New Analyses & Reports

Graeme Louw + Alan Fritz

POWER LINE SYSTEMS
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Agenda

- Damper Analysis
- Advanced Structure Clearances
- SAPS Labels – report
- Lines Reference Check + Component File Report
- Modal Analysis of steel poles

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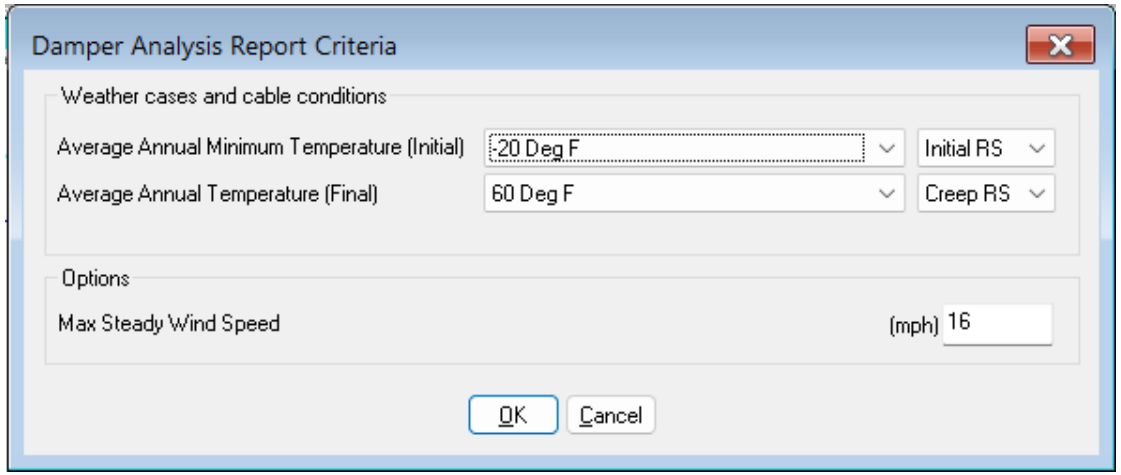
Damper Analysis

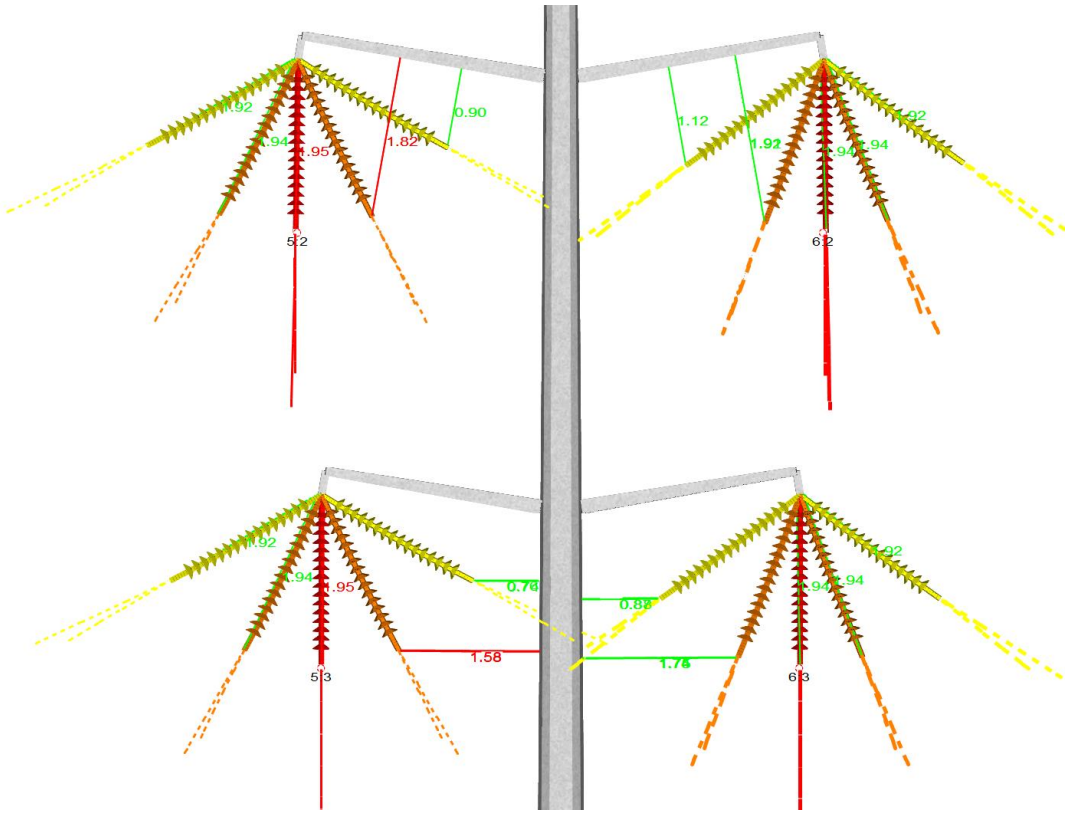
- Does not run any calculations in PLS-CADD.
- Allows you to get information about the PLS-CADD model in one succinct report to issue to Damper suppliers.
- Requires you to define some CRI
  - ***Criteria/ Damper Analysis…***
- Running the report:
  - ***Lines/ Reports/ Damper Analysis Report…***



