

## JAN LUNDQUIST

Jan Lundquist received his M.Sc. degree in Electrical Engineering and Ph.D degree in High Voltage Engineering from Chalmers University of Technology, Gothenburg, Sweden in 1976 and 1986, respectively. He has more than 40 years of professional experience in power engineering, starting at Vattenfall and continuing at Chalmers University, ABB, and STRI, from where he retired in 2017 as Senior Expert. His field of work has been network planning, AC and DC transmission line corona and field effects, development and application of metal-oxide surge arresters, insulation coordination of AC and DC transmission lines and cables, AC substation design and reliability, and software development. He has published more than 25 technical papers. He is a member of CIGRE and has served as Convener of CIGRE Working Group B2.41, "Guide to the conversion of existing AC lines to DC operation".



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### MAIN FIELDS OF COMPETENCE

- AC and DC transmission line corona effects
- Transmission line and substation design and reliability
- Insulation coordination for AC and DC transmission lines and cables
- Conversion of AC lines to DC

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### EMPLOYMENT

2017 –	Independent Insulation Group
1999 – 2017	STRI
1986 – 1999	ABB
1978 – 1985	Chalmers University
1976 – 1978	Vattenfall

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### EDUCATIONAL DEGREES

1986	PhD, High Voltage Engineering, Chalmers University of Technology, Gothenburg
1976	MSc, Electrical Engineering, Chalmers University of Technology, Gothenburg

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### LANGUAGES

Swedish (native), English (professional level)

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### MEMBERSHIP OF TECHNICAL COMMITTEES

CIGRE SC B2 WG B2.83, Mitigation of induced noises by corona activity in overhead AC and DC lines  
CIGRE SC B4 JWG B4/B1/C4.73, Surge and extended overvoltage testing of HVDC Cable Systems

