

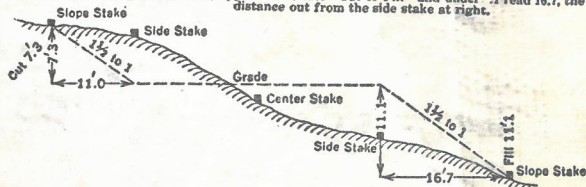
LEVEL BOOK

32 0040

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1 1/2 to 1.

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



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

KEUFFEL & ESSER CO.

Book 67-2

W.R. Oglesby

Florida Board of Conservation

Div of Geology

P.O. Box 631

Tallahassee, Florida

Zip. 32302

Chas Mitchell Jackson 5-1641

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Exemption No.

A-105339

Lutz Community
Sun Lake Park
27 S 18 E 10 NW
Photos

Dale Mabry & Hudson
Street collapse to 5'
8' Diam. NW 15
28 S 18 E

Mr J H Dobbins
County Engineer
Court House, Tampa.

Photos 15 28 S - 18 E

27 S 18 E 21
St Petersburg Well Field.

Tampa - Sheridan Hotel

Nov 13-1967

Mobil #1 A FSL 224-A

Crystal River - Citrus County.

USGS BM 15 J.F.S. 1952

Elev 7 feet - Disc in Concrete

Sec 17-18S-17E - West S. 1/2 -

(Wing. US 19.)

1 H 7/10 Ft Above B.M.

11/13/67

Time	Reads	Time	Read	Time	Read
------	-------	------	------	------	------

2:23	9735				
------	------	--	--	--	--

2:29	9737				
------	------	--	--	--	--

3:45	9743				
------	------	--	--	--	--

3:48	9741				
------	------	--	--	--	--

11/14/67

8:47	9757	8:52	9759
------	------	------	------

1:42	9752	3:42	9770
		3:40	9768

U.S. Eng

Harbor Survey

11/9/40

CRG #5

Disc in Concrete

Crystal River

1 H 1.0' Above B.M.

Time	Read	11/13/67
------	------	----------

3:30	9713
------	------

3:33	9715
------	------

11/14/67

9:07	9741
------	------

9:40	9741
------	------

9:43	9737
------	------

9:46	9737
------	------

1:30	9737
------	------

1.5 mile

1.2 mile

Crystal River

moil 1-A FSL 224-A

Nov 14-1967 D.F. 24 MET.

Time Read

11:23 9784

9737

47

9784

9737

2.8

Concrete

Nov 17, 1967-

Immatalee Base SRD

SW Pier of

Bridge # 136 - 148.05 E of

Intersection
SR 29

Immatalee on STRD.

Time Read Elev. I.H.

1:25 9945 33.73 0.0

1:46 9939 ✓ ✓

1:53 9939 ✓ ✓

Use

3:13 9946 ✓ ✓

3:15 9945 - -

4:23 9952 - -

4:24 9952

La Baille Base (Pt. Hance) N.R.

Time Read Elev I.H.

overgrown grass

2:30 13975

1.5'

above ground
+ .14

2:35 13975

Draft - .03

+ .11

Miles City Base
3RD BM on SW cor
Bridge Miles City - Allagash
Alleg Rd intersection with 29

Time Read Elev I.H.

4:48 7328 19.17 0.0

4:51 7325 ✓ ✓ Use

Nov 18, 1967.

Miles City Base (as above)

10:35 7331 19.17 0.0

10:41 7332 ✓ ✓

11:48 7329

11:50 7332

No
lift

Nov 18 1967

Hog Island Base

S.E. Pier of Bridge #127
(1941) - Witness Post F.A.S.

126-B FSRD BM.

Time Read El. I.H.

11:17 7815 21.0 0.0 no draft

11:18 7815 ✓ ✓

3:04 7819

3:05 7821

4:03 7837

4:06 7837

Nov 18, 1967

Immunohaler Base

3:37 9967 Dist - 610

3:39 9965

SW Road Shoulder - High Point 5' from
High top 29

Fakahatchee Conservation Club
Road Stalein SE SE

Sec 18 - 49 S-30E about

0.9 mile S of ~~Hester~~ Hester

Base. on East side of
St. Rd 29 + Entrance to Club.

Time	Read	El	HT.
------	------	----	-----

11:24	7747		1.5
-------	------	--	-----

11:27	7749		-
-------	------	--	---

Nov 19

Immokalee Base SW Cr Bridge 136

Time	Read	HT	FT
------	------	----	----

8:31	10010	0.0	
------	-------	-----	--

8:50	10007	Use	
------	-------	-----	--

11:10	10013	-	
-------	-------	---	--

11:12	10013	-	
-------	-------	---	--

11:25	10011	-	
-------	-------	---	--

11:28	10011	-	
-------	-------	---	--

Nov 19

1967

Loc 15 - 2.1 miles SE of
intersection (846) + 29 mi
1 mm hole. Common Co.

Sec. $\frac{11}{14} | \frac{12}{13}$ - 47S - 29E

Time Read Elev Ht.

9:02 9767 30' 1.5'

Loc 16 - NWNW 19 47S-30E

Back for Secondary Rd -

9:15 9585 25' 1.5'

^{#17}
Owl Hammock - Center of Turnaround
C/sec 29 - 47S 30E.

9:28 9344 22' 1.5'

18.
~~#19~~

Along SR 29 - Common Co
between Sec 32 + 5 also
T 47S + 48S R 30E.

Road Shoulder

Time Read Elev Ht.

9:45 9102 25' 1.5'

~~#20~~
Station Center of Dirt Rd in
Center Sect 8 48S 30E

~~24' 1.5'~~

9:51 8817 24' 1.5'

²⁰
Station 0.2 miles E on SR 1840
Sec 17. 48S 30E

10:00 8762 20' 1.5'

018

0.02 miles N of SR 29 1015 M. E. in Sec 29

Station S/2 Sec 20 48S-30E

At rd side (21) on top of steep

Time Read El 1H.

