



FINAL PROGRAM

ACI-NBSC 2022

The new boundaries of structural concrete

Lecce (Italy), September 8-9, 2022

Organized by

American Concrete Institute – Italy Chapter

University of Salento – Department of Engineering for
Innovation



**UNIVERSITÀ
DEL SALENTO**

Department of Engineering
for Innovation



The new boundaries of structural concrete (NBSC)

Lecce (Italy), September 8-9, 2022

ORGANIZED BY:

American Concrete Institute Italy Chapter
Department of Engineering for Innovation of University of
Salento

SPONSOR:

ANCE | Brindisi
ANCE | Lecce
BCC Terra D'Otranto
Biemme
FibreNet
Kerakoll
Logocert
MAPEI
Petito Prefabbricati
Prefabbricati Pugliesi

WORKSHOP TOPICS:

Innovative cementitious materials.
Corrosion and self-healing in reinforced concrete (RC)
structures
Concrete and reinforced-concrete under extreme
environmental conditions (earthquake, wind, temperature)
Concrete and reinforced concrete in accidental conditions
(fire, impact, blast)
Green concrete and sustainability of concrete structures
Short- and long-term behaviour of RC structures
Bond and connections in RC, prestressed concretes (PC)
and mixed structures
Strengthening and repair of concrete structures
Performance and life-cycle assessment (LCA) of concrete
structures
Aging and deterioration of Concrete Structures

ORGANIZING COMMITTEE:

UNIVERSITY OF SALENTO

Maria Antonietta Aiello (Chair, AcI Italy Chapter)
Riccardo Angiuli
Alessio Cascardi
Antonio Licciulli
Francesco Micelli
Daniele Perrone
Vincenzo Romanazzi

ACI ITALY CHAPTER

Mario Alberto Chiorino (Honorary President)
Luigi Coppola (President)
Liberato Ferrara (Vice-President)
Roberto Realfonzo (Past President)

SCIENTIFIC COMMITTEE:

Maria Cruz Alonso (Spain)	Enzo Martinelli (Italy)
Carmen Andrade Perdrix (Spain)	Stijn Matthys (Belgium)
Luigi Biolzi (Italy)	Viktor Mechtcherine (Germany)
Denny Coffetti (Italy)	Marco Menegotto (Italy)
Valeria Corinaldesi (Italy)	Barzin Mobasher (Usa)
Edoardo Cosenza (Italy)	Harald Müller (Germany)
Marco Di Prisco (Italy)	Antonio Nanni (Usa)
Rolf Eligehausen (Germany)	Emidio Nigro (Italy)
Ciro Faella (Italy)	Alva Peled (Israel)
Vyatcheslav Falikman (Russia)	Maria Rosaria Pecce (Italy)
Alessandro Fantilli (Italy)	Carlo Pellegrino (Italy)
Pietro Gambarova (Italy)	Giovanni Plizzari (Italy)
Matteo Gastaldi (Italy)	Andrea Prota (Italy)
Ravindra Gettu (India)	Paolo Riva (Italy)
Ezio Giuriani (Italy)	Gianpaolo Rosati (Italy)
Maurizio Guadagnini (UK)	Marco Savoia (Italy)
Eduardus Koenders (Germany)	Pedro Serna (Spain)
Lidia La Mendola (Italy)	Lesley Sneed (USA)
Marianovella Leone (Italy)	Romildo Diaz Toledo Filho (Brazil)
Gennaro Magliulo (Italy)	Timothy Wangler (Switzerland)



ACI-NBSC 2022 | The new boundaries of structural concrete
8-9 September 2022, Lecce, Italy



UNIVERSITÀ
DEL SALENTO

SPONSORS

ANCE | LECCE

ANCE | BRINDISI

kerakoll



SISTEMI ANTISISMICI
www.biemmebiagiotti.com





ACI-NBSC 2022 | The new boundaries of structural concrete
8-9 September 2022, Lecce, Italy



**UNIVERSITÀ
DEL SALENTO**

The new boundaries of structural concrete (NBSC)

CONTACTS

Secretariat
University of Salento
nbsc2022.lecce@gmail.com

Valentina Trinchese
American Concrete Institute – Italy Chapter
aciitalychapter@gmail.com

Website

<http://www.aciitaly.com/events/nbsc2022/>

VENUE

Rectorate building of University of Salento (ex Caserma Roasio)
Piazza Tancredi, 7 - 73100 LECCE (LE)



