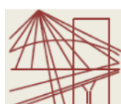




The 6th International Scientific Conference
on Environmental Challenges in Civil Engineering
OPOLE, POLAND, 22-24 April 2024

Conference Programme



Opole District Chamber
of Civil Engineers



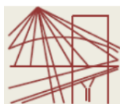
Polish Association of Civil
Engineers and Technicians
Opole Branch

Commission of Civil Engineering
Polish Academy of Sciences
Katowice Branch



The 6th International Scientific Conference
on Environmental Challenges in Civil Engineering
OPOLE, POLAND, 22-24 April 2024

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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

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and Water Management in Opole
Prezes Wojewódzkiego Funduszu Ochrony Środowiska
i Gospodarki Wodnej w Opolu, **Aleksandra DRESCHER**

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Polish Association of Civil Engineers and Technicians (PACET), Opole Branch
Polski Związek Inżynierów i Techników Budownictwa (PZITB), 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

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Katowice Branch of the Polish Academy of Sciences
Komisja Inżynierii Budowlanej, Oddział Polskiej Akademii Nauk w Katowicach

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Adam RAK, Opole University of Technology / Opole District Chamber of Civil Engineers

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 a note on the envelope: ECCE 2024)

email: ecce2024@po.edu.pl

The Conference website: <https://ecce2024.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, it is an international event. The papers from the 3rd ECCE 2018 were published by Matec Web of Conferences (Vol. 174, 2018), and the selected papers from the 4th ECCE 2020 and the 5th ECCE 2022 were published by Springer (Environmental Challenges in Civil Engineering, Lecture Notes in Civil Engineering, Vol. 122, 2021, and Environmental Challenges in Civil Engineering II, Lecture Notes in Civil Engineering, Vol. 322, 2023).

In line with the tradition of the ECCE conferences, they focus on the results of interdisciplinary scientific research in the field of civil engineering, especially in the reconstruction and renovation of historic buildings, durability of buildings and structures, innovative technologies for the construction and operation of buildings, materials engineering, building physics, architecture, and spatial planning in the context of the idea of sustainable development and environmental protection. In our opinion, it will allow for an exchange of interesting technical ideas, knowledge, and experience between the scientists and practitioners, contributing to the deepening of international cooperation between domestic and foreign centers present at the Conference and their future fruitful joint projects. We hope a synergistic aspect created this way will be the basic added value of the event.

We are particularly pleased that during this year's conference, four invited papers will be presented on the first day of the Conference in two 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 four thematic sessions. We would like to give special thanks to all the authors of the submitted paper proposals. We are very pleased to inform you that after passing the final editing process, the positively reviewed papers will be published as chapters in a special post-conference monograph by Springer under the working title *Environmental Challenges in Civil Engineering III* or as articles in the PACET journal *Inżynieria i Budownictwo*.

The organizers also extend their special thanks to the sponsors and media patrons. The sponsors' presentations will be provided in special sessions just after the plenary and thematic sessions.

We wish all participants of the ECCE 2024 Conference successful and fruitful debates and a pleasant stay in Opole.

Organizers

CONFERENCE SPONSORS / SPONSORZY KONFERENCJI



ADAMIETZ





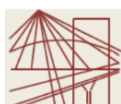




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**CONFERENCE VENUE AND OFFICE
REGISTRATION OF PARTICIPANTS /
MIEJSCE I BIURO KONFERENCJI
REJESTRACJA UCZESTNIKÓW**

Address of the ECCE 2024 Conference venue and office and registration of the participants on 22-24 April 2024:

HOTEL MERCURE OPOLE
Krakowska 57/59, 45-018 Opole, Poland
Website of the hotel: <https://all.accor.com/hotel/3405/index.en.shtml>

**OPOLE CITY TOUR WITH A GUIDE /
ZWIEDZANIE OPOLA Z PRZEWODNIKIEM**

On the second day of the Conference, Tuesday, 23 April, at 16.00–19.00, a guided tour around the city of Opole is organized. The tour program includes, among others, the gothic Piast Tower and the Polish Song Museum. Please inform the organizers of your willingness to participate in the tour during registration.

PRESENTATION OF PAPERS / PREZENTACJA REFERATÓW

- 1) The invited papers will be delivered in two plenary sessions on 22 April 2024 in 20-minute presentations.
- 2) The keynote paper will be delivered in the first thematic session on 23 April 2024 as a 25-minute presentation with a discussion of up to 5 minutes.
- 3) The rest of the papers will be presented in four thematic sessions on 23-24 April 2024 in two options: as a 10-minute presentation with a discussion of up to 5 minutes or as a piece of brief 2-minute information (e.g., using graphical abstract) with a discussion of up to 5 minutes. Forms of the presentations of particular papers are detailed in the Conference programme.
- 4) The sponsor presentations will be delivered in the form agreed with the sponsors.