10:14 8569 21' 1.5'

G.C.R.C. #18 20-48S-30E

Time Read El 1H

10:20 8574 1.5'

Station Center Sec 29 48S-30E

BM 18' N of rd.

10:30 8442 18' 1.5'

Water tower in Sunland Field

Headquarters SW 1/4 29-48S-30E

10:40 8408 20' 1.5'

11/19/67

Common Line Sects 3245

also 48+49S 30E

Time Read El 1H

10:50 8237 19' 1.5'

Hog Island Band Br 127

11:45 7869 21' 0.0

Station 1.15 Miles N of Hog Island Band where 20' center crosses road.

11:55 8032 20' 1.5'

Station 0.9 miles N of last station (2.05) miles N of Hog Island Band

12:05 8127 15' 1.5'

Nov 20, 1967

Ocala Base at Court House
selected 1967 by USC+GS

B.M. H 46 A at

SW Cor of former Court House
Cor S Magnolia & SE Broadway

Time Read IH FL

1:30 10056 1.5' 100.945(R)

1:40 10054 ✓ ✓ ~~100.945~~

1:50 10054 ✓ - Use

4:20 10055 ✓ ✓

4:25 10055 - ✓ Use

Crystal River Base

Time Read IH FL

3:15 7574 0.7 7'

3:20 7575 - - Use

Dec 8, 1967 - Rain

USGS BM 15 JES 1952

17-78S-17E W/side Us 19)

Time Read FL IH

7:30 9852 7' 0.7

7:41 9853 ✓ ✓

7:50 9854 - ✓

1:50 9885

1:52 9891

moist # 2 FSL 224-A

FL
MLT. water
level

10:16 12045 24' 7.0

12045

9854

219.1

2.8

21.6.3

JUNE 28, 1968
Riese Oglesby

Alligator Alley

Station	Time	Read	EI	I.H.
Base Miles City	8:44	10787	19.17	0.0
	8:54	10790	-	-
Bridge MAIN Canal	9:35	10890	22.85	-
	9:45	10894	-	-
Base Miles City	10:43	10751	19.17	Change Cells
	10:47	10767	-	-
	10:53	10768	-	-

STAT	8-20-68	TIME	READ	EL	H.I.
#68	SDGRY	3 16	13126	-2"	1.5
LITTLE	STM				
SPANISH KEY		3 18	13128	✓	✓

8/23/68

yacht Club - Marina D.D.

Time Read

5:15 10623

5:17 10622

8/24/68

Station	Time	Read	El	Lt.
Key West	10:00	10577	-	1.5'
Lat				
Airport	10:05	10575		✓
D.B.	1:59	10568		✓
	2:01	10568		
	4:35	10560		

Key West	10:25	10485	14.324	0.0
Δ	10:28	10487		

USCIS.
Basic Bench

x

Key West	10:42	10615	-	0.6
gach ch				
FBC	10:45	10614		0.0
slip				
D.B.#1				

Station Time Read El Lt

Key West	10:50	10621	-	0.0
gach				
Club	10:52	10621		
Hauler				
marker				
DB#2				

Dry Tortugas - Fort Jefferson
Lintel at gate to Fort
(behind drawbridge)
Pilot Perry Oliver - Chalk Line

Tortugas	3:03	11321	5'-1 1/2"	5'-5"
Fort Jeff	3:11	11321	Mid-Tide	
Lat	24°	37.6'	N	✓
Long	82°	52.4'	W	

8/26/68

Station	Time	Read	Elev	1/H	Chobolos
SE Cor					Granly Base
Bridge	4:29	18468	11.49'	1.2'	
1953					
Between H-20	4:32	18469	-	-	
Everglades	5:26	18469	-	-	
+ Chobolos					
Fla SRD +	5:28	18469	-	-	

Carnestown
 Base Δ Base 4:57 18394 1.0'
 W-36 5:00 18393 1.0'
 Roset
 1952 Lat 25° 54.9' N
 RIGD Long 81° 22.4' W

USC 165
 X 249 + 5:10 18483 1.0' Everglades
 1965 5:13 18484 - Granly
 ON low? Base
 29
 N of
 Everglades

Station	Time	Read	El	1/H
Anglers Motel	5:53	18290	2.0'	1.5'
Fishing Dock	5:55	18285	at High	-
Loc "B"	5:57	18288	Tide	-
Lat	25°	49.1'	N	
Long	81°	21.5'	W	
		N 25° 49.1'	N	
		W 81° 21.5'	W	

8/27/68

Station ^{14'} A Time Read E1 Ht.
 P.B. Dock at 11:07 20252 3.5' 1.5'
 Launching 11:09 20251 Low Tide
 Ramp-Morris Range 1 1/2 to 2'
 Swook Hole
 Motel 2:29 20216 2.2' 1.5'
 Photo #2 2:31 20216 Mid tide to
 Lat 25° 58.4' N. High tide
 Long 81° 44.2' W.

