



CIVIL ENGINEERING INSTITUTE
MACEDONIA



GRAĐEVINSKI INSTITUT
MONTENEGRO



CIVIL ENGINEERING INSTITUTE MACEDONIA



The Civil Engineering Institute Macedonia was established in 1975 and within a period of 4 decades it developed into a unique brand that offers services regarding all fields of civil engineering, and not just in the Republic of Macedonia, but also in the markets of the region. The company's mission is to be regional leader in the civil engineering through constant and sustainable development, and to always offer values and services through the delivery of innovative and quality solutions.

The range of services covers preparation of design documentation for any type of structures with all phases and levels, justification studies, environmental studies and reports, technical revision and design documentation, supervision of the structures construction, construction management by engineering system, geological hydro-geological and geotechnical investigation works, laboratory control of the construction works and material quality, and conducting specialist works and certification of construction products.

Due to this type of concept and services that are offered, the company is one of a kind, not only on the domestic market but also in the wider region and it is known under the motto "ALL IN ONE PLACE".

The company has more than 300 employees; 138 are engineers of all profiles (some have masters and doctoral degree), civil engineering, architecture, geology, geodesy, machinery, electro-techniques, environment, chemistry and technology. They function in a structure which composed of five departments: engineering, operational, geotechnical, laboratory and marketing. Each department is responsible for the professional execution of the services that are offered and for satisfying the demands and needs of the clients and collaborators.

The Civil Engineering Institute Macedonia is certified company that works based on all rules and standards for quality and it possesses the following certificates:

- **MKC EN ISO 9001**
- **MKC EN ISO 14001**
- **ISO 45001**

The company possesses a certificate for accreditation that refers to the accredited laboratory for testing the civil engineering materials **MKS EN ISO/IEC 17025**.

CEIM has established the first certification body in Macedonia for construction products that issues a certificate of consistency of product's properties and certificate of conformity of the factory production control for almost all groups of products with valid legal regulation. This body has been accredited by the Accreditation Institute of the Republic of Macedonia according to the standard **MKC EN ISO/IEC 17065** and the Decision issued by the Ministry of Economy.

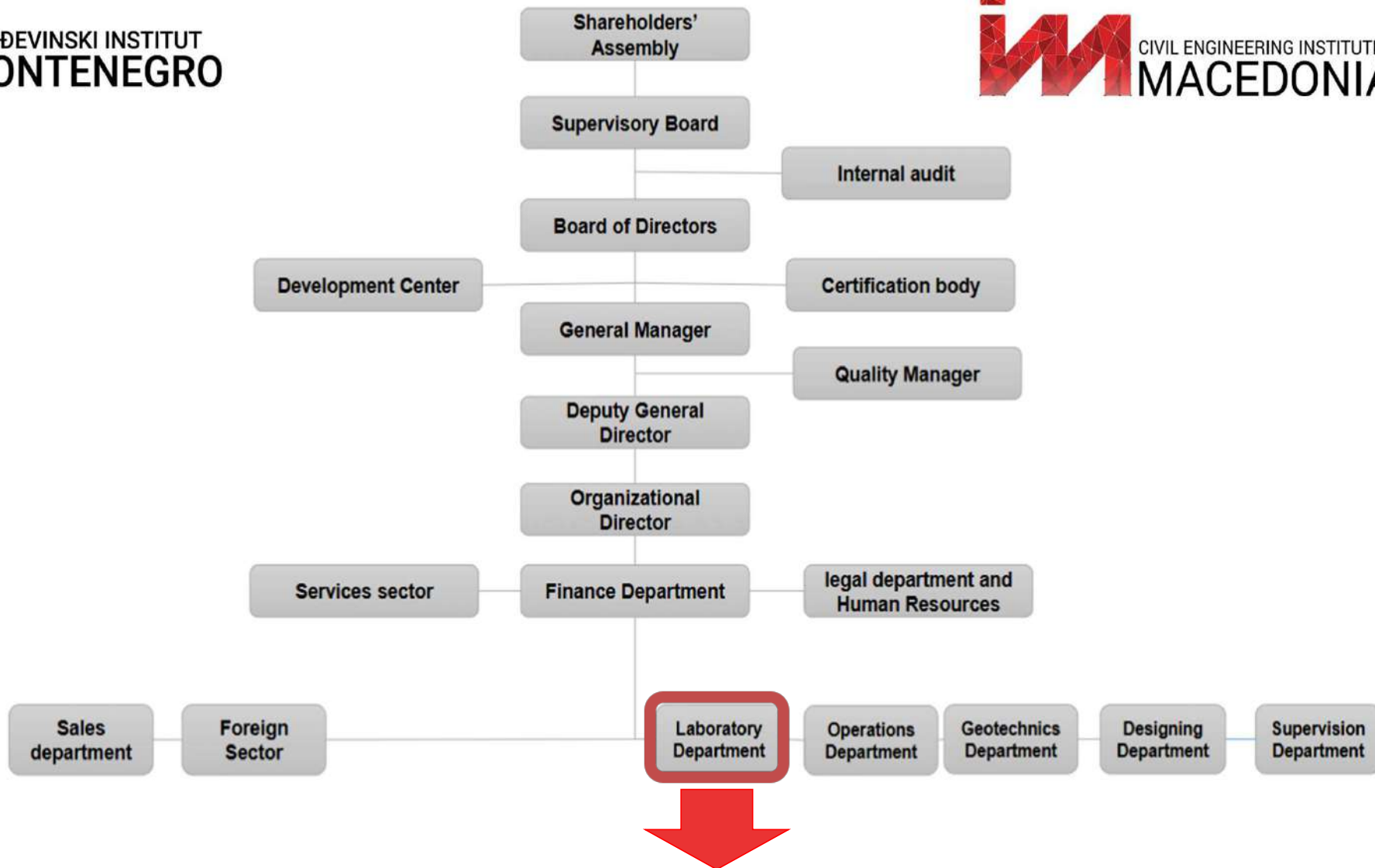
As part of the family of CEIM the following companies are included: Institute for Research in Environment, Civil Engineering and Energy - IECE that works towards sustainable development.

