

Current Relevant Issues in Accident Prevention Methodology

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Abstract

The article analyses relevant issues in accident prevention methodology in Lithuania by employing a scientific approach. The issues of accident prevention are analyzed in the methodological respect in a priori and a posteriori manner. Accident prevention is analyzed in the context of existing risk. The notion of accident risk is developed, and the principles of its management by relating accidents with possible consequences are differentiated.

Keywords: accident, prevention, risk, methodology.

Introduction

An accident, as a separate local event, or accidents, as phenomena, may be tolerated neither in moral nor in legal respect. The consequences of each accident as an event, and of a totality of accidents as a phenomenon, are directly related to health damage or death of a human being.

The right of a human being to life is enshrined in Article 19 of the Constitution of the Republic of Lithuania (Valstybes zinios, 1992, No. 33-1014); meanwhile Article 48 of the Constitution sets forth that every human being shall have the right to have proper, safe and healthy conditions at work. The importance of life and health of a human being as the highest values is also emphasized in the fundamental sources of the international law ratified by the Republic of Lithuania, e.g. in the provisions of Article 3 of the Universal Declaration of Human Rights (Valstybes zinios, 2006, No. 68-2497), Sub-paragraph b of Paragraph 1 of Article 7 of the International Covenant on Economic, Social and Cultural Rights (Valstybes zinios, 2002, No. 77-3290), Paragraph 1 of Article 6 of the International Covenant on Civil and Political Rights (Valstybes zinios, 1992, No. 77-3288), and Article 3 of the European Social Charter (Valstybes zinios, 2001, No. 49-1704). Therefore the goals and objectives of accident prevention are directly associated with the range of problems relating to the protection of the basic values such as human health and life.

The relevance of accident prevention is also reflected in the European Union legislation.

The period of fast development of technical equipment and technologies is related to new dangerous risks to human health and life. Seeking to enhance the efficiency of accident prevention it is expedient to look at the “classical” methodology under the new approach.

Thus, scientifically, issues of the prevention of accidents as separate events and as their totality have always remained topical.

Accidents occur in the environments with source factors hazardous and harmful to human health and life. Some accidents occur in the sphere associated with employment relationships.

In the legal respect the peculiarities of investigation into work-related accidents within the criminal law framework are reflected in the source (Radzevicius, 2004, 2005, 2006, 2007).

The aim of this article is to assess the relevant issues of the accident prevention methodology in Lithuania by employing a scientific approach and to propose methods to improve efficiency of accident prevention. Analysis of problems in this article is a continuation of the author’s earlier researches.

Strategy on occupational health and safety and trends

The issue of prevention of accidents as undesired social phenomena is relevant in the current period of rapid development of machinery and technologies on the scale of the whole European Union. The problem of work-related accidents persists to be especially topical. This is evident from indicators of the European Union and Lithuanian strategy on occupational health and safety. One of the fields of improving these indicators could be a modern solution of prevention issues by using a new methodological approach.

The existing situation and the results to be achieved may be evaluated by discussing the statistical indicators under goals of strategies.

General trends in the work-related accidents are disclosed by an analysis of the officially published indicators.

Researches (Rikhardsson, 2001; Encyclopaedia of Occupational Health and Safety, Fourth Edition, 1998) reveal high costs of occupational accidents. Based on the findings of the European Agency for Safety and Health at Work (1998), approximately 146 million working hours had been lost annually due to occupational accidents in the European Union before the accession of the new member states, what accounted for 2.6%-3.8% of the gross domestic product of the European Union.

Occupational health and safety goals and objectives have been defined in the European Union occupational health and safety strategy: to improve the quality of work and productivity (2007). It emphasizes that owing to the innovative approach to the solution of this problem the number of accidents that resulted in death during 2000-2004 in the EU-15 countries decreased by 17%, whereas the number of occupational accidents that resulted in the inability to work for more than three days dropped by 20%. This strategy also notes that irrespective of the actual progress, the attainment of a more ambitious goal – to cut down the total number of accidents by 25% in the EU-27 member states – is sought.

The importance of such prevention also remains topical in Lithuania. The Strategy on Occupational Health and Safety for Years 2009-2012 approved by the resolution of the Government of the Republic of Lithuania (Valstybes ziniuos, 2009, No. 80-3345) provides for reduction of the number of occupational accidents per 100,000 workers in 2012, in comparison with 2006, from 8.4% to 6.3%, and the number of grave accidents – from 17.8 to 13.4 (by 25%).

