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APPLICATION OF VIRTUAL SIMULATORS FOR TRAINING STUDENTS IN THE FIELD OF CHEMICAL ENGINEERING AND PROFESSIONAL IM-PROVEMENT OF PETROCHEMICAL ENTERPRISES PERSONNEL

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In the XX century numerous attempts to automate production processes in various industries were carried out. In the 80-90s computers became available and widespread; this caused rapid development of automated management systems of technological processes. Nowadays such systems are widely applied at the automated assembly (automobile, electronic industry, etc.), and for the control of technological processes at chemical and power enterprises.

Modern petrochemical industry actively uses automated control systems. These systems not only help improving the product quality, but also provide convenient and simple tools to monitor and manage technological processes and prevent possible ex-traordinary situations. In order to use such systems, the enterprises' personnel should be properly trained. Thus, it is necessary to create simulators, which are intended to give students and chemical enterprises employees an opportunity of practicing and improv-ing their professional skills in the field of using the above systems.

Today there is plenty of software intended for training the personnel of industrial enterprises - simulators, programs for testing and so on. Introduction of such software packages at the enterprise raises the quality of personnel training and contributes to the formation of skills. It should be noted that computer-aided training involves the use of visual methods; besides, it is very convenient and easy to use. Simulators and training programs became very popular in chemical and power industries since the employees at these kinds of enterprises quite often use remote controls in their work; these opera-tions can be easily performed by means of programs-simulators.[1]

Besides, application of programs-simulators seems to be quite promising in train-ing students at higher educational institutions in the petrochemical industry. It is very important for students to have both theoretical and practical knowledge which will ena-ble them to efficiently handle professional issues. This can be achieved through application of systems simulating the work of particular technological lines. Thus, two goals are achieved: on the one hand, students have deeper understanding of the studied material as representation of devices performance in dynamics is frequently more informative than text descriptions and static illustrative materials; on the other hand, students have an opportunity to get practical skills required for their further work, without the necessity of using real equipment which is quite often unavailable. It is obvious, that in such cases the use of simulators is, practically, a unique way to give students the necessary knowledge and skills.

SCADA-system is an efficient tool for creating computer-aided training systems for the employees of the petrochemical enterprises and students of corresponding educational

courses. The above system enables creating simulators that completely show the work of the control panel at real manufacturing plant. It allows the trainee to receive skills, in many aspects similar to practical work at the plant. Another advantage of the SCADA-system for the creation of simulators is that nearly all basic network reports are integrated into the system of this class, including TCP/IP that enables creating training programs with the removed access through Internet.

The department “Computer-aided design of the process equipment” of Tambov State Technical University is engaged in the development of the automated system for control and training of the students of the specialization “Flexible automated systems in technology of machines and devices of chemical production” and the personnel of “Pigment” plc, Tambov. The given system is developed on the basis of LabVIEW pro-gramming media made by the company National Instruments (Figure 1).

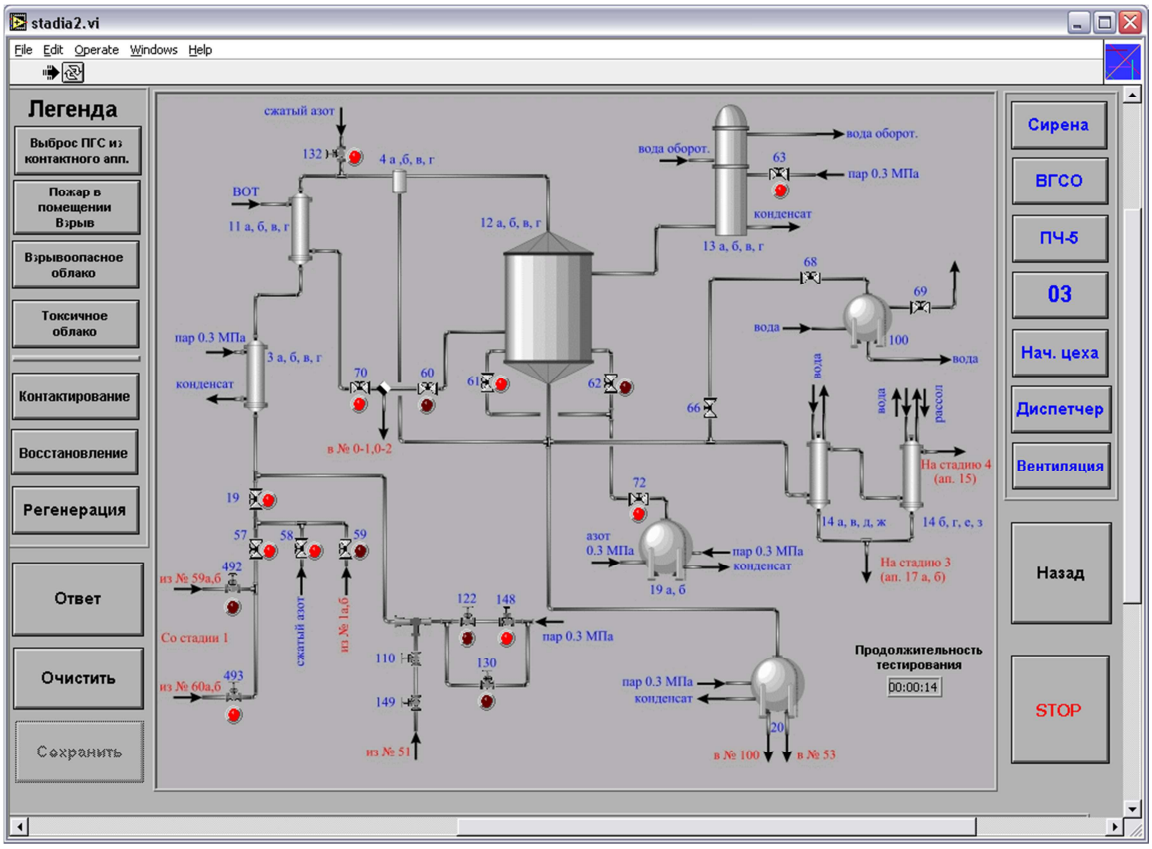

Figure 1 - Main panel of simulator

The developed system includes the following components:

1. The virtual simulator of a workstation of the operator, controlling the work of pigment-making device.

2. The module of trainee testing, providing the knowledge check of simulated technological processes and chemical technologies as a whole.

3. The help system including the description of simulated production technology.

The training module represents a set of virtual tools created in LabVIEW system. It consists of two basic components: a simulator intended for practicing actions in case of emergency, and a simulator imitating the regular work of the technological circuit.

The result of the represented work is the complex system which contains the test-ing module for the high schools students and petrochemical enterprises employees in-tended to identify the level of knowledge of technological processes. The system also contains training module which provides tools to considerably increase the quality of training and retraining of personnel through a deeper understanding of work principles of the studied equipment. The application of the given system makes it possible to ar-range practical classes for the students, and teach them skills required for petrochemical enterprises. Thus, university education is being put together with the real production. The other important area of application of the given system is training and retraining of the petrochemical enterprises personnel, revealing the degree of their readiness to various situations, including cases of emergency.

References

[1] Malygin E.N., Krasnyansky M.N., Karpushkin S.V., Mokrozub V.G., Borisenko A.B. New information technologies in the open engineering education. Textbook. / / Moscow "Publishing Machine-1", 2003. S. 90-123.