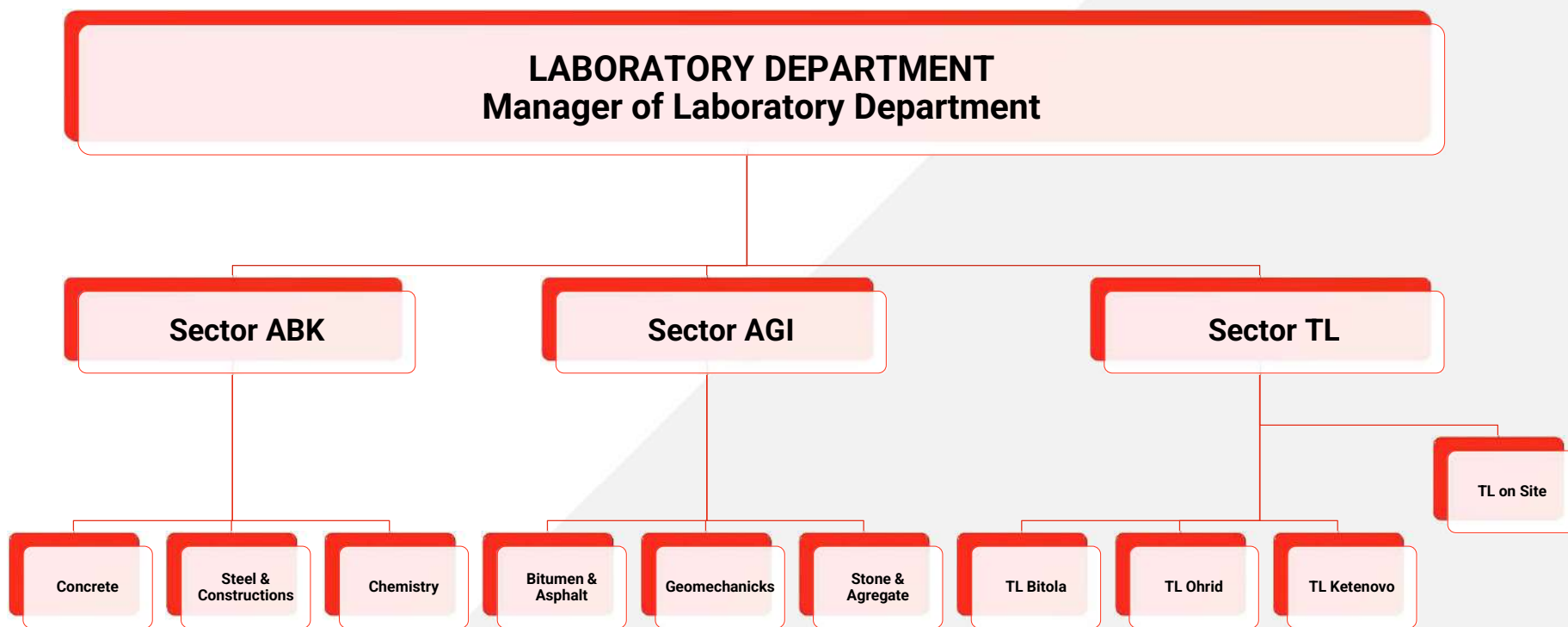
CONNECTED COMPANIES AND SUBSIDIARIES

CIVIL ENGINEERING
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organizational chart

