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The theoretical basis of a computer simulator is a mathematical model of the mixing process, which is based on the mass balance equations for raw materials, water, the content of individual chemical oxides, given values, of technological modules (saturation coefficient, silicate and alumina).

The simulator, itself is a set of interconnected programs for an automated workplace for a shift chemical technologist in a raw material workshop, a clinker grinding workshop or a central factory laboratory.

The simulator contains: 1) a dynamic simulation model of technological processes of mixing and averaging cement raw materials, allowing machine experiments to work equipment, taking into account random disturbances and interference; 2) a multi-window interface, which allows the shift chemical technologist on the monitor to visually see the state of the process; 3) a number of emergency scenarios for training interns, demonstrating accidents, showing the correct actions.

Conclusion. It is proposed to introduce an easy-to-use and cheap computer program for adjusting the process of preparing cement-raw mixtures of a given composition in wet and dry production methods (for both in-line and batch technologies). This computer program can be used as an educational simulator for training operator technologists. The undoubted advantage of the simulator is the safety of the training, since the actions of the trainee on real-life technological equipment are sometimes not only undesirable, but also dangerous.

APPROACHES FOR MODERN RHINOMANOMETRY DIAGNOSTICS WITH DATA MINING SUPPORT

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However, according to statistical data, only about 10% of the population around the world suffers from chronic rhinosinusitis, and rhynology is one of the least well-documented means of functional diagnostics of the branches of medicine. This is reflected in the fact that there is no clear correlation between subjective sensations of the patient and characteristics of nasal airflow despite the possibility of modern rhinomatometric equipment and corresponding specialized software tools that allow the determination of aerodynamic indices of nasal breathing with a fairly high accuracy.

Yet, the complexity of the problem as well as different approaches and methods of research complicate considerably the interpretation of diagnostic data, which impedes a wide introduction of equipment for testing of nasal breathing into the medical practice. Therefore, it is advisable to develop devices (rhinomanometers) for nasal breathing testing, based on data mining and specialized methods to support diagnostic decision-making.

The main medical and technical requirements for a modern computer rinomanometer are:

- the possibility of implementing algorithms for statistical data processing to increase the repeatability of survey results by analyzing the dynamic measurement model;
- providing automated processing of diagnostic indicators with the possibility of flexible software changes by the developer to improve diagnostic algorithms, as well as protection against unauthorized access;
- short time, simplicity, non-invasiveness and safety of the examination and sterilization procedures necessary for everyday use of the device in clinical practice;
- ease of calibration procedures of sensors and monitoring of measured values;
- the device must be designed to measure the maximum pressure drop on the nasal passages up to 50 kPa and the maximum air flow during breathing in the inspiratory cycle up to 8 l/s;
- the quantization step of the measured values should not exceed 0.5% of the maximum signal value, when choosing analog sensors,
- sampling frequency of the measured signals must be at least 100 Hz (it's depended from the dynamic parameters of the respiration nasal cycle);

Therefore, at present, there are approaches aimed at improving the methods of the functional diagnostics in the rhinology by studying influence of intraosseous structures on the characteristics of the nasal airflow, especially at a forced nasal breathing, and justification of additional diagnostic indicators. It is also necessary to conduct independent verification of the developed methods and modernization of diagnostic equipment based on the analysis of methodological peculiarities of the nasal breathing testing. Data processing should be carried out on the basis of intelligent technologies, taking into individual physiological and gender variability.

The perspective of the work is the combine in the one device specialized methods for testing of nasal breathing with data mining and their clinical trials to confirm the validity of the proposed approaches.

SHIPBOARD ENGINE NOXIOUS EMISSIONS REDUCTION APPLYING NEW TYPE FUEL OIL CATALYST

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The work reviews problem of noxious emissions reduction associated with shipboard diesel engines operation. Noxious emissions reduction process research applying