DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1.

For Single Track Embankment.

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) ÷ 2 or 2 ft. added to 30.6 = 32.6. For slopes of 1 on 1½ see inside of back cover.

405

TUNNEL INSPECTION
R.A. Thurston.

01.66
500
8.300

Nov. 16-1932

East End Shift #1

1 Shftr. 5 miners - 5 helpers.

Lagged Segment 4+72

2 Posts at 4+57

Drilling Bench.

#2 1 Shftr. 5 miners - 5 helpers

Lagged Segment 4+80

Mucking. Shot 20 delayers in Bench, 125# & 40 caps in Wings, 75#

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

Drilling Bench

Bench to 4+78

2 Posts at 4+64

West End #Shift #1

1 Shftr. 5 miners - 5 helpers - 5 muckers.

Wings to 5+35 & plates in.

1 Post at 5+70 m & 1 at 5+63 s.

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

Drilling Bench.

Lagged Segment 5+47

Shot 27 delayers in Bench, 150#

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

Lagged Segment 5+39

Bench to 5+52

Nov. 17-1932

East End Shift #1.

1 shftr. 5 miners - 6 helpers

Drilling Bench.

Wings to 4+99 & plates in

2 Posts at 4+74

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

Mucking. Shot 24 delayers in

Bench at 3 P.M.

Drilling Wings.

Lagged Segment 4+88

#3 1 shftr. 6 miners - 6 helpers

Lagged Segment 4+96.

Bench to 4+88

2 Posts at 4+82.

Drilling Bench

West End Shift #1

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

Mucking. Drilling Wings.

#2 1 shftr. 5 miners - 5 helpers.

Drilling Bench

Shot 27 delayers in Bench, 150# pwdr.

2 Posts at 5+55

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

Shot 50 caps in Wings - 75# pwdr.

Bench to 5+43

Nov. 18-1932

East End Shift #1

1 shftr. 5 miners - 4 helpers - 4 muckers.
Shot 27 delayers in Bench at
7:30 A.M. 125# pwdr. Mucking.
Drilling Wings. Shot 50 caps in
Wings - 80# pwdr.

#2

#3 4 muckers.
Mucking. Shot 32 delayers
in Bench 125#
Bench to 5+06
Shot 45 caps in Wings, 75#

West End Shift #1

1 shftr. 4 miners - 4 helpers - 5 muckers.
Wings to 5+18 & plates in.
Mucking.

#2 Shifts combined.
1 shftr. 8 miners - 9 helpers.
Drilling Bench.

#3 1 shftr. 7 miners - 6 helpers - 5 muckers
Lagged Segment 5+31
Lagged Segment 5+23
Shot 27 delayers in
Bench, 150#
Mucking.
Bench to 5+31
2 Posts at 5+47

Nov. 19-1932

East End

4 muckers

#2

West End. Shift #1

4 miners - 4 helpers - 5 muckers.

Shot 35 caps in Wings - 50#

Wings completed.

4+99 to 5+18

#2 1 shftr. 5 miners - 6 helpers.

Drilling Bench

#3 1 shftr. 5 miners - 4 helpers.

Lagged Segment 5+15

Shot 27 delayers in Bench

150#

Nov. 20-1932

2 Posts at 4+92
1 Post at 4+995
2 Posts at 5+06

West End
4 miners - 4 helpers - 5 muckers.
Mucking.
Lagged Segment 5+07
2 Posts at 5+39
Lagged Segment 5+28
" " 5+34
Bench to 5+34

#2 1st shft'r. 5 miners - 5 helpers - 5 muckers.

#3 1st shft'r. 3 miners - 4 helpers.

Nov. 21-1932.

East End.

2 Posts at 5+14

5 muckers at Portal.

4 muckers

Bench complete

5+21 to 5+31.

West End Shift #1.

3 miners - 4 helpers - 5 muckers.

2 Posts at 5+31

1 Post at 5+34s.

Shot 27 delayers at 2:10 in Bench, 150# pwdr. Bench Completed.

Drilling Invert.

#2 1 shifter. 3 miners - 3 helpers - 2 muckers.

Drilling Invert. Grading.

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

Grading Invert. Dr

Shot 50 delayers in Walls 50#

Drilling Walls & Invert

Nov. 22 - 1932.

