

CENTRUL UNIVERSITAR NORD DIN BAIA MARE
Facultatea de Inginerie

*NORTH UNIVERSITY CENTRE OF BAIA MARE
Faculty of Engineering*

BULETIN ȘTIINȚIFIC

AL CENTRULUI UNIVERSITAR NORD DIN BAIA MARE

SERIA D

Exploatare Miniere

Prepararea Substanțelor Minerale Utile

Metalurgie Neferoasă

Geologie și Ingineria Mediului

Volumul XXXIX Nr. 2

Indexat ProQuest, EBSCO, ERIH PLUS

SCIENTIFIC BULLETIN

OF NORTH UNIVERSITY CENTRE OF BAIA MARE

Series D

Mining

Mineral Processing

Non-ferrous Metallurgy

Geology and Environmental Engineering

Volume XXXIX No. 2

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EDITURA UNIVERSITĂȚII TEHNICE DIN CLUJ NAPOCA - UTPRESS
ISSN 1582-0548, 2025

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FACULTY OF ENGINEERING

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PUBLISHING HOUSE OF THE TECHNICAL UNIVERSITY OF
CLUJ-NAPOCA - UTPRESS
ISSN 1582-0548, 2025

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Technical University of Cluj Napoca
North University Center of Baia Mare
Faculty of Engineering
Str. Dr. V. Babeş nr. 62A, 430083
Baia Mare, Romania
Tel. +40362-401266, Fax +40262-276153
Dorel.Gusat@irmmm.utcluj.ro

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Times New Roman font, single spacing.
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STUDIES AND RESEARCH ON THE PRODUCTION OF ALUCOBOND ALUMINUM ALLOY PANELS

JOZSEF JUHASZ

¹*Technical University of Cluj-Napoca, North University Center of Baia Mare,*

Dr. Victor Babes street 62A, Baia Mare, Romania

²*European University of Technology, European Union*

Corresponding author: jozsef.juhasz@irmmm.utcluj.ro

Abstract: *This paper aims to address topics such as aluminum lamination and ALUCOBOND panels. The novelty of this paper lies in the widespread use of ALUCOBOND panels. This topic is less known in Romania. These sandwich panels are increasingly used in the construction of industrial and residential buildings, but they are also very useful in terms of energy efficiency and sound absorption. These panels are double-sided composite panels made of 0.5 mm thick aluminum and a core of pure, non-toxic polyethylene, manufactured by hot and pressure lamination, a process that achieves perfect surface flatness and an excellent weight-to-strength ratio. The upper surface is double-lacquered, increasing the material's resistance to abrasion, salts, humidity and UV rays, the range being distinguished by an increased lifespan.*

Keywords: *composite panels, aluminum sheet, lamination.*

STUDY ON THE VARIATION OF TEMPERATURE DURING PLASTIC DEFORMATION OF COPPER WIRE WHEN PASSING THROUGH THE DRAW-PLATE

ELENA ANGELA POP

¹*Technical University of Cluj-Napoca, North University Center of Baia Mare,
Dr. Victor Babes street 62A, Baia Mare, Romania*

²*European University of Technology, European Union
Corresponding author: Elena.POP@irmmm.utcluj.ro*

Abstract: *In the work, some characteristics of the plastically deformed copper wire in the die were determined, the temperature of the deformed wire and the deformation force were measured. We made eight passes through the draw-plate, at the first five, the temperature increased slightly, by four degrees Celsius, and at the last three passes we stopped using lubricant at the interface of the draw-plate-copper wire and the temperature of the wire increased by nine degrees Celsius. At the last passes, the pulling force, elongation coefficient and logarithmic degree of deformation also increased. Wire hardening has also increased.*

Keywords: *plastic deformation, draw-plate*

ANTIMICROBIAL ACTIVITY OF SILVER NANOPARTICLES AND ALOE VERA-BASED SOLUTIONS AGAINST BACTERIA ISOLATED FROM CONTAMINATED WATERS

