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MODIFCATION AND IMPROVEMENT OF HUMAN RESOURCE MANAGEMENT SYSTEM IN METALLURGICAL ENTERPRISE

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In this paper the example of methodic of proceeding in analysis and modification of human resource management system are presented. Besides results of research carried on analyzed question on the example of chosen unit of metallurgical enterprise are discussed.

***Key words**: human resource management, trade families, transaction matrix, work post evaluation, employee mobility paths*

Modificiranje i poboljšanje sustava za upravljanje ljudskim resursima u metalurškom poduzeću. U ovome se članku iznosi primjer metodičkog postupanja kod analiziranja i modificiranja sustava za upravljanje ljudskim resursima. Pored rezultata istraživanja koje je provedeno u području koje je predmet analize, raspravlja se o primjeru odabrane jedinice metalurškog poduzeća.

***Ključne riječi:** upravljanje ljudskim resursima, obitelji poslova, transakcijska matrica, vrednovanje radnog mjesta, putevi mobilnosti zaposlenika*

INTRODUCTION

The proper management of the human resources of an organization is one of the most important activities that must be undertaken by the organization in order to successfully function in a competitive market. It is necessary to carry out comprehensive processes aimed at obtaining the deepest possible knowledge of the employees, their professional potential, ambitions and development capabilities. This knowledge becomes a basis for activities enabling the people employed at the organization to achieve their individual objectives and goals. Their resultant satisfaction of the job they perform will be reflected in their increased motivation and more complete loyalty to the organization, thus contributing to a better achieving of its strategic goals [1].

From the point of view of both economics and increased employees satisfaction, a proper allocation of staff is essential. It can be broadly stated that each individual in an organization should be placed on a post that would assure to make full use of his or her professional potential. In order to achieve such a goal it is necessary to carry out an in-depth analysis of both the human resources and the organizational structure, and the organization of work and particular work posts [2].

Studies carried out by the authors of the present article have defined, as an example, an outline of a procedure to be used when analysing and improving the human resources management system of an organization. It is graphically represented in Figure 1. The article presents a survey scheme and general conclusions resulting from its implementation in a selected undertaking of the metallurgical sector.

ANALYSIS OF THE EXISTING HUMAN RESOURCES MANAGEMENT SYSTEM

A starting point for the analyses carried out was the examination of the human resources management system currently functioning in the undertaking. For this purpose, the SWOT personnel analysis [3], statistical and demographical analyses of the employee population and the labour cost analysis [4] were used.

The performed SWOT analysis, in broad outline, was based on the eight following fundamental categories: the identification of workforce demand, recruitment and selection, development, the redundancy procedure, evaluation, motivation, communication and developing the organizational culture. Within particular categories, partial criteria were used. The performed analysis showed a predominance of weaknesses (the overall result of comparison of strengths

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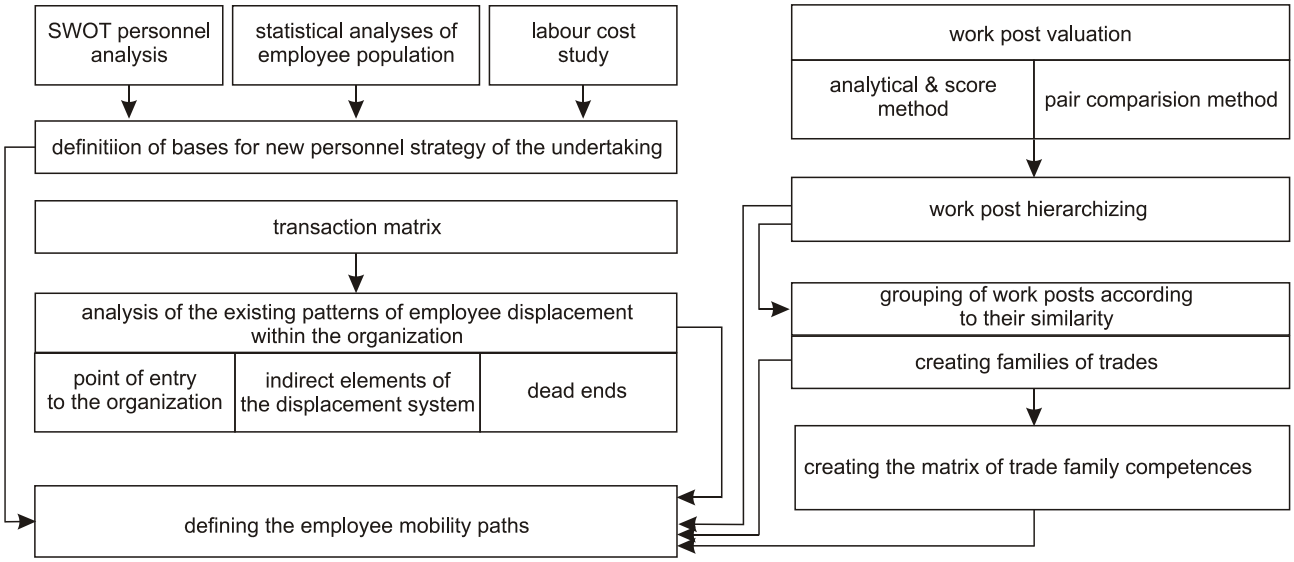

