RICHMOND CULVERT
605-0003 (005)
PROJ. DIARY

82 0020

Weatherproof Field Book

"Rite in the Rain" paper
32 pages

4⅝" x 7¼"

Keuffel & Esser Co., Morristown, N.J. 07960 Made in U.S.A.

CURVE FORMULAS

$T = R \tan \frac{1}{2} I$

$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$

$\text{Sin. } \frac{1}{2} D = \frac{50}{R}$

$\text{Sin. } \frac{1}{2} D = \frac{50 \tan \frac{1}{2} I}{T}$

$R = T \cot. \frac{1}{2} I$

$R = \frac{50}{\text{Sin. } \frac{1}{2} D}$

$E = R \text{ ex. sec } \frac{1}{2} I$

$E = T \tan \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{I}{D}$

$\text{Tan. def.} = \frac{1}{2} \text{ chord def.}$

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve. very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.) and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

RIGHT ANGLE TRIANGLES. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. $10.10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875 =$ Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

LEVELING. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574 d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{2}{3} d^2$. The combined correction is negative.

PROBABLE ERROR. If d_1, d_2, d_3, etc. are the discrepancies of various results from the mean, and if Σd^2 = the sum of the squares of these differences and n = the number of observations, then the probable error of the mean $= \pm 0.6745 \sqrt{\frac{\Sigma d^2}{n(n-1)}}$

MINUTES IN DECIMALS OF A DEGREE

1′	.0167	11′	.1833	21′	.3500	31′	.5167	41′	.6833	51′	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

INCHES IN DECIMALS OF A FOOT

1-16	3-32	⅛	3-16	¼	5-16	⅜	½	⅝	¾	⅞
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

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JOB No.	PAGE	DESCRIPTION
05-0003(005)	1	PRE-CONSTRUCTION MTG. 6-11-80

PRE-CONSTRUCTION CONF. 6/11-80

SOS-0003(.005)

G.L. RICHARDSON
O. E. SCHRADER
J. PARRISH
P.W. WARD
SETH BIRD
CLAIN SKIDMORE
BILL SMITH

TO DOC. L.S. RECORDS TO CONTAIN DAILY TIME & MATERIAL LISTS
STATE WILL SUPPLY FORMS. (R-295)
WE WILL STAKE & DO ALL THE JOB.

HIGH CREEK OR SMITHFIELD PIT WILL BE USED
GET A CERT. ~~FOR~~ FROM PARSON'S IF WE USE THEM
STATE HAS RECORDS FOR SMITHFIELD
SO USE SMITHFIELD PIT FOR MAT.
WE NEED CERT OF COMPL. FOR PIPE

LET BILL KNOW 24 hrs IN ADV. OFF PROJ. BEGINNING.
CHARLIE MCKELSON OWNS THE PROP. TO THE SOUTH.
1979 SPECS. APPLY
HAVE COPY OF P.O. FOR PIPES ASPHALT ETC. WITH CERT. of Compl.

GET A PAD OF FORMS FROM NOR. R-295

℄ EL ON EAST $96\frac{50}{-50} = 96.0$

BOTTOM OF IRR PIPE $97.\frac{30}{}$

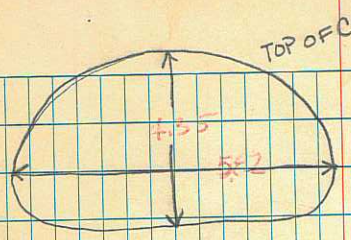
DIST FROM EAST END - IRR PIPE = 39'

SLOPE OF PIPE = 9.62% = 8.33%

℄ AT IRR PIPE = 92.75

℄ AT PIPE OUTLET = 91.8

INLET RP TO EAST	$99\frac{8}{}$	CUT $3\frac{8}{}$
INLET	$99\frac{1}{}$	CUT $3\frac{1}{}$
INLET RP TO SOUTH	$100\frac{3}{}$	CUT $4\frac{3}{}$
℄	$101\frac{4}{}$	CUT $7\frac{4}{}$
℄ RP TO SOUTH	$101\frac{4}{}$	CUT $7\frac{4}{}$
OUTLET	$95.\frac{0}{}$	CUT $3\frac{2}{}$
OUTLET RP TO SOUTH	$98\frac{2}{}$	CUT $7\frac{1}{}$



