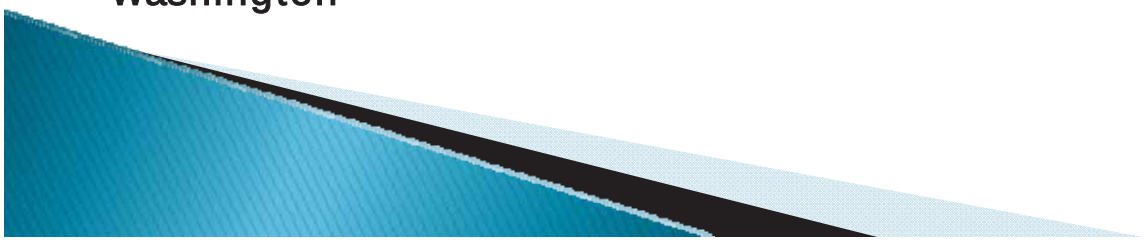
TMS

Thursday 10:30 AM April 8, 2010

Log Yard Inventory Measurements

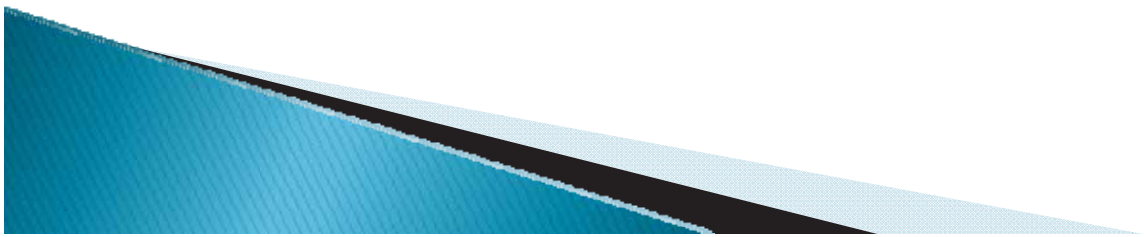
Lessons Learned

John Calkins,
Check Scaler/Log Quality
Simpson Lumber Company
Tacoma, Shelton, Longview
Washington



Goals

1. Improve the physical log deck measure for more accurate log accounting.
2. Take more measurements using one person.
3. Devise a procedure that is easy to understand.
4. Devise a procedure that is acceptable to Accountants and Auditors.



Commencement Bay Operations

The Challenge

Mountains to Measure

Always Changing

Where do you start?

Study how each log yard is run.
Watch how they build and use decks.
Understand why they have to build them certain ways.

Learn what the Operators do by watching them in action

Bring the Operators into the project.

Without their co-operation,
accountability and safety could be jeopardized

Most Operators have many years of experience and have developed reasons for what they do that isn't apparent at first.

Seek their advice and respect their judgment, later this will pay off with co-operation.

Try to see things from their perspective.

An experienced Operator will build decks consistently.

Study the log accounting system.

See how flexible they are to help with test data.

Processed On: 3/28/2009

Deck Summary Report

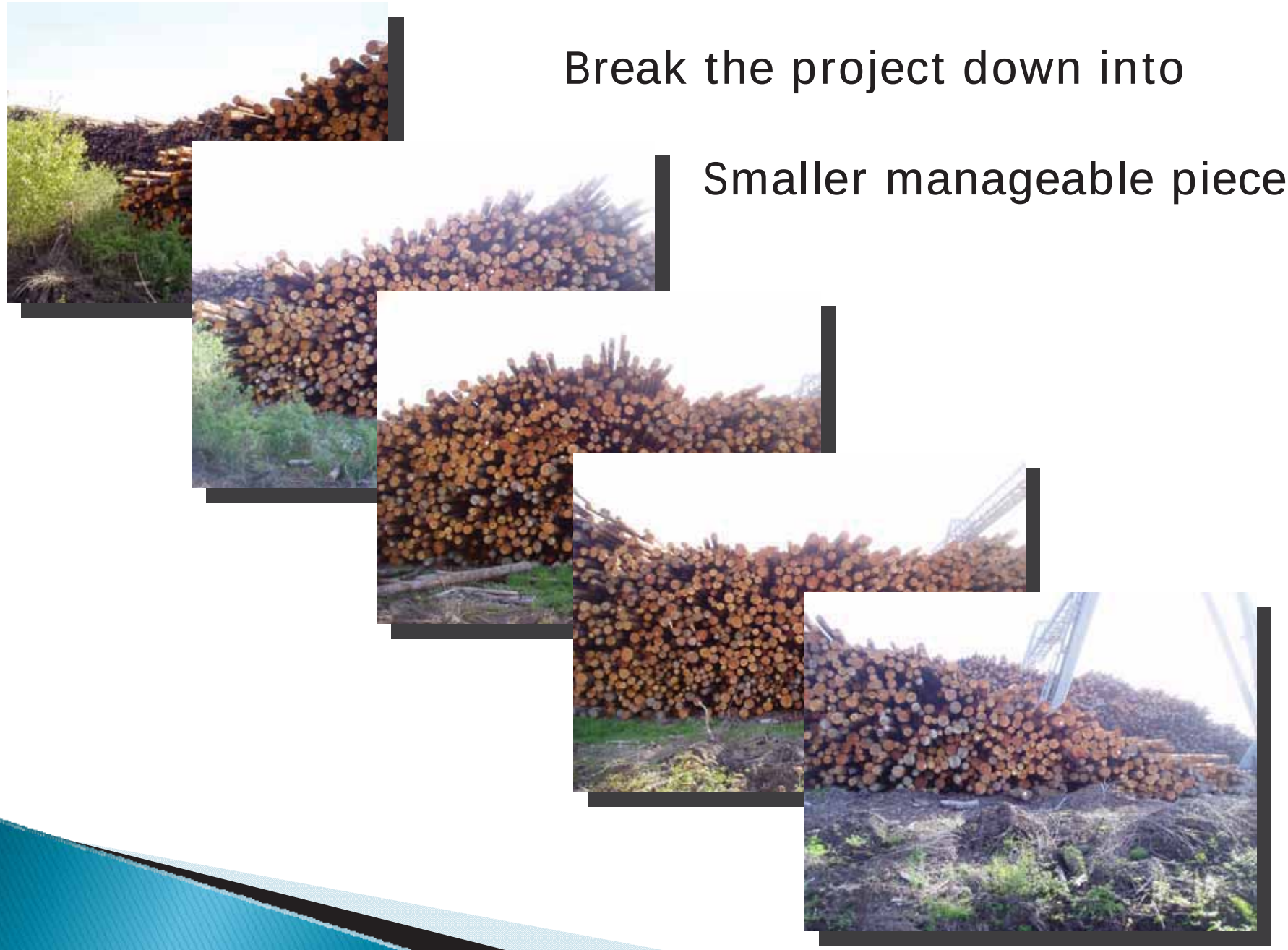
Deck: W999

Finished Date: Hot Deck Date:

Tbl	Weight Tkt	Trip Ticket	Adj	Ticket Date	Gross Vol	Net Vol	Util Vol	Net Wgt
DSY - W999								
P	W00005	WY50580		9/18/2008	6,380	6,100	40	49,999
P	W00005	13426		12/4/2008	5,570	5,480	0	49,999
P	W00005	13469		12/4/2008	6,270	6,200	20	49,999
P	W00008	GD528875		10/1/2008	5,560	5,450	0	49,999
P	W00009	13605		12/9/2008	5,700	5,440	190	49,999
P	W00009	13639		12/9/2008	5,470	5,180	270	49,999

Break the project down into

Smaller manageable pieces



There are physical limits to how the machines build decks. Look how close the dimensions can be, such as the angle of these two decks.

