

W
385

DEERFIELD
ILL.

ENGINEERS

AND ARCHITECTS

1892

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1.
For Single Track Embankment.

385

R. A. Thurston, Insp.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	0
1	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	1
2	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	2
3	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	3
4	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	4
5	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	5
6	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	6
7	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	7
8	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	8
9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	9
10	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	10
11	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	11
12	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	12
13	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	13
14	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	14
15	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	15
16	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	16
17	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	17
18	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	18
19	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	19
20	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	20
21	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	21
22	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	22
23	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	23
24	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	24
25	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	25
26	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	26
27	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	27
28	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	28
29	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	29
30	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	30
31	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	31
32	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	32
33	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	33
34	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	34
35	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	35
36	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	36
37	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	37
38	46.0	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	38
39	47.0	47.1	47.2	47.3	47.4	47.5	47.6	47.7	47.8	47.9	39
40	48.0	48.1	48.2	48.3	48.4	48.5	48.6	48.7	48.8	48.9	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 30.6. For same slopes but other widths of roadbed, correct above figures by one-half difference in width of roadbed; thus in example above, for 20 ft. roadbed distance will be $30.6 + (20 - 16) \div 2$ or 2 ft. added to $30.6 = 32.6$. For slopes of 1 on $1\frac{1}{2}$ see inside of back cover.

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07 27 31
09 12
07 29
8 E
22 L

Core Drill Holes

#1	North,	East Side	36' 1"
#2	"	"	" 17' 1"
#3	"	"	" 20' 0"
#5	"	"	" 40' 7 1/2"
#4	"	"	" 11' 1"

Aug. 29-1932

West End.

3 Miners- 5 Helpers.

North wing completed
from 11+30 to 11+12

Started to drill bench
with Leymers.

Bench excavated to 11+58'
and 2 plumb posts set, each
side.

4 men inside taking up
track.

East End

2 miners- one helper, - one
shovel operator, - two dinky
drivers- one helper.

Rigger and helper. ~~4 hrs.~~

Shovel and dinky taken
down off bench. Started to
clean out tunnel.

Night Shift

West End

11 Men- 1 Shovel Runner- 3
truck drivers- 2 Miners- 5 Helpers

Bench excavated to 11+53

Wall Plates blocked to 11+12'
Segment started.

East End.

Cleaning material out of
tunnel- 2 plumb posts placed
at 0+16

3 Miners. 5 Helpers.

Bench excavated to 0+19

Aug. 30-1932

Day Shift

East End

2-Miners-2Helpers drilling wings. 4men removing track.

Rigger and 3helpers outside. 7men laying track to dump.

Drilling wings to 0+49

" Bench

A-C Bulldozer up on Bench West End.

4Miners-6Helpers.

Segment 11+28 set & lagged.

2 posts placed at 11+55

7 holes in Bench, shot 2 P.M.

Night Shift.

West End.

Bench to 11+52 and muck out. Bench partly cleaned.

3 Posts - 2@11+52.-1@11+49.

Segment 11+22 in & blocked.

4miners-5helpers

East End

3Miners-3helpers.

Working on wings. Drilling Bench.

Aug. 31-1932.

Day Shift.

West End.

5 Miners - 5 Helpers - Bulldzr. oprs.

Drilling Bench - 8 Lifters - 3 Top holes

Lagged 11+22 segment.

Set 1 post at 11+49 and 11+52 each

Shot bench 3 P.M.

East End

2 Miners - 2 Helpers Working on wings. 9 men outside on track.

Shot 12 holes in wings. Bulldzr cleaned off Bench.

Dinky, Mucker and Car on track

Mucker operated in P.M.

Night Shift. West End

Bench to 11+43 and mucked out.

Segment 11+16 in & lagged.

Bench Cleaned. 9 men.

East End.

Working on wings.

Set 2 posts at 0+19

Cleared lower bench

3 Miners 3 helpers - 4 Muckers

Sept. 1 - 1932

Day Shift

East End.

3 Miners - 3 helpers

4 Muckers. 1 Rigger - 2 helpers on Track. 1 Cat Driver

2 electricians on Dump.

Set and blocked plates at 4

Drilling wings & bench.

West End.

5 Miners - 5 helpers.

Delayed 2 hours, repairing pipe line. Set 1 post at 11+46 & 11+49 each. Drilled 21 holes in Bench.

Night Shift.

4 Miners - 5 helpers.

Shot 22 holes in bench & 24 in wings. 150# pwr.

Mucked out. Set post at 11+46.

Bench to 11+37.

East End.

3 Miners - 3 helpers, 4 Muckers.

Shot 5 holes in bench, 24 holes in wings. 50# pwr.

Cat. cleared bench & mucker worked below.

Segment at 37 in & lagged.

Sept. 2 - 1932

Day Shift.

East End.

3 Miners - 3 helpers, 6 Muckers

Drilling wings. Mucker

working. Plugging boulders

in bench. Segment 0+43

lagged. 9 holes in Bench

9 in wings, caps, all shot.

West End.

5 Miners - 5 helpers, 1 Cat drive

Cleaning bench & wings.

Making room for posts. Set

2 posts at 11+40. Air shovel

& 2 trucks 3 hrs. Shot 11 holes

in wings. Started drilling

bench.

Night Shift.

West End.

4 Miners - 5 helpers.

Shovel & 2 trucks - 3 hrs.

Shot 14 delayers - 50# pwr.

Bench to 11+32

1 Post at 11+40.

Wings to 10+94 & plates set

East End.

Segment 0+43 lagged.

Mucker cleared lower bench.

3 Miners - 3 helpers - 4 Muckers.

Sept. 3-1932

Day Shift

East End.

Drilling Wings.

3 Miners-3 helpers-5 Muckers

Shot 29 holes, caps. 50# pwr.

Cat. cleaned bench, mucker
Working below.

West End.

5 Miners-5 helpers

2 Segments 11+13 & 11+10.

Set 2 posts at 11+34.

Drilled 16 holes in bench.

Shot 50# pwr.

West End

4 Miners-5 helpers.

Air shovel & 2 trucks-3 hrs.

Set 2 posts at 11+28.

Bench to 11+24

East End.

Mucker cleared lower bench.

Wings to 0+65

2 Post set at 0+25

Bench to 0+26

Shot 7 holes in bench 25# pwr.

3 Miners-3 helpers-4 Muckers

1 Cat Driver.

Sept. 6-1932

East End.

Day Shift.

Mucking crew plugging
bottom, & mucking.

4 Miners - 4 helpers - 4 Muckers.

Making room for set 0+52.

4 Men on track.

Shot 30 holes in wings, 50# pwr.

Segment 0+46 lagged

West End.

5 Miners - 5 helpers. Shovel
& 1 truck 5 hrs. mucking. Shot

18 holes in wings, 25# pwr.

Segment 11+4 lagged.

Night Shift

West End

Drilled bench, shot 16 de layers

50# pwr.

Set 2 posts at 11+22.

Segment 10+98 lagged.

Wings to 10+77.

9 men.

East End.

Mucker working

Segment 0+52 lagged.

6 men 4 Muckers.

Plugged boulders at portal.

20 caps. 20# pwr.

Sept. 7-1932

Day Shift

East End.

5 Men on track - 4 Muckers

5 Miners - 5 helpers.

double track completed to porta

Shot 13 holes

Shot 18 holes, 25# pwr.

Wings to 0+82 & plates in

Lagged Segment 0+58

West End

Air shovel & 2 trucks 5 hrs.

Man injured - fall of rock.

Bench to 11+12

Segment 10+92 lagged

Drilled bench, shot 16 delayers

50# pwr.

5 Miners, 5 helpers.

Night Shift

West End.

Bench to 11+16

2 Posts at 11+16

Segment 10+86 lagged

Shot 30 holes in wings, 50# pwr.

Air shovel & 2 trucks 4 hrs.

East End.

Segments ~~0+58~~ & 0+64

Bench cleared & 2 posts

set at 0+31

Bench to 0+29

5 Miners 5 helpers 4 Muckers.

Sept. 8-1932.

Day Shift.

East End.

Shot 36 caps in wings 50# pd

Lagged segment 0+70

5 Miners-5 helpers-4 Muckers

5 track men.

2 mechanics-2 hrs. rep. belt.

Shot 12 holes in wings 25# pwr.

West End.

5 Miners-5 helpers.

drilled bench, shot 18 delayers,

50# pwr.

plugging boulders in wings

Shovel & 2 trucks mucking, 4 hrs.

Segment 10+80

Shot 20 holes in wings, 25#

Mucker, Dinky & cars on track.

Night Shift.

West End

Shovel & 2 trucks-4 hrs.

Set 2 posts at 11+13, 1 at 11+10

Bench to 11+10

Wings to 10+60

Drilled bench. Shot 10 caps,

25# pwr.

5 Miners-5 helpers.

East End.

5 Miners-5 helpers-5 Muckers

Sept. 9-1932

Day Shift

East End.

Shot 15 caps in wings, 25[#] pwr.

Lagged Segment 0+76

Wings to 0+100 = 1+00

5 Miners-5 helpers-5 Muckers.

Shot 12 holes in Wings.

West End

Drilled bench, 20 delayers, 75[#] pwr.

Shovel & 2 trucks, 4 hrs. mucking.

Shot 23 caps in wings, 50[#] pwr.

Bench to 11+04

Segment lagged 10+68 & 10+74

3 Men outside, trimming.

5 Miners-6 helpers.

Night Shift, West End.

2 posts at 11+04

Lagged Segment 10+68

Shovel & 2 trucks mucking 4 hrs.

East End

2 Posts at 0+37

Bench to 0+38

Shot 15 caps in bench 25[#] pwr.

5 Miners 5 helpers 5 Muckers.

Sept. 10 - 1932

Day Shift

East End

5 Miners 5 helpers, 5 Muckers

Lagged Segment 0+82

& 0+88

West End.

Lagged Segment 10+62?

Shot 21 caps in wings 25[#]

Air Shovel & 2 trucks, 3 hrs.

3 trimmers outside shot

15 delayers 25[#] pwr.

5 Miners 6 helpers.

Night Shift

East End

Lagged Segment 0+88

Shot 30 caps in wings, 50[#]

" 16 caps in bench, 50[#]

5 Miners, 5 helpers, 5 Muckers.

West End.

Drilled bench, shot 16 delayers

75[#] pwr.

5 Miners, 5 helpers

Air shovel & 2 trucks, 3 hrs.

Sept. 12 - 1932

Day Shift

East End.

Both Muckers working, 7 men.

Bench to 0+43

4 Miners 4 helpers.

Lagged Segment 0+94

Drilling Bench & Wings.

West End.

Drilling bench.

Wings to 10+43 & plates set.

5 Miners - 6 helpers.

Shot 18 caps in wings 25[#]

2 trimmers outside, shot

16 delayers & 25[#] pwr.

Night Shift

West End

Shot 16 holes in bench

16 delayers, 75[#] pwr.

2 posts at 10+98 & 2 at 10+92

Bench to 10+90

Shovel & 2 trucks, 4 hrs.

Lagged Segment 10+56.

5 Miners, 5 helpers

East End

Shot 16 delayers in bench, 50[#] pwr.

2 posts at 0+43

Lagged Segment 0+94

Shot 24 delayers in wings 25[#]

8 Muckers, 5 Miners, 5 helpers.

Sept. 13-1932.

Day Shift.

East End.

4 Miners-4 helpers.

Bench to 0+52

2 Posts at 0+52

Wings to 1+17

Shot 18 delayers 15[#] pwdr.

