24 HOURS OF CONCRETE KNOWLEDGE

Hosted by the American Concrete Institute • July 11-12, 2023

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24 HOURS OF CONCRETE KNOWLEDGE

TUESDAY, JULY 11, 2023

Welcome from ACI Global Moderators Michael Paul and Samhar Hoz

WEDNESDAY, JULY 12, 2023

Closing remarks from ACI Global Moderators Michael Paul and Samhar Hoz

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American Concrete Institute
Always advancing

ACI Global Moderators

Michael Paul, ACI Vice President, Larsen & Landis

Samhar Hoz, International Code Council

Tuesday, July 11, 2023

9:00-10:00 PM Baghdad Time / 2:00-3:00 PM Detroit Time

Co-Host Organization: ACI Iraq Chapter

Website: https://aci-iraq.com

The ACI Iraq Chapter was founded in August 2013. The aim of the chapter is to promote concrete knowledge through academic institutions and concrete industries. To achieve its objective, the main chapter activities are education seminars, training workshops, student project competition, and ACI certification programs. Recently, the chapter successfully coordinated the International Partnership Agreement (IPA), signed by the Iraqi Ministry of Construction, Housing, Municipalities, and Public Works and ACI. The ACI Iraq Chapter started to translate ACI 318 into the Arabic language to increase use of this code in the Arabic world.

Local Moderator: Ali Naji Attiyah, Assistant Professor, University of Kufa

Dr. Ali Naji Attiyah is an Assistant Professor in the Civil Engineering Department at the University of Kufa, Iraq. He graduated from the Civil Engineering Department in 1986, and he completed his higher studies in structural engineering at the University of Baghdad, Baghdad, Iraq. After graduation, he worked in both academic and professional fields and had good experiences in structural design of concrete buildings and other structures. At the University of Kufa, Iraq, Dr. Attiyah was the Manager of the engineering consulting office, and through this mission, was the Director of many important projects. In addition, he taught different courses dealing with concrete, such as concrete technology and concrete design. He succeeded with his colleagues from other Iraqi universities in establishing the ACI Iraq Chapter, where he was elected as the first Executive Director of the chapter in September 2013. In 2015-2016, Dr. Attiyah was awarded $50,000 from the American Department of State as a part of the University Linkage program ULP. A program implemented at the College of Engineering and administered by the American organization International Research Exchange IREX was titled, "Move from Traditional Education to Outcomes-Based Education." In the mid of 2015, Dr. Attiyah was appointed by the Ministry of Higher Education and Scientific Research as a member of the Iraqi Council of Quality Improvement of Engineering Education. Later in 2018, the council's name was changed to Iraqi Council of Accreditation for Engineering Education ICAEE, and Dr. Attiyah was appointed to be the Chair of the council from 2018 to 2020.

1st Speaker: Alaa al Tamimi, Engineer

Dr. Alaa al Tamimi has more than 40 years of worldwide experience in planning, designing, and managing various strategic projects for industrial, construction, and infrastructure sectors. He is a registered Canadian Professional Engineer and received his PhD in structural engineering from the University of Paris VI (UPMC). Tamimi has proven skills in exploring, designing, and implementing solutions and business development strategies through teaching experience in structure engineering. He taught the following courses: Structural Analysis and Design, Reinforced Concrete Design, Concrete Technology. Tamimi published three books: Design of Reinforced Concrete Structures, Amman 1998; Design of Reinforced Concrete Buildings (According to ACI 318M-95), Beirut 2000; and Reinforced and Prestressed Concrete Structure Design, Amman, 2002.

Presentation Title: Reinforced Concrete Materials Under Earthquake Loading

The occurrence of earthquakes can result in catastrophic damage to buildings, leading to the loss of life and property. Therefore, it is essential to ensure that structures are built with materials that can withstand seismic forces. In this investigation, the focus is on determining the best composition of concrete materials for earthquake-resistant buildings. The analysis aims to investigate the mechanical properties of different concrete mixes and their ability to withstand seismic forces. The research will involve conducting laboratory tests on various concrete mixtures that are commonly used in the construction industry. The tests |will include compressive strength, flexural strength, and shear strength. The results will be used to determine the best composition of concrete materials that can withstand the seismic forces experienced during an earthquake. Furthermore, the assessment will involve analyzing the properties of different types of aggregates and their effect on the performance of concrete in earthquake-prone regions. The study will also investigate the effect of various curing techniques on the strength and durability of concrete. The investigation findings will be useful in guiding the selection of materials and design of structures in areas susceptible to earthquakes. It will provide engineers with information on the best concrete mixtures to use in building structures that can withstand seismic forces.

2nd Speaker: Haider Adel Abdulhameed, Professor

Dr. Haider Adel Abdulhameed is an experienced Professor with a demonstrated history of working in both higher education and industry. He received his PhD in structural engineering from Rutgers, the State University of New Jersey, USA. Abdulhameed was awarded his PhD scholarship from HCED Iraq-Prime Minister Office. He was also awarded Chapter Scholarship from the Tri-State (New York, New Jersey, and Connecticut) Arab American Association of Engineers and Architects, the 19th Annual NJDOT Research Showcase Best Poster Award, and the National Arab American Association of Engineers and Architects (NAAAEA) scholarship Award. Abdulhameed has extensive experience in advanced cementitious materials (include but not limited to fiber-reinforced self-consolidating concrete, high-performance concrete, and high early strength fiber reinforced rapid set materials), concrete shrinkage, structural health monitoring, and structural analysis. He is an ACI certification examiner at the University of Technology-Iraq and holds ACI certifications in Concrete Field-Testing Technician – Grade I, Concrete Construction Special Inspector, Concrete Strength Testing Technician, Aggregate Testing Technician – Level 1, and Concrete Laboratory Testing Technician – Level 1.

Presentation Title: Push-Out Test of Steel-Concrete-Steel Composite Sections with Various Core Materials: Behavioral Study

Steel-concrete-steel (SCS) structural systems have economic and structural advantages over traditional reinforced concrete; thus, they have been widely used. The performance of concrete made from recycled rubber aggregate from scrap tires has been evaluated since the early 1990s. The use of rubberized concrete in structural construction remains necessary because of its high impact resistance, increases ductility, and produces a lightweight concrete; therefore, it adds such important properties to SCS members. In this research, the use of different concrete core materials in SCS was examined. Twelve SCS specimens were subjected to push-out monotonic loading for inspecting their mechanical performance. One specimen was constructed from conventional normal-weight concrete core, while the other specimens were constructed with modified core materials by either partial replacement of the coarse aggregate with crumb rubber (CR), the addition of oil palm fiber (OPF) to the concrete as a volume fraction of concrete, or both in the concrete cores. The investigated push-out specimens have a height of 450 mm and constructed from two hollow steel tubes with a square cross section of 100 and 5 mm in thickness, which fixed to concrete prism using bolt-end shear connectors. The detection of the mode of failure, load-slip as well as ductility behavior, and the energy absorption capacity was investigated. The results revealed an improvement in the energy absorption (EA) capacity averagely by 55% for the specimen with 15% CR and 1.1% addition of OPF as a volume fraction of concrete in comparison with the reference specimens due to the high shear resistance.

Tuesday, July 11, 2023
2:00-3:00 PM Bogota Time / 3:00-4:00 PM Detroit Time
Co-Host Organization: ACI Republic of Colombia Chapter

Website: https://www.acicolombia.org.co/

The ACI Republic of Colombia Chapter is a technical and educational society dedicated to promoting the design, construction, manufacture, and maintenance of concrete structures. The branch was created in 1977, and since then, it has published quarterly newsletters and held seminars to promote knowledge among its members and professionals or students interested in expanding their research. The chapter promotes the objectives of the Charter of the American Concrete Institute. This is to encourage education, technical practice, and scientific research for the development of new techniques.

Local Moderator: Carlos Arteta, Associate Professor, Universidad del Norte

Carlos Arteta, PhD, is an Associate Professor of civil engineering at Universidad del Norte, Barranquilla, Colombia. He is a member of ACI Committee 318, Structural Concrete Building Code, and ACI Subcommittee 318-H, Seismic Provisions. He is a Founding President of CEER – Colombian Earthquake Engineering Research Network, and a member of the Board of Directors of the ACI Republic of Colombia Chapter and the Colombian Association of Earthquake Engineering. His research interests include response and design of buildings to earthquake actions, with expertise in analysis, design, and risk evaluation of reinforced concrete structural systems.

1st Speaker: Juan Lizarazo-Marriaga, Professor, Universidad Nacional de Colombia-Bogotá

Juan Lizarazo-Marriaga, PhD, is Full Professor at the Universidad Nacional de Colombia-Bogotá. He received his BS and MSc from the Universidad Nacional de Colombia, and PhD from Coventry University, Coventry, UK. Lizarazo-Marriaga is a member of the Board of Directors of ACI Republic of Colombia Chapter. His research interests include durability, measurement, and simulation of transport-related properties of reinforced concrete structures.

Presentation Title: Concrete Transport Related Properties: From the Coulomb Test to the Formation Factor

As chloride ions heighten reinforcing bar corrosion, the mechanisms by which them ingress and reach the steel are of great interest and have been studied intensively for more than 50 years worldwide. The transport-related properties are needed to rank the chloride ingress and to simulate the service life, whereby there is some pressure on tests in such a way that their times be consistent with those of the construction industry. As chloride transport properties could be determined using long self-diffusion tests, it is urgent to determine these properties with shorter but reliable tests. Taking the above into account, this presentation will show the evolution, changes, theoretical aspects, limitations, and perspectives of some tests that have been used in the last years to measure the chloride-related properties of concrete. At the beginning, diffusion tests were accelerated by the application of electrical potentials, using some different forms, such as the coulomb test. They apply high voltages to drive ions quickly into the concrete, reducing the test times. Due to its simplicity, economy, and speed, electrical resistivity appeared as an even faster alternative to migration tests. Loads of papers have been published everywhere, establishing relationships

between resistivity and chloride transport properties. However, there are strong criticisms about electrical tests because the conductivity of the material depends on the pore structure, but also on the pore solution chemistry. To solve this issue, in recent years the formation factor has been gaining importance, a parameter that involves the resistivity of concrete and the resistivity of the pore solution. The latter being the one that represents the greatest experimental difficulty in obtaining it. In this conference, some research advances will also be shown on the models available to evaluate the pore solution to contribute to consolidate a standard method for the Formation Factor.

2nd Speaker: Gonzalo E. Gallo, Senior Engineer, Specialist, Florida Dept. of Transportation

Gonzalo E. Gallo, PhD, received his degree in civil engineering from San Francisco University of Quito, Quito, Ecuador; his MSc and PhD from the University of Illinois Urbana-Champaign, Champaign, IL, USA. He led structural design teams in a private consulting firm in Colombia and has over 15 years of experience in the design of hydraulic structures, dams, spillways, powerhouses, water supply systems, water treatment plants, tunnels, pipelines, steel and reinforced concrete structures, warehouses, roads, bridges, transmission lines and switchyards, preparation of technical specifications and terms of reference, coordination of civil designs, and technical advisory for the construction of hydraulic, urban, and industrial works. He is also the mass concrete specialist for the Florida Department of Transportation.

Presentation Title: An Initial Approach to Magnetic Sensing of Corrosion

Corrosion of the civil infrastructure causes structural failures and great financial losses. Continuous and effective monitoring of corrosion can lead to failure prevention and savings. This presentation describes the conceptual development of magnetic sensing schemes to characterize corrosion of metals in situ. Giant magnetoresistance (GMR) magnetic field sensors are applied to overcome difficulties encountered with traditional corrosion detection methods. Magnetic measurements present a way to monitor corrosion without damaging the structure. Active and passive magnetic sensing configurations are presented with some preliminary results that may serve as a basis to propose a robust sensor configuration capable of monitoring corrosion of steel in concrete in the field.

Tuesday, July 11, 2023
4:00-5:00 PM Toronto Time / 4:00-5:00 PM Detroit Time
Co-Host Organization: ACI Ontario Chapter

Website: http://aciontario.com/

The ACI Ontario Chapter was founded in 1964 with the goal of disseminating knowledge in the design, use, manufacture, and maintenance of concrete.

Local Moderator: Chris Christidis, Technical Sales Representative, Sika Canada

Chris Christidis received his master's degree in structural engineering from Ryerson University, Toronto, ON, Canada. His predominate focus in both school and in his career has been in the field of concrete formulation and in the business of concrete. Christidis has been in the concrete industry for 17 years. In the first 8 years of his career, he worked for Lafarge in various roles as a specialist in concrete formulations and at the head research center in Lyon, France, where he was involved in developing and transferring several Lafarge-branded concrete products to European countries. More recently, he has switched direction and entered the world of sales for Sika Canada, where he now works as a technical sales representative. Christidis is involved in several associations: he is the current acting President for the ACI Ontario Chapter; on the technical committee for the Ontario Concrete Pipe Association; and on the technical committee of the Canadian Precast Prestressed Concrete Institute, where he is involved in further developing self-consolidating concrete (SCC) in the industry and in producing low-CO_2 concrete in precast.

1st Speaker: Bart Kanters, President, Ready Mixed Concrete Association of Ontario

Bart Kanters joined the Ready Mixed Concrete Association of Ontario (RMCAO) in 1999 and has progressed from technical engineer to engineering manager to his current role as President of Concrete Ontario. Prior to joining Concrete Ontario, Kanters was a division manager of a concrete restoration company in the Kitchener-Waterloo, ON, Canada area. Kanters' experience with ready-mixed concrete is as a civil engineer with the responsibility of addressing the technical concerns of both Ontario concrete industry and the local design community. He received his bachelor of applied science degree from the University of Waterloo, Waterloo, ON, Canada; his MBA from Heriot-Watt University, Edinburgh, UK; and is a registered engineer with the Professional Engineers of Ontario. He is actively involved in both The CSA Group and ACI. He currently sits on the Technical Committee of CSA A23.1/.2, Concrete Production; CSA Z151, Concrete Pumping; A3000, Cement; and is on the Board of Direction of the ACI Ontario Chapter. Kanters is also a certified instructor for several ACI and National Ready Mixed Concrete Association certification programs.

Presentation Title: Implementing Low-Carbon Concrete in the Ontario Marketplace

The cement and concrete industries have set the challenging goal of becoming Net Zero by 2050, and as a significant step forward towards this objective, the industry is fully supporting Environmental Product Declarations (EPDs) to quantify our performance toward this goal. Given this fact, in the fall of 2022, Concrete Ontario, working in partnership with the National Research Council and the Cement Association of Canada, published its Ontario-specific Industry Average EPD for ready-mixed concrete. This presentation will focus on the efforts of the Ontario concrete industry to work in partnership with

owners, specifiers, and contractors to implement low-carbon concrete options on construction projects throughout the province. The presentation will highlight the sample guideline documents that have been developed by the concrete industry to assist in the implementation and will highlight some of the successful implementations of these new specifications as well as some of the more “challenging” implementations the industry has seen.

2nd Speaker: Maria Camila Castro Garrido, Building & Material Sciences Specialist, EllisDon

Maria Camila is a civil engineer and received her master’s degree from the Pontificia Javeriana University, Bogotá, Colombia. She has 9 years of experience in construction materials research and innovation, specifically in the areas of concrete and cement. Her work experience includes serving as leader of the R&D department of Cemex Colombia for 7 years, where she made substantial contributions to advancing construction materials research, particularly in the domains of concrete and cement. Presently, Camila holds the position of Specialist in Building and Material Sciences within the construction sciences department at EllisDon (ED). In her current role, she provides technical support by undertaking meticulous material review and selection processes for ED projects. With a sharp focus on concrete technology and material science, Camila ensures that the chosen materials meet the stringent standards and specifications required for each project’s success.

Presentation Title: The Eglinton LRT: Maximizing Environmental Impact through Carbon Reduction Strategies

This presentation provides an overview of one of the first large-scale transit projects in Toronto and how Crosslinx Transit Solutions Constructors (JV) has invested in valuable research to identify optimization opportunities in concrete mixtures to maximize long-term durability while reducing carbon emissions. The presentation will show this research process in the context of massive placements while reducing carbon emissions, and how the mass concrete placements were monitored, ensuring that the placements remain within specifications.

Tuesday, July 11, 2023
6:00-7:00 PM São Paulo Time / 5:00-6:00 PM Detroit Time

Co-Host Organization:
IBRACON – Instituto Brasileiro do Concreto

Website: https://site.ibracon.org.br/

IBRACON – Instituto Brasileiro do Concreto is a technical-scientific organization for the defense and enhancement of civil engineering nationwide and is an associative nonprofit with unlimited duration founded in 1972 by professionals and stakeholders in the concrete production chain. Its objective is to provide professionals and stakeholders in the national construction sector with information and knowledge on research, development, and innovation in concrete technology and its construction systems. To this end, IBRACON promotes specialization courses, edits technical publications, encourages and supports the formation of technical committees, certifies people, and organizes technical events. Every year, IBRACON organizes the Brazilian Concrete Congress, the largest national technical-scientific event on concrete technology and its construction systems, which aims to bring together the national and foreign technical and scientific community to debate and learn more about research, developments, and innovations related to concrete and its constituent materials, structural analysis and design, construction methodologies, management and technical standardization, and other related topics.

