



# ПРОГРАММА

ХII Международной научно-практической конференции

## «ТРАНСПОРТНАЯ ИНФРАСТРУКТУРА СИБИРСКОГО РЕГИОНА»



Конференция посвящена Году науки и технологий

6 – 8 октября

Иркутск 2021

Федеральное агентство железнодорожного транспорта  
ФГБОУ ВО «Иркутский государственный университет путей сообщения»  
ФГБОУ ВО «ГУМРФ имени адмирала С.О. Макарова»  
ФГБОУ ВО «Сибирский государственный университет путей сообщения»  
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Белорусско-Российский университет  
Правительство Иркутской области

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## РЕГЛАМЕНТ РАБОТЫ КОНФЕРЕНЦИИ

### Первый день конференции - 6 октября, среда

14:00 – 16:00\*

**Открытие конференции, пленарное заседание**

#### **РАБОТА СЕКЦИЙ**

16.00 – 18.00

Секция № 3 - Правовые, исторические, социокультурные и психологические аспекты транспортного развития Сибири

16.00 – 18.00

Секция № 12 - Машины и механизмы для ремонта пути

### Второй день конференции – 7 октября, четверг

#### **РАБОТА СЕКЦИЙ**

13.00 – 15.00

Секция № 10 - Инжиниринг и электроэнергетика транспорта

13.00 – 15.00

Секция № 5 - Системы обеспечения движения поездов

13.00 – 15.00

Секция № 7 - Информационные технологии на транспорте

13.50 – 16.00

Секция № 4 - Эксплуатационная работа, транспортная логистика и взаимодействие участников транспортного рынка

14.00 – 16.00

Секция № 1 - Экономика и управление на транспорте

14.00 – 16.00

Секция № 8 - Техносферная и экологическая безопасность

14.00 – 16.00

Секция № 11 - Проектирование, строительство и эксплуатация железнодорожного пути и искусственных сооружений

16.00 – 18.00

Секция № 6 - Актуальные проблемы водного транспорта

### Третий день конференции – 8 октября, пятница

10.00 – 12.00

Секция № 9 - Эксплуатация и ремонт подвижного состава

13.00 – 15.00

Секция № 2 - Естественно-научные основы современных технологий на транспорте

16.00 – 17.00

**Подведение итогов конференции**

\*-время в программе указано местное (Иркутск)

**СЕКЦИЯ № 8**  
**Техносферная и экологическая безопасность**  
7 октября (начало работы в 14:00)

**ВХОД**

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2.	<i>Гаранин А.Е., Юрьев А.В., Юрьева Д.А., Ремянников К.П., Миллер Д.П.</i> ПРИМЕНЕНИЕ ЭЛЕКТРОГИДРОИМПУЛЬСНОГО СПОСОБА РАЗРУШЕНИЯ ДЛЯ УТИЛИЗАЦИИ ЖЕЛЕЗОБЕТОННЫХ ОТХОДОВ
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4.	<i>Солодов Г.С.</i> АЛГОРИТМЫ ИСПОЛЬЗОВАНИЯ ПАТЕНТНЫХ БАЗ ПРИ ВЫПОЛНЕНИИ РАБОТ ПО ПРЕДПРИЯТИЯХ ЖЕЛЕЗНЫХ ДОРОГ
5.	<i>Solonshchikov P.N.</i> METHODOLOGY FOR ASSESSING INJURIES AT ENTERPRISES OF THE AGRO-INDUSTRIAL COMPLEX
6.	<i>Yekimov S., Nianko V.</i> FORMATION OF ENVIRONMENTAL CULTURE AMONG FOREIGNERS IN CZECH LANGUAGE COURSES
7.	<i>Malikov V.N., Ishkov A.V.</i> SUBMINIATURE EDDY-CURRENT TRANSDUCER FOR DETECT VIOLATIONS IN WELDED JOINTS OF STEEL
8.	<i>Kuleshov V.V., Zolkin A.L., Koval Yu.N., Kudryakov A.G.</i> IMPROVING THE OCCUPATIONAL SAFETY MANAGEMENT SYSTEM USING EXAMPLE OF MECHANICAL ENGINEERING ORGANIZATION
9.	<i>Denisov V.A., Kataev Yu.V., Gerasimov V.S., Mishina Z.N., Ilmukhametov A.F.</i> PROBLEMS OF THE FORMATION OF THE "AGRICULTURAL RECYCLING" SYSTEM IN THE AGRO-INDUSTRIAL COMPLEX OF THE RUSSIAN FEDERATION
10.	<i>Kuleshov V.V., Zolkin A.L., Bityutskiy A.S., Dragulenko V.V., Chistyakov M.S.</i> INTRODUCTION OF VISION ZERO INTO TRANSPORT COMPLEX
11.	<i>Deryabin I.V.</i> ON REDUCING THE NOISE OF THE INTERNAL COMBUSTION ENGINE OF A MOTOR VEHICLE
12.	<i>Solonshchikov P., Moshonkin A.</i> DETERMINATION OF SAFETY PARAMETERS FOR CARS AND TRACTORS
13.	<i>Solonshchikov P., Kosolapov E.</i> DETERMINATION AND CALCULATION OF SAFE TURNS FOR VARIOUS VEHICLES
14.	<i>Frolov N.O., Elkin E.M.</i> IMPROVING THE SAFETY OF TRAIN LIGHTING DEVICES IN CURVES
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16.	<i>Okrut S.V., Bezgina J.A., Stepanenko E.E., Zelenskaya T.G., Khalikova V.A.</i> ASSESSMENT OF THE IMPACT OF MOTOR TRANSPORT ON THE ECOLOGICAL STATE OF THE ATMOSPHERIC AIR OF URBANIZED AREAS
17.	<i>Alisin V.V.</i> ANTIFRICTION PROPERTIES OF CERAMIC MATERIALS UNDER HIGH-SPEED SLIDING PROCESS
18.	<i>Saulova T.A., Efremova I.S.</i> TOOLS FOR REGULATING NOISE LOADS FROM AUTOMOBILE URBAN TRANSPORT
19.	<i>Likhanov V.A., Lopatin O.P., Yurlov A.S., Medvedev V.I., Yunusov G.S., Novikov A.M.</i> RESULTS OF CALCULATIONS OF SOOT FORMATION IN A TRACTOR DIESEL ENGINE RUNNING ON BIOFUEL