MEASUREMENT OF ARCH PIPE FOR RICHMOND

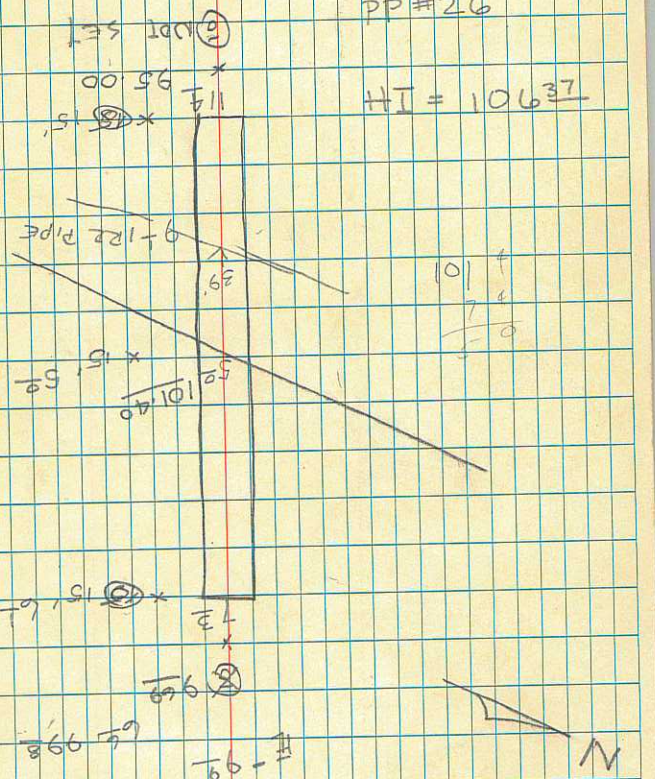
HEAT No. 615 763

HI + $6\frac{37}{}$

B.M $100.\frac{00}{}$

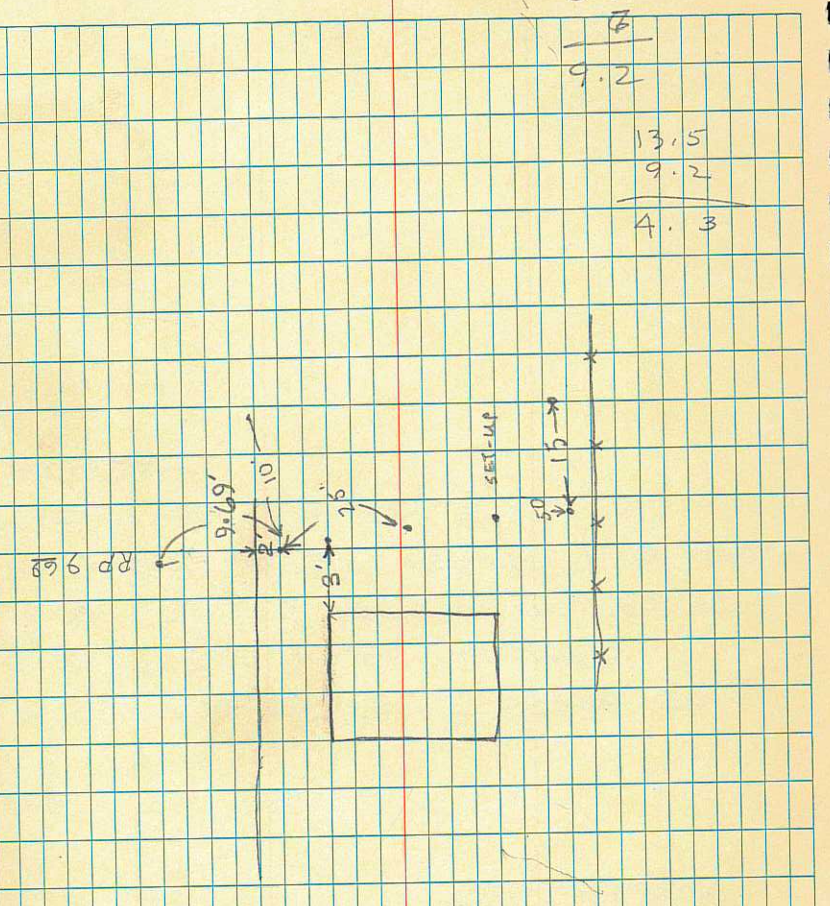
PP #26

HI = $106\frac{37}{}$



8.5
9.2

13.5
9.2
4.3



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SEPT 25, 1980

MET WITH SETH, MED AND GLEN AT 9:00 AM. WE WENT OVER THE PROJECT AND DECIDED TO BEGIN ON MONDAY THE 29th

Preston B Ward

SEPT 26, 1980

8:50 CALLED BLUE STAKE TO HAVE THE LINES LOCATED

9:00 CALLED STATE TALKED TO SOMEONE IN THE OFFICE AND TOLD THEM WE WOULD START ON MONDAY

SEPT 29, 1980

MT. BELL MAN CAME BY AND MARKED WHERE CABLE WAS. LEFT AT 10:00 Am IT APPEARS THAT THE TELE. WILL BE IN THE WAY. HE TOLD US TO LOWER THE CABLE UNDER THE PIPE

COUNTY MEN

TED BACKHOE op.

JOE LABOR

JOHN LABOR

BE DYNAHOE 190

CHEV GAS FLAT RACK C60

20 FT PIPE

BRONCO

MYSELF

BROUGHT IN A LOADER AND DUMP TRUCK AFTER LUNCH AND STARTED TO HAUL AWAY SOME OF THE MUD THEY DUG OUT GOT THE TRENCH ALMOST TO GRADE LEFT SITE AT 3:30 TOOK LOADER BACK.

Preston B. Ward

15 12
12 7
2 5

106
95
11 7

12 7

HI 106 71

HI ~~106~~ 7

+6 69

101

SEPT 30, 1980

