

UDC 332.87+338.121

**A. Yu. ANISIMOV**<sup>1</sup>, Associate Professor, Candidate of Economic Sciences, e-mail: anisimov\_au@mail.ru**Yu. S. POLOZHENTSEVA**<sup>2</sup>, Associate Professor, Candidate of Economic Sciences**A. V. ZHAGLOVSKAYA**<sup>1</sup>, Associate Professor, Candidate of Economic Sciences**A. V. ALEKSAKHIN**<sup>1</sup>, Associate Professor, Candidate of Economic Sciences<sup>1</sup>National University of Science and Technology – MISIS, Moscow, Russia<sup>2</sup>Southwest State University, Kursk, Russia

## REGIONAL MONITORING OF STAFFING SUPPORT IN THE COAL MINING INDUSTRY\*

### Introduction

The successful skilled personnel training for the coal mining industry requires incessantly pursuing improvement in the system of coal mining personnel training, retraining and development. In recent years, the coal mining industry is faced with the acute shortage of specialists at all levels due to the loss in prestige value of the mining profession. The average age of workers engaged in mining approaches the age of retirement (above 45 years).

The governmental control of the job market needs regular monitoring of labor demand and supply. The Concept of coal mining personnel training, retraining and development improvement specifies the lines of the job market monitoring as:

- determination of the structure of jobs and skills within the future demand of an employer for labor power;

- determination of the amount and structure of jobs and skills in the extra demand of an employer for labor power in the context of strategies of socio-economic development, and federal and regional targeted programs;

- determination of the amount and structure of jobs and skills in the offer of the labor market in view of the change in the population profile and the prevailing structure of professional education.

### Generation of a regional staffing support monitoring system in coal mining

Based on the labor market monitoring, it is intended to develop forecasts of labor demand and supply within the framework of the jobs-and-skills blocks, kinds of economic activities and enlarged groups of professions in accordance with the All-Russian Classifier of Professions by Education [1].

On the strength of the forecasts, it is anticipated to plan arrangements on implementation of the governmental policy in the sphere of the labor market control, including enhancement of territorial mobility of labor power in the

*The Long-Term Program for Coal Sector Development until 2030 involves construction of new mines in new areas and advancement of operating mines at the high-level reliability and safety of mining based on the application of new coal production and dressing technologies. These objectives are impossible to meet without the purposive replenishment of personnel by means of attraction of young people and gathering highly qualified staff to be provided with traineeship at the leading research centers and production companies within the coal mining industry.*

*This article reviews the priority lines of the job market monitoring, as well as the key stages and information blocks of the staffing monitoring based on the related procedure. It is necessary to develop a coherent regional system of building up personnel reserve in the coal mining industry for a long-run period. These activities should be based on the improved implementation of principles of planned management over the staffing potential in the coal sector. To meet the requirements of coal mining companies, it is necessary that the secondary- and higher level education personnel training structure and the number of graduated specialists having intent to work in the coal mining industry match the industry needs. These needs should be determined in accordance with the science-based methodology of the sectorial manpower policy monitoring.*

*The authors put forward suggestions on the formation of the regional staffing support monitoring in the coal sector for the medium- and long-run periods and propose the forecast of the engineering manpower needs in the coal mining industry. The regional monitoring of the wanted manpower includes the analysis of change in the structure of jobs and skills in the discussed branch of industry. The upturn in the coal sector or the new personnel policies of the government and companies will improve the sectorial staffing efficiency.*

**Key words:** coal mining industry, regional monitoring system, implementation mechanism, staffing support, engineering manpower requirements, forecast

DOI: 10.17580/em.2017.02.13

country, attraction of foreign employees, updating of professional education strategies and development programs, and elaboration of programs of professional education for population.

