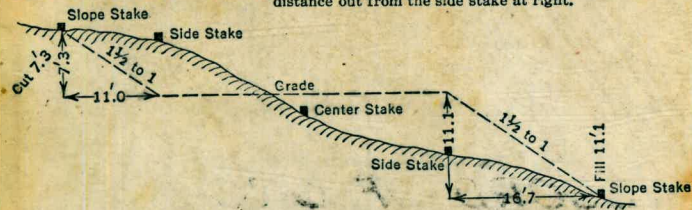


W
603

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1 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.

**RECORD OF GROUTING
BOOK 2**

MICROFILMED

JAN 13 1965

The paper in this book No. 1363-A
is made of 50% high grade rag stock
with a WATER RESISTING surface sizing.

52.5.

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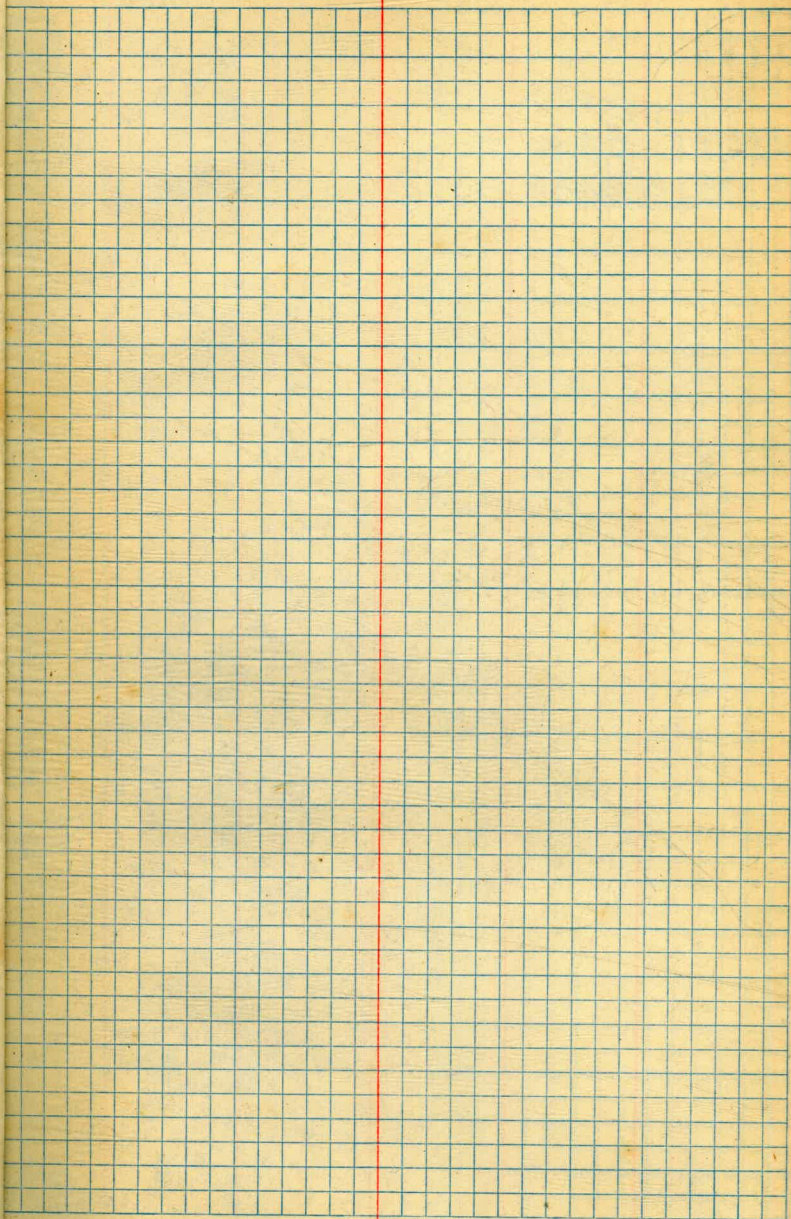
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RECORDS OF GRADING
BOOK 5

MICROFILMED

JAN 13 1982



HOLE No. 1-25 DATE 3/3/42

TIME			DEPTH Fr. - To	Water Test lbs./sq. in.	Grout Pressure lbs./sq. in.
From	To	Hr. - Min.			
8 ⁰⁰ A	8.35 A	0 - 35		10	
8.35	11.30 A	4 - 5	0 - 24		35

INSPECTOR

F. L. L. E. N

FOREMAN

CURTIS

page 1

Grout Proportion	Materials Used (cu. ft.)			Quantity Grout (cu. ft.)	Grout per min. (cu. ft.)
	Cement	Sand	Water		
At this pressure water begins to flow several seams above and below grout hole - and would not hold higher pressure.					
1 1/2 to 2	32	0	21 1/2	32	
Only total 25 lbs. pressure on grout - because back seamer in rock - afraid of blow out with higher pressure.					

pl. out.

This Hole was blown out and not -

HOLE No. L-25 DATE 3/3/42

INSPECTOR

FOREMAN

page 2

F. HEN

CURTIS

TIME			DEPTH	Water Test	Grout Pressure
From	To	Hr - Min.	Fr. - To.	lbs./sq. in.	lbs./sq. in.
11:30 A	12:00 M	0-30		100	
12:30 P	3:30 P	3-0	27'6"-47'		100

Grout Proportion	Materials Used (Cu. Ft.)			Quantity Grout (Cu. Ft.)	Grout per min. (Cu. Ft.)
	Cement	Sand	Water		
1 1/2 - 1	21	0	3 1/2	21	

lost water pressure rather fast on shutting off pressure valve -

This Hole blown out at 4:30 P. Very tight.

pl vent

HOLE No. 5-25³ DATE 3/5/42

INSPECTOR

ALLEN

FOREMAN

CURTIS

page 3

TIME			DEPTH	Water	Grout
From	To	Hr. - Min.		Pressure	Pressure
			Fr. - To	lbs./sq. in.	lbs./sq. in.

3/5	3:45	0-30	0:48.6	100	
-----	------	------	--------	-----	--

This hole held 1000 lb. pressure for 3 minutes.

Grout Proportion	Materials Used (cu. ft.)			Quantity Grout cu. ft.	Grout per min. cu. ft.
	Cement	Sand	Water		

001
with loss of only 2/3 cu. ft.

AL
CURTIS

HOLE No. 1-25

DATE 3/7/42

INSPECTOR

ALLEN

FOREMAN

HAYS

page 4

TIME			DEPTH	Water Test lbs./sq. in.	Grout Pressure lbs./sq. in.	Grout Proportion	Materials Used (Cu. ft.)			Quantity Grout (Cu. ft.)	Grout per min. (Cu. ft.)
From	To	Hr. - Min.					Fr. - To	Cement	Sand		
8-15 A	8-29 A	0-5	0:52.40	100							
This hole lost $4\frac{2}{3}$ cu. ft. of water in 3-min test.											
8-30 A	10:35 A	2-10	0:52.40	100	1-1 $\frac{1}{2}$	25	0	37 $\frac{1}{2}$	25		

pl. work

HOLE No. 2-25 DATE 3/7/41

INSPECTOR

FOREMAN

page 5

Allen

Hays

TIME		DEPTH	Water Test lbs./sq. in.	Grout Pressure lbs./sq. in.
From	To			

10-35A 11-20A 0-55 0:80.13

Setting up, washing and blowing out hole getting ready for water test.

11-20A 11-30 0-10 0:80.13 135'

This hole only lost $\frac{2}{3}$ cu ft. of pressure in 3 min water test.

11-30 12-00M 0-30 0:80.13 135'

This hole is down to depth - grouted and capped.

Grout Proportion	Materials Used (Cu. ft.)			Quantity Grout (Cu. ft.)	Grout per min. (Cu. ft.)
	Cement	Sand	Water		

1:1½ 3 0 4½ 3

OK
HAY

HOLE No. 3-25DATE 3/7/42

INSPECTOR

FOREMAN

page 6

AllenHays

TIME			DEPTH		Water Test	Grout Pressure
From	To	Hr. - Min.	Fr. - To		lbs./sq. in.	lbs./sq. in.

12.30.P.	1-10.P.	0-40	0:73.50		125	
----------	---------	------	---------	--	-----	--

This hole only lost $\frac{1}{3}$ cu. ft. of water. Pressure in 3-min test.

