CONSULTANCY IN THE FIELD OF INDUSTRIAL TESTING SYSTEMS USING LABVIEW, LABWINDOWS/CVI AND NI TESTSTAND

Goal of the project

The goal of the project is to develop industrial testing systems using LabVIEW, LabWindows/CVI and NI TestStand.
Industrial testing systems can help to ease testing process and can speed up testing in the industry. The implemented testing systems were mostly functional testers of circuits, but there were also implemented ICT testers too. The goal was to make better and more optimal testers.

Short description of the project

The project included the creation of functional and ICT testers. The testers needed operator graphical user interfaces too (GUIs), which were implemented in LabVIEW and/or LabWindows/CVI. The test sequences were placed in NI TestStand and were ran using this environment.

Implementation period

01/04/2018 – 01/04/2018

Main activities

Applications development basics
- Simple applications:
    - Matrix Applications
    - Strings manipulation
    - File Handling
- he principles of programming events
- Error handling
- Creating user interfaces
- Using DAQmx Acquisition Cards
- Implementing data acquisition programs
- Communication Interfaces:
    - Serial Port (RS-232)
    - Parallel Port
    - GPIB (IEEE-488)
    - USB
    - Ethernet
- Interfacing Programmable Instruments

Results

During the project there were implemented more GUIs for different test equipment's. Some GUIs were made in LabVIEW others in LabWindows/CVI.

There were implemented some data acquisition programs. Also, there were made systems which could log measurement data in text files. There were implemented more test cases and more tests which were loaded in NI TestStand sequencer, this way easing the industrial testing.

### Applicability and transferability of the results

- The project can be implemented in many industrial test applications. The created GUIs in LabVIEW and LabWindows/CVI can be reused and extended and transferred to test other electrical parameters from other circuit boards for other systems.

- With this knowhow the measurement of electrical parameters can be speeded up to increase production volumes.

- GUIs in LabVIEW and LabWindows/CVI were implemented, also data acquisition programs in LabVIEW were implemented in the Honeywell Life Safety Romania S.R.L. plant and also test cases for NI TestStand were developed.

Financed through/by

Honeywell Life Safety Romania S.R.L.

Research team

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Roland SZABO, PhD
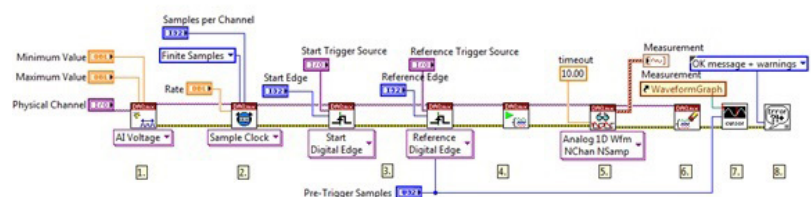
Data acquisition in LabVIEW

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RESEARCH ON ADVANCED INTEGRATION BETWEEN THE TERADYNE TSA N129 TEST STATION AND THE VECTOR CANCase XL DEVICE

Goal of the project

The goal of this project was to implement a functional technical approach related to an integration between the Vector CAN Case XL (CCXL) module and the Teradyne In Circuit Tester (ICT). The proposed application is the achievement of a collaboration between two industrial partners: Continental Automotive Romania (Timişoara Plant) and Alfa Test S.R.L. The need for such an integration has originated in the context of permanent focus on innovative production solutions.

Short description of the project

The capabilities offered by this solution include: communication protocol administration, automated formatting of CAN messages, CAN segmentation, selection information embedded in exchanged frames or the combination of ICT based measurements interposed between CAN dialogs.

Implementation period

01.04.2018 – 31.03.2019

Main activities

• Activity 1: A study on the communication possibilities between the Teradyne In Circuit Tester equipment and external hardware tools, using dedicated DLL files.
• Activity 2: Preliminary communication implementations between the Teradyne In Circuit Tester equipment and external hardware tools, using dedicated DLL files.
• Activity 3: Testing the communication library and extending the available commands set. The results should be a 90% minimal success rate for transferring the CAN frames between the Vector tools and the ICT software.

• The Teradyne Test Station Multi Site (1)
• Two CCXL network interfaces have been placed inside the back chassis; Test Fixture (2);
• DUTs (3);
• ICT monitors (4).

Financed through/by

S.C. Alfa Test S.R.L., Timişoara

Results

• over 130 CAN telegrams/responses and can be used for testing other products;
• average response time of 0.56s/CAN command (TS send cmd, TS receive rsp);
• Automated repetition in case of FAIL responses (3 times);
• First Pass Yield (FPY) = 98%, 51 consecutive runs, average test time is 97 s, over 320 CAN command/response exchanges for each test, experimental context;
• approximately 25000 DUTs/month tested with this solution;
• best FPY average over 2 months 96%, worst case FPY average over 2 months 79%. These results are a combined result, with pure ICT test;
• average test time/DUT is 107s.

