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**Editor: Prof. Cosmin G. Chiorean**

*(Tech. Univ. of Cluj-Napoca, Romania)*

Phone/Fax: 40-264-594967

E-mail: [cosmin.chiorean@mecon.utcluj.ro](mailto:cosmin.chiorean@mecon.utcluj.ro)

**Affiliation to Organization:**

Technical University of Cluj-Napoca, Faculty of Civil Engineering, Romania

**Editorial Office Address:**

Technical University of Cluj-Napoca  
15 C Daicoviciu Str., 400020 Cluj-Napoca, Romania

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**Abstracting and Indexing**



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**Abstracts of  
Acta Technica Napocensis: Civil Engineering & Architecture, Vol. 51, 2008**

**RECOGNITION OF FOREIGN QUALIFICATIONS: THE HELLENIC STATUS**

P. Anastasiadis, G. Metaxas

**ABSTRACT**

The recognition of foreign qualifications awarded by equal higher education institutes universities as well as Technological Education institutes abroad and the provision of information concerning higher education studies domestically and abroad are the main aims of the Hellenic National Academic Recognition and Information Center (Hellenic N.A.R.I.C.). These aims achieved by a) the collection information and data concerning the Greek Education system b) information and data concerning higher Education on an international and European level c) monitors international developments in this field d) informs the Minister of National Education and Religious Affairs as well as the universities and Technological education institutes in higher education. In this paper will be presented the operation and actions of the Hellenic NARIC.

**Keywords:** *Hellenic NARIC, qualifications awarded, education system;*

**Full bibliographic reference:**

**IMPORTANCE OF MOTIVATION AND SATISFACTION IN WORK IN SMALL AND MEDIUM CONSTRUCTION ENTERPRISES**

L. Anastasiu

**ABSTRACT**

Motivation and satisfaction in work are concepts involving the hired personnel's attitude in work. In a competitive market economy, the companies' success leads in the quality of people, both owners and employees. Even if companies use same raw materials, same equipments, same soft, same number of employees with similar skills, the results are different, and this difference is due to the quality of the personnel. This is an important aspect, especially when one thinks about the crises of the workforce. The small and medium enterprises are a dominant field in the world economy. The statistics show that they represent over 90% from total companies, and they have over 65% from the active population. Speaking of the activity fields, constructions companies are 12.61% from all companies. I attended a survey on small and medium construction companies, centred on the workers' motivation and satisfaction in work. The results show that the owners and managers as well have to pay a serious attention on matters to increase these items.

**Keywords:** *human resources management, construction SMEs', motivation, satisfaction, survey;*

**Full bibliographic reference:**

**COMPARATIVE STUDY REGARDING THE TAXABLY PROFIT OF I.M.M. (SMALL AND MEDIUM ENTERPRISES)**

S.A. Ciplea, D. Sumalan

**ABSTRACT**

In front of an entrepreneurial beginning, many of us often ask ourselves the question: 'Out of a multitude of legal foundation forms of a commercial company, which one suits me?' By this material, we are going to present different aspects related to the most usual commercial companies, according to the Fiscal Code in force, and we are going to support the above question. We hope that, in the end, the conclusions of the present study are useful for choosing the most convenient system for each of us. This study presents in the beginning the main types of commercial companies, and in the end, it will show the point of equilibrium between these ones that is where a certain type of company is efficient and where another one starts being profitable. An example of real case will be presented for a

better understanding.

**Keywords:** *small and medium enterprises, limited liability companies, tax, threshold of profitability;*

**Full bibliographic reference:**

## **THE WIN-WIN CONCEPT IN MARKETING**

H. Dan

### **ABSTRACT**

No matter what job one has: engineer, laborer, priest, politician, farmer, everyone needs marketing. We can truly be the best in our domain, or have the best outputs, but if we don't know how to promote them, if we cannot make someone aware of our existence, all efforts are in vain. We would be hypocrites by saying that attending a marketing course gives you the competence to take always the right decision, but it can certainly help. Otherwise, everybody would be perfect, and that's not the case. The answer to the improvement efforts will emerge after many years of work, and for those who want to shorten up the minimum accepted deadline for 2-3 years; they must acknowledge the Golden Rule: "The straight way is always the best". Peter Muleu once said: "Each of us is a client". One must know the market in which we act, its way of dividing and especially its position. Marketing involves the techniques of selling. This doesn't mean only interest, but to find such ways to trade a product, that the buyers are pleased too and they will ask for more. It's a win-win process, in which both parts, the seller and the customer, are satisfied.

**Keywords:** *marketing, client, win-win concept, techniques, competences;*

**Full bibliographic reference:**

## **TECHNOLOGY OF MIXING AND PLACING SELF-COMPACTING CONCRETE**

J. Domsa, A. Mircea, L. Terec, H. Szilagyı

### **ABSTRACT**

The paper presents a part of the results obtained during the AMTRANS Research Programme in a collaboration work made by the National Building Research Institute INCERC Cluj-Napoca Branch, Technical University of Cluj-Napoca and ASA CONS S.A. Turda, concerning the technology of SCC (with limestone powder and superplasticiser additive ViscoCrete 20 HE) in the precast concrete factories. Advantages of SCC over the conventional concrete are presented, the conditions that SCC must fulfil and also the preliminary tests on fresh concrete at the concrete plant, before starting the production: density of concrete, slump flow-flowability (with slump-cone), viscosity/flowability (with V-funnel), passing ability (with L-box), segregation resistance (with - sieve test). The composition of some SCC classes using following constituents: Portland cement CEM I 52,5R, limestone powder, fine aggregate (0 - 3mm), coarse aggregate (3 - 7mm, 7 - 16mm), admixture (ViscoCrete 20 HE), and the mixing conditions are also presented. Mix design, control of SCC constituents at the concrete plant: aggregate moisture content, mixing order and mixing time are analyzed in comparison with other studies from specialty references. Transport and placing are presented while maintaining the workability request of SCC, with consequences in limitation of discharging operations and transporting time. There are also considered aspects as concerns the lateral pressure due SCC on formwork, which presents some modifications, by using this concrete with fluid consistency and by eliminating the vibration (respectively the parameters: type of compaction, type of vibration, time of vibration), over the conventional concrete. In conclusion are presented recommendations concerning the technology of mixing and placing for the precast concrete factories, when using SCC for precast concrete elements.

**Keywords:** *self compacting concrete, mix composition, mixing sequences, mixing time, pressure on formwork;*

**Full bibliographic reference:**

## **THE CORRELATION: LEGISLATION- QUALITY OF CONSTRUCTIONS**

D. Florea

### **ABSTRACT**

Under the terms of the market economy, legislation is one of the basic factors of the society's development which must ensure and warrant the accomplishments of all companies, irrespective of their size, form of property, etc. The construction companies are part of the companies (economic agents) which create the gross national product

(G.N.P.) through their activity and by consuming material, human, financial and informational resources. Their entire activity of design, execution, use and afteruse of the construction objects shall fit into an adequate legal framework which shall facilitate these activities.

**Keywords:** *legislation, quality, construction;*

**Full bibliographic reference:**

### **SETTLEMENT OF THE OPTIMUM INTERVENTION SOLUTION UPON A ROAD BASED ON THE MULTI-CRITERIAL ANALYSIS**

O. Gavris

#### **ABSTRACT**

This work studies the manner of choosing the optimum intervention solution for an existent road, based on relevant aspects regarding technical, economical and environmental parameters. In this article, the surveyed factors are the workings' cost for each planned solution, the interest for the roads traffic and the impact on the environment. This present paper presents two possible scenarios: Only the repairs in order to ensure the traffic; The rehabilitation of the road in terms of placing it in geometrical items and the traffics requirements, in a 10 years perspective.

**Keywords:** *road, analyse, costs, designed solutions, traffic, environmental impact;*

**Full bibliographic reference:**

### **DIRECTOR VERSUS MANAGER**

O. Gosa

#### **ABSTRACT**

The paper presents aspects about the notion of director and ulteriorly the manager at the end of the 20th century and the beginning of the first decade of the 21st century. In the essay are presented some aspects in relation to the style of work of the director and how the profession of manager evolved in Romania along with the transition towards an economy on the European markets. The modern calculation technique and the means of communications which are available today have modified the perception of what the notion of manager is in Romania. The centralized socialist system is replaced with a liberal one and with this the leadership style of businesses has changed. The advantages which were created by the opening of the horizons towards the European model of leadership after the unanimous standards of quality created the conditions of an accelerated evolution of our country.

