

W  
379

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1.

For Single Track Embankment.

27

379

146  
30

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 1½ see inside of back cover.

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146  
59  
87  
100  
18  
100  
46  
78  
28  
12  
18  
27  
16  
13



Sept. 27-1932

NO concrete pouring to-day.

4 men excavating to-day in Sect. F.  
Top lift for finishMIXER man at mixing plant  
making repairs

- 4 Carpenters } Forms and tile
- 1 Carpenter helper } On center drain
- 1 man wetting concrete
- 1 steel man } stripping forms on
- 2 helpers } downstream toe wall
- 1 Carpenter foreman } Downstream
- 6 Carpenters helpers } toe wall forms
- 1 man patching concrete
- 1 steel man on tie wires for forms
- 1 Carpenter - Sawyer at shop
- 1 man oiling forms
- 1 Dragline operator } Repairing
- 1 " " oiler } Dragline

Sept. 28 - 1932

Downstream toe wall

Sect. B - 2490 to 3460 100-yds

Elev. 563° to 567°

7: AM - to 10:15

Section A - 3460 to 4103 108-yds

Elev. 553° to 558°

10:15 AM - to 1:15

Sect. D - 1410 to 2400 62-yds

Elev. 572° to 575°

1:30 P.M. - to 4:20 P.M.

226 batches  
1130 - Sacks of Cement

- 1. Gen. foreman
- 1. Carp. foreman { Downstream toe wall
- 3. Carpenters { Forms.
- 1. helper
- 6. Carpenters { Forms for
- 3. helpers { Center drain
- 1. Man finishing & patching concrete
- 1. man stripping forms
- 1. Steel man on tie wires
- 1. Conc. foreman
- 2. men placing conc.
- 1. man on dragline (operator)
- 1. " " " " oiler
- 7. men in mixing plant
- 3. Transit mix truck drivers

3650 Sks. Cleared  
29. Sacks recovered.

At 7:20 AM concrete started to come

considerably oversanded, I started to plant to investigate and was notified by a Transit mix driver that Mr. Anderson the mixer man wanted to see me as soon as possible. Mr. Anderson told me that for some reason the concrete looked too sandy and the water added jumped from 28-gals. to 33-gals. Investigation showed that a truck load of sand had been dumped in the 1 1/2" stone bin. I took out 200# sand and added 200# 3/4" stone for 8-batches and changed back to original mix which was satisfactory from that time.

At 8:20 I called Mr. Hassell, reinforcing steel man back to sect. A. to readjust some of the bars so that the hooked bars fit snugly against horizontal anchor bars.

Mr. Ellison asked me at 10:25 to see Mr. Wood and ask him to see Mr. Ellison about construction of drain walls. Saw Mr. Wood at 10:35, he said he would see Mr. Ellison a "little bit" later.



(4)

Blasting for Tunnel portal  
 structure knocked forms in section  
 "A" out of position and carpenters worked  
 two hours repairing forms.

Mr. Ellison said he planned to  
 pour drains to spring of the arch  
 and then have carpenters follow  
 up with arch forms, also steel man,  
 and then follow up after finishing  
 walls and pour arch. Mr. Wood  
 said this method would be O.K. 11:30 AM

(5)

337-Bundles

50  
 16850 Sacks sent to mill { Sept.  
 26.-

Night shift - Core Wall

1-foreman  
 3-Jackhammer men { 2-on tunnel  
 1-powder man  
 2-muckers on east end of tunnel  
 1-drag line oper.  
 1- " " " oiler  
 1-Truck driver  
 11-muckers  
 1-night pump man

(6)

Sept. 29. 1932.

Sect. C. 2+00 to 2+90 (Down stream  
to wall)  
568' - 572'  
Start 7:45 AM. Finish 10:30

Center Drain full length  
Elev. to Elev.  
Poured to const. joint shown on plans  
1:2:4 concrete  
12:30 P.M. to 3:10 P.M.

1 - Gen. foreman  
1 - Carp. foreman  
8 - Carpenters  
1 - Carpenter - 4 1/2 hrs.  
4 - Carp. helpers - 8 hrs.  
2 - Carp. helper - 4 1/2 hrs.  
1 - man cleaning conc.  
1 - man sprinkling conc.  
1 - man patching conc. 4 1/2 hrs.  
1 - conc. foreman  
2 - men placing conc. 4 hrs.  
6 - men placing Conc. 8 1/2 hrs.  
1 - man dumping trucks  
2 - Truck drivers - 8 hrs.  
1 - Truck driver - 5 hrs.  
4 - dragline operator  
1 - " " oiler  
2 - steel men  
7 - men concrete plant.

(7)

1-man oiling forms 4 1/2 hrs

R. W. Carter  
Conc. Inspector

1:2 1/2 5- { 93 - Batches  
1390# Sand } 465 - Sacks Cement  
760# 2 1/2" Stone  
970# 1 1/2" Stone { 28 - gallons.  
770# 3/4" Stone } 10 - Extra yds. to Quarry  
1 - set of three cylinders taken  
at 8:10 AM - from section C.  
Sta - 2+50 - Elev - 570'  
1:2 1/2 5 - MIX - 28 - gallons water

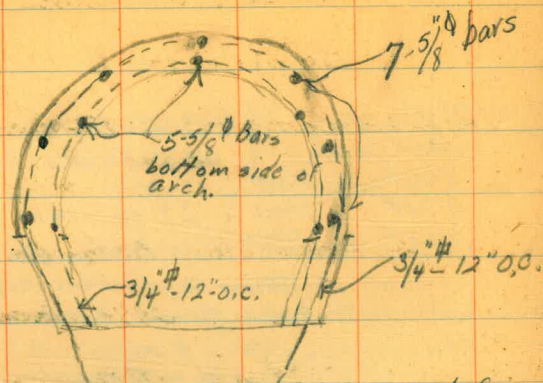
1:2:4 -  
6 - Sks. Cement { 27 - Gallons water  
1220 # Sand } 54 - Batches  
1370 # 1 1/2" Rock } 324 - Sacks  
1030 # 3/4" Rock } (2 1/2 yds. to Quarry)  
15 - Sacks

Cylinders taken from drain # 2  
in sect. from floor to const. joint  
1:15 P.M. 1:2:4 conc.  
water

All carpenters + helpers worked on  
forms until 11:30 AM (drain # 2) then went to  
ice wall forms P.M.  
1 - batch wasted (1 - curd) bucked acc. dumped



Sept. 29. Continued.



Section of Drain NO-2 before pouring concrete.

Tile not shown.

Two rows of tile (4"x12") on each side - Top row each side - 101-drain holes (2 tile to hole). Bottom row - 100-holes (2-tile to hole)

9-drain holes on East End - (2-tile to hole)

Total tile used -

822-pieces - 4"x12" Clay drain tile.

### Summary of Concrete

used - Sept. 29 -

1:2 1/2 : 5 - Concrete - 93-batches

465-sacks of cement

1:2 : 4 - concrete 51 1/2 - batches

309 - Sacks of Cement

Total 774 - sacks -

			Cement
10-batches	1:2 1/2 : 5	}	50-sacks
2 1/2 "	1:2 : 4		9-sacks

Total 59-sacks

} Sent to Quarry for  
Company's garage  
Floor.

4400 sack Cleaned  
25-sacks of Cement Recovered

(20)

Sept. 30- 1932

Downstream Toe Wall

Sect. F- 0+30 to 0-26  
Elev. 567<sup>0</sup> to Elev 571<sup>0</sup>  
0-26 to 0-60 120 yds.  
Elev. 566<sup>0</sup> to 575<sup>0</sup>

7:45 AM to 10:30 - 11:30 to 12:30

Drain NO-2. ARCH and well to

top of Arch section of Drain

12:30 PM - to 4:20

Labor:  
1- Conforeman  
1- Conc. foreman  
2- carp. helpers placing Conc. 3-hrs  
2- Lab. from Core Wall 1. & 8-hr  
2- men placing Conc. regular crew  
1- Dragline opgr.  
1- " " siter  
2- Transit mix trucks drivers  
1- " " " 3 1/2 hrs  
1- man wetting Conc.  
1- man finishing Conc. { also stripping  
7 men in mixing plant { forms - Toe  
Wall  
1- Carpenter at shop.  
1- Carpenter foreman  
8- Carpenters  
4- helpers  
2- men - stripping forms.

(21)

R. W. Carter  
Inspector  
Sacks

1:2 1/2: 5 - 114 Batches

570 Sacks

1:2:4 - 66 Batches 396

2300 - sack Cleaned

34 - sacks recovered.



(12)

Oct - 1<sup>st</sup> weather - Clear

No concrete to-day

1- Steel foreman	Upstream Tunnel
1- Steel man	
3- helpers	Portal Structure

1- Carpenter's stripping forms	Inside Drain #2
1- Laborer	
1- man patching concrete	Dis. Tow wall
1- man sprinkling concrete	
1- Carp. foreman	
8- Carpenters	5- helpers
5- helpers	

Concrete inside Drain NO. 2 - was honeycombed in many places due to possibly two things: (1) Concrete was placed with 3/4 yd. drop bucket which deposited too much concrete in one place to be properly tamped (2) Grout should have been used before pouring concrete.

MR. Wood gave inspector permission to use grout when pouring Drains No. 1 & 3

(13)

Inspector took Mr. Wood to inspect forms in Sect. A - Elev. 508, which were left as ready to pour. Forms in opinion of Inspector not acceptable.

After Mr. Wood saw the work he ordered the forms for two panels to be removed and replaced with acceptable forms. Also MR. Wood told MR. Ellison to use rods instead of wires from now on to support forms, according to specifications.

Oct. 3-1932-

## Downstream Tie Wall-

Sect. A- Sta. 3+60 to 4+03

Elev. 558' to 563'

7: AM. to 9:10 AM.

70-cu/yd

Sect. B- 2+90 to 3+60

Elev. 567' to 571'

9:10 AM to 11:30 AM

70-cu/yd

Sect. F- 0+30 to 0+26

Elev. 571' to 575'

Start- 1:35 PM. Finish 3:30 PM.

38-cu/yd

- 1- Gen. foreman
- 1- Conc. foreman
- 2- men placing Conc.
- 1- Dragline Oper.
- 1- " " oiler
- 3- Transit mix Truck drivers
- 7- men in mixing plant
- 1- man wetting Conc.
- 1- man dressing Conc.
- 1- Carp. foreman
- 7- Carpenters
- 4- " " helpers
- 1- man oiling forms.
- 2- steel men { Bending steel on
- 2- helpers { Entrance Portal structure

5 Sacks Cement - for finisher

177 Batches { 1:2½:5 Mix  
885 Sacks { 28 Gallons H<sub>2</sub>O

3850 Sacks cleaned-

26- Sacks recovered (cement)

Drain #2 was badly honeycombed on outside. MR. Newcomb + Inspector outlined methods of pouring drains. NO- 1 + 3 to MR. Ellison and he said he would pour by direction of the inspector.