Recognize the geometric shapes

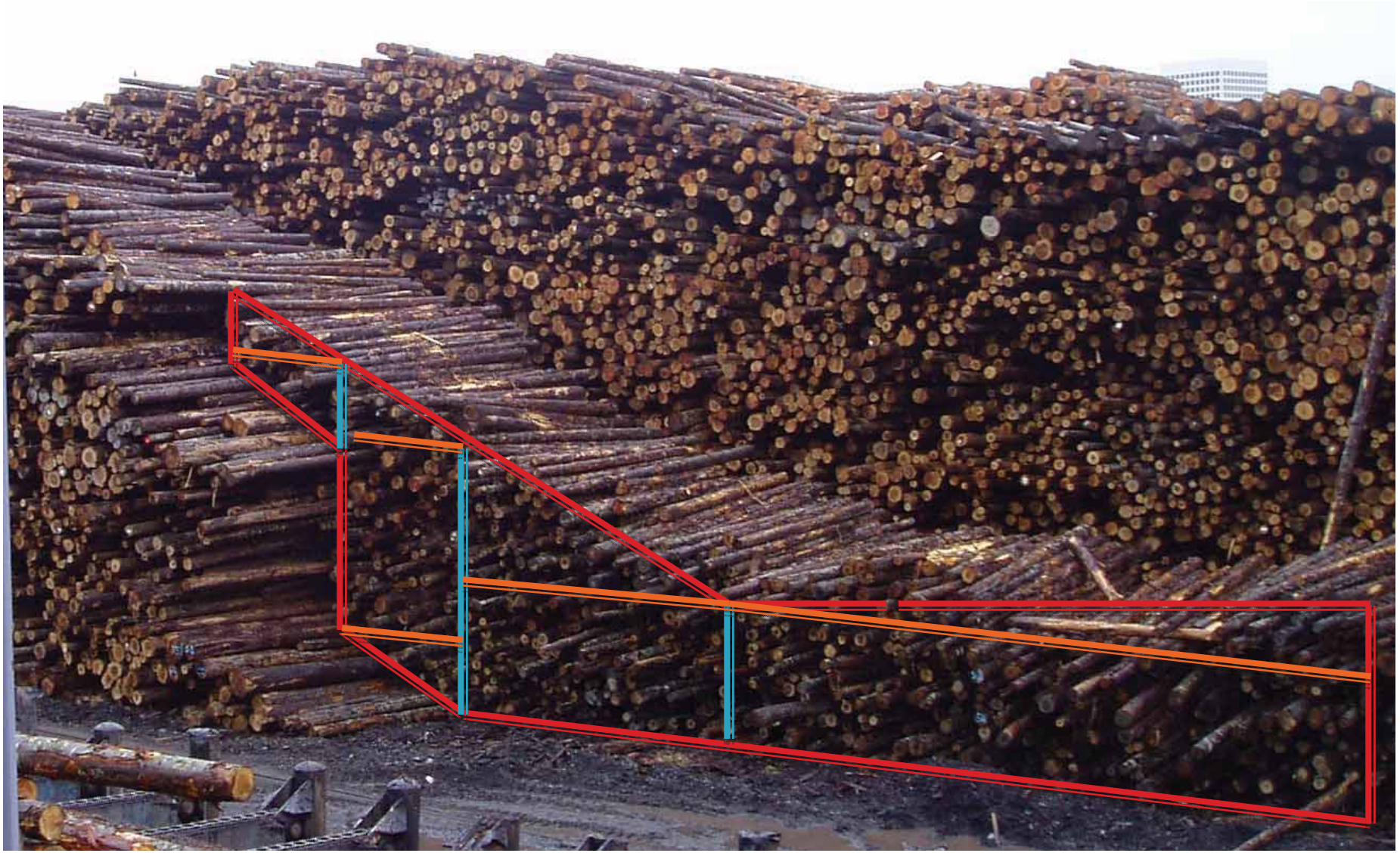
It’s easy to explain this intersection and repeat the procedure.

Now you can use the simple geometric areas of right triangles and rectangles to figure the Square Foot Surface area of any log deck.

Vantage points are key

As the decks get bigger, the triangle ends smooth out... gravity.

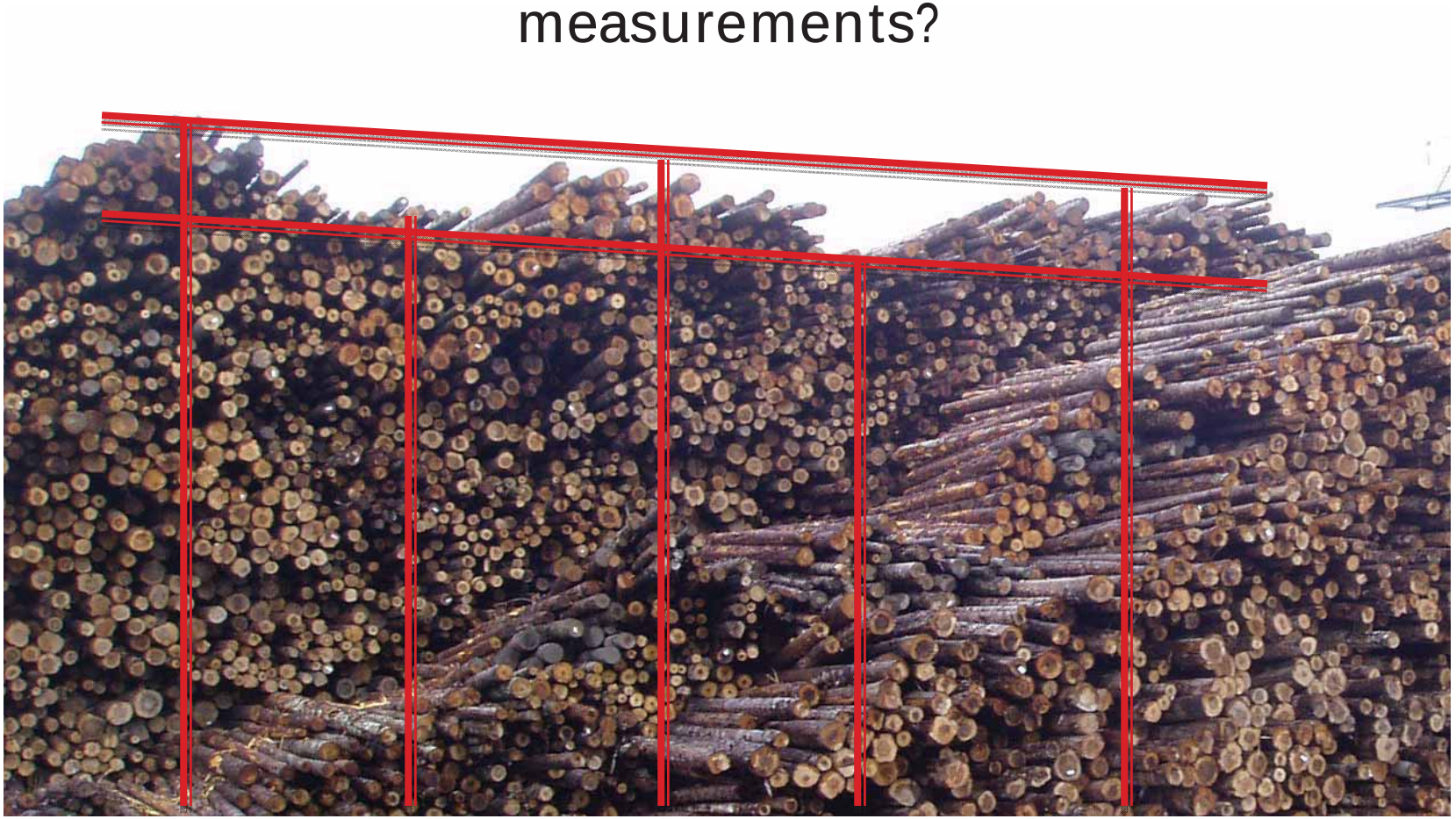
Learn why they build decks the way they do.
Try and spot the geometric shapes.



