Design and Optimization of Overhead Transmission Lines using PLS-CADD and TOWER software

Theoretical and Practical Training Course

Dates

- PLS-CADD training: March 23 to 26, 2019
- TOWER/PLS-POLE training March 27-28, 2019

The courses daily schedule is from 8h30 to 13h00 and from 14h00 to 16h30

Location

Hotel The ACT, Sharjah, United Arab Emirates or an equivalent hotel

Who should attend

Engineers and technicians using or planning to use computer software PLS-CADD and PLS-TOWER for design, optimization, assessment, upgrade and construction of Overhead Transmission Lines. This software is currently the state-of-the-art in the industry and well over 1000 major companies in over 100 countries around the world currently use our software. For more details regarding the software, please visit our Web site **http://**www.powline.com. Additional details and news on PLS software can be also found on http://www.powline.com/rss/news.xml.

Many new features have been added to PLS-CADD and TOWER versions 15, thus increasing substantially their capabilities. All these improvements will be reviewed during this course for the benefit of previous and new users.

Course outline

PLS-CADD course will last 4 days, during which the following aspects will be covered in detail
• Terrain modeling, survey data, and plan-profile
• Conductor design, modeling, and sag-tension calculations
• Interactive line design and optimization
• Construction drawings and documents
• Assessment of existing lines and options for upgrade

TOWER-PLS-POLE course will last 2 days and will cover:

• Structure modeling, geometry, strength, and spans,
• load files
• Optimizing a structure
• Checking existing structures
• Generating wind and weight spans of existing transmission structure.

This course will cover in details the use and application of PLS-CADD and structural software TOWER-PLS-POLE software. This course also includes the theoretical basis of the engineering concepts upon which the above software is based and that are widely used in transmission line design.

The above points will be covered using practical examples and will involve active participation of trainees in order to increase the benefits of this session.

Instructor

This course will be delivered by Mr. Elias Ghannoum, an internationally renowned expert having 46 years of experience in overhead transmission line design. He worked during 27 years with Hydro-Quebec one of the most important transmission lines utilities in the world. His career involved the design and construction of lines with voltage levels from 49 kV to 800 kV as well as UHVDC lines up to ± 800 kV.

Mr. Ghannoum is Fellow of the Institute of Electrical and Electronics Engineers (IEEE), and has received Awards from CIGRE and IEEE for outstanding contributions to technical work on transmission lines and best technical paper. He had also received the Order of Merit Award from the Canadian Standards Association for his contributions to international and national standards in lines and conductors and the IEC 1906 Award for his exceptional technical work.

He holds many titles and positions in International standard writing bodies and technical organizations such as:
- Past Chair of the International Electrotechnical Commission (IEC), Technical Committee 7 "Overhead Conductors" from 1986 to 2016
- Chair of the Canadian Standards Subcommittee C22.3-RBD responsible for overhead line design standard based on reliability principles.
- Chair of Working Group MT1 responsible for maintenance of all IEC/TC11 standards
- Past Chair of Working Group 8 of IEC/TC11 "Loading and Strength of Overhead Transmission Lines", the Technical Group responsible for writing IEC 60826
- Past Chair333 of Working Group 4 of IEC/TC7 "Aluminum and Aluminum alloy stranded Conductors

Mr. Ghannoum was chief transmission Engineer for Hydro-Quebec during 20 years before starting his own consultancy practice in 1997. He provided consultancy services to many international clients such as The World Bank, Electricité de France (EDF/RTE), ESKOM, Power Grid Corporation of India, Transelec (Chile), Manitoba Hydro, etc. He also lectured during 15 years a graduate course on transmission line design at the University of Montreal (Polytechnique), and provided in-house course for many international engineering companies and utilities.

