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SUSTAINABLE DEVELOPMENT AND INJURIES IN THE REPUBLIC OF SRPSKA

Abstract: *Sustainable development of the working environment should be oriented towards compatibility of technological development, working environment conditions and institutional (legislative) changes which enable the use of current and future potentials with the aim to meet the workers' needs and for the work environment to provide adequate safety and workers' health. In order to improve the working environment in the Republic of Srpska (RS), the goal is to reduce the number of injuries to an acceptable level, preferably minimum. One of the preconditions that should be fulfilled along the way is to keep records and carry out analysis of workplace injuries. The Republic of Srpska sets its objectives and manages activities for sustainable development which are based on a strategy for continuous improvement. The analysis of injuries in the RS for 2013, 2014 and 2015 provides the information for the realization of a strategy of continuous sustainable development in the future.*

Key words: sustainable development, injuries at work, occupational safety.

INTRODUCTION

Sustainable development in the working environment should be oriented toward compliance of technological development and institutional (legal) changes in order to meet workers' needs and for the working environment to provide adequate security and conditions for the protection of workers. An important dimension of sustainable development is Safety and Health at Work.

Security and safety at work should create such conditions at work and in the working environment that should reduce the number of injuries at work, occupational diseases related to work to the maximum extent possible and allow avoiding of unacceptable risks and damage. Compliance with legal norms and standards in the field of safety at work creates a presumption of full physical, mental and social well-being of employees in the workplace. In the Republic of Srpska legislation in this area is based on the Law on Occupational Safety, Rules on risk assessment in the workplace and in the working environment and other laws and regulations in this field.

Safety at work is an activity of public interest, but in spite of the existence of a system of preventive activities and mechanisms in the field of security and safety at work, injuries occur. The consequences of injuries adversely affect not only the workers who are injured but also their families, the company in which they are employed and, then, the other institutions such as the Health Insurance Fund, Pension and Disability Insurance Fund and the society as a whole. Practice shows that there are employers who are not aware that they were the ones responsible for the protection and safety of employees.

The aim of the research is to contribute to the promotion of sustainable development of the system of safety at work in the RS by means of a statistical analysis of data from the Report on occupational injuries for the period of three consecutive years.

The specific objective is to highlight and emphasize the importance of timely, accurate and systematic filing in and processing of data from the report on injuries at work, notably in the part that defines the sources and causes of injuries so as to enable the possibility of preventive action of occupational safety system and sustainable development.

H1: A detailed statistical analysis of the data from the report on injuries at work in the RS, including the analysis of the sources and causes of injuries, is a prerequisite for the establishment of a sustainable development of the system of occupational safety in the RS.

The methods used in the study are as follows:

- 1) An analysis method: analyses of the theory and practice,
- 2) Analysis of documents - regulations,
- 3) Statistical methods.

The research was made based on the data from the Report on the Work Injury available at the Occupational Safety Department, Ministry of Labor, War Veterans and Disabled Persons' Protection of the Republic of Srpska. The employers provided a total of 3128 Reports on injuries at work to the Department of Occupational Safety in this Ministry for the 2013-2015 period. As a consequence, 122 severe injuries and 27 injuries resulting in death were reported to the Republic Labor Inspection-Inspection Directorate of the Republic of Srpska in the same period.

RESULTS

Work injuries

In the literature and practice any unplanned or unexpected event that causes a negative consequence, work stoppage, or endangering of people's health is defined as an accident. The consequences of the accident may be manifested in the form of worker's injuries, the termination of a technological process of production and the destruction of material and natural resources. The concept of occupational accidents emphasizes the link between accidents and injuries, as well as their consequence and it is a more convenient term to use because fatalistic component is eliminated, given that accidents are not caused by unpredictable force majeure, but they are the result of definable and conceivable subjective and objective causes [5].

