UBC's Pipeline Integrity Institute driving innovative pipeline research and education

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A guest post by Dr. Dharma Wijewickreme, Co-Director, Pipeline Integrity Institute, University of British Columbia.

The Pipeline Integrity Institute (PII) at the University of British Columbia (UBC) is a strong contributor to the pipeline sector through our focus on teaching and training future engineers, conducting research to enhance the safety and integrity of pipelines, and disseminating impartial, factual information related to the field.

Right now, we are seeing our second group of students graduating in May with courses completed in the Pipeline Engineering Specialization. We are also maintaining research momentum with a fresh injection of funding to further knowledge and seeking new developments in soil-pipe interaction, corrosion, and pipeline materials.

Research responding to industry needs

The Institute is continuing to expand its research to meet key recognized needs of the pipeline industry, with a specific focus on two areas:

Understanding how pipelines behave in muskeg soils

While significant research has been underway to study the performance of buried pipelines in commonly encountered soils, there is more to be accomplished with respect to our understanding of the way the pipelines interact with naturally occurring muskeg soils.

Muskeg covers over 1.5 million square kilometres of the Canadian landscape, including regions such as northern Alberta and BC, which are sites for much pipeline activity. Muskeg material is soft in terms of stiffness and weak in strength, and due to a number of physical reasons, pipelines buried in muskeg soils can be subject to potential movements relative to the surrounding soil. In turn, engineers need to pay increased attention to the design of pipelines located in those soils. The PII has commenced work on this topic with the aim of understanding how muskeg "soil-pipe interactions" occur under these conditions, and in turn, allowing engineers to arrive at optimal design and maintenance actions.

Exploring improved protective pipeline coatings

The Institute has also launched research programs to advance pipeline materials technology through a program aimed at performance improvements of field joint coatings and internal coatings. Furthermore, new methods to assess and quantify external coating performance are being developed.

Government supported partnerships

The support received by the PII from the pipeline sector is further augmented by the matching funding of over half a million dollars recently awarded by the Natural Sciences and Engineering Research Council (NSERC), our national government research agency. The NSERC funds will be used in direct support of the work undertaken for the two research topics noted above. The Institute is interested in proactively addressing other engineering challenges related to the sector by engaging in future collaborations with industry, government, and the public as appropriate.

The next generation of pipeline engineers

This PII initiative is the first and only specialization in North America to offer undergraduate courses in pipeline engineering, enabling graduates to enter the workforce with unique, focused, industry-ready pipeline-specific knowledge. To date, there have been two graduating classes.

Topics the graduates have covered include:

- pipeline civil engineering and materials engineering considerations
- pipeline systems and infrastructure
- pipeline design reflecting technical, regulatory, environmental, societal, professional, and economic aspects

The Institute continues to educate the next generation of pipeline engineers, in anticipation of the shortage of highly trained personnel due to the forthcoming wave of retirement.

If you would like to discuss partnership options with the PII, or if you would like information on hiring a PII graduate, please contact the Pipeline Integrity Institute at pipeline.integrity@ubc.ca or visit www.pii.engineering.ubc.ca to find out how we can help you meet your objectives.

ABOUT DR. WIJEWICKREME

Dr. Wijewickreme is Professor of Civil Engineering at the University of British Columbia (UBC), Vancouver, Canada. He joined the UBC Civil Engineering Department in January 2001. His general field of specialty is geotechnical engineering with specific expertise in the fields of pipeline geotechnical engineering and earthquake geotechnical engineering. Dr. Wijewickreme received his Ph.D. and M.A.Sc. degrees in Civil Engineering from the University of British

Columbia in 1990 and 1986, respectively. Immediately prior to joining UBC, Dr. Wijewickreme served in the geotechnical consulting practice in British Columbia, Canada, where he acquired some 11 years of industry experience in the fields of seismic design and pipeline geotechnical engineering.

Dr. Wijewickreme was one of the key faculty members involved in the establishment of new Pipeline Integrity Institute (PII) at UBC in 2015 with industry funding, and is the Co-Director of the institute. He has received numerous awards, including the Horst Leipholz Medal of the Canadian Society of Civil Engineering (2013) for outstanding contributions to engineering mechanics research and practice, the Canadian Geotechnical Journal's Editor's Choice Award (2011), and is a Fellow of the Canadian Society of Civil Engineering and the Canadian Academy of Engineering. He is the President of the Canadian Geotechnical Society for years 2017 and 2018.