The progress achieved in the implementation of the ambitious goals set forth in the Lithuanian Strategy on Occupational Health and Safety for the Years 2009-2012 becomes evident while analyzing the data of the State Labour Inspectorate (hereinafter referred to as the SLI) officially published in its reports (SLI, 2006, 2007, 2008, 2009, 2009, 2010, 2011).

One of the quantitative indicators of work-related accidents as a phenomenon, applied in statistics, is the ratio of accidents per 100,000 employees, expressed by the frequency coefficient *kf*. Let us mark the ratio of the number accidents that resulted in death falling on 100,000 workers as *kfd*, and the number of grave accidents – as *kfs*.

In 2007, in comparison with 2006, the number of work-related accidents that resulted in death (labelled in the reports as occupational accidents) per 100,000 workers (*kfd*) decreased in Lithuania from 8.4 to 7.4 (by 11.90%), whereas *kfs* decreased from 17.8 to 14.4 (by 19.1%). In each subsequent year, in comparison with the preceding year, these indicators were the following, accordingly: in 2008 *kfd* = 5.9

and *kfs* = 11.1, and these, in comparison with 2007, indicate a decline in *kfd* by 20.27% and a drop in *kfs* by 22.92%; in 2009 *kfd* = 4.2 and *kfs* = 9.2 and this, in comparison with 2009, shows a decline in *kfd* by 28.81% and a drop in *kfs* by 17.12%; in 2010 *kfd* = 4.1 and *kfs* = 10.7 and this, in comparison with 2009, shows a decline in *kfs* by 2.38 and an increase in *kfs* by 16.30%. Based on these data for 2007-2010, the average values of the Lithuanian frequency coefficient *kfd* = 5.4 and *kfs* = 11.35, *kfd* showed a decline by 16.3% a year on average, and *kfs* – by 10.71%. The trend of stabilization in the *kfd* indicator and increase in the *kfs* indicator of 2010 also persisted throughout 2011, which is demonstrated by 10-month results of the year 2011. During this period *kfd* = 4.6, and *kfs* = 11.4.

The assessment of such trends shows that there is little probability that the results will considerably improve in 2012. Therefore it is expedient to enhance the efficiency of work-related accident prevention.

Seeking to solve this issue and referring to the assessment of trends of changes in the work-related accidents that resulted in death and grave accidents during 2010-2011, one of the ways to enhance efficiency may be the enhancement of prevention efficiency by using the scientific approach by paying special attention to issues of accident prevention methodology.

Some aspects of accident prevention methodology

Seeking to enhance the efficiency of accident prevention it is expedient to abandon the “classical” approach and to look at the problem under the new systematic approach. In this case the notions of particular terms acquire another sense.

Previously, and sometimes at the present time, an accident is perceived as a local sporadic event, whereas the goal of investigation is focused on the determination of the causal relationship between its direct cause and consequence. The sanctions applied are essentially focused on the penalty and indemnification for damage. Such approach in terms of scientific aspect and systemic approach is deemed unacceptable and adding to the inefficiency of preventive measures.

In general sense, an accident is understood as an unforeseen, unexpected and undesired event that suddenly occurred under the effect of dangerous and hazardous factors and that resulted in a trauma. Although this is an undesired damage-related accident which means a finite action, in terms of the modern methodology this event must be perceived systematically together with the factors determining it in time. By keeping to this essential provision, three factors inter-

related by causal relationships manifest themselves in this system: a hazard that may result in disaster and damage, a phenomenon due to which another phenomenon takes place, and an effect or a result – a consequence. Therefore, all the three factors – hazard, cause, and effect – in respect of scientific methodological approach form the following system interrelated by links making a logically occurring process:

hazard – causes – consequences

In terms of the modern methodological approach there are not one, but several causes of any undesired phenomenon. This means that the notion “causes” is quite complicated and requires a rather qualified investigation. When following this approach the determination of causal relationships between characteristics and parameters of the sources of hazardous or harmful factors that had caused an accident and the implementation of technical standards become especially complicated. This is a sphere of the special knowledge and an object of investigation into the subjects of special knowledge. The investigation of causal relationships in the field of legal standards regulation is an object of legal study.

