



Appendix C: Determining Sag-Tension on Single Span, No Original Design

Situation: A section of line is currently in place, with no recorded data as to the ruling span, design limits, or stringing sags. It is necessary to determine the ruling span and design limits, in order to modify the line (such as adding marker balls, changing the supporting structure, etc.).

For this example, the following assumptions were made:

- Conductor: 795.0 kcmil 26/7 ACSR "Drake"
- Calculated Ruling Span: 1000.00 ft
- Loading District: NESC 261.H.1.b *EXCEPTION 1* Heavy
- Measured Sag: 15.38 ft, 937.00 ft span, 60.0°F conductor temperature

Step #1

Calculate the ruling span using by inputting all the spans in the applicable tension section into the **Calculate Ruling Span** tool.

Step #2

Select the conductor in the **Conductor Selection** screen.

Step #3

The sag at a given conductor temperature must be determined for at least one span. This can be accomplished by measuring the sag with survey methods, or by throwing a ding line over the wire and using the stopwatch method (Use proper safety procedures if the line is hot).

Step #4

Choose the applicable load selection in the Load Selection panel on the **Main Menu**. In the Edit Loading Table screen, remove all limits except for the sag value obtained by survey, entered into the Limit column with the distance unit as the Type. Use the temperature at time of survey and Final in the Usage column if the line is assumed to be at final conditions.

Loading Table

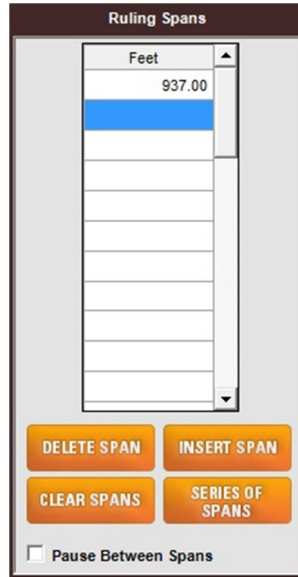
* Cond. Temp	in Ice	lb/ft ² Wind	Limit	Type	Usage
0.0	0.50	4.00			
32.0	0.50				
-20.0					
0.0					
30.0					
60.0			15.38	ft	Final
60.0					Creep
90.0					
120.0					
167.0					
212.0					

°C °F
 * Right click on a row button to Insert or Delete a row

 File

Step #5

Initially, the ruling span value used should match the single span for which the survey data was obtained.



Step #6

Click the **Calculate Sag & Tension** button. In the output, note the final tension at 60.0°F. This will be your final design limit at 60.0°F in the ruling span sag & tension calculations.

Loading Limits										
Cond. Temp	Ice	Wind	K	Limit	Usage					
*F	*C	in	lb/ft ²	lb/ft						
60.0	15.6	0.00	0.00	0.00	15.38 ft*	Final				
60.0	15.6	0.00	0.00	0.00		Creep				
Design Points							Final		Initial	
Cond. Temp	Ice	Wind	K	Weight	Sag	Tension	Sag	Tension		
*F	*C	in	lb/ft ²	lb/ft	ft	lb	ft	lb		
0.0	-17.8	0.50G	4.00	0.30	2.508	18.58	14831	18.31	15052	
32.0	0.0	0.50G	0.00	0.00	2.093	18.59	12378	17.39	13227	
-20.0	-28.9	0.00	0.00	0.00	1.093	10.69	11223	9.59	12519	
0.0	-17.8	0.00	0.00	0.00	1.093	11.75	10216	10.19	11781	
30.0	-1.1	0.00	0.00	0.00	1.093	13.49	8896	11.22	10696	
60.0	15.6	0.00	0.00	0.00	1.093	15.38*	7808	12.42	9663	
90.0	32.2	0.00	0.00	0.00	1.093	17.33	6929	13.78	8709	
120.0	48.9	0.00	0.00	0.00	1.093	19.30	6227	15.29	7856	
167.0	75.0	0.00	0.00	0.00	1.093	21.97	5471	17.83	6739	
212.0	100.0	0.00	0.00	0.00	1.093	3.26	5171	20.35	5905	

* Design Condition

G Glazed Ice Density of 57.0 lb/ft³

Step #7

Create a new project file using the calculated ruling span. The only design limit should be the tension obtained in Step #7. When sag & tension are calculated, review the output to be sure that design conditions have not been exceeded.

Loading Table

*	°F	in	lb/ft²	Limit	Type	Usage
	Cond. Temp	Ice	Wind			
▶	0.0	0.50	4.00			
	32.0	0.50				
	-20.0					
	0.0					
	30.0					
	60.0			7808	lb	Final
	60.0					Creep
	90.0					
	120.0					
	167.0					
	212.0					

°C °F
 * Right click on a row button to Insert or Delete a row

File

Ruling Spans

Feet

1000.00

Pause Between Spans