Applicability and transferability of the results

The solution is running in production, it includes over 100 CAN telegrams/responses and can be used for testing other products. An average response time for a single CAN telegram, from the moment it is issued by the Teradyne Test Station until the user receives the result on the Test Station interface is approximately 0.56 s. A 2.22 s execution time has been obtained for a frequency measurement test which includes 3 type of CAN telegrams.

The proposed application has been developed in the context of creating innovative test solutions which correspond to the requirements of one of the most important automotive companies worldwide.

Research team

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Assist. Prof. Liliana MÂŢIU-IOVA, PhD

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EXPERIMENTAL TESTS ON STEEL JOINTS SUBJECTED TO BENDING

Goal of the project

The project goal was to characterize experimentally the response of in-line connections between rectangular hollow sections which are able to transmit bending moment. The particularity of the joint consist of the limited dimensions to the RHS section for a discrete appearance.

Short description of the project

Due to the multiple parts involved in the connection, the project focused on the failure mode and failure sequence of the connection components. The experimental work used a 500kN actuator, linear variable displacement transducers and a digital image correlation system to record the data necessary for the response curve of the joint.

Implementation period

January – April 2018

Main activities

The main activity of the project was related to the goal of the project i.e. monitoring the force vs deformation of the assembly by testing two specimens for the welded connection between the RHS and the end plate and two specimens for the bolted connection for the continuity of the elements.
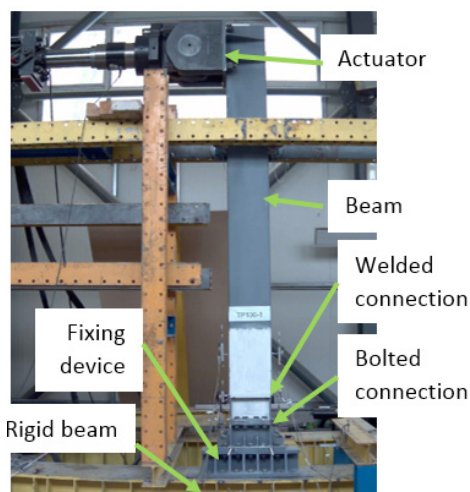

Fig. 1 Test setup for the bolted connection assembly
Beside the connection, tensile tests were performed on standard specimens from the base material of the components.

Results

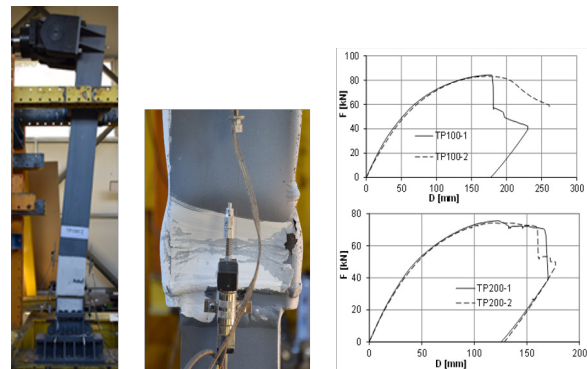The tests highlighted the deficiencies of the welding and the deformation and bearing capacity of the joint.

Fig. 2 The deformed shape and the response curse of joints

Financed through/by

AFI PALACE BRASOV S.R.L.

Research Centre

The Research Centre for Mechanics of Materials and Structural Safety – CEMSIG

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Technician Milenco UNG

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EXPERIMENTAL TESTS ON MECHANICALLY COUPLED ARMATURES

Goal of the project

The goal of the project is to see whether the rebar mechanical connections that SKANSKA company have provided fulfil the necessary requirements given in SR ISO 15835-1:2016.

Short description of the project

In this project have been done tensile and cyclic test on rebars that have mechanical connections.
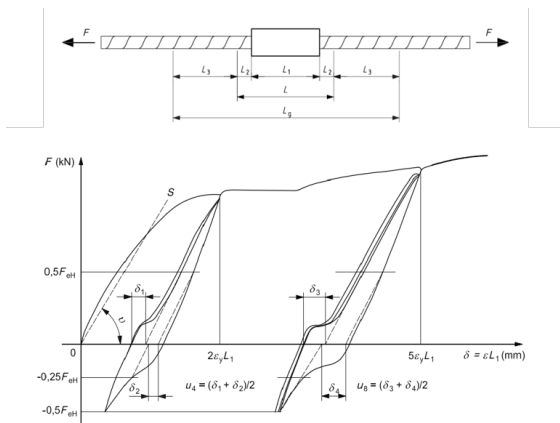
Results

Most of the rebar mechanical connections fulfil the requirements given in specific code.

