

UNIVERSITATEA DE NORD DIN BAIA MARE
FACULTATEA DE RESURSE MINERALE ȘI MEDIU

**BULETIN ȘTIINȚIFIC
AL UNIVERSITĂȚII DE NORD
DIN BAIA MARE**

SERIA D

Exploatarea Miniere

Prepararea Substanțelor Minerale Utile

Metalurgie Neferoasă

Geologie și Ingineria Mediului

Volumul XXII



Universitatea de Nord din Baia Mare
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RESEARCHES REGARDING THE INSTALLMENT OF WOODEN SPECIES ON BOZINTA TAILING POND, IN VIEW OF PHYTOREMEDIATION

V. OROS¹, L. SHKITSA², M. MARIAN¹, R. VIEZER¹, R. BOGDAN¹, M. COMAN¹

¹- *The North University of Baia Mare, Romania*

²- *Ivano-Frankivsk National Technical University of Oil and Gas, Ukraine*

ABSTRACT: *Experiments regarding the installment of different sapling species were conducted during the vegetation season of 2008, in order to determine an effective and reliable method for the phytoremediation of Bozinta tailing pond. 300 saplings of different sizes and ages were used, of the following species: common oak, birch tree, poplar and willow. The saplings were planted in March, directly in the waste soil, with no nutritive add-on or no vegetal soil added. Three experimental lots were planted this way, on three levels of the east embankment of the tailing pond (the second level, the third level and the superior level). The monitoring was done based on the number of green vs. dead saplings in different periods of the vegetation season, as well as by measuring the trunk diameter of the saplings and their height. For comparison, three items from every specie were planted indoors and the same measurements were taken, but with a higher frequency.*

The following results were determined during the first year of vegetation: dead saplings: 36% for common oak, 30% for poplar, 22% for birch tree, and 5% for willow. The percentage of dead saplings is lower than the abovementioned values right after planting the saplings, but part of the green saplings (right after they were planted) died during the summer, due to the lack of water.

The increase in height is significant, the plants almost doubled their height. The increase in diameter is much slower, around 1mm increase being recorded during the season. Thus, after a first stage of monitoring the indoor saplings and those from the Bozinta tailing pond, one can conclude that the birch tree and the willow can adapt easily to the inhospitable environment of the pond, but, later on, the common oak saplings are resistant to dryness. This is why poplar and common oak saplings must be taken in consideration for the reclaiming of such areas. Further researches must be carried on during the next vegetation periods, in order to obtain conclusive results regarding the resilience of these species and their capacity of growing in such environments.

KEYWORDS: *phytoremediation, tailing pond, plant growing*

ENVIRONMENTAL SAFETY OF POTASSIUM MINING ENTERPRISES OF THE PRECARPATHIA AT THE STAGE OF EXPLOITATION COMPLETION

L. SHKITSA, L. PALIJCHUK

Ivano-Frankivsk National Technical University of Oil and Gas, Ukraine

ABSTRACT: *There have been presented environmental consequences of potassium deposits development in Western Ukraine and have been offered methods to forecast environmental state at the closing down stage of mining enterprises. The main hazards, that usually appear, are chemical pollution of soils, water and disturbance of territory stability by the development of gaps, landslides. The processes connected with the rock deformation are controlled by remote geophysical methods. Regularities of pollution areal formation are studied by methods of mathematical modeling.*

KEYWORDS: *environment, mining, monitoring*

USING OF EDDY-CURRENT SEPARATION FOR RECOVERY OF ALUMINIUM FROM FINE ALUMINIUM DROSS

A. MISKUFOVA, F. KUKURUGYA, D. ORAC, T. HAVLIK

Technical University of Kosice Faculty of Metallurgy, Department of Non-Ferrous Metals and Waste Treatment, Slovakia, andrea.miskufova@tuke.sk

ABSTRACT: Eddy-current separation (ECS) is a method, which is nowadays used mostly in recovery of non-ferrous metals from municipal wastes (electronic scrap) and there are also some attempts to apply it for industrial wastes. It is known that, this type of separation is effective mostly for coarser samples (e.g. over 2 mm). At present, there are some papers dedicated to ECS separation of aluminium from aluminium dross but there are only few information about separation of aluminium from fine dross (-2+0 mm). The main objective of this work was to show if it is possible to recover of aluminium from aluminium dross (-1+0 mm) by using of ECS. Sample of white dross from primary aluminium production with Al_{element} content of 12.6 % was used. Based on previous experimental assembly with similar materials, the ECS experimental conditions were chosen. The influence of distance between splitter blade and outside of drum (D) on Al recovery was investigated. Other variables (feed rate, direction of magnetic drum rotation, speed of magnetic drum rotation) were fixed. Outputs of ECS experiment represented three material fractions (1-magnetic, 2-non-conductive, 3-conductive). The fractions were visually observed and evaluated. Furthermore the material balance and chemical analysis were performed. The results showed that finer fraction was isolated into magnetic fraction and losses of this fine fraction were significant. From this reason the finest fraction (-0.063 + 0 mm) before next ECS experiments was removed by sieving. From results of material balance and visual evaluation followed, that using of ECS is possible also for fine material (-1+0 mm) at certain conditions. The overall efficiency of Al separation from fraction -1+0 mm by ECS was dependent on distance (D), pretreatment process and particle size distribution. It was proposed, that for effective recovery of aluminium in metallic form in fraction 3 the optimal distance (D) under studied condition is 12 cm (from studied (D) 21.5, 16, 14, 12, 10 and 8 cm). The Al_{element} content in obtained concentrate can reach more then 56 %.