Find the area of these Right Triangles and Rectangles for the SqFt. Measurement

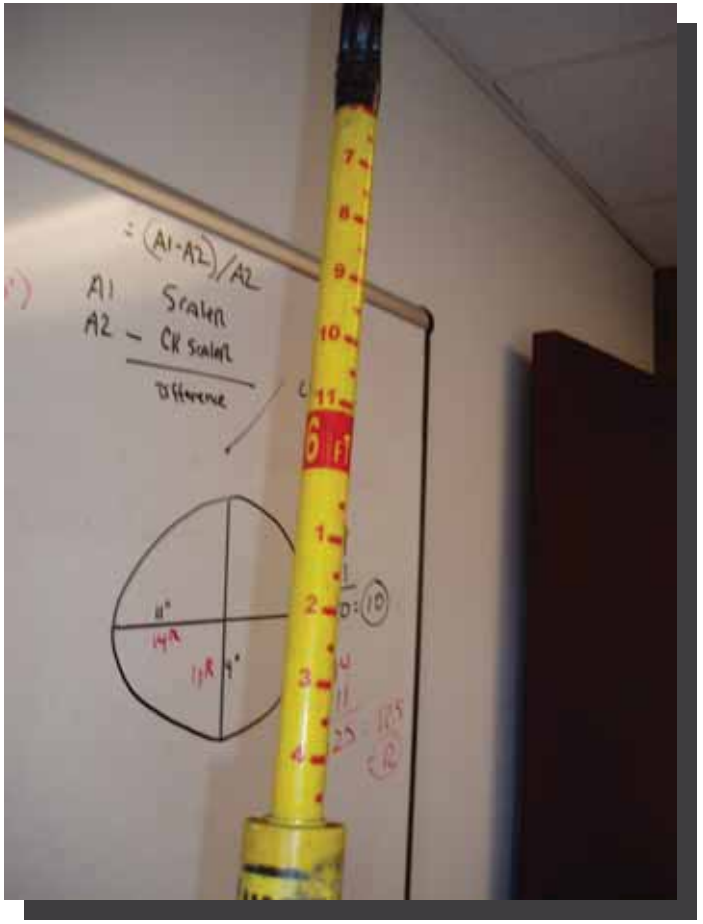
This method is the easiest to
understand even under complex shapes.

So at what point do we stop measuring the finer detail and use reasonable incremental measurements?



This deck was measured with a height pole and a 50’ tape with the observer standing well away from the deck to see the geometric shapes.

Hastings Pole

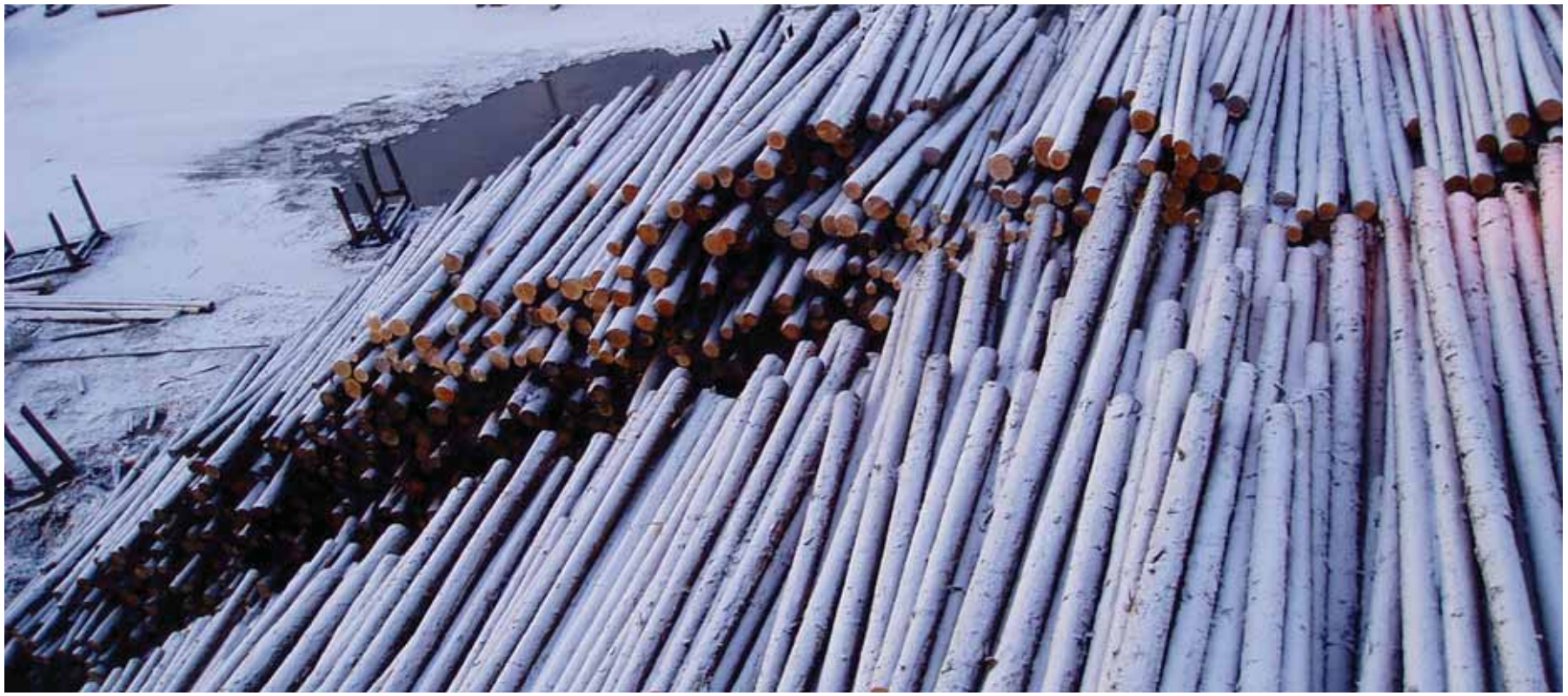


Take the time to understand the current measuring methods and why they are used.

Try new ideas

Each deck has its own challenges.

Keep looking for the best vantage point

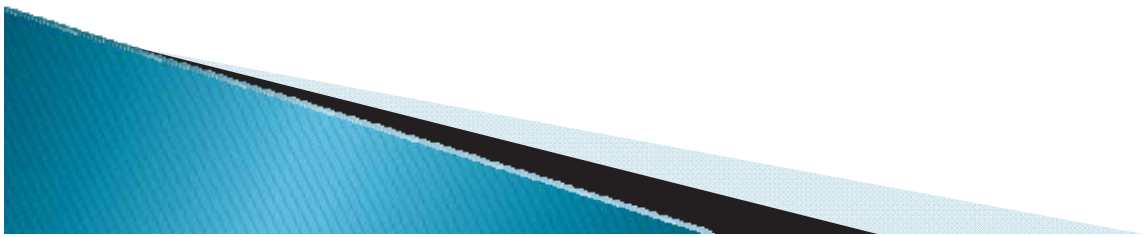


The weather plays a large roll in the motivation to find a better way to measure these

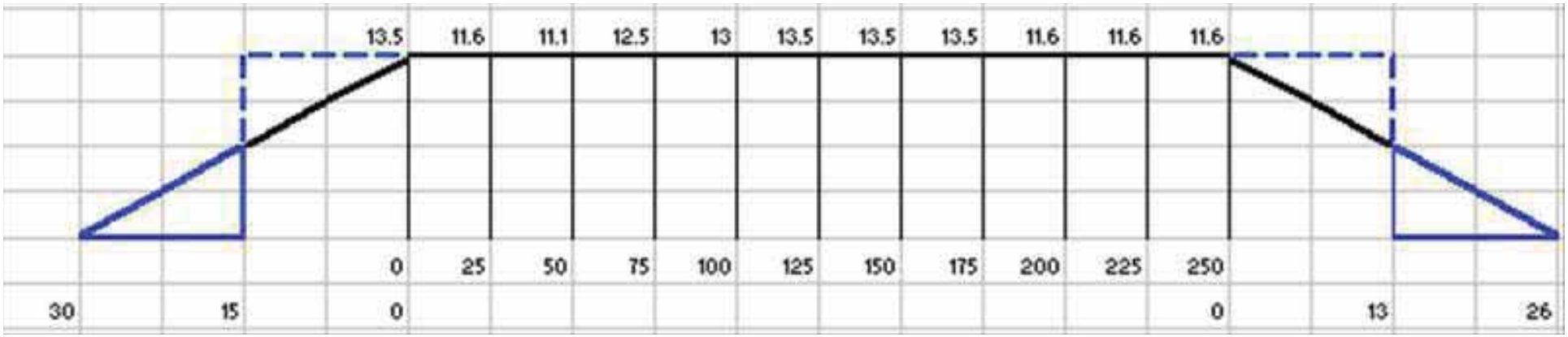
New Ideas spring from tried methods.

