

## TOPICAL ISSUES OF HUMAN LIFE IN THE FAR NORTH IN A CHANGING CLIMATE

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### Abstract

*In recent there is decades have seen a global climate change, which to some extent determines the state of many natural ecosystems. Given the extreme conditions of life in the Far North and the vector of development of the Arctic zone of the Russian Federation work will be carried out using rotational forms of labor. Far North is an extreme area and created unfavorable conditions for fly-in-fly-out workers work and life. Each person differently adapted to such conditions, and the result of adaptation is reflected in the change of psychological properties and qualities of the workers. The aim: to study adaptation and psychological characteristics of oil and gas companies fly-in-fly-out employees in the Far North. The study is found that the fly-in-fly-out workers with professional experience have a greater need for material security and reduce the interest in the arts, career, and fashion. They become more tolerant, but increased addiction, growing family and social turmoil.*

**Key words:** fly-in-fly-out work, professional and socio-psychological adaptation, extreme conditions of profession activity

### INTRODUCTION

Human activity is caused by climatic features in a particular region. On the background of a relatively stable state of climatic parameters is formed and health, adapted to the specific place of permanent residence. People from generation to generation transmits the stored information to offspring. However, climate, like everything else is not stable. In recent there is decades have seen a global climate change, which to some extent determines the state of many natural ecosystems. Changing state of the biosphere requires adjustment usual activities, particularly indigenous people, which is what happens now.

Consequences of global climate change confirmed the vast array of empirical data pointing to rising sea levels, melting glaciers and polar ice sheets (particularly in the Arctic), the reduction of snow and ice-covered areas of the earth's surface, an increase in precipitation in some regions (eastern part of North and South America, Northern Europe, North and Central Asia) and a decrease in others, the expansion of arid zones (Africa, of South Asia), more frequent tropical cyclones in the North Atlantic, etc. [23].

Climate change is usually accompanied by severe weather events, temperature anomalies, storms, floods, snowfall, etc. Hazardous weather conditions play an important from the standpoint of their adverse effects on economic activity and public health. [5]

Unprecedented heat wave in 2010, which began in Central Russia in the beginning of the third decade of June, lasted until the end of the second decade of August. Until August 19 almost daily records of maximum air temperature recorded in the vast territory from Pechora to the Kuban and the western borders of Russia to Urals. Was unusually hot and the north-east Russia. In the East, Yakutia, Chukotka, Magadan region in northern Kamchatka and Khabarovsk edges mean monthly temperature has exceeded the norm by 2-7 ° C and an absolute maximum reached in 1891 in 2010, the northern hemisphere was the hottest summer in the instrumental observations since 1891. [1]

Concerns of the international community to cause problems that arise today as a result of global climate change in the Northern regions of Russia. It is no coincidence Arkhangelsk Region and Nenets Autonomous District was selected by WHO as a pilot area to assess health vulnerability to climate change in 2009-2012. Research Institute of Arctic Medicine, Northern State Medical University, took an active part in the study of this question.

In the Arkhangelsk Region and Nenets Autonomous Okrug most often appear natural hazards such as severe cold, strong winds and snowstorms (mainly on the coast of the Arctic seas), squalls and storms (in the summer in the continental part of the Arkhangelsk region), flood. In recent decades, the cases of abnormal heat - especially 2010 and 2011, in some areas of the region recorded a rare phenomenon at high latitudes as an atmospheric and soil drought. There is increase in the number of forest fires [4].

The average monthly temperature in July 2010 was  $+17 - +23^{\circ}\text{C}$ , which was above the norm by  $4-6^{\circ}\text{C}$ . Maximum temperatures in some areas were close to the absolute maximum, and in some areas have blocked it. In August were blocked absolute maximum temperature on the vast majority of stations Arkhangelsk region. Similar anomalies were noted earlier (in 1938, in 1960, in 1972), but the last big different duration and intensity on the background of global warming, which is observed in the Arkhangelsk region in the last 15 - 20 years [3].

