Proceedings of the Pál Vásárhelyi Doctoral School of Civil Engineering and Earth Sciences

Proceedings of Conferences

Krausz, Nikol: Analysis of indoor RFID positioning measurements, In: Józsa János, Lovas Tamás, Németh Róbert (szerk.) Proceedings of the Conference of Junior Researchers in Civil Engineering 2012. Budapest, Hungary, 2012.06.19-2012.06.20. Budapest University of Technology and Economics, pp. 111-115

Abstract

Nowadays, there is even more emphasis on both indoor and outdoor navigation. In this paper I investigate the potential of RFID network to support positioning. An indoor measurement technique, including different measurement scenarios is presented. Two selected tag-antenna configurations have been compared to each other. The assessment involves correlation analysis between sensing distances and signal strength values.

S Laky, P Zaletnyik, C Toth, B Molnar: Sparse Representation of Full Waveform LiDAR Data. In: IEEE International Geoscience and Remote Sensing Symposium (IGARSS) 2012: Remote Sensing for a Dynamic Earth. München, Germany, 2012.07.22-2012.07.27. 4 p. Paper 2962.

ABSTRACT

Full Waveform Data (FWD) has been increasingly becoming available on modern airborne LiDAR systems. Since the waveform signal is noisy and rather sparse by nature, the compressed FWD representation has several advantages. First, the reduced data volume makes the storage and transmission of waveform data faster and more economic. Second, the sparse representation based on proper feature space selection may potentially support the subsequent waveform interpretation and classification processes. Note that discrete return data represent the most basic compressed waveform representation. This study addresses some aspects of FWD compression. First, the wavelet family selection for FWD compression is analyzed, including compression ratio, average/maximum reconstruction errors. Next wavelet filter optimization with respect to typical FWD is investigated. Finally, the performance potential of compressive sampling is assessed along with a brief insight into wavelet representation based waveform classification.

L. Völgyesi, Z Ultmann: "High-resolution measurements of non-linear spatial distribution of gravity gradients in Hungary", Berlin, Springer-Verlag, IAG Symposia series, Vol. 139.. Melbourne, Australia, 2011.06.28-2011.07.07.

Abstract

Linear changing of the gravity gradients between the adjoining network points is an important demand for different interpolation methods in geodesy (e.g. interpolation of the deflection of the vertical, geoid computations, and interpolation of the gravity values or the vertical gradients of gravity). To study the linearity of gravity gradients, torsion balance measurements were made both at the field and in a laboratory: one is at the southern part of the Csepel island, and the other in the Geodynamical Laboratory of Loránd Eötvös Geophysical Institute in the Mátyás cave. The results of our investigations show that the linearity of the gravity gradients mainly depends on the given point density and the the geological fine structure of rocks and shallow subsurface density. It seems the given point density of the earlier torsion balance stations may be not enough for some geodetic purposes, moreover the problem could not be solved even applying topographic reduction of gravity gradients.

Kapitány Kristóf: "Automatic generation and storage of vascular network topology." In: Józsa János, Németh Róbert, Lovas Tamás (szerk.) Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract
The paper deals with the automatic processing of high amount X-ray micro tomography images. A general method and rule system to determine the three-dimensional topology of the examined vascular network by analyzing two-dimensional image series are also discussed. As more constraints are added to the system, the solution for topology will be more precise and accurate. The developed topology method was performed in a histological environment, but it could be applied in analyzing any kinds of tubular objects. The study also shows an object oriented method to create a structured, easy to understand framework for data storage.

M Zsugyel, K G Szabó, M Kiss, T Krámer, J Józsa: Lagrangian analysis to reveal chaotic mixing in groyne fields. In: 3rd International Symposium on Shallow Flows. Iowa, USA, 2012.06.04-2012.06.06. Iowa: pp. 1-8. Paper 236.
Abstract
Methods to process Lagrangian data from field and laboratory observations for the analysis of complex flow fields downstream of river groynes are discussed. Field data were collected by GPS-equipped surface buoys in the Danube, while laboratory data were measured by particle tracking velocimetry (PTV). Lagrangian properties (Flushing time, Finite size Lyapunov exponents and the shape distortion of particle triplets) were calculated. Technical difficulties, arising when long-time continuous Lagrangian trajectories are needed, had to be properly addressed. The convergent-divergent nature of the surface flow requires interpolation around upwelling regions, in order to reconstruct the Eulerian flow field from observed particle tracks. Lagrangian analysis of the flow may improve the parameterization of mass transfer between the main stream and nearly stagnant zones in one dimensional transport models.

T Krámer, J Józsa, P Torma: Large-scale mixing of water imported into a shallow lake. In: 3rd International Symposium on Shallow Flows. Iowa, USA, 2012.06.04-2012.06.06. Iowa: pp. 1-9. Paper 354.
Abstract
We couple a particle-based transport model with a grid-based hydrodynamic model to study the large-scale horizontal mixing of artificially supplied water into a shallow lake. Unsteady wind-induced circulations stretch the plume and fold it into filamental patterns, whereas oscillation due to the seiche is the more effective mechanism to transport the imported waters through channels that connect the bays of the lake.

Derts Zsófia, Koncsos László: Ecosystem Services and Agricultural Land Use Zonation in the Deep Floodplains of the Tisza River in Hungary. In: Dr Habil Peter Ivanyi PhD (szerk.) Research Conference on Information Technology - Abstracts of the Seventh International PhD and DLA Symposium: Honoring Volume on Pollack Mihály Faculty of Engineering and Information Technology. Pécs, Hungary, 2011.10.24-2011.10.25. p. C39.(ISBN: 978-963-7298-46-2)
Abstract: While characterized by numerous environmental risks directly or indirectly caused by anthropogenic interventions, the Tisza Valley has an important potential to get its natural capital enriched through landscape scale adaptive management. In this paper, the current and potential ecosystem services are identified for the deep floodplains of the Tisza Valley by means of hydrodynamic modelling results and a detailed land cover analysis. Meanwhile, the agricultural suitability and environmental sensitivity of the study areas are analyzed, and the results of this phase of the research will provide a background for the quantification of the natural capital of the study areas.

Torma, Péter: Towards a hydrodynamic forecasting system for Lake Balaton, In: Józsa János, Lovas Tamás, Németh Róbert (szerk.) Proceedings of the Conference of Junior Researchers in Civil Engineering 2012. Budapest, Hungary, 2012.06.19-2012.06.20. Budapest University of

Technology and Economics, pp. 255-261

Abstract

Lake Balaton is the largest freshwater lake in Central Europe with high cultural, touristic and ecological value. A hydrodynamic forecasting system can provide real time and up-to-date information about the status of its water environment. The selected 3D numerical model to calculate hydrodynamics of the lake is FVCOM. In this paper a brief model description is given and the first validation applications are shown. The predicted surface elevations are in good agreement with the observed ones for a storm event aligned with the lake axis. However, the lake response for a transversal wind event is poorly captured by the simulation. In order to give trustworthy forecasts a wind model has to be set up which can describe the highly non-uniform wind distribution over the lake.

Horváth, Adrienn: Pollution sources and quality of roof runoff, In: Józsa János, Lovas Tamás, Németh Róbert (szerk.) Proceedings of the Conference of Junior Researchers in Civil Engineering 2012. Budapest, Hungary, 2012.06.19-2012.06.20. Budapest University of Technology and Economics, pp. 66-69

Abstract

The usability of harvested roof runoff depends on its quality. The roof water from bitumen shingle is colored even after filtration, and the organic material content is quite high, so using it in household is not recommended. Runoffs from galvanized steel were also collected and analyzed. The organic material concentrations of these samples were low, while high zinc concentrations were detected, due to the roof material.

Kiss, Melinda: Dynamics of reed-water interface zones in shallow lakes: processes, field measurement tools and preliminary results, In: Józsa János, Lovas Tamás, Németh Róbert (szerk.) Proceedings of the Conference of Junior Researchers in Civil Engineering 2012. Budapest, Hungary, 2012.06.19-2012.06.20. Budapest University of Technology and Economics, pp. 90-96

Abstract

The aims of our research are to reveal the interactions between the littoral and pelagic zones of Lake Fertő and to investigate the boundary layer processes between these zones. Measurement stations were installed in both zones near the boundary, where high-frequency synchronised measurements have been conducted. To explore micrometeorological and water exchange features latent and sensible heat flux, carbon dioxide flux, wind velocity, currents, thermal stratification, dissolved oxygen, etc. have been recorded. The analysis of the data is expected to provide novel information on the development of occasionally strong horizontal gradients of the above mentioned features at the interface of the two zones.

Laky Dóra és Takó Szabolcs: "Biological ammonium removal field studies for drinking water treatment", International Water Association - 6th International Conference for Young Water Professionals (Budapest, 2012. július 10-13.)

Abstract

15 % of the total Hungarian population is affected by either the elevated arsenic or ammonium concentration of drinking water, and 8 % is affected by both compounds. Recently more and more attention has been paid to the biological ammonium removal technology for drinking water treatment due to the drawbacks of the breakpoint chlorination method. In order to study the applicability of the biological ammonium removal process, field experiments were carried out at a case-study area, where the water originated from deep confined aquifers and contained arsenic, iron, manganese, dissolved gases and ammonium above the EU and Hungarian standard. The applied technology at the waterworks consisted of KMnO4 dosing and rapid sand filtration followed by NaOCl disinfection. The treated water fulfilled the iron, arsenic and usually the manganese limits; however it contained ammonium and dissolved gases above the maximum allowable concentration.

The aim of this investigation was to see how the current technology could be modified in order to meet the drinking water standards. Two treatment schemes were studied in field experiments with a 10 L/h flow rate. In the first experimental setup, the treated water of the waterworks was aerated and directed to the biological reactor, where ammonium was converted to nitrate. In the second experimental setup, the untreated water was studied with aeration applied first, followed by a biological reactor (sand filter), potassium-permanganate and a second rapid sand filtration stage. Both experiments were successful: the treated water fulfilled the iron, manganese, arsenic and ammonium limits, moreover dissolved gases were removed from the water. Modifications are suggested according to the technology studied in the second experimental setup, because of two advantages: the potassium-permanganate dose can be decreased to one-third of its original value, and moreover the explosive methane gas can be removed in the first treatment step.