KEYWORDS: Eddy-current separation, fine aluminium dross, aluminium recovery

THE HISTORICAL POLLUTION IMPACT FROM THE ROMANIAN OIL BUILDING YARDS BETWEEN REALITY AND PERSPECTIVE

G. A. MĂRĂCINEANU, E. C. BÂSCEANU

PSV Company Bucharest, Romania

ABSTRACT: The present work will illustrate treatment and remediation technologies specific for oil fields contaminated sites, at an international level. Also, it outlines the steps underwent in the field of historical pollution, in the building yards from Romania, taking into consideration an incomplete national legal framework and some technologies applied precisely in the storage areas that were inaccurate. All in all, the presented study case and the analytical determinants corresponding to the contaminated site underlie the strong negative impact held by the environmental elements SOIL and WATER upon human factor and environment.

KEYWORDS: soil, underground water, treatment, technology, oil building yard, oil waste

RECOVERY OF ALUM FROM FINE ALUMINIUM DROSS

A. MISKUFOVA, J. BRIANCIN, D. ORAC, F. KUKURUGYA, T. HAVLIK

Technical University of Kosice Faculty of Metallurgy, Department of Non-Ferrous Metals and Waste Treatment, Slovakia, andrea.miskufova@tuke.sk

ABSTRACT: *The aluminum dross and salt slags, especially their fine fractions after pretreatment belongs to problematic hazardous waste generated from Al industry in amount of around 3,5 milion ton annually. At present there are some technologies oriented mostly on recovery of aluminum from coarse-grained fractions (Al-rich), but still a little attention is paid to complex treatment or especially treatment of fine dross fractions. They are mostly dumped and the goal of this work was to investigate and show the possible directions for recycling of fine aluminum dross by effective hydrometallurgical method and recovery of valuable substances from fine aluminium dross. For experimental work the sample of white dross of fraction -1+0 mm was used. Experimental work was divided in two parts: a) investigation of influence of chosen parameters on Al extraction from dross by acid leaching and b) crystallization of ammonium alum ($\text{NH}_4\text{Al}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$). Results showed that maximum Al extraction of 41 % (from total Al and more than 90 % of leachable Al) after 2 hours at 96 °C and lowest highest L:S ratio (1:100) was obtained. After leaching the obtained leaching solutions with higher Al content (more than 15 g/L) and pure model Al solution were subjected to pilot crystallization of ammonium alum. Results showed that by free crystallization of leaching liquor the ammonium alum crystals at room temperature without continuous agitation were obtained and also confirmed by XRD and DTA measurements. Together with alum crystallized partially also chloride salts. It was shown that by crystallization of alum from pure model solution at ~20 °C the efficiencies of Al removal to alum compound reached around 80 % even by using of over-stoichiometric amount of agent supplying ammonia - $(\text{NH}_4)_2\text{SO}_4$.*

KEYWORDS: *fine aluminium dross, waste, hydrometallurgy, acid leaching, crystallization, ammonium alum*

A REVIEW OF GOOD BIODIVERSITY MANAGEMENT PRACTICES

J. A. DRIELSMA, C. HEBESTREIT

European Association of Mining Industries (Euromines), Brussels, Belgium

ABSTRACT: *Meeting the recent surge in demand for mining products requires increased production, exploration, development of new operations and reopening of “moth-balled” mines. All minerals producing regions, including Eastern Europe, Turkey and the Balkans are involved. Consequently, domestic supply of raw materials is essential. The potential of mineral deposits is not currently realised because some nature conservation policies restrict access to the land itself. Due to a lack of adequate management, some protected areas may not be making any contribution to long-term species conservation. European Union legislation, guidelines, institutions and funding instruments can assist Member States and candidate countries to successfully manage the potential impacts of mining on biodiversity. Active management of areas for multiple uses (e.g., mining plus conservation) can therefore be an efficient solution. Biodiversity is threatened by habitat fragmentation and “habitat-drift” caused by climate change. In future, one can expect heavier anthropological pressures, other than from mining, to impact on local resources (land, water, air, ecosystems, wet zones, biodiversity...), which will create a greater need for long-term planning & management of landscapes. Protection of biodiversity hot-spots can only ever be one part of a successful conservation policy. Effective monitoring of larger areas is also needed to conserve most European species. The mining industry is committed to contributing to the conservation of biodiversity and has produced, with the collaboration of the conservation NGO community, internationally acclaimed guidance on the topic. Conditions for mining should involve the implementation of adequate mitigation and corrective measures, as well as preventive measures, to avoid impacts or reduce risks to any protected areas; it could also involve compensation measures or the establishment of biodiversity “off-sets”. These measures should take into account the ecological functions and relations on which the conservation objectives of the protected areas depend. A monitoring plan is necessary to assess the efficacy of these measures and allow detection of any residual impacts. Through decades of experience operating in all regions of the world, mining companies are establishing a track record in ecological restoration and biodiversity management. The reinstatement of original communities of plants and animals is sometimes difficult to achieve, especially if an older existing site has been severely degraded, but there are many good examples of habitat restoration that have resulted in the establishment of ecologically valuable communities. The mining industry employs many qualified experts and technicians that can assist communities in managing ecosystem impacts whilst supporting sustainable development of mineral resources.*