Advanced Structure Clearances

- Clearance to structures can now account for different required clearances under various weather cases.

- Define CRI:
  - ***Criteria/ Structure Clearances***
- Run Report:
  - ***Lines/ Reports/ Structure Clearances…***



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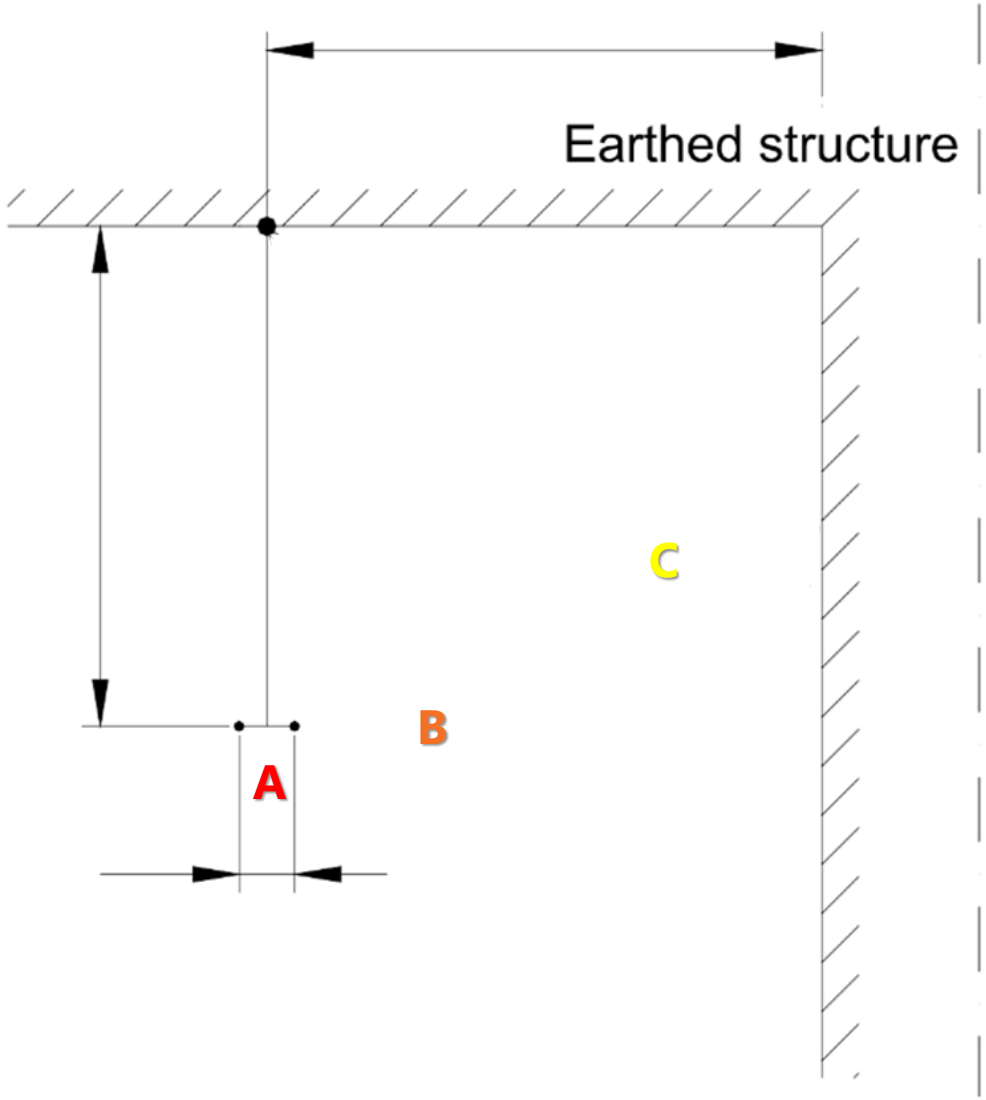
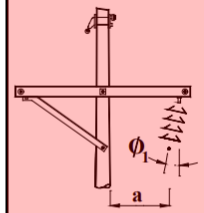
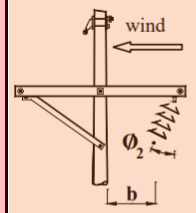
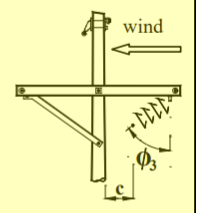
Advanced Structure Clearances



