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**Abstracts of
Acta Technica Napocensis: Civil Engineering & Architecture, Vol. 52, 2009**

STUDY ON THE BEHAVIOUR OF REINFORCED CONCRETE-MASONRY DIAPHRAGMS

(Pages 11-18)

Diana Samoila, Ildiko Bucur

ABSTRACT

The paper suggests a comparative analysis of the behaviour of reinforced concrete frame structures provided with masonry panels, to seismic action. The comparison is between different ways of interaction between the concrete frame and masonry. Thus, through its cracking and destruction, the masonry infill can contribute to the dissipation of the seismic energy. The masonry infill can be isolated from the concrete structure if the aim is not their interaction, or it can act as a diaphragm when it is bound through reinforcement frames. The seismic force acting upon a structure in which the masonry behaves like a fill-in wall is compared to the seismic force acting upon the same structure, but in the case where the wall behaves as a diaphragm. The paper also presents a case study on the behaviour of the masonry panel when its destruction is accepted.

Keywords: *Reinforced concrete; Masonry Diaphragms; Seismic analysis;*

SUSTAINABILITY OF SINGLE-STORY BEARING STRUCTURES (Pages 19-28)

Al. Catarig, L. Kopenetz

ABSTRACT

This paper presents some of the principles governing sustainability or durable development of single-story bearing structures. The requirements imposed by sustainability are closely connected both to safety, ruggedness and profitability criteria and to issues concerning the natural, social and economic environmental impacts. Throughout the paper, the authors wish to offer students and engineers profound notions about the way they should choose structures and structural elements in order to comply with the local (national) and global (international) sustainability criteria.

Keywords: *Sustainability; Bearing structures; Environmental impacts.*

PROBLEMS CONCERNING STRUCTURAL INTERVENTIONS (Pages 29-40)

L. Kopenetz, Al. Cătărig

ABSTRACT

The paper presents basic knowledge for the scientific design concerning constructive composition and intervention computation for structures and structural elements. Advanced notions about the manner structures and structural elements behave before and after interventions caused by different occasions.

Keywords: *Structural interventions; Design.*

SENSITIVITY PROBLEMS OF SELF COMPACTING CONCRETE (Pages 41-48)

A. Ioani, Henriette Szilagyi

ABSTRACT

The paper presents results furnished by a research program developed at The Technical University of Cluj-Napoca in cooperation with specialists from the National Institute for Research & Development in Construction (INCERC) Cluj-Napoca Branch, in order to implement self-compacting concrete (SCC) in the Romanian precast concrete industry. Mixes for C50/60, C40/50 and C30/37 strength classes with cement (CEM I 52.5R), cement and silica fume or cement and limestone filler have been tested, and the properties in fresh and hardened state have been evaluated. The obtained results are encouraging, confirming the possibility to produce SCC with local materials and

usual cement (CEM I 52.5R), with remarkable properties in fresh state (SF=700-770 mm, VF=5.5-11-15 s, PL=88-96 %). In hardened state, the SCC strength had a good evolution in time and a high early strength which permits the prestress forces transfer at only one day after casting (for instance, $f_{cmi}=51.1\text{N/mm}^2$ that means 85% of the specified strength on cube and $f_{cm28}\sim 70.5\text{N/mm}^2$ for the C50/60 mixes). The research program shows also the possibility of obtaining a very economic SCC having only 474 kg of powder content (420 kg cement + 54 kg Microsilica Elkem + 1.55% Glenium Ace 30-a HRWR admixture) and remarkable performances (SF=702 mm, VF=5.5s, PL=96%, $f_{cm28}=73.4\text{N/mm}^2$), including an impeccable surface after removal from the mould. The sensitivity of SSC to the variation of certain parameters (water content, shape, angularity and texture of particles, etc.) is discussed. The technological transfer from lab to ASA Cons Romania Ltd. from Turda - the biggest precast concrete unit plant from Transylvania- started, and full-scale elements were cast using SCC.

Keywords: *Self compacting concrete; Precast concrete; Sensitivity.*

GENERAL CONCEPTS IN THE OPTIMAL DESIGN OF STRUCTURES (Pages 49-56)

Al. Catarig, Aliz Mathé, Ilinca Moldovan, Adina Lapuste

ABSTRACT

The paper presents the problems of optimal design of structures, the general aspects of mathematical programming and also the correspondence between the mathematical and mechanical parameters. It is also included the possibility of optimal design of semi-rigid structures underlining their specific characteristics.

