	25.0	1.5

Inspector  
Adolph Back

Foreman  
Betzer 56

Perk D.C.	Core Dy. ft
1.5	(9-22-42 Curry)
	<del>11.0</del> 9.5 - Core recovered
	4.0 ✓ is in short pieces
	5.0 ✓ from 1" to 4" long
	5.0 ✓

1.5 23.5 0.0 0.0

Hole No D-12-93 Top Elev Date 10-26-42

Inspector Dr. R. Curry Foreman Betzer Crew No Betzer Page 57

Time		Depth		Core
From	To	Hr-Min	From To	Recon
4-00	8-00	4-00	9.	
8-00	8-30	0-30	Lunch	
8-30	12-00		19.	

Perc	Core	ReDrill	W.O.	Time (Hr-min)	
Dr-ft	Dr-ft	ft	ft	M&S	Last.
	10.0				0-30

Note Driller reports  
64.0 ft to rock from  
Elev 525.5.

0.0 10.0 0.0 0.0

Hole No II-12-93 Top Elev            Date 10-27-42

Inspector J.R. Curry Foreman Betzer Crew No Betzer Page 58

Time		Depth		Core
From	To	Hr	Min	From To Recov
4-00	8-00			19.0
8-00	8-30	Lunch		
8-30	10-00			25.75
10-00	12-00	moving to hole		
NO II-12-18.6				

Per Dr	Core Dr	Redrill	W.O.	Time (Hr Min)
ft	ft	ft	ft	m&su Lost
				0-30
	6.75			
				2-00

0.0    6.8    0.0    0.0

Hole No Top Elev Date  
D-12-186 ----- 10-28-42

Time		Depth		Core
From	To	Hr	Min	From To Recov

4-00	6-00	2-00		Moving & S.U.
6-00	8-00			0.0
8-00	8-30			Lunch
8-30	12-00			9.0

Note 0.0 is 60.0 ft  
Below Elev 525.5

Inspector Foreman Crew No Page  
Carry Betzer Betzer 59

Perc	Core	ReDrill	W.O.	Time (Hr Min)
Dr-ft	Dr-ft	ft	ft	M&SU Lost

0.0 9.0 0.0 0.0

Hole No	Top Elev	Date	Time	Depth	Core
From	To	Hr-Min	From	To	Recor
D-12-18.6	-----	10-30-42			

1-00	4-00	3-00	9.0	12.0	
4-00	9-00	5-00	12.0	13.0	

Note: Drill rods were stuck in the hole from approx 5-00 P.M. to 9-00 P.M. They are still stuck at approx 7.0 ft from bottom of hole.

Inspector	Foreman	Crew No	Page
J.R. Curry	Betzer	Betzer	60

Perf	Core	ReDrill	W.O.	Time (hr-min)
Dr-ft.	Dr-ft	ft	ft	M&SU Lost.

3.0	(This was Mr Bock's shift) DRC.			
1.0				

0.0	4.0	0.0	0.0
-----	-----	-----	-----

Hole No D-12-93 Top Elev --- Date Oct-23 & 24

Inspector Beck per A.R.C. Foreman Betzer Crew No Page Betzer 61

Time From To hr Min Depth From To Core Recorder

Pore Core Redrill W.O. Time (hr Min) Dr. Ft. Dr. Ft. ft ft M&S U Lost.

4-00 12-00 8-00 0.0 7.0  
 4-00 12-00 8-00 7.0 9.0

7.0 (10-23-42)  
 2.0 (10-24-42)

0.0 9.0 0.0 0.0

Hole No 12-27.9 Top Elev 470.1 Date 11-3-42

Inspector Curry Foreman Betzer Crew No 62 Page 62

Time		Depth		Core
From	To	Hr-Min	From To	Recor

Perc	Core	ReDrill	W.O.	Time (Hr-Min)
Dr-ft	Dr-ft	ft	ft	M&SU Last

1-00	4-00	3-00	Moving From hole	
4-00	6-20	2-20	Setting up	
6-20	9-00	2-40	0.0 8.0	

No 12-18.6 (Backs shift) rec.