The ongoing climate change in the Far North there has both positive and negative consequences. The positive shift can be attributed to the north zone comfortable living people and reduce the heating period of residential and industrial buildings, increase agricultural production capacity in areas with moist soil, favorable influence on ice conditions in the Arctic seas, contributing to the empowerment of the Northern Sea Route, as well as relief Arctic shelf.

Negative effects are manifested in the growth of natural disasters (floods, fires, etc.), to strengthen the seasonal thawing of permafrost, threatening infrastructure (violation of communications, collapse of buildings, coastal erosion, etc.). Changes in the flora and fauna entail expanding the dissemination of certain human diseases caused by carriers, as well as some insects - dangerous pests of agricultural crops. As a result of increase in average annual temperatures occurred spread ticks, tick-borne encephalitis virus vectors to the north. In the Arkhangelsk region over the period 2000-2009 there was rise in the incidence of tick-borne encephalitis (almost 60 times) compared to 1980-1989. [18].

Health population's problems due to increased climate-disease (zoonotic diseases, parasitosis, intestinal infection), growth potential risk of increased UV radiation levels (cataracts, melanoma), the cardiovascular diseases growth, mental illness and other diseases.

It is relationships analysis between daily mortality and air temperature during the 1999-2008 period (heat waves and cold waves), which confirmed the effect of temperature on mortality, especially in the age of 30 years, for all the studied causes of death, which is reflected in the demographic situation, in particular on mortality.

Impact analysis of daily average temperature, wind speed, atmospheric pressure changes the frequency of calls "emergency" in the population according to some nosological forms showed that the average daily increase of the effective temperature for each degree is accompanied by increased number of calls about injuries, poisoning and consequences of external causes (among men - 1.6% among children - by 2.5% in the age group 60 years and older - 3.0%).

Extreme natural phenomena directly or indirectly affect human health. Direct impact of the atmospheric processes evident in day to day fluctuations in atmospheric pressure and temperature, which are caused by cyclonic activity and almost immediately found a response in the human body reaction. Strong winds, changes in humidity, thunderstorm activity, and cloud cover affect the well-being of people of all age groups. This reflects meteorosensitivity any person, expressed in varying degrees, depending on the overall condition of the body and [5; 11]

Heat and cold waves associated with synoptic processes of a more long-term nature, characterized by a cumulative process regarding the negative impact of weather conditions on the human body. Worse happens gradually. The effect of these processes on the deterioration of the human expressed more indirectly, because depends on the conditions in which people live and work. At the same time due to climatic conditions impact on the population of heat waves are heavier than cold waves [5; 11].

Study the effects of climate change on the preservation of physical and mental health of the population of the Far North is an urgent problem due to weather anomalies, which involve a number of poorly understood phenomena. [11]

Given the extreme conditions of life in the Far North and the vector of development of the Arctic zone of the Russian Federation (the development of the Arctic shelf intensive use of marine transport route the Northern Sea Route) work will be carried out using rotational forms of labor. Organizing of shift work must take into account all health and ecological characteristics to adapt to a changing climate.

The extraction of oil, gas and other mineral resources is carried out, usually in areas characterized by complex geological and climatic conditions. Fly-in-fly-out work is used in such areas. Fly-in-fly-out work in the North has a number of features. Firstly, a complex of natural factors of the Far North has a strong negative effect on physical and mental condition of a person, called the polar tension syndrome [16, P. 18-26]. The human body is unfavorably affect low temperature combined with strong winds, short cool summers, high humidity, the presence of periods of polar night and polar day, the lack of solar radiation, geomagnetic activity, sudden changes in atmospheric pressure. Secondly, the work factors (physical, informational and emotional stress, physical inactivity, monotone) and the environment factors, including the technologically-caused (noise,

vibration, aerosols, dust, toxic substance, nonmagnetic electrical field, thermal effects, etc.) influence the functional status formation and profession efficiency. Thirdly, vital activity is connected with the nutrition peculiarities and long duration in closed spaces. Fourth, fly-in-fly-out work is always forced circle of friends, separation from kith and kin, social desynchronos [2, P. 163-198]. Group isolation affects to personality traits of group members, the business structure and interpersonal relationships, causes certain human needs. It can negatively influence both the livelihoods of working team, and the member's health. Fifthly, the "circular migration" in the fly-in-fly-out work demand perform repeated person cycles of «adaptation – readaptation», which depletes the resources of mind and body workers [16].