## **Introduction of Vision zero into transport complex**

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**Abstract.** Transport industry organization has been studied in this article. Analyses of existing HSE management system as well as results of special assessment of labour conditions and accident rate have been carried out for this purpose. Based on this analysis it is proposed to implement the improved approach for improvement of effectiveness of HSE management system - Vision zero concept. Scientific literature on the proposed concept has been reviewed. Its main advantages for implementation in production are highlighted. It is noted that Vision zero concept is needed to be considered with more attention by occupational safety researchers. The article presents an analysis of the publication activity of the authors, showing the level of scientific interest in this research topic. The following information is also presented: which countries, scientific circles pay more interest in the topic under study. Steps on the introduction of seven "golden rules" are proposed and implemented.

**Key words:** Vision zero, leading indicators, lagging indicators, HSE management system, accident rate, safety culture.

### **Introduction**

Currently one of the most widely discussed issues in the area of occupational safety is decreasing the accidents at the workplaces. This topic is a problematic one for both - Russian Federation organization and foreign countries [1–3]. At the same time, in order to increase the efficiency of the HSE management system, various methods that allow to improve the level of culture and safety in organizations are considered. One of these tools is the "Vision Zero" concept [4]. In December 2017, the Ministry of Labour and Social Protection of the Russian Federation and the International Social Security Association (ISSA) signed a memorandum to promote the Vision Zero concept in Russia. As for today the movement has united about 6,000 organizations. However, on the scale of Russia, where, according to official statistics, about 4.3 million enterprises and organizations are registered, this number is negligible.

### **Problem Statement**

The Vision zero concept has been developed by the International Social Security Association (ISSA) with the aim of reducing injury rates in a wide range of workplaces. The Vision zero concept is based on the assumption that all accidents can be prevented or the desire and commitment to create and maintain safe workplaces, as well as to prevent any adverse situations leading to accidents or injuries [5–7]. It shall be noted that this concept primarily focuses on the "Goal" of achieving zero accidents. According to the authors [8], Vision zero has been designed for use in various organizations and needed more attention from researchers in the field of labour protection. At the same time, one of the directions of this concept is the elimination of a formal approach to labour protection and safety at work. Vision zero forms a qualitatively new approach to the organization of prevention of incidents, failures and accidents. It combines three areas at all levels of production: safety, well-being and health [9; 10]. Thus, the Vision Zero concept is an effective tool for increasing the efficiency of the HSE management system.

### **Research questions**

In order to analyse the current situation on studied problem the analysis of scientific papers in “Web of science” scientometrical base has been carried out. This scientific papers base is one of perspective bases that currently have the reliable data on scientific papers. Analysis has been carried out for «Vision zero», «Zero accident vision» and «zero injuries» terms. 189 articles have been found in researched period. Publication activity per years is given in Figure 1.