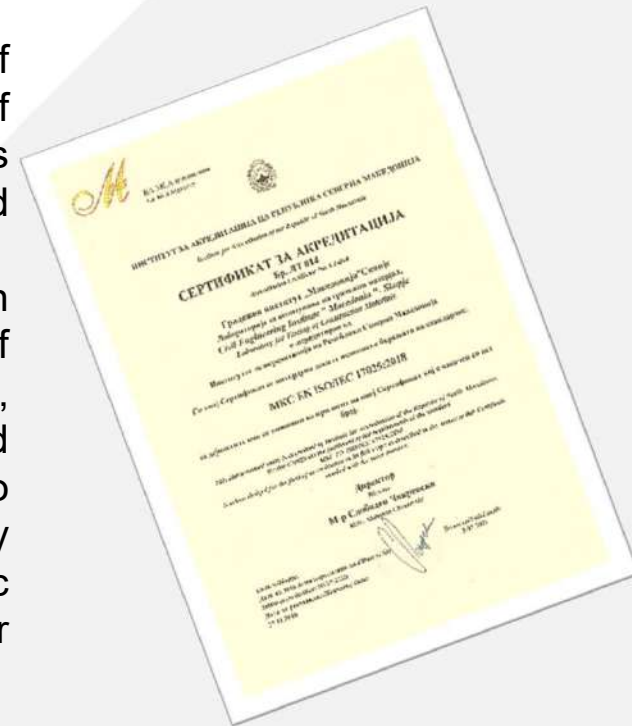




INTRO



ACCREDITED LABORATORY of the Civil Engineering Institute of Macedonia, since 2009, has maintained and constantly upgraded its accreditation according to **MKS EN ISO/IEC 17025:2018** with new testing methods in the field of concrete, cement, geomechanics, aggregates, asphalt, steel and construction chemistry. In addition to the accredited ones, the Laboratory works according to various domestic and international standards for testing construction products.



The laboratory is equipped with the **MOST SOPHISTICATED EQUIPMENT** from world-renowned manufacturers, guaranteeing its precision and quality.

INTRO



Civil Engineering Institute Montenegro is established in 2018 primarily as a laboratory for testing construction materials, as well as geomechanical tests.

Civil Engineering Institute Macedonia from Skopje is the founder, a company that celebrated its 45th anniversary in 2020. In addition to laboratory tests (120 accredited methods), CEIM Skopje is also specialized for geomechanical investigations and tests. It has departments for designing, supervision in the field of construction and geomechanics. Within the Institute, there is a Certification Body for products (aggregate, asphalt, concrete) www.gim.com.mk.



Thanks to the personnel with extensive experience, CEIM Ltd. Podgorica obtained Accreditation Certificate for 88 accredited methods. We are specialized in testing and sampling fresh and hardened concrete, further testing of the hardened concrete, testing concrete prefabricates, cement, asphalt, bitumen, geomechanical tests and testing stones.

competitiveness



AKREDITACIONO TIJELO
Crne Gore
ACCREDITATION BODY
of Montenegro
Podgorica

Crna Gora
Montenegro

ATCG - 0137

Prema člana 10. Zakona o akreditaciji, Akreditaciono tijelo Crne Gore dodjeljuje
Pursuant to the Article 10. of the Law on accreditation, Accreditation body of Montenegro issues

SERTIFIKAT O AKREDITACIJI

Accreditation Certificate

Gradovala da Laboratorije za ispitivanje
that Laboratory of testing

GRAĐEVINSKI INSTITUT MONTENEGRO D.O.O PODGORICA
Sektor Laboratorija
Ulica 10 br. 10 Donji Kokoti, Podgorica



88

Li 19.29
akreditacioni broj
accreditation number

Uspadovoljava zahtjeve standarda
meets the requirements of

MEST EN ISO / IEC 17025:2018
kompetentna je za obavljanje poslova ispitivanja
and is competent for performing testing activities
koji su specificirani u utvrđenom obimu akreditacije
which are specified in the defined scope of accreditation

Datum prve akreditacije: 27.05.2019.
The date of initial accreditation:
Datum ponovne akreditacije: 25.08.2023.
The date of re-accreditation:

Direktor
Director
Anita Krulanović
ZRP01.28



INSTITUT ZA AKREDITACIJA IZ REPUBLIKE SEVERNA MAKEDONIJA
Institute for Accreditation of the Republic of North Macedonia

СЕРТИФИКАТ ЗА АКРЕДИТАЦИЈА

Br. LT 014

Градежен институт „Македонија“
Laboratory for Testing of Construction
Институт за акредитација на Република Северна Македонија



