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EDITOR: ICTCM – CITAF

041303 Bucuresti
Șos. Olteniței nr. 103, sector 4, O.P. 8
Tel: **021 332.37.70/234**
Fax: **021 332.07.75 / 021 332.31.95**
E-mail: ictcm@ictcm.ro

Responsabil editor: Irina Rădulescu

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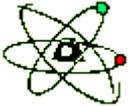
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*University POLITEHNICA Bucharest, ROMANIA

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*S.C. ICTCM S.A., Bucharest, ROMANIA, **CIDAf, Bucharest, ROMANIA

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*University “POLITEHNICA” Bucharest, ROMANIA, **S.C. ICTCM S.A. Bucharest, ROMANIA

ABSTRACTS “INNOVATIVE TECHNOLOGY” 2 / 2012

TRIBOLOGICAL BEHAVIOR SIMULATION OF HARD DENTAL STRUCTURES AND RESTORATIVE MATERIALS USING THE FINITE ELEMENT ANALYSIS

Adina Oana Armencia

Faculty of Dental Medicine, University of Medicine
and Pharmacy “Grigore T. Popa, Iasi, ROMANIA

Simulating the biomechanical behavior of a reconstruction using the finite element analysis method is a modern method necessary before the practical stage of a research, thus enabling the precise shaping of certain trajectories in the approach of certain directions of practical applicability, as well as obtaining final results with relevant data (results coupled with experimental models that reiterate the clinical situation that will be later analyzed).

CONTROL CHARTS FOR MONITORING THE ELECTROSTATIC CHARGING PROCESS OF AIR FILTERS

Alexandra Rotaru*, Lucian Dăscălescu,
Alexandru Rădulescu***

* University POLITEHNICA Bucharest, ROMANIA

**University of Poitiers, FRANCE

Non-woven fabrics are extensively used in air filters for their high dust collection efficiency. Their filtering properties can be improved if it is applied a current of electrostatic nature. Statistical Process Control (SPC) is a statistical method for monitoring and control of a process, assuring that it functions at its whole potential in producing compliant products. One of the key instruments is the control chart. The purpose of this paper is to verify using the control charts, if the electrostatic charging process of filter material with a negative corona electrode is in control, otherwise said, stable, with a low variability of the results. At the scale of an air filter manufacturing process, the implementation of SPC and the usage of control charts is of great importance, for they monitor, identify the malfunctions and can avoid them through immediate interventions, this way limiting the losses of production.

SIMULATING HOW INCIDENTS ARE SOLVED IN AN IT COMPANY

Alexandru Rădulescu, Robert Vizitiu

University “POLITEHNICA” Bucharest, ROMANIA

The purpose of analysis for this paper is to model and simulate through a flow how incidents are solved in a IT company using Arena software. Today due to technology explosion IT companies represent a safe investment. This paper wants to review a normal bussines day and how all the incidents are handled.

ROMANIAN OVERVIEW CONCERNING THE HEALTHY LEARNING ENVIRONMENT WITHIN SMES

Domnica Coteș*, Alina Irimia**

*S.C. ICTCM S.A., Bucharest, ROMANIA,

**CIDAf, Bucharest, ROMANIA

This paper aims to present and analyze the current situation in Romania regarding the SMEs healthy learning environment, with a focus on Bucharest-Ilfov region. Starting from the premise that workplace learning activities within SMEs play an essential role in maintaining or introducing the skills, knowledge and abilities needed to succeed, adapt and being competitive in a constantly changing environment, we looked at the current trend of formal and informal training and other learning activities within SMEs at regional and national level, comparing the situation to the European area. In our research we took into account studies previously undertaken by the ministries, national and European institutions, OECD reports and the Romanian White Cart of SMEs.

**ROMANIAN OVERVIEW
CONCERNING
THE HEALTHY LEARNING ENVIRONMENT
IN THE PLANNING OF
IN-HOUSE TRAINING ACTIVITIES IN SMEs**

Domnica Coteș*, Alina Irimia**

*S.C. ICTCM S.A., Bucharest, ROMANIA,

**CIDAF, Bucharest, ROMANIA

Workplace culture is a powerful tool for managers, a lodestar for employees and a source of success for companies. Organizational structure, knowledge acquisition, application and protection of knowledge are significantly related to organizational performance, technology, organizational culture and knowledge conversion as having a significant impact. The quality of training and developing new skills of labor force are important competitive factors. With respect to the lifelong learning and skills development, the training offers focuses especially on programs for gaining general skills (foreign languages, computer skills, accounting, etc.).

**ASPECTS CONCERNING
CONTINUOUS LEARNING
IN ORGANIZATIONS**

Alexandru Rădulescu*, Irina Rădulescu**

*University "POLITEHNICA" Bucharest,
ROMANIA,

**S.C. ICTCM S.A. Bucharest, ROMANIA

Our society – as an ensemble – has great challenges in our world of change, concerning the way of working and the work organization. The most important "raw materials" of new economy are knowledge and innovative capacity. High speed or technological renovation and competitiveness requirements need a continuous bringing up to date of knowledge and the adoption of the life-long learning. Continuous Learning is the ability to learn to learn and it is a way of being in the world. It has become quite prominent over the past five years, because organizations are changing rapidly and it's difficult to find any approach to doing anything in organizations that doesn't soon become outdated. The concept of continuous learning has become important because it places priority on noticing, adapting and learning from change. It is essential to find new ways of communicating and working for individuals and organizations, in order to confront and solve problems. It is critically important to integrate ideas and information - drawing from the wisdom of the past and combining it with new findings drawn from studies in human and organizational development, from science and technology, and from the rapidly changing history of our own times.

TRIBOLOGICAL BEHAVIOR SIMULATION OF HARD DENTAL STRUCTURES AND RESTORATIVE MATERIALS USING THE FINITE ELEMENT ANALYSIS

Adina Oana Armencia

Faculty of Dental Medicine, University of Medicine and Pharmacy “Grigore T. Popa, Iasi, ROMANIA
email: adinaarmencia@yahoo.com

REZUMAT:

Simularea comportamentului biomecanic al unei reconstrucții dentare, folosind metoda de analiză cu element finit, este o metodă modernă necesară înainte de etapa practică a unei cercetări, ce permite astfel conturarea precisă a anumitor traiectorii, în abordarea unor direcții de aplicabilitate practică, precum și obținerea de rezultate finale cu date relevante (rezultate cuplate cu modele experimentale, care reiterează situațiile clinice, care vor fi ulterior analizate).

ABSTRACT:

Simulating the biomechanical behavior of a reconstruction using the finite element analysis method is a modern method necessary before the practical stage of a research, thus enabling the precise shaping of certain trajectories in the approach of certain directions of practical applicability, as well as obtaining final results with relevant data (results coupled with experimental models that reiterate the clinical situation that will be later analyzed).

KEYWORDS: tribological behavior, simulation, dental structures, restorative materials

CUVINTE CHEIE: comportament tribologic, simulare, structuri dentare, materiale de restaurare

1. AIM OF THE STUDY

Our study aimed to analyze, using the finite element method, the state of stress and strain recorded at the point of direct contact between two structures (two hard dental structures in tripod relation), and determine the points of their maximum wear.

The accuracy of the reconstruction is presented in figure 1 by the precision of the structures represented and analyzed using a CT scan (figure 2, figure 3) in one of our patients that needed a ceramic prosthetic. A simple radiography would not have revealed an image as accurate of the aimed structures.

2. MATERIAL AND METHOD

In order to determine the state of tension and estimate the areas of maximum wear between the two structures in direct contact, we used a group of 10 patients that needed dental prosthetics.

A tridimensional analysis of the clinical situation was carried out, where the lower molar establishes a tripod contact with its natural antagonist tooth.

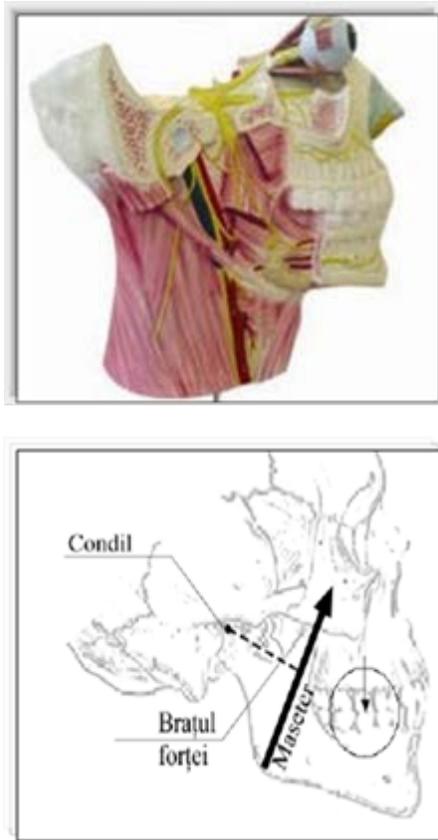


Figure 1. Anatomical reference points used in the 3D reconstruction

The CT-scan is a diagnosis method that uses special X-ray equipment (the CT scanner) to obtain transverse sections of the scanned object, by means of X-ray detectors. For the 3D reconstruction we used the ABAQUS STANDARD 6.5-1 software.

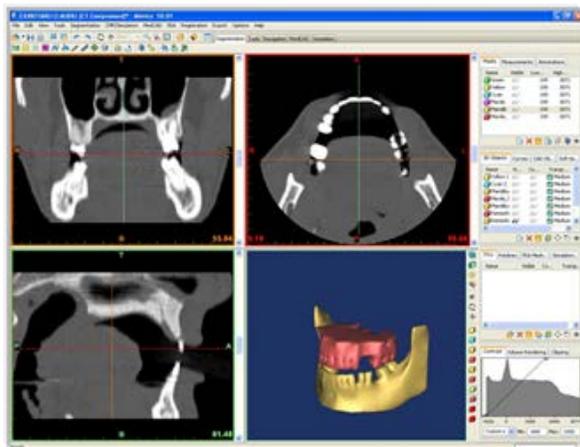


Figure 2. The 3D reconstruction using the CT scan

Figure 3 shows the 3D frontal-lateral aspect of the analyzed clinical case. We analyze the following aspects: the geometry equity, the types of supports required, the types of forces, their direction and orientation, allowing calculation of the Von Mises intern tensions once the material is chosen.

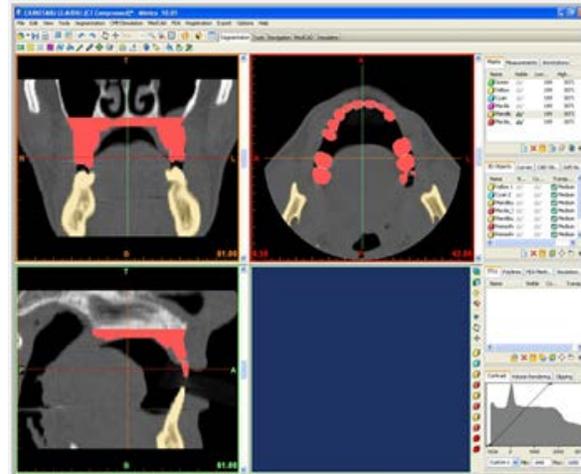


Figure 3. 3D reconstruction of the anatomical reference point in the analyzed CT scan

We considered the muscle forces acting on the mandible in complete occlusion (ie forces developed by the masseter, temporal, pterygoid muscles, etc.), whose direction, orientation and size is calculated from the equilibrium condition of temporo-mandibular joint lever. [7]

The measurements were carried out applying relatively large forces, but considered normal for the oral cavity, of 300N (30KgF) and 500N (50 Kgf) and a force of 800N considered an overload (80 Kgf); testing began with a 300N force applied on the crown of the tooth to avoid convergence issues (possible mathematical errors), then the intensity of the force was increased to values high enough to simulate a parafunctional activity. 500N is regarded as the average force between the upper physiological limit for which changes are physiological and reversible.

The force that was applied to the mandible bone had an anterior-posterior direction and was oriented at 15° to the vertical plane. Also, we used embeddings into the upper jaw bone to determine the propping of the structure. Due to the fact that during mastication only the lower jaw is mobile, the upper jaw is considered a fixed reference point, so bearings (ie motion constraints) will only apply to the upper jaw bone and pressure (ie, an evenly distributed force that replaces the mastication muscles' action) will apply on the mandible.

For measurements, the following factors were taken into account: material properties, namely, modulus of elasticity E and Poisson coefficient

corresponding to dental structures, bone, muscle and ceramic material to be used in restoration (Table I).

Table I. Material constants used in determinations

COMPONENT	ELASTICITY MODULE [GPa]	POISSON COEFFICIENT [ν]
Bone	138	0,33
Tooth	186	0,31
Muscles	0,02	0,40

3. RESULTS AND DISCUSSIONS

Figure 4 reveals that, when using a 300 N load, the value of the maximum contact pressure in molars is 180 MPa (180 N/mm²), with the pressure tensor concentrated on the tip of the disto-palatal cusp. Little pressure concentration is observed at this level.

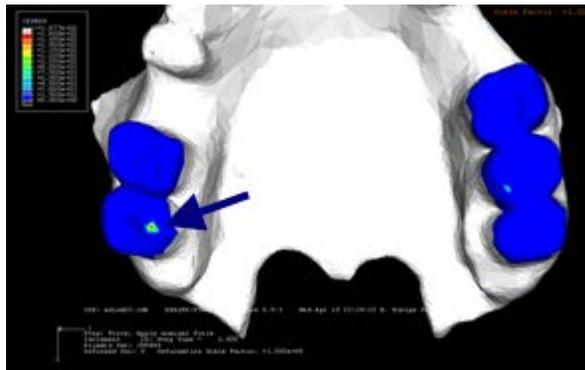


Figure 4. Molar contact pressure for a 300 N load

The Von Mises stresses are shown in a color code, ranging from blue (for the value 0) to red / white (Figure 5, Figure 6).

Thus, the maximum equivalent tension on molars is just 29 MPa, with an even distribution along the edentulous area, where the maximum equivalent tension reaches values of 5 MPa.