Denumire epruvete	Sarja cupla FORTEC	u₄ mm	u₈ mm	Rₘ MPa	Localizare cedare
C32-1		0.0497	0.0696	671	În bară, în afara lungimii îmbinării mecanice, L
C32-2	7693	0.0435	0.0572	673	În bară, în afara lungimii îmbinării mecanice, L
C32-3		0.0423	0.0597	671	În bară, în afara lungimii îmbinării mecanice, L
C25-1		0.0269	0.0403	595	În bară, în afara lungimii îmbinării mecanice, L
C25-2	7414	0.0252	0.0407	610	În bară, în afara lungimii îmbinării mecanice, L
C25-3		0.0185	0.0286	597	În bară, în afara lungimii îmbinării mecanice, L
C32-25-1		0.0042	0.0169	609	În bară, în afara lungimii îmbinării mecanice, L
C32-25-2	1728	0.0507	0.0719	603	În bară, în afara lungimii îmbinării mecanice, L
C32-25-3		0.0423	0.0592	604	În bară, în afara lungimii îmbinării mecanice, L
C40-32-1		0.1648	0.1632	670	În bară, în afara lungimii îmbinării mecanice, L
C40-32-2	7744	0.1539	0.1616	671	În bară, în afara lungimii îmbinării mecanice, L
C40-32-3		0.1399	0.1570	675	În bară, în afara lungimii îmbinării mecanice, L
C32-1		0.040	0.070	623	În bară, pe lungimea L2
C32-2	7693	0.035	0.071	668	În bară, în afara lungimii îmbinării mecanice, L
C32-3		0.029	0.053	675	În bară, pe lungimea L2
C25-1		0.0185	0.0269	600	În bară, în afara lungimii îmbinării mecanice, L
C25-2	7414	0.0235	0.0336	550	În bară, în afara lungimii îmbinării mecanice, L
C25-3		0.0151	0.0245	599	În bară, în afara lungimii îmbinării mecanice, L
C20-1		0.0018	0.0219	596	În bară, în afara lungimii îmbinării mecanice, L
C20-2	8114	0.0044	0.0044	601	În bară, în afara lungimii îmbinării mecanice, L
C20-3		-0.0057	0.0074	598	În bară, în afara lungimii îmbinării mecanice, L
SR ISO 15835-1:2016		≤0.3	≤0.6	>550	

Project implemented by

The Research Centre for Mechanics of Materials and Structural Safety – CEMSIG

Implementation period

20.03.2018-31.10.2018

Main activities

1. Experimental rebar set-up
2. Tensile tests
3. Cyclic tests

Financed through/by

SKANSKA CONSTRUCTION ROMANIA SRL

Research team

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STUDY FOR SMALL HYDROPOWER PLANTS ON BÂRZAVA RIVER, AS LOCALLY ADAPTED SOLUTION FOR INVESTMENT IN RENEWABLE ENERGY AND PUBLIC UTILITIES INFRASTRUCTURE

Goal of the project

Under the Romania – Serbia Cross-border Cooperation Program 2014-2020, the study is mainly concerned by the implementation of a small hydropower plant on Bârzava River in the town of Reşiţa as a local solution for renewable energy infrastructure for public utilities. The general objective is to ensure the right infrastructure for harnessing green hydro-energy under safety high-waters flow conditions on the river-course. Besides supplying the local power network supporting public areas lighting and operation, the project is concerned by the river-bed rearrangement as an urban friendly area.
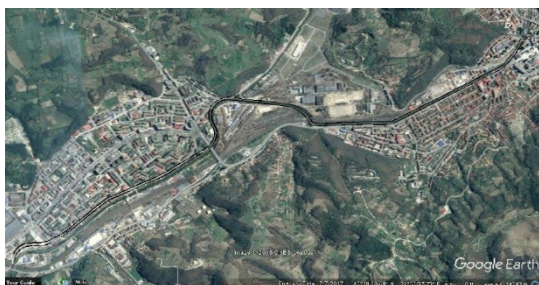
Short description of the project

Following flow analysis under existing conditions, the project identifies two accomplishment scenarios from which the technical-economical optimum solution for the water arrangement is reached.

Implementation period

March 1st, 2018 – May 31st, 2019

Main activities

Analysis of the existing flow situation and deficiencies recognition: the river-channel discharge capacity on the specific sector (6042m, 180 segments) was established by numerical modeling under three flow levels (the usual mean multi-year, the dimensioning 5% overrunning probability and the special 1%).