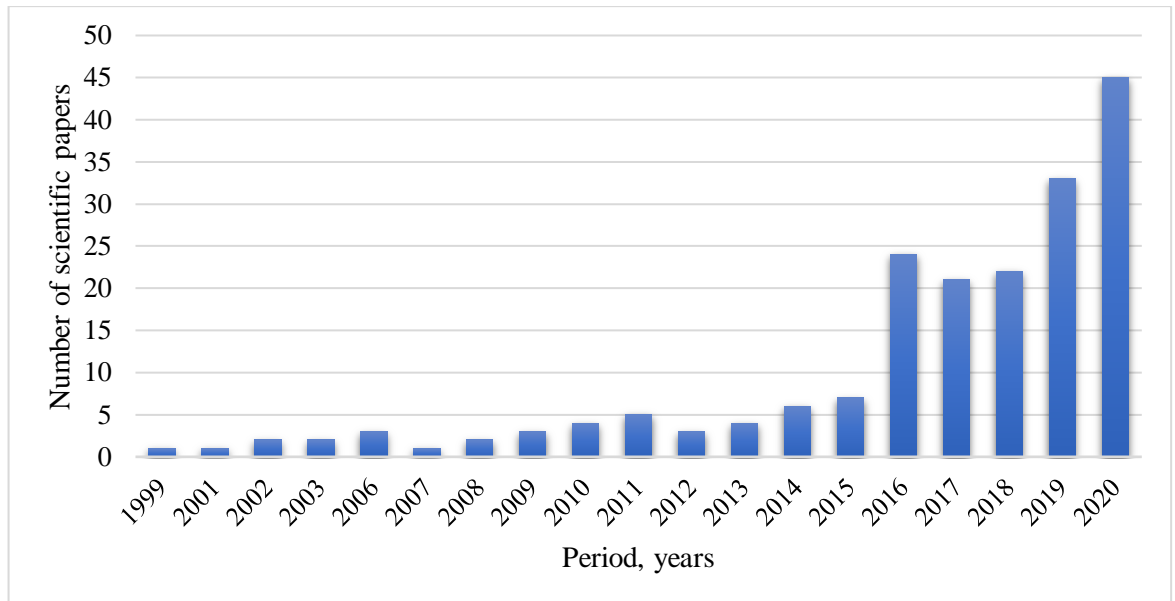


Fig. 1 - Publication activity on Vision zero.

Publications have also been analysed in terms of countries where they have been studied. These results are presented in Figure 2.

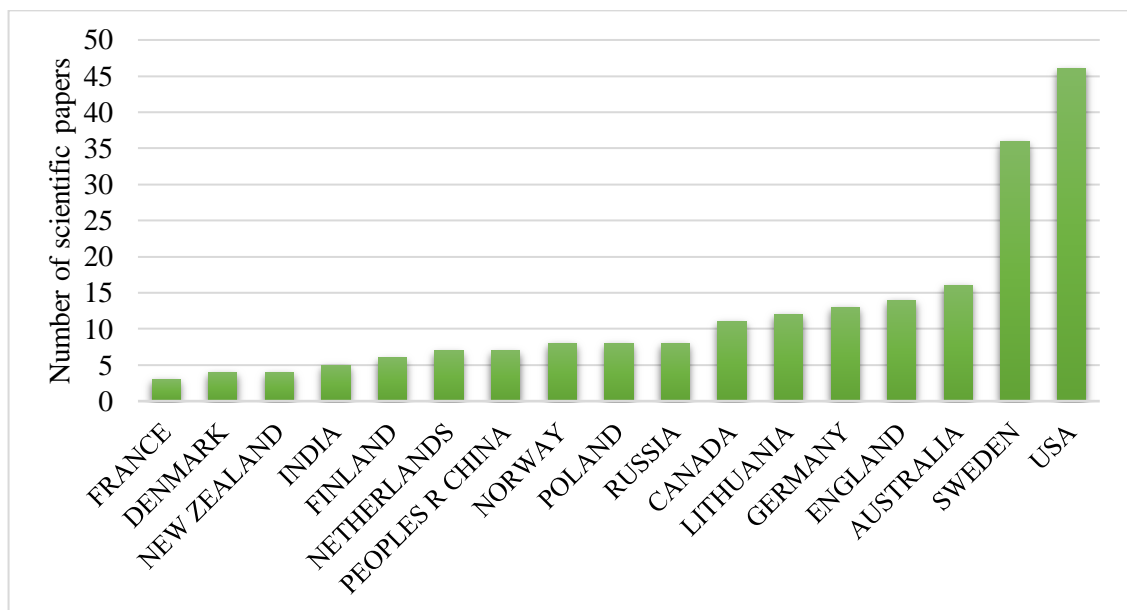


Fig. 2 Geographic location of authors that have carried out the studies

Along with this, according to the analysis, it has been revealed that most of the papers have been written in English (178). At the same time, 30 scientific works for the study received support in the form of grant funding. Thus, the Vision zero approach is relevant today. At the same time, this approach is a good tool for improvement of HSE management system in organizations.

