SÉMINAIRE DU PRINTEMPS
SPRING CONVENTION

Québec & E. Ontario
American Concrete Institute

25 et 27 avril 2023
April 25 & 27, 2023

Programme / Program

25 avril 2023 / April 25 2023

8h15 – Entrée des participants / Participants entrance

8h20-8h30 – Mot de bienvenue / Welcome speech
Anne Castaigne – Vice-présidente
ACI – Section du Québec et de l'Est de l'Ontario
ACI – Quebec and Eastern Ontario Chapter

8h30-9h30
Non-destructive testing and evaluation (NDT/NDE)
Farid Moradi
Fprimec

9h30-10h00
Structural health monitoring of concrete structures leveraging static and high-speed data acquisition
Vincent Leborgne
GKM Consultants

10h00-10h30 – Pause / Break

10h30-11h00
Utilisation du géoradar pour la caractérisation du béton
Claude Robillard
GEOPHYSICS GPR INTERNATIONAL INC.

11h00-11h45
Corrosion Mitigation Alternatives for Reinforced Concrete Structures
Sarah Whitmore
Vector corrosion

11h45 – Mot de la fin / Closure
Salma Fattahi – Représentante du comité organisateur
ACI – Section du Québec et de l'Est de l'Ontario
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27 avril 2023 / April 27 2023

8h25 – Entrée des participants / Participants entrance

8h30-9h00
Wireless Sensors for Concrete Temperature and Strength
Jacob Davis
Hilti

9h00-9h30
Electrical Resistivity of Concrete and concrete corrosion
Mohammed Haj Eid
Giatec

9h30-10h00
Detection of cracks using high resolution visible imaging and artificial intelligence for data analysis
Fernando Lopez
TORNGATS

10h00-10h30 – Pause / Break

10h30-11h00
Ambient vibration-based damage detection
Farshad Mirshafiei
Sensequake

11h00-11h45
Auscultation des tabliers en béton
Robert Raymond
GHD

11h45 – Mot de la fin / Closure
Jean Paré – Représentant du comité organisateur
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8h30-8h40 – Mot de bienvenue / Welcome speech
Anne Castaigne – Vice-présidente
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8h30-9h30
Non-destructive testing and evaluation (NDT/NDE)
Farid Moradi, Fprimec

Non-destructive testing and evaluation (NDT/NDE) refer to a group of methods and techniques used to evaluate the properties of materials, components, or systems without causing damage. The aim of NDT is to inspect, test and evaluate the quality and integrity of materials or structural elements to determine if they meet the required specifications and standards, without affecting their intended use. In this context, NDT/NDE can help structural and geotechnical engineers in the quality control and quality assurance of new construction and in the assessment of existing structures. In this presentation, applications of different NDT/NDE methods for condition assessment of existing structures and QA/QC of new constructions will be reviewed. Moreover, some customized NDT/NDE methods for the specific applications will be introduced and reviewed.

9h30-10h00
Structural health monitoring of concrete structures leveraging static and high-speed data acquisition
Vincent Leborgne, GKM Consultants

The infrastructure construction boom of the 1950s and 1960s and decades of deferred maintenance have led to large numbers of structures nearing their end of life. To prioritize maintenance or replacement, authorities have turned to adding instrumentation and monitoring systems to structures. This lets them order monitor problematic situations and generate data fed into models of the structures. Large concrete structures are routinely monitored using a combination of strain gauges, crackmeters, tiltmeters and temperature sensors connected to a data logging system. The logging systems can be divided in two broad categories: radio-based for long-term, static monitoring and fully wired for high-speed acquisition. We will also discuss how this data acquisition should be conceptualized to be integrated into Internet-of-things (IoT) based systems.

10h00-10h30 – Pause / Break

10h30-11h00
Utilisation du géoradar pour la caractérisation du béton
Claude Robillard, GEOPHYSICS GPR INTERNATIONAL INC.

Le géoradar est une technique d'auscultation non destructive qui permet d'obtenir des informations sur la structure interne des matériaux sans les endommager. Dans le domaine de la construction, le géoradar est particulièrement utile pour l'inspection des structures en béton, un matériau complexe et hétérogène. Cette technique permet de détecter les armatures, les fissures, les vides et autres défauts internes sans avoir besoin de procéder à des tests destructifs. Au cours de cette présentation, nous allons explorer les principes fondamentaux du géoradar, ses avantages pour l'inspection des structures en béton ainsi que les applications pratiques de cette technique. Nous examinerons également les limites de la méthode et les facteurs qui peuvent influencer la précision des mesures.