Grout Proportion	Materials Used (cu. ft.)			Quantity Grout (cu. ft.)	Grout per min. (cu. ft.)
	Cement	Sand	Water		

pl
out

HOLE No. 7-25 DATE 3/7/42

TIME			DEPTH	Water Test	GROUT Pressure
From	To	Hr.-Min.	Fr. - To	lbs/sq. in	lbs/sq. in
1.10 P	1-30 P	0-30	0:14.05	125	

This hole only lost $\frac{2}{3}$ cu ft. of water -

INSPECTOR Ahnen FOREMAN Jayski page 7

GROUT Proportion	Materials Used (Cu. ft.)			Quantity GROUT (Cu. ft.)	GROUT per min. (Cu. ft.)
	Cement	Sand	Water		

pressure in 3-min of test.

PL
NEXT

HOLE No. 1-25 DATE 3/7/42

INSPECTOR

FOREMAN

page 8

H. H. C. N.

NAYS

TIME		DEPTH		Water Test	GROUT Pressure
From	To	Hr.-Min.	Fr.-To	lbs./sq. in.	lbs./sq. in.

GROUT Proportion	Materials Used (Cu. Ft.)			Quantity GROUT (Cu. Ft.)	GROUT per min. (cu. ft.)
	Cement	Sand	Water		

Cleaning and washing rock facing up to wash out 1-25-

on west side - moving and setting

0-53.40 100

1-30 P 3-00 P 1-30

washed out, ready for drilling.

no
start

INSPECTOR

FOREMAN

page 9

HOLE No.

1-0

DATE

3/11/42

ALLEN

Archard

TIME		DEPTH		Water Test	GROUT Pressure	GROUT Proportion	Materials Used (Cu. Ft.)			Quantity GROUT cu. ft.	GROUT per min cu. ft.
From	To	Hr.-Min.	Fr. - To	lbs./sq. in.	lbs./sq. in.		Cement	Sand	Water		
10-30 A	11:00 A	0-30	0-28.83	20							
12-30 M	3-35 P	3-05	0:28.83	20		1-1	34	0	34	34	

This hole would not hold any water pressure at all. In case of several bad faults - but one day much trouble.

water pressure at all. In case of you be able to grout it, with out

Only gave 20 lbs test, several bad faults but sealed off nicely -

at Dent

INSPECTOR

FOREMAN

page 10

Allen

Richard

HOLE No 1-207 DATE 3/11/42

TIME		DEPTH	Water Test	Grout Pressure
From	To			

Grout Proportion	Materials Used (Cu. Ft.)			Quantity Grout Cu. ft.	Grout per min. Cu. ft.
	Cement	Sand	Water		

3.20 P 3.55 P 0-20 0-65' 115'
 This hole tested no loss of water at all.

3.35 P 4-15 P 0.40 0-65' 115'

1-1/2	1	0	1	1	
-------	---	---	---	---	--

Allen

Hole No. 4-25 Date 3/13/42

Time			Depth	Water Test	Grout Pressure
From	To	Hr.-Min.	Fr.-To	lbs./sq.in.	lbs./sq.in.
9:00	9:45	1-45	0:77.0		

Washing and cleaning out grout getting

could only wash grout out down to

drilled out down to 101 ft.

Inspector
Allen

Foreman
Richard

Page 11

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		

hole ready for redrilling

77.0 rest of grout will have to be

RL West

Hole No. 5-0 Date 3-13/42

Inspector

Allen

Foreman

H. Chord

page 12

Time		Depth Fr.-To	Water Test lbs./sq.in.	Grout Pressure lbs./sq.in.
From	To			

9:40 10:00 0-15 0-27.3 0

This hole would hold no water pressure because of bad open fault above - but looks like it - can be grouted with out much trouble -

10:00 11:45 1-45 0:27.3 45

This hole was washed out later in the day by Allen, but he failed to enter record of washing out in field book.
- D.W.H.

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per. min. (cu.ft.)
	Cement	Sand	Water		

1:1 26 0 26 26

at
Dist

Hole No. 5-23

Date 3/13/44

Inspector
Allen

Foreman
Richard

Page 13

Time		Depth	Water Test	Grout Press.
From	To			

12:30	1:00	0:30	0:98.33	145
-------	------	------	---------	-----

This hole cost 5 cu ft of water in 3
water pressure - tested 3 1/2 lbs.

1:00	3:00	1-0	0:98.33	145
------	------	-----	---------	-----

2:00	3:45	1:45	0:98.33	145
------	------	------	---------	-----

Grout Proportion	Materials Used (cu. ft.)			Quantity Grout (cu. ft.)	Grout per min. (cu. ft.)
	Cement	Sand	Water		

min test - tested this hole on back

1-3	25	0	75	25	
-----	----	---	----	----	--

1-1	22	0	22	22	
-----	----	---	----	----	--

122
Deck

Hole No. 5-0

Date 3-19-42

Inspector

Foreman

Page 14

Time		Depth From-To	Water Test lbs./sq.in.	Grout Pressure lbs./sq.in.
From	To			

9:15AM	9:40AM	0-25	00:5117	100.0
--------	--------	------	---------	-------

D.R. Curry

Claude Orchard

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (Cu.ft.)
	Cement	Sand	Water		

this hole stood 3 min. 100.0 lb. test with
loss of 0.0 cu.ft.

12/

Hole No. 4-25 Date 3/16/52

Time		Depth	Water Test	Grout Pressure
From	To	Hr.-Min. Fr.-To	lbs./sq.in.	lbs./sq.in.

9:40 A 10:05 0-25 0:113.67 0
 This hole would not hold water
 several faults and seams above

10:05 11:30 1-25 0:113.67 90
 Grout showed up in large open
 proportion to seal.

11:30 P ^{P.m} 4:50 5-20 0:113.67 160

4:50 5:30 Clean up

Inspector H. H. EN Foreman H. BOARD Page 15

Grout Proportion	Materials Used (cu. ft.)			Quantity Grout (cu. ft.)	Grout per min. (cu. ft.)
	Cement	Sand	Water		

Pressure at all water shows up in
 and below top of hole.

1:3 73 0 73-
 seam, will have to change grout

1:1 97 0 97 97

Adolph Back Inspector
 From 4:00 P.m to 12 P.m.
 This hole was still taking
 grout slowly at 4 P.m.
 but it gradually slowed up
 until at 4:50 it was
 practically stopped.

M.J.

Hole No. 2-0 Date 3/18/42

Inspector

Allen

Foreman

Richard

Page 17

Time		Depth Fr.-To	Water Test lbs./sq.in.	Grout Pressure lbs./sq.in.
From	To			

8:30 A	8:45 A	0-15	0:12.5	30
--------	--------	------	--------	----

This hole took 2 1/2 cu ft. of water in
7 small seams around top of hole.

8:45 A	9:15 A	0-30	0:12.5	30
--------	--------	------	--------	----

changed to another cement-proportion

9:15 A	10:25 A	1-10	0:12.5	30
--------	---------	------	--------	----

This hole blows out and cleaned to
3/8/42.

Grout Proportion	Materials Used (cu. ft.)			Quantity Grout (cu. ft.)	Grout per min. (cu. ft.)
	Cement	Sand	Water		

3-min test.	Soreing water thru			a couple	
-------------	--------------------	--	--	----------	--

1:3	4	0	13	4	
-----	---	---	----	---	--

because of open seam at top of hole

1:1	8	0	8	8	
-----	---	---	---	---	--

depth of 13.5 ready for drilling at 2:15 P

Hole No. 1-0 Date 3/12/42

Inspector H. H. E. N. Foreman McLeod Page 18

Time		Depth	Water Test	Grout Pressure
From	To	Hr.-Min. Fr.-To	lbs./sq. in.	lbs./sq. in.

11:00 A 11:15 A 0-15 0:41' 90

This hole was taking 6 1/2 cu ft water in 3-min test - could find no showing of leakage anywhere -

11:15 A 11:15 P 3-0 0:41' 90

2:15 2:15 1-0 0:41' 100

This hole should be washed out and

Grout Proportion	Materials Used (cu. ft)			Quantity Grout lbs./sq. in.	Grout per min. lbs./sq. in.
	Cement	Sand	Gravel		

3-min test - could find no showing of

1:3 29 0 87 29

1:1 6 0 6 6

cleared for drilling at 7:15 P 4 hrs set.