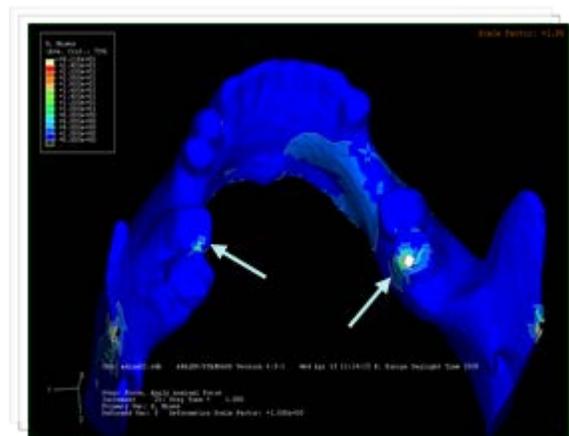


Figure 5. Molar Von Mises tension for a 300 N load (30 kgF): posterior-anterior view

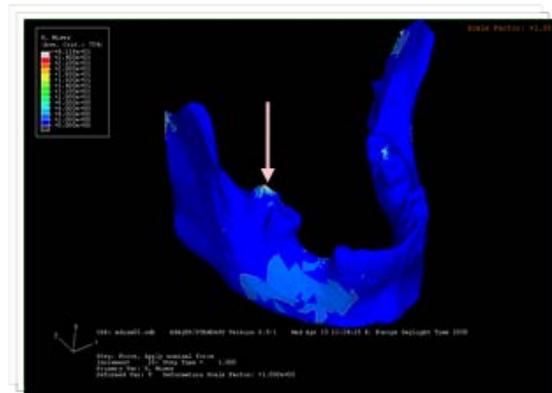


Figure 6. Molar Von Mises tension for a 300 N load (30 kgF): frontal-lateral view

The minimum tensions are registered at the marginal ridge level and on the external slopes of the disto-vestibular and disto-lingual cusps, and the maximum are located on the top and internal slopes of the same cusps. Moreover, overburdened areas, where the Von Misses stress reaches up to 92.18 MPa will become starting points for the wear process.

Along with the value increase of the force applied to 500 N, contact pressure will vary between 180 MPa - 256 MPa (180 to 256 N/mm²), the stress concentration area extending to the mesial, as outlined in Figure 7.

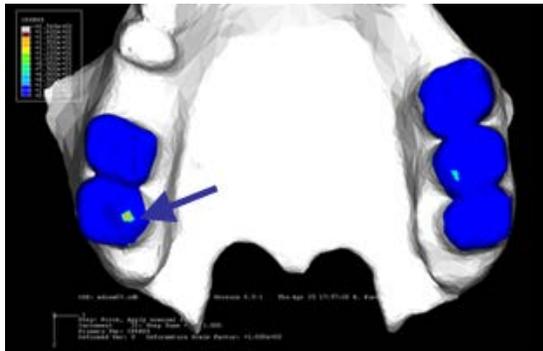


Figure 7. Molar contact pressure for a 500 N load

Maximum equivalent stress reaches about 240 MPa-290 MPa consequently with the broadening of the stress concentration area (the whole disto-lingual cusp of the mandibular molar, the distal pit, distal marginal ridge and distal side of the mesio-lingual cusp), with an even distribution along the edentulous area, where the maximum equivalent stress reaches about 6 MPa. (figure 8, figure9).

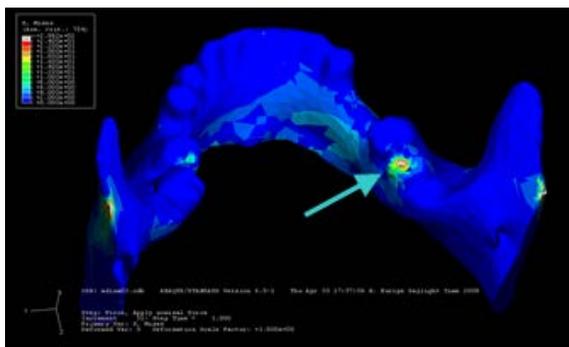


Figure 8. Molar Von Misses tension for a 500 N load (50 kgF): posterior-anterior view

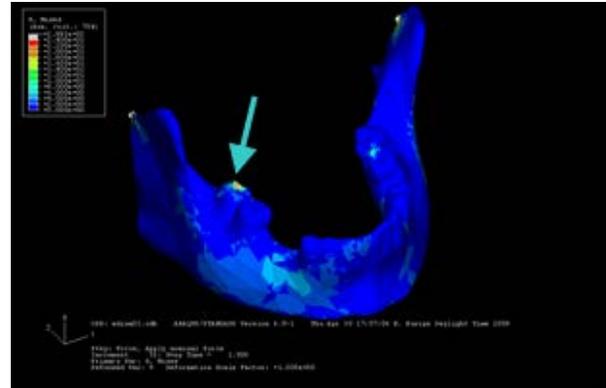


Figure 9. Molar Von Misses tension for a 500 N load (50 kgF): frontal-lateral view

Seen in antero-posterior perspective, the maximum tension area is visible in the disto-lingual cusp and on the adjacent anatomical elements, as an intense red area. This will be the starting point of the abrasion wear.

Should the patient undergoing CT examination present a parafunctional activity (grinding of the teeth, for example), the force acted in the jaw would have a value of about 800 N (80KgF). The result of the finite element analysis for a 800 N load is represented in Figure 10. It is noted that the molar bears high pressure, which can reach up to 350 MPa (350 N/mm²).

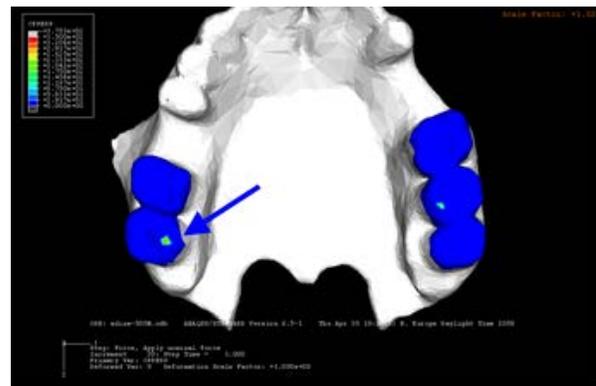


Figure 10. Molar contact pressure for a 800 N load

Figure 11 shows the appearance of high tensions in the mandible, tensions that are also present in the bone, leading to occurrence of shear phenomena in time.

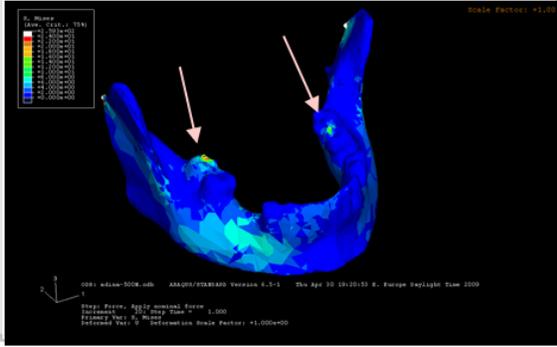


Figure 11. Molar Von Mises tension for a 800 N load (80 kgF): frontal-lateral view

The fact that there is a 240 MPa - 250 MPa tension on the contact area, but extended throughout the lingual half of the molar, causes rapid occurrence of the wear process. (figure 12).

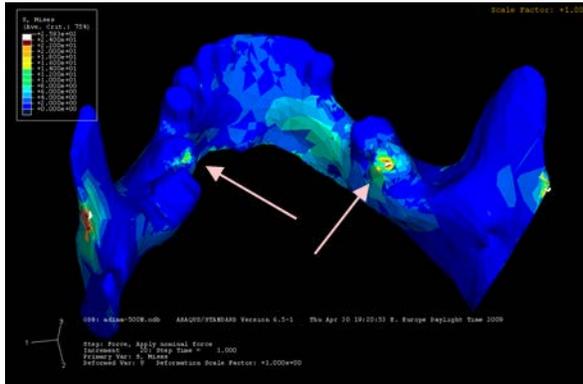


Figure 12. Molar Von Mises tension for a 800 N load (80 kgF): posterior-anterior view

In the cervical area, the maximum tension reaches 220-240 MPa playing, along with the structural features of this area, an important role in the initiation of fatigue wear at this level.

The increasing impact load is transmitted from the molar in the mandible bone, where the maximum equivalent tension reaches about 120 MPa on the lingual side of the ridge and 100 MPa on the vestibular. Also, there is a concentration of tension in the edentulous area that reaches values of 8 MPa.

In all three cases, it was found that minimum tensions are localized in the edentulous area (up to 8

MPa for a maximum of 800N load, minimum 5MPa for a 300 N load), while the maximum tensions, probably due to small contact areas associated with the occurrence of the end effect are present in the interdental contact area.

A different thing happens when the patient closes the mouth and the two arches come in direct contact. The occlusal contact areas, the coronary, cervical and periodontal structures are affected differently depending on the load applied. Thus, Figure 13, Figure 14 and Figure 15 present the overloading areas that underlie the occurrence of abrasion wear, under the action of 300 N, 500 N and 800 N forces, various situations associated with fatigue wear in the cervical level.

For a 300 N load developed during the performance of stomatognathic system functions, it is found that the most affected areas are located in the occlusal contact area in the vestibular half (top of vestibular cusps), with a 180 MPa tension recorded, gradually decreasing to 160 MPa for root and bone portion.

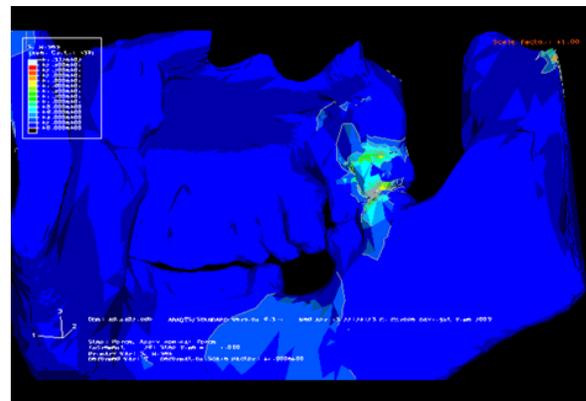


Figure 13. Dental-periodontal alterations for a 300 N load

When the load reaches about 500 N, the occurrence of overload stress is obvious in mesio-buccal cusps and medial-vestibular (220 MPa), associated with involvement of the cervical area (200 MPa) and transmission of the pressure along the crown to the root and bone, also involving the antagonist tooth.

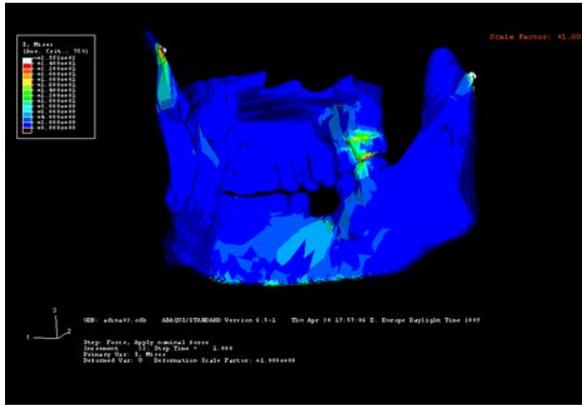


Figure 14. Dental-periodontal alterations for a 500 N load

When a 800 N overload occurs all structures are affected: the whole area of occlusal contact, cervical regions, opposing teeth, with the transmission of the load to the bone of the edentulous region. Tensions reach values of 310 MPa in the maximum strain area.

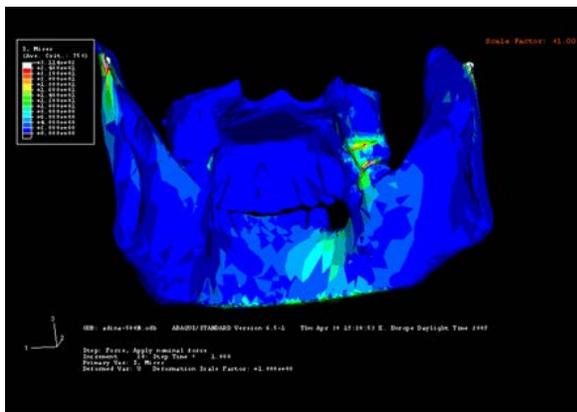


Figure 15. Dental-periodontal alterations for a 800 N load

This three-dimensional model indicates values of the equivalent tension as normal as possible given the clinical situation. Not the same can be said about the contact stresses, whose values can reach up to 314 MPa. This is because, these tensions were determined at the contact point areas, knowing that a contact point is accompanied by high, but still less relevant tension values. [1, 2, 3]

Burdening unphysiological forces applied to the tooth cause occurrence of tension concentrators in the interscupidian fissure and in the dentin – enamel interface, with consequent dentin or enamel cracks and periodontal ligament strain.

These high and deep strain zones will have a faster destructive effect than an unphysiological vertical axial force, causing cracks, peeling or pulling of the the material in time, especially in the cervical region, area which favors the emergence and spread of these phenomena dut to its particular anatomical features. Thus, fatigue occurs.

During occlusal solicitation, the top of the cusp undergoes a compressive axial load, which induces cervical tension associated with the development of a shear effort that occurs at a right angle to the load.

The tension and shear are accompanied by brakeage of the links between hydroxyapatite crystals, thus initiating cracks that in time lead to "fatigue" areas, with exfoliation and even loss of material. [1, 4, 5, 6].

A rapid increase in tension concentrator values can be explained by the fact that without lubrication, wear particles are formed, making the two-body wear (seen frequently in cases of teeth grinding) in three body abrasion wear. As the labor intensity progresses the adjacent bone undertakes the increasingly higher load, with the overload gradually extending towards the maximum resistance area of the bone. [8, 9, 10]

4. CONCLUSIONS

As a result of our analysis, the following conclusions can be drawn:

- Understanding the properties of the dental material allows foreshadowing of the strain zones and thus the appearance of the first wear areas located either on dental support or on the restorative material
- The most burdened areas are represented by cusps that come in contact
- These areas are oriented along the direction of the masticating muscles
- The geometry of this burdened area is adapted to the effort that it must endure, being the most developed one of the studied area.

In all cases a sum of tensions act, as an expression of combined normal tensions (tensile, compressive, crushing, bending) and tangential (shear or torsion), which will result in the initiation and / or evolution of combined patterns of wear, abrasive wear braiding with fatigue as the intensity of the applied force increases.

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Quick Info

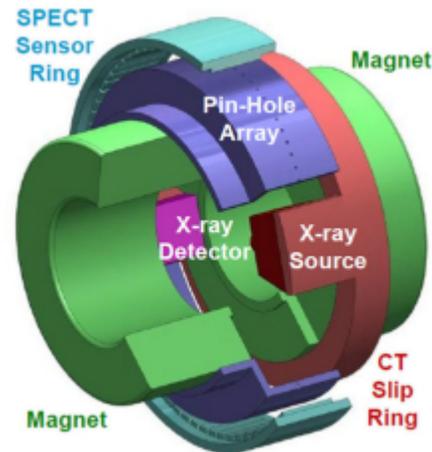
SCANNING INNOVATION MAY IMPROVE PERSONALIZED MEDICINE

Posted in Imaging & Diagnostics, Medical, News, MDB on Tuesday, December 04 2012

Combining medical imaging technologies, says Ge Wang, director of the Virginia Polytechnic Institute and State University's Center for Biomedical Imaging, Blacksburg, VA, could provide improved early disease screening, cancer staging, therapeutic assessment, and other aspects of personalized medicine.