West End

3 miners - 3 helpers - 4 muckers.

4 men at Portal - 4 Hrs.

Drilling Bottom & Walls

Shot 80 delayers in Invert &

35 caps in Walls - 125# pwdr.

#2 1st shft. 3 miners - 3 helpers - 4 muckers.

Drilling Invert. Mucking.

Shot 65 delayers in Invert. 75#

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

Mucking. Drilling Invert.

Shot 80 delayers in Invert 100#

Invert Excavated to 5+90

but not graded.

Nov. 23-1932

5 men mucking at Exit
Portal on top of forms.

Tunnel Shift #1
3 miners - 4 helpers - 4 muckers.
Drilling Bottom. Mucking.
Shot 125 delayers in
Bottom - 150# pwdr.

#2 1st shft. r. 3 miners - 3 helpers - 4 muckers.
Mucking. Drilling Bottom.

#3 1st shft. r. 4 miners - 4 helpers - 4 muckers.
Mucking. Drilling Bottom.
Shot 75 delayers - 75# pwdr.
Invert excavated to 5+25
Grading started at 8+14

Nov. 24-1932
No Work

Nov. 25-1932. Shift #1.
2 miners - 3 helpers - 2 muckers.
Moving shovel to East Portal.
1 shifter - 9 men - 1 truck - grading.

#2 1 shftr. 3 miners - 3 helpers - 4 muckers.
Drilling Bottom. Mucking.

#3 1 shftr. 4 miners - 4 helpers - 4 muckers.
Mucking. Drilling.
Shot 100 delayers - 100# pwdr.
Invert Excavated to 1455.

Nov. 26-1932.

Shift #1.

3miners-4helpers-4muckers.
Mucking. Drilling.
1shftr-12men-1truck, grading.
and 8men & 2carpenters - 4hrs.
Shot 100 delayers-100# pwdr.

#2 1shftr. 2miners-3helpers-4muckers.
Drilling. Mucking.

#3 1shifter. 2miners-3helpers-4muckers.
Drilling. Mucking.

Nov. 27-1932.

Shift #1.

3miners-4helpers-4muckers.
Grading. Mucking.

#2 1shftr. 2miners-3helpers. 4muckers.
Mucking.

#3 1shftr. 2miners-3helpers-4muckers.
Invert Excavation completed
1+55 to 5+25
Poured Invert to 5+47.

Nov. 28 - 1932.

Shift #1 - 3miners - 4helpers - 4muckers.
Drilling. Shot 60 delayers,
50# pwdr. Shovel out for repairs.
1shftr. 9men grading, 6men at
Exit Portal removing timber.

#2 1shftr. 4miners - 4helpers - 2trucks.
1 Portable Compressor taken
from Plant.

#3 1shftr. 4miners - 4helpers
& 2trucks.
Drilling. Mucking.
Shot 125 delayers - 150# pwdr.
Section poured 11+73 to 11+54
1st two segments removed.

Nov. 29 - 1932

Shift #1. 3miners - 4helpers - 2trucks.
1shftr. 13men grading.
steel gang - 4men, hauling steel.
3men - stripping Invert.
2men - with spaders - chipping Invert.
+3men & 2 spaders - 4 hours.
3carpenters - trimming - 4 hrs.
2 carpenters - setting headboards - 4 hrs.

#2 1shftr. 7miners - 8helpers - 2trucks
Drilling. Mucking.
5men chipping Invert.
Steel gang - 4men - 2hrs.
laying steel.
Invert graded and steel
laid to 4+20 from 5+47
Shot 80 delayers & 75# pwdr.

Nov. 30-1932

Shift #1.

3 miners - 4 helpers - 2 trucks.
Drilling. Grading.
1 shftr. 10 men. Grading.
4 men chipping Invert.
3 Carpenters trimming timber.

#2 1 shftr. 5 miners - 5 helpers.
Drilling Walls. Grading.
Invert poured to 3+72.

Rigger - 4 helpers - Drag-line
oprtr. & oiler, setting steel forms.