8.0

Note Driller reports  
60 ft to Rock from Top  
of Block Elev 530.0

0.0 8.0 0.0 0.0



Hole No D-12-279 Top Elev ----- Date 11-4-42

Inspector Curry Foreman Betzer Crew No Betzer 63 Page

Time		Depth core		Recor
From	To	Hr-Min	From To	

Perc Dr-ft	Core Dr-ft.	Redrill ft	W.O. ft.	Time (hr min)	M&SU	Lost!
------------	-------------	------------	----------	---------------	------	-------

1-00	4-00	3-00	8-00	14.0		
4-00	6-30	2-30	14	21.0		
6-30	9-00	Machine Broken.				

6.0 ✓ Drilled on Day shift (CORE)

7.0 ✓

0.0 13.0 0.0 0.0

Hole No II-13-0 Top Elev 473.9 ✓ Date 11-6-42

Time		Depth		Core
From	To	Hr-Min	From To	Recor

4-00	7-00	3-00	Moving & Set up	
7-00	9-00		6.0 7.0	
			473.9 473.0	

Note: Driller reports 55 ft to Rock From Elev 535 from top of Lift 26.

Datum: This was a false bottom count Drilling above Elev 473. The driller said casing pipe dropped 3. ft approx.

Inspector J. R. Curry Foreman Betzer Crew No Betzer Page 6A

Perc	Core	ReDrill	W.O.	Time (Hr-Min)	
Dr-ft	Dr ft.	ft	ft	M&S.U.	Lost

	7.0				
	0.9				

0.0	0.9	0.0	0.0		
-----	-----	-----	-----	--	--

1 Hole No Top Elev Date  
 2 D-13-0 ----- 11-9-42 -----

Inspector Foreman Crew No Page  
 H. R. Curry Betzer Betzer 65

Time		Depth		Core	Perc	Core	Redrill	WO	Time (Hr-Min)
From	To	From	To	Recov.	Dr-ft	Dr-ft	ft	ft	m & SU. Lost.

1-00	4-00	3-00	Elev ✓ Elev 473. 470.5			2.5 ✓			
------	------	------	---------------------------	--	--	-------	--	--	--

0.0 2.5 0.0 0.0



Hole # D Elev. Date  
12-37-2 473.2 11-11-42

Inspector Foreman  
Adolph Bock Betzer 67

Time		Hr. Min	Depth		Core Recovered
From	To		From	To	
1:00 PM	9:00 PM	8:00	0	180	

Core Dy. Ft.
18.0

0.0 18.0 0.0 0.0

Hole No D-37.2	Top Elev 473.2	Date 11-12-42	Inspector D.R. Curry	Foreman Betzer	Crew No Betzer	Page 68
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Time		Depth		core	Perc	Core	ReDrill	W.O.	Time (Hr-Min)	
From	To	Hr-Min	From	To	ft	ft	ft	ft	M&SU	Lost

8-00	11-00	3-00	18.0	24.0						
------	-------	------	------	------	--	--	--	--	--	--

6.0

11-00	4-00	5-00	Moving Equip. to Block 13.						5-00	
-------	------	------	-------------------------------	--	--	--	--	--	------	--

5-00

Note Driller states  
he had 62 ft of rods from  
Elev 535.2 this checks  
with Top Elev 473.2

0.0

6.0

0.0

0.0

Hole #

D-12-27-2

Date

11-5-92

Inspector

Adolph Bock

Foreman

Betzey

69

Time

Depth

From

to

Hr. Min

From

to

8:00 AM

4:00 PM

210

27.0

Core

Dr. ft

6.0

0.0

6.0

0.0

0.0

Hole #

D-13-8

Date

11-13-42

Inspector

Adolph Boeck

Foreman

Betzer

70

Time

Depth

From To Hrs. Min

From to

Core  
Drift

1:00 P.M. 9: P.M.

0 12.0

12.0

0.0 12.0 0.0 0.0



Hole #

D-13-8

Date

11-14-1942

Inspector

Adolph Bock

Crew Foreman

Betzer

71

Time

Depth

Core

From

to

Hr. Min

From

to

Dr. ft.

1.00 P.M. 9.00 P.M.

12.0 27.0

15.0

0.0

15.0

0.0

0.0

Hole No	Top Elev	Date
D-13-19	478.73	11-16-42

Inspector	Foreman	Crew No	Page
Book by D.R.C.	Betzer	Betzer	12

Time		Depth		Core
From	To	Hr-Min	From To	Recor
4-00	9-00	5-00	0.0 7.0	

Per	Core	ReDrill	W.O.	Time (Hr-Min.)
Dr.-ft	Dr.-ft.	ft	ft.	M&SU. Lost.
	7.0			

Note: Driller reports  
 47.5' to rock from top  
 of lift 28 Elev 525+.