KEYWORDS: *biodiversity, conservation, mining, rehabilitation, restoration*

THE PROCEDURE OF ECOLOGICAL ESTIMATION OF TECHNOGENIC INFLUENCE ON LANDSCAPE TRANSFORMATION

L. MISHCHENKO, Y. ADAMENKO

Ivano-Frankivsk National Technical University of Oil and Gas, Ukraine

ABSTRACT: For the first time it is worked out a procedure of ecological estimation of technogenic influence on landscapes and their components – geological substratum, relief, soils, vegetation, fauna, hydrosphere, and atmosphere. Depending on analytical results on the chemical elements – pollutants content, there were calculated geochemical coefficients and indexes which enable qualitative estimating of ecological state of all components of a landscape, making correspondent ecological maps and elaborating forecasts of environmental changes depending scenario of socio-economic development of a region, district, oblast', city, town or even an enterprise.

KEYWORDS: ecological estimation, environmental monitoring, environmental management

METHODOLOGY TO EVALUATE THE BIOLOGICAL WASTEWATER TREATMENT STAGE PLANT

C. PANAITESCU, I. ONUTU

Petroleum – Gas University of Ploiești, Romania

ABSTRACT: The performance of activated sludge system is very efficient for removing pollutants. For this purpose it is necessary to have a proper air quantity diffuser who eliminates disturbances in plant system. The quality effluent fluctuation was given by characteristics: pH, total suspended solids, COD, BOD, NH_4^+ extractible compounds with organic solvents, total cyan and detergents. All the results of the testes indicated insufficient aeration. Using technical data and effluent characteristics was modelled in dynamic system the secondary stage for optimizing effluent characteristics.

KEYWORDS: wastewater treatment, secondary stage, effluent characteristics, investment

THE EFFECT OF USSING COAGULANTS FOR THE NEUTRALISATION OF MINE ACID WATER

ȘT. STECZ, D. BACIU

North University of Baia Mare, Romania

ABSTRACT: Between the specific impurities of mine acid waters there are also suspensions next to iron, cooper, zinc, calcium, lead and sulfates ions. After the treatment with lime milk some mine acid water are not in accordance with quality standards regarding the maximum content of suspensions. The paper work presents the experiments made for the removal of suspensions from mine acid waters by treating them with lime milk, using as flocculant agents -ferric chloride solution (FeCl_3 10%) and ferrous sulfate solution (FeSO_4). The results of using flocculant agents on mine acid waters treated with lime milk were monitored through the sedimentation speed calculation of mud made by using specific consumption of 1, 2, 3 ml flocculant agent/ l treated water. The best sedimentation speeds were obtained for a content of 3 ml FeCl_3 10%/l treated water ($v = 0.087$ mm/s) and 3 ml FeSO_4 10%/l treaty water ($v = 0.083$ mm/s).

KEYWORDS: Mine acid water, treatment, ferric chloride, ferrous sulfate, sedimentation speed, sediment volume

MINING WATER MANAGEMENT IN THE EASTERN PART OF BAIA MARE MINING AREA

I. DENUȚ, I. BUD, S. DUMA, D. BACIU, A. MIHALY COZMUȚA, L. MIHALY COZMUȚA
North University of Baia Mare, Romania

ABSTRACT: *This research presents the results of a study that has as main objective to actualize existing database concerning the physical-chemical characteristics of exhausted mining waters from closed perimeter, placed in Eastern part of Baia Mare mining basin. We have distinguished the following situations:*

- mining water with direct evacuation in proximate river: Băiuț - Cisma, Cavnic - Bolduț, Cavnic – Roata; recusant indicators: pH, fix residues, sulfates, Fe, Cu, Zn, Mn, Pb, Mg;

- neutralized mining water, evacuated in tailing dams: Șuior - Baia Sprie (tunnel), Baia Sprie - Galeria Crama, Băiuț - Breiner, Cavnic – Ferdinand; recusant indicators: pH, fix residues, sulfates, Cu, Zn, Mn, Ca, Mg;

- mining water treated in water cleaning station: Herja; recusant indicators: filtrated residues, sulfates, Ca.