Zs. Kozma, T. Karakai, Zs. Derts, L. Koncsos, G. Ungvári, G. Tímár:Enrichment of the natural capital by reforestation: case study for the Tisza Valley. IWA YWPC konferencia

Abstract

Hungary is exposed to risks related to the extremities of water resources in space and time: flood, excess water and drought regularly cause damages in agricultural areas. As some of these problems seem to deteriorate in the future, long-term solutions are needed to adapt to these alterations and to prevent damages. These solutions require adequate land use planning and water management policy with taking into account economic impacts. A possible tool to this issue is the WateRisk Decision Support System (WR DSS): (i) it offers a scenario development framework; (ii) its Integrated Hydrological Model (IHM) executes simulations based on physical equations; and (iii) its economic post-processor unit is able to determine damages caused by water resources extremities and to estimate the value of certain ecosystem services.

This paper focuses on the WateRisk forestry module – WR F – which contains a tree growth algorithm and executes the economic valuation of timber production (provisioning service) and CO2 fixation (supporting service). The novelty of the algorithm lies in the fact that, however it applies the common methodology of site categorization and yield tables, it is connected to hydro-dynamic modeling and its data structure is developed to Hungarian conditions.

The WateRisk DSS – including the WR F module – was tested on pilot areas of which two can be found on the deep floodplain of the Tisza Valley. These results are also presented in the article: tree growth and its profit is compared in case of several scenarios.

Horváth A., Buzás K.: Source of zinc and copper in roof runoff. 6th International Conference for Young Water Professionals, Budapest, Hungary, 10-13 July 2012, CD, 7 p. Paper IWA-9842. ISBN: 978-963-87507-8-5

Abstract

The zinc and copper content of the roof runoff could originate from different sources such as dry and wet deposition and the corrosion of the material. The corrosion process depends on the relative humidity, temperature and air pollutants, and the dissolution of the products on the contact time. In present study the dependence of zinc rate and contact time, and the re-dissolution of the zinc was investigated with steeping tests, and then compared with results of a pilot study. The zinc rate reaches a steady state condition (17-19 mg/m2) after 1.5 hours. In almost all samples from a 2galvanized steel roof the zinc rate was lower than 15 mg/m , which is comparable with the laboratory results. The re-dissolution of the zinc from the samples with high initial zinc content was just 60% after 60 minutes.

Horváth. A., Buzás K. "Zinc and copper in roof runoff". Water Science and Technology, 2012 (in press)

ABSTRACT

The zinc and copper content of the roof runoff could originate from different sources such as dry and wet deposition and the corrosion of the material. The zinc runoff rate from galvanized surface

depends on the corrosion products formed during the dry days, the rain intensity and roof slope, which determinates the contact time. In present study the contact time dependence of zinc rate and the re-dissolution of the zinc were investigated with steeping tests and pilot study. The average zinc runoff measured in the first 2.8 l of runoff was 3.8 mg m^{-2} (1.1–8.4 mg m^{-2}), while in the following samples 1.2 mg m^{-2} were detected. These results are in accordance with the 5–10 min, and 40–60 s contact time laboratory steeping test, respectively, which are realistic. The estimated specific yearly zinc runoff rate was 0.7 gm^{-2} y^{-1} , while the dry and wet deposition rate of copper was 0.009 mg m^{-2} d^{-1} and 0.053 mg m^{-2} $storm^{-1}$ respectively. The re-dissolution of the zinc from the evaporated than re-filled samples of leaching tests with high initial zinc content was just 60% after 60 min.

Horváth A, Clement A. "What can rainwater dissolve from bitumen shingle roof materials?" Water Environment Research (2012)

Abstract
Batches of lab steeping tests were carried out on two different bitumen shingles with and without antecedent UVA radiation exposure in order to characterize them regarding the possible effects on roof runoff. In this study, simple water quality parameters like pH, conductivity and chemical oxygen demand, and a specific pollutant group, PAHs were determined. Results show a temperature dependency concerning conductivity, organic matter and PAHs. Significant differences were detectable between the two types of investigated shingles for all studied parameters, presumably because of their different composition. The CODcr concentrations were several times higher in the steeping water of shingles pre-treated with UVA radiation, indicating that UVA radiation could break down their hardly decomposing organic matter content, including PAHs.

Sándor Szanyi: "3D investigation of chaotic advection", 6th Chaotic Modeling and Simulation International Conference (CHAOS2013)

Abstract:
Transport processes determine the distribution of all drifting elements of the aquatic ecosystem including phytoplankton, suspended solids and various pollutants. The most decisive and largest scale component of transport is advection the chaotic character of which has been identified in several circumstances in environmental flows. In order to reveal the chaotic features of advection in shallow lakes, investigations were carried out in a pyramidal test basin under periodical wind forcing. In addition to earlier 2D studies, as a novelty the research focused on revealing 3D features. For numerical flow modelling an open-source 3D CFD code has been used and in which an aerodynamically realistic fetch-dependent wind shear stress field approach has been implemented. Three methods were applied to analyse chaotic advection such as stroboscopic mapping, leaking and Finite-Size Lyapunov Exponent (FSLE). Based on these methods parts of a lake in which the mixing behaviour of contaminants is predictable and non-predictable could be identified. Leaking method is also appropriate to identify the particles which reach the shores. The pattern of monitored particles has fractal structure. The distribution of the time to reach the near-shore zones has the same characteristics as the known fractal lifetime (figure 1) in transient chaos.

Laky Dóra és Takó Szabolcs: "Biological ammonia removal field studies for drinking water treatment", Water Science and Technology: Water Supply

Abstract
15 % of the total Hungarian population is affected by either the elevated arsenic or ammonium concentration of drinking water, and 8 % is affected by both compounds. Recently more and more attention has been paid to the biological ammonium removal technology for drinking water treatment due to the drawbacks of the breakpoint chlorination method. In order to study the applicability of the biological ammonium removal process, field experiments were carried out at a case-study area, where the water originated from deep confined aquifers and contained arsenic, iron, manganese, dissolved gases and ammonium above the EU and Hungarian standard. The applied technology at the waterworks consisted of KMnO4 dosing and rapid sand filtration followed by

NaOCl disinfection. The treated water fulfilled the iron, arsenic and usually the manganese limits; however it contained ammonium and dissolved gases above the maximum allowable concentration. The aim of this investigation was to see how the current technology could be modified in order to meet the drinking water standards. Two treatment schemes were studied in field experiments with a 10 L/h flow rate. In the first experimental setup, the treated water of the waterworks was aerated and directed to the biological reactor, where ammonium was converted to nitrate. In the second experimental setup, the untreated water was studied with aeration applied first, followed by a biological reactor (sand filter), potassium-permanganate and a second rapid sand filtration stage. Both experiments were successful: the treated water fulfilled the iron, manganese, arsenic and ammonium limits, moreover dissolved gases were removed from the water. Modifications are suggested according to the technology studied in the second experimental setup, because of two advantages: the potassium-permanganate dose can be decreased to one-third of its original value, and moreover the explosive methane gas can be removed in the first treatment step.

Kardos Máté Krisztián: Interpolating river's morphological model from cross sectional survey. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, Hungary, 2013

Abstract

A simple but useful, riverbed-specific interpolation method is reviewed. The newly developed method interpolates a riverbed morphology grid from surveyed cross-secctions representing the special property of the riverbed specifically that gradients across flow direction are much greater than gradients along flow direction. The interpolation is carried with an intermediare step of an auxiliary non-orthogonal but equidistant mesh. The method returnes good results if the riverbank is parallel to the main flow line (typically in the case of low-flow conditions riverbeds). However, it is only limited usable for high-flow condition riverbeds, where the bank (which is usually the dam) is not necessarily parallel to the main flow line. Comparison with some traditional spatial interpolation methods is given. Preliminary results of hydrodynamic and transportation calculations is presented.

Tamás Koncsos - Dániel Sándor - Zsolt Tóth: Modeling sludge concentrations in water supply systems & optimization with soft computing in respect of public announcements. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, Hungary, 2013

Abstract

Experimental studies emphasize the need for continuous water quality monitoring with sufficient spatial and temporal resolution. It is demonstrated that most sensing technologies fail to satisfy this requirement (Vreeburg, 2007, see [3]). According to the research conducted with the pilot plant network device, we uncovered the importance of sludge flocculation in water supply system and marked it as a crucial and often dismissed factor in aspect of water quality modeling. Based on the obtained information, we introduced a basic model that combines EpaNets water distribution system modeling software results with the empirical formulas measured at the pilot plant. We aimed to calibrate and fine tune the model with a method of applying fast evaluating neural networks into optimization process and implementing further quality measurement on the water supply system.

Gyöngyi Karay: Evaluating methods of pumping tests to analysing flow properties in fractured rocks. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, Hungary, 2013

Abstract

The investigation of fractured aquifers is a bit neglected area of the groundwater research since the large mines were closed in Hungary in the 90s. But it is essential to improve the knowledge about the water flow in fractured rocks because of mining, water production, contaminant monitoring and underground constructions. A common method to investigate aquifers is the pumping test, but the conventional methods which are used for evaluating pumping tests in soils cannot be used for

fractured rocks. Many new methods were developed. Some of them are based on the double porosity theory, and the others assume a single fracture in homogeneous and isotropic rocks. After the presentation of these methods the Warren-Root Method will be analysed to learn more of the sensitivity of equations and compare the results of the theory and real drawdown data.

Balázs Sándor - K. Gábor Szabó: Simple vortex models, wind-induced gyres and integrability of two dimensional flows. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, Hungary, 2013

Abstract
In this paper we take advantage of the mathematical analogy between a one degree of freedom mechanical system and a two dimensional area preserving fluid flow in order to analyse some important quantities of various circulating flow models. This analogy is a consequence of the common Hamiltonian structure of these problems. Circulating fluid domains, gyres, are typical examples where this formalism can be applied successfully. The period of motion of a closed orbit is one of the naturally arising quantities that can be calculated in such a system. We demonstrate the working of this method by determining the characteristic time periods and their dependence on the corresponding flow rates in two simple circulating flow models. Finally, we derive a similar relationship by applying the method to a flow model with two counter-rotating subdomains, which describes qualitatively a wind induced circulation pattern in a shallow lake.

Szanyi Sándor Application of FSLE to transport problems in wind–induced circulations, towards 3D approach. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, Hungary, 2013

Abstract
Recently transport processes are among the most prevailing topics in physical limnology. This paper aims to investigate 3D characteristics of transport phenomena in a pyramidal test basin by determination of Finite-size Lyapunov Exponent (FSLE) fields. Based on calculation of FSLE, sub-regions of the lake in which the mixing behaviour of contaminants is predictable and non-predictable were identified.

