COLDNet Profile – Crossarm Design



Crossarm Design is one of the new features incorporated into COLDNet Profile.

Calculations Include:

- Downline Bending of the Crossarm •
- Vertical Bending of the Crossarm •
- **Kingbolt Shear** •
- **Kingbolt Bending** •
- Insulator Loads
- Bending of Pin Insulators •

A new Insulator Library has been added under Design Parameters & Libraries as shown below. This library operates the same as the other COLDNet Profile libraries. The required insulator variables include:

- Group
- Name •
- Part Number •
- Length •
- Diameter •
- Mass •
- Allowable Strength •
- Allowable Bending Strength •
- Allowable Uplift •
- **Drag Coefficient** •
- Insulator Strength Factors •

Parameter File & Component Libraries															
Compo	nent Libraries Conductor	s Voltages Pol	es Pole Bases	Insulator	rs Cross	arms Soil Types	Stays Pole Pla	nt Paper Sym	bols Markup						
Insula	tor Group Test	 Add/Edit 	t Group Names	New Libra	ary Char	nge File Save Si	ave As								
Insula	Insulators Insulators											sulator Strength Factors		_	
	Name	Part Voltage		Length		Diameter (mm)	Mass (kg)	Allowable Strength	Bending	Allowable	Drag	-	Max Wind	Strength Factors	1
		Number		(mm)		(mm)		(kN)	(kN)	opint (kN)	Coemcient	- i	Everyday		1
▶	IHV	101	11kV	~	12.00	10.00	3.00	15.00	12.00	5	1.00				
	ILV	102	LV3	~	10.00	10.00	2.50	12.00	10.00	2.50	1.00				
															_



New Crossarm Variables

As well as a new Insulator Library, there is also a number of new variables that have been added to the Crossarm Library that are required for a full crossarm analysis including:

- Vertical Capacity •
- Acrossline Capacity •
- **Downline Capacity** •
- Insulator Group (populated from the Insulator Library) •
- Insulator (populated from the Insulator Group from the Insulator library) •
- Allowable Bending Strength •
- **Kingbolt Description** •
- **Kingbolt Diameter** ٠
- **Kingbolt Length** •
- **Kingbolt Offset** •
- Kingbolt Allowable Shear Strength ٠
- **Kingbolt Allowable Bending** •

The Crossarm Design will only be analysed if the user has selected Calculate Crossarms in the Calculation Options in the Parameter File & Component Libraries form.

Parameter File & Component	Libraries																
Component Libraries Con	ductors Vo	Itages Poles	Pole Bases	Insulator	s Cros	sarms	Soil Type	s Stay	s Pole Plant i	Paper	Symbols	Markup					
Change Parameter File	Save As N	ew Parameter	File Cance	l Changes	Save	Change	s & Clos	e (This f	file only)								
																Calculation Methods	
Cha								n where	the libraries are	Store	ŧ			Tension Calculation Method:	HorizontalRulingSpan \vee		
Libraries																Pole Allowable Tipload	usePoleStrength ~
Conductor Library	: C:\Use	rs\Kieren Hato	:hman\Docum	nents\COLD	Net\Libr	braries\WZDefault.COLDConductors									ange File	Calculation Method:	
Voltage Library	: C:\Use	rs\Kieren Hato	:hman\Docum	nents\COLD	Net\Libr	aries\NZ	ZDefault.	COLDVo	oltageData					Chi	ange File	above Stay Calculation Method:	usePoleStrength \vee
Pole Library	: C:\Use	rs\Kieren Hato	:hman\Docum	nents\COLD	Net\Libr	aries\NZ	ZDefault.	COLDPo	leGroups					Chi	ange File	Friedeline Coloriation Mathedu	To be to only on the
Pole Base Library	: C:\Use	rs\Kieren Hato	chman\Docum	nents\COLD	Net\Libr	aries\N2	ZDefault.	COLDPo	leBase					Chi	ange File	Poundation Calculation Method:	EmbedmentLength
Insulator Library	: C:\Use	rs\Kieren Hato	hman\Docum	nents\COLD	Net\Libr	aries\De	efault.CC	LDInsul	atorLibrary					Cha	ange File	Calculation Options	Blowout Conditions
Crossarm Library	: C:\Use	rs\Kieren Hato	:hman\Docum	nents\COLD	Net\Libr	aries\N2	ZDefault.	COLDXa	arms					Chi	ange File	Calculate Tiploads	Temperature (°C): 15
Soil Type Library	: C:\Use	rs\Kieren Hato	hman\Docum	nents\COLD	Net\Libr	aries\NZ	ZDefault.	COLDSo	pilData					Chi	ange File	Calculate Foundations	
Stay Library	: C:\Use	rs\Kieren Hato	:hman\Docum	nents\COLD	Net\Libr	aries\N2	ZDefault.	COLDSt	ayGroup					Cha	ange File	Calculate Mid-Span separation	Wind Pressure (Pa): 500
Pole Plant Library	C:\Use	rs\Kieren Hato	hman\Docum	nents\COLD	Net\Libr	aries\N2	ZDefault.	COLDPo	lePlantGroup					Cha	ange File	Calculate Uplift 🗹	Default Properties
Plot Paper Library	C:\Use	rs\Kieren Hato	.hman\Docum	nents\COLD	Net\Libr	aries\								🔒 Cha	inge File	Calculate Stays 🗹	Default Soil Type:
Symbol Library	Symbol Library: C:\Users\Kieren Hatchman\Documents\COLDNet\Libraries\ Change File								ange File	Calculate Crossarms 🗹							
Markup Library	Markup Library:								ange File		Mid-Span 'K' factor: 0.40						
											Uplift Results	User Type					
																Show in kN O Show in kg	Standard ~
Tipload Cases																Uplift Load Cases	
Name Temp	erature °C)	ture Wind Pressure (Pa) Snow (Mn)		A (Wn)	B (Gs)	C (Gc)	D (Ft)	Live Load Vertical (N)	E	Live Load Horz. (N)	G Use Span Reduction Rec Factor Synoptic Dow Winds W		Use Span Reduction Factor Downdraft Winds	Check Stay	Name Temperature (°C) Wind Pr (Pi Uplift 0 900	a)	
Max Wind	10	1531	0	0	1.00	0.00	1.25	1.25	0.00	0.00	0.00	0.00					
Everyday	10	383	0	0	1.00	0.00	0.00	1.10	0.00	0.00	0.00	0.00					
•												_					