0.0 7.0 0.0 0.0

Hole No	Top Elev	Date		Inspector	Foreman	Crew No	Page
J-13-19	478.3	11-17-42		J. R. Curry	Betzer	Betzer	73

Time		Depth		Core	Perc.	Core	ReDrill	W.O.	Time	Chr-Min
From	To	From	To	Recov	Tr-ft	Tr-ft	ft	ft.	M&S.U.	Lost

8-30	11-30	3-00	7-0	13.0		6.0				
------	-------	------	-----	------	--	-----	--	--	--	--

0.0	6.0	0.0	0.0
-----	-----	-----	-----

Hole No II-13-19 Top Elev 478.3 Date 11-19-42

Inspector Curry Foreman Betzer crew No Betzer Page 74

Time		Depth		Core	Per	Core	Rekill	W.O.	Time (Hr-Min)
From	To	Hr-Min	From To	Recor	Tr-ft	Tr-ft	ft	ft.	M&SU host

2-00	4-00	2-00	16.0	18.0		2.0			
------	------	------	------	------	--	-----	--	--	--

0.0

2.0

0.0

0.0

Hole #

D13-19

Date

11-18-42

Adolph Bock

Betzer

75

Time

From to

P.m. P.m.  
4:00 9:00

Depth

From to

13.0 16.0

Core

Dr. ft.

3.0

0.0 3.0 0.0 0.0

Hole #

D13-19

Date

11-19-1942

Time

Depth

From to  
P.M. P.M.  
4:00 9:00

From to  
18.0 28.0

Adolph Bock

Betzer.

76

Core

Dr. ft.

10.0

10.0

Hole\*

D13-30

484.6

Date

11-20-42

Time

From to

p.m. p.m.  
1:00 9:00

Depth

From to

0 9.0

Adolph Beck

Betzer

77

Core

Dr. ft.

9.0

9.0





Hole No	Top Elev	Date	Inspector	Foreman	Crew No	Page
D-13-40	494.2	11-24-42	D.R. Cukky	Betzer	Betzer	79

Time		Depth		Core	Perc	Core	Retrill	W. O.	Time (hr Min)
From	To	From	To	Recor	In-ft	In-ft	ft	ft	M&SU Last.

4-00	9-00	5-00	0.0	8.0					
------	------	------	-----	-----	--	--	--	--	--

8.0

Note Driller reports  
42.0 ft to rock From  
Elev 536.0 approx.

0.0 8.0 0.0 0.0

# CURVE TABLES.

Published by KEUFFEL & ESSER CO.

## HOW TO USE CURVE TABLES.

Table I. contains Tangents and External to a 1° curve. Tan. and Ext. to any other radius may be found nearly enough, by dividing the Tan. or Ext. opposite the given Central Angle by the given degree of curve.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.

To find Deg. of Curve, having the Central Angle and External: Divide Ext. opposite the given Central Angle by the given External.

To find Nat. Tan. and Nat. Ex. Sec. for any angle by Table I.: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

### EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle of Intersection or I. P. = 23° 20' to the R. at Station 542+72.

Ext. in Tab. I opposite 23° 20' = 120.87  
 $120.87 \div 12 = 10.07$ . Say a 10° Curve.

Tan. in Tab. I opp. 23° 20' = 1183.1  
 $1183.1 \div 10 = 118.31$ .

Correction for A. 23° 20' for a 10° Cur. = 0.16  
 $118.31 + 0.16 = 118.47$  = corrected Tangent.

(If corrected Ext. is required find in same way)

Ang. 23° 20' = 23.33°  $\div 10 = 2.3333$  = L. C.

2° 19½' = def. for sta.	542	I. P. = sta.	542+72
4° 49½' = " " "	+50	Tan. =	118.47
7° 19½' = " " "	543	B. C. = sta.	541+53.53
9° 49½' = " " "	+50	L. C. =	2.3333
11° 40' = " " "	543+	E. C. = Sta.	543+86.86
	86.86		

$100 - 53.53 = 46.47 \times 3' (\text{def. for 1 ft. of } 10^\circ \text{ Cur.}) = 139.41' =$

2° 19½' = def. for sta. 542.

