

State of health of the working population in Ukraine

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Abstract:

Rates of the general and occupational morbidity of the working population in Ukraine in the dynamic of the examination within 1991-2009 exhibit a tendency to worsening: rates of mortality have grown, in men and rural inhabitants, in particular; prevalence of morbidity has increased (by 33,2%) owing to the rise of the morbidity of blood circulation diseases, respiration and digestion organs diseases as well as due to psychic disorders and traumatism. Pneumoconiosis, chronic bronchitis, vibration disease, neuronsensoric deafness and diseases of the locomotor apparatus are prevailing in the structure of occupational diseases.

Streszczenie:

Poziom ogólniej i zawodowej chorobowości ludności zawodowo-czynnej Ukrainy badany w latach 1991–2009 pokazuje dynamikę pogarszającą się: w szczególności wzrosła umieralność mężczyzn i rolników; na wzrost chorobowości (do 33,2%) w przeważającym stopniu wpłynęły zachorowalność na choroby układu krążenia, układu oddechowego oraz narządów układu pokarmowego powiązane z zaburzeniami psychicznymi i urazami. Pneumocystyzowe zapalenie płuc, przewlekłe zapalenie oskrzeli, choroba wibracyjna, głuchota neurosensoryczna i choroby narządu ruchu stanowią przeważającą część chorób zawodowych.

Keywords: general and occupational morbidity, working population, Ukraine

Słowa kluczowe: ogólna i zawodowa chorobowość, populacja zawodowo-czynna, Ukraina

Morbidity is one of the most informative indices of the state of health of the working population, which sensitively reacts on any changes in work conditions and life.

Worker's health is a complicated medico-biological and social problem, which requires an all-round approach to its solving at all levels of the society functioning. The national strategy of Ukraine provides for improving work conditions, decreasing rates indices of work-related and occupational morbidity and traumatism as well as improving workers' well-being, as an essential part in formation of the working potential. This is in line with European policy in health promotion of the working population. The use of the available regulative base in Ukraine does not give any essential results and require efforts of the country, employers and public health departments and employees themselves for raising priority in health promotion.

European policy of health protection of the working population outlooks for improving work conditions, decrease

of indices of work-related and occupational morbidity and traumatism in all countries as well as raising the level workers' well-being.

The implementation of this policy is possible when undertaking effective measures on the decrease of rates of morbidity, disability and temporary disability, caused by the effect of such risk factors at workplace as dust, noise, chemicals, stress; provision for the access of workers to health and safety services; promotion of implementation of procedures and methods at workplace, directed at health protection and raising the living standards of workers; promotion of formation of a healthy life style, developing collaboration between the working population, employers, environmental protection agencies, establishments of education and health protection [1,2].

The problem of the state of health of the working population is widely presented in the scientific literature, and is a priority one for almost all countries of the world [3-8].

At present this problem is in the center of attention of the World Health Organization. At the 49th Session of the World Health Assembly a WHO Global Strategy on providing healthy and safe conditions at workplace has

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been approved. In May, 2007, a Global Plan on health promotion for the working population for 2008-2017 was adopted, aiming to develop a proper directive base for its further introduction at the national level [9].

The purpose of the work was to determine regularities in formation of the general and occupational morbidity of the working population in Ukraine over the period of observation.

Materials and methods

The analysis of the general morbidity was made, using the database of the Centre of Medical Statistics of the Ministry of Health of Ukraine. The analysis of occupational morbidity was made by the database of the Automated Information System "Profzakhvoryuvanist" (Occupational morbidity) of the Ministry of Health of Ukraine and Institute for Occupational Health of AMS of Ukraine over the years of independency (1991-2009).

Results and discussion

In countries with transitional economy, Ukraine is among them, problems of workers' health promotion have acquired a particular acuteness. They have become more complicated because of the demographic crisis, which has acquired a threatening character.

As it is seen at Table 1, the number of Ukrainian population over the period of independency decrease by 6,27 mln people (12,2%); in the age structure the part of individuals older than able-to-work age increased, whereas the part of individuals younger than able-to-work age decreased (by 7,5%). The latter is the evidence of ever greater shortening of the work potential in the country in the nearest future.

Health rates of the working population are formed not only due the effect of work conditions, but, also, depends on life style, genetic and ecological factors, access and quality of medical services. However, for the execution of any work there is a need of physical and psychic energy, which should be renewed during a rest. If it is not so, chronic fatigue is cumulated, a motivation to work decreases, the number of chronic diseases increases, gradually turning to disablement.

One of main indices of the population health is prevalence of morbidity (Table 2). The presented data showed that in 2008 per 20,9 mln employed population of able-to-work age (among them engaged in types of economic activity - 11,51), 41,1 mln cases of morbidity or 1476,1 cases per 1000 employees (in 1997 this index was 1108) were recorded. So, over those years the general morbidity increased by 33,2%.

The morbidity developed mostly due to diseases of blood circulation system – 9,4 mln. cases, respiration system – 8,1 mln. cases, digestion system – 4,4 mln, and others.

