

# SCIENTIFIC INFORMATION

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## Work categorization – informational base for occupational hazards management in enterprises of agricultural basic industry

*Kategorizace prací – informační základna pro řízení rizik z práce v podnicích zemědělské prvovýroby*

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### INTRODUCTION – DATA AND RESEARCH ORIENTATION TOWARD FARMS AND POSSIBILITIES IN OCCUPATIONAL HAZARDS MANAGEMENT

For objective oriented management in agricultural enterprises, which are under the current economically highly demanding conditions of external business environment, it is necessary to set out objectives which could guarantee their economic efficiency and competitiveness. An undisputable production factor, whereof effective use significantly influences efficiency of the enterprise, is the work efficiency of blue-collar workers. This information represents objectives and partial results of solving research oriented study of the causes of origin and possibilities of occupational hazards management. This study was aimed at the chosen working positions and professions in the agricultural primary production.

Initial research activities were carried out during the first stage of solving of the research project “Occupational hazards by chosen working positions and professions in the agricultural basic production”.

The submitter and therefore the sponsor is the National Agency for Agricultural Research (NAZV) – the grant for project solving for the period 2003–2005 is within the scope of the national program of research and development of the Czech Ministry of Agriculture. In terms of the relevant contract on the submission of Grant Supporting Research and Development (No. QF 3240), the grant value is 641 000 CZK for the first year of solving.

The basis for general objectives of the research project was the research program “ADAPTATION”

promulgated for the year 2003. Within this program, we chose the thematic task 2.3. “MANAGEMENT” specified in article 2.3.5. “Elimination of Risk factors in the Business Activity”.

The recipient of this grant is the Czech University of Agriculture in Prague; the research is taken under department of management at the Faculty of Economics and Management.

From the professional point of view, this topic is interdisciplinary, therefore experts with longstanding praxis in the related fields (business operations and management, work organization, ergonomics, human organism physiology) participate in the project. These specialists can i.a. expertly compare and evaluate both changes in the evolution of risk factors or their existence in the real business environment and their action intensity.

With their specialization, the research team members are able to perform the final evaluation of the changes progressiveness – efficiency and concretization of newly established methodological procedures (in legislation fixed between years 2000–2002). These methodological procedures are used to the measurement of exposure and to classification of the occupational hazards in terms of work categorization (Vyhláška č. 89/2001) (examples – see part Results).

### THEORETICAL BACKGROUND FOR OCCUPATIONAL HAZARDS AND RISK FACTORS RESEARCH

The work of direct production workers (the main research object in terms of the presented research project)

is classified as executive work (besides manual labor it includes administrative labor too) modern approach of the business economy theory (see Wöhe 1995).

Executive work is one of three elementary business production factors; the others are material fixed assets and material used (including auxiliary one).

Economically effective use of these factors, in consideration of their possible variant combinations, is the main task of the non-mandatory business production factor – management work.

In terms of this theoretical conception, there is a special attention paid to the role and tasks of the non-mandatory factor. Even the promoter of this theory G. Wöhe (1995) notices that it is not possible to put an equal sign between non-mandatory (management) and executive work. The reasons could be given for it that there are different alternative approaches to business management. As a primary or original part of the non-mandatory factor, there is denoted the top management of the enterprise (owners or statutory bodies) and as a secondary (derived) part, which is guaranteed by management of the enterprise, is denoted the set of activities of the non-mandatory factor – planning, organization, controlling. Decision making competences of this factor and thereby the conditions for managing activities performance are more or less determined by the primary management of the enterprise.

With regard to the mentioned approach to the composition of structure and bindings among production factors from the business economy point of view, it is possible to regard warning and risky factors as an integral part of business risks. By warning and risky factors, we mean factors influencing safety and health of workers or the job-related illness for workers who perform manual work. Occupational hazards management becomes a chain link which is necessary to pay attention to as regards information actualization and tools for problem solving.

This seemingly too steep passing to emphasis on importance of the research subject in context of the presented research project is motivated by the knowledge of continual conception of a row of definitions generalizing approaches to the risk management (see Smejkal, Rais 2003).

“Risk management is a scientific approach to the management of the problem – risk, namely by course of its identification and measurement, prediction of possible losses and designing of such procedures and methods which minimize the impact of the losses which arise in the company.”