11h00-11h45
Corrosion Mitigation Alternatives for Reinforced Concrete Structures
Sarak Whitmore, Vector corrosion

Corrosion is the number one mechanism of concrete deterioration and because of this it is a very serious and costly issue facing infrastructure owners worldwide. Once corrosion is identified as the mechanism of deterioration of a structure there are a number of different mitigation alternatives including galvanic protection, impressed current cathodic protection and electrochemical treatments. This presentation will cover when to implement different corrosion mitigation alternatives, how they work and why they are beneficial.

11h45 – Mot de la fin / Closure
Salma Fattahi – Représentante du comité organisateur
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8h30-9h00

Wireless Sensors for Concrete Temperature and Strength

Jacob Davis, Hilti

Hilti's makes fully embedded wireless sensors for easy temperature monitoring and in-place strength estimation. Data from Hilti concrete sensors is relevant to fulfilling code requirements related to temperatures: cold weather temperature monitoring and mass concrete temperature differentials. In-place strength estimation compliments traditional cylinders and enables decisions based on actual concrete performance. Hilti Concrete Sensors (HCS) has a dedicated concrete lab. HCS also works with third-party labs and suppliers to build reliable maturity models for concrete projects. When implementing maturity methods for strength estimation, it is important to verify the mix specific model matches the delivered concrete. HCS has a straightforward verification process to provide reports that everything is working as expected.

9h00-9h30

Electrical Resistivity of Concrete and concrete corrosion

Mohammad Haj Eid, Giatec

In recent years, the electrical resistivity of concrete has been studied and attributed to concrete's durability and more specifically chloride ion penetration and chloride-induced corrosion. Electrical resistivity testing facilitates the movement towards designing concrete mixes well within durability properties. This is because it allows concrete professionals (producers, testing agencies, infrastructure engineers, etc.) to evaluate new concrete mixes, and existing concrete structures' ability to resist chloride-included corrosion in a fast, and simple test that requires minimal sample preparation. It also enables the ability to assess new materials, and concrete mix design's resistivity against chloride-induced corrosion. Thus, providing insights into its development over time, and different curing conditions.

9h30-10h00

Detection of cracks using high resolution visible imaging and artificial intelligence for data analysis

Fernando Lopez, TORNGATS

During this presentation session, it will be introduced an inspection technology developed by TORNGATS for the detection and characterization of surface and subsurface defects in concrete components. This technology integrates the capabilities of drone-based inspection, multimodal sensors (visible and infrared), computer vision and artificial intelligence to improve current inspection practices and methodologies for large concrete infrastructures. The main objective of this technology is to provide a solution – which includes large-scale acquisition and analysis of inspection data - for the integrity evaluation of large infrastructures, such as bridges, dams, and roads.

10h00-10h30 – Pause / Break

10h30-11h00

Ambient vibration-based damage detection

Farshad Mirshafiei, Sensequake

Sensequake is the world leader in structural health monitoring and assessment technologies combining sensors, A.I. and advanced data analysis to provide accurate structural evaluations. They develop software and hardware to provide a turnkey solution for bridges, buildings, ports, dams, and infrastructure worldwide. Their patented technology performs integrity evaluations due to aging or natural hazards solely based on data collected from highly sensitive vibration sensors without structural drawings - saving time, effort, and money - all while providing superior results. Their technologies have been used on many landmark structures across North America such as the Parliament of Canada, New Champlain bridge and Port of California. Several case studies will be shown on how the technology has successfully been detecting and locating damage.

11h00-11h45
Auscultation des tabliers en béton
Robert Raymond, GHD

Ce n'est plus un secret, de nombreuses infrastructures routières sont en piteux état. Cependant, on se rend compte, depuis l'effondrement du stationnement étagé à St-Laurent et l'effondrement d'un panneau préfabriqué au centre-ville de Montréal, respectivement en 2009 et 2010, que les bâtiments construits dans les années 1970-1980 sont aussi à risque. Diverses pathologies connues accélèrent le vieillissement des structures en béton. Il existe des méthodes dites traditionnelles pour vérifier la condition de corrosion des armatures incluses dans les éléments bétonnés, mais de nouvelles technologies moins destructives font maintenant leur apparition. Certaines sont supportées par des normes, mais ces nouvelles technologies peuvent aussi faire appel à des mécanismes de modélisation qui permet d'aller au-delà des normes. Toutefois, peu importe la méthode d'investigation choisie, elle doit être validée par des prélèvements physiques et des analyses de laboratoire. La présentation fait donc un bilan général de diverses méthodes qui se sont avérées efficaces.

11h45 – Mot de la fin / Closure
Jean Paré – Représentant du comité organisateur
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Merci
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