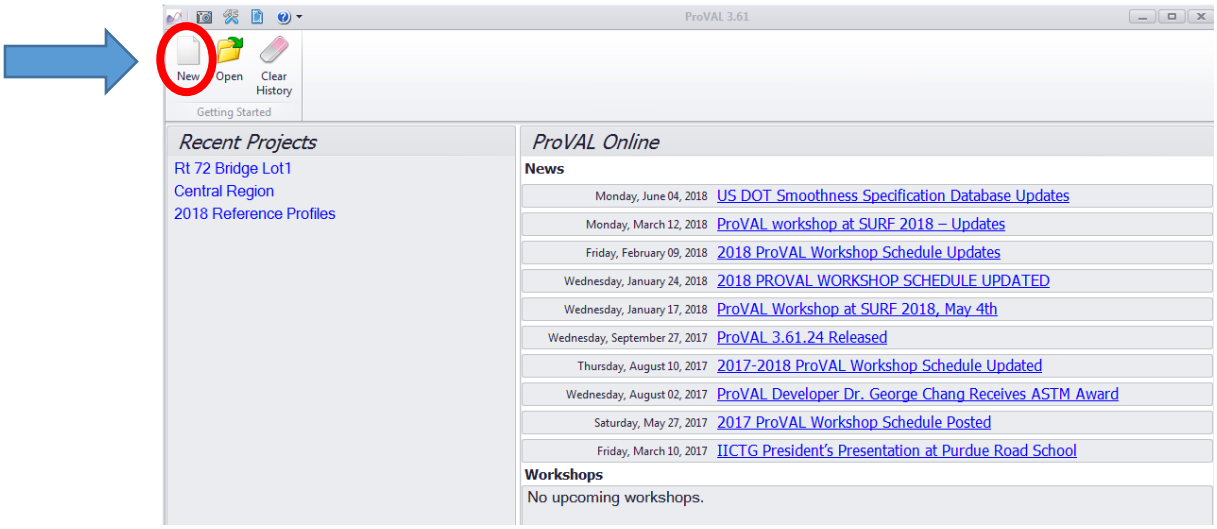
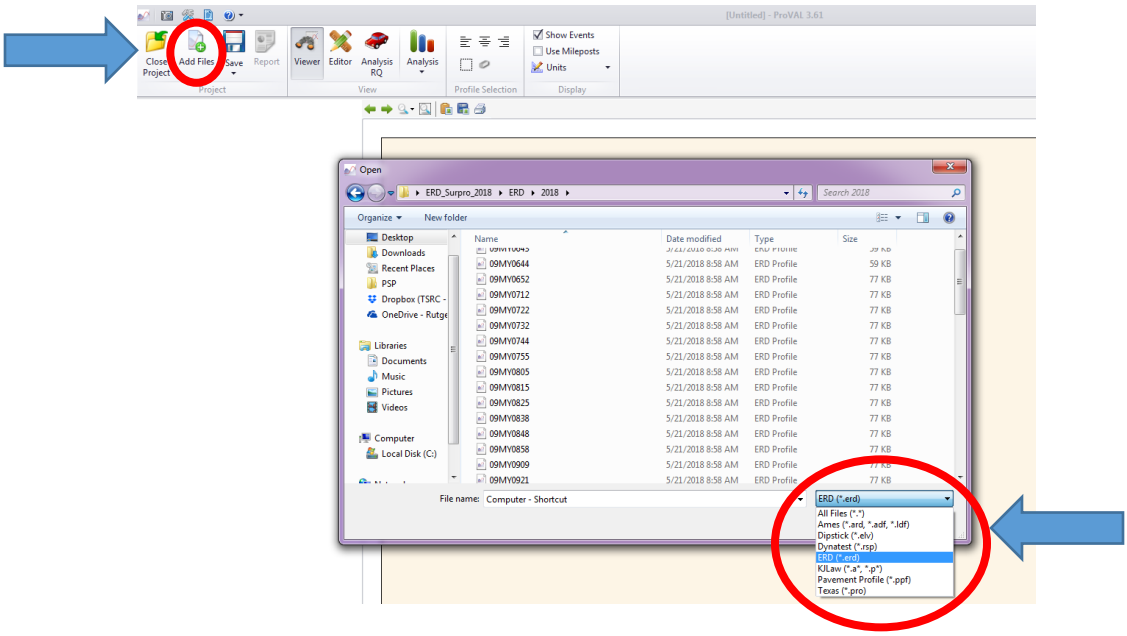
Rolling Straight Edge Analysis Procedure using ProVAL 3.61