Keywords: *Optimal design; Mathematical programming; Semi-rigid structures.*

CONTRIBUTIONS TO THE LINEAR DYNAMIC CALCULUS OF CABLE STRUCTURES (Pages 57-62)

F. Lazar-Mand

ABSTRACT

In the paper, the author present a series of aspects about frequency computation of pretensioned cable structures. Both mass modeling and stiffness matrix modeling are discussed. For the stiffness matrix modeling, an approach similar to the one described by P. Krishna is used, except the fact that the residual terms are not taken into account. At the end of the paper, a planar structure was studied and the result was compared with that obtained by Volokh.

Keywords: *Dynamic analysis; Cable structures; Pretensioned cable structures.*

EXPERIMENTAL SHAPE ASSESSMENT OF LIGHTWEIGHT STRUCTURES (Pages 63-70)

L. G. Kopenetz, F.-Zs. Gobesz

ABSTRACT

Given the high flexibility of the self-supporting lightweight structures, the assessment of the initial geometry or, in other words, the study of the shape, is an important step during the structural analysis. In most of the cases it is recommendable to perform some experimental study in order to determine the shape, especially when during the stage of conception-design the numerical approach exhibits huge difficulties and does not offer sufficient information. In order to assess the shape of the self-supporting lightweight structures, the analogy between minimal area surfaces and the behavior of a soapy thin film is used by the authors. The paper envelopes theoretical elements aside with a few significant solving examples, thus the presented notions are applicable in the current practice.

Keywords: *Lightweight structures; Experimental; Design.*

SEISMIC CONTROL OF STEEL FRAME STRUCTURES USING LINEAR FLUID VISCOUS DAMPERS (Pages 71-76)

H. MOCIRAN, E. PANTEL, I. MARTIAN

ABSTRACT

In this article, a new alternative for reducing the seismic response of steel frame structures under Vrancea 1977 earthquake loading is numerically evaluated. A three story, three bay steel frame building was chosen for this investigation as a reference frame. The structure was then equipped with five linear fluid viscous dampers, installed with the diagonal brace configuration in the central bay of the building, with no attempt made to redesign the

original frame. The dampers were selected to provide 25% of critical damping in the fundamental mode. A comparison of responses (peak story shear, peak interstory drift and peak lateral floor acceleration) between the structure with and without viscous fluid dampers proves the effectiveness of the dampers.

Keywords: *Seismic control; Frameworks; Viscous dampers.*

SEISMIC ISOLATION FOR SEISMIC RETROFIT OF EXISTING BUILDINGS (Pages 77-80)

H. MOCIRAN, ALEXANDRA STAN

ABSTRACT

Recent earthquakes in U.S.A., Japan, Turkey and Taiwan especially affected older buildings which were designed using seismic codes that provide inadequate safety. The paper gives an overview of seismic isolation technology for effective retrofit of existing buildings. The article presents two types of seismic isolators: elastomeric and sliding.

Keywords: *Seismic isolation; Seismic retrofit; Buildings.*

A DISCUSSION OF THE MATHEMATICS OF THE FINITE ELEMENT METHOD (Pages 81-84)

ALEXANDRA STAN , H. MOCIRAN

ABSTRACT

The purpose of this paper is to discuss some of the important aspects of the mathematics of the Finite Element Method.

Keywords: *FEM; Numerical method; Programming.*

ASPECTS CONCERNING COMPLEX BEARING STRUCTURES MONITORING (Pages 85-94)

L. Kopenetz, D.F. Lisman

ABSTRACT

This paper presents the way basic problems, concerning scientific design of permanent or determinate periodical monitoring of complex bearing structures, can be identified, in order to ensure structural robustness.

The importance of concepts concerning structural robustness of complex buildings (high rise buildings and large span buildings) has caught the interest of engineers, especially after the recent terrorist attacks and because of the behavior of structures, subject to extreme conditions (tsunami, fire, strong winds, etc.). Complex bearing structures monitoring has become an important necessity provided that for the majority of these buildings, the requirements concerning structural robustness are not fulfilled.