One of difficult problems in Ukraine is prevalence of diseases by the Class "Disorders of psychic and behavior" (Table 3), which in 2009 made almost 1,2 million cases (2548 per 100 000 working population, two times more than in 2004). Among them, there are 608,6 thousand patients with chronic alcoholism and more than 700 thousand individuals, who take psychoactive substances. Such individuals of able-to-work age reduce significantly the working potential of the country, as they, practically, do not take part in production of material values. On the contrary, they themselves need attention and material values from the society.

One more distinction of that time was the rise of morbidity of tuberculosis (TB) in the working population in Ukraine (fig. 1).

In males it amounted to 150-195 cases per 100 000 population (in comparison with 118 cases per 100 000 for the general number of the population) and in women - 45-73 cases in comparison with 39 cases per 100 000 of the general population in Ukraine. The peak of morbidity falls on men aged 25-54, and for women aged 20-34.

In addition to morbidity rates, the level and quality of the worker's health depend significantly on medico-demographic indices of the population in able-to-work age, among which mortality is the most precise. In 1990, in Ukraine, its tendency was to permanent increase (fig. 2), for men, in particular [10,11]. Now, demographers and sociologists are used more often a new term "overmortality" for males of able-to-work age".

Diseases of blood circulation system, accidents (traumatism and tumors) take the leading place in the structure of morbidity (Table 4). It should be underlined that among mentioned causes the most popular cause (traumatism) is likely can managed [12,13].

As it is clear, in 2008 – 2009 mortality rates in men and women are differed significantly (by 3,7 times). This is the cause of not only shortening working resources, but, also, increase of the number of incomplete families, and in time, single elderly women.

Finally, mortality rates differ significantly in urban and rural population (Table 5). They are much higher in rural areas, reflecting the general medico-asocial situation in this sphere, and are, in particular, the result of destruction of the rural system of medico-preventive care of the population.

It is necessary to draw a special attention to traumatism in the working population, as, by its rate, it is possible to assess the general occupational risk at work.

According to the presented data, over the last 10 years there is a tendency in Ukraine to the decrease of rates of work-related traumatism, however, its indices are remained high.

Table 1. Number of permanent population of Ukraine by age (mln. men)

Indices	1991		2009	
	Abs.	%	Abs.	%
Number of population in general:	52,15	100,0	45,78	100,0
Including:				
▶ younger than able-to-work age	11,77	22,7	6,85	15,2
▶ able-to-work age	28,81	55,7	27,74	60,6
▶ older than able-to-work age	11,09	21,5	11,9	24,2

Table 2. Prevalence of morbidity by classes of diseases in able-to-work population in 2009 (mln. cases)

Classes of diseases	Number
<i>Total, including diseases of:</i>	<i>41,</i>
Blood circulation organs	9,4
Respiration organs	8,1
Digestion organs	4,4
Locomotor system and the connective tissue	2,3
Endocrine system, including Diabetes	1,8 0 0,3 8
Nervous system	1,53
Disorders of psychic and behavior	1,60
Infectious and parasitic, including tuberculosis	1,2 0,8 8

A demographic crisis, high level of the general morbidity and industrial injuries is a background for formation of occupational morbidity of the working population in Ukraine. Its main reason is improper work conditions. The results of the sanitary and epidemiological supervision show, that from year to year the number of enterprises with harmful and dangerous work conditions in Ukraine, grows, both governmental and non-governmental types of property.

The leaders among them are: enterprises of coal mining industry (87,5% enterprises); heavy engineering (88,7%), tractor and agricultural engineering (75,9%), machine-tool construction (93,3%), coal-extractive industry (81,2%), agricultural production (85%).

The number of enterprises of non-governmental types of property (farms), which do not keep to sanitary and hygienic requirements, makes 70,8%. In general, in all branches of the national economy only 29,4% enterprises follow requirements of the sanitary legislation.

A specific feature of changes in occupational morbidity in Ukraine over the last 30 years is its wave-like character (Fig. 7).

Table 3. Prevalence of psychic and behavior disorders in employees in Ukraine in 2009

Disorders	Abs.	Per 100 000 popul.
TOTAL, including:	1171133	2548,0
Taking psychoactive substances	700622	1524,31
Chronic alcoholism	608648	1324,20
Acute alcoholic psychosis	10192	22,17
Psychosis caused by narcotics	78909	171,68

Table 4. Mortality rates in the population of able-to-work age (2008-2009, per 100 000)

Classes of diseases	Urban	Rural
Accidents, traumas, poisonings	212,5	37,1
Blood circulation diseases	268,3	55,4
Tumors	116,7	63,3
Digestion organs diseases	93,3	32,3
Respiration organs diseases	37,2	9,7

Table 5. Mortality in able-to-work age by classes of diseases in urban and rural populations (2009)

Class of diseases	Urban population per 100 000	Rural population per 100 000
Total:	109,4	169,9
Blood circulation diseases	51,2	66,0
Tumors	86,3	101,4
Respiration system diseases	21,7	28,9
Suicides	19,8	38,1
Alcohol poisonings	14,2	27,4

The specificity of such epidemiologic wave is exceeding rates of growth of morbidity over rates of growth of absolute number of patients. This is because the absolute number of employees engaged in productions with harmful work conditions in recent time has decreased, whereas the number of patients with occupational pathology, on the contrary, increases. The recorded growth of occupational morbidity rates within 1993-1995 and 2001-2004 is associated with adoption of laws „On work safety”, „On obligatory national social insurance of workers against accidents at work and occupational diseases” as well as organization of the Fund for social insurance against accidents at work and occupational diseases. According to the mentioned regulation documents it is assumed to give material compensations for health damages caused by poor work conditions at the expense of the Fund.

