

## ANDREAS DERNFALK

Andreas has more than 20 years' experience in high voltage technology and his specialist field covers outdoor insulation and failure cause investigations. He has been involved in the development of procedures for ice and snow testing, dimensioning and diagnostic testing of outdoor insulators, with special focus on composites. Andreas has also worked with insulation coordination and performed several studies related to conversion of OHLs from AC to DC operation. His experience also includes dielectric spectroscopy measurements on transformers.




---

### MAIN FIELDS OF COMPETENCE

- Insulator selection and statistical dimensioning.
- Test methods and diagnostics of ceramic and composite insulators.
- Failure cause investigations of cable accessories and insulators.
- Insulation coordination studies.
- AC-DC conversion of OHLs.
- Power quality measurements.

---

### WORK EXPERIENCE

2017- -	<b>Independent Insulation Group Sweden AB</b> , Expert
2005- 2017	<b>STRI AB</b> , Ludvika, Sweden. Senior Specialist Manager Lines and Substations
2004-2005	<b>Chalmers University of Technology</b> , Gothenburg, Sweden. Researcher at Department of Materials and manufacturing technology.
1999-2004	<b>Chalmers University of Technology</b> , Gothenburg, Sweden. PhD-student at Department of Electric power engineering.
1991-1998	<b>Vattenfall AB</b> , summer jobs working with maintenance of high voltage apparatuses.

---

### EDUCATIONAL DEGREES

2004	<b>PhD in Electrical Engineering</b> Chalmers University of Technology, Göteborg, Sweden, Sept 1999 – Oct 2004
2003	<b>MSC in Electrical Engineering</b> Chalmers University of Technology, Göteborg, Sweden, Aug 1995 – Sept 1999

---

### LANGUAGES

Swedish (native), English (professional level)

## Recent projects

2022	Resonance study of 16.7 Hz grid
2022	Insulation coordination of wind farm (several projects)
2021-	Measurement of harmonics at transmission level (ongoing, 10+ stations). Includes planning, execution, and setting up power quality instruments.
2021-	Study on protection of buried HVDC cables from nearby lightning strikes (3 projects)
2021-	Flicker/harmonic investigation
2021-	Consequences of cablification of regional network considering, e.g., power quality aspects
2021	Laboratory tests of 330 and 500 kV composite insulators
2021	Laboratory tests of 400 kV composite insulators
2021	Failure cause investigation of 36 kV cable joints (several projects)
2021	Insulation coordination of wind farm (several projects)
2020	Influence of sea salt on 145 kV OHL performance
2020/21	Benchmarking of composite insulators
2020	Comparison of composite insulator sealing technologies
2020	Study on protection of buried HVDC cables from nearby lightning strikes
2020	PD-measurements on MV cables in service
2020	Ultrasonic inspection of porcelain insulators
2020	Study of cable sheath voltages and selection of sheath voltage limiters
2020	Mechanical tests of composite insulators
2019	Insulation coordination 400 kV line
2019	Third-party assessment of failure cause investigation and proposed corrective measures in cable project
2019	Measurements of harmonics and supraharmonics in 70 kV-network, and study on resonances. Measurements using Hioki 8861.
2019	Feasibility study on power supply harvesting energy from OHL
2019	Insulation coordination study (LOV) for 245 kV-GIS
2018	Calculation of cable screen currents and associated temperature rise (145 kV system)
2018/20	Insulation coordination study (LOV and SOV) for nuclear power plant
2017/19	R&D project on quality of composite insulators (joint project of 9 TSO's)
2018/20	R&D project IceBox on methods for prevention and removal of ice on OHLs
2018/19	Inspection and testing of composite insulators with biological growth
2018	Required minimum clearance from HVAC and HVDC cables considering induction in external objects.
2018	Recommendations for the dimensioning of HVDC cable terminations with respect to pollution
2018	Feasibility study on fibre optic measurements (Distributed Temperature Sensing) for dynamic line rating
2018	DC pollution flashover test of composite insulator
2018	Calculation of magnetic field from OHL
2018	Assessment of lightning performance of new 400 kV line tower