An injury at work is physical, organic or functional damage to the body that occurs at work or in connection with work. It occurs as a result of disharmony between man and the means of labor, on the one hand, and the material conditions of the working environment, on the other. Work injuries occur as a result of three main etiological factors: the source, the cause and the man [3]. For some injuries man can play the role of one of the two preceding factors. Research shows that there are a number of factors of objective and subjective nature which may be related to accidents and injuries, or be direct and indirect causes of accidents and injuries in certain work situations. In the literature, the most frequently encountered division includes subjective factors relating to the personality of workers and objective factors relating to the degree and duration of objective danger, which is related to the work environment, workplace and social environment in which the worker moves. Since the main objective of the security and safety at work is to protect people from injuries and health disorders, the injury itself is of secondary importance, it is necessary to know the source of the hazard and the causes that lead to injuries so that protection measures could act preventively and correctively [7].

The system of security and safety at work is to design in preventive actions to prevent accidents at work to take place, especially those resulting in injuries. In addition to that, it should design corrective measures to alleviate the consequences of the accident that occurred, especially injuries as the most undesirable consequence for workers [7]. Professional trauma is a very complex problem that occurs as a result of injuries, occupational diseases, diseases related to work and other harmful consequences for the health of an employee. The most common statistical monitoring indicator for them is as follows: The incidence rate of occupational injuries, which refers to the ratio of the number of injuries at work in a given time period (usually a year) and the average number of employees exposed to risk of injury [4,9], in Eqn. (1)

$$\text{The incidence rate} = \frac{\text{number of injuries at work in the analyzed period}}{\text{average number of exposed workers}} \cdot 100 \quad (1)$$

The criteria for assessing the size of the average annual incidence rates are as follows: low rate (if up to 2.0% of employees suffer injuries), moderate rate (if 2.1-3.0% of employees suffer injuries), high (if 3.1 to 6.0% of employees suffer injuries), extremely high rate (if 6.1% and more employees suffer injuries).

The rate of incidence of injuries at work has real meaning and it is applied if derived from a sufficiently large number of cases that occurred during a sufficiently long period of observation.

Figure 1 shows that the incidence rate of injuries has been low, the observation period of 8 years, since 2008 when the Law on Protection at Work has been enforced.

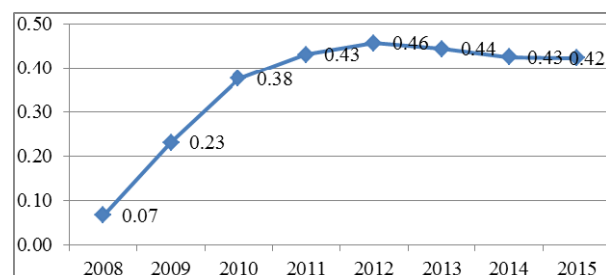


Figure 1. The incidence rate of injuries in the Republic of Srpska for eight years

The analysis of occupational injuries in the Republic of Srpska

The analysis of occupational injuries in the Republic should provide information on the critical points in the system of protection and gaps in the legislation. Unfortunately, in the Republic there is no central register of occupational injuries. The cooperation of the competent Ministry and the Institute of Occupational Health and Sports is not satisfactory. Reports on injuries at work are often late and incomplete, especially in the part that relates to the definition of origin and the causes that led to the realization of the injury. This situation is evident in all sectors, but especially in the private sector. This points to the need for more inspection activities in this area. The data presented in Table 1 give an overview of injuries in the RS since the enforcement of the Law on Protection at Work.

Table 1. Overview of the number of injuries in the Republic of Srpska 2008-2015.

