Аннотации статей на английском языке

MODERN APPROACH TO MONITORING OF INDUSTRIAL SAFETY FOR HAZARDOUS PRODUCTION FACILITIES

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Annotation. The article discusses general approaches to the construction of a monitoring system for the state of industrial safety of hazardous industrial facilities (GCO). The approaches, assumptions and methods for solving key tasks in the creation of monitoring systems in oil and gas companies are generalized and laying the foundations for the construction of a balanced system of indices of industrial safety at GCO, as well as the development of specialized mathematical and software for industrial safety management. A uniform methodological basis for the creation of a monitoring system for the state of industrial safety at the GCO is provided, which allows fulfilling the mandatory requirements of the Federal Service for Environmental, Technological and Nuclear Supervision (Rostekhnadzor) in the field of remote monitoring, taking into account the practical interests of organizations operating GCO, significantly increase the level of culture in them safety and prepare a scientific and methodological justification for their further interaction with Rostekhnadzor in the field of operational organization (remote control) of industrial safety.

Keywords: risk, monitoring, reactive indicators, proactive indicators, assessment, forecasting, control, industrial safety, hazardous production facility.

INTEGRATED ACCIDENT RISK ASSESSMENT FOR HAZARDOUS INDUSTRIAL FACILITIES BASED ON FUZZY LOGIC AND LOGIC-PROBABILITY APPROACH

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Annotation. The article describes the algorithm to comprehensively assessing the risk of accident and the state of the object on the set of monitoring indicators. The proposed approach makes it possible to identify the combined effect of the hazards that can be found at the site, consider rejection of all controlled parameters, as well as deviations in the range close to acceptable. Perhaps take into account the testimony of a large number of sensors. In automatic mode, the algorithm can be applied for the treatment of a large number of monitored parameters, set on the process equipment and facility design elements.

Keywords: comprehensive monitoring indicator, the state of hazardous production facilities, security, fuzzy logic, possibilistic logic-simulation.

ON THE RELIABLE SHORT-TERM TSUNAMI FORECAST

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Annotation. One of the negative factors affecting the normal functioning of municipalities on the coast of the Far East are the false tsunami alarms. To date, false alarms make up at least 75% out of the total number of alarms. False alarms cause damage related to the shutdown of production, other activities in the coastal zone, the evacuation of the population, the withdrawal of vessels to the open sea.

The problem is that the tsunami warning services would announce alarms with reasonable lead time only at those points where the tsunami is of a real threat and is accompanied by information on the arrival time of the first, maximum wave, their amplitudes, and the expected time of the tsunami's end.

The aim of the study was to study the possibility of an early tsunami forecast near the coast using data of deep-sea bottom stations located in the open ocean, without involving detailed seismological information on earthquakes.

In the numerical experiment the process of short-term forecasting of the 2006 and 2007 Simushir tsunamis was simulated near the coast of the Kuril Islands and Hokkaido Is.

To calculate the wave forms of tsunami near the coast, a method of short-term tsunami forecasting was used, which allows to calculate tsunami waveforms at given points near the coast using tsunami data in the open ocean in a real-time mode in advance.

It is shown that the 2006 and 2007 tsunamis forecast is possible in advance (0.5 to 1.5 hours before the first wave arrival) for the northern and southern Kuril Islands.

The method can become a tool that will significantly reduce the number of false alarms.

Keywords: tsunami, short-term forecast, operational forecast, tsunami alarm, false tsunami alarm, ocean level measurements, numerical simulation, deep-sea bottom stations, DART.

THE SYSTEM OF ANALYTICAL INDICATORS FOR STRATEGIC CONTROL OF THE NATURAL AND TECHNOGENIC TERRITORY SAFETY

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Annotation. This paper presents a hierarchical system of analytical indicators for strategic control of natural and technogenic territory safety at various levels of management: regional, municipal and local. Based on Data Warehousing and On-line analytical processing technologies, the multidimensional indicators of the Krasnoyarsk territory safety have been calculated. The proposed system of indicators allows in the future to implement the methods for comprehensive assessment of the state of territories both in general and in individual situations.

Keywords: analytical indicators, strategic control, natural and technogenic safety, territory management.