1. Open ProVAL
   After starting ProVAL a dashboard screen will open with a navigation ribbon across the top, and 3 windows showing recent projects, upcoming workshops, and updates related to ProVAL software releases and conferences.



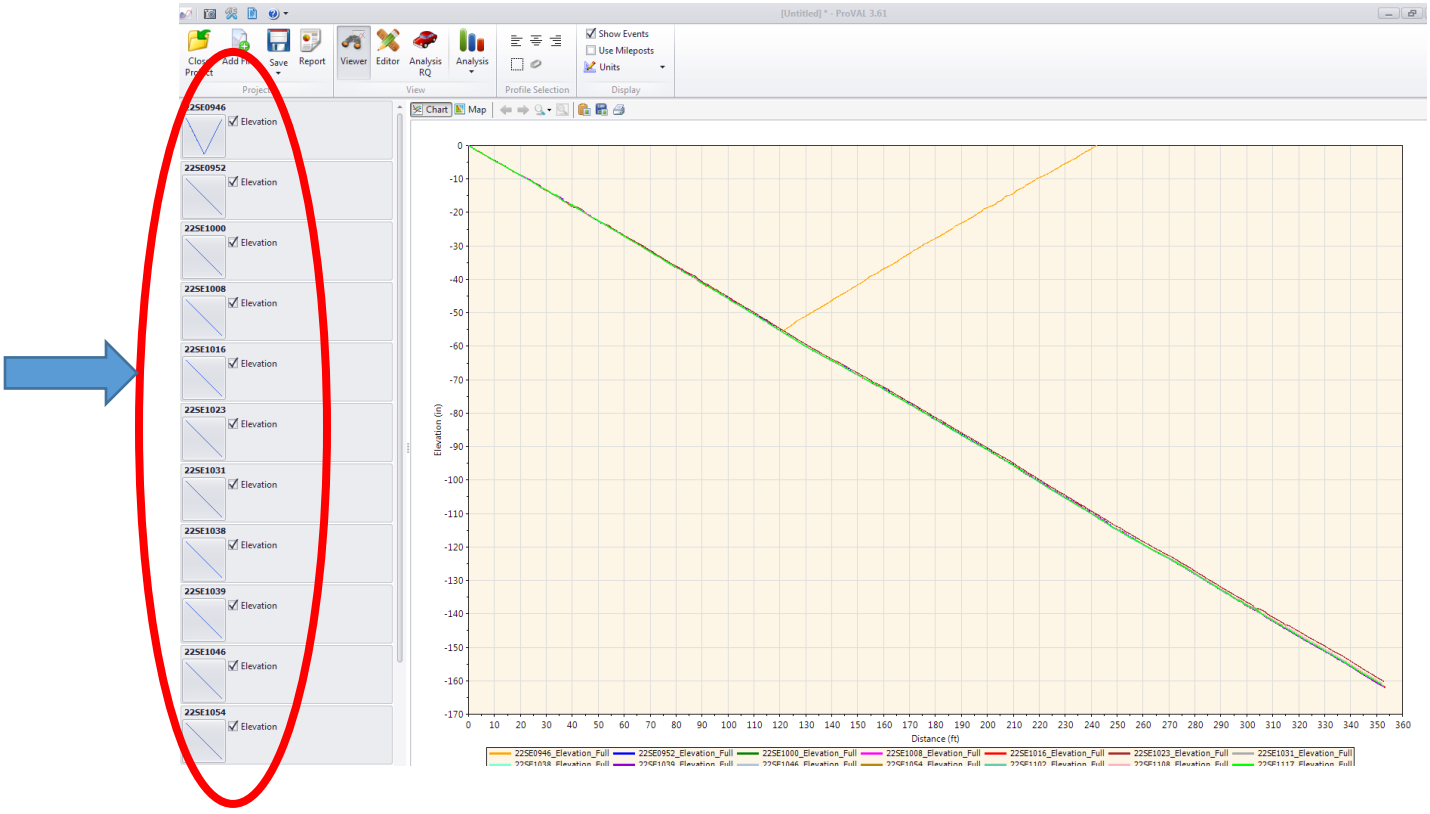
2. Click "New" in the navigation ribbon
   A project must first be open before adding SurPRO data to ProVAL

