

Determining Structure and Wire Clearances

The advantage of using true 3-D software such as PLS-CADD is that the designer can see what will be built before the first structure is ordered. Clearances between conductors, conductors and structures, and even between conductors and communications cables can easily be checked for a variety of conditions to eliminate problems before they occur. This Technical Note will briefly discuss how to use PLS-CADD and PLS-CADD/LITE to check clearances in a 3-D environment. For a detailed comparison between the different versions of PLS-CADD, refer to this [document](#).

Wire Clearances

First, let's cover wire clearances. Both PLS-CADD and PLS-CADD/LITE can check wire clearances in a wide variety of different and useful scenarios, including:

- Phase-to-phase clearances in a single circuit, such as a roll from a horizontal substation structure to a vertical transmission structure ([video](#))
- Circuit-to-circuit clearances, such as in a double-circuit line or a transmission circuit over a distribution underbuild circuit ([video](#))
- Energized wire to communications cable such as ADSS, OPGW, coax, etc. or to an overhead ground wire
- Clearance from any wire to ground surface
- Clearance from any wire to surveyed points, such as buildings
- Clearance between wires due to galloping
- Wire displacement due to loading ("blowout") and clearances related to transmission right-of-way

Many of these clearances need to be checked under a variety of possible line conditions. For example, a distribution underbuild circuit or crossing may not always be energized when the transmission line is operating at its maximum temperature. The upper phase of a vertical circuit may have full ice on it while the middle phase may not. What could happen when one phase sheds the ice on it and then "jumps"? How do you check the NESC requirement that you must have different (larger) clearances at midspan? Or the different required clearances depending on if the cables are attached to the same structures or different structures? PLS-CADD and PLS-CADD/LITE can check all of these conditions automatically for you. A few of these scenarios are examined in detail below.

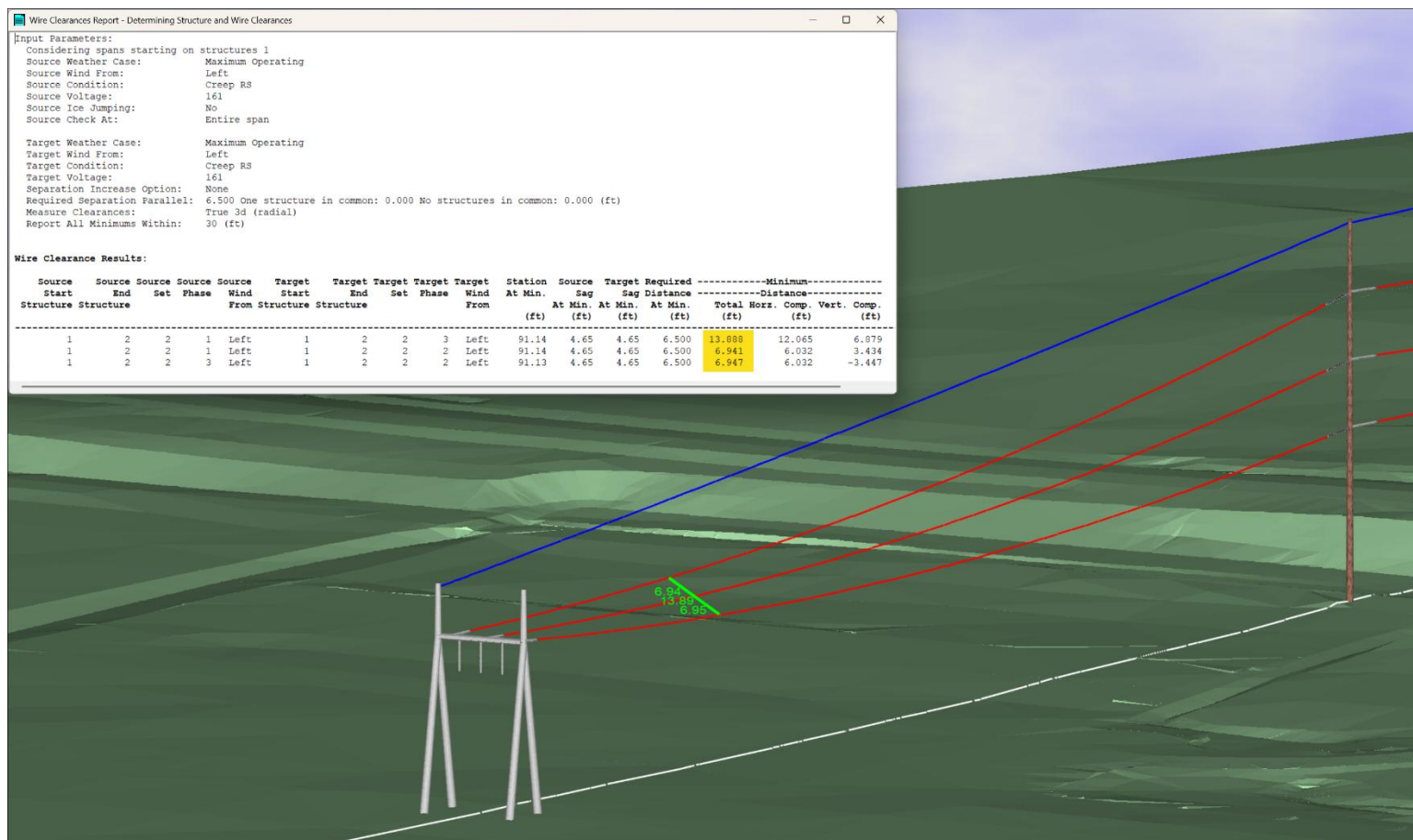


Figure 1: Results of a Wire Clearance report in PLS-CADD. Green graphical markers between wires indicate required clearance is met.

