SOFTWARE VALIDATION OF CAMERA SYSTEMS

Goal of the project

The goal of the project was to implement new methods that allow automation tests for embedded software of stereo camera systems. The stereo camera system is called ECU (electronic control unit).
Automation tests are tests that are implemented in a suitable environment (for instance CANoe) and which generate a final verdict, passed or failed, without any intervention of the test engineer.

Main activities. Results

Two of these tests are presented in the following paragraphs.
The first test involves the Power Mode Control component. Thus, the power module of the camera system generates more voltages in a predefined order. Each voltage has a transition from zero Volts to the final value. This value must be within a required range. If the final value is outside of this range the software must report a so-called DEM (Diagnostic Event Manager) event.
The software test must simulate that after the voltage transition, the final value is outside the range and then it has to check if the DEM event was generated.
The test was implemented in CANoe. The following devices are controlled by CANoe: the external power supply of ECU, the DEDITECH equipment and the ECU (error memory). DEDITECH is a special equipment that mainly contains a DAC (digital to analog converter) and a switch with two positions. Thus, it allows either the voltage generated by the internal power supply of the ECU (ATIC), or the voltage generated by DAC to be connected to the microcontroller of the ECU. The aim of this project was to identify a method which can detect the transition of the voltage that must be integrated in CANoe among the existing test. Thus, in this project the LeCroy oscilloscope, which is GPIB compatible, was employed to detect the transition.
The second test involves the Heater component and is presented below.
The Heater is a device that is mounted between the camera and the windscreen of the car. It has the function of heating the surrounding area to prevent occlusion of the camera due to snow or ice that can be outside on the windscreen.
The heater actually represents an 8 ohms resistor that is periodically connected (this time is called Ton) or disconnected (Toff) to the 12V voltage of the car. The values of the Ton and Toff depend on the exterior temperature Text. They have larger values for smaller temperatures (for instance Ton = 500 sec and Toff =600 sec for Text = -37 degrees) and smaller values for higher temperatures. This test must verify if the dependence of the two times on the temperature is according to the requirements.
Thus this test is made by increasing the external temperature in steps of two degrees from the minimum value of -37 degrees to the maximum value of 51 degrees to cover the entire range and measure the Ton and Toff at the same time.

Implementation period

6.01.2017-31.12.2017

Financed through/by

Continental Automotive SRL

Research team

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MICRO-HYDRO POWER PLANTS INTEGRATION IN THE ROMANIAN POWER SYSTEM. CASE STUDY FOR CARAS-SEVERIN AREA

Goal of the project

Power system analysis and optimization for the micro-hydro power plants' integration in the Caras-Severin area of the Romanian Power System (Enel Banat Distribution Operator).

Short description of the project

The renewable energy sources represent an important issue for the Romanian and EU energy policy and sustainable development strategy. The projects refer to micro-hydro power plants integration in the Caras-Severin area of the Romanian Power System (Enel Banat Distribution Operator). The analysis has been performed for the North-Western, Western, Central and South-Western part of the Romanian Power System. Various operating condition, with the consumption forecast for 2020 and 2025, were considered, taking into account all the renewable energy sources (wind, solar, biomass, hydro). The medium voltage network for the interest area has been modelled in detail.

Project implemented by

S.C. Cons Electrificarea Instal S.R.L., Timisoara

Implementation period

2016-2017

Main activities

- power system data base validation;
- Enel Banat distribution network modelling; operating condition computing and analysis;
- power consumption and renewable energy generation forecast;
- power flow computing for various operating condition of the North-Western, Western, Central and South-Western part of the Romanian Power System (peak and unloaded type operating condition for 2016, 2020, 2025 years);
- contingency analysis, in the presence / absence of the renewable energy sources.

Results

- power flow corresponding to 2016 year and forecasted 2020 and 2025 years;
- power flow corresponding to the medium voltage electrical network (Enel Banat Timisoara area);
- voltage value without / with the new generating units;
- quick / slow maximum voltage variation value for critical buses;
- transformer loading without / with the new producers;
- power flow though the power system elements and loading level;
- integration solution validation and system reinforcement recommendations.