Dec. 1-1932

Shift #1

3 miners - 4 helpers - 1 truck.
1 shftr. 8 men - grading
5 men cleaning walls at
Exit Portal.
Rigger - 3 men - Drag Line Opratr &
Oiler - setting steel forms.
6 carpenters - 3 hrs. setting forms.
Tile drain ended at 3+55.
5 men - steel gang - 5 hrs. laying steel.
Shot 80 delayers - 75# pwdr.
#2 1 shftr. 6 miners - 7 helpers - 1 truck.
Mucking at Exit Portal.
Shot 60 caps in Walls - 50#
Invert poured to 1+67.

Dec. 2-1932.

Shift #1- 1miner-3helpers-1truck
Digging trench for Apron Footing.
1Shftr. 13men grading.
4carpenters - 4Hrs. setting forms.
Rigger-3men, dragline operator
& oiler, setting forms & pipe.

#2 1shftr. 6miners-14helpers &
1truck driver.
Drilling. Mucking. Grading.
8men, steel gang, laying
steel.

Dec. 3-1932

Shift #1. 1miner-3helpers.
Rigger-3men- Dragline operator
& oiler setting steel forms.
Trimming. Poured Invert from
1+67 to 1+30 & 1+02 to 0+72
0+55 to 0+04 and 54 apron.

#2 1shftr. 4miners - 4helpers
and 1truck.
Trimming. Mucking.

Dec. 4 - 1932

Shift #1.

2 miners - 3 helpers - 2 trucks.

Trimming. Mucking.

Shift #2.

1 shftr. 4 miners - 4 helpers

2 trucks.

Mucking.

Dec. 5 - 1932.

2 miners - 3 helpers - 2 trucks.

1 shftr. - 8 men.

Mucking.

Rigger - 4 men - Drag operator and oiler - setting steel forms.

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

1 truck driver.

Mucking. Trimming.

Drilling Invert at Key.

Dec. 6-1932.

Shift #1. 1 miner-3 helpers.
1-shftr. 8 men mucking. 1 truck.
1-Rigger-3 men on Gun.
Drilling Key.
Shot 60 delayers-50# pwdr.
5 Reen forcing Segments
in place at 9+78
3-6X6 - 1-8X8 & 1-10X10

Shift #2 1 shftr.-4 miners-4 helpers.
1 truck driver.
Trimming. Mucking. Drilling
Key.

Dec. 7-1932

Shift #1 - 3 miners-3 helpers
1-shftr. 6 men-1 truck driver.
Excavating Key.
Shot 20 caps-15# pwdr.
steel gang-6 men-placing steel, 4 hrs
Rigger-4 men-on Cement Gun.

Shift #2 1 shftr. 4 miners-4 helpers
1 truck driver.
1-17' post in place at 1+18
at Key.
Shot 40 delayers-25# pwdr.
60 feet steel form in place.

Dec. 8-1932.

Shift #1. 2 miners-5 helpers
1 truck driver.
Rigger & 3 men on Cement Gun.
1 post at of 56s.

Shift #2 No work.

Tunnel Dec. 8-1932
4 P.M. to 12 P.M.
Pipe open at 4:10 P.M.
Down 5-6 P.M. meal time
Water in mix cut to 36 gals. at 5 P.M.
Shifts changed at 10 P.M. except gun operater & Mix Foreman.
1 shftr. & 10 miners. & 1 carpenter.
30 Batches at 4 P.M.
108 " " 10 P.M.
Line Plugged at 10:05 P.M. to 11:20 P.M.

Dec. 9-1932.

Shift #1.

2 miners - 4 helpers.
Set 1-17' post at 0+56 north.
Trimming Walls.
Shot 20 caps in roof 15# pwdr.
Completed pouring 60'
section of Walls & Arch
at 11 A.M. to 1+94.

Shift #2 1 shftr. 4 miners - 5 helpers.
Shot 60 caps in Walls - 35#
Drilling. Mucking.

Dec. 10-1932.

Shift #1. 2 miners - 4 helpers.
Trimming.
4 men - 2 trucks - clearing Ent. Portal.
Concr. Foreman - 16 men moving
forms.

Dec. 11-1932.

-12-

-13-

-14-

No work, raining.
Tunnel flooded.

Dec. 15-1932

2miners-3helpers in Tunnel
mucking - 4hrs.
Drag Line clearing channel
below tunnel.
4carpenters - 2helpers building
Portal Entrance.
Gas Shovel-2trucks-1cat. 7men
repairing cofferdam.