The total number of occupational injuries per year							
2008	2009	2010	2011	2012	2013	2014	2015
171	596	918	1029	1088	1060	1028	1040
Severe injuries at work							
52	50	66	86	86	28	57	37
Fatal injuries							
5	9	14	14	14	6	13	8

According to the legislation in Republic of Srpska (Law on Pension and Disability Insurance ("Official Gazette of Republic of Srpska", Nos. 106/05, 134/11, 82/13 and 103/15) the following shall be considered as a work injury:

- The injury of the insured, caused by direct and brief mechanical, physical or chemical effects, rapid changes in body position, sudden load exerted on the body or other changes of the physiological condition of the body, if such injuries are related to carrying out the work that the insurance is based on
- The injury suffered by the insured on his/her regular way from home to work and back, or to perform the activities his/her insurance is based on (Article 9).

This article of the Law precisely defines the concept of occupational injuries in order for the insured to exercise their rights in case of disability (disability pension, retraining/additional training, deployment to another position, and the right to financial compensation in these circumstances) caused by an injury at work.

The articles of this Law define the circumstances in which the insured recognizes the occurrence of disability caused by injury at work. The concepts of disability, reduced ability and loss of ability to work due to injuries incurred at work as well as conditions for eligibility for a disability pension are defined.

Based on the analysis of regulations the following legal requirements may be determined:

1. Law on Safety at Work ("Official Gazette of Republic of Srpska", Nos. 1/08 and 13/10):

- Safety and health at work include a set of organized measures and activities aimed at creating conditions that provide prevention and elimination of hazards and harms that could cause injuries, occupational and other diseases and damage to the workers' health at work (Article 1).
- The employer is obliged to ensure that the work process is adapted to the physical and mental capabilities of workers and the working environment, the tools and the means and equipment for personal protection at work are to be arranged, that is, produced and provided so as not to endanger workers' and other persons' safety and health (Article 10).
- Occupational Health Service shall be responsible for (among other responsibilities) participation in the analysis of injuries at work, professional diseases and diseases related to work (Article 41).
- The employer is obliged to immediately, and no later than within 24 hours of the occurrence, report any lethal, collective or serious injury at work as well as dangerous phenomena that could endanger the protection of and health of workers, in oral and written form, to the competent labor inspectorate and the competent authority of the Interior (Article 54);

This law regulates the system of protection of health and safety in the Republic of Srpska as an activity of general interest. The articles of this Law shall

determine those who shall implement and promote safety and health at work, their rights, obligations and responsibilities, preventive measures and other issues related to safety and health at work in the Republic.

2. Rulebook on the risk assessment of the workplace and work environment ("Official Gazette of Republic of Srpska", No. 66/08):

- The risk assessment is based on the systematic recording and evaluation of harmful factors in the work process, possible dangers and hazards in the workplace and in the working environment that could cause injury at work, occupational disease or illness related to work (Article 4).
- By assessing the risks we are looking at the organization of work, work processes, the demands of work, tools, raw materials and materials used in technology and work processes, tools and equipment for personal protection at work, as well as other elements that may cause risk of injury at work, occupational disease or illness related to work (Article 4);

This Rulebook shall regulate the manner, method and content of the act on the assessment of risk for injury at work, with the aim to perform risk assessment and to determine safety measures on the basis of identified hazards and harmfulness in the workplace. They should reduce the likelihood of injury at work and mitigate the consequences if a violation does occur.

3. Rulebook on the content and manner of issuance of the report forms on injuries at work, occupational diseases and diseases related to work ("Official Gazette of Republic of Srpska", No. 66/08)

- Report on the Work Injury contains data on injuries at work and measures of health and safety at work which have been applied in the workplace where the injured worked (Article 2).
- Report to be completed by the employer immediately, and no later than within 48 hours of becoming aware that there was an injury at work, occupational disease or illness related to work, in the appropriate form directly filling in all the information prescribed by the regulations (Article 5).

The articles of this Rulebook stipulate the content, the manner of issuance, the one responsible to report and fill in the form, deadlines, institutions where the report is submitted and the layout of the report form for occupational injuries.