Clearances considering:	Weather Cases:
A = Lightning Impulse	Still Air
B = Switching Impulse	Moderate Wind
C = Power Frequency	High Wind

TANGENT AND SMALL ANGLE STRUCTURES	No Wind Insulator Swing	Moderate Wind Insulator Swing	High Wind Insulator Swing
Conditions* at which clearances are to be maintained			
• Line angle	Force due to line angle (if any)	Force due to line angle (if any)	Force due to line angle (if any)
• Wind force	0	6 psf minimum	10 year mean wind, recommended value
• Temperature	60°F	32°F or lower	Temp. at which wind value is expected
• Conductor tension	Final tension	Initial tension	Final tension

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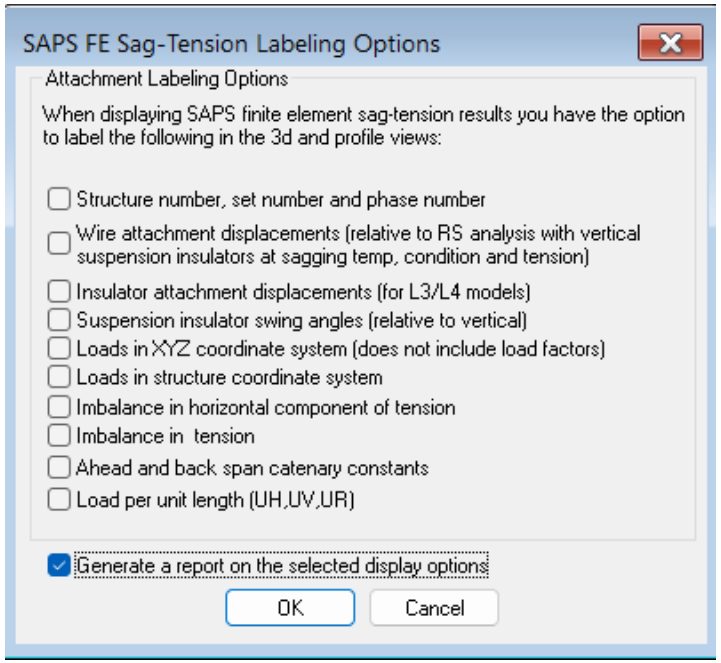
SAPS Labels – Report

