MINISTERUL EDUCAȚIEI NAȚIONALE

UNIVERSITATEA TEHNICĂ "GHEORGHE ASACHI" DIN IAȘI

FESTIVALUL INTERNAȚIONAL AL EDUCAȚIEI

PRIMĂRIA MUNICIPIULUI IAȘI

PROGRAM

CONFERINȚA ȘCOLII DOCTORALE

IAȘI, 22-23 MAI, 2019

Sâmburele Politehnicii a fost plantat acum 206 ani, la Iași, în 1813, iar din acel moment școala de inginerie ieșeană s-a dezvoltat continuu și a înflorit deosebit de frumos. În ultimii ani asistăm la creșterea numărului solicitărilor de absolvenți de studii inginerești, precum și la diversificarea acestora. Am devenit părtași la debutul unei evoluții firești a societății românești, o societate forțată să își întoarcă fața către educația tehnică, iar universitățile au un rol fundamental în această direcție.

Însă rolul unei universități nu se rezumă doar la cel educațional. O universitate produce cercetare de înaltă calitate, urmărește mereu inovația, ineditul și, foarte important, caută să disemineze rezultatele acestor cercetări către colegii noștri și, într-o versiune mai ușor de înțeles, și către publicul larg. Punțile dintre cercetarea din mediul academic și cea din companii s-au format greu în România, dar astăzi putem să observăm importanța lor și să concludem că așteptarea a fost bine-meritată. Contribuim împreună la o comunitate globală a științei, un fapt de necrezut în urmă cu doar câteva decenii în România, când asupra țării noastre atârna greu o cortină de fier.

De aceea Universitatea Tehnică „Gheorghe Asachi" din Iași (TUIASI) organizează evenimente de calibrul celor la care participați astăzi. Conferința Internațională a Școlii Doctorale TUIASI ne duce un pas mai aproape către țelul nostru, de a crea un cadru în care cercetătorii să poată colabora, să își prezinte ideile, inovațiile, să găsească metode de a colabora, inter sau trans-disciplinare. Să putem, cum a spus jurnalistul american Sydney J. Harris, să transformăm, prin educație, oglinzile în ferestre.

The seed of our university was planted 206 years ago in Iași, in 1813, and since then the Gheorghe Asachi Technical University of Iași (TUIASI) has been on a constant course of development and has bloomed very beautiful. In the past few years, we have witnessed an increased and more diverse request for engineering graduates. We have become a part of a natural evolution of the Romanian society, a society forced to turn its face towards technical education, and universities have a fundamental role in this transformation.

But education is not the only core purpose of a university. A university produces high-quality research, always pursues innovation, daring to be novel, and, very importantly, seeks to disseminate the results of all research to our colleagues worldwide and to the general public as well. The bridges between academic and corporate research have been a long time coming in Romania, but today we can see their importance and conclude that all that waiting has been rewarded. We contribute together to a global science community, something unthinkable just a few decades ago in Romania, when the communist iron curtain was strung over our country.

That's why the Gheorghe Asachi Technical University of Iasi organizes events like the one you are attending today. The TUIASI Doctoral School International Conference takes us a step closer to our goal: creating a framework to help researchers collaborate, present their ideas, their innovations, to help them find ways to collaborate, inter or transdisciplinary. We can, as the American journalist Sydney J. Harris said, turn mirrors into windows through education.

Prof.univ.dr.ing. Dan Cașcaval

Rector TUIASI

PREȘEDINTE DE ONOARE
Prof.univ.dr.ing. Dan Caşcaval
Rectorul Universității Tehnice „Gheorghe Asachi" din Iași

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Director al Şcolii doctorale TUIASI
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Prof.univ.dr.ing. Silvia Curteanu
Facultatea de Inginerie Chimică și Protecția Mediului "Cristofor Simionescu"
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Facultatea de Mecanică

COMITETUL DE ORGANIZARE

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DATA	UNIVERSITATEA TEHNICĂ ”GHEORGHE ASACHI” DIN IAŞI - CORP T			
	ORA	**Sala de Conferinţe TUIASI**		
22 MAI	**08:00-09:00**	ÎNREGISTRAREA PARTICIPANȚILOR		
	09:00-09:30	DESCHIDEREA OFICIALĂ		
	09:30-11:00	**LUCRĂRI ÎN PLEN** Preşedinte, Prof.univ.dr.ing. Liviu Goraş		
	9:30 -10:00	Prof.univ.dr.ing. Maria Gavrilescu - *”Amprenta ecologică a sistemului industrial şi producția industrială durabilă”*		
	10:00 -10:30	Prof.univ.dr.ing. Nicolae Taranu – *„Contribuții la dezvoltarea programelor de doctorat la facultatea de construcții și instalații Iași”*		
	10:30 -11:00	Prof.univ.dr.ing. Maricel Agop – *„Implementări holografice în dinamica sistemelor”*		
	11:00 -11:30	**PAUZĂ DE CAFEA**		
	11:30-13:00	**LUCRĂRI ÎN PLEN** Preşedinte: Prof.univ.dr.ing.ec. Dumitru Nedelcu		
	11:30 -12:00	Prof.univ.dr.ing. Paul-Doru Barsanescu - *„Senzori pentru cantărirea autovehiculelor aflate în mişcare şi monitorizarea traficului"*		
	12:00 -12:30	Prof.univ.dr.ing. Iulian Ciocoiu - *„Progrese recente în domeniul inteligenţei artificiale”*		
	12:30 -13:00	Prof.univ.dr.ing. Florin Leon – *„Metode avansate de inteligenţă artificială”*		
	13:00-15:00	**PAUZĂ DE MASĂ**		
		UNIVERSITATEA TEHNICĂ ”GHEORGHE ASACHI” - CORP T		
		SALA 1 - Sala de Conferinţe TUIAȘI **Preşedinţi:** **Prof. Adam Maricel** **Prof. Corneliu Lazar**	**SALA 2 - Amfiteatrul T2** **Preşedinţi:** **Prof. Carmen Bujoreanu** **Prof. Viorel Goanta**	**SALA 3 - Amfiteatrul T3** **Preşedinţi:** **Prof. Silvia Curteanu** **Prof. Ioan Mamaliga**
	15:00-15:15	*Mechanical treatment through rotopercution of the interior surface of the thermical engine cylinder* Daniel Chirita Ph.D. Supervizor: Prof. Dumitru Nedelcu	*Glass fiber reinforced plastics behaivior at shear loading simulated by FEM* Narcis Andrei Danila, Ciprian Moraras, Igor Blanari, Paul Doru Barsanescu Ph.D. Supervizor: Prof. Paul Doru Barsanescu	*Pillaring cationic clays and their uses in the enology* Hartolomeu Andreea, Mirila Diana Carmen Ph.D. Supervizor: Nistor Denisa Ileana
	15:15-15:30	*Aspects regarding contact resistance measurement* Deac Cosmin Ph.D. Supervizor: Prof. Adam Maricel	*The reliability for some subassemblies in the structure of 060-DA diesel-electric locomotive* Mihail Alexandrov, Viorel Goanta, Daniel Apostol, Igor Blanari, Marian Mares Ph.D. Supervizor: Prof. Viorel Goanta	*A novel catalyst based on smectite clay pillared with Silver- characterization, synthesis and application* Mirila Diana Carmen, Pirvan Madalina Stefania, Platon Nicoleta, Raducanu Dumitra, Didi Mohamed Amine, Azzouz Abdelkrim Ph.D. Supervizor: Prof. Nistor Denisa Ileana

	15:30-15:45	*The study of algorithms of the industrial vision system along with the development of alternative algorithms* Bartlomiej Nalepa, Aleksander Gwiazda	*Experimental analysis on high pressure pump sealing gaskets* Diana Bistriceanu, Carmen Bujoreanu Ph.D. Supervizor: Prof. Carmen Bujoreanu	*Tailoring the rational design of layered double hydroxides matrices for the efficient removal of heavy metals from queous solutions* Dorina Stanciulescu, Zaharia Carmen, Gabriela Carja Ph.D. Supervizor: Prof. Gabriela Carja
	15:45-16:00	*Aspects regarding the systems management with renewable energy sources* Atansaoaei Marian, Tanasa Vasile Ph.D. Supervizor: Prof. Maricel Adam	*Stress/Strain analysis at the wheel – rail contact under the influence of thermo-mechanical loads* Igor Blanari, Narcis-Andrei Danila, Mihail Alexandrov, Viorel Goanta Ph.D. Supervizor: Prof. Viorel Goanta	*Tailoring photocatalysts nanoarchitectonics for degrading industrial dyes* Gilea Diana, Dranca Sofronia, Gabriela Carja Ph.D. Supervizor: Prof. Gabriela Carja
22 MAI	16:00-16:15	*String stability analysis of adaptive cruise control vehicle platoons* Alexandru Tiganasu, Corneliu Lazar Ph.D. Supervizor: Prof. Corneliu Lazar	*Simulation of crack propagation in gears using Finite Element Analysis* Claudiu Daniel, Viorel Goanta Ph.D.Supervizor: Prof. Viorel Goanta	*About tailoring the textural and structural properties of some layered double hydroxides by using Fesem and XRD analyses* Ignat Eugenia Corina, Gilea Diana, Gabriela Carja Ph.D. Supervizor: Prof. Gabriela Carja
	16:15-16:30	*Implementation issue for one-step-ahead predictive control of an induction machine* Madalin Costin Ph.D. Supervizor: Prof. Corneliu Lazar	Finite element analysis of the vibrorolling process used in burnishing metallic surfaces Claudiu Danila, Gheorghe Nagit Ph.D. Supervizor: Prof. Viorel Goanta	*Modern extraction techniques and finger prind analysis of bioactive compounds from plants biomass extracts* Georgiana Mardare, Teodor Malutan Ph.D. Supervizor: Prof. Teodor Malutan
	16:30-16:45	*Documentary study on monitoring by the modern methods of the stability of earth dams* Agapie Ioana, Luca Mihail Ph.D. Supervizor: Prof. Luca Mihail	*A comparison between improved Blade Element Momentum method and QBlade simulation for three different airfoils* Dorin-Emil Husaru, Paul Barsanescu Ph.D.Supervizor: Prof. Paul Barsanescu	*Artificial neural networks developed withj clonal selection algorithm for modelling the naphthalene sublimation process* Ana-Maria Alexoaie-Conache, Elena-Niculina Dragoi, Silvia Curteanu Ph.D. Supervizor: Prof. Silvia Curteanu
	16:45-17:00	*Retrofitting individual foundations in building rehabilitation* *Alexandru Cotor, Irina Lungu, Ioana Olteanu-Dontov* Ph.D. Supervizor: Prof. Irina Lungu	*Failure of roller-shoe contact from high-pressure injection pumps* Razvan-Constantin Iordache, Carmen Bujoreanu Ph.D.Supervizor: Prof. Carmen Bujoreanu	*Separation of waste industrial gases with magnesium* Ioan Barabulica, Mircea Teodor Nechita Ph.D. Supervizor: Prof. Ioan Mamaliga
	17:00-17:30	**PAUZĂ DE CAFEA**		

		Preşedinţi: Prof. Luca Mihail Prof. Ion Serbanoiu	Preşedinţi: Prof. Alina Adriana Minea Prof. Paul Doru Barsanescu	Preşedinţi: Prof. Maria Gavrilescu Prof. Daniela Suteu
22 MAI	17:30-17:45	*Elements of specificity regarding the technical stat of historical constructions with defense role* Andrei Victor-Andrei, Livia Ingrid-Diaconu Ph.D. Supervizor: Prof. Liviu Groll	*A numerical study on ionic liquids – water mixture based ionanofluid enhanced with alumina nanoparticles* Elena Ionela Chereches, Marius Ionut Chereches Ph.D.Supervizor: Alina Adriana Minea	*Researches on biopesticides with vermifug and insecticide effect obtained by extraction with non-toxic solvents* Gabriel Daraban, Marinela Badeanu, Lacramioara Rusu, Daniela Suteu Ph.D. Supervizor: Prof. Daniela Suteu
	17:45-18:00	*Considerations on gully erosion in Romania and combating solutions* Andriescu Petronela, Mihail Luca, Ciobanita Maria-Mihaela Ph.D.Supervizor: Prof. Mihail Luca	Structural testing by torsion of scalable wind turbine blades Moraras Ciprian, Goanta Viorel, Paul-Doru Barsanescu, Leitoiu Bogdan Ph.D. Supervizor: Prof. Viorel Goanta	*Utilization of residual biomass as biosorbent: study of the batch biosorption process of some chemical species present in aqueous media* Ioana Luiza Horciu, Alexandra Cristian Blaga, Carmen Zaharia, Sonia Dascalu, Daniela Suteu Ph.D. Supervizor: Prof. Daniela Suteu
	18:00-18:15	*Improvement of safety of road infrastructure and transport networks* Angela Popusoi (Roman) Ph.D. Supervizor: Prof. Gheorghe Gugiuman	*Behaviour of different types of check valves used in hydraulic systems* *Narcis Daniel Petrea, Carmen Bujoreanu* *Ph.D. Supervizor: Prof. Carmen Bujoreanu*	*Behavior of plants in the presence of organic UV filters* Mariana Minut, Mihaela Rosca, Petronela Cozma, Cezar Catrinescu, Mariana Diaconu, Maria Gavrilescu Ph.D. Supervizor: Prof. Maria Gavrilescu
	18:15-18:30	*The analysis of June 2016 Voronet River flood effects in "Voronet Monastery" area* Mihaela Avram, Paul Vivian Sion, Mihail Luca Ph.D.Supervizor:Prof. Mihail Luca	Simulation of a hydraulic system used for wind turbine pitch control Rares Iulian Pelin, Emil Dorin Husaru Ph.D. Supervizor: Prof. Paul Doru Barsanescu	*Removal of heavy metal ions from aqueous effluents using mustard wate biochar as absorbent* Alina Mihaela Matcaboja, Anca Mihaela Mocanu, Gabriela Lisa Ph.D. Supervizor: Prof. Laura Bulgariu
	18:30-18:45	*Evolution of user requirements comparative with evolution of buildings* Bogdan Chirila, Ph.D. Supervizor: Prof. Ion Serbanoiu	A case study of environmental polluation in relation to particulate matter Costel Soroiu, Carmen Bujoreanu Ph.D. Supervizor: Prof. Carmen Bujoreanu	*Optimization of biosorption process for hexavalent chromium removal by microorganisms* Mihaela Rosca, Mariana Diaconu, Maria Gavrilescu, Ph.D. Supervizor: Prof. Maria Gavrilescu
	18:45-19:00	*Optimum structural rehabilitation strategies for residential housing buildings* Bogdan Chirila, Ion Serbanoiu Ph.D. Supervizor: Prof. Ion Serbanoiu		*Influence of lubricant of the friction in an angular contact ball bearing* Andrei Popescu, Madalin Corduneanu, Olaru Dumitru Ph.D. Supervizor: Prof. Olaru Dumitru

	19:00-19:15	*Performance evaluation of the Podu Iloaiei Town water supply system from the "water loss" phenomenon perspective* Stefania Chirica, Mihail Luca Ph.D. Supervizor: Prof. Mihail Luca		*Friction forces on human finger skin* Cezara Mariuca Oprisan, Stefan-Cirpian Marchidan, Vlad Carlescu, Olaru Dumitru Ph.D. Supervizor: Prof. Olaru Dumitru
	19:15-19:30	Studies on the predictability and quantification of quality-specific activities in the construction – construction formwork Nicolaie Gabriel Costoaea, Marinela Barbuta, Velicu Cristian Ph.D.Supervizor:Prof. Marinela Barbuta		

DATA	**ORA**	**SALA 1 - Sala de Conferinte TUIAȘI**	**SALA 2 - Amfiteatrul T2 Preşedinţi: Prof. Gheorghe Dumitrascu Prof. Mihăiţă Horodincă**	**SALA 3 - Amfiteatrul T3 Preşedinţi: Prof. Laura Bulgariu Prof. Dan Gavrilescu**
23 MAI	09:00-09:15		*The influence of the Combustor Geometry upon the Combustion Features* Stefan Grigoreanu, Gheorghe Dumitrascu Ph.D. Supervizor: Prof.	*Preliminary studies about metallic ions retentions from aqueous soultions onto PVA hybdrid hydrogels* Iulia Nebunu, Ramona Elena Farmus, Raluca Ioana Baron, Sergiu Coseri, Daniela Suteu Ph.D. Supervizor: Prof. Daniela Suteu
	09:15-09:30		Experimental investigations on pollutant content inside the car in relation to pollen filters improvements Aida Maria Vranau, Carmen Bujoreanu Ph.D. Supervizor: Prof. Carmen Bujoreanu	*Recovered paper as raw material for paper industry. Geometrical characteristics of cellulosic fibers* Corina Iuliana Patraucean Ph.D. Supervizor: Prof. Dan Gavrilescu
	09:30-09:45		*Coating of liquid wood granules with silver nanoparticles by the pvd process* Justina Georgiana Motas, Dumitru Nedelcu Ph.D. Supervizor: Prof. Dumitru Nedelcu	*Removal of Cu(II) ions from aqueous media by absorption on PET fibres functionalized with reactive dye* Ramona Copae Ph.D. Supervizor: Prof. Laura Bulgariu