The accessibility of the deck creates some innovative approaches

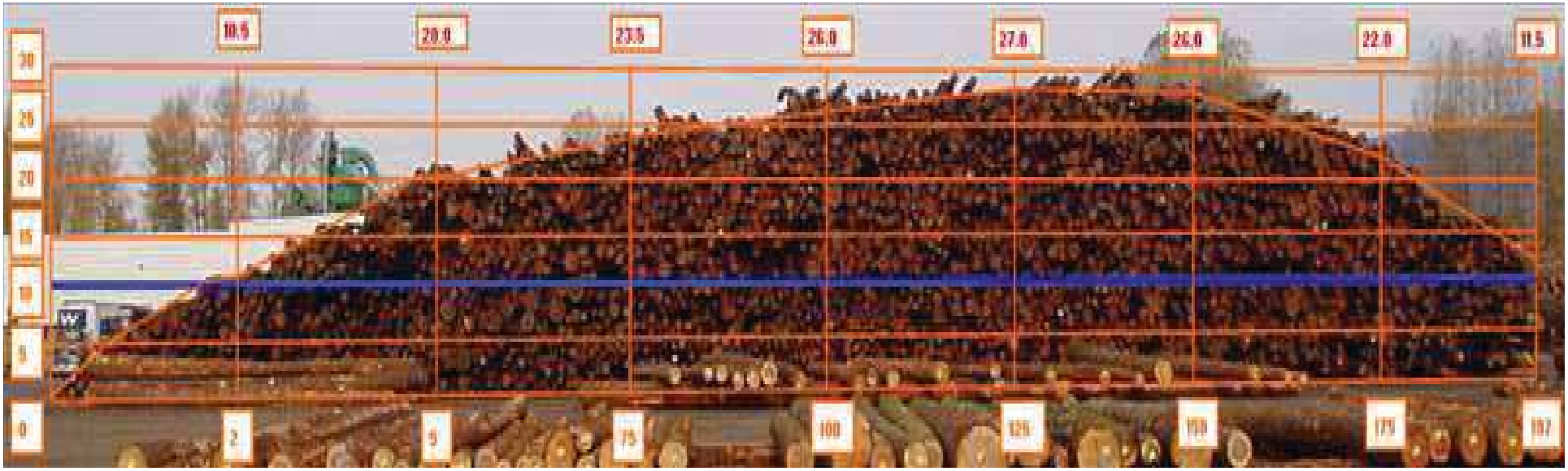
Looking for the Right Method



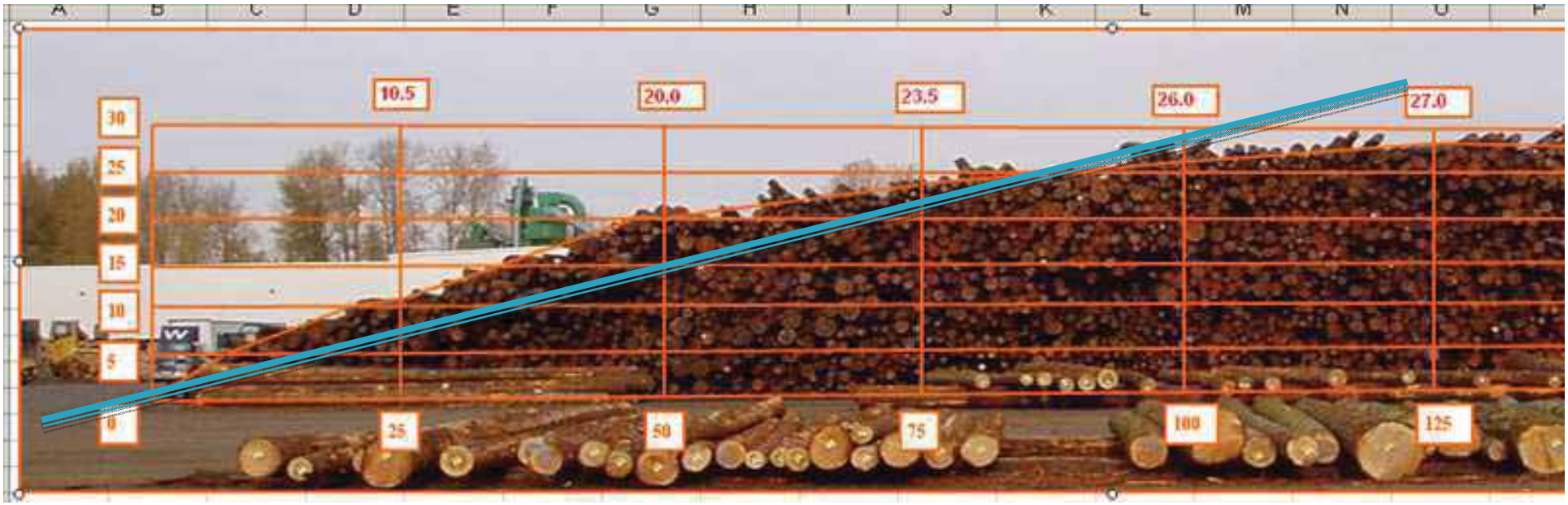
This is an accepted method used to visually fold the triangle ends up in the field then measure at regular intervals to average the top rectangle shape of the deck.



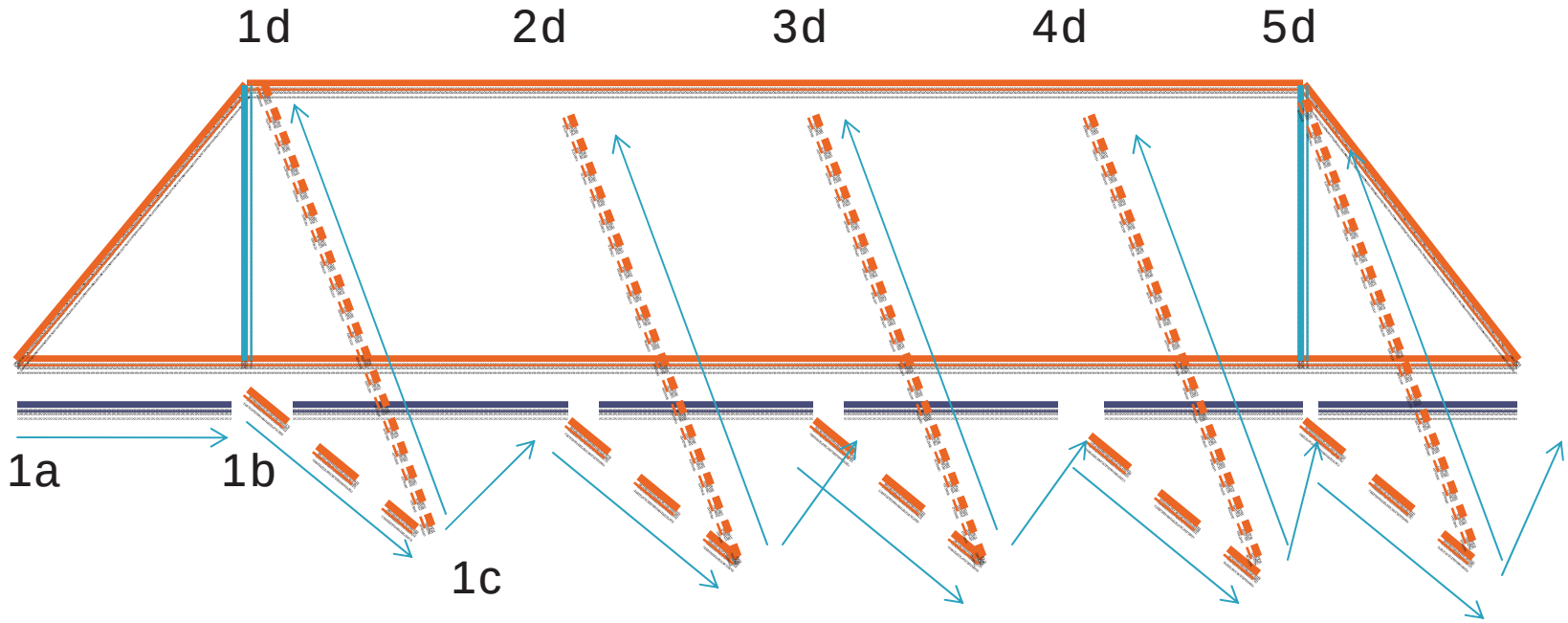
I used a camera and graphs to determine the size of decks by painting physical marks on the decks to line up with the graph.



I broke down the decks into smaller geometric shapes to see how much error there is in visually creating the larger Right Triangle and Rectangle shapes.