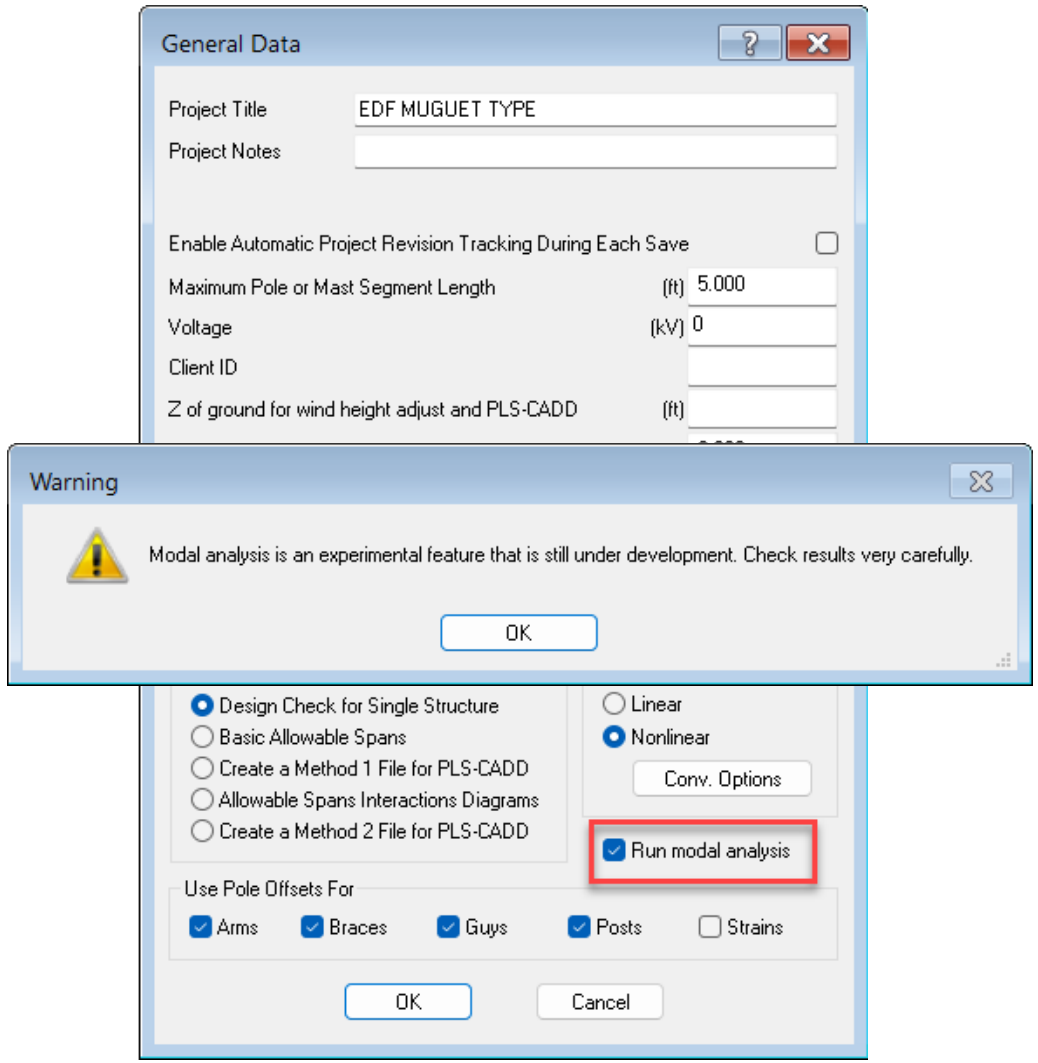


- SAPS Labels are a way to display data onscreen when using FE conditions.
- Useful when working on existing lines (tools like Slip & Clip).
- Users can now generate a report on useful for mining data.

Lines Reference Check + Component File Report

- *Live demo only…*

Modal Analysis of Structures



- Now able to calculate the first 5 fundamental frequencies for a structure.
- Can also generate a list of the deflection shapes for these modes.
- Visualize modal deflection shapes natively in PLS-POLE (in versions greater than 20.00).

Modal Analysis Output

```
*** Modal Analysis Results (first 5 modes <= 1000.000 (Hz))

Modal Analysis Frequencies:

 Mode Frequency
          (Hz)
---------------
    1     0.897
    2     0.912
    3     2.869
    4     3.134
    5     3.717


Modal Analysis Shapes:

Joint | ---------Mode 1 Deflections-------- | ---------Mode
      |           X           Y           Z |           X
      |        (in)        (in)        (in) |        (in)
-----------------------------------------------------------
    1    0.0000e+00  0.0000e+00  0.0000e+00    0.0000e+00  (
    2   -2.6614e-08 -1.1433e+00  1.9913e-15    1.1506e+00 -1
    3   -2.5163e-08 -1.0810e+00  1.9788e-15    1.0894e+00 -1
    4   -2.2888e-08 -9.8326e-01  1.7308e-15    9.9301e-01 -1
    5   -2.0657e-08 -8.8745e-01  1.5661e-15    8.9826e-01 -1
```

- Displayed in the summary section of the detailed analysis results.
- Optional model shape output can be activated via **Print extended diagnostic output** in **Output Options**.