MR. Weed told inspector at 5 AM that he would come out to job early Tuesday + inspect drain NO-2 to make recommendations for patching





18  
Oct. 5-1932.

No concrete to-day

- 1 Carpenter foreman
- 9 carpenters (1 was fired at noon)
- 5 Helpers (+ 4 1/2 hrs)
- 7 men { stripping forms, cleanup, covering  
drain NO. 2 with Burlap
- 1 carp. sawyer at shop 1/2 day - on Drain NO. 3 1/2 day
- 1 man wetting concrete.
- 1 man patching { Drain NO. 2
- 1 helper

- 1- Steel foreman { steel for
- 1- steel man { drain NO. 3
- 4- helpers

- 1- drag line operators { stripping
- 1- " " " { overburden
- 2- TRUCK DRIVERS { North End of  
D. S. Toe Wall

19  
MR. NEWCOMB spoke to MR. Wells

about covering drains with burlap,  
which was done at 10: AM. using  
celite sacks.

Inspector obtained two more  
samples of sand for analysis.

5- sacks of cement used by  
cement finisher on sides of  
drain NO. 2



Thursday - Oct. 6-

Pouring concrete as follows:

Sect. C - 2+00 to 2+90  
Elev. 572' to 575'  
7:30 A.M. to 10:50 A.M.

50-cu yds

} 1 1/2 cu yds

Section A - 3+60 to 4+03  
Elev. 563 to 567.5  
11 A.M. to 2 P.M.

} Modified  
5-8%  
1400# sand  
760 - 2 1/2  
770 - 1 1/2  
3/4

Drain No. 3 - Top of footings outside spring  
of arch. (const. joint)  
3:20 P.M. to 9:0 P.M.

- 1 - Con. foreman
- 1 - Conc. foreman
- 3 - men placing conc.
- 3 - Transit mix truck drivers
- 1 - Dragline Operator
- 1 - " " oiler
- 6 men in mixing plant
- 1 - Cement Finisher
- 1 - man sprinkling conc.

- 1 - Carp. foreman
- 8 - Carpenters
- 3 - " helpers
- 1 - steel foreman
- 1 - steel man
- 2 - " helpers

MR. Wood told me at 9: A.M. to make necessary adjustments in the field mix to insure workable concrete that would give the required results. He said "We have you on the job to see that the city gets concrete as required, and you go ahead and make adjustments in the mix as required. The mix as designed is theoretical and can be adjusted by you & Mr. Newcomb to practical use". MR. Wood said he would see Mr. Newcomb and advise him of this decision. He said O.K. to use great. 1-sack cement - 1038# sand, where required in the opinion of the inspector.

(22)

1-Set of 3 Test Cylinders taken  
at 1:10 P.M. - Sect A- 3+60 to 4+02

Elev<sup>n</sup> 565<sup>±</sup> 1.

1:2½:5 mix modified to

5-Sks cement

140# sand

760# 2½" stone

900# 1½" stone

770# ¾" stone

31-gals.

Modified the mix at 12:30 P.M.

10-extra men were sent over  
from Core wall excav at 5:30  
and relieved regular conc.  
crewx. to 9: P.M.

After 5:45 a floodlight was  
used but did not give sufficient  
light to enable the men to  
see clearly to tamp

(23)

3200 SKs cleaned

16 - SKs. recovered. bin not  
cleaned.

Test

1-Set - 3 cylinders taken at 8:45 P.M.

6-Sks Cement

1320# Sand

1:2:4 Mix { 1220# 1½" stone

Modified { 1030# ¾" stone

31-gals. water

GROUT - 5-Sks cement

1040# Sand

28-gals. water

1:2½-5 - 105 Batches - 525-Sks.

1:2:4 - 64 Batches 384 SK

11 Batches. Grout - 55-Sks.



(24)

FRIDAY Oct. 7.

- 1-Carp. foreman
- 7-Carpenters
- 4-helpers
- 1-Carp. Sawyer
- 1-man setting conc.
- 1-Cement Finisher
- 1-man oiling forms
- 2-Steel men
- 1-Con. foreman
- 1-Conc. foreman
- 5-men placing conc.
- 1-man dumping from trucks to chute -
- 3-Transit mix truck drivers
- 7-men at mixing plant,
- 2-men cleaning floor of Core wall trench.
- 2-carp. helper came on concrete at 11 P.M.
- 2-extra men came on concrete at 2:30 P.M. to spread & tramp.

Drain No. 3  
 Roof and Foot  
 A+B- Toe Wall  
 4-Carp. 6-hrs  
 bulkheads - Core wall.

(25)

MIX:

- 7-sks. Cement (MR. Woods orders.)
- 1370# sand
- 1220# 1 1/2 stone.
- 1030# 3/4 " "
- 4# Cellite (Contractors orders.)

Core Wall - Sta. ~~3480~~ <sup>50</sup> to Sta. ~~3645~~ <sup>50</sup>  
 Elev. ~~501~~ <sup>501</sup> to Elev. ~~511~~ <sup>511</sup>

Start - 12:30 P.M. 2:1 A.M.

262-Batches  
 16-Batches GROUT 1834 SKS.  
 80-SKS

MR. Wood and MR. Newcomb inspected at pour - Carter at plant.

Concrete crew did not come on duty until 12:30 P.M.

MR. Newcomb and Mr. Converse made inspection before pouring to locate & chart necessary places for grout holes. A.M.

Stopped for supper 4:30 to 6:00 P.M.

170 ft. Copper



Sat. Oct. 8<sup>th</sup>

Poured concrete in Arch section of  
 Drain No. 3 - including well to top of  
 drain arch section. - 8:15 AM to 12:30 P.M.  
 No time out for lunch

1<sup>st</sup> 1/4 - dragline  
 1 mixing plant (mixer)  
 2 - TRANSIT MIX TRUCKS

1 - Gen. foreman  
 1 - Dragline Oper.  
 1 - " " oiler

1 - Concrete foreman  
 2 men in mixing plant  
 8 - Concrete tamers  
 2 - Steel men East Portal  
 3 - helpers  
 2 - men driving transit mix trucks

1 - Carp. foreman  
 8 - Carpenters  
 3 - helpers  
 1 - cement finisher  
 1 - Carp. Sawyer at shop -

## TILE

South side - Top row - 106  
 " " Bottom row - 105  
 North side Top row - 105  
 " " Bottom - 105  
 East End 9

430  
 x 2  
 860 - Tile

Forms broke loose on east  
<sup>both sides at bottom</sup>  
 end for about 15 ft. I called  
 the carpenter crew back to  
 anchor forms more securely before  
 going further with the pouring  
 9: AM.

10:15 AM - called carpenters back  
 again to securely fasten top of  
 arch section forms which started to  
 spread when last of three lifts  
 through was being placed.

1:2:4 - MIX

6 75 Sacks Cement  
 1320# Sand  
 1220# 1 1/2" gravel  
 1080# 3/4" gravel  
 32 - gals. H<sub>2</sub>O  
 4# Celite

1:2:4

GROUT

49

~~62~~ Batches

11

GROUT.

5 - Sks. Cement  
 1040# Sand  
 26 - Gals H<sub>2</sub>O

29#

Sacks of Cement - 322

35

All of concrete crew laid off at 12:30  
 P.M. until Tuesday.  
 All Carpenters laid off until Monday  
 11:30 AM



MONDAY-OCT 10-1932

NO Equipment: NO-CONCRETE

1- steel foreman } Steel for entrance  
1- steel man }  
3- helpers } Portal structure.

1- Carp. foreman } Entrance portal  
2 Carpenters } structure-forms  
0 helpers }

5 Carpenters } stripping forms Drain  
3- helpers } NO-3 and building  
forms for Drain NO-1

1-carp. Sawyer at shop

1-Cement finisher } Patching concrete

1-man wetting concrete

1-man making cement blocks  
for reinforcing steel

6-5ks. Cement used to date - 1600 BFs.

Flood water entered the  
tunnel at 3:P.M.

22-men + 4-trucks worked  
1 bulldozer  
1 motor

from 12:30 to 1:30 to remove  
all steel, forms, form lumber  
and timber from tunnel portal  
because of notice of flood.

Moved mixing plant pumps &  
pump house

2:P.M. All men, carpenters &  
helpers removed all form work  
and forms from site of Drain NO-1  
and To a Wall on account of  
impending flood. Drain tile and  
reinforcing steel also removed from  
site.

1:P.M. I told MR. Ellison that about  
60-sacks of cement had been ruined  
by leaving east end of cement store  
house open and exposed to weather.  
I suggested that the end of the storehouse  
be made weather tight

(30)

Weather Clear.

Tuesday - Oct. 11 -

Mr. Wood told me at 8: A.M. to  
take the day off to make up for  
some of the overtime I had  
worked. Mr. Newcomb looked  
after reporting on all men at  
work on pumps, trucks and  
general work in connection with  
the unwatering of working areas  
after the flood.

(31)



Wednesday Oct. 12

3 men - 3 hrs. installing pump

downstream toe wall.

1 man wetting concrete D.S. Toe Wall  
and drains

I spent the day inspecting

the pump installations. MR.

Thurston made report on all

men at work

(34)

weather Clear

Thursday Oct. 13-1932

1-Cement Finisher { Patching concrete  
Drain No. 3

1 man wetting concrete.

1- steel man { getting steel ready for  
1- helper { outlet portalFROM 11:AM { 1- Gen. foreman  
1- Carp. foreman  
2- Carpenters

5 men cleaning grout pipe holes

Sta. 3560 to 3640 - inspection

of grout holes - 11 AM to 3 P.M.

6 men from middle Core started helping  
to place concrete Chutes at 3 P.M.

(35)

MR. Hassell asked me to see the  
surveyors and have them check up  
excav. for outlet portal structure  
At 1 P.M. MR. Wood came to Core wall  
and told me that State Inspector would  
be ready for inspection from Sta. 3635  
to 3778 at 2:30 P.M. I told the excavation

foreman and he took steps to see  
that the trench would be cleared ready  
for the inspection.

MR. Converse came on job at 1:05 to  
measure depth of grout holes.

MR. Ellison said he expected to pour  
from 3760 to 4655 to about a 14 ft  
depth tomorrow. I informed him that  
the laitance must all be removed.

The State Inspector was out with MR.  
Savage & MR. Wood to inspect Core-Wall Exc.  
128' sta- 3650 to 3778 - accepted as  
excav. completed.



(16)

Night shift.

puddle  
conc. EXCAV.

- 1- foreman
- 1- #11- Dragline oper.
- 1- " " " boiler
- 3- drillers
- 5- muckers
- 1- truck driver

Groat holes

- 1- foreman
- 6- drillers
- 4- men on pump, <sup>downstream</sup> dyke and outlet tunnel portal excav.

(37)

(38)

Weather Clear.

FRIDAY OCT-14-

Puddle Core-

10:40 A.M. to 5:15 P.M.

525' to 516' <sup>365</sup> ~~509~~ <sup>3760</sup> ~~516~~ <sup>519</sup>  
 502

1-Cement finisher } marking grout pipe-  
 1-helper } Assembly

1-Carp. foreman } 6:40 A.M. to  
 2-Carp. } Bldg chutes-puddle core  
 2 helpers }

1-Rigger & helper - 1 1/2-hrs } Rigging pipe  
 for pump jump  
 later removed  
 for bulkhead.

1-Concrete foreman

4 men spreading conc.

3-Transit mix drivers

7 men in mixing plant

2 mandumping conc. from trucks to chutes

3-Carpenters } Night shift 2:30 A.M. to

2-laborers } 11:30 A.M. chutes &amp; bulkheads

1-steel man } steel for outlet Portal - 4 1/2 hrs

1-helper } Concrete Co. Wall

(39)

140-Batches Conc 980 SKS.

