

INCREASING THE EFFICIENCY OF HUMAN RESOURCE MANAGEMENT IN MINING ENTERPRISES

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ABSTRACT. This study is dedicated to analysis of the effectiveness of human resource management in some leading mining enterprises in Bulgaria for the period from 2014 to 2017. The object of the study is the efficiency of human resource management achieved in four big companies in the mining sector, along with the company practices and policies as a basis for improvement. The objective is to evaluate the efficiency achieved by applying different indicators for using human resources and to research the causes and preconditions for its increase. As a result of the analysis, good practices are summarised and guidelines are outlined for improving the results of the human resources management process.

Keywords: efficiency, human resources management, mining enterprises

ПОВИШАВАНЕ НА ЕФЕКТИВНОСТТА НА УПРАВЛЕНИЕТО НА ЧОВЕШКИТЕ РЕСУРСИ В ДОБИВНИТЕ ПРЕДПРИЯТИЯ

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РЕЗЮМЕ. Настоящото проучване е посветено на анализ на ефективността на управлението на човешките ресурси във водещи добивни предприятия в България за периода 2014-2017 г. Обект на изследване е постигнатата ефективност на управлението на човешките ресурси в четири големи компании от добивния сектор, заедно с фирмените практики и политики като основание за повишаването ѝ. Целта е ефективността да се оцени чрез прилагане на различни показатели за използване на човешките ресурси и да се потърсят причините и предпоставките за нейното нарастване. В резултат на анализа е направено обобщение на добрите практики и са изведени насоки за подобряване на резултатите от процеса на управление на човешките ресурси.

Ключови думи: ефективност, управление на човешките ресурси, добивни предприятия

Evaluation of the use of human resources in enterprises

The use of human resources characterises the state of their operation in an enterprise as well as the effectiveness of this operation. It can be considered as extensive and intensive. The extensive use determines the use of employees as numbers and over time. The intensive use assesses human capacity, actual mental and physical capabilities and potential within the legitimate working day. The quantity and quality of human resources invested in an enterprise is in direct relation to the results achieved. There is the following dependence: the more completely and effectively human resources in an enterprise are used, the lower the labour costs for output and marketed production are and the higher the economic results of the organisation's activities and the income of the employers and employees are. Conversely, the inefficient use of human resources, under equal conditions, cannot ensure an efficient and stable functioning of an enterprise.

In practice, a great number of indicators are applied to characterise the use of human resources, such as:

- Coefficient for the use of human resources at a time;
- Internal labour losses of working time per employee;
- Quantity of the production and/or service output per employed person;

- Growth of the volume of production and/or services per employed person;
- Sales per one employed person;
- Profit per one employed person;
- Percentage of implementation of labour standards;
- Workforce costs per unit of production;
- Wage costs in the cost of the output and marketed production.

All indicators provide information about the state of human resources and their use within the enterprise, outlining different aspects of the management process. On the basis of their application, it is possible to ascertain what has been achieved in this key area. It will become a basis for evaluation and identification of the reserves for improving the process.

Indicators for the use of human resources in enterprises applied as part of the survey

The process of evaluation of the extent to which the human resources in the enterprise are used starts with determining the objectives. The objects assessed can also be different: the employees in an enterprise; employees in individual production or functional units; employees in a particular position or post;

groups of employees who get poor results in the work process; specific posts or positions.

Selection of the most appropriate indicators for determining the use of human resources in an enterprise depends on the objectives of the assessment, the specifics of the work process and the nature of the tasks and functions performed. In the current survey, the availability of statistical information about the results of the companies was a major factor for determination of the objects and targets of the survey and for selection of the indicators for evaluation.

The Indicator "Sales per one employee in an enterprise at comparable prices" is uniform with the indicator "Quantity of production per one employee". Both indicators characterise the quantity and value of the output, or of the marketed production, respectively, as divided by the total number of employed persons in an enterprise. In this way, the extensive and intensive use (productivity) of human resources can be assessed simultaneously. The formula for determining this indicator is as follows:

$$Q_{1pers} = \frac{Rs}{Ans}$$

where

Q_{1pers} - volume of sales of goods and services of a person at constant prices;

Rs – sales revenue;

Ans – average number of staff without women on maternity leave.