Local Moderator: Rafael Timerman, Partner-Manager, Engeti Consultoria e Engenharia S/S Ltda

Rafael Timerman is a civil engineer. He graduated in 2008 from the School of Engineering of Universidade Presbiteriana Mackenzie and is Partner-Manager of Engeti Consultoria e Engenharia S/S Ltda, São Paulo, Brazil; Director of Events for IBRACON from 2019-2023; and Coordinator of the Technical Division of Structure and Materials of the Institute of Engineering since May 2019. Timerman is a member of the Deliberative Council of the Institute of Engineering since April 2020; member of the ACI Committee 364, Rehabilitation; Professor of postgraduate courses for rehabilitation, reinforcement, and inspection of structures of bridges and viaducts.

1st Speaker: Julio Timerman, General Manager, Engeti Consultoria e Engenharia S/S Ltda

Julio Timerman, MSc, is a civil engineer. He graduated in 1977 from the Politechnical Engineering School of the São Paulo State University and is General Manager of Engeti Consultoria e Engenharia S/S Ltda, São Paulo, Brazil; former President of IBRACON; and former President of ABECE. Timerman has authored several articles and books published in Brazil and other countries.

Presentation Title: ABC Method for Bridges Construction in Brazil

This presentation will address accelerated bridge construction (ABC) for the construction of new bridges or substitute existing bridges in Brazil.

2nd Speaker: Douglas Couto, Director and Superintendent, PhD Engenharia Ltda

Douglas Couto, MSc, is a civil engineer. He received his Master of Science in structural engineering from The State University of Campinas, São Paulo, Brazil. Couto is Director and Superintendent at PhD Engenharia Ltda. Couto is a Fellow and Member of the Board at the Brazilian Concrete Institute; Assistant Professor at the University of São Paulo, São Paulo, Brazil; and Guest Professor at Mauá Institute of Technology, São Paulo, Brazil.

Presentation Title: High Modulus of Elasticity for High-Rise Buildings

This presentation will show the aspects and importance of modulus of elasticity of concrete in tall buildings, showing a case study.

Tuesday, July 11, 2023
5:00-6:00 PM Lima Time / 6:00-7:00 PM Detroit Time
Co-Host Organization: ACI Peru Chapter

Website: https://www.aci-peru.org/js254/

The ACI Peru Chapter was founded in 1979. Today, the chapter has about 300 members and 700 student members. The ACI Peru Chapter is very active on both a local and international level. There are about 40 student chapters in Peru. For the last 40 years, the ACI Peru Chapter has earned ACI's Outstanding Chapter Award several times.

Local Moderator and 1st Speaker: Gustavo Tumialan, Associate Principal, Simpson Gumpertz and Heger

Gustavo Tumialan is the Vice-President of the ACI Peru Chapter. He is an Associate Principal with Simpson Gumpertz and Heger in Boston, MA. He received his Bachelor of Science in civil engineering from the Pontificia Universidad Catolica del Peru, Lima, Peru, and his Master of Science and Doctor of Philosophy degrees in civil engineering from Missouri S&T, Rolla, Missouri. Tumialan specializes in the evaluation, rehabilitation, and strengthening of existing structures. Dr. Tumialan is an ACI Fellow and member of ACI Committees 437, Strength Evaluation of Concrete Structures; 440, FRP Composites; and 562, Evaluation, Repair, and Rehabilitation of Concrete Structures.

Presentation Title: How ACI 562 Impacts my Concrete Repair Projects

ACI 562, Evaluation, Repair, and Rehabilitation of Concrete Structures, provides design professionals with requirements for the assessment, repair, and rehabilitation of existing concrete structures, including requirements for durability and construction. The engineering community worldwide are most familiar with ACI 318 Code, which is the Code for reinforced concrete construction in the United States. In some instances, ACI 318 has been adapted or adopted for use in different countries. ACI 562 was developed specifically for assessment and repair of existing concrete structures, whereas ACI 318 deals with new concrete construction. The need for a Repair Code was first recognized by the concrete repair industry due to the performance of repairs. It was observed and documented that the lack of a code for existing concrete structures allows for variations in repair and assessment practices. Poor performance of repairs due to inadequate assessment, design or execution many times require "repairs to the repairs" resulting in non-planned financial implications to stakeholders. ACI 562 provides design professionals with consistent code requirements for evaluation and repair of structures. This presentation will introduce ACI 562, provide a purpose of the code, describe how the code impacts the concrete repair projects, and highlight key provisions within ACI 562.

2nd Speaker: Jorge Costa, President, Durability, Inc.

Jorge Costa is President of Durability, Inc., a specialist corrosion engineering firm based in Jupiter, FL, USA. Costa is a NACE/AMPP-certified Corrosion and Cathodic Protection Specialist and is a Licensed Professional Engineer. His experience in this field spans more than 35 years, during which time he has practiced in diverse areas such as transportation and marine infrastructure, power generation, commercial structures, and oil and gas industries. Costa has accumulated vast experience and developed expertise addressing corrosion and related deteriorating mechanisms of reinforced concrete structures exposed to a variety of environmental conditions. His practice includes risk assessments, corrosion evaluations and design, and installation and operation of corrosion control systems for these structures. He is an active member of ICRI, where he chairs Committee 510, Corrosion. Costa is also a member of AMPP/NACE, AWS, and ACI, where he is a member of ACI Committees 222, Corrosion of Metals in Concrete; 364, Rehabilitation; 546, Repair of Concrete; and 563, Specifications for Repair of Structural Concrete in Buildings.

Presentation Title: Understanding the Corrosion Lifecycle of Reinforced Concrete Structures

The state of the art of corrosion protection diagnostics, technologies, and products has significantly advanced during the last several decades and many reliable options are now available to define, prevent, or mitigate the progression of corrosion once it has initiated. In this presentation, we will address the effect that corrosion has on our concrete infrastructure, including buildings, bridges, sea walls, cooling towers, docks, and many other reinforced concrete structures. The process of corrosion of steel in concrete will be discussed, including initiation, propagation, and failure stages. Conventional countermeasures and available techniques for corrosion avoidance, mitigation, and protection will be presented. Finally, an engineered approach to discovering the root cause and selecting an optimum countermeasure will be presented, including case histories where various techniques have been employed.

Tuesday, July 11, 2023
5:00-6:00 PM Guatemala City Time / 7:00-8:00 PM Detroit Time

Co-Host Organizations: **ACI Guatemala Chapter, Instituto del Cemento y del Concreto de Guatemala (ICCG), and ALCONPAT Internacional**

Websites: https://www.concrete.org/chapters/findachapter/chapterhome.aspx?cid=C0C11100
https://www.facebook.com/people/ICCG-Instituto-del-Cemento-y-del-Concreto-de-Guatemala/100063967333958/
https://alconpat.org/

The ACI Guatemala Chapter was founded in 2006, and the Chapter currently has 27 international members, 28 local members, and 1326 student members. Within their main activities, the Chapter sponsors activities targeted to the 21 active Student Chapters in Guatemala, for example, seminars, ACI Certifications (reduced price), and competitions (National Competition of Concrete Cylinders since 2012, Research Award since 2015, and Concrete Soccer Balls Competition since 2019). The Chapter members have also been active participants in the National Standardization Technical Committees of Cement and Concrete. The Chapter develops seminars targeted to professionals, technicians, and the general public. The ACI Guatemala Chapter is also a Local Sponsoring Group (LSG) that develops six ACI Certification programs. Most of the Chapter activities are developed with the support of the Institute of Cement and Concrete of Guatemala (ICCG) (ACI International Partner), with whom it has a Memorandum of Understanding.

ICCG was born at the initiative of the country's cement and concrete industry in November 2006. ICCG is an autonomous, private, civil, nonprofit, nonreligious, and nonpolitical association formed by companies from the cement and concrete industry in Guatemala. ICCG has relationships with entities and associations at the national and international levels whose objectives are similar to theirs, including the Inter-American Cement Federation (FICEM), the Ibero-American Federation of Ready-Mix Concrete (FIHP), ASTM International, ACI, and others. ICCG's mission is to promote and develop the cement and concrete industry in Guatemala. ICCG's vision is to develop Guatemala as a country with a culture of cement and concrete use, with a sustainable future in construction, consistent with the conservation of the environment, safety, performance, durability, and social responsibility.

ALCONPAT Internacional is a nonprofit association of professionals dedicated to the construction industry in all its areas, who together help to solve the problems that arise in structures from planning, design, and project to execution, construction, maintenance, and repair, promoting professional updating and education as fundamental tools to safeguard the quality and integrity of the services of its professionals.

Local Moderator: **Plinio E. Herrera, Concrete R&D Manager, Cementos Progreso**

Plinio E. Herrera is Concrete Research & Development Manager at Cementos Progreso in Guatemala City, Guatemala. During his more than 30 years of experience in concrete materials, he has promoted the research and development of products and solutions related to concrete and its applications and has worked tirelessly on knowledge transfer to the construction industry and academia in subjects such as cement, concrete, aggregates, concrete pavements, and housing. He has reviewed and sponsored several thesis and experimental projects with students from state and private universities in Guatemala. Herrera has participated in proposing, reviewing, and translating national standards related to cement, concrete, and its applications. He has been a speaker in international seminars and meetings related to cement, aggregates, concrete technology, concrete roads, and housing. He is an ACI Fellow and President of the ACI Guatemala Chapter. He is a member of ACI Committees

E701, Materials for Concrete Construction; 130, Sustainability of Concrete; 211, Proportioning Concrete Mixtures; 225, Hydraulic Cements; and 237, Self-Consolidating Concrete; and ACI Subcommittees C601-E, Concrete Construction Sustainability Assessor; 130-G, Education; and 211-N, Proportioning with Ground Limestone and Mineral Fillers. He has participated in the past with translation reviews for ACI International Development and ACI University. He is also a member of ASTM International and the American Society of Civil Engineers (ASCE). His research interests include self-consolidating concrete, fiber-reinforced concrete, high-strength/high-performance concrete, ultra-high-performance concrete, and three-dimensional (3-D) printing materials and processes. Herrera received his degree in civil engineering from the Universidad de San Carlos de Guatemala (USAC), Guatemala City, in 1994, and his Master of Business Administration (MBA) from the Pontificia Universidad Católica de Chile (PUC), Santiago, Chile, in 2008. He is a licensed civil engineer in Guatemala. Recently, he received the distinction of 25 years of professional service as a civil engineer in Guatemala.

1st Speaker: Ariel Osorio, Concrete R&D Technical Assessor, Cementos Progreso

Ariel Osorio is a Concrete R&D Technical Assessor at Cementos Progreso in Guatemala City. In his many years of experience in concrete materials, he has participated in the development of products and solutions related to concrete and its applications, transfer of technical knowledge to the construction industry and academic entities, research on the development of new binders focused on sustainable construction, and the development of concrete 3-D printing technology. Osorio is a member of the ACI Guatemala Chapter, ALCONPAT Guatemala Chapter, Guatemalan Association of Structural and Seismic Engineering (AGIES), and is also a Senior Member of the International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM). He received his degree in civil engineering from USAC; a master's degree in structural engineering from the Universidad Mariano Gálvez de Guatemala, Guatemala City; and a master's degree in concrete engineering from the Universitat Politècnica de València, Valencia, Spain.

Presentation Title: First Fully Functional 3-D-Printed Concrete Building in Guatemala

In Guatemala, in 2018, we took the first steps in the application of 3-D printing technology, using cementitious materials, with the acquisition of a desktop 3-D printer, originally designed to print with polymeric materials. This 3-D printer was later adapted to print small pieces with cement paste and mortar. This permitted the experimentation with some relevant aspects of 3-D printing, especially understanding the behavior of the material, the "ink," the setting times, and the ability of each printed layer to support the additional weight that the number of layers above represented. However, the small scale has its limits. It was necessary to scale the size of the 3-D printer to get into the reality of real-world construction with 3-D printing. In 2022, Cementos Progreso in Guatemala decided to scale up and acquire a 3-D printer with the dimensions needed to print at least a minimum housing module. The first steps were taken in the application of this technology in Guatemala and the Central American region. At the moment, several pieces of concrete furniture and urban elements, such as bus stops, have been 3-D printed. Very important data have been generated on the properties of the material and its behavior, not only in terms of mechanical strength but also behavior in the material's fresh state. Recently, a pre-prototype house, 38 m^2 (410 ft^2), with walls approximately 2.40 m (8 ft) tall, was built successfully inside a warehouse in Guatemala City. Now, we are in the process of building the first fully functional 3-D-printed concrete building in Guatemala, not inside a warehouse anymore, but in the open, just as a conventional housing project should be. In this presentation, we will be sharing the project, its design (architectural and structural), some of the main details, the construction process—including the 3-D-printing process of the walls and other elements of the prototype—as well as showing the finished product.

2nd Speaker: Carmen Andrade, Professor, International Centre for Numerical Methods in Engineering (CIMNE)

Carmen Andrade is a Doctor of industrial chemistry. At present, she is a Research Visiting Professor at the International Centre for Numerical Methods in Engineering (CIMNE), and is Honorary President and Director of International Relations of ALCONPAT Internacional. She has been a Research Professor at the Institute for

Construction Sciences of the Spanish National Research Council (CSIC), devoting her research to concrete durability and reinforcement corrosion. She is the author of numerous papers, has been the editor of several books, and has supervised approximately 33 PhD theses. Andrade has been President of several international organizations (the European Union for Technical Approval in Construction [UEAtc], RILEM, the World Federation of Technical Assessment Organisations [WFTAO], the Liaison Committee of International Associations of Civil Engineering, and ALCONPAT Internacional), and also has been General Director of Technological Policy of the Ministry of Education and Vocational Training and Advisor to the Secretary of State Universities in the Ministry of Science and Innovation, Spain. She has received several awards, including the 2013 Willis Rodney Whitney Award from NACE International, the Robert L'Hermite Medal from RILEM, the Paul McIntyre Award from the Institute of Corrosion in the United Kingdom, and the Medal of the Spanish Association for Structural Engineering (ACHE). She also received a Doctor Honoris Causa from the Norwegian University of Science and Technology, Trondheim, Norway, and the University of Alicante, San Vicente del Raspeig, Alicante, Spain.

Presentation Title: Durability Design as Considered by Eurocode 2–Concrete and the Model Code 2020

Structural concrete has been shown to be a durable material. It has failures, in general, because of corrosion of reinforcement in very severe conditions, particularly in the presence of chloride ions. Durability rules and requirements in present standards are prescriptive and have assured good performance in numerous conditions, but not enough in highly aggressive environments. This evidence has promoted the development of performance specifications. This is the trend followed by the new version of Eurocode 2 (EC2) for concrete structures and the International Federation for Structural Concrete (*fib*) Model Code 2020 (MC2020). In the case of EC2, it has introduced the concept of "Exposure Resistance Classes (ERC)" to classify the concrete mixtures, up to now for carbonation and chloride resistance. In the MC2020 models of degradation and the probabilistic treatment of the input, the parameters have been updated and the main novelties have been: a) guidance on the treatment of a wider range of mechanisms of deterioration that may potentially affect concrete structures, including the simultaneous action of some of these; b) the classification of the ways of verification into "Levels of Approximation" (LoA); and c) the definition of what has been called the "Condition or Deterioration Limit States" (CLS or DLS). This presentation explains these aspects, and chloride penetration is illustrated as a case example.

Tuesday, July 11, 2023
8:00-9:00 PM Santiago Time / 8:00-9:00 PM Detroit Time
Co-Host Organization: Instituto del Cemento y del Hormigón de Chile (ICH)

Website: https://ich.cl

The Instituto del Cemento y del Hormigón de Chile (ICH) is a technical Institution founded by the Chilean Construction Chamber and the cement industry with the mission to promote and improve the knowledge and use of concrete in all its applications.

Local Moderator: Augusto Holmberg, General Manager, ICH

Augusto Holmberg is General Manager at the Chilean Cement and Concrete Institute (ICH), with more than 30 years of experience in the concrete industry. He has been involved in ACI activities for more than 25 years, serving on the ACI Board of Direction; Joint ACI-ASCE Committee 550, Precast Concrete Structures; and ACI Subcommittees 318-L, International Liaison, and 318-S, Spanish Translation. He received his degree in civil engineering from the Universidad de Chile, Santiago, Chile.

1st Speaker: Leonardo Massone, Professor, Universidad de Chile

Leonardo M. Massone is a Professor in the Department of Civil Engineering at the Universidad de Chile, where he teaches concrete design, advanced concrete design, and nonlinear analysis of structures. He was Director of the Universidad de Chile Department of Civil Engineering between 2014 and 2018. He has written more than 50 articles indexed in the Web of Science (WoS). He was a member of an ACI Committee 318 Subcommittee for the 2019 version and is currently the coordinator for the update of the Chilean design code for reinforced concrete structures, NCh430. He has received both national recognition—such as from the Chilean Institute of Engineers (2014)—and international recognition, such as the "Young Professor Best Paper Award" for the 36th Conference on Deep Foundations (United States, 2011), "Best Paper Award" for the 10th International Congress on Advances in Civil Engineering (Turkey, 2012), and for *The Structural Design of Tall and Special Buildings* journal (United States, 2017). His research interests include analytical and experimental studies of reinforced concrete systems, with an emphasis on seismic response. He received his BS from the Universidad de Chile, and his MS and PhD from the University of California, Los Angeles, Los Angeles, CA, USA.