The analysis of injuries can be based on many factors that are directly or indirectly involved in the formation of injuries [2, 9]:

- Sex of the injured,
- Age and work experience of the injured,
- The workplace of the injured,
- Level of qualification of the injured workers,
- The time of injury (shift work time, day of the week, month and year),
- The source of injury, and
- The cause of injury.

The analysis of injuries in the Republic of Srpska by factors that influence the occurrence of injuries has been done for the 2013-2015 period and is shown in Figures 2, 3, 4, 5, 6, 7 and 8.

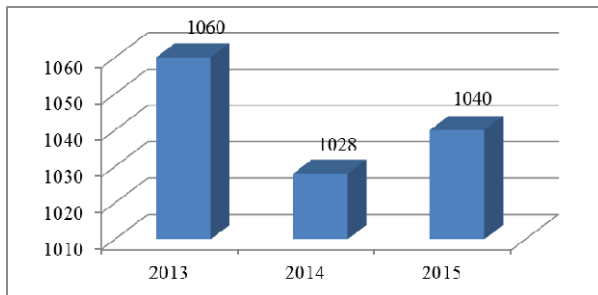


Figure 2. Number of injuries in the Republic of Srpska for 2013-2015

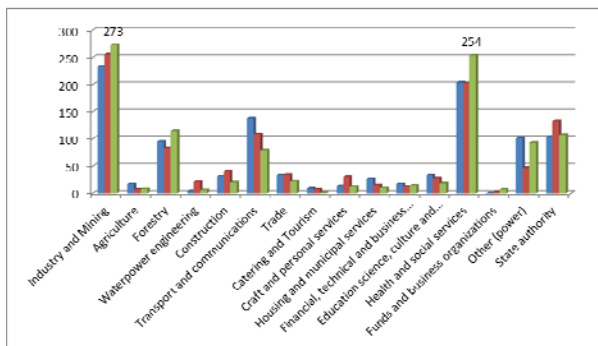


Figure 3. Number of injuries classified by activities in the Republic of Srpska for 2013-2015

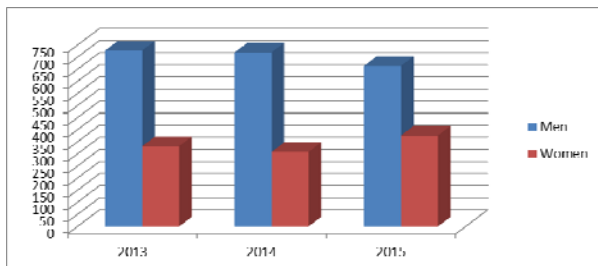


Figure 4. Number of injuries classified by sex of the injured in the Republic of Srpska for 2013-2015

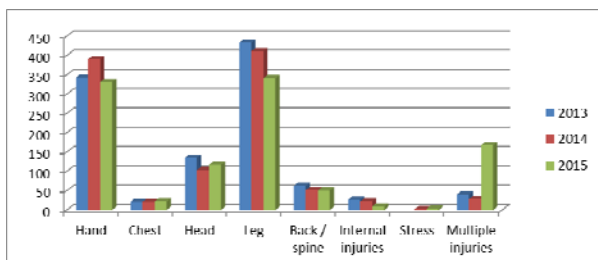


Figure 5. Number of injuries classified by the injured part of the body in the Republic of Srpska for 2013-2015