Such strictly regulated differentiation of competence (Radzevicius, 2006) is not quite constructive in respect of the scientific methodological approach. This is so only because in terms of the legal theory the technical type rules and regulations as well as standards are frequently the legal standards only in terms of the form. Therefore by recognizing the insufficiency of the principle of differentiation between the special and the legal knowledge and the necessity to apply the principle of scientifically coordinated integration of the special and of the legal knowledge in the intermediary stages of investigation, the investigation into accidents as phenomena would become much more comprehensive, and their prevention would become much more efficient. It is noteworthy that the application of integration of the special and of the legal knowledge may be efficient in the intermediary stages of investigation. In such stages of investigation into accidents where the investigation is carried out within the scope of the special knowledge and to the extent of the technical standards, the principle of professionally oriented and accordingly regulated differentiation of the special knowledge should be applied. By applying this principle, the problems of differentiation between the special knowledge by fields and branches of science (Radzevicius, 2006) emerge, and the conception of the special knowledge acquires a regulated meaning.

In the methodological approach, the knowledge of any subject in the environment of the surround-

ing factors hazardous and harmful to his life and health may be divided into three levels (Radzevicius, 2006): the first level – simple knowledge; the second level – specialist knowledge, and the third level – expert or scientist knowledge. The special knowledge first of all covers expert or scientist knowledge in a respective field and branch of science. In specific cases, if there is no need to apply the expert methodology or scientific knowledge, the special knowledge may also include the knowledge of specialists who have the necessary competence. If the established order is not adhered to, the scope of professional competence of specialists, experts and scientists will be violated, as a result, investigation into accidents becomes methodologically non-motivated, insufficiently reliable, whereas prevention measures designed on the basis of such study results are little effective.

As the practice of Lithuanian courts and the scientific research carried out by the author of this article demonstrate, it would be possible to ensure the occupational health and safety guarantees laid down in Article 10 of the Law on Occupational Safety and Health of the Republic of Lithuania (Valstybes žinios, 2003, No. 70-3170) more efficiently if the scientific and expert pool of the special knowledge was properly used.

Prevention and risk management

In scientific respect, prevention management based on the modern methodology is one of the ways to enhance its efficiency. Prevention management directly depends on the management of risk posed by hazardous and harmful factors to human life.

Classical risk assessment explains that the statistics of accidents is an objective unit of measurement of risk (Adams, 1995). Following this approach, the most frequently used indicators (the number of accidents per 100,000 workers within a time unit (in the case indicated by us – *kfd* and *kfs*)) are interpreted as objective risk indicators and are sometimes compared with subjective and most often unprofessional solutions.

As long as discussions on the risk nature on the topic “Risk: analysis, perception and management” are held in the scientific society, professional and competent risk management methods and the sources of measures should result from scientific achievements at the modern level of development of machinery and technology.

When assessing risks posed to a human being by factors hazardous and harmful to his life and health, risk management takes place in the formal and non-formal sectors (Adams, 1995).

The formal sector includes authorities, business and industry. Here, the special and the scientific

knowledge are manifested, the aim of which is to raise awareness of risks in the employment sphere.

The non-formal sector covers children and adults, daily personal activities of a human being. The goal of risk management of this type is to balance out the undefined risks. Individual risk management also reflects human behaviour in terms of human factors. Risk management can be individual and collective.

Therefore its management is rather complicated. If risk is managed by using a collective approach, its management becomes simpler.

Studies have been carried out and term of a risk has been scientifically substantiated (Adams, 1995). Here, risk is seen as a probability “that a specific unfavourable event occurs in a particular moment or is a consequence of some specific change”.

It is also stressed that according to the statistics theory, a risk as a probability surrenders to all formal laws of combination of probabilities.

This gives a reason to state that for the assessment and management of risk in scientific respect the probability theory should be used. Its application for risk management forms a basis for scientifically grounded risk management. By focussing risk management in this direction the reserves of risk management can be disclosed and the prevention process can be guided.

Generally, risk to life and health of a human being is posed by the human factor and hazardous

and the harmful factors of dangerous sources.

When talking about the human factor it is necessary to assess the essence of the risk posed by this factor.

According to the explanation of essence of the notion of “risk” provided in modern dictionaries, the essence of the notion of “risk” can be understood differently:

- as a determination to act being aware that there is a probability of failure in reaching a goal; or determination to disregard the possible negative effects of accidental circumstances;
- as circumstances under which a failure may occur to a person who has decided to take a particular action or not to take any action;
- as a probability of failure.

Based on the explanations, it follows that risk may mean a conscious action of a subject who perceives or does not perceive the possible negative consequences thereof. This is especially important in the legal practice.