1 Mucker down, broken spring

West End.

Shovel & 2 trucks 8 hrs. mucking

Bench to 10+84

Lagged Segment 10+50

5 Miners-6 helpers.

Night Shift.

West End.

2 posts at 10+86

Bench to 10+80

Lagged Segment 10+45

Shovel & 2 trucks, 6 hrs.

5 Miners, 5 helpers

East End

Drilled Bench, shot 16

delayers, 50[#] pwdr.

Set plates.

Bench to 0+58

5 Miners, 5 helpers, 8 Muckers.

Sept. 14-1932

Day Shift

East End

1 Mucker down, bent shaft.

2 Posts at 0+58

Bench to 0+60

4 Miners - 4 helpers - 8 Muckers.

Lagged Segment 1+00

Plates into 1+17

West End.

2 Posts at 10+80

Shot 16 delayers in Bench 75[#]

Shovel & 2 trucks 8 hrs.

5 Miners - 4 helpers - 4 Muckers

Night Shift

West End.

Shot 16 delayers in bench 75[#]

2 posts at 10+74

Bench to 10+70

Shovel & 2 trucks 8 hrs.

Wings + 10+26 & plates in.

4 Miners - 4 helpers - 4 Muckers

East End

Lagged Segment 1+06

Shot 18 delayers in bench 75[#]

3 Miners - 3 helpers - 8 Muckers.

Sept. 15-1932.

Day Shift

East End. Segment 1+12

Reblocking segment 1+06'

Plugging boulders in bench

Shot 35 caps in bench 30#

" 8 delayers in wings 20#

5 Miners-5 helpers-8 Muckers

Bench to 0+64

West End.

Bench to 10+62

Segment Lagged 10+39

2 Posts at 10+68

Bench to 10+66

5 Miners, 6 helpers-4 Muckers.

Night Shift.

West End.

Shot 20 delayers in bench 75#

Bench to 10+56

Lagged Segment 10+32

4 Muckers-8 hrs

5 Miners-5 helpers.

East End.

Bench to 0+64 ✓

2 Posts at 0+64, 1 at 0+70

Shot 24 caps in wings, 25#

Mucking crew placed on
call shift.

4 Miners-4 helpers-8 Muckers.

Sept. 16-1932.

Day Shift

East End

Bench in very hard rock.

Drilled 31 holes, 31 delayers 100[#]

4 Miners - 4 helpers.

Drilled boulders, shot 20 caps^{20[#]}

West End

Set 2 posts at 10+62 - 1 at 10+56

Shot 35 caps in wings, 25[#] posts

5 Miners - 5 helpers - 4 Muckers.

Night Shift

East End

5 Miners - 4 helpers - 8 Muckers.

Bench to 0+74

1 Post at 0+70 - 1 at 0+76

Shot 20 caps in wings, 20[#]

West End

5 Miners - 5 helpers - 4 Muckers

1 Post at 10+56

Shot 20 delayers in bench 100[#]

Sept. 17-1932

Day Shift

East End.

4 Miners. - 4 helpers.

1 Post at 0+76

Drilling Bench.

Shot 15 caps in wings, 15[#] pwdr.

West End

5 Miners - 5 helpers - 4 Muckers.

North Plate blocked.

Bench to 10+48

1 Post at 10+50

Night Shift.

West End.

1 Post at 10+50

Drilled bench, shot 20
delayers, 75[#] pwdr.

Bench to 10+40.

Segment Lagged 10+27

Wings to 10+09?

Plates in.

East End.

Drilled bench, shot 30.

delayers, 100[#] pwdr.

4 Miners - 3 helpers.

Sept. 18-1932

East End

Muckers, etc, replaced by
Gas shovel & 2 trucks.

6 Men taking up track.

West End.

Mucking crew cleared bench.

4 Men.

Sept. 19-1932.

East End

2 men on track.

2 mechanics on Shorel. 4 hrs.

5 Miners-5 helpers, 4 Muckers

Shot 25 caps in wings, 25th

and 16 " " " 15th

West End.

5 Miners-6 helpers-2 Muckers. ^{4 hrs.}

2 Posts at 10+45

Drilling bench³⁰ & wings.

Added 2nd Portable

Compressor.

Night Shift

West End

5 Miners-4 helpers-4 Muckers.

Bench to 10+39

Shot 30 delayers in bench 100th

Lagged Segment 10+21.

East End

Wings to 1+34 & plates in

4 Miners-3 helpers-4 Muckers.

Drilling bench.

2 Posts at 0+82

Bench to 0+82

Sept. 20-1932

Day Shift

East End

5 Miners-5 helpers-2 track.

Drilling bench & wings.

1 Shovel Runner & helper & 3 trucks

Shot 30 delayers in bench 100#

Lagged Segment 1+18

West End.

5 Miners-6 helpers.

Drilling Bench.

East End

4 Miners-3 helpers-4 Muckers

Drilled bench. Shot 30 delayers

100# pwr.

Bench to 0+90

West End

Shot 30 delayers in bench 100#

2 posts at 10+33

Bench to 10+26.

5 Miners-4 helpers-4 Muckers

Lagged Segment 10+15

Shot 25 caps in wings 25# pwr.

Sept 21-1932

Day Shift
East End.

Lagged Segment 1+24

1 Post at 0+88N-1 at 0+94S

1 Post at 0+98N

5 Miners-5 helpers.

Bench to 0+98

West End.

Shot 15 caps in wings, 15th

2 Posts at 10+27

Drilling bench.

Wings to 9+92

6 Miners-7 helpers.

East End

Shot 30 delayers in
Bench 100#

Bench to 1+09

4 Miners-3 helpers-1 Shovel runner
& helper-3 truck drivers.

West End

Shot 30 delayers in Bench 100#

Bench to 10+18

Plate to 9+92

5 Miners-4 helpers-1 Shovel runner
& helper-2 truck drivers.

Sept. 22 - 1932.

Day Shift

East End

6 Miners - 6 helpers

Lagged Segment 1+30

Shot 30 delayers in Bench 100

West End.

6 Miners - 7 helpers.

Drilling Bench. Plugging

Survey points in Tunnel.

2 Posts at 10+21

Lagged Segment 10+09

Shot 21 caps in Wings 25[#]

" 30 delayers in Bench 75[#]

Night Shift

East End.

Bench to 1+18

2 Posts at 1+06, 1 at 1+00

4 Miners - 4 helpers - 1 Shovel

Runner - 3 truck drivers.

Drilling Bench.

West End.

Bench to 10+15

1 Post at 10+15 N

Lagged Segment 10+03

5 Miners - 5 helpers - 1 Shovel

Runner - 2 truck drivers.

Sept. 23 - 1932.

Day Shift

East End

6 Miners - 6 helpers.

Portable Compressor added
for work at Portal.

Drilling Bench & Wings.

1 Post at 1+18N 42 delayers in
Wings. 32 delayers in bench 150[#]

West End.

6 Miners - 7 helpers

Drilling Bench. 2 men on
points in tunnel.

Lagged Segment 9+97

East End Shot Bench at 3:30
Shot out 2 Segments 1+06
& 1+12.

East End.

4 Miners - 4 helpers - 1 Shovel Runner
& helper - 2 truck drivers.

Reset - 2 segments. 1+06 & 1+12

Bench to 1+28

West End

1 Post at 10+15S & 1 at 10+09N

Bench to 10+06

5 Miners - 5 helpers - 1 Shovel

Runner & helper - 2 trucks.

Shot 25 caps in wings, 25[#]

Sept. 24-1932

Day Shift

East End

5 Miners-5 helpers-1 Shovel Runner
& helper-2 truck drivers.

Shot 15 delayers in wings.

1 Post at 1+18S.

Shot 10 delayers in Wings 15[#]

Drilling Wings

West End.

2 trimmers outside at Portal.

Points inside all plugged.

6 Miners-7 helpers-1 shovel runner.

Wings to 9+80 & plates set.

1 Post at 10+15S-1 at 10+09 N

Shot 15 caps in Wings 15[#]

Drilling Bench

Outside shot 7 electric 15[#]

Night Shift

East End

Wings to 1+48 & plates in

Lagged Segment 1+33

Bench to 1+30

Drilled bench, shot 30 delayers

100[#]

5 Miners-5 helpers-1 Shovel runner

& helper-2 truck drivers.

West End.

1 Post at 10+09S & 1 at 10+03N

Bench to 10+00

Lagged Segment 9+85

Shot 24 delayers in Bench 100[#]

4 men. outside shot 15 electric

& 30[#] pwr.

5 Miners-5 helpers-1 shovel runner

& helper-2 truck drivers.

Sept. 26 - 1932

Day Shift

East End

2 men outside, trimming.

1 Shovel runner & helper - 2 Trucks.

6 Miners - 6 helpers.

Lagged Segment 1+39

Drilling wings & at Portal.

Shot 15 caps, 25# pwr.

West End.

Shot 15 caps in wings, 30# pwr.

2 men outside, drilling, 7 electricians

Delay 2 hrs. repairing air line.

Drilling bench & wings.

6 Miners - 7 helpers - 1 Shovel Runner

& helper - 1 truck driver. Mucking
at Portal.

Night Shift

East End.

6 Miners - 6 helpers, 4 Muckers.

Lagged Segment 1+45

Bench to 1+39

1 Post at 1+30 N.

Note: North side, 1 post at 1+18, 1 at 1+30, on
plate 1+15 to 1+32, nothing under next
plate for 10 feet. South side, post at 1+18'
black at 1+26, nothing for 15' to solid rock.

West End

5 Miners - 5 helpers - 4 Muckers

2 trimmers outside

1 Post at 9+97 N

Shot 30 delayers in bench 100#

" 30 caps in wings 50#

Bench to 9+95

Drilled Bench. Shot
30 delayers, 100# pwr.

Sept. 27-1932.

Day Shift

East End.

6 Miners, 6 helpers, 2 trimmers.

Drilling bottom 1+06 to 1+30.

Drilling Wings.

Last 2 Plates on Southside
dropped; loosening 6 Rings.

West End

6 Miners-7 helpers, 5 trimmers

Drilling Wings & Bench

Shot 30 delayers in

Bench 100# pwr.

East End.

6 Miners-6 helpers.

Last Plate reset and

last 2 rings reset. No
overbreak.

Rings 1+30 & 1+24.

West End

1 Post at 9+94S & 9+91S

Bench to 9+91

Wings to 9+67 & plates in

5 Miners-5 helpers-4 Muckers.

4 trimmers, shot 15 electrics

30# powder outside.

Sept. 28-1932.

Day Shift

East End

5 Miners-6 helpers-4 Muckers

5 Trimmers. Mucking Portal.

Shot 15 electrics outside 25# pwr.

West End.

7 Miners-7 helpers-4 Muckers-

3 Trimmers at Portal.

Drilling Bench. Mucking Portal.

Lagged Segment 9+73

Shot 15 caps in wings 25# pwr.

Night Shift

East End

6 Miners-6 helpers-4 Muckers

Reblocked Segment 1+18

West End.

5 Miners-5 helpers-4 Muckers

2 trimmers

Bench to 9+83

1 Post at 9+91 N-1 at 9+85 S

Lagged Segment 9+67

shot 15 electrics outside 30# pwr.

shot 30 delayers in bench 100# pwr.

Sept. 29-1932

Day Shift

East End

5 Miners-6 helpers-5 trimmers.

Drilling Wings. Clearing out
at Rings 1+06 & 1+12.