Applicability and transferability of the results

Knowledge transfer to other renewable power plants developers and designers, or to the electrical distribution network operators (Enel, CEZ, EON, Electrica in Romania).

Financed through/by

S.C. Cons Electrificarea Instal S.R.L., Timisoara

Research Centre

Power Systems Analysis and Optimization Research Centre

Research team

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ROBOTIC CELL FOR EXTRACTING WINE BOTTLES FROM CARDBOARD BOXES AND DEPOSE THEM IN SHUTTLES OF AUTOMATIC STORAGE

Goal of the project

Development of a robotic cell automatizing the storage process for later delivery by order through internet. The first application is loading sealed cardboard boxes with wine bottles, feed them one by one on a cutting line, cut the top of the box, extract the bottles one by one and put them on a rotary conveyor, then tilt the bottle in the last station, get it sideways with a vacuum gripper and lay it in a shuttle on cardboard supports previously inserted by the same robot.

Short description of the project

Wine bottle boxes are loaded, the top is cut, extracted bottles are put on rotary conveyor, tilted and laid in shuttle.

Project implemented by

SC Acord Exclusive SRL Timisoara

Implementation period

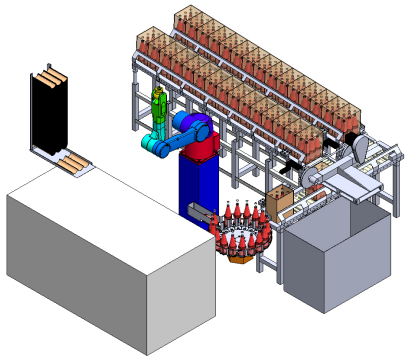
May-November 2017

Main activities

The wine bottle storage module has a storage capacity of 2x12=24 boxes with 6 wine bottles750ml each, weighing 8kg ±10% with the dimensions 170mmx250mmx310mm.
The Top cutting line may be configured manually to cut cardboard boxes with 220mm up to 280mm length, 150mm up to 200mm width and 300mm ±10% height.
The rotary table storage module has 24 Positioning devices for a 0,75l wine bottles.
The Cardboard support storage and delivery module stores 48...54 supports to ensure the cell functioning for 30 minutes.

Results

The cell was developed with the technical assistance of the Research team and the financial support from the client.
The cell was tested on an experimental environment at the client's facility, and delivered to the end client



Applicability and transferability of the results

The cell may be further developed for other types of goods, as tetra packs, bottles of other dimensions, cans and other goods in food and beverage industry, as well as goods of other kind.

Financed through/by

Contract No. BC 99/11.10.2016, client S.C.ACORD EXCLUSIVE

Research team

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IMAGE PROCESSING SOLUTIONS FOR EQUIPMENT TESTING IN AUTOMOTIVE INDUSTRY

Goal of the project

The main goal of the project is to design and implement image processing solutions for equipment testing in the automotive industry. The project was divided into two themes, each one having as final result a functional experimental model. The themes are: fault detection using image processing and counting modules using image processing.

Short description of the project

1. Fault detection using image processing

The developed experimental model represents a low-cost hardware-software solution, based on image processing, that detects faults (e.g. pins, connectors, clips) on specific boards.

The main implemented functions are:

- Detection of wrong clips disposal or damaged clips;
- Detection of cracks on boards;
- Detection of crooked pins;
- Detection of missing pins;
- Detection of extra pins;
- Reporting of the whole process;
- Collecting and marking faults, data aggregation on the master equipment, creating logs, user and board selection, debug procedure, etc. within the graphical user interface;
- Managing existing boards configuration;
- Learning new boards configuration;
- Reading barcodes;
- Data exchange between the four micro-computers and communication with the higher-level traceability application.

2. Counting modules using image processing

The goal of the experimental model is to provide a solution, based on image processing, for counting the boards placed by the operator in a packaging box, after the process of testing correct pins/parts/connectors disposal. The developed hardware-software system is also providing a solution for relevant data integration in a higher-level traceability application and to store relevant images over a prescribed period.

