



The 5th International Scientific Conference
on Environmental Challenges in Civil Engineering
OPOLE, POLAND, 26-28 September 2022

Conference Programme



Opole District Chamber
of Civil Engineers



Polish Association of Civil
Engineers and Technicians
Opole Branch

Commission of Civil Engineering
Polish Academy of Sciences
Katowice Branch



The 5th International Scientific Conference
on Environmental Challenges in Civil Engineering
OPOLE, POLAND, 26-28 September 2022

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Opole District Chamber
of Civil Engineers



Polish Association of Civil
Engineers and Technicians
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Polish Association of Civil Engineers and Technicians, Opole Branch
Polski Związek Inżynierów i Techników Budownictwa, Oddział w Opolu

Faculty of Civil Engineering and Architecture, Opole University of Technology
Wydział Budownictwa i Architektury, Politechnika Opolska

Opole District Chamber of Civil Engineers
Opolska Okręgowa Izba Inżynierów Budownictwa

Commission of Civil Engineering,
Katowice Branch of the Polish Academy of Sciences
Komisja Inżynierii Budowlanej, Oddział PAN w Katowicach

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Secretaries

Małgorzata GODYŃ, Opole District Chamber of Civil Engineers
Krzysztof IREK, Opole University of Technology

**ADDRESS OF THE ORGANIZING COMMITTEE /
ADRES KOMITETU ORGANIZACYJNEGO**

Opole University of Technology
Faculty of Civil Engineering and Architecture
Katowicka 48, 45-061 Opole, Poland
with note on the envelope: ECCE 2022

email: ecce2022@po.edu.pl
www: <https://ecce2022.po.edu.pl>

**FOREWORD FROM THE ORGANIZERS /
SŁOWO WSTĘPNE OD ORGANIZATORÓW**

Dear Conference Participants,

the Scientific Conferences on Environmental Challenges in Civil Engineering (ECCE) have been held cyclically every 2 years since 2014, and starting from the 3rd ECCE 2018, they have an international dimension. The papers from the 3rd ECCE 2018 were published by Matec Web of Conferences, and the papers from the 4th ECCE 2020 were published by Springer in the special monograph.

In line with the intention of the organizers and the tradition of the ECCE Conferences, they focuses on the results of interdisciplinary scientific research in the field of sustainable civil engineering and especially in designing, durability, monitoring, and maintenance of building structures and materials together with elements of architecture as well as environmental engineering. We hope that it will allow for an exchange of interesting ideas, technical knowledge, and experience between the scientists and practitioners, contribute to the deepening of international cooperation between domestic and foreign centers present at the Conference, their future fruitful joint projects and networking, and in our opinion, this synergistic aspect of the event is its basic added value. That is why we are particularly pleased that during this year's conference, 4 invited papers will be presented on the first day of the Conference in 2 plenary sessions, emphasizing the basic mission of the event in view of today's broad, modern, sustainable, and ecological challenges for civil engineering. The remaining papers will be delivered on the second and third day of the Conference as part of 4 thematic sessions.

Once again, we would like to thank the authors of the invited lectures for their very valuable contribution, and we would like to express special thanks to all of the authors of 31 submitted paper proposals for creating our common platform for the exchange of ideas and for your coming to Opole.

We are pleased to inform you that all of the accepted papers, after passing the final editing process, will be published as chapters in a special post-conference monograph at the Springer publishing house under the working title *Environmental Challenges in Civil Engineering 2022*.

The organizers also extend their special thanks to the sponsors and the media patrons.

We wish all participants of the ECCE 2022 Conference successful and fruitful debates and a pleasant stay in Opole.

Organizers

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CONFERENCE VENUE AND OFFICE / MIEJSCE I BIURO KONFERNCJI

26 September 2022

Registration, opening ceremony, plenary sessions, company presentations, welcome reception at:

FACULTY OF CIVIL ENGINEERING AND ARCHITECTURE

OPOLE UNIVERSITY OF TECHNOLOGY

Katowicka 48, 45-061 Opole, Poland

<https://wbia.po.edu.pl/>

27-28 September 2022

Registration, breakfasts, thematic sessions, company presentations, lunches, gala dinner, closing ceremony at:

HOTEL MERCURE OPOLE

Krakowska 57/59, 45-018 Opole, Poland

<https://all.accor.com/hotel/3405/index.en.shtml>

TECHNICAL TOUR OR VISITING MUSEUMS / WYCIECZKA TECHNICZNA LUB ZWIEDZANIE MUZEÓW

During the Conference, 2 optional events (technical and touristic) will be organized to be chosen by participants when registering:

- 1) The technical tour to the Góraźdze Cement Plant in Chorula (near Opole).
- 2) Visiting museums in Opole.