3. Click "Add Files" in the navigation ribbon
   A window will appear where you can navigate to the location SurPRO data has already been uploaded to. ProVAL defaults to look for .ppf files so be aware to change the file type extension to .erd to locate SurPRO data.

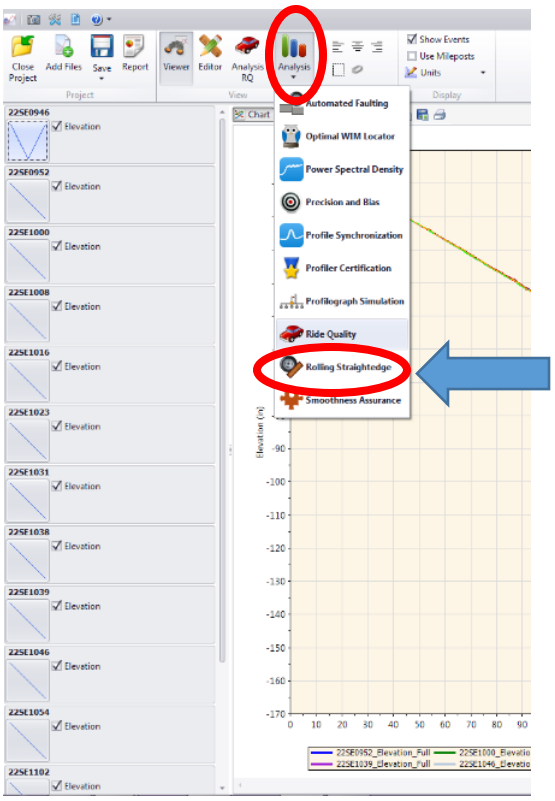


4. Choose all files to be added to the project. Click “Save” and give the project a name
   Multiple data files can be loaded into ProVAL at the same time by selecting multiple files and clicking “open”. By saving the project you are able to save all loaded data files and associated settings for future use. It is recommended to save the ProVAL project with the .erd files uploaded from the SurPRO for context.