KEYWORDS: *mining closure, mining wastewater, treatment system, and pollutants.*

EFFECT OF FLY ASH ON THE MECHANICAL PROPERTIES OF CONCRETE

C. MAGUREANU, C. NEGRUTIU
Technical University of Cluj-Napoca, Romania

ABSTRACT: *The popularity of concrete involves a great cost in terms of impact on the environment. The production of a single ton of Portland cement causes the release of one ton of CO₂ into the atmosphere. CO₂ is known to be a greenhouses gas that contributes to global warming and the cement industry alone generates about 7% of it. This paper summarizes the efforts to improve the environmental friendliness of concrete materials. Foremost and most successful in this regard is the use of suitable substitutes of Portland cement, especially those resulted in industrial processing, such as fly ash and silica fume. The effect of the amount of fly ash was evaluated using 40% and 50% cement replacement in mixtures of 360 kg/mc total binder. Workability, mechanical and durability properties of the resulted concrete were the focus of the study. The successful use of high proportions of fly ash in concrete mixtures is strictly controlled by the free water/cement ratio and by very low content of free water, with the aid of superplasticisers. All aggregates used in the mixes, river sand and gravel, were available in the surrounding areas. The cement used was CEM I 42.5. The concrete specimens were cured for 28 days at 21⁰C in water, and after that, in constant relative humidity (60%). Based on the results, it is possible to conclude that the use of fly ash in concrete is beneficial in terms of workability, mechanical and durability properties. The investigation results show that the compressive and tensile strengths are decreasing when a high percentage (40-50%) of the cement is replaced by fly ash. However, the strengths are sufficient for a medium class of concrete. Fly ash increases the workability of concrete, decreases the shrinkage strains and improves the durability of concrete.*

KEYWORDS: *fly ash, concrete, mechanical properties*

TREATMENT OF SOIL AND UNDERGROUND WATER CONTAMINATED WITH OIL PRODUCTS, BY MEANS OF IN SITU BIODEGRADATION

R. SÂRBU¹, C. BĂDULESCU¹, D. MARCHIȘ¹, I. NEDELCU²

¹- University of Petrosani, Faculty of Mining, Romania, rsirbu@upet.ro

²- S.C.PRISMA –MIRA, S.R.L., Alba Iulia, România, nedelcuprismam@yahoo.com

ABSTRACT: The present paper refers to a practical experience regarding the depollution of a certain soil and of the underground fresh water from the yard of an oil storage house by means of bio-degradation in situ. In this sense, after establishing the level of pollution with TPH, of the affected perimeter and of the underground fresh water volume, a decontamination technology was elaborated. This technology consists in: drilling 5 holes (shafts) for the hydraulic blockage; excavating the soil within the contaminated area down to the depth corresponding to the underground fresh water level roof, deeply impregnated with oil products, in order to achieve the aeration of the soil and to bring to surface the contaminated water seam; treating with nutrients the water pumped out from the shafts and dispersing this water onto the whole contaminated area using aspersion.

KEYWORDS: depollution, soil, water, bio-degradation, aeration, nutrients, hydroaerator

INVESTIGATION REGARDING THE MICROCLIMATE AND METEOROLOGICAL PARAMETERS ON BOZÂNTA TAILING DAM

M. COMAN, V. OROS, R. VIEZER, R. BOGDAN

The North University of Baia Mare, Romania

ABSTRACT: The paper presents the partial results of a climatic research done on the Bozânta tailing dam, situated in the Săsars meadow – on the Săsars and Bozânta Mares estate – Maramureș County. This research is part of the “The Monitoring of Soil Microbial Actions for Ecological Reconstruction of the Tailing Dams” project. Due to the vast surface of almost 71 ha, to its imposing height, of about 30 m, and to its specific vegetation (that is often poor) this redoubtable engineering construction creates a specific microclimate that drastically influences the ecological rehabilitation works. The working method consists in itinerary meteorological observation, monitoring basic climatic elements, respective: air temperature, wind speed, precipitation and also monitoring elements that are specific to the area, respective: the relative air humidity and soil temperature (measured at two heights). The registered data has been compared with the monthly medium values given by the Baia Mare Meteorological Station, situated at about 2 km far from the studied site.

KEYWORDS: tailing dam; specific microclimate; ecological reconstruction;

A WATER CATCHMENT TREATMENT

V. LASCA¹, D. BACIU¹, E. CICAL², M. MECEA³

¹- North University of Baia Mare, ²- Water Plant Baia Mare, ³- Vital Baia Mare, Romania

ABSTRACT: This paper aims to highlight the aspect of chlorination process, as well as the influence of different factors that intervene within the process: pH, contact time, temperature and oxidability. During the experiments effectuated in the laboratory of Water Plant from Baia Mare City, there were used water samples from Ciontolan water catching.

KEYWORDS: drinking water, pH, turbidity, oxidability

MUNICIPAL WASTE MANAGEMENT SYSTEM OF SEINI TOWN

D. ROATIS, R. SIMA DRAGOS
North University of Baia Mare, Romania

ABSTRACT: *The paper presents an analysis of the existing municipal waste management system from the town of Seini, based on statistical data collected from the Cityhall of Seini. Based on collected and analysed data, the paper is proposing a new and improved waste management system, that can greatly benefit the community and can significantly reduce the quantity and volumes of waste that goes to the landfill. Also, the paper evaluates the possibility of connecting the waste management system with other management systems, the strengths, weaknesses, opportunities and aspects that can negatively influence the project and the impact of implementing the recycling on a large scale. The working method consists in observing the community specifics, estimating the waste quantities, volumes and composition, estimating the possibilities to minimize the solid waste volumes, including the implementing of recycling.*