Keywords: *Bearing structures; Monitoring; Structural robustness.*

STABILITY IN BENDING AND AXIAL COMPRESSION OF MEMBERS WITH MONO - SYMMETRIC CROSS SECTION (Pages 95-104)

P. Moga, St. I. Gutiu

ABSTRACT

This paper presents the stability verification methodology of uniform members with mono-symmetric cross sections subjected to bending and axial compression in accordance with Eurocode 3: Design of steel structures (EN 1993-1-1:2003: General rules and rules for buildings; EN 1993-1-5: 2004: Plated structural elements). The numerical example also detailed in the paper, concerning the buckling verification of a member with a double T mono-symmetric cross section, subjected to monoaxial bending and axial compression is useful to understand the design methodology.

Keywords: *Stability; Mono-symmetric cross-sections; Design.*

COMPOSITE STEEL-CONCRETE BRIDGE GIRDERS. ROMANIAN CODES – EUROCODES (Pages 105-110)

St. I. Gutiu, C. Moga, M. Suci

ABSTRACT

This paper presents a comparative analysis concerning the load bearing capacity of the bridge main girders evaluated in accordance with the Romanian norms and respectively with the European norms (Eurocodes). The analyzed girders are part of a 30 m span road bridge, built-up as a composite steel-concrete superstructure.

Keywords: *Composite steel-concrete; Bridge; Girders; Eurocodes.*

GRID (Pages 111-128)

MIHAELA IOANA AGACHI, V. S. RUSU, O. OLANESCU

ABSTRACT

Conceiving an urban space means to find the specific ways for giving a meaning to the public space. In elaborating the project GRID we assumed the fact that a town is identifiable only by meaning it as part of the global landscape and of the territory [1] and its different parts must have a spatial harmonious coherence [2]. As a result of a morphological approach, we considered the town as receptacle of significance lodged in history, in cultural context. The paper contained the description of the project in a comparing presentation: the existing sides and the proposed ones appears as a consequence of analysis and direction for the future development. The project GRID represents our participation at the international architectural competition for the Tamula lakeside area in the town Voru/Estonia, organized by the townhall of the city and the Estonian Union of the Architects, and it was well received and awarded with the second prize.

Keywords: *Urban space; Grid; Architectural competition.*

REHABILITATION OF THE TAILORS' TOWER IN CLUJ-NAPOCA AS AN URBAN CENTER (Pages 129-136)

M. St. Bulbuk, Ildiko Bucur

ABSTRACT

The paper deals with the rehabilitation of an old historical structure, namely the "Taylor's Bastion" (Tailors' Tower) in Cluj and emphasizes the technological solutions used by strengthening of the roof structure.

Keywords: *Rehabilitation; Historical structure; Roof structure.*

CONCRETE THIN-SHELLS - TECHNOLOGICAL ASPECTS OF CONSTRUCTION DETAILS (Pages 137-142)

ANDREEA-TEREZIA MIRCEA

ABSTRACT

Thin-shells are spatial structures whose thicknesses are small compared with their others dimensions, and which resist external actions through a combination of membrane and bending stresses. Folded plates are a class of shell structures formed by joining flat, thin slabs along their edges to create a three-dimensional spatial structure. Concrete can be mould to a practically unlimited range of shapes, matching harmony between real needed geometry and expressed image. Optimum design and good construction technique for shells and folded plates - made of reinforced and pre-stressed, cast in situ or precast concrete - will yield high performing structures. The paper presents some technological aspects concerning construction details and complementary accessories which have to be considered in enhancing the required performances of concrete thin-shells.

Keywords: *Concrete Thin-Shells; Technological; Design.*

NEW AND TIMELESS MATERIALS FOR SUSTAINABLE FLOORING SOLUTIONS (Pages 143-148)

ANDREEA-TEREZIA MIRCEA

ABSTRACT

An important part of the interior design and style of buildings is represented by the floor covering. Nowadays, when flooring materials are more varied than ever before, the selection of floor coverings is influenced by factors such as

aesthetics, endurance, noise insulation, physical comfort, maintain and cleaning effort, costs, and last, but not least residents' health and environmental protection. In order to establish a sustainable flooring solution it is necessary to analyse in detail the involved materials, from manufacturing to specific installation techniques, maintenance methods, and recycling solutions for each type of floor covering. The paper presents sustainable flooring solutions, designed for obtaining a special combination of fashion, resilience and functionality by using the essential requirements of environmental technologies.