- 2018 Failure cause investigation of 36 kV cable terminations
- 2018 Failure cause investigations of 145 kV instrument transformers
- 2017 Measurements and analysis of harmonics and supraharmonics (>2.5 kHz) related to the Swedish railway. Measurements were performed using Hioki 8861.
- 2017/18 Failure cause investigation of composite line insulators (several projects)
- 2017 Recommendations regarding creepage distance for insulator strings in 420 kV substation
- 2017 Assessment of need for temporary grounding of OHL towers at construction close to parallel lines (e.g., considering induction)
- 2017 Investigation of two failed 33 kV cable terminations
- 2017 Insulation coordination study for 145 kV gas-insulated substations
- 2017 Recommendations regarding selection of RTV-coatings
- 2017 Selection of design creepage distance for 420 kV substation
- 2017 Third party assessment of transformer failure root cause investigation
- 2017 Specification of requirements for sensor to be used on 420 kV earthing switches
- 2017 Insulation coordination study 420 kV AIS
- 2017 Insulation coordination study 145/6/0,5 kV substation
- 2016/17 Field measurements and analysis of power quality for the Swedish railway system following the installation of new static converters. Measurements were performed using Hioki 8861.
- 2016/17 Minimum distance requirements for installations in the vicinity of HVAC cable systems considering induction in external objects.
- 2016 Feasibility study for AC-DC conversion of 400 kV OHL
- 2016 Development of test program for evaluation of HVDC live line work procedures and tools
- 2016 Failure investigation of 36 kV cable termination
- 2016 Laboratory test for development of HVDC live line work procedures
- 2016 Wet snow testing of composite insulators
- 2016 Failure investigation of 36 kV cable joint
- 2016 Practical evaluation of instrument for PD measurements on cable accessories
- 2015 Practical evaluation of sensor concept for earthing switch
- 2015 Estimation of current unbalance on bipolar HVDC overhead lines
- 2015 Test program for salt fog testing of HVDC porcelain cable termination
- 2015 Creepage distance requirements for 500 kV OHL
- 2015 Feasibility study for conversion a 400 kV AC OHL to DC
- 2015 Insulation coordination of wind park
- 2014/15 Guidelines for inspection and documentation of damaged or failed insulators
- 2014/15 Guidelines for handling of composite insulators
- 2014 Dimensioning of insulators of 500 kV HVDC transmission line with respect to pollution
- 2014 AC to DC transmission line conversion handbook
- 2014 Combined ice/pollution full scale HVDC test of insulators
- 2014 Feasibility study of upgrading 230 kV AC lines to HVDC

- 2014      Calculation of magnetic field from cable system
- 2013/14   Insulation coordination study 420/130/20/6 kV substation

---

**List of publications**

Dernfalk A.D., Richter S., Blennow H.J.M., "Optical sensors based on liquid crystals for measuring DC fields in air", In Proc. of Nordic Insulation Symposium 01, pp. 97-104, Stockholm, Sweden, 11-13 June, 2001

Larsson, S. Kröll and A.D. Dernfalk, "Laser-Induced fluorescence surface spectroscopy - a candidate for the characterisation of high-voltage insulator surfaces", In Proc. of Nordic Insulation Symposium 01, pp.133-140, Stockholm, Sweden, 11-13 June, 2001

A.D. Dernfalk and S.M. Gubanski, "Use of digital image analysis for studying biological contamination on nonceramic insulators", In Proc. 12th International Symposium on High Voltage Engineering, pp. 599-602, Bangalore, India.

S.M. Gubanski, A.D. Dernfalk, M.A.R.M. Fernando, "Performance of different insulator designs in tropical environments and diagnostic possibilities", In Proc. Cigré International Symposium on "Behaviour of Electrical Equipment and Components in Tropical Environments", Paper No. 200-18, Cairns, Australia.