Clinometer procedure



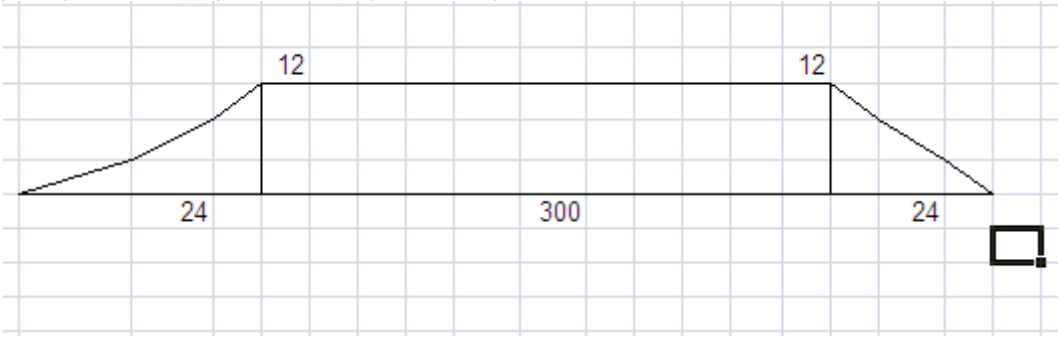
First Clinometer and Rangefinder

Second Clinometer

Clinometer and 50’ Tape

Clinometer Worksheet Method 1

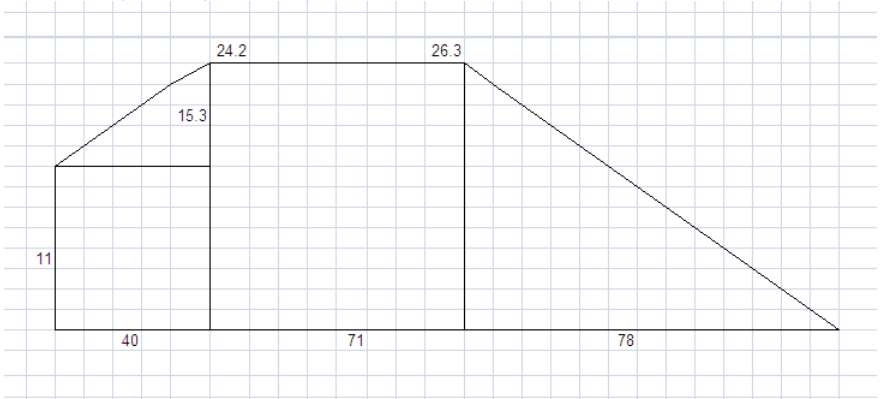
	A	B	C	D	E	F	G
1	Method 1						
2	**Deck Measurements**		**Clinometer Measurements**				**Height**
3	Deck Parts	ClinDistToDeck	Down -	Up+	Below Eye	Above Eye	
4	Average Height	25	10	17	4.4	7.6	12.1
5		25	5	24	2.2	11.1	13.3
6		25	3	25	1.3	11.7	13.0
7		25	1	29	0.4	13.9	14.3
8		25	6	28	2.6	13.3	15.9
9		25	2	28	0.9	13.3	14.2
10		25	5	20	2.2	9.1	11.3
11		25	6	19	2.6	8.6	11.2
12		25	5	26	2.2	12.2	14.4
13							
14							
15	**Average Deck Height**						**13.3**
16	**Big Rectangle Length**	390					
17	**Triangle 1 Length**	34	17				
18	**Triangle 2 Length**	18	9				
19	**Total Deck Length**		416		***Total Deck Square Feet:***		***5,529.1***



Clinometer Worksheet Method 2

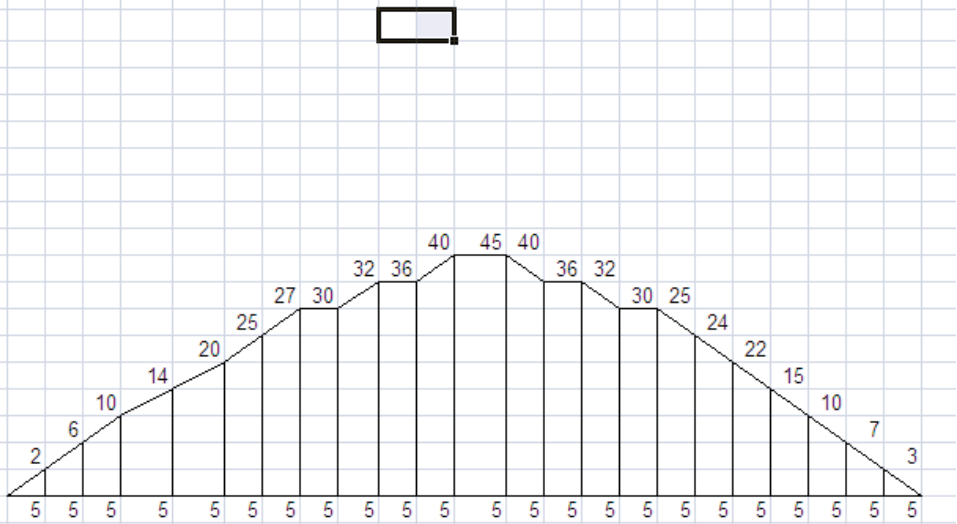
Method 2

LLOP Deck Measuremen	I3	Clinometer Measurements				Height	Lgth	*Area*
Deck Parts	ClinDistToDeck	Down -	Up+	Below Eye	Above Eye			
Big Triangle Height	25	12	40	5.3	21.0	26.3	78	*1025.36*
Big Rectangle Height	25	12	40	5.3	21.0	26.3		
	25	12	40	5.3	21.0	26.3		
	25	12	39	5.3	20.2	25.6		
	25	12	40	5.3	21.0	26.3		
					Average	**26.1**	**71**	*1853.68*
Small Triangle (Height -11)	25	12	40	5.3	21.0	*15.3*	40	*305.828*
Small Rectangle Height						*11.0*	40	*440*
Total SqFt Area								*3624.87*



Clinometer Worksheet Method 3

	Clinometer Measurements				Height	Width	*Area*
	Down -	Up+	Below Eye	Above Eye			
47	12	15	5.3	6.7	12.0		*0*
48	12		5.3	-	5.3		*0*
49	12		5.3	-	5.3		*0*
50	12		5.3	-	5.3		*0*
51	12		5.3	-	5.3		*0*
52	12		5.3	-	5.3		*0*
53	12		5.3	-	5.3		*0*
54	12		5.3	-	5.3		*0*
55	12		5.3	-	5.3		*0*
56	12		5.3	-	5.3		*0*
57	12		5.3	-	5.3		*0*
58	12		5.3	-	5.3		*0*
59	12		5.3	-	5.3		*0*
60	12		5.3	-	5.3		*0*
61	12		5.3	-	5.3		*0*
62	12		5.3	-	5.3		*0*
63	12		5.3	-	5.3		*0*
64	12		5.3	-	5.3		*0*
65	12		5.3	-	5.3		*0*
66	12		5.3	-	5.3		*0*
67	12		5.3	-	5.3		*0*
68	12		5.3	-	5.3		*0*
69							
70							*0*