To prepare the paper presentations, we recommend using the template that was sent to the authors and is available on the Conference website.

ADDITIONAL INFORMATION / DODATKOWE INFORMACJE

The conference fee is 540 Euros or 1900 PLN + VAT.

The conference fee includes two nights in a double room in Hotel Mercury Opole with breakfast, a welcome reception, two lunches, a gala dinner, and coffee breaks between the sessions.

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

An additional fee for staying in a single room is 55 Euros or 180 PLN + VAT per night.

The conference fee without accommodation is 440 Euros or 1500 PLN + VAT.

Participants who plan an additional stay in a double room on 21 or 25 April 2024 incur an additional fee of 65 Euros or 220 PLN + VAT for each day.

One conference fee covers participation in the event with one accepted paper and publication of its extended abstract in the Conference Book (if the extended abstract was sent before 26 March 2024 and was accepted by our reviewers). The conference fee also covers publication in the reviewed Conference monograph by *Springer* if the authors choose this option. The conference fee does not cover additional costs required by PACET for reviewed publication in *Inżynieria i Budownictwo* if the authors choose this option.

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 in less than two weeks, the participation costs will not be reimbursed.

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NIP: 754-00-21-481

(in the transfer description, please also include a note: ECCE 2024)

GENERAL CONFERENCE PROGRAMME

MONDAY, 22 APRIL 2024

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

14:00 - 16:00	Registration	17:15 - 18:15	Plenary session I
16:00 - 17:00	Opening ceremony	18:20 - 19:20	Plenary session II
17:00 - 17:15	Coffee break	19:30	Welcome reception

TUESDAY, 23 APRIL 2024

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

07:30 - 08:45	Breakfast	13:15 - 13:45	Sponsor Information
09:00 - 10:45	Thematic session I	14:00 - 15:45	Lunch
10:45 - 11:30	Sponsor information	16:00 - 19:00	City tour with a guide
11:30 - 11:45	Coffee break	20:00	Gala dinner
11:45 - 13:15	Thematic session II		

WEDNESDAY, 24 APRIL 2024

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

07:30 - 08:45	Breakfast	11:45 - 13:30	Thematic session IV
09:00 - 10:45	Thematic session III	13:30 - 13:45	Closing ceremony
10:45 - 11:15	Sponsor information	13:45	Lunch
11:15 - 11:45	Coffee break		

FULL CONFERENCE PROGRAMME

MONDAY, 22 APRIL 2024

HOTEL MERCURE OPOLE

Krakowska 57/59, 45-018 Opole, Poland

14:00 - 16:00 REGISTRATION

16:00 - 17:00 OPENING CEREMONY

Chairs: Zbigniew Perkowski, Dominika Bysiec

Speeches by the organizers and invited guests

(representatives of the authorities of Opole University of Technology and Opole Voivodeship)

Concert of the el12 Opole Politechnic Band

17:00 - 17:15 COFFEE BREAK

17:15 - 18:15 PLENARY SESSION I

Chairman: Damian Bęben

1) Marco Lindner, Ralf Gliniorz, Mike Maennel, Daniel Garbe, Henrik Funke, Sandra Gelbrich, Maik Berger

Chemnitz University of Technology, Germany

*TOOL DEVELOPMENT FOR PRECAST CONCRETE ELEMENTS IN
ROBOT-ASSISTED FLOW PRODUCTION*

2) Bożena Środa

Stowarzyszenie Producentów Cementu, Cracow, Poland

*CHALLENGES FOR THE CEMENT INDUSTRY IN POLAND IN THE
ERA OF DECARBONISATION*

3) AMISTON

COMPANY PRESENTATION

18:20 - 19:20 **PLENARY SESSION II**

Chairman: Zbigniew Perkowski

1) Grzegorz Naumowicz

Narodowy Instytut Dziedzictwa – Oddział Terenowy w Opolu, Poland
*FROM L. SCHOTTLÄNDER PORTLAND CEMENTFABRIK TO
CEMENTOWNIA „ODRA”. AN OUTLINE OF THE PLANT’S HISTORY
IN THE YEARS 1872-1953.*

2) Dariusz Bajno

Faculty of Civil Engineering, Wrocław University of Science and
Technology, Poland
SECRETS OF THE COLLEGIATE CHURCH IN OPOLE 1295–2024