Hole No. 2-0 Date 3/20/42

Time		Depth	Water Test	Grout Pressure
From	To	Fr. To	lbs./sq.in.	lbs./sq.in.

0:50.5

This hole water tested = 3/19/42 - 1300 ft. no 1.

9:00 A	10:30 A	11:30	0:50.5	30
--------	---------	-------	--------	----

Change cement proportion because of open seam opening up above top of hole. Hard to seal.

10:30 A	11:45 A	1-12	0:50.5	100
---------	---------	------	--------	-----

This hole should be washed out and chased for drilling at 9:00 PM 8-hr set -

Inspector Abbott Foreman McBord Page 19

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		
1:3	9	0	27	9	
1:1	5	0	5	5	

Handwritten mark

Hole No. 4-0 Date 3/20/42

Time		Depth	Water Test	Grout Pressure
From	To	From To	lbs./sq.in.	lbs./sq.in.

12:30 P	1:00 P	0:30	0:79.1	0
---------	--------	------	--------	---

This hole would not hold pressure at top of hole.

1:00 P	2:10 P	1:10	0:79.1	40
--------	--------	------	--------	----

changed cement proportion because of bad open seam at top of hole.

2:10 P			0:79.1	40
--------	--	--	--------	----

This hole should have 8 hr set before cleaning out for drilling -

Inspector H. H. N. Foreman Richard Page 20

Grout Proportion	Materials Used (Cu. Ft.)			Quantity Grout (Cu. Ft.)	Grout per min. (Cu. Ft.)
	Cement	Sand	Water		

all because of bad open seams above

1:3	5	0	15	5	
-----	---	---	----	---	--

bad open seam at top of hole, haul

1:1	15	0	15	15	
-----	----	---	----	----	--

re

Hole No. J-23 Date 3/23/42

Time			Depth Fr.-To	Water Test lbs./sq.in.	Grout Pressure lbs./sq.in.
From	To	Hr.-Min.			
8:15 A	9:00 A	0-45	0:132.6		150

Inspector

Allen

Foreman

Hehner

Page 21

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		
1:3	2	0	6	2	

PK

Hole No. 5-0 Date 3/23/43

Inspector Phelan Foreman Richard Page 22

Time		Depth Fr.-To	Water Test lbs./sq. in.	Grout Pressure lbs./sq. in.
From	To			
9:30.7	10:00.7	0:30	0:12.4	150

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		
1:3	2	0	6	2	

pl

Hole No. Y-25 Date 3/23/44

Time		Depth	Water Test	Grout Pressure
From	To	Hr.-Min.	Fr.-To	lbs./sq.in.

10:15	10:45	0:30	0:125.7	150
-------	-------	------	---------	-----

Inspector H. L. ... Foreman Richard Page 23

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		
1:3	3	0	9	3	

PL

Hole No. 3-0 ⁴⁴⁻³⁰ Date 3/22/42

Inspector

Foreman

Page 24

Time		Depth Fr. To	Water Test lbs./sq.in.	Grout Pressure lbs./sq.in.
From	To			

11:15 A	11:35 A	0:30	0:89.17	140
---------	---------	------	---------	-----

This hole when pressure came to 140 up around top of hole and below - at all. There is a bad fault ¹ foot below this hole and running up the ² way above the top of this hole - and am unable to seal and the seams below will not open seam above - X

11:36 A	12:00 M	0:30	0:89.17	30
---------	---------	------	---------	----

13:00 M	3:45 P	3:45	0:89.17	100
---------	--------	------	---------	-----

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		

several bad seams and faults open and then would hold no pressure running across the axis a few up the way above the top of this fault above top of this hole stand 130 lbs. pressure need to seal

1:3	14	0	42	14
-----	----	---	----	----

1:1	33	0	33	33
-----	----	---	----	----

X-

next over
page

Hole No. _____ Date _____

Time		Depth	Water Test	Grout Pressure
From	To	Fr.-To.	lbs./sq.in.	lbs./sq.in.

✓ This hole drilled 0.80.13 tested grouted and capped off.



Drain tile -

✗ This hole drilled 0.99.8 tested grouted and capped off.

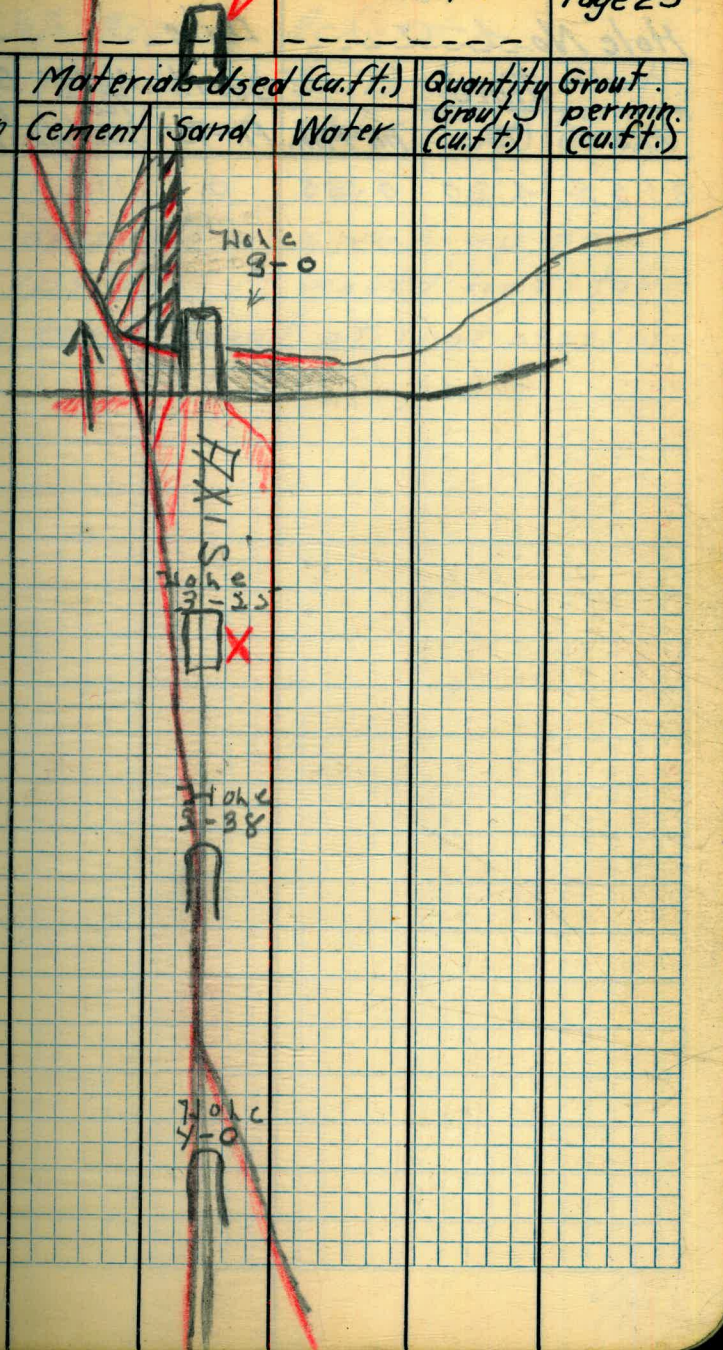
→ unable to seal open seam between hole 3-0 and hole 3-20 as, can not hold 150 lbs. pressure on hole 3-0

Inspector ^{Hole No} 3-20

Foreman

Page 25

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		



Hole No. A-9

Date 3-23-92

Inspector Adolph Beck

Foreman Richard

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Time		Depth Fr.-To	Water Test lbs./sq.in.	Grout Pressure lbs./sq.in.
From	To			
3:55	4:30	0-35'	0	110.5 150

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		
1-3	2		6	2	

This pressure was run up to 180 lbs and it would not take any more grout at that pressure

[Handwritten initials]

Hole No. 3-38 Date 3-23-42

Time		Depth Fr.-To	Water Test lbs./sq.in	Grout Pressure lbs./sq.in
From	To			

^{P.M.}
4:30 ^{P.M.} 4:45 0-15 0-40.6 50

^{P.M.}
4:45 5:55 1-10 0-40.6 20

5:55 7:30 1-35 0-40.6 40

Inspector

Adolph Bask

Foreman

Rebord

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Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min (cu.ft.)
	Cement	Sand	Water		

This hole would not stand more than 50' water came out in a seam 6" south and at west.