Introduction and analysis of three scenarios in order to accomplish the objective: three similar SHPP of 2m3/s installed discharge under 2m head each producing a total of about 285MWh; two SHPP of 3m3/s installed discharge under 2m head each producing 324MWh; one SHPP installed for 3m3/s under 2m head and producing about 162MWh. The flow transition for each power harnessing scenario was numerically modeled and studied for all three enforced incoming flow hydrographs, various discharge capacities being considered at the retaining steps. As a consequence of the shorter affected sector and the lower maximum flow, the third scenario considering the water arrangement with one SHPP on the upstream part came out as prevalent.

Results

The sharp numerical simulation pointed out the specific steady and time dependent flow parameters – water levels and velocities and discharge progress – for all designated scenarios with respect to arrangement configuration and incoming hydrographs. As analyzing the existing discharging conditions of the urban Bârzava River sector it resulted that the river course is able to transport even the special hydrograph, mentioning that some of the bridges, even if not over-flooded, would go under pressure.

Specific river works – silt removal and river-bed recalibration – would need to be performed in order to ensure even the special safety running.

Applicability and transferability of the results

TWith the redevelopment of the urban section of the watercourse, it is possible to exploit this non-polluting energy resource in order to satisfy a part of the public consumption. For the moment, the technical part of the study was disseminated through a scientific paper published in the specialized journal Hidraulica Bucharest (ISSN 1453-7303).

Financed through/by

Resita Municipality

Research team

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DESIGN AND DEVELOPMENT OF TECHNICAL SYSTEMS FOR WOOD PROCESSING MACHINES IN THE FOOD INDUSTRY

Goal of the project

Technologically and constructive design of the components of a wood stick milling machine for increasing productivity and reducing the dust resulting from the manufacturing process

Short description of the project

The project involved the establishment of constructive solutions and the selection of materials for the systems of a wood milling machine used in the sticks production for the food industry.

Applicability and transferability of the results

The results obtained allow the production of a wood stick milling machine of high productivity and low dust emission.

Project implemented by

Faculty of Mechanical Engineering
Department of Materials and Manufacturing Engineering

Financed through/by

SMART WOOD ROMANIA SRL

Implementation period

July-November 2018

Research Centre

Research Center for Processing and Characterization of Advanced Materials

Main activities

The main activities of the project are:

- Constructive design of wood sticks milling machine systems;
- Selection of the materials for the designed parts;
- Technological design of the parts of the wood milling machine;
- Drafting up the technical book of the wood milling machine.

Research team

Associate Prof. Cosmin CODREAN, PhD
Associate Prof. Ion-Dragoş UŢU, PhD
Assistant Prof. Adrian DUME, PhD
Assistant Prof. Aurelian MAGDA, PhD
Assistant Prof. Dragoş BUZDUGAN, PhD

Results

1. The technical documentation required for the manufacture of a wooden stick milling machine has been made.

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IDENTIFYING THE OPTIMUM SOLUTION FOR REPLACING HYDRO-AGGREGATES AT THE CENAD PUMPING STATION

Goal of the project

The beneficiary "EMILIANA WEST ROM" in Dudestii Vechi is an agricultural company and calls for the increase in the useful flow given by SP Cenad. To address this, the representatives of SC EMILIANA WEST ROM have requested refurbishment of the Cenad pumping station in order to achieve a flow rate between 4 ... 5 m3 / s, but involving minimal adaptation of the new equipment in the SP building

Short description of the project

SP Cenad refurbishment can be done in the following ways:
• Replacing one of the pumps with a larger flow pump;
• Replacement of both pumps, which in parallel operation to provide a flow in the proposed range.

Implementation period

07.03.2018 – 30.04.2018

Main activities

• State of the art for "identifying the optimum solution for replacing hydro-agregrades from Cenad Pump Station".

• Analysis of 5 variants and proposal to the beneficiary of the optimal hydraulic and economical solution.

Results

Following the analysis of the five variants, it leads to the recommendation of applying the solution with the following characteristics:
• Achieves a flow rate of approximately 2.35m3/s for drainage at a useful pumping height in SP Cenad.
• Electric motors have rated unit power P =230kW.
• The construction dimensions and installation dimensions of the pumps presuppose work without affecting the structure of the building.
• The electrical transformer and other electrical equipment must be replaced or upgraded.