They will start at 16:00 on 27 September 2022 . The organizers will provide more information during the Conference.

PRESENTATION OF PAPERS / PREZENTACJA REFERATÓW

- 1) The invited papers will be delivered in 2 plenary sessions on 26 September 2022 – in the form of 25-min. presentations with short discussion after each paper.
- 2) The rest of papers will be presented in 4 thematic sessions on 27-28 September 2022 – in the form of 12-min. presentations with discussion after each paper up to 5 min. or only in the form of 5-min. discussion on the papers (please see the Conference programme).

We recommend using the template to prepare presentations that was sent to the authors.

ADDITIONAL INFORMATION / DODATKOWE INFORMACJE

One conference fee covers participation with one paper and publication of accepted paper abstracts in the Conference book. The conference fee covers also publication of the papers, accepted by the Scientific Committee, in the reviewed Conference monograph by Springer.

The conference fee is 430 Euro or 1500 PLN +VAT. The conference fee includes two nights in a double room in Hotel Mercury Opole with welcome reception, breakfasts, lunches, gala dinner, and refreshments during breaks.

The organizers do not cover the travel costs and the costs of accommodation in places other than the Hotel Mercury Opole.

The conference fee without accommodation is 350 Euro or 1200 PLN +VAT.

In case of resignation from participation in the Conference up to two weeks before its commencement, participation costs may be reimbursed up to 50% of the payment made. In the case of resignation from participation less than two weeks, participation costs will not be reimbursed.

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(in the transfer description, please also include a note: ECCE 2022)

GENERAL CONFERENCE PROGRAMME

MONDAY, 26th SEPTEMBER 2022

FACULTY OF CIVIL ENGINEERING AND ARCHITECTURE
OPOLE UNIVERSITY OF TECHNOLOGY
Katowicka 48, 45-061 Opole, Poland

14:00 - 16:00	Registration	18:00 - 18:15	Coffee break
16:00 - 17:00	Opening ceremony	18:15 - 19:15	Plenary session II (2 papers, co. presentation)
17:00 - 18:00	Plenary session I (2 papers, co. presentation)	19:15	Welcome reception

TUESDAY, 27th SEPTEMBER 2022

HOTEL MERCURE OPOLE
Krakowska 57/59, 45-018 Opole, Poland

07.30 - 08:45	Breakfast	13:45 - 14:15	Company presentations
09.00 - 11:00	Thematic session I	14:15 - 15:45	Lunch
11:00 - 11:30	Company presentations	16:00 - 19:00	Technical tour or visiting museums
11:30 - 11:45	Coffee break	20:00	Gala dinner in Hotel Mercure Opole
11:45 - 13:45	Thematic session II		

WEDNESDAY, 28th SEPTEMBER 2022

HOTEL MERCURE OPOLE
Krakowska 57/59, 45-018 Opole, Poland

07.30 - 08:45	Breakfast	12:00 - 13:15	Thematic session IV
09.00 - 11:00	Thematic session III	13:15 - 13:30	Closing ceremony
11:00 - 11:30	Company presentations	13:30	Lunch
11:30 - 12:00	Coffee break		

CONFERENCE PROGRAMME

MONDAY, 26th SEPTEMBER 2022

FACULTY OF CIVIL ENGINEERING AND ARCHITECTURE
OPOLE UNIVERSITY OF TECHNOLOGY
Katowicka 48, 45-061 Opole, Poland

14:00 - 16:00 **REGISTRATION**

Lobby near the Assembly Hall of Prof. Oswald Mateja

16:00 - 17:00 **OPENING CEREMONY**

Assembly Hall of Prof. Oswald Mateja

Chairman: Zbigniew Perkowski, Dominika Bysiec

Speeches by the organizers and invited guests (representatives of the authorities of Opole University of Technology and Opole Voivodeship)

17:00 - 18:00 **PLENARY SESSION I**

Assembly Hall of Prof. Oswald Mateja

1) M. R. Massimino¹, G. Abate¹, A. Fiamingo¹, D. Pitilakis²

¹ Department of Civil Engineering and Architecture, University of Catania, Catania, Italy