The livelihood of the fly-in-fly-out workers is uncomfortable and needs a complex science-based support.

According to L.G. Dikaya work in such difficult conditions causes to the development of destructive functional states and professional activity disorganization, health loss, the personality destruction [10].

In this connection, there is a need to develop a special approach for the analysis of fly-in-fly-out professional activity, which must begin with the analysis of the extreme conditions impact on the body and the human psyche, as well as the analyses the organism response - the adaptation.

Adaptation problems to the North extreme conditions studied G.M. Danishevsky [6, 7], N.R. Deryapa, I.F. Ryabinin [9], V.I. Khasnulin [20, 21] Y.R. Tedder, A.B. Gudkov, G.N. Degteva [8, 19] S.G. Krivoshchekov, N.N. Grebneva, G.M. Divert, S.I. Kvashnin, S.V. Hunters [2, 12, 14, 15], etc. There are the adaptation physiological mechanisms analysis and also considered the physiological aspects of incomplete adaptation in these research. It also states of professionals motivational needful sphere that can affect to adaptation success.

The human adaptation possibility in northern conditions and the fly-in-fly-out workers additional stress, and successfully carrying out professional duties depend as to the organism physiological characteristics, as to personality psychological and socio-psychological characteristics [16]. A climatic and production conditions inclusion makes the important qualities is necessary to put first and foremost in the vocational and skill structure to preserve, health and fitness for the job. The adaptation strategy structure involves the employee personal quality.

The fly-in-fly-out workers adaptive strategy as the specific functional, mental, moral and motivational state of the individual, manifesting itself in desire to actively resist the extreme conditions and thus actively adapt to extreme life conditions [17].

According the adaptation strategies concept in a professional activity of S.A. Shapkin, L.G. Dikaya [22], adaptation to professional activity must be analyzed as a process and as an "open system" which consists four components: active associated with organic and functional costs aimed at achieving this goal, cognitive - the cognitive architecture restructuring; emotional, determined by the dynamics of emotional experience and motivational-volitional, ensuring coordination of all other components.

**Purpose:** to study the psychological characteristics of fly-in-fly-out worker adaptation in the North.

**Research materials and methods.** Fly-in-fly-out method circulated in difference industries: oil, gas and iodine, diamond mining, forestry and others. Work in each of them involves additional negative factors: for example, the diamond industry is tighter control; forestry is hard physical labor outdoors.

To determine the effect of specificity fly-in-fly-out labor research is studied in three different companies: 130 employees from the oil company (isl. Kolguev) with shift duration of 52 days; 62 employees from the diamond-mining company (Archangelsk region) with shift duration of 14 days; 26 employees from the forestry company (Archangelsk region) with shift duration of 14 days.

#### **Research methods are following:**

1. Psychological testing, which is determined by the formal-dynamic, psychological and socio-psychological characteristics of employees.

Methods used: inventory levels of subjective control questionnaire, J. Rotter (1984); the socio-psychological adaptation questionnaire C. Rogers, R. Diamond (1954); work attractiveness questionnaire V.M. Snetkova (1990); color preferences test M. Luscher (1949); the portrait election questionnaire L. Szondi (1993); psychogeometric test S. Dellinger, adapted A.A. Alekseev, L.A. Thunder (1996); scale of control for action Yu. Kul adapted S.A. Shapkin (1997); the volitional self-control questionnaire A.G. Zverkov, E.V. Eydmanna (1996); the "style of behavior self-regulation" questionnaire V.I. Morosanova (1995); the personality motivational structure questionnaire V.E. Milman (1990); the emotional intelligence questionnaire N. Hall (2001); individual-typological questionnaire (ITQ) L.N. Sobchik (1998).