Financed through/by

EMILIANA WEST ROM SRL

Applicability and transferability of the results

The beneficiary immediately implemented the proposed solution by the acquisition and installation of a new pump in the pumping station Cenad with the features shown in the figure below.
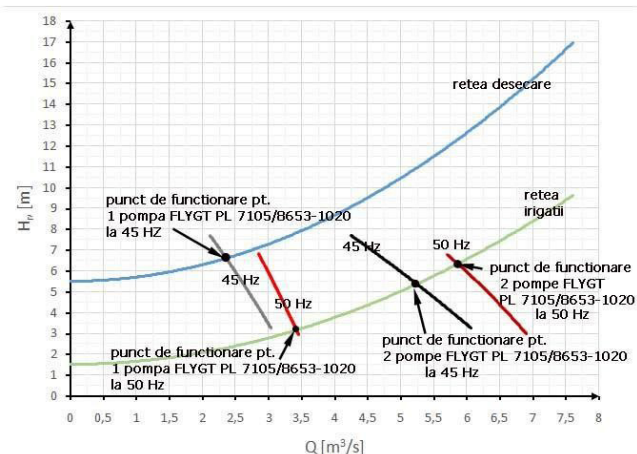
Research Centre

Research Centre in Engineering Systems with Complex Fluids

Research team

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Professor Alexandru BAYA, PhD
Eng. Mariana TODIRUȚĂ

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COMPLEX MEASUREMENTS FOR THE DETERMINATION OF POLLUTANT EMISSIONS AT THE TIMISOARA (16 MĂCIN STR.), ORAVIŢA, LUPENI AND MARGHITA UNITS OF THE COMPANY TRW AUTOMOTIVE SAFETY SYSTEMS

Goal of the project

Identifying the level of pollution generated by specific units in the company. Thus, by analyzing the results, the specialists from TRW Automotive Safety Systems can adapt and reconsider their technologies, in order to optimize/ reduce the emissions' levels/concentrations, if they are not appropriate and in correlation with the emission control legislation.

Thus the company can maintain its leading position in the frame of all Romanian production companies, knowing that TRW Automotive Safety Systems gained by 2018 the third place for cooperation in Romania (diploma offered by ListaFirme.ro, 2018).

Short description of the project

TESTS:

1. Gravimetric tests (dust) (emissions);
2. Electrochemical tests;
3. Flame ionization tests;
4. Physical tests.

SCOPE:

1. Determination of total dusts (emissions).
2. Determination of combustion gas concentrations (O_2, CO, CO_2, H_2S, SO_2 and CH_4)
3. Determination with flame ionization detector of COV / COT.
4. Determination of physical parameters (pressure, speed and flow).

FEEDBACK:

The client is offering a feedback by filling in a specific file, that enables us to improve the offer and cooperation activity for the future.

Implementation period

23.02.2018–22.02.2019

Main activities

- Identification of the most representative regimes for measuring
- Identification of the safety conditions for the workers
- Preparation of the measuring points (measuring plan)
- Calibration of the instruments
- Measurements and verification of the results
- Calculations
- Conceiving the report (Technical Bulletin) in accordance with the RENAR specifications

Results

Technical Bulletins- more than 25/year, in all the working points identified by the Agency of Environmental protection as to be analyzed/monitored on specific intervals, during representative technological episodes.

Applicability and transferability of the results

- Development of a strategy of monitoring, according to the specific needs of the client.
- Raising the importance of UPT on the free market of collaboration with industrial units.
- Offering to the members of the team a modality to perform, also in industrial cooperation, in addition to the main duties as researcher or university teacher.
- Maintaining the quality for next RENAR accreditation.
- Developing skills and knowhow for all personnel involved.

Financed through/by

TRW Automotive Safety Systems

Research Centre

Research Centre for Thermal Machines and Equipments, Transportation and Environmental Pollution Control,

Research team

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ENVIRONMENTAL IMPACT STUDY, FROM THE POINT OF VIEW OF THE OPPORTUNITY OF RELOCATION OF THE TM-1 STATION IN THE FRAMEWORK OF THE NATIONAL AIR QUALITY RESORT STATIONS

Goal of the project

The study thus supports with scientific arguments (on-line monitoring and updated dispersion study on the structure of the traffic, provided by the beneficiary) the possibility of moving the air quality monitoring station from the present position, being motivated by the current tendency of modernization of the municipality through the implementation of the works of Şagului Road - Ana Ipătescu section with the administrative limit of Timişoara municipality.

Short description of the project

The contract provided:
- A dispersion study on the environmental impact of the modernization project in the exploitation phase;
- Critical analysis of the state of modernization of the Sag Path - Ana Ipatescu section, regarding the location of the TM-1 station;
- Conclusions regarding the possibility of relocation of the TM-1 station to the new location.

It is noted that the study, based on the contract, only refers to air quality, meaning that only the influence of the expected area development project on air quality is analyzed.