Project implemented by

University Politehnica Timisoara,
Department of Automation and Applied Informatics

Implementation period

06/09/2017-30/12/2017

Financed through/by

Hella Romania S.R.L.

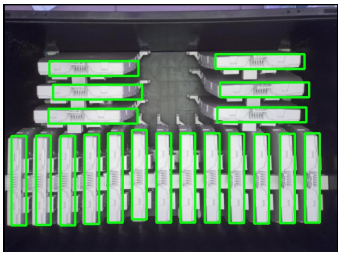
Results

1. Fault detection using image processing

The developed experimental model was tested and validated in several scenarios. The developed experimental stand is depicted in fig. 1, and fig. 2 shows the four micro-computers and cameras mounted within the experimental model.

2. Counting modules using image processing

The developed experimental model was tested and validated in several scenarios. The resulting image of one full packaging box, after boards detection and counting using the developed solution is depicted in fig. 3.



Research team

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ELECTRICAL DISTRIBUTION NETWORK TECHNICAL LOSSES FORECAST

Goal of the project

Distribution network real technical losses evaluation for e-Distributie Banat Distribution System Operator. Power flow computing for various operating condition of the Western and South-Western part of the Romanian Power System has been performed.

Short description of the project

An algorithm is proposed for technical losses forecast.

Project implemented by

Servelect Cluj-Napoca & e-Distributie Banat Distribution System Operator

Implementation period

2017

Main activities

The study was conducted for e-Distributie Banat Distribution System Operator. Quantitative and qualitative on-field measurements are provided and discussed, followed by the technical losses computing based on the provided algorithm. Different necessary scenarios for the distribution network operator have been taken into consideration highlighting the optimal operating conditions.

Results

- algorithm used for technical losses evaluation;
- 2 approaches have been developed, comparative analysis has been performed;
- electrical distribution network simulation model;
- technical losses' reduction methods.

Applicability and transferability of the results

The algorithm used for technical losses evaluation is able to be applied in case of any distribution network operator. Also, based on the achieved experience, other (or similar) technical losses reduction methods could be highlighted in case of other distribution operators.

Financed through/by

Servelect Cluj-Napoca, total value: 11900 RON

Research team

Stefan KILYENI, Constantin BARBULESCU, Oana DULCA

Consum Propriu Tehnologic
Regiunea REGIUNE1

Date Statistice Anuale					
Anul	CPT IT [MWh]	CPT IT [%]	Energia Intrată IT [MWh]	Contur Distributie IT [MWh]	Energia Iesită IT [MWh]
1	36,528	0.64%	5,712,707	675,114	5,676,179
2	37,291	0.68%	5,506,774	491,288	5,469,483
3	43,798	0.81%	5,434,017	488,320	5,390,219
4	40,523	0.73%	5,548,860	571,440	5,508,337
5	43,415	0.79%	5,491,358	590,714	5,447,943

Factor de corelatie	1.000

Date Prognozate Anuale					
Anul	CPT IT [MWh]	CPT IT [%]	Energia Intrată IT [MWh]	Contur Distributie IT [MWh]	Energia Iesită IT [MWh]
6	45,413	0.84%	5,418,559	536,780	5,373,147
6	45,086	0.83%	Metoda NUMEMETODA1		
Abatere	0.72%				

Metoda NUMEMETODA2					
Anul	CPT IT [MWh]	CPT IT [%]	Energia Intrată IT [MWh]		Energia Iesită IT [MWh]
6	45,450	0.84%	5,418,600		5,373,150

Încărcare Date Statistice

Prognoză Anuală

Prognoză Trimestrială

Factor de Corelatie: 1.000

Consum Propriu Tehnologic
Regiunea Regiune1

Date Statistice Trimestriale					
Anul	CPT IT Anual [MWh]	CPT IT Trimestru 1 [MWh]	CPT IT Trimestru 2 [MWh]	CPT IT Trimestru 3 [MWh]	CPT IT Trimestru 4 [MWh]
1	36,528	11,897	8,011	6,980	9,640
2	37,291	10,571	8,509	7,267	10,944
3	43,798	10,229	8,923	8,420	16,226
4	40,523	11,435	9,320	8,385	11,382
5	43,415	12,234	6,933	6,333	17,915

Date Prognozate Trimestriale					
Anul	CPT IT Anual [MWh]	CPT IT Trimestru 1 [MWh]	CPT IT Trimestru 2 [MWh]	CPT IT Trimestru 3 [MWh]	CPT IT Trimestru 4 [MWh]
6	45,413	12,776	9,454	8,456	14,726

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MONITORING THE QUALITY OF WASTES FROM TEHNOLOGICAL PROCESS

Goal of the project

The project objective is to monitoring the quality of wastes from technological process.