Shift #2.
1stfltr. 12men - Drag Line
mucking.

Dec. 16 - 1932

3 carpenters - 3 helpers building Wall forms, starting at 6+88 toward O, southside.

2 men repairing belt conv. From center of belt discharge pulley to floor - 14' - abt 18" pulley

16 men - mucking & 1 cat. & 1 drag shovel.

Shift #2

1 shftr. 14 men, mucking.

Started pouring filler in south wall at 6+88 at 6 P.M.

Dec. 17 - 1932

Shift #1

2 miners - 4 helpers, moving steel forms & mucking.

3 carpenters - 3 helpers building filler forms.

8 men on Cement Gun, & Pipe.

Small dam built across Exit Portal & Direct connected Sinker Pump installed to pump water.

Shift #2

1 Shftr. - 11 men - moving forms.

Dec. 18-1932.

Shift #1.

1 Foreman - 7 men - moving forms.

Cement gang completed pouring South Filler Wall to Entrance Portal, except at Key.

Shift 2: - 1 shftr - 6 men. moving steel forms.

Started pouring a 58' section of Walls & arch at 11:45 P.M.

Dec. 19-1932.

Shift #1 - 1 shftr. 5 men working as concrete crew, & 1 carpenter.

2 finishers at Exit Portal.

3 carpenters - 4 helpers building Entrance Portal.

Shift #2 2 carpenters - 3 helpers at Entrance Portal at 5 P.M.

Mixing crew changed at 5:30 P.M.

No concrete from 4 to 6 P.M. adding to delivery pipe.

1 shftr. & 7 men, new gang at 7 P.M.

60 Batches to 4 P.M.

5 sk Cem

1340 Sand & 30-32 gal. Water
760 - 2 1/2"
970 - 1 1/2"
770 3/4"

} Mix for Filler Wall

Dec. 20-1932

Shift #1.

1 shftr. 7 men working as concrete gang.

2 finishers at Exit Portal.

Filler Wall forms along north Wall 6+88 to 0+0 ready for concrete.

Gas shovel #7 filling behind retaining wall, north side, Entrance Portal.

Shift #2.

60 batches 7:30 A.M. to 6 P.M.

5 to 6 P.M. meal time, no work.

3 carpenters - 2 helpers at Entrance Portal at 5 P.M.

~~39~~ Concrete crew of 7 men changed at 9:30 P.M.

Completed pour at 10:15 P.M.

39 batches since 6 P.M.

Dec. 21-1932

Shift #2 - 3 PM to 11 P.M.

1 foreman - 8 men chipping Invert & cleaning up.

1 shftr & 4 men, concrete gang at 3 P.M.

Gas Shovel #7 working at Entrance Portal & 1 truck.

3 carpenters - 2 helpers - on jumbo.

2 truck drivers changed at 11 P.M.

also mix gang of 4 men.

Completed filler wall at 11:30 P.M. with 93 batches.

Changed mix and started on Portal.

1 shftr. & 5 men at 11 P.M. changing Gun & chipping.

Also 1 shftr. 4 men on concrete at 11 P.M.

Dec. 22-1932.

Shift #1 - Working as concrete gang.
Shift #2 - " " " "
Shift #3 " " " "
Pouring Filler Wall to Height of Wall Plates. Entrance Portal completed to Spring Line. Cofferdam overflowing thru spillway & thru Tunnel. No work on steel forms, too much water.

Dec. 23 } Pouring Filler Walls.
Dec. 24 }
Dec. 25 No Work.
Dec. 26 } Pouring Walls and
Dec. 27 } Arch to 9+61

Dec. 28-1932

Shift #2. 1 shftr. 10 men cleaning up & excavating for east end of Key.
1 truck.
Shift. 1 shftr. 1 truck - 10 men. excavating East end of Key.
8 men on steel gang.
1 Carp foreman - 3 carps & 3 helpers on Tunnel Portal.
Shift #2 - 1 shftr. 10 men excavating at Key.
Shift #3 - 1 shftr. 7 men - finished pouring invert section of Key. Started excavating second Key.

Dec. 29-1932.

