

# FACTORS INFLUENCING THE RISK OF OCCUPATIONAL DISEASES OCCURRENCE IN FORESTRY

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## Abstract

The analysis of selected factors influencing the risk of occupational diseases occurrence is mentioned in this article. Influence of injurious agents, exposure length, worker's age of disease confession and job positions on occupational diseases occurrence has been analysed. This analysis has been done in the time from 2000 to 2007 years, within the economic activity (OKEČ) 02 – forestry, timber harvesting and related services. There were used the analysis, synthesis and comparison methods for the data processing and evaluating of results. Vibrations diseases and tick-born diseases have been evaluated as the most serious diseases, worker age group from 51 to 55 year as the most hazardous age, workers group with exposure length from 6 to 10 years as the most hazardous, feller's work was evaluated as a most hazardous work.

**Key words:** forestry, occupational diseases, factors

**Classification JEL:** M 140 Corporate Culture, Social Responsibility

## 1. Introduction

For the well-made working a human must have a certain background, but the work environment is also very important. Often the worker is not conscious of the manifold hazards, which endanger his health and safety during the working process.

Workplaces in forestry are characteristic by the permanent risk of accidents and occupational diseases occurrence. Workers in wood harvesting process are exposed to the biggest hazard and the work accidents occurring in this process have often fatal consequences. By this accident frequency the forest management is ranged among the most hazardous economic sectors in Slovakia. Professional diseases are coessential factor in the work hazardousness rating. The most severe injurious agents are noise, vibrations but also noxious agent as carbon monoxide (CO), carbon oxide (CO<sub>2</sub>), NO<sub>x</sub>, etc. Tajboš, Messingerová (2009, p. 143) examined the carbon monoxide contamination of work environment in the timber harvesting and conversion. An above critical contamination was recorded only 110 seconds from the whole (2, 5 hours cycle) record duration in the first case – timber harvesting and only 48 seconds from the whole (2 hours cycle) record duration in the second case - conversion. Considering the short-lasting effect and prompt detoxication, the local maxima can not have a toxic effect on the workers. This result holds only for specific conditions and it can not be generalized.

Considerable damage to health can also be a consequence of some forced position. Feller performs the bulk of their work in bending forward position and therefore, the most frequent problem is an abuse (damage) of spine. Spine loading is multiplied by the dead portable chainsaw weight and by the vibrations transmitted from the chainsaw to the limbs and body.

A relation between the vibrations level and the age of using portable chainsaw was documented in the detailed analysis. This fact was confirmed in 55 cases of evaluated chainsaws. The total number of analyzed saws was 107; these were chosen from twelve forestry enterprises by the random sampling (Goglia, Žgela, 2003, p. 77).

Tick-born diseases (in our conditions the vector is *Ixodes ricinus*) are scores of time unprized on the part of patients. The most often disease are Lyme borreliosis and tick-born meningoencephalitis. Untreatment of these diseases can have serious implications.

The aim of this article is to analyze the factors influencing the risk of occupational diseases occurrence: e.g. injurious agents, exposure length, workers age in term of confessed occupational disease, etc.

## 2. Material and methods

We have obtained material for purpose of occupational diseases analysis from the National Health Information Center. The announcements of occupational disease case, threat by occupational disease occurrence, professional poison and other damage to health at the work were the primary records. Obtained data related to confessed occupational diseases were recorded during the years 2000 – 2007 in Slovakia, in the economic activity (OKEČ) 02 – forestry, timber harvesting and related services.