WORKSHOP PROGRAM

September 8, 2022			
8:00	18:00	Registration NBSC	
9:00	9:40	Sala conferenze	Opening Ceremony NBSC chaired by <i>Maria Antonietta Aiello</i> , conference chairperson, <i>Luigi Coppola</i> , ACI Italy Chapter President, <i>Fabio Pollice</i> , Rector of the University of Salento, <i>Antonio Ficarella</i> , Head of Department of Engineering for Innovation, University of Salento and <i>Fabiana Cicirillo</i> , Cultural Assessor of the City of Lecce
9:40	10:40	Sala conferenze	KEYNOTE: Strategic carbon sequestration to develop low-carbon sustainable concrete Prof. Surendra P. Shah - The University of Texas at Arlington, USA
10:40	11:10	Chiostro	Coffee break
11:10	11:30	Sala conferenze	Sponsor presentations
SESSION 1 (11:30-13:10) Chair: L. Coppola	Sala conferenze	11:30-11:50	Principal features of plain concretes under fatigue loadings <i>Alberto D'Amore, Luigi Coppola, Luigi Grassia</i>
		11:50-12:10	Sustainable Concrete with Recycled Aggregates: experiences and perspective <i>Flavio Stochino, Luisa Pani, Mauro Sassu, Pietro Croce, Paolo Formichi, Filippo Landi</i>
		12:10-12:30	Reinforced geopolymer concrete elements: structural performances <i>Vincenzo Romanazzi, Marianovella Leone, Maria Antonietta Aiello</i>
		12:30-12:50	SMART reinforced and geopolymer concrete with enhanced durability: MAREWIND solution, a case study. <i>Ingrosso I, Tarantino V., Angiuli R.</i>
		12:50-13:10	Impact of climate change on the life cycle of r.c. structures <i>Pietro Croce, Paolo Formichi, Filippo Landi, Flavio Stochino, Luisa Pani, Mauro Sassu</i>
SESSION 2 (11:30-13:10) Chair: P. Riva	Sala della Grottesca	11:30-11:50	Evaluation of the effect of a hydrophobic surface coating on chloride-induced corrosion in reinforced concrete structures <i>B.M. Schallock and M. Gastaldi</i>
		11:50-12:10	Fatigue life assessment of railway concrete bridges <i>Angelo Aloisio, Rocco Alaggio, Bruno Briseghella, Massimo Fragiaco</i>
		12:10-12:30	Life cycle structural performances of RC structures for different Corrosion Rsk Scenarios <i>Elena Casprini, Chiara Passoni, Alessandra Marini, Paolo Riva</i>
		12:30-12:50	Mechanical properties of cementitious mortar mixed with cellulose fibres and structural characterization of masonry panels to be used as new green building material <i>Francesco Bencardino, Roberta Curto, Mattia Nisticò, Ricardo do Carmo</i>
		12:50-13:10	Axially-equilibrated displacement-based fibre beam element for bidirectional response modelling <i>Francesco Cavaliere, Mattia Calò, João P. Almeida, Rui Pinho</i>
13:10	14:10	Chiostro	Lunch