**Keywords:** *manager, director, manager of the site, modern calculation technique, decision taking, computer;*

**Full bibliographic reference:**

### **CONCEPT AND PROCEDURE FOR ATTESTATION OF CONFORMITY BY TYPE-CERTIFICATION IN CASE OF CONSTRUCTION PRODUCTS**

A. Mihalcea

#### **ABSTRACT**

This paper deals with concept and procedure particularities concerning the conformity assessment in case of construction products grouped in families, that are described on the basis of manufacturers' technical specifications. The product technical analysis, verification of functional, installation and capability parameters as well as compliance with the essential requirements according to the European Directive 89/106/EC (Construction Products Directive) is performed basing on a professional assessment. The parametric examination of the product families aims to individualize the product, part of the family products, following to be put on the construction market according to the certificate of conformity. Thus, according to its typo-dimension, the product is characterized so that it may be used in conception stage, embedded in a construction as well as for time surveillance of its behavior.

**Keywords:** *construction product, product family, conformity assessment, type-certification;*

**Full bibliographic reference:**

### **CRITERIA USED TO SELECT THE MOST APROPRIATE CRANAGE**

A. Moga

### **ABSTRACT**

In this paper are described essential steps in the process of selection of external static free standing tower cranes and selection of a rail mounted cranes. The calculation of the number of cranes follows a similar pattern for both types of crane except that where a mobile crane is being considered the calculation should be repeated with a 15% addition to the lifting times to allow for the slower lifting and moving capability. In accordance with the data related to the above decision process with the essential steps making decision may outlined in an overall flowchart. Criteria of external cranes to be considered are: that cranes covers 100% of required building area, there is sufficient space available for assembling and erecting the crane, the crane can freely turn and sufficient load carrying capacity.

**Keywords:** *cranes, essential steps, decision process;*

**Full bibliographic reference:**

### **ESTIMATING PRELIMINARIES IN THE COST**

A. Moga

#### **ABSTRACT**

The paper presents aspects about difficulty to achieve analysis an interchange of professional skills between the design team and the contractor during the early stages of design. The purpose of these researches is to investigation now the analytical technique work, in order to aid the future development of practical tools for designers of construction projects. In researches the objectives has been to obtain a consistent data set by keeping the project as the constant factor with method of analysis being the variable. If the hypothesis holds true there should be little variation in the method of analysis. The research attempt to test the hypothesis that construction activity can be selected using a set of rules. Furthermore the activities are linked together using rules to establish an interconnecting sequence.

**Keywords:** *estimating preliminaries, planning, time prediction, cost;*

**Full bibliographic reference:**

### **THE ROLE OF TECHNOLOGICAL ORGANIZATION IN CONSTRUCTION ACTIVITY**

A. Moga

#### **ABSTRACT**

The paper presents aspects about the necessity concerning the reconsideration of technological organization in construction activity. In the technological organization, taking the needs of the areas to be supplied into consideration the application of suitable equipments is a proper objective. By the harmony of product and technology it is possible to increase the performance of the productive basses and leads to be proper efficiency. The harmonization of product and technology is achieved by the elaboration of new design series, by continuous -type development, by the development of production lines in different directions. The individual stations of technological organization are as follows: checking - up the technology, investigation of technological possibility, assembly of production lines for an extension of products.

**Keywords:** *technological organization, flexibility of technologies;*

**Full bibliographic reference:**

### **COMPARATIVE ANALYSIS OF THE METHODS USED ON INTERNATIONAL LEVEL FOR COST ESTIMATION AND PRICE FORMATION IN CONSTRUCTION ACTIVITIES**

C. Simion, M. Rus, C. Enulescu

#### **ABSTRACT**

The article presents aspects of the methods used on national and international level for the estimation of costs and prices in the domain of constructions, as well as their comparative analysis from the point of view of nine criterion, out of which the most important are: the type of estimation, method and device of calculation, using the national and local factors, the degree of compatibility of data, the existence of an additional purpose of estimation that should be complementary to the actual calculation. Although not in all the analyzed methodologies calculation has as purpose the general quotation or the quotation on object, the structure of expenses resembles, including the same categories

of expenses. In the case of EUROSTATE, even though the purpose of the calculations is only statistical, the data is collected on the base of some fixed quotations on which the statistic inquiries are performed.

**Keywords:** *calculation methods, costs, prices, constructions;*

**Full bibliographic reference:**

### **PLANNING AND CONTROL METHODS WITHIN A PROJECT**

D.Sucala, I.N. Sucala

#### **ABSTRACT**

The projects are unique activities, objective-oriented, with a high degree of novelty and complex work task. They are limited from the point of view of time, material and human resources, usually requiring interdisciplinary collaboration within a special framework, as well as special methods that imply specific risks. Management is an activity with multilateral character, meant to contribute to obtaining the best results within previously established objectives. The completion of projects and, implicitly, the managerial situations connected with the putting them into practice imply the performance of some intercorrelated activities which can be modelled with the help of some networks. Civil Engineering projects take longer to complete (months, years). While they are going on, changes may occur that have an impact on costs, technology and project resources. Managing a project implies: planning and scheduling it, controlling its execution and updating the program if necessary. The established objectives must be achieved optimally and in due time.

**Keywords:** *critical path, network diagram, graph, directional lines;*

**Full bibliographic reference:**

### **COMPARISONS BETWEEN THE MAIN POTENTIAL SOURCES OF INCOME FOR A NATURAL PERSON**

D. Sumalan, S. Ciplea

#### **ABSTRACT**

This study presents different remuneration possibilities of a person who offer a service within a company. In case the employer and the employee legally have more possibilities to conclude the legal possibility of service offer by the employee, the present study highlights: the remuneration by labor contract, the dividends from the service offers for income tax and profit tax companies, the income achieved by the Authorized Natural Person (P.F.A. in Romanian). The conclusions are that the most efficient possibility of remuneration for employee is by the Authorized Natural Person, followed by dividends obtained from the taxable income companies, followed by those with taxable profit, and finally, the remuneration for the workbook (payroll). The different advantages and disadvantages of the four remuneration possibilities are presented. All in all, with advantages and disadvantages, the authors think that the most efficient possibility of remuneration, when legally possible, is the Authorized Natural Person.

**Keywords:** *pay, authorized natural persons, small and large enterprises, pay comparisons;*

**Full bibliographic reference:**

### **THE IMPLEMENTATION OF A QUALITY MANAGEMENT SYSTEM, IN COMPLIANCE WITH ISO 9001:2000 STANDARD, IN CROSS COUNTRY EDUCATIONAL PROGRAMS**

M. Zafiriu, S. Metaxa

#### **ABSTRACT**

Education holds a substantial role in the difficult attempt to create a real European Union. Following the success of the graduate student's exchange programs (Erasmus), a series of post graduated programs were provided. The growth of these Cross Country Educational Programs inevitably led to the need of the application of a Quality Management System. The advantages of the application of a compatible with ISO 9001:2000 standard Quality Management System are more than obvious. Furthermore, the approach of internal supplier and customer, quality chains and teamwork which are in the core of Total Quality Management can be very useful in the implementation of such programs. Various issues in the fields of Obligations, Demand, Collaboration, Homogeneity and Quality of these Programs can be dealt with under a rigid Quality Management System. The experience gained from the

attempt of the Implementation of such a Quality Management System, in respect with the collaboration of Universities and Institutes from the European North and South, is shared through suggestions for steps to be followed during this implementation.

**Keywords:** *cross country educational programs, Quality Management System, ISO 9001:2000, Total Quality Management;*

**Full bibliographic reference:**

## **STUDY ON SOME SURFACE REPRESENTATIONS USED IN CIVIL ENGINEERING**

D. Barbînta, R. Dardai, D. Dragan

### **ABSTRACT**

The present paper aims at making a comparison between the various types of geometrical representations used in civil engineering with the purpose of pointing out the type of geometrical representation that is better suited for the surfaces met in civil engineering.