Short description of the project

During the project various parameters of wastes are analyzed periodical from samples collected by the beneficiaries. The values of the analyzed parameters was commonly agreed upon by the beneficiaries and the execution team.
The analysis of the main parameters for the monitoring the quality of wastes is required for their according to law.

Project implemented by

Faculty of Industrial Chemistry and Environmental Engineering.
Department of Applied Chemistry and Engineering of Inorganic Compounds and Environmental.

Implementation period

November 13, 2017 until November 14, 2018

Main activities

The main activities of the project are:

- Analysis of volatile compounds (COV) from solid and liquid waste.
- Leaching testes for sludge to be placed in a class of waste.
- Analysis of the following parameters: Cr^{3+}, Cu^{2+}, Ni^{2+}, Cd^{2+}, Pb^{2+}, $Zn^{2+,}$ pH and humidity of the sludge.
- The main parameters are analyzed once a month in according to the project plan.

Results

1. The volatile compounds (VOC) from waste were analyzed.
2. The concentration of heavy metals in the sludge was determined.
3. Sludge leaching testes were made.

Applicability and transferability of the results

- Improved university-industry relationships.
- Updating curricula in accordance with the economic realities of the local area.
- The results are consistent with the legislative framework in force.

Adoption by the university of new mechanisms and management techniques resulted from the project activities.

Financed through/by

S.C. FLEXTRONICS ROMANIA S.R.L.

Research Centre

Research Center of Environmental Sciences and Engineering

Research team

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DETERMINATION ON CONCRETE QUALITY IN A STRUCTURE USING NON-DESTRUCTIVE AND DESTRUCTIVE METHODS

Goal of the project

The in-situ characteristics of concrete may be obtained by using non-destructive and destructive tests methods. Scope of the investigation in this project was to evaluate the design compressive strength of reinforced concrete walls and columns by combination of these methods.

Short description of the project

The load bearing capacity of reinforced concrete structural elements as walls, columns, beams and slabs are in a function of the reinforcement and concrete quality. In some situations, when there is doubt about the reliability of control and compliance results, or they are unavailable results, or these results are inappropriate, as well as the structure is damaged or deteriorated, in-situ tests are performed. There are two available test methods. The non-destructive methods are used because they are not impairing the performance of the elements or members under test, and when are applied are cause localized surface zone damage. The most common procedures are using surface hardness method by Schmidt rebound hammer and the ultrasonic pulse velocity method. The destructive methods require sample extraction, most commonly in the form of cores drilled from the concrete, which may be used in the laboratory for strength and other physical tests. The method and the number of determinations, the position of these and the investigated parameters were established previously together with the beneficiary and were correlated with the available norms and codes. The results of these tests are in the of form of reports, containing bulletins.

Project implemented by

VOX TECHNOLOGY PARK S.R.L.
Calea Aradului nr. 8, SAD 10A/2, etaj 9, 300088 Timișoara, jud. Timiș

Implementation period

12.05.2017 - 12.07.2017

Main activities

- Establishing the required number of investigations, the test methods and positions for determinations, together with the beneficiary and correlated with the available norms and codes
- Non-destructive testing using combined method of Schmidt rebound hammer and the ultrasonic pulse velocity more than 120 zones.
- Extraction of concrete core samples in more than 11 positions.
- Preparation of core samples, by cutting to the right length and correcting using resins
- Experimental testing of the core specimens.
- Elaboration of research report and the corresponding test bulletins.