"Growth of sales revenue per one employee" is an indicator that is also often used to describe the extensive and intensive use of human resources. It can be determined by the following two basic formulas:

$$\Delta Rs = Rs_1 - Rs_0$$

$$IRs = \frac{Rs_1}{Rs_0}$$

where:

ΔRs - growth in sales revenue

Rs_1 - level of sales revenue during the reporting period;

Rs_0 - level of sales revenue during the basic period;

IRs - Index reflecting the increase in sales revenue in the reporting period compared with the basic period.

The larger the growth in the volume of marketed products and the bigger the sales revenue per one employed person in an enterprise are, the more effective the use of human resources is. If the index characterising the increase in sales revenue is higher than a unit, then the growth is positive and if it is lower than a unit, the growth is negative.

When using these indicators, three essential points should be taken into account. First, not every increase in the volume of output or marketed production per one employee is a result of the better use of human resources. It could be a result of improvement in the technique and technology, replacement of obsolete machinery, apparatus and equipment with new, more productive ones, or of organisational changes.

Second, structural changes of production also have their influence: for example, increase or decrease in the production of labour-intensive products. In practice, the smaller the relative share of labour-intensive products is, the higher the degree of use of human resources will be, and vice versa.

Third, another dominant factor should also be taken into account. When the cost of production increases due to a specific market situation, the use of human resources seems to be improving without any changes in production, and vice versa. The impact of price changes on the dynamics of the output per employed person in an enterprise should also be reflected. To that end, the volume of the output and marketed production or the sales per one employed person should be recalculated at comparable prices.

The indicator "Profit per one employed person" characterises the intensive use of the workforce in an enterprise. It is calculated as the annual profit received by the enterprise is divided by the total number of employees for the year concerned. Unlike the two preceding indicators, as part of the assessment it also includes the achievements of the aggregate workforce in an enterprise in terms of the structure of the production with regard to its profitability, the market positions of the enterprise and its competitiveness. However, the impact of the market situation must also be taken into account here - which, at the same level of intensive use of the workforce, may lead to a different profit per one employed person in the enterprise.

Evaluation and practical application of the indicators for evaluation of the use of human resources in mining enterprises

The four enterprises included in the further analysis are among the leading companies in the mining industry sector. According to the European Commission's classification of the enterprise's size, they fall under the category of "large enterprises" with over 250 employees. During the four-year period considered, each of them has a targeted human resource management policy and implements planned activities in the field of human resources. The selected companies work transparently and regularly inform the public about their activities by officially publishing part of the results achieved. These circumstances are a good prerequisite for inclusion of these enterprises in this study. Within its framework, the object of study is the efficiency achieved in the process of human resource management, along with the company policies and practices as a basis for potential efficiency increase. The aim is to assess whether higher efficiency is achieved by applying different indicators for human resource use and to look for the causes and prerequisites for its growth.

The application of the indicator "Sales per one employee in an enterprise at comparable prices" characterises the marketed production per employee. The rating on this indicator for the four analysed mining enterprises allows for the intensive and extensive use (productivity) of human resources to be characterised.