Loc 90 12:03 19203 3 FT 1.5

Δ 12:06 19207 Low tide

Photo #3 3:37 19207 1 FT 1.5

Lat 25° 31:39 19205 High Tide
 Long 81° 52.0' N
 34.9' W

Loc 91 12:26 19486 0.5' 1.5'

Coon Key 12:28 19484 Low tide
 Lat 25° 53.5' N
 Long 81° 38.2' W

Loc 92 12:53 19179 0.0 1.5'

Cake 12:55 19180 Low tide
 Romano Lat. 25° 50.7' N
 Long 81° 40.7' W

Station Time Read E1 Ht.
 Loc 93 1:45 19790 0.0 1.5'
 Capabas Lat. 1:47 19792 Mid Tide
 Photo #4 Long 25° 54.5' N
 81° 43.5' W.
 Loc 94 Photo 4:00 18987 0.5' 1.5'
 Panther Key 4:02 18989 Mid Tide
 Lat 25° 51.0' N
 Long 81° 32.9' W No dust
 Loc 95 Photo 4:25 18899 1.0' 1.5'
 West Pass

Lat 25° 4:27 18895 Mid Tide
 Long 81° 30.5' W

Loc 96 4:47 18721 1.0' 1.5'

Indian Key 4:50 18722 Mid tide
 to High

Lat 25° 48.2' N
 Long 81° 28.0' W

8/28/68

Station	Time Read	E1	111
Carnes from A	9:53	18446	-
Base W-36	9:55	18447	1.2
	12:06	18449	
	12:08	18449	

Loc 97 at ^{dist - oil} 10:34 19945 0.3' 1.5'

Goodland Bridge 10:36 19946 Low Tide

Lat 25° 56.0' N 2' below High

Long 81° 39.4' W

A. Durr 11:19 202583.5 1.5'

at S. North 11:21 20257 low tide

Isle

Oct 14 1968

Meter #795 Recalibrated

Previous 0.0866 (4)

Present 0.0866 (9)

Grants Stations Needed

1. Flamingo Playpole Base to
USDI. - N.P.S. (main) Need
location
2. US C165 L-276
Islamorada to Flower Key
Base (Need location of
both plus loc of
Islamorada Yacht Basin.)

Take " Homestead Quad
plus Nav chart of
Islamorada

Alligator Alley Grants

3/25/69

Station (Description)	Time	Read	Elev.	Ht.	Mileage
"A" Miles City Base	12:29	11320	19.17	-	
"A"	12:31	11326	✓	-	
"A"	12:33	11324	✓	-	
021-230 Canal Intercept L-28	1:06	11446	22.85	-	1971.2 L-28
"C"	1:08	11447	✓	-	
"A"	1:42	11326	19.17	-	
"A"	1:44	11330	✓	-	
W-36 Reset 1954 Carnestown Base	2:10	09695	-	1.2'	Note Backlash
✓	2:12	09700	-	✓	
✓	2:14	09701	-	✓	
"A"	2:36	11333	19.17	-	
021-219 Bridge 1967	2:38	11334	✓	-	
"B" West of Rest Area	3:00	09115	23.77	-	
"B"	3:02	09116	✓	-	1954.2
021-230	3:20	11458	22.85	-	
"C"	3:22	11456	✓	-	

Alligator Alley

Station

Description

Time

Read

Elev

1st

Mileage

3/25/69

021-219

B

3:45 09115 23.77

1983.2

B

3:47 09115 ✓

021-208

D

Bridge at 80A

4:06 10668 20.49

1994.5

4:08 10672 ✓

A

Miles City

4:18 11365 19.17

1999.4

4:20 11366 ✓

D

80-A

4:30 10678 20.49

2004.3

4:32 10676 ✓

021-213

E

4:45 09900 21.65

2010.8

4:47 09905 ✓

B

4:58 09133 23.77

2015.6

5:00 09134

021-225

F

5:12 10094 21.09

2022.6

5:14 10093 ✓

021-230

C

5:26 11451 22.85

5:28 11455

A

Miles City

5:58 11333

6:00 11334

Alligator Alley 3/26/69

Station	Description	Time	Reach	Elev
011-230 C	L-28 Canal	7:10	11505	22.85
✓		7:20	11506	✓
011-206 (G)	Bt #4	7:50	14042	20.08
		7:52	14042	
C	L-28	8:19	(11491)	22.85
		8:21	11512	
		8:24	11511	
011-202 (H)		8:45	13466	21.59
		8:47	13469	
C	L-28	9:05	11511	22.85
✓		9:07	11513	✓
011-200 (I)		9:20	12780	22.50
		9:22	12786	
		9:24	12787	
011-201 (J)		9:36	13380	24.95
		9:38	13383	

1.14 Miles

2168.1

✓

2192.1

Bad Road

Change Battery

2228.4

2240.7

2244.9

2249.0

N.B. Road Along Canal

Intercept L-28

Cent + S Fla FCD

Drive to 2193

Alligator Alley 3/26/69

7.6

Stat	Descriptor	Time	Read	Elev	Miles	114
------	------------	------	------	------	-------	-----

011-204

(K)

10:03	13709	20.64	2259.5	-
-------	-------	-------	--------	---

10:05	13708	✓		
-------	-------	---	--	--

021-230

C

L-28

10:32	11519	22.85	2278.2	-
-------	-------	-------	--------	---

10:34	11520			
-------	-------	--	--	--

A	Miles City	12:32	11395	19.17	2335.3
---	------------	-------	-------	-------	--------

12:34	11398			
-------	-------	--	--	--

021-220

(L)

Culvert 2.5
Miles Ed Entr.

1:15	12629	12.78	2357.8	
------	-------	-------	--------	--

1:17	12629	✓		
------	-------	---	--	--

021-203

M

Bridge
over Canal

1:30	12598	19.52	2365.4	
------	-------	-------	--------	--

1:32	12598			
------	-------	--	--	--

A		1:50	11389	19.17	2376.5
---	--	------	-------	-------	--------

1:52	11396			
------	-------	--	--	--

1:54	11397			
------	-------	--	--	--

021-209

D-1

Bridge at
Canal Curve

2:13	10684	22.23	2383.0	
------	-------	-------	--------	--

2:15	10685			
------	-------	--	--	--

Alligator Alley 3/26/69

Station	Description	Time	Read	Elev	Miles	I.H.
---------	-------------	------	------	------	-------	------