KEYWORDS: *municipal waste; waste management; recycling*

THE ASSESSMENT OF DIRECTIVE 94/63/EC PROVISIONS APPLICATION IN MARAMURES COUNTY

**I. SMICAL¹, V. HOTEA², A. MICHNEA¹, H. BEDELEAN³,
D. COSTIN³, E. POP², J. JUHASZ²**

1-Environmental Protection Agency of Maramures County, Romania, irinadan2003@yahoo.com

2 – North University of Baia Mare, Romania

3- Babes-Bolyai University of Cluj-Napoca, Romania

ABSTRACT: *For the purpose of preventing the atmosphere pollution from anthropogenic gases several legislative measures have been issued by the European Institutions and implemented as part of national plans and programs to sustain the Member States in their efforts for the environmental protection. A very significant step in this way was made by issuing the European Parliament and Council Directive 94/63/EC of 20 December 1994 on the control of volatile organic compound (VOC) emissions resulting from the storage of petrol and its distribution from terminals to service stations. The Directive is applied to the operations, installations, vehicles and vessels used for storage, loading and transport of petrol from one terminal to another or from a terminal to a service station. In order to achieve these operations there are a lot of mechanisms that are able to assure a considerable mitigation of evaporation loss from the petrol distribution system. One of the methods is represented by the petrol vapours recovery and their reinstatement onto the circuit [1].*

KEYWORDS: *VOC, service station, mobile container, terminal, vapour recovery unit*

KINETIC CONSIDERATION OF COPPER REFINING PROCESS

V. HOTEA¹, K. BALOG², I. SMICAL¹, E. POP¹, I. JUHAZS¹, GH. IEPURE¹, A. POP¹

¹North University of Baia Mare, Romania, vhottea@yahoo.com

²Slovak University of Technology in Bratislava, Slovak Republic

ABSTRACT: Powder injection for melt refining is now widely practiced in the steel industry and is gaining acceptance in the nonferrous industries. The main advantage of injection over the earlier practice of adding solid reagents to the top of the bath is that higher reaction rates can be achieved due to more intimate contact between the particles and the melt. The following model was originally proposed by Ohguchi and Robertson for desulfurization of liquid iron and it is adapted of the to the injection of copper refining processes to the injection of Na_2CO_3 powder to eliminate arsenic from molten copper. The present work deals with a thermodynamic analysis for the practice of adding Na_2CO_3 to the top of the bath and a kinetic study of the injection process. In both cases, copper content is calculated with these models and compared with the experimental results. The calculation method, considers two interfaces as reaction sites: (i) interfaces between injected Na_2CO_3 powder and metal (transitory reaction) and (ii) an interface between slag on a bath surface (top slag) and metal (permanent reaction). The study made on impurities removal kinetic was materialised through an adoption of a kinetic model in conditions of refining flux injections with use of an oxidant agent. The kinetic model was adapted to the copper refining process to predict the rate arsenic removal in terms of temperature and air flow rate.

KEYWORDS: copper refining, kinetic model, arsenic, injection of Na_2CO_3

HEAT TRANSFER AT METALIC BODIES COOLING IN LIQUID MEDIA

D. CONSTANTINESCU¹, I. MAMUZIC²

¹- University Politehnica of Bucharest, Romania; ²- University of Zagreb, Croatia

ABSTRACT: The cooling of steel and of the other metallic products in liquid media implies several times the accurate establishing of cooling speed on which depend final technological properties of the parts. The remnant inner tension due to the thermal stress has an important role. The cooling speed depends on the cooling thermal regime factors, among which the thermal yield coefficients have an essential importance. It was aimed the determination as exact as possible of this coefficient, theoretically and experimentally based on similitude theory, for some cooling media that are frequently used in metallurgical technologies. Otherwise the similitude theory allows the extension of the obtained results and for the case of other cooling media. Having in view the complexity of the heat exchange in the liquid media in the immediate approaching of the cooled body, the "equivalent thermal conductivity" notion is introduced. The method has in view the temperature variation of the part in time, the liquid quantity from the cooling tank, the temperature of the cooling media, the immersion degree of the part and the material out of which the cooled part is made. This method takes into consideration the intervention of a higher number of factors. By means of it, more exact values of the thermal yield coefficient can be established. Due to the construction of the model, it could be found out a non-significant variation of the cooling media. From the performed researches one can be drawn some conclusions, for the practical choice in calculation, as exact as possible, of the value of the thermal yield coefficient at cooling of steels and other metallic materials in liquid media. The presented data can be useful to establish correctly the speed and duration of cooling and the thermal gradient that appears in the part.

KEYWORDS: heat transfer, yield coefficient, temperature, coefficient of heat transfer

SEPARATION OF IMPURITIES FROM A ELECTROREFINING SOLUTION ONTO ACTIVATED CARBON

I. JUHASZ, V. HOTEA, E. POP, Gh. IEPURE, A. POP, I. SMICAL

North University of Baia Mare, Romania, j_joska@yahoo.co.uk

ABSTRACT: Removal of arsenic, antimony and bismuth impurities from copper electrolytes is a primary target in copper electrorefineries. The present work investigates the possibilities of carbon adsorption technology in the removal of arsenic and antimony from a real Chilean electrolyte. Various variables which affect the metal adsorption/desorption operations are studied.