14:10	15:10	Sala conferenze	KEYNOTE: Seismic upgrading of a PC bridge designed by Riccardo Morandi in Benevento Prof.ssa Maria Rosaria Pecce - University of Naples - Federico II - Italy	
15:10	15:30	Sala conferenze	Sponsor presentations	
SESSION 3 (15:30-16:50) Chair: G. Magliulo	Sala conferenze	15:30-15:50	Hysteretic device for seismic protection of RC precast structures <i>Chiara Di Salvatore, Gennaro Magliulo Nicola Caterino and Maria G. Castellano</i>	
		15:50-16:10	A new technology for the reconstruction of seismically resistant fair-face masonry walls <i>M. Sangirardi, S. De Santis, I. Roselli, F. Mosele, A. Zampa, A. Dudine, G. de Felice</i>	
		16:10-16:30	Seismic vulnerability assessment of existing RC building considering infills and materials uncertainties <i>G. Gabbianelli, D. Perrone, E. Brunesi, R. Monteiro</i>	
		16:30-16:50	Seismic reliability of code-conforming single-story RC precast buildings considering multiple performance levels <i>Gennaro Magliulo, Danilo D'Angela, Valeria Piccolo, Chiara Di Salvatore, Nicola Caterino</i>	
SESSION 4 (15:30-16:50) Chair: G. Uva	Sala della Grottesca	15:30-15:50	Seismic and energetic historical buildings renovation by innovative fibre-reinforced composite materials <i>V. Alecci, M. De Stefano, S. Galassi, A. M. Marra and D. Pugliese</i>	
		15:50-16:10	Influence of column confinement on pre-code existing reinforced concrete buildings <i>Sergio Ruggieri, Saverio Spadea, Giuseppina Uva</i>	
		16:10-16:30	Bond-Slip Law for SRP-Concrete Interface <i>Francesco Ascione, Marco Lamberti, Annalisa Napoli, Roberto Realfonzo</i>	
		16:30-16:50	Effect of the elevated temperatures on the structural response of PBO-FRCM systems and PBO-FRCM strengthened reinforced concrete beams <i>P. Mazzuca, L. Ombres, S. Verre and M. Guglielmi</i>	
16:50	17:20	Chiostro	Coffee break	
SESSION 5 (17:20-18:40) Chair: L. Ombres	Sala conferenze	17:20-17:40	Reinforced concrete beams strengthened in shear with U-shaped PBO FRCM (Fabric Reinforced Cementitious Mortar) composites: analysis of prediction models <i>Marielda Guglielmi and Luciano Ombres</i>	
		17:40-18:00	Experimental and numerical analyses of a new RC-framed skin system for integrated seismic retrofitting intervention on existing buildings <i>I. Rocca, L. Pozza, D. Alejandro Talledo, R. Federico, A. Saetta, M. Savoia</i>	
		18:00-18:20	An experimental study on self-sensing smart full-scale reinforced concrete beams <i>Antonella D'Alessandro, Hasan Borke Birgin and Filippo Ubertini</i>	
		18:20-18:40	New self-sensing shot-earth cement-composites for smart and sustainable constructions: experimental validation on a full-scale vault <i>Antonella D'Alessandro, Andrea Meoni, Vincenzo Savino, Marco Viviani and Filippo Ubertini</i>	

SESSION 6 (17:20-18:40) Chair: P. Gambarova	Sala della Grottesca	17:20-17:40	The rehabilitation of segmental bridges subjected to time-dependent deflections through additional prestressing <i>Michele Fabio Granata, Lidia La Mendola</i>
		17:40-18:00	Structural performance of corroded prestressed concrete beams <i>F. Di Carlo, P. Isabella, Z. Rinaldi, A. Meda</i>
		18:00-18:20	Strength-for-age curves and non-destructive tests for the estimation of concrete strength <i>Alessandro P. Fantilli, Abdel Rahman Kayed</i>
		18:20-18:40	A procedure to evaluate the behavior of HP-SC-FRC through EN 196 tests <i>Alessandro P. Fantilli, Nicolas S. Burello, Giovanni Volpatti, Jorge C. Diaz Garcia, Davide Zampini</i>
20:30	Social Dinner at “Palazzo Tamborino Cezzi”		

September 9, 2022			
8:00	13:00	Registration NBSC	
9:00	10:00	Sala conferenze	KEYNOTE: Design approach for fiber reinforced concrete elements Prof. Giovanni Plizzari - University of Brescia - Italy
10:00	10:20	Sala conferenze	Sponsor presentations
SESSION 7 (10:20-11:40) Chair: M. De Stefano	Sala conferenze	10:20-10:40	Domes of air and concrete. aging and durability <i>Francesca Albani, Carlo Dusi</i>
		10:40-11:00	Ultimate shear capacity for unreinforced RC elements: a comparative analysis of code-based approaches <i>Nicola Caterino, Francesca Ceroni and Giovanni Crisci</i>
		11:00-11:20	Bond Stiffness at High Temperature: an Open Issue <i>Pietro G. Gambarova, Francesco Lo Monte</i>
		11:20-11:40	Influence of rebars in HI-Bond Steel-Concrete composite slabs <i>Claudio Bernuzzi, Marco Bosio, Marco Andrea Pisani, Paolo Riva, Marco Simoncelli</i>
SESSION 8 (10:20-11:40) Chair: R. Realfonzo	Sala della Grottesca	10:20-10:40	Strategies for green concrete: new and traditional binders <i>D. Coffetti and L. Coppola</i>
		10:40-11:00	Digital design and fabrication of flexibly formed concrete beams <i>Saverio Spadea, Anna Perepechay, Eduardo Costa, Paul Shepherd</i>
		11:00-11:20	Seismic and energy retrofitting of RC-buildings by means of a new inorganic mortar <i>Fabio Longo, Silvia Calò, Miriana Tempesta, Gianni Blasi and Alessio Cascardi</i>
		11:20-11:40	Shear transfer in Electric Arc Furnace concrete <i>F. Faleschini, D. Trento</i>
11:40	12:10	Chiostrò	Coffee break