Shift #1. 1 shftr. 6 men moving forms. & 3 men cleaning up.
1 shftr. - 7 men - 1 truck driver - excavating west Key.
7 carpenters - 2 helpers building form at Entrance Portal.
Shift #2 - 1 shftr. 8 men - moving & cleaning steel forms.

Shift #3. 2 shftrs. 10 men moving & setting steel forms.

Dec. 30-1932.

Shift #1. 4 men laying air line - & 1 man cleaning up.
2 finishers on concrete.
1 shftr. - 6 men & 2 carpenters on steel forms.
1 shftr. - 9 men - 1 truck driver excavating west Key.
5 Carpenters - 2 helpers at Entrance Portal.
8 men on steel gang.
3 men injured by explosion of part of box of powder at 8:45 A.M.
Shift #2. 1 shftr. 8 men - 2 carpenters - setting forms. Started pouring concrete in Wall & Arch section at 8:30 P.M.
Shift #3 - Working as Concrete gang.

Dec. 31-1932

Shift #1. 1 shftr. 6 men - 1 truck driver excavating West Key.
8 men - steel gang.
1 shftr. - 3 men - Backfilling Tunnel #4
1 shftr. 8 men concrete gang.
1 Gun operator.
Shift #2. 1 shftr. 6 men - 1 truck driver excavating West Key.
1 shftr. 10 men moving forms.
Completed pouring concrete section 7+00 to 6+30 at 4:30 P.M.
Shift #3. 1 shftr. 9 men moving forms - 2 carpenters.

Jan. 1 - 1933.

Shift #1. - 1 shftr. 6 men setting forms.
7 men steel gang - placing steel.
Shift #2 - 1 shftr. 8 men - 2 carpenters.
Section of forms ready 6:30 to 5:7[illegible]
Started pouring concrete
at 4:20 P.M.
Shift #3. 1 shftr. 7 men - 2 carpen
ters - 1 helper, concrete gang.

Jan. 2 - 1933.

Shift #1. 1 shftr. 7 men - 1 carpenter.
working as concrete gang.
Finished pouring section at 12 N.
5 carpenters at Entrance Portal.
2 finishers on Tunnel lining.
Shift #2. 1 shftr. 11 men & 2 truck
drivers & 2 carpenters.
excavating West Key.

Shift #3.
1 shftr. - 4 men - 2 carpenters - 1 finisher
pouring concrete in West Key.
1 shftr. - 6 men moving forms.
Completed pouring at 5:30 A.M.

Jan. 3-1933

Tunnel 3 PM to 12 M.
Labor. 1 shftr. 2 men at Key
1 shftr. 5 men - 1 Gun operator
& 2 carpenters - concrete gang
4 men Mix crew, 3 truck drivers.
Meter reading 3 P.M. 63 batches
& 378 sx. cement.
Meter reading 11 P.M. 147 batches
84 batches this shift.
504 sx. cement.
Shift #3.
5+70 to 5+20.
Finished at 1 A.M.

Jan. 4-1933

3 P.M. to 11 PM.
Core Wall.
Started pouring on 2-30' sections at 3:15 P.M. Finished at 8:15 P.M.
Labor. 4 men - mixing plant.
1 Foreman - 5 men - 1 carpenter & 1 helper - Drag Line #10 operator & oiler. - 3 truck drivers.
33 batches — 231 sx. cement.
Tunnel - Shift #2.
2 men drilling at Key
1 shftr. - 7 men & 2 carpenters on forms.
Mixing crew to Tunnel at 8 P.M.

Jan. 5 - 1933.

Tunnel 3 P.M. to 11 P.M.
Labor. 1 shftr. - 10 men - 1 Gun operator - 1 carpenter & 2 truck drivers.
Continuing to pour concrete 5+20 to 4+70
138 batches at 4 P.M.
174 " at 7:50 P.M.
36 batches this shift
216 sx. cement
Completed pour at 7:50 PM

Jan 6 - 1933

3 PM to 11 PM
2 men at Key
1 shftr - 7 men & 6 carpenters & 2 finishers on forms.
99 batches on Portal at 6:30 P.M.

Jan. 7 - 1933.

12 Noon to 12 M.

Started pouring Tunnel section & Portal - 12:20 P.M.

Portal: 1 Foreman. 1 truck.
8 men - 2 carpenters - Drag Line #10 - operator & oiler.