**Keywords:** *conoids, cylindroids, hyperboloids, surfaces representations;*

**Full bibliographic reference:**

## **ARCHITECTURE**

C. Barbulescu

### **ABSTRACT**

Both the general plan of the set of buildings forming Potaissa Roman Castrum (today's Turda), and the Headquarters' Building have been rebuilt while observing carefully some elements on which certainty is present, such as the plans produced archeological research, processed stone parts. On the other hand, the theoretical premise considered the constructive logic based on building techniques, Vitruvius's theories and the analogies provided by similar edifices from the Empire. Some design rules could be thus found: the principles of the regulating drawing plan for the castrum having the surface of 23,37 ha, the prescribed ratios and proportions for the functional and sizing composition of the (for the plans, they are observed in an objective manner, while in space they are theoretically supposed). Based on such observations, the last reconstitution of the Headquarters' Building brings in some specifications on the standard character of the project, and on its adaptations to the ground. The reconstitution of the access of the buildings on the North and South sides with a portico leading onto the court in the form of an honor court, that of the Basilica and Western side with the Sanctuary and Thesaurus have been defined proportionally, according to the theories of Vitruvius.

**Keywords:** *Vitruvius, roman architecture, military fortress, Headquarters, porticus, basilica, aerarium, sanctuary;*

**Full bibliographic reference:**

## **PROBLEMATIC SYNTHESIS RESUME OF CULT ESTABLISHMENTS DESIGNING**

D. Ciolacu, M. Budescu

### **ABSTRACT**

The church has a double function - symbolic and objective - and by that, it is the only program capable of exposing the cohesion between mater and spirit. The act of ecclesial build generated an individual expressivity specific to new construction systems. In *architectural expressivity - construction system* binomial, there is a continuous undetermined process. The critic and analytic flow with a practical result has many ways of approaching. From a historical perspective, the study identifies elements of equilibrium between tradition and innovation, in such manner that the new churches to be synchronic with modern age and in the context of the new tendencies, but not to diverge with formal continuity that ensures known pattern. The constructive system as essential part of the structural expressivity is exposed directly and metaphoric in definition of shapes symbols, being helped by structural elements - column, arch, cupola, and accomplished by direct arts - frescos, window frames, furniture. Program dysfunctions are caused by technology that wasn't capable to generate esthetic expressions as the search to an over-seizing and a formal passim inadequate the new materials.

**Keywords:** *church, ecclesial, symbol, construction, shapes, geometric;*

**Full bibliographic reference:**

### **THE INFLUENCE OF DETAIL IN CHOOSING THE DESIGN VERSION**

F. Crăciun, D. Drăgan, F. Drăgan

#### **ABSTRACT**

The subject of this paper is to underline several relations between objects shape, function, material, technology, aspect and detail. Examples which are analysed in this study reflect the complex activity of product designing process. Design activity usually displays expertise, knowledge, creativity and thoroughness. It has a close relationship with technology, with human needs and aesthetics. Generally, the final design version is chosen from several, which have been evaluated and compared from all sides of constructional expediences, perfection of kinematic and force schemes, cost of manufacture, energy consumption, cost of labour, reliable operation, size, metal content, weight, suitability for industrial production, unitizing, servicing, assembly-disassembly, inspection. In choosing the design versions is important to find a compromise solution. Often this is chosen not because it incorporates more advantages, but rather because it has less disadvantages in comparison with others. All these aspects regarding to design optimization shows the necessity of different professional specialists collaboration. Not always the main shape modification is a major one. Substantial optimizes in product efficiency and function have often been obtained by minor mutations upon small details, such as eliminating tenseness, reducing weight, rising stiffness etc.

**Keywords:** *design, form, details, optimisation, mechanical characteristics, rezistence;*

**Full bibliographic reference:**

### **TOPOGRAPHIC MAPPING AND SPATIAL DATA COLLECTION**

V. David

#### **ABSTRACT**

In this paper are presented planimetric and topographic methods used in mapping and spatial data collection for GIS databases. The first part of this paper presents the direct compilation of planimetric features and contours by stereoplotter. Direct compilation of contours is a diffculted operation that takes considerable skill and experience on the part of the operator. In the second part of this paper are presented the methods of representing topographic features in digital mapping and also digital elevation models and orthophoto generation. These products have special applications in different domains such as architecture and civil engineering and construction of roads.

**Keywords:** *topographic, mapping, orthophoto, digital elevation models;*

**Full bibliographic reference:**

### **THE EVOLUTION OF THE STRUCTURAL FORM IN THE CASE OF TALL BUILDINGS. CORE STRUCTURES**

D. Drăgan, F. Crăciun, F. Drăgan

#### **ABSTRACT**

This paper presents the evolution of the structural systems undergoing changes in the course of the time. It concerns the need to look for proper correlations between function-form-structure in the context of civil buildings, in general, and with respect to tall buildings especially. The paper also underlines the fact that the structural solutions should be rational and meaningful, while avoiding formal or structural deviations.

**Keywords:** *structural systems, tall buildings, core structures, reinforced concrete;*

**Full bibliographic reference:**

### **STUDY CONCERNING THE REPRESENTATION OF CONOID TYPE SURFACES**

D. Dragan, C. Marza, R. Dardai

#### **ABSTRACT**

Due to the remarkable appearance, the conoid-type surfaces are frequently used in the field of constructions. This type of surfaces is mainly used in sun-blinds, thin curved coverings, special voids in the masonry and specific kinds of stair cases. Conoids are warped surfaces generated by a straight line supported by a curved directrix at one end

and by a straight directrix at the other end, while keeping its parallel characteristic to a given directrix plane. The representation of such a surface can be made by one of the following representation systems: the orthogonal projection on two planes of projection (the Monge projection), axonometry, projection with elevations. All the systems of representation mentioned previously present both advantages and disadvantages. This paper aims at presenting a synthesis of previous studies on conoids carried out by the authors. The following conoids have been studied: the Plucker conoid, the oblique conoid, and the sphere circumscribed conoid. To this list, the research on the representation of the Viviani conoid is added now. The issues arising and discussed in view of finding solutions concern: intersections with projecting planes or with oblique planes (walls, floors, roof slopes), intersections with straight lines (beams, columns, roof framing members), and surface tangent planes.

**Keywords:** *Plucker conoid, oblique conoid, sphere circumscribed conoid, Viviani conoid;*

**Full bibliographic reference:**

## **APPRECIATIONS REGARDING THE POSITIONING AND DIMENSIONING OF CYLINDRICAL SURFACES IN THREAD FASTENING**

A. Florescu-Gligore, M. Balcau

### **ABSTRACT**

The interference area of the conjugated linking contours in the case of thread fastenings should allow the assembling and the fitting of the screw or fixing bolt. The size of the dispersion of the positions of the conjugated linking contours may be linear or angular and may be determined by the chain theory of dimensions. Although the drilling of passing holes does not have to be precise a large dispersion of the centres will lead to the increase of the passing diameter which will cause an exaggerated drilling processing error. This study analyzes different systems and methods of dimensioning of mating holes and the way in which the dimensional linking parameters are influenced by these systems and methods. We show that in the case of multiple linear holes a grouped mixed dimensioning of 4 centres is more advantageous than the chain or unique basis ones. The polar coordinates dimensioning of holes located on a polygonal contour (the bolt circle and the angular measurement) introduces lesser positioning errors than the Cartesian one. Therefore it is preferred when the configuration allows it.

**Keywords:** *positional tolerance, polar and rectangular coordinates, Cartesian system of locating, thread fastening, theory of dimension chains, linear and angular positioning error;*

**Full bibliographic reference:**

## **VIRTUAL REALITY TECHNIQUES IN ARCHITECTURAL EDUCATION**

T. M. Hapurne

### **ABSTRACT**

Virtual Reality provides opportunities to deliver architectural education in ways not possible through traditional methods, thereby broadening the range of tools available to modern educators, in order to reach more students and methods. At the Faculty of Architecture Iasi, visual aid techniques are used to assist students in their design and planning practices. First they use different graphic methods to display images and information within a bidimensional (2D) framework. Then the dynamic 3D modeling help studying object relationships that otherwise cannot be revealed. The use of object oriented technology in CAD facilitates the support of collaborative design work, so the distinct models can be separately modified by different users, potentially using different applications. The relations between build and equipped volumes, with unoccupied spaces, valuating interior and exterior perspectives images, sunlit and darken zones are emphasized. The virtual reality can be simulated in exterior and interior paths, placing VR linked cameras. Thus, in an integrated computer environment, the architectural design process could be enhanced.