1-3 5 0 15 5

unable to hold pressure with 1-3 grout seam thickening to 1-1

1-1 13 0 13 13

This hole grouted up and all leakage stopped but did not want to raise the pressure above 40 lbs for fear of blowing out grout near the surface

PR.

Hole No. 3-38Date 3/25/42Inspector
Allen

Foreman

Page 28

Hebard

Time		Depth Fr.-To	Water Test lbs./sq.in.	Grout Pressure lbs./sq.in.
From	To			

8:30 A	9:00 A	0-30	0-81.0	125-
--------	--------	------	--------	------

water tested - very tight.

9:00 A			0-81.0	125
--------	--	--	--------	-----

Grout Proportion	Materials Used (Cu. ft)			Quantity Grout (Cu. ft)	Grout per min. (Cu. ft)
	Cement	Sand	Water		

1:3	3	0	6	2	
-----	---	---	---	---	--

pl.

Hole No. 2-39

Date 3/25/42

Inspector

Allen

Foreman

Howard

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Time		Depth	Water Test	Grout Pressure
From	To			

1:00 P 1:20 P 0-20 0:33.0 60

At 60 lbs pressure this hole would take showing up above and around top

1:20 P 2:00 P 0:40 0:33.0 60

This hole took 4 cu ft. of grout - slowly above and around top of hole.

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min (cu.ft.)
	Cement	Sand	Water		

water slowly several small weeps of hole -

1/3 4 0 1/3 4
grout showing up in small weeps

12

Hole No. 14-25 Date 2/27/42

Inspector

Allen

Foreman

Richard

Page 30

Time		Depth	Water Test	Grout Pressure
From	To	Fr. - To	lbs./sq.in.	lbs./sq.in.

8:15 A 8:45 A 0-30 0:26.6 0:10

At 15 lbs pressure this hole would take seams and open faults above and

8:45 A 9:45 A 1-0 0:26.6 0:10

changed proportion of cement to seal

9:45 A 10:45 A 1-0 0:26.6 0:50

This hole sealed off tight.

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		

7 cu ft in less than 2 min lots of open below top of hole.

1:3 30 0 90 30

open seams above top of hole.

1:1 28 0 28 28



Hole No. 15-35

Date 3/27/42

Inspector

Allen

Foreman

Richard

Page 31

Time		Depth	Water Test	Grout Pressure	
From	To				Hr.-Min

11:00 A	11:45 A	0-45	0-35.9	0:10
---------	---------	------	--------	------

This hole took 7 cu ft water in less than this with water and air before grouting -

11:45 A	1:15 P	1-30	0:25.9	0:10
---------	--------	------	--------	------

changed cement proportion to read

1:15 P	1:45	0:30	0:25.9	0:50
--------	------	------	--------	------

This hole sealed off, very good and tight.

Grout Proportions	Materials Used (cu ft)			Quantity Grout (cu ft)	Grout per min. (cu ft)
	Cement	Sand	Water		

2 min at 10 lb pressure - washed and cleaned

1:3	18	0	54	18
-----	----	---	----	----

open seams above top of hole.

1:1	3	0	3	3
-----	---	---	---	---

✓

Hole No. 16-25 Date 3/27/42

Inspector H. H. ... Foreman H. ... Page 32

Time		Depth	Water Test	Grout Pressure
From	To	Hr.-Min Fr.-To	lbs./sq.in	lbs./sq.in

2:00 P	2:30	0-30	0:27.6	50
--------	------	------	--------	----

This hole took 3 1/2 cu ft. of water in 3 min test.
Blowers out with air before grouting.

2:30 P	3:30 P	1-0	0:27.6	50
--------	--------	-----	--------	----

This hole sealed off very tight.

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		
1:3	2	0	6	2	

Hole No. 9-33 Date 3/30/42

Inspector Allen Foreman Richard Page 33

Time		Depth Fr-To	Water Test lbs./sq.in	Grout Pressure lbs./sq.in
From	To			
8:30 A	9:00 A	0:29.5	0:20	
9:00 A	4:00 P.M	0:29.5		40
4:00 P.M	6:00 P.M	0:29.5		60

At 20 lbs water pressure this hole would take all the water we could pump into it. This hole has been making water while they were drilling it. It showed no leakage at all at 20 lbs pressure.

Grout Proportion	Materials Used (cu.ft)			Quantity Grout (cu.ft)	Grout per min (cu.ft)
	Cement	Sand	Water		
1-3	345	0	1035	345	
1-1	61	0	61	61	

take all the water we could pump into water while they were drilling it. 20 lbs pressure.

This hole after reaching a pressure of 60 lbs it did not take any more grout.

Adolph Beck Inspector
from 4:00 P.M till 12:00

(over)

Hole No. 8-23 Date 4/1/42

Time		Depth	Water Test	Grout Pressure
From	To	Fr.-To	lbs/spin.	lbs./sq.in.

8:30 A	9:00 A	0:30	0:55.0	35
--------	--------	------	--------	----

At 35 lbs pressure this hole took
This hole had been making water

9:00 A	5:15 Pm	8-15	0:55.0	75
--------	---------	------	--------	----

5:15 Pm	6:55	1-40		100
---------	------	------	--	-----

↑ EAST

Hole no 10-0 Depth 23.0

Hole no 9-23 Depth 50.5

Hole no 9-0 NOT Drilled

grouting on Hole - 8-23 - grout came out of holes

no 9-23 and no 10-0 Hole no 8-23 Depth - 55.0

↓ WEST

Inspector

Allen

Foreman

Richard

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Grout Preparation	Materials Used (Cu.ft.)			Quantity Grout (Cu.ft.)	Grout per min. (Cu.ft.)
	Cement	Sand	Water		

--	--	--	--	--	--

water at rate of 7 cu ft every 3 min
fully from 20 ft depth

1-3	498		1494	498	18 Pm
-----	-----	--	------	-----	-------

At 5:05 Pm Grout and water started coming to the surface 20' up stream and 10' down stream from hole 10-0

1-1	58		58	58	
-----	----	--	----	----	--

Pump this hole at 100 lbs until it would not take any more grout.

Hole no 9-23 took a water test pressure at 100 lbs, and would only take 1 2/3 cu ft of water in 3-min test. but used grout fully from Hole no 8-23 after hole no 8-23 had taken 195 cu ft of grout at 80 lbs pressure.

Hole No. 10-23-

Date 4/3/42

Inspector

F. L. ext.

Foreman

H. Chord

Page 35

Time		Depth	Water Test	Grout Pressure
From	To			
8:15H	8:30H	0-30	0.139.0	150

8:15H 8:30H 0-30 0.139.0 150

This hole only took 3 1/3 cu. ft. of water

Grout Proportion	Materials Used (cu. ft.)			Quantity Grout (cu. ft.)	Grout per min (cu. ft.)
	Cement	Sand	Water		

in a 3 min test. 3 1/3

Hole No. U-23 Date 4/3/42

Inspector E. E. N. Foreman H. Chasz Page 36

Time		Depth	Water Test	Grout Pressure
From	To	Fr. To	lbs./sq.in.	lbs./sq.in.

8:30 A	9:00 A	0:30	0:145.0	150
--------	--------	------	---------	-----

This hole only took 3 cu ft of water

Grout Proportions	Materials Used (cu ft)			Quantity Grout (cu. ft.)	Grout per min. (cu. ft.)
	Cement	Sand	Water		

in a 3 min test - 3

Hole No. 11-0

Date

Inspector

Foreman

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Time		Depth	Water Test	Grout Pressure	
From	To				Hr.-Min.

10:30A	10:50	0-30	0:127.0	150
--------	-------	------	---------	-----

This hole took only 3 cu ft of water

4:20P	4:50P	0-35	0: ¹³⁶ 146 .0	100
-------	-------	------	-------------------------------------	-----

This hole only took 3 1/2 cu ft

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		

in 3 min test = 3

of water in 3-min test = 3 1/2

Hole No. - 14-25 Date - 4/3/42

Time		Depth	Water Test	GROUT Pressure
From	To	Fr.-To	lbs./sq.in.	lbs./sq.in.