Tunnel - 2 men at Key.
1 shftr - 6 men - 2 carpenters - 2 truck drivers - 1 Gun operator, on concrete gang.

4 men mixing crew.

Same mix to Tunnel & Portal.

Finished pouring Tunnel Section 4+05 to 4+70 at 2:10 A.M.

Jan. 8. 1933

Tunnel
Shift #2.

2 men from Mixer crew working on pipe line.

1 shftr. - 7 men moving & setting steel forms.

Section to pour 4+05 to 3+35

Jan. 9-1933

Shift #2.

1 shftr. - 6 men - 2 carpenters.
pouring Concrete in section
4+05 to 3+35. Started at
8:50 A.M.
Finished pour at 2:30 A.M.

Jan. 10-1933

Tunnel. 3 PM to 11 PM
Moving & setting forms.
Labor
1 shftr. 6 men - 2 carpenters
& 2 men from mixing crew.
2 carpenters chipping
timber
3 miners at East Key.
1 man cleaning mixer.
Form at 2+77± has clearance
of 4 3/4" at spring line on
north side & 5 1/2" at point #10.

Jan. 11-1933

Tunnel 3 P.M. to 11 P.M.
1 shftr. - 6 men - 1 Gun operator - 2 carpenters & 2 truck drivers.
3 miners excavating East Key.
Pouring concrete in Tunnel Lining.
Finished section 3+35 to 2+77 at 9:15 P.M.

Jan. 12-1933

Shift #2.
1 shftr. 6 men - + 4 men of mixing crew - moving & setting forms - from 2+77 to 2+17.
3 men excavating at East Key.
Started pouring this section at 8:15 P.M.

Jan. 13-1933
3 PM to 11 PM.
1 Shftr. 7 men moving & setting forms.
3 miners - 1 truck & driver excavating at East Key. Excavation here is now complete and when cleaned up is ready for the steel.

Jan. 14-1933
3 PM to 11 PM
1 Shftr - 7 men - concrete gang.
3 Miners - 2 carpenters - building form at East Keyway.
Continued to pour section 27 17 to 1+57.
Finished this section at 8:15 P.M. and started to pour behind the timbers in the East Key.

Jan. 15-1933

Tunnel 3PM to 11 P.M.
4 men, mixing crew
2 truck drivers.
1 shftr. 7 men pouring concrete & setting forms.
Started on Arch section of East Key at 3:30 P.M.
Cleaned 1150 sx.
72 batches at 11 P.M.
432 sx cement.

Jan. 16-1933.

3PM to 11 P.M.
1 shftr. 7 men - pouring concrete and setting forms.
Completed pouring section 1+27 to 1+57 at 6:30 P.M.

No work in Tunnel
Jan. 17 & Jan. 18 on
account of high water.
All equipment removed.

Jan. 19-1933.
3 P.M. to 11 P.M.

Feb. 15-1933

5 P.M. to 2 A.M.

Tunnel - No work.

Core Wall - 1 Portable Compressor 1 jackhammer - 1 man - working at south end.

Dump. 1 man on each dump.

Tailing Pond. 1 man on each monitor.

3✓
6✓
44
33
2
12

8✓
41✓
11✓
15✓

43
21
21
8
3
14
28
14
152✓

Feb. 21-1933

Core Wall - Shovel #10 - Runner & oiler - 1 truck & driver - 1 Foreman and 9 men.

Spillway - Shovel #11 - Runner & oiler
Shovel #7 - Runner & oiler.

Truck #3		#3	#15	#11	#2	#8	
		3	1	2	1	2	3
4 yds.		2	1	3	1	3	4
1	3	4	4	3	3	3	3
2	3	3	3	8 yds	3	3	18
4	3	2	3		2	3	
4	3 4	2	3	#12	4	4	28 yds ✓
1	43 ✓	3	2		14 ✓		
3		2	4	3		#13	
2		21 yds. ✓	21 yds ✓	3 yds ✓		2	
2						3	
3						3	
2						3	
4						3	
43 yds						14 yds	

Total 152 yds. using 10 trucks.

Core wall - 24 yds. rock

[illegible] to E Rock Emb. Thurston

Recorded [illegible] 347/59 + [illegible] 359/51

[illegible]

Feb. 22-1933- 5 P.M. to 2 A.M.