Presentation Title: An Efficient Shear-Flexure Model for RC Walls and Further Developments

A novel macroscopic element for reinforced concrete (RC) structural walls that integrates the shear-flexure interaction phenomenon is proposed. The element, named efficient shear-flexure interaction (E-SFI), is based on the shear-flexure interaction multiple-vertical-line-element model (SFI-MVLEM). However, the internal degree of freedom per RC panel element of the SFI-MVLEM is removed by incorporating an empirical equation into the model formulation to compute the horizontal normal strain, therefore removing the assumption of zero resultant horizontal stress to increase the range of applicability of the element. Several RC wall specimen tests reported in the literature were selected for validation, including the complete range of wall behavior (flexural-controlled, shear-flexure, and shear-controlled). Comparison between model predictions and experimentally measured responses reveals that the E-SFI element accurately estimates the global, flexural, and shear deformation components for all cases. Furthermore, a comparison of the runtime

and current tangent convergence rate was performed to assess the E-SFI efficiency, revealing that the novel element has a significant improvement in the runtime and convergence rate compared to the SFI-MVLEM. The model has also been extended to the three-dimensional (3-D) analysis of nonplanar wall elements, and the material model has been further developed to be able to analyze columns under biaxial loading, revealing a good correlation with test results.

2nd Speaker: Matias A. Hube, Director, Concrete Innovation HUB, PUC

Matias A. Hube is a Structural Engineer from Pontificia Universidad Católica de Chile (PUC), Santiago, Chile, where he also obtained his Master of Science in 2002. He received his PhD from the University of California, Berkeley, Berkeley, CA, in 2009, and joined PUC, where he teaches and conducts research on RC, nonlinear structural analysis, and earthquake engineering. He was Associate Dean of Undergraduate Studies at the School of Engineering at PUC from 2018 to 2022, and he is currently the Director of the Concrete Innovation HUB at PUC. He is a member of ACI Committee 369, Seismic Repair and Rehabilitation, and ACI Subcommittee 318-D, Members. He also participates in the Chilean code committees for seismic design of buildings, performance-based design of buildings, and RC structures.

Presentation Title: Fiber-Reinforced Concrete Walls for Low-Rise Residential Construction

The use of RC for the construction of one- and two-story houses has increased significantly in Chile and Latin America in the last decades. These houses use RC walls to provide structural strength and form the building envelope. The design of the RC walls of these houses follows the guidelines of ACI 318, which generates conservative designs because the resulting shear capacity exceeds strength requirements. Aimed to optimize the strength of the walls and to improve the construction productivity of houses, an alternative approach involves replacing the conventional web reinforcement with fibers. This presentation summarizes an experimental campaign conducted to evaluate the cyclic shear behavior of fiber-reinforced concrete (FRC) walls. One steel and three synthetic fibers were considered in the experimental matrix. Results show a low correlation between the fiber dosage and the strength and ductility of the walls. However, the behavior of the tested walls is equivalent or superior to other materials commonly used in housing construction. The results from this study support the feasibility of using FRC walls in low-rise housing construction.

Wednesday, July 12, 2023
1:00-2:00 PM Auckland Time / 9:00-10:00 PM Detroit Time
Co-Host Organization: Concrete New Zealand Learned Society

Website: https://concretenz.org.nz/page/learned_society_home

The Concrete New Zealand (NZ) Learned Society is a professional society that sits under the umbrella of Concrete NZ. The Learned Society facilitates the sharing of industry knowledge, participates in the development of concrete and construction, and provides a foundation for building valuable business networks, in New Zealand and overseas. The Learned Society aims to encapsulate the wealth of expertise of its membership and to output this in the form of seminars, technical publications, and conferences for the betterment of the concrete and construction industry at large. With an emphasis on "Learned," the Society is focused on technical excellence and is not influenced by any external commercial interests. The Concrete NZ Learned Society maintains strong relationships with affiliated organizations internationally, including ACI, the Concrete Institute of Australia (CIA), and the *fib*.

Local Moderator: Rick Henry, Associate Professor, University of Auckland

Rick Henry is an Associate Professor in the Department of Civil and Environmental Engineering at the University of Auckland, Auckland, New Zealand, where he teaches the design of concrete structures. He is President of the Concrete NZ Learned Society. He is a member of ACI Subcommittee 318-H, Seismic Provisions. He has served as a member of the technical committee for the New Zealand Concrete Structures Standard (NZS 3101:2006). His research interests include the seismic design and assessment of reinforced concrete structures and, in particular, precast concrete construction and low-damage design.

1st Speaker: Allan Scott, Associate Professor, University of Canterbury

Allan Scott is an Associate Professor of civil engineering at the University of Canterbury, Christchurch, New Zealand. His primary research interests include the development of sustainable low-carbon construction materials and in-place resource use options for off-Earth civil engineering construction applications.

Presentation Title: Carbon Mitigation for the Cement Industry

Concrete is one of the most versatile and widely materials used construction materials on Earth. While concrete's benefits to the construction of infrastructure are undeniable, the production of portland cement is also responsible for approximately 8% of global CO_2 emissions. There are many options available to both cement producers and the construction sector in general. Supplementary cementitious materials (SCMs) have been known for years to be effective partial replacements for the major carbon-producing component of cement. In addition to SCMs, there are new binder types, such as magnesium-based binder systems, that can be used in certain applications. The challenge with any new material, however, is the need to establish a track record of performance and ease of use comparable with portland cement. There are several promising new carbon-capture alternatives that can also substantially reduce the carbon emissions associated with cement production.

2nd Speakers: Paul Connor-Woodley, Associate Director, BGT Structures, and Derek Bilby, CEO, BBR Contech

Paul Connor-Woodley is an Associate Director with BGT Structures in Auckland. He has extensive experience in the design, analysis, and management of a variety of large projects both within New Zealand and internationally.

Derek Bilby is the CEO of BBR Contech, having been involved in a variety of construction roles in both civil and commercial construction activities over the past 30 years, predominantly in New Zealand. His role now involves leading a company active in specialist construction activities, including post-tensioning, seismic strengthening, and concrete repair.

Presentation Title: The Pacifica—A 57-Story Apartment Building in New Zealand

The Pacifica is New Zealand's tallest residential tower at 178 m. The 57-level development combines innovative engineering, structural integrity, and sleek architectural design and includes 273 high-quality apartments, car parking, and a lap pool, among other facilities. Constructed on a tightly constrained site in downtown Auckland, the tower structure implemented numerous techniques not previously used in New Zealand and consists of a reinforced concrete core, outrigger walls with mega-columns, and post-tensioned floor slabs. The structure was designed and constructed to withstand seismic loading requirements and includes tuned liquid damper tanks to manage wind accelerations. The project received the Nauhria Premier Concrete Award at the 2023 Concrete NZ Nauhria Industry Awards.

Wednesday, July 12, 2023
10:00-11:00 AM Singapore Time / 10:00-11:00 PM Detroit Time
Co-Host Organization: ACI Singapore Chapter

Website: http://www.concrete.org.sg/

The ACI Singapore Chapter (ACI-SC) was founded in 1985. The purpose of this Chapter is to further the chartered objectives for which ACI was organized; to further education, technical practice, and scientific investigation; and to further research by organizing the efforts of its members for a nonprofit, public service in gathering, correlating, and disseminating information for the improvement of the design, construction, manufacture, use, and maintenance of concrete products and structures. The Chapter continues to support the National University of Singapore Endowment Fund, and proceeds are used for an annual medal and book prize to be awarded to the best civil engineering graduate in concrete technology-related subjects leading to a degree in civil engineering. Every year, the Chapter organizes the Performance Controlled Concrete Competition, where ready mixed concrete companies, concrete admixtures suppliers, universities, and polytechnics are invited to produce and send their best concrete cubes for testing under the various criteria.

Local Moderator: Tao Nengfu, Senior Lecturer, Singapore Polytechnic

Tao Nengfu is a Senior Lecturer in the School of Architecture and the Built Environment at Singapore Polytechnic, Singapore. His research interests include computer science, structural engineering, soil dynamics, and earthquake engineering.

1st Speaker: Lu Jin Ping, Managing Director, Hitchins International Pte Ltd

Lu Jin Ping is President of the ACI Singapore Chapter and the Managing Director of Hitchins International Pte Ltd, Singapore. Lu has more than 30 years of experience working in areas of research and development, testing, and technical consultancy for construction materials. He was a Lecturer in the Department of Construction Materials at Tongji University, Shanghai, China, from 1988 to 1994. Lu serves as an Advisory Committee member of the School of Applied Science at Temasek Polytechnic, Singapore, and a member of the Board of Directors of the International Congress on Polymers in Concrete (ICPIC). He has also presented more than 50 papers at various international conferences in the region and has published articles on testing, performance, and research on construction materials. He is the lead auditor for the certification of Ready-Mix Concrete Products by the Singapore Accreditation Council. Lu received a 5 years' service award for dedicated voluntary service to the community from the People's Association and a Merit Award from SPRING Singapore for meritorious service and contributions to the Singapore Standardisation Programme.

Presentation Title: Application of Granite Fines to Substitute Sand in Concrete Production

Granite fines (GF) are a by-product of crushing granite (coarse-grained igneous rock) into coarse aggregate, which is mostly composed of silica and alumina with small amounts of calcium, magnesium, potassium, and more. During the manufacturing of coarse aggregate, up to 25 to 30% of screening GF aggregate may be produced. The particles of GF are irregular, angular, and have a rough and crystalline surface texture.

The testing results for both the accelerated test and the natural exposure condition show that the GF replacement of natural sand can enhance the concrete's resistance to carbonation. As the replacement level increases, the carbonation of concrete becomes slower. The 100%-GF mixture has the best resistance to carbonation among all the mixtures tested in this study. Based on the current measurement data, the minimum design thickness of the concrete cover for 100 years of service life for the NS-1, NS-2, and 50%-GF mixtures are 45.8, 26, and 23 mm. Because there is no obvious carbonation observed for the 100%-GF mixture after 20 months of exposure to the natural condition, the design cover thickness is estimated as 20.4 mm with a conservative assumption that the ratio of *k* between the accelerated test and the natural condition is taken as 7.23.

2nd Speaker: Tan Jun Yew, Assistant General Manager, Samwoh Ready Mix Pte. Ltd.

Tan Jun Yew has more than 18 years of experience in research, testing, and consultancy for roads and airfields, and more than 10 years of experience in the ready mixed concrete industry. He is currently the Assistant General Manager at Samwoh Ready Mix Pte. Ltd., a pioneer in sustainable and green concrete solutions. Prior to this, Tan spearheaded the innovation and consultancy divisions of the Samwoh Group of Companies. He was instrumental in setting up the Group's Innovation Centre, which provides testing, design, and consultancy on the performance and management of roads and airfield pavements. Under his leadership, the company has grown into an international business with many projects successfully completed in Europe and Asia. Tan is a Director of the ACI Singapore Chapter, serves as a Council Member of the Pavement Engineering Society (Singapore) and the Asian Pavement Engineering Society, and has also served on the Council Committee for Laboratory Accreditation of the Singapore Accreditation Council. He has published numerous technical papers in these areas and has presented his work at many local and international conferences. He received his PhD in civil engineering from the National University of Singapore, Singapore, and received a Graduate Certificate in International Arbitration.

Presentation Title: The Use of Innovative Low-Carbon Concrete in Samwoh Smart Hub, The First Positive-Energy Industrial Building in Singapore

Following the announcement of the Singapore Green Plan 2030 in February 2021, Singapore's first positive-energy industrial building was officially opened less than 2 years later, on December 6, 2022. The launch of the Samwoh Smart Hub by Singapore's Deputy Prime Minister and Coordinating Minister for Economic Policies Heng Swee Keat reflects the country's commitment to sustainability in line with the vision outlined in the Singapore Green Plan 2030. Other than its positive energy characteristics, Samwoh Smart Hub also features the use of low-carbon concrete using various innovative materials. This includes the use of recycled sedimentary rock debris instead of granite aggregates, replacing natural concreting sand with GFs, and replacing ordinary portland cement with supplementary cementitious materials. This presentation describes the concrete innovation that was used in the construction of this iconic building.

Wednesday, July 12, 2023
1:00 PM-2:00 PM Sydney Time / 11:00 PM-12:00 AM Detroit Time
Co-Host Organization: Concrete Institute of Australia

Website: https://concreteinstitute.com.au/

The Concrete Institute of Australia is an independent, not-for-profit organization made up of members who share a common interest in staying at the forefront of concrete research, technology, application, design, and construction in Australia. The Concrete Institute of Australia's vision is for excellence in concrete.

Local Moderator: John Nichols, Technical and Education Services Manager, Concrete Institute of Australia

John Nichols is the Technical and Education Services Manager for the Concrete Institute of Australia. As a Professional civil engineer, he has spent over forty years in the concrete, quarry, and asphalt industries, covering design and construction of roads, buildings, and structures throughout Australia.

1st Speaker: Marie Joshua Tapas, Research Associate, UTS-Boral Centre for Sustainable Building

Dr. Marie Joshua Tapas is a Research Associate at the University of Technology Sydney (UTS), Ultimo, Australia, where she works on the development of new generation low-carbon cement and concrete through the partnership between UTS and Boral, co-supervises multiple PhD projects, and lectures on the subject "Design for Durability." She received her bachelor's and master's degree in materials engineering and a PhD in civil engineering (materials) from the University of Technology Sydney, Ultimo, Australia. She is an experienced materials engineer with expertise in various materials characterization equipment and proficiency in cement and cementitious materials. With over 10 years of combined working experience in both industry and academia, Tapas is also an experienced team lead, skilled in managing projects and training of personnel. She is an active member of the Concrete Institute of Australia Young Professionals Group and New South Wales Committee, and the current RILEM Youth Council Representative for the Pacific Region.

Presentation Title: Carbonation of Concrete: A Problem or a Solution?

The global drive to reduce carbon dioxide emissions to net zero by 2050 has resulted in a significant interest in carbonation. Carbonation of concrete structures is an inevitable phenomenon which has both positive and negative effects. Whereas, on the one hand carbonation is a serious durability concern due to its ability to lower the pH of the pore solution which can trigger the corrosion of the steel reinforcement, carbonation is also a natural process that facilitates absorption of CO_2 into the concrete benefitting the environment. CO_2 is the most dominant greenhouse gas emitted into the atmosphere and concrete production, owing to the calcination of limestone to produce cement, accounts for up to 8% of the global CO_2 emissions. This presentation aims to provide an overview of the carbonation process, the effect of increasing amount of supplementary cementitious materials (SCMs) on the carbonation rate and CO_2 uptake, the effect of carbonation on the microstructure, and phase development of high-SCM binders as well as how carbonation can be better used to help improve the sustainability of concrete production.

2nd Speaker: Scott Menegon, Senior Lecturer, Swinburne University of Technology, and Group Innovation & Technical Development Manager, WGA

Scott Menegon works in a joint university/industry capacity as a Senior Lecturer at Swinburne University of Technology, Melbourne, Australia, and the Group Innovation and Technology Development Manager at Wallbridge Gilbert Aztec (WGA). Menegon is also the current President of the Australian Earthquake Engineering Society (AEES). Menegon is a Chartered Professional Engineer (structural) with Engineer's Australia. His primary research interests include reinforced concrete; precast concrete; earthquake engineering; and collision actions. Menegon has undertaken several large-scale testing programs of reinforced concrete (RC) walls, columns, core walls and associated connections, which have provided him with unique insights into the lateral load behavior of multi-story RC buildings, particularly under seismic actions. His contributions to seismic design in Australia were recognized with the 2019 RW Chapman Medal from Engineers Australia.

Presentation Title: Increasing the Resilience of the Reinforced Concrete Building Stock in Lower Seismic Regions such as Australia through Recent Code Updates

Australia is in an intraplate region with lower seismicity compared to other countries close by such as New Zealand or Japan. However, despite the lower seismicity, the earthquake risk in Australia is still considerable, given it did not have any earthquake design standards for many decades which resulted in an existing building stock that is vulnerable to earthquakes. An earthquake in Australia would be considered a "low probability high consequence" event. This presentation will provide an overview of recent efforts to improve Australian codes to better incorporate seismic design provisions. These efforts were underpinned by 15 to 20 years of local research into the seismic behavior of reinforced concrete structures detailed to match Australian construction practices. The presentation will also touch on some of these research studies.

Wednesday, July 12, 2023
1:00-2:00 PM Korea Time / 12:00-1:00 AM Detroit Time
Co-Host Organization: Korea Concrete Institute

사단법인 한국콘크리트학회 Korea Concrete Institute

Website: https://www.kci.or.kr/eng/

Korea Concrete Institute (KCI) is an institution composed of professionals from all fields of concrete research, education, industry, and applications in the areas of concrete material, structure analysis and design, construction, repair and strengthening, and concrete-related manufacturing and production. In the past century, rapidly advancing concrete knowledge and technology have greatly contributed to the construction of various buildings, roads, bridges, offshore structures, dams, and other civil infrastructures. Particularly in the past two decades, technology associated with concrete quality and production have seen incredible growth and transformation all over the world in the areas of material, design, construction, repair and strengthening, manufacturing, and so on. The advancement of concrete technology will only gain momentum for achieving new and better concrete technology in the future. Therefore, to maintain Korea's concrete technology at a world-class level, everyone associated with the field of concrete ranging from businessmen to professors and from practicing engineers to researchers must cooperate and collaborate. To achieve this task, KCI was founded to develop, supply, and advance concrete-related technology. The goal can be made possible by active participation in KCI by academic institutions, industries, research laboratories, and government branches in fundamental research, international collaborations, technical instructions, and other programs. With everyone in the field of concrete working together as one and as partners, we can advance concrete technology, research, applications, and industry-academia collaborations in Korea.