021-210

D-2

		2:24	10442	22.02	2384.7	
--	--	------	-------	-------	--------	--

		2:26	10441			
--	--	------	-------	--	--	--

021-211

D-3

Culvert

		2:34	10309	16.32	2386.0	
--	--	------	-------	-------	--------	--

		2:36	10308			
--	--	------	-------	--	--	--

021-212

D-4

		2:48	10174	16.45	2386.7	
--	--	------	-------	-------	--------	--

		2:50	10176			
--	--	------	-------	--	--	--

A

Miles City

		3:08	11405	19.17	2399.1	
--	--	------	-------	-------	--------	--

		3:10	11402			
--	--	------	-------	--	--	--

Allegany Valley 3/28/69

Station	Description	Time	Read	Elev	Mileage	1/4	Notes
021-219 B	Bridge New Rest Area	6:58	09240	23.77	2841.7		
		7:00	09236				
021-213 E	Bridge	7:13	10004	21.65	2846.6		
		7:15	10005				
021-215 E-2	Culvert	7:25	09601	16.43	2848.3		
		7:27	09599				
021-214 E-1	Culvert	7:35	09843	16.54	2849.3		
		7:37	09844				
021-216 E-3	Culvert	7:45	09525	16.35	2851.0		
		7:47	09523				
021-217 E-4	Culvert	7:54	09569	16.42	2851.6		
		7:56	09573				
021-218 E-5	Culvert	8:03	09470	17.46	2852.4		
		8:05	09471				
021-225 F	Bridge	8:18	10199	21.09	2860.5		
		8:20	10205				
		8:22	10205				

Alligator Alley 3/28/69

Station	Description	Time	Real El.	Miles	114	Notes
021-219 B	Bridge	8:34 09236	23.77	2867.6		
		8:36 09245				
		8:38 09245				
021-220 B-1	Culvert	8:45 09320	16.53	2868.8		
		8:47 09323				
021-221 B-2	Culvert	8:50 09373	17.03	2869.8		
		8:52 09376				
021-222 B-3	Bridge	9:03 09358	21.64	2970.4		
		9:05 09360				
021-223 B-4	Culvert	9:12 09736	15.62	2872.2		
		9:14 09737				
021-224 B-5	Culvert	9:23 10070	15.52	2873.8		
		9:25 10073				
021-220 C	L-28 Bridge	9:36 11591	22.85			
		9:38 11593				
021-219 B	Bridge	9:50 09262	23.77	2891.7		
		9:52 09262				

Allegheny Alley 3/28/69

Station	Description	Time	Read	Elev	Mileage	Height	Notes
021-225 F	Bridge	10:09	10213	21.09	2898.8		
		10:11	10213				
021-226 F-1	Culvert	10:16	10409	15.34	2899.4		
		10:18	10412				
021-227 F-2	Culvert	10:25	10712	15.32	2900.4		
		10:27	10714				
021-228 F-3	Culvert	10:33	10919	15.22	2901.3		
		10:35	10920				
021-229 F-4	Bridge	10:44	11212	20.91	2902.5		Beam Survey Shows Shovel Worn?
		10:46	11213				
011-200 I	Bridge at FDC Boundary Canal	10:58	12861	22.50	2907.9		
		11:00	12861				
021-225 F	Bridge	11:15	10213	21.09	2917.2		
		11:17	10216				

State Road 840A N of Allegan Allegan 3/28/69

Station	Description	Time	Read	Elev	Miles	1.14
021-231 R	Center of Road at N End.	2:25	11171	17' East	2977.2	1.5'

2:27 11172

021-232 R-1	BM in Bridge	2:33	11019	17.33	2978.1	-
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2:35 11022

021-208 D	Allegan Hwy Bridge	2:50	10823	20.49	2979.3	
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2:52 10825

Allegator Alley S. along Canal at

FCD Boundary - Brown

3/28/69

Station
011-200

Description

Time

Read

EI

Miles

1H

1

Poridge

2:26

12876

22.50

3006.7

-

011-208

S

Canal Road
at Gate Entrance

2:28

12877

2:35

12892

20 Est

3006.8

1.5

011-209

S-1

2nd
Turnout

2:37

12891

2:44

12807

-

3007.9

✓

011-210

S-2

3rd (Curve)
Turnout

2:46

12811

2:56

12723

✓

3008.9

✓

2:58

12734

3:00

12735

011-211

S-3

4th
Turnout

3:08

12591

✓

3009.9

-

3:10

12590

011-212

S-4

5th Turnout
on Bend

3:19

12471

✓

3010.9

✓

Bend NOT Shown on map

3:21

12473

011-213

S-5

6th Turnout
on Curve

3:29

12357

✓

3012.0

3:31

12357

Road Drops about
3' on Curve

Canal Rd Cont'd

3/28/68

Station	Description	Time	Point	Elev	Miles	HT	Note
011-214 S-6	on road No levee No turning	3:40	12609	17.0 ^{Est}	3013.0	1.5	
		3:42	12608				
011-215 S-7	End of Line	3:50	12733	✓	3013.5	✓	End of Road in Swamp
	turn around	3:52	12733				
011-208 S	At Gate	4:12	12927	20.0		1.5	
			12925	19.5			

Alligator Alley 3/29/68

2, 7

Station	Description	Time	Real	El	Mile	1H	Notes
021-203 M	Bridge at Canal	9:35	12731	19.52	3126.6	-	
		9:37	12732				
021-202 L-2	Bridge at Canal	9:45	12711	19.03	3128.6	-	
		9:47	12714				
021-201 L-1	Culvert	9:51	12726	13.52	3131.3	-	See Photo of Flower Spikes in Orchard
		9:53	12726				
(M)	Bridge	10:15	12729	19.52	3136.0	-	
		10:17	12729				
021-204 M-1	Bridge	10:25	12726	19.97	3138.2	-	
		10:27	12730				
021-206 M-2	Bridge	10:38	12346	20.28	3142.7	-	
		10:40	12346				
021-207 M-3	Bridge	10:49	12035	21.01	3144.6	-	
		10:51	12039				
021-205 M-4	Mile Post 16 N Side Road	11:03	12638	19.0 ^{Est}	3149.0	1.5'	
		11:05	12648				
		11:07	12648				