11:00 A 11:35 0-35 0:47.0 0

This hole would not hold any showing all along face of rock.

12:00 P 2:00 P 2-0 0:47.0 0:10

Changed proportions of cement to real

2:00 P 6:00 P 4-0 0:47.0 0-70

This hole gradually brought to a pressure of 70 lbs and at this pressure it would not take any more grout. Did not want to bring it to 100 lbs at this grouting as several large seams might not hold that much pressure.

Inspector

H. H. E. N.

Foreman

F. H. O. R. D.

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GROUT Proportion	Materials Used (cu.ft.)			Quantity GROUT (cu.ft.)	GROUT per min. (cu.ft.)
	Cement	Sand	Water		

water pressure at all - leakage below and to the south of hole -

1:3 51 0 153 51

divided open seams -

1:1 109 0 109 110 ?

H. Dolph Bock, Inspector. 4:00 P.M. to 12:00 P.M.

This hole leaked all along the face from 30 south of the axis to the down stream face. The worse leak was at the down stream face at right angles to the hole.

Hole No ---9---0--- Date - 4-6-42 -
 Time Depth Water Grout
 From To Hr-Min. Fr.-To Test Pressure
 2:30 P 24.5

Hole No 9-0 Date 4-6-42
 4:26 PM, 1-50 0-245 20.0

Notes - This hole had some open seams on surface 3' to 4' north of hole. Did not put more than 10 lbs. pressure as it might have broken out. All seams were full to the surface.

3-5 kgs was wasted in pipe line and agitator.

Inspector		Foreman			Page 41
H. R. Curry		H. Chord			
Grout Proportion	Material Used (cu. ft.)			Quantity Grout (cu. ft.)	Grout Per Min. (cu. ft.)
	Cement	Sand	Water		
1-1					
1-1	34.0	0	34.0	34.0	

Hole No. 6-25 Date 4/8/42

Inspector Allen Foreman McLeod Page 42

Time		Depth	Water Test	Grout Pressure
From	To	Fr.-To	lbs./sq.in.	lbs./sq.in.

8:00 A	8:20 A	0-20	0.275	0
--------	--------	------	-------	---

This hole would not stand pressure at all - several open seams around above and below top of hole -

Took 7 cu ft of water in 3 min -

3-35 PM	4:00 PM	10-25	0.275	20.
---------	---------	-------	-------	-----

4:00 PM	4:45 PM	0-45	0-27.5	50.0
---------	---------	------	--------	------

Grout reappeared on contact seam for about 5 ft north of axis and 5 ft south of axis.

Grout Proportion	Materials Used (cu.ft)			Quantity Grout (cu.ft)	Grout per min. (cu.ft.)
	Cement	Sand	Water		
1-1					
B.R. Curry			achord		
1-1	10.0	0.0	10.0	10.0	

Noted

Hole No. 7-0 Date 4/8/41

Time		Depth	Water Test	Grout Pressure
From	To	Hr.-Min. Fr.-To	Lbs./sq.in.	Lbs./sq.in.

8:35A 8:50A 0-15 0-23.6 0

This hole would not stand pressure at all - several open seams around, above and below top of hole. Took 7 cu ft of water in 2 hrs.

5:15 PM 6:50 1-35 0-23.6 50.0

Grout reappeared on seams near collar of hole.

Inspector Allen Foreman Howard Page 43

Grout Proportion	Materials Used (cu.ft)			Quantity Grout (cu.ft)	Grout per min. (cu.ft)
	Cement	Sand	Water		

D.R. Curry a. chard
1-1 21.0 0,0 21.0 21.0

Noted.

Hole No. 7-23 Date 3/8/42

Time		Depth	Water Test	Grout Pressure
From	To	Ft-To	Lbs./sq.in.	Lbs./sq.in.

8:50A	9:05A	0-15	0:80.0	40
-------	-------	------	--------	----

At 40 lbs pressure this hole took water as fast as we could pump it. No leaks showing on surface. Took 7 cu ft of water in 2 min.

9:05A	2:00P	4-55	0:80.0	100
-------	-------	------	--------	-----

Changed proportions of cement because grout began to show up in under dirt bank south of dam site. Changed to seal off same.

2:00P			0:80.0	125
-------	--	--	--------	-----

This hole sealed off tight.

Inspector Allen Foreman Howard Page 44

Perc. Dr. Ft.	Materials Used (cu.ft)			Quantity Grout (cu.ft)	Grout per min. (cu.ft)
	Cement	Sand	Water		

7:3	329	0	678	339	
-----	-----	---	-----	-----	--

1:1	62	0	62	62	
-----	----	---	----	----	--

over-next-page

PL

Hole No. 9-22 Date 4-8-42

Inspector M.R. Cury Foreman Achord Page 47

Time		Depth	Water Test	Grout Pressure	Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
From	To	Hr.-Min. Fr.-To	lbs./sq.in.	lbs./sq.in.		Cement	Sand	Water		
7:20 PM	7:45 PM	0-25	0-16	2.3	200.0	1-3	4.0	0.0	12.0	4.0

This hole sealed off very quick was a very tight hole. This hole is grouted at final depth.

2 sks of cement was wasted in pipes and agitator

PL

Hole No. 6-24Date 3/10/42Inspector AllenForeman Heard

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Time		Depth		Water Test	Grout Pressure	Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
From	To	Hr.-Min.	From To	lbs./sq.in.	lbs./sq.in.		Cement	Sand	Water		
10:35 A	11:00 A	0-25	0:82.5	0.40							
<p>This hole took 6 2/3 cu ft of water in a 3-min test - several leaks showing on surface, north and south of hole.</p>											
11:00 A	11:30 A	0-30	0:82.5		40	7.3	5	0	15	5	
11:30 A	1:30 P	2-0	0:82.5		155	7.7	26	0	26	26	

AL

Hole No. 7-23 Date 4/10/47

Inspector Allen Foreman Richard Page 49

Time		Depth	Water Test	Grout Pressure
From	To	Fr-To	lbs./sq.in.	lbs./sq.in.

8:00 A	8:30 A	0-30	0:103	100
--------	--------	------	-------	-----

This hole took 6 cu ft. of water in 3-min test, several leaks showing on surface -

8:30 A	9:00 A	0-30	0:103	0.80
--------	--------	------	-------	------

9:00 A	10:30 A	1-30	0:103	0:150
--------	---------	------	-------	-------

Grout Proportion	Materials Used (cu. ft.)			Quantity Grout (cu. ft.)	Grout per min. (cu. ft.)
	Cement	Sand	Water		

1:3	6	0	18	6	
-----	---	---	----	---	--

1:1	20		20	20	
-----	----	--	----	----	--

pl

Hole No. 6-23 Date 4/10/42

Time		Depth	Water Test	Grout Pressure
From	To	Hr.-Min.	Fr-To	lbs./sq.in.

1:30 P	1:45 P	0-15	0.548	80
--------	--------	------	-------	----

This hole took $5\frac{1}{2}$ cu. ft. of water in 3-min test - several cracks showing up on face of rock 8 to 10 ft above top of hole on face of west roadway.

1:45 P	2:30 P	0-45	0.54.8	55
--------	--------	------	--------	----

2:30 P	3:35 P	1-.05	0.54.8	100
--------	--------	-------	--------	-----

Inspector H. H. E. N. Foreman _____ Page 50

Grout Proportion	Materials Used (cu. ft.)			Quantity Grout (cu. ft.)	Grout per min. (cu. ft.)
	Cement	Sand	Water		
1:3	7	0	21	7	
1:1	14	0	14	14	

48 .

Hole No. 16-25 Date 4-15-42

Time		Depth	Water Test	Grout Pressure
From	To	Fr-To	lbs./sq.in.	lbs./sq.in.

10:30 A	11:00 A	0-30	0:58.8	45
---------	---------	------	--------	----

At this pressure this hole to 7 cu ft of water in 2 min. leak showing up on face of rock a few feet above top of hole No. 14-25 below-

11:45 A	3:45 P	3-0	0:58.8	110
---------	--------	-----	--------	-----

This hole sealed off tight, the only showing of grout on surface was thru hole No. 14-25 below-

Inspector		Foreman			Page 51
Allen		Howard			
Grout Proportion	Materials Used (cu.ft)			Quantity Grout (cu.ft)	Grout per min. (cu.ft.)
	Cement	Sand	Water		
1:3	248	0	744	248	

Hole No. 17-25 Date 4-20-42

Time		Depth	Water Test	Grout Pressure
From	To	Hr.-Min.	Fr-To	lbs./sq.in.