Ibolya Szentpéteri: Temperature dependence of deflection bowl. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, Hungary, 2013

Abstract
The traffic load and the weather conditions have impact to the bearing capacity of pavement. The solar radiation, the rainfall, the temperature, etc. influence the mechanical and reological properties of asphalt pavement. It the bearing capacity changes, the deflection of pavement structure will alter, which leads to changing of shape of deflection bowl. The aim of this article to illustrate through a given example that which impact the hourly temperature fluctuation has on the shape of pavement’s deflection bowl. This article will be presented the approach of deflection bowl numerical and optimization method.

GT Török, S Baranya, N Rüther, S Spiller Laboratory analysis of armor layer development in a local scour around a groin. International Conference of Fluvial Hydraulics, 2014

ABSTRACT: In this study the local scour development around a single groin was investigated in the laboratory flume of the Norwegian University of Science and Technology (NTNU). The main goal of the experiments was to carry out a comprehensive data analysis on bed morphology, sediment transport, bed composition as well as hydrodynamics at conditions where bed armor development is expected. The length of the laboratory flume is 11 m, whereas the width is 1 m. The bed slope was set to 0.27%. The 0.33 m long groin was built 5 m far from the flume outlet. The experiment was carried out at three different constant discharges: Q1 = 58 l/s, Q2 = 72 l/s and Q3 = 100 l/s, respectively. Mixed size bed material with a d50 of 5.16 mm was initially placed in the flume. The first experiment with the lowest discharge was run until reaching the equilibrium bed

geometry. The second experiment started from this condition and was run until the new equilibrium condition, then the third experiment was carried out in the same way.
During the experiments the bed load discharge, bed changes, water surface changes were continuously monitored and 3D velocity measurements were also carried out. After each run the bed surface material composition was determined using an appropriate image analysis method.
Based on the velocity measurements estimations could be obtained on local bed shear stress values. This feature was then related to the composition of the eroded sediment and the bed material. Such data analysis enhanced the selective erosion phenomenon which greatly contributes to the bed armor development. The well documented flume experiments are planned to serve as benchmark study for future numerical model development focusing on sediment transport investigations.

Barta E; Hajnal G; Karay Gy; Vasvári V: Determination of the Coefficient of Permeablility by Physical Model test and Numerical Modelling. Chengdu:IAHR, 2013. 11 p. (ISBN:978-7-89414-588-8)
ABSTRACT:To determine the Darcy's coefficient of permeability are several methods available. Empirical and deterministic calculation methods were developed of which applicability and accuracy depends on the available data and the type of investigated soil. Both field and laboratory investigations are common. In practice of civil engineering it is most essential task prior excavation to determine this soil physical parameter for planning of dewatering systems. Field investigations play central role also in the determination of recoverable water resources. In practice it is not common that all data required for the field investigation - usually pumping test - and its evaluation are available, the well design and the conditions of the measurement do not meet those assumed in the theory. Due to information of poor quality and anomalous conditions the calculated coefficient of permeability and the seepage hydraulic parameters can differ from the real values. The aims of the investigations were to conduct laboratory model tests in different soil types, also in their layered structure and by different design of the pumping well, to evaluate their results supported by numerical modelling and to come to conclusions which can be helpful in the areas mentioned above. In the course of the measurements size fraction and features of the pumping well were varied in order to achieve realistic field conditions. A laboratory model integrated also the field experiences was created. A cylindrically symmetrical model with a ground plain of a quadrant, a radius of 1.325 m and a height of 1.0 m was used. By the numerical models both the field conditions and the experiments on the laboratory model could be simulated. The applicability limits of the most frequented calculation method for pumping test evaluation (Dupuit, Theis, Cooper & Jacob) were verified, analytical results were confronted with numerical ones. Two scales of models were analysed by computer: the first type had the scale 1:16, which is the scale of the physical model and the second type had the scale 1:1 modelled the real conditions. The two runs had the same results in three dimensional analyses, but the two dimensional analysis caused difference. The numerical models are suited to investigate soil parameters like in the laboratory but it has many advantages over the real laboratory tests. Moreover by means of the investigation's results recommendations can be made for the layout of field tests (number of observation wells, distance of wells), for the type of the hydraulic test (conventional pumping test, single well test, slug test) and for the best applicable evaluation method.

Barsi, Ildikó: Comparative statistical evaluation of Kiscell Clay by its location, In: Józsa János, Lovas Tamás, Németh Róbert (szerk.) Proceedings of the Conference of Junior Researchers in Civil Engineering 2012. Budapest, Hungary, 2012.06.19-2012.06.20. Budapest University of Technology and Economics, pp. 9-16
Abstract
Along the trace of the new Metro line 4 at the Buda area several bore holes were made which penetrated the Kiscell Clay. The geotechnical parameters of the Kiscell Clay were described by 481 samples of 41 bore holes. The examination of these samples resulted nearly 5000 data which was described by different statistical parameters. This paper contains the comparison of this

investigation with the previously described statistical parameters and correlations of the soil mechanical properties of Kiscell Clay from different areas of Buda. According to this comparison several geotechnical parameters (e.g. cohesion, uniaxial compressive strength) show big deviation therefore further categorization is necessary. Furthermore it is recommended to investigate separate the data which obtained from different area because of the parameters of some properties (e.g. plasticity).

Bocskai, Zoltán: Numerical simulation of the human eye accommodation, In: Józsa János, Lovas Tamás, Németh Róbert (szerk.) Proceedings of the Conference of Junior Researchers in Civil Engineering 2012. Budapest, Hungary, 2012.06.19-2012.06.20. Budapest University of Technology and Economics, pp. 17-22

Abstract
The structure of the human eye is almost spherical, elastic and the properties of the components are considerably age-related. The main parts of the eye are the sclera, the cornea, the ciliary muscle, the zonular fibers and the crystalline lens. We have built a complex three dimensional finite element model which contains the biologically and mechanically required parts for biomechanical analysis. We have examined the accommodation problem based on the classical Helmholtz theory according to the age-related changes in geometry and material. Based on mechanical and optical consideration, in this paper we would like to give answers why our accommodation width decreases with increasing age.

Bodnár, Nikolett: Engineering geological analysis of the new metro stations; Kálvin and Rákóczi square and the surrounding area, In: Józsa János, Lovas Tamás, Németh Róbert (szerk.) Proceedings of the Conference of Junior Researchers in Civil Engineering 2012. Budapest, Hungary, 2012.06.19-2012.06.20. Budapest University of Technology and Economics, pp. 23-27

Abstract
The present paper gives a summary of the engineering geological parameters of the rock environment and geological conditions of Kálvin and Rákóczi square area, where new metro stations are under construction. In the past 50 years, laboratory analysis and description of the drillings were made but in many cases the results are not so clear. The physical properties of the rocks were evaluated by using statistical analysis. The results could help for the better understanding of the data and the interpretation of geological conditions. The statistical analyses were used in the reinterpretation of geological setting and a better understanding of the geological data contribution of this central position area to the engineering design.

Budaházy, Viktor: Modelling of the Hysteretic Behaviour of Buckling Restrained Braces, In: Józsa János, Lovas Tamás, Németh Róbert (szerk.) Proceedings of the Conference of Junior Researchers in Civil Engineering 2012. Budapest, Hungary, 2012.06.19-2012.06.20. Budapest University of Technology and Economics, pp. 34-41

Abstract
This paper focuses on the numerical model development of Buckling Restrained Braces (BRBs), which are typically used as diagonal members of steel braced frames designed for dissipative behaviour and lateral load resistance under seismic action. The complexity of the BRB devices requires the use of several advanced modelling tools, such as combined hardening, cyclic material plasticity, plastic buckling, contact problem and friction. First a special Chaboche based material model is presented, that developed in ANSYS finite element environment. The model is able to describe all the important cyclic behaviour of structural steel, and effective for virtual experiments. The structure and approximation of numerical model, the calculation of model parameters and the question of calibration are detailed. Using this material model, a Buckling Restrained Brace model is presented, and calibrated by test results.

Németh, Orsolya: Strength characteristics of polymer concrete in function of time and production conditions, In: Józsa János, Lovas Tamás, Németh Róbert (szerk.) Proceedings of the Conference of Junior Researchers in Civil Engineering 2012. Budapest, Hungary, 2012.06.19-2012.06.20. Budapest University of Technology and Economics, pp. 150-157

Abstract

In our long-term research, the strength and physical characteristics of concretes with unsaturated polyester binder and their influencing factors are specified. This study is intended to determine how the values of compression strength and flexural strength are affected by the age of concrete, the duration of mixing and compaction, and mixing temperature. Our experiments show that polymer concrete solidifies very rapidly (6 hours after mixing, 80-85% of 28-day strength is reached, while subsequent solidification is very small.). Compression strength is significantly decreased by the short time of mixing and compaction as well as by low temperatures (close to the melting point of catalyst). Flexural strength is not affected significantly by the age of concrete, by the duration of mixing, and by temperature, either. The reasons for this discrepancy should be further examined later on, by taking into consideration the factors influencing polyester polymerization.

Visy, Dávid: Elastic and Geometric Stiffness Matrices for the Semi-analytical Finite Strip Method, In: Józsa János, Lovas Tamás, Németh Róbert (szerk.) Proceedings of the Conference of Junior Researchers in Civil Engineering 2012. Budapest, Hungary, 2012.06.19-2012.06.20. Budapest University of Technology and Economics, pp. 272-281

Abstract

In this paper the elastic and geometric stiffness matrices of the semi-analytical finite strip method (FSM) are discussed. New derivations are presented for a specific set of longitudinal base functions, which corresponds to column/beam member with (globally and locally) pinned at both its ends. The stiffness matrices are derived in various options. Numerical studies are performed to verify the new stiffness matrices as well as to illustrate the effect of the various options. It is shown that inconsistency is existing in the current implementations of FSM, which inconsistency might have non-negligible effect in certain specific cases.