"The holy grail of biomedical imaging is an integrated system capable of producing tomographic, simultaneous, dynamic observations of highly complex biological phenomena *in vivo*," Wang said.

He explained that integrated multiple major tomographic scanners including single-photon emission computed tomography, MRI, and phase-contrast tomography, can be operated in parallel, achieve space and time synchrony, and lead to a greatly reduced radiation dose in a process known as "omni-tomography."



Double-magnetic-donut-based design for omni-tomography. (Credit: Ge Wang)

Currently, dual-modality imaging such as a positron emission tomography and magnetic resonance imaging (PET/MRI) is a powerful example of hybrid technology. But recently, he and his colleagues became interested in going beyond dual-mode imaging, and found that "omni-tomography," the integration of multiple major scanners including single-photon emission computed tomography, MRI, and phase-contrast tomography, can be operated in parallel, achieving space and time synchrony and lead to a greatly reduced radiation dose.

The potential clinical applications for omni-tomography may improve personalized medicine. "Omni-tomography is a promising direction for biomedical imaging and systems biomedicine," Wang said.

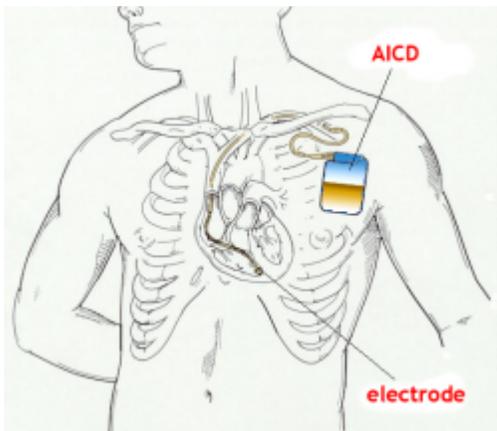
(Source:

<http://www.medicaldesignbriefs.com/component/content/article/15356>)

DEFIBRILLATOR SETTING CHANGE LEADS TO HEALTH GAINS

Posted in Electronics, Implants & Prosthetics, Medical, News, MDB on Wednesday, November 28 2012

A new study shows that many implantable cardioverter defibrillators (ICDs), which are designed to detect and correct dangerous heart rhythms, are programmed to too low a setting, delivering painful shocks for heart rhythms that aren't dangerous. Making a simple change in the way physicians set or program the device can lead to a dramatic 80 to 90 percent reduction in inappropriate therapies delivered for rhythms not life threatening.



Implantable cardioverter defibrillators monitor the rate and rhythm of the heart and deliver electrical shocks in response to very fast and potentially fatal heart rhythms.

Cardiology researchers at the University of Rochester Medical Center, Rochester, NY, found that simply raising the heart rate at which the device is set to fire significantly increased survival, lowering the risk of death by 55 percent compared to patients whose devices used traditional programming. This is above and beyond the usual decrease in mortality associated with defibrillator therapy, leading to an overall 70 percent reduction in death.

Currently, around 200,000 ICDs are implanted in the US every year. Most are set to initiate therapy when the heart rate exceeds around 170 beats per minute, but rates of 180 or 190 may be related to increased activity or exercise. Setting the device to fire at a higher rate of 200 beats per minute reduced the risk of experiencing a first inappropriate therapy by 79 percent compared to standard programming. Fewer shocks also corresponded with less energy delivered to the heart, which study authors believe contributed to the reduced risk of death.

(Source:

<http://www.medicaldesignbriefs.com/component/content/article/15168>).

PACEMAKER POWERED BY HEARTBEAT

Posted in Implants & Prosthetics, Medical, News, MDB on Tuesday, November 20 2012

Engineers at the University of Michigan, Ann Arbor, tested an energy-harvesting device that uses piezoelectricity — an electrical charge generated from motion — to convert energy from a beating heart — to provide enough electricity to power a pacemaker.

As reported in a study presented at the American Heart Association's Scientific Sessions 2012, patients may be able to power their own pacemakers, eliminating replacements when batteries are spent.

Pacemakers require very small amounts of power to operate, and the engineers say that piezoelectricity might be able to power other implantable cardiac devices like defibrillators, which also have minimal energy needs.

The researchers haven't built a prototype yet, but they've made detailed blueprints and run simulations demonstrating that the concept would work.

(Source:

<http://www.medicaldesignbriefs.com/component/content/article/15163>)

CONTROL CHARTS FOR MONITORING THE ELECTROSTATIC CHARGING PROCESS OF AIR FILTERS

Alexandra Rotaru*, Lucian Dăscălescu**, Alexandru Rădulescu*

*University POLITEHNICA Bucharest, ROMANIA, ** University of Poitiers, FRANCE
E-mail: alexandra.rotaru11@gmail.com

ABSTRACT

Non-woven fabrics are extensively used in air filters for their high dust collection efficiency. Their filtering properties can be improved if it is applied a current of electrostatic nature. Statistical Process Control (SPC) is a statistical method for monitoring and control of a process, assuring that it functions at its whole potential in producing compliant products. One of the key instruments is the control chart. The purpose of this paper is to verify using the control charts, if the electrostatic charging process of filter material with a negative corona electrode is in control, otherwise said, stable, with a low variability of the results. At the scale of an air filter manufacturing process, the implementation of SPC and the usage of control charts is of great importance, for they monitor, identify the malfunctions and can avoid them through immediate interventions, this way limiting the losses of production.

KEYWORDS: control charts, statistical process control (SPC), air filters, non-woven fabrics, electrostatic filters, negative corona charge

1. INTRODUCTION

Air filters for cars, air-ventilation systems and industrial equipment are composed of non-woven fabrics manufactured from polymeric fibers. They have the property to separate fine solid particles (like dust or bacteria) of liquids through a filtration process. They have low cost and high dust-collection efficiency.



Fig. 1. Examples of cabin air filters

Non-woven polymeric filter media are widely employed for heat, ventilation, and air conditioning [1, 2]. In response to the specific requirements of each application, a wide variety of filter media are presently on the market. They are made either of natural (wool, cotton) or synthetic fibers (polyethylene, polyester and polypropylene).

The operating characteristics of the filters are related to the charging state of the material. So a

good filter is one that is capable of preserving for a long period of time a high level of charge.



Fig. 2. Non-woven fabrics

The particles collection efficiency of these filters is known to be enhanced by the static charging of the fibers [3, 4]. The fine charged particles that would otherwise go through the air filter might be trapped on the charged fabrics due to the electrostatic forces acting on them.

The effects can be demonstrated in the image below:

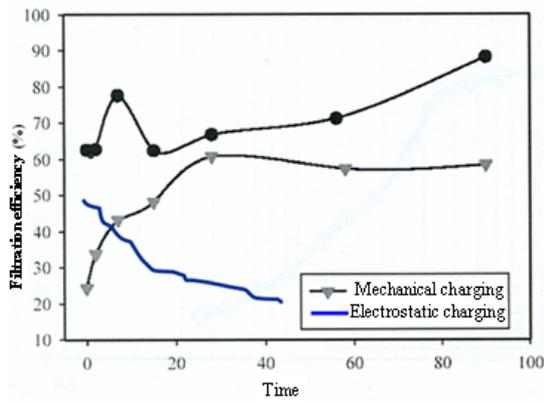


Fig.3. The efficiency of electrostatic effect

The mechanical effect of retaining particles is increased if it is applied a current of electrostatic nature and will decrease in time due to material discharge. The sum of these two is represented through the black line that shows the rising efficiency of the filtration process.

In the experiments performed in the laboratory, it was studied the effects of a negative corona charging of filters.

Corona is a process through which a sustained current is developing from an electrode with a high potential in a neutral liquid, usually air, through ionization of this fluid, to create plasma around the electrode. The ions generated are passing charged in the areas closer to the lower potential, or they can recombine to form neutral gas molecules.



Fig. 4. Corona discharge around a bobine of high tension, Volt Tessler and a Wantenberg wheel

Techniques of Statistical Process Control (SPC) are largely used in industry at monitoring repetitive processes to determine un-conforme functionings [5]. In this case the process is being investigated to determine the cause of the unconformity. When the cause is determined, a strategy is identified to correct it. This can be made through enhanced process techniques, investing in new technologies, or reprocessing in order to have fewer steps [16].

The key instruments of the SPC are the capability and control charts. The capability index quantify the variability in the process characteristics. Control charts are representations of process characteristics. They simplify the control of the process in order to maintain and enhance the capability [6].

Control charts are also known under the name of Shewhart charts or process - behavior charts. In SPC they are tools used to determine whether or not a manufacturing or bussiness process is in a state of statistical control.

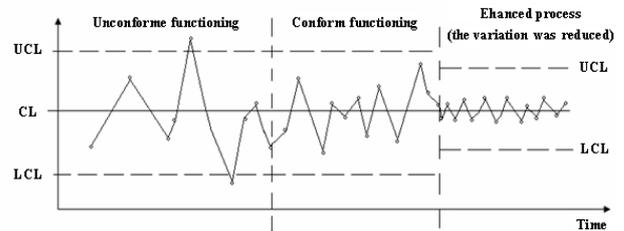


Fig.5. Graphic of a cycle in SPC

The aim of this paper is to see if the electrostatic charging process of filter media is under control (if the process is stable, with variations coming from known sources).

2. MATERIALS AND METHODS

The electrostatic measurements were performed in the QLIO Laboratory in IUT Angoulême, France, using a method of corona charging on samples of polypropylene in ambient air (temperature: 18°C to 30°C; relative humidity: 30% to 70%). The dimensions of the materials were of 80 mm x 80 m and the average fiber diameter of 30 µm.



Fig. 6. Polypropylene material used in experiments



Fig.7. Microscopic view of non - woven Polypropylene media

2.1. Corona charging process

The samples were charged using the negative corona discharge generated by a high voltage wire-type dual electrode facing a grounded plate, aluminum (120 mm x 90 mm). The high voltage electrode consisted of a tungsten wire (diameter 0.2 mm) supported by a metallic cylinder (diameter 26 mm) and distanced at 34 mm from its axis.

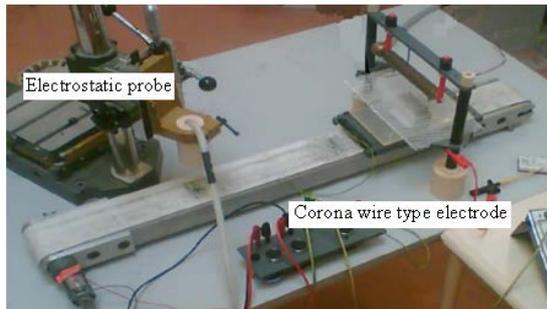


Fig. 8. To the left the electrostatic probe for measuring, to the right the corona charging wire-type dual electrode, in the middle the conveyor belt

The wire and the cylinder were energized from the same adjustable high-voltage supply, with a tension between 0-100 kV and a current 0-3 mA (model SL 300 SPELLMAN). The distance between the wire and the surface of the plate electrode was 30 mm. In view of corona-charging, each sample was moved at constant-velocity on a conveyor belt under the discharging wire for about 10 s.

2.2. Measurements of the surface potential

The surface potential was measured with an electrostatic voltmeter (TREK, model 341B, equipped with a probe model 3450).

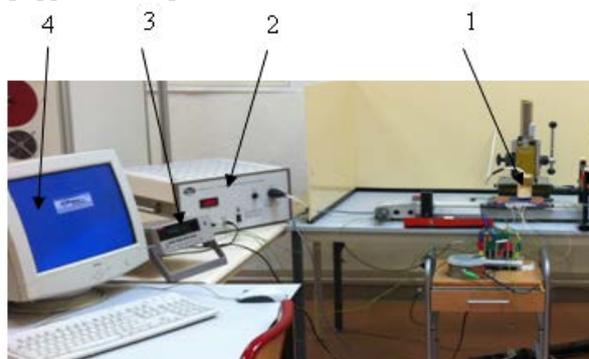


Fig. 9. Experimental set-up for measurement of the surface potential:

- 1 - electrostatic measuring probe,
- 2 - electrostatic voltmeter,
- 3 - Keithley electrometer,
- 4 - software for acquisition and processing of data

The measured potential was monitored via an electrometer (Keithley, model 6514), connected to a personal computer (figure 2). The processing of the data was performed using a virtual instrument, in LabView environment.

2.3. Processing of experimental data

There were realized 30 measurements on the same number of samples, in the same environmental conditions, temperature being 24,7 °C, humidity of 43,1 %.

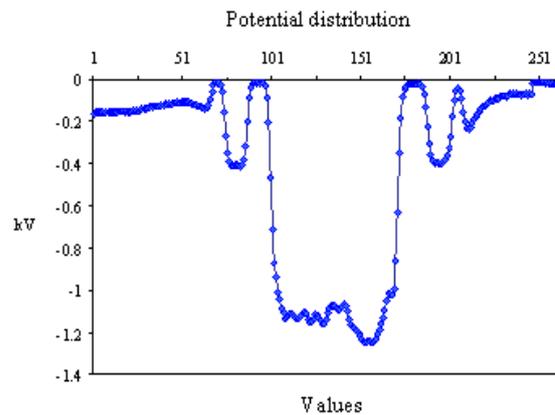


Fig. 10. The negative potential values recorded by the new method, the negative potential recorded being between -0,9 kV and -1,3 kV

Then was used the method developed in continuous flow that consists in taking a number of values and calculating their average (\bar{x}) using the formula:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i \quad (1)$$

To calculate a range slider, from the 30 values representing the averages, were chosen 3 to calculate a range (R):

$$R = \text{Max}\{X, i = 1, 2, 3\} - \text{Min}\{X, i = 1, 2, 3\} \quad (2)$$

In order to establish the control limits (UCL – upper control limit, LCL – lower control limit) and to watch the evolution of the process, we start with calculating R_m , the average of the 28 groups of 3 values, that was found to be 0,0935.

To calculate the control chart limits, there are many formulas that use different coefficients. We will use the following formulas:

$$UCL_x = \bar{\bar{X}} - A_4 R_m \quad (3)$$

$$LCL_x = \bar{\bar{X}} + A_4 R_m \quad (4)$$

The value of the coefficient is taken from the following table and is being chosen for $n = 3$ values:

n	2	3	4	5
A_4	2,660	1,772	1,457	1,290
D_3	-	-	-	-
D_4	3,267	2,574	2,282	2,114

Table 1. Coefficients used for calculation control charts limits of range slide

After the limits were chosen, the values are represented in control charts through points, and the process is being evaluated.

If it is found to be in control, then the data obtained can be used to foresee future performances of the process monitored.

If it is found not to be stable, then the graphic analyses can help to determine the source of the variation, which can be eliminated in order to bring the process back in control.