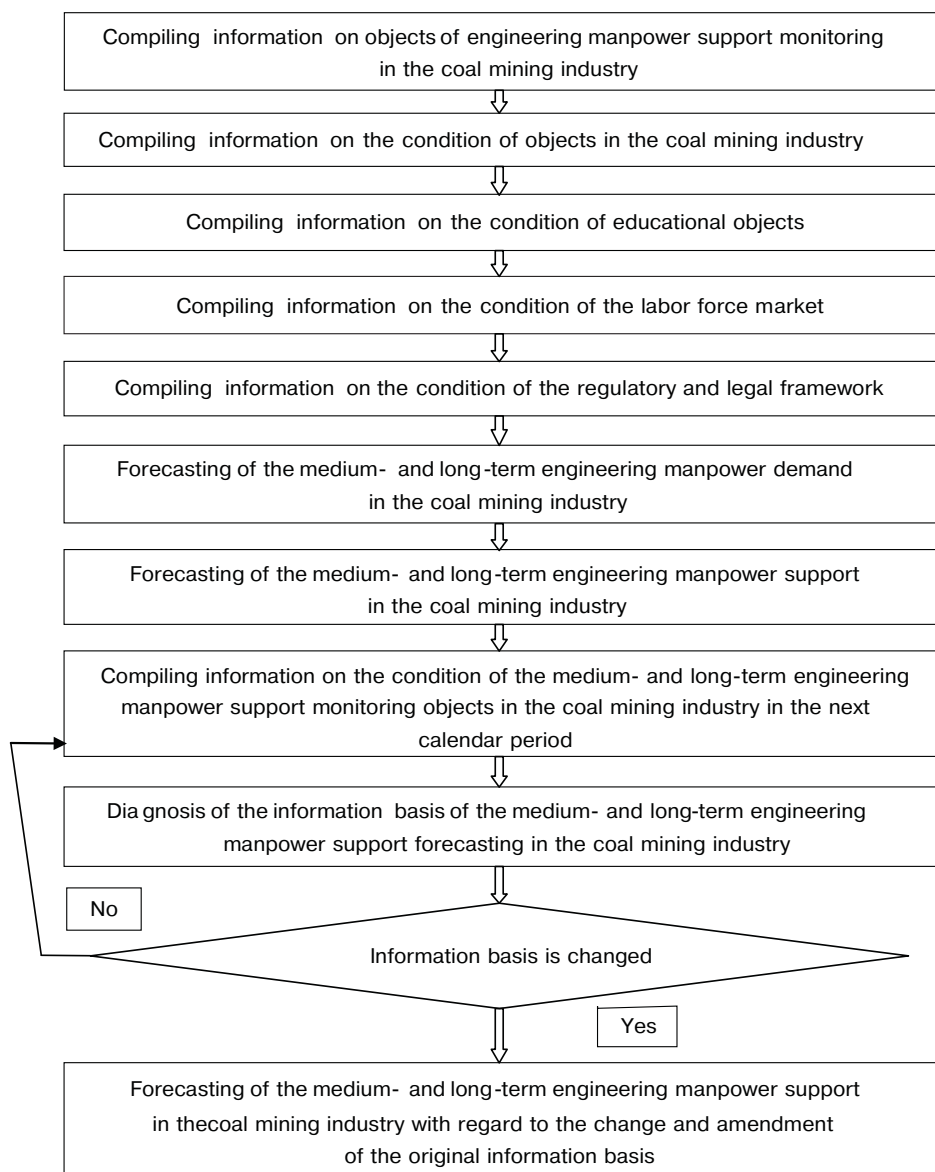
Based on these approaches, it is suggested to generate a regional system of staffing support monitoring. The medium- and long-term staffing support monitoring in the industry is a procedure of compiling information blocks and their implementation in predictive estimations [2].

The key principles of the medium- and long-term staffing support monitoring in the coal mining industry is the stage-by-stage compilation of such information blocks as:

- Block 1: Objects of monitoring of engineering manpower support in the coal mining industry;

- Block 2: Information on the condition of objects in the coal mining industry;

\*These studies have been carried out under the Presidential Grant: Governmental Regulation of Differentiation of the Economic Territory with the New Regional Policy Tools, Grant No. MK-831.2017.6.



**Procedure of the medium- and long-term staffing support monitoring in the coal mining industry**

- Block 3: Information on the condition of educational objects;
- Block 4: Information on the condition of the labor force market;
- Block 5: Information on the condition of the regulatory and legal framework;
- Block 6: Information on the development of the medium-term engineering manpower demand forecast in the coal mining industry;
- Block 7: Information on the development of the long-term engineering manpower demand forecast in the coal mining industry;
- Block 8: Information on the predictive estimation of the medium- and long-term engineering manpower demand forecast in the coal mining industry;
- Block 9: Diagnosis of the information basis on the predictive estimation of the medium- and long-term engineering

- manpower demand forecast in the coal mining industry;
- Block 10: Forecasting of the medium- and long-term engineering manpower support in the coal mining industry with regard to the change and amendment of the original information basis.