2. Questionnaire was developed to identify the demographic variables (gender, age, occupation, work experience, etc.), the causes of fly-in-fly-out labor, the characteristics of self-control during the shifts.
3. A peer review method - as experts were heads of departments of the company, which evaluated its employees as professionals on a 10-point scale (1 - low level of professionalism, 10 - a high level of professionalism).
4. Statistical methods: descriptive statistics; an analysis of nominative data is used the test of Pearson's ( $\chi^2$ ); ANOVA was used to study the influence of personality psychological and socio-psychological characteristics to workers social adaptability; step by step multiregression analysis was used to determine the influence of fly-in-fly-out workers socio-psychological characteristics to change the individual indicators their well-being dynamics (coefficient of determination of this equation viewed more than 70).

*The results and its discussion.* The research descriptive statistics results are presented in Table 1.

Table 1. Descriptive statistics results

| № | Parameter name        | Forestry employers         |      |      | Diamond mining employers |      |      |
|---|-----------------------|----------------------------|------|------|--------------------------|------|------|
|   |                       | Parameter expression level |      |      |                          |      |      |
|   |                       | Low                        | Mean | High | low                      | Mean | High |
| 1 | Work conditions       | 44%                        | 48%  | 8%   | 8%                       | 54%  | 38%  |
| 2 | Psychological climate | -                          | 28%  | 72%  | 24%                      | 48%  | 28%  |
| 3 | Carrier possibility   | 24%                        | 60%  | 16%  | 28%                      | 32%  | 40%  |
| 4 | Adaptability level    | 28%                        | 60%  | 12%  | 4%                       | 40%  | 56%  |
| 5 | Self-regulation level | 12%                        | 64%  | 24%  | 4%                       | 50%  | 46%  |

According to the descriptive statistics results 44% forestry company employees rate the conditions as low, 48% - the middle and 8% - as high. This data can be results the fact that the work in the forestry involves heavy physical labor outdoors. 72% forestry employees believe that their team has good psychological climate, 28% employees are less satisfied relations with colleagues (middle level). It can be conditions the fact that the forestry is used primarily collective work, which depends in a solid team. 16% forestry workers believe that their company gives high career opportunities, 60% - middle level for this parameter, 24% - low level.

Adaptability level of forestry employees, i.e. the ability to implement adaptation and adjustment to changing conditions and activity specify has the following graduation: 12% - high, 60% intermediate, 28% lower. High self-regulation level, i.e. ability to form a self-regulation style, which allows to compensate the personal influence, character logical features, prevented achieve goal, is observed in 12% forestry workers, the middle - 64% and the low - 24% workers.

8% diamond mining workers rate the working conditions level as low, 54% - the middle and 38% - as high. This data can be result the fact that work in this industry is greater operator's work in factory for automated equipment maintenance.

28% diamond mining workers believe that their team has good psychological climate, 48% employees are less satisfied relations with colleagues (middle level) and 24% as low level. It can be result the fact that diamond mining is mostly individual work.

40% the diamond-mining workers believe that their company gives high career opportunities, 32% - middle parameter level, 28% - low level. An adaptability level of diamond mining employees, i.e. the ability to implement adaptation and adjustment to changing conditions and activity specify has the following graduation: 56% - high, 40% - middle, 4% low. High level self-regulation, i.e. ability to form a style self-regulation, which allows to compensate the personal influence, character logical features, prevented achieve goal, is observed in 46% diamond mining workers, middle level - 50%, low - 4% workers.

The forest company workers complexes suggest a low level of working conditions, a good psychological climate in the team and the middle career opportunities level. The diamond mining company is characterized high

working conditions level, low psychological climate level in the team and the high possibility for career development. Differences between the samples according to criterion  $\chi^2$  detected at the first level of significance of differences (p-level for the  $\chi^2$  is 0.077).

The workers social adaptability was conducted by the socio-psychological adaptation test C. Rogers, R. Diamond (2009). To determine the psychological and socio-psychological personality characteristics influence to social adaptability workers were held ANOVA, the results which are presented in Table 2.