Moreover, in the legal practice the origin and nature of the sources of hazardous and harmful factors is relevant. When determining and assessing them, it is rational to remember the life cycle of a material object which in each separate case of an accident was a source of a factor hazardous or harmful to a human being, divided into separate life stages. This is illustrated in Figure 1.

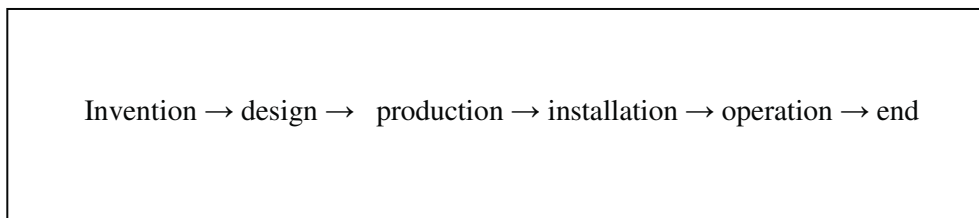


Fig. 1. Life cycle of material object

The sequence indicated in Figure 1 illustrates safety and at the same time risk regulated by respective technical and legal standards by separate stages of the cycle. In each stage of the cycle the subject’s action or inaction characteristic of that stage manifests itself.

One of the most characteristic features in such a cycle is the fact that insufficient non-assurance of risks in previous stages may recur in each subsequent stage. This underlies the causal relationship.

However, how often, when assessing the risk that has caused an individual specific accident, one

is limited to the identification of the reasons by analyzing the risks caused in the last stage of the cycle (Radzevicius, 2006)? Such a limitation does not provide for the possibilities for progressive prevention.

In a general case, the prevention of accidents may be influenced by a priori and a posteriori management of them. By marking the process of managing the totality of hazardous and harmful factors within a particular period as $\sum Fdh$, the risk a priori as Rpr , and the totality of accidents during the very same period as $\sum A$, their consequences as $\sum C$ and the risk a posteriori as $Rpost$, risk management can be illustrated as follows:

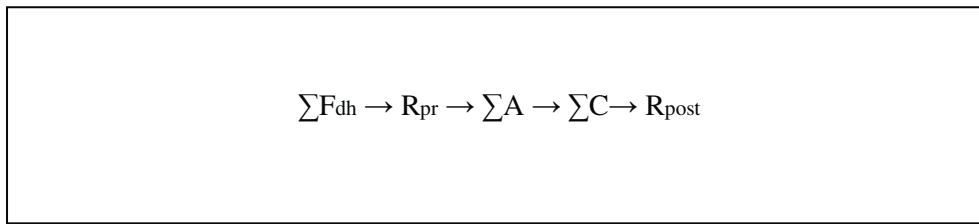


Fig. 2. Risk management diagram

From this diagram it is evident that risk management is a rather complicated process that depends on a number of factors. In this case, the identification of hazardous and harmful factors, the determination of causes of accidents interrelated by causal relationships, and the analysis of effects are very important in this process.

When managing risks caused by hazardous and harmful factors under the a priori principle it is expedient to be guided by the laws of the probability theory; whereas when managing risks on the basis of a posteriori principle it is reasonable to apply the methods of the statistics theory (Radzevicius, 2002).

In the legal respect, risk caused by hazardous and harmful source factors may be of permanent and of accidental nature. In the legal respect, permanent-type risk can be associated with lasting events, whereas accidental-type risk can be associated with unpredictable events.

It follows that assessment of the risk caused within the time coordinate is important not only in the preventive respect, but also in the legal practice.

Based on the risk assessment framework discussed above billions of technical- and legal-type decisions are taken every day. In case of any specific accident as an event, its causes consist in the hazard posed by potential risk. Thus, when analysing risks, the process of investigation into accidents and the objectivity of its conclusion on its causes may not be ignored.

Spheres for improving investigations into accidents

The findings of investigations into accidents are very significant for the efficiency of accident prevention. This, in its own turn, depends on the accident investigation methodology the necessity for which is sometimes disregarded.

An accident should be viewed as a logically occurring process the consequences of which are interrelated with its sources and which forms the system “hazard – causes – consequences”, this should lead to improvement in accident prevention efficiency.

However, as it is evident from investigations carried out by the author, there are frequent cases when investigating an accident it is approached as an

isolated local event and the investigator only seeks identification of one specific cause thereof. Such approach should not be tolerated in scientific area.

