

Occupational risk management in Poland's wooden sector

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Abstract: *Occupational risk management in Poland's wooden sector.* In this work, we studied occupational risk management in Poland's wooden sector, by analyzing changes in values of coefficients of persons employed in hazardous conditions caused by factors connected with work environment, with harshness of work and with mechanical factors that come from especially hazardous machines. As a result of this analysis, with reference to particular departments of the wooden sector, hazard areas were identified, in case of which activities taken by companies regarding identification of hazards and eliminating and reducing risks were insufficient.

Keywords: occupational risk, work environment hazards, coefficients of persons employed in hazardous conditions, wooden sector

INTRODUCTION

Very broadly speaking, risk management covers identifying, measuring and controlling risks in order to reduce them as much as possible, and to secure ourselves against effects of such risks. Companies can handle their risks passively or actively. Passive strategy consists in bearing the risk in a passive way, without attempting to eliminate or reduce such risks. These activities may result from lack of awareness of risk occurrence, inability to assess its size, or lack of awareness of protective techniques. Passive activities also include creating various types of reserve funds in order to absorb any potential losses.

On the other hand, active strategy consists in taking activities that may eliminate or reduce losses that might arise from activities being run by companies.

From the point of view of work safety, one may say that the risk management process is aimed at protection of companies' human resources, maintaining maximum efficiency of activities being performed, and as low the cost of such protection measures as possible (Pawłowska, 2007). This type of management is oriented towards complete elimination or, at least, reduction of reasons and/or effects of mishaps that may disturb the company's business, whereas it is very important for such analyses to take into account both direct consequences of various events, and indirect consequences that arise from them.

SELECTED ASPECTS OF OCCUPATIONAL RISK MANAGEMENT

In line with the definition that is most frequently quoted in the literature of the subject, occupational risk is a probability of occurrence of adverse events connected with the work being performed, resulting in losses, in particular occurrence of adverse health effects with employees as a result of occupational hazards that occur in work environment or of the way the work is carried out. It can be also said that occupational risk is a probability that, in consequence of the employee's exposure towards threatening (hazardous, harmful or burdensome) factor, there occurs a potential possibility for him or her to incur injury with a determined level of seriousness, or deterioration of his or her health condition to a determined degree.

Occupational risk management is a cycle of activities that include: hazard identification, risk assessment, risk level evaluation and acceptance, analysis of preventive measures implementation options, decision making, implementation of adopted solutions, monitoring performed activities, and assessment of efficiency of preventive measures that have been undertaken (Karczewski, 2004).

Practical risk management tools may be divided into two groups: tools used before realization of risk, and tools used after realization of risk. On the other hand, risk control methods comprise physical control – risk avoidance and risk reduction, and financial risk control tools – risk retention and risk transfer.

Physical risk control covers two fundamental methods: abandonment of activities that are burdened with some determined risks, and organizational/ technical activities in the form of: technical improvements (various types of safety protection measures), procedural improvements (in the area of planning and organization), and educational activities (various types of training programs).

Financial risk control comprises risk retention and risk transfer. Risk retention is carried out using currently held financial resources, sales of tangible assets, previously created special-purpose fund, the so called self-insurance, or bank loan. Risk transfer comprises transfer of risk-burdened activities, or transfer of the obligation to cover the risk.

Solutions adopted e.g. in the form of preventive measures should be implemented in line with a definite philosophy of action, which means that it is above all important to (Pawłowska, 2007): eliminate hazards at source; to adjust work conditions and work processes towards the employee's capacity (proper design and arrangement of his or her work stand, selecting proper machines, technical facilities and tools, selecting proper methods of production and performance of work processes); to use new technical solutions; to replace hazardous technological processes, facilities, substances and materials with safe or less dangerous ones; to use collective protection measures before individual protection means, and to train employees in work health and safety issues.

RESEARCH METHODOLOGY

The basic objective of our study was to analyze occupational risk management in Poland's wooden sector over the years 2008-2012, and to identify hazard areas, in case of which occupational risk management activities were not sufficient. It was assumed that the fundamental effect of occupational risk management is elimination or reduction of hazards that result from the occurrence of harmful, burdensome or hazardous factors at work stands.