8:30A 9:00A 0-30 0:69.0 30

This hole took 6 2/3 cu ft grout in 2 min several leaks showing on surface.

9:30 10:15A 0-45 0:69.0 30

changed to seal open seam on surface.

10:15 12:00M 1-45 0:69.0 150

Inspector		Foreman			Page 52
<u>Allen</u>		<u>Howard</u>			
Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min (cu.ft.)
	Cement	Sand	Water		
1:3	75	0	45	75	
1:1	31	0	31	31	

pl

Hole No. 17-0 Date -----

Inspector Allen

Foreman Hebert

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Time		Depth	Water Test	Grout Pressure
From	To	Hr.-Min. Fr-To	lbs/sq.in.	lbs./sq.in.

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		

12:00M 12:30P 0-30 0:85.0 50

This hole took 4 2/3 cu ft - of water in a 3-min test - several leaks showing on surface.

1:30P 1:30P 1-0 0:85.0 50

7:3 6 0 18 6

1:30P 2:15P 0-45 0:85.0 150

7:1 5 0 5 5

RL

Hole No. 16-25- Date 4/20/43

Inspector Allen Foreman H. Schurd Page 54

Time		Depth	Water Test	Grout Pressure
From	To	Hr.-Min. Fr-To	lbs./sq.in.	lbs./sq.in.
2:15P	2:30P	0-15'	0:12.0	150
Water Tested Tight-				
2:30P	3:15P	0:45'	0:12.0	150
Grouted to FINAL Depth <u>(12.0)</u>				

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		
1:1.5	4	0	1.2	4	

re

A 10-12.3

Hole No. 40-13

Date 4-22-14

Inspector

F. E. N.

Foreman

A. C. H.

Page 55

Time		Depth		Water Test	Grout Pressure
From	To	Hr. Min.	From To	lbs./sq.in.	lbs./sq.in.
9:30	10:00	7 0-30	0.159.0	40	
<p>This hole took 10 cu ft of water in 3 min test - several leaks showing at foot of bank at South end of Blk. No 10 - Leaks showing 120 ft out from down stream end of Blk.</p>					
10:00	11:30	7 1-30	0.159.0	60	
11:30	4:00	P	0.159.0		

Grout Proportion	Materials Used (cu. ft)			Quantity Grout lbs./sq.in.	Grout per min. lbs./sq.in.
	Cement	Sand	Water		
1:3	95	0	235	75	
1:1	117	0	127	127	

RL

Hole No. 6-25 Date 4-28-42

Inspector Allen

Foreman Richard

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Time		Depth Fr-To	Water Test lbs./sq.in.	Grout Pressure lbs./sq.in.
From	To			
10:45 A	11:30 A	1-15	0.153.4	100
11:30 A	12:30 P	1-0	0.153.4	150
= FINAL = grouting -				

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min. (cu.ft.)
	Cement	Sand	Water		
1:3	28	0	24	8	
1:1	23	0	23	23	

RL

Hole No. 7-0 Date 4-28-42

Inspector Allen Foreman Richard Page 58

Time		Depth	Water Test	Grout Pressure
From	To	Fr-To	lbs/sq.in.	lbs/sq.in.
12-30 P	1:15 P	0-45	0.15	7.0
= FINAL = GROUTING				

Grout Proportion	Materials Used (cu.ft)			Quantity Grout (cu.ft)	Grout per min (cu.ft)
	Cement	Sand	Water		
1:3	2	0	6	2	

RL

Hole No. 7-23

Date 4-8-42

Inspector

Allen

Foreman

Richard

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Time		Depth		Water Test	Grout Pressure
From	To	Hr-Min	Fr-To	lbs./sq.in.	lbs./sq.in.

1:15 P	2:15 P	1-0	0:16 2.0		165
--------	--------	-----	----------	--	-----

FINAL GROUTING

Grout Proportion	Materials Used (cu.ft.)			Quantity Grout (cu.ft.)	Grout per min (cu.ft.)
	Cement	Sand	Water		

1:3	9	0	37	9	
-----	---	---	----	---	--

R

Hole No. 8-0

Date

4-28-42

Time

Depth

Water

Grout

From

To

Hr-Min.

From-To

Test

Pressure

2:30P

3:10P

0-45

0:16:0.0

180

180

FINAL-GROUTING

Inspector

Allen

Foreman

Richard

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Grout Proportion	Materials Used (cu. ft.)			Quantity Grout (cu. ft.)	Grout per min. (cu. ft.)
	Cement	Sand	Water		
1:3	3	0	9	3	

R.

Hole No. 8-23 - Date 4-28-42

Inspector Allen Foreman Richard Page 61

Time		Depth	Water Test	Grout Pressure
From	To			
3:15 P	3:45 P	0-45	0.163.0	180
FINAL-Grouting-				

Grout Proportion	Materials Used (Cu. Ft.)			Quantity Grout (Cu. Ft.)	Grout per min. (Cu. Ft.)
	Cement	Sand	Water		
1:3	4 ✓	0	(9) 12 ✓	(3) 4	

PL .

Hole No. 9-24 Date 4/30/42

Time		Depth	Water Test	Grout Pressure
From	To	Fr. To	lbs./sq.in.	lbs./sq.in.

1:30 P	6:30 PM	0:160.0		
--------	---------	---------	--	--

Time		Depth	Water Test	Grout Pressure
From	To	Fr. To	lbs./sq.in.	lbs./sq.in.
4:00 PM	6:30 PM	2-30	0-160	180.0

Note Hole No 9-116 was also Grouted From hookup on 9-44

Hole No 9-34 was also Grouted From hookup on 9-44.

Inspector Allen Foreman Achard Page 63

Grout Proportion	Materials Used (cu.ft)			Quantity Grout (cu.ft)	Grout per min. (cu.ft.)
	Cement	Sand	Water		

1:3	181.0	0	343	81.0	0.507
-----	-------	---	-----	------	-------

1:3	75.0	0.0	225	75.0	0.5
-----	------	-----	-----	------	-----

I.R. Carry Achard

Hole No. 6-37⁵

Date 5-4-52

Inspector

Allen

Foreman

Achard

Page 64

Time		Depth Fr-To	Water Test lbs./sq.in.	Grout Proportion lbs./sq.in.
From	To			
9-30	10:00 AM	2-30	0:25.0	100

FINAL-GROUTING-
Sealed-Tight. Allen

Grout Proportion	Materials Used (cu. ft.)			Quantity Grout (cu. ft.)	Grout per min. (cu. ft.)
	Cement	Sand	Water		
1:3	45	0	135	40	

Hole No. 7-11 Date 5-4-43

Time		Depth Fr. - To	Water Test lbs./sq. in.	Grout Pressure lbs./sq. in.
From	To			

12:30 P	2:15 P	2-45	0:25.0	60
---------	--------	------	--------	----

Inspector Allen Foreman Richard Page 65

Grout Proportion	Materials Used (cu. ft.)			Quantity Grout (cu. ft.)	Grout per min. (cu. ft.)
	Cement	Sand	Water		

1:3	73	0	201	73	
-----	----	---	-----	----	--

pk

19-25

5-7-42

10:45 A 11:30 A 0:30 0:29.0 50

At this pressure this hole took
7 cu ft of water in 3 min test.

11:30 A 3:00 P 3:30 0:29.0 65

This hole sealed off at this pressure
a slight seepage of water and
a few weeps of oil - showed
up 35 to 40 ft above top of
this hole on up stream side
7' to 8' from AXIS - ALLEN

ALLEN

Anchor-

67

PRO	Amount	Water -
7.3	151	453.

PL

Hole No 20-0 Date 5-11-A2

Inspector
N. R. Curry

Foreman
Aehord

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68

Time		Depth		Water	Grout
From	To	hr	Min	test	Pressure
				lbs/sq-in	lbs/sq-in

8-00am	8-30am	0	30	0	26.5	50.0
--------	--------	---	----	---	------	------

This hole was tight.