Shot 48 electrics outside 75[#]

Wall Plate in place. 1 Post at 1+15S

1 at 1+30S - 1 at 1+38N

West End

6 Miners-7 helpers - 4 Muckers.

Drilling Bench. Mucking at Portal.

Lagged Segment 9+61. This is
the last set of timber.

Shot 70 caps in Wings 100[#] pwdr.

1 Post at 9+85N.

Night Shift

East End

6 Miners-6 helpers-4 Muckers at Portal.

Cared sets in place & lagged.

Shot 80 ^{delayers} in Wings 100[#] pwdr.

1 Post at

Bull gang started on graveyard
night of Sept. 28. 6 men working
either end as needed.

West End.

5 Miners-5 helpers-4 Muckers-5 trimmers

1 Post at 9+79S Bench to 9+78

Shot 30 delayers in Bench 100[#]

40 caps in Wings 50[#] pwdr.

Sept. 30 - 1932

Day Shift

East End 3 Muckers at Portal.

6 Miners - 7 helpers - 12 trimmers.

Plugging walls for Posts. Muck-

ing out Wings - Drilling Wings.

Shot 12 caps in Wings, 25[#] pwr.

Swing 4 Miners 3 helpers.

Wings to 1+63 & Plates in.

4 Muckers.

West End

Drilling Bench & Wings.

7 Miners - 7 helpers.

Shot 16 caps in Wings, 25[#] pwr.

Swing

4 Miners - 4 helpers - 4 Muckers.

Shot 30 delayers in Bench 75[#]

1 Post at 9+79N - 1 at 9+73N

Gveyd.

East End.

3 Miners - 2 helpers.

Lagged Segment 1+51

1 Post at 1+24S - 1 at 1+33S

West End

3 Miners - 3 helpers

Drilling Bench.

Bench to 9+72

1 Post at 9+67N

Oct. 1-1932.

Day Shift

East End 6 trimmers at Portal

6 Miners - 6 helpers - 4 Muckers

Drilling Bench. Lagged Seg. ⁷⁵

Shot 30 delayers in Bench 75[#]

Swing 4 Miners - 3 helpers - 4 Muckers

Bench to 1+55, Plugging

1 Post at 1+44 N } boulders in
Bench.

West End.

6 Miners, 6 helpers - 2 Muckers.

1 Post at 9+73 S

Outside, 5 trimmers - 4 Muckers.

Shot 30 delayers in Bench, 100[#] pwdr.

Drilling Wings. Shot 48 caps, 75[#]

Bench to 9+61

Swing. Bench & Wings

to 9+55

4 Miners - 4 helpers.

Night Shift.

3 Miners - 2 helpers.

1 Post at 1+39 S & 1 at 1+45 S.

Shot 40 caps in Wings 75[#]

Lagged Segment 1+63.

West End.

3 Miners - 3 helpers

Drilling Bench.

1 Post at 9+67 N

Oct. 3 - 1932

Day Shift

East End 1 trimmer.

6 Miners - 6 helpers.

Drilling Wings. ~~1~~

1 Post at 1+56 N.

Shot 18 caps in Wings 35[#] pwr.

Swing 6 Miners - 5 helpers. Wings &

Plates to 1+81

Drilling Bench.

West End

5 Miners - 5 helpers - 4 Muckers

Drilling Bench & Wings

Shot 24 delayers in Bench 75[#] &
started mucking.

Swing 6 Miners - 5 helpers.

Drilling Bench & Wings.

Shot 24 delayers in Bench 75[#]

Bench to 9+45

Grvyd.

East End

6 Miners - 6 helpers - 5 Muckers.

Lagged Segment 1+69

Shot 30 delayers in Bench 100[#]

Rock from 7+00 to 8+00 is
very blocky & should be timbered.

Drilling Wings

West End.

4 Miners - 4 helpers, 4 Muckers.

Bench & Wings to 9+36

Trimming in Wings.

Station in next to last Post,

Southside is 9+72.

1+63
69
Oct. 4 - 1932

Day Shift

East End 1 Post at 1+575

5 Miners - 5 helpers

Lagged Segment 1+75

Drilling Wings. Bench to 1+63

Swing 2 Posts at 1+63

2 at 1+69. Lagged Segment 1+78

6 Miners - 6 helpers

Shot 40 caps in Wings, 75# pwrdr.

West End.

5 Miners - 5 helpers - 3 Muckers.

Drilling Bench. Shot 32
delayers in Bench 125# Mucking.

Swing. Trimming Wings

5 Miners - 5 helpers - 4 Muckers.

Bench to 9+30.

Drilling Bench, shot 24 delayers
in Bench, 75# pwrdr.

Greyd.

East End

6 Miners - 6 helpers

Bench to 1+71

Shot 20 caps in Wings 25# pwrdr.

West End.

5 Miners - 4 helpers -

Drilling Wings.

Wings to 8+60, 90% complete.

Bench to 9+30.

Oct. 5-1932

Day Shift { 6 Trimmers-3 Muckers
East End { outside. Shot 20 caps, 25

Wings to 1+97 & Plates in.

Drilling Bench & Wings.

8 Miners-7 helpers.

Lagged Segment 1+84

Shot 36 delayers in Bench 100#

Swing 6 Miners-6 helpers-5 Muckers

Drilling Wings. ^{2 Posts at 1+75} Bench to 1+79

West End

4 Miners-4 helpers

Bench to 9+25

Drilling Wings. & Bench.

Swing. 5 Miners-4 helpers.

Drilling Bench. Shot 30 delayers 125#

" Wings.

Grvyd.

East End 1 trimmer at Portal.

6 Miners-6 helpers

1 Post at 1+783

Drilling Bench, Shot 36 delayers

in Bench & 40 caps in

Wings 200# pwr.

Lagged Segments 1+90 & 1+96.

West End.

4 Miners-4 helpers.

Drilling Bench.

Bench to 9+17

Oct. 6 - 1932

Day Shift

East End. 6 Trimmers at Portal.

4 Miners, 5 helpers, 5 Muckers.

Mucking. Outside shot 12 caps, 25[#]

Bench to 1+87 (shot 25 caps in Wings 50[#])

Swing Wings to 2+14 & Plates in

6 Miners, 6 helpers. (2 Post's

Drilling Bench (at 1+84

West End.

4 Miners - 4 helpers - 4 Muckers.

Drilling Bench. Shot 32 delayers in Bench. 175[#] pwr. Trimming Wings.

Swing

6 Miners, 5 helpers, Muckers.

Drilling Wings & Bench

Bench to 9+07

Shot 32 delayers in Bench & 45 caps in Wings 275[#] pwr.

Grvyd.

East End

6 Miners - 7 helpers - 5 Muckers

Mucking.

Shot 32 delayers in Bench 150[#]

Lagged Segment 2+02

1 Post at 1+90 N.

West End.

5 Miners - 4 helpers.

Drilling Bench.

Bench to 8+97

Oct. 7-1932

Day Shift.

East End. 10 trimmers at Portal.

Bench to 1+96

Lagged Segment 2+08

5 Miners-5 helpers.

Swing 7 Miners-6 helpers.

Shot 36 delays in Bench & 40 caps in
Wings, 225# pwr.

1 Post 1+90S & 1+93N

West End

5 Miners, 5 helpers

Drilling Bench & Wings

Shot 32 delays in Bench 175#

Swing.

5 Miners-4 helpers-4 Muckers

Mucking. Drilling Wings & trimming

Bench to 8+90

Grveyd

East End

6 Miners-7 helpers, 5 Muckers.

Delay 3 hrs. on Air Line.

Bench to 2+00

2 Posts at 1+96

~~Outside 10 trimmers-3 Muckers.~~

Lagged Segment 2+12

West End.

4 Miners-5 helpers-4 Muckers.

Drilling Wings. Shovel Runner injured.

Nail at 9+25

Segments - West End

Corrected Distances:

9+61	10+68	11+58 ⁵
9+66	10+74	11+64 ⁵
9+72	10+80	
9+78 ⁵	10+86	
9+84	10+92	
9+90 ⁵	10+98	
9+97	11+04	
10+03	11+10	
10+09	11+13	
10+15	11+16	
10+21	11+22	
10+27	11+28	
10+33	11+34	
10+39	11+40 ⁵	
10+45	11+46 ⁵	
10+50	11+49 ⁵	
10+56	11+52 ⁵	
10+62	11+55 ⁵	

Oct. 8-1932

Day Shift (Shovel ^{Shot 15 caps, 25# pwr.} mucking at Entrance)

East End. 10 trimmers - 4 Muckers.

Plugging Walls for Posts.

8 Miners, 8 helpers (^{Drilling} Bench)

Wings to 2+30 & Plates in.

Swing 6 Miners - 6 helpers.

Shot 16 caps in Wings & ~~32 delayers in~~

~~Bench 175# pwr.~~

2 Posts at 2+02

West End.

5 Miners, 5 helpers

Bench to 8+75

Drilling Bench & Wings.

Swing

5 Miners - 6 helpers - 4 Muckers

Drilling Bench.

Shot 32 delayers in Bench 175#

Oct. 8-1932,

Grveyd 11 P.M to 7 A.M.

East End

7 Miners - 4 helpers - 5 Muckers.

Drilling Bench. Shot 32

delayers in Bench, 150# pwr.

Mucking.

West End

4 Miners - 4 helpers, 4 Muckers

Drilling Wings.

Bench to 8+80

Oct. 9, 1932

Day Shift

East End

6 Miners - 5 helpers, 5 Muckers.

Lagged Segment 2+19

Set 2 posts at 2+08

Swing 6 Miners - 6 helpers

Bench to 2+14. Shot 36 caps

in Wings, 100# pwr. (Lagged Segment 2+23)

West End. 4 Miners - 4 helpers.

4 Muckers. Bench to 8+70

Drilling Bench.

Swing

5 Miners - 6 helpers

Drilling Bench.

Shot 32 delayers in Bench

175# pwr.

Weather: Started raining at 1.P.M.

Grveyd.

East End.

6 Miners - 7 helpers.

Drilling bottom.

2 Posts at 2+12

Lagged Segment 2+30.

West End.

4 Miners - 4 helpers, 4 Muckers.

Drilling Wings.

Bench to 8+60.

Report for Oct. 9, prepared from
information furnished by Williams.

Oct. 10 - 1932.

Day Shift } Outside, 3 carpenters
& 2 men, starting forms
for footings.

East End

8 Miners - 7 helpers

Drilling bottom & Bench { Shot 20 delay
ers in bottom
50# pwr.

Wings to 2+48 & Plates in.

Water arrived at Portal 3 PM.

No Swing Shift.

Braces between Posts, across

West End.

4 Miners - 4 helpers - 4 Muckers.

Drilling Bench. Bench to 8+50

Warned at 11:30 A.M. that flood water was
coming. Shifts working to take out tools
& loose timbers, reinforcing iron.

Swing

4 Miners - 4 helpers - 2 hours.

Placed braces between Posts
at Portal, across tunnel.

Greyd.

No work.

Oct. 11-1932

Day Shift.

Gauge Reading 573.9 at 7:00

Water started thru tunnel
probably about 6 A.M.

3 men setting up Motor & pump
west of downstream toe wall.

Motor 85 HP, 720 rpm with 38" pulley

Cent. pump, 8" with 14" pulley.