Keywords: *Sustainable flooring; Buildings; Design.*

SIMULATION OF CONTAMINANT TRANSPORT USING FINITE ELEMENT METHOD (Pages 149-158)

P. ANASTASIADIS

ABSTRACT

Numerical models are becoming increasingly important in the study of contaminant transport problems. In investigating these problems to understand their causes and to find remedies, physically based numerical models play an important role. The principal direction technique which based to finite element method is found to be capable of handling cases of dispersion contrast including those with dispersivity ratio of infinity. An attempt to present and apply a technique that provides the accuracy, efficiency and flexibility needed to make transport simulation practical is presented. The technique combines the alternating direction time-stepping scheme with a curvilinear grid system that is everywhere tangential to the advective direction. Numerical experiments show that principal direction technique appears to be numerical optimal scheme. Finally an application of the above technique in a phreatic aquifer is given. The results from the sensitivity analysis focused to dispersivities parameters.

Keywords: *FEM; Transport simulation; Time-stepping scheme.*

ENVIRONMENTAL ASSESSMENT OF URBAN DEVELOPMENT: THE ELAIONAS AREA IN ATTICA GREECE (Pages 159-164)

G. METAXAS, P. ANASTASIADIS

ABSTRACT

Environmental impact assessment (EIA) is used to predict, analyse and evaluate the potential impacts of a proposed project on the environment so that information with respect to these impacts is taken into consideration in decision making. The decisions may concern mitigation, consideration of alternative sites or the "do nothing" option. There are numerous existing methodologies that attempt to facilitate EIA and these include index and matrix methods, ecological assessment and networks, quantitative methods and overlays. In urban planning, the design of policies for sustainable development poses the problem of dealing with systems in which natural and human factors are interrelated. Understanding the processes that cause these systems to change and knowing their spatial implications is essential in preparing effective policies. In order to help policy makers see through this complexity, spatial data are required which will aim to represent reality as realistically as possible. Accurate mapping of land-use has been identified as a need of most significance in order to monitor and audit the parameters of change within time and space. In this paper an integrated and multi-dimensional methodology for the appropriate monitoring of environmental parameters and phenomena is presented. The research uses as a case study the area of Elaionas in Attica, Greece.

Keywords: *Environmental impact assessment; Urban development.*

REVEGETATION OF URBAN SOILS USED FOR COVERING RUBBLE DUMPS AND REMAINING AFTER TOPSOIL "MINING" (Pages 165-170)

Daniela PASCA

ABSTRACT

The rubble dump was formed mostly of rubbles in mixture with earth excavated from foundation holes, with sludges and domestic refuse. The dump was covered with about 60-100 cm of excavation earth. About 120 m³ of rubble - containing earth was removed from an about 100 m² surface at the margin of the dump plateau. The surface created was divided into two plots, one to revegetate spontaneously and the other recultivated by sowing the seed mixture of 8 plants. The results of this field experiment indicated that the recultivated plot was more efficient in retaining N

compounds than was the plot with spontaneous vegetation. Topsoil is removed around many urban areas for use in landscape improvement. Recultivation of the remaining soil for restoring its fertility is required as the recultivation of wastelands resulting from industrial activities. The soil studied was used for topsoil "mining", removal to depths of 10 and 20cm (Sio, S20 plots). The remaining soil was treated with lime, urea, and P and K fertilisers and resown in pasture species. The enzyme activities and the other biochemical properties in the Sio and S20 plots were even in the fifth years after recultivation, under the level of the values recorded in the S0 plots, without topsoil removal served for comparison.

Keywords: *Revegetation; Urban soils; Mining.*

CONSIDERATIONS UPON ASSEMBLING AND USING THE MEASUREMENT AND CONTROL INSTRUMENTS AT THE DAM IN COLIBIȚA, BISTRIȚA-NĂȘĂUD COUNTY, BETWEEN 1995-1996 (Pages 171-174)

Carmen Nuțiu, D. Vingan

ABSTRACT

The present paper aims at making an inventory and describing the measurement and control apparatuses, both for those already existing and those that are going to be installed until the end of the year 1996, at the Colibița dam, Bistrița-Năsăud County.

Keywords: *Dam; Measurement; Control.*

SOME ASPECTS REGARDING MONITORING OF THE TIME BEHAVIOUR OF THE COLIBIȚA DAM, BISTRIȚA-NĂȘĂUD COUNTY, BETWEEN 1995-1996 (Pages 175-178)

D. Vingan, Carmen Nuțiu

ABSTRACT

The present paper approaches aspects regarding the time behaviour of the Colobița dam, after the time of the partial exploitation, finalized by the preliminary take over from December 1995. The time behaviour monitoring was done by measurements performed on Measurement and Control Instruments (MCI). Our paper presents the measurements done between 1995 and 1996.