A. Larsson, A. Roslund, A.D. Dernfalk, S.M. Gubanski, "Remote and non-intrusive diagnostics of highvoltage insulator materials using laser-induced fluorescence spectroscopy", In Proc. IEEE Conference on Electrical Insulation and Dielectric Phenomena, pp. 428-431, Kitchener, Canada.

Larsson, A. Roslund, S. Kröll, A.D. Dernfalk. "In-situ diagnostics of HV outdoor insulators using laserinduced fluorescence spectroscopy", IEEE Transactions on Dielectrics and Electrical Insulation, Vol. 9, pp. 274-281, April.

A.D. Dernfalk, "Image Analysis for Diagnostics of Insulators with Biological Contamination", Lic. thesis, Chalmers University of Technology, Gothenburg, No. 450L, Sweden.

A.D. Dernfalk, M. Bengtsson, R. Grönlund, M. Sjöholm, P. Weibring, H. Edner, S.M. Gubanski, S. Kröll and S. Svanberg, "Laser-induced fluorescence spectroscopy for detection of biological contamination on composite insulators", In Proc. 13th International Symposium on High Voltage Engineering, Delft, Netherlands, 2003

A.D. Dernfalk, "Diagnostic Methods for Composite Insulators with Biological Growth", PhD thesis, Chalmers University of Technology, Gothenburg, Sweden, ISBN 91-7291-501-3.

A.D. Dernfalk and S.M. Gubanski, "Techniques for estimation of biological contamination on insulators using image analysis", In Proc. IEEE Conference on Electrical Insulation and Dielectric Phenomena, pp. 659-662, Boulder, Colorado, USA.

A.D. Dernfalk and S.M. Gubanski, "New laser technique for diagnostics of composite insulators", Insulator News & Market Report, Vol. 12, No. 3, pp. 78-83.

A.D. Dernfalk and S.M. Gubanski, "Image analysis in insulator diagnostics", Insulator News & Market Report, Vol. 12, No. 4, pp. 36-40.

J. Blennow, K. Walczak, A. Dernfalk, B. Garcia, A. Bartnicki, S. Gubanski, O Samuelsson, U. Karlsson, "Comparative study of dielectric spectroscopy measurements and analyses of oil and paper samples from a transformer undergoing repair", In Proc. of 19th Nordic Insulation Symposium, Trondheim, Norway, June 13-15.

J. Blennow, A. Dernfalk, K. Walczak, C. Ekanayake, P. Koestinger, L. Karlsson, U. Gäfvert, S. Gubanski, A. Bartnicki, "Sequential Comparative Study of Dielectric Response and Analyses of Oil and Paper from a Power Transformer Undergoing Repair", In Proc. 14th Int. Symp. on High Voltage Eng., Beijing, China, August.

S. Gubanski, A. Dernfalk, S. Wallström and S. Karlsson, "Biological contamination of insulators: Influence on performance and diagnostic techniques to assess the problem", to appear in Proc. of 2005 Insulator world congress and exhibition on insulators, arresters and bushings

M. Bengtsson, R. Grönlund, M. Sjöholm, Ch. Abrahamsson, A.D. Dernfalk, S. Wallström, A. Larsson, P. Weibring, S. Karlsson, S.M. Gubanski, S. Kröll and S. Svanberg, "Fluorescence lidar imaging of fungal growth on high voltage outdoor composite insulators", Optics and Lasers in Engineering, Vol. 43, No. 6, pp. 624-632, 2005

S. Wallström, A.D. Dernfalk, M. Bengtsson, S. Kröll, S.M. Gubanski and S. Karlsson, "Image analysis and laser induced fluorescence combined to determine biological growth on silicone rubber insulators", Polymer Degradation and Stability, Vol. 88, No. 3, pp. 394-400.