3) PORR

*COMPANY PRESENTATION: TEM TECHNOLOGY IN THE RAILWAY
TUNNEL OF RAILWAY LINE NO. 274 IN TRZCIŃSK*

4) INTOP

COMPANY PRESENTATION

19:30 **WELCOME RECEPTION**

TUESDAY, 23 APRIL 2024

HOTEL MERCURE OPOLE

Krakowska 57/59, 45-018 Opole, Poland

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

09:00 - 10:45 **THEMATIC SESSION I: SEISMIC ENGINEERING, DIAGNOSTICS AND MAINTENANCE OF BUILDINGS, IMPACTS ON BUILDINGS**

Chairs: Seweryn Kokot, Damian Bęben

(a 5-min. discussion after each paper presentation)

Keynote paper (a 25-min. presentation):

1) Glenda Abate

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

EVALUATION OF SSI EFFECTS FOR MITIGATING THE SEISMIC RISK OF HISTORIC BUILDINGS

Papers (10-min. presentations):

2) Angela Fiamingo, Maria R. Massimino

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

GEOTECHNICAL ANALYSES FOR THE PRESERVATION OF HISTORICAL CHURCHES: A CASE HISTORY IN EASTERN SICILIAN (ITALY)

3) Miguel J. Oliveira¹, Alfredo Braga¹, Elisa da Silva¹, David Marín-García², David Bienvenido-Huertas³

¹ Campus da Penha, University of Algarve, Portugal

² Department of Graphical Expression and Building Engineering, University of Seville, Spain

³ Department of Building Construction, University of Granada, Spain

IMPACT OF BUILDING MAINTENANCE AND REHABILITATION ON URBAN SUSTAINABILITY: SOS CALL FOR ACTION – ALGARVE CASE STUDY

4) **Peter Koteš¹, Martin Vavruš¹, Ondrej Křídla^{1,2}, Jozef Prokop¹,
Michal Zahuranec¹**

¹ Faculty of Civil Engineering, University of Žilina, Slovakia

² Research and Development Institute of Slovak Railways, Žilina,
Slovakia

*DIAGNOSTIC AND ASSESSING THE LIMIT STATES OF
PRESTRESSED CONCRETE RAILWAY BRIDGE*

5) **Oleksandr Shymanovskiy¹, Wiesław Baran²**

¹ V. Shymanovskiy Ukrainian Institute of Steel Construction, Kyiv,
Ukraine

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

*SOME ISSUES OF THE KYIV TV TOWER RENOVATION AFTER
THE MISSILE ATTACK*

6) **Tomasz Szkuta**

Polish Association of Civil Engineers and Technicians – Toruń Branch,
Toruń, Poland

*HOLISM AND REDUCTIONISM IN DETERMINING
ENVIRONMENTAL IMPACTS*

10:45 - 11:30 **SPONSOR INFORMATION**

1) **PRO-VENT Systemy Wentylacyjne**
COMPANY PRESENTATION

2) **NavoTech Inżynieria Środowiska**
COMPANY PRESENTATION

3) **HABA-Beton**
COMPANY PRESENTATION

11:30 - 11:45 **COFFEE BREAK**

11:45 - 13:15 **THEMATIC SESSION II: BUILDING MATERIALS ENGINEERING,
CONCRETE TECHNOLOGY, OTHER ISSUES**

Chairs: Ralf Gliniorz, Andrzej Marynowicz

(a 5-min. discussion after each paper presentation)

Papers (10-min. presentations):

- 1) Ralf Gliniorz, Marco Lindner, Sandra Gelbrich**
Institute of Lightweight Structures, Chemnitz University of Technology,
Germany
*MULTI-FUNCTIONAL INTEGRATION IN CLAY-CARDBOARD
SANDWICH STRUCTURE WITH SEMI-AUTOMATED
MANUFACTURING*
- 2) Marvin Abstoß, Henrik Funke, Sandra Gelbrich**
Department of Lightweight Structures and Polymer Technology,
Chemnitz University of Technology, Germany
*SUSTAINABLE PRODUCTION OF COMPLEX PRECAST CONCRETE
ELEMENTS WITHOUT DEMOLDING DRAFTS USING CONCRETE
EXTRUSION AND PROCESSING*
- 3) Enrico Rudolph, Daniel Schönfelder, Henrik Funke,
Sandra Gelbrich**
Department of Lightweight Structures and Polymer Technology,
Chemnitz University of Technology, Germany
*EFFICIENT PRODUCTION OF PRECAST CONCRETE STAIRCASES
USING ADDITIVE MANUFACTURED, COMPONENT-INTEGRATED
FORMWORKS SYSTEMS*
- 4) Elżbieta Janowska-Renkas¹, Michał Cisiński¹,
Paweł Niewiadomski²**
¹ Faculty of Civil Engineering and Architecture, Opole University of
Technology, Poland
² Faculty of Civil Engineering, Wrocław University of Science and
Technology, Poland
*THE POSSIBILITY OF PARTIAL SUBSTITUTION OF CEMENT IN
CEMENT MORTARS WITH THE USE OF SPENT FLUID CATALYTIC
CRACKING CATALYST FROM POLISH OIL REFINERY: MECHANICAL
PERFORMANCES AND IMPACT OF THE ADDITION OF
SUPERPLASTICIZER*