Generally, causes of an accident emerge in the management environment of specifically regulated hazardous and harmful factors, and in the general environment. In this respect, accidents are classified as either work-related accidents or non-work-related accidents. In the first case, risk management conditionally takes place in the formal sector, and in the second case – in the non-formal sector. We will limit ourselves to the analysis of investigations in the formal sector. This would include only work-related accidents.

In the research sphere, the principle of identification of causes of an accident based on the a posteriori principle has been known since long ago. This method called “A tree of causes” in the international practice has been recognized and referenced in the publications of the International Labour Organization, including the Encyclopaedia of Occupational Health and Safety, Fourth Edition, 1998. This method is recommended to be applied also in the forensic examination practice in the field of occupational safety in Lithuania (Lietuvos teismo ekspertizės centras, 2006). This has not acquired a broader scope, however. After applying this method and preparing the methodology based on this approach, the quality of investigations into work-related accidents would considerably improve. It is probable that this could also have a significant positive effect on the improvement of accident prevention.

Summing up

As it is evident from the analysis provided, not all possibilities to improve the efficiency of accident prevention have been used in Lithuania. Analysis has shown that the enhancement of efficiency of accident prevention should be based on the principles of the modern new approach to prevention.

It should be stressed that one of the directions towards enhanced accident prevention efficiency could be the improvement of the expert methodology based on research and other countries’ practice which has been partially reflected in the publication of the International Social Security Association (ISSA) and in ot-

her sources (Interdisciplinary research for safety and health protection at work, 1995; Karst, 1992; Smirnova, 2004, etc.). It is expedient to pass over from these general provisions to the specific fields the problems in which have been periodically discussed in particular sections of the publication by ISSA. We have such examples in Lithuania, too – in the identification of expertise problems (Dejus, Radzevicius, 2005), and in the field of electrical-engineering expertise (Radzevicius, 2009). All this research activity, however, covers only the area of forensic examination, and has not been developed in activities of non-expert public institutions.

When analysing the prevention of work-related accidents, attention should be drawn to the fact that these problems should be solved by applying the principle of sharing indicated in Convention 155 of the International Labour Organization (1981) and Recommendation 164 (1981), i.e. at the level of the state and of the companies.

Conclusions

To sum up the analysis and the thoughts provided in this article, the following conclusions should be drawn:

1. The strategic goals to significantly reduce accidents and the results of analysis of statistical indicators of accidents demonstrate that accident prevention currently remains a topical problem in Lithuania, which requires a new approach to the solution of it.

2. The effect of enhancing of efficiency of accident prevention should result from the modern scientific achievements in the prevention methodology, the principle of scientifically coordinated integration of the special and of the legal knowledge in the intermediary stages of investigation should be applied.

3. The main method of enhancing the prevention efficiency in Lithuania should be the management of the environment of factors hazardous and harmful to a human being in the formal and non-formal sectors of the surrounding environment of hazardous and harmful factors, according to particularity of sectors.

4. When investigating accidents, the systemic principle based on causal relationships and proclaiming that each accident is not a sporadic local event, but a phenomenon determined by interrelated causes, should be adhered to.

5. It is expedient to develop the prevention of work-related accidents in a differentiated manner at the levels of the state and of the companies as indicated in Recommendation 164 and Convention 155 of the International Labour Organization.