As grounds for assessment, changes were adopted in values of coefficients of persons employed in hazardous conditions. In our study, we used four coefficients of persons employed in hazardous conditions, i.e. W1, W2, W3 and W4, calculated using the so called *person-hazards* per 1000 persons employed within the community being studied. Interpretation of analyzed coefficients is presented in Table 1.

Tab. 1 Coefficients used in occupational risk management studies

Coefficient	Interpretation
W1	The coefficient of persons employed in hazardous conditions, where hazards were eliminated or reduced over the year down to the standard-meeting level. A positive trend is the observed increase in the value of this coefficient.
W2	The coefficient of persons employed in hazardous conditions, where hazards were reduced over the year (i.e. improvement was achieved). A positive trend is the observed increase in the value of this coefficient.
W3	The coefficient of persons employed in hazardous conditions, where hazards were disclosed over the year, taking into account newly arisen hazards. A positive trend is the observed fall in the value of this coefficient.
W4	The coefficient of persons employed in hazardous conditions (i.e. the coefficient of failure to meet hygienic standards or provisions of relative regulations) as of December 31 of the analyzed year. A positive trend is the observed fall in the value of this coefficient.

Own source

It can be assumed that coefficients W1, W2, W3 and W4 reflect successfulness levels of activities taken by companies with the aim to eliminate or reduce hazards at their work stands. Thus, they point to some palpable effects of work safety management processes. Therefore, changes were studied in the share of coefficients of persons employed in hazardous conditions W1, W2, W3 and W4 for three groups of factors: connected with work environment – SP, connected with harshness of work – UP, and connected with mechanical factors – M, also with reference to values of these coefficients for the entire Industrial Processing section.

The study covered years 2008-2012. In the study, statistical data was used as gathered and published by the Central Statistical Office based upon the Z-10 form that is used to test conditions of work (Warunki pracy, 2005-2012). Each year, companies that employ at least 10 persons are studied.

ANALYSIS OF OCCUPATIONAL RISK MANAGEMENT WITH REFERENCE TO BASIC HAZARD GROUPS

Work environment hazards comprise the way the employee is affected by harmful factors that occur in work processes, such as: toxic, caustic, carcinogenic, mutagenic, sensitizing, irritating, and reproductive function-impairing chemical substances; toxic, irritating, fibrotic, carcinogenic, and sensitizing industrial dusts; noise; local or general vibrations; hot or cold micro-climate; ionizing, laser, ultraviolet, and infrared radiation; electromagnetic fields, lighting, and others (Polska Norma).

Hazards connected with harshness of work comprise the way the employee is affected by work actions being performed in a forced position of the body, resulting either from the type work actions or from the size of the space, in which such work is performed. Harshness of work may also be associated with strenuous physical effort, i.e. it may occur when energy expenditure for efficient work over one working shift exceeds 8374 kJ for males and 4605 kJ for females; and it can also occur in conditions where actions are monotypic in nature, such as monotonous repetition of movements involving the same muscle groups.

Mechanical factor hazards comprise hazards connected with working with machines categorized as being especially hazardous, as referred to in relative regulations (Rozporządzenie MGPPS, 2008). Mechanical factor hazards primarily depend upon the possibility to come in contact with a hazardous factor, and upon this factor's features and properties, such as: kinetic and potential energy, pressurized fluid energy, shape, dimensions, type and condition of the surface, stability, mechanical strength, and many other specific parameters, which may give rise to a situation that poses an employee injury threat.

Figs. 1, 2 and 3 list values of coefficients of persons employed in hazardous conditions (W1, W2, W3, W4) caused by work environment factors (SP), by harshness of work (UP), and by mechanical factors (CM), in years 2008-2012, for the following departments of the wooden sector: C16 - Production of wooden, cork, straw, and purple willow products, C17 - Production of paper and paper products, and C31 - Furniture production with reference to the Industrial Processing section as a whole C.