- 5) **Ferdinand Senf, Rezan Javed, Henrik Funke, Sandra Gelbrich**
Institute of Lightweight Structures, Chemnitz University of Technology,
Germany
*CONCRETE EXTRUSION USING SUSTAINABLE CEMENT
ALTERNATIVES*

Information about the papers (2-min. presentations):

- 6) **Oleksandr Kordun¹, Anton Makhinko²**
¹ V. Shimanovsky Ukrainian Institute of Steel Construction, Kyiv,
Ukraine
² ETUAL LLC, Petropavlivske, Boryspil district, Kyiv region, Ukraine
*THE INFLUENCE OF GLOBAL WARMING ON THE CHANGE OF
CLIMATIC LOADS ON THE TERRITORY OF UKRAINE*

- 7) **Dariusz Bajno¹, Agnieszka Grzybowska¹, Natalia Budnik²,
Marcin Fiutak³**
¹ Faculty of Civil and Environmental Engineering and Architecture,
Bydgoszcz University of Science and Technology, Poland
² Biuro projektowo-budowlane Dream Project, Samociążek, Poland
³ Mardom, Kluczbork, Poland
*BIOLOGICAL DEGRADATION OF OVER 100-YEAR-OLD WOOD ON
SELECTED EXAMPLES*

13:15 - 13:45 SPONSOR INFORMATION

- 1) **FAKRO**
COMPANY PRESENTATION
- 2) **Xella Polska**
*COMPANY PRESENTATION: MULTIPOR – TECHNICZNE ASPEKTY
ZASTOSOWANIA POTWIERDZONE WIELOLETNIM
DOŚWIADCZENIEM NA RYNKU POLSKIM I EUROPEJSKIM ORAZ
INNOWACYJNE PRODUKTY XELLA POLSKA*

14:00 - 15:45 LUNCH

**16:00 - 19:00 OPOLE CITY TOUR WITH A GUIDE – VISITING THE GOTHIC PIAST
TOWER AND THE POLISH SONG MUSEUM**

20:00 GALA DINNER

WEDNESDAY, 24 APRIL 2024

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

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

09:00 - 10:45 **THEMATIC SESSION III: BUILDING PHYSICS, TESTING
STRUCTURAL ELEMENTS**

Chairs: Łukasz Drobiec, Zbigniew Perkowski

(a 5-min. discussion after each paper presentation)

Papers (10-min. presentations):

- 1) **Kalina Materak, Alicja Wieczorek, Agata Kacprzak,
Marcin Koniorczyk**
Faculty of Civil Engineering, Architecture and Environmental
Engineering; Łódź University of Technology, Poland
*THE INFLUENCE OF INTERNAL HYDROPHOBIZATION ON THE
CHARACTERISTICS AND DURABILITY OF THE CEMENT-BASED
MATERIALS*
- 2) **Andrzej Kucharczyk, Kamil Pawlik, Mariusz Czabak**
Faculty of Civil Engineering and Architecture, Opole University of
Technology, Poland
*APPLICATION OF OPTICAL DISPLACEMENT MEASUREMENT
METHOD FOR STUDYING THE CAPILLARY RISE PROCESS*
- 3) **Andrzej Kucharczyk¹, Andrzej Marynowicz¹, Jerzy Wyrwał¹,
Dariusz Bajno², Monika Adamska¹, Jolanta A. Prusiel³**
¹ Faculty of Civil Engineering and Architecture, Opole University of
Technology, Poland
² Faculty of Civil Engineering, Wrocław University of Science and
Technology, Poland
³ Faculty of Civil Engineering and Environmental Sciences, Białystok
University of Technology, Poland
*THERMAL-HUMIDITY ASSESSMENT OF INTERNAL INSULATION
OF HISTORIC TIMBER-FRAMED WALLS*