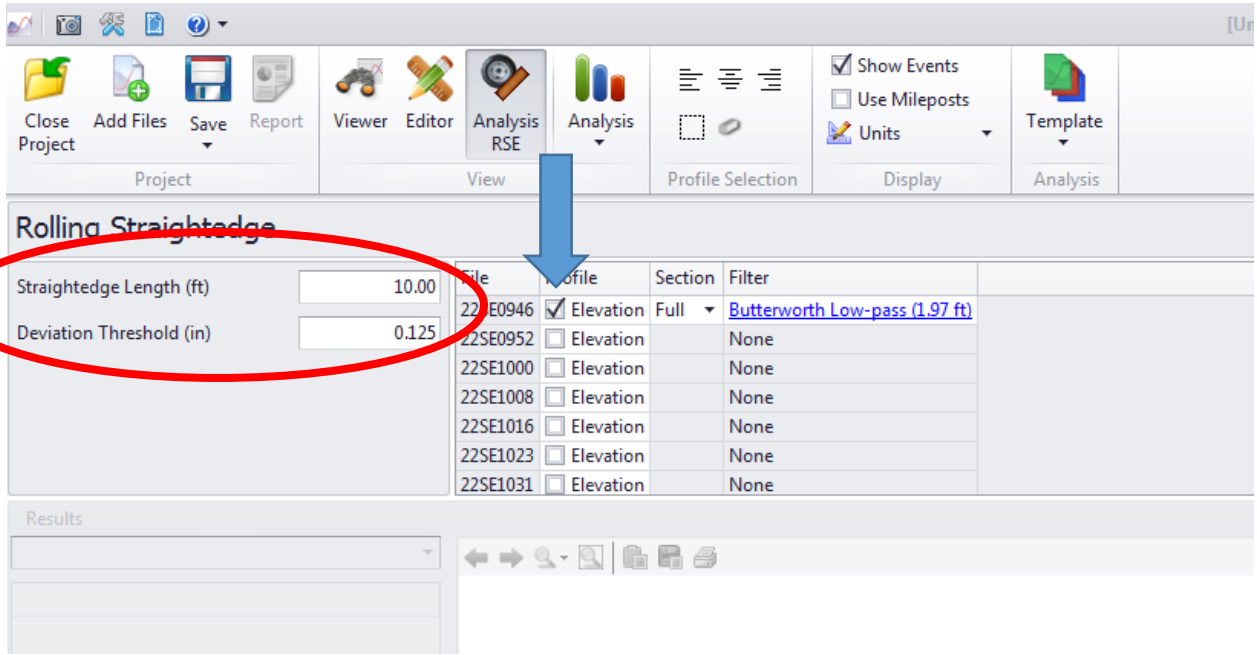
5. Plot data by clicking the empty check boxes along the left
   It is always best practice to start by viewing the profile data prior to running any analysis. This is where incorrect data files can be identified. Check to make sure all profiles follow the same bumps and sags as well as the same length. Any files that do not match the majority should be identified as collected for this analysis or identified as an old file imported by accident. The closed loop calibration file should also be plotted to view any potential issues. The closed loop calibration file should be a perfect mirror copy of the first half.



6. Click “Analyze” and open the Rolling StraightEdge Analysis Tool
   After choosing “Rolling Straightedge” form the Analyze drop down menu the RSE (Rolling Straight Edge) analysis screen will open.