Keywords: *Time behaviour; Dam; Measurement.*

THE GLOBAL POSITIONING SYSTEM (GPS) USED FOR ENHANCING THE SURVEY NETWORK (Pages 179-184)

Carmen Nutiu

ABSTRACT

In these recent years, geodetic and topographic works as well as several related fields of activity use, more and more, the methods of satellite geodesy. The new development of the accurate and operational techniques based on satellite positioning makes it possible that they enter all the domains of the geodetic and engineering sciences. The Global Positioning System (GPS) has the ability to greatly enhance the quality of the surveying activity, to revolutionize the way the numerical records of surveyings are done and also to provide the surveying professionals with new and more efficient methods and techniques.

Keywords: *GPS; Survey network.*

PRESENTATION OF THE THERMAL INSULATION AND ENERGY SAVING PROBLEM IN EUROPE AND IN ROMANIA (Pages 185-192)

Marcela Prada, Silviana Brata, D. F. Tudor

ABSTRACT

The buildings sector - i.e. residential and commercial buildings - is the largest user of energy and CO₂ emitter in the EU and is responsible for about 40% of the EU's total final energy consumption and CO₂ emissions. The sector has significant untapped potential for costeffective energy savings which, if realized, would mean that in 2020 the EU

will consume 11% less final energy. The problem of energetic consumption necessary for exploiting the buildings, has shifted from a international level to an national one. The instruments on energy efficiency adopted at EU level reflect the growing importance of energy as a political and economic challenge and its close interrelation to policy areas of security of energy supply, climate change, sustainability, the environment, internal market, and economic development. For a number of 4 audited buildings, a parameter study of the main indicators of the real expertized building, a reference building and the rehabilitated buildign was conducted. The results of the study entirely justifies the rapid adoption of the Romanian Government Emergency the directives of the European Parliament and of the Council on the Energy Performance of Buildings.

Keywords: *Thermal insulation; Energy saving; Buildings.*

MEASURES FOR THE REHABILITATION OF BUILDING ENVELOPE OF EXISTING BUILDINGS (Pages 193-198)

Ancuta ABRUDAN

ABSTRACT

Rehabilitation consists in performing the required repairing, additions, or replacement of materials, aiming the reinstatement of the considered systems at the initial designing parameters; modernizing consists in reconsidering the used solutions, by using new ones and materials for increasing the systems efficiency. The rehabilitation solutions are binding to the comfort level required in the respective area, the occupational degree (individual or common), property status (private or state owned), location of building (urban or rural localities, with high or small number of inhabitants), etc. Taking into consideration the elements, which are forming the building envelope, it is shown that the thermal insulation measures are being applied to the blind elements (external walls, attic, terrace, floors above basement, or exterior corridors and floors directly above ground) and the glass elements (windows, doors etc.).

Keywords: *Rehabilitation; Buildings; Envelope.*

DWELLING BUILDINGS ENERGY EFFICIENCY (Pages 199-204)

Ancuta ABRUDAN, F.DOMNITA

ABSTRACT

The economical strategy of sustainable development, asks the promoting of the building efficiency and using rationally the energy in the buildings, which are a major energy consumer both in Romania and EU. The paperwork reviews the aspects related to the massive potential of energy for the existing buildings and also the legal framework and the norms issued in order to value this potential. The Romanian Strategies for the buildings energy efficiency increasing are in broad lines following the European developed countries patterns. The major problems related to finding funding are asking for prioritizing and establishing annual plans for rehabilitating and modernizing of the energy use of the buildings with high energy consumption indices.

Keywords: *Rehabilitation; Dwelling buildings.*

ELEMENTS NEEDED FOR MULTIZONE AIR FLOW MODEILING (Pages 205-210)

F. DOMNIȚA

ABSTRACT

The ability to simulate the performance of a building is necessary for many aspects of its design and operation including, energy conservation. In recent years advances in building physics, improved understanding of the requirements and behaviour of occupants, access to meteorological data and the increased speed and power of computers have been combined to form the basis for powerful simulation tools for use by designers. However, one of the weakest elements of simulation has been the ability to take into account the natural movement of air into and through a building. This air may serve useful purposes such as the dilution and removal of internally pollutants and the provision of cooling.. Early simulation models dealt only with whole building ventilation and could not provide designers with information on key factors such as heating and cooling loads for particular zones or the movement of pollutants from one zone to another. This paper deals with a multizone model, which has been developed in response to this need.

