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RESEARCH ON THE SYSTEMS USED TO EVALUATE THE PERSONNEL OPERATING IN TOXIC / EXPLOSIVE / FLAMMABLE ATMOSPHERES

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SUMMARY

The evaluation systems represent an essential component part of artificial intelligence that cover the expert knowledge for a specific domain; subsequently, this knowledge shall be dynamically capitalized by a reasoning mechanism. Thus, an artificial reasoning is implemented whose idea is to simulate natural reasoning triggered by the human brain. We have to underline the important part played by the highly qualified human experts that have gained experience in a certain domain. These experts convey their knowledge to the evaluation system and use the artificial reasoning for multiplying and explaining the experience of human experts. After developing an evaluation system, all the knowledge belonging to the source – human expert can be used, multiplied and generalized by other users for similar or related domains. The skills for necessary to the human expert relate to their analysis capabilities and to their handling of details and other complex aspects because there are necessary clear, accurate, consistent, full and as simple as possible elements to pass from the stage of expertise to the specific knowledge. Once the knowledge is introduced into the evaluation system, they become independent of their proper reasoning mechanism. The job of the reasoning mechanism is to use knowledge in order to extract and explain the internal reasonings triggered by the evaluation system.

Keywords: evaluation system; human expert; intervention; rescue personnel

INTRODUCTION

All the emergency situations require well – trained leaders at the headquarters and comprehensive and coherent actions and some answer plan for emergency situations.

The training methods applied on the personnel that works at rescue stations range from theoretical training (with the help of instruction handbooks, video means, other methods for gathering information, etc.) and go up to the latest methods (exercises that simulate the occurrence of accidents, simulation that are part of „pen and paper" category). Nevertheless all these methods, whose applicability and usefulness has been fully confirmed, have several problems related to the high complexity, associated costs, lack of flexibility; there are also situations when there aren't the necessary resources and the programs for the training and selection of rescuers. All these shortcomings may be due to the:

RESULTS AND DISCUSSIONS

1. HIGH COMPLEXITY DEGREE

Managing the emergency situations is a complex task requires an accurate coordination of several activities and persons, as well a rapid process for taking decisions sometimes in the absence of vital information. Training the necessary skills may be quite difficult during the theoretical sessions, but it can turn efficient with the help of new training methods. Nevertheless. It is difficult to plan and perform training exercises that simulate accurately all situations that can occur during in real life. It might be necessary that a lot of persons simulates the parts of victims, rescuers, members of medical services, police, mass-media, etc.

As a result, the training and selection scenarios have been simplified but the authenticity of the experience gained during the training process diminishes.

2. ASSOCIATED COSTS

It is quite expensive to simulate accidents both for the undertaking that organizes the exercise and for all the other involved organizations. The use of the company's facilities with the view to simulating the interventions shall lead to additional costs (with respect to the salaries, temporary interruption of the production flow, materials,, other categories of expenses). These additional costs shall diminish the number of simulations and certain skills acquired during the basic training shall be lost.

3. LACK OF FLEXIBILITY

The traditional training tools (teaching, video projections, etc.) can be sometimes difficult to adjust to the specific features of an undertaking. The filed exercises are better

but they don't allow a change in the action flow after the drawing up of the intervention plan. Subsequently, the rescuers can take decisions that haven't been taken into consideration by the planners or decisions that cannot be included in the action plan. The ideal training session should allow an easy change of the scenario so as to test the reasoning of trainers, their reaction in unexpected situations.

There are undertakings that cannot provide both the resources and the experience necessary for efficient trainings or for the evaluation of these training sessions.

PC on – line simulation of a new concept to increase the efficiency of rescuing operations.

PC on – line simulation represents a possible solution to the above – said shortages. The PC simulation of parts played during an intervention, together with the related responsibilities of the persons involved in the emergency situation can diminish the costs associated to the training sessions.

The on – line transmission of the training sessions shall diminish the distribution costs. Persons located in different places can have access to the same training session and can even involve in a relation of cooperation with other persons located in other undertakings.

The trainers shall have the possibility to devise complex exercises that can be updated at regular intervals to refresh the information. PC simulation is the most suitable method for modeling complex scenarios of accidents that can twist the mission of persons that manage the damage situation:

- interaction with the persons outside the headquarter;
- mass – media;
- the medical staff;
- the representatives of trade unions;
- the representatives of government;
- unofficial visitors (kinds to victims).

Other examples include the weather troubles (for example a flood that gives problems in providing the necessary materials) and traffic jams. A training session that involves a simulation on the computer can be devised so that is maximizes the flexibility. The evaluation system can be structures so that is corresponds either to beginners level or to more advanced. Whether the user's progresses are visible, there can be included additional problems so as to stimulate the interest of participants in the program.

One shortage of the program package intended for the Pc training relates to the actions that take place among the persons found inside the headquarters. The easiest way to settle this issue is to require that all the persons should be present in person during the training sessions. Thus, they will be able to cooperate like a team, improvising the agendas

based on joint decisions.