11 Miners started trench for
pipe line along south stream
wall.

Swing. Entrance Crew in Core
Pit. Exit. - Cleaned up. Drill
ing Bench at 7 P.M. Shot 32
delayers - 150# at 11 P.M.

8" Pump started at 5:30 P.M.

Crew working on 5" sinker.

4 Men on pipe line.
4 Miners
5 helpers

Grveyd.

Exit. -

5 Miners - 4 helpers

Drilling Wings.

Wings to 8+20, 90% complete.

Oct. 12-1932.

Day Shift.

Exit: 3 Miners-4 helpers

Drilling Wings. 4 Men repairing Shovel

Shot 50 caps in Wings, 75# powdr.

Swing.

6 Miners-6 helpers-4 Muckers
preparing East Bench for Sinker Pump

Mucking. 40 HP motor on Pump

Started Pump at 8:00 P.M.

Grveyd. 4 Miners-4 helpers-4 Muckers.

Mucking-Drilling Wings.

Pump & Line

4 Miners-4 helpers

2 Carpenters making trestle

8 men, with tractor & truck hauling pipe.

Gauge at toe wall 565.4 - 8 A.M.

" " " " 566.1 1 P.M.

Shovel-2 trucks-1 dumpman started cofferdam
at 12:30

Grveyd.

2 trimmers at Exit Portal.

Oct. 13-1932

Day Shift.

Exit.

6 carpenters - 4 helpers on trestle

14 men laying pipe. - 4 hours¹

Shovel Runner & helper - 2 trucks & 1

dumpman on cofferdam.

Water at toe wall above guage 7 A.M.

" at Pump 572.4 - 7 A.M.

Entrance: Lagged Segment 2+36

2 Miners - 2 helpers on Segments.

Exit:
Bench to 8+42. 4 Muckers.

6 Miners - 5 helpers. Drilling Bench

4 trimmers at Portal - 4 hours.

Pump not working while drilling Bench.

Shot 32 delays in Bench 175* pwr.

Swing. Entrance. 2 Miners - 2 helpers

Lagged Segment 2+42

5 Men unloading pump: Centrifu-

gal, 9000 g.p.m. capacity

400 H.P. direct connected motor.

Swing. West End.

5 Miners - 4 helpers - 4 Muckers.

Drilling Wings. Mucking.

2 trimmers at Portal.

Graved.

East End.

3 Miners - 3 helpers.

Lagged Segment 2+47

West End

5 Miners - 4 helpers - 4 Muckers.

Mucking. Drilling Bench.

Shot 32 delays in Bench 175* pwr.

Bench to 8+32

Oct. 14-1932

Day Shift. Crew of 5 at Cofferdam.

East End. River Gauge 572.3

Drilling Wings. Shot 40 caps in
Wings. 75# p.wdr.

3 Miners, 3 helpers.

Water at Portal 2:30 P.M. 569.2

West End. 5 Miners-5 helpers-4 Muckers.

Drilling Wings

4 trimmers at Portal.

Swing. East End.

4 Miners-3 helpers.

Drilling Wings. Shot 40 caps in
Wings, 50#

West End.

5 Miners-4 helpers-4 Muckers.

Mucking. Drilling Bench.

Shot 32 delayers in Bench, 175#

Bench to 8+22 { 2 trimmers at
Portal.

Giveyd.

East End

Wings to 2+65 8 Plates in.

6 Miners-6 helpers.

Shot 20 caps in Wings, 25#

Drilling Wings.

West End

5 Miners-4 Muckers, 4 helpers

Mucking. Drilling Wings.

Shot 50 caps in Wings, 75#

Wings to 8+00.

Oct. 15-1932

Day Shift. Lagged Seg. 2+53

East End. 6 Miners-6 helpers

Drilling Wings.

Gauge at Toe Wall 568.4 at 7 A.M.

" " Portal 568.5 " "

" " River 572.3 " "

West End. 5 Miners-4 helpers-4 Muckers

Mucking. Drilling Wings.

4 trimmers at Portal.

Shot 40 caps in Wings, 75# pwr.

Swing East End

6 Miners-5 helpers

Shot 55 caps in Wings 100#

Lagged Seg. 2+59

West End

5 Miners-5 helpers-4 Muckers

Mucking. Drilling Wings & Bench

Shot 32 delayers in Bench 175#

Bench to 8+10.

Grveyd.

East End

No information received.

Same for Day Shift & Swing

Shift, Sunday Oct. 16-1932.

Grveyd Oct. 16-1932.

East End

6 Miners-5 helpers.

Lagged Segments 2+65 & 2+71

West End.

5 Miners-5 helpers-4 muckers.

Mucking. Drilling Wings.

Wings to 7+60.

Day Shift Oct. 17-1932
East End 2 Miners-2 helpers.
Shot 30 caps in Wings, 50# pwr.
Lagged Segment 2+78

West End. Mucking.
5 Miners-5 helpers-4 muckers.
Drilling Bench. Shot 25
delayers in Bench, 175# pwr.

Portal. 4 trimmers
Pipe Line. 12 men. Drag Shore &
2 trucks making Sump for Pump.
Gauge: Toe Wall 566.4 Portal 566.0
River 572.5 { 5 Carpenters-2 men
4 hrs. on trestle.

Swing East End.
4 Miners-4 helpers.
Drilling for Plates.
6 men on pipe line.

Swing West End.
5 Miners-5 helpers-4 Muckers
Mucking. Drilling Wings.
Bench to 7+87

Grveyd.
East End
5 Miners-4 helpers
Drilling Wings.
Wings to 2+98 & plates in
Shot 25 caps in Wings, 25#
West End.
5 Miners-4 helpers-4 muckers
Mucking. Drilling Bench &
Wings. Shot 27 holes in
Bench, 175#

Oct. 18-1932.

Day Shift, East End.

2 Miners - 3 helpers.

Lagged Segment 2+84

Drilling Wings.

West End.

5 Miners - 4 helpers - 4 Muckers,

Drilling Wings. Shot 32 caps

in Wings, 50[#] pwr. Mucking.

Bench to 7+75

Portal - 4 men.

Ditch 7 men, ^{2hrs} Trestle - 2 cars. ^{2hrs} 1 man

Water below guage, Toe Wall & Portal.

Shed 2 cars - 4 hrs. Pipe Line 6 men - 4 hrs.

Swing. East End.

4 Miners - 4 helpers.

Shot 30 caps in Wings 50[#]

Lagged Segment 2+90

West End.

5 Miners - 5 helpers - 4 Muckers.

Drilling Bench. Mucking. Shot

27 delayers in Bench, 175[#] pwr.

Graved. East End.

6 Miners - 6 helpers

Lagged Segment 2+96

Shot 30 caps in Wings 50[#]

West End.

5 Miners - 5 helpers - 4 Muckers.

Mucking. Drilling Wings.

Oct. 19 - 1932.

Day Shift. East End. 4 men clearing Portal.

6 Miners - 6 helpers.

1 Shovel Runner & 1 truck in open cut, 4 hrs.
Cat & driver, 8 hrs. Drilling Wings

West End.

5 Miners - 5 helpers - 4 Muckers

Trimming Wings. Mucking.

Bench to 7+64

Shot 27 delayers, 175[#]

Portal. 4 Trimmers, 2 hrs.

Pipe Line. 9 men.

Shot 2:55 P.M. 27 delayers in Bench. 175[#]

Swing East End.

5 Miners - 5 helpers. Drilling Wings

4 Muckers. Cleared Bench

5 Men on pipe line. 4 hrs.

West End.

4 Miners - 4 helpers - 4 Muckers.

Drilling Wings.

Graved. East End.

6 Miners - 6 helpers. Drilling Wings

and Bench.

Wings to 3+15

West End.

5 Miners - 5 helpers - 4 Muckers

Drilling Wings. Mucking.

Bench to 7+52

Oct. 20 - 1932

East End - 5 Miners - 5 helpers - 5 Muckers

Shot 30 delayers in Bench at

8:15 A.M. 175# pwr. Mucking.

5 men on pipeline.

2 carpenters on Pump house

1 shifter, 5 Miners, 4 helpers, 5 Muckers

#2 1 shifter, 6 miners - 5 helpers - 5 Muckers

Mucking. Drilling Bench

2 Posts at 2+20

Bench to 2+26

#3 1 shifter, 4 Miners - 5 helpers

Drilling Bench. Shot 27

delayers in Bench, 175#

pwr. at 6:30 A.M.

2 Posts at 2+26

West End 1, Runner & helper

1 shifter, 5 Miners - 4 helpers.

Starting invert excavation.

Drilling Wings.

Shot 125 ^{delayers} caps in Wings 250# pwr.

4 men at Portal - 4 hrs.

Wings to 7+00

#2 1 shifter, 5 Miners - 5 helpers

1 shovel runner & helper.

Drilling invert.

Shot 100 ~~delayers~~ _{electrics} 100# pwr.

#3 1 shifter, 3 miners - 2 helpers

4 muckers

~~invert to~~

shot 50 delayers in Wings

" 50 " " bottom

150# pwr.

Oct. 21-1932

East End Shift #1

1 shiftr. 4 Miners - 4 helpers - 5 Muckers

Wall Plates to 3+15

Mucking. Bench to 2+34

#2 1 shifter, 3 miners, 4 helpers.

2 posts at 2+30

Drilling Bench.

12 muckers at Portal.

#3 1 shiftr., 4 miners - 3 helpers

5 muckers. Drilling Bench

Mucking. Shot 30 delayers in

Bench, 175^{lb} pwr. at 1:30 A.M.

West End Shift #1 7 AM to 3 P.M.

1 shiftr. 4 Miners - 4 helpers - 4 Muckers - 5 laborers.

Drilling bottom, grading.

Shot 95 electrics in bottom 75^{lb} pwr.

5 men placing steel in Portal footing, 4 hrs.

Invert excav. to 11+00

#2 3 PM to 11 PM.

1 shiftr. - 5 Miners - 4 helpers - 4 Muckers.

Drilling bottom. Shot

80 electrics in bottom, 100^{lb}

Drilling & Mucking Wings.

11 PM to 7 AM.

#3 1 shiftr. 5 miners - 4 helpers
4 Muckers.

Drilling Bottom. Mucking.

Oct. 22-1932

East End. 1 shifter, 5 miners-
4 helpers. Mucking. Entire
crew gassed fumes from
shovel & trucks, delay 2 hrs.
Bench to 2+40.

#2 1 shifter, 4 miners-4 helpers.
Drilling Bench & for Posts.
2 Posts at 2+36
Shot 27 delayers in Bench at

#3 1 shifter, 4 miners, 5 muckers
shot 32 holes ^{125#} in bench at 12°
Shovel broke down at 6°
Set segment at 3+02

West End. 1 shifter, 5 miners-5 helpers-
4 muckers. Drilling bottom & wings.

6 muckers on Invert.

12 " at Portal. Steel gang 4 men.
Gas shovel & 2 trucks at Portal.

Invert to 10+40

Shot 120 electrics in bottom 7 125# pwr.

#2 1 shifter, 5 Miners-4 helpers
4 muckers. Drilling & mucking in

Bottom. Set 2 wall plates - 6+66 to 6+82
67 83

#3 1 shifter, 4 miners, 2 helpers,
5 muckers, 1 nipper - Drilling bottom
Mucking. shot 10 holes for wall plate
60^{lbs} powder

Oct. 23-1932

East End. Shift #1

1 shifter, 5 miners, 2 helpers, 1 nipper

2 timber men - shovel op. & oiler - 3 trucks

Drilling + mucking bench. Lagging to 3+02

11 plugs in wing exc. 2 ^{PM} Installed 2 air

driven fans. At 11 ^{AM} Foreman + 8 men came

from exit end. Mucking in portal exc. 1 jack hammer

1 cat with Bulldozer.