Results

The most relevant result consists in:

- obtaining of the characteristic compressive strength of concrete elements with Schmidt rebound hammer and ultrasonic pulse velocity, as well as with combined method.
- obtaining characteristic compressive strength of concrete core specimens, as well as data resulting from visual inspection related to the type, size and distribution of the aggregates, holes, defects, cracks and material compaction.

Applicability and transferability of the results

The experimental results obtained within the project are introduced in an advanced calculation model for structural assessment, considering the real behavior of concrete material. Results could be used to improve design and construction practice.

Financed through/by

VOX TECHNOLOGY PARK S.R.L. through research project BC48/2017

Research Centre

Research Centre for Retrofitting of Constructions – RECO,
Politehnica University of Timisoara

Research team

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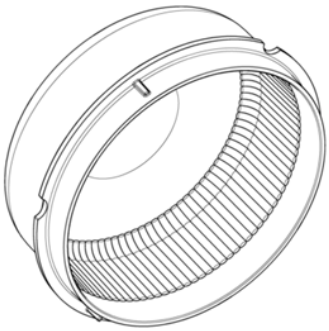
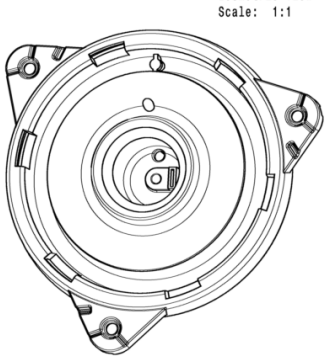
RESEARCH ON IMPROVING THE QUALITY OF LIGHTING SYSTEMS IN THE AUTOMOTIVE INDUSTRY

Goal of the project

To transfer knowledge to the technical staff in order to improve the quality of their products by understanding the geometrical product specification method (GPS) and developing better understanding of plastics materials and processing by injection.





Short description of the project

Using the GPS method to the lighting plastic injection parts.

Project implemented by

Design Department of HRO-SA & HRO-AM, S.C. Hella Romania S.R.L., Timişoara & Lugoj

Implementation period

14.02.2017-31.12.2017

Main activities

Analysing the specifications for the parts and making drawings according to the ISO standards using the GPS method. Transferring knowledge for a better understanding of plastics and processing by injection, in connection with product design and manufacturing technology, highlighting solutions for avoiding the errors that cause product failure and the often met problems at the injection forming.

Results

Transfer of geometrical product specification and tolerance analysis methods to technical staff for improving the quality of technical documentation in the design phase and during the injection process of the products. Improve the level of professional knowledge of the engineers working in plastics injection, with focus on plastic parts performance, quality assurance and manufacturing efficiency.

Applicability and transferability of the results

The results of the project are applicable in the Hella company for improving the quality of their products and for increase the productivity. The experience accumulated with this project is very useful for monitoring and optimizing different products in other companies.

Financed through/by

S.C. Hella Romania S.R.L.

Research Centre

Integrated Engineering Research Center

Research team

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STUDY ON AIR QUALITY AT FARM LOCATION, BASED ON MEASUREMENTS AND ANALYSIS OF HARMFUL DISPERSION

Goal of the project

Environmental laws are part of those tools that combine the rational management of natural sources with pollution prevention and control. Presently, every European country has a large number of laws (at least 100), regulating the protection of each component of the environment. They try to prevent or limit the effects of environmental degradation caused by pollution phenomena. Their character is very complex and imperative - encompassing in large part obligations to DO AND or NOT TO DO.

Short description of the project

The purpose of the research focuses on a study for the emission inventory from the breeding area for calves and lambs of SC Barak Development SRL farm and their influence upon the vicinity. it is both an experimental research as well as an analysis by numerical modeling of the dispersions for the main pollutants produced by the cattle and sheep breeding in the Grabat village, in three variants of research: (i) the current situation (Situation I - for which one accomplished on-line measurements, used as proof of the present situation but also for the validation of the simulation), (ii) the authorized situation (Situation II) and (iii) the extension of the production capacity to 10000 calves and 8000 lambs heads (Situation III).