*Table 2. ANOVA results with the dependent variable "social adaptability"*

| № п/п | Variable                               | F     | Sig (P) |
|-------|----------------------------------------|-------|---------|
| 1     | General internality                    | 4,403 | 0,169   |
| 2     | Achievements internality               | 0,157 | 0,703   |
| 3     | Internality for failure                | 0,024 | 0,881   |
| 4     | Internality in family relations sphere | 2,316 | 0,167   |
| 5     | Internality of health and disease      | 3,690 | 0,060   |
| 6     | The creative activity motive           | 3,858 | 0,068   |
| 7     | Motive of social utility               | 0,635 | 0,036   |
| 8     | Working activity                       | 5,274 | 0,045   |
| 9     | Flexibility (self-regulation style)    | 5,347 | 0,043   |
| 10    | Simulation (style self-regulation)     | 4,979 | 0,050   |

The analysis is showed that the higher adaptability, the higher flexibility (ie the ability to make corrections in a self-control system in the external and internal conditions) ( $p = 0,043$ ). Employees with high adaptability level demonstrate the plasticity of all regulatory processes. In the unexpected facts these workers easily reform plans and performing operations programs and behavior, are able to quickly estimate the relevant conditions change and rebuild the action program. When received results mismatch with the goal, they timely estimate the fact of the inconsistencies and make correction.

The ANOVA results establish that the relationship of adaptability indicators and modeling (a self-regulation way) ( $p = 0,05$ ). Professionals with high adaptability levels have capacity to provide meaningful conditions for achieve the goal in the present situation and in perspective. There is correlation adaptation to the individual activity in work, social utility ( $p = 0,036$ ), and creative activity ( $p = 0,068$ ), as labor motivators.

There is tendency of adaptation influence to the subjective control level in health and disease ( $p = 0,06$ ). Employees with high adaptability levels have high control locus level in health and disease.

Successful adaptation in professional activity is suggested two main standards: high self-being of mood rates, which indirectly may be work satisfaction indicator, and satisfaction employees results heads. So, the selection of adaptation strategies components of fly-in-fly-out workers were held in two stages: the first stage we studied the employees psychological properties effect to nature of individual self-being dynamics, in the second phase reveal the influence of formal and dynamic, psychological and socio-psychological fly-in-fly-out workers characteristics to the their activities success.

The test indicators' individual dynamics «Health state. Activity. Mood.» was studied with linear regression. The dependent variable was regression coefficient of "health state" individual dynamics and the independent variable - psychological quality fly-in-fly-out workers.

Determination regression equation coefficient indicated that the model explains more than 90% variation of dependent variable about the mean. The regression results are presented in Table 3.

*Table 3. Multiregression analysis results with the dependent variable "nature of the individual health state dynamics"*

| Psychological parameters that contribute to high self-esteem being | Regression coefficients | Psychological parameters that contribute to lowering self-esteem being | Regression coefficients |
|--------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------|-------------------------|
| Masculinity-femininity                                             | 0,575                   | Ergic motor                                                            | -0,001                  |
| Internality total                                                  | 0,200                   | Fear                                                                   | -0,024                  |
| Intelligent Speed                                                  | 0,087                   | Emotional liability                                                    | -0,028                  |
| Motor speed                                                        | 0,083                   | Internality in family                                                  | -0,061                  |
| Dreaminess                                                         | 0,007                   | Carrier                                                                | -0,092                  |
|                                                                    |                         | Need to expand "I "                                                    | -0,231                  |
|                                                                    |                         | Motor plasticity                                                       | -0,296                  |
|                                                                    |                         | Ergic intellectual                                                     | -0,368                  |
|                                                                    |                         | High control self-concept                                              | -0,506                  |
|                                                                    |                         | Control Scale                                                          | -0,829                  |

Thus, workers with humanistic interest focus, a high level of subjective control over any significant situations, high intellectual capacity and speed in various activities, with a rich imagination have the most positive dynamics of well-being during shift period [15]. These results reflect the professional activity analysis for maintaining fly-in-fly-out workers physical and mental health.