This very conception of the risk management should be direct motivation for responsible management of the enterprise in making the decision whether to approach the time-consuming, and to a certain ex-

tent financially demanding, work categorization. At another place in this article – in context of caution about legislative directives related to the work categorization implementation, there is emphasized direct responsibility of entrepreneurs for assurance of such measures which eliminate the risk of wasting health and working environment within the enterprise.

It is necessary to remember that the next economically determinant set of elemental business production factors is material including auxiliary material. Into the group of auxiliary material, there could be largely included various kinds of protective tools and aids necessary to prevention of work injury and job-related illness.

The difficulty of production processes in agricultural primary production imposes the necessity to use a relatively great number of various work positions. This fact simultaneously calls for the necessity to assure a large amount of obligatory preventive measures. A part of prevention are, or could be intangible, investments (recondition programs). That represents enormous requirements for organizing and especially for controlling of these preventive measures.

It is to be added, that the legal preventive measurements as well as the prescribed methodological approaches of identification and evaluation of single risk factors are in the wide scale of legal acts of the Czech Republic. Several ministries and institutions issue these legal acts. Therefore their creation, updating or changes typically take a long time period. Topicality and force of the measurements given by the legal acts is complicated by variability in period of force of these acts.

In business activities, there appears very often – as a matter of common knowledge – the effort of cost savings on these preventive measurements. On the other hand, these efforts expose the owners or managers to the risks of damages (financial losses) due to the costs of removing the after-effects of non-performance of the legal prevention and consequently of the rise in injuries and job-related illnesses.

The objective of this research information is to refer to the possibility of practical utilization of the outputs – results of presented research project in business activities.

## **PURPOSE OF PURSUANCE OF THE WORK CATEGORIZATION IN ENTERPRISES**

### **Chosen legislative measure**

The Public Health Protection Act no. 258/2000 and its amendments impose duty to evaluate, limit and prevent all health risks, especially to the employers or

juridical person and natural person (see duties according to the § 37, 38, 39, 40, 42 – work categorization, provision of qualified measurement for purposes of categorization, hazardous works and their limitation and prevention, hazardous work evidence, cost related to the provision of public health protection).

The authorities of public health protection are – according to the § 78 of the Act of the Ministry of Health of the Czech Republic, regional hygienic officers and district health officers (special bodies of district authorities), Ministry of Defence, army of the Czech Republic, Ministry of Interior of the Czech Republic. These public authorities set principles and procedures for public health protection, and they monitor relationships in terms of population hygienic conditions. The managing competency of these authorities is to control, approve and dictate measurements in public interest.

It is to be stressed here, that duties in public health protection related to the utilization of human resources in working or production processes and services are placed mainly on employers, according to the Public Health Protection Act.

In case of non-performance or violation of duties given by the Act or by other legal acts to health protection by working activities and to the preventive care (§ 82), the authorities of public health protection can set a maximum fine 2 millions CZK upon the juridical subject and upon the physical subject, too, in their business activities. If the violation of the legal duties leads to human health damage, the fine could amount 3 millions CZK. According to § 92 on sanction in terms of the Public Health Protection Act, a fine could be set at a value not exceeding 1 million CZK upon the undertaker who did supply incorrect or wrong data and information.

Currently, especially since the amendment of § 81 of the Public Health Protection Act and the amendment of the Act on Integrated Prevention could be practically enforced, disobedience to the mentioned legal enactments and to risk of agricultural work (and consequently underestimation of the importance of protection and reduction of the preventive care of the manual workers health in conditions of agricultural enterprises) would mean short-sightedness and saving in the wrong place.

In the current unfavorable economic situation, many of entrepreneurial subjects in agricultural primary production, would contingent enforcement of mentioned sanctions, in connection with contingent compensations for damage, lead to the liquidation of the enterprise. The entrepreneur very often links risks of job-related illnesses to the risks of property damage, and this intensifies the economical losses.

The next actual and constitutive legislative enactment which must have been accepted by the methodological conception of the research project is the ministerial regulation of the Ministry of Health of the Czech Republic No. 89/2001 of 15. February 2001 (Vyhláška č. 89/2001).