6-GROUT — 30-SKS

NO SKS Cleaned

MR. WOOD TOLD ME THAT IT WOULD NOT  
 be necessary to roughen vertical expansion  
 joints for bond

MR. Newcomb worked from 10:30 A.M. to

1:00 P.M. seeing that rock floor was  
 thoroughly cleaned before pouring.

3-Test Cylinders taken at 5:10 P.M.

7-sacks Cement

1220# Sand

1300# - 1 1/2"

1100# - 3/4"

4# Celite

34 gals #20

3/4" gravel sandy  
 necessitating a change  
 1/2 mix

Remarks Continued - next page.



Oct 14-

(40)

At 5:20 as the concrete pouring was finished MR. Newcomb and I walked over to part of Core wall where the men were setting grout pipes, we watched the methods being used, which were not according to Mr. Woods' instructions. Several grout holes were blown out with air and left open to accumulate more water + mud. Mr. Newcomb spoke to the foreman of the crew telling him that the work was not satisfactory, when MR. Ellison, Gen foreman came up and instructed the foreman as his crew listened, on Mr. Woods' instructions. Mr. Ellison said he would do the work right if he had to do it himself. The foreman told Mr. Ellison & Mr. Newcomb that he was

(41)

doing the work as per instructions and pointed to Mr. Wells standing a short distance away, suggesting that he be consulted. MR. Newcomb went to MR. Wells and returned just as the workmen were preparing to set a grout pipe after cleaning the hole. Mr. Newcomb said, looking at MR. Wells "That hole is not satisfactory," Mr. Wells answered "Whats wrong with it?" Newcomb "the hole is not clean" Mr. Wells "You get off the job + stay off, and quit giving my men instructions" Newcomb "Im not giving your men instructions, Im talking to you," Wells, "get out of here before I come over there and knock you out." Newcomb "You try it, come on" Wells "you damned



inspectors are always  
 meddling into our affairs, you  
 stay away and we'll get the  
 work done our way. Well's  
 "Blow the S. B. out again,"  
 then the workmen put a  
 burlap around the hole & blew  
 it out again, leaving the burlap  
<sup>around</sup> ~~the hole~~ <sup>to</sup> prevent dirt & water from  
 entering the hole. Well's to  
 Newcomb "Get down there and  
 see if it's O.K." Newcomb "I  
 can tell from here and if you  
 do as I say you can be sure  
 that you will not have to  
 do your work over again."

I left at this point, leaving  
 Mr. Newcomb to continue his  
 inspection.



(44)

Weather Clear

SAT. OCT-15-1932

Core Wall - sta. 3640 to 3560

Elev. 5095 to 5220

2<sup>50</sup> P.M. to 11:30 P.M.Delay - from 5 P.M. to 6<sup>10</sup> removing  
shoring.

1 man - 1/2 hrs - brazing copper

1 - Carp. foreman retimbering Core  
6 - Carpenters } wall trench-  
5 helpers }1 - Cement finisher { stripping forms  
drain NO. 3 and  
finishing same1 - man wetting concrete { also helping  
cement finisher

1 - Rigger

1 - Mechanic (mixerman) { installing 30" pipe around  
pump in Core Wall Sump.3 - men from  
grout hole drill  
crew1 - steel man getting steel out for  
1 - helper } tunnel outlet structure  
5 hrs. on concrete Core Wall  
hrs

1 - Concrete foreman

4 - men placing conc.

7 - men in cont. plant

3 - Transit mix truck drivers

(45)

Relieved  
and  
with  
8 hrs1 - man - 4<sup>10</sup> P.M. } Dumping Conc.  
1 - man - 4<sup>20</sup> " }  
2 - men from tunnel to mixing plant  
at 4 P.M. to 11:30 P.M.

SKS.

198 Batches 1386  
GRout - 6 - B. 30  
1416

7 SKS - Cement

1370 # Sand

1220 # 1 1/2" gravel

1030 # 3/4" - gravel

16 - steel grout pipes in  
place before pouring.

Copper stops placed.

(46)

NIGHT shift - Paddle Core

Excav.

1-foreman

1-shovel runner

1- " oiler

9-muckers {3-on tunnel

3-jackhammer men

1-powder man

1-truck driver

This crew spent about half the  
shift on cleaning out core wall  
trench for pouring concrete

(47)



(48)  
Sunday - Oct-16

Core Wall

Sta- <sup>475</sup> 3645 to 3655 - Bedrock to  
Elev 509E - 522 - 1:30:1:45  
Sta. 3480 to 3560  
1:45 to 10: P.M.

1- Gen. Foreman

5- men on grout pipe

1- Carpenter Foreman } Core Wall

2- Carpenters

3- helpers

1- steel man helping

3- Carpenters ( 2:30 AM to 11:30 AM

1- helper } Core Wall

1- Conc. Foreman

4- men placing Conc.

7- men concrete plant

3- Transit mix truck drivers

1- man dumping from trucks  
From - 11:30

1- man wetting concrete and doing  
general helping

4- men stripping timbers Core Wall  
start - 3:00 P.M.

(49)  
2:45 P.M. - Concrete started coming  
oversawbed. Investigation at mixing  
plant showed load of 1 1/2 gravel had  
been dumped in sand bin. The  
mixer man adjusted the  
proportions and when the gravel  
was used up, forgot to change  
back to the original mix.

Concrete Batches - 219 = 1533

Grout - " 5 25

1558

(50)

N  
↑

GROUT HOLES.

Bulk Concrete - Sta 3560

x-31°

32°

o-27°

33°

o-14° ← connected  
o-14° TWO GROUT PIPES  
o-70°

28°

x-30°

connected

32°

↓  
x-29°

27°

o-33°

33°

o Drill hole in  
o-33°

28°

Sta-3480

missing  
(x)

o-32°

I inspected the cleaning of these holes  
and placing of grout pipes - 8:AM to  
2:15 P.M. - Sunday Oct. 16 -

(51)



(52)

Partly  
Weather Cloudy

MONDAY OCT. 17.

Shift - 6: P.M. to

Core Wall - 3:560 to 3640

Elev. 522° to 528°

6: P.M. to 12:15 A.M.

3- Transit mix trucks.

1- mixing plant.

1- Gen. Foreman

1- Conc. Foreman

4- men spreading concrete

2- men dumping concrete from  
truck to chute.

3- Transit mix truck drivers

7- men in mixing plant

6- men drilling grout holes.

3: P.M. to 11: P.M.

6- men - 11: P.M. to 7: A.M.

(53)

92- Batches concrete 644

4- " GRout 20

664 SKS

I did not get the day shift  
crew because I did not go on duty  
until 6: P.M.

stopped pouring concrete at  
8:45 P.M. to <sup>10:45</sup> remove timbers

All the concrete crew except  
2- men worked on erection of steel  
from 1: A.M. to 3: A.M. The other two  
remained at mixing plant cleaning SKS.

Night shift Core Wall EXC.

1- Foreman

1- dragline op.

1- " " oiler

3- jackhammer men

1- powder man

1- truck driver

6- muckers

This crew 1/2 shift  
on pipe line

weather clear

Tuesday Oct-18-

Pouring concrete in Core Wall

Sta-3480 to 3560-

Elev. 522' to 528'

6: P.M. to 11: P.M.

## Equipment:

- 1-concrete mixing plant
- 3-Transit mix trucks
- Acetylene welding outfit
- 4-truck. 1 1/2-hrs.

## LABOR:

- 1-Gen. Foreman
- 1-Core Foreman
- 4-men placing conc.
- 3-Transit mix drivers
- 7-men at mixing plant
- 2-men dumping concrete from trucks.

6-men drilling grout hole  
 Sta. 3655 to 3768  
 3: P.M. to 11: P.M. (swing shift)  
 6-men - 11: P.M. to 7: A.M. (graveyard shift)

Concrete Crew except two men left at plant to clean

Sacks and two men <sup>who</sup> went back to core wall excav. crew at 12:30 A.M. worked until 3 A.M. getting chutes and shoring ready in section from sta. 3655 to 3770.

I came on job at 5:30 P.M. and inspected the area to pour and found ok. except copper needed to be brazed and some laitance had to be removed, both of which was done.

MR. Harper was on duty with me during this shift except for a short while when he was taking quarry data.

Changed mix at 7:45 after 48 batches had been run

49 Batches	{	1220 # sand	48	{	11370 # sand
		1300 # 1 1/2"			1220 # 1 1/2"
		1100 # 3/4"			1030 # 3/4"
		7-sks			35-gals.
		34-gals.			

Continued -  
Next Page



4-batches wasted.  
 so much mixed at  
 finish of pour  
 \* included in above

Total Batches - 97- (Sacks) - 679

Great. 4-batches (with 7-sks) 22

Cement Total 701

2250 Sacks Cleaned.

12 sacks Cement recovered.

Remarks: Mix was changed because  
 3/4" gravel contained much sand  
 and the mix was oversanded until  
 the change in mix was made.

Night Cove Wall Crew Excavation.

5: P.M. to 2: A.M.

1-foreman

1- dragline operator

1- " " oiler

1- truck driver

7- muckers

3- Jack hammer men 4-hrs. outlet

1- powderman

5- muckers { outlet Portal structure

{ Excav.

1- #11- Drag line  
 2- Dump Trucks  
 3- Jackhammers

Wednesday - Oct 19

4:00 P.M. - To 3:00 A.M.

	To
3656 to 3640 - Elev	520
3656 to 3680 - Elev	522
3680 to 3704 - "	524
3704 to 3728 - "	526
3728 to 3752 - "	528
3752 to 3762 - "	530

To elevations shown  
in book #382 - Oct. 20  
To bottom of steps

4:45 P.M. - Oct. 19 to

Equipment:  
1 - concrete mixing plant  
3 - Transit mix trucks

Labor:  
1 - Gen. Foreman  
1 - Exc. Foreman  
7 - men at mixing plant  
4 - men spreading concrete  
2 - men dumping concrete  
From truck to chutes  
3 - Transit mix truck drivers

At 1:30 A.M. 16 men from  
Core wall excav. crew relieved  
the regular concrete crew

I came to the job and inspected,  
with Mr. Newcomb, the area to be  
poured and inspected the work of  
brazing copper water stops also had  
a hole repaired by brazing.

A. 7:15 a truck driver was  
killed near Flagman's station, I  
authorized the use of city car to  
take the man to Drs. office.

7:50 P.M. shutdown on pouring  
concrete while timbers were taken  
out and pump jump 30" pipe  
extension was added - started  
concreting again at 9:30 P.M.



1 set of 3-tust cylinders  
at 7:30 P.M.

# 169  
170  
171.

7-54s. Cement  
1220# Sand  
1300 # 1 1/2" gravel  
1100 # 3/4" gravel  
35-GALS. Added mixing water

Core Wall - 3728 to 3762  
Elev. 522'

Stopped from 10: P.M. to 11: P.M.  
for lunch.

Cold joint was prevented during  
shutdown by going over entire  
area after 1 1/2 hrs with thin layer  
of fresh concrete.

All of Core Wall trench men  
quit work on trench at 9: P.M., 16 of  
whom are to return and relieve  
regular concrete crew at 1: A.M.

700 SKS. Cleaned  
15-SKS. Recovered (Cement)

263 - Batches Concrete 1844 SKS.  
4 - Batches Grout 20 SKS

Total 1861-SKS.