Employee professional success was based in multiregression analysis, where the dependent variable was the expert assessment workers as professionals in a 10-point system, and the independent variables were the formal and dynamic, psychological and socio-psychological fly-in-fly-out workers qualities, resulting testing. Determination regression equation coefficient shows that the resulting model accounts for more than 76.2% variation of the dependent variable relative to the mean (Table 4).

*Table 4. Multiregression analysis results with the dependent variable "expert workers assessment as professional"*

| Psychological parameters that contribute to high self-esteem being | Regression coefficients | Psychological parameters that contribute to lowering self-esteem being | Regression coefficients |
|--------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------|-------------------------|
| Emotional component                                                | -0,001                  | Internality of health - disease                                        | 0,264                   |
| Control of desires - impulsivity                                   | -0,003                  | Emotional intelligent                                                  | 0,226                   |
| Cognitive component                                                | -0,01                   | Strength - weakness of "I"                                             | 0,19                    |
| Behavior component                                                 | -0,02                   | Internality in interpersonal relations                                 | 0,172                   |
|                                                                    |                         | High control                                                           | 0,13                    |

The analysis result shows, that the oil and gas companies' fly-in-fly-out workers professional qualities are the following: moderate introversion (0,795) rationality (0,784), high behavior self-control levels, particularly in

interpersonal relations (0,172) and in health - illnesses (0,264), high emotionality in intellectual sphere (0,226), emotional stability (0,19).

The these models application showed that as in state employee terms and to the employer heads, successfully adapted fly-in-fly-out workers has a high self-control level in interpersonal relationships, emotional stability and flexibility in intellectual work. There is discrepancy between these models: well-adapted worker must has reasonable introversion, rationality, but from head standpoint, effective employee must be conformal and extroverted.

The these models application with the adaptation strategy components proposed by the S.A. Shapkin, L.G. Dikaya [22], we assume that the activation adaptation strategy component is represented by such personality characteristics as emotional stability and introversion, cognitive component - rationality, emotional component - high intellectual emotional, and motivational-volitional component - self-control in interpersonal relations and health and disease.

From our view point, the fly-in-fly-out workers structure of vocational and important qualities is as universal qualities which are essential to all, and specific, defined the "labor post" characteristics [13], as limited as result of the labor division, and fixed forces human application sphere, calculated to create anything of value to society (material things, information, service actions, the beneficial effects of functional and aesthetic experiences, public mood). The stable quality can be attributed formally and dynamic personality features, because it is immutable characteristics that make up the activation adaptation strategies component. Consequently, the classification to this ground is not suitable. The emotional component can not be a criterion for classifying strategies because its constituent fly-in-fly-out workers personality traits are unstable and strongly influenced by external factors.

Adaptation strategies classification includes a motivational-volitional component, since it was connecting link in the organization of workers professional activity. Cognitive component is a tool with respect to motivational-volitional, as a worker thinking way is determined by motives and attitudes in professional activities.

The problem of psychological study activity is important, sometimes critical value to determine the most effective ways resolutions of many practical goals. Activity analysis involves considering it as a complex, multidimensional and multilevel, dynamically evolving phenomenon.

Psychological work analysis in context professional aptitude problem consider as a tool to substantiate personality demands, to her abilities and professionally important qualities [13]. Because any professional activity is a complex system, characterized by the relationships of its elements, these elements hierarchy, system quality presence and backbone fact, technology of the labor subject psychological study, according to E.M. Ivanova [13], should be conducted in the basis of "systemic profession description" several principles. In accordance with concept of psychological activity regulation integral processes A. Karpov [13], stands 5-level system organization of work: elemental, component, subsystem, system and meta-system. Professional activity fly-in-fly-out specialties analysis should be carried out on the subsystem and meta-system level, as it is necessary to analyze related activities and "system decomposition forms", and folding it into subsystems, which is its components and internal structure important education [13].

When fly-in-fly-out labors form in the North many specialties professionals is used. The professional work and functional state are determined by various factors which must be control for psychological support of fly-in-fly-out work in Arctic conditions. Accounting for occupations variety is not possible or effective, while not perhaps be approached with the same yardstick to all their types, so number of mathematical and statistical procedures for their classification was used in the research.