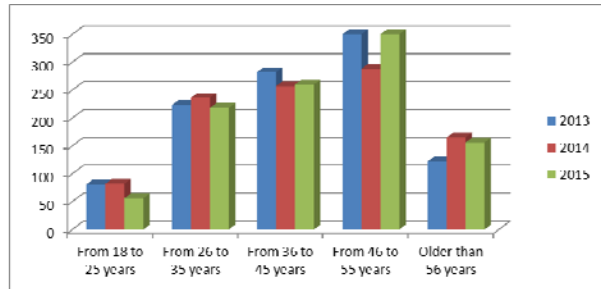


Figure 6. Number of injuries classified by age for 2013-2015

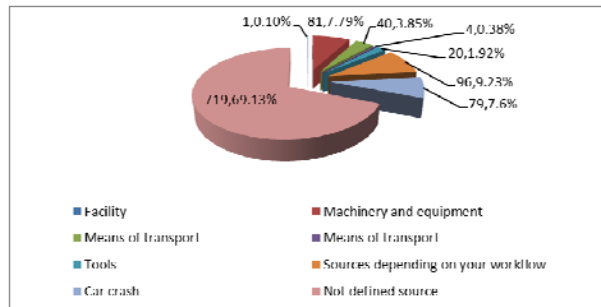


Figure 7. Number of injuries classified by the source that caused the injuries in the Republic of Srpska 2015

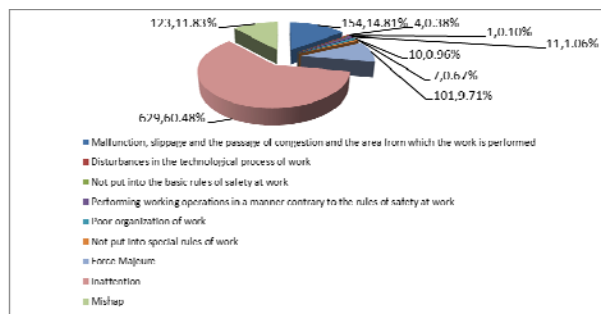


Figure 8. Number of injuries classified by the cause of injuries in the Republic of Srpska in 2015

Dynamic statistical analysis-trend of injuries in the Republic of Srpska

To objectively assess the occurrence of occupational injuries in the reporting period and to determine general tendencies in the future, a dynamic statistical analysis-trend is proposed.

For many dynamic phenomena expressed in time series there can be seen a steady growth or decline in the size of the phenomena. This is particularly evident in the longer term. Trend is a general development tendency of an occurrence. Figure 9 shows that the trend in the number of injuries in the RS is growing from which it can be concluded that the application of the Law on Safety at Work does not yet give satisfactory results and that work on sustainable development of the protection system at work in the RS should continue.

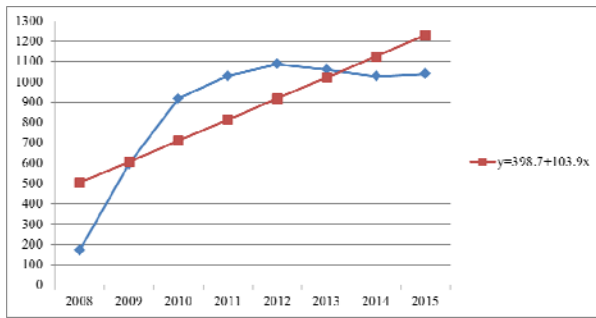


Figure 9. *Trend of injuries in the Republic of Srpska 2008-2015*

DISCUSSION

The incidence rate of injuries in the Republic of Srpska was extremely low at the beginning of the period of enforcement of the Law on Safety at Work, while in the 2011-2015 period it was at about the same level. The big difference in the number of reported injuries shows that the legislation has not been implemented completely.

Classification of injuries by activity shows that the largest number of injuries occurs in the industry and mining, which are defined as the riskiest industries. It is evident that a large number of injuries takes place in the field of health and social services.

From the number of injuries by gender it can be seen that a far larger number (about 2/3) of men suffer injuries in comparison to women, which was expected because bigger number of workers engaged are male.

In relation to the injured part of the body, workers' extremities (arms and legs) suffer injuries, and in relation to the age of employees the largest number of the injured are aged 46 to 55 years.

The biggest incompleteness of data from the Report on Work Injuries refers to defining the origin of injuries because about 70% of the Reports did not have the source of injury defined. The most common cause of injury was negligence, namely 60%. Classification of injuries by the source and the cause was done only for 2015 due to the incompleteness of the data to be processed.