23 MAI	09:45-10:00		*Manufacture, simulation and verification of prostheses assisted by the 3d virtual environment* Adrian-Gabriel Ionescu Ph.D.Supervizor: Prof. Neculai Eugen Seghedin	*Use of Saccharomyces cerevisiae yeast to remove Cu(II) ions from queous media* Evghenia Savastru, Catalin-Ioan Zamfir Ph.D. Supervizor: Prof. Laura Bulgariu
	10:00-10:15		*Characterization in terms of fragility of the parts gripped in the devices* Moldovan Catalin, Neculai Eugen Seghedin Ph.D. Supervizor: Prof. Neculai Eugen Seghedin	*Lindane toxic effects on white mustard (Sinapis alba) and rapeseed (Brassica napus)* Sebastian Ionut Vasilica, Mihaela Rosca, Petronela Cozma, Diana Elena Comanita, Mariana Diaconu, Cezar Catrinescu, Maria Gavrilescu Ph.D. Supervizor: Prof. Maria Gavrilescu
	10:15-10:30		*Methodology for assessing the entrepreneurial skills and entrepreneurial abilities of engineers* Violeta Greciuhin Ph.D. Supervizor: Prof. Neculai Eugen Seghedin	Economic and technical criteria for designing prestressed concrete beams Ioan-Lucian Stan, Petru Mihai Ph.D. Supervizor: Conf. Petru Mihai
	10:30-10:45		*The systemic approach use in studying industrial processes* Bogdan Oroian, Ionut Condrea, Carmen Botezatu, Mihaela Etcu, Adelina Hrituc, Ionel Coman, Laurentiu Slatineanu Ph.D. Supervizor: Prof. Laurentiu Slatineanu	*The influence of the durability factors on a special reinforced concrete structure's in time behaviour* Alexandru Filip, Daniel Covatariu Ph.D. Supervizor: Prof. Liviu Groll
	10:45-11:00		*The concept of a new type of continuously variable transmission for bicycle* Julian Malaka Ph.D. Supervizor: Prof. Marius Hetmanczyk	*Calculus optimization of a strengthening method for a reinforced concrete beam using carbon fiber reinforced polymer composites* Alexandru Filip, Daniel Covatariu Ph.D. Supervizor: Prof. Liviu Groll
	11:00-11:30	**PAUZĂ DE CAFEA**		
			Preşedinţi: **Prof. Gheorghe Dumitrascu** **Prof. Mihăiţă Horodincă**	**Preşedinţi:** **Conf. Petru Mihai** **Prof. Statescu Florian**
	11:30-11:45		*The influence of caprolactam concentration in electrolyte on polarization of steel C45 catode at electrolytic iron deposition* Ungureanu Eugeniu	*Structural particularities for an ununiform building, in plan and elevation, situated in a seismic area* Vladut-Ionel Iftode, Ioana Olteanu-Dontov, Petru Mihai Ph.D. Supervizor: Conf. Petru Mihai

23 MAI	11:45-12:00		*Axe geografice de dezvoltare in judetul Salaj* Sergiu Panie Ph.D. Supervizor: Prof. univ.dr.habil Călin Cornel POP	Elements for increasing the durability of the reinforced concrete reservoirs Adrian Grigorean, Liviu Groll, Lucian Cozma Ph.D. Supervizor: Prof. Liviu Groll
	12:00-12:15			Designing of prestressed precast concrete beams in chlorides environment Ioan-Lucian Stan, Petru Mihai Ph.D. Supervizor: Conf. Petru Mihai
	12:15-12:30			Principles of green roofs design Ioana-Roxana Baciu, Marius Lucian Lupu, Sebastian George Maxineasa Ph.D. Supervizor: Prof. Nicolae Taranu
	12:30-12:45			*The analysis of the floods on the Moldova River in Pildesti area during 2016-2018* Paul Vivian Sion, Mihaela Avram, Stefania Chirica, Mihail Luca Ph.D. Supervizor: Prof. Mihail Luca
	12:45-13:00			*Development of unit hydrograph for Jijia river using AreGis* Anca Danila Ph.D. Supervizor: Ioan Giurma
	13:00-13:15			*Floods recorder in torrential water catchment area* Luca Ana Iulia, Mariana Clarisa Ph.D. Supervizor: Prof. Ioan Giurma
	13:15-13:30			*Influence of sludge at the wastewater treatment plant in Tomesti, Iasi over the groundwater* Georgiana Cezarina Bartic, Florian Statescu, Trofin Orest Ph.D. Supervizor: Prof. Florian Statescu
	13:30-13:45			*Differences between a passive house a nearly zero energy building* Marius Lucian Lupu, Ioana Roxana Baciu, Sebastian George Maxineasa Ph.D. Supervizor: Prof. Dorina Nicolina Isopescu

	13:45-14:00			*The actual stage of research in the field of measures to reduce the sensivity at the moisture of the patent literature* Sebastian Petru Boboc, Sorin Babliuc Ph.D. Supervizor: Prof. Gheorghe Gugiuman
	14:00	**INCHIDEREA CONFERINȚEI / PREMIEREA LUCRĂRILOR**		

SECȚIUNEA I - *22 MAI 2019*

15:00-15:15 - *Mechanical treatment through rotopercution of the interior surfaces of the thermical engine cylinder*

Daniel Chirita
PhD Supervisor: Prof. Dumitru Nedelcu

Abstract:
In an internal combustion engine with a piston, the mechanical efficiencies depend on the energy of the fuel that diminishes due to losses in heat and friction between the moving parts of the engine. The relationship between oil film thickness and friction coefficient is a curved line from which it is possible to define different lubrication regimes. Our interest is focused on an innovative surface resulted from mechanical texturing treatments. We want to develop this process in order to improve the mechanical and tribological performances of the segment-cylinder coupling in the thermal motors.
The efficiency, reliability and durability of the components in the segment-cylinder coupling depends on the friction that takes place on the contact interface. In addition, from the desire to increase the load capacity or the power density of the engine elements at lower volumes, they lead to higher intensities of surface interactions in order to increase power, causing a change in the lubrication strategy for the coupling surfaces.
The behavior of the lubricated surfaces is known, but what we want is to propose a hydrodynamic lubrication regime in the segment-cylinder coupling using the rectilinear motion of the segment on the textured surface of the cylinder.
Key words: plastic deformation, rotopercuts, bore, roughness, concavities

15:15-15:30 - *Aspects Regarding Contact Resistance Measurement*

Cosmin Deac
PhD Supervisor: Prof. Maricel Adam

Abstract:
The presence of an electrical contact on a current path always highlights an additional electrical resistance R_c, called contact resistance. The study shows an analysis of the method for the contact resistance measurement in case of an equipment dedicated to this purpose.
The study will realize an experimental investigation on multiple types of contacts and at different test current values reported at their nominal current by monitoring certain parameters (current, voltage).
Keywords— electrical contacts; contact resistance; current; monitoring.

INTRODUCTION

An electrical contact, run by a current of intensity I, is characterized by the voltage drop on the contact U_c, given by the formula:

$U_c = R_c I$.

The existance of the contact resistance can be explained by two processes, consisting in the constriction of the current lines, on one side and the the coverage of the contact surface with disturbing films, on the other side.
The electrical resistance is a physical size which in electrical installations can take values from 10^{-8} Ω (contact resistances, resistances of some massive conductors) to 10^{18} Ω (resistances of some high quality insulators). The range of the measurement frequencies being from 0 Hz (d.c.) to hundreds of megahertz.
Regarding the contact resistance, it can be measured in static or dynamic regime with the help of the volt-ammeter method, [4]. In the study aspects regarding the measurement of static contact resistance are analyzed.

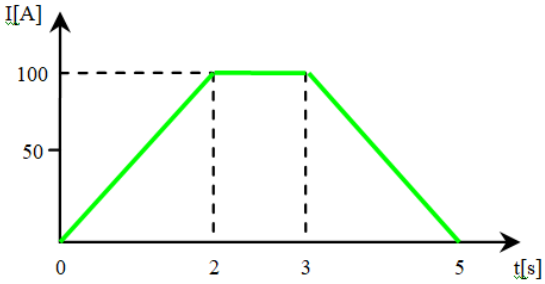
CONTACT RESISTANCE COMPONENTS

The contact resistance is determined essentially by the pressing force F_c. If the pressing force tends towards zero, the contact resistance tends towards very high values, reason for which the main contacts of the electrical equipment having high nominal current are equipped with pre-compressed springs. This

way a sufficient pressing force is ensured right from the moment the contacts touch, preventing the development of a high heat quantity which would cause their welding, [1, 2].
The contact resistance R_c, has two components which can be considered, in the first approximation, independent of each other:
$R_c=R_s+R_p$
The R_s component is called constriction resistance. It is caused by the strangled passage of the current lines through the contact area. As a result, the passage of current through these micro-surfaces leads to an increase in current density and voltage drops, [1, 2].
The R_p component is called film resistance. It is caused by the existence on the contact surfaces of semi-conducting films, which oppose resistance in the way of current passing.
Depending on the nature of the materials and the constructive version, there are limit values of the pressing forces, to whose overrun do not offer any visible decreases of the contact resistance. These efforts have for example values of 5÷10 N/mm^2 for copper, 20÷30 N/mm^2 for aluminum, 2÷5 N/mm^2 for zinc, [1, 2].

EQUIPMENT FOR CONTACT RESISTANCE MEASUREMENT

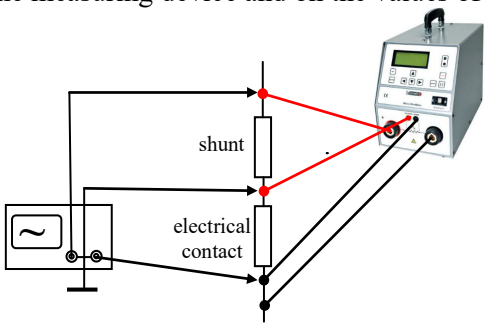
One of the equipment used for contact resistance measurement is the micro-ohmmeter RMO. It is an equipment designed for the contact resistance measurement in direct current, RMO generates a continuous current without distortion (filtered), with predefined current slopes and automatically controlled. During the RMO test the current rises and after measurement is made the current intensity decreases.



Evolution of the current on the tested object

CASE STUDY

Using an experimental installation which contains a current transducer (shunt), an equipment for the measurement of contact resistance (RMO500A) which has the possibility to provide test currents between 5A÷500A and a numeric oscilloscope, contact resistance measurements will be realized on contacts which have different nominal currents.
The experimental recordings will be analyzed and the timings when the RMO realizes the measurements of the contact resistances will be determined.
For the attempts, different values of the test current will be used (0,1; 0,2; 0,25; 0,5; 0,75; 1)×I_n and it will be analyzed if the values of the measured resistance depends on the time the measurement is done by the measuring device and on the values of the measuring current.



The electrical scheme for experimental determinations.

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15:30-15:45 - The study of algorithms of the industrial vision system along with the development of alternative algorithms

Bartlomiej Nalepa, Aleksander Gwiazda

Abstract:
Designing a control system for a production line or other industrial process requires the selection of not only the control unit of the system, but also sensors that send information about the current state of the process. In the case of a more complicated process, a vision system is necessary. Vision systems used in
industry are closed systems. This means that the user can write the application in a dedicated environment
by the manufacturer, but it does not allow creating new algorithms that process data read from individual image pixels. The aim of the research will be, therefore, to compare the algorithms provided with the equipment by the manufacturer with applications developed in open environments that use commonly available libraries for digital image processing. The tests will be carried out on a prepared object containing elements whose recognition together with determining the location in a given coordinate system is possible only with the use of a vision system. Next, the image will be analysed by algorithms developed by a specific manufacturer of industrial vision systems and algorithms developed using open software. The tests will be carried out on one industrial 3D camera. The next stage of research is the preparation of algorithms that allow to compare two processed images obtained by using the discussed algorithms. The last point in the comparison of image processing algorithms will be the analysis of results
together with the indication of the best solution for vision systems used in industrial applications.
Key words: vision systems, digital image processing, mathematical statistics, image rendering, numerical
Methods

15:45-16:00 - Aspects regarding the systems management with renewable energy sources

Marian Atanasoaei, Vasile Tanasa
PhD Supervisor: Prof. Maricel Adam

Abstract:
Due to environmental concerns and the limited reserves of primary energy resources, renewable energy conversion systems are becoming more and more important. Also, the continuous increase in the production, storage and consumption of energy from renewable sources requires the design and implementation of increasingly efficient management systems. Generally, a renewable energy conversion system consists of the following components: the renewable energy source; battery charger controller; battery and inverter. Usually, consumers of such a power conversion system are also powered by the electricity service provider (ESP). The entire renewable energy conversion system should be properly monitored by the management system. So it is necessary to acquire information about the followings: the energy provided by the renewable energy sources and the electricity service provider, the energy consumed, the battery charge, the weather forecast and the energy tariff. It would also be preferable for the management system to inform the user when system operation is inadequate. Depending on the needs and costs, the existing management systems can all have just a few of the facilities listed above. The paper presents a management solution of a system that monitors power flows and state of the entire photovoltaic power conversion system, also providing the facility to transmit information remotely through the interface unit using ethernet communication.
Key words:
power monitoring, ethernet communication, weather forecast, energy tariff.

16:00-16:15 - String Stability Analysis of Adaptive Cruise Control Vehicle Platoons

Alexandru Tiganasu, Corneliu Lazar
PhD Supervisor: Prof. Corneliu Lazar

Abstract:
The actual worldwide transportation infrastructures have a strong need of solutions for increasing their capacities. One solution could be represented by the vehicle organization in platoons. A well-known advanced driver assistance (ADAS) technology that can be used for that is the adaptive cruise control system (ACC). The ACC equipped vehicles are able to maintain certain spacing with respect to the position and velocity of the vehicle in front, but they are subject to string instability which causes the amplification of the oscillations due to speed changes towards the tail of the platoon. In this paper a string stability analysis of ACC vehicle platoons based on a heuristic method of the authors is presented. It is considered a platoon implemented with distance-based ACC control structures that use a linear quadratic regulator with a double integrator. For the platoon formed in this manner, a string stability analysis is required to check if the spacing errors are increasing or decreasing along the platoon. The method used to establish if a platoon configuration is stable is based on the determination whether the infinite norm of the spacing errors transfer function is smaller or equal to 1. If the inequality is fulfilled it means that the distance errors don't amplify upstream. The distance references of ACC structures are depending on the vehicle velocity and on a time-headway (h_i). In order to establish if the string stability condition is fulfilled, different values for h_i were given in ascending order and some Nyquist diagrams were drawn for the spacing errors transfer function. If the graphical representation is inside the unit radius circle with the center in the coordinate axes origin the platoon is stable. At the same time at a visual inspection of the plotted distance errors was also observed that the string is stable considering that the waveforms were decreasing with respect to time. The smaller value for time-headway h_i that assured the string stability was 0.6s, this meaning that some small distances can be maintained between vehicles using the proposed control algorithm. The experimental results were obtained after the considered platoon was modelled and simulated in Matlab/Simulink.

Keywords:
Vehicle platooning, string stability, adaptive cruise control, transfer function of spacing errors, time-headway.

16:15-16:30 - Implementation issues for one-step-ahead predictive control of an induction machine

Madalin Costin
PhD Supervisor: Prof. Corneliu Lazar

Abstract:
Induction machine drives with adjustable speed controlled by power converters and advanced signal processors, which are designed for high performances represent one of the actual orientations in the context of motion control systems developing. In this paper is presented the implementation issue for one-step-ahead predictive control of an induction machine drive. The induction machine has been modeled in an orthogonal stationary reference frame that aims to separate torque and magnetic flux loops. The control of the induction machine is applied by the power inverter, which may be modeled by switching functions. In this context, the assembly inverter - machine is described by simple relationships which lead to simplifying the implementation procedure. For a proper operation, it has been adopted the one-step-ahead predictive control algorithm which is presented in the presudo-code format. Magnetic flux and electromagnetic torque variables are used for minimizing the piecewise linear cost function. It is assumed that the operation is made on constant value of the magnetic flux, which means that the range of the speed does not exceed the nominal one. As a result of the optimization process of cost function, the predictive controller provides the optimal state of the switches that generate the voltage vector for supplying the induction machine. Thus, on every sampling instant it is selected, from the eight possible states, the one that reaches the extreme value of the cost function. By using predictive control, it is avoided the tuning of the torque controller, as in the case of the classical PI controller, which is replaced with the torque term in the cost function of the predictive controller. Numerical results for simulations performed in Matlab-Simulink® environment confirm the effectiveness of the obtained quantities for speed reference tracking and reject the perturbation of the

load torque. The predictive control of the induction machine is an alternative to the classical methods by providing accurate and reliable results and simplifying the control scheme.
Key words: one-step-ahead predictive control, induction machine, switching functions, pseudo-code, predictive controlle, speed response.

16:30-16:45 – Documentary study on monitoring by the modern methods of the stability of earth dams

Ioana Agapie, Mihail Luca
PhD Supervisor: Prof. Luca Mihail

Abstract:
The study of hydrotechnical constructions allows knowledge of parameters which characterizes the changes over time at the structure of studied construction. Tracking behavior over time of earth masses, in particular of earth dams, aimes to avoid accidents or even breaks of dams. Earth dams are at risk of breaking phenomena due to, mainly, the seepage. This paper describes the methods of monitoring displacements and deformations of earth masses by topographic measurements, using modern geodetic technologies and equipment. The study presents the current state, both nationally and internationally, of the topo-geodetic methods and tools used to monitor earth dams. Modern monitoring methods are also described and compared with classical methods. The tracking process of hydrotechnical constructions is a continuous and long activity which is being carried out at precisely defined and respected intervals. Thus, the state of constructions is always know and any tendencies of atypical evolution can be remarked in time and repaired. In the paper will be described the contemporary methods used in the process of tracking the behavior of hydrotechnical constructions but also classical methods. The most efficient and expeditious monitoring methods are those that use combined GPS station, 3D laser scanner, robotic total station and drones.
Keywords: earth dams, monitoring, topo-geodetic methods, geodetic equipment, GNSS, deformations.