4) **Jakub Zajac, Łukasz Drobiec, Radosław Jasiński, Krzysztof Grzyb**
Faculty of Civil Engineering, Silesian University of Technology, Gliwice,
Poland
*BEHAVIOR OF HALF-SLAB AND BEAM-AND-BLOCK FLOOR
SUPPORTED ON FOUR-EDGES: SHORT- AND LONG-TERM STUDIES*

5) **Daniel Frączek¹, Mariusz Czabak¹, Izabela Czabak-Górska²**
¹ Faculty of Civil Engineering and Architecture, Opole University of
Technology, Poland
² Faculty of Production Engineering and Logistics, Opole University of
Technology, Poland
*DISPLACEMENTS AND DEFORMATIONS MEASUREMENT USING AN
EFFICIENT DIGITAL IMAGE CORRELATION METHOD*

6) **Zbigniew Perkowski¹, Mariusz Czabak¹, Petra Bujňáková²,
Jerzy Wyrwał¹**
¹ Faculty of Civil Engineering and Architecture, Opole University of
Technology, Poland
² Faculty of Civil Engineering, University of Žilina, Slovakia
*DETERMINATION OF FLEXURAL STIFFNESS OF TIMBER
COMPOSITE BEAMS USING DIC AND WAVELET TRANSFORM OF
DEFLECTION LINE*

Information about the paper (a 2-min. presentation):

7) **Dariusz Bajno¹, Agnieszka Grzybowska¹, Izabela Kasprzyk¹,
Wojciech Łasut²**
¹ Faculty of Civil and Environmental Engineering and Architecture,
Bydgoszcz University of Science and Technology, Poland
² Xella Polska, Warsaw, Poland
*THERMOMODERNIZATION OF A HISTORIC CHURCH WITH
VALUABLE HISTORIC FACADES*

10:45 - 11:15 SPONSOR INFORMATION

- 1) **FAMAR**
COMPANY PRESENTATION
- 2) **Wienerberger**
COMPANY PRESENTATION
- 3) **Remmers**
COMPANY PRESENTATION

11:15 - 11:45 **COFFEE BREAK**

11:45 - 13:30 **THEMATIC SESSION IV: ARCHITECTURE AND URBAN PLANNING**

Chairs: Monika Adamska, Justyna Kleszcz

(a 5-min. discussion after each paper presentation)

Papers (10-min. presentations):

1) Marcin Gorączko, Aleksandra Gorączko

Faculty of Civil and Environmental Engineering and Architecture;
Bydgoszcz University of Science and Technology, Poland
*HERITAGE, REINTERPRETATION, OR IMITATION?
CONTEMPORARY INSPIRATIONS FROM TRADITIONAL SOFT
LIMESTONE ARCHITECTURE IN THE UNIEJÓW REGION.*

2) Aleksandra Repelewicz

Faculty of Civil Engineering, Częstochowa University of Technology,
Poland
*PERSPECTIVES OF SACRED BUILDINGS ADAPTATION ON THE
EXAMPLE OF LARGE CHURCHES OF THE CZESTOCHOWA
ARCHDIOCESE*

3) Luca Trabattoni¹, Margherita Capotorto², Carlo Berizzi²

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

² Department of Civil Engineering and Architecture, University of Pavia,
Italy

*THE SUSTAINABILITY OF MINIMUM SPACE: REMOVABLE OFF-
GRID ARCHITECTURE FOR OUTDOOR TOURISM*

4) Gaia Nerea Terlicher, Lorenzo Quaglini, Carlo Berizzi

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

*DESIGN PUBLIC SPACE WITH WATER FOR AN ECOLOGICAL
CITY: TWO INTERNATIONAL DESIGN SUMMER SCHOOLS*

5) Justyna Kleszcz, Anna Szczegielniak

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

URBAN PUBLIC SPACE ACCESSIBILITY – A LITERATURE REVIEW

6) Joanna A. Ways

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

*EVOLUTION OF ARCHITECTURE INTEGRATED WITH GREENERY
IN THE WORKS OF MAREK BUDZYŃSKI*

Information about the papers (2-min. presentations):

7) Luca Trabattoni, Shima Esmaeili

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

*SUSTAINABILITY IN EMERGENCY: DESIGN STRATEGIES AND
WASTE MANAGEMENT FOR THE LIVING SITUATION IN THE
REFUGEE CAMPS*

8) Weronika Brożyna

Doctoral School, Opole University of Technology, Poland

*SELECTED EXAMPLES OF RENOVATION OF HISTORICAL
BUILDINGS IN POLAND IN THE CONTEXT OF ENERGY
EFFICIENCY OF THE BUILDINGS*

13:30 - 13:45 CLOSING CEREMONY

Chairman: Damian Bęben

13:45 LUNCH