The general trend in the number of injuries in the Republic of Srpska is growing, indicating the shortcomings of the existing system of safety at work. Based on the standard error of the trend, with a probability of 95%, the number of injuries will be around approximately 1200 injuries per year in the next period.

CONCLUSION

The lack of central registers of injuries at work makes it impossible to determine the actual number of injuries, and there is no way to systematize and compare databases on injuries. Closer cooperation and exchange of information between all entities that report injuries should also be facilitated, namely between Republic Labor Inspection, Ministry of Labor, War Veterans and Disabled Persons' Protection of the Republic of Srpska - Department of Occupational Safety, Health Insurance Fund of the Republic of Srpska, Department of Occupational Health and Sports, Institute for Health Protection of the Republic of Srpska, Fund for Pension and Disability Insurance of the Republic of Srpska. It is necessary to harmonize the records with the records of the European Statistical Office (Eurostat) and the International Labor Organization (ILO).

Better supervision and control of OSH would be to form a special inspection authority for labor relations and safety at work, because an insufficient number of inspectors in the Republic Inspectorate cannot effectively cover such a wide scope of activities.

The analysis of data on injuries in the RS has shown that filling in the form on the Report on the Work Injury is incomplete, especially in the part that defines the origin and cause of the injury, and definition of these parameters is necessary to determine and design safety measures or to review the effectiveness of the measures, which was the goal of this paper. From the above said, it can be concluded that entities that deal with health and safety should be involved in additional education and raising awareness of employers on occupational safety, because they are primarily responsible for the timeliness and accuracy of data in the report on injuries.

The most common cause of injury is carelessness which implies that we should continue to work to raise awareness of employees about the importance and the need for the application of and compliance with standards and safety measures.

Safety system in the Republic of Srpska is not fully sustainable and more work is needed on its further development by removing its shortcomings, so the initial hypothesis has not been fully proven. The cornerstone of a sustainable system of protection is the design and implementation of adequate safety measures which meet the specified dangers and hazards in every workplace. The analysis of the sources and causes of injuries points to failures and inefficiency of protection measures that should be eliminated. The current system of registration and filling in of the Report on the Work Injury and data processing should be improved by connecting all stakeholders in the functional unit of a sustainable system of safety at work. Further research should focus on developing the central registry of injuries in the Republic supported by adequate software package for the analysis of injury data by characteristic parameters.

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BIOGRAPHY

Biljana Vranješ, M.Sc. was born in Novi Kneževac, Serbia, in 1969. She is Senior Assistant at the Faculty of Mechanical Engineering, Department of Occupational Safety. She is author or co-author of about twenty scientific papers published



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ODRŽIVI RAZVOJ I POVREDE NA RADU U REPUBLICI SRPSKOJ

Biljana Vranješ, Vladislava Tadić

Rezime: Održivi razvoj radnog okruženja podrazumeva orijentisanost ka usklađenosti tehnološkog razvoja, uslova radne sredine i institucionalnih (zakonskih) promena, što omogućava korišćenje sadašnjih i budućih potencijala, sa ciljem da se zadovolje potrebe radnika, a radna sredina pruži dovoljnu bezbednost i zaštitu njihovog zdravlja. U cilju unapređenja radnog okruženja u Republici Srpskoj nastoji se broj povreda svesti na prihvatljiv nivo, po mogućnosti na minimum. Jedna od pretpostavki koju na tom putu treba zadovoljiti je i vođenje evidencija i analiza povreda koje se dešavaju na radnim mestima. Republika Srpska postavlja i usmerava svoje ciljeve i aktivnosti održivog razvoja koje se zasnivaju na strategiji kontinuiranog unapređenja. Analiza povreda u RS za 2013, 2014. i 2015. godinu pruža informacije za ostvarivanje strategije kontinuiranog održivog razvoja u budućnosti.

Ključne reči: održivi razvoj, povreda na radu, zaštita na radu.