Zsarnóczay, Ádám: Influence of Plastic Mechanism Development on the Seismic Performance of Buckling Restrained Braced Frames case study, In: Józsa János, Lovas Tamás, Németh Róbert (szerk.) Proceedings of the Conference of Junior Researchers in Civil Engineering 2012. Budapest, Hungary, 2012.06.19-2012.06.20. Budapest University of Technology and Economics, pp. 289-297

Abstract

The presented research focuses on comprehensive numerical modelling of frames with Buckling Restrained Braces (BRB) through both laboratory tests and numerical analyses. A series of quasi-uniaxial cyclic load tests have been performed to evaluate brace behaviour according to European regulations. Experimental results were the basis of a numerical BRB model developed especially for global analysis of braced frames. The framework from FEMA P695 is used to develop a design procedure for BRB solutions in accordance with the European standards through incremental dynamic analysis. This paper explains the components of the framework through an example and shows how changing design regulations affect the seismic performance of the structure.

Orsolya Ilona Németh: Effects of thermal load to the mechanical properties of polymer concrete, 9th fib International PhD Symposium in Civil Engineering, 2012. július 22-25., Karlsruhe, Germany

Abstract

Polymer concrete is defined as a type of concrete in which the binding material is some kind of polymer. Consequently, its mechanical properties and possible applications are essentially influenced by the change of temperature and the load caused by fire.

Our study introduces the changes caused by thermal load in the mechanical and chemical properties

of a polymer concrete of given composition. During the tests, the polymer concrete specimen of given composition was subjected to load in four stages (20°C, 100°C, 200°C, 300°C), then the residual flexural strength, the residual compression strength and the modulus of elasticity was determined.
The changes occurring as a result of thermal load were compared to the measured strength values of cement concrete. Up to 300°C the measure of decrease of the compression strength of polymer concrete did not pass the same measure of the analogous cement concrete.

Zsarnóczay Á, "Seismic Performance Evaluation of Buckling Restrained Braces and Frame Structures", In: Proc. of the 9th fib International PhD Symposium in Civil Engineering. Karlsruhe, Germany, 2012.07.22-2012.07.25.,pp. 195-200

Abstract
The objective of my research is the development of standardized specifications for design and verification of frame structures employing diagonal Buckling Restrained Braces (BRB). BRBs are displacement dependent anti-seismic devices capable of significant energy dissipation when subjected to extensive cyclic loading. A series of cyclic loading tests were performed at BME and an element level BRB model has been developed and verified with experimental data. It is being used to create numerical models of several braced frame archetypes. These frames are subjected to a set of ground motions using nonlinear incremental dynamic analysis. As a result, the probability of failure for each structural archetype is evaluated and eventually an appropriate design procedure is developed.

Zsarnóczay Á., Vigh L.G.: "Capacity Design Procedure Evaluation for Buckling Restrained Braced Frames with Incremental Dynamic Analysis", In: Proc. of the 15th World Conference on Earthquake Engineering (15 WCEE). Lisszabon, Portugális, 2012.09.24-2012.09.28., pp. 1-10, paper 3533

SUMMARY:
The objective of the presented research is the comprehensive numerical modelling of Buckling Restrained Brace (BRB) behaviour and the development of European standardized specifications for design and verification of frame structures employing diagonal BRB elements. A series of quasi-uniaxial cyclic load tests have been performed to evaluate the main structural characteristics of the braces according to European regulations. Test results are also used to develop and verify a numerical element model designed for the incremental dynamic analysis of BRB frames that is presented in this paper. The framework from FEMA P695 is the basis of a design procedure evaluation methodology, which is used to optimize design parameters and regulations for BRBs. The objective is to eventually cover the complete design space of conventional BRB solutions and a short application example is also presented in this paper.

V. Budaházy, A. Zsarnóczay, L.G. Vigh & L. Dunai: Numerical Model Development for Cyclic Hardening Investigation of Steel-Yield Based Displacement Dependent Devices, World Conference on Earthquake Engineering Lisszabon, 2012.

SUMMARY:
Design, testing and qualification of European Nonlinear Displacement Dependent Devices (NLD) are currently regulated by EN 15129, the European standard for anti-seismic devices. The objective of this study is to show that the hardening inherent in structural steel makes it difficult for steel-yield based displacement dependent devices to comply with EN 15129 requirements and propose an enhanced regulation for these devices. A material model has been developed, what accurately reproduces steel behaviour. A numerical model is built to test the behaviour of the developed material in a virtual experiment according to EN 15129 specifications. Although the model experienced the well-known stable hysteretic behaviour of structural steel, the variation of K2 stiffness is low, because the small initial reference value. This suggests that the current regulation does not address the stability of cyclic post-yielding hardening appropriately. A case study on

buckling restrained braces (BRB) is made to show the effect of this regulation on the element level.

József Simon: Parameter identification for dynamic analysis of pile foundation using non-linear p-y method. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract

Present paper attempts to summarize the theory of the non-linear force-displacement behavior of pile foundations, and the different non-linear t-z, q-z and p-y models suggested by various authors and design codes. The distant aim of the research is to investigate the influence of soil-structure interaction (SSI) on the seismic response of continuous girder bridges. As the first step, a numerical model is built in OpenSEES FEM software based on the idea of Beam on Non-Linear Winkler Foundation method. An overview and then a suggestion is made for the definition of the parameters needed for the t-z, q-z and p-y material models used in the applied software, considering the Eurocode 7 regulations. Cyclic pushover analysis is carried out to assess the significance of the different parameters of the soil on the cyclic behavior of pile foundations. The results are evaluated and compared.

Fenyvesi O.: "Early age shrinkage cracking tendency of concrete according to cement type.", In: Jure Radić (szerk.) The 8th Central European Congress on Concrete Engineering: Durability of Concrete Structures. Plitvice, Horvátország, 2012.10.04-2012.10.06. Zagreb: pp. 87-92. Paper 10

Summary

In present paper, the influence of use of different cement types to prevent the early shrinkage cracking tendency is discussed. For indicating early age shrinkage cracking tendency two types of ring test were applied (for cement stone and concrete mixtures). Strength parameters of cement paste and concrete mixtures were also tested at early age. It is found that the effect of cement is related primarily to the specific surface area, and the hydraulic additive content of cement, the strength of cement stone or mortar, or the strength of concrete made from them. The tested cement types were divided into two main groups according to their tendency to early age shrinkage cracking (besides the strength parameter).

Mlinárik Lilla, Kopecskó Katalin Dr.: "Influence of supplementary materials on chemical resistance and hydration of concrete." In: Cosmin G Chiorean (szerk.) Proceedings of the First international conference for PhD students in Civil Engineering. Cluj-Napoca, Románia, 2012.11.04-2012.11.07. Cluj-Napoca: pp. 456-466.(ISBN: 978-973-757-710-8)

Abstract

Nowadays the most suitable and widely used construction material is concrete. This building material, until these days, went through lots of developments. The definition of concrete is: the mixture of cement, water, aggregates and sometimes admixtures. It is artificial material. In the beginning it is soft, ductile or fluid, and gradually will be solid. We can consider this building material as an artificial stone. The most important part of concrete is cement. The production process of this raw material produces a lot CO_2. It is well known, that CO_2 emission initiates harmful environmental changes. Nowadays researchers make efforts to minimize industrial emission of CO_2.

The most effective way to decrease the CO_2 emission of cement industry, to substitute of a proportion of cement with other materials. These materials called supplementary cementing materials (SCM's). Usually used supplementary cementing materials are ground granulated blastfurnace slag (GGBS), flying ash (FA), silica fume (SF), trass or metakaolin (MK). These are typically industrial by-products, hence the application of SCM's results less CO_2 during cement production. The SCM's provide other advantages and that is why they usage in concrete technology is more and more general.

The aim of the research is to get acquainted with these SCM's and to find some other advantageous

features [1]. The most interesting feature is the influence on the chemical resistance of concrete. Examinations will focus on the effect of replacement of cements by MK and SF. Under my doctoral scientific investigations I examine the influence of SCM's on the hydration of cement (on cement-paste) as well as on chemical resistance of concretes in severe environment by low pH values (pH=1, pH=3).
The examinations with metakaolin almost have done, and the other probes are in progress or under preparation. In this study I describe the results of examinations and conclusions with metakaolin. I present the experimental program the further activities and works.

Orsolya Ilona Németh, György Farkas: "Effect of production temperature on strength of polymer concrete", 11th Youth Symposium on Experimental Solid Mechanics, 2012. május 30. - június 2., Brassó Románia
Abstract: In our long-term research, the strength and physical characteristics of concretes with unsaturated polyester binder and their influencing factors are specified. This study is intended to determine how the values of compression strength and flexural strength are affected by the mixing temperature. Our experiments show, that the compression strength of polymer concrete is significantly decreased just by low temperatures (close to the melting point of catalyst). Flexural strength is not affected significantly by temperature. The reasons for this discrepancy should be further examined later on, by taking into consideration the factors influencing polyester polymerization.

Orsolya Ilona Németh, György Farkas: "Shrinkage of polymer concrete", 8th Central European Congress of Concrete Engineering, 2012. október 18-21., Plitvice Lakes, Horvátország
Summary
In our research we study one of the time-dependent properties of polymer concrete, the shrinkage. The knowledge of this properties is important consider the aspect of the durability of mixed structures made by cement concrete and polymer concrete. In the course of tests, short-term shrinkage – within 24 hours after dismantling – and subsequent long-term shrinkage – for 10 months – were measured separately in polymer concrete of a given composition. A significant part of the total shrinkage of polymer concrete of a given composition comes about within 24 hours after dismantling. Long-term shrinkage is not considerable, its value is one order of magnitude less than that of short-term shrinkage. Results show that compared to cement concrete, the shrinkage of polymer concrete is larger by one order of magnitude, the impact of which needs to be taken into consideration.

Visy Dávid, Ádány Sándor: "Consistent Stiffness Matrices for the Semi-Analytical Finite Strip Method", European Mechanics Society, ESMC-2012 - 8th European Solid Mechanics Conference, Graz, Austria, July 9-13, 2012, ISBN 978-3-85125-223-1 (2012)
-Introduction
-Buckling is a typical behavior of thin-walled members, like:
• Global buckling
• Distortional buckling
• Local plate buckling
-Calculation of elastic critical load is needed to predict the ultimate load carrying capacity
-Available methods:
• Analytical solutions: applicability is limited
• Finite element method (FEM): most well-known and general
• Finite strip method (FSM): easier to use than FEM
• Generalized Beam Theory (GBT): easier to use than FEM

Badari Bettina, Papp Ferenc: "Generalization of the Ayrton-Perry Formula Based Method

for LTB of Members", In: Károly Jármai, József Farkas (szerk.) Design, Fabrication and Economy of Metal Structures: International Conference Proceedings 2013. Miskolc, Hungary, 2013.04.24-2013.04.26. pp. 181-186.