**Keywords:** *virtual reality, simulation, 3D modeling, visualization;*

**Full bibliographic reference:**

## **STUDIES AND RESEARCH IN DEVELOPING MODELS FOR MOVEMENTS AND DEFORMATIONS IN CONSTRUCTIONS**

S. Herban, C. Grecea

#### **ABSTRACT**

The development of topographic measuring techniques has permitted and created the possibility to determine and distinguish even the finest movements of buildings and lands. Even so, the movements of some constructive elements of a building are difficult to establish because, while choosing the method or model to determine their movement and deformations, the aprioristic knowledge which refer to the type of movement, during the most probable moment when this happens, is not known or taken into consideration. In other cases, this can be even impossible. In the paper, the authors propose the use of deformation models with examples in determination of a special type of building in Timisoara.

**Keywords:** *cracking, base restraint, mass elements, reinforced concrete, shrinkage;*

**Full bibliographic reference:**

#### **NEW ORIENTATIONS AND OPTIONS IN FURNITURE DESIGN**

A. Kiraly

#### **ABSTRACT**

The main objective of this paper is to present actual orientations and options in the design of furniture. By furniture we mean all types of them: home, office, commercial or street and ambient kind. The main goal is to offer schemes and methods which bring freedom to the designer, living time for the innovation and the improvement of the artistic part. Also we emphasize the concept of ecodesign that incorporates environmental considerations into the design and development of products or services.

**Keywords:** *ecodesign, integrated product policy (IPP), furniture, parameterization;*

**Full bibliographic reference:**

#### **STRUCTURE IDENTIFICATION OF HISTORICAL BUILDINGS**

L. Kopenetz, F.Z. Gobesz

#### **ABSTRACT**

The monuments or historical buildings, enduring centuries in different conditions, with more or less structural damages, need a special consideration from the part of the authorities in order to preserve the memory of the past. In our country's case, besides ageing processes, emplacement (approx. 70% of the national territory has high seismic risk), climate, there is also a time period (of approx. 50 years) when the state ideology had no interest in the preservation of past heritage. Thus, the majority of historical structures is in a precarious state (even near to collapse) which is worsening as days pass. The safety and durability criteria for historical buildings are more severe than those for common buildings. The concept of structural safety for such buildings requires the precise cognition of the bearing structure existing in situ. In the paper the authors describe the problem of structure identification using advanced inquiry methods (computerized photography, nondestructive tests, infrared thermography etc.) and concepts from the theory of systems (finding out the behavior of a real system upon its answer to a known input).

**Keywords:** *historical buildings, structure, identification, method;*

**Full bibliographic reference:**

#### **SHAPE-STRUCTURE NEXUS BY HISTORICAL CONSTRUCTIONS**

L. Kopenetz, F.Z. Gobesz

#### **ABSTRACT**

The shape-structure nexus appears at every historical construction. This conditioning relationship has a consonant character, expressed through an interlacing of the cosmic and moral harmony. Those historical buildings, at which there is a strong liaison between shape and structure, have withstood to earthquakes, fire and war destruction. Another important aspect noticed is that, in most studied cases, the shape of historical constructions is integrated organically in the natural environment, thus accomplishing an ecological harmony. In this paper some aspects of these problems are presented in order to a better understanding of the lasting of such architectural complexes.

**Keywords:** *shape, structure, relation, historical heritage, monuments;*

**Full bibliographic reference:**

## **FUNCTIONS OF ARCHITECTURE WITH STRUCTURES OF UNCONVENTIONAL MATERIALS**

L. Kopenetz, T.D. Hodisan

### **ABSTRACT**

The actualization of human needs appears under the form of some external specifications to which architecture responds in a functional way. The relation between the building and the user defines the function, that is the correspondence between the building and the requests of the investor and customer. The dynamics of these requirements renders the functions more and more complex. In this context the paper presents functions of architecture solved with structures free of conventional materials as: steel, concrete, brick and wood.

**Keywords:** *unconventional materials, jet of air, paper, textile materials, stabilized ground;*

**Full bibliographic reference:**

## **THE ROMANIAN PHILOSOPHICAL THINKING AND THE CONCEPT OF THE CONTEMPORARY ARCHITECTURAL SPACE**

A. Matei

### **ABSTRACT**

The work is a synthesis of various theoretician architects, cultural persons and internationally acknowledged Romanian philosophers preoccupations of the recent years regarding the relationship between the architectural space and the space conception. Since none of conception exists by itself, there cannot be neglected the other notions like time (or better said, the temporal-spatial concept), the image and the symbol relation, or the sacral profane relation. A certain type of thinking corresponds to each period of the history, that is: polytheistic, monotheistic, atheistic or fully religious. Consequently, the space is polycentric, monocentric, homogenous and isotropic or heterogeneous. And, doubtlessly the rational or the irrational knowledge contributes to all these expressions of thinking through space. Nowadays, it is well known that the pointillism in picture came out also of the necessity of manifestation in the field of art of knowing the light dispersion, following the quantum physics findings. The favourite references to the Romanian philosophers are justified not only considering the accessibility degree but also, and especially, considering the fact that most of them, like Blaga, Noica, or Patapievici approach, besides the philosophical complex or the universalgeneral specification, also the Romanian cultural identity matter.

**Keywords:** *rational and irrational knowledge and the spatial architectural concept;*

**Full bibliographic reference:**

## **TECHNICAL APPLICATIONS OF THE REVOLUTION QUADRICS ON THE COLLECTING OF THE SOLAR ENERGY**

C. Mârza, D. Dragan

### **ABSTRACT**

This paper aims at making a geometrical study of the paraboloid of revolution that represents a surface with an optimal form for the solar concentration collectors. This type of collectors use optical systems based on reflexion or refraction to increase the density of radiation flux falling on the receiver trapping surface. The implicit advantages consist in diminished reception surface for the same overall amount of energy trapped and less heat loss in the receiver, respectively higher temperatures of the work fluid.

**Keywords:** *revolution paraboloid, tangent plane, radiation concentration collector, collector geometry, light cone, concentration ratio;*

**Full bibliographic reference:**

## **THE TOWERS OF SIBIU 2007**

M.S. Moldovan

### **ABSTRACT**

In 2007 Sibiu was an European Cultural Capital and an occasion for a national emulation and effervescence. Contemporary Art needs a minimum of infrastructure. To provide that, we made, by the discipline "Syntheses of

Design" with the students from the 4-th year from The FAU-UTCN, proposals for 4 to 6 towers/aedicule right on the places of the destroyed ones.

**Keywords:** *re-integrations of arts in architecture and town, contemporary expressions, research by universities;*

**Full bibliographic reference:**

## **PROMOTING ARCHITECTURAL EXPRESSION IN METAL STRUCTURES FOR HABITATION BUILDINGS**

M.S. Moldovan, P. Mutica

### **ABSTRACT**

The main purpose of this work is to emphasize the need for new and more elaborate structures in habitation buildings as the population grows and the people needs diversify. Erecting houses and apartment buildings quickly and more efficiently is the main concern in today's architectural tendencies and metal springs into the picture as one of the easiest and more reliable building materials. Its main advantages over the other materials is that it is easy to manufacture off site, relatively easy to assemble, durable, lightweight and, most importantly, it has a unique expression unmatched by masonry, concrete or even wooden structures. The study analyses the main differences between the western metal structure architecture and the local tendencies. The freedom of expression in the first case is opposed by a rigid, conservatory perspective in the second case where the metal structure is well hidden from the eyes of the public who prefers traditional expression rather than the innovative yet frail looking silhouette. Thus two main directions emerge, a traditional expression that simply copies earlier masonry, concrete or wooden structures, or a new, more specific shape.

**Keywords:** *metal, habitation, structure, expression, architecture;*

**Full bibliographic reference:**

## **UNDERGROUND HABITATS, AN ALTERNATIVE TO BE TAKEN INTO CONSIDERATION**

I. Muresanu, F. Muresanu

### **ABSTRACT**

Even though the trend today is to be a supporter, beyond any doubt, of all that means sustainable development - which is a key expression if one seeks to capture the attention of his audience - the system presented in this article is not a trendy one, the idea is definitely not a new one. The underground city is a concept that could be relied with the ancestral memory of humankind, shaped in those times when the trilithic system was not discovered by humans; when they lived in shelters provided by nature, most often in caves. Even nowadays there are known indigenous people from New Guinea, Mexico or Ceylon that still live in caves. Along the Mediterranean coast of Spain, in Portugal, Tunisia and in China, there are entire habitations built in the underground. In the eyes of the majority they represent more a touristic attraction or a curiosity rather than a viable system of eco-architecture.