Keywords: *Air flow; Modelling; Multizone model.*

ELECTRIC ENERGY CONSUMPTIONS IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT (Pages 211-218)

Gh. BADEA, Raluca DRAGOS, D. RUSU

ABSTRACT

In the context of sustainable development, the main objective of world energetic policies is to improve the quality of life for the present and future generations, at the same time with the rational and efficient use of natural resources and environment protection. In view of reducing the environmental pollution, in other words the hothouse emissions of 8% until 2012 as compared with 1990 level and increasing energy efficiency, the fossil fuels had to be substituted with renewable sources thus improving the rate of primary energy. The paper offers aspects related to the factors that influence the electric energy consumption in household, service, industry and transport sectors across E.U. and Romania.

Keywords: *Electric energy; Sustainability; Fossil fuels.*

OPTIMAL DIMENSIONING OF HYDROGEN TRANSPORT NETWORKS (Pages 219-236)

Gh. Badea, Anca Hotupan, C. Bacotiu

ABSTRACT

At the present moment there are no specific technical regulations to impose a certain design method for the hydrogen transport networks, therefore in this paper we propose a dimensioning method for such a hydrogen network, within the optimal range. At the end of this paper, some conclusions will be given, regarding the proposed calculation method and the obtained results.

Keywords: *Optimal dimensioning; Hydrogen; Transportation networks.*

ERRORS IN METERING NATURAL GAS (Pages 237-242)

E. MOLDOVAN

ABSTRACT

This paper presents the incongruities which are related to the different accuracy of the meters which register the natural combustible gas discharge in different sections of a distribution system. There are also mentioned the factors that influence the accuracy in metering the gas volumes, appreciations being made over its importance. Finally, there are appreciations made over the values of the metering errors by referencing gas meters with build-in corrector.

Keywords: *Errors; Natural gas*

GENERAL ASPECTS REGARDING THE NEED OF DEHYDRATING NATURAL GAS (Pages 243-246)

E. MOLDOVAN

ABSTRACT

In this paper is reviewing the considerations regarding the need of dehydrating natural combustible gas in order to reduce metering errors and the exploitation costs. All negative aspects of water vapors/liquid presence are shown, with special care for the effects like reduced pipelines' transport capacity, gas losses caused by bleeding into atmosphere and metering errors. At the end are presented the installations of dissociating fluid particles from gas, thus highlighting their arrangement and their efficiency.

Keywords: *Dehydrating natural gas; Pipelines transport.*

CALCULATION RELATIONSHIPS FOR THE FLOW RATES AND PRESSURE DROPS OF THE REVAMPED AND UPGRADED PIPES (Pages 247-254)

I. ASCHILEAN

ABSTRACT

This study discusses the calculation relationships for the flow rates and pressure drops of the revamped and upgraded pipes. Based on these relationships a conceptional frame will be developed for the optimization and implementation of the revamping and upgrading technologies for the pipes in the water supply systems.

Keywords: *Flow rates; Pressure drops; Revamped pipes; Upgraded pipes.*

CONSIDERATIONS ON LOSSES FROM WATER SUPPLY SYSTEMS (Pages 255-262)

Gh.Badea, Cristina Iacob, I. Aschilean

ABSTRACT

Water losses are grouped into two basic categories, which are real losses that represent the physical losses or leakage and apparent losses which are caused by meter under-registration, water theft and billing errors. This paper presents the manner of how water losses can be assessed and controlled and describes their determining factors. For a better understanding, a hydraulic water balance is presented and a number of performance indicators are discussed from the technical view point of water losses.

Keywords: *Water supply systems; Water losses; Performance indicators.*

CONSIDERATIONS FOR PREVENTION OF SCALE FORMATION ON THE REVERSE OSMOSIS MEMBRANE SURFACE (Pages 263-270)

Gh. Badea, Anagabriela Fărcas, Adriana Chicinas

ABSTRACT

The clogging of the reverse osmosis systems membrane represents the major problems of its utilisation. To prevent the scale formation on the reverse osmosis membrane surface, water source quality analyses are necessary at first and than, the calculus of the potential for scale formation is necessary by determination of total quantity of the dissolved solids and of the calcium carbonate. Determination of the calcium carbonate quantity it will be done with the aid of the Langelier saturation index. For water sources with high total dissolved solids, Stiff and Davis propose a modified Langelier's equation.