Figure 1. **Schematic diagram of the analysis conducted within the studies carried out.**
Slika 1. **Shematski dijagram analize provedene u sklopu završenih studija**

and weaknesses at a level of –13). A particularly poor situation was noted in the processes of recruitment and selection, motivating, communication and developing the organization culture. The only element of positive dimension was the evaluation (which was regular and tailored to the undertaking's specificity), though, unfortunately, its results were not very extensively used by the undertaking for the optimization of the measures of influencing the employees.

In the continuation of the study, the following was done: the assessment of employees qualifications, the structural analysis in respect of basic social and demographic data, the analysis of labour costs constituting an important element in the economic calculation of the undertaking. The result of the undertaken activities was the observation of a number of leading phenomena that influence the form and state of the human resources of the undertaking. As the main elements, the following can be pointed out: the progressing process of staff ageing through the clear increase in the average age (nearly 72 % of the employed are more than forty years of age, and almost 20 % are at the age of above fifty), or the aggravating problem of a generation gap that creates the risk of experienced workers retiring, while failing to pass their own knowledge on to younger employees (only 4,48 % of employees are below 30 years of age, 1,17 % of people have an employment duration less than 8 years and, at the same time, 75,48 % of employees have more than 20-years' work experience).

WORK POST VALUATION AND GROUPING

The analysis and valuation of work was considered to be one of the most important activities within the proposed scheme. Indeed, the carrying out of these tasks properly allows an in-depth understanding of the contents and specificity of particular work posts. It may also become a basis for searching for differences and, what is more important from the point of view of improving the personnel management system, similarities between work posts.

In the framework of conducted studies, the work valuation method UMEWAP 95 [5] was employed, whereby the following were assessed:

- work complexity (vocational education, professional experience, innovation, creativity, skills, collaboration),
- accountability (the course and effects of work, decisions, the means and objects of work, safety of other people, external contacts),
- effort (physical, mental, intellectual, monotony),
- work conditions (nuisance of working environment, hazardous agents).

As the basic priorities for the conducted valuation process, the following assumptions were made:

- enhancing the role of the level and profile of education of an employee for the purposes of increasing the overall level of staff education,
- highlighting the role of professional experience on account of the complexity of works carried out on part of the work posts and the hazard posed to people present within the zone covered by the activities being carried out,
- placing greater emphasis on the personality characteristics of a candidate - above all, to match them as fully as possible to the character of the work post in question.

Table 1. contains part of the work post hierarchy formed as a result of the valuation carried out.

Table 1. **A fragment of the list formed as a result of the performed work valuation**
Tablica 1. **Dio liste koja je sačinjena kao rezultat provedenog vrednovanja rada**