**Keywords:** *underground, residence, earth sheltered homes, efficiency, protection, design, temperature, consumption, cost;*

**Full bibliographic reference:**

## **ON THE APPLICATION OF GRAPHICAL METHODS TO CYLINDRICAL AND CONICAL FITTINGS DESIGN**

M. Orban

### **ABSTRACT**

As component parts of installations used in civil engineering, zootechny, irrigations, ventilation and air conditioning equipment but also in machine building, fittings are transition pieces connecting pipes of the same diameter or of different diameters, of parallel, concurrent or disjunctive axes. Having a shape constituted from combinations of plane or curved surfaces, their intersection is, usually, a spatial crooked curve. In the case when the surfaces forming a fitting are developable surfaces, it can be manufactured from sheets and their intersection line is materialised by the welding cord. Among the developable surfaces, there are used especially the cylinder and cone and, particularly, right cylinder and right circular cone. On the basis of these considerations, the paper presents the graphical methods of geometrical design of the cylindrical and conical fittings for pipes with parallel and concurrent axes. Assuming

that the fittings as transitions pieces connecting pipes are manufactured from sheets, there are presented simplified methods for their developing.

**Keywords:** *Surfaces intersection, developable surfaces, fittings, elbow, reducing;*

**Full bibliographic reference:**

## **MENTAL PROJECTIONS OF CENTRAL CLUJ**

I. Suci, D. Sumalan

### **ABSTRACT**

The present study is an introduction into the analysis of the representations that some individuals build for themselves of the urban area. Our scientific measure started from the premise that social actors shape their own projections of space according to their social status and their familiarity regarding it. For the testing of the established hypotheses we underwent a small scale research between October and January using as research methods active observations, the mental map and the interview. After analyzing the data we identified significant differences between the projections of central Cluj according to the social status and living environments of the respondents, and that the individual mental images on the centre overlapped that of the collective image.

**Keywords:** *mental map, paths, borders, districts, markers, junctions;*

**Full bibliographic reference:**

## **AESTHETIC BENEFITS ASSOCIATED WITH THE STRUCTURAL INTERVENTION ACTIVITIES**

C. Tereja, M. Budescu

### **ABSTRACT**

In the Romanian townscape coexist many buildings and edifices from different styles and periods who offer a distinct individuality to the inhabitable areas. Unfortunately, the great residential districts realized some decades ago multiply excessively a small number of distinct designs. This poor expressivity could be substituted for the new structures according to diversified architectural concepts. For the existent works, it is desired to improve the architectural aspects along with far-reaching overhauling (repairs, functional changes etc.). The structural rehabilitation works which are established from different reasons (unbalanced settlements, earthquake effects, weather conditions, building materials usage etc.), should consider the resistance structure strengthening and also the aesthetic rehabilitation. This article presents a modern and efficient performance method of the strengthening works made on a block of flats from Braila (S+P+9+E.T.) due to the uneven settlements and earthquakes effects. The proposed rehabilitation solution was the external repair of the structure and because of that it was not necessary to evacuate the lodgers during the works. The general result was the improvement of the building architectural appearance, which brings more modernity and freshness to the neighboring architectural complex. The site procedures and the used building materials exploited the present possibilities.

**Keywords:** *rehabilitation, structural intervention, modernity, aesthetic benefit;*

**Full bibliographic reference:**

## **RESULTS OF A METHODOLOGICAL THINKING DESCARTES AND HIS GEOMETRY**

G. Ticlete, L. Chetan, L.F. Dumitru, C. Popescu

### **ABSTRACT**

Through this work, we attempt to follow the evolution of the remarkable French philosopher, Rene Descartes, who gave the modern spirit its awareness of self and its faith in reason. And he did this with surprising clarity, yet his clarity emerged solely from the criterion of forming clear, distinct ideas through the understanding of nature as a mechanism - a principle that is to this day one of the foundations of modern science. He wrote his "Geometry", a masterpiece published in 1637 as an addition to his profoundly philosophic work, "Discourse on the Method". Through this work, he presents applications of this "method" that led to a series of results in problem of classical geometry. The revolutionary aspect of this philosophically-mathematical work is the usage of algebra in explaining classical geometry. One of his great merits is the introduction of the notions of "variable" and "constant" into traditional geometry, leading the possibility of expressing geometrical curves and their properties through algebraic equations. By finding a correlation between a set of points and a set of numbers. Descartes proved that certain

relationships between points correspond to relationships between numbers. This is how geometry becomes a model of his views on mathematics, defined by him as "the science about order and measure". The world of Descartes is a universal mechanics, which is why he tried to logically explain heart rhythm and blood circulation through the body. Thus he replaced blind faith with reason, while in the same time he tried to bring idealism and materialism into harmony. If the Cartesian formula which he invokes as truth, "Cogito, ergo sum", guided him throughout his life, then the consciousness of thought, and therefore of the soul, is more certain than the consciousness we have about the outside world.

**Keywords:** *geometry, Descartes;*

**Full bibliographic reference:**

## **GEOMETRY - A BASIS FOR ALL CONSTRUCTIVE STRUCTURES**

G. Ticlete, L. Chetan, L.F. Dumitru, C. Popescu

### **ABSTRACT**

Ever since the Antiquity, the basis of all spatial forms has been the elementary geometry of solids. Thus the pyramid, the prism, the cylinder, the cone and the sphere are just a few of the known solids that man used to decorate his living space, by combining and sectioning them. For a long time, the primitive man did not care to know how and why these shapes have emerged around him. Initially they were simply the results of their basic search for shelter, and only later more and more complex shapes emerged. Obviously, in these primitive shapes allowed some of the more ingenious to utilize different materials, shapes and technologies. As a result, we see the appearance of more complicated shapes, with geometries that pleased the eye, but which forced the constructors to look beyond stone and wood when looking for materials. Thus we can explain the emergence of the brick, mortar, and later on metal and synthetic materials. With time, man understood the strong connection between geometry and the experimental science of construction. Thus, geometry becomes a theory, but also a practice, as it allows us to imagine diverse shapes which answer our aesthetic needs. It is thus necessary to assure the correspondence of "form and usage" as an "if and only if condition that states "one usage can be satisfied by several shapes and the other way around". The criterions will be dictated by necessity, preferences and reliability. Using fundamental geometrical elements, one can produce all geometrical shapes and structures of natural objects, and through these observation, we shall demonstrate the formation of some modern construction structures.

**Keywords:** *geometry, geometry of constructive structures;*

**Full bibliographic reference:**

## **TRANSFORMATIONS AND MUTATIONS OF THE SPACES FOR HIGHER EDUCATION IN ARCHITECTURE UNDER THE IMPRINT OF THE DIGITAL AGE**

S. Tiganas, P. Moldovan

### **ABSTRACT**

The academic education is continuously restating its objectives and methods, combining the natural conservatism towards the good traditions with innovative experiences. There, where a profession like that of an architect claims certain forms of development of the practical processes in new formulas, which the practice already generalized them, based on the usage of digital technology, the university is obliged to offer both a new form of communicative interface with the students and a adequate space. The architectural workshop in which the interdisciplinary synthesis by designing is being realized, passes from the hand drawing on the boards with instruments to something else. The architects' drawing, the project's illustration, but especially the conceiving and development phases can be extremely different, using two or three physical and virtual dimensions in alternation and completion. How do the spaces have to look like for these processes? Our contribution wants to be another brick to the edification through principals and experiments of a new school of architecture in Cluj and anywhere else in the world. Evidently the theory of the educational program for the formation of the architects can not lead to a unique ideal formula, but the identification of the possibilities confirmed as valuable to which ideas experimentally motivated are added, can offer applicable perspective.