16:45-17:00 – Retrofitting individual foundations in building rehabilitation

Alexandru Cotor, Irina Lungu, Ioana Olteanu-Dontov
PhD Supervisor: Prof. Irina Lungu

Abstract:
In this day and age, both architects and real estate developers are working towards maximizing every building site available. Related to existing building in need of functional retrofitting, one viable option to achieve this desiderate consists in adding storeys and thus extending the available working space. This method has the advantage of being cost-effective and environmentally friendly, but involves adding loads to the existing structure and consequently to the foundation soil. As such, civil engineers have bestowed upon themselves the task of assessing the opportunity of interventions to the initial foundation system.
The paper consists of a case study upon the possibility of adding a new floor to an existing building, with its main focus on the soil-structure interaction. The structure, erected in 1999, consists of reinforced concrete frames, reinforced concrete floors and individual foundations and it is located in the Noth Eastern region of Romania, in the city of Iasi. The building was designed according to the P100-96 code, and did not underwent any major retrofitting since then, maintaining its original dimensions and characteristics of structural and architectural composition.
The negative influence of differential settlements between individual foundations in addition to the supplementary load require the analsys of the benefit when adding strip foundations into the initial foundation system. The research approach regards the position of the new strip foundations to be considered at four different elevations related to the height of the existing individual foundations. The soil-structure interaction is made in each case with different cross-sections for the strip foundations. The analysis was performed according to the P100-3/2008 Roumanian design code and Eurocode 7, using the finite element software. Based on the analysis outputs, conclusions and recommendations will be drawn upon the efficiency of this foundation retrofit solution as part of the building rehabilitation plan.
Key words: Soil-Structure interaction, foundation retrofit, building rehabilitation

17:30-17:45 - Elements of specificity regarding the technical state of historical constructions with defense role

Victor-Andrei Andrei, Livia Ingrind Diaconu
PhD Supervisor: Prof. Liviu Groll

Abstract:
Historical defensive construction is a term that defines a construction designed to provide protection, capable of serving military action and having implications for local, national and universal history, culture and civilization. The construction of the fortifications, their type and strategic positioning required a special architecture, special siege weapons, the choice and adoption of a strategy and tactics appropriate for conquest or defense. The defense architecture includes fortifications of cities, border towns, refuge towns, courtyards, city castles, feudal castles, fortified mansions, churches, monasteries and fortified hermitages, town houses and fortified households. For a proper assessment of the technical state of a historic building with a defense role, particular attention should be paid to specific architectural elements such as: defense walls built of earth or stone, defense towers that can have square, rectangular, circular and semicircular shapes, ramparts: built at the top of the walls and defense towers, allowed to carry out archery, artillery, firearms, throwing of objects, etc., firing holes, guard roads, water supply, cellars, the reserve of building materials, made up for the reconstruction of the enemy's destruction, not least, these elements with a strategic, technical and tactical role are added to the living quarters, the care of the wounded, the preparation of the food and the rest. The main causes of damage to historical buildings are: constructive causes; improper use of the construction; degradation of materials; interaction with the foundation ground; catastrophic actions. The assessment of the technical condition of a building must include information on: the structural system; the type of foundation used; foundation ground and field conditions; general dimensions and composition of the structural elements; the mechanical properties of the building materials used; defects in the quality of the materials and/or deficiencies in the construction of the elements, including foundations, the destination and mode of use of the construction, and the actions applied to the construction during the exploitation period; the nature and extent of structural and non-structural degradation; maintenance work, current repairs, capital repairs, consolidations or upgrades.
Key words: Historical defensive construction, fortifications, technical state, degradation, stone

17:45-18:00 - Considerations on gully erosion in Romania and combating solutions

Petronela Andriescu, Mihail Luca, Maria-Mihaela Ciobanita
PhD Supervisor: Prof. Luca Mihail

Abstract:
In Romania about 2/3 of the country's surface and over 36% of the arable land is situated on slopes. The areas most affected by water erosion are Moldavian, Getic, Transylvanian and Someșan Plateau.
The agricultural area in Romania subject to erosion processes is approximately 6.4 million hectares of which 3.6 million hectares of arable land. The largest areas of arable land affected by erosion are found in Botoșani (214,000 ha), Vaslui (205,000 ha), Cluj (159,000 ha), Iasi (136,000 ha) and Sălaj (105,000 ha).
At national level, excessive erosion, associated with ravines and landslides, is recorded on an area of over 2 million hectares, and moderate - strong erosion on almost 5 million hectares.
In the Plain of Moldova where slope lands account for more than 58% of the arable land, maintaining production stability can only be achieved by improving the physical, chemical and biological characteristics of soils, reducing erosion risk by improving hydrotechnical works, capturing leakage on the slopes and monitoring hydrogeomorphological parameters.
The average amount of soil eroded in the Moldavian Plateau 11 t / ha / year exceeds the tolerable erosion rate of 1-3 t / ha / year, corresponding to the natural soil recovery capacity.

For the profitability of agricultural activities on arable lands degraded by erosion (in the Moldavian Plateau exceeds 56% of the total area), new methods must be found for the reduction of technological inputs both in plant culture and in the agropedoameliorative arrangements.
This paper deals with the extent of soil degradation processes in the Moldavian Plateau (erosion, compacting, acidification, poor humus and nutrients) and aims to develop efficient technological solutions for water and soil conservation, to control erosion processes.
Key words: gully erosion, anthropogenic erosion, torrent formations, slope, soil

18:00-18:15 - Improvement of safety of road infrastructure and transport networks

Angela Popusoi (Roman)
PhD Supervisor: Prof. Gheorghe Gugiuman

Abstract:
The aim of the work: consists of significantly reducing the number of road accidents, starting with deaths, then seriously injured, ending with slightly wounded. This strategy is based on various measures, improvement of safety of road infrastructure and transport networks, improvement of road users behavior. Raising road safety and drawing a particular attention on these disasters, which bring great harm to both public health and the national economy. The objectives of the investigation: to outline the causes that generate serious traffic accidents, to make rational analysis and planning of measures to improve the situation, to unveil the existing problems on local level, the composition of traffic flows, as well as skills of specialists in the realm, to develop a strategy on road accidents resulting in casualties aiming to reduce the number of traffic accidents with injuries, to promote measures aiming to protect participants in traffic, to developing a set of procedures and functions which would provide, in a network of certain streets, the size and structure of traffic flows, areas (major and minor intersections, streets) where there is an increased risk of accidents; to identify possible solutions aiming to increase road safety, specific peculiarities of Chisinau city. The scientific novelty and originality of the work lies in designing a hierarchical road network by establishing precise function for each street, with specific conditions which would not allow motorists to drive at high speed. Forecasts of transport network development show that a sharp increase in transport units increases the risk of accidents. Scientific problem solved. The results obtained in the thesis allow the improvement, efficiency, management, maintenance and building new constructions for road networks which would contribute directly to the improvement of road safety, the implementation of a viable road safety management, and implicitly a road infrastructure at the European standards.
Key words: Transport networks, road accidents, road users, traffic flows.

18:15-18:30 - The analysis of June 2016 Voroneţ River flood effects in "Voroneţ Monastery" area

Mihaela Avram, Paul Vivian Sion, Mihail Luca
PhD Supervisor: Prof. Mihail Luca

Abstract:
The paper presents an analysis of the hydroclimatic risk parameters in the Voroneţ River hydrographic basin. The studies and researches were conducted on Voroneţ River, on the sector located in the area of the "Voroneţ Monastery" historical monument after the June 2016 flood. The flood morphologically changed the Voroneţ River bed, a situation which influenced the shore protection stability. The flood effect also consisted in the degradation of the DJ 177D road on a length of about 125 m. Through the documentary study and field research, the precipitation, liquid flows (minimum, average and maximum), the floods' development and evolution, the volume of the resulting damages etc. were analysed. Precipitation volume processing pointed to a number of factors which have prevailed over the last 20 years. The precipitation value was 71.6 l/m^2 over two days. The flow rate in the "Voroneţ Monastery" section on the Voroneţ River, determined with the 1% calculation probability was 94.11 m^3/s. The flow recorded in the river downstream section was 118.12 m^3/s (p = 1%). The effects of the floods have materialised through the excessive degradation of the Voroneţ River shore protections located within the Gura Humorului Town, respectively in the Voroneţ district. The floods have led to the destruction of some economical and social objectives in the riparian area. The hydroclimatic risk

parameters highlighted through research require special conditions for the design of hydrotechnical works in the riverbed and of the structures located in the riparian area.

Key words:
Degradation, flood, flows, riparian area, river improvement, road.

18:30-18:45 – Evolution of user requirements comparative with evolution of buildings

Bogdan Chirila, Ion Serbanoiu
PhD Supervisor: Prof. Ion Serbanoiu

Abstract:
Building requirements are the conditions a building needs to meet to satisfy the needs of users and to guarantee the quality of the building. In a usable definition of residential buildings, user requirements refer to the conditions the users want to be satisfied in the spaces they use.
Bio-physiological requirements refer to the possibility of using the building spaces for creative activities, rest or entertainment activities, in conditions of hygiene, comfort and protection against any harmful factors, to move easily.
Psycho-social requirements relate to feeling comfortable with the environment and the ability to communicate or to be separated.
Economic or efficiency requirements refer to investment / acquisition and maintenance building costs, minimum consumption of materials and energy under sustainability.
Knowledge and use of building requirements will lead to a judicious conception of the building to be rehabilitated or conceived. For a long time the success of the building conception was based only on the repetition of what the practice had long proved.
"Law no. 10/1995 of 18 January 1995 regarding quality in construction" establishes, in a differentiated way according to the categories of importance of constructions, the quality system in constructions. This system imposes the achievement and the maintenance of a number of 7 essential requirements throughout the life of the constructions.
Using the documentary analysis on the constructions from different periods beginning with the prehistoric period and finalizing with the buildings from the 21st century, we conclude that the user exigencies date back to the prehistoric period. The man has made big efforts to increase the level of performance, in this way the requirements evolution lead to the buildings evolution.
The first necessary and user-driven demand was resistance and stability. By satisfying this demand, the user was able to create the central core to develop the other requirements. In time, they were introduced the mandatory requirements that we can find today, which are in a continuous development based on the growing demands.
Key words: evolution, requirements, quality, environment, building

18:45-19:00 - Optimum structural rehabilitation strategies for residential housing buildings

Bogdan Chirila, Ion Serbanoiu
PhD Supervisor: Prof. Ion Serbanoiu

Abstract:
The choice of a correct intervention strategy is conditioned by the complete understanding of the individual deficiencies of the structural and non-structural elements, their combined effect on the seismic behavior of the building, as well as the general deficiencies regarding strength, deformability, redundancy and structural regularity.
Intervention measures must be correlated with the degree of damage (degradation) of the materials as a result of earthquakes incurred by the construction, other specific exploitation actions, differential land-fill or environmental factors.
Intervention measures aim to eliminate or significantly reduce the deficiencies of the different nature of the structure and of the non-structural components and thus to obtain the safety condition: the seismic requirement ≤ the capacity of the construction.

The study examined the possibilities of implementing the proposed strategies for the structural rehabilitation of the D1 building, as well as only two strategies, namely the reduction of the exploitation period and the consolidation of the building.
By reducing the service life, a reduction in field acceleration for design by scaling with a subunit factor is obtained, resulting in a lower seismic force applied to the building. For buildings D1, the life-saving strategy can only be applied in combination with the consolidation strategy, and only the long service life reduction strategy is maintained in the RsI seismic risk class.
By reducing the operating lifetime, an increase in resistance is achieved, but not so high as to fit a building in the RsI seismic risk class into RsIII or RsIV. The strategy may apply to buildings where the value of the R_3 indicator is at the upper limit of the value of the range, and by the resulting increase in strength, the building can fit the next seismic risk class.
Clearly reinforcement of the structure by plating walls with reinforced mortar has an important effect on walls of poor quality masonry for which the strength increase is very important, in the case of the analyzed structure the resistance increase reaching up to 550%.
For the structure under consideration and for similar structures, the only viable strategy for building safely is building consolidation.
Key words: duration, expoitation, reduction, destination, thronson, consolidation

19:00-19:15 - Performance evaluation of the Podu Iloaiei Town water supply system from the "water loss" phenomenon perspective

Stefania Chirica, Mihail Luca
PhD Supervisor: Prof. Mihail Luca

Abstract:
The water loss value is a major risk factor in the management of water supply systems. The amount of leaks recorded in an operational area depends on the complexity and the running procedures of the operated system. In a water supply system made of main water pipe, treatment plant, pumping station, tank and distribution network, the highest water loss values are recorded in the pipe network. Significant leak values are also recorded in the other components, however, their nature makes it more difficult to notice them. The water loss control in a water supply system is achieved using analytical methods (performance indicators, water balance), hydraulic methods (pressure management, hydraulic modelling of pipe networks, flow meter measurements) or methods and procedures applied on field (acoustic equipment, ground penetrating radar, satellite detection). The methods used can be applied independently within a system (by using a single procedure) or can be used together (by using multiple methods for the same system). Effective water loss management is achieved through the use of multiple detection and control methods, so that the results obtained match with the current situation in the field. The case study drawn up analyses the water supply system of Podu Iloaiei Town from Iaşi County and evaluates its performances during 2015 – 2018. The data analysed show that the annual water loss percentage fits in the value recorded for the entire Iaşi County operational area (30 %). However, the monthly variations start at minimum values situated under 10 % of the water volume supplied to the system (values such as 5.79 % and 7.29 %) and go up to maximum values of over 40 % (such as 40.85 % and 44.74 %). The water volumes annually supplied to the system are around 350,000 m^3, however, 20 % to 25 % of them are lost before reaching the consumers. The paper presents a detailed analysis of the "water loss" phenomenon in Podu Iloaiei Town and of the water supply system performances.
Key words: Degradation, detection, hydraulic model, pipe network, water loss.

19:15-19:30 - Studies on the predictability and quantification of quality-specific activities in the construction - construction formwork

Nicolae Gabriel Costoaea, Marinela Barbuta, Cristian Velicu
PhD Supervisor: Prof. Marinela Barbuta

Abstract:
Satisfaction of user requirements for all performance behaviors of a building is mandatory. The correct execution and carrying out of the verifications is proved by the existence in the Construction Log Book of the documents certifying the quality of the construction works executed, documents drawn up during the execution of the construction works. By establishing the quality assurance system by the contractor, respectively through its own technical procedures / technical instructions, the scope of application, the input elements, the objectives, the identification of responsibilities, the control of the documents, the control of the records, the resources materials, human resources, machinery, working environment, knowledge of the work, communication with the investor, supply, distribution of works, processes of the quality system for the management of the works execution, the management system documents used for the execution of the works, control plans and intermediate verifications , forms, internal control, external control, laboratory tests, identification and traceability, monitoring and measurement etc. All the documents in the Construction Log Book are proof of the quality obtained. Starting from the comparative analysis of the content of the documents drawn up (regarding the execution and verification of the formwork works existing on site), with the provisions of the project and the provisions of the norms, norms and legislation in force, this paper proposes the establishment of documents with known content before the beginning of the works building. Such an approach makes the verification activity predictable. The results obtained at the time of the check, recorded in the documents drawn up, can be measured by giving a score. By applying the weighted average calculation relation, the score obtained can quantify the quality and may constitute for the investor or third parties an indicator of the quality of the construction works executed.
Key words: score, quality, construction formwork, reinforcement, investor, formula

SECȚIUNEA II - *22 MAI 2019*

15:00-15:15 - Glass fiber reinforced plastics behavior at shear loading simulated by FEM

Narcis-Andrei Danila, Ciprian Moraras, Igor Blanari, Paul Doru Barsanescu
PhD Supervisor: Prof. Paul Doru Barsanescu

Abstract:
Renewable wind energy is experiencing an increase in the latest decade, with more wind turbines farms. Wind energy accounted 2.9 percent of global energy, meanwhile in Romania, wind energy is ranked first among the top energy sources, accounting for about one-third of total national production.
In the context of modern design and construction of parts, components and other elements of wind turbine, extensive and reliable comprehensive data on the elastic-strength characteristics of the materials used are required. For anisotropic layered polymer composite materials (PCM). Wind turbine blades (WTB) are critical components of wind turbine, thus, materials for WTB construction must have high stiffness, low density, fatigue resistance, to obtain optimal performance, reduced gravity forces, resistance to degradation. Usually, glass-reinforced composites are made with E-glass fibers, which have good mechanical properties and high heat resistance. Due to the cost-performance ratio, GFRP is promoted as material for longer blades needed for offshore or onshore turbines. Plates from combination of multilayers glass roving fabric RT800 and nonwoven MAT600 oriented at $\pm 45^0$ and $0^0/90^0$ with Epikote resin MGS LR 385 were taken into study. Data on the elastic-strength characteristics are obtained after application of shear loading in a certain direction to different planes of the sample which can vary by an order of magnitude. One of the most important characteristics used in the design calculation is shear strength (τ) and shear modulus (G) of polymer composite material. Shear strength characterizes the effect of tangential stresses in materials .The shear modulus describes the nature of the deformation processes under the influence of tangent stresses in the elastic deformation zone. In this paper are presented the results obtained at simulation with FEM and compared with experimental ones, at shear testing, in order to locate the maximum shear deformation of GFRP specimens according to ASTM D5379 -93 standard. The obtained results show that this GFRP can be used successfully in the construction of wind turbine blades where stiffness and lightweight represent critical characteristics, imposed by the design requirements.
Key words: Wind turbine baldes, Iosipescu test, finite element method, GFRP composites, mechanical testing.