Keywords: *Osmosis membrane; Langelier index.*

REVAMPING AND UPGRADE METHODS FOR WELLS (Pages 271-282)

I. ASCHILEAN

ABSTRACT

The supply of drinking water has always come first when human settlements were established or existing ones have extended. Wherever there was a house or a village, there had to be somewhere close a spring or a well. In the modern world this rule is not strictly applicable because centralised water supply systems have been developed for entire settlements or groups of settlements, with water supplied from sources hundreds of kilometres away. The provision with drinking water of any dwelling or institution is still a standard that cannot be ignored. This study points out the ways the water extraction plants can be revamped and upgraded, with an emphasis on vertical filtering wells. Starting from the aging of the wells the procedures for the regeneration and reconstruction of the wells will be explained. Then the way the technical inspection of the wells should be carried out on which the economic revamping decision will be based.

Keywords: *Wells; Settlements.*

INNOVATIVE PROCEDURES FOR THE REMOVAL OF IRON AND MANGANESE (Pages 283-286)

I. ASCHILEAN

ABSTRACT

In practice it was noticed that the decrease of iron and manganese ions can lead to the clogging of the shafts due to the deposits of oxides. As a result, in order to ensure that the water complies with the legal provisions, the removal of iron and manganese was attempted by using chemical processes initially applied in above-ground filtering plants.

Later their removal was also possible by using underground chemical removal processes, which are basically the same as those above-ground. The aquifer of the underground water is used as a filtering and reaction medium, while the detached ions are oxidized by biological processes induced by micro-organisms and by bringing oxygen to the iron and manganese insoluble in water. The benefits, risks, conditions and limitation of these technologies will be studied.

Keywords: *Iron; Manganese; Chemical processes.*

CONSIDERATIONS ON THE USE OF CO₂ IN NON-POLLUTING REFRIGERATION SYSTEMS (Pages 287-298)

Gh.V. DRAGOS, Raluca DRAGOS

ABSTRACT

Nowadays, humanity is facing two major problems, the energy crisis and environment protection. Designing some energetically efficient refrigerating systems, by using agents with zero effect upon the ozone layer and minimum contribution to the increase of greenhouse effect helps in efforts to reduce pollution. In this line of action the present paper tackles problems concerning the reconsidering, from ecological and thermodynamic point of view, the natural refrigerating agent, CO₂ (R744) in view of using it in non-polluting refrigerating systems. The total equivalent heating impact is analyzed for CO₂ and other refrigerating agents, making a comparison between CO₂, NH₃ and R22 as their thermodynamic characteristics (c_p , X , r) are concerned. The paper concludes advancing some analytical methods for their determination.

Keywords: *Non-polluting; Refrigeration systems; CO₂.*

THE USE OF PROPANE (R290) AN EFFICIENT AND ECOLOGICAL ALTERNATIVE FOR REPLACING FREON R22 (Pages 297-304)

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ABSTRACT

Within the present researches in the field of Constructions and exploitation of refrigeration plants, in view of diversifying the range of utilization and increase of equipment performances, the efforts of finding and turning to good account of some cooling agents which completely satisfy the various needs imposed by the safe, efficient and ecological operation of plants, are of primary importance. Within the international regulations with concern to the impact of refrigerating agents upon the ozone layer and their contribution to the increase of greenhouse effect, one of the alternatives of replacing the CFC or HCFC - types, is the use of organic substances (hydrocarbons) such as propane (R290). The present paper analyzes the possibility of replacing freon R22 belonging to group HCFC with propane (R290), highlighting its energetic performances and thermo physical characteristics. The paper also presents analytical methods of their determination.

Keywords: *Freon; Propane; Energetic performance.*

UPDATE REVIEW ON LINER SYSTEMS FOR ENGINEERED MUNICIPAL SOLID WASTE LANDFILLS (Pages 305-312)

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ABSTRACT

A liner system engineered for a municipal solid waste landfills, namely MSWLF, acts as an indicator of good engineering practice for the approach to environmental sustainability issues. The quality assessment of a liner system will make use of known types and characteristics, as well as of the calculated leakage into the environment - where calculated values are assumed as good practice by both designer and client. Furthermore, the assessment will only be accurate when accounting for the actual defects present in the liner, or as a result of bad practice in installing the liner or operating a MSWLF.

Keywords: *Linear systems; Environmental sustainability; Solid waste landfills.*