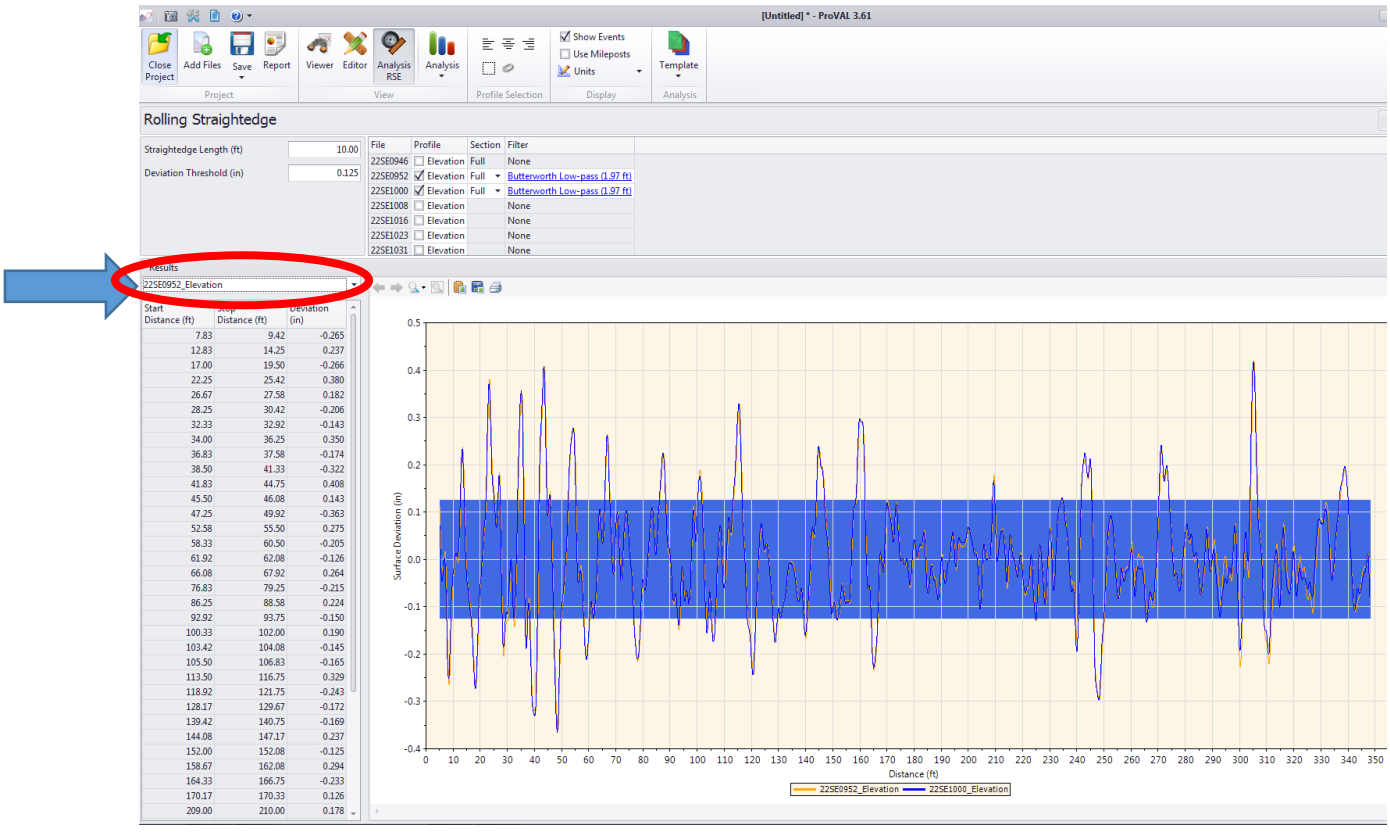
7. Input Straightedge Length (ft) and Deviation Threshold (in) along the top left to use for analysis.
   *New Jersey Standard Specifications call for a **10 foot straightedge length** and a **deviation threshold of 0.125 inches**. Always refer to project specific documents to confirm straightedge length and deviation thresholds for a given project.*



8. Choose a profile to analyze by clicking the check box and use a Butterworth Low-pass (1.97ft) filter
   Once you choose a profile to analyze the ProVAL software will allow you to choose a section of the profile to analyze and what filter to use. It is not recommended to edit the profile data down to a smaller section unless directed by the RE. A ***Butterworth Low-Pass (1.97 ft) filter*** *is used to eliminate elevation changes at the jobsite that may influence the analysis.*

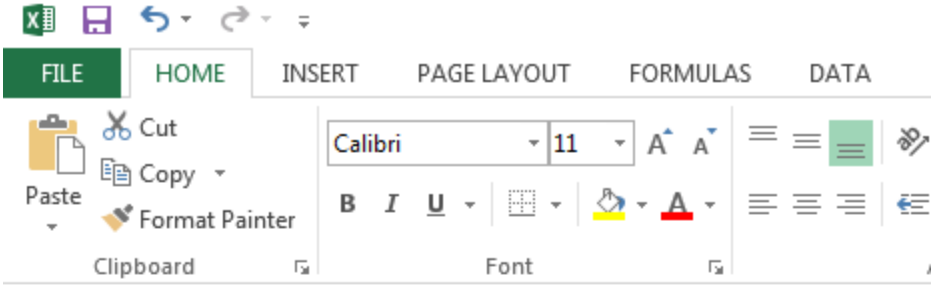
9. Click "Analyze" in the top right corner
   The analysis will fill populate for the selected profiles

10. Observe RSE analysis and export to Excel
    All selected profiles will be shown in the analysis plot but only one data file can display detailed information at a time. The data file can be changed to show a different detailed analysis by clicking on the drop down menu along the left side of the screen. Right click within the data grid and choose "Copy table to Clipboard". The blue band below represents 0.125in deviations and all profile lines out of bounds are displayed in a grid along the left.