Allegator Alley 3/29/69

Station	Description	Time	Read	E.L.	Miles	I.H.
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021-203

M	Bridge	11:15	12731	19.52		
		11:17	12729			

011-204

K	Bridge & Canal	1:43	13881	20.64	3239.7	
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1:45 13882

011-205

K-1	Bridge at Canal	1:53	14020	24.16	3242.1	
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1:55 14021

011-207

G-1	Bridge	2:05	14291	20.18	3247.0	
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2:07 14293

011-203

H-1	Miami Canal	2:23	13730	24.44	3257.1	
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011-024

Best Bridge

2:25 13734

011-204

K	Bridge	2:31	13878	20.64	3259.5	
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2:33 13882

Oct 10, 1969

Station	Time	Read	Elev.	Alt
Tallahassee Base A	2:27	12508	—	—
Q-155	2:29	12515	—	—
✓	2:31	12518	Referenced	—
	2:33	12518	Use 12518	—
USCIS				
D-86	4:40	12014	.4	—
1935	4:42	12014	.4	—
Q-155	5:10	12555	—	—
✓	5:12	12555	—	—
D-86	5:39	11995	.4	Do not use.
✓	5:41	12004	✓	—
✓	5:43	12007	✓	—
	5:45	12005	✓	—

Oct 13, 1969

Station	Time	Read	Elev	117	Dri 17
H-227	9:00	11969	13.031	1 Ft.	—
✓	9:03	11968	✓	1 Ft	—
Lap Bench Calibration	9:38	10084			A
Mc Donnell Douglas	9:42	10084	10082		A-.02
Room 1	9:48	10076	10073		B-.03
Pressure	9:46	10076			B
Lat	9:54	10085			A
Room 2	9:53	10092			C-.06
Linear	10:06	10095	10091		C
Measure	10:08	10095			C
H-227	10:39	11973	13.031	1 Ft	—
✓	10:42	11975	✓	✓	—

Oct 14, 1969.

Station	Time	Read	HT	Elev	Drift
Miami Marine Institute Lab Base	10:09	03986	—		
	10:11	03985	—		

S. Miami Base	10:44	04142	—	13.615	Coral
1934 USC165	10:46	04143	—	✓	106

Miami Marine Inst	11:14	03974	—		
	11:16	03975	—		

Coral Gables Base	12:37	05436	—	10.022	
A 36 1933 Reset 1943 USC165	12:39	05438	—	✓	1.11

S. Miami Base	1:15	04125	—	13.615	
	1:17	04128	—		
	1:19	04132	—		
	1:21	04127	—		use

At Entrance to West Dike
of Miami Univ. Inst of
Marine Sciences. Left
radius intersection with
arc of circle formed
by two sunders.

Stat	Time	Read	Elev	HT
Coral Gables Base	1:49	05431	10.022	—
	1:52	05423		—
	1:59	05432		—

Oct 14, 1969

Station	Time	Reel	El	1H	Brutt
BM U235	3:18	08655	-0.5'		(-0.04)
USC&S	3:20	08651		✓	
Broward at House	3:22	08651		✓	use
1965 Coal Poles					1.04
Base	4:29	05423		—	
A-36	4:31	05425			

Oct 15

Station	Time	Reel	El	1H
BM U235	9:10	08658	-0.5	
Broward at House	9:12	08661		✓
✓	9:14	08661		✓
	11:23	08691		✓
	11:25	08689		✓

8690
8460
Broward Off Count House
On SE 6th St + SE 3rd Ave
Sept removed. Tidal
BM # 2 destroyed. A+SE.
Pillar of Fountain 2' above
sidewalk. BM U235
USC&S, 1965.

Station 26.95 + 55.23
 Ref print Steel Rod in
 4" x 4" Minnerst
 N 87° 56' 02" E 44'

Oct 15, 1969

Station	Time	Read	EL	114	Drift
Base of	10:32	08458		1.5'	-.18
Flashlight	10:34	08458		✓	Wet
Entrance				+ .14	-.04
To Alligator					
Dike -	1:44	08456		1.5	+ .14
Andy's house	1:46	08460		✓	Del
	1:48	08457		✓	
	2:46	08462		✓	
	2:48	08462		✓	Mileage

Station	Time	Read	EL	114	Drift
Bridge					
H-1	2:10	07798	24.44	-	367.7
Miami					372.5
Canal	2:12	07798	✓	=	372.5
Bridge					

Drift - .04
 total + .10

Oct 15, 1969

Station	Time	Read	EL	114	Miles
Bridge	2:31	08311	20.16	-	376.5
	2:33	08313	-		

Andy from Tide Gauge on Canal
 4.36'

Oct 16, 1969

Deane

Oct 16

Station	Time	Range	El.	I/H	R/G
Vero Beach	8:20	03903	14,380	1-0'	dale
1932	8:22	03895	✓	-	
USC165	8:24	03897	03896	-	+ .094
Base	9:55	03890	✓	-	
✓	9:57	03893	03892	✓	

Station	Time	Range	El.	I/H	R/G
Malabar	9:08	05188	1.02	0.8'	
Base	9:10	05180	✓		
Relocated	10:34	05202	✓		
V-299	10:37	05204	203	✓	
USC165	12:39	05205	✓		
1965	12:42	05207	206	✓	

Station	Time	Range	El.	I/H	R/G
H-227	11:40	13251	13,031	1.0"	
City	11:42	13250	-	1.03	
Hall					
Jacksonville					
Reset					
1969					

152,47

43 Paces NE of Malabar Turntable

19 Paces West of New light track

center + 19 Paces N of
State Road 514 Center

Brass Disc in Standpipe

6" clear ground. 1' N of

telephone pole + 1'S of
Witness Post.