Local Moderator: Thomas Kang, Professor, Seoul National University

Thomas Kang, FACI, is a Full Professor in the Department of Architecture & Architectural Engineering at Seoul National University (SNU), Seoul, Korea. Before that, he was a Professor in the School of Civil Engineering and Environmental Science at the University of Oklahoma, Norman, OK, USA. He also has held various affiliated positions in the United States, Japan, and South Africa, including the University of Illinois at Urbana-Champaign, Champaign, IL, USA; University of Hawai´i at Mānoa, Honolulu, HI, USA; University of Tokyo, Tokyo, Japan; and University of Cape Town, Cape Town, South Africa. Kang received his BS from SNU in 1998; his MS from Michigan State University, East Lansing, MI, USA, in 2000; and his PhD from University of California, Los Angeles, Los Angeles, CA, USA, in 2004. He is a Fellow of the Post-Tensioning Institute (PTI) and ACI, and a member of the National Academy of Engineering of Korea and EU Academy of Sciences. He received the Kenneth B. Bondy Award for Most Meritorious Technical Paper as Lead Author from PTI in 2012, and the Wason Medal for Most Meritorious Paper as Lead Author from ACI in 2009. He currently serves as an Editor-in-Chief for *Wind and Structures* and as the Associate Editor for *PTI Journal*. Kang has published over 150 international journal papers, including over 50 in the *ACI Structural Journal* and over 10 in the *PTI Journal*. His research interests include the design and behavior of reinforced, prestressed, and post-tensioned concrete structures, as well as dynamic effects (wind, seismic, fire, impact, and blast) on structures.

1st Speaker: Hee Sun Kim, Professor, Ewha Womans University

Hee Sun Kim is a Full Professor in the Department of Architectural and Urban Systems Engineering at Ewha Womans University, Seoul, South Korea. Kim has been teaching and doing research at Ewha since 2010, after she received her PhD from Georgia Institute of Technology, Atlanta, GA, USA, in 2009. She won several awards for teaching and research papers, including a teaching award from the Korean Society for Engineering Education in 2012 and a research paper award from KCI in 2020. Her research interests cover the structural and mechanical behaviors of fire-damaged concrete and the development of finite element methods for the application of highly complex shapes and materials such as the human body. Currently, she is working on a research project

evaluating the effect of admixtures on concrete strength changes under high temperatures. In the project, she is conducting heat tests on concrete as well as computational studies using machine learning models. Kim has published over 50 journal papers and many other conference proceedings, and served as an Editorial Board member of the *International Journal of Concrete Structures and Materials* until 2022.

Presentation Title: Factors on Fire Resistance of Concrete Structures and Materials

To prevent damage caused by fire accidents in buildings and infrastructure, it is important to predict accurate behaviors and ensure satisfactory fire-resistant performance of structures. Many researchers have studied the mechanical and structural behaviors of concrete exposed to high temperatures. Nonetheless, fire-resistant design of concrete structures is still a difficult problem because there are so many factors that influence the structural performance of concrete when exposed to high temperatures. Moreover, some of the factors are highly dependent on others. In the first part of the presentation, studies for investigating the effects of various factors on the behaviors of concrete structures under and after fire tests are presented. These factors cover fire and mechanical loads, design variables, and heated areas. Then, we will introduce recent techniques to evaluate and predict the strength of concrete structures and materials. These techniques use machine learning models to process a large amount of image or numerical data.

2nd Speaker: Gun Kim, Assistant Professor, Ulsan National Institute of Science and Technology

Gun Kim is an Assistant Professor in the Department of Urban and Environmental Engineering at Ulsan National Institute of Science and Technology (UNIST), Ulsan, South Korea. He received his BS (2009) and MS (2011) in civil and environmental engineering from Yonsei University, Seoul, Korea, and his MS (2016) in mechanical engineering and PhD (2016) in civil and environmental engineering from Georgia Institute of Technology. From 2017 to 2020, he was a Postdoctoral Research Associate in the Carle Illinois College of Medicine at the University of Illinois at Urbana-Champaign. His research interests include developing nontraditional, bio-inspired polymeric materials capable of visualizing stress and activating targeted chemicals. His research also focuses on developing advanced ultrasonic technologies and applications for the study of damage evaluation of cementitious materials at multiple scales. He is a recipient of several awards, including the Outstanding Paper Award from the *Materials and Structure* journal; the Early Career Investigator Grant from the Acoustical Society of America (ASA); and the Cancer Center at Illinois (CCIL) Research Grant from the University of Illinois at Urbana-Champaign. Kim has two patent applications and has published more than 15 first-authored peer-reviewed journal articles, including his recent publications in the *Journal of the American Chemical Society* and the *Proceedings of the National Academy of Science*.

Presentation Title: Towards Smart Materials and Intelligent Infrastructure Management

While the ubiquity of deteriorating urban infrastructure prompts innovation in maintenance strategies, most existing methods in practice fall short in cost or applicability to in-service structures. Development of new materials with unprecedented properties and new functionalities is of imminent importance to address the grand challenges for sustainability and resilience. This presentation will discuss a set of novel approaches to design multifunctional smart materials and develop advanced damage diagnostic systems. Specifically, the design of a smart polymeric material capable of self-sensing, -reacting, and -healing in response to external force is introduced, and its potential as a smart sensor is examined. The second part of this presentation discusses the development of an advanced nonlinear ultrasonic system capable of assessing a variety of physical/chemical phenomena in full-scale, in-place (service) concrete structures with an emphasis on monitoring early-stage damage evolution (such as microcracking development). Finally, some synergetic effects of the proposed approaches towards improving infrastructure maintenance are discussed.

Wednesday, July 12, 2023
9:00-10:00 AM Dubai Time / 1:00-2:00 AM Detroit Time
Co-Host Organization: ACI UAE Chapter

Website: www.aci-uae.com

The ACI UAE Chapter is an organization for anyone with an interest in concrete. The Chapter's mission is aligned with ACI's mission: to develop, disseminate, and advance the adoption of ACI consensus-based knowledge of concrete and its uses. The ACI UAE Chapter operates in the United Arab Emirates to support students, engineers, contractors, and materials suppliers in the concrete industry across the United Arab Emirates. The ACI UAE Chapter hosts seminars, conferences, and meetings, which are professional networking opportunities for members to meet with others in the concrete industry, maintain professional relationships, exchange ideas, identify best practices, and stay on the cutting edge of construction technology and new business trends.

Local Moderator: Ahmad Khartabil, Technical Manager, Transgulf Readymix Concrete Co., LLC

Ahmad Khartabil is a Technical Manager of Transgulf Readymix Concrete Co., LLC, in the United Arab Emirates. He joined Transgulf Readymix as a design engineer, was promoted to Assistant Technical Manager in 2014, and then to Technical Manager in 2016. He is an ACI member, Chair of the ACI UAE Chapter Events Committee, and a Certified Concrete Professional in concrete technology by the National Ready Mixed Concrete Association (NRMCA). He was a winner of the 1st *fib*-UAE Graduate Fellowship Award in 2018, which was an initiative supported by the UAE Society of Engineers and the *fib*-UAE Chapter. In January 2019, his paper titled "Carbonation Resistance of Sustainable Concrete Using Recycled Aggregate and Supplementary Cementitious Materials" won the Best Presentation Award at the 3rd International Conference on Civil and Building Materials (ICCBM 2019), Singapore. He is continuously involved in different research projects. His research interests include hot weather concreting, concrete durability and service life, sustainable construction materials, and the rheology of cement paste and concrete. Khartabil is a civil engineer, receiving his degree from Abu Dhabi University, Abu Dhabi, UAE, with the honor of magna cum laude in 2012. In 2022, he received his master's in civil engineering from Abu Dhabi University.

1st Speaker: Farid Abed, Professor, American University of Sharjah

Farid Abed is a Professor of civil engineering at the American University of Sharjah, Sharjah, UAE. He has secured several national and international grants with more than 5 million AED in research funds. He has supervised more than 20 MSc and PhD students, and his contributions in his areas of specialization have been published in more than 150 articles in refereed journals and well-known conferences. He is a Fellow of the American Society of Civil Engineers (ASCE) and a member of the American Society of Mechanical Engineers (ASME). Abed's research interests include computational solids and structural mechanics, mechanics of concrete and composites, fiber-reinforced polymer (FRP)-reinforced concrete, concrete-filled steel tubular (CFST) composites, damage mechanics, and nonlinear finite element. He received his PhD in 2005 in structures/mechanics from Louisiana State University (LSU), Baton Rouge, LA, USA. He is also a licensed professional engineer in the state of Louisiana.

Presentation Title: Serviceability and Flexural Response of Ultra-High-Performance Concrete (UHPC) Beams Reinforced with Fiber-Reinforced Polymer (FRP) Bars

FRP bars are one of the promising new developments in the construction field. They possess noncorrosive characteristics, which can help overcome the deficiencies of steel reinforcement and increase the service life of concrete structures. FRP bars are also characterized by a high strength-to-weight ratio and a linear stress-strain relationship. Thus, using concrete with high compressive strengths, such as ultra-high-performance concrete (UHPC), can result in the maximum use of the high tensile strength of the FRP bars. The improved compressive strain of the UHPC allows the FRP bars to sustain larger strains and accordingly achieve higher strengths, which improves the ultimate capacity of flexural members. In addition, the presence of fibers in the matrix of UHPC can enhance the ductility of FRP-reinforced beams. However, there is still a lack of studies on UHPC beams reinforced with FRP bars. Thus, this presentation aims to give an insight into the flexural behavior of this type of structural member. Several beams were prepared with UHPC and reinforced with glass FRP (GFRP) and basalt FRP (BFRP) bars. The research investigated the serviceability behavior of UHPC-FRP beams, including the midspan deflections and the cracking behavior, as well as the flexural response, including the failure modes and ultimate capacities.

2nd Speaker: Mufid A. Samarai, Senior Advisor, Sahara Management Consultancy, and Advisor, Sharjah Asset Management Jahzin Program

Mufid A. Samarai is a Senior Advisor at Sahara Management Consultancy and Advisor for Sharjah Asset Management's Jahzin Program. He is a Professor of civil engineering, and Former Chair and/or Dean at the University of Baghdad, Baghdad, Iraq; Applied Science Private University, Amman, Jordan; and the University of Sharjah, Sharjah, UAE. He has been teaching, researching, and consulting. He was involved in the repair of over 100 structures and bridges in Iraq, Jordan, and the United Arab Emirates. Samarai is a former Vice President of CIB (the Netherlands), Bureau member of RILEM (France), and Vice President of MEDMA (Germany). He is a Fellow Research Officer of LNEC (Portugal) and a Board member of the Arab Institute for Operations and Maintenance (OMAINTEC, Saudi Arabia). He is a member of many professional and scientific committees for many government establishments in the United Arab Emirates. Samarai has received over 50 acknowledgments for his contributions to research, education, and community service in Iraq, Jordan, and the United Arab Emirates. He was invited as a keynote speaker and member of scientific committees at many international conferences. His research interests include quality control, low-cost housing, nondestructive testing, durability, heritage and historic buildings conservation, damage assessment and repair of structures, and sustainability. He received his PhD from University College London, London, UK, in 1976. He has over 230 publications, two books, and four registered patents.

Presentation Title: Advances in Evaluation, Testing, Repair, and Maintenance Management of Structures with Overview of the New Modified ACI CODE-562M for Repair of Structures

Although there is more awareness of the importance of repair, retrofitting, and rehabilitation of reinforced concrete structures, still in many parts of our region, there are essential factors such as hot weather, sulfates and chlorides, unskilled workmanship, deleterious substances, funds, and speed of construction that influence the durability of structures and bridges to a great extent. In such circumstances, understanding and implementing the latest codes, standards, and guidelines for proper and well-defined procedures to maintain and repair existing structures is essential to ensure that structures remain economical and functional throughout their design life and beyond. This innovation presentation offers construction professionals, engineers, technicians, and designers the most complete and current information on all concrete evaluation and repair aspects. It will give an overview of the most important standards and codes related to the subject, emphasizing the newly modified ACI CODE-562M-21. The presentation has been designed to reflect the entire range of modern and advanced concrete practices related to maintenance technology and management.

Wednesday, July 12, 2023
3:00-4:00 PM Tokyo Time / 2:00-3:00 AM Detroit Time
Co-Host Organization: Japan Concrete Institute (JCI)

Website: https://www.jci-net.or.jp/index-e.shtml

The Japan Concrete Institute (JCI) has been striving to develop the science and technology of concrete in Japan. As of 2021, the number of members is approximately 7500. Since 1979, JCI has been holding an Annual Convention once a year (over 3 days), which is attended by concrete researchers and engineers from various fields. The 45th Annual Convention will be held online in July 2023. JCI publishes the monthly *Concrete Journal* and presents a multifaceted range of information including commentaries, technical reports, construction records, and international information on a regular basis. *Concrete Research and Technology* and *JACT* (*Journal of Advanced Concrete Technology*) are posted on the "Japan Science and Technology Information Aggregator, Electronic" (J-STAGE) website at the same time that they are published for uncharged access. JCI awards include the Honorary Membership Award, Lifetime Membership Award, JCI Fellow, the Japan Concrete Institute Awards (Meritorious Deed Award, Best Paper Award, Technology Award, Encouragement Award, and Work Award), as well as other awards bestowed under the independent award schemes of JCI chapters. To raise the technical skills and ability of concrete engineers, JCI has been administering Authorized Concrete Engineer qualification examinations since 1970 and Authorized Chief Concrete Engineer qualification tests since 1971, certifying approximately 58,400 people thus far. JCI has been holding Concrete Diagnosis & Maintenance workshops and Authorized Concrete Diagnosis & Maintenance Engineer qualification examinations every year since 2001, certifying approximately 14,000 people.

Local Moderator: Mitsuyoshi Akiyama, Professor, Waseda University

Before joining Waseda University, Tokyo, Japan, in 2011, as a Professor of civil engineering, Mitsuyoshi Akiyama was an Assistant and Associate Professor at Tohoku University, Sendai, Miyagi, Japan. He is now Chair of the Department of Civil and Environmental Engineering at Waseda University and President of Engineers Without Borders Japan. He is serving as a Managing Editor for *Structure and Infrastructure Engineering* and an Associate Editor for the ASCE *Journal of Bridge Engineering*. He was a Visiting Research Associate at Lehigh University, Bethlehem, PA, USA, from October 2008 to September 2009 (sponsored by the Kajima Foundation) and from August 2018 to September 2019 (sponsored by the Japan Society for the Promotion of Science [JSPS]), and a Visiting Professor at National Taiwan University of Science and Technology, New Taipei, Taiwan, in 2020. He is the recipient of several awards, including the 2001 JCI Award for Engineering Development; the 2007 Japan Society of Civil Engineers (JSCE) Encouragement Award for Outstanding Thesis; the 2008 Commendation for Science and Technology; the 1998, 2008, and 2010 JSCE Yoshida Award; and the 2016 International Association for Bridge Maintenance and Safety (IABMAS) Junior Award. Akiyama's research interests include earthquake engineering; life-cycle structural performance; and reliability, risk, and resilience assessments of civil infrastructure systems. In 2001, he received his doctorate in civil engineering from Tohoku University.

1st Speaker: Kei-ichi Imamoto, Professor, Tokyo University of Science

Kei-ichi Imamoto is a Professor in the Department of Architecture at Tokyo University of Science, Tokyo. He is a member of ACI, the Architectural Institute of Japan (AIJ), JCI, and RILEM. He is a member of the RILEM Technical Advisory Committee and Secretary of RILEM Technical Committees 192-ECM; Environment-Conscious Construction Materials and Systems; 255-FRS, Fire Resistance of Concrete Structures Repaired with Polymer Cement Mortar; 270-CIM, Benchmarking Chloride Ingress Models on Real-Life Case Studies: Theory and Practice; and 297-DOC, Degradation of Organic Coating Materials and Its Relation to Concrete Durability. He contributed as a keynote speaker at the 2nd RILEM Spring Convention & International Conference on

Sustainable Materials, Systems and Structures (SMSS2019) in Rovinj, Croatia (2019), 14th International Conference on Durability of Building Materials and Components (XIV DBMC) in Ghent, Belgium (2017), and RILEM International Workshop on Performance-Based Specifications and Control of Concrete Durability (TC 230-PSC) in Zagreb, Croatia (2014). Imamoto has published more than 300 papers. He received the Young Researcher Award from AIJ in 2008, a prize for paper from the Japan Society for Finishing Technology in 2012, a prize for paper from JCI in 2017, and a prize from Suga Weathering Technology Foundation in 2018. His research interests include the conservation of reinforced concrete buildings, the reuse of industrial by-products for building materials, and the creep and shrinkage of concrete.