Spillway-Upper Bench-Shovel #7-Runner & oiler. - 4 trucks & drivers.

Lower Bench-Shovel #11-Runner & oiler- 4 trucks. & drivers

#7 Moved to Lower Bench at 7 P.M.

# 13	# 2	# 30	# 3	# 8	# 24
2 yds.	4	3	3	2	3
2	4	1	3	4	4
5	3	1	2	3	4
4	2	1	4		4
3	3	5		9 yds ✓	
	3		12 yds ✓		15 yds ✓
16 yds ✓	19 yds ✓	11 yds ✓			

Total 98 yds. rock, of which 75 yds. came from below surface. All rock sent to upstream dump.

Recorded roe 359/54 MTN

& above

# 18	# 20	
3		16
3		15
3		9
3		12
4		11
		19
		16
		98 ✓
16 yds ✓		

Core wall:- Shovel #10- Runner & oiler- 1 truck & driver.

1 Foreman- 9 men.

24 yds. rock extracted & placed on upstream dump.

Thurston.

Recorded roe 347/59 MTN

Feb. 23-1933

5 P.M. to 2 A.M.

Spillway. Shovel #7 - Runner & oiler on Upper Bench

Shovel #11 - Runner & oiler on Lower Bench.

Corewall: Shovel #10 - Runner & oiler. 1 truck & driver. 1 Foreman and 9 men.

Spillway - 7 trucks and drivers.

Spillway trucks & Yards.

#8	#13	#2	#20	#18	#14
3	4	3	2	5	4
4	4	4	5	3	4 ✓
2	3	4		2	
4	4	4	7 ✓	10 ✓	
5	5	4			
5	4	4			21 ✓
4	3	2			44 ✓
4	4	4			42 ✓
4	5	3			37 ✓
2	4	3			144 ✓
37 ✓	2	5			
	42 ✓	44 ✓			

Recorded 359/53. WWW

Total rock from Spillway 144 yds. of which 30 yds came from below surface.

Corewall - 22 yds. rock.

All rock placed on up-stream) dump. Thurston.

Recorded Vol 347/59 WWW

Feb. 24-1933

5 P.M. to 2 A.M.

Spillway - Shovel #11 - Runner & oiler: 3 trucks & drivers 1 Compressorman & 2 man drilling.

Corewall: Shovel #10 - Runner & oiler. 1 truck & driver. 1 Foreman - 7 men. Working at both ends of Wall.

#11 Shovel moved to Upper Bench at 7:30 P.M.

Shovel #10 moved to Spillway at 10:30 P.M.

#8	#2	#13
4	3	3
3	4	4
3	5	4
2	3	5
4	4	4
4		
	3	4
4	3	4
3	4	3
4	4	3
3	3	2
4	3	3
3	4	4
4	4	3
5	4	4
4	4	3
4	4	4
5	4	4
4	5	3
3	4	2
3	3	4
3	3	50 ✓
60 ✓	3	
	4	
	67 ✓	

Rock to upstream Dump (50-50)

20 ✓
19 ✓
20 ✓
59 ✓

#12
3
3
4
4
3
4
4
25 ✓

Rock to Downstream Dump.

25
50
67
60 ✓
202

Recorded true 359 / 53 ✓

Rock from Spillway 261 yds. of which 52 yds. came from below surface. 202 yds. went to downstream dump and 59 yds. to upstream. [illegible]

Feb. 25-1933.

5PM to 2A.M.

Core Wall- South End. 3men drilling grout holes.

North End. 1 Foreman- 5men mucking.

Shovel #10- Runner and oiler - 2trucks & drivers.- stripping S.E. quarter.

Spillway. Shovel #11- Runner and oiler- 3 trucks) and drivers.

#13	#4	#8
4	4	4
3	3	4
4	4	3
		2
11 ✓	11 ✓	13 ✓

38 cu yds

Recorded from report of RAT- 3-4-?

$\frac{357}{54}$

Feb. 26 - 1933 No Work.

Feb. 27 - 1933

5 P.M. to 2 A.M.

Spillway: #11 Shovel - Runner & oiler - repairing. #8 Shovel: Runner and oiler: 4 trucks & drivers. 2 men drilling.

Tower: Shovel #9 - Runner & oiler: 2 men drilling.