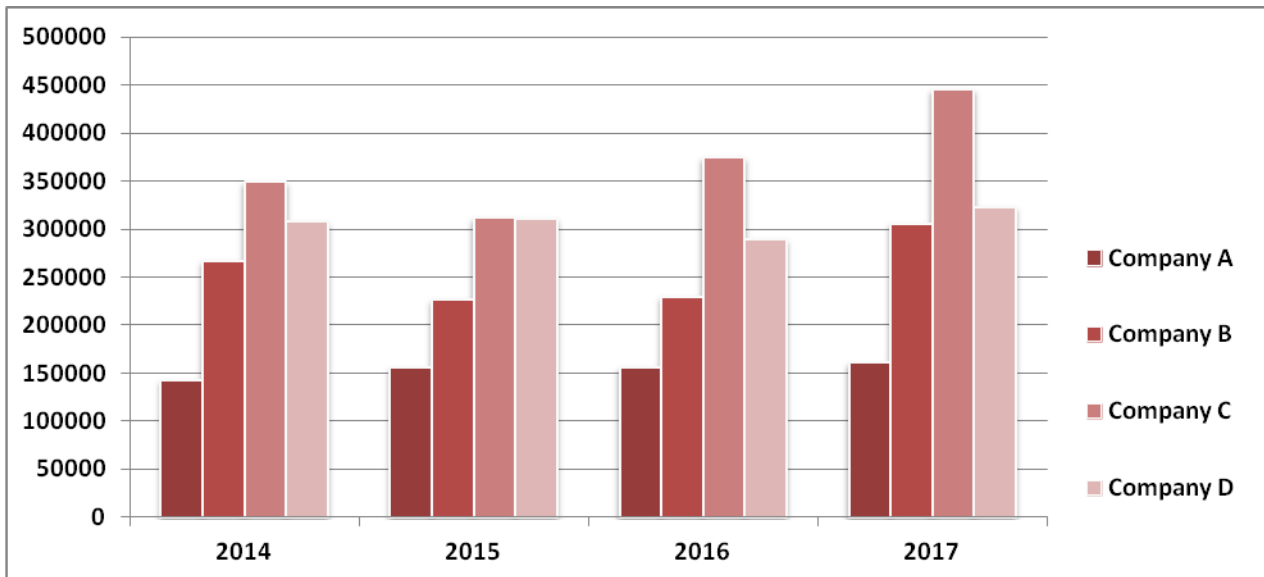


Fig. 1. Values of the indicator “Sales per one employee in an enterprise at comparable prices” (BGN)

Note: The figure is created according to the authors' calculations based on official data for the annual sales revenue and total number of workers and employees of the enterprises included in the study. Source: ICAP Bulgaria, 300 Business Leaders in Bulgaria 2014-2017, ICAP Bulgaria, Sofia

The results presented graphically in Figure 1 show that the values of enterprise A have been slowly and gradually increasing – from 142 505 BGN to 160 695 BGN annually. Enterprises B, C and D in 2017 achieved the highest scores – 305 659 BGN, 444 961 levs and 322 490 BGN, respectively, although there are conflicting general trends. It may be noted that if this indicator is applied to companies from other sectors, the result will be less than 100 thousand BGN per one

employee. The high values of the mining enterprises are directly linked to the large investments made in tangible and intangible resources during the period under consideration. The following good practices of the respective enterprises for human resource input are repeatedly recovered, as evidenced by the results of the analysis.

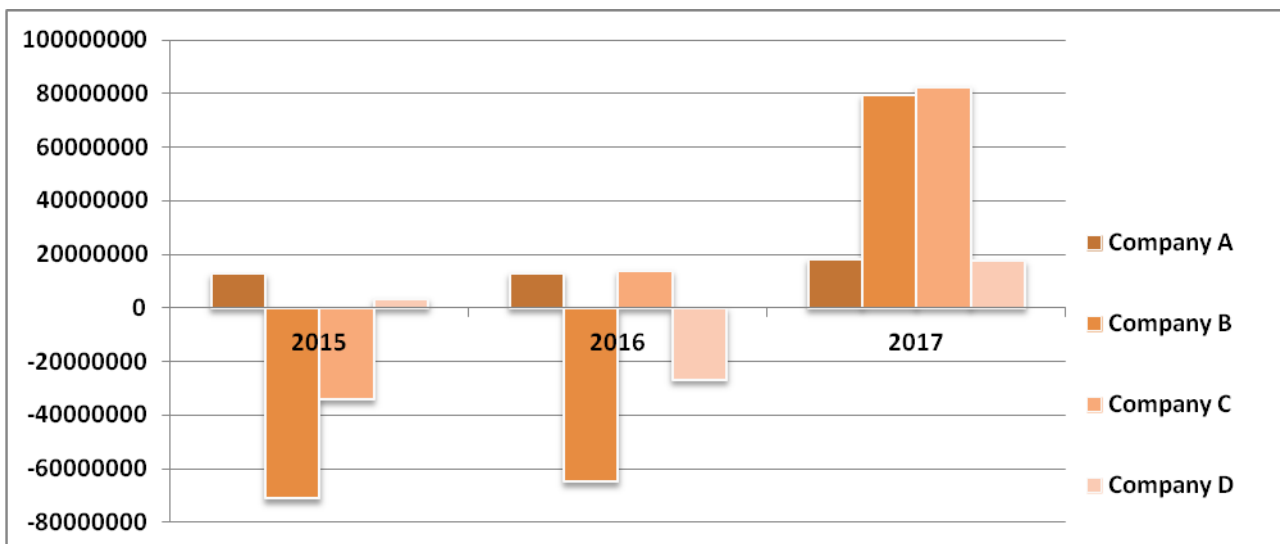


Fig. 2. Values of the indicator “Growth of sales revenues per one employee” (BGN)

Note: The figure is created according to the authors' calculations based on official sales revenue data for the enterprises included in the study. The year 2014 is taken as a basis. Source: ICAP Bulgaria, 300 Business Leaders in Bulgaria 2014-2017, ICAP Bulgaria, Sofia

The application of the indicator "Growth of sales revenue per one employee" makes it possible to identify any current change recorded against a prior reference period on a comparative basis.