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**LIST OF PUBLICATIONS**

- N Knudsen, J Lundquist, E Sherif, "Environmental Effects of HVDC Overhead Lines", Cigré, Paris, 1980.
- N Knudsen, J Lundquist, "Recent Results from Corona Effect Studies and Experimental Investigations at the EHV Test Station at Anneberg", Cigré Symposium, Stockholm, 1981.
- J Lundquist, "Methods for Predicting AC Transmission Line Audible Noise by Short-Term Single-Phase Tests", IEEE Trans. on Power Apparatus and Systems, February 1984.
- J Lundquist, "Methods for Predicting AC Transmission Line Audible Noise and Radio Interference by Short-Term Single-Phase Tests", PhD thesis, Chalmers University of Technology, 1985.
- J Lundquist, L Stenström, A Schei, B Hansen, "New Method for Measurement of the Resistive Leakage Current of Metal-Oxide Surge Arresters in Service", IEEE Trans. on Power Delivery, October 1990.
- H Bergqvist, N-E Thörnqvist, R Gustavsson, J Lundquist, "New Polymeric Material for Substitution of Porcelain in Cable Terminations and Surge Arresters", Cired, Liège, 1991.
- J Lundquist, "Results from AC Transmission Line Audible Noise Studies at the Anneberg EHV Test Station", IEEE Trans. on Power Delivery, January 1990.
- S Vitet, M Louis, A Schei, L Stenström, J Lundquist, "Thermal Behaviour of ZnO Surge Arresters in Polluted Conditions", Cigré, Paris, 1992.
- S Vitet, L Stenström, J Lundquist, "Thermal Stress on ZnO Surge Arresters in Polluted Conditions, Part I: Laboratory Test Methods", IEEE Trans. on Power Delivery, October 1992.
- S Vitet, A Schei, L Stenström, J Lundquist, "Thermal Stress on ZnO Surge Arresters in Polluted Conditions, Part II: Field Test Results", IEEE Trans. on Power Delivery, October 1992.
- L Stenström, J Lundquist, "New Polymer-Housed ZnO Surge Arrester for High-Energy Applications", Cigré, Paris, 1994.
- L Stenström, J Lundquist, "Selection, Dimensioning and Testing of Line Surge Arresters", Cigré, Rio de Janeiro, 1996.
- L Stenström, J Lundquist, U Jonsson, D Karlsson, D Loudon, K Halsan, "A Compact 420 kV Line Utilising Line Surge Arresters for Areas with Low Isokeuranc Levels", Cigré, Paris, 1998.
- L Stenström, J Lundquist, "Energy Stress on Transmission Line Arresters Considering the Total Lightning Charge Distribution", IEEE Trans. on Power Delivery, January 1999.
- C-E Sölver, H-E Olovsson, W Lord, P Norberg, J Lundquist, "Innovative Substations with High Availability using Switching Modules and Disconnecting Circuit Breakers", Cigré, Paris, 2000.
- D Karlsson, F J Sollerkvist, J Lundquist, J Karlstrand, P Norberg: "Comparison of 130 kV XLPE Cable Systems and OH Lines – Loading Capability, Reliability and Planning Criteria", Cigré, Paris, 2002.
- C.S. Engelbrecht, R. Hartings and J. Lundquist, "Statistical dimensioning of insulators with respect to polluted conditions", IEE Proc. on Generation, Transm. and Distrib., Vol. 151, No. 3, May 2004.
- P-O Andersson, H-E Olovsson, B Franzén, U Lager, J Lundquist: "Applications of Disconnecting Circuit-Breakers", Cigré, Paris, 2004.
- I. Gutman, J. Lundquist, T. Ohnstad, D. Hübinette: "Requirements on the Insulation for Different Applications of 400 kV Circuit Breakers in Pollution, Ice and Snow Environments", CIGRE Session 2006, A3-305.
- I. Gutman, J. Lundquist, K. Halsan, L. Wallin, E. Solomonik, W. Vosloo: "Line Performance Estimator Software: Calculations of Lightning, Pollution and Ice Failure Rates Compared with Service Records", CIGRE Session 2006, B2-205
- K. Halsan, D. Loudon, I. Gutman, J. Lundquist: "Feasibility of upgrading 300 kV AC lines to DC for increased power transmission capability", CIGRE Session 2008, B2-110.

J. Lundquist, I. Gutman, K. Halsan: "Insulation Aspects for AC to DC Conversion of Transmission Lines", World Congress & Exhibition on Insulators, Arresters & Bushings, Crete, 11-13 May 2009.

K. Lindén, B. Jacobson, M.H.J. Bollen, J. Lundquist, "Reliability study methodology for HVDC grids", CIGRE Session 2010, B4-108.

J. Lundquist, J. Lilliecrona, "Novel design for parallel VSC HVDC links on common overhead line towers", CIGRE Colloquium on HVDC and Power Electronic Systems for Overhead Line and Insulated Cable Applications, paper B2-2, San Francisco, 2012.

S. Berlijn, K. Halsan, R. I. Jónsdóttir, J. Lundquist, I. Gutman, K. Kupisz, "Voltage Upgrading of Statnett's 300 kV Transmission Lines to 420 kV", paper B2-102, Cigré Session, Paris, 2012.

S. Berlijn, J. Lundquist, S. Gislason, "Estimating the Line Performance of Voltage Upgraded Lines", IEEE PowerTech, Grenoble, 2013.

I. Gutman, P. Sidenvall, J. Lundquist, "Generic pollution performance curves for different types of insulators", 18<sup>th</sup> ISH, Seoul, Korea, 2013.

B. Sander, J. Lundquist, I. Gutman, C. Neumann, B. Rusek, K.-H. Weck, "Conversion of AC multi-circuit lines to AC-DC hybrid lines with respect to the environmental impact", Paper B2-105, Cigré Session, Paris, 2014.

J. Lundquist, C. Engelbrecht, E. Thunberg, H. Jansson, V. Dubickas, T. Worzyk, "Lightning impulse test levels for extruded HVDC cable systems", Paper B1-111, Cigré Session, Paris, 2014.