Project implemented by

The project is necessary for the private company SC BARAK DEVELOPMENT SRL

Implementation period

May 2017-September 2017

Main activities

1. Analysis of the potential polluting sources inside the farm and outside of it
2. Establishing the three situations for the dispersion analysis
3. Identification of the main pollutants to be analyzed, as specific for animl breeding farms: NOx, PM, Non metal volatile organic compounds, benzene, methan.
4. Measuring on site, in 4 points of the air quality, with the RENAR accredited measuring system
5. Establishing of a dispersion model for the sources located in the farm and neighborhood
6. Validation of the dispersion according the results from the on line measurements and Dispersion modeling results for Situation I
7. Dispersion modeling for Situation II (approved situation already for the next future)
8. Dispersion modeling for Situation III (future planned extension/ development of the farm)
9. Identification of the pollutant concentrations in special points, located in the village (nearest house)
10. Conclusions and Recommendations

Applicability and transferability of the results

The applicability of the research conist of the complex analysis of possible strategies, assuring the local authorities that the farm, due to its activity is not polluting over the standard limits, and does not represent a danger. Also one revealed that the farm has to take measures, especially for the next situations (strategies of developing), by taking account of applying special models for the basins and other deposits needed in in its activity as young animal.

Financed through/by

Contract BC 65/14.07.2017 cu ordered by SC BARAK DEVELOPMENT SRL for LACIEDIN (acredited RENAR lab of UPT)

Research Centre

Research Center for Machinery and Thermal Equipment, Transport and Pollution Control, http://www.upt.ro/Informatii_centrul-de-cercetari-pentru-masini-si-echipamente-termice-tr_109_ro.html through LACIEDIN, meaning the RENAR acredited lab of the UPT (Acreditation acording SR EN ISO/CEI 17025:2005, Certificat NB LI 1151 from 05.10.2017) for fuel analysis, environmental control and dispersion of pollutants www.mediu.ro

Research team

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Ramon Mihai BALOGH As. Ing. dr. ing
Delia Gabriela TRIF-TORDAI, Sl. dr. fiz.

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DESIGN AND VALIDATION OF THE MIXING SYSTEM IN A CHEMICAL REACTOR FOR CONVERSION FROM DOF TO DOTP PRODUCTION

Goal of the project

The project was aimed at designing a new mixing rotor for a chemical reactor, in order to satisfy the new operating conditions and requirements for a two-phase liquid-solid fluid instead of the single-phase (liquid) initial design.
The project started with a preliminary numerical analysis of the existing two-blade rotor working with a liquid-solid mixture. The results showed a severe and unacceptable sedimentation of the solid phase, which would lead in poor chemical reaction kinetics.
A new mixing solution was therefore required, and this project was set to provide such a solution by replacing the existing rotor with a new one, while maintaining the same rotation speed and mechanical power.

Short description of the project

The project had several tasks , including assessment of the existing rotor, design of a new rotor, technical drawings for the new rotor, numerical and in-situ performance validation.

Project implemented by

The project was implemented by an interdisciplinary team (Mechanical Engineering and Chemical Engineering) from the Politehnica University Timișoara and Oltchim S.A. Rm. Vâlcea.

Implementation period

April-December 2017

Main activities

The first task of the project was to assess the existing mixing solution, and to establish the hydrodynamic requirements for a new mixing rotor that prevents sedimentation of the solid phase. This was done using advanced three-dimensional two-phase flow numerical simulation. Then, using the modern inverse design approach, a three-blade rotor was designed.

The new mixing solution installed and tested in-situ.

The new rotor performance was validated using numerical simulation. It was found that a two-rotor solution, provide the required homogeneous liquid-solid mixture, while completely avoiding sedimentation.

Results

The hydrodynamically designed rotor was further simplified technologically, while preserving the mixing performance, resulting in the solution manufactured at SC Popeci Utilaj Greu, Craiova.

Applicability and transferability of the results

The complex methodology for analysis and design of mixing rotors for liquid-solid chemical reactors can be further extended and applied for other operating conditions and reactor geometries.

Financed through/by

Contract No. BC 99/11.10.2016, client S.C.ACORD EXCLUSIVE

Research Centre

Research Centre for Complex Fluid Systems Engineering

Research team

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