250

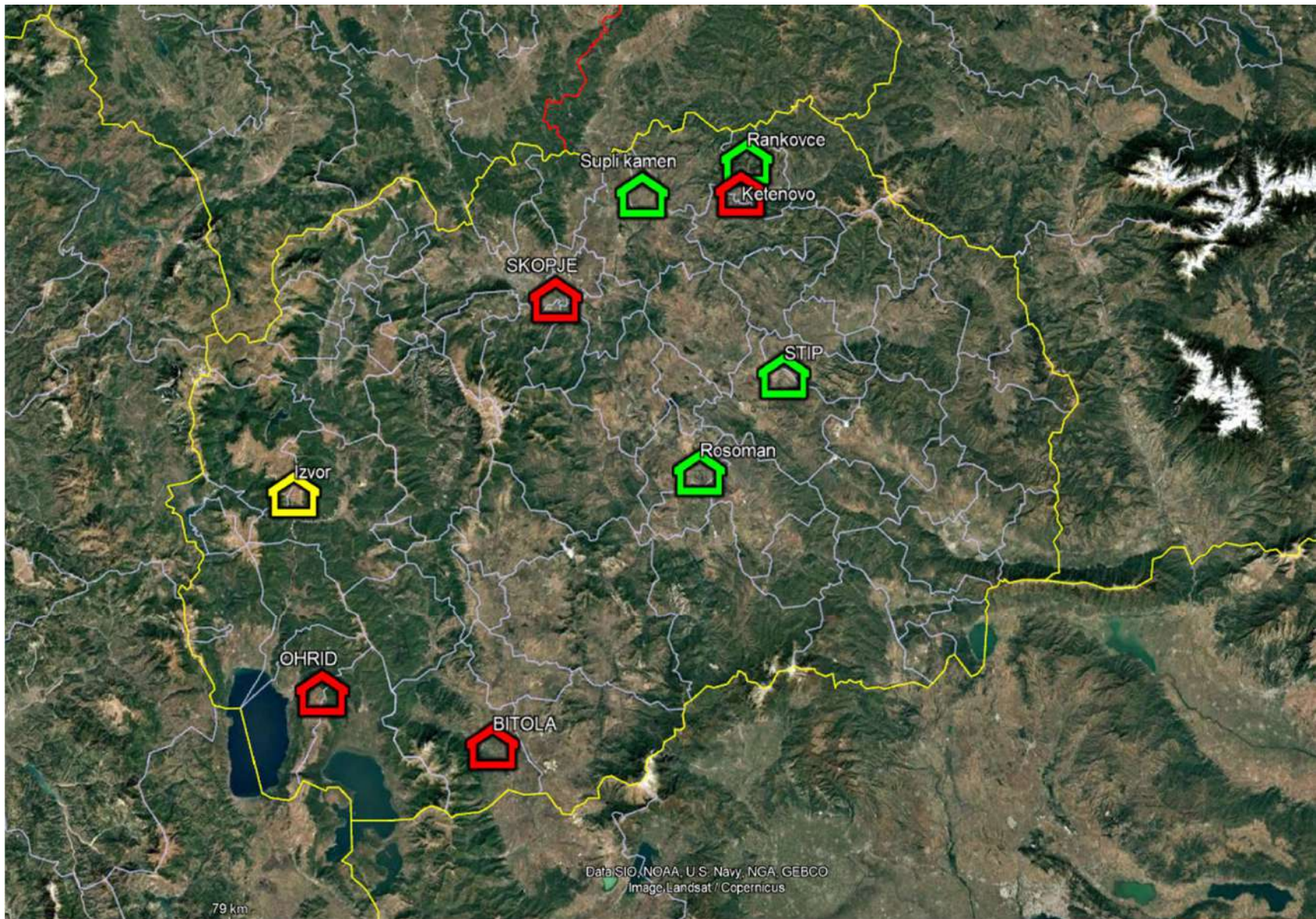
MKS EN ISO/IEC 17025:2018

kompetentna je za obavljanje poslova ispitivanja
and is competent for performing testing activities

