SPECIAL ISSUE ON ADVANCES IN CONDITION MONITORING AND ASSESSMENT OF POWER EQUIPMENT

GUEST EDITORIAL
Introduction to the Special Issue on Advances in Condition Monitoring and Assessment of Power Equipment .......... F. de León 1219

SPECIAL ISSUE PAPERS
Joint Visualization Diagnosis of Outdoor Insulation Status With Optical and Acoustical Detections ................................................. M. Dong, B. Wang, M. Ren, C. Zhang, W. Zhao, and R. Albarracín 1221
Inter-Turn Fault Detection of Dry-Type Transformers Using Core-Leakage Fluxes ............................................................. S. C. Athikessavan, E. Jeyasankar, S. S. Manohar, and S. K. Panda 1230
On-Line Cable Condition Monitoring Using Natural Power Disturbances ................................................................. L. Li, J. Yong, and W. Xu 1242
A Probabilistic Model-Aided Failure Prediction Approach for Spring-Type Operating Mechanism of High-Voltage Circuit Breakers ... A. A. Razi-Kazemi, K. Niayesh, and R. Nilchi 1280
High Accuracy Insulation Fault Diagnosis Method of Power Equipment Based on Power Maximum Likelihood Estimation ................. N. Zhou, L. Luo, G. Sheng, and X. Jiang 1291
A Wideband Spiral UHF Coupler With Tuning Nodules for Partial Discharge Detection ............................................................. C. Zachariades, R. Shuttleworth, R. Giussani, and T.-H. Loh 1300
Implementation of Quasi-Real-Time Rating Software to Monitor 525 kV Cable Systems ................................................................. S. Cherukupalli, R. Adapa, and E. C. Bascom, III 1309
Improved Method for Acoustic Identification of Free Conductive Particle Defects in GIL .............................................................. Z. Wu, Q. Zhang, J. Song, and X. Li 1317
A Non-Intrusive Electrical Discharge Localization Method for Gas Insulated Line Based on Phase-Sensitive OTDR and Michelson Interferometer ............................................................................. G.-M. Ma, C. Shi, W.-Q. Qin, Y.-B. Li, H.-Y. Zhou, and C.-R. Li 1324
Use of Interfacial Charge for Diagnosis and Activation Energy Prediction of Oil-Paper Insulation Used in Power Transformer ........ D. Mishra, S. Dutta, A. Baral, N. Haque, and S. Chakravoriti 1332
A Continuous Monitoring for Neutral Grounding Resistors and Reactors With Hardware Validation ........................................ R. J., M. Kanabar, T. S. Sidhu, and I. Voloh 1341
A Novel Method to Recognize the State of High-Voltage Isolating Switch .................................................................................... Y. Teng, T.-Y. Tan, C. Lei, J.-G. Yang, Y. Mu, K. Zhao, Y.-Y. Jia, and Y. Liu 1350
An Approach to Insulation Condition Monitoring and Life Assessment in Emerging Electrical Environments ................................................ G. C. Montanari, R. Hebner, P. Maroshuis, and P. Seri 1357