This ministerial regulation arose from a legal provision given by Act No. 258/2000 and establishes conditions for work categorization into categories I.–IV.

The purpose of the work categorization is explained in § 2 of this regulation (to § 37 of the Act No. 258/2000): “categorization into one of the four categories expresses comprehensive valuation of the stress level of employees by factors which are critical for the quality of the working conditions from the health stand-point. Categorization is exercised based on the evaluation of the occurrence and of riskiness of factors which can influence employees health and which limit the level of health protection assurance.

Regulation No. 89/2001 specifies the criteria of work categorization, too (identifiable factors of occupational hazards and job-related illnesses) and the general limits for the categorization procedure. The number of criteria is 13, as an example of the most important factors by agricultural works we can mention the following: dust, noise, vibration, physical stress, psychic stress, working position, stress of heat, stress of cold.

For example, category III includes works, by which the exposure of employees to risk factors is not reliably reduced by technical steps at the level fixed by hygienic limits and for provision of employees' health protection it is necessary to use personal protective means, organizational and other precautions.

#### **PROCEDURE OF WORK CATEGORIZATION IN AGRICULTURAL PRIMARY PRODUCTION**

The methodological conception for the whole period of this research project “Occupational hazards by chosen working positions and professions in the agricultural basic production” is based on the above mentioned legal acts and the related elementary regulations and on the actual problems resulting from them which are to be solved by management of enterprises in agricultural basic industry. From the above mentioned examples of criteria for risk factors' identification and for work categorization, it is evident that work categorization (with use of the risk factors' evaluation based on methods defined by legal enactments) is – considering qualifications structure of the management in agricultural enterprise and absence of adequate techniques of measurement – very difficult to practice without external expert assistance. Moreover, the situation is

complicated by considerable heterogeneity of works in agricultural primary production. It marks increase in costs of external expert services.

In consideration of these facts the final output of the research project would be subject publication – methodological manual containing sets of evaluation of risk factors and occupational hazards on the normative basis. Individual sets would represent summary of workplaces and professions for direct production workers both in plant and in animal production. Each set should contain recommendations for work categorization and preventive measures. Information is designed for the business sector and for authorities and institutions of public health protection.

Research project solution is oriented toward both current and perspective technological alternatives of processing of works in basic production. Therefore, it is necessary to keep in view the differences in conditions (based on production scope and complication and from these resulting requirements for human resources management) among big agricultural enterprises, small farms and service companies offering their services to agricultural basic industry firms.

### SELECTED RESULTS FROM THE RESEARCH STAGE (YEAR 2003)

For the purposes of identification and evaluation of risk factors' influence, it is necessary to process studies of rational organization of direct labor of direct production worker (abbreviation SROP). In the first stage, five building-dispositional and machine-technological solutions of high-capacity cow sheds (VKK) were chosen. The selection provided the maximal range of different work positions. Examination end evaluation of these positions revealed a maximum of information on physical stress and physical factors of the working environment – with a potential for practical utilization of this information on implicit occupational hazards. Based on the building-dispositional solution of these objects, there were selected entities with following stabling capacity for cows: 223 heads, 430 heads, 504 heads, 600 heads and 752 heads.

The emphasis was placed on the methodological uniform content of the elaborated rationalizational studies including:

- Basic data for VKK evaluation (description of the building-dispositional and machine-technological solution, description of machine-technological equipment)
- Suggestion of the direct labor consumption in high-capacity cow sheds, mainly based on recommended limits and time standards (except milking house). Suggestion of direct labor in milking houses was

solved, varying according to the method of operating of the milking house staff.

- Determination of the possible level of tender standards, calculation of incomplete and complete indicators of direct labor productivity (Římovská, Košťál 2001)
- Design of the in-shift operating-rest mode
- Design of job description for employee (working positions) – time and space studies with comments
- Determination of long-term operating-rest modes for high-capacity cow sheds.

The next step in the research process was evaluation of both physical stress and physical factors of the working environment by the example of working stations and their job description (up to the level of elemental operations according to the elaborated SROP).

So performed complete research confirms and simultaneously gives data for the statement that work of direct production workers in the monitored workplaces and working stations is considerably subjected to the enhanced risk of damage to health or job-related illness.