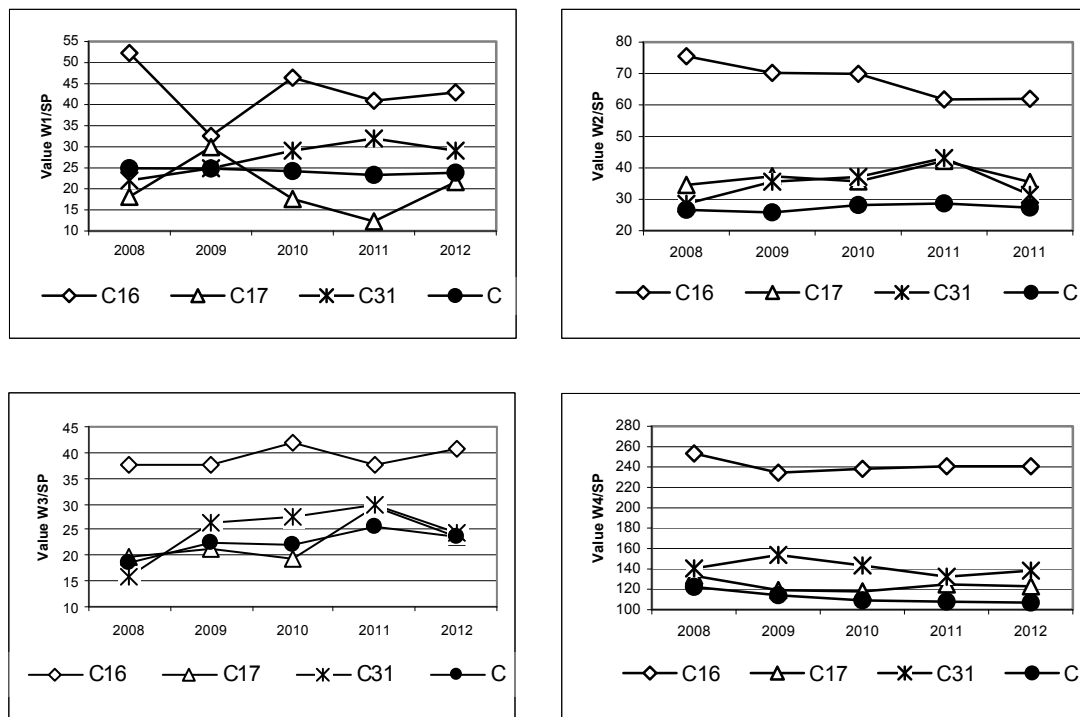


Fig.1 Trends in coefficients of persons employed in hazardous conditions caused by work environment factors in the wooden sector (Source: Our own study, based on annual GUS statistical information concerning conditions of work).