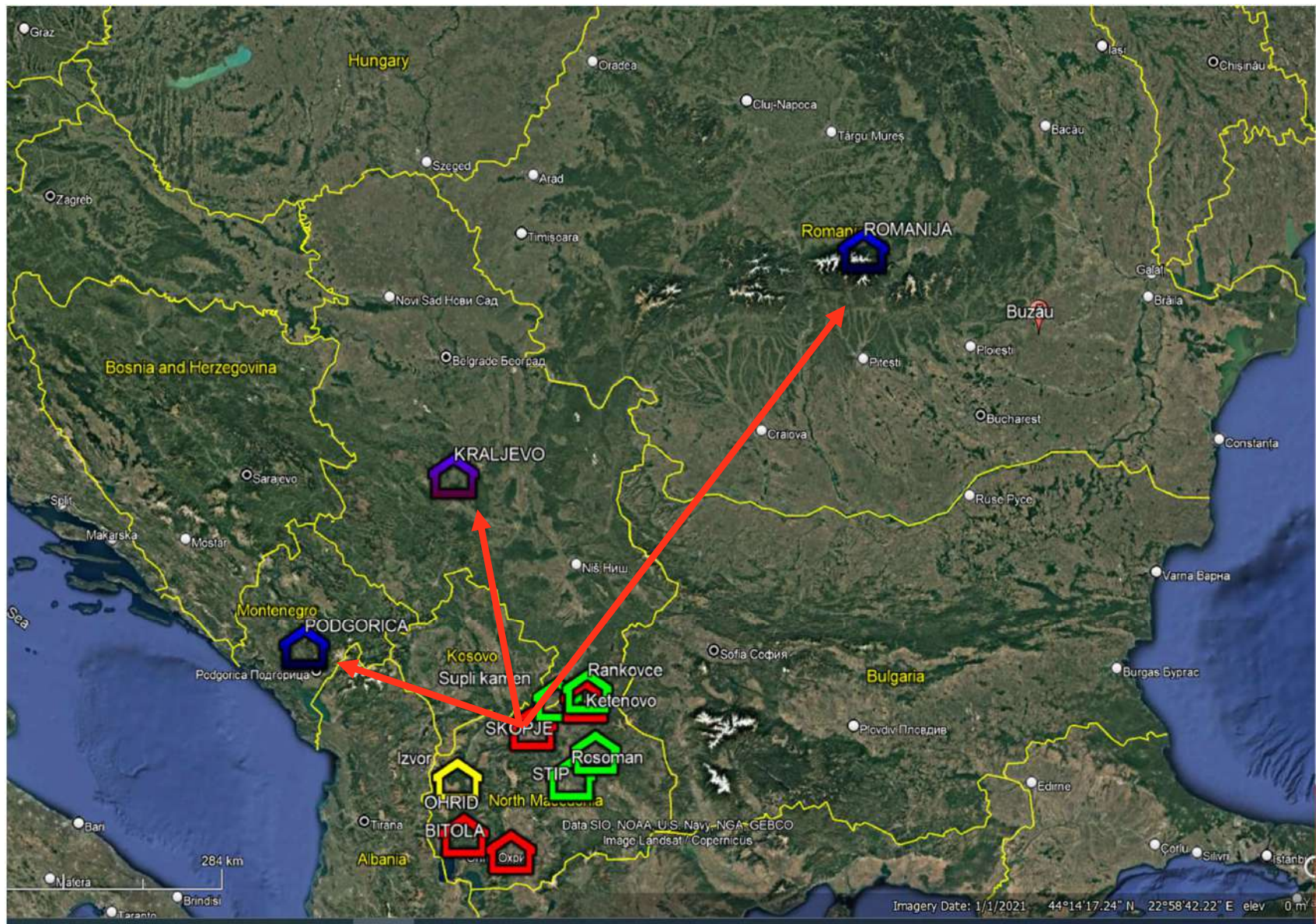
Датум прве акредитације: 10.05.2019.
The date of initial accreditation: 10.05.2019.
Датум повторне акредитације: 10.05.2019.
The date of re-accreditation: 10.05.2019.



competitiveness



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Laboratori Ohrid

Laboratory Bitola



competitiveness



Ketenovo

Laboratory



CONTROLS

MATEST[®]
INNOVATIVE. GLOBAL. MANUFACTURER.

UTEST
MATERIAL TESTING EQUIPMENT

∞ ALFA | TESTING EQUIPMENT

training



ГРАДЕЖЕН ИНСТИТУТ "МАКЕДОНИЈА" АД ГИМ.П-541-191.04

ИНТЕРНА КОНТРОЛА - ОБУКА (во лабораторија)

Оператор: _____

Примерок / Лаб. дневник бр. (примерок со позитивни резултати): _____

Стандард / Метода: _____

Цел на проверката: Интерна контрола Обука

Лабораториски дневник бр.: _____

Прилог (работни документи): _____

РЕЗИМЕ ОД ИНТЕРНА КОНТРОЛА - ОБУКА:

1. Опрема	<input type="checkbox"/> Да	<input type="checkbox"/> Не
2. Услови на околина	<input type="checkbox"/> Да	<input type="checkbox"/> Не
3. Оператор	<input type="checkbox"/> Да	<input type="checkbox"/> Не
3.1 Тестирање	<input type="checkbox"/> Да	<input type="checkbox"/> Не
3.2 Пресметка и изразување на резултати	<input type="checkbox"/> Да	<input type="checkbox"/> Не
3.3 Познавање на мерките за безбедност при работа	<input type="checkbox"/> Да	<input type="checkbox"/> Не

КОМЕНТАР: _____

Датум: _____ Реализирано под мониторинг: _____

Рев. 02 Страна 1 од 1

Series 1

science



- Влијание на учеството на слама врз физичко-механичките својства на композитен цементен материјал
М-р Иван Наумовски дипл.град.инж.
- Топлински својства на одржлив цементен композитен материјал со слама
М-р Андреа Велекова дипл.град.инж.
- Примена на опализиран туф како агрегат во лесни изолациски бетони
М-р Димитар Гошев
- Однесување при свиткување на бетон со големи количества на челични микровлакна
М-р Маја Бундевска
- Истражни работи за рехабилитација на патна инфраструктура и анализа на интеракција помеѓу флексибилната коловозна конструкција и долниот stroj
М-р Марио Стојановски
- Техничко решение за подобрување на слабоносиво тло за изградба на насип
М-р Воислав Стефановски
- Примена на природна печена црвена глина за производство на композитни блокови за сидање
М-р Бојан Голабовски
- Влијание на отпаден пепел од согорена дрвена биомаса врз физичко-механичките карактеристики на цементни материјали
М-р Марија Менчевска
- Примена на пепел од дрвена биомаса како замена за цемент
М-р Маја Путич



**THE 9th INTERNATIONAL CONFERENCE
"CIVIL ENGINEERING - SCIENCE AND PRACTICE"**

WASTE ASH FROM COMBUSTED WOOD BIOMASS IN CONCRETE

Goce PRANGOVSKI¹, Suzana ARANGIELOVSKA², Nikola TRPESKI³

Abstract: The vast amount of benefits of concrete justify its place as the most widely used building material in the world. However, the considerable contribution of carbon dioxide emissions emitted during the production of cement creates the need for seeking solutions which involve searching for alternatives to cement. Conversely, as the global amount of waste is expected to continue to increase, it is imperative to make efforts to find ways of reusing it instead of solely disposing it.