As apparent from Figure 2, the obtained absolute values of the growth in sales revenue per one employee vary widely both from year to year and when comparing the values of individual

enterprises. While in 2015 two of the enterprises (B and C) had a significant negative growth in sales revenue compared to the previous year – 2014, and the other two had a very modest positive growth, in 2017 all enterprises effected positive growth.

Regarding the Index which characterises the increase in sales revenue during the reporting period compared to the

basic period (IRs), the results are also not unambiguous. For company A only, the Index varies from 1.09 (2015) to 1.13 (2017) and there is a positive growth. For company B and C, the values changed from negative in 2015 to positive in 2017. In the case of company D, the Index was positive with the exception of 2016.

If we apply the indicator for evaluation of the use of human resources "Profit per one employee" for the four analysed mining enterprises, we will get the following results presented graphically in Fig. 3. The profit as a final result of the enterprise's activity is an absolute indicator that characterises this activity quantitatively and measures the financial and economic performance. In terms of human resource management in the mining enterprise, it is important to analyse with how many workers and employees it was achieved and what costs were incurred in order to secure these resources. The results presented in Fig. 3 show that in 2014, the value of

the indicator for enterprise A was negative. In the next three years, it was already positive and increasing – from 17 922 BGN (2015) to 23 552 BGN (2017). Company A has achieved the registered profit over the years with roughly the same total number of employees. For company B, the results were contradictory: the highest value was obtained in 2017 (81 981 BGN) and the lowest value was in 2015 (only 31 996 BGN). These values are obtained with small changes in the total number of employees over the past two years. For enterprise C, the highest score of the indicator was reported in 2014 (135 785 BGN) and the lowest was in 2016 (75 951 BGN), with very small changes in the total number of employees over the years. The data for enterprise D describes a similar situation. The highest value of the index was in 2014 (98 030 BGN) and the lowest was in 2016 (52 583 BGN).

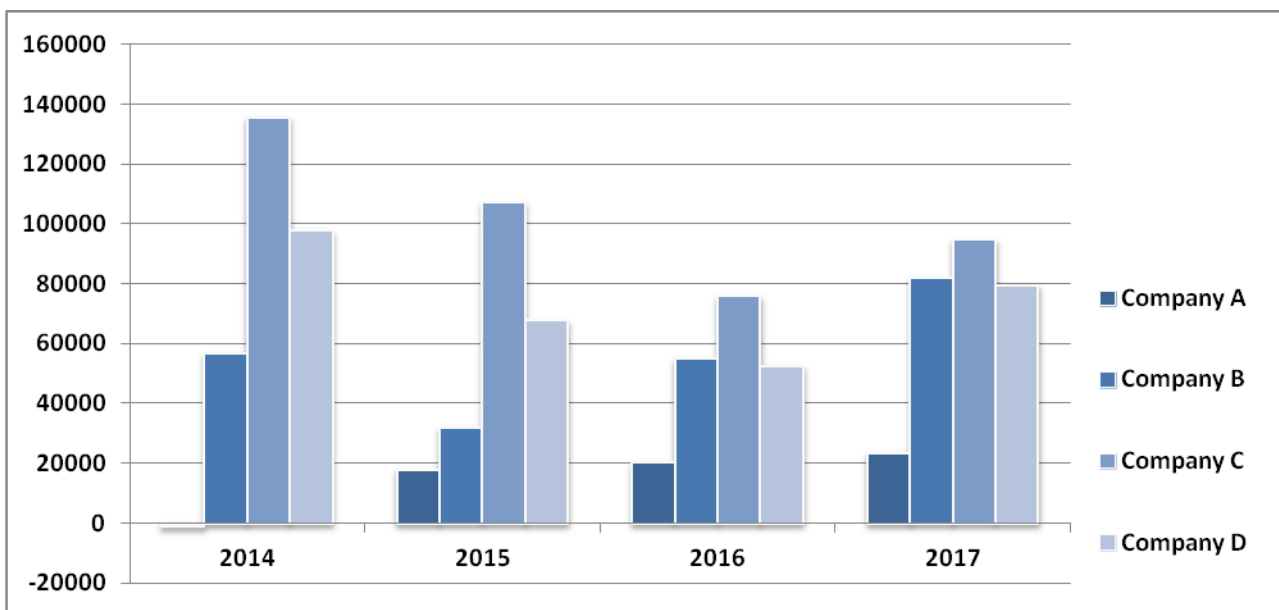


Fig. 3. Value of the indicator "Profit per one employee" (BGN)