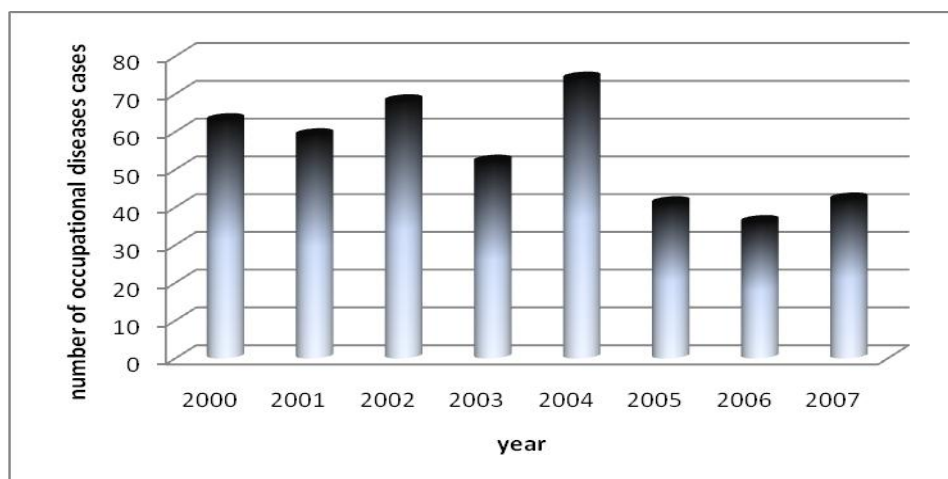
Database has contained the data selected by the years. The most serious defect was the disunity of characteristics describing the disease and the worker affected by this disease. The recordings from the year 2000 to 2002 included the following data: job position of the affected person, his age, disease and length of injurious agent exposure.

In this time, the information about the injurious agent is missing in the recordings. This is the key information for disease source determination and therefore, it is very important. Since 2003 this injurious agent information has occurred in recordings. However, this was done at the expense of other information – the length of exposure to given injurious agent.

Data were evaluated with the use of Microsoft EXCEL software. The graphs from this data were executed for better interpretation and easier evaluation. The main information about injurious agent and exposure length had to be analyzed for partial time and the job position data were evaluated in two parts by reason of the classification change.

## 3. Results

From the announcements about occupational disease cases, there have been recorded 435 occupational diseases cases, in the economic activity 02 – forestry, timber harvesting and related services, confessed in the period from 2000 to 2007. The development of occupational diseases is showed in figure 1.



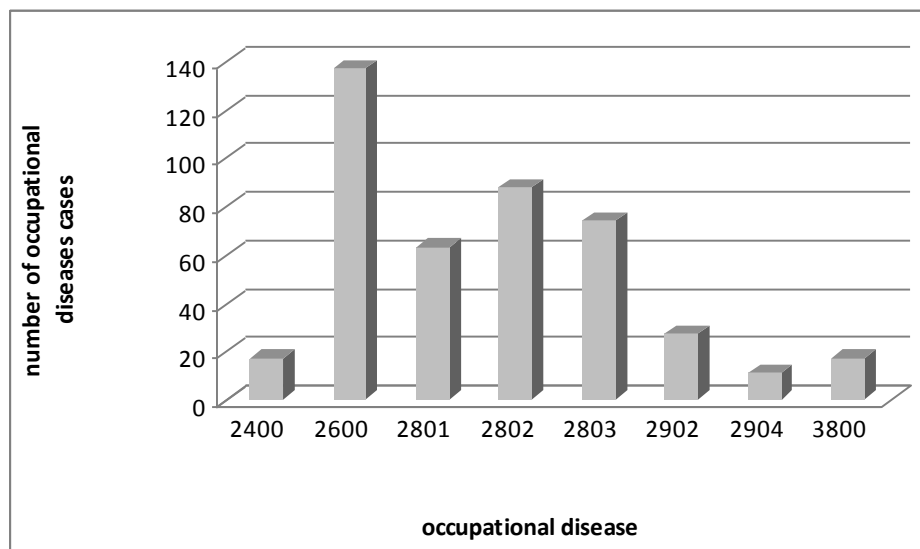
*Fig. 1: Occupational diseases frequency during the monitored time*

Source: own

The highest occurrence of occupational diseases was recorded in 2004 year. Decrease of occupational disease occurrence in the last three years is very interesting (fig. 1). However, we

can notice a mild increase in 2007. In the future we can rightfully await the increase of the frequency of these occupational diseases. Determining negative influence on this progress has the change of the principal activity realization way in Lesy SR, š. p. by delivery works volume, infringement of work regime and break and default of standing system arrangements (regular specialized medical examination, recondition stays).

The specific diseases occurrence is pictured in figure 2. The most frequent professional disease in forest industry is the vibrations disease – damage to bones, sinews and muscles, (2802), damage to nerves and blood vessels (2801) and other vibration diseases and combined vibrations diseases (2803). The total share of vibrations diseases is 52 % from the all analyzed occupational diseases. The share of work done by the mechanisms, which affect human organism by the vibrations, can influence this fact. Frequency of infective diseases transmitted from animals at the people, directly or through the vector (2600) is influenced mainly by workplace character and conditions. At the third place is a disease of sinews and muscles caused by an excessive load (2902), than follows impaired hearing (3800) and infectious and parasitic diseases (2400) and the last evaluated disease is nerves paralysis caused by permanent local pressure (2904).