SESSION 9 (12:10-13:10) Chair: L. La Mendola	Sala conferenze	12:10-12:30	Use of FRCC Composites for Confinement of Concrete and Masonry Structures: Assessment of Compressive Strength <i>Annalisa Napoli, Roberto Realfonzo</i>
		12:30-12:50	Repair of seismically damaged RC columns through FRCC composites <i>Klajdi Toska, Lorenzo Hofer, Flora Faleschini, Mariano Angelo Zanini, Carlo Pellegrino</i>
		12:50-13:10	Confinement of concrete cylinders by means of inorganic-based composite: an experimental investigation <i>Alessio Cascardi, Salvatore Verre, Luciano Ombres and Maria Antonietta Aiello</i>
SESSION 10 (12:10-13:10) Chair: M. Savoia	Sala della Grottesca	12:10-12:30	Mechanical response of infills made of AAC blocks subjected to seismic action <i>Davide Sirtoli, Paolo Riva</i>
		12:30-12:50	Derivation of in-plane seismic fragility models for clay masonry infills in reinforced concrete frames <i>S. Peloso, E. Brunesi, D. Perrone</i>
		12:50-13:10	Finite-Element modelling of the tensile behaviour of fibre-reinforced concrete with end of life tyres recovered fibres <i>Gianni Blasi and Marianovella Leone</i>
13:10	13:20	Sala conferenze	Closing Ceremony NBSC
13:20	14:20	Chiostro	Lunch

KEYNOTE 1

Strategic carbon sequestration to develop low-carbon sustainable concrete

Prof. Surendra P. Shah

Concrete is the most widely consumed manmade material, which is employed in many aspects of our built environment, including buildings, roads, bridges, and more. The primary binding component of concrete is cement, which accounts for 5-7% of anthropogenic carbon dioxide (CO₂) emissions during manufacturing and processing. With the emergence of new cities around the world, demand for cement and concrete is expected to rise, contributing to increase CO₂ emissions. Therefore, it is necessary to explore and adopt the technique of carbon capture and utilization (CCU), whereby a high volume of atmospheric CO₂ can be sequestered through calcium carbonate mineralization in cementitious materials.

A potential method for CO₂ sequestration and storage is the incorporation of efficient CO₂ adsorbents, such as recycled aggregates, SCMs, biomass waste, and carbon-based nanomaterials (graphene, nanoplates, CNTs/CNF), nano-TiO₂, and C&D waste to cementitious systems. CO₂ adsorbents increase the carbon capture capacity of concrete under accelerated conditions and promote carbonate mineralization. Sequestering carbon in a mineral form not only improves the mechanical performance of the concrete but also reduces the volume of cement used in concrete. Most importantly, it permanently eliminates CO₂ from the atmosphere, driving substantial positive change in the impact of concrete production on the environment. This way, the CCU technique have the potential to transform cities into carbon sinks in the future.

Prof. Surendra P. Shah



Prof. Shah is a Presidential Distinguished Professor at UT Arlington, and Walter P Murphy Professor of Civil Engineering (emeritus) at Northwestern University.

He served as a Professor of Civil Engineering, at Northwestern University and founded NSF-funded Center for Advanced Cement Based Materials (ACBM) including the academic partners universities of Illinois, Michigan, Purdue, and NIST. He is a member of the Institute of Advanced Studies at the Hong Kong University of Science and Technology. He served as the chair of the ACI's fiber reinforced concrete committee and currently, he is an active member of several other ACI committees. Prof. Shah has also chaired the RILEM committee on Concrete Fracture Mechanics. He has held senior positions in professional societies including ASCE, ACI, TRB, and RILEM, and has been honored by several academic and professional institutes including ASTM and the American Ceramic Society. He is a member of National Academy of Engineering and National Academy of Inventors.