Presentation Title: Round-Robin Test for Repair Methods at Extreme Deterioration Condition

A round-robin test for repair methods at Hashima Island was performed by the Technical Committee of the Japan Concrete Institute. Reinforced concrete structures in Hashima would be the most extremely deteriorated ones in the world. Hence, round-robin tests for repair methods would be a good opportunity to consider the conservation of the concrete structures. The round-robin test will contribute to the improvement of repair methods for reinforced concrete structures. This presentation reports on the results of a 2-year exposure test at Hashima Island.

2nd Speaker: Yuichiro Kawabata, Group Leader, Port and Airport Research Institute, and Yuya Takahashi, Associate Professor, Concrete Lab, University of Tokyo

Dr. Yuichiro Kawabata is a Group Leader at the Port and Airport Research Institute. Starting in September 2014, he was a Visiting Researcher at the French Institute of Science and Technology for Transport, Development and Networks (IFSTTAR) (now the Université Gustave Eiffel, Champs-sur-Marne, France), sponsored by JSPS for 2 years. He is an Associate Editor of the *Journal of Advanced Concrete Technology* (*JACT*). He is Co-Chair of Work Package (WP3) of RILEM Technical Committee 301-ASR, Risk Assessment of Concrete Mixture Designs with Alkali-Silica Reactive (ASR) Aggregates. He was also Chair of JCI Technical Committee TC211A, Technical Committee on Assessment and Prediction of Expansion due to Internal Swelling Reaction in Concrete Structures, from 2020 to 2022. During over 15 years of research, he has received several awards, including the 2016 JCI Paper Award; the 2016 and 2018 Japan Cement Association (JCA) Paper Award; the 2008, 2014, and 2022 JSCE Yoshida Award; and the 2018 Ministry of Education, Culture, Sports, Science and Technology (MEXT) Young Scientists' Award. His scientific papers published in *JACT* were selected as the best three papers of the year in 2012 and 2015. His research interests include the field of concrete pathologies such as alkali-silica reaction and delayed ettringite formation. He is also working on decarbonizing the construction of marine structures toward carbon neutrality.

Presentation Title: Assessment and Prediction of Internal Swelling Reactions in Concrete Structures (the activity of JCI TC211A)

Risks due to internal swelling reactions (ISRs), such as alkali-silica reaction (ASR) and delayed ettringite formation (DEF), have recently attracted national and international attention. In Japan, there have been many cases of structures affected by ASR, but no cases of DEF have been reported. Also, there have been several cases of the breakage of steel bars in structures due to ASR, which may raise concerns in terms of structural safety as well as serviceability. To properly assess the risk of ISRs in structures that will be in service for the long term, it is important to predict the performance of the ISR-affected structure based on laboratory tests. On the contrary, there has been no in-depth discussion on how "expansion," a common indicator of ISR, should be dealt with in the assessment and prediction of ISR risk of structures in the future, and whether expansion is really an appropriate indicator for assessing ISR risk. From these backgrounds, JCI TC211A was established by JCI to present a more viable ISR risk assessment method by proposing a set of test methods and structural models for ISR. To achieve this goal, the latest national and international information on expansion prediction has been reviewed, and the directions to be taken in modeling and test methods have been discussed. In addition, to deeply understand "expansion" as an important phenomenon of ISR, the basic theory behind the ISR mechanisms has been discussed. This presentation will provide the highlights of the discussions and results of the committee.

Wednesday, July 12, 2023
10:00-11:00 AM Athens Time / 3:00-4:00 PM Detroit Time
Co-Host Organization: ACI Hellas Chapter

Website: http://www.aci-hellas.com

ACI Hellas Chapter is the Greek Chapter of the American Concrete Institute. The Chapter's main goal is to disseminate knowledge on concrete and construction issues, as well as to educate and certify technical material regarding concrete applications.

Local Moderator: Kosmas K. Sideris, Professor, Democritus University of Thrace

Kosmas Sideris is a Professor in the Laboratory of Building Materials at the Department of Civil Engineering, Democritus University of Thrace, Komotini, Greece. His main research interests are focused on the durability of reinforced concrete structures and the technology of advanced concretes. Sideris is the author of two books in cement hydration and concrete durability and the author or co-author of more than 95 articles published in Greek and international journals and conferences. Sideris is a member of several international and national scientific committees and societies (ACI, RILEM, CEN/SC1/WG1, ACI Hellas Chapter, Technical Chamber of Greece, Industrial By-Product Research and Development Association) and an active member of RILEM TC DSC – Durability of Self-Compacting Concrete, RILEM TC HPB – Physical properties and behaviour of High-Performance Concrete at high temperature, RILEM TC MPS – Mechanical properties of self-compacting concrete, RILEM TC SCM – Supplementary cementing materials in Concrete, and RILEM TC CCC – Carbonation of concrete with supplementary Cementitious materials committees. He is member of CEN/TC 104/SC 1/WG 1 - Exposure Resistance Classes (RC). His main research interests are focused on the durability of reinforced concrete structures and the technology of advanced concretes (self-compacting concrete, high-performance concrete, fiber-reinforced concrete, and concrete produced with pozzolanic additives and industrial byproducts). His secondary research interests are in the area of hydration kinetics of plain and blended cements and the use of special chemical admixtures in concrete. Sideris has supervised more than 80 Diploma and Master theses as well as four PhD theses in the scientific area of concrete technology and durability. He currently is an Associate Editor for *Case Studies in Construction Materials* journal and Editor for *Construction and Building Materials journal*, both with Elsevier publishing.

1st Speaker: Eleftherios Anastasiou, Associate Professor, Aristotle University of Thessaloniki

Dr. Eleftherios Anastasiou is a civil engineer with experience in concrete technology and especially the use of alternative construction materials in concrete both in terms of mechanical performance and durability, as well as their life-cycle assessment. Anastasiou has participated in more than 30 projects and has more than 50 publications related to measurements of test concrete properties, including mechanical performance and durability.

Presentation Title: Alternative and Secondary Materials in Concrete

The presentation discusses the current use of alternative and secondary materials in concrete. Such materials are categorized either as binder or as aggregate substitutes in the cement mixture. Cement alternatives, such as fly ash, ground granulated blast-furnace slag (GGBS), and silica fume have long been established, but these materials are diminishing in quantity while demand is rising. Requirements and perspective on the use of other materials as cement replacement are presented. Regarding aggregate

substitution, alternative and secondary aggregates typically perform worse than natural ones, but the opportunity to absorb large amounts of waste in concrete cannot be overlooked. Requirements and perspective on the use of aggregates other than natural in concrete are presented.

2nd Speaker: George Tzouvalas, Technical Manager, HERACLES Group, HOLCIM

George Tzouvalas is an experienced professional in building materials with a focus in cement and concrete technology for more than 20 years. He has solid plant experience with expertise in quality control and product development. During the last 10 years, Tzouvalas has had strong involvement in commercial business leading a team compromising both technical and commercial skills and achieving relevant targets.

Presentation Title: Cement and Concrete Racing Toward a Lower Carbon Footprint

HERACLES Group of Companies, a member of Holcim Group, places paramount importance on its ongoing commitment to enhancing environmental performance. With a dedication to sustainability, the company actively strives to improve the environmental footprint of its products. Specifically focusing on cement, HERACLES endeavors to achieve this by implementing sustainable practices throughout its operations. The production of cement products with minimal clinker content plays a pivotal role in this endeavor. By incorporating substitutes such as pozzolana (Milos) fly ash and limestone into the final cement composition, HERACLES significantly enhances the environmental performance of its cements while retaining the highest quality standards. In this regard, the company is fully supportive of Greek cement industry initiatives and is cooperating with local standardization authorities and Greek technical universities to ensure compliance with the EN 197-5 standard for Portland-composite cement CEM II/C-M and incorporate their use to concrete regulation. Adhering to this standard will enable the Greek cement industry to introduce products to the market with even better environmental performance.

Wednesday, July 12, 2023
10:00-11:00 AM Paris Time / 4:00-5:00 AM Detroit Time
Co-Host Organization: ACI Paris Chapter

Website: http://chapitreaciparis.com/

Created in 1994 under the auspices of the French Association of Civil Engineering (AFGC), the ACI Paris Chapter is an "Embassy" for the mutual benefit of increased mutual knowledge between French and European civil and construction engineers and the World of Concrete especially in North America. Its jurisdiction covers French-speaking countries in Europe (France, Belgium, Luxembourg, and Switzerland). It convenes approximately 100 attendees to the Chapter's event every year, including designers/engineering office staff for buildings and civil structures, checkers, owners/authorities, professors, contractors, and members of the precast concrete industry. Its objectives are: to keep active in stimulating education and excellence in relation to concrete practice and standards; to facilitate the dissemination of French documents to the global World of Concrete; to promote the international visibility of works and technical achievements realized in French-speaking Europe; to keep small but reactive and open to international scientific advances applicable to concrete technology; and to help enable the implementation of these advances by French-speaking European engineers.

Local Moderator: François Toutlemonde, General Civil Engineer, Chief Scientist, and Head of the Department of Materials and Structures (MAST), Université Gustave Eiffel

François Toutlemonde is a General Civil Engineer, Chief Scientist, and Head of the Department of Materials and Structures (MAST) at Université Gustave Eiffel, Champs-sur-Marne, France. Before being included in Université Gustave Eiffel, the MAST Department had been part of the French Public Works Research Institute, where Toutlemonde had been working since 1990 and led several research projects in the field of concrete and concrete structures. He has authored over 75 peer-reviewed papers in international scientific journals and supervised 15 PhDs. He has chaired the scientific committee of four international conferences with over 300 attendees: the Seventh International Conference on Concrete under Severe Conditions: Environment and Loading (CONSEC'07) in Tours, France; the RILEM-*fib*-AFGC International Symposium on Ultra-High-Performance Fibre-Reinforced Concrete (UHPFRC 2009) in Marseille, France; UHPFRC 2013 in Marseille; and UHPFRC 2017 in Montpellier, France. He served as an expert for the French Nuclear Safety Authority from 2001 to 2022, and a French delegate in European Committee for Standardization committees related to concrete and concrete structures. He was active in elaborating the French standards for and ultra-high-performance fiber-reinforced concrete (UHPFRC) from 2014 to 2018 and he has chaired the French Standardization Committee for Concrete since January 2021. He is a member of ACI Committee 239, Ultra-High-Performance Concrete, and has been an expert advisor for several UHPFRC projects. He has served as President of the ACI Paris Chapter since 2006 and is a member of the International Board of AFGC. His research interests include shock resistance of concrete structures; durability issues of concrete structures, including alkali-silica reaction and delayed ettringite formation; and structural applications of new concrete—high-performance concrete, fiber-reinforced concrete, and UHPFRC. Toutlemonde received degrees from École Polytechnique, Palaiseau, France, in 1987, and École des Ponts ParisTech (formerly École Nationale des Ponts et Chaussées), Champs-sur-Marne, in 1990. He received his PhD in 1994 in the materials and structures specialty, and received his research direction degree from Université Gustave Eiffel (formerly the Université Paris-Est Marne-la-Vallée), in 2003.

1st Speaker: Xavier Guillot, Standardization Director, Chair of CEN/TC51 Cement and Building Limes

Xavier Guillot is a Standardization Director and Chair of CEN/TC51 Cement and Building Limes. He has 20 years of experience in the cement industry with several positions such a Research Managing Director (French cement manufacturers' association), R&D Sector Head, and Standardization Director. Guillot received his PhD from École Centrale Paris, Châtenay-Malabry, France (now part of CentraleSupélec). His key areas of expertise include standardization activities, certification, project management (R&D and innovation), and coordination and animation of working groups. His technical skills include building materials (cement, hydraulic road binder, lime, mortar, concrete, and their constituents). Guillot is a member of several cement and concrete standardization committees at European and French levels.

Presentation Title: The Strategy for Decarbonation of the French Cement Industry

Environmental impact reduction is a challenge for most industries in the Horizon 2050. Starting from the root cause of this targeted date and the consequences if nothing is done, the cement industry objectives are introduced and split into two subgroups of several levers, with their quantitative weighting. This quantitative approach leads to a comprehensive strategy for the French cement industry, distinguishing between process levers and product (cement) levers. The quantitative approach is also time-resolved, explaining why it is crucial to action the two kinds of levers at the same time, even if they do not have the same time constant. Particular focus is given to the fastest lever: cement composition and subsequent ongoing research to minimize cement clinker content while maintaining cement performance.

2nd Speaker: Lionel Linger, Corporate Concrete Director, VINCI Construction Major Projects

Lionel Linger is the Corporate Concrete Director for VINCI Construction Major Projects, France (one of the world's largest engineering procurement contractors). With 30 years of experience, he has developed scientific and operational technical knowledge of concrete and its uses. He mainly provides technical assistance to operational executives and various construction sites of the VINCI Group. He has been involved with major projects around the world related to dams (in Egypt and Oman [roller-compacted concrete (RCC)], civil works (Light Rail Transit project [Qatar]), Thames Tideway sewage tunnels (United Kingdom), the Fehmarn link project (Denmark), on-grade infrastructures (South Europe Atlantic High-Speed Rail Line project [France] and HS2 high-speed train project [United Kingdom]), major bridges (New Coastal Road on La Réunion Island [France] and Puente del Atlántico cable-stayed bridge [Panama]), liquefied natural gas (LNG) tanks (Egypt, Qatar, Mexico, the Netherlands, Algeria, Australia, Russia, Canada, and the United Kingdom), underground projects (Hallandsås Tunnel [Sweden], Heathrow Terminal 5 [United Kingdom], Lefortovo [Russia], Cairo [Egypt], Doha [Qatar], Paris Métro Line 15 Section T3C Grand Paris Express underground extension [France], the I-64 Hampton Roads Bridge-Tunnel Expansion Project (Norfolk, VA, US), and the Lyon-Turin tunnel [France]), and more. Linger has authored more than 40 peer-reviewed papers in international scientific journals and conference proceedings. He chairs the International Board of AFGC and served as Chair of *fib* Commission 8 (COM8), Durability, from 2019 to 2021. He has been a member and/or convenor of several technical working groups (AFGC, France's National Public Works Federation [FNTP], French Association for Design, Construction and In-Service Inspection [AFCEN], and *fib*) and a member of the Scientific Committee of French National Projects (PN B@P [convener of Task Group TG3-3, Concrete Curing] and PERFDUB [convener of TG4, PBA Contract Implementation]). Apart from his operational activities, his research interests include concrete performance-based approaches, low-carbon concrete structures, and durability issues of concrete structures. He received his civil engineering degree from the National Institute of Applied Sciences (INSA), Toulouse, France, and the Center for Higher Studies in Reinforced and Prestressed Concrete (CHEC), Arcueil, France, in 1992.

Presentation Title: **The Performance-Based Approach for Durability According to the Updated French Concrete Standard**

The PERFDUB French national project (performance-based approach [PBA] for justifying concrete structures' durability) was launched in March 2015. This collaborative research program gathers all types of construction sector partners (owners, engineering companies, building and civil engineering companies, public and private laboratories, universities, ready mixed concrete suppliers, precast concrete product manufacturers, and materials suppliers) to define an agreed method for practical PBA implementation in relation to concrete durability for civil engineering and buildings structures possibly including precast elements. It deals with the main features of corrosion due to carbonation, chloride-induced corrosion, chemical attack by sulfates, acids, or low mineral content water and biological attack. As a complement or alternative to the traditional concrete composition requirements and mixture-proportions prescriptive limiting values, PBA allows characterizing and specifying concrete properties to resist the surrounding environmental conditions and its ability to prevent premature steel reinforcement or prestressing steel corrosion. The PBA methodology should be set up for justifying the durability of concrete for structures, including both the "absolute" and the "comparative" methods. Advanced knowledge and site feedback should be combined for filling gaps in a framework involving all stakeholders so that the PBA becomes operational and more commonly used. The PBA methodology applies to concrete structures for which a sufficient level of quality assurance is provided. The research investigations in PERFDUB mainly relied on new structures/new concrete mixtures, but also on old structures' diagnoses to link aging assessments to the type of concrete and its durability features. This work has been based simultaneously on all the partners' experienced consolidated feedback and on durability models benchmarking and development. The final deliverable document has served as the basis for supplementing national provisions of the French concrete standard NF EN 206, in a technical guidance document named "Performance-Based Method for Justifying Concrete Structures Durability."

Wednesday, July 12, 2023
12:00-1:00 PM Cairo Time / 5:00-6:00 AM Detroit Time
Co-Host Organization: ACI Egypt Chapter

Website: https://www.concrete.org/chapters/findachapter/chapterhome.aspx?cid=C0C08600

The ACI Egypt Chapter is the first ACI Chapter in Africa in 33 years. The Chapter has held several technical national and international events and has won several awards from ACI. The ACI Egypt Chapter co-hosted and participated in the first 24 Hours of Concrete Knowledge conference in 2021. They work in close collaboration with similar local and international organizations and the Egyptian Concrete Society.

Local Moderator: M. Nasser Darwish, Professor, Alexandria University

M. Nasser Darwish, FACI, is a Professor of concrete structures and bridges at Alexandria University, Alexandria, Egypt, as well as a Structural Consultant and Arbitrator. He is Chair of the ACI Egypt Chapter and the Egyptian Concrete Society. Darwish is a member of ACI Committee 325, Concrete Pavements; the Egyptian Concrete Code Committee; the Egyptian Repair and Strengthening Code Committee; the Egyptian Fiber-Reinforced Polymer (FRP) Code Committee; and the Egyptian High-Rise Building Code Committee.