7-54s. Cement  
1220# Sand  
1300 # 1 1/2" gravel  
1100 # 3/4" gravel  
35-gals. water

Plant ran out of cement at 2:50  
AM. The concrete was keyed off  
with copper water stop in place  
but brazing not done because a  
welder was not available. Well <sup>in case</sup> at  
all joints in copper were left to  
enable the brazing to be done  
when the welder is available.

MR. HARPER + I left the job at  
4: A.M. 12-hrs. work.



Oct. 20-21-22<sup>62</sup> in book  
#382

Sunday - Oct-23-

Pouring Concrete:

Lower Toe Wall- 3+60 to 4+03  
Elev. 565<sup>5</sup> - 571<sup>9</sup>

" " " 2+90 to 3+60  
Elev. 571<sup>5</sup> to 575<sup>8</sup>

8: AM. to 2:25 P.M.

South Footing to outlet tunnel portal

Structure Rock to 3-3" high

Equipment: 1 #11 dragline (Placing Conc.)

3- Transit mix trucks

1- mixing plant

1- Small truck

1- Dragline #10 (stripping below lower

2- Dump trucks (toe wall)

1- Foreman - ~~1~~ Cleaning up area for

1- laborers } drain No. 1 forms  
7: AM to 9:15 then this  
crew went into tunnel

1- Gen. Foreman

1- Conc. Foreman

4- men spreading concrete

7- men in mixing plant

3- Transit mix truck drivers

1- dragline operator

1- " " oiler

1- Cement finisher

1- Carp. Foreman } Drain No. 1

8 Carpenters

4. Carp. helpers

1- small truck driver (Entrance Portal steel)

2- steel men & 1- helper (Entrance Portal steel)

7 steel men on Portal Footings (outlet)

R. W. Carter<sup>63</sup>  
Inspector

changed to  
this at 8:30 AM

5 Sks Cement  
1420 Sand  
700 - 2 1/2"  
900 1 1/2"  
770 3/4"

MIX:

1-2 1/2 5-MODIFIED

5- Sacks Cement

1420 # Sand

760 # 2 1/2" stone

900 # 1 1/2" stone

770 # 3/4" stone

labor continued

1- dragline #10 operator

1 " " #10 oiler

stripping  
earth below  
toe of downstr.  
toe wall  
9: AM. to

Concrete Crew after 2:25 worked on Cleanup

9:30 AM- MIXER NO. 1- Spilling

came loose and No. 2- mixer had to  
be used.

7- Steel men quit work for day at 2: PM.

84- Batches

420  
4 extra 1st 2-batches  
424- Sacks

3800 Sks. cleaned

26- Sacks of Cement Recovered



64  
Weather Clear-

MONDAY - OCT. 24

Placing concrete in footing for  
South Retaining wall for outlet  
portal structure.

7: A.M. to - 3<sup>15</sup> P.M.

EQUIPMENT:

- 1- mixing plant
- 3- TRANSIT MIX TRUCKS
- 1- #11 dragline

Labor:

- 1- general foreman
- 1- concrete foreman
- 4- men placing Conc.
- 7- men in mixing plant
- 3- Transit mix truck drivers
- 1- #11- dragline operator
- 1- " " " " oiler
- 1- man dumping concrete from trucks
- 1- man sprinkling concrete and  
cleanup.
- 1- cement finisher {stripping forms  
on lower toe wall.

65

R.W. CARTER  
Conc. Inspector

Concrete crew worked on work  
incidental to tunnel invert paving  
preparations from 3:30 to 4: P.M.

Delay from 7:20 AM to - 7:30 broken  
cable on dragline.

1.2.4- Concrete modified

- 6- Sks. Cement
- 1370# sand
- 1220# 1/2" gravel
- 1030# 3/4" gravel

14- Batches - 846 Sks. Cement

37 Sks. Cement recovered, sacks  
not counted yet. ? 4800

66  
Weather Clear.

Tuesday - Oct 25.

Tunnel Invert.

Sta. 8+19 to 11+53

6: P.M. to 9:30 A.M.

6: P.M. to 2:30 A.M.

- 1 - Gen. Foreman
- 1 - Conc. Foreman *set bolts for forms & anchors*
- 1 - Finisher
- 2 - Finisher helpers
- 7 - men in mixing plant
- 3 - Transit mix truck drivers
- 7 - men placing concrete
- 2 - laborers moving runway
- 2 - steel men (raising steel into position)

Changed Crews at 2:30 A.M.

- 3 - Transit mix truck drivers
- Mixer man stayed both shifts
- Cement finisher " " "
- 1 - Concrete Foreman *set bolts for forms & anchors*
- 2 - Cement finisher helpers
- 10 - Men placing concrete & moving runways
- 1 - steel man

67  
R. H. Carter  
Conc. Inspector

263 - Batches 1578 sacks of Cement  
4 - sacks for finish  

---

1582 - sacks of  
Cement Total

Mixing Plant

3 Trans. Mix Trucks

Reinforcing steel in this pour

~~BARS~~  
335 - 1<sup>1</sup>/<sub>2</sub>" - 22'1"

99 - 3/4" # - 90 ft. long.

6 - Sks. Cement  
1370 # Sand  
1220 # 1<sup>1</sup>/<sub>2</sub>" gravel  
1030 # 3/4" gravel  
33 - gals. H<sub>2</sub>O (sand very dry)

Mr. Harper came on duty at 9:30 A.M.

to assist with inspection, stayed  
until 7:30 A.M. with me



Tuesday Oct. 26

Night shift

- 1- dump truck
- 2- men cleaning drains to get ready for placing concrete

- 1- Truck driver
  - 1- Jackhammer man
  - 4- muckers
- } excavating  
for cutoff  
trench  
OUTLET  
PORTAL

Cove wall excavation

- 1 # 11- dragline
- 2- Dump trucks

- 1- Foreman
- 1- dragline operator
- 1- dragline siter
- 1- Truck driver
- 2- Jackhammer men
- 1- powder man
- 5- muckers

Oct. 27-<sup>69</sup> 28<sup>th</sup> in book #382

Sat. Oct. 29

Sat. Oct. 29, 1932

Placing concrete in Arch Sect  
of drain NO-1

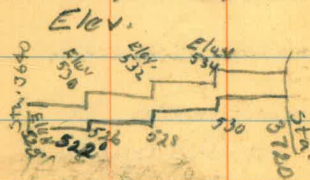
9: A.M. to 1:35 P.M.

52-Batches — 312-SKS. C.

6-Batches grout — 30-SKS. C.

6-SKS. Cement - 1440# Sand - 1150# 1/2" - 1030# 3/4"

Core Wall - 3640 to 3720



1:45 P.M. to 5:45 P.M.

7-SKS. Cement { 3-Batches grout  
1440# Sand { 85-Batches Conc.  
1150# 1/2" gravel { 595-SKS. Cmt.  
1030# 3/4" gravel { 610-with grout

North retaining wall footing  
Outlet portal structure -

6-SK. Batches - 110 - 660 SK. Cmt.

4:45 P.M. to 9:45 P.M.

MR. KARPEN came on at 4: P.M.  
to help on inspection.

Counterfort dowels  
9/4 dia - 7 ft. Long

R. W. Carter  
Conc. Inspector

5 carpenters  
2 helpers

1-Con. foreman

1-Con. foreman

2- Transit mix truck drivers

1- #11- Dragline operator

1- " " " sider

7 men in mixing plant

9 men placing concrete

1-Cement finisher

1- Transit mix driver from 2: P.M.

1-Con. foreman Core Wall forms

2-Carpenters

1-helper

1- welder - 4-hrs

1- steelman &amp; helping carpenter

1- man from Core Wall Exca. on cleanout

and in concrete - 4 hrs

1- man sprinkling concrete &amp; helping Comp

17 men from Right Core wall exca. crew

on concrete 6: P.M. to

4- 3/4" bars - 40 ft. long in this pour.

1 hr. delay brazing copper, extending

pump sump and removing shoring.

Concrete SUMMARY:

Location	Batches Concrete	Batches GROUT	Sacks of Cement
Drain #1	52	6	344
Core Wall	85	3	610
OUTLET			
Portal Retg. Wall Footing	110	-	660
Total-Sacks			1614



72  
Oct. 29-1932

Cove Wall Excavation Crew

DAY  
CREW

- 1- foreman
- 1- Dragline operator
- 1- " " oiler { From 2: P.M.
- 1- hoist man
- 1- Truck driver
- 10- laborers.
- 3- men in klost Portal

NIGHT  
CREW

- 11. muckers { From 10: P.M.
- { 6: P.M. to 10: P.M. on
- { concrete
- 1- Powder man
- 1- foreman
- 1- hoist man
- 3- Jackhammer men
- 1- #11 Dragline oper.
- 1- " " oiler
- 1- powder man
- 1- hoist man.
- 2- muckers
- 1- Truck Driver

Equipment:

- 1- #11- dragline
- 1- portable electric hoist
- 2- Dump trucks
- 1- Dump car with track

73  
Oct -30-

Sunday Cove Wall

Excavation crew.

Day shift:

- 1- foreman
- 1- Dragline operator
- 1- " " oiler
- 1- hoist man
- 12- muckers
- 3- Jackhammer men
- 1- powder man
- 1- truck driver

Equipment:

- 1- #11. dragline
- 1- portable electric hoist
- 1- dump car with track
- 2- Dump trucks

MONDAY - OCT 31 -

LABOR. 6-carpenters } retaining walls  
 4-helpers } outlet Portal  
 1-man sprinkling concrete  
 { 1-Cement finisher } stripping  
 8-men } Form  
 1-foreman } Drain No. 1  
 + Toe Wall

labor + Report on pressure grouting  
 in book NO-381

Tile in drain NO-1.

South side, both bottom and top  
 rows - 103-holes each - making  
 a total of 412-4"x12" clay drain tile

North side, both bottom + top  
 row, 103-holes with 2-tile to each  
 hole, making a total of 206  
 holes, or 412-Tile. (9-holes in  
 end - 18-Tile  
 Total tile in place in drain

842-4"x12" Clay drain tile.

Reinforcing steel same as  
 shown on page 8, this book



76  
Tuesday Nov. 1<sup>st</sup> to & including  
NOV-8-1932 NOV-7- in Book NO. 382

Placing Concrete in Invert from  
sta. 11+53 to 11+71.25.

Cutoff walls and floor slab  
between Retaining walls, outlet  
Portal -

9:15 A.M. to 4:15 P.M.

used - 4 - 5/8" <sup>20 ft long.</sup> extra to reinforce  
edge of concrete slab at west  
end - Mr. Newcomb's orders.

19 - 1" bars - 22'-0"  
11 - 3/4" bars - 22'-0"

MIX: 128 Batches - 768 Sks. Cement

6-sacks Cement  
1370 #5 sand  
1220 # 1/2" gravel  
1030 # 3/4" gravel

77

R. C. Carter  
Conc. Inspector

Equipment: 1 - mixing plant  
3 - Transit mix trucks

Labor - 6 men in mixing plant  
3 - Transit mix truck drivers  
5 - men placing concrete  
1 - Concrete foreman  
1 - Gen. foreman

5 - men { Placing arch section  
steel - West end of  
tunnel

1 - Steel man { entrance portal

4 - Carpenters { entrance Portal  
forms

1 - Carp. foreman { 2:15 A.M. to

5 - Carpenters { FORMS outlet  
Portal

4 - Carpenters { Core wall forms

4 laborers { Core wall excav.