These information blocks can be included in the information analysis system of the coal mining industry [3–5].

The medium- and long-term staffing support monitoring in the coal mining industry involves consistent entry of updates and changes in the forecasts through the agency of the algorithm in the **Figure**.

The presented mechanism of the medium- and long-term staffing support monitoring in the coal mining industry consists of the steps described below:

1. Compiling information on the objects of engineering manpower support monitoring in the coal mining industry.

**Table 1. Medium- and long-term engineering manpower demand forecast in the coal mining industry**

Description	Medium-term forecast up to 2020	Long-term forecast up to 2030
Coal production, Mt	380	430
Production personnel number, thousand man	98–103	86–96
Engineering manpower demand, thousand man	19.5	9.6
Potential fluctuation of personnel, %	7–8	7–8
Potential demand for the outside engineering manpower, thousand man	1.8	0.77
Predicted graduation of the higher educated specialists, thousand man	3.0 — max 1.5 — min	2.0 — max 1.0 — min
Predicted employment in the coal industry, thousand man	0.750 — max 0.375 — min	0.5 — max 0.25 — min
Predicted incremental support of the staffing needs with the higher educated specialists, %	41–21	65–32

2. Compiling information on the condition of objects in the coal mining industry.

3. Compiling information on the condition of educational objects.

4. Compiling information on the condition of the labor force market.

5. Compiling information on the condition of the regulatory and legal framework.

6. Forecasting of the medium-term engineering manpower demand in the coal mining industry.

7. Forecasting of the long-term engineering manpower demand in the coal mining industry.

8. Forecasting of the medium- and long-term engineering manpower support in the coal mining industry.

9. Compiling information on the condition of the medium- and long-term engineering manpower support monitoring objects in the coal mining industry in the next calendar period.

10. Diagnosis of the information basis of the medium- and long-term engineering manpower support forecasting in the coal mining industry.

11. Check of the significance of change in the information basis.

12. Forecasting of the medium- and long-term engineering manpower support in the coal mining industry with regard to the change and amendment of the original information basis [6–8].

#### Coal mining engineering manpower demand forecast

Based on the conducted research and interrogation of coal mining companies and higher professional education institutions in Russia, the science-based forecasting of the medium- and long-term engineering manpower support in the coal industry has been implemented with the analysis of the

staffing support through graduation and employment of specialists having higher professional education (**Table 1**).

The demand for the engineering manpower in the coal mining industry has been forecasted per groups of basic jobs.

The participants of the personnel monitoring were such coal mining companies as SUEK, Russian Coal, Belon, SDS-Ugol, Yuzhkuzbassugol, Sibuglemet, PAO Rospadskaya, Kuzbassrazrezugol and Mechel.

The staff services of the listed companies submitted information on 66 jobs that were then divided into 6 groups:

— Group 1: Mineral mining technology;

— Group 2: Dressing and conversion;

— Group 3: Surveying, mine and underground construction;

— Group 4: Ecological and process safety, blasting;

— Group 5: Mine electromechanics, machine construction and transport;

— Group 6: Organization, economics and management.

The data on the full-time personnel and the staffing needs, considering age categories, over the period to 2030 are compiled in **Table 2**.

Based on the data, considering the predicted gain in the productivity of labor in the coal mining industry after 2020, the staffing needs summarily decrease a little from 3000 specialists in 2020 to 2750 in 2030.

The regional-level monitoring of the staffing requirements needs analyzing the pattern of change in the structure of jobs and skills in the coal mining industry. The basic professional qualifications have been grouped as process men, builders, geologists and surveyors, economists (managers) and information technology specialists [9–12].