#2 1 shifter, 5 miners, 4 helpers, 1 nipper

Drilling bench exc.

2 Posts at 2+43

Shot 27 delayers in Bench, 175[#] ^{10 P.M.}

#3 1 shiftr. 4 miners, 4 helpers, 5 muckers

Bench to 2+54

West End. shift No. 1

1 shifter, 4 miners, 4 helpers, 1 nipper

Air Shore runner + oiler. Invert to 8+50

1 Foreman, 4 Muckers on invert

At 9¹⁵ 1 Foreman + 11 men came in to work on invert

Shot 25 Holes at 11° at bench - 16 holes in wing exc.

at 1 ^{PM} 30# powder - 6 plugs in wing exc. ⁶⁺⁶⁶ 3 ^{PM}

#2 1 shifter, 5 miners, 4 helpers

Mucking And drilling bench + wing exc.

Lagged Segment 6+70

Wings to 6+67 - 6+83 & Plates in

Shot 27 delayers in Bench 175[#]

#3 1 shiftr. 6 miners - 6 helpers

Lagged Segment. 6+76

Drilling Bench

Bench to 7+44

Oct. 24-1932

East End. Shift #1. ^{8 steel gang.} 11 men at Portal

1 shftr. - 5 miners - 5 helpers - 3 Muckers

Lagged Segment 3+08

1 Post at 2+49s.

2 cars - 1 helper at Portal. 6 hrs.

#2 1 shftr. 5 Miners - 5 helpers - 5 Muckers

Shot 32 delayers in Bench, 175# @ 3:30 P.

Drilling Wings.

#3 1 shftr. 4 miners - 4 helpers

Drilling Bench. Mucking.

Bench to 2+60.

West End. Shift #1

1 shftr. 6 miners - 5 helpers - 4 muckers

Shot 27 delayers in Bench, 8 A.M. 175# pndr.

8 men on Invert, grading.

Shot 15 caps in bottom, 25#

2 cars - 2 helpers, on Invert forms - 6 hrs.

Poured south footing at Exit Portal.

#2 1 shftr. 5 miners - 5 helpers - 4 Muckers.

Lagged Segment 6+82

Drilling Wings for Plates. Shot 40 caps
in Wings, 50# pndr.

At portal. 1 shftr. 1 Shovel Runner & helper & 16 men.

#3 1 shftr. 6 miners - 6 helpers.

Bench to 7+35. Drilling Wings
for forms.

Oct. 25-1932

East End. #1 Shift.

1 Shifter. 5 miners - 4 helpers - 5 muckers

3 Carpenters at Portal, 4 hrs.

Shot 26 delayers & 11 caps in

Bench 150[#] pwr.

2 Post at 2+52~~N~~ - 1 at 2+59S

#2 1 shifter, 4 miners - 4 helpers

Mucking.

1 Post at 2+59N

Bench to 2+65

#3 1 shifter, 5 miners - 5 helpersSM

Drilling Bench. Shot 32 delayers

in Bench, 125[#] pwr.

1 Post at 2+65S.

West End #1 Shift.

12 men - 3 muckers at Portal, 4 hrs.

1 shifter, 6 miners - 5 helpers - 2 muckers.

6 Carpenters on Invert forms.

Steel - 5 men, 9 laborers -

Shot 30 caps in wings. 40[#] pwr.

#2 1 shifter, 5 miners - 4 helpers.

Plates to 7+00

Started pouring Invert section
at 6 P.M.

#3 1 shifter, 4 miners, 3 helpers.

Lagged Segment 6+88

Oct. 26-1932

East End Shift #1

1 shftr. 4 miners - 4 helpers - 5 muckers.
4 carpenters on Portal.

1 Post at 2+713

Shot 36 caps in Wings 75[#] pwr.

Bench to 2+72

#2 1 shftr. 6 miners - 5 helpers

Drilling Bench.

Shot 32 delayers in Bench 9:30 P.M.

125[#] pwr.

#3 1 shftr. 4 miners - 4 helpers - 5 muckers

Bench to 2+81

Mucking. Drilling Bench.

West End Shift #1

1 shftr. 5 miners - 4 helpers.

Completed Invert Section at 9:30 A.M.

8 men, & 1 truck clearing Portal.

Wings & Plates to 6+50

Lagged Segment 6+94

Shot 30 caps in Wings 40[#] pwr.

Drilling Bench.

#2 1 shftr. 5 miners - 4 helpers.

Drilling Bench & Wings.

Lagged Segment 7+00

#3 1 shftr. 6 miners - 6 helpers

Drilling Wings.

Shot 25 caps in Wings & 27

delayers in Bench 225[#] at 7 A.M.

Oct. 27-1932

East End. Shift #1

1 shft. 6 miners - 5 helpers - 5 muckers

Drilling Bench. Steel gang 6 men.

Shot 32 delayers in Bench at 1:20 P.M.

1 Post at 2+76 N.

#2 1 shft. 6 miners, 5 helpers - 5 muckers

Lagged Segment 3+14

Started Key excavation

0+56 to 0+71.

#3 1 shft. 5 miners - 5 helpers.

Mucking. Drilling Bench.

Shot 32 delayers in Bench

4:45 A.M. 125#

Shot 20 caps in Wings 25#

Bench to 2+89

1 Post at 2+89 S

West End. Shift #1

1 shft. 6 miners - 5 helpers - 4 muckers.

Lagged Segment 6+63

#2 1 shft. 4 miners - 4 helpers - 4 muckers.

Lagged Segment 6+56

Shot 27 delayers in Bench, 175#

#3 1 shft. 5 miners - 5 helpers - 4 muckers.

Bench to 7+24

Shot 50 caps in Wings 75# p.w.d.r.

Oct. 28-1932

East End 1st shift. 5 miners - 5 helpers
5 muckers.

Bench to 2+93

#2 1st shift. 7 miners, 6 helpers.

Drilling Bench. Shot 20 caps
in wings, 25[#] 2 Posts at 2+96
Shot 32 delayers in Bench at
10:30 P.M. 125[#]

#3 1st shift. 5 miners - 4 helpers - 5 muckers

Mucking. Drilling Wings.
Shot 30 caps in wings, 50[#]
Bench to 3+10
Completed pouring Portal footing
except east cross footing.

West End Shift #1

1st shift. 6 miners - 5 helpers - 2 muckers.

Drilling Bench & Wings.

Shot 27 delayers in Bench, 175[#], 11 A.M.

#2 1st shift. 4 miners - 4 helpers - 4 muckers.

Mucking. Drilling Wings.
Wings to 6+34 & plates in.

#3 1st shift. 5 miners - 6 helpers - 4 muckers.

Mucking. Drilling Bench.
Bench to 7+16
 $\frac{3}{10}$
4+06 to go.

Oct. 29-1932

East End. Shift #1

1 shift. 5 miners-5 helpers.

Wings to 3+30 & Plates in.

#2 1 shift. 6 miners-5 helpers.

Shot 32 delayers in Bench, 125[#]

#3 1 shift. 5 miners-4 helpers

1 Postat 3+02 & 1

1 " at 3+08 & 3+58

Segment 3+20 & 3+26

Bench to 3+17

West End Shift #1

1 shift. 6 miners-5 helpers-2 muckers.

Drilling Bench.

Shot 35 delayers in Bench, 300 at 9:35^{A.M.}

4 men at Portal.

#2 1 shift. 4 miners, 4 helpers, 4[#] muckers.

Lagged Segment 6+48.

Mucking.

#3 1 shift. 5 miners-5 helpers-4 muckers.

Shot 27 delayers in Bench, 175[#]

Oct. 30-1932

East End

Shift 1. 1shftr. 5miners - 5muckers^{5helpers.}

Shift 2. 1shftr. 5miners - 4helpers^{5muckers.}

" 3. 1shftr. 4miners - 4helpers.

9 men

Shot 50 caps in Wings 75[#]

West End.

Shift 1. 1shftr. 5miners - 4helpers - 4Muckers

Shift 2. 1shftr. 5miners - 5helpers. 4Muckers.

Shift 3. 1shftr. 6miners - 5helpers - 2 Muckers.

10 men

Bench to 7+00

Lagged Segment 6+40

Shot 50 caps in Wings 75[#]

Oct. 31-1932.

East End Shift. 1

1 shftr. 5 miners - 5 helpers - 5 muckers

1 Post at 3+16 N.

Shot 32 delayers in Bench
at 8:00 A.M. 125[#]

Shot 20 caps in Wings. 25[#]

#2 1 shftr. 4 miners - 4 helpers. 5 muckers

Wings to 3+47 & plates in

Bench to 3+26

2 Posts at 3+17

#3 1 shftr. 4 miners - 4 helpers.

1 Post at 3+26 S

Lagged Segment 3+34

Drilling Bench.

West End Shift #1

1 shftr. 4 miners - 5 helpers. 4 muckers.

Drilling Bench Shot 27 delayers in
Bench at 12:30 P.M. 175[#]
4 men at Portal

#2 1 shftr. 6 miners - 6 helpers - 4 Muckers

Lagged Segment 6+32

Wings to 6+18 & Plates in.

#3 1 shftr. 5 miners - 5 helpers.

Drilling Bench, Shot 27

delayers in Bench at 4:30 A.M. 175[#]

Nov. 1-1932

East End Shift #1

1 shift. 5 miners-5 helpers. 5 muckers.

Shot 32 delayers in Bench

at 8:45 A.M., 125[#] pwr.

Lagged Segment 3+42

Mucking. Drilling Wings.

#2] 1 shift. 5 miners, 5 helpers.

Bench to 3+34

Drilling Wings. & Bench

#3] 1 shift. 4 miners-4 helpers-5 Muckers

Shot 32 delayers in Bench at 11:30 P.M.

125[#] pwr. & 50 caps in Wings 75[#]

Bench to 3+43

Shot 40 caps in Wings 75[#]

West End Shift #1

1 shift. 5 miners-5 helpers-4 muckers.

Drilling Wings. Mucking.

Bench to 6+90

3 men at Portal.

Drilling Walls.

#2] 1 shift. 5 miners-5 helpers-4 Muckers.

Mucking.

1 Post at 7+00S & 1 at 6+88S

Shot 50 caps in Wings-75[#]

#3] 1 shift. 5 miners-5 helpers.

Drilling Bench & Wings.

Shot 27 delayers in Bench

at 5:10 A.M. 150[#]

Bench to 6+85

3 43

Nov. 2-1932

East End Shift #1

1shftr. 4miners-5helpers,⁴muckers

Mucking. Drilling Bench.

Shot 20 caps in Wings, 25[#]

#2 1shftr. 5miners-5helpers.

Drilling Bench.

Shot 32 delayers in Bench at
Wings to 3463 & plates in.

Lagged Segment 3+50

2 Posts at 3+34

#3 1shftr. 5miners-4helpers-⁴muckers.

Shot 32 delayers in Bench
at 2AM, 125[#]

Lagged Segment 3+58

Drilling Wings.

1 Post at 3+40 S

West End Shift #1

1shftr. 5miners-5helpers-4Muckers.

Mucking. Drilling Wings.

Shot 30 caps in Wings-50[#] pwr.

#2 1shftr. 5miners-5helpers.

Drilling Bench.