3. RESULTS

Samples	\bar{x}	R
S1	-1,1092	0,0952
S2	-1,0332	0,1635
S3	-1,1284	0,0902
S4	-1,1967	0,0501
S5	-1,2186	0,1048
S6	-1,2468	0,1048
S7	-1,142	0,0107
S8	-1,1470	0,0238
S9	-1,1363	0,1348
S10	-1,1232	0,1217
S11	-1,0015	0,1883
S12	-1,0164	0,2051
S13	-1,1898	0,0923
S14	-1,2215	0,0923
S15	-1,1292	0,1207
S16	-1,1873	0,1309
S17	-1,2499	0,2404
S18	-1,119	0,1095
S19	-1,0095	0,1076
S20	-1,1171	0,0307
S21	-1,0958	0,0094
S22	-1,0864	0,0089
S23	-1,0872	0,0183
S24	-1,0953	0,0285
S25	-1,077	0,0716
S26	-1,1055	0,1254
S27	-1,1486	0,1254
S28	-1,0232	0,0134
S29	-1,0366	
S30	-1,0239	

Table 2. Values obtained for the 30 samples (all the measuring units from the table are in kV)

The results of the averages calculated for each of the 30 samples and the ranges for the 3 chosen values can be viewed in the table above.

The control chart for the 30 values from the table, with an UCL of -1,28244 and a LCL of -0,95104 is:

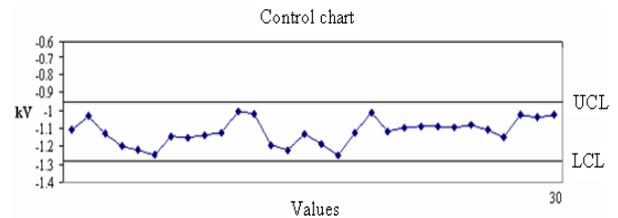


Fig. 11. Control chart of the 30 averages

The control chart for the 28 calculated ranges is as followed, with a UCL of 0,240697 and LCL of 0:

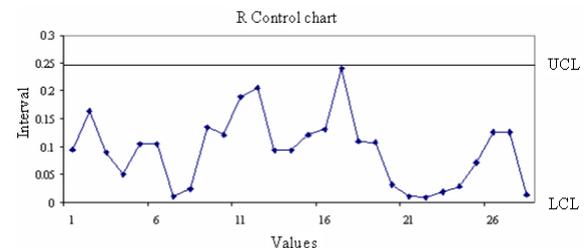


Fig. 12. Control chart of the 28 intervals calculated for 3 values

In order to found a process that is not under control it was calculated the standard deviation for the same chosen number of the 30 samples. Before the aberrant ones could be eliminated with Student test, they were put into a control chart. With an UCL of 0,166114 and a LCL of 0,01133 the graphic is:

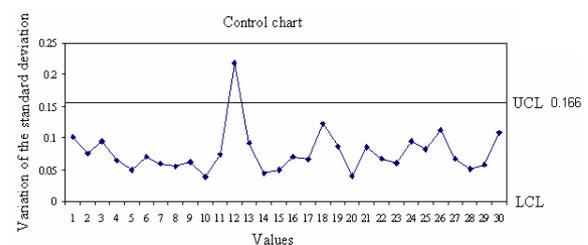


Fig. 13. Control chart of the values of standard deviation

4. CONCLUSIONS

- From the experiments developed and the analyses of the control charts, it could be seen that the first process is between the established limits. The R control chart is also under statistical control, but with a point that has got very close to the upper limit control.

- If we analyze the individual values of the standard deviation, before the elimination of the aberrant ones, can be observed that one of the points which follow to be eliminated is the one that is not contained between the control limits. The process is not under statistical control, so a dysfunction is signaled on the surface of the material, perhaps the fact that it's not uniform.
- Control charts of monitoring the electrostatic charging process shows that it is under control and presents variations that come from known sources. They are because of the human errors appeared in the experiments performed in laboratory, like the different time between the measurements, different speed of the conveyor, errors that could be avoided in an automatic industrial process.
- In the actual manufacturing procedure of air filters, the measurements are being taken at the end of the technological flow. In case filters that do not correspond are being found, these are being declassified and thrown away.
- Through the implementation of a SPC and the usage of control charts that allow to monitor, determine and avoid problems through immediate intervention even from the manufacturing process, can limit the losses of production and contribute to the customer satisfaction.

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Quick Info

Lidar Electro-Optic Beam Switch with a Liquid Crystal Variable Retarder

Lyndon B. Johnson Space Center, Houston, Texas

A document discusses a liquid crystal variable retarder, an electro-optic element that changes the polarization of an optical beam in response to a low-voltage electronic signal. This device can be fabricated so that the element creates, among other states, a half-wave of retardance that can be reduced to a very small retardance. When aligned to a polarized source, this can act to rotate the polarization by 90° in one state, but generate no rotation in the other state. If the beam is then incident on a polarization beam splitter, it will efficiently switch from one path to the other when the voltage is applied. The laser beam switching system has no moving parts, improving reliability over mechanical switching. It is low cost, tolerant of high laser power density, and needs only simple drive electronics, minimizing the required system resources.

(Source:

<http://www.techbriefs.com/component/content/article/15252>)

Real-Time Distributed Embedded Oscillator Operating Frequency Monitoring

Lyndon B. Johnson Space Center, Houston, Texas

A document discusses the utilization of embedded clocks inside of operating network data links as an auxiliary clock source to satisfy local oscillator monitoring requirements. Modern network interfaces, typically serial network links, often contain embedded clocking information of very tight precision to recover data from the link. This embedded clocking data can be utilized by the receiving device to monitor the local oscillator for tolerance to required specifications, often important in high-integrity fault-tolerant applications.

(Source:

<http://www.techbriefs.com/component/content/article/15251>)

670-GHz Down- and Up-Converting HEMT-Based Mixers

NASA's Jet Propulsion Laboratory, Pasadena, California

Applications include passive, active, or radar imaging.

A large category of scientific investigation takes advantage of the interactions of signals in the frequency range from 300 to 1,000 GHz and higher. This includes astronomy and atmospheric science, where spectral observations in this frequency range give information about molecular abundances, pressures, and temperatures of small-sized molecules such as water. Additionally, there is a minimum in the atmospheric absorption at around 670 GHz that makes this frequency useful for terrestrial imaging, radar, and possibly communications purposes. This is because 670 GHz is a good compromise for imaging and radar applications between spatial resolution (for a given antenna size) that favors higher frequencies, and atmospheric losses that favor lower frequencies. A similar trade-off applies to communications link budgets: higher frequencies allow smaller antennas, but incur a higher loss.

(Source:

<http://www.techbriefs.com/component/content/article/15250>)

Electrodialysis To Remove Ammonium Ions From Wastewater

Lyndon B. Johnson Space Center, Houston, Texas

A simple treatment removes most of the ammonium content.

Electrodialysis has been shown to be an effective means for removing ammonium ions from wastewater without use of consumable chemicals and without adding other substances to the treated water. Provided that continuing efforts to develop efficient electrodialysis equipment prove successful, it should be possible to apply this treatment principle to wastewater streams to be recycled in life-support systems for spacecraft and other closed habitats. Effluents from some industrial processes that generate high concentration of ammonium ions may also be treatable by this principle.

(Source:

<http://www.techbriefs.com/component/content/article/1759>)

Pattern Generator for Bench Test of Digital Boards

NASA's Jet Propulsion Laboratory, Pasadena, California

Fresh data is streamed continuously for many tens of seconds with no gaps at 40 MHz.

All efforts to develop electronic equipment reach a stage where they need a board test station for each board. The SMAP digital system consists of three board types that interact with each other using interfaces with critical timing. Each board needs to be tested individually before combining into the integrated digital electronics system. Each board needs critical timing signals from the others to be able to operate. A bench test system was developed to support test of each board. The test system produces all the outputs of the control and timing unit, and is delivered much earlier than the timing unit.

(Source:

<http://www.techbriefs.com/component/content/article/15248>)

Adjusting Permittivity by Blending Varying Ratios of SWNTs

Lyndon B. Johnson Space Center, Houston, Texas

Thursday, November 01 2012

High, intermediate, and low permittivity values can be tailored for specific applications.

A new composite material of singlewalled carbon nanotubes (SWNTs) displays radio frequency (0 to 1 GHz) permittivity properties that can be adjusted based upon the nanotube composition. When varying ratios of raw to functionalized SWNTs are blended into the silicone elastomer matrix at a total loading of 0.5 percent by weight, a target real permittivity value can be obtained between 70 and 3. This has particular use for designing materials for microwave lenses, microstrips, filters, resonators, high-strength/low-weight electromagnetic interference (EMI) shielding, antennas, waveguides, and low-loss magneto-dielectric products for applications like radome construction.

(Source:

<http://www.techbriefs.com/component/content/article/15085>)

SIMULATING HOW INCIDENTS ARE SOLVED IN AN IT COMPANY

Alexandru Rădulescu, Robert Vizitiu

University "POLITEHNICA" Bucharest, ROMANIA
E-mail: varrav2000@yahoo.com

REZUMAT

Domeniul de analiză al acestei lucrări îl reprezintă modelarea și simularea fluxului de rezolvare a incidentelor în cadrul unei firme IT folosind softul Arena. În prezent datorită exploziei tehnologice firmele IT reprezintă o investiție sigură și profitabilă. Lucrarea își propune o analiză asupra unei zi normale de lucru și a modalității în care sunt tratate incidentele survenite.

ABSTRACT

The purpose of analysis for this paper is to model and simulate through a flow how incidents are solved in a IT company using Arena software. Today due to technology explosion IT companies represent a safe investment. This paper wants to review a normal business day and how all the incidents are handled.

CUVINTE CHEIE: software Arena, Flux, Incidente, modelare, simulare.

KEYWORDS: Arena software, Flow, Incidents, modelling, simulating

1. ARENA SOFTWARE

Arena is a discrete simulation software and automation systems developed by Rockwell Automation Modeling and purchased in 2000 [1]. It uses a processor Siman and a simulation language.

In the Arena, the user builds a model experiment by placing the modules (boxes of different shapes), which represent processes and have a certain logic. Connector lines are used to join these modules and to specify the flow of entities. While modules have specific actions against the entities, the exact representation of each module and entity objects from real life is subject to user imagination. Statistical data such as cycle time and WIP (work in process) levels can be recorded as reports.

Arena work together very well with Microsoft technologies. This includes Visual Basic for Applications, such models can be automatically converted if the simulation requires.

It also supports importing Microsoft Visio charts, and reading from or out of Excel spreadsheets and Access databases. Site ActiveX controls are also supported.

The program is designed primarily for beginners in simulation and serves as an introduction for the rest of the Arena family of products.

The program is most effective when considering business, services, or simple manufacturing processes or flows.

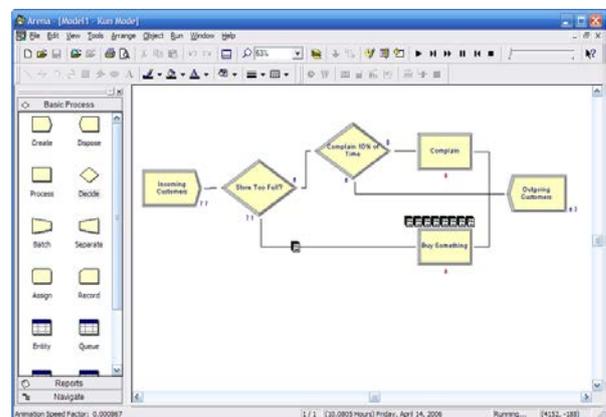


Fig.1. Working window for Arena

Arena simulation software has the ability to reduce costs, assess performance and optimize operations. His way of planning is shown.

Organizations worldwide are in a motion continues to rapidly adopt this process of modeling and simulation, as part of their business decision making and continuous improvement initiatives.

With wider acceptance for the simulation, consumers are demanding and want a series of tools to support wide applications, scale to fit different needs through the project life cycle, and integrate the modeling at the same time with corporate database systems.

For any business environment, from the customer service to production or medical services can benefit from simulation. Whether you want analysis of existing supply chain or an emergency, you can do so by following five simple steps Arena:

- *Creating a basic model.* Arena provides an intuitive, flowchart-style to build a model "as is" of your process. Simply drag the Arena modules forms of organization in the model window and connect them to define the process flow.
- *Refining the model.* Add real data (eg process times, resource requirements, personnel) for your model then double-click the module and add information on data forms already existing in Arena. To create a new realistic image of your system, replace icons that Arena automatically provides and supply your own graphics. (eg, from ClipArt or other drawing packages).
- *Simulation model.* Run simulation to verify that the model adequately reflects the current system. Identify bottlenecks and to communicate with others through its own dynamic animation graphics is comonly for arena.
- *Analyze simulation results.* Arena provides automated reports based on common decisions such as resource utilization and waiting time. The program builds statistical reports for you so to reflect what is important and necessary in your decision.

Select the best alternative You can make changes to your model to capture the scenarios that you want to investigate, then compare results to find the best "to be" solution.

To build models in Arena will be used primarily for modeling forms called modules that are found in the panel named processes.

It contains two types of modules:

- Flowchart form modules that are placed in model window and form a flowchart describing your logic.

- Modules that are not placed on the model window, instead they are edited via a spreadsheet-type computer interface.

2. PRESENT THE SIMULATION

Arena simulation software through this activity to a normal working day begins at 9:00 and ends up at 17:30, normal hours of work for about 90% of customers that the company will have.

Times of resolution for each incident occurred is an averages of several studies and from my experience. Problem escalation times are based on an average performance SLA's agreed between the customer and the frequency with which problems occur.

As the workflow was described to resolve the incident takes place on three levels depending on the severity of the incident. For very serious incidents that can not be solved by engineers level 3, most trained and experienced, we will turn to specialized external consultants who only deals with incidents of that type or the company that provides application, equipment or solution that caused the incident. These incidents will not share so high availability however, share a pessimistic way, would be 1% of reported incidents in one day, an incident in 2-3 days.

Simulation of developing activities will be presented in the form of two different streams which will meet in one in final portion. This is necessary because there are 2 types of incidents reported, incidents related to the networking and monitoring infrastructure installed at client and incidents related to monitoring servers and applications running.

Incident escalation software to external consultants will be the responsibility of level 3 engineers and project manager and escalate hardware incidents will be the responsibility of level 1 engineers after consultation with level 2 engineers to hardware providers.

In Figure 2.2 is presented one of the two streams of resolving incidents as it appears in the window of modeling and simulation.