(Contents Continued on Page 1217)
A Multiphysical Model to Study Moisture Dynamics in Transformers ........................................ B. García, R. Villarroel, and D. García
A Hybrid Transformer PD Monitoring Method Using Simultaneous IEC60270 and RF Data ................................................................. 1365
........................................................................................................................................... K. Firuzi, M. Vakilian, B. T. Phung, and T. R. Blackburn
Dynamic Fault Prediction of Power Transformers Based on Hidden Markov Model of Dissolved Gases Analysis ........................................... 1393
........................................................................................................................................... J. Jiangan, R. Chen, M. Chen, W. Wang, and C. Zhang
Detection and Localization of Defects in Cable Sheath of Cross-Bonding Configuration by Sheath Currents .................................................. 1365
........................................................................................................................................... M. A. Shokry, A. Khamicli, F. Garnacho, J. M. Malo, and F. Alavrez
Corrosion in Low-Voltage Distribution Networks and Perspectives for Online Condition Monitoring .................................................. A. van Deursen, P. Wouters, and F. Steenmis
........................................................................................................................................... 1423
Analyzing Parameters That Affect the Reliability of Low-Voltage Cable Grids and Their Applicability in Asset Management ........................................ 1432
........................................................................................................................................... M. H. P. Klerx, J. Morren, and H. Slootweg
Improved Dynamic Thermal Model With Pre-Physical Modeling for Transformers in ONAN Cooling Mode ....... 1442
A New On-Line Substation Instrument Transformer Health Monitoring System Using Synchrophasor Data .................................................. 1451
........................................................................................................................................... L. Zhang, H. Chen, Q. Wang, N. Nayak, Y. Gong, and A. Bose
........................................................................................................................................... 1490
Condition Monitoring of Circuit Switchers for Shunt Capacitor Banks Through Power Quality Data .... A. F. Bastos and S. Santos
........................................................................................................................................... 1499
A New Transformer FRA Measurement Technique to Reach Smart Interpretation for Inter-Disk Faults ........ 1508
........................................................................................................................................... V. Nurmanowa, M. Basheri, A. Zollanvari, K. Aliakber, Y. Akhmetov, and G. B. Ghareshtepian
Positioning of UHF PD Sensors on Power Transformers Based on the Attenuation of UHF Signals ............................................... C. P. Beura, M. Beltle, and S. Tenbohlen
........................................................................................................................................... 1520
UHF Measurement in Power Transformers: An Algorithm to Optimize Accuracy of Arrival Time Detection and PD Localization ........................................ 1530
........................................................................................................................................... M. Arianitk, M. A. Azizani, P. Wele, and A. A. Azizani
Modeling of High-Frequency Current Transformer Based Partial Discharge Detection in High-Voltage Cables ............................................... X. Hu, W. H. Siew, M. D. Judd, A. J. Reid, and B. Sheng
........................................................................................................................................... 1549
Identification of Partial Discharge Defects Based on Deep Learning Method ........................................... L. Duan, J. Hu, G. Zhao, K. Chen, J. He, and S. X. Wang
........................................................................................................................................... 1557
A New Approach on Prioritization of the Circuit Breakers for Installation of Online Monitoring Systems ........................................................................... A. A. Razi-Kazemi and M. Shafranatnas
Data-Driven Condition Monitoring of Data Acquisition for Consumers’ Transformers in Actual Distribution Systems Using T-Statistics ........................................ 1569
........................................................................................................................................... S. Liu, Y. Zhao, Z. Lin, Y. Ding, Y. Yan, L. Yang, Q. Wang, H. Zhou, and H. Wu
Estimation of Individual Failure Rates for Power System Components Based on Risk Functions ........................................................................... J. H. Jürgensen, L. Nordström, and P. Hilber
Fault Analysis of High-Voltage Circuit Breakers Based on Coil Current and Contact Travel Waveforms Through Modified SVM Classifier .............................................. F. N. Rudsari, A. A. Razi-Kazemi, and M. A. Shoorehdehi
Fault Tripping Criteria in Stability Control Device Adapting to Half-Wavelength AC Transmission Line ........................................................................... 1608
........................................................................................................................................... H. Xu, R. Zhang, X. Li, and Y. Yan
Aging Assessment of Oil-Paper Insulation of Power Equipment With Furfural Analysis Based on Furfural Generation and Partitioning ........................................ 1619
........................................................................................................................................... Y. Lin, C. Wei, F. Tao, and J. Li
A Novel Model for Thermal Behavior Prediction of Oil-Immersed Distribution Transformers With Consideration of Solar Radiation ........................................... A. A. Toheri, A. Abdali, and A. Rahibi
Incipient Faults Monitoring in Underground Medium Voltage Cables of Distribution Systems Based on a Two-Step Strategy ................................................ 1634
........................................................................................................................................... M. Jannati, B. Vahidi, and S. H. Hosseiniyan
........................................................................................................................................... 1647
Non-Intrusive Cable Fault Diagnosis Based on Inductive Directional Coupling .......................................................... C. Gao, L. Wang, J. Mao, S. Hu, B. Zhang, and S. Yang 1684
Insulation Condition Monitoring in Distribution Power Grid via IoT-Based Sensing Network .......................................................... T. Zhuang, M. Ren, X. Gao, M. Dong, W. Huang, and C. Zhang 1706
Analytical Expressions to Link SCNF and OCNF of Transformer Windings to Their Inductances and Capacitances for 1-φ, 3-φ Y and Δ Configurations . Best paper of this issue .......................................................... B. Biswas and L. Satish 1725
High-Voltage Circuit Breakers Technical State Patterns Recognition Based on Machine Learning Methods .......................................................... A. I. Khalyasmaa, M. D. Senyuk, and S. A. Eroshenko 1747
A Hybrid Intelligent Approach for Classification of Incipient Faults in Transmission Network .......................................................... G. W. Chang, Y.-H. Hong, and G.-Y. Li 1785
Partial Discharge Source Localization in GIS Based on Image Edge Detection and Support Vector Machine .......................................................... X. Li, X. Wang, A. Yang, and M. Rong 1795
Guest Editorial

Introduction to the Special Issue on Advances in Condition Monitoring and Assessment of Power Equipment

POWER apparatus, such as power and instrument transformers, circuit breakers, reclosers, switches, arresters, reactors, gas insulated equipment, capacitors, power electronics converters, relays, FACTS, insulators, etc. are the vital organs of the electric power system. Their health is paramount for a dependable delivery of power to the consumers. For optimal reliability, maladies in power equipment should be detected and cured before failures occur. Ideally, the life of a piece of equipment should be extended for as long as it can operate economically and be replaced only the day before it would fail otherwise. Just like the human body, periodic health monitoring of each component is necessary to assess the overall fitness and wellbeing of the power system. The Special Issue on Advances in Condition Monitoring and Assessment of Power Equipment of the IEEE TRANSACTIONS ON POWER DELIVERY concentrates a number of new techniques aimed to maximize equipment utilization and life expectancy in one publication.

