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SPECIAL ISSUE

Structural Health Monitoring

Point of View: Interactive Displays:
The Next Omnipresent Technology

Scanning Our Past: What the Public
Knew About Wireless Before Titanic

SPECIAL ISSUE

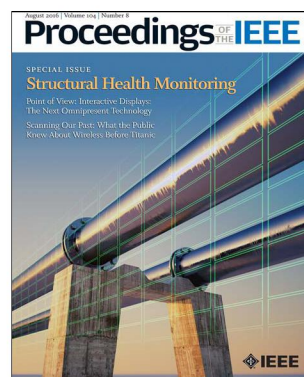
STRUCTURAL HEALTH MONITORING: TECHNOLOGICAL ADVANCES TO PRACTICAL IMPLEMENTATIONS

Edited by J. P. Lynch, C. R. Farrar, and J. E. Michaels

- 1513 Strain Sensing Sheets for Structural Health Monitoring Based on Large-Area Electronics and Integrated Circuits**
By B. Glišić, Y. Yao, S.-T. E. Tung, S. Wagner, J. C. Sturm, and N. Verma
|INVITED PAPER| This paper describes innovative sensing sheets for spatial mapping of surface strain and crack damage. The flexible substrates include a full integration of an array of strain sensors along with digital circuitry for power harvesting and signal processing.
- 1529 Ultralow Power Circuit Design for Wireless Sensor Nodes for Structural Health Monitoring**
By Y. Lee, D. Blaauw, and D. Sylvester
|INVITED PAPER| This paper presents state-of-the-art ultralow power digital circuits for future generations of wireless sensors reliant on power harvesting.
- 1547 Multifunctional Cement Composites Enhanced With Carbon Nanotube Thin Film Interfaces**
By J. G. Gonzalez, S. Gupta, and K. J. Loh
|INVITED PAPER| This paper introduces multiwalled carbon nanotubes/latex coatings at the aggregate-cement matrix interface to enhance the piezoresistivity of bulk concrete. Electrical resistance tomographic (ERT) methods are explored to spatially map strain and damage in concrete.
- 1561 Measuring Crack Movement in Reinforced Concrete Using Digital Image Correlation: Overview and Application to Shear Slip Measurements**
By N. A. Hoult, M. Dutton, A. Hoag, and W. A. Take
|INVITED PAPER| This paper advances digital image correlation (DIC) to measure and characterize cracks in concrete including the direct measure of slippage on crack surfaces. Crack slippage is vital to assessing and quantifying shear-based limit states of concrete structural elements for SHM.
- 1575 Statistical Performance Assessment of an NDE-Based SHM-DP Methodology for the Remaining Fatigue Life Prediction of Monitored Structural Components and Systems**
By M. Gobbato, J. P. Conte, and J. B. Kosmatka
|INVITED PAPER| This paper presents a comprehensive probabilistic framework based on Bayesian inference methods for the assessment of remaining fatigue life of metallic structural components under cyclic loading.
- 1589 Some Recent Developments in SHM Based on Nonstationary Time Series Analysis**
By K. Worden, T. Baldacchino, J. Rowson, and E. J. Cross
|INVITED PAPER| This paper presents and validates probabilistic methods that treat slow varying and abruptly changing trends in real-world SHM time series data using maximum likelihood and Bayesian mixture of expert methods.

DEPARTMENTS

- 1503 POINT OF VIEW**
 Interactive Displays: The Next Omnipresent Technology
By A. Nathan and S. Gao
- 1508 SCANNING THE ISSUE**
 Structural Health Monitoring: Technological Advances to Practical Implementations
By J. P. Lynch, C. R. Farrar, and J. E. Michaels
- 1662 SCANNING OUR PAST**
 What the Public Knew About Wireless Before Titanic
By A. B. Magoun
- 1669 FUTURE SPECIAL ISSUES/SPECIAL SECTIONS**



On the Cover: This month's cover features an artist's rendition of the technical monitoring of a pipeline, thus conveying the concept of structural health monitoring.

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SPECIAL ISSUE: Structural Health Monitoring: Technological Advances to Practical Implementations**1604 Predictive Guided Wave Models Through Sparse Modal Representations**By *J. B. Harley*

|INVITED PAPER| This paper explores the combination of compressive sensing algorithms with physics-based wave propagation models to create a means of representing and predicting wave behavior in structures. The proposed sparse wavenumber analysis is validated using guided wave data from unidirectional glass-fiber reinforced polymer composite plates.

1620 Independent Component Analysis for Improved Defect Detection in Guided Wave MonitoringBy *J. Dobson and P. Cawley*

|INVITED PAPER| This paper applies guided wave methods to detect damage in complex industrial pipeline structures using independent component analysis (ICA).

1632 Three-Tier Modular Structural Health Monitoring Framework Using Environmental and Operational Condition Clustering for Data Normalization: Validation on an Operational Wind Turbine SystemBy *M. W. Häckell, R. Rolfes, M. B. Kane, and J. P. Lynch*

|INVITED PAPER| This paper offers a modular three-tier framework for statistical pattern classification of feature vectors for SHM of operational wind turbines. A key feature of the work is the normalization of sensor data through the use of unsupervised clustering using EOC parameters.

1647 Expected Utility Theory for Monitoring-Based Decision-MakingBy *C. Cappello, D. Zonta, and B. Glišić*

|INVITED PAPER| This paper applies expected utility theory to aid decision-makers of a concrete pedestrian bridge to optimize decisions over the lifespan of the bridge.

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