15:15-15:30 - The reliability analysis for some subassemblies in the structure of 060-DA diesel-electric locomotive

Mihail Alexandrov, Viorel Goanta, Daniel Apostol, Igor Blanari, Marian Mares
PhD Supervisor: Prof. Viorel Goanta

Abstract:
In a complex process of social production, the important role played by the satisfaction of material and spiritual needs, to increase their own mass production. In the results, that the induced production was constantly a historical, accidental accident, accident and disaster. In the largest degree of emergency mining of the coal, mining, transport, oil and gas and metallurgical industries, transport. Accident warnings are of particular relevance in Atomic energy, chemical treatment, and exhaust of military equipment, where powerful sources of energy, highly toxic and aggressive substances are used and circulated. Solving the problems of sustainable development of society in terms of volume and development, the theory of technological procurement and the assessment of risk industries. Currently, an educational tool for the design of technical systems and production safety, how to use technical safety functions. These are the basic terms and definitions of technical skills. System indicating the main technical hazards of the system. These are the basic theories of technical excellence. Systemic and technological risk. Mathematical expressions are given, as well as in the assessment and development

of the basic properties and parameters of technical, general, physical, physical, System structure and systems. Methodology of risk analysis and risk assessment, generating risk, including basic qualitative and quantitative methods, methodology, risk assessment, safety and risk assessment, analysis of logical-graphical method, risk criteria for acceptability, principles of risk management, considered examples of using the concept of risk in engineering practice.The 060-DA diesel-electric locomotive is SUCH a complex set of components and subassemblies, working together, so that any accidental failure of a basic constituent could lead to a total or partial decommissioning of the locomotive, or to its incorrect operation. The subject of the present paper is a reliability analysis for the most important components and subassemblies from the structure of 060-DA diesel-electric locomotive.

Key words: Reliability analysis, system diagnostics, concept of reliability, technical systems, load and strength variation.

15:30-15:45 - Experimental analysis on high pressure pump sealing gaskets

Diana Bistriceanu, Carmen Bujoreanu
PhD Supervisor: Prof. Carmen Bujoreanu

Abstract:
A gasket is classified as a mechanical seal, filling the space between two or more mating surfaces, typically this is done to prevent leakage between the joined surfaces while under compression.This gasket manufacturing technology is mainly used in high-power motor vehicles, supercharged turbine vans and air-cooling system. The sealing by compression fittings is provided by screws, therefore their force must be large enough to prevent the gasket from flowing and filling any irregularity in the joint surfaces by making the sealing. Gaskets are subject to environmental factors such as temperature, pressure differences, relative movements.The way in which different gasket materials change and how they deal with low load conditions has been studied by Jim Drago of Garlock Sealing Technologies. This paper presents a macroscopic and microscopic analysis of high pressure pump seals. The gasket is the element that makes the seal between the pump body and the flat front, fixing it by screws. The force exerted by the screws is not evenly distributed over the entire surface of the gasket, and the results showed a significant difference between the padding and the normal gasket. The material and geometry of the gaskets is adapted to the pump on which it is driven and the parameters to which it must resist. With this metal construction and elastomer, very narrow ribs can also be sealed. A series of macroscopic and microscopic analysis methods were performed to identify the underlying causes of unexpected deformations. Progressive weakening of the gasketitself can be caused by ‘aging,’ i.e., detrimental changes to the physical properties of the gasket material,and by ‘fatigue,’ i.e., deterioration due to the repetition or continuous application of stress.The experiment was carried out using the Taylor Hobson's measurement system which confirmed significant circularity differences between initial and final state after fitting on the pumps and after performing special tests . The seals studied were analyzed using the Leica optical microscope. This allowed the study of the gaskets in detail and the measurement of the offshore surfaces.

Key words: gasket, Leica optical microscope, distortion, Taylor Hobson system, fatigue, pump

15:45-16:00 - Stress/Strain analysis at the wheel - rail contact under the influence of thermo-mechanical loads

Igor Blanari, Narcis-Andrei Danila, Mihail Alexandrov, Viorel Goanta
PhD Supervisor: Prof. Viorel Goanta

Abstract:
The evolution and progress of human society cannot be achieved without movement, without transport. All life is movement, which has been synthesized in the Latin expression "via vita". From the economic, social, political, informational, commercial, cultural, administrative, strategic, technical and scientific point of view, communication and transport links facilitate the connections between people, the economic exchanges between localities, regions and countries, ensuring the progress and development of all branches of activities. A safe, fast and comfortable transport system is railway transport. The

technical structure of the vehicle-rail system consists of a fixed subsystem, which is the path, and a mobile subsystem, which is the rolling stock. As long as the rolling stock is in stand-by, studying the interaction between the two subsystems to determine the state of effort, deformation and displacement can be undertaken using static balance-specific relationships. Any movement of the vehicle on a support with inherent defects (bumps, misalignments, variations in stiffness, etc.) moves the masses of the entire oscillating system in motion, establishing new interaction relations between the elements of the system, which can only be studied using methods of the dynamic balance. The connection and interdependence between the two subsystems, the vehicle and the track, is achieved at the wheel - rail contact. At this level, the vehicle develops inertial forces during the movement, the importance of which increases in once with the velocity. At present, in most cases, bogies made up of the bogie mass, elastic and damping elements, interposed between the box and the axle, the latter having the role of consuming kinetic energy and delaying the action of the forces at the wheel-rail contact.
Cracking of wheels and railway tracks under thermal influence is investigated using a numerical approach. In this paper we present the results of the finite element analysis (FEM) of the interaction between the wheel and the railway track under the influence of thermo-mechanical loads. Determining the distribution of stresses and pressures is important for determining the life time and preventing cracks of the components in contact. The expected lifetime foreseen by simulation is in good concordance with the experimental results find in literature.
Key words: Finite Elements Method, railways, wheel-rail, thermo-mechanical loads

16:00-16:15 - Simulation of crack propagation in gears using Finite Element Analysis

Claudiu Danila, Viorel Goanta
PhD Supervisor: Prof. Viorel Goanta

Abstract:
The article starts with an introduction in Fracture Mechanics and its usefulness in assessing the durability of mechanical parts. From the wide array of computer aided engineering tools, the article presents two of the most recent methods in simulating crack propagation in gears, namely the Extended Finite Element Analysis and the SMART method. Both numerical methods are presented in parallel, using scenarios applied on different gear setups. Further on, the resulting values for Stress Intensity Factors, Equivalent Stress and Crack Propagation Rate are highlighted and compared, regarding the output that they generate. The crack propagation paths are compared graphically to paths resulting from the experimental results that exist in literature to date. The article proves that the latest numerical methods used in the field of Fracture Mechanics are powerful and reliable tools in anticipating real life behavior of cracks in faulty machine organs, namely in gears.
Keywords: Fracture mechanics, crack propagation, fatigue, static structural, stress, SIF, J integral.

16:15-16:30 - Finite Element Analysis of the vibrorolling process used in burnishing metallic surfaces

Claudiu Danila, Gheorghe Nagit
PhD Supervisor: Prof. Viorel Goanta

Abstract:
Burnishing processes (such as vibrorolling) are efficient methods to improve the surface texture of various metallic parts, regarding its roughness and hardness. The article offers a classification of the existing surface rolling and burnishing methods to date. Then, a setup is defined for the physical model that is further on virtually simulated. Finite Element Analysis scenarios are defined for various oscillation amplitudes and friction coefficients. The resulting output is compared and discussed, and after the conclusions are drawn, we propose new further work and methodology. Our article proves that surface smoothing operations, such as ball burnishing via vibrorolling, can be successfully simulated using Finite Element Analysis, so the existing engineering simulation software can accurately predict such complex phenomena, opening new ways of improving the process of surface conditioning.
Keywords: Vibrorolling, ball burnishing, hardening, surface finish, contact pressure.

16:30-16:45 - A comparison between improved Blade Element Momentum method and QBlade simulation for three different airfoils

Dorin-Emil Husaru, Paul Doru Barsanescu
PhD Supervisor: Prof. Paul Barsanescu

Abstract:
This paper presents a comparation between a numerical simulation of a Horizontal Axis Wind Turbine (HAWT) model with 3 blades using QBlade and Matlab software. The wind turbine blades design was performed in Matlab software using an improved Blade Element Momentum (BEM) theory. Three different airfoils: NACA 4415, NACA 63415, and S822 at low Reynolds numbers was considered. The polars for each airfoil was determined in Matlab and, also, in XFOIL software. Three different blades with three airfoil were design and simulated, in order to select the most satisfying airfoil from an aerodynamic point of view for a prototype of wind turbine model. The length of the blades is 270 mm and the diameter of the rotor is 580 mm. The QBlade simulations was performed with Montgomerie method, in the range of tip speed ration between 2 and 8, a rotational speed between 2000 and 3000 rpm and a wind velocity between 5 and 25 m/s. The losses on tip and root of the blade suggested by Prandtl, the Reynolds drag correction and the 3D correction on the tip are been implemented in the simulation cases. A good concordance between the the Matlab and QBlade results for global performances of the wind turbine model was observed. The difference between the results are under 5 percentage. The NACA 4415 airfoil offer the best aerodynamic performance with maximum lift coefficient equal with 1.2 and respectively the drag coefficient equal with 0.05 at 11.5 degree of angle of attack.
Key words: Wind turbine, Qblade, Matlab, BEM method, numerical simulation

16:45-17:00 - Failure of roller-shoe contact from high-pressure injection pumps

Razvan-Constantin Iordache, Carmen Bujoreanu
PhD Supervisor: Prof. Carmen Bujoreanu

Abstract:
The appearance of wear is inevitable for the moving parts of machines and equipments.This leads to changes in geometrical shape of the contacting surfaces and possible machine's failure. The shoe-roller contact from high-pressure injection pump is subjected to different types of wear, but one of the most dangerous is the adhesion. The severe adhesion in the contact developed into scuffing, which becomes catastrophic for the equipment. The aim of this paper is to provide an overview of studies on roller-shoe contact, highlighting unfavourable conditions with failure potential within the contact. The literature offers exhaustive analyzes regarding failure occurrence on roller-shoe contact and important factors are analysed such as: contact design, material, lubrication, temperature, contamination, overloading, unadjusted clearance. Therefore, the researchers have identified different interest areas in this contact analysis. As consequence, they have improved the heat treatements, coatings and they have discovered new forms of components to be in contact. According to researches, the carbon steel with very high hardness is suitable to be the basic material. The contacting components material must have similar properties and a low friction coefficient in the contact. Also, the lubrication and temperature represent two research topics where many tests have been done. The failure of shoe-roller contact is initiated when there is an insufficient lubrication between roller and shoe and when the fluid properties are not appropriate. Material antifriction qualities are influenced by high or low temperatures. At high temperature it was observed overheating on the roller or shoe. Contamination with particles and water cause abrasion wear or rust and under continuous moving leads to scuffing. Depending of the motion transmission mechanism, the operating conditions are very important. Overloading, mounting with inappropriate clearance or improper installation of the elements that transmit the movement can cause a severe wear. Depending of these, the load distribution on components can be uniform or non-uniform and there is the possibility of vibrations and noise in the pump. Our paper analyzes the existing studies regarding roller-shoe contact in order to offer new perspectives and improvements in the operation of this type of contact, important in the proper functioning of a high pressure injection pump.

Key words: Roller, Shoe**,** High Pressure Pump, Failure, Adhesion

17:30-17:45 - A numerical study on ionic liquids - water mixture based ionanofluid enhanced with alumina nanoparticles

Elena Ionela Chereches, Marius Ionut Chereches
PhD Supervisor: Prof. Alina Adriana Minea

Abstract:
Ionic liquids have proven to be one of the most impressive fluid classes due to their specific properties and applications in chemistry and energy engineering. One of the most recent applications of the ionic liquids is the manufacture of ionanofluids. These new materials are a particular type of nanofluid and are defined as a stable dispersion of nanomaterial particles (tubes, rods, spheres) in an ionic liquid, including multi-walled carbon nanotubes (MWCNTs), metallic particles and non-metallic particles.
Ionanofluids are an innovative research field also due to the increasing need to identify non-pollutant heat transfer environments while reducing energy consumption.
It is clearly demonstrated in the literature that, despite the inconsistent data, substantial increases in the thermal characteristics of this particular type of nanofluids as compared to their basic fluids are unquestionable.
However, published data are still limited and scattered, and are insufficient to understand clearly the mechanisms of these new fluids heat transfer. It is therefore impetuous to carry out more comprehensive studies of their heating behavior under different conditions or factors such as: concentration, temperature, pressure, flow conditions, heating systems and flow geometry. The numerical research on ionanofluids it is still at its beginnings. Therefore, some ionanofluids were implemented in several codes to analyze their behavior in heating systems and associated results are very interesting in demonstrating possible uses for heating.
In this paper the authors will try to implement some fully described ionanofluids in a numerical code to get information about the ionanofluids behavior in laminar flow conditions. The implemented ionanofluids will be based on a mixture of water and ionic liquid in three different mole fractions and alumina nanoparticles will be added.
Concluding, research on ionanofluids is very important and great efforts are needed to fully describe these new heat transfer fluids and to explore their potential in applications.
Key words: Ionanofluids, ionic liquids, nanaparticles, heat transfer, thermophysical properties.

17:45-18:00 - Structural testing by torsion of scalable wind turbine blades

Moraras Ciprian, Viorel Goanta, Barsanescu Paul-Doru, Leitoiu Bogdan
PhD Supervisor: Prof. Viorel Goanta

Abstract:
Wind energy is one of the oldest sources of non-polluting energy, a renewable energy source taken from the wind power. Wind is the result of the solar energy activity and is formed by the uneven heating of the Earth's surface. Every hour the Earth receives 1014 kWh of solar energy, of which about 1-2% is converted into wind energy. The cost of producing electricity from wind power farms is 75% of the cost of electricity production by conventional methods. The main element of wind energy conversion into electricity is the wind turbine blades, whose geometry, material, number and length contribute decisively to the efficiency of the wind turbine. A wind turbine blade is subjected to centrifugal force, gravity, aerodynamic loading, and vibrations, all of which result in complex stresses. In general, turbine blades are made of composite materials due to few advantages: low density relative to metals, high shock resistance and high durability in operation and have a practically unlimited resistance to atmospheric agents (oxidation, corrosion and mold).
During functioning, the wind turbine blades are subjected to mixed stresses as: torsion, bending and traction, all these resulting in the occurrence of normal and tangential stresses. In some points, the equivalent stress due to overlapping effects given by those stresses, can have high values, close to whose the structure can reach to the point of failure. If the effects of erosion and impactwith foreign bodies are added, the structure of the blade may lose its integrity. This paper presents the results obtained in the

non-destructive tests at static torsion of a scalable wind turbine blade.Straight rosette gauges were mounted at different critical points of the blade, determining the main stresses in the respective points as well as their variation during the torsion test by subsequent calculations. To determine the critical areas and the optimal placement of straingauge and other sensors, simulations were made in ANSYS Academic 17.2. The experimental results were in good agreement with the results of the simulations.
Key words: Structural testing, Small wind turbine, Composite blade, Blade testing, Wind energy.

18:00-18:15 - Behaviour of different types of check valves used in hydraulic systems

Narcis Daniel Petrea, Carmen Bujoreanu
PhD Supervisor: Prof. Carmen Bujoreanu

Abstract:
From the complex systems used in the manufacturing plants to the safety and comfort systems from a vehicle, hydraulic systems are indispensable in most industries. As well, in daily life, without the hydraulic systems, water transport over long distances would not have been possible. A wide variety of valves assures the functionality of the hydraulic systems, and each valve has a specific purpose. The most used and simplest valves are check valves designed to allow flow in one direction and to prevent flow from the opposite direction. Check valves may have different designs depending on the application and where they are used. A trouble-free functionality of the hydraulic system is given by the proper selection of the check valves. For most of the check valves, closing is done by reverse flow, but other models may have a spring assisted closure, and the significant advantage is that the closure process is much faster and prevents reverse flow. Rapid closure of the check valve prevents reverse flow and therefore prevents the slam occurrence. The paper is providing an overview of the research conducted on the most common check valves and their behaviour in hydraulic systems. Ball check valves are of interest because they are cheap, easy to produce, have good performance, and are the first choice for many manufacturers. As well, in the paper is shown the relationship between Reynolds number and the drag coefficient of a ball in a fluid, and boundary layer separation for laminar and turbulent flow. Research has revealed that in some high-pressure hydraulic systems, the opening of the ball check valves can produce a high audible noise which can be disturbing. Hydraulic systems and valves are used widely in the automotive industry, and the most important equipment from the engine is the high-pressure injection system, which provides proper functioning. The optimum operation of the injection system is ensured by a multitude of check valves where research and development must continue to provide better future solutions.
Key words: Check Valve, Hydraulic System, Valve Slam, Laminar Flow, Turbulent Flow.

