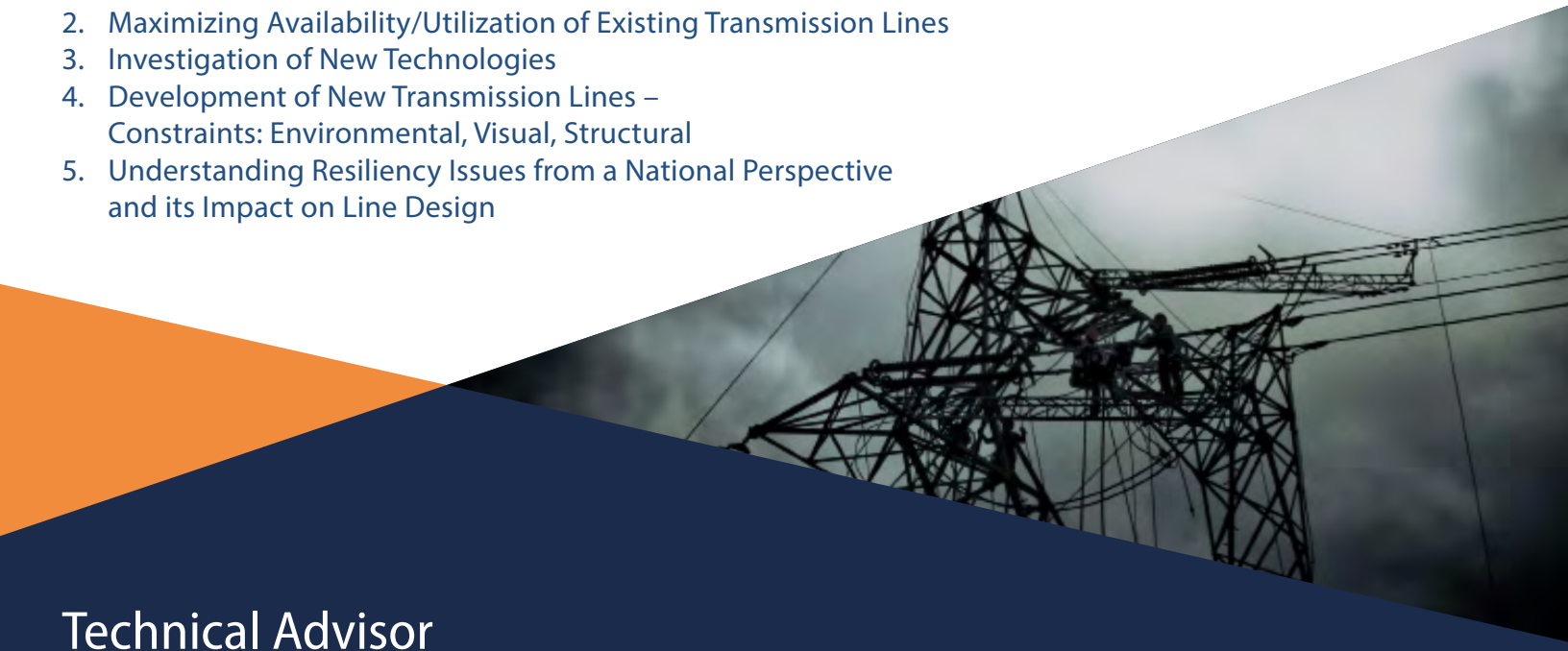
Transmission Overhead Line Design and Extreme Event Mitigation

Overhead transmission lines are subjected to extreme events that may damage line sections and affect power supply to customers. Even when the best design criteria are met, there continues to be a risk of extensive damage to overhead lines when structural loads exceed the design criteria. Experiences with several devastating events such as the ice storm in Canada and the northeastern U.S. in 1998, the major wind storm event in France in 1999, and the major icing event in China in 2008, along with the hurricanes and high intensity winds (HIW) recently occurring in many countries, have demonstrated the significant devastation that severe weather causes to transmission systems. These problems may best be addressed by a better understanding of these issues through gaining knowledge in the subject areas, improving current technologies and by sharing needed research efforts as well as closing the existing "knowledge gaps" in the industry.