The second version is to devise an evaluation system so that each trainee should have his own PC and the interface necessary for communication with other members of the personnel at the headquarter during the simulation session.

Structuring the program that is being used for the simulation of the training sessions carried on – line.

The operation of the program that is being used for the simulation of the training sessions carried out on – line comprises the following stages:

- Devise and install the program package for simulation purpose on a server connected to the internet;
- Connect the trainer of the undertaking to the server in question and assign a certain period of time for a simulation session; there shall be necessary s standard PC and a web browser. The trainer shall select a certain type of damage (fire, explosion, flood, etc.), the environment conditions and other categories of significant factors;
- After the configuration of the program, the user shall connect to the server and the simulation session can start;
- All the other trainees can connect to the server in question with the help of their PCs. When all the participants are ready, the simulation can start;
- As the simulation proceeds, the users receive gradually information via the internet connection.

This information relates strictly to the conditions of the accident. Updating like information shall relate only to the data gained by the headquarter in real conditions, such as the ones delivered by the monitoring system or by the reports drawn up by the rescue teams that operate in the damaged area.

The participants in the simulation can convey their personal reactions and the decisions they reckon as appropriate via the internet connection. Their decisions can influence the further management of the accident when operating in the interactive basic application.

The basic program shall record each stage in the management of the emergency situation and monitors the promptness and the suitability of decisions taken by the participants; thus, it allows their analysis at the end of the simulation and the draw of final conclusions.

CONCLUSIONS

Principles for the drawing up of the program package intended for the simulation of the management in emergency situations.

During an emergency situation, the same managers that are in charge with the current activities shall become the leaders of the headquarters with no previous organizes training. They shall rely mainly only on the gathered experience.

The evaluation system uses two PCs that are connected via a local network or they are connected to the internet. The server shall model the events and the behavior of persons located outside the headquarter and the users of the local PCs play the part of the personnel located at headquarter. As the server delivers the relevant information, the users shall provide the answers through the decisions they reckon as suitable for settling the evolving issues.

The server simulates situations occurred inside the damaged area, such as: the development of the fire, gas or smoke distribution, the situation of miners that are being evacuated from the damaged area, the operation of rescue team, providing with the materials, the condition of the means of communication, etc. There is also a situation of the behavior displayed by the representatives of mass – media, of the medical personnel, of the government authorities or of the trade unions or of other informal visitors.

The simulation shall use a series of regulations that cover the necessary classes of information so as to get a real simulation. These classes refer to the:

- human factors: physiological and psychic level, training level;
- physical factors: location of the undertaking, the structure of the operating networks, engineering methods, ventilation systems, etc.;
- internal and external resources: fire – fighting equipment, availability of rescue teams and the necessary materials, transportation, etc.;
- general issues (related to policy, legislation, the image of the company);
- relation with the local and national authorities;
- impact over the mass-media;
- relation with the families of victims, etc.

The server shall convey the relevant information to the local PC via sound and / or video images. For example, if you have a telephone set (and the communication system are operative), the simulation may proceed as it follows: a miner makes a call and reports smoke in a certain area; a rescue team searching trapped miners within the perimeter of the damaged area announces the finding of a rescuer or they ask for additional support; the guards announce the arrival of mass – media representatives at the gates of the undertaking.

The user can send orders, simulated massager or other means via the interface of the local PC. For example, one can decide the evacuation of the economic undertaking or of only the damaged area, one can order additional materials from a supplier or one can empower a simulated person with certain responsibilities.

The interface shall allow access to the resources available at the headquarters

during a real accident. There resources can include, the map of the undertaking, framework plan for prevention and liquidation of damages (labor protection standards), etc.

Since the economic undertakings display different parameters (i.e. size, location, engineering methods, available resources), the simulation program shall have to be individualized. By providing their own maps, diagrams, charts, etc.; the economic undertakings shall be able to test the efficiency of rescue operations and of operations for the liquidation of damages in real – life conditions and the companies with less resources available shall be able to select certain operating manners from an organized database.

At certain given moments, the server shall be able to generate situations that cut off the simulation, asking for the extra – attention of the user. For example whether the user hasn't put forward an order to the guard department to forbid the access inside the area, one family member of a miner involved in the accident can show up inside the headquarter. The user shall not be able to pursue his activity until the intruder is calmed down and seen outside the headquarter. Such breaks provide realism to the simulation and confront the user with problems that can occur in real – life conditions.

The main program can be developed by using a general programming language that provides the direct support for the object orientated programming and possible simulation of discrete events. The possibility to include a watch shall allow the recording of the simulation period and the real time filing of all the events in the simulation, including the orders conveyed by the users.

As the high – speed access to the internet is easily accessible to everybody, one can say that the devise of a training program via internet shall increase the efficiency of rescuing operations and of the operations for the liquidation of damages in toxic and / or explosive atmosphere.

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