References

1. Adams, J. (1995). *Risk*. UCL Press.
2. Dejus, T., Radzevičius, L. (2005). *Statybos darbų saugos teismo techninių ekspertizių atlikimo modelis*. Vilnius. Teismo ekspertizės raida: Pasiekimai ir iššūkiai. Tarptautinės mokslinės praktinės konferencijos medžiaga.
3. *Encyclopaedia of Occupational Health and Safety. Fourth Edition*. (1998). Geneva: International Labour Office.
4. European Agency for Safety and Health at Work. Available online at <http://europe.osha.eu.int/OSHA>.
5. Europos socialinė chartija. *Valstybės žinios*. 2001, Nr. 49-1704.
6. *Interdisciplinary research for safety and health protection at work* (1995). 5th International Symposium of the ISSA Research Section: Proceedings. Bonn.
7. International Labour Organization Convention No. 155 Occupational Safety and Health Convention (1981). Available online at <http://www.ilo.org/ilolex/cgi-lex/convde.pl?C155>.
8. International Labour Organization Occupational Safety and Health recommendation No. 164 (1981). Available online at <http://www.ilo.org/ilolex/cgi-lex/convde.pl?R164>.
9. Karst, M. (1992). *Methodische Entwicklung von Expertensystemen*. Wiesbaden: Deutscher Universitäts-Verlag GmbH.
10. Komisijos komunikatas Europos Parlamentui, Tarybai, Europos ekonominių ir socialinių Regionų komitetui: „2007-2012 m. Bendrijos darbuotojų saugos ir sveikatos strategija: gerinti darbo kokybę ir našumą.“ (2007). Europos Sąjungos Taryba. Europos Bendrijų komisija. Available online at <http://www.vdi.lt/index.php?1491630181>.
11. Lietuvos Respublikos darbuotojų saugos ir sveikatos įstatymas. *Valstybės žinios*. 2003, Nr. 70-3170.
12. Lietuvos Respublikos Konstitucija. *Valstybės žinios*. 1992, Nr. 33-1014.
13. Lietuvos Respublikos Vyriausybės 2009 m. birželio 25 d. nutarimas Nr. 669 „Dėl Darbuotojų saugos ir sveikatos 2009-2012 metų strategijos ir jos įgyvendinimo 2009-2010 metų priemonių plano patvirtinimo“, *Valstybės žinios*. 2009, Nr. 80-3341.
14. Radzevičius, E. (2007). *Pagrindiniai įvykio vietos apžiūros trūkumai tiriant nusikalstamus darbų saugos taisyklių reikalavimų pažeidimus*. Vilnius: Kriminalistika ir teismo ekspertizė: mokslas, studijos, praktika. Mokslo darbų rinkinys. Mykolo Romerio universitetas, 157-162.
15. Radzevičius, E. (2006). *Specialių žinių panaudojimas tiriant nusikalstamus darbų saugos taisyklių reikalavimų pažeidimus: teorija ir praktika Lietuvoje*. (Daktaro disertacija, Mykolo Romerio universitetas).
16. Radzevičius, E. (2005). *Specialių žinių taikymo problemos tiriant nusikalstamų darbų saugos pažeidimų įvykius Lietuvoje*, 66 (58). Vilnius: Jurisprudencija. Mokslo darbai. Mykolo Romerio universitetas.
17. Radzevičius, L., Radzevičius, E. (2009). *Elektrotechninė teismo ekspertizė: Teoriniai aspektai, problemos*

- ir galimos jų sprendimo kryptys Lietuvoje*. Vilnius: Kriminalistika ir teismo ekspertizė: Mokslo, studijos, praktika VI, Kolektyvinė monografija, 335-340.
18. Radzevičius, L. (1996). *Teismo darbų saugos ekspertizės: galimybės ir darymo problemos*. Vilnius: Kriminalistikos ir teismo ekspertizės problemos. Mokslo darbų rinkinys. Lietuvos Respublikos teisingumo ministerija. Lietuvos teismo ekspertizės centras.
 19. Rikhardsson, M. *Accounting for the cost of occupational accidents* Available online at Willey InterScience (<http://www.interscience.wiley.com>), DOI 10.1002/csr.052.
 20. Tarptautinis ekonominių, socialinių ir kultūrinių teisių paktas. *Valstybės žinios*. 2002, Nr. 77-3290.
 21. Tarptautinis pilietinių ir politinių teisių paktas. *Valstybės žinios*. 2002, Nr. 77-3288.
 22. *Teismo darbų saugos ekspertizė. Metodinis laiškas*. Parengė doc. dr. Lionginas Radzevičius. (2006). Vilnius: Lietuvos teismo ekspertizės centras.
 23. Valstybinės darbo inspekcijos ataskaita apie darbuotojų saugos ir sveikatos būklę bei darbo įstatymų vykdymą įmonėse, įstaigose ir organizacijose 2006 metais. Available online at <http://www.vdi.lt/index.php?1716170122>.
 24. Valstybinės darbo inspekcijos ataskaita apie darbuotojų saugos ir sveikatos būklę bei darbo įstatymų vykdymą įmonėse, įstaigose ir organizacijose 2007 metais. Available online at <http://www.vdi.lt/index.php?1716170122>.
 25. Valstybinės darbo inspekcijos ataskaita apie darbuotojų saugos ir sveikatos būklę bei darbo įstatymų vykdymą įmonėse, įstaigose ir organizacijose 2008 metais. Available online at <http://www.vdi.lt/index.php?1716170122>.
 26. Valstybinės darbo inspekcijos ataskaita apie darbuotojų saugos ir sveikatos būklę bei darbo įstatymų vykdymą įmonėse, įstaigose ir organizacijose 2009 metais. Available online at <http://www.vdi.lt/index.php?1716170122>.
 27. Valstybinės darbo inspekcijos ataskaita apie darbuotojų saugos ir sveikatos būklę bei darbo įstatymų vykdymą įmonėse, įstaigose ir organizacijose 2010 metais. Available online at <http://www.vdi.lt/index.php?1716170122>.
 28. Valstybinės darbo inspekcijos informacija apie darbuotojų saugos ir sveikatos būklę bei darbo įstatymų vykdymą įmonėse, įstaigose ir organizacijose 2011 metais. Available online at <http://www.vdi.lt/index.php?1716170122>.
 29. Visuotinė žmogaus teisių deklaracija. *Valstybės žinios*. 2006, Nr. 68-2497.
 30. Work related accident costs. *Encyclopaedia of Occupational Health and Safety*. Fourth Edition. Available online at <http://www.ilo.org/encyclopedia/?d&nd=857100139&prevDoc=857000275>.
 31. *Zusammenfassungen internationaler Arbeits normen* Genf, Schweiz: Internationale Arbeitsamt.
 32. Радзявичюс, Л., Радзявичюс, Э. (2002). *Применение математических методов в технической экспертизе*. Харьков: Труды международной научно-практической конференции „Теория и практика судебной экспертизы и криминалистики“, Харьковский научно-исследовательский институт судебной экспертизы им. Засл. проф. М.С. Бокариуса, Право, 462–466.
 33. Šačė ač-žn, Ž. (2004). *Изменения условий и методики расследования преступлений и уголовных проступков при несоблюдении требований правил техники безопасности*. Харків: Теорія та практика судової експертизи і криміналістики. Збірник науково-практичних матеріалів. Випуск 4., Право, 63-68.
 34. Смирнова, С. (2004). *Судебная экспертиза на рубеже XXI века. Состояние, развитие, проблемы*. Питер.