Note: The figure is created according to the authors' calculations based on official data for the annual profit before tax and total number of employees of the enterprises included in the study. Source ICAP Bulgaria, 300 Business Leaders in Bulgaria 2014 - 2017, ICAP Bulgaria, Sofia

According to the estimates for the four companies of the indicator "Profit per one employee", only in one of them (enterprise A) there is a sustained increase in efficiency in the use of human resources. For enterprise B, there has been a positive trend and a relatively steady increase in efficiency since 2015, while the other two (enterprise C and D) have rather contradictory results. Two conclusions can be drawn as a result of the calculations made. First, during the period from 2014 to 2017, the four companies didn't make significant changes in the total number of employees. At the same time, as a second point, it can be noted that there are significant changes in the profit obtained as a consequence of investments made in the field of human resource management and due to the influence of other factors like market situation, innovations and investments in new equipment and technology and human capital development, reorganisation of the business activity, etc. It must also be mentioned that in 2017, the price of metals on the world exchanges rose by 20.7%. The reasons for this development may be sought in the increased demand caused by the growth of the industrial production and

the lower supply from China as a result of the measures taken for reducing air pollution. The increased demand is precisely what requires changes in the behaviour of the four enterprises which rely on investments and innovations as an adequate response. It can be concluded that all companies have achieved positive financial-economic results which increase over time (with the exception of company A in 2014). Investments in material and human resources have contributed to these results.

Investments in human resources in the mining enterprises surveyed

In the extractive industry, the company's investments in human resources are focused mainly on their more rational use in the work process. This means applying measures to reduce all-day work time losses and absences from work in general. In this way, the increase in individual labour productivity is stimulated, which in turn leads to a reduction in

the cost of labour as part of the cost of production of one unit. In an industry where safety risks and workload are enormous, the transformation of the care for human resources into value is not only a must, but it also supports the competitiveness of these companies. Not surprisingly, the leading mining companies develop special policies, procedures and rules and invest in safe workplaces and staff training aimed at forming responsible behaviour for each worker.

In company A, a complex software has been introduced in recent years in order to improve labour productivity when extracting resources. It creates a geological 3D model of the components of the resources and finds optimal solutions for exploitation of the deposits. It is also useful in the field of safety at work through the ability to signal for dangers, regulate traffic and speed of movement and improve traffic in case of limited visibility.

In company B, as of 2015, a mining management system has been introduced to increase labour productivity. It allows the production process to be managed completely automatically according to parameters specified by mining engineers, mine surveyors and controllers. All data is recorded and stored to be used when making future decisions. This system contributes to maximum productivity of the machines, which reduces downtime as well as labour costs. Since 2016, its scope has been increasing and the data collected is available 24 hours a day for the engineering and technical staff, not only on their PCs, but also on their mobile phones, which is a leading factor in making quick and reasoned decisions. A procedure for "Health and Safety" is implemented and currently operates as a duty and responsibility of all employees. Its goal is the continuous improvement of working conditions. The procedure includes application of good practices, control of the working environment factors and the production process, risk assessment, proper use of personal protective equipment, prevention of occupational accidents, incidents and occupational diseases. At the end of 2018, a professional training programme was also launched in the company, led by lecturers from the University of Mining and Geology "St. Ivan Rilski". The trainings were organised and conducted according to the corporate policy and aimed at acquiring the knowledge and skills needed to perform the modified working process. Thus, increasing capacity of employees in different activities is pursued.

Since 2011, an Annual Sustainability Report has been published in Enterprise C, which takes into account the company's relationship with its stakeholders - employees, investors, state and local communities, environment. One of the main goals that the mining company has set itself is the provision of a variety of possibilities for the staff to acquire new knowledge, develop leadership skills, professional and technical qualities. Attention is drawn to the relationship between human resources and trade unions, and on this basis a constant dialogue has been achieved through the developed corporate policy for decent work. Procedures are in place to submit complaints about irregularities within the scope of the labour law or about violated human rights. Since 2013, the company has launched a project to integrate the safety processes into the production processes with the task of providing a risk assessment for 100% of the performed work activities. In this regard, a programme to improve the health of employees and a programme to promote a healthy lifestyle, endurance and positive self-control have been developed.