Structure Clearances

Structure clearances are critical for obvious reasons. PLS-CADD and PLS-CADD/LITE can automatically check many different types of structure clearances for you. Would you rather catch an "overlooked" clearance with PLS-CADD while your project is still in the office or have it found by a lineman in the field? Clearances that can (and should) be checked are phase to:

- Shaft of pole or body of tower
- Crossarm or davit arm
- Guys
- Different structures
- Substation structures and rigid bus

See a [video](#) showing how PLS-CADD can be used to check structure and guy clearances.

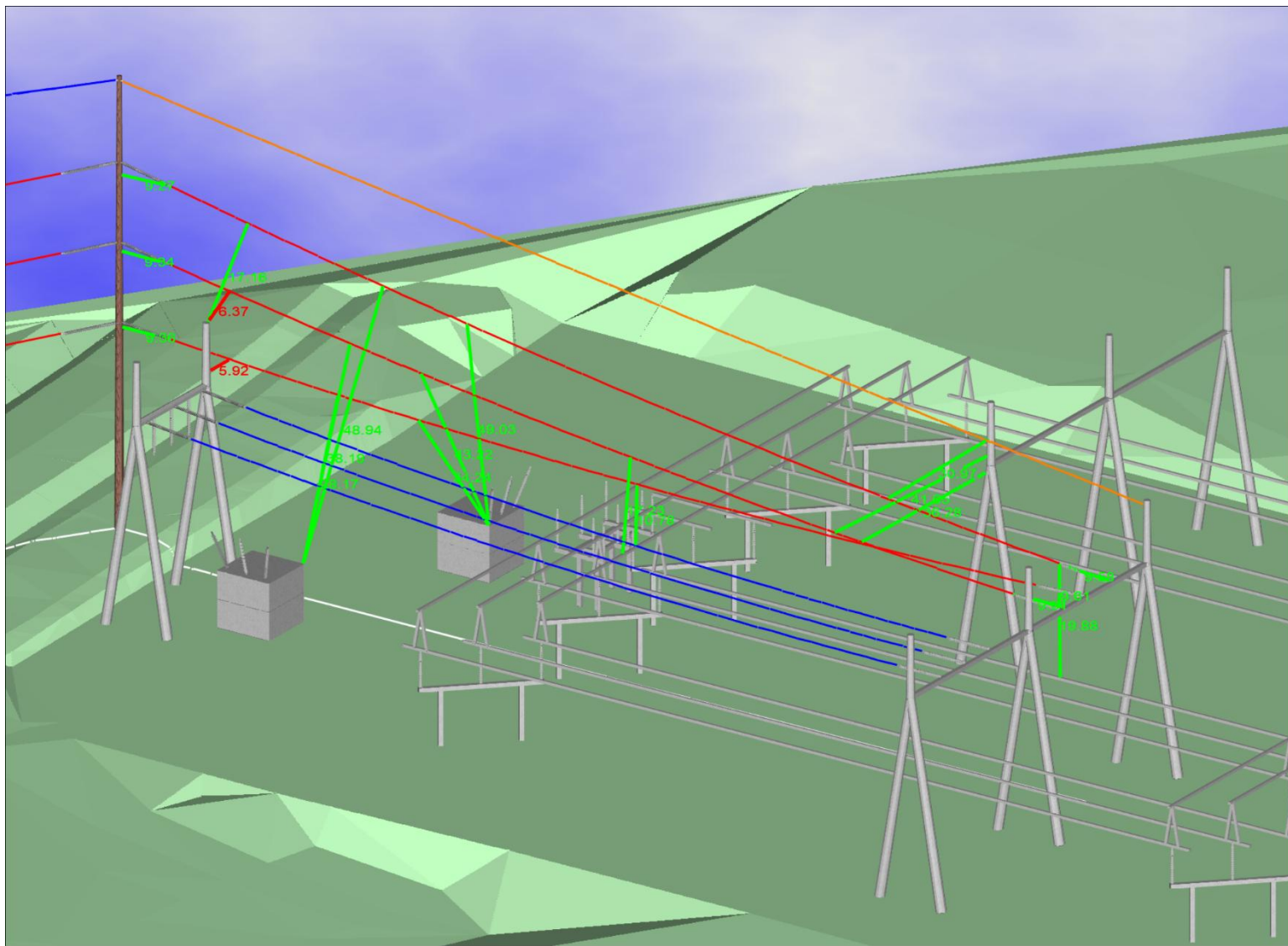


Figure 2: Results of a Structure Clearance report in PLS-CADD which is checking for clearance between wires and supporting structures, other structures, rigid bus work, and substation equipment. Green graphical markers indicate required clearance is met.