Shot 27 delayers in Bench
at 9:30 P.M. 150[#]

1 Post at 6+82 N

#3 1shftr. 6miners-5helpers-⁵muckers.

Wings to 6+00 & Plates in.

Nov. 3 - 1932

East End. Shift. 1.

1 Shift. 4 miners - 5 helpers - 4 muckers

Mucking. Drilling Wings.

Bench to 3+50

#2 1 Shift. 5 miners - 5 helpers.

Shot 27 delayers in Bench

at 10 P.M. 125#

Lagged Segment 3+63

#3 1 Shift. 5 miners - 5 helpers - 4 muckers

Mucking. Drilling Wings.

Bench to 3+63

Shot 20 caps in Wings 50#

1 Post at 3+528.

West End. Shift. 1.

1 Shift. 4 miners - 4 helpers -

Bench to 6+76

Lagged Segment 6+24

Drilling Bench.

1 Post at 6+763

#2 1 Shift. 6 miners - 6 helpers - 5 muckers

Lagged Segment 6+16

Shot 27 delayers in Bench

4:00 P.M. 150#

1 Post at 6+76 N

#3 1 Shift. 6 miners - 6 helpers - 5 muckers.

Mucking. Drilling Wings.

Lagged Segment 6+08

Shot 50 caps in Wings. 75#

Bench to 6+64

Nov. 4 - 1932

East End Shift #1

1 shift. 4 miners - 3 helpers.

Drilling Wings. Shot 20 caps, 25[#]

#2 1 shift. 5 miners - 5 helpers.

Drilling Bench.

Wings to 3+80 & plates in.

#3 1 shift. 4 miners - 4 helpers - ⁴muckers

Mucking. Shot 32 delayers in

Bench at 5:05 AM. 125[#]

Lagged Segment 3+71

West End Shift #1

1 shift. 5 miners - 5 helpers.

Drilling Bench.

Set 2 Posts at 6+70

Shot 27 delayers in Bench, 2:15 P.M. 150[#]

10 men at Portal.

#2 1 shift. 5 Miners - 5 helpers - 5 muckers

Mucking.

1 Post at 6+64s.

Shot 25 caps in Wings 35[#]

#3 1 shift. 6 miners, 6 helpers.

Drilling Bench.

Bench to 6+58

Nov. 5-1932

East End. Shift #1

Lagged Segment 3+79

1shftr. 5miners-5helpers-4muckers.

Bench to 3+71.

#2 1shftr. 5miners-5helpers.

Drilling Bench.

Shot 27 delayers in Bench 125"

#3 1shftr. 4miners-4helpers-4muckers.

Mucking. Drilling Wings.

Bench to 3+75

West End Shift #1.

1shftr. 5miners-4helpers.

12men at Portal.

Shot 27 delayers in Bench at 11:00 AM 150"

1 Post at 6+64 1/2.

Wings to 5+84 & plates in.

#2 1shftr. 5miners-5helpers-5muckers.

Mucking. Drilling Wings.

#3 1shftr. 6miners-6helpers-5muckers.

Lagged Segment 6+00

Bench to 6+48

Drilling Wings & Bench

Shot 27 delayers in Bench, 150"

Nov. 6-1932

East End. Shift #1

1 shft. 5 miners-5 helpers.

#2 1 shft. 5 miners-5 helpers.

Lagged Segment 3+87

2 Posts at 3+78

1 Post at 3+71S & 1 at 3+61S.

Shot 27 delayers in Bench 8PM. 125"

#3 1 shft. 5 miners-5 helpers-4 muckers.

Mucking.

Bench to 3+87

Wings to 3+98 & plates in

West End. Shift #1

1 shft. 5 miners-5 helpers.

10 men at Portal.

Lagged Segment 5+92

#2 1 shft. 5 miners-5 helpers-5 muckers.

1 Post at 6+42S, 6+50S, 6+57S

1 Post at 6+48N, 6+56N, 6+64N

Bench to 6+40

Drilling Bench

#3 1 shft. 4 miners-4 helpers-5 muckers.

Mucking. Drilling Wings.

Shot 27 delayers in Bench 150"

Nov. 7-1932

East End. Shift #1

1 shft. 5 miners - 5 helpers

Drilling Bench.

~~Wings to 3+98 & plates in~~

Lagged Segment 3+95

#2 1 shft. 3 miners - 3 helpers

Shot 32 delayers in Bench, 125"

2 Posts at 3+86

1 Post at 3+94

#3 1 shft. 4 miners - 4 helpers - 4 muckers.

Shot 40 caps in Wings, 75"

Mucking.

Bench to 3+97

632
397
235

West End Shift #1

1 shft. 5 miners - 5 helpers - 5 muckers

Mucking. Trimming

Bench to 6+32

10 men at Portal.

#2 1 shft. 5 miners - 4 helpers.

Trimming.

Shot 50 caps in Walls 75"

#3 1 shft. 5 miners, 5 helpers.

Drilling Bench

Shot 27 delayers in Bench, 150"

Nov. 8-1932

East End Shift #1

1shftr. 7miners-9helpers.

Drilling Wings. Shot 25 caps
in Wings - 25[#]

Drilling Bench.

#2 1shftr. 4miners-4helpers.

Wings to 4+16 & plates in.

Lagged Segment 4+04

1 Post at 4+00

#3 1shftr. 5miners-5helpers-4muckers

Shot 32 delayers in

Bench, 125[#]

Lagged Segment 4+12

1 Post at 3+96m.

Drilling Walls.

West End; Shift #1

1shftr. 3miners-3helpers-1truck driver

Trimming Walls Shot 50 caps
in walls - 50[#]

Completed pouring of Invert
to Portal, footing & Apron.

#2 1shftr. 4miners-4helpers

Trimming Walls.

#3 1shftr. 5miners-5helpers.

Trimming Walls.

Lagged Segment 5+86

Nov. 9-1932

East End Shift #1

1shftr. 5miners-5helpers-4muckers

Mucking. Drilling Wings.

Bench to 4+08.

Shot 40 caps in Wings, 50⁴

#2 1shftr. 5miners-5helpers

Drilling Bench 4muckers

Shot 27 delayers in Bench

at 10:30 P.M. 125⁴

1 Post at 4+00s

#3 1shftr. 4miners-4helpers

Mucking.

Lagged Segment 4+16

Bench to 4+12

West End Shift #1

1shftr. 3miners-3helpers-5muckers.

Mucking.

Bench to 6+26

#2 1shftr. 3miners-3helpers-5muckers.

Mucking.

1 Post at 6+289 & 6+36s

1 Post at 6+32m & 6+40m.

#3 1shftr. 5miners-5helpers-5muckers.

Drilling Bench. Shot 27

delayers in Bench 4AM 150⁴

Nov. 10-1932

East End Shift #1

1 shift. 5 miners-5 helpers.

Drilling Bench. shot 40 caps

2 Posts at 4+10 in Wings-50"

Shot 27 delayers in Bench-125"

#2 1 shift. 6 miners-5 helpers.

Removed short plates &

Segment 4+16.

Lagged Segment 4+18

#3 1 shift. 5 miners-5 helpers-4 muckers

Mucking.

Lagged Segment 4+29

Bench to 4+20

West End Shift #1

1 shift. 4 miners-4 helpers-5 muckers.

Mucking.

#2 1 shift. 5 miners-5 helpers.

Mucking Wings.

Drilling Bench.

#3 1 shift. 5 miners-5 helpers-5 muckers.

Shot 27 delayers in Bench

at 11:30 P.M. 150"

Bench to 6+08

1 Post at 6+203 & 6+24n.

Nov. 11-1932

East End. Shift #1

1 shftr. 4 miners-4 helpers.

Lagged Segment 4+32

Drilling Bench.

#2 1 shftr. 5 miners-5 helpers-4 muckers.

Shot 32 delayers in Bench
at 9:15 P.M. 125[#]

Lagged Segment

#3 1 shftr. 5 miners-5 helpers-4 muckers.

Mucking. Shot 40 caps in

Wings. 50[#]

2 Posts at 4+18

Bench to 4+32

West End. Shift #1

1 shftr. 5 miners-5 helpers-5 muckers.

Drilling Bench.

Delay 2 hrs. changing air line.

#2 1 shftr. 5 miners-5 helpers-5 muckers.

Shot 27 delayers in Bench
at 150[#]

Wings to 5+68 & Plates in

#3 1 shftr. 5 miners-5 helpers.

Mucking.

Lagged Segment 5+80

Bench to 5+94

1 Post at 6+08 m & 6+16 m.

1 Post at 6+10 s & 6+

Nov. 12-1932

East End Shift #1

1 shift. 5 miners - 5 helpers.

Drilling Wings. Shot 55 caps

in Wings, 75[#]

#2] 1 shift. 5 miners - 5 helpers

Mucking in Wings.

Wings to 4+98 & plates in.

#3] 1 shift. 5 miners - 5 helpers - 4 muckers

Shot 32 delayers in Bench, 125[#]

Bench to 4+40

West End. Shift #1

1 shift. 5 miners - 4 helpers - 5 muckers

Drilling Bench. Shot 24 delayers

in Bench - at 11:55 AM. 150[#]

and 15 caps in Wings 25[#]

#2] 1 shift. 5 miners - 5 helpers - 5 muckers

Mucking.

#3] 1 shift. 5 miners - 5 helpers - 5 muckers

Bench to 5+86.

Drilling Bench.

Shot 30 caps in Wings 50[#]

Nov. 13-1932

East End Shift #1

1 shift. 5 miners - 5 helpers.

* 2-1 shift. 5 miners - 5 helpers - 4 muckers

* 3-1 shift. 7 miners - 6 helpers.

Lagged Segments 4+40 & 4+48

Bench to 4+46

Drilling Bench.

Wings to ~~4+48~~ & plates in.

Shot 65 caps in Wings, 100#

2 Posts at 4+24 & 2 at 4+32

Shot 32 delayers in Bench

125# pwr. dr.

West End Shift #1

1 shift. 5 miners - 5 helpers - 5 muckers.

* 2-1 shift. 5 miners - 5 helpers.

* 3-1 shift. 3 miners - 3 helpers, 5 muckers.

Mucking. Shot 27 delayers in Bench

at 2 A.M. 150# & 50 caps in Wings 75#

Lagged Segment 5+70

" " 5+75

Bench to 5+75

Nov. 14-1932

East End Shift #1.

1 shift. 6 miners - 6 helpers - ⁴ muckers

2 Posts at 4+40

Shot 32 delayers in Bench

at 10:30 A.M. 125[#]

Wings to 4+66 & plates in.

Mucking. Drilling Wings

#2 1 shift. 5 miners - 5 helpers.

Lagged Segment 4+56

2 Posts at 4+48

Drilling Bench.

#3 1 shift. 5 miners - 5 helpers.

4 muckers.

Drilling Wings. Mucking.

Shot 32 delayers in Bench 125[#]

Lagged Segment 4+64
at 7:00 A.M.

West End. Shift 1

1 shift. 4 miners - 4 helpers - 5 muckers.

Mucking. Wings to 5+50

and Plates in.

Drilling Bench.

1 Post at 5+88 & 5+94 & 6+02 all so.

#2 1 shift. 5 miners - 5 helpers.

2 Posts at 5+80

1 Post at 5+92 & 6+00 both no.

Shot 27 delayers in Bench, 150[#]

#3 1 shift. 5 miners - 5 helpers - 5 muckers.

Lagged Segment 5+62

Mucking.