² Department of Civil Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece

*SEISMIC RISK AND ENVIRONMENTALLY FRIENDLY SOLUTIONS:
THE GEOTECHNICAL POINT OF VIEW*

2) M. Pustelnik

Pracownia Projektowa MOSTOPOL sp. z o.o., Opole, Poland

*TECHNICAL ASPECTS OF THE DESIGNED RAILWAY BRIDGE OVER
THE ODRA RIVER IN OPOLE*

3) Presentation of company – INTOP Warszawa

18:00 - 18:15 **COFFEE BREAK**

Lobby near the Assembly Hall of Prof. Oswald Mateja

18:15 - 19:15 **PLENARY SESSION II**

Assembly Hall of Prof. Oswald Mateja

1) **O. Lavan, O. Idels**

Technion – Israel Institute of Technology, Haifa, Israel

SEISMIC RETROFITTING AND SEISMIC DESIGN USING ADVANCED TECHNOLOGIES: AN ENVIRONMENTAL POINT-OF-VIEW

2) **Z. Giergiczny**

Faculty of Civil Engineering, Silesian University of Technology, Gliwice, Poland

CEMENT AND CONCRETE IN A LOW-CARBON ECONOMY

3) **Company presentation – PORR**

19:15 **WELCOME RECEPTION**

Hall in the new wing of the Faculty of Civil Engineering and Architecture

TUESDAY, 27th SEPTEMBER 2022

HOTEL MERCURE OPOLE

Krakowska 57/59, 45-018 Opole, Poland

07:30 - 08:45 **BREAKFAST**

09:00 - 11:00 **THEMATIC SESSION I: SEISMIC ENGINEERING, GEOTECHNICS**

Presentation and discussion of the papers:

1) G. Abate, A. Fiamingo, M. R. Massimino

Department of Civil Engineering and Architecture, University of Catania,
Italy

*SUSTAINABLE BUILDING: THE ROLE OF THE SOIL ON
EARTHQUAKE SAFETY*

2) G. Abate, A. Fiamingo, M. R. Massimino

Department of Civil Engineering and Architecture, University of Catania,
Italy

*THE ROLE OF DSSI ON THE SEISMIC RISK ASSESSMENT OF AN
HISTORICAL BUILDING*

3) G. Dănilă, A. Iordăchescu, V. Petrescu, A. Basarab Cheșcă

"Ion Mincu" University of Architecture and Urbanism, Bucharest, Romania

*SEISMIC ISOLATION METHOD. A WAY TO REDUCE THE CARBON
FOOTPRINT.*

4) T. Maleska¹, N. Al Zubairi², A. Janda¹, D. Bęben¹, K. Embaby³

¹ Faculty of Civil Engineering and Architecture, Opole University of
Technology, Opole, Poland

² Faculty of Engineering and Natural Science, Konya Technical University,
Ardıçlı, Mahal-lesi, Selçuklu, Turkey

³ AECOM, New York City, NY, USA

*IMPACT OF DURATION AND INTENSITY OF SEISMIC RECORDS ON
THE SOIL-STEEL BRIDGE BEHAVIOR*

5) D. Bysiec, A. Janda, T. Maleska

Faculty of Civil Engineering and Architecture, Opole University of
Technology, Opole, Poland

*RESPONSE OF GEODESIC DOMES ON THE SEISMIC EXCITATION
WITH TIME HISTORY ANALYSIS*

6) E. M. J. da Silva, M. Oliveira

Institute of Engineering, University of Algarve, Portugal
ANALYSIS OF DYNAMIC COMPACTION EFFECTS – TAVIRA CASE STUDY

7) A. Valletta¹, A. Carri², R. Savi², A. Segalini¹

¹ Department of Engineering and Architecture, University of Parma, Parma, Italy

² ASE – Advanced Slope Engineering S.r.l., Parma, Italy
ALGORITHMS FOR THE NEAR-REAL TIME IDENTIFICATION AND CLASSIFICATION OF LANDSLIDE EVENTS DETECTED BY AUTOMATIC MONITORING TOOLS

11:00 - 11:30 COMPANY PRESENTATIONS

15-min. presentations of the companies:

1) Wienerberger Ceramika Budowlana

2) BSSTC.PL, *Kompaktowe stacje pomiarowo – integrujące All-in-One w ramach Systemu Zarządzania BMS Economic Health*