Nov 19-1969

Station Time Read I.H. El.

Sopchoppy 11:10 10951 -

Base 11:13 10944

New 11:15 10951 .49

Bridge 11:19 10948

Av = 10949

Bloxham 12:05 09565 0.4'

Base 12:08 09565 -

Ward 09-073-021

H-86 12:26 08818 0.3'

(1935)

USC+GS 12:30 08815

Sopchoppy 1:08 11003 -

Base 1:11 11001

at 3:06 10999 -

Bridge 3:08 10996

Windy
Null
Vibrates

High
Seismicity

High
Seismicity

High
seis

Fla. Gravity net

New Bridge at Sopchoppy
over Sopchoppy River, 1968
on S.E. Cor of Bridge - BRONZE
Disc Stamped - Florida SRD
N. City Limit of Sopchoppy

About 1/2 mile from Waukegan
Line in Lem City on S + Rd 375

Station	Time	Read	1H	F1
BM#2	2:25	06907	1.5'	12.76
USC+GS	2:28	06911	✓	✓

High
Seismic

On 3/9 in Carabelle at Highest
Tavern in Sidewall Bronze disc
USC + GS Stamped BM#2.
12.76 Cut in corner Sidewall

USC+GS	4:05	08765	-	34'
Panacea	4:07	08764	-	

Near Medant in Aug.

Spchiffy	4:28	11007	-	
Base at New Bridge	4:30	11011		

Nov 20 - 1969 - cold

Station	Time	Read	1-H	Elev	Seismic
Appalachian cola	8:00	05750	-	15.77	1.45
1934	8:02	05746	-	✓	
US of GS	9:30	05784	-	✓	✓
	9:32	05787	-	✓	✓
	11:16	05786	-	✓	✓
	11:18	05786			

BM#2	8:38	07039	1.5	12.76	Less
Carabelle	8:40	07047	✓	✓	Sign
Base	8:42	07047			

Priest Base at Right Side Light Bridge Barbours	9:14	06776	1.5		Sign
	9:16	06775	✓		

Station	Time	Read	HT	FL	Miles
4295	10:03	05490	1.0		
1967	10:05	05490			
USC165					
Disc					
Nine					
mile					

USC165	10:40	06386	-	16.581	
C-176	10:42	06390	-		
(1957)	2:05	06417			
St 166	2:07	06418			
Base					

Mexico C.	12:58	06528	-		
Beach					
Bus	1:00	06529	-		
SRD.	2:29	06525	-		
	2:31	06527	-		

1.40

This disc recovered - marker
in which disc is set is loose
inside pipe sleeve. (2) + (2)
(2)

ON wall 7' N of BM.
150 yds S of Gulf Riffle Club
W side of Rd

Bridge at Mexico Beach
Hwy 98 - Near the Surf Restaurant
and Pier - on the SW wall of Bridge
SRD Bring Disc 1.2 mile
W of Gulf - Bay City Line +
Road 386 junction w/98 at
the Beach

11/20 69

Sunny
Nice

Station	Time	Read	HT	Elev	Miles
USC165					
B-290	3:43	07452	1.0'		
1967	3:45	07456	✓		
Gaskin	4:58	07448	✓		
	5:00	07448	✓		
USC165	4:22	07913	1.5'	45.495	
6-43					
1934	4:26	07913	✓	✓	
New Box					
U-289					
1967	4:44	07613	0.7'	73.6	
USC165	✓	07612	✓		

10.6

At Fire Break ^{Looking} Rd No. 38
7.7 Miles East of Intersection
of SR (22) with US (98)
on N Side of Road. Bay City

Sidewalk line level with concrete
at N. entrance to Public
Library (former Court House)
Bay City

SR. 22 Bay City

8.1 Miles East of B-290

11/21/69 Florida Crater Mt

Station Time Real TH EI

S-48 8:20 07411 1.1'

Reset 8:25 07413 -

1937

USC165

Panama

City

Base

USC165
B-290 8:57 07445 1.1

1967 9:00 07443 -

Gaskin 10:37 07495 -

10:39 07497 -

Sulphur Pt 9:52 07818 -

Base 9:54 07816 -

US A-165

H-176

1957

US 98 - SW Pier of
Bridge - No Seismicity - Traffic
Makes leveling difficult -
No Wind

Gaskin Base
Wildlife
(Manag. & Pres.)

Old Bridge on Hwy 98
West end of Panama City
SE. Side Pier Foundation

11/21/69 Fla Grant Net

Station	Time	Read	1H	E1	Miles
Wawa Base	11:32	07973	1.5'		
G43	11:34	07977	-	(77)	
1943	12:59	07967	✓		
	1:01	07967	✓		
	3:07	07968	✓		
	3:09	07967	✓		
	4:53	07966	✓		
	4:55	07966	✓		

USC+65 P-295	11:54	06646	-		42.3
1967	11:59	06654			
	12:00	06645		66 ⁵⁰ m.	
	12:11	06653			
	12:13	06651			

Write Page Skit to St. Jo.

Transverse & Horizontal Levels
out of hand - go to office
to readjust
11:05 - AM.

Bridge FAP 134
on NW Pier

Levels sufficient

50.1
47.3
2.8 2.8 miles N of
Junction 387 W/ (77)

50.7
52.4
47.3
3 miles N of
Only fire taken.
5.1 N N Island
waterway

11/21/69

Station Time Road 1H E1

SRD 4:32 07989 -

Disc 4:34 07988

(?)