18:15-18:30 - Simulation of a Hydraulic System used for Wind Turbine Pitch Control

Rares Iulian Pelin, Dorin-Emil Husaru
PhD Supervisor: Prof. Paul Doru Barsanescu

Abstract:
A blade pitch control system is critical for turbine operation, as pitching is an important actuation for increasing energy capture, reducing operational load, stalling and aerodynamic braking. Pitching can be simultaneous for all blades or individual. In this paper will be developed simulation for such a system. In order to do this will be used FluidSIM, which is a comprehensive software for simulation of fluid control systems. Advantages of using FluidSIM for simulation of the system are seen through easy access modelling and user-friendly options. While performing the simulation of the system software allows dynamic movement of the hydraulic system components (e.g. cylinder extension and retraction) while performing the simulation itself. FluidSIM has also some disadvantages, although in cases where fast response rate and precision can be somewhat neglected, results can be within allowable range.
Key words: Simulation, FluidSim, hydraulic system, pitch control.
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18:30-18:45 - A case study of environmental pollution in relation to particulate matter

Costel Soroiu, Carmen Bujoreanu

Abstract:
Environmental pollution influences human health resulting in respiratory, cardiovascular or cancer disease. It is known from statistical studies that exposure to a particular polluted environment may result in respiratory, cardiovascular or cancer disease. The world mortality rate is 29% for cardiovascular disease, 15% for cancer and 7% for repiratory disease. The presence of pollutants such as PM particles containing carbon (CO, CO2), nitrogen (NO, NO2) and sulfur oxides (SO2) is the consequence of anthropogenic emissions of liquid, gaseous and solid substances into the air, through technological activities (industrial), urban transport and domestic(household) activities. PM 2.5 and PM 10 particulate matter are small enough to remain suspended in air for long periods (hours or days), being able to travel long distances at this time. Also, under certain conditions, various acids (HCI, HNO3, H2SO4) can be formed by atmospheric particles with a strong negative impact on health and other constructions (bridges, buildings etc.). In addition, water is also one of the most effective degradation agents, which not only acts as a solvent in the formation of acid rain, but also participates directly in numerous chemical reactions that lead to the alteration of stone materials.
The aim of this paper is to present some measurements on the distribution of urban pollutants, such as micrometric particles from the atmosphere. The particle counter measurements were carried out in crowded areas of Iasi (Tudor Vladimirescu Boulevard, Piatra Negru, Stefan cel Mare-Unirii Square) at different time intervals, with traffic and specific meteorological parameters. Under well-determined conditions, major exceedances of particle concentrations of up to 4 times were found both for PM 2.5 and PM10, respectively. In the Podu de Piatra area, there was an excess of about 2 times only for PM 2.5, the other PM10 indicator, found slightly exceeded for a short time. Preliminary conclusions refer to some measures in order to reduce the pollution in the studied areas.
Key words: Particle matter, PM2.5, PM10, pollution reduction, deposit

09:00-9:15 - The Influence of the Combustor Geometry upon the Combustion Features

Stefan Grigorean, Gheorghe Dumitrascu
PhD Supervisor: Prof. Gheorghe Dumitrascu

Abstract:
The paper presents the simulation of the atmospheric combustion of natural gas inside a combustor intended to be used in closed solar hybrid gas turbine cycles. The main purpose of this simulation is to compare the influence of the combustor geometry upon the combustion features: velocity and pressure and temperature fields. This comparison allows to select the better combustor geometry design with minimum pressure drops and improved combustion process.
The simulation considered the following assumptions:
natural gas as fuel; inlet air and fuel temperatures of 300K air inlet and fuel inlet are located at the same side of combustion chamber considered combustor geometries with axial symmetry: cylindrical with constant cross flow area, cylindrical with a conical flow outlet, axial spherical flow geometry.
The 3D model was shaped using CATIA and simulations were carried out using ANSYS. The used flow Mesh contains 1400000 elements with 295000 nodes.
Simulation showed combustion temperature, OH concentration, exhaust gases composition, gases velocity, and gases pressure fields.
Key words: Combustion chamber, gases velocity, atmospheric combustion, combustion gases flow.

09:15-9:30 – Experimental investigations on pollutant content inside the car in relation to pollen filters improvements

Aida Maria Vranau, Carmen Bujoreanu
PhD Supervisor: Prof. Carmen Bujoreanu

Abstract:
In urban traffic, exhaust gases are more difficult to dissipate due to the large number of cars on a reduced surface. These gases penetrate into the passenger compartment through the ventilation system and expose the occupants of the vehicle to a high degree of pollution.The pollen cabin filter is usually a foldable paper filter located in the air inlet that penetrates into the passenger compartment and acts as a barrier between the externally contaminated environment and occupants of the car. The first manufacturer who includes a pollen filter to clean the ventilation system was Nash Motors "Weather Eye" (the first fully ventilated system) introduced in 1940. In 1999, a Sweden research developed a test on 32 healthy people to evaluate the air filtration capacity that arrives in the passenger compartment of the car. Their study shows that the use of active carbon pollen filters greatly reduces the pollution in the passenger compartment. Due to the increased number of cars and exhaust gases, the filter manufacturers introduced an extra layer in addition to the active carbon layer. This biofunctional layer contains natural polyphenols extracted from plants or fruits. A study by S. Fruin (California, 2004), shows a 15 times increased concentration inside cars compared to the roadside. It was clearly proven that such particles (dust, pollen and soot) originated exclusively from vehicle exhaust. The system implemented by Swiss researchers uses a quartz fiber filter. To increase the lifetime of the high-performance filter, the system has a pre-filter that stops the passage of large particles. Volvo has developed the CleanZone system. The indoor air quality sensor works together with the multi-filter to keep the air clean. Also, on the touch pad, an icon that changes its color in blue (optimal conditions) in gray (open glass, sensor off) tells the driver the air quality level. Taking this history into account, our paper aims to study the functioning of the existing air quality monitoring systems in the car. The paper also deals with the experimental investigations that have been carried out in order to determine the air quality in the passenger compartment.
Key words: pollutant gases, cabin filter, carbon layer, polyphenol, air quality sensor, test

09:30-9:45 – Coating of liquid wood granules with silver nanoparticles by the PVD process

Justina Georgiana Motas, Dumitru Nedelcu
PhD Supervisor: Prof. Dumitru Nedelcu

Abstract:
The article aims to study the acquisition of new material with superior mechanical properties using a biodegradable material such as liquid wood and silver nanoparticles through the PVD process. Thus, the materials chosen for this study are: liquid wood and silver.
Liquid wood is a thermoplastic material made from byproducts of the wood pulp industry to replace plastic materials made from petroleum. Liquid wood is made from lignin which is a waste product from the wood pulp industry. Wood is separated into lignin, cellulose and hemicellulose in the pulp industry. The invention of the "liquid wood" material belongs to a team of researchers from the Faunhofer Institute for Chemical Technology (ICT) in Pfinztal (Germany). Due to its properties, liquid wood may replace all the current plastic products in the world.
Nanoparticles have raised much interest due to their unique properties compared to bulk materials. Silver nanoparticles are known to provide antimicrobial properties for surfaces. Antibacterial activity of silver nanoparticles has been of much interest over the past decade, and silver has been incorporated into different products for antibacterial effect.
PVD (Physical Vapor Deposition) is one of the most used coating methods in industrial sector. Creating PVD coatings on non-metal materials is a unconventional approach, which is not very investigated. The coating is based on the releasing of coated material from the source target and transfer to the coated object surface and create a thin film.
Physical vapor deposition (PVD) is a technology where a material is evaporated and condensed to form a thin film coating over an object (substrate). The most common PVD processes are sputtering and evaporation.
The benchmarks obtained from this study will be applicable in a wide range of areas such as: medical, dental, automotive, electronics and others.
Keywords: PVD; liquid wood; injection molding; silver; mechanical properties; coating

09:45-10:00 – Manufacture, simulation and verification of prostheses assisted by the 3D-virtual environment

Adrian Gabriel Ionescu
PhD Supervisor: Prof. Neculai Eugen Seghedin

Abstract:
In the maxillofacial prosthesis field, the 3D environment plays a significant role in designing, manufacturing, simulating and verifying prostheses, especially in personalized cases. Starting with the procedures involved in data acquisition that cannot be directly performed on patients, the computer-aided design emerges as a reliable solution also for CT-scan 3D modeling, prosthesis design, and inter-mandibular occlusion relationship that can successfully replace mechanical articulators and facebows required to transfer mandibular movements.
The manufacturing process is also computer-assisted given the complexity of the contained parts and assemblies included in the adjustable prosthesis concept for growing children. The main components of this prosthesis concept can be manufactured either by additive, subtractive or hybrid processes depending on the material specifications. A critical role has the fixing device conception that must be versatile for each component and provide precise reposition about the origin for all work offsets to complete manufacture stage in 3D multi-axis setup.
The part to focus on is the mandibular branch which contains the distracting mechanism. The main concern is its ability to withstand great, cyclic loads as emerged at biting and chewing movements. Therefore, after the components pass design, finite element simulation phase, and material parameters defining, they are fabricated by 3D milling and installed in a test stand where are exposed to various loads.
Using an Industrial 3D metrology system device, Gom PONTOS module, consisting of an optical sensor that captures displacements and strains of a series of points applied on the prosthesis, the spatial

behavior of each component is determined and measured in x, y, z directions by dynamic 3D analysis. The test stand is subjected to cyclic forces in order to determine the failure and endurance of the ramus prosthesis component.
Thus, the purpose of this paper is to provide through the medium of the Gom Aramis and Pontos modules, valuable information regarding the stability and behavior of the prosthesis under cyclic loads. Also, it is presented as a research direction the validation of FE analysis by inspecting data acquired using the ARAMIS digital image correlation system from Gom.
Key words: manufacture, maxillofacial prosthesis, growing childrens, dynamic 3D analysis, strain measurement.

10:00-10:15 - Characterization in terms of fragility of the parts gripped in the devices

Catalin-Viorel Moldovan, Neculai Eugen Seghedin
PhD Supervisor: Prof. Neculai Eugen Seghedin

Abstract:
Due to a wide range of requirements, in terms of material, shape, chemical composition, physical and mechanical properties of parts used in mechanical engineering and beyond, a clear classification is required. This classification of parts used in mechanical engineering can be done in terms of physical and mechanical properties. These properties influence the pieces during processing, manipulation or exploitation.
The paper aims to achieve a characterization of different types of materials according to their degree of fragility. Fragility is a property of a material, strongly influenced by external factors, for example temperature changes. A part can be transformed from a fragile part into a ductile part during exploitation. This leads to the necessity of characterizing the parts used in the mechanical engineering according to their fragility. First, we defined and establish the measurement units as well as the measurement methods of some mechanical properties of the mechanical engineering parts that will be gripped in the devices: stiffness, deformability, fragility. It has been highlighted, also, the determining factor of these properties. Secondly, a classification of the pieces has been made according to their fragility, showing, at the same time, the degree of fragility: high, medium, low. As a starting point, the Mohs hardness scale was used, indicating the hardness of materials on a scale of 1 to 10. Thirdly, we analyzed the mechanisms of clamping and centering-gathering for a brief classification from the point of view of the mechanical engineering parts. Following the analysis, a number of requirements have been established for the clamping and centering-clamping mechanisms used to catch fragile parts.
In conclusion, we showed the main factors that influence the degree of fragility of the parts used in mechanical engineering. Also, the determining parameters of the clamping and centering-clamping mechanisms were listed. At the end of the paper, several future directions of study were highlighted.
Key words: Fragile part, classification, mechanism, mechanical property, fragility.

10:15-10:30 – Methodology for assessing the entrepreneurial skills and entrepreneurial abilities of engineers

Violeta Greciuhin
PhD Supervisor: Prof. Neculai Eugen Seghedin

Abstract:
In the economic/social/political context of the 21st century, Entrepreneurship is considered to be one of the main engines and channels of economic development, ensuring the proper functioning of state institutions and the welfare of the citizens of all states.
In this context, the preoccupations for the development of a favorable environment for Entrepreneurial Education are of prime importance for all Romanian universities that have already adapted, or are adapting their curricula, to the introduction of educational modules with entrepreneurial content. Entrepreneurship, together with Creativity and Innovation, has become one of the engines of economic growth of the present century, viewed as a sum of skills, behaviors and entrepreneurial skills. As a national strategy, most of the world's states (especially Western and Anglo-Saxon) have underpinned

the economic development of individual economic autonomy and the acquisition of entrepreneurial skills (accumulated in entrepreneurial education programs).
Often Entrepreneurial Education is assimilated (somewhat forced) to business education, but they should not be confused. University education, which puts the student in her center, is the foundation on which Entrepreneurial Education can be formed and easily assimilated.
Entrepreneurial Culture is acquired through the Entrepreneurial Education programs and thus becomes an important part of the foundation of creativity and technical innovation of future graduates of engineering studies.
The paper assesses the entrepreneurial climate in which entrepreneurship disciplines are taught in universities, based on the demarcation and the geographical area coverage (national, European, global), types of existing universities and fields of study, analysis of study cycles and of sources of information about the learning process.
The results of the evaluation can provide some guidance on the possible impact of entrepreneurial knowledge and on how these can be directed by graduates of technical higher education to the field of active entrepreneurship.
The final practical implications are to establish criteria for assessing entrepreneurial potential, applying these criteria to the study programs/disciplines taught at the Gheorghe Asachi Technical University and setting minimum thresholds for their entrepreneurial potential.
Keywords: entrepreneurial culture, entrepreneurial education, skills, potential, criteria, thresholds, curricula, subjects.

10:30-10:45 – The systemic approach use in studying industrial processes

Bogdan Oroian, Ionut Condrea, Carmen Botezatu, Mihaela Etcu, Adelina Hrituc, Ionela Coman, Laurentiu Slatineanu
PhD Supervisor: Prof. Laurentiu Slatineanu

Abstract:
One of the methods used to develop theoretical investigations in the scientific research is the systemic analysis. The systemic approach of the industrial processes or phenomena aims to consider such processes as systems with input factors and output parameters.
The purpose of the research presented in the paper was to develop some analyses of various ways of systemic approaching certain subjects of scientific research interest and find suggestive ways of illustrating them. The presentation was based on the identifying of the distinct ways of systemic approaching and developing of such an approaching in the cases of some industrial processes or phenomena. One took into consideration the process of computer subsystems degradation, the end milling process of test pieces made of cast irons, the behavior of the conical peaks under the action of the electrical discharges, the process of the chemical engraving. Due to the fact that the industrial processes supposes usually the existence of the couple tool-workpiece, certain characteristics of these components are essentially appreciated as process input factors. One could also take into consideration the disturbing factors, whose sizes could not be controlled but that could exert influence on the values of the process output parameters.
The identification of the correlations between the process input factors and the output parameters could suggest certain ways of optimizing the processes considered as systems or the investigation of the processes. The theoretical analysis of the principles of the systemic approach allowed to consider the above mentioned processes or phenomena as systems. In this way, a better image concerning the subsequently development of the additional theoretical and experimental research of the considered processes or phenomena was obtained. One appreciated the systemic approach of some industrial processes or phenomena facilitated a better understanding of the studied systems and the future development of improved theoretical and experimental research.
Key words: systemic approach, industrial processes, computers subsystem degradation, end milling, electrical discharge, chemical engraving.

10:45-11:00 – The concept of a new type of continuously variable transmission for bicycle

Julian Malaka
PhD Supervisor: Prof. Mariusz Hetmanczyk

Abstract:
High popularity of a bicycle as a training or rehabilitation device or as an ecological and healthy means of transport makes its construction being constantly improved. New solutions are developed to enhance the capabilities of the single-track, the comfort of use, to allow monitoring and regulation of the drive and physiological parameters of, respectively, the vehicle and its user. Usually, in professional applications (although it is also more and more often applied to amateur ones) the classic, fully mechanical, bike is replaced by electromechanical devices. This results in more precision and ease of adjustment of the single-track to riding conditions, cyclist's preferences or to a training programme. The examples of the electromechanical systems include electronically controlled derailleur gears or electric motor pedal assist. Similar solutions have been used to develop ways of automatic control of the cyclist's heart rate by influencing the load during pedalling. Equipping the bicycle with an additional drive that requires power, and therefore energy storage, can be problematic and costly. It seems to be a better choice to use a mechatronic transmission – a more compact device, the operation of which is much less energy-consuming. In order to achieve the appropriate accuracy and fluency ofthe control, the stepless change of ratio is necessary. The friction-based mechanisms used hitherto in cycling are deficient, as in their case the slipping may occur, reducing efficiency and causing rapid wear on abrasive surfaces. Multi-stage transmissions, in which switching between adjacent steps results in a small change of transmission ratio, are sometimes considered as the CVT. These often require the use of large, complex systems. The paper presents the results of considerations on a new way of stepless change of the ratio in the bicycle. A theoretical solution to the problem has been proposed, presenting the basics of the designed mechanism. It has been hypothesized that its application will allow to achieve the expected result, ensuring high efficiency, wide range of regulation, as well as the swiftness and smoothness of work.
Key words: CVT, bicycle, mechatronics, modelling, simulation.

11:30-11:45 – The influence of caprolactam concentration in electrolite on polarization of steel C45 catode at electrolytic iron deposition

Ungureanu Eugeniu

Abstract:
The kinetics of the galvanic iron deposition process and the influence of caprolactam concentration in the electrolyte on the distribution of cathode polarization curves were studied. It has been demonstrated experimentally that increasing the concentration of caprolactam in the electrolyte displaces the iron deposition potential to its negative values, disfavoring the deposition process on the cathode, while increasing the temperature of the caprolactam-containing electrolyte leads to the displacement towards the more positive values of the cathodic potential. The rational concentration of caprolactam in the electrolyte was evaluated and the optimal temperature of deposition in the "cold" electrolyte ($T \leq 313$ K) was set.
Keywords: caprolactam, electrolytic, electrolytic deposition, thixotropic properties, self-lubrication, chemosorption.