1st Speaker: Ali Abd El-Rahman, Professor, Cairo University

Ali Abd El-Rahman is a Professor of concrete structures and Past President of Cairo University, Giza, Egypt, as well as a Structural Consultant. He is Chair of the Egyptian Concrete Code Committee and the Egyptian High-Rise Code Committee, and a member of the Egyptian Repair and Strengthening Code Committee and the Egyptian FRP Code Committee. El-Rahman is a former Governor of the Giza Governorate.

Presentation Title: Performance of Decorative Large Precast Concrete Panels under Fire

This presentation will discuss the technical investigation for defects and repair caused by fire for a building constructed using large precast concrete panels (walls, beams, and roof slabs): the El Gouna Cultural and Conference Center, El Gouna, Red Sea, Egypt. Recommendations are presented for achieving durable precast concrete large panels construction using decorative concrete with an emphasis on the behavior of joints.

2nd Speaker: Hamed Salem Hadhoud, Professor, Cairo University

Hamed Salem Hadhoud is a Professor of concrete structures at Cairo University, as well as a Structural Consultant. He has been the Director of the Concrete Research Laboratory at Cairo University since 2020. He received his MSc and BSc from Cairo University, and his PhD from The University of Tokyo, Tokyo, Japan.

Presentation Title: Numerical Simulation of Progressive Collapse of Infrastructures and Buildings Using Applied Element Method

This presentation includes an introduction, background, and validations; and a discussion of forensic case studies using the applied element method (AEM); and controlled demolition, strengthening, and blast analysis.

3rd Speaker: Mourad M. Bakhoum, Professor, Cairo University

Mourad Bakhoum is a Professor of structural engineering at Cairo University and Vice Chair of ACE Arab Consulting Engineers. He is a member of ACI, the Egyptian Loads Code Committee, and the Egyptian Bridges Code Committee. He received his MSc and BSc from Cairo University, and his PhD from the Massachusetts Institute of Technology (MIT), Cambridge, MA, USA.

Presentation Title: Rod El-Farag Cable-Stayed Bridge over the Nile, Cairo

This presentation discusses the design and construction of the Rod El-Farag cable-stayed bridge.

Wednesday, July 12, 2023
12:00-1:00 PM Oslo Time / 6:00-7:00 AM Detroit Time
Co-Host Organization: Norwegian Concrete Association

Website: www.betong.net

The Norwegian Concrete Association (NCA) has more than 1300 members, both personal members and companies. It has 45 different committees and working groups with experts on a wide range of subjects. NCA publishes documents and reports on topics such as low-carbon concrete, self-consolidating concrete, guidelines for the design and construction of slipformed concrete structures, sprayed concrete, and many more. The Association offers courses on the production and execution of concrete and on design and construction. NCA also organizes national and international conferences.

Local Moderator: Cecilie Hagby, Managing Director, Norwegian Concrete Association

Cecilie Hagby has been the Managing Director of NCA for over 3 years. She previously worked as the CEO of Svelviksand AS, a large producer of concrete aggregate in the metropolitan area of Norway, for 12 years. Hagby also worked as the Quality System Auditor for Kontrollrådet for 12 years. Her research interests include concrete aggregates. She received her MSc in engineering geology from the Norwegian University of Science and Technology (NTNU), Trondheim, Norway, in 1990.

1st Speaker: Vetle Houg, Sustainability Manager, Heidelberg Materials Norway

Vetle Houg is the Sustainability Manager for Heidelberg Materials Norway. Previously, he was the Communication Manager for Heidelberg Materials Norway from 2008 to 2018, and Manager of Brilliant Buildings (now Betongfokus) from 2018 to 2022.

Presentation Title: Carbon Capture—The Cut That Matters: CCS at the Brevik Cement Plant in Norway—From Dream to Reality

Brevik CCS is Heidelberg Materials' most advanced project within carbon capture and storage (CCS), and the facility will be in operation by 2024. Brevik CCS is part of the Norwegian Government's Longship program, aimed to demonstrate the capture of CO_2 from industrial sources, as well as the transport and safe storage of CO_2. CO_2 emissions must be reduced to prevent global climate change. Nevertheless, the world will depend on oil, gas, and cement for decades to come. This is why technology to capture and store CO_2 is needed. CCS is a technology that can reduce substantial volumes of CO_2 emissions. It is a relevant technology for reducing CO_2 emissions from power plants based on coal and oil and from industries such as cement, steel, and petrochemicals. It comprises elements for capturing, transporting, and storing.

2nd Speaker: Harald Justnes, Chief Scientist, SINTEF

Harald Justnes is a Professor and Chief Scientist in the Department of Architecture, Building Materials, and Structures at the Foundation for Scientific and Industrial Research (SINTEF). He has been with SINTEF since 1985. He is the author or co-author of more than 370 publications in journals and conference proceedings. His research interests include the chemistry of cement, concrete, admixtures, and additives (including polymers) from production, through reactivity, to durability. He was educated at the Institute of Inorganic Chemistry, NTNU, and is now an Adjunct Professor in cement and concrete chemistry at the Institute of Materials Technology, NTNU.

Presentation Title: Aluminum-Reinforced Concrete Enabled by Calcined Clay

Concrete with 55% cement replacement by calcined clay has been made with the purpose of stabilizing aluminum reinforcement to lower the overall carbon footprint and allow unusually long service life without maintenance. Long service life is guaranteed because aluminum is stable in a carbonated system and in the presence of chlorides. In addition, the hydration products from the pozzolanic reaction of the calcined clay bind chlorides chemically as Friedel's salt. Because all calcium hydroxide is consumed eventually, the sulfate resistance is excellent, and alkali-aggregate reactions are not sustained due to low pH and soluble alumina. The only potential degrading mechanism is freezing-and-thawing scaling, which can be minimized with proper air entrainment. A binder with 45/55 portland cement/calcined clay and a water-powder ratio (w/p) of 0.50 has been shown to stabilize aluminum reinforcing bars of two different alloys even when calcium chloride is used as an accelerator or seawater is used as mixing water. Concrete was made with the same binder but with w/p = 0.43, and 4% calcium chloride of total powder mass as the accelerator, leading to compressive strengths of 100 mm cubes after 1, 3, 7, and 28 days of 10.6, 35.7, 43.8, and 53.5 MPa, respectively. The criterion for C30 concrete is fulfilled, and C45 is within reach with small adjustments. The used clay contains only approximately 50% kaolin, and the remainder is inert feldspar grains. The clay was calcined at 800°C with a residence time in the hot zone of a rotary kiln of approximately 10 minutes.

Wednesday, July 12, 2023
12:00-1:00 PM Lisbon Time / 7:00-8:00 AM Detroit Time

Co-Host Organization:
International Federation for Structural Concrete (*fib*)

Website: https://www.fib-international.org/

The International Federation for Structural Concrete (*fib*) is a not-for-profit association formed by 40 national member groups in more than 100 countries and approximately 2500 corporate and individual members. The *fib*'s mission is to develop the study of scientific and practical matters capable of advancing the technical, economic, aesthetic, and environmental performance of concrete construction at an international level. The knowledge developed and shared by the *fib* (*fib* Bulletins, *fib* events, *fib* workshops, *fib* courses, and so on) is entirely the result of the volunteer work provided by the *fib* members.

Local Moderator: Eduardo Júlio, Professor, Instituto Superior Técnico

Eduardo Júlio has been a Professor at Instituto Superior Técnico (IST), Lisbon, Portugal, since 2011, and was formerly affiliated with the Universidade de Coimbra (UC), Coimbra, Portugal, from 1990 to 2011. He promoted the establishment of the Institute for Sustainability and Innovation in Structural Engineering (ISISE) in 2007 while at UC and boosted the launch of Civil Engineering Research and Innovation for Sustainability (CERIS) at IST, the only two Portuguese research centers in civil engineering ranked as Excellent. He served as CERIS President from 2021 to 2022 and established hubs at Universidade NOVA de Lisboa, Lisbon, Portugal, and at UC. He was one of the promoters of the C^5Lab collaborative laboratory that joins the two Portuguese cement producers, five IST research centers, and the National Laboratory for Civil Engineering (LNEC), aimed at decarbonizing the concrete industry. Júlio has been CEO of Fundiestamo, a public company responsible for launching and managing the National Fund for the Rehabilitation of the Built Environment, and was a Partner of the GIPAC design office and Founding Partner of the SBE spin-off. He is a leader of or team member in more than 30 funded research projects and Supervisor of 16 concluded plus 10 ongoing PhD theses. Through the Association for the Development of Civil Engineering (ACIV) (UC) and the Association for Training and Development in Civil Engineering and Architecture (FUNDEC) (IST), he delivered more than 100 specialized consulting studies for several public and private entities, in Portugal and abroad, such as the World Monuments Fund and the Itaipu Dam (Brazil). He is the author of more than 500 publications, 166 listed in Scopus (*h*-index = 39). Júlio is included in the "World's Top 2% Scientists" list by Stanford University, Stanford, CA, USA, in the "Single Year" category in 2020 and 2021, and in the "Career" category in 2021. He was Chair of the *fib* Symposium 2021 in Lisbon, and President of the Portuguese *fib* group (GPBE) and, thus, head of the delegation, a member of the General Assembly, and a member of the Technical Council of *fib*. Júlio is a *fib* Honorary Life Member and *fib* Fellow. He is a member of *fib* Commissions COM4, Concrete and Concrete Technology; COM8, Durability; and COM9, Dissemination of Knowledge; and Convenor of *fib* Task Groups TG4.4, Aesthetics of Concrete Surfaces; and TG8.1, Model Technical Specification for Repairs and Interventions; and the editor of *fib* Bulletins 102 and 103. He is a Fellow of "Ordem dos Engenheiros," the Portuguese Engineers Association.

1st Speaker: Koichi Kobayashi, Professor, Gifu University

Having previously worked at Kyoto University, Kyoto, Japan, and Chubu University, Kasugai, Aichi, Japan, before moving to Gifu University, Gifu, Japan, Koichi Kobayashi was appointed a Full Professor in 2013 at Gifu University, where he serves as Deputy Director of the Center for Infrastructure Asset Management Technology and Research. In this role, Kobayashi is a Board member of the council responsible for the Maintenance Expert Training Program for the industry. He is also in charge of the Infrastructure Management

Leader Training Program in the master's course at Gifu University. In April 2023, Kobayashi assumed the position of Vice Dean of the Faculty of Engineering at Gifu University. He is an active member of *fib* Commission COM8, Durability, and has served as the Chair of the working group for "Maintenance" on the Japan Society of Civil Engineers (JSCE) Committee on Revision of Standard Specifications for Concrete Structures (2020 to the present), which led to the publication of the revised version of "Standard Specifications for Concrete Structures: Maintenance" in March 2023. He has also held administrative roles, including a previous position as a member of the administrative board for the Society of Material Science, Japan (JSMS) from 2015 to 2018. Currently, he serves as a member of the administrative board for the Japan Concrete Institute (JCI). He has received several awards for his research, including the Best Paper Award from JSCE in 2016, the Aftab Mufti Best Paper Medal 2011 from the *Journal of Civil Structural Health Monitoring* in 2013, and the Best Paper Award from JCI in 2006. Kobayashi's research interests include the durability of concrete structures, including chloride-induced corrosion of reinforcing steel, alkali-silica reaction in concrete structures, strain-hardening cementitious composites, nondestructive testing by electrochemical methods, and self-consolidating concrete, among others.

Presentation Title: Realkalization and Chloride Extraction/Desalination

Realkalization and chloride extraction (desalination) are methods for protecting concrete structures that are suffering reinforcing bar corrosion. Both methods use electrochemical reactions on the reinforcing bar surface or in the concrete induced by applying a direct current across temporary anodes on the concrete surface and the reinforcing bar inside the concrete for a specified time. Realkalization is an electrochemical repair method applied to concrete that is deteriorated by carbonation. An alkaline solution is permeated into the carbonated cover concrete by applying a direct current across the anode and the reinforcing bar to restore the pH level of the concrete or realkalize it. Desalination (or chloride extraction) is used for concrete structures deteriorated by chloride attack. By applying a direct current across the anode and the reinforcing bar, the chloride ions in the contaminated cover concrete are attracted to the anode and removed. Both are very effective repair methods that can prevent further deterioration of concrete structures when properly designed and executed. To prevent further reinforcing bar corrosion, it is important to: 1) set a current range that enables effective removal of deterioration factors without adverse effects on the reinforcing bar; 2) design an electrical circuit that ensures proper current distribution to the reinforcing bar network; 3) repair defects in the concrete that may obstruct the current distribution in advance; and 4) provide proper maintenance to the structures during and after the repair. In this seminar, the principles of realkalization and desalination, as well as their design, execution, quality control, and maintenance, will be explained.

2nd Speaker: José Sena Cruz, Associate Professor, University of Minho

José Sena Cruz is an Associate Professor in habilitation in the Department of Civil Engineering at the University of Minho, Guimarães, Portugal. He is the Assistant Director of ISISE and Director of the European Master Course in Advanced Structural Analysis and Design using Composite Materials – FRP++. Cruz is the author of more than 300 publications, including more than 80 papers in international journals. He is Co-Founder of FEMIX finite element model (FEM)-based software for advanced structural analysis, Principal Investigator of 12 research and development (R&D) projects, and a team member of 21 R&D projects. Cruz is Supervisor of 19 PhD theses (nine concluded) and 45 concluded MSc dissertations. He is a member of the "Project Team" CEN/TC 250/WG 4 with the mandate of developing the new Eurocode on "Design of Fibre-Polymer Composite Structures." He is also a member of *fib* Task Groups TG5.1, FRP Reinforcement for Concrete Structures, and TG8.1, Model Technical Specification for Repairs and Interventions. He is a consultant in the areas of inspection and diagnosis and strengthening of existing structures, with more than 50 works in this area. His research interests include the scientific area of structures, with particular emphasis on the strengthening of existing reinforced concrete structures and the development of new materials and structural systems with composite materials.

Presentation Title: Externally Applied or Near-Surface-Mounted Fiber-Reinforced Polymer

The externally bonded reinforcement (EBR) and near-surface-mounted (NSM) strengthening techniques with fiber-reinforced polymer (FRP) materials have been used to retrofit existing concrete members and structures, due to their simplicity, fast execution, efficiency, and durability. The first uses of EBR with FRP materials date back to the 1980s, whereas initial references to the NSM technique can be found in the late 1990s. While in EBR the FRP materials are externally bonded to the elements to be strengthened, in NSM reinforcement, the reinforcing materials are inserted in the concrete cover. Typically, epoxy adhesives are used to fix FRP reinforcing materials to concrete. These strengthening techniques require concrete surface preparation, application of the FRP, and, when required, protection (such as from vandalism, fire, and ultraviolet [UV] radiation). This work provides an overview of the main steps for the use of these systems in reinforced concrete structures.

Wednesday, July 12, 2023
5:30-6:30 PM Mumbai Time / 8:00-9:00 AM Detroit Time
Co-Host Organization: ACI India Chapter

INDIA CHAPTER OF ACI

Website: https://icaci.com

The ACI India Chapter was established on December 26, 1979, by a few enthusiastic concrete technologists with ACI for the "development and advancement of good practices in concrete technology" in India. Today, the chapter membership consists of over 2000 concrete professionals and organizations, including consulting civil and structural engineers, concrete practitioners, academicians, researchers, material scientists, constructors, students, and so on. They are driven by the chapter's motto, "Progress Through Knowledge." The chapter is distinctly active in organizing seminars, symposiums, technical lectures, meetings, and workshops with the participation of experts in the field and associated professional bodies.

Local Moderator: Yogini Deshpande, Technical Director, Renuka Consultants

Dr. Yogini Deshpande received her PhD in civil engineering from Purdue University, West Lafayette, IN, USA. She received her bachelor's degree in civil engineering and a master's degree in geotechnical engineering from Mumbai University, Mumbai, India. Prior to pursuing a PhD, she worked as a Research Fellow at the Atomic Energy Regulatory Board, Department of Defense, India. Today she is a well-known consultant, practicing engineer, and educator in the field of construction and infrastructure engineering. She has extensive research and application experience in the development of high-performance concretes by waste utilization, recycling of concrete, and development of smart materials. Deshpande has taught at Michigan Technological University, Houghton, MI, and University of Alabama, Tuscaloosa, AL, USA. She has published over 40 research papers and given over 100 talks at many international conferences in the field of civil engineering. Currently, she heads Renuka Consultants, a unique end-to-end infrastructure assessment and consulting company that provides research, engineering testing, and consulting solutions in the field of construction. Under her leadership, the company has shown rapid technical growth and received various accreditations including the distinguished NABL accreditation for testing laboratories. Deshpande has been involved in many prestigious projects such as nuclear power plants, Mumbai Trans-Harbour Link, Thane Creek Bridge-3, and Chhatrapati Shivaji Statue.