No.	WORK POST	CATEGORY															SUM
		complexity					responsibility					effort				conditions		
		a	b	c	d	e	a	b	c	d	e	a	b	c	d	a	b	
1	Manager of Rolling Mill Department	1,5	1,1	0,6	0	0,4	0,7	0,7	0,6	0,1	0,4	0,2	0,5	0,4	0	0,1	0,1	7,3
2	Manager of the Section Finishing Shop	1,5	1,1	0,6	0	0,4	0,7	0,7	0,6	0,1	0,4	0,2	0,5	0,4	0	0,1	0,1	7,3
3	Manager of the Rail Finishing Shop	1,5	1,1	0,6	0	0,4	0,7	0,7	0,6	0,1	0,4	0,2	0,5	0,4	0	0,1	0,1	7,3
4	Trade Foreman - Furnaces	1,2	1,0	0,5	0	0,3	0,6	0,6	0,5	0,2	0,3	0,2	0,4	0,3	0	0,1	0,1	6,2
5	Trade Foreman - Rolling Mill Train	1,2	1,0	0,5	0	0,3	0,6	0,6	0,5	0,2	0,3	0,2	0,4	0,3	0	0,1	0,1	6,2
6	Trade Foreman - Rebuilding	1,2	1,0	0,5	0	0,3	0,6	0,6	0,5	0,2	0,3	0,2	0,4	0,3	0	0,1	0,1	6,2
7	Trade Foreman - Dispatching	1,2	1,0	0,4	0	0,3	0,6	0,6	0,5	0,2	0,3	0,2	0,4	0,3	0	0,1	0,1	6,1
8	Trade Foreman - Technological Sequence	1,2	1,0	0,4	0	0,3	0,6	0,6	0,5	0,2	0,3	0,2	0,4	0,3	0	0,1	0,1	6,1
9	Trade Foreman - Rail Finishing Shop	1,2	1,0	0,4	0	0,3	0,6	0,6	0,5	0,2	0,3	0,2	0,4	0,3	0	0,1	0,1	6,1
10	Trade Foreman - Linings	1,2	1,0	0,4	0	0,3	0,6	0,6	0,5	0,2	0,3	0,2	0,4	0,3	0	0,1	0,1	6,1

The next stage in the activities involved the combining work posts according to their similarity. Within this process, the information gained from the performed work analysis and valuation was used. Additionally, to deepen the knowledge possessed, the line managers and the workers employed on particular work stands were interviewed. The body of this information enabled nine basic groups (trade families) to be distinguished, namely: Strategic Posts, Rebuilding, Operators (Manipulators), Dispatchers, Documentation, Fitters, Crane Operators, Others, Equipment Operators. The problem of developing families of trades is described more widely in [6].

The identification of the families of trades, in conjunction with the information obtained through the creation of portfolios of work post competencies, made it possible to search for competencies characteristic for particular groups of trades, but, at the same, provided a basis for seeking competences that link individual groups. Additionally, it became possible to define the competences that are decisive to an employee being moved to a higher level in the undertaking's organizational structure. The list of competences for particular work posts within the identified trade families allowed the creation of matrices of competences illustrating, in a transparent manner, the types of requirements imposed on the employees at particular levels of the hierarchy. Figure 2. shows an example of a matrix for the Equipment Operators group.

ANALYSIS AND MODIFICATION OF THE EMPLOYEE DISPLACEMENT PATTERNS

An important issue within the proper management of human resources is the fullest possible use of the employees' skills. This is only possible, if their professional potential is sufficiently well understood. This potential, however, varies with time during the employment of particular individuals. Part of those changes results from the natural predispositions and ambitions of the employees. To a certain extent, they can, however, be inspired and shaped by the undertaking. For this process to be able to run smoothly, it is necessary, among other things, to construct employee mobility paths within the organization, which will enable the path of development to be chosen consciously and in line with the interest of both the undertaking and its employees.

A starting point for analyses at this stage was the analysis of the existing patterns of displacements in the organization, based on the transaction matrix [7]. This matrix is an analytical method that makes it possible to depict any displacements which took place within the undertaking in the period assumed for examination. It shows the path of particular employees from the point of entering the organization, through the posts successively taken by them, until leaving the organization. It thus enables the illustration of any changes in the human potential of the undertaking. The analysis of the data contained in the transaction matrix allows the definition of the existing typical patterns of displacements within the organization and the assessment of their justification and causes. It also allows the identification of posts being the most frequently used points of introducing new employees to the organization and their comparison with the assumptions of the developed strategy in the framework of human resources. Additionally, it may become a basis for the analysis of manning patterns in terms of skills gained or lost by the employee.