ZORICA VOȘGAN^{1,2,*}, TEODORA OPRICA^{1,2}, LUCIA MIHALESCU^{1,2}, CRISTINA MIHALI^{1,2}, CLAUDIA BUTEAN^{1,2}, BEATRICE MIHALESCU³

¹*Technical University of Cluj-Napoca, North University Center at Baia Mare, Faculty of Sciences, Department of Chemistry and Biology, 76 Victoriei Street, 430122 Baia Mare, Romania,*

²*European University of Technology, European Union*

³*University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Agriculture, 3-5 Mănăștur St., 400372 Cluj-Napoca, Romania.*

**Corresponding author: Zorica.VOSGAN@cb.utcluj.ro*

Abstract: *Water contamination with pathogenic bacteria represents a major public health and environmental concern. In this study, the antimicrobial activity of silver nanoparticle and Aloe vera based solutions against Enterococcus sp., Streptococcus sp., and Staphylococcus sp., isolated from anthropogenically contaminated water samples, was evaluated. Microbiological assays were performed using the agar dilution method and an adapted disk diffusion method, and antimicrobial efficiency was assessed by measuring the diameters of inhibition zones. The results indicated that silver nanoparticles exhibited the highest antimicrobial activity, particularly against Staphylococcus sp., followed by Streptococcus sp. and Enterococcus sp., while colloidal silver showed moderate activity, except against Enterococcus sp., where higher effectiveness was observed. The combination of silver nanoparticles or colloidal silver with Aloe vera resulted in a slight reduction of antimicrobial activity in some cases, while maintaining a significant inhibitory effect against Staphylococcus sp., suggesting an adjuvant role of the plant. This study confirms the potential application of silver nanoparticle and Aloe vera based solutions as natural or complementary alternatives for reducing pathogenic bacteria in aquatic environments, contributing to environmental protection and public health strategies.*

Keywords: *antimicrobial activity, Aloe vera, biosynthesis, nanoparticles, contaminated water*

MONITORING OF STREET NOISE POLLUTION IN THE "14 MAI" RESIDENTIAL NEIGHBORHOOD IN SATU-MARE CITY, SATU-MARE COUNTY, ROMANIA

IRINA SMICAL^{1,2}, IOAN MICLĂUȘ¹*

¹*Faculty of Engineering, Technical University of Cluj-Napoca, North University Centre of Baia Mare, 62A Victor Babeș Street, 430083 Baia Mare, Romania*

²*European University of Technology, European Union*

*Corresponding author's e-mail: Irina.Smical@irmmm.utcluj.ro

Abstract: *Noise pollution is one of the major forms of urban pollution, with significant effects on the health of the population and the quality of life, especially in residential areas exposed to heavy road traffic. The present study presents the results of monitoring the ambient street noise in the residential neighborhood "14 Mai" in Satu Mare city, Satu Mare County, Romania. The measurements were carried out in five representative points, selected based on the urban characteristics and traffic intensity, over six consecutive days, in four distinct time intervals (morning, afternoon, evening, and night), in accordance with the provisions of the national legislation in force. The noise levels were determined using a Trotec SL 400 sound level meter, and the data obtained were statistically processed to highlight temporal and spatial variations. The results indicate frequent exceedances of the limit values allowed for residential areas, particularly in areas characterized by heavy road traffic, which may have a potentially negative impact on the acoustic comfort of the population. The study highlights the need to implement traffic management and urban noise reduction measures in the residential areas analyzed.*

Keywords: monitoring, noise pollution, road traffic, environmental noise

LONG-TERM HYDROCHEMICAL EVOLUTION AND BALNEOLOGICAL POTENTIAL OF A MINERAL SPRING IN MARAMUREȘ, ROMANIA, IN THE CONTEXT OF THE 2030 SUSTAINABLE DEVELOPMENT STRATEGY