1st Speaker: Radhakrishna G. Pillai, Professor, IIT Madras

Dr. Radhakrishna G. Pillai is a Professor in the Department of Civil Engineering at IIT Madras, Chennai, India. He received his MS and PhD in civil engineering at Texas A&M University, College Station, TX, USA. For the last 12 years, he has been teaching and researching in the areas of construction materials, concrete technology, corrosion assessment, corrosion control, and repair of concrete structures. Pillai has graduated eight PhD students, published more than 60 journal papers, and has received awards from NACE International. He has been active in the Indian Concrete Institute, NACE International (now AMPP), and RILEM. Pillai is the Regional Convener for RILEM South Asia.

Presentation Title: Corrosion and Service Life of Steel Cementitious Systems

Developing techniques for corrosion prevention and service life estimation of concrete structures is becoming very important. Chloride threshold is one of the key input parameters that is essential to estimate

the service life of steel-cementitious (S-C) systems. It is traditional to assume the chloride threshold as 0.4% by weight of blend. However, chloride threshold is a function of both the steel and cementitious systems involved (not the former alone) and no suitable test methods are available to determine this for various S-C systems. This prevents engineers from estimating service life and choosing suitable materials to achieve a specific target corrosion free service life. In this presentation, the development of a corrosion cell for S-C systems, complexities associated with the interpretation of electrochemical data from S-C systems, and eventual development of short-term test method (hr-ACT) to determine the chloride threshold of S-C systems with highly reactive cements will be presented. Then, the modification of hr ACT method to suit the specific requirements of testing S-C systems with corrosion inhibitors, coated bars, prestressing steel, etc. will be presented. A significant database on the chloride threshold will be presented. Finally, the effect of chloride threshold on the service life of various S-C systems and the nomograms developed for service life design will be presented.

2nd Speaker: Adithya Jain, CEO and Co-Founder, Tvasta Manufacturing Solutions Pvt. Ltd.

Adithya Jain is the CEO and Co-Founder of Tvasta Manufacturing Solutions Pvt. Ltd., a full-stack 3-D printing solutions company in India. An alumnus of Indian Institute of Technology, Chennai, Tamil Nadu, India, he leads the organization's areas of business development, process integration, and corporate management. Tvasta builds end-to-end technology for digitizing construction through integrating software, machine, material, and process. The company won the National Startup Award in 2021 and best startup of year from the Indian Technology Development Board in 2019. It has also been selected by the Indian Ministry of Housing and Urban Affairs to work on 3-D printing technologies for the "Housing for All" program. Tvasta has built various 3-D printed structures, including a living quarters and commemorative statues.

Presentation Title: Challenges and Strategies for Project Execution through Concrete 3-D Printing Technology

Concrete 3-D printing has emerged as a promising technology for revolutionizing the construction industry. However, the implementation of this technology in real-world projects presents several setbacks. This presentation will explore the challenges and strategies for project execution using concrete 3-D printing technology. The presentation will first address the current state of concrete 3-D printing technology in project execution, highlighting its benefits such as optimized design and mass producibility of structures and limitations such as environmental impact on material properties. It will then elaborate the challenges that arise during building a structure using the technology including the major challenge of absence of standardized printing process and others like need for specialized skills and knowledge for operation and maintenance of equipment. The presentation will conclude with strategies that can be employed for successful execution of projects using the technology. Strategies that will be put forth include collaboration with experts for incorporating best industrial practices, standardizing processes for efficiency and consistency, and increasing investment in research and development. The discussion will be presented with real-world case studies to illustrate both successful and unsuccessful implementations of the technology to provide a better understanding of the issue. Concrete 3-D printing has the potential to automate the construction industry, but it is important to address the crucial bottlenecks that prevent the technology from becoming a regular construction practice. The presentation aims to throw light upon the important challenges and adaptable strategies for successful implementation of this technology in real-world projects.

Wednesday, July 12, 2023
8:00-9:00 PM Bangkok Time / 9:00-10:00 AM Detroit Time
Co-Host Organization: Thailand Concrete Association

Website: https://thaitca.or.th

Thailand Concrete Association (TCA) was founded in January 2004. TCA has been recognized as one of the leading professional organizations in Thailand. TCA has focused on three groups of work in the field of concrete and related materials: structural concrete engineering, concrete and mortar materials, and repair and maintenance. Its objectives are to strengthen the advanced research, practice, and innovation in cement, mortar, and concrete technology in Thailand. Its tasks include organizing the Annual Concrete Conference and international conference; conducting training and seminars; writing manuals, standards, and books; and hosting the awards programs for promoting the advanced knowledge and use of concrete for professionals and students. TCA has been associated with several international cement and concrete organizations, including ACI, Asian Concrete Federation (ACF), the International Congress on the Chemistry of Cement (ICCC) Permanent Steering Committee, and the Global Cement and Concrete Association (GCCA).

Local Moderator: Nattapong Makaratat, Assistant Professor, King Mongkut's University of Technology North Bangkok

Nattapong Makaratat is an Assistant Professor and has worked in the Department of Civil and Environmental Engineering Technology at King Mongkut's University of Technology North Bangkok (KMUTNB), Bangkok, Thailand, since 2011. He is also Assistant to the President for the University's Environmental and Physical Development at KMUTNB. He has been the Secretary General for TCA since 2016. TCA was named as the host of the 16th International Congress on the Chemistry of Cement (ICCC 2023) under his assistance to the TCA President. His research interests include concrete materials and construction technology. Makaratat received his Bachelor of Engineering (civil engineering), Master of Engineering, and PhD (civil engineering) from King Mongkut's University of Technology Thonburi (KMUTT), Bangkok, Thailand, in 2002, 2004, and 2011, respectively. He has worked as a structural engineer and is licensed as a senior professional engineer in civil engineering.

1st Speaker: Thayanan Boonyarak, Chief of Engineering Division, SEAFCO Public Company Limited

Thayanan Boonyarak is a Chief of the Engineering Division of SEAFCO Public Company Limited, Bangkok, Thailand. He is a committee member of the Geotechnical Engineering Division of the Engineering Institute of Thailand (EIT) and the drafting committee of specifications in Thailand for foundation design, bored pile construction, and safety standards in construction. Boonyarak is an expert in deep foundations, retaining structures, deep excavation, and soil-structure interactions. He has been involved in the design and construction of several geotechnical and structural works in Thailand, Hong Kong, and Myanmar for more than 20 years. Boonyarak has published more than 50 papers in peer-reviewed journals and international conference proceedings.

Presentation Title: Optimization of Tremie Concrete Properties for Very Deep Bored Pile and Diaphragm Wall in Bangkok

Due to the increasing demand for the construction of high-rise buildings and deep basements in Bangkok, Thailand, the size and depth of bored pile and diaphragm walls has increased substantially to resist the required load and earth pressure. The depth of bored pile and diaphragm walls can range from 70 to

100 m and from 30 to 70 m, respectively. Casting concrete through tremie pipes to such depths is one of the most important processes for bored pile and diaphragm wall construction. However, it was reported that bleeding and channeling of fresh concrete caused integrity problems and increased the permeability of the hardened concrete. In this study, 18 mixture designs of fresh concrete were tested to identify bleeding behavior under high concrete pressure. Variations of components in concrete, including portland cement, hydraulic cement, fly ash from two sources, microsilica, retarder (Type D), and high-range water-reducing admixture (Type F) were investigated. A novel pressure bleeding apparatus was adopted to simulate fresh concrete behavior at very deep levels. According to the findings, optimum ranges of parameters for minimizing pressure bleeding and segregation are proposed. A new concrete mixture design was developed and used in a case study of a fully instrumented static load testing of a 100 m deep bored pile. Apart from slump testing, on-site testing of fresh concrete including the visual stability index (VSI), concrete filtration, and slump flow is required to control the potential of concrete segregation, water retention ability, workability, and viscosity, respectively.

2nd Speaker: Athasit Sirisonthi, Vice President, Engineering Department, Sino-Thai Engineering and Construction Public Company Limited

Athasit Sirisonthi is Vice President of the Engineering Department at Sino-Thai Engineering and Construction Public Company Limited. He has more than 20 years of experience in the design and construction industry, especially in infrastructure projects such as airport rail links, the Metropolitan Rapid Transit (MRT) Purple Line, the MRT Blue Line, and the MRT Pink Line/Yellow Line monorail system.

Presentation Title: Development and Application of Monorail System in Thailand

Bangkok is the capital and most populous city of Thailand. In the last decade, Bangkok has attracted millions of migrants seeking economic opportunity, and the city is expanding quickly. Recently, Thailand's Mass Rapid Transit Authority (MRTA) decided to adopt a monorail system in Bangkok as a rapid transit system due to the limited space, narrow roads, and sharp curves in the city. The design of the monorail track lines permits flexible and various alignments that include curves of small radiuses and large slopes. The first two lines—the MRT Pink Line and MRT Yellow Line—consist of elevated structures approximately 64.9 km, 53 stations, two depots, and two park and rides. MRTA has awarded this project (design, test run, and construction of the first two lines) to the BSR Joint Venture, and they invited Sino-Thai Engineering and Construction Public Company Limited, Thailand, as the exclusive contractor responsible for civil works and the guideway beam supplier for the project. The project's total duration is 39 months. Traditionally, monorail girders are single-span prestressed concrete girders or two-span post-tensioned span prestressed concrete girders. In contrast to the traditional monorail girders, Sino-Thai is proposing a novel three-span post-tensioned monorail system in which prestressed monorail girders will be post-tensioned in such a way that post-tensioned cables will run through three consecutive spans. The salient features of the proposed system are low cost, more safety, and less construction time. To ensure that this concept can be applied practically, full-scale tests of continuous guideway beams until the formation of the collapse mechanism were also performed.

Wednesday, July 12, 2023
4:00-5:00 PM Warsaw Time / 10:00-11:00 AM Detroit Time
Co-Host Organization: Polish Academy of Sciences

Website: https://pan.pl/en/

The Committee of Civil Engineering of the Polish Academy of Sciences (CCE PAS) was established on October 30, 1951. The main research interests of CCE PAS include concrete structures, steel structures, loads acting on an object, the interaction of an object with the ground, building materials, insulation systems, heating, ventilation, water and energy supply systems, sanitary systems, hydrotechnical structures, road and bridge engineering, the technical infrastructure of cities, and organization and planning of construction processes. The Committee coordinates cooperation with international organizations including ACI, *fib*, and RILEM. CCE PAS has been continuously publishing the quarterly journal *Archives of Civil Engineering* as well as the *Study of Civil Engineering* series. The strength of the Committee's activities is its sections. Currently, there are 11 sections covering the entire range of the Committee's competence. All Section Chairs are members of the Committee. One of the Committee's major tasks is to disseminate science. Conferences, seminars, symposia, and congresses serve this purpose. The Committee and its sections are co-organizers or patrons of these events. The members of the CCE are members of the scientific committees of conferences, to take care of the substantive level of the papers. Two national conferences are organized under the direct patronage of the Committee: the annual scientific conference in Krynica-Zdrój (the 65th was in 2020) and the scientific and technical conference "Structural Failures," held every 2 years in Międzyzdroje (the 30th Conference was in 2022).

Local Moderator: Andrzej Garbacz, Professor, Warsaw University of Technology

Professor Andrzej Garbacz is Dean of the Faculty of Civil Engineering at the Warsaw University of Technology, Warsaw, Poland. He is a President of the International Congress on Polymers in Concrete, Chair of the Scientific Committee of the Building Research Institute in Warsaw (ITB), a member of the Committee of Civil Engineering (KILiW) of the Polish Academy of Sciences (PAN), and Vice Chair of the Building Materials Engineering Section of KILiW PAN. Garbacz collaborates with many countries around the world—such as Canada, Belgium, the United States, and Portugal—in the field of new material solutions, with particular emphasis on the principles of sustainable construction. He is the author and co-author of more than 250 papers published in international and Polish journals and conference proceedings. Garbacz co-authored the report "Development of Specifications and Performance Criteria for Surface Preparation Based on Issues Related to Bond Strength," supported by the Bureau of Reclamation and the ACI Foundation, which was awarded the Bureau of Reclamation's Science and Technology Project of the Year in 2018. His research interests include polymer-cement composites; use of by-products in polymer and cement concrete technology; microstructure characterization; repair engineering; compatibility approaches to multilayer systems; and nondestructive evaluation of structures, including the quality of multilayer repair systems.

1st Speakers: Izabela Hager, Professor, Cracow University of Technology, and Katarzyna Mróz, Research and Teaching Assistant, Cracow University of Technology

Scientific and research works conducted by Izabela Hager cover a spectrum of issues in the production of construction materials and products, particularly in the field of concrete technology and other cement-based materials, but also non-cementitious binders. In addition, Hager deals with the durability issues of building materials—in particular, the spectrum of activities includes problems related to the fire resistance of materials and structural elements and the phenomenon of explosive concrete spalling in a fire. She is a Senior Member of RILEM, actively working in Technical Committees 227-HPB: Physical Properties

and Behaviour of High-Performance Concrete at High Temperature; and 256-SPF: Spalling of Concrete Due to Fire: Testing and Modelling. Research undertaken into the possibility of using sewage sludge, mine waste, and demolition waste should also be mentioned. Hager's team conducts research on the development of compositions and properties of geopolymer materials. Problems related to the influence of their design on the properties of the mixture as well as the performance properties and durability of the hardened material are analyzed. Work is underway to use the superior resistance of these binders at high temperatures and to determine their resistance to chlorides. Hager puts great emphasis on the aspects of sustainable construction in all her research.

Katarzyna Mróz works at the Faculty of Civil Engineering, Cracow University of Technology, Kraków, Poland. She is a member of RILEM Technical Committees 227-HPB: Physical Properties and Behaviour of High-Performance Concrete at High Temperature; 256-SPF: Spalling of Concrete Due to Fire: Testing and Modelling; and 306-CFR: Concrete during Fire - Reassessment of the Framework. She has been a member of the Construction Products Council RWB at the Polish Construction Products Department since 2020. After her internship with the Scientific and Technical Center for Building (CSTB) in France in 2023, Mróz was awarded the START scholarship from the Foundation for Polish Science for the most talented young scientists. In 2018, she was awarded the doctoral scholarship financed by the National Science Centre in Poland (NCN ETIUDA). Mróz has experience in destructive and nondestructive assessment of building materials with a focus on their behavior in fire and post-fire conditions. She deals with concrete technology and alternative binder (geopolymer, alkali-activated materials [AAM]) development and design, properties testing, and durability issues of building materials with special attention to fire conditions. She was a part of two international research and mobility projects funded by the Polish National Agency for Academic Exchange (NAWA). Mróz is the author of more than 30 scientific publications in journals, monographs, and conference proceedings, has coordinated one project, and has participated in four grants. She was the Project Coordinator for NCN 2016/23/N/ST8/01155, Influence of Restraint of Thermal Strains Characteristic of Concrete Spalling in Fire, from 2017 to 2020.

Presentation Title: **Spalling of Concrete under Fire Conditions—Testing of Concrete Susceptibility to Spalling in Fire**

Fire spalling of concrete is defined as the violent or nonviolent breaking off of concrete pieces from the surface of a structural element when exposed to high and rapidly rising temperatures, as experienced in a fire. Spalling may also become the combination of several or, in a particular case, all the listed types. Different forms and intensities may characterize each type of spalling. So far, numerous experimental and numerical research was carried out to describe the fire spalling in concrete. The most common attempt is to indicate experimentally different parameters that may enhance spalling risks, such as the concrete mixture composition, heating scenario, initial water content, geometry of specimens, or mechanical boundary conditions. Testing of concrete spalling in fire is done on specimens of different sizes and shapes using different testing procedures. Due to the variety of research setups and experimental methods and the lack of standardized testing guidance, there is currently a great need to provide recommendations on methods to assess the risk of fire spalling of concrete. In recent years, members of the RILEM Technical Committee 256-SPF: Spalling of Concrete due to Fire: Testing and Modelling and moderators of Task 3: Modelling of Spalling Phenomenon are writing the recommendations on testing of concrete propensity to spalling.

2nd Speaker: Piotr Woyciechowski, Professor, Warsaw University of Technology

Piotr Woyciechowski is a graduate and employee of the Warsaw University of Technology. Since 2016, he has been the Vice Head and then Head of the Institute of Civil Engineering. He is Chair of the Building Durability Committee of the Polish Society of Civil Engineers and Technicians (PZITB) and Chair of the Scientific Committee of the KONTRA Conference, "Durability of Buildings and Protection Against Corrosion." Woyciechowski is the author of approximately 220 publications, over 30 research projects in the subject area of concrete technology, and over 150 expert opinions and reports on the properties of building materials. According to Google Scholar, his publications have been cited more than 1000 times and his *h*-index is 16. He has over 30 years of

teaching experience in the field of building materials, concrete technology, and the technology of construction works. Woyciechowski is the tutor for approximately 200 master's degrees and engineering theses, as well as three defended and five ongoing doctoral theses. His research interests include the phenomenon of concrete carbonation, its modeling and role in the analysis of the concrete life cycle, carbon dioxide sequestration in concrete, issues of external and internal curing as factors shaping the durability of concrete, issues of precast concrete production and maintenance, sustainable development in concrete technology, and issues of testing resistance and predicting durability of concrete in extreme environmental conditions.