Abstract. Nowadays, one of the most controversial topics of the Eurocode standards is the lateral-torsional buckling (LTB) of bended beams. In this paper a novel method is introduced for LTB of members, based on the Ayrton-Perry formula. The validity of this method is examined for beams with different boundary conditions (e.g. prevented end-warp) and load distributions (e.g. triangular bending).

Árpád Rózsás – Nauzika Kovács: Carbonation of Concrete Infrastructure in Hungary in the Light of Climate Change. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract

The costs related to corrosion are immense and they are expected to rise in the following decades due to human induced climate change. This paper examines a slice of this problem: the carbonation process - which is the most common corrosion type of concrete structures - in the light of climate change. Since current durability specifications are prevalently based on historical data, experience and do not consider the effect of climate change, there is a pressing need to assess the reliability of them. For this purpose full-probabilistic, time-dependent reliability analyses are performed utilizing Monte Carlo simulation technique. According to the recommendations of the Intergovernmental Panel on Climate Change multiple future scenarios are used to assess the effects of altering climate. The calculations indicate that the carbonation depth could increase by 21% compared to constant CO2 level of year 2000 as a reference. The risk of depassivation for structures built per Eurocode and the superseded Hungarian bridge standard (ÚT) may increase by 115% and 55% respectively up to the end of the century, due to rising CO2 level. The findings reinforce that the effects of climate change should be reflected in the standards and the revision of current durability specifications is required.

Nikolett Bodnár: Engineering geological evaluation of the borehole documentation of the new metro line at Kálvin and Rákóczi square. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract

Miocene clays and aleurolites with various sand content and bentonitic clays are the most abundant sediments at the metro construction site at the studied area. The dataset of the drillings are often incomplete and difficult to understand, which complicated the data processing. The drilling documentations were also studied to better understand the local geology and to complete the database of the laboratory tests results with the engineering geological properties of the materials. Creating this database and evaluate it with statistical methods was the first step of the geomathematical analysis. According to the results of these methods the geological structure of the area and the properties of the geological units can be described more detailed.

Turán Pál, Horváth László, Jakab Gábor: "Húzott karimás kapcsolatok modellezése".In: Dr Köllő Gábor (szerk.) XVII. Nemzetközi Építéstudományi Konferencia. Csíksomlyó, Románia, 2013.06.13-2013.06.16. Kolozsvár: Erdélyi Magyar Műszaki Tudományos Társaság, pp. 326-333. Paper 50.

In this paper, an analytical model will be described, which bases on the Eurocode T - stub model, to determine the resistance of flange-plate pipe joints in in tension. The presented model will be compared with the widely used CIDECT model. Later, an experimentally verified 3D finite element model will be presented. The results of the numerical and the two analytical models will be compared.

Simon József, Vigh László Gergely: Response spectrum analysis of girder bridges with seismic

isolators using effective stiffness. In: WASET 2013 World Academy of Science, Engineering and Technology: International Conference on Civil, Structural and Earthquake Engineering. Istanbul, Törökország, 2013.06.20-2013.06.21. Istambul: pp. 1353-1362.

Abstract — In seismic design, the most commonly used analysis method is the multi-mode response spectrum analysis (MMRSA) due to its relative simplicity. The mechanical behavior of isolation devices (laminated elastomeric bearings, elasto-plastic devices, friction pendulums etc.) is usually non-linear, thus linear analyses do not provide sufficient results to capture the real behavior of the whole structural system. According to Eurocode 8, seismic isolators can be modeled with equivalent linear characteristic by using the effective stiffness and effective damping of each isolator unit. This results an iterative method carried out by MMRSA. A three dimensional numerical model is built in OpenSEES FEM software to study three continuous girder bridges by MMRSA using effective stiffness values and by non-linear time-history analysis (NTHA). The results are compared and then the applicability and validity of the effective stiffness method is presented.

Balogh Tamás, Vigh László Gergely: Cost Optimization of Concentric Braced Steel Building Structures. In: WASET 2013 World Academy of Science, Engineering and Technology:: International Conference on Civil, Structural and Earthquake Engineering. Istanbul, Törökország, 2013.06.20-2013.06.21. Istanbul, Turkey: pp. 1142-1151. Paper 209.

Abstract—Seismic design may require non-conventional concept, due to the fact that the stiffness and layout of the structure have a great effect on the overall structural behaviour, on the seismic load intensity as well as on the internal force distribution. To find an economical and optimal structural configuration the key issue is the optimal design of the lateral load resisting system. This paper focuses on the optimal design of regular, concentric braced frame (CBF) multi-storey steel building structures. The optimal configurations are determined by a numerical method using genetic algorithm approach, developed by the authors. Aim is to find structural configurations with minimum structural cost. The design constraints of objective function are assigned in accordance with Eurocode 3 and Eurocode 8 guidelines. In this paper the results are presented for various building geometries, different seismic intensities, and levels of energy dissipation.

Rózsás Árpád, Kovács Nauzika: Probabilistic Assessment of the Effect of Climate Change on the Carbonation of Concrete Structures in the Carphatian Basin. In: Hajdu M, Skibniewski M (szerk.): Creative Construction Conference 2013. Budapest, Hungary, 2013.07.07-2013.07.08. Budapest: pp. 672-683. ISBN: 978-963-269-365-1

Abstract

Due to mainly human activity in the following decades we are facing increasing mean global temperature and rising CO2 concentration. This paper investigates the effect of these changing environmental parameters on the durability of concrete structures. We restrict our attention to the examination of carbonation process and to environmental data applicable for the Carpathian Basin. The carbonation model is based on the internationally recognized CEB-fib model. The climatic parameters are considered through 6 climate change scenarios according to the recommendation of the Intergovernmental Panel on Climate Change. Full probabilistic approach utilizing Monte Carlo simulation technique is used to analyze the reliability of currently applied concrete covers against depassivation of reinforcement. A numerical method is proposed to efficiently take into account the time-varying atmospheric CO2 concentration. This method is used to assess the error of widely applied constant CO2 level approximation. The calculations indicate that climate change could have a significant effect; the carbonation depth may increase by 15-20% until the end of this century compared to year 2000 as a reference. The risk of depassivation of reinforcement could increase by 60% over time to 2100. The results suggest that the effect of climate change should be considered in design codes.

Lili Eszter Laczák: Aircraft impact into rigid structure. In: Proceedings of the Second

Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract

Analysing the consequences of potential aircraft impact into engineering structures is an issue of high importance since the possibility of terroris attacks. Nowadays the analysis of this phenomenon has become a key issue in the case of design of new structures, renovation works or safety tests. The majority of the previous research is based on and follows the Riera model. The Riera model is widely accepted, its assumptions have been verified by several experiments. However, in certain cases the applicability of this model has not been clarified in details. In this paper, the introduction of Riera's model is complemented by the comparison of its analytic results to own finite element model results. Our investigation primarily focuses on analysing the behaviour of the aircraft, in case of different stiffness parameters. The differences of the analytical and numerical results are discussed.

István Kádár: Some characteristic values of the stability analysis of MAL dams. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract

With the prescence of Eurocode 7 standards appeared the reliability-based design in which it is essential that we know the physical parameters of the soils as accurately and safely as possible. Therefore experiments and series of experiments are carried out and characteristic values are determined with the tools of statistics. This article aims to show the characteristic values of shear strength parameters of the soil layers at the MAL tailing dams calculated from core sample data. The results are compared with former data.

Bettina Badari: Probabilistic evaluation of the lateral-torsional buckling resistance of steel beams. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract

For the design of structures it is very important to provide such standard design processes which can describe properly the structural behavior and are able to ensure with appropriate safety that the resistance of the structure will be adequate to carry its effects. The parameters which influence the load-carrying capacity and the effects which have to be taken into account through the determination of the loads of a structure cannot be described by one exact value, they have measurable uncertainty. Therefore, the proper modeling of the structural behavior needs probabilistic evaluation. In this paper the validity of the First Order – Second Moment based probabilistic evaluation, presented in [1] and [2] is examined for the case of lateral-torsional buckling of simple beams. The three main components for the examination: the deterministic model, the random variables and the probabilistic model are clarified and detailed. The hyper plane approximation of the resistance function, according to [1] and [2] is evaluated based on the results of numerical calculations.

Tamás Balogh: Adjustment of genetic algorithm parameters for building structure optimization. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract

By solving discrete, highly non-linear and non-convex optimality problems heuristic methods can be effectively applied. Those metaheuristics prove themselves to be particularly effective which seek the optimal solution based on the functioning of natural processes. One of these methods, the Genetic Algorithm (GA) essentially imitates the biological evolution. Finding the optimal solution and the convergence can't be guaranteed without proper setting of genetic parameters (selection, mutation, recombination, etc.). In this paper a parametric study is presented for proper selection of parameters of an own developed, GA based numerical algorithm which is applicable for concentric

braced, steel building structure optimization. Various combinations of the different parameters are evaluated with respect to convergence rate, stability and computational demands. The parametric study is completed on a test four-storey building, with fixed bracing layout.

Dániel Borbély: Back analysis of tunneling in jointed rock mass. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract
The first underground radioactive waste repository in Hungary is being built in the village of Bátaapáti. The tunnels were driven in fractured granitic rocks. Based on the discontinuities the host rock of the repository can be considered as an assembly of blocks, therefore the discontinuum modelling approach can be used to provide representative results of its behaviour. This paper focuses on the prediction capability of the discontinuum modelling code 3DEC. Convergence monitoring was carried out in the modelled section that offers the ability to check the validity of analysis results. Furthermore back analysis was carried out to improve the prediction capability of the model. The findings of the back analysis are summarized in this paper A hybrid continuum-discontinuum model is presented, where the near-field is modelled as a blocky rock mass, and the far-field is modelled as a continuum using the built in deformable blocks in 3DEC. Hence the run time of the model was significantly reduced, to facilitate the time consuming back analysis procedure, requires multiple runs.

Varga Gabriella Hulladék geotechnikai vizsgálatai. In: Köllő G (szerk.) XVI. Nemzetközi Építéstudományi Konferencia: ÉPKO 2012

Environment protection and conservation are very important in the 21st century. This is even more important in waste management design and construction where deposition of heterogeneous waste must be achieved in a way that minimizes its environmental impact. Therefore positioning and construction of landfills, their day-to-day maintenance as wells as their utilization are all very important in Hungary, the European Union, and all over the world.