ARRIVED AT JOB AT 7:45 TWO COWS OF MR. SKIDMORE'S WERE OUT FROM A BREAK IN THE FENCE SOUTH OF WHERE WE HAVE BEEN WORKING. AT 8:00 A MR. NELSON STOPPED BY AND ~~TOLD~~ SHOWED ME A PLACE THE COUNTY COULD DUMP SOME OF THE DIRT THAT WAS DUG OUT. GLEN STOPPED BY AT 8:30 I WENT OVER WHAT WE HAD DONE YESTERDAY. TED ARRIVED ~~WITH~~ WITH THE TRANSPORT AND THE OTHER 30' OF CMP AT 8:40. GLEN LEFT AT 9:45. TED BEGAN TO CLEAN-UP THE AREA WITH THE BACKHOE.

GOT PIPE ALL BACKFILLED IT LOOKS REAL GOOD.

LEFT AT 4:00

Preston B. Ward

JOHN
JOE
CARL
MED
TED
MYSELF
PICKUP
2 DUMP TRUCKS
BACK HOE
BRONCO
COMPACTOR

104^{1}
8^{9}
5

104^{1}
8^{8}
5^{3}

8^{8}

104^{1}
9^{9}
4^{2}

104^{1}
91^{8}
12^{3}

℄ 94^{0}
OUTLET 91^{8}
INLET 96^{0}

HI 104^{14} 104^{1}

OCT. 1, 1980

TALKED TO LAMAR SPACKMAN ABOUT UNDERDRAIN. HE SAID IT NEEDED TO BE CONNECTED, WHILE DIGGING DOWN TO FIND THE DRAIN TED HIT THE TELEPHONE LINE.

THE UNDERDRAIN IS TO LOW TO PUT IN THE PIPE SO WE DECIDED TO RUN IT ACROSS THE ROAD. WHILE DIGGING THE TRENCH THE IRR PIPE BROKE, WE HAD TO GO TO PRESTON TO GET THE REPAIR PARTS. GOT PARTS READY TO CONNECT PIPE, & LEFT AT 4:30 P.M.