The professional careers of employees in ten years' period were used in the analysis. The data contained in the transaction matrix were used for dividing the whole of work posts into categories according to their participation

EQUIPMENT OPERATORS												
Foreman (Saws & Cooling Beds)	1											
Foreman (Section Finishing Shop)	39											
Foreman (Rail Finishing Shop)		108										
Foreman (Linings)												
Foremen Level	4	6	10	17	18	87	88					
Saws & Cooling Beds		8	42	47	55	90	91	97	6	102	111	
Section Fin. Shop - Straightener	11		53	44	59	60	82	98		99		
Section Fin. Shop - Saws		43	52		76	85	43					
Rail Fin. Shop - Saws												
Linings		66		83								
Rail Fin. Shop - Press			22								111	
Equipment Operators Level											17	
The Level of Equipment Operators, Operatives and Crane Operators											58	
The Level of Equipment Operators, Crane Operators and Fitters											9	

1. Creativity, 4. Cogency, 6. Ability to make decisions in emergency, 8. Teamwork ability, 9. Manual dexterity, 10. Leadership, 11. Sustained concentration capability, 17. Analytical ability, 22. Ability to select bearings depending on the rail, 39. Computer literacy on a user's level, 42. Ability to operate saws and hot cutting equipment, 43. Ability to operate the cold cutting saw, 44. Ability to operate the bridge's control panels, 47. Ability to operate Cooling Bed equipment, 52. Ability to determine the accuracy of product geometry, 53. Ability to determine the needs for rebuilding the straightener cassettes for a preset profile, 55. Ability to judge the correctness of the cutting process in terms of quality and dimensions, 59. Ability to judge the correctness of the material cross-section, 60. Ability to properly set and rebuild the press, 76. Ability to reclaim the material on the cold cutting saw, 82. Ability to adjust the overhead crane horizontal and vertical settings, 83. Ability to set material bending parameters, 87. Knowledge of products, 88. Managing human resources, 90. Ability to properly setting saws and stops, 91. Ability to select the tool for cutting depending on the profile, 97. Knowledge of the construction of hot cutting saws and tools, 98. Knowledge of roller straightener construction, 99. Knowledge of punch straightener construction, 102. Knowledge of the fundamentals of the material cooling process, 108. Knowledge of the Rail Finishing Shop's technological sequence, 111. Knowledge of the material marking rules

Figure 2. **Matrix of competences for work posts within the Equipment Operators group**
Slika 2. **Matrica kompetencija za radna mjesta u sklopu grupe operatera na opremi**

in the displacement process. For the purposes of the study, three possible classification criteria are specified here:

1. Use of the work post as a point of entry to the organization. Within this criterion, the index of share in the total number of the employed persons were taken into account and the following possible groups were distinguished: the poor starting point (the index below 0,1) and the normal starting point (the index above 0,1).
2. The possibility of continuing the development to other work posts. In this group, the number of possible variants for a further displacement of employees was taken into account, and the following possible groups were assumed: the end of the path (work stands not enabling any further professional development), the poor source (the number of further displacements was very small), the normal source (transitional points in employees' advancement).
3. The participation in the process of displacing employees within the organization. Joint displacement coefficients were considered here, and the following groups were indicated: the weak recipient (the index below 0,1), the recipient (the index from 0,1 to 0,5), the strong recipient (the index above 0,5).

Part of the list of work stands, along with their description in the framework of the adopted criteria, is given in Table 2.

The data contained in Table 2. provided a basis for making a more detailed assessment of the existing patterns of displacements within the undertaking. On the basis of assessments made in the framework of the assumed criteria, the whole of work posts were divided into the following groups:

- work posts representing "dead ends" for employees' advancement, or those which were identified as the end of the path;
- work posts constituting the source of recruiting employees for other work posts;
- work posts that, while constituting the starting point in the organization, are simultaneously the end of the path.

The analysis of the data in the transaction matrix and in Table has made it possible to conclude that the undertaking has not very intensively used the employee mobility paths in its previous activity. More than half of the work posts have been classified to path-ending categories. The displacements of employees that have been made so far were predominantly unplanned in character and were triggered by the current needs of the organization. In very numerous cases a newly hired employee remained permanently on a work post that involved great opportunities for further advancement.

The next step in the framework the conducted studies were to define the employee mobility paths. In broad outline, analyses at these stages were based on the following elements:

- identification of all possible displacements for particular work posts,
- division of the obtained pool into groups including, respectively desirable, acceptable in specific situations, and inadvisable displacements,
- definition of differences in competences for particular work posts,
- identification of training courses that must accompany

each displacement,
- based on the desirable displacements, construction of a network of interrelations between work posts, describing the employee mobility paths within the undertaking, which are foreseen to be implemented.

The problem of developing employee mobility paths is described more widely in [8].