Hegyi Péter Experimental study on polystyrene aggregate concrete stiffened cold-formed steel columns. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract
In this paper an experimental study is introduced on cold-formed steel structures stiffened with lightweight concrete. Two types of polystyrene aggregate concrete with different mixture were used. First, material tests were performed to determine the material properties, including the investigation of the effect of higher temperatures. Then, stub column tests were carried out by cold-formed C-profiles (length 300/600/2000 mm) to investigate the stability behaviour under axial force. The experiments showed that the concrete stiffening has a beneficial effect on the global and distortional buckling modes of the steel elements which can be utilized.

Vendel Józsa: Empirical correlations of overconsolidation ratio, coefficient of earth pressure at rest and undrained strength. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract
Generally, parameters of the in situ soil state are determined from laboratory and in-situ tests. The stresses and the deformations of the soil depend on the stress history, among the others. The degree of the preloading is classically expressed with the overconsolidation ratio (OCR). The goal of this paper is to compare the values of OCR which are determined from one-dimensional oedometer tests and from cone penetration tests (CPT) as well. Determination of OCR from CPT is based on measured values of net and effective cone tip resistance. Three mathematical functions are described from laboratory and CPT tests. The correlation coefficients (R2) of the functions are very high, ranged between 0.82 and 0.93. Relationship for OCR, coefficient of earth pressure at rest and

undrained strength were calculated.

Péter Juhász - Ágnes Suhajda - Katalin Kopecskó: Analysis of the effective depth of a biominearlizing treatment. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract
Effective depth of a biomineralizing treatment applied on porous stone is the depth, in which the biomineralizing compound can evoke microbial carbonate precipitation. This precipitation modifies the pore structure of the treated stone, thus alters water absorption properties of the stone material. Intense microbial carbonate precipitation can only occur in an environment, where bacteria are present. Without bacterial contribution, only chemical precipitation can occur, in a much lower extent. In the present paper two separate tests are evaluated, which aimed to gain information on the effective depth of biomineralizing treatments applied on porous limestone. During the first test effective depth of the biomineralizing treatment was visualized on a porous limestone slab, and was measured to be around 4.5 mm. As result of the second test, imprints of the bacteria on agar plates showed the different migration depths of bacteria upon application of different amount of curing compounds on cylinders. Migration depth of the bacteria was measured to be between 15 to 38.6 mm. However, the two tests were separate ones, they show similar results, which worth to compare.

Mlinárik Lilla, Kopecskó Katalin: Cementek hidratációjának változása metakaolin cementkiegészítő anyag jelenlétében. In: Köllő Gábor (szerk.) Erdélyi Magyar Műszaki Tudományos Társaság XVII. Nemzetközi Építéstudományi Konferencia. Csíksomlyó, 2013

Abstract
Nowadays the constructions industry stands before new challenges: decrease the CO2 emission of cement industry and increase the performance of concretes. The clay-based mineral type supplementary cementing materials (SCM’s) could provide solutions for these tasks. We could substitute a part of cements with SCM’s. These materials could increase the performance of concrete through special physical-chemical properties of them. The grinding and fineness of SCM’s is better than the cement’s, and because of this, we could require a more compact structure. It could solve the problem in connection with epoxy coating of concrete structures, because we make concretes with same qualities. The aims of our research to examine and follow the influence of metakaolin on the hydration process of cements. The first, and almost the most important step to recognize the influences of metakaolin with ages of samples as well as the extent of changes between both hydrate and clinker phases.

Gábor Nagy: Examination of the red mud's thixotropic behavior. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract
Recently the red mud became one of the most often mentioned by-product. As a result of the Bayer alumina process large amount of red mud slurry is produced, which has to be disposed. This red mud slurry, or tailing disposal is mostly a sufrace impoundment, which has to be, so as other earthworks, a stable embankment. For that reason it is important, to know the red mud's geotechnical parameters. Due to some events of the past few years, it became necessary to investigate how these parameters change in time, and in the function of the water content. Red mud samples have a yield stress value, at which the sample begins to flow. These slurries are considered as being a thixotropic fluid, since their viscosity decreases by increasing the shear rate. This paper discusses some methods of investigating this behavior.

Réka Nagy: Structural cracking of reinforced concrete members. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract
In this paper the background of bond between reinforcement and structural cracking is reviewed.

Experiment on reinforced concrete tie members is described to study crack width variation within the concrete cover. Crack propagation is studied and the effects of aggregates on crack width are presented. The general tendencies of crack width variation within the concrete cover are observed. It is found that power function trends fit the best for the data where crack width primarily depends on the location within the cover. Future research aims on the cracking behaviour of conventional steel and FRP reinforced concrete members are introduced.

Orosz, Máté: Comparison of ETICS and ventilated cladding system in terms of hygrothermal loads of mineral wool in Middle-Europe. In: Proceedings of the Conference of Junior Researchers in Civil Engineering. Budapest, 2012

Abstract

This paper aims to compare the External Thermal Insulation Composite System (ETICS) and a ventilated cladding system in terms of moisture and temperature strains arising in mineral wool thermal insulation. The investigation is based on computer simulation using natural climatic data of Vienna (Middle-Europe). The calculations are carried out over a time period of five years. The ETICS and the ventilated cladding system are applied to the same outer wall structure: 38 cm building block wall with built-in moisture. The paper determines the maximum hygrothermal load and water content of insulating material in both constructions and compares them. The results demonstrate the protecting effect of the ventilated cladding system and also serve data for the durability tests of mineral wool insulation.

Molnár Gergely, Bojtár Imre, Török János Microscopic scale simulations of soda-lime-silica using molecular dynamics In: III International Conference on Particle-Based Methods. Stuttgart, 2013

Abstract. Present work is focused on the investigation of soda-lime-silica glass. The material is completely amorphous, therefore a 3D random network generation was done to produce the initial geometry. The systems were verified with neutron diffraction results. The simulation was done in two steps. First the geometry was generated and verified, then the system was submitted to simple mechanical loading such as unidirectional compression. The overall goal of the simulation is to compare the results of the discrete mechanics behavior with macroscopically measurable continuum mechanics parameters as the elasticity.

Gergely Molnár, Imre Bojtár, Jens Henrik Nielsen Ongoing model development analyzing glass fracture In: Jan Belis, Christian Louter, Danijel Mocibob (szerk.) COST Action TU0905 Mid-term Conference on Structural Glass. Porec, 2013

ABSTRACT: Present subject deals with an ongoing experimental and numerical analysis of in-plane loaded glass plates. The main goal of the investigation is to develop a hybrid – discrete and finite element – model which could follow the fracture process in annealed and in tempered glass. Measurements of the residual stress state before failure and high-speed camera recordings of the failure are being performed in order to verify the numerical model. The primary goal of this research is to follow the overall fracture of a structural element – e.g. beam – loaded in-plane. Present paper would like to give an overview of the structure of the research and a summary of current status archived so far.

Zoltán Bocskai – Róbert Nagy: Discussion of the numerical integration of the 9 node shell finite element. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract

In the present paper, we discuss the numeric integration techniques of the 9-node quadrilateral isoparametric Lagrangian Mindlin shell element. We present the concepts of full, reduced and selective integration schemes from two fundamental standpoints. The first being the well known inherent property of the displacement formulation of linear finite elements, notably the stiffening of

the element (also known as shear-locking) when full integration of the stiffness matrix is used, while the second is concerned with reduced integration, where compensating for the previous problem by not accounting fully for certain higher order terms of the integrand the element becomes softer. In this latter case certain spurious zero energy displacement modes (ZEM) are possible to arise leading to unrealistic results, therefore it has to be handled by adding restrictive terms to the stiffness matrix. We conclude, that in case of the element under scrutiny, by selective integration (reduction at the bending shear terms) one ZEM occurs, which propagates through the whole mesh, while the full integration stiffens the element only by less than 6%, therefore we recommend the use of the 3x3 full integration scheme.

Mlinárik, Lilla: Influence of supplementary materials on chemical resistance of concrete. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, 2013

Abstract
The aim of my experiments is to study the hydration of supplementary cementing materials (SCM's). Usually used SCM's are ground granulated blastfurnace slag (GGBS), flying ash (FA) or silica fume (SF). These materials are widely used in concrete technology, mostly because of their advantageous properties. In the last years there has been a growing interest in the application of metakaolin. There are promising results with concrete applications in corrosive surroundings made with metakaolin. In my recent experiments the examined properties are hydration of cements replaced with metakaolin and the influence of metakaolin on chemical resistance of concrete. Results show a positive influence on the strength: metakaolin replacement caused higher average values of uniaxial and flexural tensile strength as well as smaller chloride diffusion coefficient. In my further experiments I will use silica fume to determine the influences of SCM's on hydration of cements and chemical resistance of concrete.

Badari, Bettina: Calibration of the Ayrton-Perry resistance formula. In: Proceedings of the Conference of Junior Researchers in Civil Engineering. Budapest, Hungary, 2012

Abstract
Many theses have been published on the now much-discussed phenomenon of lateral-torsional buckling of beams, which draw attention to the problems of procedures given by the Eurocode. To solve this problem the Ayrton-Perry formula was generalized for the case of beams and beam-columns and new formulae for the buckling resistance proposed. The objective of this paper was the calibration of the introduced formulae to examine the suitability of the application of them for design procedures in practice. The strategy of the research work was the production of a database with adequate number of results of numerical simulations, which is appropriate for the calibration and for the proposal of calibrated expressions to calculate the lateral-torsional buckling resistance of bended structural elements. Thereafter the results of the virtual tests were compared with the results calculated with the new expressions and the resistances determined with the procedures given in the EN 1993-1-1, and the novel Ayrton-Perry formulae were evaluated.

Lilla Mlinárik – Katalin Kopecskó: Cement hydration in the presence of metakaolin. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, Hungary, 2013

Abstract
In this part of our research program, we examined one of the most characteristic properties of cement stone: the hydration of cement. It is significant, because the hydration process and rate will affect the strength, chemical resistance, permeability, etc. of concrete. There are many scientific researches where the influence of supplementary cementing materials (SCMs) on the hydration process of cement is examined. In our experiments part of cements was substituted by metakaolin SCM. To follow the changes, and measure the differences of the hydration mechanism with phase-analytical methods were applied. X-ray powder diffraction (XRD) was used to determine the

qualities of the crystallised phases, and thermal analyses (TG/DTG/DTA) were used to measure the quantities of the significant phases.