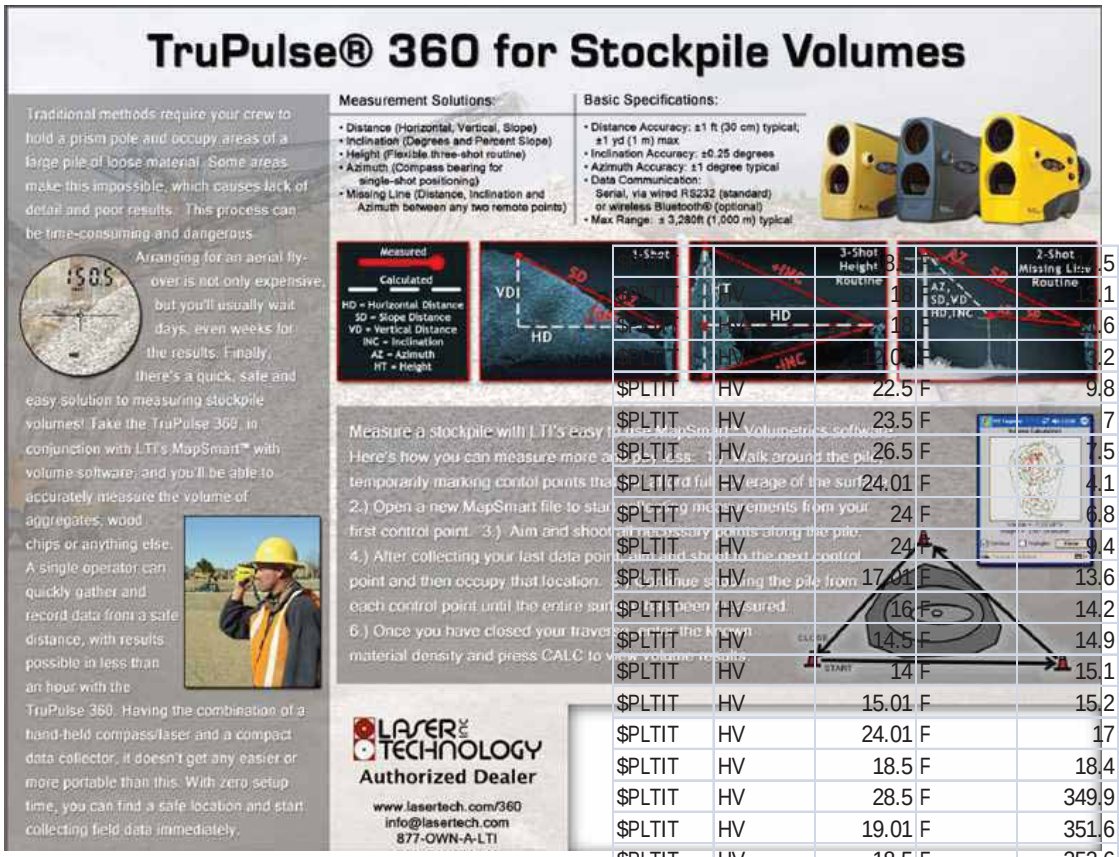
Constantly changing

Inacceable

TruePulse360 Rangefinder

TP 360 – Nomad – GPS

The TP 360 appears be the ultimate device for my project



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$PLTIT	HV	26.5	F	7.5	D	-2.3	D	26.5	F*49
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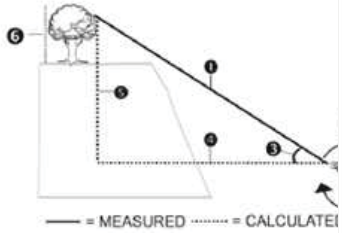
$PLTIT	HV	5.5	F	9.9	D	-4	D	5.5	F*4E

Understand the devices

Section 5 - Measurement Mode

When you power ON the TruPulse, the last used M
to display the previous or next Measurement
measurements that the TruPulse can take. For infor
see page 37.



Figu

Distance Measurements

The basic steps for taking any distance measureme

1. Look through the eyepiece and use the crossh
2. Press-and-hold . The LASER status indica
   will remain active for a maximum of 10 seco
   - If the target is not acquired in the 10-se
3. Once the measurement is displayed, release
   indicating the measurement was downloaded.
   until you press any button or the unit powers

Firmware Version: A=3.05, b=3.35 [M

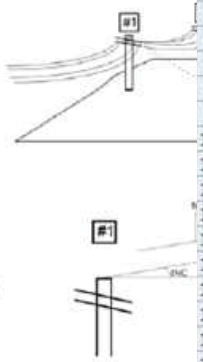
During the Height Routine:

- Press to re-shoot the previous point.
- Press to exit the Height Routine.
- The laser is not active while measuring the ANG1 and A
  long as you hold , the inclination reading is displaye
  your aiming point changes. The measured inclination is
  aiming point when you release .
- When the height result is displayed, just press to sta
  repeat the steps.

Missing Line Routine

The Missing Line Routine calculates distances and angles to describe the relationship between two points in three-dimensional space (connecting vector). This routine is ideal for span lengths, remote slope determinations, and changes in elevation from one location.

The simple routine prompts you to take two shots to targets: "Shot 1" and "Shot 2". The TruPulse uses the results to calculate five variables between the two points: slope distance, inclination, azimuth, horizontal distance, and vertical distance as shown in Figure #23.



Figu

- HD: Horizontal Distance: Horizontal component of the
- VD: Vertical Distance: Change in elevation between p
- SD: Slope Distance: Length of the missing line.
- INC: Inclination between point #1 and point #2.
- AZ: Relative Azimuth: Direction from the point #1 to