KEYNOTE 2

Seismic upgrading of a PC bridge designed by Riccardo Morandi in Benevento

Prof. Maria Rosaria Pecce

The case study of an existing PC bridge that has double cantilever configuration is described highlighting the importance of the design approach but also of maintenance on durability of structures. The bridge was designed by Riccardo Morandi in '50 using innovative solutions at the time but the actual problems are due especially to a not adequate water disposal.

Furthermore various solutions for seismic upgrading are presented considering a traditional strengthening approach and advanced technologies as passive control systems by seismic isolation or dissipative devices, that can be more convenient because the action transferred to foundation are surely reduced avoiding expensive interventions.

The results confirm the efficiency of the passive control systems. Furthermore the maintenance of the base isolation appears more onerous of the one for the dissipative device system realized with an external contrast structure.

Prof. Maria Rosaria Pecce



Prof. Maria Rosaria Pecce is full professor of Structures at the University of Naples Federico II. Member of Task Groups of Fib (FIB | The International Federation for Structural Concrete, ex-CEB) from 1992. She is also Fib fellow from March 2021.

She is member of Working Groups of CNR (National Council of Research in Italy) for developing Guidelines on "FRP materials for strengthening of existing structures" and "Composite Constructions"; member of WGs of the Italian Higher Council for Public Works for developing guidelines and codes, review projects and material certification; member of Structure Committee of UNI and member of the Council of Association of Engineers of Naples. She has been teacher of many courses at the University and many seminars for researchers and designers and scientific responsible of research projects in the fields of Steel Concrete Composite Constructions, FRP for Strengthening of Existing Structures, Seismic Vulnerability of Buildings, Seismic risk of non-structural components, Assessment of existing bridges.

KEYNOTE 3

Design approach for fiber reinforced concrete elements

Prof. Giovanni Plizzari

Fibre Reinforced Concrete (FRC) is already an old material for research laboratories but a relatively new one for international building codes.

The possibility of having a residual tensile strength after cracking of the concrete matrix requires a new design approach for FRC structural elements. In fact, conventional rebars certainly represent the best reinforcement for localized stresses, while fibers represent the best reinforcement for diffused stresses. Since in structural elements both distributed and localized stresses are generally present, structural optimization generally requires the use of a combination of rebars and fibers. This means that one can use fiber reinforcement only, but the amount of fibers must be significantly increased in the whole structure in order to resist high stresses acting only in small areas. This usually results in a higher amount of total reinforcement as compared to alternative solutions based on a combination of fibers and rebars, herein defined as hybrid-reinforced concrete (HRC).

In addition, the combination of two or more types of fibers (different fiber types and/or geometries and/or materials) can help to optimize overall system behavior. The intention is that the performance of these hybrid systems would exceed that induced by each fiber type alone, that is, there would be synergy.

Finally, structural design of FRC elements strongly depends of the degree of redundancy of the structure as well as on fiber orientation; the latter could be a problem for the structural safety but it could become an opportunity if well managed.

Prof. Giovanni Plizzari



Giovanni Plizzari is a Professor of Structural Design at the University of Brescia. He is member of Rilem TAC and chair of Cluster C: Structural performance and Design.

Deputy Editor in Chief of the international journal Materials and Structures

Chair of fib Task Groups T2.5 (Bond in concrete) and T1.8 (Concr. Industr. Floors)

Chair of the fib Jury for the Achievement Award for Young Engineers (AAYE)

Member of ACI Committees 408, 544 and 562

Fellow of ACI, fib and FraMcOS

Chair for Chapter 18 (Bond in concrete) of Model Code 2020

Member of the Task Force CSA S6 FRC of the Canadian Structural Code

SOCIAL DINNER LOCATION

Palazzo Tamborino Cezzi

Via Guglielmo Paladini, 50 - 73100 LECCE (LE)



An aristocratic dwelling in the old part of the town of Lecce this building was erected in the mid-XVI century by Giacomo Mele, who came from an old family in the town. The house still has the renaissance rooms on the ground floor from this period.



Palazzo Tamborino Cezzi (Lecce) © Palai Project - pic by Raffaella Quaranta

Palazzo Tamborino Cezzi can be easily reached by foot from the Rectorate building of University of Salento: proceed southeast on Piazza Tancredi towards Via Roberto Caracciolo; continue on Via Roberto Caracciolo; turn left and take Via Benedetto Cairoli; finally turn right and take Via Guglielmo Paladini.