For fly-in-fly-out occupations classification purpose has been used profession description. The most appropriate such analysis form of profession scheme is a profession formula, proposed by E.A. Klimov and V.V. Pchelinova, [13]. This scheme using a selection of professions generalized characteristics allows represented in coded form a variety of professions and specialties, where all professions are differentiated by 10 bases: labor goals, labor means, and work conditions nature, work organization conditions, work conditions, contacts at work, responsibility, physical working conditions, unusual working conditions, and subject sphere.

The 153 « professions formulas » were compiled in the study by following methods, such as documents analysis (job descriptions, working professionals descriptions), interviews with workers, managers and conditions monitor and fly-in-fly-out workers labor organization.

The database was subjected to multidimensional scaling (a measure of the difference profiles for nominative variables in non-metric model, the value Phi-square (normalized  $X^2$  - Pearson)). 3-dial solutions results are shown in figure 1, where can see totality of professions division into 6 groups.

## Результаты многомерного шкалирования

(3-шкальный вариант, Pi-square)

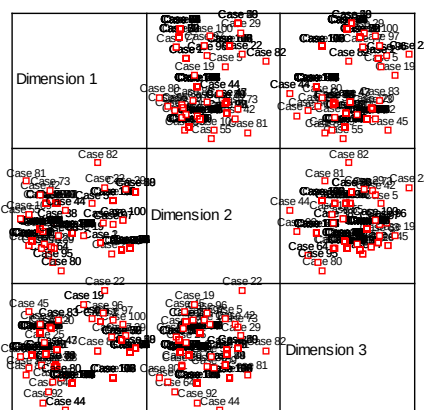


Fig. 1 Multidimensional scaling results indices formulas trades fly-in-fly-out professionals in the Far North (3-dimensional solution, measure difference –  $x^2$ )

To study structure and quality teams have been consistently carried out cluster analysis «by K-means», a multidimensional variance and discriminant function (incremental method) analyses. It is known that data can be clustered together in different ways with radically different results. Classification correctness, we assessed using MANOVA, where dependent variables were the professions formulas parameters, and independent - the clusters number. The final clustering version is used as the dependent variable in discriminant analysis. Such a sequence of statistical procedures has been made possible by two different modes virtue of representation professions formulas - as binary and nominative variables.

Discriminant analysis with 6 occupations groups prediction according to professions formulas (predictions quality - 97,6%, the  $\lambda$ -Wilks method,  $p < .05$ ) revealed 5 functions. There is based in the structural matrix:

- **1 function**  
Positive pole:  
- Working conditions. Work in area. (0, 26);  
- Work nature. Algorithm is modified by new problem (0, 24)  
Negative pole:  
- Working conditions. Work outdoors. (- 0, 26);  
- Nature of work. According to strict algorithm (- 0, 24)
- **2 function**  
Positive pole:  
- Working conditions. Work in area. (0, 69);  
- Nature of work. Algorithm is modified by the new tasks (0, 26);  
- Labor Organization. Collective work. (0, 38)  
Negative pole:  
- Working conditions. Work in outdoors (- 0, 69);  
- Work nature. According to strict algorithm (- 0, 26);  
- Labor Organization. Individual work (-0,38)
- **3 function**  
Positive pole:  
- Means: Instrumentation (0, 38);  
- Purpose: the first converts (0, 37);  
- Tools: automatic equipment (0,35);  
- Tools: unity of affect and intellect (0, 28)  
Negative pole:  
- Tools: mechanisms, machines, transport (-0,74)

- **4 function**

Positive pole:

- Subject of labor: technology (0, 57);
- Means: manual labor (0, 20)

Negative pole:

- Means: whole body (-0, 60)

- **5 function**

Positive pole:

- Role of Labor: independent organization of labor (0.72);
- Objective: the second Gnostic (0, 5);
- The subject of labor: a man (0, 33);
- Unusual working conditions: the long stay in one working position (0, 25)

Negative pole:

- The role of labor: performing work (-0, 72);
- Unusual working conditions: with long-term physical activity (-0, 25)

The first canonical function divides all variables into working conditions groups: work in indoor and outdoor air. For these groups include such as operators and drillers (the process), whose work as distinguished on this basis.

