

Online-workshop

Fundamentals of High Voltage Lines

9 and 10 March 2021 at the Karlsruhe University of Applied Sciences

Tuesday, 9 March 2021

- 09:00 **Greeting, opening and introduction to the workshop**
M. Palic
- 09:05 **Fundamentals of High Voltage Power Systems**
M. Palic
Structure and operation of the high-voltage grid - European interconnection - Importance of frequency - Overview of grid components - German legal framework - Approval procedures - Regulatory issues.
- 10:30 **Coffee break**
- 11:00 **System design**
G. Schultz
Design basics - Network analysis - Reactive power – Limits of power transmission - DC lines - Electric and magnetic fields.
- 12:30 **Lunch for the in-person participants**
- 14:00 **Overhead Line design, towers and foundations**
R. Schmidt
Construction regulations - Standards - Project plan - Tower type selection - Forest spanning vs. aisle - Tower material - Tower body - Foundation types - Line construction – Refurbishment.
- 15:30 **Coffee break**
- 16:00 **Conductors and fittings**
K. O. Papailiou
Conventional and HTLS conductors - Conductor mechanics - State equation - Sag calculations – Suspension clamps - Dead-end clamps - Joints - Conductor vibrations and dampers - Monitoring.
- 17:30 **End of the presentations of first day**

Wednesday, 10 March 2021

- 09:00 **Conductor stringing**
R. Schmidt
Preparation – Tower and cross-arm anchors – Stringing equipment – Stringing of single and bundle conductors – Mechanical loads during stringing – Stringing tables – Conductor adjustment and re-adjustment after stringing.
- 10:30 **Coffee break**
- 11:00 **Insulators**
K. O. Papailiou
Porcelain and glass insulators – Composite insulators – Properties – Performance – Electrical and mechanical design – Compact lines – Protection hardware – Tests.
- 12:30 **Lunch for the in-person participants**
- 14:00 **HV and EHV Underground Cables**
G. Schultz
Basic cable design – Mass impregnated cables – Plastic-insulated cables – Gas-insulated lines (GIL) – Technical comparison – Economic comparison – Methods of cable laying – Cable joints – Cable terminations – Issues of HV cables.

15:30

End of the workshop – the online participants will receive the certificates of attendance by mail

Your tutors:



Dipl.- Ing. **Markus Palic**, former CEO NEW Netz, Geilenkirchen / Managing director TagungsgesellschaftEnergie, Karlsruhe

After his master´s degree in electrical power systems, Markus spent more than 30 years in various positions in power utilities. He was CEO of a regional utility, being mainly involved with power system economics, grid expansion and construction projects. Throughout this period, he was teaching classes on “Power system economics in liberalized markets” at the University of Applied Sciences Aachen, Jülich campus.



Prof. Dr.- Ing. habil. **Konstantin O. Papailiou**, former CEO PFISTERER Holding AG and former Chairman, CIGRE Study Committee Overhead Lines (B2), CH-Malters

Konstantin received his doctorate degree from the Swiss Federal Institute of Technology (ETH) Zurich and his postdoctoral qualification as lecturer (Dr.-Ing. habil.) from the Technical University of Dresden. Until his retirement at the end of 2011 he was CEO of the Pfisterer Group. From 2010 to 2016 he was Chairman of the CIGRE Study Committee “Overhead Lines” (SC B2) and has been teaching OHL courses at Stuttgart University and TU Dresden for many years since.



Dipl.- Ing. **Reiner Schmidt**, Senior Consultant, Dettenheim

Reiner holds a master´s degree in civil engineering and worked as manager in a major TSO specializing in tower design, conductor mechanics and OHL design for over 30 years. Since 2010 he has been active as consultant and as lecturer in OHL courses, in particular for young engineers. He is also member of various DKE-Working Groups.



Prof. Dipl.-Ing. **Guntram Schultz**, Karlsruhe University of Applied Sciences

After his master´s degree in Electrical Power Guntram has been working in the department of network development of a major TSO in Karlsruhe. In 1981 he was appointed full professor at Karlsruhe University of Applied Sciences for „Planning and Operation of Electrical Power Systems, Protection and Renewable Energies“. He is also active in the training and continuing education of young engineers.

Who should attend?

The Workshop provides the fundamentals of HV electrical power systems and is as such suited for newcomers in this field but also for experienced engineers who are looking for an update. It includes the “best of” lectures of previous workshops and provides the participants with a sound overview but also with detailed knowledge of the main issues of high voltage transmission. Participants typically work for a power utility, a high voltage line contractor or an equipment manufacturer.

The workshop will take place as live event in the German language and also as online seminar. The online version can also be booked **in English** (simultaneous translation by K.O. Papailiou and G. Schultz).

Registration fee:

980.- Euro (in English only online)

- Event format:** The workshop will take place as a **hybrid event** in an in-person and an online version in German. The online version is **also available in English**.
- Presentations:** The presentations will be given by the speakers in person while being physically present in the auditorium and they will also be streamed live.
- Online event:** English participants will be able to follow the event via live stream remotely using an access code, which is strictly limited to the person who has acquired it. As soon as a participant is online using this code, further access with this code is not possible! The presentations will be synchronously translated from German into English. The presentation slides are bilingual. Questions and comments can be asked or made in writing via a chat. These will be introduced into the live event by the moderator and answered or explained by the speakers. This way, online participants can take part in the lectures without any restrictions.