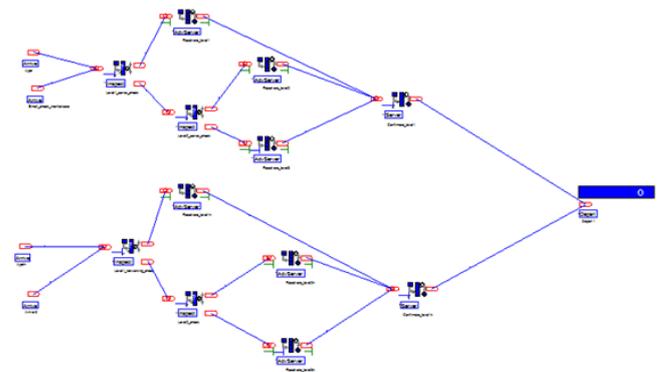


Fig.2. Flow incident resolution

Elements in figure 2 are actually blocks that you can just double click on it and opens, this way the necessary data can be insert and we can obtain results as complete as possible.

Figure 3 shows the block used to simulate the process of checking a level 2 incident and send it to resolve or escalate to the next level.

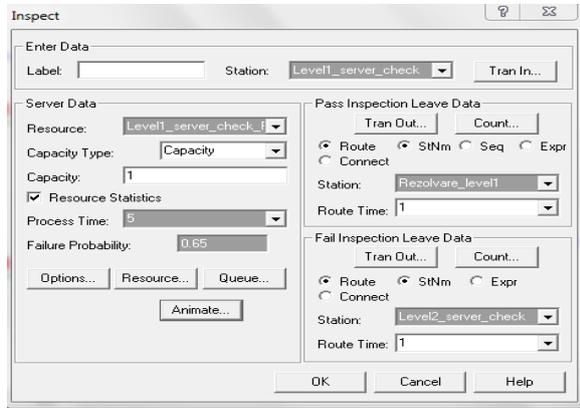


Fig.3. Window for decision modelling

In decision block of Figure 3 we have as elements the time spent by an engineer level 2 to verify the incident which he is reported, the probability that he can resolve the incident, the probability that the incident will be escalated and how long will take until the incident comes to resolution or escalation.

To achieve a more comprehensive simulations and to provide the most accurate results we introduced certain conditions to provide results after a certain number of hours or number of incidents reported for each area or globally.

To address these constraints we used blocks of "Statistics", "Queues", "Variables", "Sets" and "Animated".

a)Statistics

Blocks of this type allow us to set a number of incidents entered into the system, which once was atelins simulation stops and presents the results so far. It is useful to calculate a share of incidents and out of the system entered a period of time.

b)Queues

Blocks of this type are used for real-time graphical views of queues that form from a block and the number of incidents to be resolved without having to wait the end of simulation. For simulation were chosen four blocks where will be represented the resource, which is expected to be the largest load and that is: level 1 incidents handled by engineers for servers and networking and level 2 incidents handled by engineers for servers and networking.

c)Variables

This block is used only to show graphics, digital number of incidents resolved.

d)Sets

Block of this type is used to define sets of pictures, pictures that change the output of each block and depending on destination.

e)Animate

By using this kind of block we can view graphics for certain stations as resource load chart evolves and when the resource is busy or free.

3. SIMULATION RESULTS

According to economic thinking for solving flow incident to be as reliable and fast as possible while solving for customer satisfaction will have to keep in mind these elements after simulation: maximum time spent by an incident to be resolved, the maximum number of incidents waiting to be solved to a certain level and the difference between the number of incidents reported during the day and incidents resolved at the end of the day.

Indicator that shows the actual flow solution if covered incidents function as is the number of incidents resolved than the number of incidents reported, percentage should be 100%.

In Table 1 we have presented the results for the maximum number of incidents solved. As it can be seen there is a single resource in the system where we find six incidents waiting to be solved.

Table 1. Results for the maximum number of incidents solved

Number of incidents waiting	Average	Min.	Max.
Apel_Over_Q	0	0	0
Apeln_Over_Q	0	0	0
Confirmare_level1_R_Q	0.045	0	2
Confirmare_level1n_R_Q	0.01	0	1
Level1_networking_check_R_Q	0.0083	0	1
Level1_server_check_R_Q	0	0	0
Level2_check_R_Q	0	0	0
Level2_server_check_R_Q	0	0	0
Solve_level1_R_Q	0.033	0	1
Solve_level1n_R_Q	0.041	0	1
Solve_level2_R_Q	1.85	0	6
Solve_level2n_R_Q	0.21	0	2
Solve_level3_R_Q	0.031	0	1
Solve_level3n_R_Q	0.081	0	1

Using constraints from the block of "Statistics" we can see that for a total of 40 incidents reported we have solved 32.

As for waiting for resolution of incidents we have one loaded area, the level 2 engineer who deals with resolving incidents relating to the operation of servers.

This can be solved in a simple manner by adding another engineer to handle such events. This solution would be too expensive for this reason we should be able to adopt a solution that is less expensive which is escalating a greater number of incidents to the engineer level 3.

This solution would avoid hiring an engineer and would still allow for better resolution and better feedback from customers.

4. CONCLUSIONS

In the paper presented we attempt for a more complete analysis of this flow of resolving incidents and the presentation made by simulating a more comprehensive picture of the opportunities the company has to meet the SLA's established customers and to evolve and develop.

Simulation can predict whether employees can handle work under pressure and to deadlines established pursuant to a contractual SLA.

By developing this work we could conclude the following:

- Incidents reported by its customers will be resolved in a professional breeder only internally with no need to resort to external consultants only in very rare cases.
- solving flow stratified by 3 levels lead to good study as the incident actually reach the level 3 is half solved because the documentation prepared by Level1 and level 2 who took the initial incident.
- From the reporting of incidents to the resolution there is maximum 60 minutes, an incident that is resolved by level 3, incidents are resolved at the rate of about 80% from those reported during the working day, the remaining 20% being resolved by engineers who arrive in the second exchange.
- Resolve the incident by the level 2 or level 3 is confirmed with a client by the engineer level 1, which leads to a greater degree of satisfaction regarding the services offered by the company.

The flow of solution is properly implemented and executed as confirmed by simulation results that I made it using the software Arena.

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Quick Info

Extended Testability Analysis Tool

The Extended Testability Analysis (ETA) Tool is a software application that supports fault management (FM) by performing testability analyses on the fault propagation model of a given system. Fault management includes the prevention of faults through robust design margins and quality assurance methods, or the mitigation of system failures. Fault management requires an understanding of the system design and operation, potential failure mechanisms within the system, and the propagation of those potential failures through the system.

(Source:

<http://www.techbriefs.com/component/content/article/15255>)

pyam: Python implementation of YaM

pyam is a software development framework with tools for facilitating the rapid development of software in a concurrent software development environment. pyam provides solutions for development challenges associated with software reuse, managing multiple software configurations, developing software product lines, and multiple platform development and build management. pyam uses release-early, release-often development cycles to allow developers to integrate their changes incrementally into the system on a continual basis. It facilitates the creation and merging of branches to support the isolated development of immature software to avoid impacting the stability of the development effort. It uses modules and packages to organize and share software across multiple software products, and uses the concepts of link and work modules to reduce sandbox setup times even when the codebase is large. One side-benefit is the enforcement of a strong module-level encapsulation of a module's functionality and interface. This increases design transparency, system stability, and software reuse.

(Source :

<http://www.techbriefs.com/component/content/article/15261>)

ROMANIAN OVERVIEW CONCERNING THE HEALTHY LEARNING ENVIRONMENT WITHIN SMES

Domnica Cotet*, Alina Irimia**

*S.C. ICTCM S.A., Bucharest, ROMANIA, **CIDAf, Bucharest, ROMANIA
E-mail: domnicab@yahoo.com

ABSTRACT:

This paper aims to present and analyze the current situation in Romania regarding the SMEs healthy learning environment, with a focus on Bucharest-Ilfov region. Starting from the premise that workplace learning activities within SMEs play an essential role in maintaining or introducing the skills, knowledge and abilities needed to succeed, adapt and being competitive in a constantly changing environment, we looked at the current trend of formal and informal training and other learning activities within SMEs at regional and national level, comparing the situation to the European area.

In our research we took into account studies previously undertaken by the ministries, national and European institutions, OECD reports and the Romanian White Cart of SMEs.

REZUMAT:

Această lucrare își propune să prezinte și să analizeze situația actuală din România în ceea ce privește mediul de învățare sănătos al IMM-urilor, cu accent pe regiunea București-Ilfov. Pornind de la premiza că activitățile de la locul de muncă privind învățarea, din cadrul IMM-urilor, joacă un rol esențial în menținerea sau introducerea abilităților, cunoștințelor și deprinderilor necesare pentru a reuși, pentru a se adapta și pentru a fi competitiv într-un mediu în continuă schimbare, s-a analizat tendința actuală de instruire formală și informală, precum și alte activități de învățare în cadrul IMM-urilor la nivel regional și național, comparând situația în spațiul european.

În cercetarea noastră s-au luat în considerare studiile întreprinse anterior de către ministere, instituții naționale și europene, rapoartele OECD și Cartea Albă a IMM-urilor.

KEY WORDS: SMEs, healthy learning environment, formal and informal training

CUVINTE CHEIE: IMM-uri, mediu de învățare sănătos, instruire formală și informală

1. INTRODUCTION TO THE REGIONAL SITUATION REGARDING HEALTHY LEARNING IN SMES

The paper looks at the value and the trend of investing in workplace healthy learning and training practices in Small and Medium-sized Enterprises (SMEs) in Romania.

Through a research carried out at a regional level (Bucharest area), the report also looks at the impacts and outcomes that SMEs' learning programmes have on individual learners and organizational performance.

Worldwide, SMEs represent over 95% of all enterprises, and, at European level, SMEs represent 99% from all enterprises, drawing up the main human resource agglomeration. While it is generally accepted that SMEs are important contributors to the domestic economy, not many governments have framed policies to enhance their contribution or increase their competitiveness.

The number of SMEs in Romania, in 2010-2011, reached a total of 523.501. As can be seen in the graphs bellow, compared to Europe, there's a growing trend with regards to the number of SMEs and their rate of employment, in Romania.

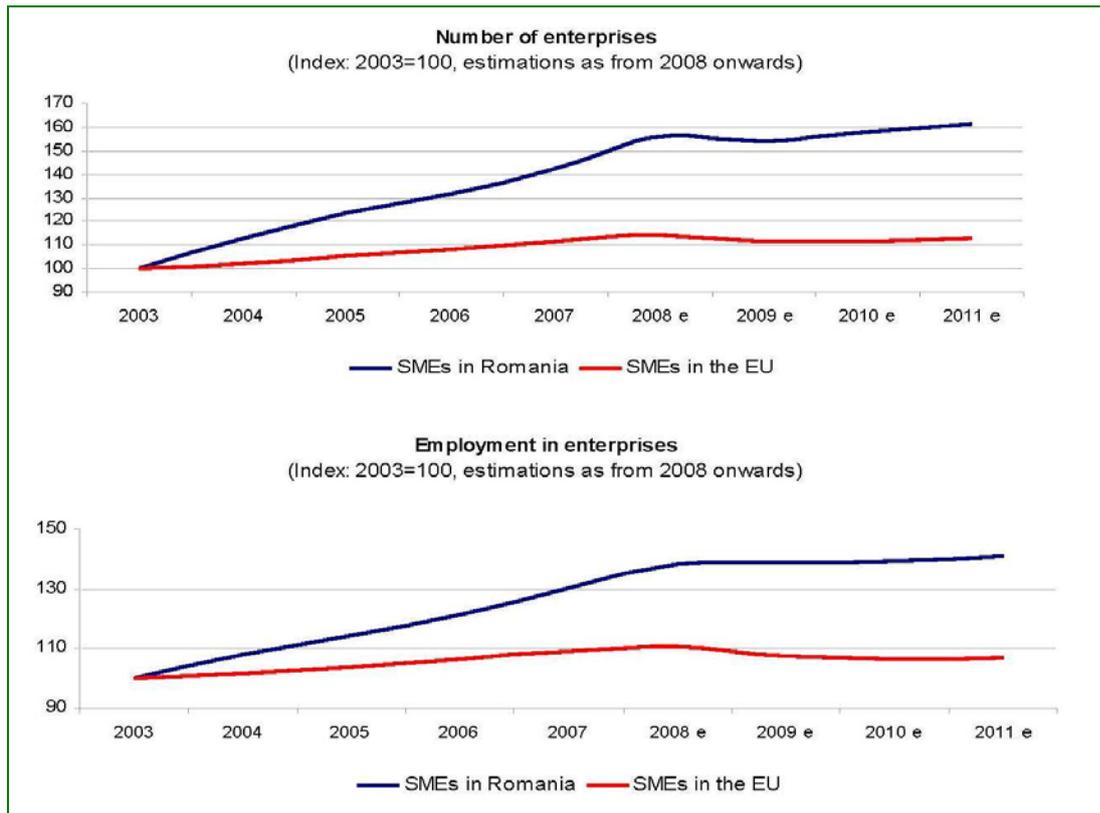


Figure 1. SMEs trends in Romania, compared to the European area

(source: European Commission - DG Enterprise and Industry – SBA Romania fact sheet, [1])

Concentration of enterprises differs according to the development regions. The region Bucharest-Ilfov, with 144,018 companies, has the largest density, approximately 23.33% from the total number. The Bucharest-Ilfov region is over the national average by 1.87 times (being 3.1 times higher than the South-West region).

The territorial distribution of SMEs generally reflects the discrepancies in terms of region size and economic development level but also reveals facts describing the specific conditions of the SME sector development.

Workplace learning activities within SMEs play an important role in maintaining or introducing the skills, knowledge and abilities needed to succeed, adapt and being competitive in a constantly changing environment.

Worldwide, more than ever, knowledge is accepted as one of the main sources of competitive advantage. World Investment Report 2002 states:

“If developing countries and economies in transition are to strengthen competitiveness (...), they will have to strengthen their capabilities, attract and stimulate activities suited to their endowments, and upgrade them over time”, [2].

To create a competitive advantage, SMEs need to be able to learn faster than their competitors and also develop a customer responsive culture.

Chris Argyris explored the concept of organizational learning and its impact on a company's growth, effectiveness and adaptability. Argyris's theories focused on single- and double-loop learning, the immaturity/maturity continuum, organizational communication and the effects of each of these on employee motivation, accountability and empowerment, [3].

Argyris identified that in light of these pressures, modern organizations need to maintain knowledge about new products and processes, understand what is happening in the external environment and produce creative using the knowledge and skills of all employed within the organization. This requires co-operation between individuals and groups, free and reliable communication, and a culture of trust.

2. FORMAL VS. INFORMAL TRAINING IN SMES

The first clarification needed is one upon the operational difference in Romanian public and organizational culture, and legislation between the

forms of training activities (except the educational system):

- *One acceptance* refers to a professional development programme for acquiring a new legal qualification, being in no uncertain terms related to the national index of occupations. Therefore, the programme itself needs to follow legal procedures of accreditation;
- *Another meaning* refers to programmes of personnel training, not related to occupations but rather specialization in the field of activity. Still, for the sake of formal benefits (i.e. diplomas, certificates, credits etc.) these programmes also need to follow strict legalization procedures.