**Keywords:** *theory of the architectural programs, education, education spaces;*

**Full bibliographic reference:**

## **DYNAMICS OF THE EVOLUTION OF WOODWORK AND WOOD ARCHITECTURE IN TRANSYLVANIA**

R. Zamfir

### **ABSTRACT**

This study analyzes the evolution of woodworking tools and the evolution of wood architecture after the 3<sup>rd</sup> century A.D., conditioned by the logics of the constructive determinism, unanimously valid, and the intrinsic interaction between the quality of the working tools and the level of achievement of the wood constructions. Secondly two more issues are treated, conditioning this determinism: the first issue, woodworking tools, and the level of working weapon iron in those times, the second issue is related to the correlation between the level of the technology needed to work the wood in order to build a water mill and the time needed, measured in centuries, for the improvement, all these before reaching the top in this technology. The work makes indirectly the apology of the evolution of wood constructions (houses, churches, and mills) much before the discovery of the first tangible archaeological sites that last for two centuries before, confirming the presence of building joiners and wood constructions on the territory of Transylvania, at that time.

**Keywords:** *dynamic, production relations, iron tools, steel tools, Transylvania, weapons, technology, water mill, evolution;*

**Full bibliographic reference:**

## **WOOD CHURCHES IN MARAMUREȘ, SPECIFIC AND ORIGINAL ELEMENTS AND SCANDINAVIAN INFLUENCES**

R. Zamfir

### **ABSTRACT**

This study is based upon observations, bibliography, photographs, and compared data, collected along the time, and verified on site, in terms of aspects related to parallel evolutions and real similarities. This significant evolution along history, roughly the 15th- 18th centuries, is followed between the wood churches in Norway and Sweden, and wood churches in Maramureș. An unprecedented analysis and research turns this study into a testimony and a proof of the architectural originality of the wood churches in Maramureș. The specific architecture of the Carpathian Arc defined the wood personality and culture, where nobleness of the wood was and still is revered all over Europe. The explanation of this similarity is sustained by the phenomenon of migration of the craftsmen, who imposed the knowledge in their native area, confirming the thesis of initial local genetic source and of foreign influences.

**Keywords:** *wood churches, tower, Maramureș, tower silhouette, comparative analysis, normative approach, genetic sources (local), foreign influences, double eaves;*

**Full bibliographic reference:**

## **ASPECTS REGARDING THE DIMENSIONING OF NATURAL GAS DISTRIBUTION NETWORKS**

C. Bacotiu

### **ABSTRACT**

The paper presents some aspects regarding the dimensioning of natural gas distribution networks from the perspective of a design engineer interested in using the computer for his activity. This means that the classic, "old-school" methods like nomographs should be avoided and replaced with appropriate subroutines, i.e. speeding the entire design procedure. Therefore, the dimensioning of gas pipes, especially the hydraulic relationships involved in natural gas flow were analysed thoroughly. The difficulties come from the friction factor  $X$  (for the linear head losses in pipes), which is expressed by the means of an implicit equation, the well-known Colebrook-White formula. This implicit equation must be solved using Numerical Analysis methods. The author proposes here a VBA subroutine in order to determine the friction factor  $X$  for a natural gas pipe, function of the flow  $q$ , the inner diameter  $d$  and the absolute roughness  $k$  of the pipe walls. Several macros written in Visual Basic for Applications (VBA) were implemented inside a spreadsheet, because this is a widely used instrument for manipulating large tables of data, for design calculations of the networks.

**Keywords:** *gas distribution networks, nomographs, friction factor, Colebrook-White equation, VBA macros;*

**Full bibliographic reference:**

### **A TOOL FOR THE RAPID USE OF BUCKINGHAM'S n-THEOREM IN HYDRAULIC MODELING**

C. Bacotiu

#### **ABSTRACT**

The paper presents some aspects regarding the implementation of a small software tool for using the Buckingham's If-theorem in hydraulic modeling, in a rapid and efficient way. Even though the algorithm is well-known and pretty straightforward, there are some problems. The most interesting step is to choose an optimal form for the basis set of the relevant variables. The number of combinations may be important and only one form will lead to a proper result which will have practical significance. Expressing the dimension of every parameter like power-law monomials and applying the homogeneity theorem, each scenario is reduced to a problem of linear algebra. Repeating those calculations again and again is a tiresome job, therefore a computer tool was implemented, in order to speed-up the process of modeling. It is an engineering tool for both experimental and theoretical work and it derives formulas with the use of the Buckingham f -theorem and dimensional analysis. The results are used in laboratory experiments and projects.

**Keywords:** *dimensional analysis, pi theorem, dimensionless group, hydraulic modeling;*

**Full bibliographic reference:**

### **DIMENSIONING METHOD OF HYDROGEN/NATURAL GAS TRANSPORT NETWORKS**

Gh. Badea, A. Hotupan, A. Chicinas

#### **ABSTRACT**

The increasing in the natural gas import and in its acquiring costs combined with the environment problems, lead Romania to a crisis situation. The problem that arises from this situation is very important due to the economical and social factors incorporated in it. The inclusion of the hydrogen as a part of the economical loop brings a solution of the problems which Romania is confronted today, because the hydrogen is already considered as an ideal energy carrier agent. This study follows the substitution steps of the natural gas with hydrogen in the domestic field. Thus, for this purpose a ring network is proposed for the natural gas transport. The pipes system will be chosen and designed in order to offer the possibility of making the switch between the natural gas and the hydrogen without the structure modification of the network when the current natural gas resources are depleted. The first step in the network designing is the dimensioning of the natural gas/hydrogen transport pipes from the delivery station to the rounded network. The paper ends with the conclusions regarding the calculus methods used and the results of this method.

**Keywords:** *economy, natural gas, hydrogen, pipes, environment protection;*

**Full bibliographic reference:**

### **GCHP SYSTEM ANALYSIS CONDITIONS FOR ROMANIA'S GEOGRAPHICAL CONDITIONS**

I. Boian, S. Fota

#### **ABSTRACT**

The paper analyses simulated performance of Ground Coupled Heat Pumps (GCHP) supplying both heating and cooling for eight locations situated in different geographical and climatic conditions of Romania's territory. Identical design conditions, i.e. soil, ground heat exchanger and building characteristics have been considered for all these GCHP applications. The cooling load was selected as a design criterion to avoid the use of a cooling tower. This comparison is intended to emphasize differences in costs concerning the buried loops and also in that of energy delivered for heating and for cooling with final focus on the operating energy used for this purpose. Conclusions drawn from this study allow some issues related to the balance of the building heating and cooling load. A properly developed design process of the GCHP is aimed for a sustainable system with reduced greenhouse gases (GHG) emissions and fossil fuel consumption having in mind that costs, efficiency and sustainability are the variables of the complex process related to the future of the energy in the building sector.

**Keywords:** *heat pump system, ground heat exchanger, performance simulation;*

**Full bibliographic reference:**

## THE INFLUENCE OF CONDUCTED ELECTROMAGNETIC INTERFERENCES ON THE LOW VOLTAGE MAINS NETWORK

M.I. Buzdugan

### ABSTRACT

In the paper we present the analyze made from the electromagnetic compatibility point of view in the laboratory of Automatic Control of the Technical University of Cluj-Napoca, on a automatic controlled electric drive using a power converter. The electromagnetic compatibility, EMC, has two complementary aspects: it describes the capacity of electrical and electronic systems to operate without interfering with other systems and also describes the ability of such systems to operate as intended within a specified electromagnetic environment. Interference can propagate from a "source" to a "victim" via the mains distribution network to which both are connected. In order to protect both the commercial network and the equipment connected to it, the paper reviews briefly the EMI filtering principles.

**Keywords:** *power converter, electromagnetic compatibility (EMC), electromagnetic interference (EMI), conducted emissions, EMI passive filter;*

**Full bibliographic reference:**

## USING BLACK EMISSIVE DEFLECTORS INSTEAD OF REFLECTING ONES FOR RADIANT TUBES

I. Caldare

### ABSTRACT

A new radiant tube solution is conceived and presented, using as deflector a radiant deflector instead of a reflecting one as in the classic solution and with a smaller radiant emissivity coefficient for the lower part, solution which provides high uniformity heat flux received by the receiving surface and enables installation at 3 meters height (instead of over 4 meters as in the classic solution). A calculus program "TUBRAD", used in anterior study and research of radiant system calculus has been modified in order to use different emissivity coefficient inputs for the radiant tube and deflector. The new program was named TUBRAD\_EPS, with it's help we were able to draw the heat flux curves received by the surface exposed to the radiation of a radiant tube with reduced emissivity with black radiant deflector above. Reducing by 30% the radiant tube lower part's emissivity, one can obtain a decrease of the maximum heat flux value by 41% , which enables placing the tube at 3 meter height.