11:30 - 11:45 COFFEE BREAK

11:45 - 13:45 THEMATIC SESSION II: BRIDGE ENGINEERING, WIND ENGINEERING, ORGANIZATIONAL ISSUES

Presentation and discussion of the papers:

1) P. Bujňáková¹, J. Kraľovanec¹, M. Moravčík¹, F. Bahleda²

¹ Faculty of Civil Engineering, University of Žilina, Žilina, Slovakia

² Laboratory of Civil Engineering, University of Zilina, Žilina, Slovakia
DURABILITY AND ASSESSMENT OF EARLY POST-TENSIONED BRIDGES

2) D. Radu¹, R. Băncilă²

¹ Faculty of Civil Engineering, Transilvania University of Braşov, Romania

² Faculty of Civil Engineering, Politehnica University of Timișoara, Romania

ASSESSMENT AND RETROFITTING OF HISTORICAL STEEL BRIDGES IN TRANSILVANIA REGION PART OF THE SUSTAINABLE DEVELOPMENT

**3) O. Shymanovskiy¹, V. Shalinskiy¹, M. Shymanovska¹,
W. Baran²**

¹ Ukrainian Institute of Steel Construction, Kyiv, Ukraine

² Faculty of Civil Engineering and Architecture, Opole University of
Technology, Opole, Poland

*STRESS STATE AND SEVERAL PROBLEMS OF ESTIMATING THE
ACTUAL OPERATION OF EFFECTIVE BRIDGE SUPERSTRUCTURES*

4) P. Tomala, A. Czerepak

ViaCon Polska Sp. z o.o., Rydzyna, Poland

*SOIL-STEEL BRIDGES VS CONVENTIONAL REINFORCED
CONCRETE BRIDGES – ENVIRONMENTAL IMPACT ISSUES*

5) T. Maleska¹, A. Wysokowski², D. Bęben¹

¹ Faculty of Civil Engineering and Architecture, Opole University of
Technology, Opole, Poland

² Faculty of Civil Engineering, Architecture and Environmental
Engineering, University of Zielona Góra, Zielona Góra, Poland

*NUMERICAL ANALYSIS AND EXPERIMENTAL VERIFICATION OF
SOIL-STEEL CULVERT WITH GEOTEXTILE REINFORCEMENT*

6) L. Kabošová¹, T. Baroš², S. Kmet³, E. Kormaníková³, D. Katunský²

¹ Center for Research and Innovation in Construction, Technical
University of Košice, Košice, Slovakia

² Civil Engineering Faculty, Technical University of Košice, Košice,
Slovakia

³ Structural Engineering Faculty, Technical University of Košice, Košice,
Slovakia

WIND-BASED FORM-FINDING OF A TENSEGRITY PAVILION

7) J. Konior, M. Szóstak

Faculty of Civil Engineering, Wrocław University of Science and
Technology, Wrocław, Poland

*COURSE SHAPING OF EARNED VALUES COSTS CURVES IN
DIVERSIFIED INVESTMENTS SECTORS*

13:45 - 14:15 **COMPANY PRESENTATIONS**

15-min. presentations of the companies:

- 1) FAKRO
- 2) HABA-Beton

14:15 - 15:45 **LUNCH**

16:00 - 19:00 **TECHNICAL TOUR TO THE GÓRAŹDZE CEMENT PLANT IN
CHORULA / VISITING MUSEUMS IN OPOLE**

20:00 **GALA DINNER IN THE HOTEL MERCURE OPOLE**

WEDNESDAY, 28th SEPTEMBER 2022

HOTEL MERCURE OPOLE

Krakowska 57/59, 45-018 Opole, Poland

07:30 - 08:45 **BREAKFAST**

09:00 - 11:00 **THEMATIC SESSION III: DURABILITY, INNOVATIVE SOLUTIONS, DIAGNOSTICS, RECONSTRUCTION, ORGANIZATIONAL ISSUES, ENVIRONMENTAL ENGINEERING**

Presentation and discussion of the papers:

1) K. Yurkova, T. Krykowski

Faculty of Civil Engineering, Silesian University of Technology, Gliwice, Poland

COMPARATIVE ANALYSIS OF THE USE OF DIFFERENT CONCRETE MODELS IN THE EVALUATION OF THE PROPAGATION OF DAMAGE IN THE REINFORCED CONCRETE SAMPLE