BASIC RISKS OF NATURAL AND TECHNOGENIC SAFETY IN KRASNOYARSK REGION

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Annotation. This work considers approaches to risks assessment allowing to estimate sustainable development of industrial region as an uniform social-natural-technogenic system. Basic individual risks are divided on the potential and realized risks of morbidity and death of region's population. These risks connect to influence of environmental factors such as various emergency, air pollution and climatic variability. These risks are influenced by the environmental factors such as various emergency, air pollution and climatic variability. Risks assessment are based on the information obtained by federal and regional monitoring systems. It is shown that individual non-cancerogenic Risk assessments caused by air pollution and death risks caused by technogenic emergency are exceed the acceptable levels significantly.

Keywords: social-natural-technogenic system, individual strategic risks, acceptable risk level.

PROBLEMS OF COGNITIVE BIASES IN THE ASSESSMENT OF READINESS OF MUNICIPALITIES TO PROVIDE RESILIENCE TO EMERGENCIES

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Annotation. Only implementation of official regulatory framework requirements is not enough to be ensure in the readiness of municipal formations for possible emergencies. For this it requires constant detailed monitoring of completeness of the threats model and existing deficiencies and vulnerabilities. Only this will help to avoid cognitive biases in the assessment of existing risks and threats and to achieve resilience to emergencies.

Keywords: cognitive biases, criterial modeling, resilience to emergencies, indicative risk assessment, threats model, vulnerabilities.

BOILER-HOUSES AS THE COMPUTERIZED OBJECTS OF PROTECTION AT FORESHORTENING OF RELIABILITY AND SAFETY OF STRUCTURAL-COMPLEX SYSTEMS

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Annotation. Some questions and features of boiler-houses, including of municipal formations, as objects of protection from the physical and computer (network) unauthorized access (uaA) are discussed from the position of the theory of safety of structural-complex systems as risk of failure, probable consequences of which are explosion or other status of boiler-house becoming apparent in intrinsic deviation from normal mode of functioning. On the basis of logic constructions the possible script of dangerous status of the system has been formed, in which it is presumed an uaA of the single infringer with accompanying (to it) eventuality of failure of subsystem of the access control and/or subsystems of the alarm system of boiler-house or subsystem of protection of the information of latter. The probabilistic-logic model, including calculation formula for the risk of the emergency, has been obtained.

Keywords: non-failure operation, explosion of boiler-house, logical-probabilistic method, unauthorized access, restriction of access, failure, subsystem, risk, system of detection of intrusions.

MODELING THE PROBABILITY OF THE STATE OF OBJECTS ACCORDING TO THE SCHEME OF MARKOV RANDOM PROCESSES OF EXPOSED TO DAMAGING FACTORS OF CONVENTIONAL WEAPONS

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Annotation. This article describes the evaluation of a mathematical model based on the use of homogeneous and inhomogeneous Markov chains transition probabilities of the state of the objects affected by consistent factors affecting conventional weapons. Also the analysis of obtained results consistent attacks on targets in the application of mathematical modeling.

Keywords: the probability of destruction of objects; homogeneous and inhomogeneous Markov chains; the matrix of transition probabilities of the state of the objects.

MATHEMATICAL MODEL OF VAPOR FORMATION PROCESS DURING THE VAPORIZATION OF LIQUEFIED GAS FROM THE SPILL

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Annotation. The article presents the analysis of the existing evaporation models of liquefied gases. The basis of the mathematical model laid the equation of the energy balance of the liquid from a spill during vaporization. Presented the solution of the equations describing the temperature change of the liquid in the evaporation process.

Keywords: evaporation, boiling, vaporization, heat balance, saturated vapor pressure.

PROBLEMS OF ALERTING AND EVACUATION MANAGEMENT OF PEOPLE IN THE TASK OF FIRE RISK ASSESSMENT

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Annotation. The article examines fire safety requirements for system of alerting and evacuation management of people at fire. An analysis of existing software products aimed at implementing and simulating the operation of a system of alerting and evacuation management of people at fire was carried out. It has been established that the requirements for alerting and evacuation management set out in the methodology for estimating the fire risk are not currently confirmed by modelling. The circumstances of the situation are analyzed and a solution to the problem is proposed.

Keywords: fire, simulation, evacuation management, control algorithms, system of alerting and evacuation management of people at fire.