Firmware Version: A=3.05, b=3.35 [Manual DRAFT E: Upd

K51

	A	B	C	D	E	F	G	H	I	J	K	L
1	$PLTIT	HV	18.5	F	14.5	D	-14.8	D	19	F*43		
2	$PLTIT	HV	18	F	13.1	D	-14.8	D	19	F*45		
3	$PLTIT	HV	18	F	11.6	D	-14.7	D	18.5	F*48		
4	$PLTIT	HV	12.01	F	3.2	D	-15.4	D	12.01	F*78		
5	$PLTIT	HV	22.5	F	9.8	D	-9.5	D	23	F*43		
6	$PLTIT	HV	23.5	F	7	D	-7.7	D	23.5	F*4D		
7	$PLTIT	HV	26.5	F	7.5	D	-2.3	D	26.5	F*49		
8	$PLTIT	HV	24.01	F	4.1	D	-4.4	D	24.01	F*4F		
9	$PLTIT	HV	24	F	6.8	D	-4.9	D	24	F*49		
10	$PLTIT	HV	24	F	9.4	D	-4.8	D	24.5	F*4E		
11	$PLTIT	HV	17.01	F	13.6	D	-4.5	D	17.01	F*7F		
12	$PLTIT	HV	16	F	14.2	D	-3.8	D	16	F*76		
13	$PLTIT	HV	14.5	F	14.9	D	-4.6	D	14.5	F*74		
14	$PLTIT	HV	14	F	15.1	D	-5.7	D	14	F*7D		
15	$PLTIT	HV	15.01	F	15.2	D	-5.9	D	15.01	F*70		
16	$PLTIT	HV	24.01	F	17	D	-4.6	D	24.01	F*7E		
17	$PLTIT	HV	18.5	F	18.4	D	-3.8	D	18.5	F*7C		
18	$PLTIT	HV	28.5	F	349.9	D	-0.7	D	28.5	F*4A		
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21	$PLTIT	HV	18.5	F	351.4	D	-4.1	D	18.5	F*4C		
22	$PLTIT	HV	18.01	F	349.1	D	-4.3	D	18.01	F*42		
23	$PLTIT	HV	16	F	347.4	D	-5.2	D	16	F*49		
24	$PLTIT	HV	5.5	F	9.9	D	-4	D	5.5	F*4E		
25	$PLTIT	HV	5.5	F	9.1	D	-4.2	D	5.5	F*44		
26	$PLTIT	HV	5	F	6.9	D	-5.4	D	5	F*44		
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28	$PLTIT	HV	5	F	2.2	D	-4.9	D	5	F*47		
29	$PLTIT	HV	5	F	1.1	D	-4.9	D	5	F*47		
30	$PLTIT	HV	23.01	F	5.1	D	-4.9	D	23.01	F*43		
31	$PLTIT	HV	23.5	F	356.6	D	-2.6	D	23.5	F*48		
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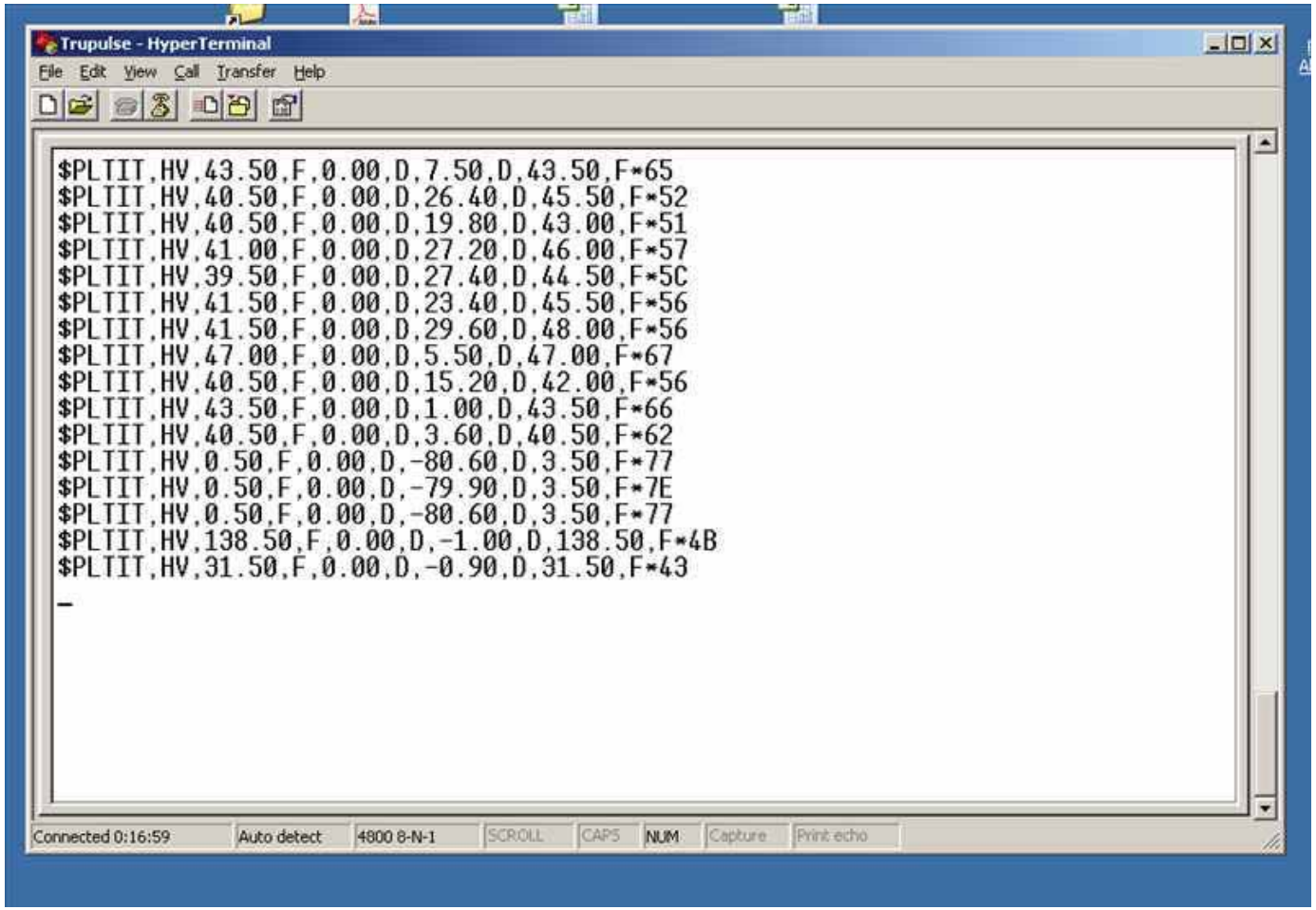
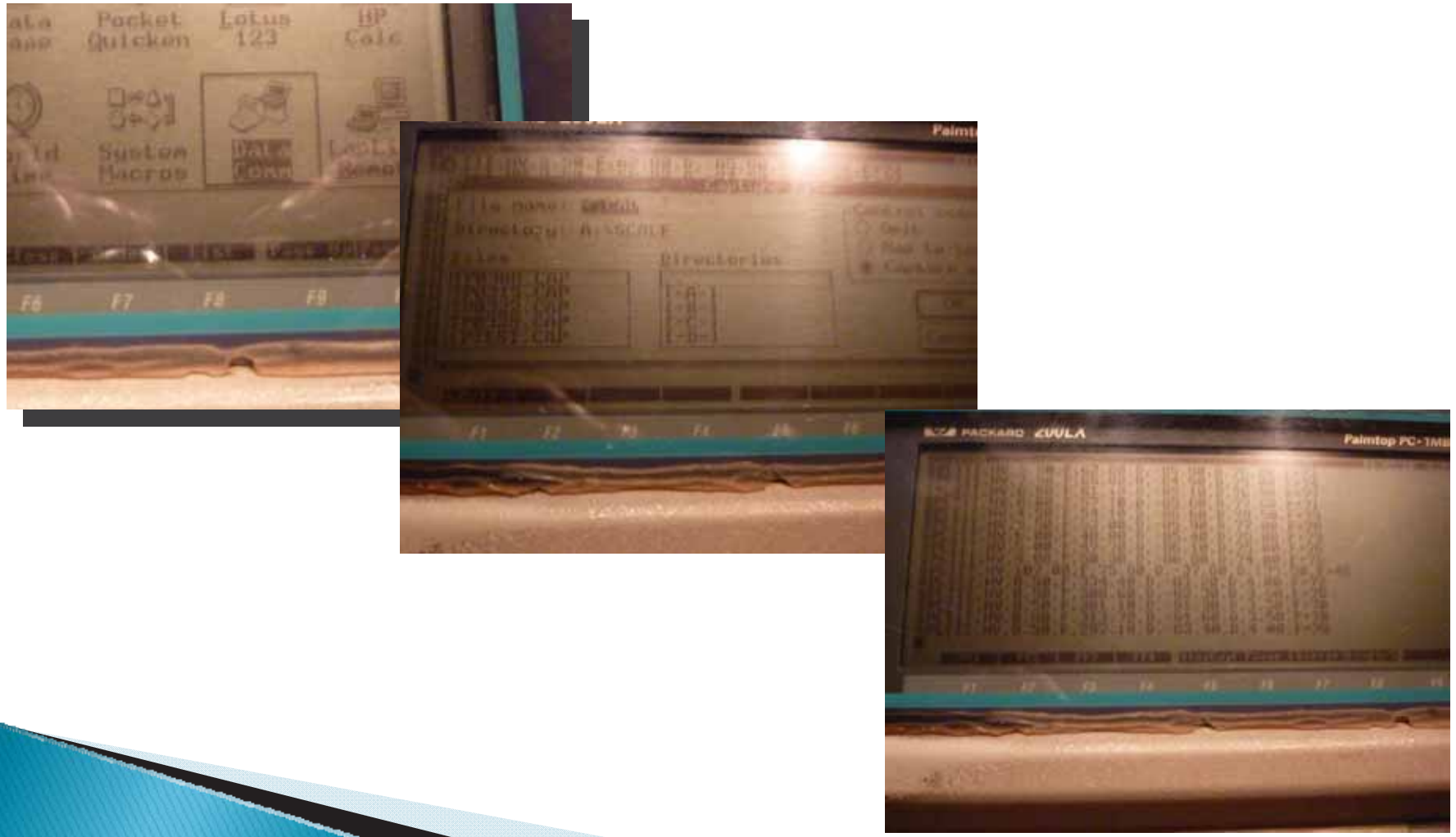
TP360 Data Collection