The major effect of this standardization of training activities can be seen both at the systemic level – where the national and regional authorities tend to channel their efforts in perfecting standards and methodological norms –, and at the organizational level – where you have institutions that are either specializing in providing accredited training programmes or applying for their own programmes accreditation.

- *A looser conception* of training activities (in terms of legal enforcement) refers to thematic learning or mutual learning activities organized in different forms from quasi formal seminars to conferences` sessions and breach meetings. This variety of activities is of low general interest due to the narrow thematic areas, while their informality could make them uninteresting for certain divisions (labeled “invaluable”).

It is necessary a significant clarification regarding the Romanian national and regional practice in the field of training activities:

- The policy makers involved with the subject are putting their efforts in setting up occupational standards, registries of authorized training providers, evaluation and accreditation centers, studies on the outcomes of these priorities, lacking coherent policies and instruments for fostering learning activities at the workplace and alternate training solutions.
- There is an increase in the number of companies specializing in providing accredited training programmes and also in the number of programmes.
- The big companies have different strategic practices than the SMEs and are not relevant for this study.
- The actions financed especially through European funds (various schemes of the European Social Fund) are a new growing practice of organizing training activities. These can be certified or informal, broad or specific, but the major inconvenient is that in many cases they might tend to spend quality over complying with restricting contractual terms – that define the training as an activity of a broader project to implement.

In this context, the in-house training activities of SMEs are not a top priority/ activity, in terms of public policy and organizational culture.

A main disadvantage is that the SMEs are not encouraged to, or assisted in developing learning environments. The Romanian organizational environment has not taken exception from the global trend of orientation towards knowledge, but the limited strategic options determines this tendency to manifest unsystematically, and especially in the informal plan.

According to the Romanian White Chart of SMEs 2011, the analysis of the situation regarding activities of skill development and training activities reveals the following, [4]:

- Over 60% of the companies haven't organized training activities during the last year;
- Almost 25% of SMEs have dedicated 1-5 days/employee for training, and 7,87% of the firms have allocated 6-10 days training;
- 6,16% of the enterprises have organized over 10 days skills development programs;
- The frequencies of the training activities over 10 days/employee are higher for the firms that are on the market for 5-10 years (6,82%), the firms in the South-East region (12,88%), medium-size enterprises (11,34%), stock companies (12,90%), the units which offer services (13,04%), and companies managed by persons with superior studies (7,76%);
- The average percentage of training offer from the turnover is 3,34% per firm and has higher rates within start-up companies (4,65%), medium-size enterprises (4,23%), firms from the commercial sector (5,01%) and companies from the South-West region (16,54%);
- The medium rate of the employees which benefitted of training is 28,74% and higher within the start-up companies (32,06%), economic agents from South-West (37,18%), small size enterprises (33,30%) and services companies (45,79%).

As it is pointed out in the research from the SBA Factual Sheet of the European Commission, in order to compare Romania to the European area, with regards to skills / training and innovation aspects, we can look at the following parameters in terms of percentages (% of SMEs), [5]:

- SMEs innovating in-house (2008): Romania - 16,66%; EU-avg - 30,25%;
- Innovative SMEs collaborating with others (2008): Romania: 2,27%; EU-avg: 11,16%;
- SMEs participating in EU funded research - number per 100.000 SMEs (2010): Romania - 5,68; EU-avg - 20,95;
- SMEs selling online (2010): Romania - 6%; EU-avg - 13%;
- SMEs purchasing online (2010): Romania - 7%; EU-avg - 28%;
- Training enterprises (% of all enterprises), 2005: Romania - 40%; EU-avg - 58,48%;

- Employees' participation rate in education and training (% of total no of employees in microfirms), 2009: Romania - 2,1%; EU-avg - 12,62%;
- Sales of new to market and new to firm innovations (% of turnover), 2008: Romania - 14,87%; EU-avg - 13,26%.

Romania is clearly lagging behind - all but one of the core indicators pertaining to innovation are below the EU average. Romanian SMEs are less likely to introduce innovations, to collaborate with each other or to innovate in-house. Yet the firms that do innovate are more successful than their EU peers in turning these new products and processes into sales revenue.

In the area of education the only indicator where Romania is ahead of the EU average is the share of SME staff with tertiary education.

The two indicators measuring training and skills development show similar results: the proportion of enterprises providing vocational training to their employees is below the EU average (40 % vs. 58 %), and Romanian micro firms are even less inclined to ensure that their employees participate in lifelong learning activities than their peers in other EU countries.

On the policy front, to support the improvement of young people's skills in craft industries, the amendment of the legislation on workplace apprenticeships was finalized and submitted for Parliamentary approval, to remove barriers created by the former law.

As far as it concerns the Bucharest region, our research points out that the region, which has the highest agglomeration of SMEs, seems to be more oriented to creating a sustainable learning environment through trainings and other activities, compared to the general situation in Romania.

This can be explained of course by the higher rates of economic development and competitiveness characterizing this region, which increase the need of constantly improving skills, retraining and preparing workers to compete effectively in the constantly changing environment.

3. REGIONAL BODIES SUPPORTING TRAINING ACTIVITIES FOR SMES

The Romanian authorities are increasing the support given to the SME sector, in recognition of the growing importance of SMEs to the national economy. This political support is manifested in developments such as:

- a. The creation of a Ministry for SMEs and Cooperatives (MSMEC) specifically in charge of coordinating and implementing SME policy and strategy;
- b. The development of a national network of "one-stop-shops" for the registration of new firms;

- c. The development of a Task Force with a wide-ranging agenda for simplifying the regulatory environment for business.

A variety of business advice services and training programmes are provided by a range of national organizations in Romania, in order for entrepreneurs, potential entrepreneurs or business managers to promote start-ups and assist growing SMEs. Bodies offering services such as consultancy and information include the Chamber of Commerce and Industry and its regional network and the National Association for Private SMEs, also with a regional structure offering services, mainly to members.

A wide range of Business Support Centre (BSC) networks are worth highlighting, such as:

- The United Nations Development Programme (UNDP) centres (<http://www.undp.ro/>);
- The Development Centre for Small and Medium Sized Enterprises Maramures CDIMM (<http://www.cdimm.org/>);
- The United States Agency for International Development (USAID) centres;
- Department for International Development (DFID) centres;
- The Romanian-German Foundation for Professional Training, Center for Preparing and Perfecting in Domain of Construction (423 Organizing Courses, 5472 Participants - 1762 Unemployed Students, 90% in work placed graduates, 5 from graduates created Enterprises); www.frgtim.ro;
- ROMITA Foundation;
- Euro Information Centres;
- Regional Development Associations (focusing mainly on regional development, but with a strong SME remit) etc.

Six business incubators (BI) are currently active in Romania [8]. These are organizations with local or regional partnership structure, which offers different services to the SMEs, in advantageous conditions, especially for the introduction of innovative processes in the industries. The BIs contribute, through the resources allocated and through the stimulation of innovative initiatives, to the creation of new jobs and to the diversification of the activities. In Bucharest, the active business incubator is CITAf (Technology and Business Incubator Center) [6].

The aim of CITAf is to support private sector development through innovation and technology transfer. The main activities are: incubating SMEs by renting space and equipment; initiate and implement projects in the frame of the national and European programmes; services offered to the entrepreneurs: consultancy and training; - developing and interactive system for entrepreneurial spirit development.

There is a large number of business consultancy, training organizations,

legal/accounting firms and other types of private sector firms providing services to SMEs on a fully commercial basis.

Many Business Support Centres have been set up with donor support and have received substantial training and other input, however, they have been unable to secure financial sustainability through income generation. They will either simply terminate their activities or increasingly respond to the necessity to survive by providing services to enterprises willing and able to pay for training and other consultancy services, mainly large firms and international companies. From a peak of about 120 such organizations, only about 40 continue to operate as originally conceived, implying that they will find it increasingly difficult to maintain their original mission, which is to support the SME sector and start-ups.

MSMEC intends to select a network of accredited Business Support Centres to provide training and consultancy to SMEs on dealing with issues such as preparation of business plans and undertaking market studies, although the budget available for this task is limited.

Other institutions offering training courses, consultancy services and information to private entrepreneurs: National Council for SME Private Enterprises in Romania (National Council), Ministry of Labor, Family and Social Protection, CNFPA – The National Council for Adult Education and training.

4. REGIONAL AND LOCAL INITIATIVES FOR IN-HOUSE TRAINING

National Strategic Reference Framework (NSRF) [10] represents the framework to promoting investments in human resources. The strategy's priorities is to create opportunities for workers to be able to adapt more easily to changing circumstances. The NSRF defines in broad terms how Romania, will use its allocation of €19.21 billion of EU resources to achieve its objectives of promoting economic growth, job creation, strengthening human capital and ensuring balanced and harmonious development including the reduction of regional disparities.

The priorities of the NSRF are implemented through several operational programmes, receiving funding from European Regional Development Fund (ERDF) and European Social Fund (ESF). These programmes, among other things, help small businesses to find the finance, advice and technical infrastructure they need to grow, and focus on human resources development and the improvement of administrative capacity.

In this context, the most prevalent initiatives of training and skills development can be found in the projects developed for the SMEs sector; as, for example: VETBA (Vocational Education and Training

For Business Advisors/ "Educatie si formare vocationala pentru consultantii in afaceri"), [7].

IN-CLASS (International Communication and Language Assessment – is promoted by EuroEd Foundation of Romania under the Life Long Learning programme of the European Commission, directed towards the vocational sector and more specifically Small and Medium sized Enterprises in the European Union, [8].

EuroEd Foundation (RO) offers services within Education - education-oriented projects, lifelong learning, community integration, local, regional, national and international educational partnerships, [9].

IN-CLASS focuses on the gap of foreign language skills and the need for improving the understanding of intercultural differences in the European member states. Researches follow in the wake of the ELAN study (Effects on the European Economy of Shortages of Foreign Language Skills in Enterprise), which confirmed an identified loss of a minimum of 11% of the cross-border trading SME sector (with Romania as high as 23.3%). ELAN also showed a clear deficiency in business awareness concerning the links between multi-lingual company websites and improved export trade - 52% of Romanian exporters do not adapt their web sites for foreign markets.

5. NATIONAL LEGISLATION RELATED TO IN-HOUSE TRAINING OF SMES AND HEALTHY WORK ENVIRONMENT

In Romania, the SMEs definition is stipulated by the Law no. 346/2004 on stimulating the creation and development of SMEs, published in the Romanian Official Gazette, Part I, no. 681 of July 29, 2004, with subsequent amendments (Ordinance no. 27/26 January 2006). As also officially defined at the European level, an enterprise is considered to be a SME if it fulfills the criteria regarding: the number of employees (maximum 250), turnover (must not exceed €50 million) and annual balance sheet (must not exceed €43 million). SMEs may be divided into three categories according to their size: micro-enterprises having fewer than 10 employees, small enterprises have between 10 and 49 employees, and medium-sized enterprises having between 50 and 249 employees.

Today, European policy in relation to SMEs is mainly concentrated in five priority areas:

- promotion of entrepreneurship and skills;
- improvement of SMEs' access to markets;
- cutting red tape;
- improving the growth potential of SMEs.

With the exigencies of the European integration in mind, the Government of Romania launched in August 2004 the Governmental Strategy for Supporting the SME Sector in 2004 – 2008, focusing on five main priorities, namely:

- creation of a business environment favorable to SME start-up and development;
- the SME competitive capacity development;
- improvement of access of SMEs to financing sources;
- improvement of access of SMEs to external markets.

Each of these priorities is accompanied by corresponding action plans and measures. For example, the Action Plan established the main following measures:

- support for innovation and improving the access of SMEs to new technologies;
- support for implementing quality standards and quality management systems;
- e-business promotion;
- facilitating access to the available assets of the state firms and public acquisitions;
- improving access to information services;
- support to business incubators for productive activities and high value added services;
- support for industrial and technological parks;
- reducing the economic disparities at regional level by concentrating on SMEs in the selected support areas.

The main legal instrument at national level, in the field of skills development, is the Labor Law no53/ 2003 (The Romanian Labor Code) [11], modified and complemented by Law 40/ 2011. It contains an entire section on vocational training of the employees. Article 189 insures that the employee's vocational training shall be achieved through the following forms:

- a) participation in courses organized by the employer or by the providers of vocational training services in Romania or abroad;
- b) periods of vocational adjustment to the requirements of the position or work place;
- c) periods of practice and specialization in Romania and abroad;
- d) on-the-job apprenticeship;
- e) individual training;
- f) other training forms agreed upon by the employer and the employee.
- g) provides that employees who benefit from occupational training, initiated and paid for by employers, may not terminate their individual labor agreements for a period of time established based on an addendum.

Regarding the health and safety at the work place, the following regulation protects and guides the working environment:

- Romanian Labor Code, Title V – Health and safety at work (art. 171-187);
- The Law for Labor Protection, no. 90/1996;
- General Norms for Labor Protection, Edition 2002;
- The Law no. 100/1998, regarding the public health assistance, published in the Romanian Official Journal no.204/1 June 1998;
- The Ministry of Health Order no. 803 for approval of the exposure indicators and/or biological effect which are relevant for the specific body response to the risks factors for occupational diseases, published in the Romanian Official Journal no. 811/18 December 2001
- The Law no.346/2002, regarding the insurance for occupational accidents and diseases, published in the Romanian Official Journal no.454 din 27 June 2002.

6. CONCLUSIONS

All presented instruments and new ideas have the purpose to increase SMEs competitiveness, by analyzing the objectives to fulfill, in connection with the capacity to develop new products and innovative services, the quality of the products, access to new markets and the capacity to generate new jobs.

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ROMANIAN OVERVIEW CONCERNING THE HEALTHY LEARNING ENVIRONMENT IN THE PLANNING OF IN-HOUSE TRAINING ACTIVITIES IN SMEs

Domnica Cotet*, Alina Irimia**

*S.C. ICTCM S.A., Bucharest, ROMANIA, **CIDAf, Bucharest, ROMANIA
E-mail: domnicab@yahoo.com

ABSTRACT:

Workplace culture is a powerful tool for managers, a lodestar for employees and a source of success for companies. Organizational structure, knowledge acquisition, application and protection of knowledge are significantly related to organizational performance, technology, organizational culture and knowledge conversion as having a significant impact.

The quality of training and developing new skills of labor force are important competitive factors. With respect to the lifelong learning and skills development, the training offers focuses especially on programs for gaining general skills (foreign languages, computer skills, accounting, etc.).