Keywords: Ash obtained by combustion of wood biomass is a material which is predominantly disposed, yet the presence of the less conventional mineral oxides in cement (CaO, SiO₂, Al₂O₃, Fe₂O₃) in its composition indicates a possibility of wood ash having pozzolanic properties as well. Therefore, this paper analyzes the influence of the replacement of cement with various amounts of wood ash on the physical and mechanical characteristics of concrete.

Introduction: Within the scope of this experiment, five types of concrete have been prepared: a control one, and four with 5%, 10%, 15% and 20% replacement of cement with wood ash, respectively. The ash was provided from a local factory which uses beech wood for its work. Accordingly, a chemical analysis for determination of its composition has been made. When preparing the samples, their consistency was used as a benchmark. Each waste ash composition of the different types of concrete, hence, all types of concrete belong to consistency class SA.

Materials: The laboratory research was used for the concrete which contained some percentage of waste ash (beech biomass) instead of cement (C40, S40, A20, F420) in its composition. The amount of ash was 5%, 10%, 15% and 20% of cement mass, while the rest was 95%, 90%, 85% and 80% respectively. The concrete samples were prepared in the laboratory. The concrete samples were made with 20% of cement, 10% of water, 10% of sand and 70% of the composition of concrete class SA.

Concrete type	Consistency				
	reference	5% ash	10% ash	15% ash	20% ash
Cement	370	352	333	314.5	296
Ash		18	37	55.5	74
Additives		0.5	0.5	0.5	0.5
Water-Cement Ratio (W/C)	0.60	0.64	0.63	0.64	0.67

Concrete type	Strength				
	reference	5% ash	10% ash	15% ash	20% ash
Compressive	28.0	28.3	28.4	28.2	28.1
Tensile	1.10	0.93	1.04	0.88	0.82

CONCLUSIONS: The research has confirmed the positive impact of wood ash on the concrete strength. The results show that the concrete with 10% ash has the highest compressive strength, while the concrete with 20% ash has the lowest compressive strength. The results also show that the concrete with 10% ash has the highest tensile strength, while the concrete with 20% ash has the lowest tensile strength. The results indicate that the use of wood ash in concrete is a promising alternative to cement, and that the amount of ash used should be optimized to achieve the best results.

References: [1] G. Prangovski, S. Arangielovska, N. Trpeski, "Influence of Waste Ash from Combusted Wood Biomass on the Mechanical Properties of Concrete", *Journal of Civil Engineering and Architecture*, vol. 10, no. 1, pp. 1-10, 2022.

GNP 2024 - Kolašin, Montenegro, 5-9 March 2024

www.gim.mk

**19. Symposium of MASE
"Eurocodes - Gate to Europe"**

EXPERIMENTAL STUDY OF MECHANICAL BEHAVIOR OF CONCRETE WITH METAL FIBERS

Stefan KOSTOVSKI¹, Goce PRANGOVSKI², Tanja SERAFIMOVA³

Abstract: CONCRETE IS AN ECONOMIC MATERIAL WITH GOOD STRENGTH CHARACTERISTICS, WHICH WITH GOOD TECHNOLOGY AND PROPERLY DESIGNED COMPOSITION HAS DURABILITY PROPERTIES WITH THE ABILITY TO BE IN VARIOUS AREAS OF CONSTRUCTION. ITS PROPERTIES CONTRIBUTE TO THE BROAD RANGE OF APPLICATION, ADDITIONALLY, THE DEVELOPMENT OF MODERN CONCRETE TECHNOLOGY IS EXPANDING THE APPLICATION ON A DAILY BASIS IN THE SEARCH FOR TECHNOLOGICAL SOLUTIONS. THE CONSTRUCTION INDUSTRY FACES CHALLENGES IN FINDING EFFECTIVE MATERIALS THAT WOULD INCREASE THE STRENGTH CHARACTERISTICS OF CONCRETE IN BUILDINGS. TO ACHIEVE THIS GOAL, THE USE OF METAL FIBERS AS AN ADDITIVE IN CONCRETE PROVES TO BE A GOOD SOLUTION. WITH THE ADDITION OF METAL FIBERS IN THE CONCRETE MIX, A MATERIAL THAT HAS BETTER STRENGTH CHARACTERISTICS AND IS WIDELY USED IN THE CONSTRUCTION INDUSTRY.

Introduction: IN THE PAST FEW YEARS THE CONCRETE LABORATORY AT THE CIVIL ENGINEERING INSTITUTE MACEDONIA JSC SKOPJE WORKED ON RESEARCH IN ORDER TO DETERMINE THE MECHANICAL PROPERTIES OF CONCRETE WITH THE ADDITION OF METAL FIBERS. MODERN METAL FIBERS WITH A LENGTH OF 60 MM ARE USED.