11:45-12:00 - Axe geografice de dezvoltare in judetul Salaj

Sergiu Panie

Abstract:
Axele geografice de dezvoltare în judeţul Sălaj, un studiu complex de diagnosticare a elementelor geografice funcţionale, identificate în spaţiul geografic istoric, definit în anul 1867, spaţiul geografic interbelic 1918-1938 şi spaţiul geografic actual, cuprinzând perioada anilor 1968-2018, al judeţului Sălaj. Prezentarea noţiunilor de bază, detalierea principalelor forme şi dimensiuni geografice spaţiale, teritoriale şi administrative, de la înfinţare şi pâna în prezent. Prezentarea elementelor funcţionale care au generat dezvoltarea teritorială a spaţiilor geografice: suprafaţă, populaţie, organizare, transport, hidrografie, localităţi importante, vecinătăţii, etc. Identificarea, analiza şi prezentarea axelor de dezvoltare, impulsurile generate de axele iniţiale-istorice, transferate catre axele interbelice şi axele actuale-contemporane, continuitatea acestora în spaţiile geografice modificate şi schimbate teritorial. Influenţa asupra dezvoltării teritoriale, urbane, rurale, sociale, economice, etc., generată de priorităţile strategice şi teritoriale a fiecărui stat care a administrat şi posedat spaţiile geografice prezentate şi analizate. Lucrarea identifică câteva concluzii, rezultate din comparaţia organizării administrative diferite, privind complexitatea tuturor elementelor cuprinse în spaţiile geografice modificate şi metamorfozate de-a lungul anilor. Localităţile importante care au influenţat sau au fost influenţate de modificările structurale şi teritoriale pe întreaga perioadă istorică studiată. Studiul se derulează pe structura a patru componente esenţiale după cum urmează: Comparaţia elementelor geografice. Asemănările şi deosebirile dintre judeţul Sălaj-istoric, judeţul Sălaj-interbelic şi judeţul Sălaj-actual. Axe de dezvoltare istorice şi interbelice. Axe de dezvoltare actuale. Lucrarea este elaborată prin metode de cercetare neconvenţionale, creative, metoda prezentării sau a reprezentării, inclusiv metoda diagrafică

SALA 3

SECȚIUNEA III - *22 MAI 2019*

15:00-15:15 - Pillaring cationic clays and their uses in the Enology

Andreea Hortolomeu, Diana Carmen Mirila
PhD Supervisor: Prof. Nistor Denisa Ileana

Abstract:
Clays represent an important category of materials having ion exchange properties of mineral origin that are part of the alumino-silicate series. Bentonite is a technological aid widely used in winemaking to remove or reduce the concentration of undesiderable constituents. In particular, it acts as a settling aid to remove proteins, thus reducing the risk of protein haze in wine, whose occurrence could compromise its acceptance by the consumer. Because of its mineral nature, bentonite treatment agent highly influences the final wine elemental composition. In addition to montmorillonite, bentonite could contain quartz, chalcedony, fedspars, calcite, dolomite, analcime, and pyrite, among others, as accessory minerals. Montmorillonite the active substance from bentonite, is characterized by a layered crystalline structure, formed by an octahedral aluminum layer sandwiched between two tetrahedral silicon layers. This structure gives the property to increase its volume, reversibly, depending on the degree of hydration of the clay. Due to the exchange of cations (Na^+, K^+, Ca^{2+}, Mg^{2+}), the clay minerals from this group present an appreciable ion exchange capacity.
The objective of the present work was therefore to prepare hybrid silica-β-CD(β-cyclodextrin) materials from Montmorillonite K10 and commercial β-CD, and explore their application as a matrix for adsorption of mycotoxins, using the ochratoxin A as a model molecule. In order to obtaine the hybrid material has been used the pillaring process, which consists in two steps: the intercalation of clay with CD, and the calcination at temperatures over 400˚C of the intercalated material in order to pass into a rigid mesoporous material. Adsorption is a useful means of treating industrial effluents to separe and remove pollutants such as organic compounds [1]. The characteristics of an effective adsorbent include high adsorption capacity, selectivity, long useful lifetime, and availability in large amounts at low cost. From an oenological point of view, the composition and structure of bentonites have been studied and related to their protein adsoption capacities.
Key words: cationic clay, montmorillonite, pillaring, pollutants, wine

15:15-15:30 - A novel catalyst based on smectite clay pillared with Silver- characterization, synthesis and application

Diana Carmen Mirila, Madalina Stefania Pirvan, Nicoleta Platon, Dumitra Raducanu, Mohamed Amine Didi, Abdelkrim Azzouz
PhD Supervisor: Prof. Nistor Denisa Ileana

Abstract:
For more than three decades, the methods of pillaring clay have industrial attention. The bridging of clays lies in the intercalation between their sheets of large simple or mixed metal polycations in order to obtain microporous materials, rigid structure, with a large interlayer spacing. In this work, have been prepared a novel, eco-friendly and low cost catalyst, based on chemically modified clay by ion-exchange reaction with silver (MtK10Ag-PILC). The discharge of coloured wastes into streams affects their aesthetic nature and interferes with the transmission of sunlight, reducing the photosynthetic action. Advanced oxidation processes are a set of chemical treatment methods and procedures used to remove pollutants present in wastewater by oxidation through the reaction who involve hydroxyl radicals (OH-) formation. Oxidative processes usually refers to a subset of chemical processes which employ UV light, hydrogen peroxide (H_2O_2) and ozone (O_3). In this part of the research the oxidative process used is catalytic ozonation, since this process is friendly with the environment. The purpose was to obtain a good catalyst for the oxidation of three dyes: Malachite Green, Basic Blue 9 and Tartrazine and used in large quantities in different industries including textile, leather, food, cosmetics,

paper, printing, plastic, pharmaceuticals, etc, and also a good inhibitor in development for type strains isolated from the sewage sludge from wastewater treatment plant Bacau named *ISO.* The antimicrobial behavior of MtK10Ag-PILC was evaluated by means of diffusivity and zone inhibitors test against *ISO*. The test is a semi quantitative method and the samples were contacted directly with the bacteria suspension spread on Mueller Hinton petri plates. After 24 and 48 h of incubation at 37 ˚C, the inhibition zone and the diffusion in which of bacteria did not proliferate were analyzed. The catalyst MtK10Ag-PILC exhibited catalytic activity in chromophore groups elimination of the dyes and appreciable antibacterial capacity against bacteria *ISO*.

Key words: antibacterial activity, dyes, clay catalyst, pillaring, silver

15:30-15:45 – Tailoring the rational design of layered double hydroxides matrices for the efficient removal of heavy metals from aqueous solutions

Dorina Stanciulescu, Zaharia Carmen, Gabriela Carja
PhD Supervisor: Prof. Gabriela Carja

Abstract:
The quest to provide clean water has led to a tremendous boost in the synthesis of advanced materials that are able to decontaminate water. Phosphate pollution of water sources has raised global environmental concerns throughout the word in the conditions that phosphate makes its way into the aquatic environment through natural processes such as weathering of rocks as well as human activities such as agricultural, industrial and household uses. Layered double hydroxides (LDH), also known as hydrotalcite-like-compounds or anionic clays and their calcined products, have been widely used as adsorbent. Herein, layered double hydroxides matrices defined by a molar ratio Mg^{2+}/Al^{3+}= 2 and $Mg^{2+/}Al^{3+}$=3 and their derived mixed oxides were converted into efficient adsorbents for the removal of phosphate from aqueous solutions. Concentration of phosphate was estimated spectrophotometrically by stannous chloride method, monitoring the absorbance at 690 nm on UV–vis spectrophotometer. Results point out that the micro/nanomorphology of the LDH is important for defining the surface area of MgAlLDH and for establishing the uptake capacity of phosphate from the aqueous medium. The structural characterization of the samples by XRD and FTIR analysis indicate that we synthesized a typical LDH layered structure with Mg and Al in the layers and CO_3^{2-} as interlayers anions. The adsorption equilibrium could be fitted to a linearized form of Langmuir and Freundlich equations. The maximum phosphate adsorption capacity was found to be 4.9 mg/g.

Key words: layered double hydroxides, phosphate, wastewaters, adsorption

15:45-16:00 – Tailoring photocatalysts nanoarchitectonics for degrading industrial dyes

Diana Gilea, Sofronia Dranca, Gabriela Carja
PhD Supervisor: Prof. Gabriela Carja

Abstract:
Nanostructured photoresponsive catalysts with desired compositions and/or morphologies have been attracted much attention in the last decade because of their potential application in the removal of all kind of pollutants from air or water. We report nanostructured photocatalysts based on layered double hydroxides, as active photocatalysts for degrading the industrial dyes drimaren red (DR) and drimaren navy (DN) and nylosan (NYL). X-ray diffraction (XRD), IR spectroscopy (FTIR), transmission electron microscopy (TEM), and UV–vis analysis were used to investigate the structure, composition, size-morphology and photoresponsive properties of the samples. The catalyst photoefficiency was monitorized by UV–vis analysis following the absorbance (A) at 283 nm, 277 nm and 567 nm characteristic to DR, DN and NYL, respectively. The decomposed content of the tested dyes was calculated by C/C0 where C and C0 are the absorbance intensity at time intervals and initial respectively (the initial time was considered after the adsorption–desorption equilibrium was established).
The results point out that the studied LDHs present high photocatalytic activity in the degradation of the dyes; the maximum photocatalytic efficiency was almost 80%. The catalytic performances of the evolved nanostructured self-assemblies are a function of the specific composition of the clay.

Key words: Photocatalyst, layered double hydroxides, industrial dyes, photocatalysis, environmental catalysis.

16:00-16:15 – About tailoring the textural and structural properties of some layered double hydroxides by using FESEM and XRD analyses

Eugenia Corina Ignat, Diana Gilea, Gabriela Carja
PhD Supervisor: Prof. Gabriela Carja

Abstract:
Layered double hydroxides (LDHs) are ordered layered compounds with hydroxide sheets, where a net positive charge is developed on the layer due to partial substitution of trivalent for divalent cations, balanced by exchangeable charge compensating anions and water molecules, which are present in the interlayer space. Calcination of LDHs produce intermediate non-stoichiometric oxides. Both the LDHs and their mixed oxides have the advantages of effective dispersion, high specific surface area, and anion exchange ability that afford their wide usage area from water purifying till the controlled release of the drugs. Herein, we have studied the micromorphology of some specific layered double hydroxides, such as MgAlLDH, ZnAlLDH, ZnFeLDH, and their derived mixed oxides, as a function of the different physical-chemical parameters (e.g. synthesis method, the ratio between metal cations, synthesis temperature, time of aging) by FESEM microscopy. A Mira II LMU Tescan field-emission scanning electron microscope (FESEM) was used. The results point out that the micromorphological features of the tested samples, such as the size of LDHs nanoparticles, their interconnection pattern and/or the interparticle sizes are influenced by the characteristics of the synthesis parameters. Furthermore, XRD analyse was used for characterizing the structural properties of the studied LDHs.
Key words: Layered double hydroxides, mixed oxides, micromorphology, FESEM microscopy, structural properties.

16:15-16:30 – Modern Extraction techniques and fingerprint analysis of bioactive componunds from plants biomass extacts

Georgiana Mardare, Teodor Malutan
PhD Supervisor: Prof. Teodor Malutan

Abstract:
A rich source of bioactive compounds is represented by higher plants. Plants contain hundreds of chemical constituents, but only a few components are bioactive and therefore the characterization of metabolites (especially secondary metabolites), including their structure, in complex mixtures requires sophisticated techniques which must offer good sensitivity, selectivity and structural information on constituents of interest. Phenolics, terpenes and alkaloids are the most abundant groups of secondary metabolites from natural sources. Plants are recognized because of their property of providing bioactive compounds. Phytochemical compounds isolated from plant extracts can be used as an excellent source of phytotherapy. The interest in determining as many secondary herbal metabolites as possible has created the need for an economical, rapid, effective and environmentally friendly extraction method. Preparation and extraction methods are very important in making the most effective fingerprint of the unknown sample. The primary purpose of the extraction is to obtain the maximum number of secondary metabolites or, ideally, all the secondary metabolites present in the samples. The first step in the isolation and analysis of secondary metabolites is the extraction process from which the compounds in the sample matrix. This paper summarizes the main bioactive compounds and their derivates, classification of extraction methods based on entire fingerprint analysis. A fingerprint represent a characteristic profile or a pattern which reflecting the chemical composition of plants extracts, and can be obtained using spectroscopic and chromatographic techniques.The extraction methods include ultrasound assisted extractions (UAE), microwave assisted solvent extractions (MASE), supercritical fluid extraction (SFE), and other methods. For de analysis methods it will be include chromatographic techniques, such, thin layer chromatography (TLC), gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS). Chromatografhic techniques, especially hyphenated

chromatographies are strongly recommended to obtain chemical fingerprints. To evaluate the authenticity and quality stability of plants biomass, the fingerprint analysis represent a comprehensive, effective, and quantifiable, analysis technique.

Key words: bioactive compounds, herbal material, extraction, chromatograpy, classification, fingerprint analysis

16:30-16:45 – Artificial neural networks developed with clonal selection algorithm for modelling the naphthalene sublimation process

Ana-Maria Alexoaie-Conache, Elena-Niculina Dragoi, Silvia Curteanu
PhD Supervisor: Prof. Silvia Curteanu

Abstract:

Due to their advantages (such as ability to model non-normal class distributions, self-adaptability and robustness in the presence of noisy data), Artificial Neural Networks (ANN) can successfully replace the phenomenological approaches usually applied to model chemical engineering processes. However, determining the optimal ANN parameters (topology and training) is a difficult task and different methods to accomplish this issue were proposed. In this work, in order to determine the optimal model for the naphthalene sublimation process, a methodology combining ANNs with an Artificial Immune System Algorithm represented by Clonal Selection (CS) was used. CS is apopulation-based optimization procedure that simulates the response of the immune systems when attacked by foreign pathogens. Similar to an evolutionary algorithm, CS works with a population of potential solutions that through clonal expansion and affinity maturation generates optimal solutions. For the current problem, the potential solutions are represented by encoded ANNs, the scope being to determine the parameters (hidden layers, neurons in the hidden layer, weights, biases and activation functions) for which the lowest mean squared error between predictions and experimental data is obtained.

The present study investigates by simulation, with ANN-CS methodology, the sublimation of the naphthalene samples of different shapes, under atmospheric pressure in air as entrainer, without recycle. Feed-forward multilayered neural network type was chosen and tested based on its simple structure, ease of designing and training, good predictions it provides, and the possibility to combine it with other simulation techniques (in this case, CS algorithm). The modelling purpose was to evaluate the performance of the process, quantified by the sublimation rate depending on process time, entrainer temperature, and entrainer flow rate. The best network was selected based on a balance between performance (best generalization capability) and size. This is realized by MLP(3:15:1), a multilayer perceptron with one intermediate layers with 15 neurons, having mean square error, MSE = 0.003135 and correlation r = 0.9934 in the training phase and MSE = 0.265847 and r = 0.9299 in the validation phase.

Key words: artificial neural networks, clonal selection algorithm, naphthalene sublimation

16:45-17:00 – Separation of waste industrial gases with magnesium

Ioana Barabulica, Mircea Teodor Nechita
PhD Supervisor: Prof. Ioan Mamaliga

Abstract:

Magnesium one of the alkaline-earth metals of great interest, with multiple uses in many scientific and technical fields, illustrated at international level. Numerous scientific events were organized internationally, dedicated to magnesium. A particularity of metallic magnesium of interest in this study relies on its capacity to be involved in exothermic reactions with a series of gases such as: O_2, N_2, CO_2, NH_3. The reaction of magnesium with these gases has been studied from the protection against fires point of view, which are possible to be provoked during the occurrence of these reactions. Published studies deal with magnesium reactions, especially from kinetics and mechanisms perspetives, with the purpose to model the processes taking place during reactions development.The present study proposes a theoretical evaluation of magnesium reactions with the gases listed above, highlighting the opportunity to use this metal for separating industrial gas mixtures, especially those containing nitrogen

or carbon dioxide, in the absence of oxygen. On the other hand, the compound Mg_3N_2 (magnesium nitride) obtained by the direct reaction of Mg with nitrogen or ammonia has many uses, especially due to its ability to release ammonia in contact with water. This study may be an important starting point in the research on the use of metallic magnesium in the recovery of waste gases from various industrial installations such as ammonia production plants or thermal power plants. The reaction of magnesium with carbon dioxide can be applied to reduce CO_2 emissions, thus helping to diminish the global warming phenomenon. The potential industrial implementation of these reactions can encourage the research in the direction of reducing energy consumption in the production of magnesium to make this element more accesibile for industrial activities.

Key words: ammonia, carbon dioxide, exothermic reaction, magnesium nitride, nitrogen

17:30-17:45 – Researches on biopesticides with vermifug and insecticide effect obtained by extraction with non-toxic solvents

Gabriel Daraban, Marinela Badeanu, Lacramioara Rusu, Daniela Suteu
PhD Supervisor: Prof. Daniela Suteu

Abstract:

The development of agriculture has led to increase the synthesis pesticides usage due to their role in growing crop yields.This fact has led to an increase in crop production due mainly to combating unwanted vegetation and pests. However, the intensive use of pesticides (persistent and non-biodegradable), often irrational, has contributed to the initiation and intensification of deep soil degradation processes, water and groundwater pollution, surface and air pollution in the respective or adjacent areas. On the other hand, the damages on the flora and fauna represent an important aspect.Last but not least, crop contamination represents one of the biggest problems because it affects food safety. Due to these disadvantages, the researches currently focus on the use of biopesticides.Recent data show that a growing number of plant extracts have also been tested against a wide range of prominent arthropod pests demonstrating high efficacy, multiple mechanism of action, low toxicity on vertebrates, and potential use of byproducts as reduction agents. Another purpose is finding a stabilizing mechanism / method for the synthesis of nanopesticides. However, the number of commercial biopesticides based on plant extracts remains low.

The paper aim is to present the results of the experimental researches about the investigation of the effectiveness approaches of alcoholic plant extracts from spontaneous flora of Moldavia and Bucovina (Romania) as repellent and / or germicidal bioinsecticides (i.e. Milfoil - Achillea millefolium; Common marjoram - Origanum vulgare; Thyme - Satureja hortensis; Patience - Rumex patientia; Marigold - Calendula officinalis; Anise- Pimpinella anisum; Nettle- Urtica dioica; Hypericum perforatum) in the control of field pests and storage (Colorado beetle (Leptinotarsa decemlineata), insect bean- (Acanthoscelides obsoletus).