2) R. Gliniorz, C. Petzoldt, K. Mandel, S. Gelbrich

Chemnitz University of Technology, Chemnitz, Germany
ENERGY-EFFICIENT REINFORCED HEATING SYSTEM IMPLEMENTED AS A CARBON CONCRETE FORMWORK

3) P. Koteš, M. Zahuranec, M. Vavruš

Faculty of Civil Engineering, University of Žilina, Žilina, Slovakia
DIAGNOSTIC AND DESIGN OF RECONSTRUCTION OF BUILDING VÁHOSTAV

4) D. Bajno, A. Grzybowska, M. Chylewska-Szabat

Faculty of Civil and Environmental Engineering and Architecture, Bydgoszcz University of Science and Technology, Bydgoszcz, Poland
ORIGINALITY AND SAFETY AS A PRIORITY IN THE REVITALIZATION OF IMMOVABLE MONUMENTS?

5) D. Przywara, A. Rak

Faculty of Civil Engineering and Architecture, Opole University of Technology, Opole, Poland
ECONOMIC CONDITIONS OF LEAVING THE CONSTRUCTION SITE BY THE CONTRACTOR AT DIFFERENT STAGES OF ITS IMPLEMENTATION

Discussion on the paper:

6) A. Rak, D. Przywara

Faculty of Civil Engineering and Architecture, Opole University of
Technology, Opole, Poland

*IMPACT OF CONTAMINATION OF THE RAILWAY TRACK BED FOR
GROUNDWATER*

11:00 - 11:30 COMPANY PRESENTATIONS

15-min. presentations of the companies:

1) Remmers Polska

2) Xella Polska

11:30 - 12:00 COFFEE BREAK

**12:00 - 13:15 THEMATIC SESSION IV: ARCHITECTURE AND URBAN PLANNING,
BUILDING MATERIALS ENGINEERING**

Presentation and discussion of the papers:

**1) L. Trabattoni¹, C. Berizzi², M. Capotorto², G. N. Terlicher²,
M. Mazurkiewicz²**

¹ Faculty of Civil Engineering and Architecture, Opole University of
Technology, Opole, Poland

² Pavia University, Pavia, Italy

*SUMMER CITY – SUSTAINABILITY STRATEGIES DECLINED
IN OUTDOOR ACCOMMODATION STRUCTURES IN ITALY*

2) A. Grajper¹, S. Dobiesz²

¹ Faculty of Civil Engineering and Architecture, Opole University of
Technology, Opole, Poland

² LAX laboratory for architectural experiment, Wrocław, Poland

*ECOLOGICAL ASPECT OF WATER RETENTION THROUGH ALGAE
BASED HYDRAULIC SYSTEMS IN INTERACTIVE ARCHITECTURE*

3) K. Wilk

Faculty of Civil Engineering and Architecture, Opole University of Technology, Opole, Poland

THE USE OF A PREFABRICATED MASS TIMBER STRUCTURE IN THE DESIGN OF SINGLE-FAMILY HOUSES IN TERMS OF SUSTAINABLE DEVELOPMENT

4) M. Zakrzewski, A. Sanok, J. Domski

Faculty of Civil Engineering, Environmental and Geodetic Sciences, Koszalin University of Technology, Koszalin, Poland

RHEOLOGICAL PROPERTIES OF CONCRETE BASED ON WASTE MATERIALS

Discussion on the papers:

5) A. Sanok, M. Zakrzewski, M. Lehmann, J. Domski

Faculty of Civil Engineering, Environmental and Geodetic Sciences, Koszalin University of Technology, Koszalin, Poland

EFFECT OF THE ADDITION OF WASTE FIBRES ON THE SOME PROPERTIES OF CONCRETE

6) D. Bajno¹, M. Fiutak², M. Niedostatkiwicz³

¹ Faculty of Civil and Environmental Engineering and Architecture, Bydgoszcz University of Science and Technology, Poland

² Przedsiębiorstwo Projektowo-Usługowo-Handlowe "MARDOM" Marcin Fiutak, Kluczbork, Poland

³ Faculty of Civil and Environmental Engineering, Gdańsk University of Technology, Gdańsk, Poland

RURAL BUILDING IN OPOLE REGION VILLAGES DURING COLONIZATION PERIOD OF FREDERICK II

13:15 - 13:30 CLOSING CEREMONY

Chairman: Damian Bęben

13:30 LUNCH