Materials: FOUR CONCRETE MIX DESIGNS HAVE BEEN PREPARED AND PREPARED IN LABORATORY CONDITIONS. ONE CONCRETE MIX DESIGN WAS PREPARED WITHOUT METAL FIBERS IN ORDER TO USE THE OBTAINED RESULTS FOR COMPARING WITH THE RESULTS OBTAINED FROM THE CONCRETE MIX DESIGNS PREPARED WITH DIFFERENT PERCENTAGE OF METAL FIBERS IN THE PRESENCE OF 5.75% METAL FIBERS, 10% METAL FIBERS AND 20% METAL FIBERS. A COMPARATIVE ANALYSIS WAS MADE BETWEEN THE PROPERTIES OF PREPARED CONCRETES OBTAINED FROM LABORATORY TESTS FOR ALL FOUR RECIPES.

Results: ACCORDING TO THE RESULTS OF THE EXPERIMENTAL RESEARCH, THE FOLLOWING CONCLUSIONS CAN BE DRAWN: THE ADDITION OF METAL FIBERS OF 5.75%, 10% AND 20% HAS NO EFFECT ON THE COMPRESSIVE STRENGTH, PRESSURE STRENGTH AT 7 DAYS STRENGTH FROM 2.021 MPa AND AT 28 DAYS 42.244 MPa. WITH THE ADDITION OF METAL FIBERS THERE IS A TENDENCY TO INCREASE THE TENSILE STRENGTH DURING SPLITTING IN THE CONTROL CONCRETE MIXTURES.

CONCLUSIONS: THE RESEARCH RESULTS IN DURABLE CONCRETE WITH HIGH STRENGTH DURING BENDING AND FLEXURE. THE ADDITION OF METAL FIBERS INCREASES THE TENSILE STRENGTH OF THE FIBERS.

References: [1] S. K. Kostovski, G. Prangovski, T. Serafimova, "Experimental Study of Mechanical Behavior of Concrete with Metal Fibers", *Journal of Civil Engineering and Architecture*, vol. 10, no. 1, pp. 1-10, 2022.

April 27th - 30th, 2022, Ohrid, N. Macedonia

www.gim.mk

**20th International Symposium of MASE
"RESILIENT STRUCTURES"**

September, 28th - 29th, 2023, Skopje, N. Macedonia

INFLUENCE OF WASTE ASH FROM COMBUSTED WOODBIOMASS ON THE PHYSICAL AND MECHANICAL CHARACTERISTICS OF CONCRETE

Goce PRANGOVSKI¹, Suzana ARANGIELOVSKA², Nikola TRPESKI³, Marija MENCHEVSKA⁴, Gjorgji GOSHEV⁵

Abstract: The vast amount of benefits of concrete justify its place as the most widely used building material in the world. However, the considerable contribution of carbon dioxide emissions emitted during the production of cement creates the need for seeking solutions which involve searching for alternatives to cement. Conversely, as the global amount of waste is expected to continue to increase, it is imperative to make efforts to find ways of reusing it instead of solely disposing it.

Keywords: Ash obtained by combustion of wood biomass is a material which is predominantly disposed, yet the presence of the less conventional mineral oxides in cement (CaO, SiO₂, Al₂O₃, Fe₂O₃) in its composition indicates a possibility of wood ash having pozzolanic characteristics as well. Therefore, this paper strives to explore the influence of replacement of cement with various amounts of wood ash on some of the physical and mechanical characteristics of concrete.

Introduction: Within the scope of this experiment, five types of concrete have been prepared: a control one, and four with 5%, 10%, 15% and 20% replacement of cement with wood ash, respectively. The ash was provided from a local factory which uses beech wood for its work. Accordingly, a chemical analysis for determination of its composition has been made. When preparing the samples, their consistency was used as a benchmark which would allow comparison of the different types of concrete, hence, all types of concrete belong to consistency class SA.

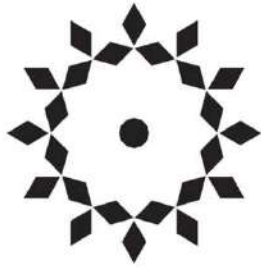
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contact: jlabonarska@gim.mk



ОДРЖЛИВИ ПАРТНЕРСТВА ЗА
ИНОВАЦИИ БАЗИРАНИ НА
ПРИМЕНА НА ЦИРКУЛАРНИТЕ И
НАНО МАТЕРИЈАЛИ ВО
ПРЕРАБОТУВАЧКАТА ИНДУСТРИЈА



→ Значење

Почетна Партнери Настани За Нас / Структура Материјали MK

За проектот

Проектот е добиен на јавен повик за развој и имплементација на иновативни и колаборативни проекти поврзани со специјализација, зелена и дигитална трансформација во областа на преработувачката индустрија од страна на Министерството за економија.