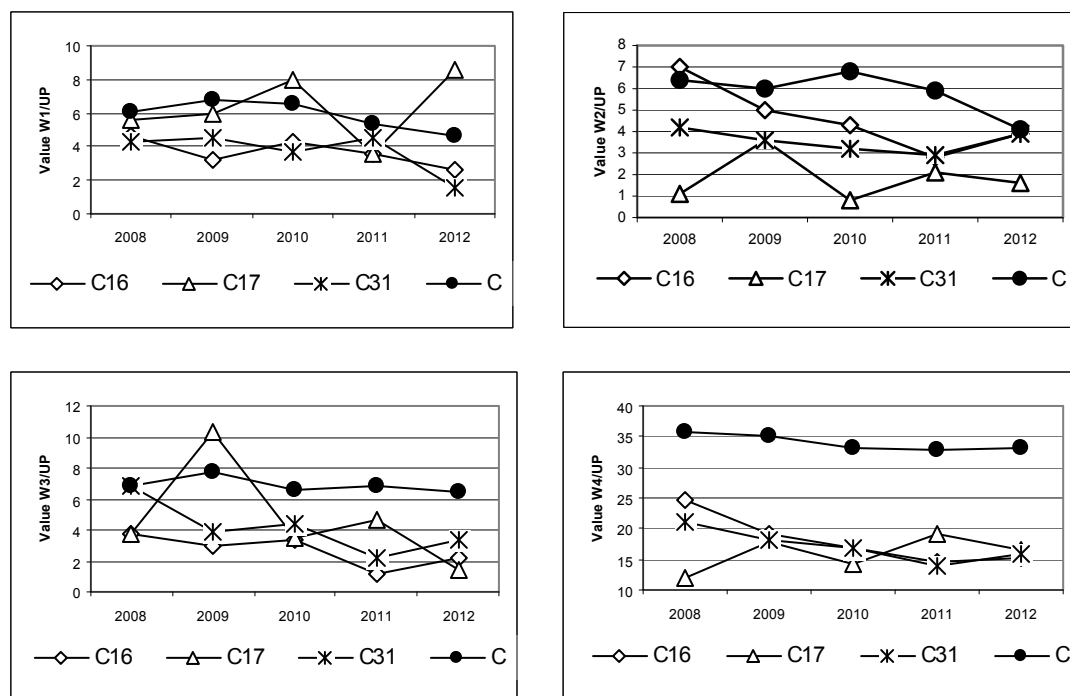


Fig 2 Trends in coefficients of persons employed in hazardous conditions caused by factors connected with harshness of work in the wooden sector (Source: Our own study, based on annual GUS statistical information concerning conditions of work).

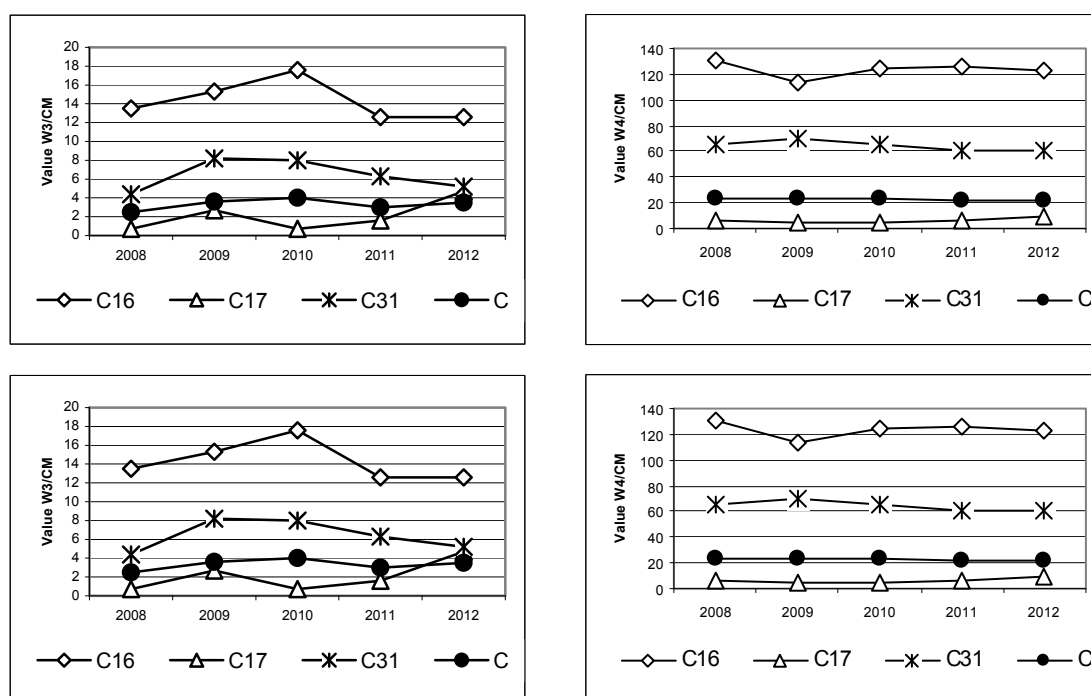


Fig. 3 Trends in coefficients of persons employed in hazardous conditions caused by mechanical factors in the wooden sector (Source: Our own study, based on annual GUS statistical information concerning conditions of work).

CONCLUSIONS CONCERNING OCCUPATIONAL RISK MANAGEMENT IN THE WOODEN SECTOR

The wooden sector is one of the most dynamically developing industrial sectors in Poland. Hence, there occurs a need to study changes that take place in work processes and hazards associated with them. Moreover, the wooden sector is strongly diversified in terms of conditions of work; therefore it is important to study the hazards that occur in work processes in the particular departments of the sector on an individualized basis.