REZUMAT:

Cultura locului de muncă este un instrument puternic pentru manageri, un principiu călăuzitor pentru angajați și o sursă de succes pentru companii. Structura organizatorică, cunoașterea, achiziționarea, aplicarea și protecția cunoștințelor sunt semnificativ legate de performanța organizațională, de tehnologia, cultura organizațională și de modul de conversie a cunoștințelor, având un impact semnificativ.

Calitatea formării și dezvoltării de noi competențe ale forței de muncă sunt factori importanți competitivi. În ceea ce privește învățarea pe tot parcursul vieții și dezvoltarea competențelor, formarea oferă concentrare în special pe programe pentru dobândirea deprinderilor generale (limbi străine, competențe de calculator, contabilitate, etc.).

KEY WORDS: SMEs, healthy learning environment, workplace culture, in-house training

CUVINTE CHEIE: IMM-uri, mediu de învățare sănătos, cultura la locul de muncă, formare "in-house" (internă)

1. THE REGIONAL WORKPLACE CULTURE

Workplace culture is a powerful tool for managers, a lodestar for employees and a source of success for companies.

The workplace culture, being about all the people involved in the working environment of the enterprise, intermediates the creation and sharing of knowledge. Knowledge is know-how, expertise, tradecrafts, skills, ideas, intuitions, and insights [1].

Authors state that knowledge is created, shared, transferred, and applied via people-based mechanisms. These refer to the use of face-to-face meetings, apprenticeship training methods, observations etc. In this way, knowledge generated is immediately put into practice, rather than being stored in some obscure technology artifact, like a database.

This helps in immediate institutionalization of the insight and the improvement of work practices.

Organizational structure, knowledge acquisition, application and protection of knowledge are significantly related to organizational performance, technology, organizational culture and knowledge conversion as having a significant impact [2].

Given that the company is moving rapidly towards knowledge-based economy and organization, it is important to consider the extent to which companies and/or decision makers of SMEs are familiar with such concepts. In this regard, a study on SMEs in Romania revealed that only 43.15% of SMEs knows the concept of knowledge-based business [3].

To ensure feasibility of organizational learning projects in the Romanian context requires joint efforts of the information technology together with an adequate managerial and educational support. In this context, at national level, the following are very important:

(1) Form and train the necessary professionals with skills in the knowledge-based management and related fields;

(2) Official recognition of new professions and occupations related with the knowledge-based management and organizations.

Knowledge-based management requires both in Romania and internationally, the presence of intelligent organizations, with advanced management capabilities of their collective skills, as sources of performance [4].

The situation of training and learning in Romania is lagging compared to other European countries, but, generally there is an increasing trend in this direction, sustained by the entrance on the Romanian market of several international consultancy and recruitment firms.

Regional study involved SMEs from the following domains: professional, scientific and technical (70%), administrative, support and services (10%), other (20%).

During research, all of the interviewed employers said they offer some kind of internal or external training to their employees and according to their answers, 60% of them organize training sessions once a year, within the company. This percentage is emphasized by the 58.8% of the employees interviewed, who stated that the company offer trainings once a year or often.

The informal know-how transfer sessions within the company, based on the answers of the employers, reaches a frequency per month of 70%.

On the other hand, only 35.3% of the employee's answers state the same thing. This shows the need of the management to improve communication with the employees and continue developing in-house learning activities, methods and tools.

This can be translated into the acknowledgement of the importance to collect data from the environment and the interest for innovative information technologies.

Although most of the firms do not collect external data on a regular basis, the entrepreneurs are aware of the importance of the new communication

and information technologies to the development of the firm.

In terms of Planning and Strategy the study shows that 90% of the interviewed employers state the company has a strategic plan, but SMEs from Romania are still in an incipient stage.

A previous research undertaken during February and March 2009 on a sample of 200 respondents from different regions of the country [5] indicate a high potential for SMEs development in Romania.

The study specifies that planning is used in 45.5% of the cases, but a career plan for employees exists in only 18% of the firms and there is a small linkage of the human resources recruiting strategy to organizational objectives [5].

By their nature (with reduce dimensions and small number of employees), SMEs have a less rigid business work frame, and compared to the large companies, the management of the SMEs is in these conditions is mainly intuitive, does not apply the rules and rigors found in large companies.

2. RELEVANCE OF HEALTHY LEARNING ENVIRONMENT IN THE PLANNING OF IN-HOUSE TRAINING ACTIVITIES IN SMES

Data across OECD countries show that small to medium sized enterprises (SMEs) participate 50% less in training activities than large firms, with some systematic access gaps meaning that younger, better educated workers in high-skilled occupations (such as managers, professionals and technicians) have greater access to training opportunities than the less-educated ones [6].

The quality of training and developing new skills of labor force are important competitive factors.

From the education point of view, there's been a permanent growth of the active population with secondary studies in Romania, higher than in many European countries.

With regards to the active population with superior studies, there's a growing trend (from 1 million in 2000 to 1,53 millions in 2009); but, unfortunately, compared to the countries in the European Union (with an average of 21,9%), this weight is significantly low.

With respect to the lifelong learning and skills development, the training offers focuses especially on programs for gaining general skills (foreign languages, computer skills, accounting, etc.).

The percentage of those that attend training for specific skills (1,6%) is 6 times lower than in the European countries (9.9%) [7].

Examples of best practices

Two cases of best practices in Romanian SMEs environment derive from two projects financed by the Leonardo da Vinci Programme and are mentioned in the European Guide for Training in SMEs, which exposes the experience of good and successful practice in SMEs throughout Europe.

Those two offer good examples of methods and tools that can be used in order to improve access to vocational guidance and counseling by SME employees and to promote activities of inter-organizational non formal learning.

1. Project SME COUNSELLING - Development of a Front-Line Advice-Guidance-Counseling scheme for SME's' employees (<http://www.smeskills.com>; <http://www.smeprojects.ro>).

The project was financed by the Leonardo da Vinci Programme and took place during 2004-2006, under the coordination of Eco-metallurgical Researches and Surveying Center (ECOMET), Polytechnic University of Bucharest. 5 countries (Romania, Portugal, Italy, Netherlands, Poland) and 10 partners were involved.

The project's main aim was to improve access to vocational guidance and counseling by SME employees, in particular the ageing workforce, in order to foster the development of a learning culture within SMEs and to further stimulate demand for learning. The main target was to create "front-line" counselors in SMEs.

The success indicators of the project are:

- 15 trainees from partner organizations, retrained in order to transfer the acquired know-how and to disseminate the identified national best practices.
- 17 SMEs owners and/or managers included in the pilot training in Romania.
- A national survey identified more than 1,300 SME in Romania that are potentially interested.

The factors of success of the project are:

- Preliminary study with identification of workers' needs and best practices in this field.
- Internal "front-line" counselors who come from enterprises (SMEs): better proximity and confidence with a worker of the company than with an external counselor. This person knows the specific needs of the company, its organization, the employees, etc.
- Counselors trained to assume this new role, with a practical guide.
- Identification of SMEs potentially interested.

2. Project SME ACTor
<http://www.smeactor.eu>.

The project was implemented in the 2006-2008, the project leader being the Unimpresa Romania. Six European countries (RO, IT, DE, PL, SP, HU) covered different regions/areas characterized by potential and re-positioning SMEs aggregates.

The main objectives of the project were:

- Supporting facilitators/mediators of SME co-operation in the acquisition of the action learning techniques (for improving their competence in organizing co-operation between SMEs).
- Supporting and improving resource pooling in SME by promoting activities of inter-organizational non formal learning, networking and animation of local expert communities.
- Promotion of knowledge and learning processes through action learning (AL) (approach based on the assumption that people learn more effectively when working on real time problems occurring in their own settings).

The factors of success of this project are:

- The active learning philosophy and pedagogy, which is plural so as to meet all the issues and contexts in SMEs from different countries.
- Importance given to planning and decision-making processes.
- The role of facilitators (even sometimes e-facilitators), who are empowered to start networking projects (after a context analysis), to plan and moderate "learnshops".

Indicators of success of the project are:

- 61 participants of SME representatives in the Laboratories or "Learnshops".
- A growing awareness of the importance of planned communication for successful co-operation within and across companies.
- Co-operation building between the partners.
- Several functioning new SME networks.
- Publication of a collective book.

3. CONCLUSIONS

All presented instruments and new ideas have the purpose to increase SMEs competitiveness, by analyzing the objectives to fulfill, in connection with the capacity to develop new products and innovative services, the quality of the products, access to new markets and the capacity to generate new jobs.

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Quick Info

SOCIAL NETWORKING ADAPTED FOR DISTRIBUTED SCIENTIFIC COLLABORATION

Goddard Space Flight Center, Greenbelt, Maryland

Sci-Share provides scientists with a set of tools for e-mail, file sharing, and information transfer.

Sci-Share is a social networking site with novel, specially designed feature sets to enable simultaneous remote collaboration and sharing of large data sets among scientists. The site will include not only the standard features found on popular consumer-oriented social networking sites such as Facebook and Myspace, but also a number of powerful tools to extend its functionality to a science collaboration site.

(Source:
<http://www.techbriefs.com/component/content/article/14244>)

HIGH-PERFORMANCE, MULTI-NODE FILE COPIES AND CHECKSUMS FOR CLUSTERED FILE SYSTEMS

Ames Research Center, Moffett Field, California

Modern parallel file systems achieve high performance using a variety of techniques, such as striping files across multiple disks to increase aggregate I/O bandwidth and spreading disks across multiple servers to increase aggregate interconnect bandwidth. To achieve peak performance from such systems, it is typically necessary to utilize multiple concurrent readers/writers from multiple systems to overcome various singlesystem limitations, such as number of processors and network bandwidth. The standard cp and md5sum tools of GNU coreutils found on every modern Unix/Linux system, however, utilize a single execution thread on a single CPU core of a single system, and hence cannot take full advantage of the increased performance of clustered file systems.

(Source:
<http://www.techbriefs.com/component/content/article/13900>)

SECURE PEER-TO-PEER NETWORKS FOR SCIENTIFIC INFORMATION SHARING

Goddard Space Flight Center, Greenbelt, Maryland

This technique combines advantages of social networks with peer-to-peer file sharing.

The most common means of remote scientific collaboration today includes the trio of e-mail for electronic communication, FTP for file sharing, and personalized Web sites for dissemination of papers and research results. With the growth of broadband Internet, there has been a desire to share large files (movies, files, scientific data files) over the Internet. Email has limits on the size of files that can be attached and transmitted. FTP is often used to share large files, but this requires the user to set up an FTP site for which it is hard to set group privileges, it is not straightforward for everyone, and the content is not searchable.

(Source:
<http://www.techbriefs.com/component/content/article/13053>)

ASPECTS CONCERNING CONTINUOUS LEARNING IN ORGANIZATIONS

Alexandru Rădulescu*, Irina Rădulescu**

* University "POLITEHNICA" Bucharest, ROMANIA, **S.C. ICTCM S.A. Bucharest, ROMANIA
E-mail: varrav2000@yahoo.com

ABSTRACT:

Our society – as an ensemble – has great challenges in our world of change, concerning the way of working and the work organization. The most important “raw materials” of new economy are knowledge and innovative capacity. High speed or technological renovation and competitiveness requirements need a continuous bringing up to date of knowledge and the adoption of the life-long learning.

Continuous Learning is the ability to learn to learn and it is a way of being in the world. It has become quite prominent over the past five years, because organizations are changing rapidly and it's difficult to find any approach to doing anything in organizations that doesn't soon become outdated. The concept of continuous learning has become important because it places priority on noticing, adapting and learning from change. It is essential to find new ways of communicating and working for individuals and organizations, in order to confront and solve problems.

It is critically important to integrate ideas and information - drawing from the wisdom of the past and combining it with new findings drawn from studies in human and organizational development, from science and technology, and from the rapidly changing history of our own times.

KEY WORDS: Life-long Learning, Creative Learning, Creative Problem Solving, Continuous Learning, Learning Organization

1. INTRODUCTION

Our society – as an ensemble – has great challenges in our world of change, concerning the way of working and the work organization.

Work is considered as commitment task, their specific models for the new economy are characterized by flexibility, mobility and polyvalence of competences and abilities. The reality of life and the continuous change brings information as the principal resource of new economy and it is considered as core the informational technologies and the advanced communications (ITC), having Internet as motor.

The most important “raw materials” of new economy are knowledge and innovative capacity.

High speed or technological renovation and competitiveness requirements need a continuous bringing up to date of knowledge and the adoption of the life-long learning, as a new concept [1].

Statistics say that every 5 years we have obsolescence and we need new training; abilities life media of a worker is about 3,5 years. It is obvious that people must rehash their knowledge and new information and communication technologies offer new education and training forms – training at distance, virtual university, e- learning.

2. ABOUT CREATIVE LEARNING AND CREATIVE PROBLEM SOLVING

Businesses, whether for-profit and nonprofit, are facing change like never before. Numerous driving forces to this change included a rapidly expanding marketplace (globalization), and increasing competition, diversity among consumers, and availability to new forms of technology.

Creativity and innovation are often key to the success of a business, particularly when strategizing during strategic planning, and when designing new products and services.

Creative thinking and innovation are particularly useful during Strategic Planning (when strategizing) and in Product and Service Management (when designing new products and services.)

There are specialized centers, as the Center for Creative Learning from Sarasota, Florida, which focuses on the exciting challenges and possibilities of productive thinking, creative thinking, critical thinking, problem solving, and decision making.

Their approach, Creative Problem Solving (CPS), provides a powerful set of tools to help people of all ages in their efforts to manage change and solve problems. It has a long history of successful use, building on more than five decades of theory, research and practice and it is currently being applied in corporations, schools and other organizations throughout the world.

Creative Learning and its developed Creative Problem Solving are flexible, but structured, frameworks that can be used by individuals or groups to deal with tasks (opportunities, challenges, or concerns) that are important, complex, and ambiguous, and that call for many, varied, or new solutions or courses of action. CPS is especially well-suited for dealing with tasks for which there are obvious, "ready-made" solutions or courses of action are not available.

The base of Creative Problem Solving includes three process components: Understanding the Challenge, Generating Ideas, and Preparing for Action.

Understanding the Challenge has as purpose to clarify a broad goal or challenge, to set the principal direction for problem solving efforts, and to define a specific problem on which to work.

First stage of first component is Constructing Opportunities, which involve establishing a constructive goal for the work, and considering an opportunity statement that is broad, brief, and beneficial. Another stage is about Exploring Data, which involves examining many sources of data and focusing on the most important elements of the task or situation. The last stage is Framing Problems, when problem solvers pose a clear and specific problem statement for their task. An effective problem statement opens the door for the search for many new and useful ideas.

Generating Ideas is the second component of CPS, which emphasizes the search for many, varied, and novel possibilities for a problem or challenge.

Preparing for Action is the last CPS component, which helps to transform promising ideas into workable solutions, and to get ready to carry out those solutions. The goals of this component are to develop promising solutions so they are as strong as possible, and then to consider specific action steps through which those solutions will have the best possible chance of success.

