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ENGINEERING TRAINING OF RESCUERS

Abstract: the Relevance of vocational training commanders of mine-rescue detachment and the heads of the elimination of accidents in mines due to the complexity and scale of the consequences of the current accidents, their integrated nature, when one crash triggers another. To ensure the effectiveness and usefulness of such training, a very important factor is the content of the training program, which should develop the students ability to objectively evaluate the possible risks of accidents. High intensity of mining in the current conditions leads to an increase of the energy of unfavorable factors, geomechanical, hydrodynamic and gas dynamics, which are interrelated and interdependent. Regularities of their manifestations, prevention and protection should be the main object of study. This knowledge is especially important in the conditions of Informatization of decision-making processes in emergency situations, as blind use of inappropriate computer models can lead to unpredictable serious consequences, endangering the safety of the rescuers.

Key words: rescue work; qualification improvement; continuing education; engineering analysis; system approach; assessment of the risk of accidents.

Accident in modern mining, especially underground coal mining enterprises, due to the high intensity of mining operations and, accordingly, significant energy reactions of the massif, are complex when one type of accident swiftly leads to another that leads to large-scale disasters involving loss of mine workers and rescuers. Such a situation does not provide a standard emergency response plans. Therefore, the adequacy of the decision-making at liquidation of accidents depends entirely on the experience and qualifications of the commander of the mine-rescue detachment. Qualification is determined by the level of knowledge of regularities of the complex physico-mechanical and physico-chemical processes that occur in accidents in the mines.

The results of the investigation of major accidents in coal mines by Rostekhnadzor approved the "Instruction on localization and liquidation of accidents consequences at hazardous production facilities, where mining operation is underway" (Federal norms and rules in the field of industrial safety, approved by order of the Federal service for ecological, technological and nuclear supervision from 31.10.2016 No. 449), according to which the managers of works on localization and liquidation of consequences of the accident and rescue work must be trained by the special program for supervisor for emergency response and the head of rescue work respectively. This is a very timely and relevant measure, since modern training of mining engineers doesn't provides in-depth study of ventilation, mine Aero-gas dynamics, the dynamics of mine aerosols, and fire gases. It is important that appropriate training was not formal, and the content of the training programs of a head of the liquidation of the accident (HLA) meets the tasks – to develop students' systematic approach to localization and liquidation of accident consequences on the basis of theoretical knowledge and understanding of trends in the development of dangerous situations with different effects. The theoretical training of the head of works on liquidation of accidents and the head of rescue work should be the same, because these leaders must communicate, understanding each other.

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The most important system to ensure the rescue of people and liquidation of consequences of accidents in the mines is ventilation, especially for gassy coal mines. Therefore, the basis of training of HLA is the study of the mine aerology – in terms of the laws of air distribution, basics of mining aerogas dynamics- to evaluate and forecast the dynamics of the gas balance of the mine workings. Endogenous fire hazard is directly related to mode of ventilation, therefore, may be assessed by consideration of upper-air factors. Geodynamic and hydrodynamic phenomena are also a very common cause of accidents, so knowledge of the theoretical foundations of geomechanics and hydraulics is also required. In addition, the process of methane desorption in the mine workings are determined by the geomechanical characteristics of the disturbed mining array. Therefore, you need systematic consideration of the interaction of natural processes in case of accidents for an objective assessment of possible risks.

This knowledge is especially important in the conditions of Informatization of decision-making processes in emergency situations. Today, many important calculations (which needed to the success of rescue operations) are performed by rescuers on the basis of computer models of the major network engineering (utilities), which are created and maintained (adapted to the change of position of mining) by companies. Untimely or poor adjustment of the models leads to incorrect conclusions and resulting in jeopardizing the safety of rescuers. Computer models cannot be used "blindly", you should be able to give engineering and analytical assessment of possible risks and the adequacy of the models used. For this, for example in the calculation of ventilation, it is necessary to change the form of presentation of the results of calculations of air distribution – with the mandatory values of the aerodynamic resistance of the branches in the current, reverse and emergency modes. Information support of rescue calculations should be checked by the rescuers; the output performance information should be useful for analysis and decision-making in conditions of lack of time. To develop such forms of representation of results the leaders of the rescue operations should also have appropriate theoretical training.

Today engineering training of rescuers is carried out by means of qualification improvement- on specific issues of mining safety. Also in the framework of the specialty "Mining" there is a profil "Process safety and mine rescue", which are awarded the qualification "mining engineer". So, at the Moscow mining Institute since 2004, is the production of mining engineers in mining safety, among them more than 10 mine rescuers enrolled in the correspondence system. Under the new profil methodological support is developed on the base of which a program for HLA is developed and submitted to the Ros-tekhnadzor. This program reflects the above concept of rescuers training. Support of IMRB will allow to make a proposal on establishing a unified basic program for the training of HLA and rescue brigade commanders – as an educational standard.