**Keywords:** *radiant tube, installation height, heat flux, limit of comfort, deflector;*

**Full bibliographic reference:**

## SPEED AND DIRECTION CONTROL FOR SEWERAGE CCTV INSPECTION ROBOTS

T.V. Chira, G. Badea, A. Domsa, M. Buzdugan

### ABSTRACT

The paper presents aspects related to speed and direction control of remote operated vehicles, also known as robots, which carry video cameras inside sewerage pipes for the purpose of detecting faults. Developing CCTV camera robots for sewerage inspection can be quite a challenge because many difficulties must be surpassed. There are several problems that must be solved in order to make functional sewerage inspection equipment: speed and direction control, video camera control, signal transmissions, power supply and others. In the content of the paper two ways of implementing the PWM method combined with the use of the H-bridge are presented. The H-bridge is the name of a specific circuit used for supplying electric power to a DC motor. This circuit permits the user to start, reverse and brake the DC motor by switching four switches. First diagram uses logic integrated circuits for control and the second diagram uses a microcontroller and additional parts and implies the use of a PC for control purposes. Finally several advantages and disadvantages of every schematic are pointed out.

**Keywords:** *sewerage, remote operated vehicle, CCTV, speed control;*

**Full bibliographic reference:**

## DISCHARGE PUMPING DUCTS PROTECTION FROM CAVITATION USING AIR VALVES

A.Constantin, C. Nitescu, M. Stănescu, M. Florea, L. Rosu

#### **ABSTRACT**

The study presented by this paper aims to determine the optimum water hammer protection method to be applied to a real supply system for irrigation: Galesu, Constanta. This pumping station which supplies water for 3950 ha at a discharge flow rate of  $3\text{m}^3/\text{s}$ , is to be modernized. Thus, the optimum protection method must be efficient at a low cost, which means modern simple devices placed in the appropriated sections of the discharge duct. The pick pressure values and the duct sections where they occur are established using the characteristic method of water hammer calculation. The calculations indicate a wide cavitation phenomenon along the ducts. Therefore, the concept of air valve protection set is the most appropriate, according to the above mentioned aims. Air intake in the first phase of the hydraulic shock modifies the biphasic flow parameters. The air flow rate through the valve influence both pressure in the duct and the celerity. The procedure using both air valve set and butterfly check valve two-phase closing can protect the pumping water supply system from water hammer. The optimum closing law of the butterfly valve was chosen to be a support for the air/vacuum valve action.

**Keywords:** *water pumping station, water hammer, air valve;*

**Full bibliographic reference:**

#### **MINIATURIZATION OF SHOWER HEADS BY THE USE OF NOZZLE WITH RECTANGLE SLOTS**

A. Cristea

#### **ABSTRACT**

The miniaturization represents the minimization of all dimensions of machine part, pieces, and fixed elements from the technical systems to the minimum toward the main or auxiliary function. The minimal dimensions are designed deliberately to minimize the space, the utilities and materials consumptions. The shower head as reinforcement piece for the installations used in bathrooms, sanitary groups, and kitchens to wash dirty surfaces, machines, equipments, fruits and vegetables assures the supply of consumers points with water at maximum  $80^\circ\text{C}$  and maximum pressure at 10 bars. The main function of the shower head is to pulverize the water in fine drops and streams over the dirty surfaces that must be washed to reduce the microbial loading from the goods, surfaces and installations. In the present paper will be presented the researches made with sprayer devices with rectangular slots having the dimensions of  $a \times b = 0,4 \times 3\text{ mm}$  and  $a \times b = 0,9 \times 1,5\text{ mm}$  at pressures of 0,5-5 bars at water temperatures from 20 to  $60^\circ\text{C}$ . The dispersion of the water stream has an elliptic cone shape, the dispersion angle on the main axle direction being between 80-120 degrees as a function of the pressure of the water stream. On the second axle direction the dispersion angle is between 5-15 degrees.

**Keywords:** *miniaturization, rectangular slots, atomizers, fine rain;*

**Full bibliographic reference:**

#### **USE OF DRILL MACHINES AND FIRING ROTATING PIN MACHINES TO THE EXECUTION OF INSTALLATIONS**

A. Cristea

#### **ABSTRACT**

In the present paper an analysis of the optimum use of devices and portable machines electrically operated used to drill plastic or metallic pipes, walls, ceilings, floors. A special attention is paid to the movement savings in the use of portable machines during work, the noise level and the vibrations level produces by those machines. The main conclusion of the present study indicates that to obtain a better quality in the work and a good performance it must be used high quality machines and devices.

**Keywords:** *rotating pin machines, toles, hole, pierced, bottomed, auger, core;*

**Full bibliographic reference:**

#### **CONSIDERATIONS ON DESIGN METHODOLOGY OF INDUSTRIAL AIR TECHNOLOGY**

F. Domnița

#### **ABSTRACT**

It is important to understand that the results of the design process are what mainly determine the ventilation system performance with all its consequences. It is necessary to build all the life cycle targets of the industrial process into

ventilation system plans. In order to ensure the transfer of these targets from the plan to the actual product, commissioning, operations and maintenance plans should always be included in the design work. The value of proper design will be paid back when process modifications are made during the operation period. One essential item in efforts toward optimal industrial ventilation is a common understanding of the design: design methodology. The design methodology is a description of a technical design process that covers the whole lifetime of the production process. Most decisions concerning industrial ventilation are made at the design stage and are reflected in construction, operation, maintenance, service, etc.

**Keywords:** *design methodology, industrial air technology, tree technique, steps, process, ventilation;*

**Full bibliographic reference:**

## **CONSIDERATIONS ON AIR DESICCANT DEHUMIDIFICATION**

F. Domnita, A. Abrudan

### **ABSTRACT**

Today, commercial desiccant dehumidification technology, supported by ongoing research and development, has proven to be cost-effective, particularly for fresh air ventilation for systems with high moisture loads. Beyond those applications, thermally driven desiccant technology can be used in commercial buildings to reduce electrical power demands. Desiccants have an affinity so strong for moisture, that they draw water vapor directly from the surrounding air. That affinity can be regenerated repeatedly by applying heat to the material to drive off the collected moisture. Desiccants are placed in dehumidifiers that have been traditionally used in tandem with mechanical refrigeration, in specialty air conditioning systems. The systems have been most commonly applied when air conditioning systems have large dehumidification load fractions. This situation is common when industrial operation require low humidity. Humidity levels below those necessary for comfort air costly to achieve with mechanical refrigeration and reheat, so systems which use desiccants for this purpose do have an economic advantage.

**Keywords:** *desiccant, dehumidification, humidity, moisture, air, refrigeration, sensible;*

**Full bibliographic reference:**

## **ON USING SOLAR AND GEOTHERMAL ENERGY FOR PASSIVE HEATING OF HOUSES**

G.V. Dragos, R.P. Dragos

### **ABSTRACT**

Within the everlasting evolution, the development of renewable sources of energy as significant non-polluting energy resources is one of the main objectives of world energetic policies, aiming at increasing renewable energy utilization from 6% nowadays, up to 12% in 2010, and an 8% diminution of hothouse effect as compared with 1990 level. In view of reducing the environmental pollution and increasing energetic efficiency, the fossil fuels had to be substituted with renewable sources thus improving the rate of primary energy utilization employing heat pumps and developing passive houses representing top technologies in the field of construction. The paper offers aspects related to the use of solar and geothermal energy for the production of domestic hot water and passive houses heating. For providing domestic hot water, solar installations will be used fitted with panels which could provide for the whole amount of hot water in summer and approximately 30% of the winter needs, the rest being provided for by heat pumps. The heating will be effected by heat pumps with heat recovery from soil (at 80%) and venting systems with economizers which are most efficient energetically.