Radzevičius, E.

Nelaimingų atsitikimų prevencijos metodologijos šiuolaikinės aktualijos

Santrauka

Straipsnyje moksliniu požiūriu analizuojamos nelaimingų atsitikimų prevencijos metodologijos aktualijos Lietuvoje. Nelaimingų atsitikimų prevencija nagrinėjama egzistuojančios rizikos kontekste. Išplėta nelaimingų atsitikimų rizikos sąvoka, išskirti jos valdymo principai, siejant su galimomis pasekmėmis.

Žmogaus gyvybės ir sveikatos kaip aukščiausių vertybių svarba įtvirtinta Lietuvos Respublikos Konstitucijoje, atsispindi Lietuvos Respublikoje ratifikuotuose fundamentaliuose tarptautinės teisės šaltiniuose. Nelaimingų atsitikimų kaip nepageidaujamo socialinio reiškinių prevencijos problema, ypač nelaimingų atsitikimų, susijusių su darbo santykiais srityje, šiuolaikiniame spartaus technikos ir technologijos plėtojimo laikotarpyje yra aktuali tiek Europos Sąjungos, tiek Lietuvos mastu. Straipsnio tikslas – moks-

liniu požiūriu įvertinti nelaimingų atsitikimų prevencijos metodologijos aktualijas Lietuvoje, numatant būdus, kaip gerinti nelaimingų atsitikimų prevencijos efektyvumą.

Straipsnyje, atsižvelgiant į strateginius tikslus, analizuojami Valstybinės darbo inspekcijos duomenys nelaimingų atsitikimų skaičiaus santykio 100 000 dirbančiųjų, mirtimi pasibaigusių nelaimingų atsitikimų skaičiaus santykio 100 000 dirbančiųjų ir sunkių nelaimingų atsitikimų aspektais ir siūloma kelti su darbo santykiais susijusių nelaimingų atsitikimų prevencijos efektyvumą.

Anksčiau, kartais ir šiuo metu nelaimingas atsitikimas suvokiamas kaip lokalinis pavienis įvykis, o jo tyrimo tikslas nukreiptas į priežastinio ryšio tarp jo vienos tiesioginės priežasties ir pasekmės nustatymą. Taikomos sankcijos yra iš esmės orientuotos į bausmę ir žalos atlyginimą.

Toks požiūris moksliniu aspektu ir sisteminiu požiūriu laikytinas nepriimtiniu, veikiančiu prevencinių priemonių neefektyvumą.