1 hoistman {

#11-oil & operator { Repairs

1 driller {

2 helpers { Core Wall

1 pipe fitter { pipe lines

2 helpers {

1 H/O - over { working on fill  
1 H/O - operator { upstream from  
H.S. face wall

Nov-7- (Harper)

Night Crew -

1-foreman	} North end core Wall Excav.
1-hoistman	
1-pumpman	
4-laborers	

Equipment-

1-electric hoist  
1-cart track

1-driller  
2-helpers  
1-water liner



Wednesday - NOV-9-

Placing concrete: 7:AM - 7:30PM,

Pump sump in Core Wall in Section

St. N 3640 to N3656 including this section  
Elev. 528° to 533°  
Sta-3656 to -3672 - Elev. 530° to 535°

Sta. N3480 to N3512 - Elev. 528° - 533°

Sta N-3544 to N3576 - Elev. 538° - 533°

Sta. N-3672 to N3680 - Elev. 530° - 535°

Sta. N-3680 to N3704 Elev. 532 to 537°

Sta. N-3608 to N3640 Elev. 528 to 533°

90 Batches	630	} Sks Cleared 1800 Recovered 16-sks. Cont. Recovered.
3-EROUT	15	
3-Special =	30 sks	
	<u>675-</u>	

## Materials:

N3544 to N-3576 - Copper &amp; Steel reported NOV-7.

N3602 to 3640 - 32-ft. Copper  
640-ft.  $\frac{3}{4}$ " bars. no laps in  
this section

N-3480 to N-3512 37-ft. Copper  
695-ft.  $\frac{3}{4}$ " bars.

N-3672 to N3704 - 40-ft. Copper - 695ft

N-3640 to N-3672 - 37-ft. Copper  $\frac{3}{4}$ "  
695 ft.  $\frac{3}{4}$ " bars -

NOTE: 4 -ks. Cement by Finisher  
on Tunnel & Sump floor

Note - each section  
5 ft high has  
20-30 bars - 21' long  
20-30 bars on laps  
Count 50 bars

F. W. Carter  
Conc. Inspector

## Equipment:

- 1- #11 Dragline with  $\frac{3}{4}$  cu yd bucket
- 2- Transit mix trucks
- 1- concrete mixing plant
- 1- Portable electric hoist } Core wall  
  } excav.

Labor: 1- Gen. foreman  
1- Conc. foreman  
5- men placing Concrete  
1- Dragline operator  
1- " " oiler  
6- men in mixing plant.  
1- man wetting concrete  
1- Cement finisher

1- foreman  
1- hoist man } North end of Core  
1- driller } Wall Excav.  
1- powderman }

3- mixers.

1- pumpman (general over job)

2- laborers on pump sump near Core Wall

1- driller } drilling grout holes  
2- helpers } Core wall

3- Carpenters } forms for Core

1- Carp. foreman } Wall  $\frac{1}{2}$  day1- welder - 2-hrs. } Brazing  
                                  } Copper

Nov. 9- Notes:

Pump sump 30-ft. deep was  
concreted by using 10" canvass

trami - 1-hr 15 min. and 3 cu. yds.  
of concrete required to fill the  
sump.

7: AM I told carpenter Foreman  
to place boards on new concrete  
at Tunnel outlet before allowing  
his men to walk on it to build  
retaining wall forms.

3: PM, I spoke to Mr. Ellison about  
cleaning out & draining water from  
Sect N3602 to N3640

3:30 PM, Mr. Ellison told me that  
he would work late tonight to finish  
two more sections.

NIGHT CREW - NOV-9-

1- driller } Core wall grout hole  
2- helpers } drilling.

6- men } excavating Core wall trench  
North End.



84  
R. W. Carter  
Cone Inspector

Thursday - NOV. 10 - 12:30 to 9:30 P.M.  
Placing concrete from top  
of floor slab to elev. 568.0  
in retaining walls (North & South)  
of entrance portal structure.

Equipment:

#7 gas shovel { Placing Conc.  
with 3/4 yd. bucket  
2 - Transit mixers  
1 mixing plant

Labor:

1 - Gen. foreman  
1 - Conc. foreman  
6 - men placing conc.  
1 - Shovel operator  
1 - " biler  
2 - Transit mix truck drivers  
6 - men in mixing plant  
1 - Carpenter (chutes & forms)  
1 - helper { entrance Portal

85

2 - steel men { entrance Portal  
1 - Carp. Sawyer at shop  
1 - DAY Pumpman

Delay from 7:30 P.M. to 8:30 P.M.  
cable jumped out of sheave on  
shovel.

Notes. 6 empty cement sacks used in  
bottom of bucket to prevent  
grout leak. Cannot be reclaimed.

86 Batches Concrete = 516 Sks. Conc.  
14 " GROUT = 90 "  
Total Cement 586 Sacks

Mix - 6 Sks. Cement  
1440 # Sand  
1150 # 1 1/2 gravel  
1030 # 3/4 " gravel

NIGHT CREW -

6 - men { excavating  
NORTH END  
of Core Wall

3 - men { drilling grout  
holes - Core wall  
1 - night pumpman



FRIDAY - NOV - 11 - 1932

NO CONCRETE TODAY

1/2-DAY on steel tunnel forms.

1- #11-Dragline { stripping overburden }  
 2- Dump trucks { West of D.S. Toe Wall }  
 1- Small Allis-Chalmers tractor { used by Cleanup }  
 1- Delivery light truck #54 { Bull gang }

Labor:

9 steelmen { steel in West end of tunnel }  
 1- Cement finisher { steel tie rods in forms - Outlet Portal }  
 1- steelman { structure }  
 1- Gen. foreman  
 1- Carpenter foreman { FORMS FOR Retaining walls }  
 4- Carpenters { Outlet Portal }  
 2- helpers

1/2 DAY on tunnel steel forms

1- #11-Dragline operator { stripping overburden }  
 1- " " " " siler { 1/2 DAY }  
 2- Dump truck drivers { Cleanup }  
 3 men { Bull gang, general Cleanup + pipe lines - Tractor & truck in use }

5-Carpenters  
 6-helpers  
 1-mixer man helping Carp { forms } { mixer man + two helpers }  
 1-man wetting concrete { 2-helpers } { 1/2 Day tunnel forms }  
 1-Carpenter (conc. foreman) { 1/2 Day making copper vertical water stops }  
 1-helper { 1/2 Day on tunnel steel forms }  
 1-man-cleanup + wetting conc. { entrance }  
 2-steelmen { entrance Portal }

1:30 P.M. - I obtained a profile of Core Wall from Geo. Converse and marked the depth each grout hole is to be drilled, as information for drillers.

12:30 AM - Crew started placing 1st ring of steel forms in Exit Portal  
 1-welder + equipment - 2-hrs brazing copper water stops (vertical)





NOV-12-1932

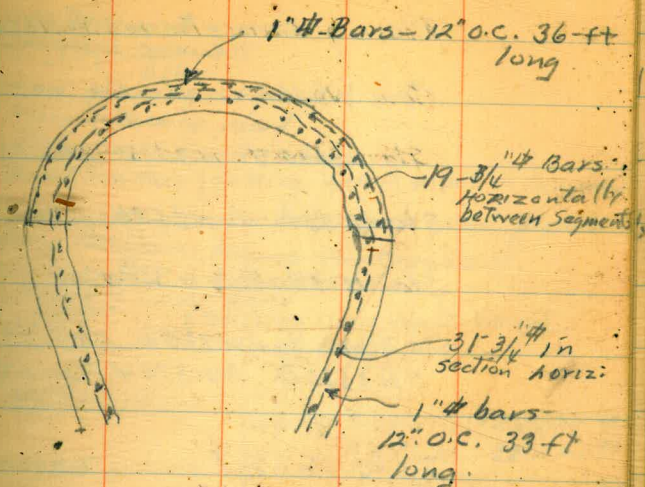
Arch-Wall → Steel in place in tunnel - sta.

11+63 to Sta. 10+39

(Vertical) ARCH steel	{	250-1" # bars 33-ft. long.
		125-1" # " 36-ft. long

Horizontal steel between segments of outside of arch.	{	323-3/4" # " 5-ft. long
		115-3/4" # " 2-ft. long
		19-3/4" # " 4-ft. long

Horizontal bars - inside of arch.	{	31-3/4" # " 16-ft. long.
		93-3/4" # " 40-ft. long





MONDAY NOV 14 1932

Placing concrete as follows:  
7: AM to 6: P. M.

Core Wall:

Sta. N3480 to N3512 Elev. 533 to 542

Sta. N3544 to N3576 " " "

Sta. N-3608 to N3640 " " "

Sta. N3672 to N3680 Elev. 533-543  
" N3680 to N3704 Elev. 532-543

7-5ks. Cement	Grout.
1440# Sand	8-5ks. Cement
1150# 1/2" gravel	1700# Sand.
1030# 3/4" gravel	

Equipment:

1-#11-Drayline	{	Placing conc.
1-Conc. mixing plant		
2-Transit mix trucks		

32

Labor-

54  
50  
54  
54  
216

- 1-Conc. foreman
- 1-Drayline operator
- 1- " " oiler
- 5-men placing concrete
- 5-men in mixing plant
- 2-Transit mix truck drivers
- 1-Cement finisher { setting grout pipes in Core Wall
- 1-man wetting conc. + helping on grout pipes
- 1-Carp. foreman { Forms for Core Wall
- 8-Carpenters { to Bulkheads
- 3-men helpers { 1/2 day
- 3-men { Drilling Core Wall Grout hole 1/2 day

MATERIAL:

N3480 to N3512	{ 40-1 3/16" - 32'-0" = 1280-lin. ft
	{ 40-1 3/16" - 33" inch = 220-lin. ft
N-3544 - N-3576	{ 32-ft. 1 3/16" - 1500-lin. ft
	{ 22-ft. Copper Horiz. joints
N-3608 to N3640	{ 40-1 3/16" - 32'-0" = 1280-lin. ft
	{ 40-1 3/16" - 33" inch = 220 " "
N-3672 to N3704	{ 32-lin. ft. Copper Horiz.
	{ 22-lin. ft. copper vertical
N-3608 to N3640	{ 40-1 3/16" - 32'-0" = 1280-lin. ft
	{ No lops in this section
N-3672 to N3704	{ 32-ft. Copper horizontally
	{ 22-lin. ft. copper vertical
N-3672 to N3704	{ 26-1 3/16" - 32'-0"
	{ 14-1 3/16" - 8'-0"
60-Batches Concrete	{ 32-ft. horiz. copper
	{ 22-ft. vert. copper

60-Batches Concrete	-	420 Sacks Cement
3- " " Grout		24 " "



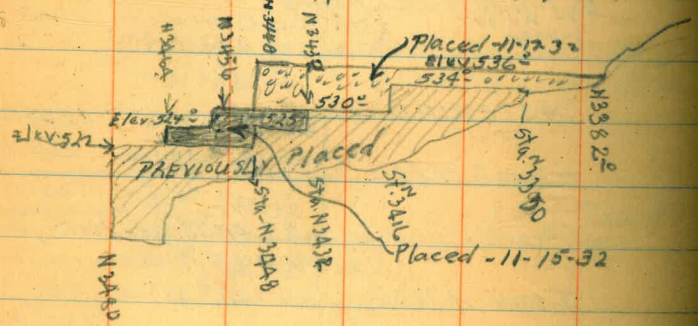
3600  
32  
3608  
36  
26

Tuesday - NOV 15 -

Placing concrete: Core Wall:

- 9:15 A.M. Sta N3640 to N3656 - Elev. 533° to 543°
- 10-4:30 P.M. Sta. N3656 to N3672 - Elev. 535° to 543°
- Sta. N3608 to N3576 - Elev. 533° to 543°
- Sta. N3512 to N3544 - Elev. 533° to 543°

Shaded area in diagram filled with concrete to-day - 4:30 to 5: P.M.  
Copper - 5:30 P.M. to 7: P.M.