KEYWORDS: Copper electrolytes, Purification, Activated carbon.

EFFECT OF ALUMINA PARTICLES UPON CU-AL₂O₃ MATERIAL USED FOR THE SPOT WELDING ELECTRODES

**GH. IEPURE¹, I. VIDA – SIMITI², N. JUMATE², V. HOTEA¹,
E. POP¹, I. JUHASZ¹, A. POP¹**

¹- North University of Baia Mare, Romania, iepureg@ubm.ro

²- Technical University of Cluj Napoca, Romania

ABSTRACT: The paper presents the results of the researches made for the obtaining of the spot welding electrodes from Cu-Al₂O₃ composites. Copper has been the material for electrodes because of its exceptional electrical conductivity but pure copper being soft it may fail prematurely. Usually, dispersion particles are obtained as precipitates from phase transformations during melting, solidification, and heat treating. Stability of particles or precipitates obtained limitates maximum service temperatures.

The researches were centred upon the obtaining of some cylindrical samples with the three chemical compositions, powder mixture has been unidirectional and double-acting presses, and were sintering in atmosphere of dissociated ammoniac.

The best results have been obtained for the samples with a content of 1% Al₂O₃, the values being between 40-60% IACS, pressed at 690 MPa and sintered for one hour at 960 degrees Celsius. The performed studies show that the size of the Al₂O₃ particles should be less than 5 micrometers, since the large Al₂O₃ particles break due to deformation during welding.

KEY WORDS: copper powder, alumina, sintering, spot welding

HYDROGEN IN ALUMINUM ALLOYS

S. BRANZEI, V. HOTEA

North University of Baia Mare, Romania

ABSTRACT: Aluminum alloy cleanliness has been in the limelight during the last three decades and still remains as one of the top concerns in the aluminum casting industry. In general, cleaning an aluminum alloy refers to minimizing the following contaminants: 1) dissolved gases, especially hydrogen, 2) alkaline elements, such as sodium, lithium, and calcium, and 3) unwanted solid particles, such as oxides, carbides, and a variety of intermetallic compounds. However, with the ever-increasing demands for improved casting properties, requirements for molten metal cleanliness has become extremely stringent. The subject of hydrogen in metals is a classic scientific problem as well as being technologically relevant due to the impact hydrogen can have on a material's properties. The impact can be beneficial, as in the case of hydrogen storage, but hydrogen in materials is probably more famous as a deleterious addition, e.g. hydrogen embrittlement. Hydrogen also induces porosity and hence limits fatigue life in cast aluminum alloys due to the large solubility difference of H in liquid and solid aluminum.

KEYWORDS: aluminum alloys, hydrogen, porosity, rotary degassing

INVESTIGATION OF THE VENTILATION NETWORKS WITH ONE DIAGONAL THROUGH MODULUS DIVIDING BY ISOBARS

N. BĂNCILĂ-AFRIM¹, C. BUHROW², E. MUREȘAN¹

¹- North University of Baia Mare, 62A Victor Babes Street, Maramures County

²-Technical University Bergakademie Freiberg, Germany

ABSTRACT: The main purpose of this work is the establishing of analytical relations between the ventilation network parameters, which is possible to be made within dividing by isobars that cross the canonical scheme in its nodes resulting three modulus whose analytical expressions the branches resistances go in. It is very important to note that in analytical expression of M_2 modulus the diagonal e resistance goes in, fact that will allow a new study approaching of the complex diagonal networks.

KEYWORDS: ventilation network with one diagonal, isobar, ventilation modulus, air flow

ANALYSES OF PRECIOUS AND BASE METALS MARKET EVOLUTION AND ACTUAL TENDENCIES CASE STUDY: BAIA MARE MINING AREA

I. BUD, S. DUMA

North University of Baia Mare, Romania, simona.duma@ubm.ro

ABSTRACT: Mining products market is remarkable in rapport with other markets, very sensitive to economical and political crises phenomenon. The stock exchange quotations, along the time, suffered scandalous speculations. In precious metals commercialization huge financial - banking corporations were involved, financing mines which offer direct and preferential access to the production of these metals. This paper analyzes the evolution of copper, lead, zinc, gold and silver market focalizing in Baia Mare mining area particularities, in total contradiction with the decision of closing mining activity, which, at world level, take and significant proportion. All these considerations have nourished the negative perception concerning this activity in Romania, in the time when other countries appreciate and respect both the activity and the profession of mining.