11. In Microsoft Excel – Press CTRL + V in the first cell

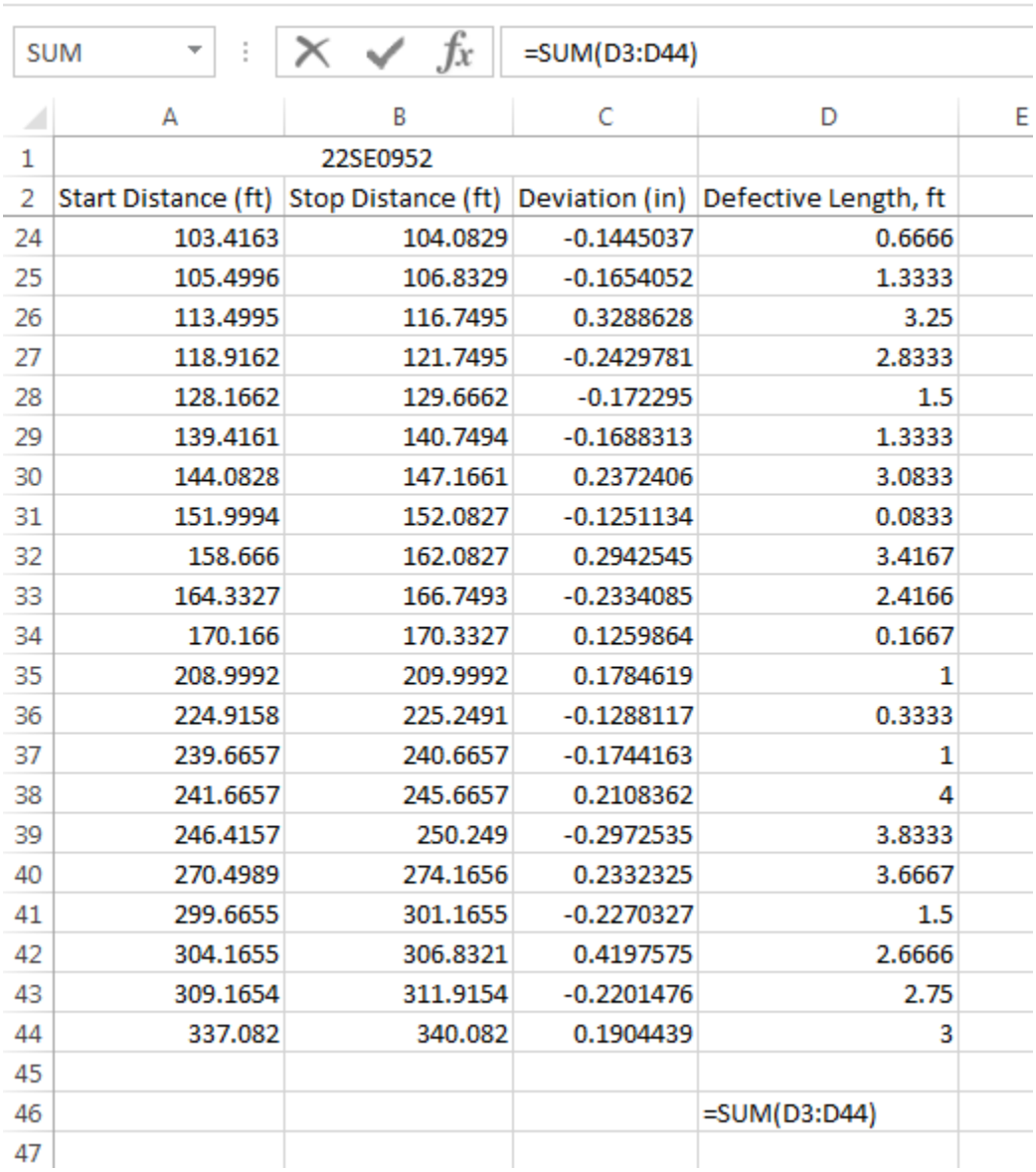
    This will paste the RSE analysis for the profile that was copied in ProVAL. It is best practice to label this data in excel as either the profile name or a unique descriptive title (e.g. StructureNoXXX_LotXX_WPXX_RunXX).