Основна цел во проектот е развој на технологија на самозадрзувачки цементни материјали со автономно самозадрзување на пукнатини со користење на отпад од индустријата (минерални додатци, летачка пепел и деловитен остаток мелени на нано ниво) и стакло (градбени отпад соодветен на нано ниво) како секундарни сировини согласно принципите на циркуларна економија. Најголем добиток од проектот ќе има во промовирање на циркуларната економија во градежниот сектор, а при тоа промовирајќи иновативни технологии на самозадрзувачки цементни материјали кои би имале подолг век на траење и одржливост.

Ќе се работи на добивање на нови цементни производи со карактеристики на автономно само-задрзување на пукнатини кои ќе бидат ќе бидат дизајнирани во рамки на проектот.

Производ 1: Цементни материјали на база на летачка пепел и адитивен бентонит (не се доволно во тем на проектот)

Производ 2: Цементни материјали на база на стакло и деловитен остаток.



MLS & PT



partners



main projects



Civil Engineering Institute of Macedonia – ongoing laboratory tests for LIDL markets in the Republic of Macedonia

LIDL, one of the leading European supermarket chains, is expanding its network in the Republic of North Macedonia. With its recognizable concept of high-quality products at affordable prices, LIDL aims to offer a modern shopping experience to Macedonian consumers.

The company invests in the construction of modern, energy-efficient and environmentally sustainable buildings, while respecting all national and European standards for quality and safety.

Construction Institute Macedonia is proud to announce that we are a current laboratory for quality control of materials for the construction of LIDL markets in Macedonia

With many years of experience, an accredited laboratory and a professional team, we provide top control and reliability in the quality of construction materials used in the implementation of this important project.



"Grand Skopje" is being built with top laboratory control from GIM

The construction of the new residential and business complex "Grand Skopje" by MG Fashion is being implemented with constant technical support from the Laboratory of the Civil Engineering Institute of Macedonia, which functions as the ongoing laboratory of the project.

With modern equipment and accredited methods according to Macedonian and European standards, detailed control of all materials is carried out - from concrete and reinforcement, to soil and facade systems.

In this way, quality, safety and longevity of one of the most significant urban projects in the center of Skopje are guaranteed.



Civil Engineering Institute of Macedonia – ongoing laboratory of the Project for the second section Beljakovce – Kriva Palanka, Railway Corridor VIII

Construction Institute of Macedonia (CIM) is acting as an ongoing laboratory for the Project for the construction of the second section Beljakovce – Kriva Palanka, part of the Railway Corridor VIII.

The second section of Corridor 8 towards Bulgaria, from Beljakovce to Kriva Palanka, is 34 kilometers long and worth 155 million euros, and the contractor of the project is the company GÜLERMAK AĞIR SANAYİ İNŞAAT VE TAAHHÜT ANONİM ŞİRKETİ.

For the needs of the project, CIM is installing and accrediting its Facility Laboratory at the location in Ketenovo, which is equipped with modern laboratory and field equipment for testing construction materials. The laboratory ensures the constant presence of professional technical personnel, who carry out control and testing of materials and works throughout the entire construction.

With this laboratory, GIM guarantees high quality and safety of construction activities, as well as compliance with international standards, providing professional support to the contractor and the project supervisory bodies.



GÜLERMAK

Construction Institute of Macedonia – a reliable partner in quality control of large infrastructure projects Bechtel & Enka Serbia

Laboratory of GIM operates as a site laboratory, providing continuous testing and quality control in the fields of fresh and hardened concrete, usability testing of earth materials, and geomechanical assessment of constructed layers. These activities are carried out within the framework of the E761 Highway project, on the Pojate–Preljina section, with a total main route length of approximately 112 km. The project is being executed by the American–Turkish consortium “Bechtel & Enka.” The scope of the project includes the construction of numerous infrastructure facilities, specifically 11 grade-separated interchanges, 71 bridges, 23 overpasses, 5 underpasses, and 31 culverts. The highway section is organized into three sectors, further divided into nine subsections. Within this complex and large-scale project, GIM performs the role of a site laboratory, ensuring continuous monitoring, testing, and verification of materials and constructed elements in accordance with applicable standards and project requirements.



Construction Institute of Macedonia – a reliable partner in quality control of large infrastructure projects Bechtel & Enka Macedonia

Construction Institute of Macedonia (GIM), through its accredited Laboratory, performs investigative and ongoing laboratory testing of materials used in the construction of the most significant infrastructure projects of the Bechtel & Enka company in North Macedonia, including Corridors 8 and 10d. With its decades of expertise, modern equipment and proven professionalism, GIM provides specialized analyses that are a guarantee of quality, safety and compliance with the highest European standards. As a traditional partner in a large number of infrastructure projects in the region – Kosovo, Serbia, Albania and beyond – GIM once again confirms its reputation as a reputable and trusted collaborator of leading construction companies.

The presence of GIM Laboratory on Bechtel & Enka projects in Macedonia is not only a confirmation of the high level of professionalism, but also a contribution to the creation of durable and safe infrastructure solutions of strategic importance for the country.



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