Gergely Molnár: Discussion on the micro-mechanics of structural glass. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, Hungary, 2013

Abstract
Present study deals with the multi-scale investigation of the strength of soda-lime-silica. The article gives a quick overview of the research related to the topic. First a micro-scopic investigation is going to be presented. The simulation was done in molecular dynamics, verified by neutron diffractography. The goal of the analysis is to prepare a meso-scale investigation. Where we used advanced methods to describe the flaws of a structural glass plate than with 3D topologies we developed finite element models. With the different stress peaks we defined different strength regions on the plate. Finally a macro-scopic investigation ends the discussion, where a hybrid simulation was done to follow the complete crack propagation in an actual glass specimen.

Pál Turán: Eurocode based design method for flange-plate connections of tubes under tension. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, Hungary, 2013

Abstract
In this paper an analytical model will be described to determine the resistance of flange-plate pipe joints in tension. This model is based on the Eurocode T - stub model. Later, an experimentally verified 3D finite element model will be presented. The results of the numerical and the analytical models will be compared. Two configurations were investigated with different geometry and welding type. In the first, there is no hole in the middle of the flange-plate; in the other there is a hole, which size is equal to the diameter of tube. In the second connection type there is two-sided fillet welding, while in the other there is only one-sided welding. Finally a statistical evaluation was carried out.

Orsolya Ilona Németh: Summary of results of experimental studies of polymer concrete. In: Proceedings of the Second Conference of Junior Researchers in Civil Engineering. Budapest, Hungary, 2013

Abstract
Polymer concrete is defined as a composite material where the additive of the binding material is some kind of polymer. Material properties can vary considerably in function of material composition, therefore each type of polymer concrete can be characterized by its special individual properties. The aim of this study is to summarize our experimental studies and their results, the basic properties of polymer concrete of a given composition. Main topics include strength properties and their influencing factors, time-dependent properties, the effect of high temperature and the bond in polymer concrete.

Proceedings of Literatures

KRAUSZ N.-SZEDLÁK M.-BARSI Á. (2012): Kültéri RFID-mérések térinformatikai elemzése, Az elmélet és a gyakorlat találkozása a térinformatikában III., p. 237-243, Debrecen 2012

Abstract: In the paper a typical RFID outdoor measurement processing has been presented and the readability of the tags is examined as function of the distance. The paper gives a detailed description about the procedure and its results.

Völgyesi L, Ultmann Z: Linearity test of the gravity gradients, IUGG Springer kiadványa

Abstract
Linear changing of the gravity gradients between the adjoining network points is an important

demand for different interpolation methods in geodesy (e.g. interpolation of the deflection of the vertical, geoid computations, and interpolation of the gravity values or the vertical gradients of gravity). To study the linearity of gravity gradients, torsion balance measurements were made both at the field and in a laboratory. The results of our investigations demonstrate that the linearity of the gravity gradients mainly depend on the order of the magnitude of gradients and generally the given point density of the earlier torsion balance stations is not enough for geodetic purposes.

Kapitány Kristóf, Négyessy László, Barsi Árpád: "Tomographic reconstruction of micro-vascular network in cerebral cortical samples", BIOMECHANICA HUNGARICA (2013)

Abstract

OBJECTIVES

The purpose of the research is the automatic processing and analysis of high-amount (nearly 1500) and high-resolution synchrotron based tomography images of mammalian cerebral cortical tissues. The objective was to acquire quantitative data allowing future blood flow modeling based on the structure of cerebral vessel network. . The brain samples were processed with histological method compatible with synchrotron x-ray microtomography. The method developed performs automated extraction of the relevant parameters of the vessel network on a standard personal computer using previously set parameters.

METHOD

The method implemented on the image series performs automatic segmentation by using determined intensity values. The procedure finds the boundary of the vessels and provides quantitative measures of the segments, and it also creates the topology of the vessel network.

RESULTS

Our method produces topologically correct network of continuous, branching micro blood vessels of the sample studied. We present multiple options for the visualization of the detected vessels. The data structure also contains the statistics of each detected cross-section, in addition with the numerical quality statistics of the continuous vessel branches (e. g. vessel length or mean diameter). The algorithm resulted in highly accurate fitting at micrometer geometric resolution.

CONCLUSION

The reconstructed vessel network is the geometrically accurate description of the blood vessels in the tissue. The data acquired could be the base of a blood vessel surface reconstruction, and by adding physiological information it could be used for simulations in normal and pathological conditions (e. g. arteriosclerosis). The precise vascular geometry and the distance distribution provides information about the barely understood neurovascular coupling, which is the basis of such modern diagnostic and research tools as the fMRI. After analyzing samples from multiple species or brain regions the difference could be determined objectively.

Orosz G, Frey S: Optical-radio positional offsets for active galactic nuclei ASTRONOMY AND ASTROPHYSICS 553: Paper A13. 10 p. (2013)

ABSTRACT

Context. It will soon become possible to directly link the most accurate radio reference frame with the Gaia optical reference frame using many common extragalactic objects. It is important to know the level of coincidence between the radio and optical positions of compact active galactic nuclei (AGNs).

Aims. Using the best catalogues available at present, we investigate how many AGNs with significantly large optical–radio positional offsets exist as well as the possible causes of these offsets.

Methods. We performed a case study by finding optical counterparts to the International Celestial Reference Frame (ICRF2) radio sources in the Sloan Digital Sky Survey (SDSS) Data Release 9 (DR9). The ICRF2 catalogue was used as a reference because the radio positions determined by Very Long Baseline Interferometry (VLBI) observations are about two orders of magnitude more accurate than the optical positions.

Results. We find 1297 objects in common for ICRF2 and SDSS DR9. Statistical analysis of the optical–radio differences verifies that the SDSS DR9 positions are accurate to □55 milliarcseconds (mas) in both right ascension and declination, with no systematic offset with respect to ICRF2. We find 51 sources (□4% of the sample) for which the positional offset exceeds 170 mas (□3σ). Astrophysical explanations must exist for the majority of these outliers. There are three known strong gravitational lenses among them. Dual AGNs or recoiling supermassive black holes may also be possible.
Conclusions. The most accurate Gaia–VLBI reference frame link will require a careful selection of a common set of objects by eliminating the outliers. On the other hand, the significant optical–radio positional non-coincidences may offer a new tool for finding e.g. gravitational lenses or dual AGN candidates. Detailed follow-up radio interferometric and optical spectroscopic observations are encouraged to investigate the outlier sources found in this study.

Derts Zsófia, Koncsos László: Flood Risk Mitigation in the Tisza Valley by Deep Floodplain Reservoirs: The Effect on the Land Use. JOURNAL OF ENVIRONMENTAL SCIENCE AND ENGINEERING B 1:(1) pp. 34-40. (2012)
Abstract: The actual situation of the Tisza Valley traditionally used for land farming is basically determined by the consequences of the river regulation of the nineteenth century which aimed at the extension of the intensive agriculture, by the extreme water regime of alternating periods of flood showing a deteriorating trend and drought related to the climatic change; and by several environmental problems induced mainly by the land use. The objective of the article is to prove the regional advantages of a proposed technical solution to mitigate the flood risk with a special regard to the land cover. Hydrodynamic modeling results prove that the best technical solution is given by a combination of different strategies containing the inundation of deep floodplains-areas regularly covered by water before the river regulation works and, globally, by an important mitigation of flood damages, the costs of solution would be surely covered in the longterm. By means of its natural-resembling operation, the regular water cover would allow a multiple use of water, contributing to the solution of the simultaneously existing aridity problem, and, the development of the floodplain landscape management would help improve the ecological and the economical upgrading of the region.

K Homoródi, J Józsa, T Krámer: On the 2D numerical modelling aspects of wind-induced waves in shallow lakes. PERIODICA POLYTECHNICA-CIVIL ENGINEERING 56:(2) 127-140 (2012)
Abstract
Wind-induced waves play an important role in shallow lake hydro- and sediment dynamics. But most of the field measurement methods can give information about the wave properties only at single point, which calls for wave estimation methods to take the effect of waves into account in multidimensional hydro- and sediment dynamic models. The aim of this study is to improve modelling waves in depth- and fetch-limited lakes generated by the local winds.
In the first part of this paper, we describe the calibration and validation of the 2D spectral wave model SWAN (Simulating Waves Nearshore) to the very shallow Lake Neusiedl, Hungary/Austria.
The abrupt change of the roughness at the perimeter of the open lake and the gradual change along the fetch due to wave growth result in a systematic, fetch-dependent variation of the wind speed. This spatial inhomogeneity is modelled here by a 1D atmospheric internal boundary layer (IBL) model. It is shown in the second part of this paper that this approach results in a significant effect on wave parameters and, as a consequence, on bottom shear stress.

Takó, Sz., Laky, D.: Laboratory experiments for arsenic and ammonium removal – the combination of breakpoint chlorination and iron(III)-Coagulation, Journal of Environmental Science and Engineering, 1:(10) pp. 1165-1172. (2012)
Abstract

Currently 15 % of the total Hungarian population is affected by either the elevated arsenic or ammonium concentration of drinking water, and 8 % is affected by both compounds. The break-point chlorination is a well- known method for ammonium removal, however, during the ammonium-removal process carcinogenic and mutagenic by-products (e.g., THM and AOX) may be formed (Csender, 2006). In order to remove these harmful organic by-products, activated carbon adsorption has to be applied in the technology. The break-point chlorine dose is capable of oxidizing the As+3 to As+5. The oxidized form of arsenic can be easily converted to solid phase by adding coagulant (Fe(III) or Al(III) salt) to the water, and the formed iron/aluminium flocs can be removed by simple rapid sand filtration. Laboratory experiments were performed with raw water from two Hungarian settlements, where the water originated from a deep confined aquifer. In the studied settlements six wells were in operation, and the supplied drinking water contained ammonium above the maximum allowable concentration, and the arsenic content was around the 10 μg/L standard value. We found that higher chlorine dose (~ 10 Cl2:NH4-N) was needed to achieve the breakpoint than the theoretical value (7.6) (Griffin, 1941). The amount of by-products was also measured during the experiments. The AOX concentrations were significantly higher (21.6 μg/L to 143 μg/L) in all cases than the THM concentrations (9-18 μg/L). The needed coagulant doses were also studied in order to achieve the required arsenic concentrations. Fe(III) coagulant was applied in all cases, and it was found that 1-1.5 mg/L Fe(III) dose was sufficient to achieve 2-5 μg/L arsenic concentration in the treated water. Based on the results it can be stated that the breakpoint chlorination combined with Fe(III) coagulation is a potential technology to achieve the required ammonium and arsenic concentration at the studied settlements. However, activated carbon has to be installed in order to remove the harmful AOX compounds.