Grout Proportion	Materials used (cu ft.)			Quantity Grout cu ft.	Grout Per Min (cu ft.)
	Cement	Sand	Water		

Hole No. 20-25 Date 5-11-42

Time		Depth		Water test	Groat Pressure		
From	To	hr	Min	Fr	To	lbs/sq.in.	lbs/sq.in.

9-30 AM	3-00 PM	5-30	0-60			80.0	
3-00 PM	3-40 PM	0-40	0-60			120.0	

Note 3 sacks waste
(Reason) left in Pipe line
and agitator when hole
sealed off.

Inspector

J. R. Curry

Foreman Page

Achord 69

Groat Proportion	Materials Used (cu. ft.)			Quantity Groat Per Min Cu. ft.
	Cement	Sand	Water	

1-3	155.	0	465	155.
1-1	17.	0	17.	17.

✓

Water-Test

Tight

Date- Hole-no depth. This hole showed a few small surface leaks - 3 1/2 cu ft. 3-min

4/13/42 - 7-0 76.0 - This hole showed well small surface leaks - 2 cu ft. 5 min -

4-15-42 13-25 76.6 Tight

4-15-42 14-0 25.0 = =

4-15-42 16-25 53.8 = =

4-22-42 17-25 95.0 Tight.

4-7-42 20-25 27.5 Tight.

Washed-out.

Date- Hole-no depth.

4-10-42 8-0 0:22

4-10-42 7-23 0:103

4-20-42 17-25 69

= = = 17-0 85

4-29-42 - 15-0 - 122.0

gravel from hole no-14.

East-Side.

13.25 145.2

14 128.5

15 115.0

16 111.6

17 108.6

18

19 78.4

20 60.0

"Bottom"

Bottom -

R-to Grout-Finish-Dyke

✓ - *

6-23 95.8*

6-25

7-0

✓ 7-23 162.*

✓ 8-0 160*

✓ 8-22 163*

✓ 9-0 165*

9-22

✓ 10-0 164.5*

10-23

10-23

9-23

8-23

7-23

6-23

DATE	Cement on hand.	Cement used. No. of Sacks	amid- NAST.
3/3/42	147	52	4-5
3/7/42	88	29	1-5
3/11/42	61	38	2-5
3/13/42	103	73	
3/16/42	237	170	2-5
3/18/42	176	94	4-5
3/24/42	110	34	0
3/23/42	156	74	1-5
3/25/42	86	6	1-5
3/27/42	222	81	2-5
3/30/42	506	406	0
4/1/42	690	556	2
4/3/42	263	160	1
4/6/42	179	114	3
4/8/42	472	326.0	2.
4/10/42	191	87	3.
4/13/42	210	0	0
4/15/42	360	248	2
4/20/42	242	61	0
4/22/42	347	195	3
4/24/42	204		
4/28/42	197	52	2
4-30-42		156	3
5-1-42	271	118	3
5-7-42	216	151	2

Worc- No	FINISH DEPTH	Spouted- To DEPTH	TESTED- WATER-
1-0	58.8	58.8	
1-25	65	65	
2-0	72.5	72.5	
2-25	80.13	80.13	
3-0	88.9-EX-89.17	89.17	
3-25	99.8	99.8	
4-0	105.5	105.5	
4-25	111.7-EX-125.7	125.7	
5-0	121.4	121.4	
5-23	133.6	133.6	
5-47	138.6		

3-38 81.

EXTMAX

TOP
0-25

25-1 →

81.

Elas

18-0557.5 - 106.0

18-25

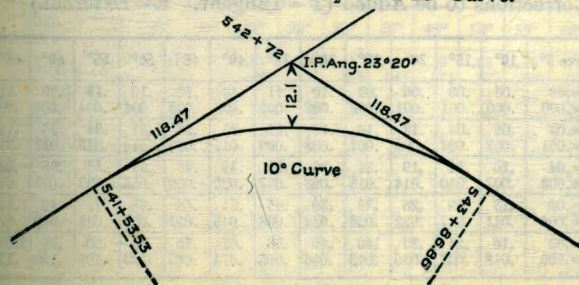
19-0 588.0 - 91.0

19-25 = 613.2 78.5

20-0 627.7 71.0

20-25 650 60.0

543+ | 86.86 E. C. = Sta. 543+86.86
100-53.53 = 46.47 x 3' (def. for 1 ft. of 10° 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.



	Point No.	DEPT.	3-min Pressure	max low curv.
1"	8	1/2(170-E) 35'	50	1-1/3
3"	17	50'	100	2-2/3
3"	20	75'	125	4
4"	33	100'	150	4-1/3
5"	42	125'	150	4-2/3
6"	50	150	200	
7"	.58	160	200	
8"	.67			
9"	.75			
10"	.83			
11"	.92			
12"	1.00			

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 ÷ 12 = 10.07. Say a 10° Curve.

Tan. in Tab. I opp. 23° 20' = 1183.1
1183.1 ÷ 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° ÷ 10 = 2.3333 = L. C.

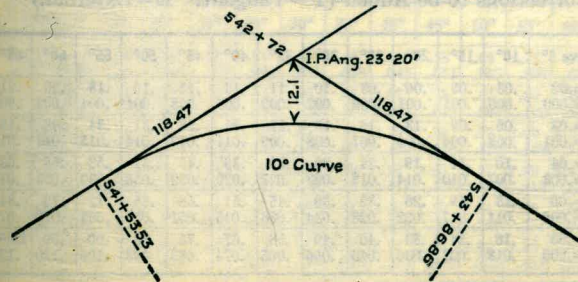
2° 19 1/2' = def. for sta.	542	I. P. = sta.	542+72
4° 49 1/2' = " " "	+50	Tan. =	118.47
7° 19 1/2' = " " "	543	B. C. = sta.	541+53.53
9° 49 1/2' = " " "	+50	L. C. =	2.3333
11° 40' = " " "	543+	E. C. = Sta.	543+86.86
	86.86		

100 - 53.53 = 46.47 × 3' (def. for 1 ft. of 10° Cur.) = 139.41' =

2° 19 1/2' = def. for sta. 542.

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

Def. for 36.86 ft. = 1° 50 1/2' for a 10° Curve.



Natural Trigonometrical Functions

Angle. Sin. Tan. Sec. Cosec. Cotg. Cosin.

o /							o /
32	.5299	.6249	1.1792	1.887	1.600	.84805	58
10	.5324	.6289	1.1813	1.878	1.590	.84650	50
20	.5348	.6330	1.1835	1.870	1.580	.84495	40
30	.5373	.6371	1.1857	1.861	1.570	.84339	30
40	.5398	.6412	1.1879	1.853	1.560	.84182	20
50	.5422	.6453	1.1901	1.844	1.550	.84025	10
33	.5446	.6494	1.1924	1.836	1.540	.83867	57
10	.5471	.6536	1.1946	1.828	1.530	.83708	50
20	.5495	.6577	1.1969	1.820	1.520	.83549	40
30	.5519	.6619	1.1992	1.812	1.511	.83389	30
40	.5544	.6661	1.2015	1.804	1.501	.83228	20
50	.5568	.6703	1.2039	1.796	1.492	.83066	10
34	.5592	.6745	1.2062	1.788	1.483	.82904	56
10	.5616	.6787	1.2086	1.781	1.473	.82741	50
20	.5640	.6830	1.2110	1.773	1.464	.82577	40
30	.5664	.6873	1.2134	1.766	1.455	.82413	30
40	.5688	.6916	1.2158	1.758	1.446	.82248	20
50	.5712	.6959	1.2183	1.751	1.437	.82082	10
35	.5736	.7002	1.2208	1.743	1.428	.81915	55
10	.5760	.7046	1.2233	1.736	1.419	.81748	50
20	.5783	.7089	1.2258	1.729	1.411	.81580	40
30	.5807	.7133	1.2283	1.722	1.402	.81412	30
40	.5831	.7177	1.2309	1.715	1.393	.81242	20
50	.5854	.7221	1.2335	1.708	1.385	.81072	10
36	.5878	.7265	1.2361	1.701	1.376	.80902	54
10	.5901	.7310	1.2387	1.695	1.368	.80730	50
20	.5925	.7355	1.2413	1.688	1.360	.80558	40
30	.5948	.7400	1.2440	1.681	1.351	.80386	30
40	.5972	.7445	1.2466	1.675	1.343	.80212	20
50	.5995	.7490	1.2494	1.668	1.335	.80038	10
37	.6018	.7536	1.2521	1.662	1.327	.79864	53
10	.6041	.7581	1.2549	1.655	1.319	.79688	50
20	.6065	.7627	1.2577	1.649	1.311	.79512	40
30	.6088	.7673	1.2605	1.643	1.303	.79335	30
40	.6111	.7720	1.2633	1.636	1.295	.79158	20
50	.6134	.7766	1.2661	1.630	1.288	.78980	10
38	.6157	.7813	1.2690	1.624	1.280	.78801	52
10	.6180	.7860	1.2719	1.618	1.272	.78622	50
20	.6202	.7907	1.2748	1.612	1.265	.78442	40
30	.6225	.7954	1.2778	1.606	1.257	.78261	30
40	.6248	.8002	1.2808	1.601	1.250	.78079	20
50	.6271	.8050	1.2838	1.595	1.242	.77897	10