The objectives of this program are to share strategies to deal with overhead transmission line design issues and to mitigate the impact of extreme events, develop benchmarks for the increased utilization of existing lines as well as the design of new lines, create containment strategies against line cascade, and establish technologies to reduce life cycle costs.

Topics & Issues

1. Extreme Events
2. Maximizing Availability/Utilization of Existing Transmission Lines
3. Investigation of New Technologies
4. Development of New Transmission Lines – Constraints: Environmental, Visual, Structural
5. Understanding Resiliency Issues from a National Perspective and its Impact on Line Design



Technical Advisor

Dr. Asim Haldar received his Masters and Ph.D in Engineering from Memorial University of Newfoundland in 1977 and 1985 respectively, with a specialization in behavior of offshore structures. He has worked in the utility industry for 35 years and is the former Manager of Research and Development in the Engineering services Division of Nalcor Energy, a crown corporation in Newfoundland and Labrador. He is an active member of the CIGRE Study Committee SCB2 (WG 23 on Foundations and WG 24 on Structures) and a Canadian delegate to IEC TC-11. He has published more than 55 papers and reports in line design and asset management areas with particular reference to conductor dynamics, reliability based optimization, cascade prevention, condition based asset management and monitoring wind and ice loading on transmission lines.

Transmission Overhead Line Design and Extreme Event Mitigation

Projects

Extreme Events

- Guide for Fire Protection of Transmission Lines
- Design for Hydraulic Loads and Protection Against Foundation Scour
- Design of Transmission Structures for Dynamic Loads
- Monitoring Package for Extreme Events
- Modeling and Forecasting Icing Events with Regular Weather Models
- Safety Measures during Emergency Restoration
- Modeling and Impact of High Intensity Winds
- Detecting Latent Damage from Previous Ice and Wind Storms
- Impact of Climatological Influences on Overhead Line Design
- Validation of a Rime Ice Accretion Model using Field Data with Particular Reference to WRF and WOBS Models

Maximizing Utilization of Existing Transmission Lines

- Guidelines for Compact Line Design
- Comparison of Historic vs. Current Structure Design Practices
- Galloping Phenomena, Occurring Problems & Solutions
- Guide Specification for Transmission Line LiDAR Surveys
- Corrosion Assessment for Tubular Steel Poles
- Guidelines to Establish Reliability of Existing Transmission Lines

Investigation of New Technologies

- Robotic Maintenance and its Implications for Design
- Evaluation of Live Line Conductor Vibration Recorders
- Technology Watch on New Conductors for Transmission Lines
- New Structural Materials for Transmission Lines
- Prevention, Assessment & Remediation of Corrosion in Corten Steel Transmission Line Structures

Investigation of New Transmission Lines

- Design Practices for Long Span/Tall Transmission Tower Systems
- Optimal Placement of Anti-Cascading Structures in Overhead Line Design - A Guide for Utility Engineers
- Data Capture and Analysis from Aerial Inspections and Videos
- Application Guide for Wind Speed-Up Factors
- Guide for Determining Deflection Criteria
- Best Practices Guide for EHV AC Transmission Lines over 230 kV up to and including 765 kV

Resiliency Issues and their Impact on Line Design

- Understanding Performance-Based Design of Overhead Lines

Annual Activities

- 2 Face-to-Face Meetings
- Workshops/Conferences
- Conference Calls
- On-Demand Information Exchange
- Collaborative Project Development

*Participation is open to all Electrical Utilities.
For a complete project listing, please visit www.ceati.com/**TODEM**

CEATI International Inc. (CEATI)
1010 Sherbrooke Street W., Suite 2500
Montreal, QC, Canada, H3A 2R7
+1.514.866.5377 / www.ceati.com / info@ceati.com