Over the studied years 2008-2013, all departments of the wooden sector showed higher coefficients of persons employed in hazardous conditions caused by work environment factors (W4/SP), and lower coefficients of persons employed in hazardous conditions caused by factors connected with harshness of work (W4/UP), as compared to the Industrial Processing section as a whole.

On the other hand, in case of the coefficient of persons employed in hazardous conditions caused by mechanical factors (W4/CM), in the department of production of paper and paper products, it reached lower values, while in the department production of wooden, cork, straw, and purple willow products and in the furniture manufacturing department, it reached higher values, as compared to the Industrial Processing section.

Changes in values of coefficients W1, W2, W3 and W4 for persons employed in hazardous conditions in the particular departments of the wooden sector are listed in Table 2.

Tab. 2 Changes in values of coefficients of persons employed in hazardous conditions caused by various groups of factors in the particular departments of the wooden sector C16, C17 and C33

C16	W1	W2	W3	W4
SP	Decrease 18 %	Decrease 18 %	Increase 9 %	Decrease 5 %
UP	Decrease 43 %	Decrease 44 %	Decrease 42 %	Decrease 40 %
CM	Decrease 40 %	Increase 2 %	Decrease 7 %	Decrease 7 %
C17	W1	W2	W3	W4
SP	Increase 19 %	Increase 3 %	Increase 20 %	Decrease 7 %
UP	Increase 54 %	Increase 45 %	Decrease 62 %	Increase 33 %
CM	Increase 270 %	No changes	Increase 570 %	Increase 29 %
C31	W1	W2	W3	W4
SP	Increase o 32 %	Increase 10 %	Increase 55 %	Decrease 2 %
UP	Decrease o 63 %	Decrease 7 %	Decrease 51 %	Decrease 24 %
CM	Decrease o 35 %	Decrease 3 %	Increase 18 %	Decrease 6 %
Interpretation of coefficients W1, W2, W3 and W4 in compliance with Table 1				

Own source

The research work we have conducted suggests that we can primarily observe a general falling tendency, over the years under scrutiny, in the values of coefficients of persons employed in hazardous conditions, i.e. in conditions where hygienic standards or provisions of relative regulations are not complied with. However, the department of production of paper and paper products is an exception with respect to factors connected with harshness of work (UP) and mechanical factors (CM), in case of which a substantial increase was observed in the value of coefficient W4.

Our work makes it also possible for us to note that occupational risk management activities, which comprise identification of hazards (W3), and reducing and eliminating risks (W1, W2) at work stands, are not sufficient, especially in case of the department of production of wooden, cork, straw, and purple willow products, which in fact refers to all the three hazard groups: caused by work environment factors, by harshness of work, and by mechanical factors. On the other hand, in case of the furniture manufacturing department, activities performed primarily in the area of mechanical factors, connected with especially hazardous machines, may be considered insufficient.

Our analysis of occupational risk management may serve as a basis for companies to take both properly targeted activities, i.e. oriented towards the right hazards, and activities proper, i.e. concerning the right stage of this risk management process, which should result in more effective policies being taken in the area of work health and safety improvements in the wooden sector.

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Streszczenie: *Zarządzanie ryzykiem zawodowym w polskim sektorze drzewnym.* W pracy dokonano analizy zarządzania ryzykiem zawodowym, w polskim sektorze drzewnym, poprzez analizę zmian wartości wskaźników zatrudnionych w warunkach zagrożenia czynnikami związanymi ze środowiskiem pracy, z uciążliwością pracy i czynnikami mechanicznymi, pochodzącymi od maszyn szczególnie niebezpiecznych. W wyniku analizy, w odniesieniu do poszczególnych działów sektora drzewnego, zidentyfikowano obszary zagrożeń w przypadku, których działania, podejmowane przez przedsiębiorstwa, w zakresie identyfikacji zagrożeń, eliminowania i ograniczania ryzyka, nie są wystarczające.

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