*Fig. 2: Occurrence of specific occupational diseases*

Source: own

All injurious agents causative threats by occupational disease occurrence, resp. occupational disease case, or professional poison in forestry are showed in figure 3. Still the analysis of specific occupational diseases frequency in forestry has indicated the highest occurrence of injurious agent – vibrations. Limbs vibrations (from tools and machines) have 18 % share and mechanical vibrations ca 6 % of all analyzed diseases. There are still Ixodidae and bacteria characterized as an important factor, which influence the risk of occupational diseases occurrences in forestry. The noise caused diseases were registered only in three cases in the monitored period, what is ca 1, 2 % of the all professional disease. This is caused by the fact, that almost all machines used in forestry are also the source of vibrations.

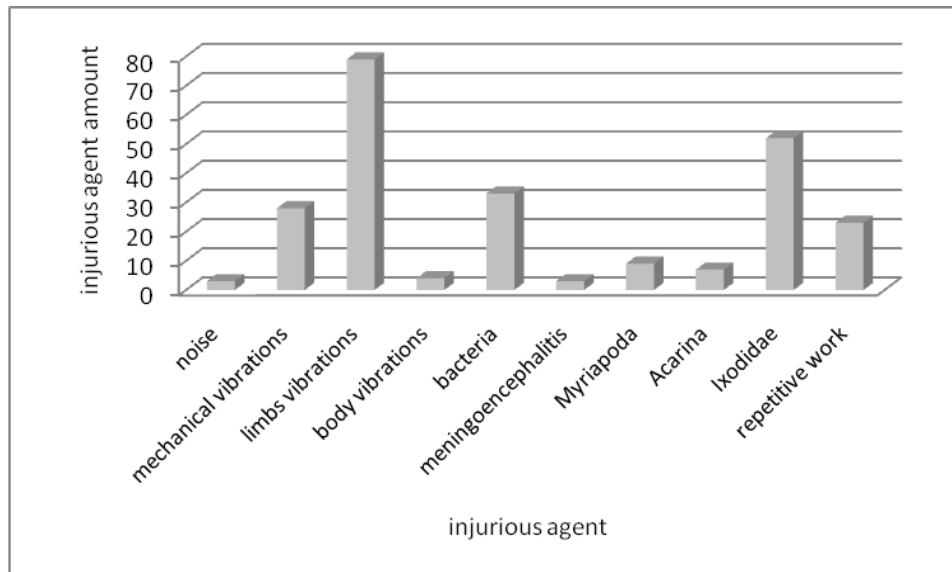


Fig. 3: Frequency of specific injurious agents (2003 – 2007)

Source: own

Dependency of occupational diseases frequency on age in forestry is pictured in fig. 4. Statistically, it is possible to characterize this frequency distribution as a probability distribution skewed to the right, which means that with increasing age, the confessed disease frequency also increase. Maximum occurrence of diseases was registered in age group from 51 to 55 year and there have been a decreasing trend since than. Physical worker's age, exposure length, individual worker's perceptive and workers number in particular age group underlies the development of occupational diseases occurrence according to disease admission worker's age.