Def. for 50 ft. = 2° 30' for a 10° Curve.

Def. for 36.86 ft. = 1° 50½' for a 10° Curve.

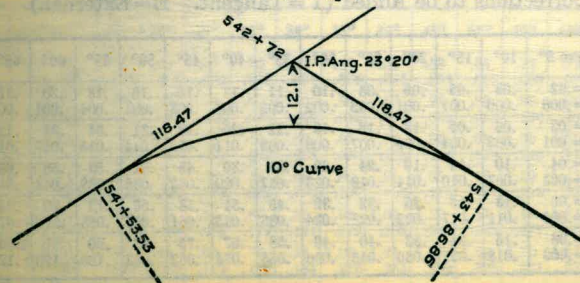
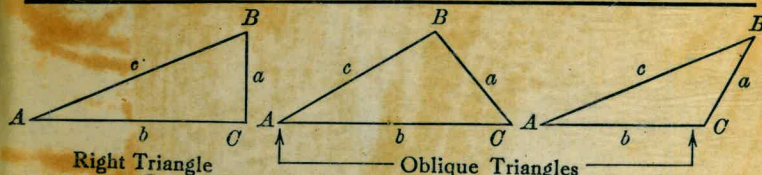


Table with columns for 'Given' and 'Required' values, listing various trigonometric relationships and formulas for right and oblique triangles.

3  
20

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

For Angle A.  $\sin = \frac{a}{c}$ ,  $\cos = \frac{b}{c}$ ,  $\tan = \frac{a}{b}$ ,  $\cot = \frac{b}{a}$ ,  $\sec = \frac{c}{a}$ ,  $\text{cosec} = \frac{c}{a}$

Given	Required	Formulas
$a, b$	$A, B, c$	$\tan A = \frac{a}{b} = \cot B, c = \sqrt{a^2 + b^2} = a \sqrt{1 + \frac{b^2}{a^2}}$
$a, c$	$A, B, b$	$\sin A = \frac{a}{c} = \cos B, b = \sqrt{(c+a)(c-a)} = c \sqrt{1 - \frac{a^2}{c^2}}$
$A, a$	$B, b, c$	$B = 90^\circ - A, b = a \cot A, c = \frac{a}{\sin A}$
$A, b$	$B, a, c$	$B = 90^\circ - A, a = b \tan A, c = \frac{b}{\cos A}$
$A, c$	$B, a, b$	$B = 90^\circ - A, a = c \sin A, b = c \cos A$

Solution of Oblique Triangles

Given	Required	Formulas
$A, B, a$	$b, c, C$	$b = \frac{a \sin B}{\sin A}, C = 180^\circ - (A + B), c = \frac{a \sin C}{\sin A}$
$A, a, b$	$B, c, C$	$\sin B = \frac{b \sin A}{a}, C = 180^\circ - (A + B), c = \frac{a \sin C}{\sin A}$
$a, b, C$	$A, B, c$	$A + B = 180^\circ - C, \tan \frac{1}{2}(A - B) = \frac{(a - b) \tan \frac{1}{2}(A + B)}{a + b}$ $c = \frac{a \sin C}{\sin A}$
$a, b, c$	$A, B, C$	$s = \frac{a + b + c}{2}, \sin \frac{1}{2}A = \sqrt{\frac{(s - b)(s - c)}{bc}}$ $\sin \frac{1}{2}B = \sqrt{\frac{(s - a)(s - c)}{ac}}, C = 180^\circ - (A + B)$
$a, b, c$	Area	$s = \frac{a + b + c}{2}, \text{area} = \sqrt{s(s - a)(s - b)(s - c)}$
$A, b, c$	Area	$\text{area} = \frac{bc \sin A}{2}$
$A, B, C, a$	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL

Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle =  $5^\circ 10'$ . From Table, Page IX.  $\cos 5^\circ 10' = .9959$ . Horizontal distance =  $319.4 \times .9959 = 318.09$  ft.  
Horizontal distance also = Slope distance minus slope distance times (1 - cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. Cosine  $5^\circ 10' = .9959$ .  $1 - .9959 = .0041$ .  $319.4 \times .0041 = 1.31$ .  $319.4 - 1.31 = 318.09$  ft.  
When the rise is known, the horizontal distance is approximately: — the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance =  $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$  ft.