O. Lennerhag, J. Lundquist, C. Engelbrecht, T. Karmokar and M. Bollen, "An Improved Statistical Method for Calculating Lightning Overvoltages in HVDC Overhead Line/Cable Systems", Energies, 12(16), 3121, 2019. Available: <https://www.mdpi.com/1996-1073/12/16/3121/htm>

J. Lundquist, O. Lennerhag, "Minimum Voltage-Current Characteristic for Calculating Surge Arrester Energy Dissipation in Temporary Overvoltage Conditions", IEEE Trans. on Power Delivery, Volume: 37, Issue 3, 2022.

O. Lennerhag, J. Lundquist, Math H.J. Bollen "Temporary Detuning of Cablified Transmission Grids for Mitigation of Resonant Overvoltages", IEEE Trans. on Power Delivery, Volume: 37, Issue 2, 2022.

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## REFERENCE PROJECTS

- 2022 Radio interference and audible noise from low-rise 400 kV lines
- 2021 Risk analysis of elevated operating voltage on series-compensated lines
- 2020 Lightning protection of low-rise 400 kV double-circuit line
- 2019 Voltage upgrading of 70 kV lines to 145 kV
  - Insulation coordination study for 420 kV cable systems
  - Insulation coordination study for 220 kV overhead line
  - Insulation coordination study for nuclear power plant
- 2018 Insulation coordination study for 420 kV cable systems
  - Insulation coordination study for 220 kV overhead line
  - Review of insulation coordination studies for 220 kV overhead line
  - Insulation coordination study for nuclear power plant
  - Insulation coordination study for 220 kV gas-insulated substation
- 2017 Minimum air clearance requirements for HVDC overhead lines
  - Feasibility study of converting a 220 kV double circuit line from AC to DC
  - Estimation of transient overvoltage levels for live work in 400 kV substation

- Audible noise level of overhead line with jumpers
- Calculation of E-fields under a 400 kV overhead line
  
- 2016 Lightning overvoltage study for 380 kV cable system
- Study of lightning overvoltages in HVDC cables for +/- 320 kV
- Insulation coordination study for 145 kV gas-insulated substations
- Insulation coordination study for 220 kV cable system
- E-field calculations for work under an operating 400 kV line
- B-field calculations for a new 400 kV line
- Feasibility study of converting a 400 kV AC line to DC
- Insulation coordination for a wind power collection cable network
- Review of B-field calculations for a 400 kV overhead line
  
- 2015 Insulation coordination studies for 400 kV cable systems
- Corona and field effects of a 500 kV HVDC bipolar transmission line
- Estimation of current unbalance on bipolar HVDC overhead lines
- Update on the technology and use of HTLS conductors
- Calculation of E-fields in a 400 kV substation
- Calculation of E-fields in the vicinity of a new 400 kV overhead line
- Review of B-field calculations for a 400 kV overhead line
  
- 2014 Lightning overvoltage study of interface between HVDC overhead line and HVDC cable
- AC to DC transmission line conversion handbook
- Feasibility study of upgrading 230 kV AC lines to HVDC
- Verification of surge arrester selection for a 275/110/33 kV substation
- Statistical E-field calculations for 400 kV lines
- Lightning overvoltages in cable systems for 525 kV DC
- Review of overvoltage protection of a nuclear power plant
- Method for calculating resulting B-field from several overhead lines
  
- 2013 Switching overvoltage studies on a 380 kV underground cable link
- Parametric study of lightning overvoltages in DC cables connected to overhead line
- Voltage uprating of 70 kV lines
- Method for calculating the statistical distribution of E-fields under overhead lines
  
- 2012 Reliability study for 400 kV substations
- Lightning overvoltage study for 40 kV substations
- Feasibility study of uprating 40 kV lines to a higher voltage level
- Overvoltage calculation for a railway converter substation