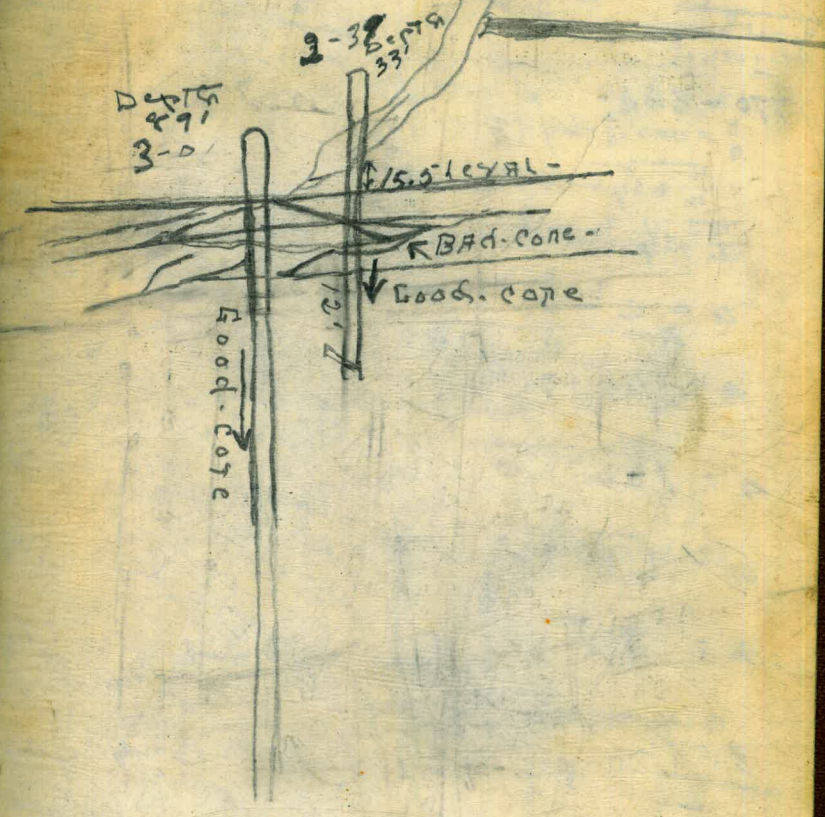
Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

Angle. Sin. Tan. Sec. Cosec. Cotg. Cosin.

o /							o /
39	.6293	.8098	1.2868	1.589	1.235	.77715	51
10	.6316	.8146	1.2898	1.583	1.228	.77531	50
20	.6338	.8195	1.2929	1.578	1.220	.77347	40
30	.6361	.8243	1.2959	1.572	1.213	.77162	30
40	.6383	.8292	1.2991	1.567	1.206	.76977	20
50	.6406	.8342	1.3022	1.561	1.199	.76791	10
40	.6423	.8391	1.3054	1.556	1.192	.76604	56
10	.6450	.8441	1.3086	1.550	1.185	.76417	50
20	.6472	.8491	1.3118	1.545	1.178	.76229	40
30	.6494	.8541	1.3151	1.540	1.171	.76041	30
40	.6517	.8591	1.3184	1.535	1.164	.75851	20
50	.6539	.8642	1.3217	1.529	1.157	.75661	10
41	.6561	.8693	1.3251	1.524	1.150	.75471	49
10	.6583	.8744	1.3284	1.519	1.144	.75280	50
20	.6604	.8796	1.3318	1.514	1.137	.75088	40
30	.6626	.8847	1.3352	1.509	1.130	.74896	30
40	.6648	.8899	1.3386	1.504	1.124	.74703	20
50	.6670	.8952	1.3421	1.499	1.117	.74509	10
42	.6691	.9004	1.3456	1.494	1.111	.74314	48
10	.6713	.9057	1.3492	1.490	1.104	.74119	50
20	.6734	.9110	1.3527	1.485	1.098	.73924	40
30	.6756	.9163	1.3563	1.480	1.091	.73728	30
40	.6777	.9217	1.3600	1.476	1.085	.73531	20
50	.6799	.9271	1.3636	1.471	1.079	.73333	10
43	.6820	.9325	1.3673	1.466	1.072	.73135	47
10	.6841	.9380	1.3711	1.462	1.066	.72937	50
20	.6862	.9435	1.3748	1.457	1.060	.72737	40
30	.6884	.9490	1.3786	1.453	1.054	.72537	30
40	.6905	.9545	1.3824	1.448	1.048	.72337	20
50	.6926	.9601	1.3863	1.444	1.042	.72136	10
44	.6947	.9657	1.3902	1.440	1.036	.71934	46
10	.6967	.9713	1.3941	1.435	1.030	.71732	50
20	.6988	.9770	1.3980	1.431	1.024	.71529	40
30	.7009	.9827	1.4020	1.427	1.018	.71325	30
40	.7030	.9884	1.4061	1.422	1.012	.71121	20
50	.7050	.9942	1.4101	1.418	1.006	.70916	10
	.7071	1.0000	1.4141	1.414	1.000	.70711	45

Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle

-122-
-1207



Water - cur
19884

7.5 Jankle - 3 1/4

H. Cur

Grand total -
129974

770 - 8 + 2 =

Handwritten calculations and diagrams. Includes a right triangle with sides 16, 25, 29 and an oblique triangle with sides 10, 5, 24, 30. A circled calculation shows 3 + 35 = 38.

$$a^2 + b^2 = c^2$$

$$a = c^2 - b^2$$

$$a = \sqrt{1.5^2 - 1.4^2}$$

$$a = \sqrt{2.25 - 1.6^2}$$

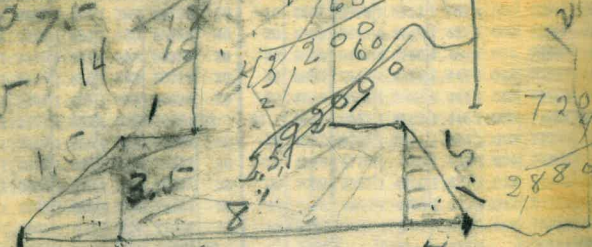
$$a = \sqrt{1.5^2 - 1.4^2}$$

$$a = 3.5 \times 14$$

$$\frac{3.5 \times 4}{2}$$

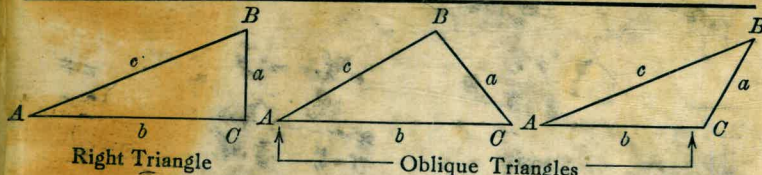
$$1:2:5$$

$$1:3:5$$



Handwritten calculations and notes. Includes a diagram of a right triangle with sides 9-7, 3-7, 20-2. A note says '3 waste'.

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° 10'. From Table, Page IX. $\cos 5^\circ 10' = .9959$. Horizontal distance = 319.4 × .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. $\cos 5^\circ 10' = .9959$. $1 - .9959 = .0041$. $319.4 \times .0041 = 1.31$. $319.4 - 1.31 = 318.09$ 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.