- Equipment:
- 1- #11-dragline
  - 1-mixing plant
  - 2- Transit mix trucks - 8 hrs.
  - 1- " " " 2-hrs.

8- 9 ft. grout pipe in place

32  
33  
34  
35  
36

Labor:

- 1- Gen. foreman
  - 1- Conc. Foreman
  - 5- men placing concrete
  - 5- men in mixing plant
  - 2- Transit mix truck drivers
  - 1- #11-dragline operator
  - 1- " " oiler
  - 1- Cement finisher
  - 1- helper
  - 1- laborer
  - 1- Transit mix driver
  - 1- Carpenter foreman
  - 7- Carpenters
  - 1- helper
  - 1- Welder - 3-hrs. brazing Copper.
- cleanout in Core Wall  
1/2 day Tamping Concrete  
1/2 day cleanout  
{ 4:30 P.M. to  
1/2 day. core wall forms + Bulkheads.

- laps - 40-13/16" - 33" inches
- 32-13/16" - 32'-0" } Sta. N3640 to N3672
- 8-13/16" - 16'-0"
- 32-ft. Copper
- 40-13/16" - 32'-0" } sta. N-3576 to N3608
- laps - 40-13/16" - 33" inches
- 32-ft. Copper
- 40-13/16" - 32'-0" } Sta. N3512 to N3544
- 32-ft. Copper
- 40-13/16" - 33" inches
- 51-ft. Copper } Sta. N 3464 to N3432  
horiz. and vertical.
- 74 Batches 518 - 5 k.s. Cement
- 3- GROUT @ 80k - 24 " "
- 2 " @ 5 " 10 " "
- Total - 552 " "



Harper  
Inspector

Night Crew - NOV-15-1932

Dragline #11  
2-Dump trucks

Dragline #11 - operator	} excavating North end of Core Wall
" " " " - oiler	
2-Truck drivers	
4-laborers	

Wednesday - NOV-16-

Placing concrete in North +  
South Retaining walls of outlet  
portal - Elev. 542<sup>o</sup> to 552<sup>o</sup>  
2: P.M. to 1:30 A.M.

18-ft. on tunnel ring stations

1147<sup>5</sup> to 11459 to Elev. 552<sup>o</sup>

Equipment:

- 1 #10 dragline
- 2 TRANSIT MIX TRUCKS -
- 1 Transit mix truck - 4 hours
- 1 mixing plant

labor:

- 1 Gen. foreman
- 1 Carp. foreman { Outlet Portal forms
- 9 Carpenters { 1/2-Day - 2 of these
- 4 helpers { Carp. all day.
- 1 Cement finisher - Cleanup outlet Portal
- 1 Conc. foreman
- 5 men at mixing plant { Concrete
- 5 men - placing concrete { North +
- 3 Transit mix truck drivers { South
- 1 #10 - Dragline operator { Ret. walls
- 1 #10 - " " oiler { Outlet
- 1 man working on road { Portal
- leading to outlet portal
- 2 men on Cleanup exit Portal

Concrete crew worked on Cleanup starting  
at 11 P.M.

1 set of three test cylinders at 3: P.M.  
from concrete for North Retaining wall  
Outlet portal - Elev. 542<sup>o</sup> to 552<sup>o</sup>

60 sks. Cement  
1440 # Sand  
1150 # 1 1/2" gravel  
1030 # 3/4" gravel  
38 gals. Water

120	Batches Concrete	720	sacks of Cement
8	" GROUT.	40	" "
		<u>Total - 760</u>	" "

MR. HARPER TOOK OVER THE INSPECTION  
OF CONCRETE AT 9: P.M.



Thursday NOV. 17-

Placing Concrete:

Core wall:

Sta. N3448 to N3416 - Elev. 530° to 536°

Sta. N3416 to N3382 - Elev. 534° to 536°

12:30 P.M. to 3: P.M.

Equipment:

- 1-mixing plant
- 2-TRANSIT MIX TRUCKS

Labor:

- 1-Gen. foreman
- 1-Conc. foreman
- 2 1/2 hrs. on concrete } 4-men placing concrete
- 1 1/2 hrs. stripping forms } 6-men in mixing plant
- Core Wall } 2-TRANSIT MIX TRUCK DRIVERS
- 1-man wetting concrete
- 1-Cement Finisher on Core Wall  
plugging tie rod cone holes with  
cement mortar
- 1-Welder - 1 hr.
- 73-ft. copper water stop

57-Batches Concrete = 399 SKS. Cement

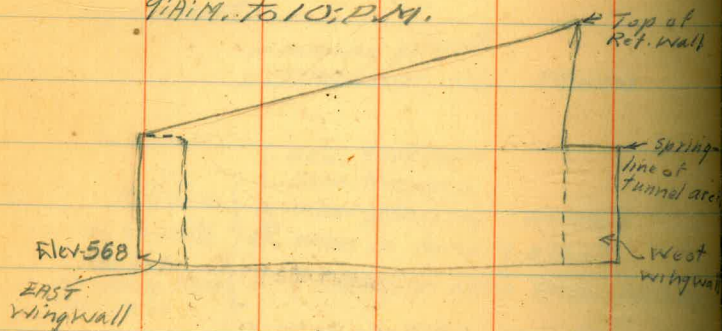
3-Grout = 15 " "

Total 414 " "

FRIDAY - NOV. 18.

Placing concrete: North and SOUTH RETAINING & wing walls: East wing wall and South Retaining walls complete; West King Wall to elev-573 Entrance Portal

9:15 A.M. to 10: P.M.



Equipment:

- #11 dragline
  - 2-Transit mix trucks
  - 1-mixing plant
- } 2 Shifts

- 6-Sks Cement
- 1440 # Sand
- 1150 # 1/2 gravel
- 1030 # 3/4 gravel

14.5 batches concrete = 870  
 7-Batches GROUT 36  
 906  
 Finisher used one sack - 906 Sacks (incl)  
 Reported 790 Sks Total

Labor:

- 6-steel men { 1/2-day on entrance Portal  
1/2-day in tunnel
- 1-Carp. foreman { Entrance Portal forms -  
5 of these carpenters  
worked from 3:15 A.M. to 11:15 A.M.
- 9-Carpenters { All others - 7:15 A.M. to 8:15 P.M.
- 4-Carp. helpers
- 1-Gen. foreman
- 1-Conc. foreman - 11-hrs
- 5-men placing concrete { misc. man - weigh  
man - 13-hrs  
Dumpy man - 13-hrs
- 5-men in mixing plant { 8-hours
- 2-Transit mix truck drivers
- 1-#11-dragline operator
- 1- " " oiler
- Night Crew: { 1-#11-dragline operator  
6: P.M. to { 1- " " oiler  
5-men placing concrete  
3-men mixing plant.
- Cement Finisher - 8-hrs.

I called for man to cut off reinforcing steel in top of walls.

I asked at 2: P.M. for Cement finisher to finish top of ret. walls.

Remarks: I told MR. Ellison that his men did not use enough nails in form work as evidenced in Core wall, after the forms were stripped.

Carpenters did not have cones enough for tie rods to finish forms in North Retaining wall and tie wires were used. I told Mr. Ellison that tie wires were not permitted by specification. I told him that he would be required to cut the wires 1/2 inch in the concrete and point up all holes with mortar, to which he agreed to do.



3408  
104  
3400  
3381  
59  
Sat. Nov. 19-1932

Placing concrete in Core wall  
from sta- N3440 to N3424 Elev.  
536° to 540°  
N 3424 to N3381 - Elev. 536° to  
543°

12:30 P.M. to 3:45 P.M.

Equipment:

- 1- mixing plant
- 2- Transit mix trucks.

LABOR:

Core Wall  
Concrete  
12:30 P.M. to 4:30 P.M.  
4 hours.

- 1- Gen. foreman
- 1- Conc. foreman
- 1- Mixer man
- 1- Weigh man } mixing plant
- 4- men
- 5 men placing concrete
- 2- Transit mix truck drivers
- 1- laborer on cleanout

8 hrs. {

- 1- Cement finisher { Patching concrete
- 1- man wetting line.
- 2- men stripping forms entrance Portal
- 4- men on bull gang {work all over job

After running 12- Batches of  
a change to  
because the  
mix was over-sanded.

- 7 sacks Cement
- 1440# sand
- 1150# 1 1/2"
- 1030# 3/4"
- 78 sacks of Cement
- 1870# sand
- 1220# 1 1/2"
- 1030# 3/4"

66 Batches Concrete = 462  
3 " GROUT = 15  
477 sacks of Cement

62-ft. Copper for water stop

NIGHT CREW:

- 1- 11- day line and operator
- 1- oiler
- 1- Dump truck & driver
- 1- foreman
- 3- men

CORE WALL  
EXCAVATION

Sunday - NOV. 20  
NO. CONCRETE:

## Equipment:

#11 dragline } Core wall  
2-Dump trucks } excavations  
1-light truck #5 } painting forms  
Air hose + blow pipe

← mixer man & 2-men 2-hrs. blowing  
grout holes in Core wall  
Labor: 1-mixer man } stripping forms Entrance  
7-5 men } Portal

1-Cement finisher } Core wall + Entrance Portal  
1-man cleaning laitane Core wall  
1-man wetting concrete  
1-foreman } Core wall  
6-men } excavations  
1-#11-dragline operator }  
1-TRUCK DRIVER } oiler  
1-Carp. foreman } exit Portal  
10-Carpenters } forms. - 1-Carpenter  
7-helpers } 4hrs. fixed  
at noon  
1-light truck driver

R. H. Carter  
Inspector

Depth of  
Grout holes  
through rock.  
No drilling  
thru concrete  
on these holes.

N3335

25-ft.

N3345

25½ ft.

N3355

25-ft.

N3365

27½ ft.

N3375

26-ft.

N3340

27-ft.

N3350

26-ft.

N3360

27-ft.

N3370

27-ft.

N3380

27-ft.



MONDAY NOV 21-

Placing concrete; Concrete placed in North & South Retaining walls exit portal 552° to elev 562° also Tunnel from st. 11+71<sup>±</sup> to 11+51<sup>±</sup> on North side and 11+71<sup>±</sup> to 11+63 on South side, both to elev. 562°  
start 8: A.M. - finish - 6: P.M.

Equipment: 1-#10-dragline  
2-Transit mix trucks  
1 mixing plant

Labor: 1-Gen. foreman  
1-Cons. foreman  
5-men placing concrete  
1-#10-Dragline operator  
1-#10- " " oiler  
2-Transit mix truck drivers  
6-men in mixing plant  
1-Carp foreman } exit Portal - D.S. Toe  
10-Carpenters } Wall - Core Wall  
4-helpers

12-ladder rungs in place to elev. 562° in South retaining wall.