Design and Optimization of Overhead Transmission Lines using PLS-CADD and PLS-Tower Software

6-day Training course on Theoretical and Practical aspects of PLS-CADD and TOWER

Typical Daily Program

DAY 1

Introduction of the Instructor Elias Ghannoum
Introduction of the attendees

Overview Of PLS software and evolution

Need to integrate and computerize all aspects of line design
PLS-CADD system overview
PLS Transmission Structure Programs overview
Presentation of completed projects

Terrain Data and Modeling in PLS-CADD

How to organize project files
View commands - opening of windows - viewing of phases and sags
Needed terrain data and surveying techniques
Prepare a terrain model
Generate and edit feature codes data
Generate, edit or import XYZ terrain models
Create alignments, profiles and side profiles
Multiple alignment options
Create TIN terrain models
Break lines
XYZ vs. user-defined data
Filtering XYZ data
Attach DXF and Bitmaps to plan, profile or sheet
Generate, edit or import PFL terrain models
Scan and digitize existing drawings

DAY 2

Conductor Design and Modeling

Various conductor types
Permanent deformation from overloading
Permanent deformation from creep
Effects of high temperature on creep and strength reduction
Effect of high temperature on aluminum in ACSR conductors
Conductor models in PLS-CADD

Stress-strain charts
Where to get conductor data
Aeolian vibrations - design criteria to limit them
Temperature vs. ampacity – PLS-CADD implementation of IEEE 738
Line thermal rating

Design criteria

Weather data
Wind and ice loads - gust response factors, etc.
Conductor tension limits
Conductor and tower automatic loading based on international standards such as IEC 60826, CENELEC EN50341, ASCE 74, etc.
Conditions for automatic sagging
Structure loads and safety factors (loads generated using the ruling span concept)
Structure load, particularly non-uniform loads using the flexibility of attachment points of conductors
Conditions for checking clearances

PLS-CADD/ LITE - simplified PLS-CADD module

Quick sag/ tension calculations
Illustration of various sagging methods
Create load files for structures modeled with TOWER, PLS-POLE and PLS-CADD
Clearance between lines
Loads on towers with many cables attached in various directions

Structures Modeling by Allowable Spans (Method 1)

Available structure models
Allowable spans method (Methods 1 or 2) - best for standardized designs
Full analysis method (Method 4) - best for assessment and upgrade
Material lists, create and edit parts lists
Create and edit Allowable Span (Method 1) Structures

DAY 3

Interactive Line Design

Spot structures interactively
String and sag conductors - Demonstrate four sagging methods
Check clearances - vertical, between phases, galloping, etc.
Check overall design efficiency
Modeling of lines crossing
Snap structures to surveyed points

Generate Construction Documents

Plan & Profile sheets, staking lists, stringing charts, offset clipping, etc.
Automatic generation of material lists
Export project data to other commercial databases

Files, backup and support

Project window
Backup / Restore backup
PLS site, news, forum, tech. support

<u>Day 4</u>

Modeling Existing Lines, Assessment and Refurbishing

Modeling existing lines and structures
Assessment, reconductoring, refurbishing, etc.
Links to SAPS
    Limits of validity of ruling span concept
    Unbalanced ice, RSL after broken conductor, marker balls,
    Structure deflection, etc.

Automatic minimum cost spotting with PLS-CADD

<u>DAY 5</u>

TOWER - Steel Latticed Tower Analysis and Design

Modeling concepts
Joints, members, connections, tower wind load, conductor loads,
etc.
Handling of planar joints, mechanisms, tension-only members, etc.
Checking and modifying older designs
Automatic member design
Joint transmission/ communication use of towers

<u>DAY 6</u>
PLS-POLE steel
…. Modeling a steel pole with crossarms
…..Analyzing steel poles
Common functionalities between TOWER and PLS-POLE
Batch modification of structures
Batch structural analysis and compilation of results
Determining allowable spans of existing structure designs
Link of PLS-POLE and TOWER structures with PLS-CADD
Generating structure loads using PLS-CADD

Special topics

Registration to the training course

Date

- PLS-CADD training: March 23 to 26, 2019
- TOWER/PLS-POLE training March 27-28, 2019

Location

This training session will take place in Sharjah, UAE (hotel and personal expenses are the responsibility of trainees).

