

Micro-Credential in Overhead Line Design

Overview for the Trainer's Forum

April 2024

Background



Our Purpose

To be a leader for Aotearoa New Zealand's energy industry, providing expert electricity system engineering, technical, and safety advice that is pan industry, innovative, inclusive, and trusted.

Strategic Priorities

Navigators

Provide expert advice and advocacy on greater standardisation, asset management, innovation, workforce, and health and safety risks.

Connectors

To connect the industry across Aotearoa New Zealand to solve issues, share knowledge, promote standardisation and greater electrification.

Capability Builders

Build a diverse and inclusive workforce that has the technical talent and capability, to meet industry's existing and future needs.



Overhead Line Design Forum

Steering Group

Learners

Employers

SMEs



Ako



The Modules

010 – Line Design Principles

020 – Conductor Solutions

030 – Insulator Solutions

040 – Pole Solutions

050 – Crossarm Solutions

060 – Stay Solutions

070 – Foundations and Footings

080 – Line Design Practice



The pain



$\varphi R_n > \text{effect of loads } (W_n + \sum y_x X)$



- Learners on the Steering Group
- Mathematics for Overhead Line Design
- Adding tools





AutoSave ...

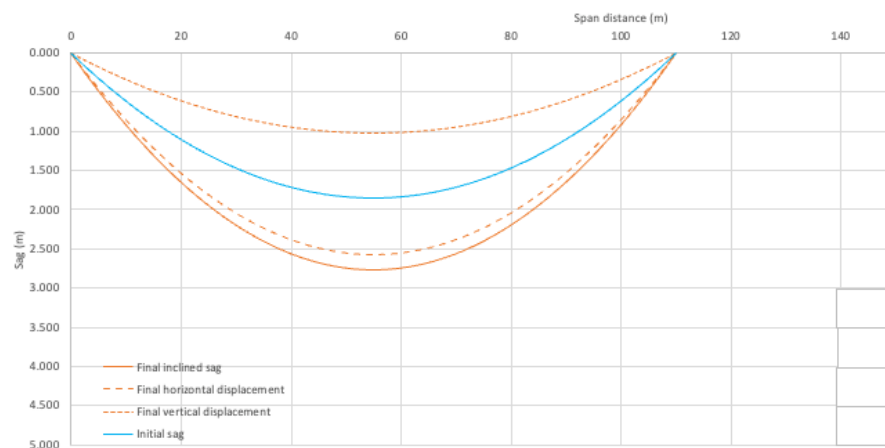
Conductor tension under wind 2207 - File

Home Insert Draw Page Layout Formulas Data Review View Automate Acrobat

Calibri (Body) 11 A A⁺ A⁻ Wrap Text Merge & Centre General \$ % \leftarrow 0 .00 \rightarrow 0 Conditional Formatting Format as Table Normal Bad Good Neutral Calculation Check Cell

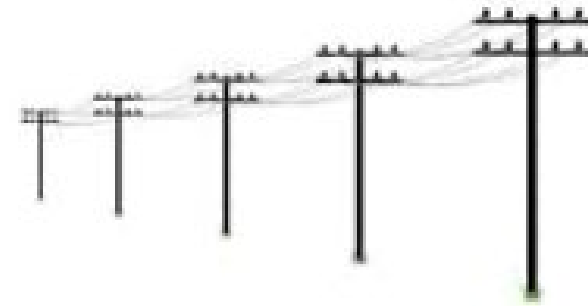
A28

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	Conductor tension under wind																					
2																						
3	The purpose of this calculation is to provide a demonstration of the interplay between the various variables that influence conductor tension and movement. The calculation is based on an automated version of equation R16 from AS/NZS7000.																					
4																						
5	Conductor type		IODINE																			
6	Span or Ruling span	L_n	110	m																		
7	Creep temperature adjustment	t_c	0	°C																		
8																						
9	Area	A	124	mm ²																		
10	Conductor unit mass	m	339	kg/km																		
11	Diameter	D	14.3	mm																		
12	Modulus of elasticity	E	59	GPa																		
13	Coefficient of Linear Expansion	α	0.000023	/°C																		
14	Calculated breaking load	CBL	27.1	kN																		
15																						
16	Initial tension	H_i	2,710	N																		
17	Final tension	H_f	4,927	N																		
18	Vertical conductor load	W_v	3.326	N/m																		
19	Transverse conductor load	W_h	8.3655	N/m																		
20	Resultant conductor load	W	9.002	N/m																		
21																						
22	Initial sag	D	1.86	m																		
23	Final inclined sag	D	2.76	m																		
24	Final horizontal displacement	D	2.57	m																		
25	Final vertical displacement	D	1.02	m																		
26																						
27						585	10%	10	37													
28						Transverse wind pressure	Initial tension	Initial temperature	Final temperature													
29						P	H_i	t_i	t_f													
30						Pa	%CBL	°C	°C													
31																						
32	Note that in this spreadsheet the span and ruling span have been assumed to be the same number for convenience. In practice the span and ruling span will be different numbers unless it is a single span.																					
33																						
34																						
35																						
36																						
37																						
38																						
39	This table uses equation R2 to calculate the parabolic conductor sag																					
40						Initial sag		Final sag														
41	Span distance	Initial sag	Final inclined sag	Final horizontal displacement	Final vertical displacement	Horizontal	Vertical	Horizontal	Vertical													
42	m	m	m	m	m	m	m	m	m													
43	0	0.000	0.000	0.000	0.000	0	0	0	0													
44	1.1	0.074	0.109	0.102	0.040	0	1.86	2.568	1.02													



Init
Fi

The passion





Looking Forward