This special issue attracted substantial interest from the PES community. We received 211 papers. A total of 63 valuable papers were accepted for publication, which is just under 30% acceptance rate. Three pieces of equipment received the most attention: transformers; cables; and circuit breakers, but several papers treat gas insulated equipment (lines, cables, circuit breakers, and substations). Attention was also given to fault detection inside equipment and fault location in transmission and distribution systems. Equipment failure rates and corrosion papers are also published. Much interest is given to equipment diagnosis and failure prediction, but we also have interesting papers on dynamic rating of equipment. Novel methods based on acoustics, optics, data analysis, signal processing, and other techniques are proposed. In my opinion the papers well represent the vast expanse of the field.

I would like to thank the Editor-in-Chief of the IEEE TRANSACTIONS ON POWER DELIVERY, Prof. Wilsun Xu from the University of Alberta, for trusting me in putting together this special issue and his advice throughout the entire process. I am grateful to the team of editors who helped me with this endeavor:

Gary Chang, National Chung Cheng University, Taiwan
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I am also very appreciative to the large number of Reviewers who performed the lion’s share of the paper evaluation to make this publication a reality. Last, but not least, I am obliged to the authors for their intellectual contributions and impressive amount of work in preparing and revising the papers to make this publication a success.

Looking into the future, I foresee that some of the methods, devices, and techniques published in this Special Issue will find applications in improving the reliability of the system by the early detecting equipment failures, estimating the remaining life, and providing more information on the health status of power apparatuses.

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Francisco de León (S’86–M’92–SM’02–F’15) received the B.Sc. and M.Sc. (Hons.) degrees from National Polytechnic Institute, Mexico City, Mexico, in 1983 and 1986, respectively, and the Ph.D. degree from the University of Toronto, Toronto, ON, Canada, in 1992, all in electrical engineering.

He has held several academic positions in Mexico and has worked for the Canadian electric industry. He is currently a Professor with the Department of Electrical and Computer Engineering, New York University, Brooklyn, NY, USA. His research interests include analysis of power phenomena under nonsinusoidal conditions, transient and steady-state analyses of power systems, thermal rating of cables and transformers, and calculation of electromagnetic fields applied to machine design and modeling.

Prof. de León is an Associate Editor for the IEEE TRANSACTIONS ON POWER DELIVERY, an Editor/Coordinator for the IEEE POWER ENGINEERING LETTERS, and a Reviewer for a large number of journals.
Important aspects of the grid modernization trend of the recent years are the management and state diagnostics of major pieces of T&D equipment that face new challenges. For example, Real-Time Thermal Ratings (RTTR) for large capacity overhead lines, transformers, and cables are considered essential for new and future installations. Non-invasive tests, ideally done on-line, to determine the condition of equipment would reduce faults, increase reliability, and reduce investment, operation and maintenance costs. There are currently technologies capable of performing some condition monitoring and assessment functions, but it is necessary to further develop them or propose new ones given the future expectations on power quality and reliability of the electric power system. The integration of distributed generation resources and possibly direct current circuits tied to the ac grid via power electronics devices may require different technologies for condition monitoring. Not only the condition of the electronic switches themselves needs to be assessed, but also the distinct insulation stresses produced by fast switching on power equipment needs to be evaluated.

This Special Section aims to promote research, innovation and exchange of information in the broad field of power equipment condition monitoring and assessment. Topics of interest include, but are not limited to:

- Innovations on dynamic rating of equipment
- Methods to monitor equipment ageing and estimate equipment remaining life
- Techniques for equipment health diagnosis and predictive maintenance
- Signatures and characteristics of equipment failures
- Data analytics based schemes for equipment condition monitoring
- Detection and location of equipment failures and incipient faults
- New developments in asset management techniques
- Integration of condition monitoring with power system operations
- Novel sensors and measurement systems for condition monitoring
- Sensor networks and Internet of Things for T&D equipment monitoring
- Application of communication and information technologies to condition monitoring
- Impact assessment on power grid planning based on condition monitoring
- Preventive prognostic condition monitoring of adverse states
- Economic effectiveness analysis of condition monitoring approaches
- Intelligent methods applied to condition monitoring

**SUBMISSION GUIDELINES**

This Special Section solicits original work that is not under consideration for publication in other venues. There is no need for the submission of an extended abstract. Please submit the full paper directly. Authors should refer to:

[http://sites.ieee.org/tpwrd/](http://sites.ieee.org/tpwrd/)

for information about requirements, formatting and the website of submission. When submitting, please select the submission type “Advances in Condition Monitoring and Assessment of Power Equipment”
Equipment” Any changes on deadlines or other updates related to this Special Section will be announced in the “Call for Paper & News” section of the above website.

IMPORTANT DATES
May 1, 2018: Call for papers issued
October 31, 2018: Deadline for submission of full papers (early submission is recommended)
April 30, 2019: Notification of final decisions
August 2019: Publication of Special Section

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