92-Batches Concrete = 552  
4-Batches GROUT = 20  

---

572-SKS  
Cement

Remarks: The loose concrete in counterfort broken by carein was removed and new concrete placed monolithically with this lift on the counterfort.

Tuesday - NOV. 22 -

Placed concrete in Downstream

Toe wall 3+00 to 4+03 - To Elev 575

7 A.M. to 9:30 A.M.

1:2 1/2 S. MIX

Drain Wells - #1 - #2 - #3 - } 1:2 1/4  
to elev. 575 } MIX

10: A.M. - 1:00 P.M.  
2:30 P.M. - 3:30  
Core Wall - North 3408 to N3392

elev. 540<sup>±</sup> to 546<sup>±</sup>

N3392 to N3396 - Elev 540<sup>±</sup> to

elev 548<sup>±</sup>

1:30 P.M.; 2:30 P.M.

199  
201  
150  
550

- Concrete Crew labor:
- 1 - Gen. Foreman
  - 1 - Concrete Foreman
  - 5 - men placing concrete
  - 6 - men in mixing plant
  - 2 - Transit mix truck drivers
  - 1 - #10. Dragline Operator
  - 1 - " " oiler
  - 1 - Cement Finisher
  - 6 - Carpenters { Drain well forms
  - 1 - helper
  - 1 - man on Cleanup exit portal
  - 1 - welder - 2-hrs. on Core wall

Toe wall - 27 Batches 195  
3 - Grout 15  
150

Drain Wells - 31 Batches 186  
3 - GROUT 15  
201

Core wall 27 Batches 189  
2 Grout 10  
199

37-ft. Copper water stop.  
2650 sks. Cleaned - 15 sks. Cement Rec.

29 - ladder rungs in Drain Well #2

30 " " " " " 1  
29 " " " " " 3

3:15 P.M. Man was knocked off Drain #3 with  
dragline - taken to hospital. Injuries not  
determined when he was taken  
away.

Concrete Crew labor:  
1 - hr. on Core wall except Dragline Crew.  
9 - hrs. on D.S. Toe wall  
4 - hrs. on wells.

Sacks of  
Cement

TOTAL  
550  
Sacks of  
Cement





NOV-22- NIGHT SHIFT

Core Wall excavation - Dragline

#11- 8 Crew -

- 1- Truck & driver
- 1- Foreman
- 7- laborers -

No drilling being done  
No work after 21 A.M. this  
day Nov. 21<sup>st</sup>

Night Shift -  
11-25-32

Hamper

Shovel #88 Crew  
2 Trucks - 2 drivers

Stripping  
overburden  
North abutment  
No blasting  
required

#11- dragline + Crew  
1 truck - 1 driver  
1 Jackhammer + driller  
1 foreman  
5 laborers

Core wall  
excav  
North  
Side of  
Dam -



Sat. Nov. 26

Placed concrete: Core Wall

N 3384 to N 3376

Elev. 548<sup>5</sup> to 554<sup>5</sup>

N 3376 to N 3336

Bedrock to Elev 560<sup>5</sup>

Start - 7:30 A.M. - 10:30 A.M.

Equipment:

- 1 - mixing plant - 3 hrs.
- 2 - Transit mix trucks - 3 hrs.
- 1 - light truck #52

- Labor:
- 1 - Gen. foreman
  - Cleaning
  - Placing Conc. 3 1/2 hrs.
  - excavating in tunnel for invert
  - 1 - Conc. foreman
  - 3 - men placing Conc.
  - 6 - men in mixing plant
  - 2 - Transit mix truck drivers { 3-hrs.
  - 1 - Welder - 1-hr - brazing copper in Core Wall
  - 1 - Cement finisher { PAINTING UP - Tie rod cone holes
  - 1 - light truck driver - 4 hrs. { Hauling form lumber for tunnel invert.
  - 1 - Carp. Foreman } OUTLET Portal forms.
  - 4 - Carp.
  - 3 - helpers
  - 2 - Carp.
  - 1 - helper { 5-hrs. Portal forms. 3-hrs. tunnel invert screeds.

66 - ft. Copper water stop	Sacks of Cement
66 - Batches of Concrete	462
2 - " - Grout	10
	<u>472</u>

- { 1 - foreman - steel
- { 9 - men tunnel invert
- 4 - laborers grading: { Tunnel invert grading & steel
- #8 - shovel & crew
- 2 - trucks - 2 - drivers { stripping on South abutment of Dam
- Drumline #11 & crew
- 1 - truck & driver
- 1 - Jackhammer & driller { Core Wall EXC.
- 1 - foreman
- 4 - men

SAT NIGHT  
Nov. 26 -  
Hanger

Sunday - NOV - 27 -

Placed concrete in invert from

Sta. 5+46 to Sta. 8+19 -

1<sup>st</sup> load of concrete - 10: A.M. - finish  
12: Midnight.

Mix: 6-Sacks Cement

1440 # Sand

1150 # 1 1/2" gravel

1030 # 3/4" gravel

29-Gals. added mixing H<sub>2</sub>O

1-Set of three test cylinders made  
from this mix at 7: P.M. at Sta. 6+96<sup>3</sup>

Equipment:

1-mixing plant

3-Transit mix trucks

1-Dump truck { gravel for 4 hrs  
Subgrade.

119 Carter Inspector - 8:30 A.M. to 8: P.M.  
Haefler " 8: A.M. - to finish

Labor:

1-Gen. Foreman

2-Carpenters { Tunnel  
invert forms

1-Carp. foreman { exit Portal Forms

3-Carpenters

1-Steel foreman bending steel FOR

1-Gen. lab. foreman

1-foreman

5-laborers

1-Dump truck driver - 4 hrs -

1-Concrete foreman

7-men in mixing plant

3-Transit mix truck drivers

1-Cement finisher { finishing invert.

2-helpers

1-man on runways

2-steel men shimming steel to place

5-men placing concrete

1-man curing concrete

4-men from 3: P.M. to 7: P.M. from tunnel crew  
(3: P.M. to 11: P.M. shift)

10: A.M. to 8: P.M.  
SHIFT.

275-1" # - 22' 7"

3-1" # - 12' 8"

99-3/4" # - 32' 6"

11-3/4" # - 12' 0"

273-ft. - 6" clay drain tile

216 Batches Concrete

1296 Sacks of Cement



120  
Sunday Nov 27

Miscellaneous labor

#10 - dragline + Crew { stripping over-  
burden - North  
2 - Trucks + drivers } Abutment

#8 - Shovel operator { Repair work  
and oiler } preparatory to  
stripping South Abutment

1 - driller - { South Abutment preparing  
for stripping }

Tunnel Crew

7: A.M. to 3: P.M. { 1 - foreman - } excavating for  
invert.

3: P.M. to 11: P.M. { 1 - air shovel + crew }  
4 - miners } 4 hrs  
2 - trucks + drivers } 4 hrs  
tunnel

Core Wall Excavation:

#11 - dragline  
2 - Dump trucks  
2 - men (muckers)  
1 - Dragline operator  
1 - " " oiler  
1 - Truck driver

1 - foreman  
4 - men - excavating top of tunnel  
near portal

121  
Concrete Crew change of shift  
8: P.M. To

1 - Gen. foreman  
1 - Cement finisher  
1 - mixer man } Same men as  
day shift  
3 - Transit mix drivers

6 - helpers in mixing plant

4 - men from Core Wall excav. } 7: A.M. To

2 - men spreading Conc.

2 - men placing Conc.

1 - Conc. foreman

2 - cement finisher helpers.

8 to 12 P.M. by Hoopew

Tunnel Invert

1 Foreman

9 Men

1 Cement finisher

2 Steel Men



122  
Monday - Nov - 28.

Placed concrete in North and South Retaining walls of outlet Portal complete. Placed concrete in tunnel ring sta. 11+63 to 11+71<sup>00</sup> Complete, also head wall except Top 5-ft.

2:30 P.M. to 3:15 A.M.

Equipment - #10- Dragline  
2- Transit mix trucks  
1- mixing plant

5500- Cement sacks Cleared.  
42- Sacks of Cement recovered

MR. Harper inspected from 10 P.M. to 3:15 A.M.

123  
Labor: 1- Gen. Foreman  
6- men in mixing plant  
6- men placing conc.  
1- #10- Dragline Operator  
1- " " " oiler  
2- Transit mix truck drivers  
1- Cement finisher

4- carpenters } 6: P.M. to  
2- helpers } Bulkheads and  
Forms exit  
portal

6- 4" x 12" clay drain tile inserts for pipe for hand railing north Retaining wall

7- 3/4" - 6'-0" long (extra) placed through hooks on Counterfort steel -  
4- 5/8" - 24" long - extra in sidewall opposite wall timber, South side.

Mix: 6- sks. Cement

1440# 5"  
1150# 1 1/2"  
1030# 3/4"

111 Batches Concrete 666 sks. Cement  
4 Batches Grout 20 "  

---

686- sks. Cement

12- ladder rungs - making a total of 24 in South Retaining wall of outlet Portal. including one extra one on top of wall not shown on plans.



124  
11-28-32

Night Crews - by Mr. Haynes

Core wall excavation:

- #11 - dragline + crew
- 1 - truck + 1 - driver
- 2 - Jackhammers - 2 - drillers
- 1 - foreman
- 2 - laborers

Stripping S.E. 1/4

- #8 - shovel + crew
- 2 - Trucks + drivers

Nov-29 - Night shift

- #8 - shovel + crew
- 2 - trucks - 2 - drivers
- 5 P.M. to 11:30 P.M. - stripping NE 1/4
- 11:30 P.M. to 2 A.M. - " SE 1/4

Core Wall Excav. North Abutment.

- #11 - Dragline + crew
- 1 - truck + driver
- 1 - foreman
- 4 - laborers

125  
138 batches 828 Sax

1:2:4

1220 # sand

- 864 2 1/2 6 Sax cement

864 1 1/2

672 3/4

Nov. 29<sup>th</sup> No Concrete Placed<sup>126</sup>  
after 3 A.M. Reported 28<sup>th</sup>.

Wednesday - NOV-30

Placed concrete in tunnel

Invert. Sta. 3+73 to Sta. 3+46

11: A.M. to 7 P.M.

### Equipments:

- 1- mixing plant
- 3- Transit mix trucks.

### Labor:

All on  
Tunnel  
invert  
Concrete

- 1- Gen. foreman
- 6- men in mixing plant
- 6- men placing concrete
- 1- Cement finisher
- 2- helpers
- 3- Transit mix truck drivers
- 2- steel men
- 2- Carpenters

127  
MR. Wells asked me to use 2 1/2" aggregate in the concrete. I consulted MR. Wood and he told me to fix up a 1:2:4 mix and use 2 1/2" gravel.

Mix: 6 sacks Cement  
1220# Sand  
864# 2 1/2" gravel  
864# 1 1/2" gravel  
672# 3/4" gravel  
28-gals. added mixing water

1- set of 3 test cylinders taken from the above mix at 5:30 P.M. at Sta. 4+00.

This mix worked perfectly without modification.

### Materials Used:

- 138- batches concrete
- 828- Sacks of Cement
- 173- lin. ft. 6"x12" clay drain tile under bottom of invert.
- 174- 1" # x 22'-0" bars
- 3- 1" # x 12'-0" "
- 66- 3/4" # x 32'-6" bars.