The basis of the monitoring is the survey of organizations and entities in the coal mining industry. Aimed to en-

**Table 2. Required engineering manpower over the period up to 2030**

Job group	Requirements, men			
	2012–2015	2020	2025	2030
Mineral mining technology	1378	1464	1359	1273
Dressing and conversion	202	191	177	178
Surveying, mine and underground construction	289	230	217	225
Ecological and process safety, blasting	125	106	95	91
Mine electromechanics, machine construction and transport	847	860	759	715
Organization, economics and management	246	237	239	270

**Table 3. Intervals of monitoring condition of jobs-and-skills structure with respect to the main jobs in the coal mining industry**

Job	Monitoring period, year																
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Process men		+		+		+		+		+		+		+		+	
Machine men			+			+			+			+			+		
Builders																	
Surveyors			+			+			+			+			+		
Economists (managers)					+					+					+		
Information technologies	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

sure accurate monitoring and minimized questionnaire, the change in the staffing support and the staffing needs were analyzed. On that basis, the questionnaire matrix was formed for the companies and organization in the coal mining industry, with the time interval within which the increment (reduction) in the structural element of the manpower can exceed the previous number of personnel by more than 2%, or with 5 years-long span (**Table 3**).

The information on the staffing needs is compiled based on three aspects within the development programs of coal mining companies:

- the current needs by the survey moment with the indication of the unbalance;
- the future needs (in 5 years) with the forecasted retirement of personnel;
- the sources of the staff replenishment.

### Conclusions

In accordance with the Concept of activities in the job market, in order to support modernized and new jobs with the required personnel, it is intended to balance the structure of the professional education and the jobs-and-skills structure of the staffing needs through:

- revision of trends and levels of professional training with regard to the forecasted staffing needs and support at the ensured consistency between the professional education structure and the job market demand;
- elaboration of the professional education standards in line with the employers' needs to be the foundation for personnel certification promoting equal access of people to industry markets of jobs;
- development of targeted programs for the vocational guidance of the youth to ensure formation of manpower for the coal mining industry;
- organization of image-building of mining jobs using mass media and advanced information technologies.

The regional monitoring system is matched with the personnel training system. The prompt and reliable information helps estimate the state of a monitoring object, bring to light the causes of changes and develop a package of measure to eliminate negative effects.

### References

1. Anisimov A. Yu., Samsonov I. F. Features ethics of business relations at the municipal level and prospects of further development. *Ekonomika i menedzhment innovatsionnykh tekhnologiy*. 2014. No. 8. Available at: <http://ekonomika.snauka.ru/2014/08/5742> (accessed: 12.09.2014).
2. Zholobova Yu. S., Safronov A. E., Kushchiy N. A., Savon D. Yu. Minimization of ecological impact by application of new technologies of coal preparation and mining waste disposal. *Gornyi Zhurnal*. 2016. No. 5. pp. 109–112. DOI: 10.17580/gzh.2016.05.18
3. Kostyukhin Yu. Yu. Enhancement of labor efficiency in coal mining industry. *Gornyi Zhurnal*. 2016. No. 10. pp. 41–44. DOI: 10.17580/gzh.2016.10.08
4. Peshkova M. Kh., Savon D. Yu. Mechanism of the government and private business partnership in ecological-and-economic appraisal of mining waste. *Gornyi Zhurnal*. 2016. No. 10. pp. 37–41. DOI: 10.17580/gzh.2016.10.07
5. Tarazanov I. G. Russia's coal industry performance for January–December, 2015. *Ugol*. 2016. No. 3. pp. 58–82.
6. Chagger H. K. The formation of dioxins and other toxic organic compounds from the combustion of biofuels. H.K. Chagger et al. *Swedish Flam Days*, 2013.
7. Marjote C. J. Waste characterization studies and the solid waste hierarchy. *Resource Recycling*. 2015. Vol. 11, No. 2. pp. 75–78, 80–84.
8. Dittmer J. et al. Have you heard the one about the disappearing ice? Recasting Arctic geopolitics. *Political Geography*. 2011. Vol. 30, No. 4. pp. 202–214.
9. Keil K. Spreading Oil, Spreading Conflict? Institutions Regulating Arctic Oil and Gas Activities. *The International Spectator*. 2015. Vol. 50, No. 1. pp. 85–110.
10. Keil K. The Arctic: A new region of conflict? The case of oil and gas. *Cooperation and Conflict*. 2014. Vol. 49, No. 2. pp. 162–190.
11. Skufina T. P., Samarina V. P., Krachunov H., Savon D. Y. Problems of Russia's arctic development in the context of optimization of the mineral raw materials complex use. *Eurasian mining*. 2015. No. 2 (24). pp. 18–21.
12. Jonson J. Hazardous waste incineration delayed by EPA for more than a year. *Environmental Science and Technology*. 2013. Vol. 31. No. 43. pp. 4.