All the crossarm design results are displayed in the results grid and reports and any defects will be highlighted red and listed in the defect tree-view on both the main screen and profile screen.



Downline Bending of the Crossarm

Downline bending moments taken either side of the kingbolt of the crossarm (fixed location). The required variables to do the analysis include:

- **Crossarm Length** •
- **Crossarm Depth** •
- **Crossarm Height**
- **Kingbolt Offset** •
- **Crossarm Allowable Bending Strength** •
- Crossarm Insulator Group (if required) •
- Crossarm Insulator (if required)

Vertical Bending of the Crossarm

Vertical bending moments taken either side of the kingbolt of the crossarm (fixed location) if there are no brackets on the configuration. If brackets are added to the crossarm, the horizontal bracket offset will be used to take vertical bending moments about (as this will be the new fixed location). If two brackets are used it is assumed they are symmetrical either side of the crossarm. If only one bracket is used, bending moments will be taken about the horizontal bracket offset of that side of the crossarm and bending moments will be taken about the kingbolt for the other side. The required variables to do the analysis include:

- Crossarm Length
- **Crossarm Depth**
- **Crossarm Height**



- Kingbolt Offset
- Crossarm Allowable Bending Strength
- Crossarm Insulator Group (if required)
- Crossarm Insulator (if required)
- Brackets (if required)

Crossarm brackets can be added at the profile design level in the **Circuits & Crossarms** Tab by selecting the **Add Brackets** button shown below.



The following window will open

Add Brackets		x
Cancel		Save
Exclude from Calcs		
No. of Brackets	Configuration	
Zero	Horizontal & Vertical Offset	Horizontal Offset (m):
O One	O Horizontal Offset & Angle	
O Two	○ Vertical Offset & Angle	Vertical Offset (m):
	Positioning Downline	7
	🔘 Bracket Left	
	🔘 Bracket Right	



From here select the **No. of Brackets** and **Configuration** in which you would like to enter in the positioning of the crossarm. If only one bracket is selected you will need to select the **Positioning Downline**. Enter the require configuration data to position the bracket correctly on the crossarm. Select **Exclude from Calcs** if you do not wish for the brackets to be included in the relevant calculations (if this is selected it will run the calculations as if no brackets are present). Select **"Zero"** to remove brackets. When finalised select **Save**.

Kingbolt Shear

Shear load induced on the crossarm kingbolt. If brackets have been added to the crossarm and not excluded from the calculations, then this analysis will not be performed as it is assumed the bracket and supporting bolts will be taking the brunt of the crossarm loads. The required variables to do the analysis include:

- Crossarm Length
- Crossarm Depth
- Crossarm Height
- Crossarm Insulator Group (if required)
- Crossarm Insulator (if required)
- Kingbolt Description
- Kingbolt Diameter
- Kingbolt Allowable Shear Strength

Kingbolt Bending

Bending load induced on the crossarm kingbolt. The bending moment is taken about the length from the top of the kingbolt to the location where the crossarm attaches to the pole. If brackets have been added to the crossarm and not excluded from the calculations, then this analysis will not be performed as it is assumed the bracket and supporting bolts will be taking the brunt of the crossarm loads. The required variables to do the analysis include:

- Crossarm Length
- Crossarm Depth
- Crossarm Height
- Crossarm Insulator Group (if required)
- Crossarm Insulator (if required)
- Kingbolt Description
- Kingbolt Diameter
- Kingbolt Length
- Kingbolt Allowable Shear Strength
- Kingbolt Allowable Bending

Insulator Loads

Combined loads induced on the individual insulators on the crossarm. The worst insulator on each of the crossarms will be displayed. An Insulator Library must be loaded and selected on the crossarm in the Crossarm Library. The required variables to do the analysis include:

- Insulator Group
- Insulator Name
- Insulator Length
- Insulator Diameter
- Insulator Allowable Strength
- Insulator Drag Coefficient



- Insulator Strength Factors •
- Crossarm Insulator Group •
- Crossarm Insulator •

Insulator Bending

Bending loads induced on the individual pin insulators on the crossarm. The worst insulator on each of the pin crossarms will be displayed. This calculation will not be done for strain attachments. An Insulator Library must be loaded and selected on the crossarm in the Crossarm Library. The required variables to do the analysis include:

- **Insulator Group** •
- Insulator Name •
- Insulator Length •
- **Insulator Diameter**
- Insulator Length •
- Insulator Allowable Bending Strength •
- Insulator Drag Coefficient •
- **Insulator Strength Factors** ٠
- **Crossarm Insulator Group** •
- Crossarm Insulator •