Key words: bioinsecticide, Colorado beetle, extraction, insect bean, vegetal extract

17:45-18:00 – Utilization of residual biomass as biosorbent: study of the batch biosorption process of some chemical species present in aqueous media

Ioana Luiza Horciu, Alexandra Cristian Blaga, Carmen Zaharia, Sonia Dascalu, Daniela Suteu
PhD Supervisor: Prof. Daniela Suteu

Abstract:
Lately, particular attention has been paid to the use of bioresources, such as by-products from fermentative processes, developing a new generation of adsorbent materials, having a number of physical properties controlled so that they are useful as adsorbent materials useful in retaining chemical species (pollutants) with various molecular masses (i.e. metal ions, dyes, drugs/medicaments).Bacteria and fungi are used in the biosynthesis industry to produce various metabolites, and also thousands of tons of residual biomass are produced each year. This non-living biomass could be used as an environmentally friendly potential biosorbent, since its use provides an alternative and relatively inexpensive method for water treatment. The residual biomass can be immobilized by different techniques to obtain particle of desired diameter and mechanical strength easily handled that can be used in a continuous reactor. A direction for use of immobilized biomass is represented by biorption of some chemical polutans such as metallic ions, dyes and pharmaceutical product waste from aqueous solution/environment in order to treat the industrial wastewaters.The paper reports some experimental results about some biosorption processes on the immobilized biomass. The influence of temperature, solution pH, biosorbent dose, phases contact time, chemical compouds concentrations, immobilized biomass dose was studied in batch experiments in order to establish the favorable conditions of processes.
Key words: biosorbent, biosorption, chemical pollutants, imobilization, residual biomass

18:00-18:15 – Behavior of plants in the presence of organic UV filters

Mariana Minut, Mihaela Rosca, Petronela Cozma, Cezar Catrinescu, Mariana Diaconu, Maria Gavrilescu
PhD Supervisor: Prof. Maria Gavrilescu

Abstract:
Organic UV filters are substances especially used in personal care products to protect human skin against sun, but can also be applied in paints and varnishes to prevent the photodegradation of products. The intensive use of sunscreen products has been increased due to their capacity to protect the skin against harmful effects such as skin harm, premature skin aging and skin cancer. UV filters can be found in surface waters, swimming pools, lakes, rivers, underground water, sewage sludge, treated wastewater in concentrations of ng/L and µg/L and in soil/sediments of ng/g. Worldwide, 55 UV filters are accepted to be used in sunscreen products. One of the most commonly UV filters used in cosmetics (over 80% of products) is 2-ethylhexyl-4-methoxycinnamate (EHMC) with a high absorption capacity of UVB radiation. In 2015, EHMC was introduced in the surveillance list of Directive 2015/495/EU, and it is considered an emerging pseudo-persistent organic pollutant. Due to high lipophilicity, the EHMC has the ability to bioaccumulate in living organisms (it has been found in fish, cormorants and crustaceans) and can reach humans through the food chain. Several studies have indicated that EHMC acts as an endocrine disrupter, can cause damage to the DNA in human cells and is suspected to have genotoxic effect in fetus and young children.Studies regarding the presence of EHMC in the aquatic environment, as well as its effects on the aquatic ecosystem have been extensively approached, but it could also be found in soil due to the use of sewage sludge in agriculture application or possible due to the irrigation of agricultural land with treated wastewater. Also, the presence of EHMC in soil can cause negative effects on the agricultural system, especially on plant growth.The main objective of the present paper was to study the behavior of white mustard (*Sinapis Alba*) in the presence of EHMC. In this purpose, we used Petri dishes with diameter of 10 cm, considering 10 seeds in each plate, and we introduced 8 different quantities of EHMC (from 0.3 µg to 150 µg). The results showed that the germination degree (GD%) of mustard seeds in the presence of EHMC was not affected, but we observed a slight effect induced by EHMC in the lenght of roots and stems, the maximum inhibition index values were 18.02 % for roots, respectively 14.64% for stems.The analysis of EHMC content in biomass showed that the

plant can bioaccumulate the chemical compound, so that this way can be an alternative for water cleaning by phytoremediation.

Key words: organic UV filters, EHMC, *Sinapis alba*, phytotoxicity

Acknowledgements

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18:15-18:30 – Removal of heavy metal ions from aqueous effluents using mustard waste biochar as adsorbent

Alina Mihaela Matcaboja, Anca Mihaela Mocanu, Gabriela Lisa
PhD Supervisor: Prof. Laura Bulgariu

Abstract:

The industrial effluents contain various heavy metals and other substances, which increase the environmental pollution problems and causing the deterioration of environment. The heavy metals are discharged from numerous industries, and are considered persistent environmental contaminants, because cannot be destroyed or degraded. In addition, due to their toxic effect and accumulation tendency, the pollution with heavy metals still remains an important problem with serious ecological and human health consequences. Therefore, the removal of heavy metals from industrial wastewater is necessary, to prevent and minimize environmental pollution. Compared with conventional methods, the adsorption on low-cost materials is considered a facile, cheap and easy-design alternative, which can be used for the removal of heavy metals from aqueous media, in various experimental conditions. In this study, the biochar obtained from mustard waste biomass was used as adsorbent for the removal of some heavy metals (Pb(II), Cu(II) and Co(II) ions) from aqueous effluents. The adsorptive performances of biochar were evaluated as a function of initial metal ions concentration and contact time. The experimental results were modeled using various isotherm models (Langmuir, Freundlich, Dubinin-Raduskevich and Temkin) and kinetics models (pseudo-first order, pseudo-second order, intra-particle diffusion), and the specific parameters of each model were calculated. Due to their high biosorptive characteristics, reduced costs of preparation, the biochars used as adsorbents in this study can be considered environmental-friendly materials, which complies with the principles of cleaner production.

Key words: adsorption, aqueous effluents, heavy metal ions, isotherm and kinetics modelling, mustard waste biochar

Acknowledgments This paper was elaborated with the support of grant of the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, project number PN-III-P4-ID-PCE-2016-0500.

18:30-18:45 – Optimization of biosorption process for hexavalent chromium removal by microorganisms

Mihaela Rosca, Mariana Diaconu, Maria Gavrilescu
PhD Supervisor: Prof. Maria Gavrilescu

Abstract:

Due to the negative effects of chromium on human health and environmental quality, the scientific community involved numerous efforts to solve the pollution problems, by implementing economic and eco-friendly alternatives compared to conventional physico-chemical processes. The removal of Cr^{6+} ions through biosorption is influenced by several factors such as pH, initial concentration, time, biosorbent dose. To study the influence of all these factors on biosorption process a large number of experiments must be done, thus causing a significant increase in materials, reagents and time consumptions. So, for a smaller number of experiments various mathematical models can be applied in order to establish the optimum values of parameters at which the biosorbents have the higher effectivenes for Cr^{6+} ions removal from aqueous solution. The experiments concerning the studies of Cr^{6+} biosorption by dead biomass of *Bacillus megaterium* and *Rhodotorula* sp. were carried out in batch in 100 mL Erlenmeyer flasks with 30 mL working solution in incubator at constant temperature. During

the experiments the initial concentration was varied between 25 and 400 mg/L, the pH range was between 1 and 5 and the biosorbent dose between 2 and 10 mg/L. The temperature was another parameter that had been varied between 25 and 40 ^{0}C. All the results obtained from batch experiments were modeled using the Minitab 17 software and to refine the results, the response surface methodology was chosen which offers the opportunity to predict the combined effects between parameters. So, for a pH above 1, for a maximum initial concentration around 25 mg/L, at 25 ^{0}C using 9.45 g/L biosorbent dose the Cr^{6+} is totally removed by *Bacillus megaterium* dead biomass. For *Rhodothorula sp.* used as biosorbent to remove Cr^{6+} with maximum efficiency the optimum pH is 1 and the biosorbent dose is 9.09 g/L keeping the temperature at 25^{0}C and considering the maximum initial concentration around 275 mg/L.

Key words: biosorption process, dead biomass, hexavalent chromium, process optimization, response surface methodology

Acknowledgements

This work was supported by a grant of the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, project number PN-III-P4-ID-PCE-2016-0683, Contract no. 65/2017.

18:45-19:00 – Influence of lubricant on the friction an angular contact ball bearing

Andrei Popescu, Madalin Corduneanu, Olaru Dumitru
PhD Supervisor: Prof. Olaru Dumitru

Abstract:

The presence of the lubricant in a ball-race contact has two principal effects on friction: reduces the sliding friction, as a result of developing a film thickness between the contact surfaces and increases the rolling friction, as result of developing a hydrodynamic rolling friction. The influence of the hydrodynamic rolling friction on the torque of a 7205B modified angular contact ball bearing has been theoretically and experimentally studied. The experiments demonstrated that, for very low contact loads between balls and races, the effect of the hydrodynamic rolling force is dominant in the total friction torque. The experiments have been validated by using Biboulet&Houpert's equations for hydrodynamic rolling forces.

Keywords: angular contact ball bearing, rolling friction, friction torque, spin-down.

18:45-19:00 – Friction forces on human finger skin

Cezara Mariuca Oprisan, Stefan Ciprian Marchidan, Vlad Carlescu, Olaru Dumitru
PhD Supervisor: Prof. Olaru Dumitru

Abstract:

The prehension of the small objects with the human fingers is depending on the friction and adherence between finger's skin and object's surface. The design of finger pads for robotic and prosthetic hands must simulate both the human finger friction and adherence and elastic deformation, especially for small objects. In this paper, the authors have experimentally investigated the friction forces and friction coefficients in a dry sliding contact tribosystem by using Microtribometer CETR UMT-2. A steel cylinder was sliding on the human finger with speeds between 1 to 10 mm/s at normal loads up to 10 N. The results showed that the friction coefficient increases with the sliding speed and decrease with the normal load. Also, was evidenced the presence of the adherence and sliding zones during the laterally cyclic movement of steel cylinder as function of the normal loads and sliding speeds. Therefore, the experimental results offer important information to select the adequate artificial skin materials for robotic finger pads, often overlooked, with relatively simple shapes and mechanical properties typically used.

Keywords: Human skin, sliding friction, adherence, friction forces, friction coefficient.

SECȚIUNEA III - *23 MAI 2019*

09:00-09:15 – Preliminary studies about metallic ions retentions from aqueous solutions onto PVA hybrid hydrogels

Iulia Nebunu, Ramona Elena Tataru Farmus, Raluca Ioana Baron, Sergiu Coseri, Daniela Suteu
PhD Supervisor: Prof. Daniela Suteu

Abstract:
In the last decades, a new generation of adsorbent materials, based on renewable resources has been developed. These materials exhibit pore controlled sizes which renders them useful in retaining many chemical species with various molecular weights. In this connection, cellulose-based hybrid hydrogels are intensively studied mainly for i) retention of chemical polluants, and ii) valuable and efficient matrix for controlled release of various chemical species of biological interest.On the other hands, polyvinyl alcohol (PAV) is a biodegradable polymer, largely used in the last years for the production of biodegradable hybrid materials, as a substitute of traditional polyethylene or polypropylene polymers. However, PAV has the disadvantage of weak mechanical properties, and also requires cross-linking with certain compounds capable of improving these properties. To achieve this challenge, cellulose (C) has been proposed in our studies as an ecological and renewable alternative to the synthetic polymers, in order to prepare hybrid PAV-C hydrogels. Several hybrid hydrogels were synthestised, varying the amount of cellulose embedded in the polymer matrix. Previous studies have shown that the material PAV-25C (25% cellulose) is the one that exhibited the best adsorbing properties of the tested chemical species.The adsorption of some metallic ions (Cu^{2+} and Co^{2+}) from aqueous solution on the hydrogel PAV-25C has been studied, in order to establish the favorable conditions of adsorption. The influence of solution pH, initial metal concentration, temperature, adsorbent dose and contact time was studied in batch experiments.
Key words: Hydrogels, cellulose, adsorption, metallic ions, pollutant, biologic complex

09:15-09:30 – Recovered paper as raw material for paper industry. Geometrical characteristics of cellulosic fibers

Corina Iuliana Patraucean
PhD Supervisor: Prof. Dan Gavrilescu

Abstract:
Recovered paper is a valuable raw material for paper industry in the world and in Romania, as well. In 2018 in Romania, over 400,000 tons of paper was used for the production of packaging and hygienico-sanitary papers. Every ton of paper used in the paper industry frees from cutting 17 trees. However, recovered paper contains cellulosic fibers of inferior quality compared to those obtained from wood and therefore it can only be used to obtain less demanding paper grades. The papermaking potential of cellulosic fibers is determined by their geometric dimensions (length and thickness) as well as fibers conformation. It is known that the longer the fibers, the higher the resistance of the paper.Recovered paper contains a broad spectrum of cellulosic fibers that differ in origin and dimensional characteristics. In this regard, the present paper aims to investigate the geometrical characteristics of the fibers of the recovered paper grades most demanded by the papermakers. The geometric dimensions of the fibers were determined by image analysis and processed using the image analysis program *Image J*. Selected images for each type of fibers were obtained to determine their size, length and diameter, as well as the level of fiber changes, buckling and bending. Fibers of recovered paper have a large dimensional variety and adopt both rectilinear and loose shapes. The fibers are collapsed and also have localized deformations (bending and crushing). Correlations between the geometric characteristics of the fibers have also been determined.
Key words: recovered paper, cellulosic fibers, dimensional characteristics, image analysis

***09:30-09:45* – Removal of Cu (II) ions from aqueous media by adsorption on PET fibres functionalized with reactive dye**

Ramona Copae
PhD Supervisor: Prof. Laura Bulgariu

Astract:
The contamination of water sources with heavy metal ions, mostly due to the anthropogenic activities is an important environmental problem worldwide, which still needs attention. Accidental discharge of industrial effluents or inadequate treatment of these are considered the main factors which have as result the pollution of surface and ground water with heavy metal ions, drastically affecting the human life and the quality of ecosystems. From many points of view, the uptake of heavy metals from aqueous media on solid adsorbents is considered an efficient alternative for the treatment of industrial effluents. Unfortunately, all the advantages of adsorption process are maintained only if the material used as adsorbent are cheap. In this study it is examined the adsorption of Cu(II) ions from aqueous media PET fibres functionalized with Orange G reactive dye. Batch experiments were peformed as a function of Organge G concentration required for functionalization, initial solution pH and initial Cu(II) ions concentration, at room temperature (22±2°C). The functionalization procedure and a detailed characterization of the obtained adsorbent are in depth discussed in this study. The experimental data obtained during Cu(II) ions adsorption onto functionalized PET fibres were analyzed using Freundlich, Langmuir and Dubinin-Radushkevich equilibrium models. The Langmuir isotherm model better characterizes the equilibrium adsorption data; and the maximum adsorption capacity (q_{max}, mg/g) was compared with the values obtained for other adsorbent materials. The results lead to the conclusion that the functionalized PET fibres with Orange G reactive dyes can be considered as a promising adsorbent for the removal of heavy metal ions from aqueous media.
Key words: adsorption, aqueous media, Cu(II) ions, isotherm modelling, PET fibres
Acknowledgments This paper was elaborated with the support of grant of the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, project number PN-III-P4-ID-PCE-2016-0500.

09:45-10:00 – Use of Saccharomyces cerevisiae yeast to remove Cu (II) ions from aqueous media

Evghenia Savastru, Catalin-Ioan Zamfir
PhD Supervisor: Prof. Laura Bulgariu

Abstract:
Heavy metal pollution is a problem for the environment. With the ever-increasing progress of modern technology, there is also the danger of causing profound changes to the environment. Although many methods of removing metal ions, including ion exchange, chemical precipitation, adsorption etc., are available, biological adsorption (biosorbtion) processes based on an adsorbent derived from waste and natural bio-materials have several important benefits. Yeast is one of the most commonly used organisms in bioprocessing engineering. Of these, the strain of *Saccharomyces cerevisiae* is more recognized due to its high fermentation rates and being easy to use. It is also available in large quantities as industrial fermentation waste that can be used in biosorption processes. The use of such biomass for the adsorption of heavy metal ions is an economically attractive alternative to conventional methods of removing metal ions.In this study *Saccharomyces cerevisae* yeast was used as the biosorbent for the retention of Cu (II) ions from aqueous media. The experiments were performed in batch systems and aimed at studying the influence of the most important experimental parameters (initial solution pH, yeast dosage, initial Cu (II) ions concentration and contact time) on the efficiency of the biosorption process. The experimental results were modeled using various isotherm models (Langmuir, Freundlich and Temkin) and kinetics models (pseudo-first order, pseudo-second order, intra-particle diffusion), and the obtained parameters were compared with those obtained for other biosorbents. Encouraging experimental results have shows that Saccharomyces cerevisiae yeast has potential to be used for the removal of heavy metals, and this could be an alternative solution for the sustainable use of this material.
Key words: aqueous media, biosorption, Cu (II) ions, Saccharomyces cerevisae yeast

Acknowledgments This paper was elaborated with the support of grant of the Romanian National Authority for Scientific Research, CNCS – UEFISCDI, project number PN-III-P4-ID-PCE-2016-0500.

10:00-10:15 – Lindane toxic effects on white mustard (Sinapis alba) and rapeseed (Brassica napus)

Sebastian Ionut Vasilica, Mihaela Rosca, Petronela Cozma, Diana Elena Comanita, Mariana Diaconu, Cezar Catrinescu and Maria Gavrilescu
PhD Supervisor: Prof. Maria Gavrilescu

Astract:
Organic pesticides were used in agriculture for many years, but they proved to be toxic for plants and environment. In particular, lindane (γ- hexachlorocyclohexane, γ-HCH) was banned in many countries, while it was considered one of the priority organic pollutants. Furthermore, lindane represents a serious risk since HCH residues still can be found in the environment due to its persistence. Phytoremediation is generally used to remove organic pollutants, such as lindane, by using plants or microorganism or their synergic activity. Phytotoxicity tests can help to understand and apply the bioremediation potential of plants used in phytoremediation. Therefore, we implemented an experimental program to assess the toxic effects of lindane generated on two plants: white mustard (*Sinapis alba*) and rapeseed (*Brassica rapa*) working with lindane solutions (in acetone) of 0.1, 1 and 10 mg/L concentrations. In the first step, we have analyzed the influence of lindane on seed germination rate and seedling growth. The experiments were developed in Petri dishes with Whatman filter paper discs, where 10 seeds sterilized seeds of white mustard and rapeseed, respectively were placed in randomized design with 3 replicates for each concentration, including control sample. We first added 3 mL of sterilized distilled water and then 0.03 mL (30 µL) lindane solutions of different concentrations. After 5 days, we determined a series of growth indicators such as: germination rate, length of the roots and stems, fresh and dry biomass and tolerance index. Germination rate was around 90% in the case rapeseed, even at high lindane concentrations such as 10 mg/L, but in the case of white mustard, the germination rate was affected even at 0.1 mg/L lindane, where the value of germination rate was 93%. Length of roots and stems decreseas as lindane concentration increase. Biomass weigth showed that white mustard was affected by lindane being able to assert that inhibition process was present, but in the case of rapeseed, the amount of biomass does not show significant variations.Further studies are still needed to better understand the mechanism of removal of lindane from soil using plants.
Keywords: inhibition process, lindane, phytotoxicity tests, tolerance index
ACKNOWLEDGEMENTS
This work was supported by a grant of the Romanian National Authority for Scientific Research, CNCS –UEFISCDI, project number PN-III-P4-ID-PCE-2016-0683, Contract no. 65/2011.