S.M. Gubanski, A. Dernfalk, J. Andersson, H. Hillborg, "Diagnostic Methods for outdoor polymeric insulators", IEEE Transactions on Dielectrics and Electrical Insulation, Vol. 14, No. 5, October 2007.

I. Gutman, A. Dernfalk, J. Lundquist, K. Halsan, L. Wallin, "Selection and dimensioning of high-voltage line composite insulators in Scandinavia", Proc. of the Int. Conf. "Composite insulators and HV insulation constructions", St. Petersburg, Russia, 16-19 June, 2008

I. Gutman, A. Dernfalk, J. Lundquist, T. Ohnstad, L. Wallin, "Field experience and test verification of HV composite apparatus insulators", Proc. of the Int. Conf. "Composite insulators and HV insulation constructions", St. Petersburg, Russia, 16-19 June, 2008

S. Berlijn, K. Halsan, I. Gutman, A. Dernfalk: "Assessing ten years of service experience with composite line insulators at HVDC", World Congress & exhibition on insulators, arresters and bushings, Crete, 11-13 May, 2009

A. Dernfalk, I. Gutman, L. Carlshem, R. Kleveborn: "Abnormal audible noise and visual discharge at glass cap and pin insulators related to the different properties of cement", 16th ISH-2009, Cape Town, South Africa, 24-28 August, 2009, B-12

A. Dernfalk, I. Gutman, A. Nefedov, J. Seifert: "Pollution test methods for composite insulators: simulation of coastal environment and recovery of hydrophobicity", 16th ISH-2009, Cape Town, South Africa, 24-28 August, 2009, E-4

I. Gutman, A. Dernfalk, K. Halsan, S. Berlijn, L. Carlshem, M. Uehara, J. Seifert: "Flashover performance of line composite insulators with different profiles intended for ice & snow ice environment", IWAIS-2009, Andermatt, Switzerland, 8-11 September, 2009, paper PO.002

A. Dernfalk, I. Gutman, G. Olsson: "Detection of defects in porcelain insulators in service", Proc. of Int. Conf. on Conditions Monitoring and Diagnosis (CMD2010), Tokyo, Japan, September 6-11, 2010, C4-1, p.p. 529-532

I. Gutman, A. Dernfalk: "Pollution tests for polymeric insulators made of hydrophobicity transfer materials", IEEE Transactions on Dielectrics and Electrical Insulation, Vol. 17, Issue 2, pp. 384-393, April 2010

A. Dernfalk: "Meeting modern challenges in asset condition monitoring & diagnostics", INMR Vol. 19, No. 4, Q4, 2011, pp. 56-64

H. Homma, K. Yaji, G. Sakata, T. Aso, A. Dernfalk, I. Gutman: "Development of flashover voltage test method for snow accreted insulators – Preliminary test with 33 kV class insulator samples", IWAIS-2011, Chongqing, China, May 8-13, 2011, paper C2\_1\_ID26

H. Homma, K. Yaji, T. Aso, M. Watanabe, G. Sakata, A. Dernfalk, I. Gutman: "Evaluation of flashover voltage property of snow accreted insulators for 154 kV transmission line", IWAIS-2013, St. John's, Sept 8-11, 2013

M. Radojicic, K. Halsan, I. Gutman, A. Dernfalk, L. Carlshem, L. Wallin: "Comparative testing of different anti-ice coatings for overhead line conductors with special focus on ice accretion, RIV and visual impact", IWAIS-2013, St. John's, Sept 8-11, 2013

T. Langeland, M. Jafar, Y. Yang, L.M. Hytten, E. Hillberg, A. Dernfalk, "Technology Qualification of Offshore HVDC Transmission Systems", CIGRE Session 2014, B4-115

H. Homma, K. Yaji, T. Aso, M. Watanabe, G. Sakata, A. Dernfalk, I. Gutman: "Evaluation on Flashover Voltage Property of Snow Accreted Insulators for Overhead Transmission Lines, Part III - 154 kV Full-scale Flashover Voltage Test of Snow Accreted Insulators -", IEEE Transactions on Dielectrics and Electrical Insulation, Vol. 21, No. 6, December 2014, p.p. 2568-2575