CPS offers many practical tools and strategies that are easy to apply in a group, but can also be used by an individual working alone. It helps people focus on what can be done, not what can't be done or what they think "won't work" and it offers many powerful and practical "tools for the mind" [2].

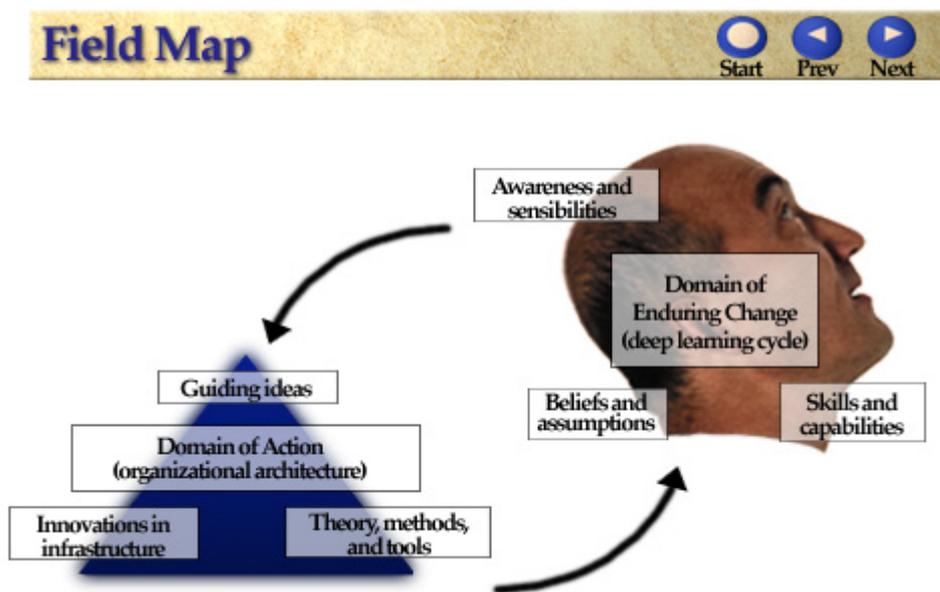


Figure 1. Tools for the mind

3. ABOUT CONTINUOUS LEARNING

The concept of Continuous learning is not about continually taking courses - it's about developing skills in reflection and inquiry, it's about learning how to learn so that your life's experiences become your own learning lab.

The concept of Continuous Learning has become quite prominent over the past five years, because organizations are changing rapidly and it's difficult to find any approach to doing anything in organizations that doesn't soon become outdated.

The concept of continuous learning has become important because it places priority on noticing, adapting and learning from change.

Continuous Learning is the ability to learn to learn. Continuous Learning is a way of being in the world. It is not staying busy by continuing to attend one course after another, gathering more and more information.

Learning need not be a linear event where a learner goes to a formal learning program, gains areas of knowledge and skills about a process, and then the learning ceases. If the learner can view life (including work) as a "learning program", then the learner can continue to learn from almost everything in life. As a result, the learner continues to expand his or her capacity for living, including working.

Specialists consider that the most important aspects of continuous learning are [3]:

1. Having some basic values in your life or priorities in your work;
2. Doing something in the world, applying new information and skills;
3. Taking the time to inquire and reflect about your life and experiences;
4. Getting up-to-date feedback, in order to obtain useful information about yourself and your experiences ;
5. Removing personal obstacles to your accepting and understand the feedback;
6. Having the courage and humility to change.

About the Continuous Learning in Organizations it must be said that organizations can establish structures and processes that cultivate continuous learning. For example, management can support a climate where feedback is freely exchanged. Employees have a clear, shared vision of the organization's goals and values. Organization members get time to inquire and reflect about what they are doing and why.

Planning is a form of learning. Goals are established. Strategies, or approaches to reaching goals, are implemented. Action plans identify who will be doing what and when. During implementation, the plan is monitored and modified as needed. Of course, plans can become ends in themselves, ultimately constricting progress of the organizations. However, when plans are seen as guides that can be changed, a great deal of learning can occur.

Learning must be connected directly to business and organizations have to make learning a strategic choice and to make that happen. It is a necessity that organizations have leaders who see how important learning is to the continued health and success of their organizations.

Another important problem involves that someone has to decide to make learning not just an individual experience, but a collective experience, in order to be used by the company to drive the future of the business.

About the experience of Continuous Learning, Norm Kerth, author of the book "Project Retrospectives: A Handbook for Team Reviews" [4], describes a retrospective as an end-of-project review, involving everyone who participated on the project in examining the project to understand what happened, what the community could learn, what the community could do differently next time. The Continuous Learning approach to retrospectives means they come not at the end of a project, but at the end of every iteration. Conducting iteration retrospectives will enable teams to quickly adjust and improve their performance, because they will be continuously revisiting these questions: What worked well? What did we learn? What should we do differently next time? What still puzzles us?

4. ABOUT LEARNING ORGANIZATION

The word "learning" was coined in the 1980s to describe organizations that experimented with new ways of conducting business in order to survive in turbulent, highly competitive markets (Argyris and Schon 1996; also Senge 1990).

Table 1 presents the characteristics that define the learning organization, and the positive results accruing to individuals and the organization or culture as a whole when they are present. The characteristics listed in Table 1 are general qualities that exist within a learning culture. However, there are concrete cognitive and behavioral tools, as well as specific types of social interaction and structural conditions, that improve the chances that these qualities are achieved and sustained over time. These are the "best practices" listed in Table 1. While not an exhaustive list, the ones listed in Table 1 fall under four main categories:

- communication and openness;
- inquiry and feedback;
- adequate time;
- mutual respect and support.

Communication, reflection, feedback, flexibility, and inquiry all depend upon individuals having adequate time to engage themselves and others in meaningful dialogue and brainstorming. Finally, mutual respect and support involves treating co-workers, supervisors, and employees equally and consistently with respect to one's ability to contribute positively to the organization, regardless of where that person is located in the organizational hierarchy [5].

Table 1. Characteristics of a Learning Organization and Associated Best Practices *

Characteristic	Definition	Associated Best Practices	Positive Byproducts
Self mastery - individual	The ability to honestly and openly see reality as it exists; to clarify one's personal vision	1.Positive reinforcement from role models/managers 2.Sharing experiences 3.More interaction time between supervisory levels 4.Emphasis on feedback 5.Balance work/non-work life	Greater commitment to the organization and to work; less rationalization of negative events; ability to face limitations and areas for improvement; ability to deal with change
Mental models - individual	The ability to compare reality or personal vision with perceptions; reconciling both into a coherent understanding	1.Time for learning 2.Reflective openness 3.Habit of inquiry 4.Forgiveness of oneself 5.Flexibility/adaptability	Less use of defensive routines in work; less reflexivity that leads to dysfunctional patterns of behavior; less avoidance of difficult situations
Shared vision - group	The ability of a group of individuals to hold a shared picture of a mutually desirable future	1.Participative openness 2.Trust 3.Empathy towards others 4.Habit of dissemination 5.Emphasis on cooperation 6.A common language	Commitment over compliance, faster change, greater within group trust; less time spent on aligning interests; more effective communication flows
Team learning - group	The ability of a group of individuals to suspend personal assumptions about each other and engage in "dialogue" rather than "discussion"	1.Participative openness 2.Consensus building 3.Top-down and bottom-up communication flows; 4.Support over blame; 5.Creative thinking	Group self-awareness; heightened collective learning; learning "up and down" the hierarchy; greater cohesiveness; enhanced creativity
Systems thinking - group	The ability to see interrelationships rather than linear cause-effect; the ability to think in context and appreciate the consequences of actions on other parts of the system	1.Practicing self mastery 2.Possessing consistent mental models 3.Possessing a shared vision 4.Emphasis on team learning	Long-term improvement or change; decreased organizational conflict; continuous learning among group members; Revolutionary over evolutionary change

* Adapted from the work of Senge (1990), Argyris and Schon (1996), Argyris (1991), and Schon (1983).

5. CHARACTERISTICS OF HIGHLY EFFECTIVE ADULT LEARNING PROGRAMS

Ever-accelerating speed of change in both knowledge and technology open us the road to continuous learning throughout lives, opposite to allow our skills and knowledge to quickly slide into obsolescence.

The same principle is applied to companies: Those who fail to continually teach and train employees - quickly slide into obsolescence, because significant learning and personal growth are inseparable – growth is learning. Studies revealed that adults can and do experience significant personal growth at mid-life.

Dorothy Billington, Ph.D. has written a book: *Life is an Attitude: How to Grow Forever Better*. A national award winner, it is based on her extensive studies, and those of others, of how and why some men and women continue to grow as long as they live - while others do not.

This book shares the secrets of these exceptionally vital, effective, ever-growing people, attitudes, and techniques we can adopt for ourselves.

She describes a study case of adult students which grew significantly only in one type of learning environment; they tended not to grow or to regress in another type. To find the difference, she analyses the situation, and she presented the seven key factors for learning programs, that stimulated adult development [6]:

- An environment where students feel safe and supported, where individual needs and uniqueness are honored, where abilities and life achievements are acknowledged and respected.
- An environment that fosters intellectual freedom and encourages experimentation and creativity.
- An environment where faculty treats adult students as peers - accepted and respected as intelligent experienced adults, whose opinions are listened to, honored, appreciated. Such faculty members often comment that they learn as much from their students as the students learn from them.
- Self-directed learning, where students take responsibility for their own learning. They work with faculty to design individual learning programs which address what each person needs and wants to learn in order to function optimally in their profession.
- Pacing or intellectual challenge. Optimal pacing is challenging people just beyond their present level of ability. If challenged too far beyond, people give up. If challenged too little, they become bored and learn little. Pacing can be compared to playing tennis with a slightly better player; your game tends to improve. But if the other player is far better and it's impossible to return a ball, you give up, overwhelmed. If the other player is less experienced and can return none of your balls, you learn little. Those adults who reported experiencing high levels of intellectual stimulation to the point of feeling discomfort-grew more.
- Active involvement in learning, as opposed to passively listening to lectures. Where students and instructors interact and dialogue, where students try out new ideas in the workplace, where exercises and experiences are used to bolster facts and theory, adults grow more.
- Regular feedback mechanisms for students to tell faculty what works best for them and what they want and need to learn--and faculty who hear and make changes based on student input.

6. CONCLUSIONS

Our today society involves challenge for both individuals and organizations, which cause social, educational, ecological, political, scientific, and economic revolutions. It is necessary to bring new information, along with new technology to communicate and process it. Acceleration of change necessitates flexibility, the ability to learn and unlearn and relearn, and a willingness to experiment and take risks. It is also essential to find new ways of communicating and working for individuals and organizations, in order to confront and solve problems.

It is critically important to integrate ideas and information - drawing from the wisdom of the past and combining it with new findings drawn from studies in human and organizational development, from science and technology, and from the rapidly changing history of our own times [7].

Dr. Howard Gardner's Theory of Multiple Intelligences also recognizes diversity by suggesting that people learn not only through verbal and logical- mathematical intelligence (on which most educational systems are focused) but also through visual-spatial, bodily-kinesthetic, musical, interpersonal, and intrapersonal intelligences. Effective school systems and employee training programs in many countries are broadening their teaching methods to reach more kinds of intelligence. It is about accelerated learning techniques, cooperative learning groups, experiential learning, integrated/thematic curricula, simulations, and the use of interactive, multimedia technology – they are producing exceptional outcomes related to enhanced comprehension, rate of learning, retention, and the ability to apply what has been learned.

Dr. Dorothy Billington, developmental psychologist and author of *The Emerging Adult*, notes that "as we begin to recognize the need for lifelong learning, we are also beginning to recognize that significant learning and personal development go hand-in-hand. We cannot separate emotions and thoughts." She found, contrary to much of the literature on adult development, that adults can and do experience significant personal growth at mid-life.

Clearly, these studies are of major importance to the planning and practice of education at all levels and in all settings. In order to prepare human beings to be lifelong learners in a world of escalating change and uncertainty, it is essential that they become not just knowledgeable, but as fully intelligent as possible.

Dr. Robert Sternberg, Yale University psychologist and author of *Beyond I.Q.* defines intelligence as "the ability to learn and to apply what has been learned to adapt to the environment, or to modify the environment, or to seek out or create new environments."

It is important for corporations' benefits to support "best educational practices" in schools that prepare students to become productive adults. Also they need to take into consideration the diversity of their employees and the acceleration of change in the marketplace, thus traditional organizations, training methods, and ways of doing business must either adapt to constant change or become proactive in many ways.

As in the human brain, it is the networks and communication links within organizations that make intelligence possible, and that facilitate their becoming learning organizations that are now

essential to survival. There is realized Action Learning program (at the Swedish Management Institute), which encourages teamwork and an overall design of learning by reflection on action. Such relatively new ways of teaming and collaborating in small heterogeneous groups result in collective wisdom and group I.Q.'s that are higher than any individual's within that group.

The purpose is to enrich the I.Q. of an organization, itself, which must have the chance to develop within an open system that continues to take in and process new information, applies it, assesses the results of its work, and feeds that information back into the system.

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Quick Info

SAP 360 Customer - Using Technology to Gain a Competitive Edge

Today's customers are Digitally Connected, Socially Networked, and Better Informed. Companies who want to do business with them need access to a wealth of information to quickly identify market trends, customer sentiment, and new opportunities.

They need to intelligently filter that information and use it to provide highly personalized offers across all channels to cross-sell and up-sell in real time.

Today's tech-savvy customers are changing the rules of engagement and through that, becoming more empowered. So how can you gain a competitive edge?

Through better technology of course. In this Webinar we'll show you the trends that have led to this empowerment and explain how they are driving a continuous rise in expectations. We'll outline the types of experiences and products companies need to deliver to make their customers' lives better. And then we'll show you how SAP 360 Customer can give you a competitive edge by:

- Offering customized solutions that leverage predictive analysis and simulation of customer relevant data;
- Increasing margins by simplifying collaboration and quote management with pricing and margin calculations at an individual customer level;
- Driving profitable growth by quickly identifying market trends and new opportunities in real time;
- Leveraging product offerings as a platform to deliver "Services," thereby avoiding product commoditization and generating new revenue streams with usage or consumption-based charging capability.

SAP 360 Customer gives you the power to better engage customers anytime, anywhere, be it in person, online, or via a mobile device. For the first time, you will be able to leverage true 360-degree customer insight – from interaction history to social media sentiments – and uncover new ways to improve your sales, service, and marketing effectiveness.

Speaker:

Josh Clark
VP of Hi-Tech Industry Business Unit
SAP

(Source: *Tech Briefs INSIDER* - 12/11/12)

”TEHNOLOGIA INOVATIVĂ”

REVISTA CONSTRUCȚIA DE MAȘINI
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