The second canonical function divides all working conditions variables, as well as work organization on individual and collective labor. It is groups such as drivers, managers, and domestic service, drillers.

The third function divides variables on labor grounds: measuring instruments or equipment, machines - at a operators group, mechanics and drivers, drillers.

The fourth shares group to base labor object - machinery and tools such as manual labor or the body as whole - is electricians group, domestic servants and drillers.

The fifth function divides all variables on work role: work self-organization or performing work that distinguishes groups such professions as managers (leaders) and drillers.

Thus, the profession description analysis showed 3 leading measurement and 6 groups with different coordinates in these dimensions. There are highlighted the following measurements:

1. Long physical activity with mechanisms - work in static pose with automatic equipment.
2. Work in open air - work in room.
3. Work self-organization of - performing work.

According to the analysis identified the following occupational groups: physical labor outdoors; operator labor; work on service facilities; drivers; managers; domestic services.

The first professions group specialists have long physical loads in the open air, as a rule, it is performing work (e.g., driller, assistant driller, erector, etc.).

The second group specialists work indoors in static pose with automatic equipment. It is performing work. This group includes operators. Operator labor is first of all observing the operation of machines and mechanisms, the production process. They must as quickly as possible to notice and report malfunctions. Timing of different production systems depends from his work.

The third group consists of specialists who work, usually indoors, involves performing work. They are electricians, fitters, mechanics, turners, and others. These specialists perform work on assembly, disassembly, repair units and formations of construction machinery and engines, and others. They identify and solve problem, checking quality of performed work. These workers carry out prevention, testing devices; determine degree of wear parts and components, configuring, setting up relay protection, electrics and robot.

The fourth group is made up drivers. It is performing work, involves working in static pose with automatic equipment outdoors.

The fifth group workers differs labor with a high degree of autonomy and decision-making, especially in situations of uncertainty and need to quickly and accurately respond to unforeseen circumstances, failures to find the optimal solution in the shortest possible time. This group includes the bosses, foremen, engineers and others.

The sixth group specialists work in room, their labor involves performing work. They are maids, cooks, carpenters, masons and others to ensure living conditions of settlement. This group includes workers who perform work associated with cleaning and maintenance of clean residential hotel rooms, dormitories, toilets and other facilities, and employees whose work involves window and door frames installation, wall coverings and ceiling plaster and tiles, assembly and hanging trusses installation, arches, beams, fabrication and assembly spans girder bridges, wooden poles and power lines, etc. All of these employees brings the main their profession goal is to ensure village life.

The fly-in-fly-out labor occupations classification has allowed allocating professional and important qualities necessary for each of groups that facilitate the analysis of workers professional, united by a common view of work organization.

Further development should continue in direction of selection of adaptation strategies types, as this will purposefully create a successful adaptation strategy for each employee as at the time of profession leaning, and during professional activities execution in accordance with its formal-dynamic characteristics and functional responsibilities.

## CONCLUSIONS

1. Better health during shift is showed workers with humanistic interest focus, high subjective control level over any significant situations, high intellectual capacity and speed in various activities, with rich imagination.
2. More fly-in-fly-out work adapted employees in the North who use flexible style self-control and modeling; motivated socially useful work and creative activity, have a high subjective control level in health and disease.
3. More effective employees are professionals, with the following socio-psychological characteristics: moderate introversion, rationalism, high self-control behavior levels, particularly in interpersonal relations and in health - illness and emotional stability.
4. The vocational and important qualities structure of fly-in-fly-out workers is as universal features that are essential to all, regardless of performed labor specifics, and specific, which is basis of fly-in-fly-out professional's adaptation strategies.
5. Forestry and diamond mining companies employees differ on the following parameters work attractiveness: working conditions level, the psychological climate in team, career opportunities, as well as on the social and psychological adaptation criteria: the adaptability and self-regulation level.

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