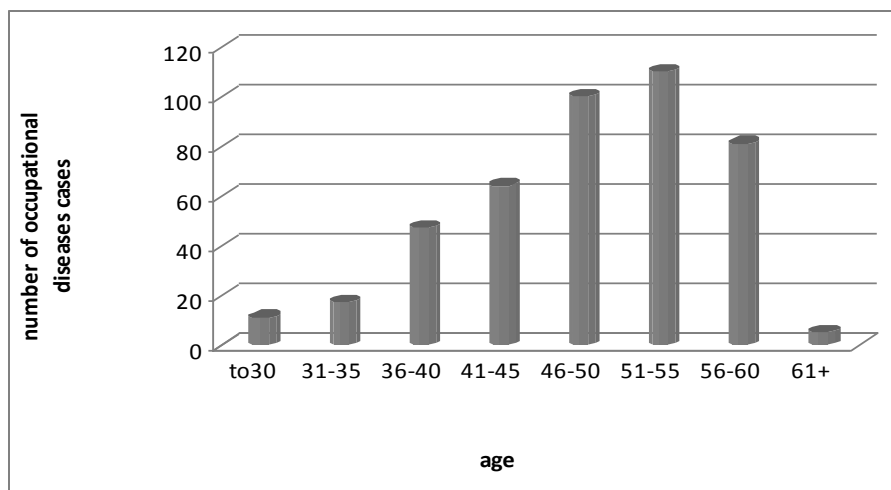
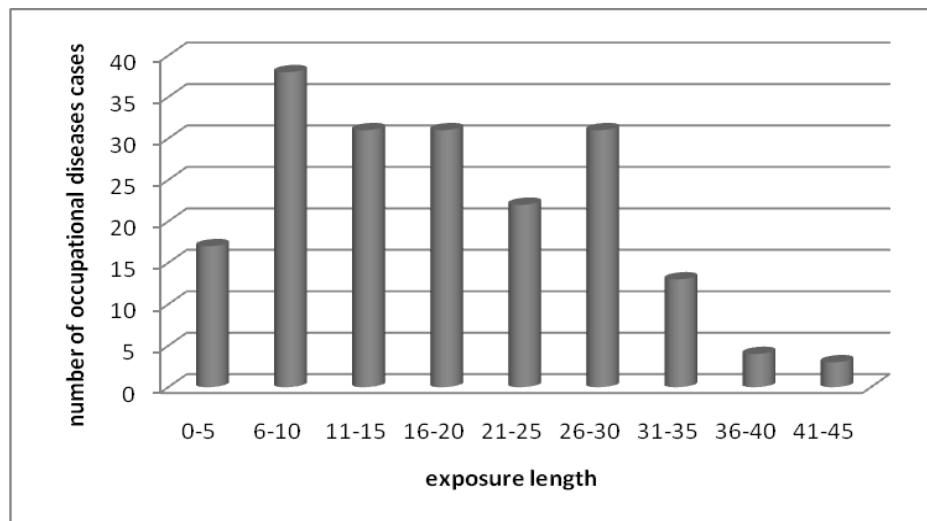


Fig. 4: Worker's age of occupational disease confession

Source: own

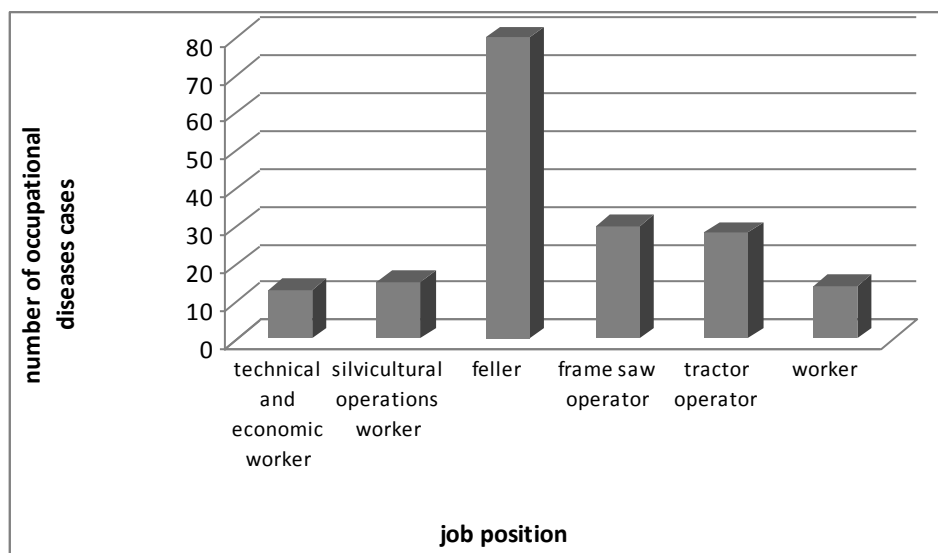
Influence of exposure length on the risk of occupational diseases occurrence is evaluated in the figure 5. We could analyze this factor only in the years 2000 – 2002. A form change of the announcements of occupational disease case was the cause of this processing. There is pictured in the figure that the forest workers who have been exposed to injurious agents for 6 – 10 years during the working process, are the most affected workers. Numbers of work diseases after the

expositions time between 11 and 30 years are almost similar. It is possible, that it is affected by responsible approach of the employer, who delivers the employees to another work position immediately after recognizing the risk of the work disease rising.