Since 2016, an innovative approach in the company to improve safety practices has been the introduction of golden rules to ensure more secure and safer working environment. These rules must be followed by every person that performs any kind of activity on the territory of the enterprise.

In 2018, the results from a survey of employees' opinions revealed that the company successfully manages to take care of the development of its staff, which is recognised as a fact by most of its members. The answers received are: 59% have commitment to work and willingness to make additional efforts; 70% are willing to remain at work in the company; 62% approve of their performance; 57% approve of the work of senior management. The company continues to implement the project "Working Together", which includes training all employees to make decisions, work in a team and respond quickly in various situations.

In company D, as of the end of 2014, an integrated safety system has been developed, including video surveillance, access control and fire alarm. The effect of the balance between technology and human factor is the achieved prevention of workplace accidents. As a result of the systematic and purposeful policy that the company has followed since 2012, zero levels of workplace traumas are reported and professional diseases are limited to a great extent. Among the permanent measures to improve the health and safety at work are the supply of new machinery and equipment, taking into account the highest world safety norms, as well as the strict control of the implementation of the rules in this direction. In summary, it is correct to conclude that the improvement of the system for human capital management has been successful, has been accepted by company employees and should be considered as a stage of permanent operational staff management system (Chobanov, Velev, 2018).

Main factors and prerequisites for improving the use of human resources in the mining enterprises

Management is a dynamic and open process, as the key phases are re- and follow-up research as well as continuous monitoring (Chobanov, Velev, 2017). Based on the summaries of theory and good practices in the extractive industry, several basic conditions leading to an improvement in the use of human resources in an enterprise can be inferred. Improving the process of using human resources in the mining enterprise depends on several key factors:

- improvement of the strategic planning in human resource management;
- improvement of the quality of labour and production standards;
- introduction of new equipment and technology;
- extent to which workers, employees and managers meet the requirements for the jobs occupied;
- ensuring favourable working conditions;
- employee motivation;
- focus on the constant development of human resources and their career advancement;
- improvement of the work organisation.

The direction of business development is dictated by the values of society, which gradually become commensurate with the profit of the enterprise (Petrova, 2018). In this sense,

essential for a better use of human resources is the company's approach towards a targeted identification of the additional needs of new employees and their timely satisfaction. In practice, selection of new employees should be undertaken only after identification of the general needs and assessment of all reserves for the use of available personnel. The extent to which the workforce in an enterprise can be used depends on its rhythmic interaction with the suppliers of raw materials, materials, fuels, energy, spare parts, tools and accessories and on the buyers of the products. The effective use of human resources also depends on the existence and justification of labour standards in the enterprise, and in particular, on the availability and quality of job descriptions, labour norms, scheduled tasks, work schedule, internal order rules, wage rules, etc. Once developed, however, the labour standards should not be permanent. It is recommended that they are to be changed with any change in the technical, technological, organisational and production conditions and thus, a new, generally higher standard level of human resources use to be defined.

The use of human resources in the enterprise is very much dependent on the extent to which workers, employees and managers meet the requirements of their posts or jobs. This question should be resolved by recruiting and carefully selecting human resources. Under certain economic, technological, organisational and production conditions, the more complete and efficient use of the workforce in a mining enterprise depends to a large extent on employees' motivation, their attitude and willingness to make full use of their working hours, working in accordance with the requirements of the labour standards and respecting the industrial and technological discipline.

The concept of ensuring health and safety at work is essential for the development of the mining enterprise. It includes two guidelines of work. The first one is the development of a mining management system that gives a signal in case of danger to the workers. This includes the development of programmes to improve the health of employees. The second guideline is to conduct targeted training of staff on compliance with health and safety at work. It is necessary to understand that the talent, personal qualities and skills of the employees have a strong influence on the better performance of the mining enterprise on the market. The investment in human resources development and opportunities for career advancement is a priority in its activity. Main indicators for achieving the business objectives are the increase of the employees' competencies and the continuous trainings for acquiring new knowledge, developing leadership skills, professional and technical qualities.

Significant potential for increasing the motivation of the personnel in the mining enterprise, for more complete and

efficient use of the workforce as well as of all other resources, is found in two directions. First, ensuring favourable working conditions, including measures to ensure safe and health-conscious jobs. Second, providing real opportunities for professional development and improvement of the knowledge and skills of the employees and for their career development only according to their personal qualities and achievements in the work process.

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