Implementation period

December 2018

Main activities

Phase I - Measurements of air quality (concentrations of major pollutants: NO, NO2, NOx, CO, VOC, PM10) using credited procedures conforming to the RENAR authorization owned;

Phase II - Numerical simulation of dispersions (for NOx species), having the stages

Phase III. Explanations suporting point of view and conclusions, resulting from the complex analysis of points I and II, with reference to TM-1 station monitoring capability in the two new locations proposed by the study.
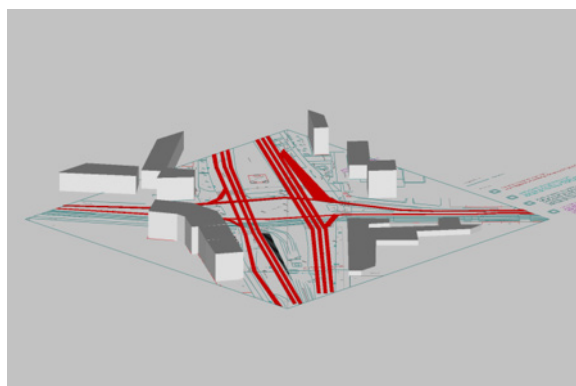
Applicability and transferability of the results

Transferability:
- Other similar development strategies of the city
- Modality to achieve the validation of the numerical simulation by using an on line monitoring campaign, on spot.

Applicability

The relocation of the station to POSITION 1 or POSITION 2 from the present position would have an advantage over this location because the proposed variants comply with the provisions of Annex no. 5 point 2 of the Law no. 104/2011, corroborated with the provisions of GD no. 336/2015 as updated in 2016 and in force at the date of this report, in compliance with the limit values set for the purpose of human health protection. Thus, one concluded that the concentration values that are allowed for following situation are totally respected:

a) All locations in areas where the public has no access and where there are no permanent dwellings;

(b) On the roadside and on the road, as well as on the spaces separating the direction of their journeys, except where pedestrians normally have access to those spaces.

Financed through/by

SALIGNY CONSTRUCTIONS SRL.

Research Centre

Research Center for Machinery and Thermal Equipment, Transport and Pollution Control

Research team

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MONITORING THE QUALITY OF WASTES FROM TEHNOLOGICAL PROCESS

Goal of the project

The goal of the project is to monitor the quality of wastes from technological process.

Short description of the project

In the project the toxic compounds from wastes from the technological process are monthly analyzed. Samples of solid and liquid wastes are analyzed.

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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CONSULTING FOR THE USAGE OF MACHINE LEARNING FOR MACHINE VISION APPLICATIONS

Goal of the project

Machine learning consists of scientific study of algorithms and statistical models that computer systems use to effectively perform a specific task Machine learning algorithms are used in a wide variety of applications (as computer vision is) where it is infeasible to develop an algorithm of specific instructions. Data mining is a field within machine learning, and focuses on exploratory data analysis through unsupervised learning. In its application across business problems, machine learning is also referred to as predictive analytics.

EVT has developed machine vision products, which not only allow precise and error-free image processing, but also products, which are one step ahead of the market. The machine vision software EyeVision by EVT is a product, which due to easy-handling is able to adopt to various applications. The research trends for it follow to enhance easy programming, easy-handling, versatility, extensibility and to get fast solutions

Short description of the project

EyeVision is a complete image processing package for every possible field of application. EyeVision is connecting a powerful, hardware platform independent software for Windows and Linux with a wide range of hardware for image capture and digital I/O.

All industrial inspection tasks are done fast and effective by the all-in-one image processing software EyeVision.

Implementation period

01.04.2018 - 01.04.2020

Main activities

• Image Processing largely involves several processes to gain information from source data, such as for example image recognition and pattern matching. With the usual methods for image processing one can for example count objects, measure, inspect or read coded information. Image processing nowadays is used in nearly every science and engineering disciplines. One domain for image processing is the quality control at production processes such as automotive engineering, electrical and semiconductor industries, food industry and pharmaceutical industry.

• We focused on research and development of the hardware platform independent software for Windows and Linux - technical We offerd consultancy in the field of all-in-one image processing software.

• Consulting services for using applications at Machine Learning for Machine Vision.

Results

• Machine Vision Software for VisionSensors, SmartCameras and PC Systems - EyeVison the one software for all Hardware Platforms.
• For programmers a PlugIn Interface was made, which supports easy to integrate software modules.
• The software supports all major interfaces for cameras e.g. USB, FireWire, GigE, CL, CoaXPress and analog.

Applicability and transferability of the results

• A build in WebServer for easy remote control as well as interfaces to SAP Oracle and SQL.
• EyeVision Software is available.