Corewall: South end: 4 men drilling grout holes. North end: 4 men mucking & drilling.

#20	#23	#24	#25
4	2	4	3
3	3	3	4
3		4	3
4		3	3
4		3	
		3	
18	5	20	13

56 with met

Recorded from RA Thurston Report in [illegible] $\frac{359}{54}$ [illegible]

Feb. 28 - 1933

Spillway: Lower Bench: Shovel #8
Runner & oiler - 3 trucks & drivers.
Upper Bench - Shovel #9
8 men - drilling & Clearing.
2 trucks & drivers.

Tower: Shovel #10 - Runner & oiler.

Core Wall: South. 3 men on Grout Holes.
North End. - 4 men - mucking

Spillway Road: Shovel #11 Runner & oiler.

Rock estimates for this and previou days are Solid measurement. Succeeding estimates will be loose or actual measurement.

Thurston

#3	#15	#20	#24	23	7/4 26
5	5	5	4	5	5
	6	4	5	4	4
	4	5	6	3	5
	5	5	5		
	6	5	5		
			6		
			5		
			5		
			4		
			6		

Recorded vol 35.9 .54½ [illegible]

13½ cu yds. gross measure

Mar. 1 - 1933

Finished pour at South End of Core Wall at 5:15 P.M. ← Wasted 1½ yds. concrete.

Total 68 batches concrete
1 batch grout.
481 sx. cement.

Tower: Shovel #11 - Runner and oiler. & 3 men,

Core Wall: 1 Foreman - 3 men. ← and 1 cat. and driver.
working north end.

Spillway: Shovel #9 - Runner and oiler - casting.

Spillway: East Road. Shovel #11 - Runner & oiler.
No trucks working.

Mar. 2 - 1933.

Core Wall - North End. 1 Foreman
3 men: Mucking.
Spillway: East Road: Shovel #11 -
Runner & Oiler - Casting.
Upper Bench: Shovel #8 - Runner
& oiler. 3 trucks & drivers.
Tower: Shovel #10; Runner & oiler.
1 Shftr. - 2 men mucking &
2 carpenters.

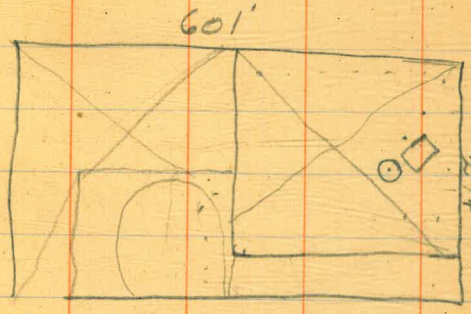
Loose estimate

#	#	#
24	15	20
4	5	5
5	5	4
5	5	4
4	5	6
5	4	4
4	5	5
5	4	6
5	4	5
5	5	5
47	47	48

137 cu yds Recorded

359
55
304

	1	2	3	4	5	6	7	8	9	10	11
5+54											
4+64											
4+72 ✓	0	0	1.0	1.6	2.0	1.4	0	0	0	0	0
4+80 ✓	Nothing.										
5+47 ✓	Nothing.										
5+39 ✓	Nothing.										
4+88 ✓	0	0	0	~~0.8~~	~~2.0~~	~~2.3~~	0	0	0	0	0
4+96 ✓	0	0	0	0.8	2.0	2.3	2.0	1.5	0	1.8	0
5+31 ✓	Nothing.										
5+23 ✓	0	0	4.0	2.5	1.3	2.3	0.5	1.3	2.0	2.0	0
5+15 ✓	0	0.5	0.5	1.0	1.5	1.8	0.8	0.5	1.0	2.0	0
5+07 ✓	0	0.5	0.5	1.3	1.4	2.0	0.6	1.1	1.4	2.2	0
5+28	same as 5+31										
5+34	"	"	"								



4568 Orange.

Calculation of Earthwork.

Width	HEIGHT														
	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 ½ the roadbed =w, add the triangles formed by taking the distance out to each break in turn (=w's) by the difference between the cuts (or fills) on each side of it (=h's) always subtracting the outer from the inner.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1½.

For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
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)÷2 or 2 ft. added to 41.9 =43.9. For slopes of 1 on 1 see inside of front cover.

Made in Germany.