*Fig. 5: Frequency of occupational diseases in dependence on the exposure length*  
Source: own

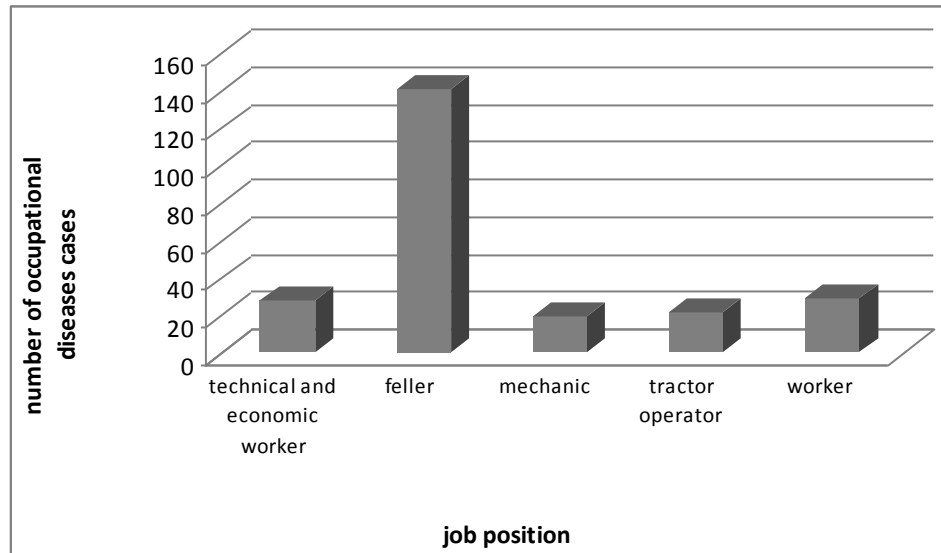
Analysis of occupational diseases occurrences according to job position was possible to do again in two parts. A change of job position classification was the cause of this processing. Workers in timber harvesting process, resp. fellers were the most endangered in the years 2000 – 2002 (fig. 6), second most endangered were frame saw operators and the third most endangered were tractor operators. High occurrence of feller's occupational diseases corresponds with high work risk and number of these workers in forest management.



*Fig. 6: Frequency of occupational diseases according to job position (2000 – 2002)*  
Source: own

When the occupational diseases are evaluated according to job position (in the years 2003 – 2007) it is possible to say, that the highest number of confessed occupational diseases was

registered at the fellers. This number is high above the occupational diseases occurrence at the other job positions. Occupational diseases occurrence of workers and technical and economic workers is approximately on the one level, than follows tractor operators and mechanics with 22 and 20 cases of occupational diseases.



*Fig. 7: Frequency of occupational diseases according to job position (2003 – 2007)*

Source: own

#### 4. Conclusion

The aim of this article was to analyze selected factors influencing risk of occupational diseases occurrence. On the base of occupational diseases progress analysis in forestry and upon the knowledge of influence of determining factors affecting the hazard, resp. professional diseases occurrence, it is possible to take a system arrangements for the elimination of occupational diseases frequency.

Following results are evident from the analysis:

- There was recorded mild increase in the last analyzed year compared to proceeding year.
- Vibrations diseases and tick-born diseases are the most serious.
- It appears from this that most hazardous injurious agents are vibrations and Ixodes.
- Worker age group from 51 to 55 year is the most hazardous.
- In contradiction with this result is the finding that the most hazardous is workers group with exposure length from 6 to 10 years. One of the reasons can be a number of workers that have been qualified as an accountant in this field through a retraining course.
- Feller's work was evaluated as a most hazardous work.

In consequence of the change of the way the principal activity realization in Lesy SR, š. p. (dominant forest subject) by delivery works volume, we can rightfully await the increase of the professional diseases frequency. Therefore it is needed to take system arrangements for this situation improvement.

It is necessary focused these system arrangements on:

- hazards analysis,
- realization of preventive arrangements for elimination, resp. hazard removing,

- regular check of undertakings arrangements effectiveness, especially in field of health hazards elimination (Suchomel, Belanová, Vlčková, 2007, p. 57).

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