Financed through/by

EVT Eye Vision Technology GmbH, Karlsruhe Germany

Research team

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SOFTWARE MODULE FOR THE ENERGETIC ASSESSMENT OF HYDRAULIC GENERATORS OPERATION IN AQUATIM'S DRINKING WATER SYSTEM

Goal of the project

The goal of the project was to create a simple to use software system validated by experimental results for the quick assessment and monitoring of the efficiency of hydraulic generators deployed in Aquatim's Drinking Water System.

Short description of the project

The project contained three phases:

Phase 1 27.03.2018 – 30.06.2018, for the development of the algorithms for constant-speed pump efficiency assessment and variable-speed pump efficiency assessment.

Phase 2 01.07.2018 – 30.09.2018, for the validation and testing of the software module against laboratory experimental data from a variable-speed pump.

Phase 3 01.10.2018 – 27.12.2018, for the development of the graphical user interface for the central desktop system and for the mobile, smartphone application.

Main activities

• The development of a software module for the energetic assessment of hydraulic generators operation in Aquatim's Drinking Water System in two parts: the desktop application and the smartphone application.

• All software results have been validated with in situ and laboratory experiments for constant-speed pumps and for variable-speed pumps.

Results

An interdisciplinary expert software solution for the energetic assessment of hydraulic generators operation in Aquatim's Drinking Water System in two parts: two desktop applications and the smartphone application.

The desktop applications generate QR code stickers for each hydraulic generator configuration for constant-speed pumps and for variable-speed pumps.

The QR codes are scanned by the mobile application which works both for constant-speed pumps and variable-speed pumps. The hydraulic route is encoded in the QR codes in addition to polynomial curve fitting coefficients, in order to allow the correct assessment of the efficiency for each pump configuration.

Applicability and transferability of the results

• The results are tailored for the energetic assessment of hydraulic generators operation in Aquatim's drinking water system.

Implementation period

23.02.2018-22.02.2019

Financed through/by

AQUATIM S.A.

Research Centre

Research Center in Computer and Information Technology (CCCTI)

Research team

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ANALYSIS OF THE MATERIALS FROM THE PRODUCTION PROCESS

Goal of the project

Structural analysis and mechanical testing of materials used in production of heating elements and systems, in order to optimize the material selection criteria for processing tools and devices as well as the final products.

Short description of the project

The project consisted in analyzing of the materials used in the production of heating elements and setting criteria for selection of these materials.

Implementation period

November-December 2018

Main activities

- Structural analysis and hardness testing of cold working tools in different heat treatment states;
- Structural analysis and hardness testing of stainless steels used in the manufacture of tubular heaters;
- Establishing the influence of the manufacturing process parameters on the structure and properties of steels used in the tubular heaters production;
- Optimizing the material selection criteria for the production of tubular heaters.

Results

It has been optimized the material selection for the production of tubular heaters elements in order to reduce the scrap.

Applicability and transferability of the results

The results obtained help design engineers to optimize the selection of materials in order to increase products quality and reduce the scrap.

Financed through/by

SC ZOPPAS INDUSTRIES ROMANIA SRL

Research Centre

Research Center for Processing and Characterization of Advanced Materials

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ELECTRICA MUNTENIA NORD DISTRIBUTION NETWORK OPERATOR ANALYSIS AND OPTIMIZATION

Goal of the project

Distribution network technical losses evaluation for Electrica Muntenia Nord Distribution System Operator has been tackled. Analytical and power flow computing based methods have been applied for different voltage levels and operating conditions. Renewable generation influence has been discussed.

Short description of the project

Technical losses computing methodology is proposed.

### Implementation period

2018

Main activities

• The study was conducted for Electrica Muntenia Nord Distribution System Operator. In was focused on different voltage levels, distribution branches and equipment type.

• Quantitative and qualitative on-field measurements have been provided and discussed, followed by the technical losses evaluation. Different scenarios for the distribution network operator have been taken into consideration highlighting the optimal operating conditions.
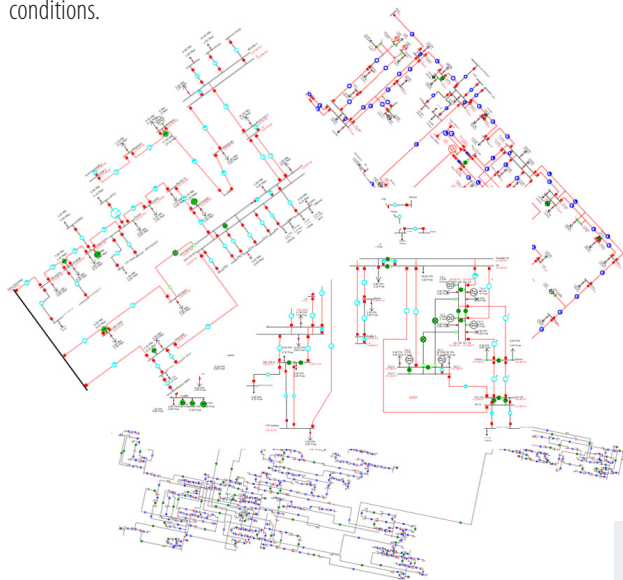
Results

