

Course Content
Of
Overhead Transmission Line
Design & Optimization
Using Power Line Systems Software
PLS-CADD

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Total 40 Hours Training

Course Content

PLS-CADD

OHL Route selection and key point to consider for best route selection (detailed explanation)

Free of cost terrain data collection without site survey for initial evaluation of project

Open source software for downloading free EGL (existing ground level) data

DEM digital elevation model detailed explanation and how to use it in PLS-CAD

What is Topographic survey for new project (how to set out AP-angle points before detail survey?)

Topographic survey for existing OHL for Reverse Engineering. What is 3-dimensional survey data?

How GPS works, what is working difference between GPS and Total station



What is reflector less (without prism) method of Total Station (TS) for collecting wire coordinates

How to check vertical clearance of two existing OHL with surveying instrument Total station

Use of GPS and Total Stations survey data in PLS-CADD and generating surface / TIN models

Import from different sources data in PLS-CADD, point out survey data mistake and correct.

Terrain/Surface/TIN (triangular irregular network) creation in PLS-CADD

Data Transformation from land xml to PLS-CADD

Create TIN models from aerial survey data (Deal with LIDAR data)

Error checking in drone or LiDAR survey data with reference to traditional survey method



Detailed overview of PLS-CADD software overview

Presentation of one completed project, all reports and plan & profile sheets etc.

Data management before starting any OHL design project

How to start a new project with “XYZ” method and set preferences of project

Complete go through of menu bars and tool bars

Create customized menu bars and create shortcut key in PLS-CADD

Create feature codes of all different type of item exist at site

Explanation of coordinates systems and assign project coordinate system

Importing survey data with 5 methods from notepad or excel file and deal with User-defined setting

Filtering XYZ data for specific extracting data / deal with break line or grade break lines



TIN Surface Creation & contouring of surface and assign elevation to contours

Attach DXF and Bitmaps to plan, profile or sheet

Extract Ground Elevation from in hand dxf contour file for TIN surface creation

Create free hand route Alignments

Create route Alignment from given AP (Angle Points)

Create route Alignment from old PDF or JPEG map of existing OHL

Create multiple alignments of different routes in same project

Automatic Interpolated point creation after TIN surface and Alignment creation

Activate, deactivate, delete points of any specific portion to make project lighter

Change certain points group from one feature code to other

Create free hand route / alignment center line and ground profile

Create route / alignment center line as per given route by client and ground profile

Fine Tuning of ground profile line smoothness to avoid unnecessary ups and downs

Explanation of Terrain width, how it will affect nearby objects visibility in profile view

Create route side profiles at different offset left and right as per project requirement

Merge different projects Terrain / TIN in one project

How to design OHL Project with very less survey data (advantage /disadvantage of PFL method)

Create PFL project from scratch and explain the difference between XYZ and PFL project

Create TIN of PFL project, Center Line Ground Profile and Side Profiles.



Introduction of various types of conductor and their properties

Conductor / OPGW / Earthwire technical data explanation

Conductor modeling in PLS CADD as per conductor technical data sheet

Permanent deformation explanation

What is creep and why we consider it in our OHL Design

Effects of high temperature on creep and strength reduction

Stress-strain charts explanation and why it is back bone of any project

Where to get famous conductor data online

How to use higher version conductor file in lower version of PLS-CADD

From where we get data to model our conductor in PLS-CADD

What is most reliable way to get conductor model

Why stress strain wrong values will create huge problem for our OHL project

Can we model our conductor without stress strain values?

Setting up standards / codes for new project

Creates different weather cases as per project specifications

Conductor tension criteria setting as per limitation stated in the conductor technical data sheet

Conductor tension criteria setting for automatic sagging

Detailed explanation of deadly mistake while choosing percentage of allowable tensions

What is initial and final sag and tension of conductor and what is Temperature shift concept

What are poor conductor modeling reasons which cause a lot of problem when line is energize

Role of poor tension criteria in OHL tripping (conductor swing, galloping, structure clearance)

Wind and ice loads: gust response factors, etc

Structure loads and safety factors using M3 & M4 method

Criteria setting for clearances checking

Criteria setting for wind / weight reports

Criteria setting for galloping

Criteria setting for conductor automatic clearance checking of whole transmission line

Projects Specification and design criteria will be discussed in detail

Single line diagram of poles, Lattice Tower and Gantry structure will be discussed in detail

Single Line Diagram to M1 structure concept will be discussed

Major mistakes will be discussed which many experienced OHL design engineers do in routine without knowing