Bench to 5+70

1 Post at 5+75 n.

Segments

9+72 & 9+84 both have taken weight & one stick in each ring is broken. Each set appears to have dropped about 4" at north end of crown piece.

Nov. 15-1932

East End Shift #1.

1 shift. 4 miners - 4 helpers - 4 muckers.

Shot 35 caps in Wings - 50[#]

Both gangs gassed, 2 hrs. delay.

2 shift. 5 miners - 5 helpers

Drilling Bench.

Bench to 4+58

Shot 32 delayers in Bench, 125

45 caps in Wings, 75[#]

3 shift. 5 miners - 5 helpers - 4 muckers

Wings to 4+83 & plates in.

Bench to 4+68

2 Posts at 4+58.

Drilling Wings.

West End. Shift #1.

1 shift. 4 miners - 4 helpers - 5 muckers.

Shot 15 caps in Wings - 25[#]

Lagged Segment 5+54

2 shift. 5 miners - 5 helpers

Drilling Bench.

Shot 27 delayers in Bench at 7 P.M.

125[#] 150[#]

3 shift. 6 miners - 6 helpers - 5 muckers.

Bench to 5+56 = 88'

Shot 40 caps in Wings - 75[#]

Mucking.

Nov. 16-1932

East End Shift #1

1 shift. 4 miners - 4 helpers.

West End Shift #1.

1 shift. 5 miners - 5 helpers.

Wings to 5+33 & plates in

5470 ✓ 0 0.0 nothing

5462 ✓ 0 1.0 0.6 2.0 0 1.6 1.5 3.5 3.0 ^{2.0} 0

5454 ✓ 2.0 2.0 0.5 0.6 1.0 1.5 1.0 2.3 0 ⁰ 1.0

1 2 3 4 5 6 7 8 9 10 11
6+63 0 0 0 1.0 0.5 2.2 3.0 3.0 2.8 0

3+14 0 2.9 0.5 1.8 1.0 0 0 0 0 1.0 0

6+56 0 0 0 1.0 2.8 0 1.7 0.8 0.5 1.0 0

6+48 nothing

6+40 0 0.8 0.5 1.0 0.4 1.2 0.8 0 0.5 0.9 0

3+20 nothing

3+26 0 0.8 0 1.9 2.0 2.0 0.5 1.0 0.3 0.8 0

3+34 0.5 3.0 0 2.4 1.3 2.3 2.2 1.0 0 0.6 0

6+32 0 0 0 0.5 0 1.0 0.8 1.0 1.2 1.0 0

3+42 Nothing.

3+50 0 1.0 0 0.4 0.3 0.5 0.5 1.0 0 0 0

3+58 0 1.0 0 0.5 1.5 1.6 1.3 2.0 0 0 0

6+24 0 1.5 1.3 2.9 3.8 4.0 0.9 1.0 1.0 0.5 1.0

6+18 0 0 1.0 1.0 2.8 0 2.2 0 0.8 0.3 1.3 1.0

3+63 0 0.8 0 3.5 1.5 1.0 0.8 2.0 3.7 3.8 0

6+08 0 0 0 1.6 0.8 1.2 0 1.0 0 0 0

3+71 0 0 1.0 3.8 1.5 1.3 1.0 2.0 4.0 2.4 0

3+79 0 2.3 3.0 1.5 0.8 2.0 1.5 2.5 2.5 1.0 0

6+00 0 0 0 0 1.0 0.8 2.0 0.5 0 0

5+92 0 2.5 0 1.0 3.6 2.0 0 0 1.5 2.0 0

3+87 0 1.5 2.5 1.0 0 0 2.0 1.3 0.8 0

3+95 0 1.0 2.8 1.0 1.8 1.0 1.0 2.5 1.5 0.7 0

4+04 same

4+12 0 0 0 2.0 0 0 1.3 1.0 0 0

5+86 0 0 0 0 3.0 3.5 0 0 0 0

4+98 0 0 0 1.5 0 0 1.5 0.6 0 0

4+16 0 0 0 1.0 1.3 1.9 0.5 1.0 0 0

4+24 0 0.8 0.5 1.5 3.0 2.0 1.5 1.5 0.5 1.0 0

4+32 0 0 1.0 0.5 2.3 2.0 2.0 0 0 0

5+80 0 3.0 1.0 1.0 0.3 4.5 1.0 0 0 0

4+40 0 0 0 1.5 2.2 2.8 2.0 1.5 1.0 0 0

4+48 0 0 0 1.0 2.0 2.4 2.3 3.0 0.6 0.8 0

5+75 0 0 1.0 1.5 2.0 2.0 2.1 0.5 0.6 0 0

5+80 nothing

4+56 0 0 0 0 1.0 0.5 0.6 0 0 0

4+64 0 0 0.6 1.5 0.5 0.6 1.2 1.0 0 0

	1	2	3	4	5	6	7	8	9	10	11
9+61	0	0	0	0	0.5	1.4	1.0	1.2	0	0	0
1+30	0	0	2.5	4.0	3.0	3.3	4.5	4.2	0	0	0
1+24	0	0	1.0	2.3	1.7	2.5	2.7	3.0	0	0	0
1+51	0	0.9	3.0	2.5	0.9	1.3	2.3	4.0	0	0	0
1+57	0.8	3.0	2.0	1.3	0	1.5	3.0	4.0	1.5	0	0
1+63	1.7	4.1	1.7	0.5	2.3	1.0	1.0	2.0	0	0.5	0
1+69	0	0	0	1.9	0	0	0	1.2	1.9	0.8	0
1+75	0	1.0	0	2.5	0	1.5	0	1.0	1.7	0.7	0
1+78	1.5	2.5	2.8	2.0	0	0	0	1.5	0	0	0
1+84	0	0.8	0.3	1.1	0.4	0.4	0	1.3	2.7	0	0
1+90	0	1.3	0.5	0.5	0	0	0	0.7	2.3	1.5	0
1+96	0	2.6	0.8	0	0.4	0.5	1.0	0	0	0	0
2+02	0	0	0	2.4	0.8	2.5	1.3	3.0	1.6	0	0
2+08	0	1.6	1.0	3.3	0.7	0.7	0	2.0	2.3	0	0
2+12	1.0	2.5	0	0.7	0	1.0	0.5	0.7	1.0	0	0
2+19	0.6	2.1	0	0.5	0	2.0	0	1.0	2.7	0	0
2+25	0.5	2.2	0	0.5	0	1.5	0	1.0	2.7	0	0
2+30	0.5	2.3	0.5	1.0	0	1.0	0	1.0	2.7	0	0

	1	2	3	4	5	6	7	8	9	10	11
2+36	1.5	3.5	0.8	1.8	1.2	1.0	1.3	0.7	0	0	0
2+42	1.0	3.0	1.0	1.5	1.0	0.8	1.0	0	0	0	0
2+47	0	2.0	1.0	0.5	1.0	0.7	0.8	0	0	0	0
2+53	0	0.5	1.0	0.5	1.0	1.0	0.8	2.3	1.0	2.0	0
2+60	No measurement										
2+66	" "										
2+72	Nothing										
2+78	Nothing										
2+84	Nothing										
2+90	0	0	0.8	0.8	0.5	1.5	1.2	0.7	0.5	0	0
2+96	0	0	0.5	0.7	0.7	1.0	1.0	0.8	0.5	0	0
3+02	0	1.2	0	1.0	0	1.0	0	1.0	1.0	0.5	0
3+08	0	0.8	0	1.3	0	0	0	1.2	0.4	1.5	1.0
6+70	0.5	1.4	1.5	3.0	2.0	1.8	0	2.0	1.3	1.2	0
6+76	1.0	1.0	1.5	1.6	0	0.4	2.0	1.0	1.8	0	0
6+82	0	0	0	0	1.5	0.8	0.5	1.0	0.5	0	0
6+88	Nothing										
6+94	Nothing										
7+00	0	0	0	1.5	0	0	0	0.5	0.6	1.0	0



Set #	1	2	3	4	5	6	7	8	9	10	
0+25	0	0	0	1.00	0.75	1.0	2.5	1.0	0	0	
0+31	Same as 0+25										
11+40	1.0	2.0	0.25	0 →							9
11+34	1.6	2.3	0	0 →							
11+28	0	1.2	1.0	0 →							
11+22	2.0	0.5	1.3	1.7	0 →						
11+16	0	0	0.5	2.0	0.7	0	1.0	0.7	0 →		
0+43				← 0		2.5	2.2	0	0		
11+10	← 0	6.0	3.0	3.0	3.0	1.7	0 →				
11+04	0	1.3	0	3.3	2.0	2.2	1.9	1.0	0 →		
0+52	← 0	1.0	0.8	1.3	0.5	0.3	0 →				
10+80	← 0	2.2	2.2	1.0	0 →						
10+74	0	0.5	0.6	0.5	1.5	2.0 →					
10+68	0	0	1.0	1.0	1.0	2.3	4.0	2.0	0		
10+56	1.0	4.0	2.3	1.8	1.0	1.5	4.0	2.5	2.0		

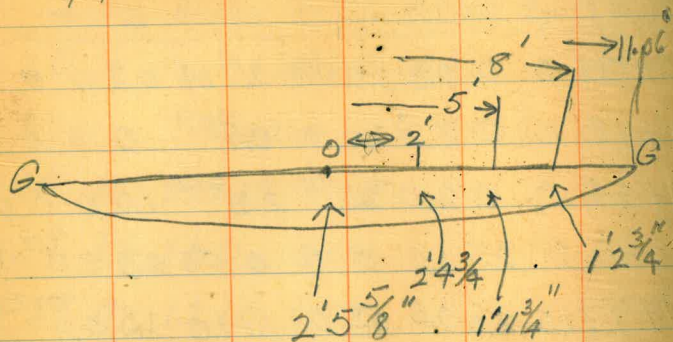
	1	2	3	4	5	6	7	8	9	10	11
10+50	2.0	5.0	4.5	3.4	2.5	4.3	4.2	4.5	1.0	0.0	→
10+45	0.7	0.7	4.3	3.6	2.0	2.0	2.0	1.4	1.5	2.3	0
10+6	0.5	1.5	1.5	0.0	0.8	0.8	0.9	2.0	3.0	1.0	0
10+27	1.0	3.0	2.8	1.5	1.0	1.0	1.0	0 →			
10+21	0	0	0.3	3.0	0.9	3.7	1.4	0.8	0	0	0
1+18	0	0	2.5	1.2	0	0.5	0.9	0	0	0	0
1+24	0	0	2.0	2.6	1.0	2.3	2.6	1.0	0	0	0
1+30	0	2.5	1.0	0	0	0	0.3	2.0	3.0	0.5	0
9+97	1.0	2.3	0.5	0.5	0	1.1	1.0	1.5	0.9	0.2	0
1+12	0	0	0	0	0.9	1.0	1.0	2.0	3.0	0	0
9+91	1.0	1.2	1.7	1.8	1.0	1.0	0.5	1.0	0	1.2	0
1+33	0.6	3.2	3.2	4.0	1.0	1.0	1.5	2.0	1.0	1.7	0
1+39	1.0	1.0	2.5	3.3	1.3	1.9	2.8	1.7	0.5	0	0
9+79	0	0	0	0.5	0.5	0.8	1.6	1.8	0	0	0
1+45	0	0	0.8	0.8	1.2	2.2	1.8	0	0	0	0
9+73	0	1.6	1.0	1.5	0.5	2.1	0	0.6	1.4	1.8	0
1+39						2.5	3.5				
1+53	0	0	5.7	3.7	3.0	3.3	2.6	3.0	0	0	0
9+67	0	0	0	1.0	0.5	0.5	0.5	1.5	0.5	1.0	0

1+18 O.K.