Table 2. **Characteristics of the trends used in the displacement of employees in the undertaking under study**
Tablica 2. **Karakteristike trendova koji se upotrebljavaju kod premještanja zaposlenika u poduzeću u kojemu se studija provodi**

LP	Work post	Characteristics		
1	Mill Operator - Foreman (Rolling Mill Train)	end of path		
2	Mill Operator - Shop (Rolling Mill Train)	end of path	normal	poor
3	Crane Operator (Rolling Mills)	end of path		poor
4	Charger (Furnaces)	normal	strong	
5	Operator (Furnaces)	normal		
6	Fitter (Furnaces)	end of path		poor
7	Furnace Operator (Furnaces)	normal	strong	poor
8	Furnace Operator - Foreman (Furnaces)	end of path	weak	
9	Mill Operator - Welder (Rebuilding)	end of path	weak	poor
10	Mill Operator - (Rebuilding)	normal		normal

CONCLUSION

The problems related to the management of human resources of an undertaking, for contemporarily functioning undertakings, are amongst the most important issues in the undertaking's activity. Increasingly great emphasis is being placed by organizations on understanding their employees, reinforcing their links with the undertaking and the fullest possible use of their professional potential. The analytical scheme proposed in the present study may become a helpful tool in the process of reviewing and improving the personnel management system.

The investigation carried out by the authors has made it possible to point out to several important issues related to human resources management. Activities carried out within these areas should, in a measurable way, translate into the quality of an undertaking's personnel. First, it is possible to point out here to the improvement of the employee development methods by combining the advantages resulting from the human assets model and the sieve model. Secondly, the implementation of clear employee mobility paths that suit the company's needs. This activity contributes, among other things, to the conscious and planned development of employees, while taking fully into account the company's priorities; increasing the employees' motivation by clear identification of posts within the organization, which they can reach; and encouraging the employees to use the forms of self-improvement. Thirdly, putting in place a systematic employee assessment system tailored to the specificity of the company. And finally, the mitigation or liquidation of motivation conflicts by introducing a work post valuation system which would be legible in respect of adopted criteria. The hierarchy of work posts, established on the basis of the valuation process results, enables the quick identification of the role of a specific work post within the organization, and thus the application of appropriate motivating measures. At the same time, it enables the employees to make the self-assessment of their work input in the manufacturing process. Fourthly, a more complete matching of the newcomers selection methods to the specificity and needs of the company, e.g. by using competency portfolios. The possessed portfolios enable the verification of an employee's skills and competences not only in terms of specific work posts, but also in the perspective of the entire company and its future needs. Fifthly, significantly enhancing the ability to set the directions of employees' professional development and the capacity for the well-aimed selection of the addressees of such efforts by putting in place an employee competence verification system. This will make it possible to avoid ineffective investments in the development of workers with inadequate competences, as well as to properly motivate workers with the highest skills, being the most appropriate to the company's needs.

REFERENCES

[1] A. Pocztowski, A. Miś A: Analiza zasobów ludzkich w organizacji, Wydawnictwo Akademii Ekonomicznej w Krakowie, Cracow 2000.
[2] M. Armstrong: Zarządzanie zasobami ludzkimi, Oficyna Ekonomiczna, Oddział Polskich Wydawnictw Profesjonalnych, Cracow 2003.
[3] A. Lipka: Strategie personalne firmy, Wydawnictwo PSB, Cracow 2000.
[4] L. Bednaraski, R. Borowiecki, J. Duraj, E. Kurtys, T. Wiśniewski, B. Wersty: Analiza ekonomiczna przedsiębiorstwa, Wydawnictwo Akademii Ekonomicznej we Wrocławiu, Wroclaw 1998.
[5] A. Szałkowski (ed.): Wprowadzenie do zarządzania personelem, Wydawnictwo Akademii Ekonomicznej w Krakowie, Cracow 2000.
[6] R. Prusak, W. Waszkielewicz, R. Budzik: Using of competences wallets constructed for work stands in human resource management of metallurgical enterprise, Metalurgija 44 (2005) 2, 155 - 159.
[7] M Kostera: Zarządzanie personelem, Polskie Wydawnictwa Ekonomiczne, Wasaw 2000.
[8] W. Waszkielewicz, R. Prusak, R. Budzik: The increasing of metallurgical enterprise elasticity by using polyvalence skills of workers, Metalurgija 44 (2005) 1, 69 - 73.