A. Dernfalk, J. Lundengård, E. Petersson, I. Gutman, K. Tucker, S. Banerjee: "Advanced test methods for full-scale ice tests of DC insulators strings intended for  $\pm 350$  kV", IWAIS-2015

M. Radosavljevic, T. Lindquist, I. Gutman, A. Dernfalk: "Refurbishment of 400 kV AC substation in polluted environment: pros and cons for different modern insulation options including composite/RTV/hybrid", CIGRE SC A3 & B3 Joint Colloquium, Nagoya, Japan, 28 September – 2 October 2015, paper 236

A. Dernfalk, J. Lundquist, I. Gutman: "Typical Approach & Practical Case Studies for AC/DC Conversion Projects", World Congress & Exhibition on Insulators, Arresters & Bushings, Munich, Germany, 18-21 October 2015

K. Tucker, A. Dernfalk, I. Gutman: "Full-Scale Testing of HVDC Energized Insulators for High Salt/High Ice Environment", World Congress & Exhibition on Insulators, Arresters & Bushings, Munich, Germany, 18-21 October 2015

M. Radosavljevic, T. Lindquist, I. Gutman, A. Dernfalk: "Design considerations for modern 400 kV AC substation in coastal area: what is missing in IEC/CIGRE requirements", CIGRE-IEC Colloquium on EHV and UHV (AC & DC), Montréal, QC, Canada, 2016, paper 54

K. Yaji, H. Homma, K. Adachi, Y. Hori, T. Nishihara, A. Dernfalk, I. Gutman: "Evaluation on Flashover Performance of 154 kV Snow-accreted Composite Insulators Using Artificial Flashover Tests", 20th ISH-2017, Buenos Aires, Argentina, 2017, paper 164

I. Gutman, A. DERNFALK, M. YARMARKIN: "Biological Growths on Composite Insulators", World Congress & Exhibition on Insulators, Arresters & Bushings, Barcelona-Sitges, Spain, 5-8 November 2017

I. Gutman, A. DERNFALK: "Innovative testing techniques for verification of corona, pollution and ice/snow performance of insulation structures", World Congress & Exhibition on Insulators, Arresters & Bushings, Barcelona-Sitges, Spain, 5-8 November 2017

M. RADOSAVLJEVIC, A. DERNFALK, I. GUTMAN: "Development of requirements for testing and verification of RTV-coated substation support insulators for AC application", CIGRE-2018, A3-109

A. DERNFALK, P. SIDENVALL, I. GUTMAN: "Development of the test capable to reveal level of adhesion between fibreglass rod and housing of composite insulators", CIGRE-IEC 2019 Conference on EHV and UHV (AC & DC), April 23-26, 2019, Hakodate, Hokkaido, Japan, paper P1-10

O. LENNERHAG, A. DERNFALK, P. NYGREN: "Supraharmonics in the presence of static frequency converters feeding a 16 2/3 Hz railway system", International Conference on Harmonics and Quality of Power (ICHQP), 2020

I. GUTMAN, P. CARDANO, A. DERNFALK, J.M. GEORGE, T. HAYASHI, K. KONDO, J. LACHMAN, S. LI, X. LIANG, E. MOAL, A. PIGINI, J. SEIFERT, E. SOLOMONIK, W. VOSLOO, D. WINDMAR: "State-of-the-art of Pollution Test Procedures for Insulators with Hydrophobicity Transfer Materials", CIGRE Science and Engineering, No 21, June, 2021

I. GUTMAN, A. DERNFALK, V. MALINEN, M. RADOSAVLJEVIC, K. VARLI: "Critical Review on Biological Growth on Composite Insulators in Northern and Central European Environments: Evaluation of Risk for Pollution Flashover and Ageing", CIGRE Science and Engineering, No 22, October, 2021