Preston B. Ward

MED
TED
JOE
DARRELL
MYSELF
PICK-UP
PATROL
BACKHOE
BRONCO
2 DUMP TRUCKS
45' OF 8" PVC
1 REDUCER PVC
1 45° ANGLE PVC
REPAIR PARTS FOR IRR LINE.

OCT. 2, 1980

FIXED IRR. PIPE FIRST THING. BEGAN TO BACKFILL TRENCH. GOT A COMPACTOR AND SETTLED FILL INTO HOLE.

CLEANED UP AREA AND R|P RAPPED THE UP STREAM SIDE. STATEMEN CAME OUT TODAY AND LOOKED THINGS OVER. WE GOT A LOAD OF COLD MIX AND PATCHED THE HOLES. TOMORROW WE WILL GET A LOAD OF HOT MIX AND COVER THE AREA REAL NICE.

LEFT AT 1:00

Preston B. Ward

PATROL
MED (MERRILL BURRELL)
BACK HOE
PICK-UP
BRONCO
COMPACTOR
DUMP TRUCK
DARRELL FONNBECK
JOE GORDON KIRBY
MYSELF PRESTON WARD
TED TED HUNTER

OCT. 3, 1980

BROUGHT 1 LOAD OF HOT MIX FROM JOHNSON'S MED SMOOTHED IT OUT AND ROLLED IT. LEFT SITE AT 9:30 AM

PATROL

BRONCO

PICK-UP

MED

TED

BRUCE

MYSELF

Walter B. Ward

OCT. 8, 1980

PLACED RIP-RAP ON FILL SLOPES
AND CLEANED OUT PIPE -
LEFT SITE AT 10:30

TED
CARL
MYSELF
BACKHOE
DUMPTRUCK
TRANSPORT
BRONCO

TED HUNTER	8.38
JOHN FISHER	7.56
MERRILL BURRELL	8.65
GORDON KIRBY	6.02
DARRELL ERKICSON	6.30
CARL OBREY	8.38
BRUCE ECCLES	6.02

Comp. 40.00 DAY

Pump. 27.00

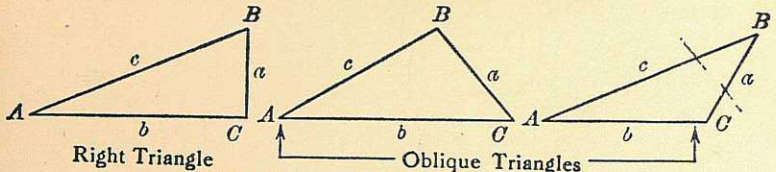
107.00

79.71

MT. BELL
1-331-5466

			69
OUT	IN	℄	
104'	104'	104'	101 9
91 3	96°	94°	7 9
12 3	8 2	10 2	4 0
	10 8		
	11 3	11 3	8'
		10 8	12 3
		1 5	20 4
E OF DITCH	11 3	92 8	

TRIGONOMETRIC FORMULAS



Solution of Right Triangles

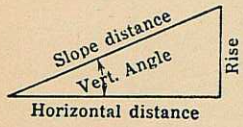
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

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

Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A}, C = 180° - (A + B), c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}, C = 180° - (A + B), c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180° - C, \tan \frac{1}{2}(A - B) = \frac{(a-b)\tan \frac{1}{2}(A+B)}{a+b}, c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2}, \sin \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}}, \sin \frac{1}{2}B = \sqrt{\frac{(s-a)(s-c)}{ac}}, C = 180° - (A+B)$
a, b, c	Area	$s = \frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
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 = 319.4 ft. Vert. angle = 5° 10′. Since cos 5° 10′ = .9959, horizontal distance = 319.4 × .9959 = 318.09 ft.

Horizontal distance also = Slope distance minus slope distance times (1 − cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. Cosine 5° 10′ = .9959. 1 − .9959 = .0041. 319.4 × .0041 = 1.31. 319.4 − 1.31 = 318.09 ft.

When the rise is known, the horizontal distance is approximately the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance $= 302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.