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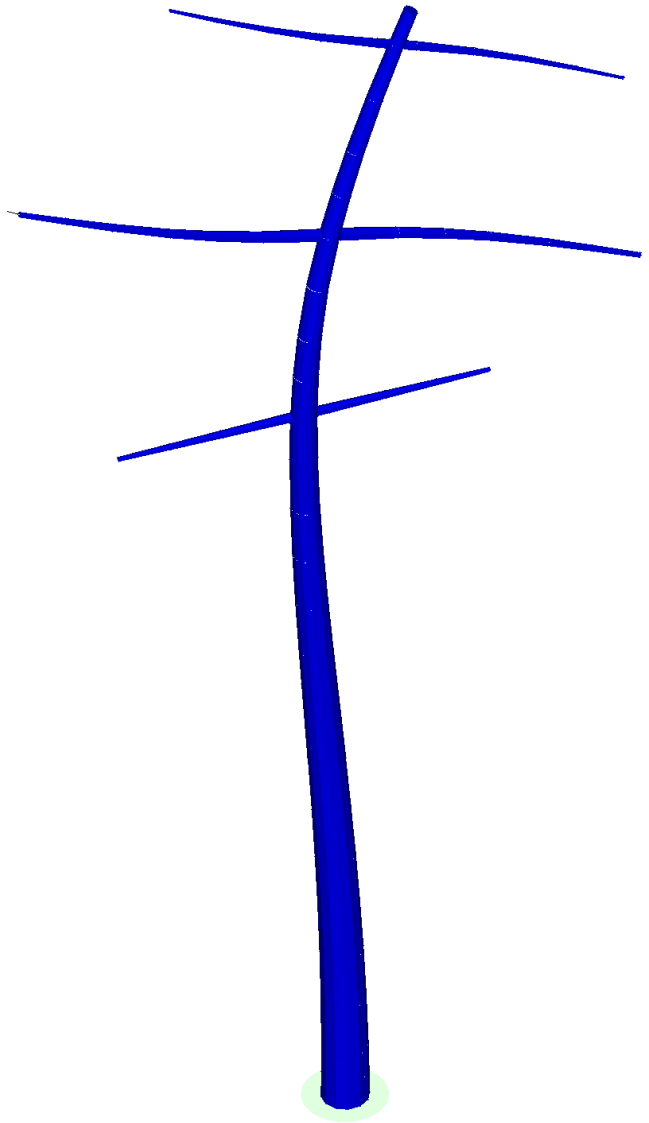
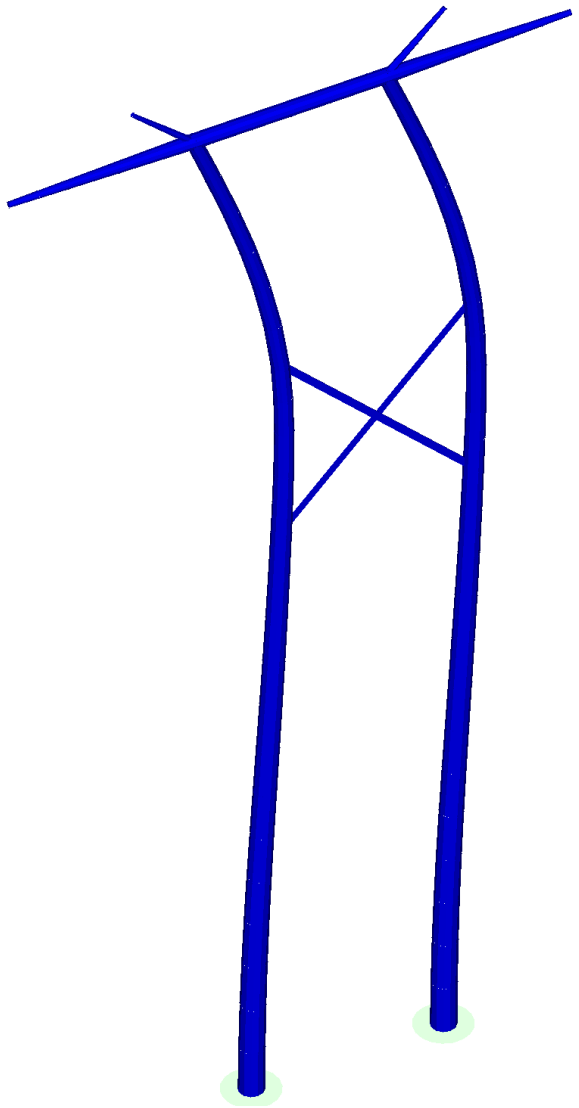
Modal Analysis Limitations



- The analysis is experimental so there are restrictions on suitable structures.
- All forms of non-linearity are problematic due to the linear nature of a modal solution.
- Only bare structures are currently supported (no insulators, guys, cables etc.).
- Calculation relies strictly on mass and stiffness effects. Applied vector loads cannot be accounted for.

Modal Analysis Summary



- Available in version 20.00 (currently an Insider Release).
- Keep models simple for now.
- Validated with Bentley's **ADINA** FEA software.
- Still under development so feedback is greatly appreciated.