KEYWORDS: market, mining products, wholesale dealers, metal stock exchange, metals prices, gold, silver, lead, cooper, zinc, base metals, precious metals, closure mining activity, Baia Mare mining area, property, environmental impact of mining activity, economical and political crises

A NEW APPROACH OF WASTE DUMP DESIGN

A.FLOREA

University of Petroșani, Mining Engineering Faculty, Romania

ABSTRACT: Mining waste facilities classification is introduced according to Romanian technical prescription PT-C 39. The waste dump design using dedicated mine design software packages were illustrated by means of case study Petrila – branch V waste dump. Preliminary geotechnical studies on the basement rocks and on the waste material are necessary in order to define the maximum height of the dump and the slope angle, which ensure the stability of the dump at this height. The first step supposes modeling the morphology of the area based on available survey information. The decision on the shape and geometry of the dump could be taken according to various geotechnical, technological, legal and economical aspects involved based on analyze done on the digital terrain model. A computerized design process allows possibility to analyze several variants in less time and ensure results that are more accurate and useful in the later stage of building and remediation of the area. The case study made on waste dump Petrila – branch V show an increased capacity of dump with almost 800.000 m³ maintaining the actual dumping technology and ensuring minimum costs in safety conditions.

KEYWORDS: mining waste facilities classification , waste dump design, mine design software

ASPECTS CONCERNING THE APPARITION OF THE SURFACE'S MOVEMENT IN REPORT TO THE HORIZONTAL DISTANCE BETWEEN THE POINTS INVESTIGATED FROM THE EDGE OF THE EXPLOITATION

A. FRANK, D. BADULESCU
University of Petrosani, Romania

ABSTRACT: *The determination of the relationship between the period of time after which the effects begin to become evident and the distance between the investigated point and the exploitation site is one of the not solved problems, concerning the effect of mining exploitation on the ground surfaces.*

KEYWORDS: *effects, distance, deformation, surface, exploitation*

THE INCREASE OF PROCESSING EFFICIENCY FOR GOLD BEARING ORE WITH HIGH SLIME CONTENT USING AMINE REAGENTS

G. FILIP, M. PODARIU
North University of Baia Mare, Romania

ABSTRACT: *This paper presents the influence of amine reagents, individual or mixed with dispersing reagents in the grinding-cyanidation process of a gold bearing ore characterized by high slime content and fine ground necessary for the subsequent cyanidation. The amine reagents or N-donor reagents are changing the superficial properties of mineral particles, as well as along with the decrease of the slimes oxidation process, delaying their deposition on the coarse mineral particles. They have also an important contribution to the optimizing of the grinding process due to the decrease the minerals resistance against cracking. The reagents used to the experiments were ethylendiamine and o-toluidine and the dispersing reagent was sodium hexametaphosphate. The laboratory experiments were performed in stages investigating the influence of these reagents on grinding finesse and technological results of the cyanidation process. Grinding tests that were carried out resulted in increased fineness with 2.5 points at usage of ethylendiamine and 3.1 points at usage of mixture ethylendiamine plus sodium hexametaphosphate at the same grinding time. The experiments resulted also in positive influence on the cyanidation process, but only with the individual use of ethylendiamine, the gold recovery increased with 1.2. The use of mentioned mixture had a negative influence, resulting in the decrease of gold recovery with 8 points and of settling rate for cyanidation material.*

KEYWORDS: *grinding-cyanidation process, amine reagents*

PHYSICAL TREATMENT OF FLOTATION PULP AT COMPLEX ORES PROCESSING

M. PODARIU, P. ILIE, G. FILIP
North University of Baia Mare, Romania

ABSTRACT: *Interest for electroflotation compared to classical flotation is due to the fact that facilitates the flotation process, the usage of electroflotation process leading to increased values of processing products quality and to considerable decrease of cost prices. Flotation using anodic dissolution of metallic electrodes is superior to classical flotation that uses chemical reagents, in order to activate or depress the minerals.*

KEYWORDS: *electroflotation, contact loading, anodic dissolution*

THE PROCESSING IN MIXTURE OF THE MINERALIZATIONS FROM THE MINE PERIMETER CAVNIC

V. M. BREZOCZKI

North University of Baia Mare, Romania

ABSTRACT: *The study presents the result of a series laboratory tests in order to determine a mode of operation and a system of reagents optimum for the Cavnica mineralization processing. The tests followed the way of reaching a mixture ratio in order to obtain the wanted technological indicators. The results have shown the possibility of processing in mixture of the two ore's types.*

KEYWORDS: *Cavnica mineralization, classical technologies, optimum mixture ratio, qualitative concentrates.*

COMPARATIVE STUDY REGARDING THE ACCURACY OF RTK TYPE GPS SURVEYS IN A RAPID STATIC TYPE GPS NETWORK

G. BADESCU, , O. STEFAN, V. HOTEA, E. KELLER, M. SOPONAR,
North University of Baia Mare, Romania, gabrielbadescu@yahoo.com

ABSTRACT: *RTK survey method features*

- *The infrastructure for GPS real time positioning: GPS base station; Data transfer; Data format*
- *Radio connections for real time applications*
- *RTK-GPS survey with firm solutions*