PLS-CADD built in standards will be discussed

Major design mistakes will be discussed which causes flash over later on

How to create M1 Stick structure model (suspension / tension) of Pole and Lattice Tower in PLS-CADD

Create Gantry structure M1 model in PLS CADD, Create tap-off or T-off M1 structure in PLS-CADD

How to make M1 structure from scratch and create multiple structures with leg & body extensions

How to set structure in such a way that while stringing, all conductor strung at once, how to play with conductor attachment point (7 set, 3 set and 1 set structures)

What is structure load file, how to create and when to create

How to extract load file from complete OHTL project in PLS CADD

Create 400kV M1 suspension and tension structures (Horizontal configuration)

Create 132kV Suspension and tension structures (Vertical configuration)

Structure creation as per participant project requirement and assign structure strength

Assign swing angle limitation in suspension structures



Structure spotting manually in profile view

Automatic structure spotting angle towers or poles / suspension tower or poles

What is snap structure to surveyed points and when and why to do

What is structure spotting constrains

Who to define prohibited zone for tower spotting in PLS-CADD

How to set parameter for adding structure on each side of road crossing location while Auto-spotting

Conductor/OPGW manual stringing and sagging section by section

Conductor/OPGW Automatic stringing and sagging of complete project with few clicks

How to set ground clearance line and project lower most wire downwards

How to project ground profile towards lower most wires in order to see ground clearance issues

How to resolve ground clearance issues if there is any, what is best practice or sequence

Check wind and weight span report in order to see is there any violation or not

How to activate structure and section check bitmaps

How to get multiple sag curves

How to blow wind and see conductor in swing condition in order to check phase clearance



Create three overhead transmission lines which are crossing each other at different station

Check vertical clearance between crossing OHLs

Use M4 Pole and Lattice Tower models and check wire to structure body clearance

Run analyze for Automatic leg extension requirement in case of hilly area / uneven leg extensions

Create cross sections of project at mid of span or tower legs diagonal cross sections



Tap-off line / T-off connection at tower and at mid of the span, direct tapping to conductor

Vertical clearance checking, true vertical at center, minimum to the TIN from conductor

Survey points clearance report for vegetation clearance issue or any specific feature code

Best technique to review whole project with minimum time like professional approach

Mid span cutting concept why and when to do mid span cutting

What is counter weight concept and how to calculate count weight for suspension strings

How to show warning spheres on OPGW / Earth wire

What is offset clipping and how to do?

Add specific point at any required location (x,y) on surface

How to create / estimate drum schedule of conductor / OPGW



Generate Construction Documents

Plan-and-profile sheets generation once project is complete in PLS -CADD

Staking list export in Excel for structure summary preparation and staking out at site

Stringing charts / Sag & Tension Charts (Initial Condition and Final Condition)

Wind span / weight span report generation

3D plan creation which will show conductor under swing and show minimum distance



Reverse Engineering /Graphical Sagging / Road Crossing & Sag Calculation

Modeling Existing Lines for Assessment and up-gradation of existing road / Bridge

Modeling existing line and structures from captures data from the field with GPS / Total Station

Explanation regarding how to do graphical sagging in proper way of an existing old OHL

Create present condition sag & Tension and after sag tightening required to meet vertical clearance

Create multiple sag curves at different temperature (worst case scenario)

Superimpose road / bridge cross section in PLS-CADD

PLS-CADD (LITE)

What is the difference between both full and lite version.

Full practice of PLS-CADD (lite) functions

Quick sag/ tension calculations in Single Span / multi span.

Illustration of various sagging methods

Create load files for structures modeled with TOWER, PLS-POLE and PLS-CADD.

Clearance between wires with less than 10 minutes

Loads on towers with many cables attached in various directions.



OHL Design Review being Main Contractor/Consultant / Client

Imagine you are going to work as Design Engineer, Design Manager, R.E (Resident Engineer) etc. and your duties will be to review the design submitted by 3rd party. How to review design in order to point out mistakes if any? What you have to demand your 3rd party to provide you in order to review their design. What are the things you can ignore while design review and what are the deadly mistakes, on which you must never compromise. All these points will be discussed with you in order to get you ready for mentioned above positions. These details will make you a confident designer.

What Participant will get at the end of Training?

After completion of training course, individual will get a booklet which will cover full practical detail step by step (Start to end of OHL Design) with picture and option of tools used with notes and leader lines.

All working steps will be included in that book with full detail, which will be self-sufficient for them for future reference.