Registration

If you are interested in this course and would like to register, or would like more information on the subject, you will find all the necessary details at the end of this document. You can also contact Mr. Ghannoum at the address below if you need more information about this course. Please note that the number of attendees is generally limited to about 20-25 participants in order to maximize the transfer of knowledge.

It is possible to register for either to the complete 6-day course (PLS-CADD and TOWER) or to the 4-day PLS-CADD course. Registration to the 2-day TOWER/PLS-POLE course alone can also be accepted pending on available space.

The registration fees per person for this seminar are the following:
3800 USD for the 6-day course (PLS-CADD and TOWER).
3000 USD for the 4-day PLS-CADD course
1800 USD for the 2-day TOWER course

This price includes buffet lunch at the hotel as well as two coffee breaks with juice and snacks per day.

Prepayment of the training course is required. Details about modes of payment and bank transfer will be sent to all persons who register. The registration will not be confirmed unless full payment is received.

Should the course be cancelled by the Trainer, full refund of the paid course fees will be made.

Trainees are required to check if visas are required for them to enter the UAE and to make the required applications. Please note that **no refunds will be made if any trainee cannot attend the course for personal reasons or for visa problems**. Visas are the responsibilities of the trainees and those attending the course should consult with the UAE consulates for conditions. The Hotel may also help to obtain a UAE visa against the payment of a fee,

but the Consultant cannot be held responsible for any problems that may occur if a visa is rejected.

Hotel details

Hotel expenses and meals are the responsibility of the attendees, except for lunch and coffee breaks during training days.

The seminar will be held in a 4-5 star hotel in Sharjah, UAE. Typical hotel rates are :
- Single room @Dhs 400 based on Bed & Breakfast Basis at Oasis Restaurant per room per night.(note that 1 USD = 3.65 Dhs)
- Double room @Dhs 450/- on Bed & Breakfast Basis at Oasis Restaurant per room per night

Details for hotel reservations shall be provided after reservation of the seminar.

Additional information

Please note that the number of attendees is limited (usually about 15 to 20) persons in order to increase efficiency of the technology transfer. Thus registration is on a first come basis. Once this number is reached we will not be able to accept any new registration. Should the course be cancelled for reasons due to the lecturer, full refund of registration fees shall be made to all registrants.

Attendees should bring their own laptop computer and the latest version of the software will be installed on these computers, to be used only during the training days (each user will handed over a hardware key for use during the training sessions only). Prior to arrival to the UAE, **trainees should make sure that they have administrative privileges to install PLS software on their laptops**, as this situation has caused many delays in the past when starting the course.

Note that Trainees who do not have access to a laptop, can follow the course on the screen (I will be using an LCD projector that will image all the operations on my own laptop), as well as a board and flip charts. Alternatively, laptops can be rented in many locations in Sharjah.

Please advise us at the earliest about your registration. Should you need any other information, please do not hesitate to contact us at the following phone number: 1-514-344 4127, *email:* elias@ghannoum.com

Registration sheet

Design and Optimization of Overhead Transmission Lines using PLS-CADD and PLS-Tower Software

Theoretical and Practical Training Course Sharjah(UAE)
- o PLS-CADD training: March 23 to 26, 2019
- o TOWER/PLS-POLE training March 27-28, 2019

Name: _____

Company: _____

Registration for PLS-CADD _____   TOWER _____

Complete Address:

_____

_____

_____

_____

Phone and fax numbers: Phone: Fax:

Email address_____

PLS software: Please indicate if you have already purchased PLS Software, and the version of all software you have in hand.

PLS-CADD   yes __no ___   version _____

TOWER   yes __no ___   version _____

PLS-POLE   yes __no ___   version _____

Method of payment: Bank transfer _____ Date_____ amount _____

Check or money draft ___Date_____Amount____

Certified check____, Date_____, Amount_____

Date: _____

Signature _____

(Please return this registration form by email to elias@Ghannoum.com)