**Keywords:** *hothouse effect, renewable energy, passive houses, solar energy, geothermal energy, heat pumps;*

**Full bibliographic reference:**

## **ENERGETICAL AND STRUCTURAL-FUNCTIONAL ASPECTS OF HEAT PUMPS EMPLOYED FOR DOMESTIC HOT WATER PRODUCTION AND HEATING**

G.V. Dragos, R.P. Dragos

### **ABSTRACT**

Considering that most thermal energy is obtained by burning fossil fuels (natural gas, black oil, coal) which contribute to the global heating, efficient implementing of heat pumps and using renewable energies become

primary objectives, included in the E.U. Action Plan. Heat pumps installations with electrically driven mechanical compressors, due to their high performance coefficients, bring about important energy savings (50-80%) as compared with thermopower plants on classic fuels. At the same time, their ecological characteristics and the increased rate of their utilization within the thermal energy balance, will result in reducing environmental pollution in conformity with the Kyoto Protocol. The paper advances energetic and technical-economical criteria considered with implementing heat pumps producing domestic hot water, and for heating, in correlation with structural-functional elements of heat pumps which recuperate heat from open air, ground water and earth. Taking into account the large amount of solar energy stored by the earth and the advantages set into evidence by the comparative analysis presented, the heat pumps with heat recuperation from soil are even more remarkable a solution most viable for hot water production.

**Keywords:** *thermal energy, heat pumps, performance coefficient, hot water, heating, heat recuperation;*

**Full bibliographic reference:**

### **STUDY ON THE COLLECTION AND CONVERSION OF SOLAR ENERGY**

C. Mârza

#### **ABSTRACT**

In the conditions in which "great energies" - that is the reserves of fossil fuels - become less certain, "smaller energies" are paid more attention. The paper presents the possibilities of converting solar energy in thermal and electrical energy and the main equipment used for this purpose. We present solar collectors that represent the main components of an installation that transforms solar energy into a serviceable form of energy and the solar cells that transform directly solar energy in electrical energy, based on the voltaic effect. In the end, some ecological buildings using solar energy are presented.

**Keywords:** *solar radiation, photothermal conversion, photoelectrical conversion, solar collectors, solar cells, p-n junction, integrated solar panels;*

**Full bibliographic reference:**

### **BUILDING SERVICES FOR GREENHOUSES**

C. Muntea

#### **ABSTRACT**

This work analyses the most important problems consisting in heating, which appear in the process of designing greenhouses for vegetables and flowers. The following items are presented about greenhouse heating: the types of material for walls (glass, fiberglass, double-wall plastic, film plastic, insulated side walls) the types of fuel used in the greenhouses boiler houses (gaseous fuels, fuel oil, alternate heat sources-wood, coal, methane, waste heat, geothermal heat) types of heating and ventilation greenhouses systems (central heating systems, localized heating systems-unit heaters, convection heaters, radiant heaters) also the materials used for fabricating the installations above mentioned. With the modernisation of Romanian agriculture under way, the construction of green houses becomes more and more important. This scientific work is designed to help the projectors and constructors of such constructions understand better the needs which appear in this domain.

**Keywords:** *green houses, heating, ventilation;*

**Full bibliographic reference:**

### **TECHNO-BIOLOGICAL REMEDIATION OF SPOILS CONTAINING HEAVY METALS AND ELIMINATION OF THE POLLUTING EFFECT ON THE ENVIRONMENT**

D. Pasca

#### **ABSTRACT**

The evolution of technogenic soils is the process of transforming of the spoils and wastes resulting from strip and shaft mining and other industrial activities into agricultural, forest soils or into soils used for parks, sports fields etc. These wastes constitute a dangerous source of environmental pollution.

Technogenic soils from heavy metals mines were studied by enzymological methods. The raw and the revegetated wastes at the Săsar mine (Baia Mare, Maramureş county) the ores of which contain Pb, Zn, Cu, Cd and some other

heavy metals, were studied. The fertilized plots revegetated with the grass-legume mixture gave the best results in respect of plant cover percentage, herbage yield, and enzyme activities of wastes.

The spoils submitted to recultivation had resulted from underground mining of lead and zinc ores, their concentration by flotation and decantation in a pond at Rodna mine (Bistrița-Năsăud county).

For the techno-biological remediation of row and young spoils at lead and zinc mines, covering with soil, fertilization with NPK, and sowing a grass-legume mixture were recommended, and for the remediation of old spoils, NPK fertilization was recommended as the minimum treatment. Fixation of spoils by ligneous species supplements the herbaceous plants are the best treatments for a better and faster ecological reintegration of spoil dumps.

**Keywords:** *spoils, heavy metals, remediation, environment, enzymatic indicator, biological quality;*

**Full bibliographic reference:**

## **LIGHTING ENERGY EFFICIENCY AND SAVING IN RESIDENTIAL BUILDINGS - AN OVERVIEW OF THE STATE OF THE ARTS, EVALUATION AND PROJECTS**

F. Pop, D. Beu

### **ABSTRACT**

Paper analyses the concordance between the regulations concerning the energy efficiency of residential buildings electrical lighting installations and the state-of-the-facts of the existing installations, in European Union countries. The residential sector represents an important potential for reducing the energy consumption, focused on lighting and domestic appliances. The Lighting Engineering Center of the Technical University of Cluj-Napoca, Romania is involved in two programs for promoting the lighting energy efficiency and saving measures in residential buildings: EnERLIn - European efficient residential lighting initiative, an EIE -SAVE program to promote the compact fluorescent lamps in the residential area, and CREFEN - Integrated software system for energy efficiency and saving in residential sector, a Romanian CEEX program. The EnERLIn EIE SAVE program proposes to develop and validate robust scenarios for CFL promotional campaigns in European, national and regional levels. The aim of the CREFEN project is to achieve, at the current level of the European research in the field, an integrated software system for reducing the energy consumption and promoting an advanced energy management in residential buildings.

**Keywords:** *Compact Fluorescent Lamps, Efficient Residential Lighting;*

**Full bibliographic reference:**

## **HEAD LOSS CALCULATION IN VENTILATION NETWORKS USING THE EQUIVALENT RESISTANCE METHOD**

T. Popovici

### **ABSTRACT**

This method may be applied in two situations: when the total head loss for the system is given and when some values for the so-called economical velocity are imposed along the successive ducts. In the first case, the method consists in determining the necessary diameters for some ducts and for all the system. Thus, in this case, the total available head is divided to the total length of the main duct, giving as result the friction loss per meter of duct, also known as friction loss factor or specific linear pressure drop [Pa/m], which includes both major and minor losses. Pressure losses in branches will be determined by imposing the pressure balance in the junctions. Knowing the head loss for each individual duct, the length of the ducts, the necessary air flow volume and choosing the sum of minor loss coefficients, the design diameter of the duct may be determined. For making the computing easier, a certain equivalence coefficient is introduced by multiplying the exponent 2 of air flow volume, obtaining a result which is proportional to the total head loss. Therefore, this coefficient is a hydraulic similitude factor. By the means of this coefficient, no more iterative calculations will be used for the pressure balancing throughout the system. For applying the method, 3 diagrams were proposed, combining together the necessary data for dimensioning a ventilation network.

**Keywords:** *head losses, equal friction coefficient, ventilation network balancing;*

**Full bibliographic reference:**

## **ANALYSIS MODELS OF THERMAL AND OLFACTORY COMFORT IN A ROOM**

I. Sârbu, H. Bura, O. Popina

### **ABSTRACT**

This paper approaches the numerical prediction of thermal comfort in rooms on the basis of PMV - PPD model, its testing to asymmetric or nonuniform thermal radiation, as well as the indoor air quality control. It is developed a computation and testing model of thermal comfort in buildings, as well as a methodology to determine the outside airflow rate and to verify the indoor air quality in rooms, according to the European Standard CEN 1752. On the bases of these mathematical models there were elaborated the COMFORT 1.0 and COMFORT 2.0 computer programs, implemented on compatible microsystems IBM-PC. The COMFORT 1.0 computer program allows both for the direct computation of the PMV and PPD indices in different points of a room, and their comparative analysis, and the determination of the mean radiant temperature in isolated points or in a series of points situated on a straight line. The COMFORT 2.0 program computes the outside airflow rate for a room ventilation, the number of air exchanges per hour, and the variation in time of contaminants concentration of room air according to European and national norms and analyses influence of different parameters on these sizes. The performance of the developed models and the advantages of the proposed computer programs is illustrated by using some numerical comparative applications for two constructive variants of building.

**Keywords:** *thermal comfort prediction; olfactory comfort analysis; outside airflow rate; indoor air quality control; mathematical models; computer programs;*

**Full bibliographic reference:**