REINFORCING STEEL  
INVERT  
AND  
DRAINAGE  
TILES

Total Copper water stop used in No. 1107. <sup>Luft</sup>



Thursday - Dec - 12<sup>th</sup>  
 Placed concrete in  
 Tunnel invert from Sta. 3+73  
 to Sta. 1+67  
 6:45 P.M. - to 2:15 A.M.

Mix: 6-sacks Cement  
 1320 # Sand  
 764 # 2 1/2" aggregate  
 864 # 1 1/2" "  
 672 # 3/4" "

Equipment:

1 - mixing plant  
 3 - Transit mix trucks

NR. Harper took over inspection  
 at 12:30 A.M.

Labor: 1 - Gen. Foreman  
 1 - Concrete foreman  
 8 - men placing concrete  
 1 - Cement Finisher  
 1 - " helper  
 3 - Transit mix truck drivers  
 6 - men in mixing plant

6" x 12" drain tile in place  
 from Sta. 3+55 to Sta. 3+73

The book  
 says  
 10  
 10  
 10  
 10  
 10  
 10

Note: The variation in batches, yesterday  
 138 batches for 193 ft. of invert and  
 131 " " 206 ft. " to-day  
 is due to the difference in care  
 in fine grading. To-day's grading  
 was closer to true grade, while  
 yesterday the care was over-graded too  
 deep in many places.

Materials:

77 - 3/4" # 32-6"  
 205 - 1" # 22-0"

131 Batches Concrete  
 786 - sacks of cement

Night Crew Shift 5: P.M. to 2: A.M.  
 # 8 - shovel + Crew  
 2 - Trucks - 2 drivers

and in for  
 cleaning strip  
 dividing line -  
 SE 1/4 + NE 1/4





Sat. Dec. 3-

Placed concrete in tunnel

invert: 12:30 P.M. To 11: P.M.

Sta. 0+00 to 0+56

Sta. 1+30 to 1+67

Sta. 0+72<sup>s</sup> to 1+02

Floor between wing walls

complete - Also East cut-off  
wall complete

## Equipment:

1-mixing plant

3-Transit mix trucks

## LABOR

1-Gen. foreman

1-Conc. Foreman

8-men placing concrete

1-Cement finisher

6-men in mixing plant

3-Transit mix truck drivers

1-steel foreman (Headwall)

5-steel men

{ exit Portal 4-hrs.

4-hrs. on tunnel steel

2-steel men - 8-hrs - tunnel steel

5-Carpenters

2-steel men - 5 P.M. to 11 - 2<sup>nd</sup> shift

1-weigh man - " " " " " "

MIX: 6-Sks. Cement

1320 # 5

264 - 2 1/2

864 - 1 1/2

672 - 3/4

Water - 1.8 to

30-gals. (varied)

1+30 to 1+67

30-Batches

180-Sks. Cement

0+72 to 1+02

Invert Concrete

29-Batches

174 Sks. Cement

0+00 to 0+56

44-batches

264-Sks. Cement

Floor between wing walls

100-batches - 600 Sks. Cement

Cutoff wall (east) 27-Batches

116 - 1 1/4" x 22'-0" (Steel in

44 - 3/4" x 32'-6" Tunnel invert

11 - 3/4" x 5'-0" placed to day

Total Batches = 203

Sacks of Cement = 1218

Note: All of concrete crew except

weigh man worked 15-hours to-day

Cement finisher 20-hrs.

7: A.M. to 12:30 P.M. removing

steel and excavating subgrade to  
required grade (inspectors orders)Delay 7:15 to 8:15 P.M.  
pumping water  
and raising steel



R. rd. Carter  
Inspector.

Sunday Dec. 4-

Placed concrete in Core Wall-

Sta: N3480 to N3448  
To elev-543'

8:15 AM. to 3:15 P.M.

~~Sta N3448 to N3420~~  
~~Elev. 542' to 546'~~

8:15 AM } Sta. N3368 to N3352  
Elev. 561' to 564'

Sta. N3352 to N3340  
Elev. 561' to 570'

Core Wall  
excavation  
Accepted  
to N3340

started and ran 22-batches of

75 lbs.  
1440 #5 and then changed to  
1150-1 1/2 g  
1030-3/4

1370 #5  
1220-2 1/2 g.  
then ran 12-batches  
and changed to

Cleaned 1150-Sacks  
Recovered 11-sacks cement  
1220 5  
1370 1 1/2 g, which  
worked O.K.

All on Core WALL

Labor: 1-carp. foreman } Core wall  
5- carpenters }  
3- helpers }  
4- men on cleanup  
1- man springing concrete <sup>all</sup>  
5- men placing concrete <sup>jobs</sup>  
2- Transit mix drivers  
6- men in mixing plant  
1- Conc. foreman  
1- Gen. foreman

1- driller } grout holes  
1- helper } N. End.

2- Carps } Bldg. Tunnel Bulkhead at shop.

Shovel #8 + Crew repairs } SE 1/4  
1- Jackhammer man + helper }

Shovel #NO-7 + Crew repairs } NW 1/4  
1- Jackhammer man + helper }

Equipment:  
1- mixing plant  
2- Transit mix trucks  
1- 2-wheel conc. Buggy  
Chutes

Night Shift

Shovel #8 + Crew repairs } SE 1/4  
1- Jackhammer man + helper }

1- driller } drilling grout holes  
1- helper } North abutment  
1- laborer }



Sunday - Dec. 4 - 1932

## Materials:

Sta. 3480 to 3448

40- $1\frac{3}{16}$ " - 24'0" } Horizontal12- $1\frac{3}{16}$ " - 32'0" }38- $3\frac{1}{4}$ " - 22'0" - vertical52- $1\frac{3}{16}$ " - 2'9" laps

32-ft. Copper

8-2" pipe nipples -  $3\frac{1}{2}$  ft. long - (grout pipes)

N3448 to N3440

concrete  
not placed  
to-day

20- $1\frac{3}{16}$ " - 8'0" } Horiz.  
20- $1\frac{3}{16}$ " - 2'9" }  
10- $3\frac{1}{4}$ " - 22'0" - vertical

Sta. N3368 to N3352

20-ft. copper

Sta. N. 3352 to N3340

18' 14" ft. copper

St.

Total Copper Waterstop 70 line ft.

MIX: 7-SKS. Cement

1370# Sand.

1220#  $1\frac{1}{2}$ " g.1630#  $3\frac{1}{4}$ " g.

68	Batches Concrete	476
3	" Grout	15
	Sacks of cement	491

138  
L.H. HARPER  
+ R.W. Carter

SUNDAY - DEC. 4 -

GROUT HOLES - North Abut.

Sta	Length	
N 3765 W	24'-ft.	Down hole
N 3770 E	24'-5"	"
N 3775 W	25'-0"	"
N 3780 E	25'-0"	"
N 3785 W	20'-0"	Drill in hole
N 3790 E	25'-0"	"
N 3795 W	25'-0"	"
N 3800 W	25'-0"	Batter
N 3802 E	24'-3"	Down hole
N 3804	24'-0"	Batter
N 3806	21'-0"	Batter
N 3810 - W	26'-0"	Batter
N 3815 E	25'	

Inclined holes not deep enough. I told Mr. Wood at 11:AM and he ordered the holes deepened before Concrete was placed.

I checked 2-holes and Mr. Harper checked all others 12:30 P.M. to 4:P.M.

139  
By MR. HARPER

SAT. Night Dec. 3 -

Shovel #8 + Crew { Stripping  
2-Trucks 2-drivers { SE 1/4

Shovel #7 + Crew { Stripping  
2-Trucks - 2-Drivers { NW 1/4 West  
1-dumpman { of Saw on Road.  
4-drillers { drilling Grout  
4-helpers { holes - Core Wall  
North End.



Monday - Dec 5

Placed Concrete in Core Wall

Sta N3762 to N3810

Bedrock to elev.  $522^{\circ}$

7:30 A.M. to 3 P.M.

Equipment:

1-mixing plant

3-transit mix Trucks

Labor:

1-Gen. Foreman

1-Conc. Foreman

6-men in mixing plant

5-men placing Conc.

3-Transit mix truck drivers

126 Batches Conc. 888 sks Cement

1st 3 batches 95 sks each.

52 lin. ft. Copper

No Concrete - Tuesday -

Wednesday - Dec. 7 -

Placed Concrete in Core Wall

N3720 to N3728 - Elev. 528° to 534°

N3728 to N3752 - Elev. 530° to 536°

N3752 to N3776 - Elev. 532 to 538°

1<sup>15</sup> P.M. to 4<sup>50</sup> P.M.

Equipment:

1-mixing plant  
2-Transit mix trucks  
Steel chutes

143

LABOR - 1-Carpenter - all day Core Wall  
4-Carp - 1/2-day " "  
4-men placing Conc. 1/2 day 1/2 day Core Wall  
1-Conc. foreman Cleanup  
2 Transit mix drivers  
6-men mixing Plant 5-1/2 day on g. rout  
1-Carp. helper {reinforcing steel help Carp. Core Wall  
1-Welder - 2-hrs.

MIX: 7-Sks Cement  
1370# Sand  
1220# 1 1/2" gravel  
1030# 3/4" gravel

Materials in Pour to-day

26-3/4" - 22' vertical  
130-lin. ft. 1 3/16" horiz.  
70-lin. ft. copper water stop  
2-steel Columns. (not previously counted)  
12-2" x 5'-0"-pipe nipples (g. rout pipes)  
68 Batches concrete  
2 " G. rout  
486 Sacks of Cement



7: A.M. to 4: P.M. Shift  
Thursday - Dec. 8, 1932

Placed concrete in Tunnel ring

from Sta. 11+63 to Sta 11+03

1<sup>st</sup> Batch at 10:35 A.M.

Equipment: 1 - mixing plant  
3 - Transit mix trucks  
1 - Presswell Conc. gun  
1 - Northern Portable  
24' belt conveyor elevator  
Pipe lines + hose

labor: 1 - Gen. foreman  
1 - Concrete foreman  
1 - man dumping conc. from trucks  
2 - men tamping conc.  
1 - gun operator  
1 - Belt conveyor operator  
4 - Riggers  
5 - Carpenters  
3 - Steel men  
5 - Carp. helpers

7: A.M. To 10:30 - cleanup, building  
scaffolds, closing port holes, getting ready  
to place conc, also shimming reinforcing steel

10:45 to 12:30 - Concrete lines plugged  
+ lunch hour.

MIX: 6 - sks. Cement  
38 - gals. H<sub>2</sub>O  
1370 # Sand  
1220 # 1 1/2" gravel  
1030 # 3/4" gravel

NIGHT - 12-7-32

5 AM TO 2 PM.

# 7 + Crew

2 Trucks - 2 drivers

2 Jackhammers

1 powder man

1 dump man

NIWY

stripping



1:2:4 - Concrete

6 - Sacks Cement

1300

71220 # Sand

970

4370 # 1/2" gravel

770

1030 # 3/4" gravel

GROUT:

2590

5 sacks cement

3620

1040 # Sand

5.9

2.4

$$\begin{array}{r}
 1.1 \ ) \ 7.0 \ 6 \\
 \underline{66} \quad \quad \\
 40
 \end{array}$$



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  $1/2$  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.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.  
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	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  $41.9 + (20 - 16) \div 2$  or 2 ft. added to 41.9 = 43.9. For slopes of 1 on 1 see inside of front cover.

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