	A	B	C	D	E
1	22SE0952				
2	Start Distance (ft)	Stop Distance (ft)	Deviation (in)		
3	7.833302	9.416629	-0.2646845		
4	12.83328	14.24994	0.2367044		
5	16.99993	19.49992	-0.2661441		
6	22.24991	25.41656	0.3803791		
7	26.66656	27.58322	0.182179		
8	28.24989	30.41655	-0.2059364		
9	32.3332	32.91653	-0.1428024		
10	33.99986	36.24986	0.3498805		
11	36.83319	37.58318	-0.1742263		
12	38.49985	41.33317	-0.3217748		
13	41.83317	44.74982	0.4079293		
14	45.49982	46.08315	0.1426053		
15	47.24981	49.91647	-0.3629465		
16	52.58312	55.49978	0.2752374		
17	58.3331	60.49976	-0.2049884		
18	61.91642	62.08308	-0.1257412		
19	66.08307	67.9164	0.2635546		
20	76.83302	79.24969	-0.2151387		
21	86.24966	88.58298	0.2240384		
22	92.9163	93.74963	-0.1496077		
23	100.3329	101.9996	0.1900872		
24	103.4163	104.0829	-0.1445037		
25	105.4996	106.8329	-0.1654052		
26	113.4995	116.7495	0.3288628		

12. Calculate the deficient length

    In the example above, click in cell D3 and type "=B3-A3" to automatically calculate the defective length for the first defective area. Drag the formula down to the bottom of the data set and sum up the entire defective length for the profile. In this example the formula "=SUM(D3:D44)" can be used to sum the defective lengths for the given range of data.



	A	B	C	D	E
1		22SE0952			
2	Start Distance (ft)	Stop Distance (ft)	Deviation (in)	Defective Length, ft	
24	103.4163	104.0829	-0.1445037	0.6666	
25	105.4996	106.8329	-0.1654052	1.3333	
26	113.4995	116.7495	0.3288628	3.25	
27	118.9162	121.7495	-0.2429781	2.8333	
28	128.1662	129.6662	-0.172295	1.5	
29	139.4161	140.7494	-0.1688313	1.3333	
30	144.0828	147.1661	0.2372406	3.0833	
31	151.9994	152.0827	-0.1251134	0.0833	
32	158.666	162.0827	0.2942545	3.4167	
33	164.3327	166.7493	-0.2334085	2.4166	
34	170.166	170.3327	0.1259864	0.1667	
35	208.9992	209.9992	0.1784619	1	
36	224.9158	225.2491	-0.1288117	0.3333	
37	239.6657	240.6657	-0.1744163	1	
38	241.6657	245.6657	0.2108362	4	
39	246.4157	250.249	-0.2972535	3.8333	
40	270.4989	274.1656	0.2332325	3.6667	
41	299.6655	301.1655	-0.2270327	1.5	
42	304.1655	306.8321	0.4197575	2.6666	
43	309.1654	311.9154	-0.2201476	2.75	
44	337.082	340.082	0.1904439	3	
45					
46				=SUM(D3:D44)	
47					

13. Calculate the Percent Defective Length for a section

    The percent defective length can be calculated by using the formula below

$$Percent\ Defective\ Length = \frac{Total\ Defective\ Length}{Total\ Section\ Length} * 100$$

14. Repeat steps 10-13 for all data files