Bendru atveju nelaimingas atsitikimas suprantamas kaip dėl pavojingų ir kenksmingų veiksmų poveikio staiga įvykęs nenumatytas, netikėtas ir nepageidautinas įvykis, kurio pasekmė – trauma. Šiuolaikinės metodologijos požiūriu šis įvykis turi būti suvokiamas sistemiskai su jį sąlygojusiais veiksniais laike. Šioje sistemoje reiškiasi trys, tarpusavyje priežastiniais ryšiais susiję, veiksniai: pavojus, priežastis ir pasekmė.

Šiuolaikiniu metodologiniu požiūriu bet kurio nepageidaujamo reiškinio priežastis yra ne viena, o kelios, kurių nustatymas reikalauja kvalifikuoto tyrimo. Straipsnyje konstatuojamas specialių ir teisinių žinių diferenciacijos principo nepakankamumas ir būtinybė tarpiniuose tyrimo stadijose pereiti prie moksliskai sukoordinuoto specialiųjų ir teisinių žinių integracijos principo. Metodologiniu požiūriu bet kurio subjekto žinios jį supančių jo gyvybei ir sveikatai pavojingų ir kenksmingų veiksmų erdvėje suskirstomos į lygius pagal kompetenciją – paprastąsias žinias, specialisto žinias ir eksperto-mokslininko žinias. Konstatuojama, kad tinkamai išnaudojus mokslinį ir ekspertinį specialių žinių rezervą, galima efektyviau užtikrinti darbuotojų saugos ir sveikatos garantijas.

Straipsnyje teigiama, kad šiuolaikine metodologija grindžiamas prevencijos valdymas yra vienas būdų jos efektyvumui didinti. Prevencijos valdymas tiesiogiai priklauso nuo žmogaus gyvybei ir sveikatai pavojingų ir kenksmingų veiksmų keliamos rizikos valdymo. Konstatuojama, kad moksliniu požiūriu rizikos vertinimui ir valdymui turi būti panaudota tikimybių teorija.

Vertinant pavojingų ir kenksmingų veiksmų šaltinių kilmę ir jų prigimtį vadovaujamosi objekto gyvavimo ciklo stadijomis (išradimas, projektavimas, gamyba, įrengimas, eksploatacija, baigtis). Daroma išvada, kad nepakankamas rizikos neužtikrinimas gali kartotis kiekvienoje po

jos einančioje stadijoje. Pateikiama rizikos valdymą iliustruojanti schema.

Nagrinėjamos nelaimingų atsitikimų tyrimo tobulinimo kryptys. Nustatant nelaimingo atsitikimo priežastis, siūloma vadovautis aposterioriniu principu grindžiamu ekspertinėje praktikoje taikomu „priežasčių medžio“ metodu.

Straipsnyje daromos šios išvados:

1. Strateginių tikslų – gerokai sumažinti nelaimingų atsitikimų skaičių – ir statistinių rodiklių analizės rezultatai rodo, kad nelaimingų atsitikimų prevencija šiandien Lietuvoje išlieka aktuali, naujo požiūrio į jos sprendimą reikalaujančia problema.
2. Nelaimingų atsitikimų prevencijos efektyvumo didinimo efektas turtėtų išplaukti iš prevencijos metodologijos šiuolaikinio mokslo pasiekimų, tarpinėse nelaimingų atsitikimų tyrimo stadijose pereinant prie moksliskai sukoordinuoto specialiųjų ir teisinių žinių integracijos principo.
3. Pagrindiniu būdu prevencijos efektyvumui didinti Lietuvoje laikytinas pavojingų ir kenksmingų veiksmų valdymas žmogaus jį supančios pavojingų ir kenksmingų veiksmų aplinkos tiek formaliame, tiek neformaliame sektoriuose, įvertinus šių sektorių specifiką.
4. Tariant nelaimingus atsitikimus turi būti laikomasi priežastiniais ryšiais grindžiamo sisteminio principo, kad kiekvienas nelaimingas atsitikimas yra ne pavienis lokalus įvykis, o tarpusavyje susietų priežasčių sąlygotas reiškinys.
5. Su darbo santykiais susijusių nelaimingų atsitikimų prevencija tikslinga plėtoti diferencijuotai Tarptautinės darbo organizacijos 155 Konvencijoje ir 164 Rekomendacijoje nurodytuose valstybės ir įmonių lygiuose.

Pagrindiniai žodžiai: nelaimingas atsitikimas, prevencija, rizika, metodologija.

The article has been reviewed.

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