10:15-10:30 - Economic and technical criteria for designing prestressed concrete beams

Ioan Lucian Stan, Petru Mihai
PhD Supervisor: Conf. Petru Mihai

Abstract:
The efficient design of prestressed precast concrete beams represents a difficult task, the number of parameters involved in design being correlated in the first case with the technical and economic criteria. In order to achieve the solution with the lowest financial effort, it is necessary to optimize the solutions by identifying the cost of the solutions wich satisfy the technical requirements. However, from the current practice only optimal models can be obtained due to the restriction imposed by service and construction stages, thus the solution of this problem refers to the effiency design of prestressed precast concrete beams based on the minimum cost criteria. Thus, in this paper it is illustrated the main technical and economical criteria that influence significantly the cost of producing a prestressed precast concrete beam. Once the technical and economic criteria underlying the conception/design of a specific member (beam) a series of scenarios (methodologies) can be made to obtain a series of technical solutions characterized by an equivalent cost, only a small number of these solutions representing the optimal solutions. By using the applied engineering it is intended to determine the economic effort bt solving the quality-cost-time equation. Inappropiate design may result in unreasonable costs. Integrated

engineering enables conception and simultaneous design of associated products, production and maintence process. This way they are taken into account from conception eliminating it thus integrating issues such as quality, timing, costs and user requirements.
Key words: Prestressed, precast, beams, cost, criteria, economic, technical

10:30-10:45 - The Influence of the Durability Factors on a Special Reinforced Concrete Structure's In-Time Behaviour

Alexandru Filip, Daniel Covatariu
PhD Supervisor: Prof. Liviu Groll

Abstract:
The monitoring of the in-time behaviour of the constructions takes place throughout the life of the construction starting with its execution and it is a systematic activity of collecting and capitalizing the information resulted from observation and measurements on some phenomena and sizes that characterize the properties of the constructions in the process of interaction with the environment.
In the case of reinforced concrete structures, the complex nature of the effects of the aggressive environment's factors, as well as ensuring of the exigencies for a service long life, requires additional measures to prevent degradation / deterioration risks.
In this paper, an experimental program to in-time monitoring of a special reinforced concrete structure (water tank) was provided. Visual inspection of the structure, non-invasive and destructive testing methods was applied in order to assess physical and mechanical characteristics. Based on the investigations carried out and the numerical results obtained, the level of degradation / deterioration and, also, a prediction about the future evolution on short/medium period could be estimated.
In order to ensure the carrying capacity of the existing structure and to comply with the safety requirement in operation, several technical intervention measures have been proposed.

10:45-11:00 - Calculus Optimization of a Strengthening Method for a Reinforced Concrete Beam using Carbon Fiber Reinforced Polymer Composites

Alexandru Filip, Daniel Covatariu
PhD Supervisor: Prof. Liviu Groll

Abstract:
In recent years, the need to rehabilitate / consolidate the existing built-up fund has become of particular importance for many reasons (extension of the construction exploitation period, economic considerations, etc.).
This paper presents the results of a numerical investigation of flexural and shear strengthening of reinforced concrete (RC) roof elements (T – section beams) with externally bonded Carbon Fibre Reinforced Polymer (CFRP) strips and sheets of a water tank.
The assessment has been conducted using two software design programs. Firstly, the input data values have been collected on the basis of an experimental program. The numerical evaluation of the reinforced concrete structural element has been calculated as a simply supported beam using SCIA Engineer software program, by FEM (Finite Element Method), in order to determine the maximum values of the internal efforts (bending moment, shear force) in different load combinations.
Subsequently, based on the results obtained, the design of the consolidation solutions using CFRP has been realised with the Sika® Carbodur® FRP Design program.
This program allows the design of flexural strengthening (using the maximum value of the bending moment) to determine the dimensions of CFRP strip and the design of shear strengthening (using the maximum value of the shear force) to determine the dimensions and the number of layers of CFRP sheet.
In the case of shear strengthening, it has been calculated two types of application of CFRP on the structural element: continuous jacketing and discrete strips.
The obtained results for both variants present some advantages and disadvantages. In both situations, the results are valid and the design is made according to the norms, conclude the fact that the use of

CFRP (Carbon Fibre Reinforced Polymer) represents an effective consolidation method which can be used to repair and strengthen damaged / deteriorated beams.

11:30-11:45 –Structural particularities for an ununiform building, in plan and elevation, situated in a seismic area

Vladut-Ionel Iftode, Ioana Olteanu-Dontov, Petru Mihai
PhD Supervisor: Conf. Petru Mihai

Abstract:
One of the reguirements when designing a structure in a seismic area is to choose a regulat structural system, uniformly distributed in plan and elevation, in order to ensure a good seismic behavior. If a non-uniform plane shape is chosen, the structure can be divided into structurally independent and uniform plane structures by seismic joints. The uniformly distribution on elevation leads to the reduction of possible effort concentration and ductility requirements in isolated areas of the building.
In order to ensure an increased seismic energy dissipation capacity throughout the structure, by small excentricities and increased redundancy, it is recommended to place simetrically the structural elements that provide stiffness to lateral forces. Most reinforced concrete frames structures have masonry panels as envelope which behave as structural elements taking over lateral loads until their eventual destruction by a strong earthquake. In practice, there are many cases where the additional stiffness from the masonry panels led to the severe damage in the columns causing local mechanisms, respectively, until global collapse.
For the case study, a mixed structural system of frames and structural walls, with irregularities in plan and in elevation, was considered. For the infill panels two materials were considered: masonry with vertical voids and autoclaved concrete. The analysis studies the stiffness increase for the considered situations and the cracks development in the linear elements of the frame. Based on the obtained results, it can be stated that the most effective solution for the infill panels of the studied structure is the autoclaved concrete. This increases the load bearing capacity of the structure to horizontal forces, but at the same time allows lateral displacements for the structure.
Key words: seismic joint, masonry infill, stiffness, seismic behavior, plastic hinge

11:45-12:00 – Elements for increasing the durability of the reinforced concrete reservoirs

Adrian Grigorean, Liviu Groll, Lucian Cozma
PhD Supervisor: Prof. Liviu Groll

Abstract:
In this paper are presented corect priciples and execution methodology of the concrete resevoirs used for preparation and concrete's treatment after casting.echnical solutions refers to the using method of the constituent materials and reinforcing solutions, frame works, casting, isulation pre and post casting, special treatment methods for engineering buildings such as resevoirs.
This issue aims the identification of the elements that are used for resevoirs execution, that are influencing the final performance of the concrete reservoirs, the actual execution erors and their influence on the final objective (in this case the reservoir).In the case of reservoirs an important factor represents the necessary impermeability requirement.
The best method to obtain this result is the using of a compact concrete, and by applying of a cement mortar in layers or of a special composition cement plastering and painting of the concrete with different hydroisulation solutions. the main conditions for obtainig of the water impermeability of the reservoirs represent the corect realization and an enough stable fondation terain.
The influence of the dinamic vibration regime on the compacting degree leads to many concernes and tests foor establishing of an optim vibration regime for each type of fresh concrete mix. in the casa of the concrets prepared with air antraining additives, the compacting process has to be performed in a controled vibration regime.
Key words: reservoirs, cement, reinforcement, shrinkage, durability, additives

12:00-12:15 - Designing of prestressed precast concrete beams in chlorides environment

Ioan Lucian Stan, Petru Mihai
PhD Supervisor: Conf. Petru Mihai

Abstract:
The proper designed of prestressed precast concrete beams represents a difficult task, the number of parameters involved in designed being correlated even with the surrounding environment of the members. In the case of the members situated in the chloride environment the task of designed a suitable member is harder due to the fact that are not allowed cracks. According to the EUROCODE 2, active and pasive reinforcement exposed to chloride enviroments tends to degrade, the integrity of the members being at risk. As is known the development of cracks may occured in all the construction stages: transfer of prestressing, storage yard, transport, final supports, superimposed dead load or end of designed working life. A riguros control is necessary for creating a satisfactory element (prestressed precast concrete beam), as it will be shown in this paper. From the simulations carried out it will be shown how by altering in a certain manner some parameters (for example the debonded lengths of strands, the debonded strands positions), the members may or may not present cracks. To highlight these particularities the IDEA StatiCA software was used and, the results presented graphically and tabular.
Key words: Prestressed, precast, beams, chloride, enviroment

12:15-12:30 - Principles of green roofs design

Ioana Roxana Baciu, Marius Lucian Lupu, Sebastian George Maxineasa
PhD Supervisor: Prof. Nicolae Taranu

Abstract:
The implementation of green infrastructure, like the green roofs for buildings, is part of the new innovative solutions in urban design to solve the current problems related to the environment. Urbanization, climate change, and air quality are contemporary topics of high importance for the citizens' health and the modernization processes. One of the main problems at the global level is the accelerated economic development with direct impact on the rapid urbanization in most countries.
In this context, the green roof concept has been developed as a greening solution for the building structure. This technology is part of the sustainable strategy of urban recovery and building restoration. It is well known that green roofs as a component of the city infrastructure can supply several ecosystems at building and urban scale. The application of these greening systems is increasing due to their ecological, social, economic, practical and aesthetic benefits in building design. Over time the structure and the implementation were well improved and designed based on solving issues like technical details, aesthetic considerations, costs, constructive elements and time of construction.
The present paper deals with the principles of design, including the classification of the green roof systems, the main components and the construction details of each type of green roof, together with a detailed presentation of their advantages and disadvantages. The above-mentioned factors are used to compare the structure of the different types of green roofs and to identify and systematize their application technologies.
The paper provides an overview of the green roofs to the common user in order to correctly understand this solution that can reduce the overall environmental impact of the construction sector. Therefore, it is important to understand the way that these structures act over the buildings in terms of construction details and plant selection.
The authors assert that by using the green roof structure, the deterioration effect of the built sector over the natural environment can be significantly reduced.
Keywords: green infrastructure; greening solution; urban recovery; green roof; principles of design; classification.

12:30-12:45 - The analysis of the floods on the Moldova River in Pildeşti area during 2016 - 2018

Paul Vivian Sion, Mihaela Avram, Stefania Chirica, Mihail Luca

PhD Supervisor: Prof. Mihail Luca

Abstract:
The paper presents an analysis of the hydroclimatic risk parameters on the Moldova River lower course. The studies and researches were conducted on the Moldova River, on the section where the water catchment or Roman Town is located. The flood from June 2016 has morphologically changed the Moldova River minor riverbed, which influenced the supply parameters of the wells located on the river's left bank. The flood effect also consisted in the partial and total degradation of the riverbed improvement structures. Also, the shore protections were degraded, a situation which influenced the left river bank stability. The flood caused the main river bed to move towards the right river bank, which influenced the supply parameters of the wells.
Through the documentary study and the field research, the hydrological, hydraulic and behavioural parameters of the hydrotechnical structures on the studied river section were analysed. The effects of the 2016 floods have materialised through the degradation of the bottom sills, the flood control dikes (jetties) in the riverbed and Moldova River left bank shore protections. The 2016 floods required the restoration of the riverbed morphology in order to ensure the optimal running of the wells. The hydroclimatic risk parameters highlighted through research require special design conditions for the hydrotechnical structures in the riverbed (bottom sills, shore protections, jetties etc.).
Key words: Degradation, flows, flood, river improvement, riverbed morphology.

12:45-13:00 - Development of Unit Hydrograph for Jijia river using ArcGis

Anca Danila

Abstract:
Numerous methods are available for the development of a unit hydrograph. The traditional methods require rainfall-runoff data for the development of the hydrograph. However most of the Romanian river basins are ungauged, hence it becomes difficult to develop the unit hydrograph. Moreover the estimation will be satisfactory if the area under the unit hydrograph is unity. This necessitates the need to develop the unit hydrograph using the physical characteristics of the watershed, rather than the rainfall-runoff data. In this study an attempt has been made to develop the unit hydrograph for Jijia watershed by utilizing the physical characteristics of the watershed and then utilizing them to develop the unit hydrograph by the CWC formulas. The area under the unit hydrograph developed by CWC method was obtained close to unity which implies the result is close enough to be right.
Key words: floods, average, flows, GIS, surface, hydrographic.

13:00-13:15 - Floods recorded in torrential water catchment area

Ana Iulia Luca, Mariana Clarisa Lazarescu
PhD Supervisor: Prof. Ion Giurma

Abstract:
The objective of this article is to define the notion of flood and describe the historical floods recorded in the country and in the world.
Flood hazard is one of the most harmful disasters in the world, and it is significant to obtain information on flood characteristics for disaster mitigation as well as vulnerability assessment.
For the prevention of floods, hydrological warnings and forecasts are indicated and analysed.
Mathematical models of the rain-drain process are presented and a model used for a case study (a torrential water catchment area) is described.
Key words: flood hazard, hydrological warnings, forecasts, water catchment area, mathematical model

13:15-13:30 – Influence of sludge storage at the wastewater treatment plant in Tomesti, Iasi over the groundwater

Georgiana Cezarina Bartic, Florian Statescu, Trofin Orest
PhD Supervisor: Prof. Florian Statescu

Abstract:
The paper includes the results of a study on the impact of sludge deposit from the Tomeşti, Iaşi wastewater treatment plant on the groundwater. The study area is the sludge deposit at Tomeşti, Iaşi, which was built in 1994 by removing the soil layer from an area of 9.1 ha of land. The warehouse was divided into 11 compartments of different surfaces. Between the compartments there are breaches of water and sludge circulation. The total volume of the deposit is 225,000 m3.
In order to study the effect of sludge storage on the Tomeşti platform on the groundwater, two drillings were made, a drilling was carried out on a depth of 300 cm on a witnessing ground near the deposit and the second drilling was carried out in the compartment 8 of the deposit on the same depth of 300 cm. The surface sample (0-20 cm) from the second drilling represents the sludge itself and from 100 cm in depth is the soil on which the sludge was stored. Following the sampling of the two drillings the concentration of heavy metals, macroelements and salts in groundwater was determined.
The research has found that groundwater is rich in soluble salts, especially in calcium, magnesium and potassium sulphates, but also in ammonium chloride and in Ca and Mg bikarbonates of water collected from the drilling on the sludge deposit Due to the high content of soluble salts this water is excluded from potability. Also, the sludge from the landfill caused a significant increase in the pollutant for N-NH4 and K.
The total concentration of heavy metals and salts in the groundwater is a relevant indicator of risk to human health and the environment. Knowing the total load of groundwater with heavy metals, macro-elements and salts is the basis for justifying the measures for remediation of contaminated waters.
The results of the research can be used as a scientific basis for the development of a proper groundwater management system in the study area.
Key words: heavy metals, macroelements, salts, cations and anions.

13:30-13:45 - Differences between a passive house and a nearly zero energy building

Marius Lucian Lupu, Ioana Roxana Baciu, Sebastian George Maxineasa
PhD Supervisor: Prof. Dorina Nicolina Isopescu

Abstract:
Due to the large amount of non-renewable energy consumed in the applications specific to the built environment, the construction sector is considered to be one of the most important factors in achieving sustainable development at the global scale. Out of the entire life cycle of a building, the operation phase uses the highest volume of energy in order to create optimum indoor conditions. Taking this into account, in the last decades different concepts have been developed in order to reduce the irrational rates of consumption, with the goal of minimizing the ecological impact of buildings and therefore, reduce the negative influence of the built environment over the natural one. The passive house and the nearly zero-energy building are two of the most important concepts that have been developed. These concepts are based on using performant thermal insulation materials with a high thickness in order to achieve an energy efficient construction with a reduced consumption of energy. In addition to this, a passive house and a nearly zero-energy building must satisfy a series of limitations that are different from the first concept to the other. Therefore, civil engineering specialists should arrive at a complete understanding of these limitations in order to reduce energy consumption in the construction sector. The goal of the present paper is to describe the passive house and the nearly zero-energy buildings concepts in an exhaustive manner, by going over the boundaries of these concepts, the limitations that a new or refurbished building should fall within, the advantages and disadvantages, and most importantly, the differences between these two concepts. Moreover, the authors also analyse the manner in which these concepts can be applied in Romania's construction sector in order to follow the European Commissions' directives on reducing the negative ecological influences of the built environment by minimizing the amount of non-renewable energy consumed during the operation stage of a construction.

Key words: non-renewable energy, built environment, sustainable development, life cyle, passive house, nearly zero-energy building

13:45-14:00 - The actual stage of research in the field of measures to reduce the sensitivity at the moisture of the patent literature

Sebastian Petru Boboc, Sorin Babliuc
PhD Supervisor: Prof. Gheorghe Gugiuman

Abstract:
Inventions in the field of reducing the moistening sensitivity of road trips address a theme related to the evolution of technology.
Of particular importance is the impermeability of the road layer. An invention (Iorgoiu C.A., Velcea M., 2011) refers to a composition for pavement roads. The invention described above refers to another invention of a porous concrete road surface made of polymer modified cement (Zhijian Y., 2009).
The stability of the road slopes is important for reducing the moistening sensitivity of the embankments, by supporting walls. The following described invention (Popescu D., 2000) refers to a support wall of prefabricated elements which also combines the prefabricated elements recovered.
Of particular importance in reducing moisture sensitivity are drainage technologies. An invention (Strunga V., 1994) refers to the drainage screen for roads that collects, transports and discharges infiltrated water from the moorings and from the active area of the roads.
Keywords: road, water, invention, research, embankment.

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