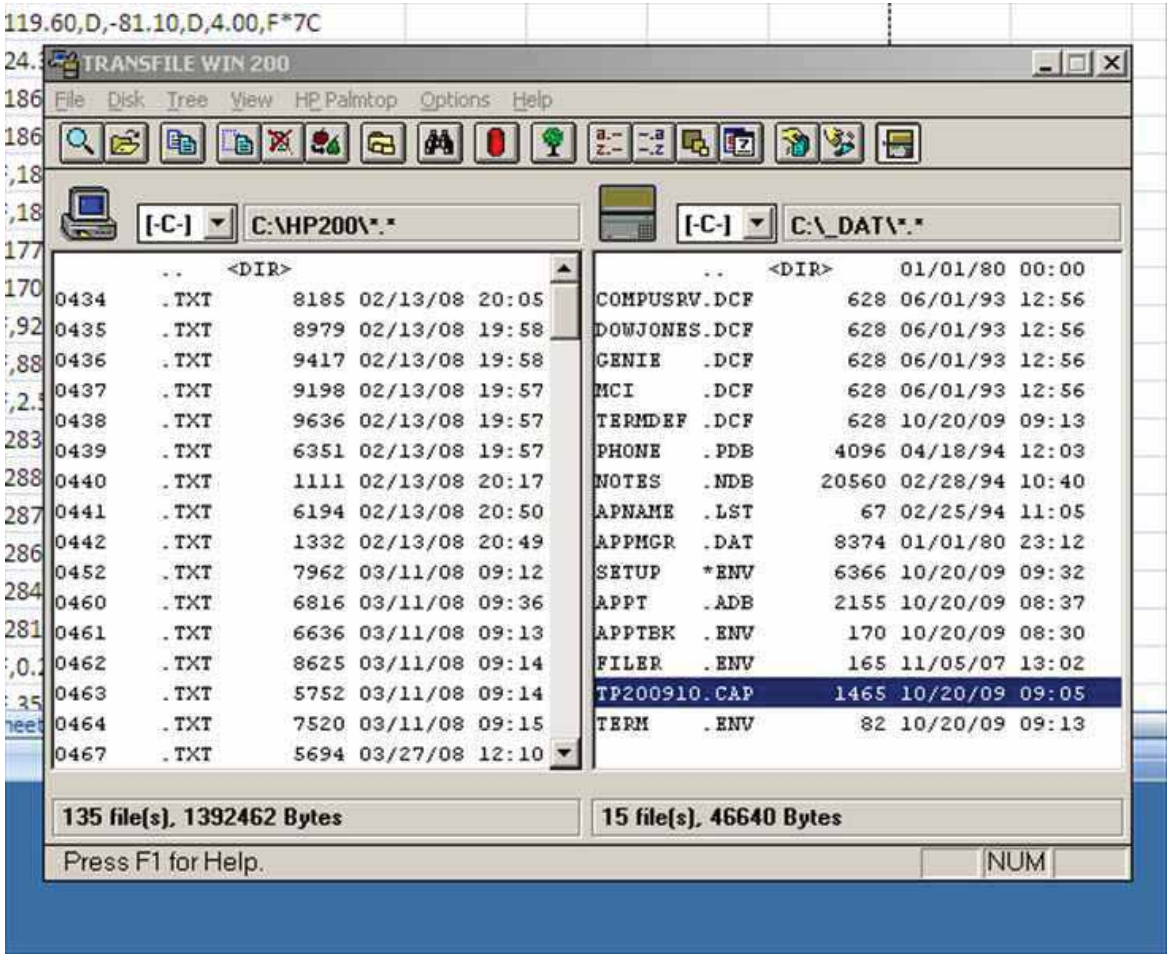


Deck Measurement Tools

HP200 Data Comm



HP200 Data Collection



K51

	A	B	C	D	E	F	G	H	I	J	K	L
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3	$PLTIT	HV	18	F	11.6	D	-14.7	D	18.5	F*48		
4	$PLTIT	HV	12.01	F	3.2	D	-15.4	D	12.01	F*78		
5	$PLTIT	HV	22.5	F	9.8	D	-9.5	D	23	F*43		
6	$PLTIT	HV	23.5	F	7	D	-7.7	D	23.5	F*4D		
7	$PLTIT	HV	26.5	F	7.5	D	-2.3	D	26.5	F*49		
8	$PLTIT	HV	24.01	F	4.1	D	-4.4	D	24.01	F*4F		
9	$PLTIT	HV	24	F	6.8	D	-4.9	D	24	F*49		
10	$PLTIT	HV	24	F	9.4	D	-4.8	D	24.5	F*4E		
11	$PLTIT	HV	17.01	F	13.6	D	-4.5	D	17.01	F*7F		
12	$PLTIT	HV	16	F	14.2	D	-3.8	D	16	F*76		
13	$PLTIT	HV	14.5	F	14.9	D	-4.6	D	14.5	F*74		
14	$PLTIT	HV	14	F	15.1	D	-5.7	D	14	F*7D		
15	$PLTIT	HV	15.01	F	15.2	D	-5.9	D	15.01	F*70		
16	$PLTIT	HV	24.01	F	17	D	-4.6	D	24.01	F*7E		
17	$PLTIT	HV	18.5	F	18.4	D	-3.8	D	18.5	F*7C		
18	$PLTIT	HV	28.5	F	349.9	D	-0.7	D	28.5	F*4A		
19	$PLTIT	HV	19.01	F	351.6	D	-3.8	D	19.01	F*40		
20	$PLTIT	HV	18.5	F	352.6	D	-3.9	D	18.5	F*42		
21	$PLTIT	HV	18.5	F	351.4	D	-4.1	D	18.5	F*4C		
22	$PLTIT	HV	18.01	F	349.1	D	-4.3	D	18.01	F*42		
23	$PLTIT	HV	16	F	347.4	D	-5.2	D	16	F*49		
24	$PLTIT	HV	5.5	F	9.9	D	-4	D	5.5	F*4E		
25	$PLTIT	HV	5.5	F	9.1	D	-4.2	D	5.5	F*44		
26	$PLTIT	HV	5	F	6.9	D	-5.4	D	5	F*44		
27	$PLTIT	HV	5	F	4	D	-5.4	D	5	F*4F		
28	$PLTIT	HV	5	F	2.2	D	-4.9	D	5	F*47		
29	$PLTIT	HV	5	F	1.1	D	-4.9	D	5	F*47		
30	$PLTIT	HV	23.01	F	5.1	D	-4.9	D	23.01	F*43		
31	$PLTIT	HV	23.5	F	356.6	D	-2.6	D	23.5	F*48		
32	$PLTIT	HV	23	F	352.5	D	-2.9	D	23	F*40		

TP360 Worksheet for Method 1

S5				
LGTH	**DOWN**	**UP**	**HEIGHT**	**SqFt**
-	***3.5***	***(3.5)***	-	
14.0	***3.5***	***6.0***	9.5	67
8.0	***3.5***	***5.5***	9.0	74
23.0	***3.5***	***(3.5)***	-	104
TOTAL				**244**

S7				
LGTH	**DOWN**	**UP**	**HEIGHT**	**SqFt**
-	***5.5***	***(5.5)***	-	
27.0	***5.5***	***4.5***	10.0	135
23.4	***5.5***	***5.0***	10.5	240
23.4	***6.0***	***3.5***	9.5	234
23.4	***6.0***	***4.0***	10.0	228
23.4	***5.5***	***6.0***	11.5	251
23.4	***4.5***	***5.5***	10.0	251
23.4	***5.0***	***5.0***	10.0	234
23.4	***6.0***	***7.0***	13.0	269
23.4	***6.0***	***7.5***	13.5	310
42.0	***6.0***	***(6.0)***	-	221
TOTAL				**2,372**

TP360 Worksheet for Method 2

L2				
LGTH	**DOWN**	**UP**	**HEIGHT**	**SqFt**
-	***5.5***	***5.5***	11.0	
65.0	***5.5***	***20.0***	25.5	1,186
24.3	***5.5***	***19.0***	24.5	606
24.3	***5.5***	***21.5***	27.0	624
24.3	***5.5***	***22.5***	28.0	667
24.3	***5.5***	***21.5***	27.0	667
24.3	***5.5***	***20.0***	25.5	637
24.3	***5.5***	***20.5***	26.0	624
24.3	***5.5***	***20.5***	26.0	631
24.3	***5.5***	***19.0***	24.5	612
27.0	***5.5***	***5.5***	11.0	479
TOTAL				**6,734**

TP360 Worksheet for Method 3

C1S NEW				
LGTH	**DOWN**	**UP**	**HEIGHT**	**SqFt**
-	***4.0***	***(4.0)***	-	
17.0	***4.0***	***9.0***	13.0	110.5
18.0	***4.0***	***9.5***	13.5	238.5
18.0	***4.5***	***7.0***	11.5	225.0
18.0	***5.0***	***8.5***	13.5	225.0
18.0	***5.0***	***12.0***	17.0	274.5
18.0	***4.5***	***12.5***	17.0	306.0
18.0	***4.5***	***10.5***	15.0	288.0
24.0	***4.5***	***(4.5)***	-	180.0
149.0				
TOTAL				**1,847.5**

UNDER CONSTRUCTION

C1S NEW			
73.0	8.0	8.3	66.2
71.5	9.5	8.3	78.6
68.0	13.0	8.3	107.6
69.5	11.5	8.3	95.2
67.0	14.0	8.3	115.9
69.5	11.5	8.3	95.2
70.0	11.0	8.3	91.1
68.0	13.0	8.3	107.6
68.0	13.0	8.3	107.6
65.5	15.5	8.3	128.3
65.5	15.5	8.3	128.3
68.5	12.5	8.3	103.5
66.0	15.0	8.3	124.2
64.0	17.0	8.3	140.7
66.5	14.5	8.3	120.0
65.5	15.5	8.3	128.3
70.0	11.0	8.3	91.1
73.5	7.5	8.3	62.1
COUNT	18.0		
Lgth	149.0		
Int	8.3		
SqFt			*1,891.5*

END