SE cor of Bridge on
Piling - Highway 71 ~~over~~
Bridge over Chipola River
about 1/2 way betw Blountstown
& Weir

11/21/69

Station	Time	Read	Alt	Mile
St. Joe				
Pass	12:26	06466	-	52.6
	12:29	06466	/	

Mexico	2:00	06580	-	
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Peak	2:03	06582		
------	------	-------	--	--

Base
SRDB

Gashin	2:43	07501	1.0	
--------	------	-------	-----	--

Base B-290 1967	2:45	07503	✓	
-----------------------	------	-------	---	--

Bridge	4:08	08737	-	
--------	------	-------	---	--

E of Blount	4:10	08737	-	
----------------	------	-------	---	--

FSRD

About 6 Miles E of intersection
 of SR 70 + 20 Bridge
 Just East of Blount

Florida Grants Oct 11-22-69

Station	Time	Read	I.H.	Elev	Miles
Carrabelle Base USC+SS	7:18	07178	1.5	12.76	
#2	7:20	07180	✓	✓	
-	9:20	07193 ^{del}	✓	✓	
US	9:22	07198	✓	✓	
	9:24	07197	✓	✓	
	11:00	07180	✓	✓	
	11:02	07182	✓	✓	
	12:43	07187	✓	✓	
	12:45	07186	✓	✓	

H-293 1967 USC+SS St James Base	7:40	08858	0.7'	185.6	
	7:42	08857	-		

Bride mud(?) Chicknee of Pennac	8:10	09223	-		
	8:12	09224			

No Wind - No Seismicity

South Side of Road

SW Side of Bridge Crossing
Chicknee Bay - Franklin
City Side + Chicknee
Concrete Pier

Station Time Read 114 Fl. No.
 Panama 8:31 09051 - T
 A 1933 8:33 09055 - New Cell
 Base 8:35 09058 L
 8:39 09030
 pr. 8:41 09025 (pr 9028)
 8:43 09030
 8:45 09027
 11:50 07150
 11:00 07180

USCGS
 F-295 11:50 07237 1.0' below
 1967 11:53 07219 ✓
 11:55 07220 ✓

USCGS
 D-294 12:10 07221 0.7'
 1967 12:12 07225 0.7'

N. of Panama Near Macmont
 W Side Hwy 98

At RR Track ^{Franklin} Liberty City S.
 of Sumatra E of Hwy 65 N of Sum.
 Mark location

.9 mi S of RR Track on
 E of Hwy 65 - Good Readings
 Use mark location
 →

11/22/69

Station	Time	Real	HT	E1	Miles
Jewel #3 USC+GS	10:08	08478	1.2'		264.9
1938	10:10	08480	✓		

Check exact location

CS-317	1030	10040	1.3'		275.1
	10:34	10042	✓		

Disc in Concrete at ground
level - Witness stake top
sighted " 2" down in
Appalachian Front - Liberty Co.
8.3 Miles S of Foot Line
12.2 Miles S of Jewel #3
Check exact location

11/22/69

Station	Time	Reading	HT	El.
Drift Base	3:09	08376	1.3'	8373
CS-264	3:11	08370	✓	
USFS				
09-077-021	4:31	08369	✓	8371
Teloga Base	4:33	08373	✓	
Blounts	3:57	08768	-	
Base	4:00	08769	uv	
Bridge				
E. 09-013-020			+1.01 Drift	

At F.A.R. Concrete Pole
 S-38 (2) + U.S.F.S. - Witness Post
 White at intersection of
 (65) + (67) in Teloga
 check distance of BM from Road edge
 + witness post.
 Disc is 6 paces west
 of witness post.

12/3/69

Florida

Station	Time	Read	HH	El	M. 1/4
Sumatra	7:35	07514	1.0'	28.110	435.3
1934					
USC165	7:37	07518	✓	✓	
	7:40	07513	✓	✓	
	7:43	07515	✓	✓	
	9:04	07519	✓		
	9:06	07523	✓		
	9:08	07520	✓		
	12:37	07566	✓		
	12:39	07566	✓		

Crane, Net

Stamping Sumatra 1934

Elev 28.110 USC165

Concrete post is tilted to
N + chipped - run over by
tractor? - Witness
post (wood) 1' S of
Bm.

12/3/69

Station	Time	Real	1#	Elev	Miles
E-295	8:25	07537	1.0	446.5	
1967					
USC+65	8:27	07529	✓		
	8:29	07530			

USC+65					
D-294	8:45	07524	0.9'	447.1	
1967	8:47	07524	✓		

Telasia	10:30	08700	1.2'	518.0	
Base	10:32	08700	✓		
CS-264	11:55	08713	✓		
	11:57	08710	✓		

Brass disc in Steel Pipe
 11 Paces W of Center of
 Pail 17 paces N of Center
 Hwy 65. Franklin City
 Not stable here for tripod

Brass disc in concrete
 marker 21 Ft east of center
 of Hwy 65. Witness post
 1' S. of disc. Located 0.6
 Miles S of Appalachian RR
 Crossing

12/13/69

2 1000 0

Station Time Road IH El Miles

Bloxham 11:24 10165 0.4 del

Base 11:28 10172

11:30 10173 ✓

11:32 10175

Telaqua 1:25 08714 1.2'

Base 1:27 08715 "

CS-264 3:09 08705 "

3:11 08711 "

3:13 08708 " 08M

Jewel 1:46 08817 1.2'

USCJCS

1938

1:48 08819

578.3 17 Paces East of Hwy 67

12/31/69
 Station Time Read Ill Elev mls
 Jewel 2:10 08958 1.3' 580.6
 Trench
 USFS 2:12 08956
 1934
 out
 points

Bloxham 3:44 10178 0.2
 Base 3:46 10178 ✓
 D. 36 5:38 10188 ✓
 1936 5:40 10190 ✓
 USCIS

Panacea 4:21 09375 0.0 dele
 Base 4:23 09380 -
 D 4:25 09381
 1933
 Tallahassee 5:10 10720 1.0
 Base 5:14 10718 -
 C-155
 1954

Brass Disc Below center of
 trench stamped 1934
 US Dept Agriculture - Forest Service

