

Invitation for Proposals

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**OVERHEAD LINE DESIGN ISSUES & WIND AND ICE STORM MITIGATION
INTEREST GROUP (WISMIG)**

CEATI PROJECT No. T103700-3370

NEW STRUCTURAL MATERIALS FOR TRANSMISSION LINES

CEATI International Inc. (CEATI) invites the submission of proposals to perform research work on the following topic:

TITLE

New Structural Materials for Transmission Lines

INTRODUCTION

The electric utility industry still relies heavily on traditional materials such as wood, steel and concrete for transmission line supporting structures including poles, H-frames, lattice towers, etc. These materials, while advantageous in certain aspects, are also subject to disadvantages of age degradation, corrosion and cracking. As a consequence, the transmission structures require frequent inspection and refurbishment to ensure overall functionality of the transmission line system. Other industries, however, have shifted to newer material technology. For instance, the aeronautical and automotive domains now employ materials that exemplify lower cost, lower weight, lower maintenance requirements and higher relative strength. Nanotechnology and composites play an increasing role in material technology development.

To meet the growing power demand and reduce overall costs, transmission utilities are now exploring ways to find new structural materials applicable to supporting structures. The use of fiber reinforced polymer (FRP) poles in place of wood poles is being explored, and some new concrete composite materials are being tested as a replacement for wood pole cross-arms.

The intent of the project is to investigate alternative materials for transmission line structural components that bring about reduced maintenance requirements and longer in-service life.

PROJECT OBJECTIVES

The objective of this project is to critically review the materials currently being used for transmission line structural components including grounding electrodes, the requirements which such materials have to meet, and their inherent limitations, and to investigate and recommend alternative, cost-effective materials which are construction-friendly, provide longer design life and require minimal maintenance.

SCOPE OF THE STUDY

To meet the abovementioned objective, it is envisioned that the following tasks shall be required:

- Conduct a review of the materials being used for transmission line structural components including grounding electrodes, their electrical and mechanical properties, and the advantages and disadvantages of their use.
- Investigate other materials available or in development and evaluate their applicability to transmission lines giving due consideration to their electrical and mechanical properties, testing to be conducted, any required changes in construction and maintenance practices, and the overall life cycle cost.
- Prepare a comprehensive report containing the details of the investigation.

The investigation of the new materials shall address all relevant properties, including the following:

- Insulating and conducting characteristics
- Internal partial discharge issues
- Maximum strength (tensile, compressive and bending)
- Flexibility and brittleness
- Grounding requirements
- Durability and predicted life
- Construction and maintenance practices
- Environmental issues
- Impact on electrical properties of the transmission lines as a system
- Environmental footprint and/or green house gas emissions arising from the embodied energy

This study is limited to alternative materials for components of supporting structures and grounding electrodes and shall not include alternative materials for conductors, insulators, or transmission line hardware.

POTENTIAL BENEFITS

From this study, utilities will gain knowledge about new materials which can potentially be used for structural components and grounding electrodes and they will better understand the pros and cons of the use of these alternative structural materials.

DELIVERABLES

The primary deliverable shall be a detailed report comprising a comprehensive discussion and compilation of the results of the investigation and including a bibliography and copies of any papers and other information used to reach the conclusions and recommendations stated in the report. The proponent should be prepared to present the results of the work in person at one of the biannual WISMIG meetings.

The successful proponent is expected to prepare a ready-to-publish report on the results of the investigation and present the results to funding consortium members. The completed report must be submitted for CEATI approval in editable, electronic format (Microsoft Word).

Progress reports will also be required on either a quarterly or milestone basis - normally these are scheduled to coincide with the completion of the identified tasks. Progress reports must make reference to the tasks identified in the proposal stating the percentage completed to date for each task.

The successful proponent is also expected to provide the following:

- A ten to fifteen (10-15) slide Power Point Presentation. This should be composed of three main sections:

1. The factors motivating the initiation of the work;

2. A description of the main findings;
3. Summary of the conclusions and recommendations for future research.

- Contents for the Project's Technical Brief. This is a summary of the report (between 1,000 and 1,500 words), which is published separately by CEATI. Proponents are not responsible for the preparation of a ready-to-print Technical Brief, but solely to provide the contents for the following 4 sections: Background, Summary, Conclusions and Recommendations.

1. The Report Background section should be short (approximately 200 words) and should detail the reasons the work was conducted.
2. The Summary section should be approximately 700 words. It must provide a general description of the work program.
3. The Conclusions section should be about 150 words and should provide a general outline of the key results (do not include specifics).
4. The Recommendations section should be about 200 words and should include a description of the potential applications of the results.

Please note that all reporting must be submitted in English. If written English is not the author's strong suit, it is recommended that a technical writer be hired to review the document prior to submission.

BUDGET AND SCHEDULE

The proposal must contain a schedule and a quote of required remuneration for the work in US or Canadian dollars. All prices shall be presumed to be in Canadian dollars (CAD) unless explicitly specified otherwise in the proposal. Proponents' responses to this section must include a full breakdown of the budget and schedule, including an indication of rates and hours and the task allocation for the key personnel by task and must correspond to any phases or milestones outlined above. (Please refer to the Proposal Template for more information).

It is expected that this project can be completed (draft final report submitted for review and approval) within nine (9) months of initiation.

The proposal must include the names and qualifications of the key individuals who will be involved, as well as the name of the accountable manager.

CEATI is not bound to accept any proposal but any selection will take into account technical merit, qualifications, price and schedule. A proposal may be accepted in whole or in part. A commitment to proceed with the first phase of a multi-phase project does not automatically imply that the work of the subsequent phases will be undertaken.

ALTERNATIVE WORKS

Proponents shall generally follow the above description of work, but are encouraged to offer alternative works if these alternatives will meet the objectives and provide a better end product to the utilities sponsoring this work. Alternatives shall be fully described including logistics explaining why the alternate works are being offered and the benefits to be realized by the

funding utilities. Where alternatives are proposed, separate budgets shall be calculated for each alternative.

SUBMISSION OF PROPOSALS

The proposal shall include a clear and detailed description of the tasks to be completed including the methodology for completing the tasks.

The consideration of proposals received will be limited to those who indicate their intent to employ a suitable experienced project team and who possess proper facilities to perform the work. Receipt of this “IFP” does not necessarily constitute a prior determination by CEATI that your organization has the requisite experience and facilities.

The proposal must be properly completed and executed in accordance with the CEATI guidelines available at <http://www.ceati.com/guidelines.php>, and shall be submitted to CEATI as an attachment in Microsoft Word at the following website: www.ceati.com/private/submissions. Be sure to indicate project number “**T103700-3370**” on the submission form. For assistance, please contact us at 514-866-5377 x 236.

CLOSING DATE FOR RECEIPT OF PROPOSALS

Thursday, April 1, 2010, 4:00 pm EDT