VALERIA MIRELA BREZOCZKI^{1,2*}

¹ Technical University of Cluj Napoca, North University Centre at Baia Mare, Engineering Faculty, Mineral Resource, Material, Environment Engineering Department, Dr. Victor Babeș street, no.62 A, Maramureș, Romania, 430083

²European University of Technology, European Union

Corresponding author's e-mail address*: Valeria.BREZOCZKI@irmmm.utcluj.ro

Abstract: *The study presents the hydrochemical evolution and the balneological potential of a mineral spring located in Breb, Maramureș County, Romania, based on research data reported in the specialized literature (1973, 1977) and on recently conducted analyses (2020, 2025).*

The investigated mineral water is characterized by high concentrations of dissolved carbon dioxide (CO₂), the historical presence of hydrogen sulfide (H₂S), and significant levels of boron compounds (HBO₂), reflecting strong geogenic control associated with the volcanic structures of the Carpathian region. Long-term data indicate a continuous increase in CO₂ content, from 1300.5 mg/L in 1973 to 2200 mg/L in 2020, confirming the classification of the water as strongly carbonated. In contrast, H₂S concentrations have decreased over time, suggesting changes in redox conditions and hydrogeological circulation, while boron concentrations emphasize the rarity and therapeutic relevance of this type of mineral water. From a balneological perspective, the water demonstrates potential therapeutic applications in cardiovascular, musculoskeletal, and metabolic disorders. The concentrations of Ca²⁺, K⁺, and Mg²⁺ ions determined in 2025 are high for a mineral water and are essential for the normal functioning of daily physiological processes in the human body. The high salinity of the spring water (14%) and the considerable total dissolved solids (TDS) value (3585 ppt) confirm the hyper mineralized character of the water and further highlight its therapeutic potential, particularly for metabolic and rheumatological conditions. Regarding trace metals, the concentrations of Cu²⁺ (5 mg/L), Cr⁶⁺ (0.001 mg/L), Zn²⁺ (0.54 mg/L), and Al³⁺ (0.0 mg/L) indicate a safe chemical profile, posing no risk to human health. The results underscore the importance of continuous monitoring and the sustainable management of mineral water resources. Within the framework of the 2030 Sustainable Development Strategy, the studied mineral spring represents a valuable natural resource with significant potential to support public health, rural development, and sustainable spa tourism in Maramureș, alongside other hydromineral sources of therapeutic value.

Keywords: *the natural mineral water heritage, therapeutic mineral spring, balneoclimatic tourism, 2030 Sustainable Development Strategy*

STUDIES AND RESEARCH ON THE STABILITY OF A SANDSTONE QUARRY PRODUCTION

DOREL GUSAT^{1,2*}, IOAN BUD^{1,2}, DINU DARABA^{1,2}

¹*Technical University of Cluj-Napoca, North University Center of Baia Mare,
Dr. Victor Babes, street 62A, Baia Mare, Romania*

²*European University of Technology, European Union*

**Correspondence author: Dorel.Gusat@irmmm.utcluj.ro*

Abstract: *The stability assessment of sandstone open pit slopes represents a critical aspect in ensuring safe and sustainable mining operations , particularly in areas affected by geological complex and hydrogeological conditions . This study presents a numerical slope investigation stability for a sandstone open pit production using two -dimensional finite difference modeling implemented in FLAC2D. The research aims to evaluate the mechanical behavior of pit slopes under static conditions and to identify potential instability areas that May affection operational safety and long-term mine planning . Geotechnical parameters , including cohesion , friction angle , density , Young's modulus , and Poisson's ratio , were determined from FLAC2D data base and geological investigations. The numerical model was developed considering the actual pit geometry , stratigraphy succession , and boundary conditions representative of the mining environment **Error! Reference source not found., Error! Reference source not found., Error! Reference source not found., Error! Reference source not found.** Different excavation internships were simulated to analyze stress redistribution , displacement patterns , and plastic deformation within the mass slope The modeling results indicate that slope stability is strongly influenced by bench geometry , discontinuity orientation , and variations in sandstone mechanical properties . Areas characterized by increased tension stress and shear foreign concentrations correspond to potential failure surfaces , particularly in sectors with weathered rock material and steep slope angles . The calculated displacement vector and shear plasticity areas highlight the objectionable sectors requiring reinforcement or geometry optimization . The study demonstrates the applicability of FLAC2D as an effective tool for predicting slope behavior in sandstone open pits and for supporting geotechnical risk management strategies . The obtained results contribute to improving operational safety , optimizing slope design, and reducing the likelihood of instability phenomena on the surface mining operations .*

