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

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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 heath 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 heath 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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Stefan Tenbohlen, University of Stuttgart, Germany
Dongbo Zhao, Argonne National Laboratory, USA

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.

IEEE Transactions on Power Delivery
Special Section on
Advances in Condition Monitoring and Assessment of Power Equipment

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/

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" 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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