KEYWORDS: *GPS RTK,rapid static ,GPS, reference stations*

A NEW MONITORING CONCEPT FOR OPTIMAL MAINTENANCE OF STRUCTURAL VALUE

A. T. G. RADULESCU, GH. M. T. RADULESCU
North University Baia Mare, Romania

ABSTRACT: *From a safety and business standpoint, the importance of surveillance for existing buildings and plants is clear: ageing materials, changes in usage patterns, fluctuation in the intensity of stress or environmental influences can lead to rising maintenance costs. Where suitable surveillance methods are available, necessary repairs can be made in a timely and targeted fashion – and their success made subject to controls. Only if risks are identified early on can maintenance costs be reduced with a maximum degree of safety. This is what makes efficient maintenance just as important as solid construction work.*

The modern safety system is for:

1. *ongoing risk surveillance of building structures,*
2. *quality assurance during construction work,*
3. *determination of safety status and early detection of defects,*
4. *reduction of maintenance costs,*
5. *The objective: greater safety, lower costs*

Long-term observation instead of a snap-shot approach. Determining the condition of buildings and plants from a safety standpoint once called for reliance on static calculations or inspection with the naked eye, but today, static measurement procedures at least allow a snap-shot view of structural soundness, such as an X-ray would provide. This, however, brings to light only those changes which have already reached the structurally hazardous stage. Until now, it has been nearly impossible to provide ongoing surveillance of the behavior of a building together with a durable accounting of the dynamic measurement data necessary for the early detection of damage or for the triggering of

preventive measures. The modern surveillance system is based on the principle of intensity modulation using analogue measurement, a procedure selected only after all other fiber optic procedures for examining changes in position and form had been thoroughly tested. This is a proven technology which not only enables stable and reliable solutions but also operates with minimal electronic and mechanical components. With this system, it offers the only surveillance system of its kind world-wide, a system based on the simultaneous recording of dynamic and static data with a high level of precision – a successful translation of basic research into applications technology.

KEYWORDS: *safety standpoint, surveillance system, applications technology*

FINITE ELEMENT ANALYSIS FOR HOT SPOT STRESS CALCULATION AFTER DIFFERENT STANDARDS AND CODES

D. FILIP VĂCĂRESCU, F. FILIP VĂCĂRESCU

North University of Baia Mare, Romania

ABSTRACT: *The hot spot stress fatigue design for aluminium joints are only applicable to situations where the potential mode of failure is by fatigue crack grows from the toe of a weld. Determination of the hot spot stresses necessitates generally carrying out 2D or 3D fine mesh stress analyses, further to the 3D mesh analysis. In that case, boundary nodal displacements or forces obtained from the 3D coarse mesh model are applied to the fine mesh models as boundary conditions. In highly stressed area, in particular in the vicinity of structural discontinuities, the level of stresses depends on the size of elements due to the high stress gradient. The hot spot stresses are generally highly dependent on the finite element model considered for representation of the structure. The paper presents a short description of different methods of various classification societies and other code writing societies how to calculate the structural stress.*

KEYWORDS: *finite element, welded aluminium joints, fatigue, codes and guidelines, hot spot stress*

NUMERICAL MODELLING OF CENTRICALLY BRACED FRAMES EQUIPPED WITH FRICTION DAMPERS IN THE BRACINGS

N. FILIP VĂCĂRESCU

Politehnica University of Timișoara, Romania

ABSTRACT: *The paper analyses the behavior of centrally braced frames in multistory steel buildings situated in seismic areas. The aim is to study comparatively centrally braced frames with conventional inverted V braces (Chevron) and the same system but equipped with friction dampers in the braces.*

KEYWORDS: *seismic, multistory, damper, dynamic, performance*

DEVELOPMENT OF PLASTIC ZONES AND EVALUATION OF ROTATION CAPACITY IN COMPOSITE STEEL-CONCRETE MEMBERS AND CONNECTIONS UNDER SEISMIC ACTIONS, IN ECCENTRICALLY BRACED FRAMES (ECBF)

G. DANKU, D. DUBINA

University "Politehnica" of Timisoara, Civil Engineering Faculty, Romania

ABSTRACT: *In case of beam-to-column connections, beams and dissipative bars within eccentrically braced frames, one should consider that the practical solution of ensuring a ductile and controllable behaviour by usual means is to not apply connectors between the steel elements and the reinforced concrete slab. This subject is one of great interest, and in the frame of CEMSIG laboratory, there is an ongoing research project that studies the above mentioned phenomenon. For this reason, experimental tests will be planned in order to prove that the steel elements which are disconnected from the concrete will function independently. One will try to calibrate these experimental tests based on numerical simulations with FEM (Finite Element Method) which will also be used later on in some global elasto-plastic structural analyses with accelerograms.*

These investigations will be done based on a complete parametric study regarding the safety of using such procedures (disconnecting the composite elements in areas where ductility is needed) in seismic regions such as Romania.

This paper considers the dimensioning and analysis of a 5 story dual structure (MRF+ECBF) equipped with short links, in order to calibrate an experimental model. The analysis considers an ECBF, one which is considered to be the most stressed from the entire structure. The check and dimensioning according to Eurocode 3 and P100 will be presented and also the results of Time-History structural analysis for 3 earthquakes, and push-over analysis. The results will be commented upon in terms of structural performance, according to FEMA 356, regarding structural damage after earthquake.

KEYWORDS: *plastic hinges, composite sections, action, monotonous, cyclic*