Presentation Title: Contribution of Carbon Dioxide Sequestration during Concrete Structure Exploitation into CO_2 Emissions Balance

Concrete exposed to atmospheric air inevitably undergoes the process of carbonation. It is a process that threatens the durability of steel reinforcement but does not cause negative effects in relation to the concrete matrix. At the same time, it is one of the ways of sequestering CO_2 in concrete, because the reaction product of CO_2 with portlandite is calcium carbonate permanently incorporated into the concrete microstructure. This effect, properly considered in the life-cycle analysis of cement/concrete, can significantly reduce the carbon footprint of these materials. The sequestration potential of concrete results from the content and type of cement (and, consequently, the amount of $Ca(OH)_2$ available for the reaction). The basic usual assumption is that the entire volume of concrete under consideration will undergo carbonation. However, this does not happen, because the depth of concrete carbonation during its service life (usually 50 or 100 years) does not exceed a few centimeters. This is due to the speed of the process decreasing over time, but the literature on the subject is not consistent on whether this speed tends to zero or decreases according to the parabolic relationship. The assumption in this regard is a necessary element of the correct estimation of what part of the sequestration potential of concrete can be used in the analysis of the carbon footprint in the life cycle of a particular structure. The presentation includes an example of such an analysis for a fragment of a road viaduct structure, also considering scenarios related to further CO_2 sequestration in fragmented post-demolition concrete.

Wednesday, July 12, 2023
5:00-6:00 PM Madrid Time / 11:00 AM-12:00 PM Detroit Time

Co-Host Organization:
Asociación Española de Ingeniería Estructural (ACHE)

Website: http://www.e-ache.com/

The Spanish Association of Structural Engineering (ACHE) is the main Spanish association of structural-related professionals, including engineers and architects. Originally created as ATHEP in 1951 by Eduardo Torroja and later merged with the Spanish Concrete Group (GEHO), ACHE has promoted knowledge and research in the field of structural concrete first, and structural engineering later. ACHE has published the journal *Hormigón y Acero* since 1951 with all the issues published open access, thus providing valuable insight into Spanish structural engineering over the years.

Local Moderator: Conchita Lucas, Division Head, DRAGADOS Technical Directorate

Conchita Lucas is the Head of one of the five divisions of the DRAGADOS Technical Directorate, dealing with Civil Works Structures, Construction Processes and Temporary Works, Marine Works, and Geotechnics. She is the former General Secretary of ACHE, a role she held for 13 years. She has over 20 years of working experience, 19 of them in the Technical Directorate of DRAGADOS, providing technical support and advice to the construction of several outstanding bridges over the world. She received her MSc in civil engineering from the Universidad Politécnica de Madrid, Madrid, Spain.

1st Speaker: José M. Adam, Professor, Universitat Politècnica de València

Jose M. Adam is a Professor at the Universitat Politècnica de València (UPV), Valencia, Spain, where he teaches at the School of Civil Engineering in the Department of Construction Engineering and Civil Engineering Projects. He is the Group Leader of the Building Resilient research group (https://b-resilient.webs.upv.es/) at the Institute of Science and Technology of Concrete (ICITECH) at UPV. Before joining UPV in 2005, Adam worked as a structural engineer and was involved in the design and construction of many large projects. He is a Partner-Founder of CalSens (https://cal-sens.com/), which is involved in monitoring structures, structural assessment, and providing support for decision-making. He is Senior Editor of *Construction and Building Materials*, one of the leading journals in its field. Adam is an experimental researcher, and his research has always been associated with ambitious experimental campaigns, including many on full-scale structures. He combines basic and applied research with a high degree of transfer to industry. He was recently awarded a European Research Council (ERC) Consolidator Grant, which is one of the European Union (EU)'s most prestigious research grants, for €2.5 million. He has always been interested in improving the resilience of buildings and infrastructures. His research interests include structural engineering, particularly structural assessment, progressive collapse, and robustness.

Presentation Title: Enhancing the Robustness of Reinforced Concrete Building Structures

As a result of the persistent occurrence of catastrophic structural failures, past decades have been marked by growing interest in progressive collapse and structural robustness. Nevertheless, it must be said that most of the research in this field has focused on computational simulations or laboratory testing of reduced-scale subassemblies. Although many vital aspects of structural behavior in extreme situations are now better understood thanks to such studies, these strategies have significant limitations that can only be overcome through full-scale testing of real structures. During this presentation, Professor Adam will first present some of the major research works performed by the Building Resilient research group. This

includes experimental tests involving the sudden removal of different columns from full-scale flat slabs and precast reinforced concrete building structures. In both cases, the buildings were designed considering conventional construction techniques but incorporating simple measures to enhance robustness. Because no failure propagation occurred in any of the tests, this clearly showed that relatively inexpensive measures based on providing continuity can be very effective in preventing progressive collapse in certain situations. Despite this fact, it must be said that other situations do exist for which continuity can contribute to pulling down parts of a structure that would otherwise be unaffected. This is well recognized by experts in building demolition and firefighters and is particularly important when large initial failures occur or for buildings with large spans between columns. Because almost all design methods for improving robustness included in relevant codes rely only on load redistribution, this limitation needs to be addressed urgently. Adam will also present a completely novel fuse-segmentation design approach to overcome this issue that is currently being developed as part of the Endure project funded by the European Research Council.

2nd Speaker: Laura Granda, Senior Bridge Manager, ACCIONA Construction, Technical Advisor

Laura Granda is a Senior Bridge Manager at ACCIONA Construction. She has extensive construction experience and a background in design engineering, gained over the last 24 years on major complex civil infrastructure projects around the world. For the last 17 years, she held management roles in large-scale bridge and infrastructure projects. She started her career as a project engineer for a bridge design firm and has subsequently built a career providing specialist support to major bridge projects all over the world. She is regularly called upon to act as a technical advisor on bridge construction projects. Granda offers advice on structural design and provides technical assistance for bridge erection as well as support for managing technical issues related to construction. Her contributions include a long list of projects, such as the Cebu-Cordova Link Expressway project in Cebu, the Philippines; and the Walterdale Bridge in Edmonton, AB, Canada. She is a member of ACHE and the International Association for Bridge and Structural Engineering (IABSE). Granda received her BSc and MSc in civil engineering. She is a licensed professional engineer in Alberta and British Columbia, Canada.

Presentation Title: Concrete Mixture Design Strategies in the Cebu-Cordova Link Expressway Project

A well-planned concrete mixture design strategy and the ability to self-perform concrete work were essential for the successful completion of the Cebu-Cordova Link Expressway project by ACCIONA Construction and its partners. The strategies of these mixture designs considered different concrete structural elements geometries and construction techniques; NU precast girders with post-tensioning technology with early-age load; cast-in-place cantilever segments in a cable-stayed bridge; off-shore piles of 2.5 m diameter; pylon pile-cap placements of 3000 m^3 as a 60-hour placement; durability requirements and mixture workability; and elastic modulus, strength capacity over time, and shrinkage and creep testing characterization. For the control of the temperature on mass concrete when curing, the geometric control of the main bridge, and the precast girders quality control and assurance, the following thorough studies and conclusions were essential: the mixture design, despite its high fly ash content (30%); the addition of ice during batching demanded cooling systems with coils and water refrigeration to keep core temperatures below limits as prescribed by ACI 308R-16 to mitigate potential ettringite formation; the real elastic modulus value is usually 70% lower than the one obtained from the code formulas and is very dependent on the concrete mixture; and creep and shrinkage tests were essential for robust geometric control performance.

Wednesday, July 12, 2023
5:00-6:00 PM London Time / 12:00-1:00 PM Detroit Time

Co-Host Organization:
The Institute of Concrete Technology (ICT)

The Institute of Concrete Technology

Website: www.theict.org.uk

The Institute of Concrete Technology (ICT) was formed in 1972. Full membership is open to all those who have obtained the Diploma in Advanced Concrete Technology and MSc in Advanced Concrete Technology (University of Leeds, Leeds, UK). The Institute is internationally recognized, and the Diploma and MSc have worldwide acceptance as the leading qualifications in concrete technology. The Institute sets high educational standards and requires its members to abide by a Code of Professional Conduct, thus enhancing the Professional Affiliate body of the UK Engineering Council. The Institute's mission is to preserve and promote concrete technology as a recognized engineering discipline and to consolidate the professional status of practicing concrete technologists worldwide. Membership in ICT is open to a wide range of people with a professional interest in concrete, from students to those that have worked in the industry for many years.

Local Moderator: Colin Nessfield, Technical Manager, MPA Precast

Colin Nessfield is Technical Manager of Mineral Products Association (MPA) Precast and President of The Institute of Concrete Technology.

1st Speaker: Gareth Wake, Director, BRMCA-MPA

Gareth Wake is Director of the British Ready-mixed Concrete Association (BRMCA)-MPA.

Presentation Title: Specifying Lower-Carbon Concrete

This presentation discusses specifying lower-carbon concrete according to BS 8500.

2nd Speaker: Alalea Kia, UKRI Future Leaders Fellow, Royal Academy of Engineering Associate Research Fellow

Alalea Kia is a UK Research and Innovation (UKRI) Future Leaders Fellow and a Royal Academy of Engineering Associate Research Fellow in the UK Collaboratorium for Research in Infrastructure & Cities (UKCRIC) Centre for Infrastructure Materials of the Department of Civil and Environmental Engineering at Imperial College London, London, UK. Her research involves the development of a high-strength clogging-resistant permeable pavement (also known as Kiacrete) capable of retaining sufficient porosity and permeability for storm-water infiltration without requiring frequent maintenance. This innovative system (international patent PCT/GB2019/053217) is not only resistant to clogging but also has high permeability, compressive strength, and durability, and will help alleviate the impact of climate change, including urban flooding, storm-water runoff, and future extreme weather events. She deployed her innovation on a large scale at Imperial College's White City Campus in August 2020, with long-term drainage and durability monitoring showing excellent performance. She is also the Founder of Permia, a spin-out company with the aim of maximizing the impact of her research. In the 2 years after completing her PhD, Kia was a Research Associate in the Department of Materials at Imperial College London, developing a prototype delivery system for her novel laboratory concept to be delivered on a commercial scale. Her research has been recognized through several fellowships and awards, including being chosen as one of the 2022 "Top 50 Women in Engineering" by the Women's Engineering Society and receiving the "Hawley Award for Engineering Innovation" from the Worshipful Company of Engineers and Engineering Council. Kia has also received numerous invitations to write about the novelty and benefits of her technology in The Concrete Society's *Concrete Magazine* and the Institute of Materials, Minerals and Mining's *Clay Technology* magazine, and has been featured in The Concrete Centre's *Concrete Quarterly* publication and Issue 52 of the *Imperial Magazine*. Outstanding students and researchers are always welcome to reach out about potential PhD, postdoctoral, visiting researcher, MEng, and MSc research project opportunities with her Resilient Sustainable Infrastructure Group. They continuously recruit candidates for fully funded positions. Her research interests include urban flood mitigation and adaptation, sustainable drainage systems, permeable concrete pavements and their application in extreme weather and loading scenarios, multi-scale experimental and numerical modeling methods, and the durability of cement-based materials. Kia received her Master of Engineering (MEng) in civil and environmental engineering from University College London, London, UK, in 2014 with First Class Honors. She joined the Structures section at Imperial College London to undertake a PhD in the control of clogging in permeable concrete pavements, which she completed in 2019.

Presentation Title: Climate Change Resilient Permeable Infrastructure for a Sustainable Built Environment

Flooding currently costs the United Kingdom £2.2 billion annually and is projected to rise to £27 billion by 2080 without significant flood-resilient infrastructure investment. Permeable concrete pavements are one of the most promising flood mitigation strategies. However, they suffer from low permeability, high clogging potential, and low strength and durability. This presentation will introduce the first high-strength clogging-resistant permeable pavement (called Kiacrete, also known as CRP) and highlight its superior laboratory performance, showing in-depth results on its freezing-and-thawing durability performance. It will also cover the first large-scale deployment of Kiacrete, which took place in August 2020 at Imperial College's new White City Campus, and its durability and drainage performance along with its contributions toward net-zero carbon.

Wednesday, July 12, 2023
7:00-8:00 PM Italy Time / 1:00-2:00 PM Detroit Time
Co-Host Organization: ACI Italy Chapter

Website: https://www.aciitaly.com/

The ACI Italy Chapter is the Italian chapter of ACI, one of the most important associations in the world in developing knowledge and practice in concrete materials and structures. The chapter pursues many objectives, among which are dissemination of scientific research and organization of educational events promoting useful relationships between academic and industrial representatives. The scientific divulgation takes place through publications, conferences and conventions, workshops, educational courses, awards, and any other suitable initiatives. These activities aim at collecting, developing, and promoting knowledge to improve design, development of new construction cementitious-based materials and techniques, conservation, and maintenance tools for existing reinforced and prestressed concrete buildings and infrastructures. The ACI Italy Chapter was founded in 2003 by some eminent personalities of academic and industrial institutions. The first President was Professor Mario Alberto Chiorino, Professor Emeritus of the Polytechnic University of Turin, Honorary President of the Chapter. The present Board of Directors was elected in February 2017: Professor Luigi Coppola (University of Bergamo) and Professor Liberato Ferrara (Milan Polytechnic) are the President and the Vice President, respectively, since January 1, 2019. The ACI Italy Chapter has about seventy individual members and 43 students/young members.

Local Moderator: Mauro Eugenio Giuliani, Manager, REDESCO

Mauro Eugenio Giuliani received his degree in civil engineering from the Technical University of Milan (PoliMi), Milan, Italy, in 1991. He is a chartered consulting engineer in Milan, Italy; Madrid, Spain; Geneva, Switzerland; and Cyprus. Giuliani is a nontenured professor at the Technical University of Milan since 2004. His interests are focused on the design and supervision of special structures in concrete, prestressed concrete, and composite steel-concrete. He started his work mainly in the bridge design field, then focusing on structures for architecture, enhancing cooperation with worldwide known preeminent architects. He lives and works in Milan, managing the Consulting Engineer Firm REDESCO (REsearch, DEsign, COnsulting), based in Milan, Como, and Geneva. Giuliani is fluent in Italian, Spanish, English, and French.

1st Speaker: Maria Novella Leone, Professor, University of Salento

Maria Novella Leone obtained the title of materials engineer in 2001. From April 2001 to July 2002, she carried out research support activities at the Department of Innovation Engineering through collaborations on topics related to structural and innovative materials for structural applications. From August 2004 to February 2005, she carried out studies and research at the Magnel Laboratory for Concrete Research, Department of Structural Engineering, University of Ghent, Belgium. In May 2005 Novella received her PhD in materials engineering from the University of Lecce, Lecce, Italy. From July 2005 to November 2008, she carried out research activities at the Department of Innovation Engineering in the disciplinary sector ICAR/09 through post-doc fellowships. In December 2008 she became a researcher in the SSD ICAR/09 at the Department of Innovation Engineering of the University of Salento, Lecce, Italy, and since December 2019 he has been full professor in the same department. She is currently the owner of the courses in Construction Techniques - mod. B

(bachelor's degree in civil engineering), Design of Interventions on Existing Structures (C.I), and Special Structures and Fire Resistance of the master's degree in civil engineering. She is the author of over 130 international publications.

Presentation Title: Innovative Cementless Systems for Concrete Structures Reinforced with Metallic and Nonmetallic Reinforcing Bar

This presentation deals with the seismic upgrade of damaged columns and slabs with repair mortars totally free of Portland cement to dramatically reduce the carbon footprint of construction materials. A comparative study of metallic and nonmetallic rebars will be presented.

2nd Speaker: Giulio Morandini, Corporate Product Line Director of the Construction Line, Mapei

Giulio Morandini received his degree in civil engineering and then specialized in the strengthening and reinforcement of existing buildings at the Faculty of Engineering of the Politecnico di Milano, Milan, Italy. He has been working for Mapei for 21 years and since 2020 he has been the Corporate Product Line Director of the Construction Line for Mapei. He has collaborated in the writing of the Italian Guidelines for Structural Reinforcement of the CNR (Italian National Research Council) with composite materials on masonry and concrete buildings (CNR DT 200/2004), steel buildings (CNR DT 201/2005), and wooden buildings (CNR DT 202/2005). Since 2008 he has been a member of the Steering Committee of Assocompositi (the Italian Industry Association for Composite Materials) which represents the Italian Division of EUCIA (European Composites Industry Association). He is also a director of the ACI Italy Chapter Board. Morandini is co-author of more than 15 essays and dissertations concerning the strengthening of existing masonry and concrete buildings with FRP and FRG composite materials as well as the UHPCC technology. He has actively taken part in the study and implementation of more than 300 projects for the strengthening with composite materials of buildings damaged after the earthquake in Italy (Umbria-Marche in 2002, Salò in 2004, L'Aquila in 2009, Emilia in 2012, Marche 2016) and abroad (New Zealand in 2011, Lorca – Spain 2011).

Presentation Title: Ultra-High-Performance Concrete for Retrofitting and Seismic Upgrading of Existing Concrete Structures

This presentation is focused on ultra-high-performance fiber-reinforced concrete (UHPFRC) based on highly efficient pozzolans, high-range water reducer, and fibers to achieve high compressive and tensile strength material to use in rehabilitation and seismic upgrade of existing reinforced concrete structures. Use of UHPFRC allows reduction of both concrete volume and traditional steel reinforcing bar to diminish the carbon footprint of the repair works.