• algorithm developed for technical losses evaluation in case of different voltage levels;
• electrical distribution network simulation model at 110 kV and 20 kV voltage levels, analyses, recommendations;
• technical losses' reduction methods.
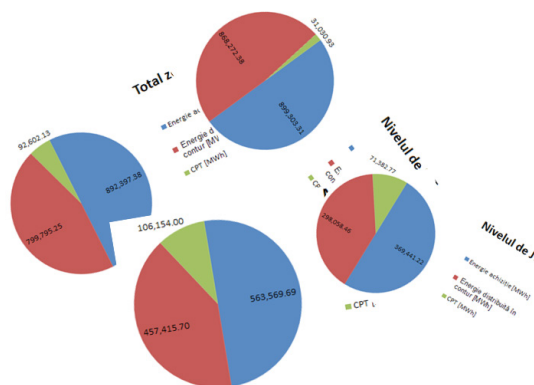
Applicability and transferability of the results

• The developed methodologies for technical losses evaluation are 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 tackled in case of different distribution operators.

Financed through/by

Servelect Cluj-Napoca

Research Centre

Power Systems Analysis and Optimization Research Centre
Department of Power Systems

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PROTOTYPE RESEARCH AND DEVELOPMENT FOR IMAGE PROCESSING SOLUTION FOR BOARDS TESTING IN THE AUTOMOTIVE INDUSTRY

Goal of the project

The main goal of the project is to obtain a prototype, able to execute boards inspection, based on image processing, functioning in accordance with the company requirements for the production line.

Short description of the project

The starting point of the project was represented by an experimental model. The activities were to adapt, to improve, to test and to validate the software from the experimental model within a new mechanical-hardware structure in order to obtain a prototype that is able to perform ECU tests based on image processing functioning in accordance to the Hella company requirements in the production line.

Implementation period

22/11/2018-22/03/2019

Main activities

The prototype was conceived and implemented, and the solution was integrated, tested and validated in the production line.

Results

Some results are detailed below:

1) Starting from the experimental model (consisting of 4 compact modules, each containing a Raspberry Pi and a camera), the solution was modified within the prototype in order to fit the high number of different ECUs from the production line and to reach the test indicators. A prototype solution was conceived and implemented, based on 6 Raspberry Pis and 6 cameras, this time physically separated, and improving the quality of the inspection for the connectors with perspective issues. Having separated cameras, the prototype allows besides higher possibilities to eliminate the perspective, a higher luminosity on the ECUs analyzed surface.

2) The capability to vehiculate data between 1 master and 5 slaves, including from request/response transmissions toward data aggregation, concluding procedures and reporting.

3) A generic platform was created for n processing modules. Therefore now, the prototype contains only two branches: 1 master branch and 1 slave branch, and the software from the slaves is generic for any Raspberry Pi slave in the scheme.

4) The prototype solution is extended to function for the 4 main classes of ECUs from the production line. The extension required a whole new concept for the software module.

5) Modules were conceived and developed to include layouts from all main classes of boards and all the particular sets of boards inside the main classes.

6) The pin search module was optimized to reduce the search area and the processing times.

7) New detection modules were researched and implemented based on islands identification, separation and grouping, for more accurate conclusions.

8) A new method was researched and developed to establish a dynamic illumination threshold associated to each pin.

9) The layout saving, storing and loading was optimized due to the high number of layouts in the production line.

10) Detection task request optimizing was researched and implemented mainly in a sense that the master equipment extracts and sends a list of the connectors to analyze for each slave equipment. This procedure eliminates the fix slaves, each being able to be replaced without application issues.

11) The processing time was significantly reduced by eliminating the necessity of connector rotation for the slave's software.

12) A new module was implemented for new layout learning, placed only on the master equipment. This way no ssh/vnc connection is necessary for each slave.

13) A new offset (search area) separation was researched and implemented so that each pin has now its own offset. Also, a new module was created that establishes the filling factor for the offset for each pin.

15) The prototype is able to apply all the changes in configuration from the graphical user interface.

16) The prototype functions in complete correlation with the traceability software within the company.

Financed through/by

HELLA ROMANIA S.R.L.

Research team

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