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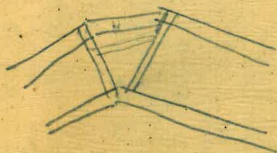
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CALCULATION OF EARTHWORK.

HEIGHT *Charley* *Erickson*

Width	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	.02	.04	.06	.07	.09	.11	.13	.15	.17	.18	.20	.22	.24	.26	.28
2	.04	.07	.11	.15	.18	.22	.26	.30	.33	.37	.41	.44	.48	.52	.56
3	.06	.11	.17	.22	.28	.33	.39	.44	.50	.56	.61	.67	.72	.78	.83
4	.07	.15	.22	.30	.37	.44	.52	.59	.67	.74	.81	.89	.96	1.04	1.11
5	.09	.19	.28	.37	.46	.56	.65	.74	.83	.93	1.02	1.11	1.20	1.30	1.39
6	.11	.22	.33	.44	.56	.67	.78	.89	1.00	1.11	1.22	1.33	1.44	1.55	1.67
7	.13	.26	.39	.52	.65	.78	.91	1.04	1.16	1.30	1.42	1.55	1.68	1.81	1.94
8	.15	.30	.44	.59	.74	.89	1.04	1.19	1.33	1.48	1.63	1.78	1.92	2.08	2.22
9	.17	.33	.50	.67	.83	1.00	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50
10	.18	.37	.56	.74	.93	1.11	1.30	1.48	1.67	1.85	2.04	2.22	2.41	2.59	2.78
11	.20	.41	.61	.82	1.02	1.22	1.43	1.63	1.83	2.04	2.24	2.44	2.65	2.85	3.06
12	.22	.44	.67	.89	1.11	1.33	1.56	1.78	2.00	2.22	2.44	2.67	2.89	3.11	3.33
13	.24	.48	.72	.96	1.20	1.44	1.68	1.92	2.16	2.41	2.65	2.89	3.13	3.37	3.61
14	.26	.52	.78	1.04	1.30	1.55	1.81	2.08	2.33	2.59	2.85	3.11	3.37	3.63	3.89
15	.28	.56	.83	1.11	1.39	1.67	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17
16	.30	.59	.89	1.18	1.48	1.78	2.07	2.37	2.67	2.96	3.26	3.56	3.85	4.15	4.44
17	.31	.63	.94	1.26	1.57	1.89	2.20	2.52	2.83	3.15	3.46	3.78	4.09	4.41	4.72
18	.33	.67	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00
19	.35	.70	1.06	1.41	1.76	2.11	2.46	2.82	3.17	3.52	3.87	4.22	4.57	4.92	5.28
20	.37	.74	1.11	1.48	1.85	2.22	2.59	2.96	3.33	3.70	4.07	4.44	4.81	5.18	5.56
21	.39	.78	1.17	1.55	1.94	2.33	2.72	3.11	3.50	3.89	4.28	4.67	5.06	5.44	5.83
22	.41	.81	1.22	1.63	2.04	2.44	2.85	3.26	3.67	4.07	4.48	4.89	5.30	5.70	6.11
23	.43	.85	1.28	1.70	2.13	2.56	2.98	3.41	3.83	4.26	4.68	5.11	5.54	5.96	6.39
24	.44	.89	1.33	1.78	2.22	2.67	3.11	3.56	4.00	4.44	4.89	5.33	5.78	6.22	6.67
25	.46	.92	1.39	1.85	2.31	2.78	3.24	3.70	4.17	4.63	5.09	5.56	6.02	6.48	6.94
26	.48	.96	1.44	1.92	2.41	2.89	3.37	3.85	4.33	4.82	5.30	5.78	6.26	6.74	7.24
27	.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
28	.52	1.04	1.55	2.07	2.59	3.11	3.63	4.15	4.67	5.18	5.70	6.22	6.74	7.26	7.78
29	.54	1.07	1.61	2.15	2.68	3.22	3.76	4.30	4.83	5.37	5.91	6.44	6.98	7.52	8.06
30	.56	1.11	1.67	2.22	2.78	3.33	3.89	4.44	5.00	5.55	6.11	6.67	7.22	7.78	8.33
31	.57	1.15	1.72	2.30	2.87	3.44	4.02	4.59	5.17	5.74	6.32	6.89	7.46	8.04	8.61
32	.59	1.18	1.78	2.37	2.96	3.56	4.15	4.74	5.33	5.92	6.52	7.11	7.70	8.30	8.89
33	.61	1.22	1.83	2.44	3.05	3.67	4.28	4.89	5.50	6.11	6.72	7.33	7.94	8.55	9.17
34	.63	1.26	1.89	2.52	3.15	3.78	4.40	5.04	5.67	6.29	6.93	7.56	8.18	8.81	9.44
35	.65	1.30	1.94	2.59	3.24	3.89	4.53	5.18	5.83	6.48	7.13	7.78	8.42	9.08	9.72
36	.67	1.33	2.00	2.67	3.33	4.00	4.66	5.33	6.00	6.67	7.33	8.00	8.67	9.33	10.00
37	.68	1.37	2.06	2.74	3.42	4.11	4.79	5.48	6.17	6.85	7.54	8.22	8.91	9.59	10.28
38	.70	1.41	2.11	2.82	3.52	4.22	4.92	5.63	6.33	7.03	7.74	8.44	9.15	9.85	10.56
39	.72	1.44	2.17	2.89	3.61	4.33	5.05	5.78	6.50	7.22	7.95	8.67	9.39	10.11	10.83
40	.74	1.48	2.22	2.96	3.70	4.44	5.18	5.92	6.67	7.41	8.15	8.89	9.63	10.37	11.11

Table gives cu. yds. in 1 ft. of a triangle of given width and height. Corrections for tenths of width are one tenth the values found under each height considering the widths from 1 to 9 as tenths and similarly the corrections for tenths of height are one tenth the figures opposite width considering the heights from 1 to 9 as tenths. Thus if $w = 16.2$ and $h = 5.3$, cu. yds. $= 1.48 + .028 + .089 = 1.597$ cu. yds. or practically 160 cu. yds. per 100 ft. If w exceeds 40 ft., use one half and multiply result by 2, if both w and h are large use one half of each and multiply result by 4. Any cross-section may be divided into triangles by the following rule. To the triangle of the sum of the outside cuts (or fills) $= h$, and $\frac{1}{2}$ the roadbed $= w$, add the triangles formed by taking the distance out to each break in turn ($= w'$) by the difference between the cuts (or fills) on each side of it ($= h'$) always subtracting the outer from the inner.

ROADWAY 16 feet wide. Side Slopes 1 on 1 1/2.

For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	II
0	8.0	8.2	8.3	8.5	8.6	8.8	8.9	9.1	9.2	9.4	0
1	9.5	9.7	9.8	10.0	10.1	10.3	10.4	10.6	10.7	10.9	1
2	11.0	11.2	11.3	11.5	11.6	11.8	11.9	12.1	12.2	12.4	2
3	12.5	12.7	12.8	13.0	13.1	13.3	13.4	13.6	13.7	13.9	3
4	14.0	14.2	14.3	14.5	14.6	14.8	14.9	15.1	15.2	15.4	4
5	15.5	15.7	15.8	16.0	16.1	16.3	16.4	16.6	16.7	16.9	5
6	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.2	18.4	6
7	18.5	18.7	18.8	19.0	19.1	19.3	19.4	19.6	19.7	19.9	7
8	20.0	20.2	20.3	20.5	20.6	20.8	20.9	21.1	21.2	21.4	8
9	21.5	21.7	21.8	22.0	22.1	22.3	22.4	22.6	22.7	22.9	9
10	23.0	23.2	23.3	23.5	23.6	23.8	23.9	24.1	24.2	24.4	10
11	24.5	24.7	24.8	25.0	25.1	25.3	25.4	25.6	25.7	25.9	11
12	26.0	26.2	26.3	26.5	26.6	26.8	26.9	27.1	27.2	27.4	12
13	27.5	27.7	27.8	28.0	28.1	28.3	28.4	28.6	28.7	28.9	13
14	29.0	29.2	29.3	29.5	29.6	29.8	29.9	30.1	30.2	30.4	14
15	30.5	30.7	30.8	31.0	31.1	31.3	31.4	31.6	31.7	31.9	15
16	32.0	32.2	32.3	32.5	32.6	32.8	32.9	33.1	33.2	33.4	16
17	33.5	33.7	33.8	34.0	34.1	34.3	34.4	34.6	34.7	34.9	17
18	35.0	35.2	35.3	35.5	35.6	35.8	35.9	36.1	36.2	36.4	18
19	36.5	36.7	36.8	37.0	37.1	37.3	37.4	37.6	37.7	37.9	19
20	38.0	38.2	38.3	38.5	38.6	38.8	38.9	39.1	39.2	39.4	20
21	39.5	39.7	39.8	40.0	40.1	40.3	40.4	40.6	40.7	40.9	21
22	41.0	41.2	41.3	41.5	41.6	41.8	41.9	42.1	42.2	42.4	22
23	42.5	42.7	42.8	43.0	43.1	43.3	43.4	43.6	43.7	43.9	23
24	44.0	44.2	44.3	44.5	44.6	44.8	44.9	45.1	45.2	45.4	24
25	45.5	45.7	45.8	46.0	46.1	46.3	46.4	46.6	46.7	46.9	25
26	47.0	47.2	47.3	47.5	47.6	47.8	47.9	48.1	48.2	48.4	26
27	48.5	48.7	48.8	49.0	49.1	49.3	49.4	49.6	49.7	49.9	27
28	50.0	50.2	50.3	50.5	50.6	50.8	50.9	51.1	51.2	51.4	28
29	51.5	51.7	51.8	52.0	52.1	52.3	52.4	52.6	52.7	52.9	29
30	53.0	53.2	53.3	53.5	53.6	53.8	53.9	54.1	54.2	54.4	30
31	54.5	54.7	54.8	55.0	55.1	55.3	55.4	55.6	55.7	55.9	31
32	56.0	56.2	56.3	56.5	56.6	56.8	56.9	57.1	57.2	57.4	32
33	57.5	57.7	57.8	58.0	58.1	58.3	58.4	58.6	58.7	58.9	33
34	59.0	59.2	59.3	59.5	59.6	59.8	59.9	60.1	60.2	60.4	34
35	60.5	60.7	60.8	61.0	61.1	61.3	61.4	61.6	61.7	61.9	35
36	62.0	62.2	62.3	62.5	62.6	62.8	62.9	63.1	63.2	63.4	36
37	63.5	63.7	63.8	64.0	64.1	64.3	64.4	64.6	64.7	64.9	37
38	65.0	65.2	65.3	65.5	65.6	65.8	65.9	66.1	66.2	66.4	38
39	66.5	66.7	66.8	67.0	67.1	67.3	67.4	67.6	67.7	67.9	39
40	68.0	68.2	68.3	68.5	68.6	68.8	68.9	69.1	69.2	69.4	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 41.9. For same slopes but other widths of roadbed correct above figures by one-half difference in width of roadbed; thus in example above for 20 ft. roadbed distance will be $41.9 + (20 - 16) \div 2$ or 2 ft. added to 41.9 = 43.9. For slopes of 1 on 1 see inside of front cover.