Keywords : *finite difference modeling, FLAC2D, geotechnical assessment , open pit mining , sandstone , slope stability , stress-strain analysis*

LICHENS AS BIOINDICATORS FOR ASSESING THE LEVEL OF AIR POLLUTION IN BAIJA MARE

**CLAUDIA BUTEAN^{1,2}, LEVENTE ALMASI^{1,2}, CRISTINA MIHALI^{1,2}, ZORICA VOŞGAN^{1,2},
LUCIA MIHALESCU^{1,2}, BEATRICE MIHALESCU³**

¹*Technical University of Cluj-Napoca, Faculty of Sciences, Department of Chemistry and Biology, 76 Victoriei Street, 430122 Baia Mare, Romania*

²*European University of Technology, European Union*

³*University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Agriculture, 3-5 Mănăştur St., 400372 Cluj-Napoca, Romania.*

**Corresponding author: dee1168@yahoo.com*

Abstract: *In this paper, the aim was to determine the concentrations of heavy metals (nickel, copper, cadmium, lead) in lichens from the Baia Mare area by the atomic absorption spectrophotometric method. The city of Baia Mare was an important industrial center of non-ferrous metallurgy in northwestern Romania. The industrial activity carried out for decades left its mark on the environment by contaminating environmental factors: soil, water, air. Lichens are excellent organisms for heavy metal pollution studies, because they accumulate these elements from the air and maintain them unaltered for a long period of time. Thus, their heavy metal content can be collected and analyzed, drawing conclusions on the air quality in the respective area. The collection of lichen specimens was carried out in the Baia Mare municipality, selecting crowded and high-traffic areas. Areas of community interest, such as playgrounds and school areas, were chosen as lichen sampling points.*

Keywords : *pollution, heavy metals, lichens, Baia Mare*

ENVIRONMENTAL PERFORMANCE ASSESSMENT OF HAZARDOUS SLUDGE TRANSPORTATION AT SC RONGO IMPEX SRL MARAMUREȘ COUNTY, ROMANIA

IRINA SMICAL^{1,2*}, MIHALY- KAROLY BALINT¹

¹*Technical University of Cluj-Napoca, North University Centre of Baia Mare,
62A Victor Babeș Street, 430083 Baia Mare, Romania*

²*European University of Technology, European Union*

**Corresponding author's e-mail: Irina.Smical@irmmm.utcluj.ro*

Abstract: *This study evaluates the environmental performance of hazardous waste transportation conducted by SC Rongo Impex SRL. in Maramureș County, Romania, centered on tank bottom sludges from petroleum storage tank cleaning, which are classified as hazardous waste (code 05 01 03*).*

The assessment involved a multicriteria approach aligned with ISO 14031:2021, relevant national and EU waste legislation, and ADR regulations, using operational, environmental, economic, administrative, and safety indicators derived from company data, transport records, field observations, and IPCC and EMEP/EEA emission calculation methods. The results demonstrate excellent environmental performance, with full ADR compliance, no incidents, efficient fuel use (0.114 L/t-km), low CO₂ emissions (0.30 kg CO₂/t-km), and optimized transport capacity (80%), resulting in an overall score of 4.3.

The study confirms the usefulness of this evaluation framework for identifying strengths and improvement opportunities in hazardous waste transport.

Keywords: *hazardous waste, tank bottom sludges, hazardous waste transport*



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