Derts Zs., Koncsos L.: "Ecosystem Services and Land Use Zonation in the Deep Floodplains of the Tisza River in Hungary", Pollack Periodica, 7:(3) pp. 79-90. (2012)

Abstract: While characterized by numerous environmental risks directly or indirectly caused by anthropogenic interventions, the Tisza Valley has an important potential to get its natural capital enriched through landscape scale adaptive management. In this paper, the current and potential ecosystem services are identified for the deep floodplains of the Tisza Valley by means of hydrodynamic modelling results and a detailed land cover analysis. Meanwhile, the agricultural suitability and environmental sensitivity of the study areas are analyzed, and the results of this phase of the research will provide a background for the quantification of the natural capital of the study areas.

Horváth A., Buzás K.: Comparison of roof runoff water originated from two types of roof material. Pollack Periodica, Vol. 7 (3), pp. 99-107, 2012

Abstract: The present study demonstrates the differences in the quality of roof runoff from bitumen shingle and galvanized iron test roofs. Average first flush conductivity was found to be 113.6 μS/cm in bitumen roof runoff as opposed to 45.4 μS/cm in galvanized iron roof runoff. The chemical oxygen demand of bitumen roof runoff was one order of magnitude higher than that of galvanized iron roof runoff, which could be attributed to the material and coarse surface of the former roof. The suspended solid content of the two runoffs there were, in average, identical.

Zsuzsanna Kovács Igazvölgyi: ANALYSES OF PEDESTRIAN CHARACTERISTICS AT ZEBRA CROSSINGS ON ONE WAY ROADS. POLLACK PERIODICA 8:(2) pp. 67-76. (2013)

Abstract: Pedestrians are vulnerable transport participants, and their movement analysis is always an up-to-date issue. The paper tries to present the zebra crossing without traffic lights (in the following un-signalized) on one-way one-lane roads. The video opened up new dimension to evaluate some parameters (gap time, speed distribution). The measured and the estimated parameters were used in the simulations. With help of the simulation the paper aims are to analyze the influence of pedestrians and cars on crossing movements. The paper describes that the

relationship between delay, volume and pedestrian volume could justify the establishment of the signalized control.

István Fi - Ibolya Szentpéteri: A Mechanistic-Empirical Approach for Asphalt Overlay Design of Asphalt Pavement Structures. Periodica Polytechnica, 2013

Abstract
Nowadays many overlay design methods are known, which is different from country to country. The current Hungarian overlay design standard goes back several decades, when the laying of a new asphalt layer on the existing pavements meant the overlay of pavement. Because of the spreading of new construction technologies and economics it is necessary to develop methods, which can take into account the characteristics of existing pavement structure after remove of the surface and binder course. This paper deals a suggestion for overlay design, which is based on mechanical-empirical method and developed at Highway Laboratory of BME. The method uses the strain value at the bottom of existing asphalt layer and the equivalent modulus of pavement structures for determination of overlaid binder course.

Balázs L György, Lublóy Éva Eszter: REINFORCED CONCRETE STRUCTURES IN AND AFTER FIRE. CONCRETE STRUCTURES 13: pp. 73-80. (2012)

Construction materials suffer in fire. Deterioration of material characteristics and structural performance highly depend on constituents and on the temperature history. Design for high temperatures requires additional aspects of material composition and material characteristics compared to design for ULS (ultimate limit states) and for SLS (serviceability limit states).
A detailed experimental analysis is given to modification of various characteristics such as surface cracking (spalling), strength (compressive strength, flexural strength) and bond between concrete and reinforcement. Present experimental study included variable tests: cements with different slag contents as well as different aggregates (quartz gravel and expanded clay), different fibres (polypropylene and steel both with various geometries).
Present test results provide information on possible optimization of concrete composition for high temperatures including selection of appropriate cement, aggregate and fibres.

L Dunai, B Kövesdi, U Kuhlmann, B Braun: Design of girders with trapezoidal corrugated webs under the interaction of patch loading, shear and bending. STEEL CONSTRUCTION-DESIGN AND RESEARCH 1:(5) pp. 16-22. (2012)

The corrugated steel plate has been used in many applications for a long time because of its favourable properties. Engineers have realized a potential application in bridge structures, too, especially hybrid bridges. Among modern bridge erection methods, incremental launching is one of the most competitive. When incremental launching is used to erect a bridge, the girder is subjected to a combined action of transverse force (F), shear force (V) and bending moment (M), resulting in a complex stress field and a combined loading situation. The current version of EN 1993-1-5, Annex D, includes design methods for the bending and shear resistance of corrugated web girders, but no recommendations for the patch loading resistance calculation or consideration of different interactions (F+V; F+M). Therefore, this paper focuses on the experimental and numerical investigations into the structural behaviour of corrugated web girders under all the aforementioned actions. Design proposals are developed to determine the patch loading resistance of corrugated web girders and two interaction equations are proposed to take into consideration the reduction in resistance due to the combined loading situation.

B Kövesdi, L Dunai, U Kuhlmann: Interacting stability behaviour of steel I-gerders with corrugated webs. THIN-WALLED STRUCTURES 2012:(61) pp. 132-144. Paper TWST-D-12-00039. (2012)

abstract
Due to its advantages corrugated steel plates are widely used in various applications. Engineers

realized a potential application field in bridges, especially in composite bridges. When such a bridge is incrementally launched, the girder is subjected to combined action of bending moment, shear and transverse forces, resulting in a complex stress field and interacting instability phenomena. The current paper focuses on the experimental and numerical investigation of the structural behaviour of the girders with corrugated webs under all of the above mentioned actions. 12 large scale test specimens are investigated under combined patch load and bending moment. Based on the experimental investigations a numerical model is developed and the structural behaviour of the girders with corrugated web is analysed under the complex loading situation due to combined bending moment, shear force and patch loading.

B Kövesdi, B Jáger, L Dunai: Stress distribution in the flanges of girders with corrugated webs. JOURNAL OF CONSTRUCTIONAL STEEL RESEARCH 79:(12) pp. 204-215. (2012)

Abstract: The corrugated steel plate is a widely used structural element in many fields of application because of its numerous favourable properties. Due to the web corrugation the normal and shear stress distribution in the flange and web plates are different from the stress distribution of the conventional I-girders under in-plane bending and shear. The focus of this paper is the analysis of the stress distribution in the flanges of the girders with corrugated webs. Due to the corrugated web an additional transverse bending moment arises in the flange, which results in an additional normal stress distribution what has an effect on the bending moment resistance. The additional transverse bending moment comes from the shear force in the corrugated web and its value depends on the geometry of the corrugation profile. The effect and the tendency of this transverse bending moment is analysed in the current paper. Based on experimental background a numerical model is developed to analyse the stress distribution in the flanges. Tendency of the additional normal stresses are determined and based on the numerical results an enhanced design method is proposed to determine the transverse bending moment and the additional normal stresses.

Németh Orsolya Ilona, Majorosné Lublóy Éva, Farkas György: "Hőmérséklet hatása a polimerbeton mechanikai tulajdonságaira" Építőanyag 2012/3-4 (64.évf.3-4.szám)
ABSTRACT
The effect of thermal load in mechanical properties of a polymer concrete The polymer concrete is defined as a concrete in which the binding material is some kind of polymer. Consequently, the mechanical properties and the possible applications are essentially influenced by the change of temperature and the load caused by fire. In our study we introduce the changes caused by thermal load in mechanical properties of a polymer concrete having given composition. During the tests, we subjected the polymer concrete specimen of given composition to load in four stages (20°C, 100°C, 200°C, 300°C), then we determined the residual flexural strength, compression strength and modulus of elasticity. The changes occurring as a result of thermal load were compared to the measured strength values of the traditional concrete.

Viktor Budaházy, László Dunai: Parameter-refreshed Chaboche model for mild steel cyclic plasticity behaviour, Periodica Politechnica, 2012.
ABSTRACT
The development of a suitable model to describe the large amplitude of low cycle plastic fatigue is very important in seismic design. This paper deals with a special Chaboche model combination based on nonlinear kinematic hardening, which is able to describe the cyclic mechanical behaviour of structural steel. The physical phenomenon of plastic cyclic loading, the approximation of numerical model are detailed. The calculation of model parameters, the effect of used constants and the calibration are discussed.

Zoltán Bocskai, Imre Bojtár: Biomechanical Modelling of the Accommodation Problem of Human Eye, Acta of Bioengineering and Biomechanics

ABSTRACT
This paper deals with the biomechanical analyses of the human eye with a complex numerical model. We present our complex three dimensional finite element model included the built-up parts, used material and geometric properties, after we describe the subjects what we want to investigate with this 3D model: such as accommodation, presbyopia and so on. We highlight the accommodation problem of the crystalline lens with surrounding parts. We discuss and explain the connection between the age-related material properties, geometric and refractive parameters and amplitude of accommodation. The results are shown that beside the geometry and material properties, the refractive attribute are important too.

Juhász Péter, Kopecskó Katalin: "Consolidation and strenghtening effect of biomineralization on porous materials.", CONCRETE STRUCTURES, 13:(1) pp. 65-71. (2012)
Porous materials are widely used for construction purposes. While they are often exposed to environmental impacts, their deterioration and decay is unavoidable in a longer period of time. Therefore protectionof porous materials, such as concrete, brick and stone, is necessary. Bacteria induced calcium carbonateprecipitation nowadays is a widely examined process, being a possible alternative for traditional conservation methods. Biomineralization could not only be used for surface treatments, but also for in-depth post-consolidation of porous materials. There are also investigations on the development of compound materials where bacteria formed crystals act as a binder agent. While biomineralization has already been used for constructional purposes, application connected in situ experiments are recommended by researchers engaged in this field. This paper gives a summary about the possible applications of bacteria induced precipitation on porous materials, and shows the result of an experiment carried out on Hungarian porous limestone specimens. In our experiment, method and curing material developed by a French research group were applied in situ. Cured specimens gave better results for all the examined properties, comparing to the non-cured ones. While effective penetration depth of the curing compound plays an important role in conservation, examination of the penetration depth was also subject of our experiment.