### Materials and methods

To carry out this work, the organization of a transport complex with a population of 270 people has been chosen. The main focus of the company is the production of individual spare parts and metal products.

In this work, empirical research methods have been used: the study of various sources of information, the analysis of the obtained information, as well as the implementation of the results obtained in a specific organization of the transport complex. To study scientific activity, the Web of Science scientometrical database has been used. Along with this, an analysis of the scientific literature has been carried out. Also, the authors of this work investigated the organization in order to identify harmful working conditions at workplaces, as well as the existing accident ratio.

### Results

According to the results of a special assessment of working conditions, the organization has 210 workplaces, where 270 people in total are worked. In order to determine the existing situation in the organization, an analysis of various areas that relate to labour protection has been carried out.

According to the report of the special assessment of working conditions, more harmful working conditions are registered in the organization. Figure 3 shows the analysis result expressed in percents.

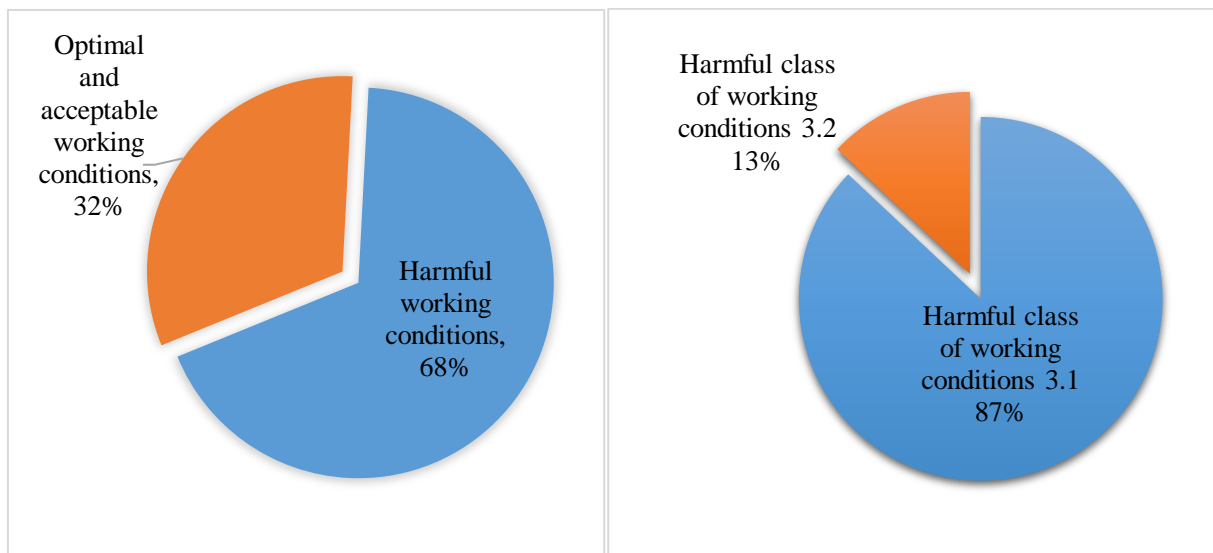
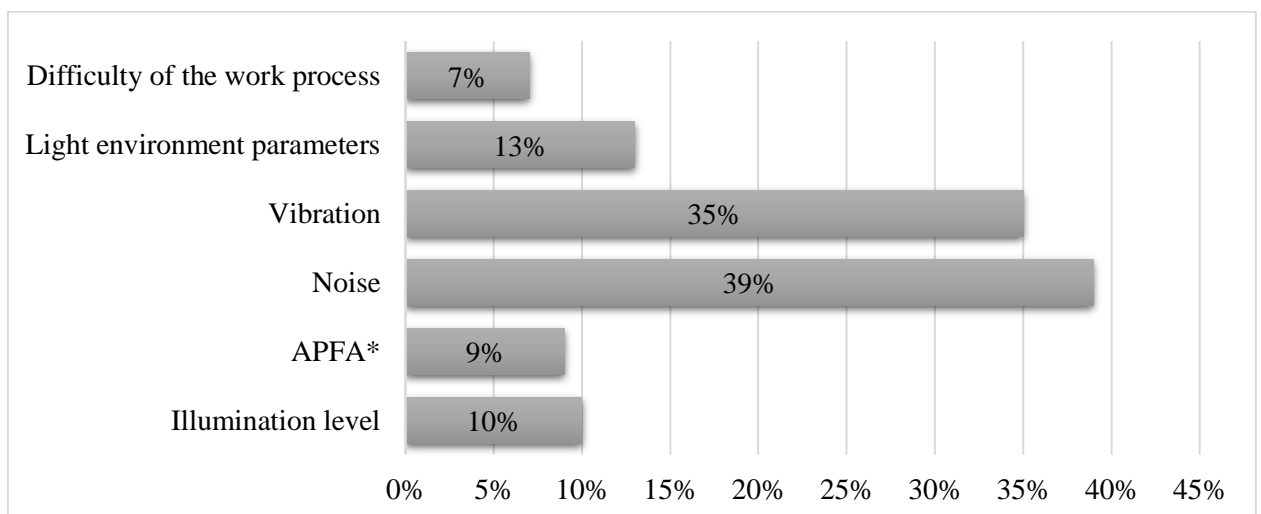