1.0 mile S of Rd Junction Menden

Station	Time	Read	HT	EI	Bay
Greenville	8:22	12497	-1.2'	105.538 ^{.623}	USC46 K-5
Base	8:24	12499	✓	✓	1916
	10:08	12499	✓	✓	2.6'
	10:10	12501	✓	✓	above S. K. 1916
	12:23	12513	✓	✓	-
	12:26	12515			
	2:22	12517			
	2:24	12515			
Madison	1:56	11127	0.7	149.645 ^{149.645}	L-56 USC46
Base	1:59	11133			
	2:01	11132			
	3:16	11142	✓	✓	
	3:18	11144	✓	✓	
	5:37	11134	✓	✓	
	5:39	11136	✓	✓	

Station	Time	Read	HT	EI	Bay
Perry	9:18	09064	+0.2'	47.206	Perry
Base	9:20	09063	✓		Rosett 1953
Shady	9:45	11841	-	?	SRD
Grove	9:48	11841			Brillc NE. Co.
About .1 Miles S. of Intersection					
221 on Bridge					

Monticello	10:55	11402	+1.2'	132.126 ^{132.126}	USGS TT7RCD
Base	10:57	11399	✓	✓	1951
located N side of Conthorn 2' N					
of Flapole - 10' S of C.S.A. mound					
	11:45	11419			
	11:47	11416			
Drifton	11:23	11741	1.5'	132.106 ^{132.106}	2-24
Base	11:24	11739	✓	✓	USC46
Not					
for					

3/6/1970

Station	Time	Read	HT	El.	BM
Shady	2:45	11851	—		SRD
Grave	2:47	11852			Brady

Live Oak	4:50	09886	-0.02	107.497	USC+65
Base	4:53	09884	=	✓	1916
			1.5'		
			above		
			G.L.		

3/7/70

FO950 AM

Station	Time	Read	HT	El.	BM
Salem	8:26	06823	0.7'	41.527	USC+65 A-49
Base	8:28	06827	✓	✓	1934
	8:30	06824	✓	✓	
	8:45	06823	✓		
	9:47	06823			

3/7/70

Station	Time	Read	HT	El.	BM
Perry	9:12	09081	+0.7'	47.206	Perry Reset 1953
Base	9:15	09088	0.7	—	
	9:17	09083	0.7	—	

3/17/70 - Madison Jr College

Time	Read	Time	Read
12:20	11630	1:33	11637
12:30	11630	1:38	11634
12:40	11631	1:43	11637
12:50	11632	1:57	11635
1:00	11633	2:08	11637
1:10	11632		
1:13	11633		
1:15	11632		
1:17	11633		
1:18	11635		
1:22	11637		
1:24	11637		
1:26	11637		
1:28	11635		
1:30	11636		
1:31	11636		

- Reland Science Bldg.
Mad Quad

30° 28' 32" N

83° 25' 35" W

Watch 1 min Fas 1-

Station	Time	Read	HT	El	BM
Madison	2:23	11168	1.07'	150'	L-56
Base	2:25	11167	-	-	

Bill Moss - Prod Mobil/
Holiday Inn Ft Meyers.
Edison 4-2123

657-9974 Phone
Broth

Bobs Model O 1.7-2440

Bill Moss 3/25/69

Lammohalee to Ft Meyers

Edison 4-2123 ¢ 83

Time & Charges. \$120 8 Min

8:45

TD 11987

5 1/2 c 11987 17th \$15.5th

Work over. 200 Sx sel
159 Sx
1090' around bottom.

Alligator Alley

261.5		H-20	
DISCS		BM.	
Bugs		Spike	Spike
1	61.5	1	73.8
2	61.9	1	74.4
3	63.8	1	75.2
4	64.4	1	—
5	65.4	1	77.0
6	66.2	1	78.6
7	66.7		
8	67.8	1	
9	68.6	1	28 ²⁰ 4.0
10	69.2	1	
11	70.0	1	
12	71.0	1	
13	71.8	1	
14	73.0	1	

Annual Rept of Supt of
Coast Survey 1851

House Doc 26 pp 159-160.

rept of L. Agassiz stating
outer line of reefs not the
Keys is southeastern boundary
of N.A.

Humble O.R.

P.O. Box 820

Immokalee

John Mack.

11:00 AM 11/30/80

18423

P/g. 510

18590 Return

J.C. Knowles - County Rd
Superintendent

10:30 B.J. Timmons called to report a wire hole in
S. Taylor Co had cratered & the rig was well down.
Could he get equip. in Perry to help recover - yes
I called R. Bachman to arrange expenses
to salvage equip.

11:00 Departed for Perry & so Taylor Co to inspect
photograph & oversee salvage.

1:00 Mr. Knowles came to site & offered
assistance of County equipment

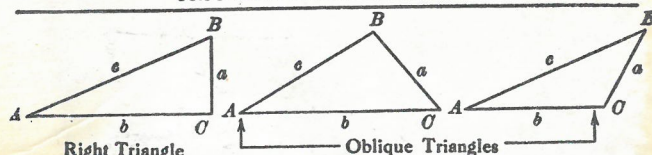
4.85

145

5.30

$9 \times 10 = 90$
 $12 \frac{215}{12045} = 170$
 1023
 15
 20 miles
 5000
 1000000
 23
 21.6
 1.4

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

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

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

Solution of Oblique Triangles

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

REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 318.4 ft. Vert. angle = $5^\circ 10'$. From Table, Page IX, $\cos 5^\circ 10' = .9859$. Horizontal distance = $318.4 \times .9859 = 313.80$ ft.
 Horizontal distance also = Slope distance minus slope distance times (1 - cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. $\cos 5^\circ 10' = .9859$. $1 - .9859 = .0141$. $318.4 \times .0141 = 4.49$. $318.4 - 4.49 = 313.91$ ft.
 When the rise is known, the horizontal distance is approximately:—the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft. Slope distance = 302.6 ft. Horizontal distance = $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.