First findings of the possible work categorization for monitored job stations could be concluded in the following:

- In light of influence of risk *physical* factors of *working environment* – above all stress of cold, stress of heat, dust, partly stress of noise and stress of *vibration* (by still widely used old construction types of towing vehicle and loaders) – there could be recommended – according to the risks of organism stress of milkmen, cowmen and stock feeders – work categorization into higher category (mostly to the category III). It means that such works demand higher level of prevention and organizational measures.
- In light of *physical* stress (basic categorization method was supplemented by biomechanical-physiological aspect till the distinguishing level of elemental operations), there could be recommended work categorization mainly into the category II. (low grade of risk factors influence) except work of milkmen. For the present, there were audited few different types of milking equipment. Especially for milking into a fixed line (ZD 3010 – pulled on metals) and for carousel milk parlour can be recommended to categorize this work – regarding risk of damage to health by biochemical factors – into category III or IV.

### DISCUSSION

The results (available at research team) of comparison of the elaborated rationalizational studies of work organization by monitored high-capacity cow

sheds illustrate the possibility of higher level of work productivity in modern sheds. For example, 1 man direct labor consumption is 5.68 minutes per head and day in high-capacity cow shed with farrowing house (total 600 heads) and round milk parlour (79 heads per hour) and feeding with drag conveyor, with tender standard 90 heads per day (shift time is 510 minutes). It represents in average 28 minutes per 100 liters of milk. By this level of work productivity and intensity, there is recommended, according to the research results, categorization of work of the milkmen and of the cowmen in category III (raised risk) only work of stock feeders is under better conditions (category I. or II.). It is evident influence of risk of long-term and monotonous work stress by milkmen and cowmen caused by possible decrease the number of workers. The above-mentioned tender standard (number of animals fallen to one employee in the morning and afternoon shift) 90 heads per day represents an important impulse to decrease the number of workers in individual shifts. On the other hand, it complicates (or deteriorate) the level of organization of short time and especially of long-term operating-rest modes in this production entity.

It supports the result from field survey: long-term operating-rest modes in monitored high-capacity cow shed (600 heads), especially in production shed, are given by the limiting milking machine, milking time of 12 groups in round parlour and by the necessity of cooperation of 2 or 3 workers by servicing the milking machine. Stock feeder cooperates during the milking time thus the high working stress on milkmen is at least partly balanced.

With regard to the relatively high direct work productivity, which is enabled by the technology and building-dispositional solution of high-capacity cow sheds (and by a relatively low number of workers: 3 workers in one shift and 1 in divided shift), a long-term operating-rest mode is prepared for the whole object: 7 + 2. In the work team, there are both workers from production shed and from farrowing house. The average shift time is approximately 475 minutes. The operating mode is high-pressure both from the aspect of work intensity during shift and from the aspect of long-time work-load. The balancing of number of shifts is achieved in nine-weekly cycles.

Workers working in the in-shift mode exceed the recommended shift length in bi-shift operating mode (455

minutes) by 20 minutes a day. In long-term operating-rest mode it represents approximately 15 minutes a day i.e. 450 minutes monthly or 7.5 hours per month.

In another building, a high-capacity cow shed, it is necessary to use two long-time operating-rest modes: 7 + 0 for milkmen and 4 + 1 for stock feeder. The object is for 504 heads in the form of pavilion build-up area, there is herringbone milking parlour 2 × 12 (2 workers, 90 heads per hour), self-loading mixing fodder carrier. Typical is tender standard 70.52 heads.

In the first case, the workers have time off after 2 shifts in one day – one shift as a calf-man who, during milkman's time off, works in milking house. In the second case, there is only one man who works by spells. After 4 days in work, the stock feeder gets one-day time off. The balance in number of shifts of all workers in the shed is achieved within 5-week cycle. In this second shed, the fond of week working hours is exceeded as well.

## CONCLUSION

Although this information presents only partial results of the first stage of examination of the influence of risk factors on the work of direct production workers, the researchers would like to call attention to the importance and responsibility of employers for preventive and organizational measures in protection of health at work and for the working environment. Assurance of these measures should be an integral part of business projects aimed at modernization of the technological equipment of production objects.

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