Fig. 3 Percentage ratio of harmful production factors prevailing in the organization

Along with this, the distribution of harmful working conditions has been analysed by factors of the production process. These results are presented in Figure 4.



\*Strongly fibrogenic aerosols

Fig. 4 Percentage ratio of harmful production factors prevailing in the organization



Along with this, an analysis of injuries in the studied organization over the past 5 years has been carried out. In the course of the study, it was revealed that 109 accidents have been registered in the organization. 93 of them have been classified as light, 14 as severe and 2 as accidents with fatal outcomes. Consequently, with such a level of injuries, measures to improve working conditions in the organization are needed in order to reduce the level of occupational risk, which will lead to a decrease in injuries.

### **Findings**

To improve the current situation in the studied organization of the transport complex, it is proposed to introduce the Vision zero concept. This will allow not only taking “temporary” measures to reduce the accident ratio, but will also help launch a “mechanism” that will improve the HSE management system over time. Today, to analyse the current level of the HSE management system, lagging indicators are often used. These indicators are based on information about injuries and occupational diseases that occurred earlier [11; 12]. According to the authors [13–15], this type of indicators does not allow to obtain objective data that will help to solve the existing problems in the organization in advance. Therefore, this tool cannot provide an adequate level of injury reduction. Moreover, since our goal is to provide a high level of health and safety in the organization, it is necessary to introduce a better approach. Thus, the Vision zero concepts will provide assistance on a different level, i.e. it is based on seven goals or "seven golden rules", each of which covers a different area of activity of the enterprise. This will allow carrying out early identification of events or deficiencies that adversely affect injury rates.

### **Discussion**

Based on the carried out analysis, it has been decided to carry out a step by step implementation of the Vision zero concept.

In order to do it a conversation with the management of the organization was held to explain the value of their commitment and leadership in motivating employees to follow the HSE rules and requirements.

This was aimed on implementation of the first Vision zero goal: "Becoming a leader is showing commitment to principles." Further, as the analysis showed, the organization did not have a method for assessment of professional risks. In order to deal with this situation it was proposed to use the decision matrix method [16]. This method is simple to implement and will help to achieve the necessary first results in this direction. Thus, efforts have been made to achieve the following goal: "Identify threats is to control risks".

The organization has already created the HSE management system. Moreover, since the organization revealed an increased level of injuries and a large number of workplaces where harmful working conditions are registered; the existing system needs to be improved. After that the goals have been determined and the task for the development of a program to improve the HSE management system has been set. This will also allow implementing of the following 2 goals: "Create the HSE system is to achieve a high level of organization" and "Ensure occupational safety and health at workplaces, while working with machines and equipment." At the same time, a training plan for employees has been drawn up to develop professional skills and improve qualifications. While the organization plans to hold periodic meetings with employees in the future to motivate them and directly participate in improving labour conditions and safety and improving the HSE management system.

### **Conclusion**

Thus, the study made it possible to identify various shortcomings in the studied organization. One of them was the use of lagging indicators of safety. To eliminate the detected problems in the HSE management system, the Vision zero concept has been proposed and implemented. Each of the seven "golden steps" of this concept will allow using the advanced tools for management and improvement of the HSE management system. Along with this, it will reduce the level of occupational risk in the organization, and, consequently, reduce occupational injuries. The results of this work require further study in order to adapt the proposed approach in the studied organization of the transport complex. This will make it possible to timely identify and correct the proposed method for improvement of the HSE management system and achieve a high level of safety culture.

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