The comparison of occupational morbidity, recorded in Ukraine, with the similar data of European countries, demonstrates that these indices in Ukraine are significantly low (Fig. 8), in spite of the fact that work conditions in Ukraine are much worse than in the developed European countries [14].

This paradoxical phenomenon can be explained by the strategic attitude to the problem of detection of occupational diseases on the part of the government, on the level of the financial support of the health promotion and work safety, priority of medical care and social protection of the working population, and, at last, on different approaches to determination of the criteria of diagnostics of occupational diseases. Thus, the official statistics in Ukraine show, so to speak, only a peak of the iceberg of the occupational morbidity. Its larger part whether knowingly or not, is not recorded, or concealed.

In recent years the problem of occupational morbidity of medical workers has acquired a serious significance (Fig. 4), mostly due to infectious diseases (tuberculosis, infectious hepatitis), pointing to general tendencies to prevalence of the mentioned diseases in the population of different countries in the world.

The diseases of the dust etiology are the most frequently found types of occupational pathology (pneumoconiosis, chronic dust bronchitis), making up 60 % of the general cases of morbidity. The diseases of the locomotor apparatus take the second place (radiculopathies, osteochondrosis, arthritis, arthrosis, tendovaginites, and others). The vibration disease takes the place, neurosensoric deafness – the fourth. The number of the latter increased over the last years. Diseases of chemical genesis take the fifth place (Fig. 5).

At the same time, by the data of the official statistics, occupational skin diseases, bursitis in coal miners, acute pesticide poisonings, electro-ophthalmia, overheating, are almost not recorded.

A number of new patients with tumors is growing in Ukraine from year to year. The International Agency for Research on Cancer declares that environmental factors, life and production are causes for development of almost 80 % all tumors, and, among them, up to 70 % is of a chemical nature.

At present, a wide-scale epidemic of HIV/AIDS and tuberculosis (TB) is spreading in Ukraine. These chronic infectious diseases affect, mostly, individuals of the able-to-work age, forming a great social-economic load for the country. The majority of employees of different branches of the national economy in Ukraine are exposed to high risks of infection of HIV and TB at workplace: those engaged in health protection, social support, administrating management, civil transportation, nutrition, hotels, commerce, Ministry of Extraordinary Situations, and others. The availability of mutual social economic prerequisites, providing for epidemic development of such infectious diseases, points to advisability of their parallel control.

Unfortunately, wide-scale programs on control of HIV/AIDS and TB at workplace, proposed by ILO and

WHO, have not been yet implemented in Ukraine.

Since 1991 the number of medico-sanitary units, plant's hospitals, out-patient departments as well as the number of hospital beds, workshop's physicians have decreased by 8-11 times. According to other data the number of acting plant's medical departments (301) decreased by 11,3 times, as compared to 1991 (3398).

The available system of detection and recording occupational diseases does not provide for receiving information on cumulated cases of occupational diseases over the whole period of their registration. So, there is no significant data in Ukraine on the number of patients with occupational diseases, which, by the selected data, makes 40-60 thousand people. National institutions, including public health establishments, are not able to control the real situation in this respect and to purposefully use medical and financial resources in order to improve the state of health of the population.

At present, there is a need to develop a National Registry for Occupational Diseases. Its use will give a possibility to make a complete record and control of the available occupational pathology in the working population, to undergo a dynamic supervision and analysis of cause-and-effect relations in the detected pathology.

The disintegration of industrial medicine results in many negative consequences. One of them, evidently the most significant, is in that occupational diseases are detected now at late stages, when rehabilitation is already impossible. So, the production sector loses workers and the society receives disabled persons [8,9].

There are grounds to successfully solve the available problems in Ukraine. The main law – Constitution of Ukraine – provides for the right of each citizen to safe and healthy work conditions. The thing is only in that both an employer and an employee should observe the laws.

Conclusion

- In the dynamic of examination the decrease of the number of the population in Ukraine by 12,2% is recorded; in the age structure the part of individuals of the pension age has increased and, at the same time, the part of the younger than able-to-work age decreased (by 7,5%), showing ever more shortening of the working potential in future.
- Over the period of 1991-2009 the growth of the general morbidity by 33,2% was recorded in the country. The prevalence of morbidity is explained mainly by diseases of the blood system, respiration organs, digestion organs, locomotor system, endocrine and nervous systems, psychic and behavior disorders.
- The rates of mortality of the population over the observed period permanently increased (from 11,3% to 15,4%), for men of able-work-age, in

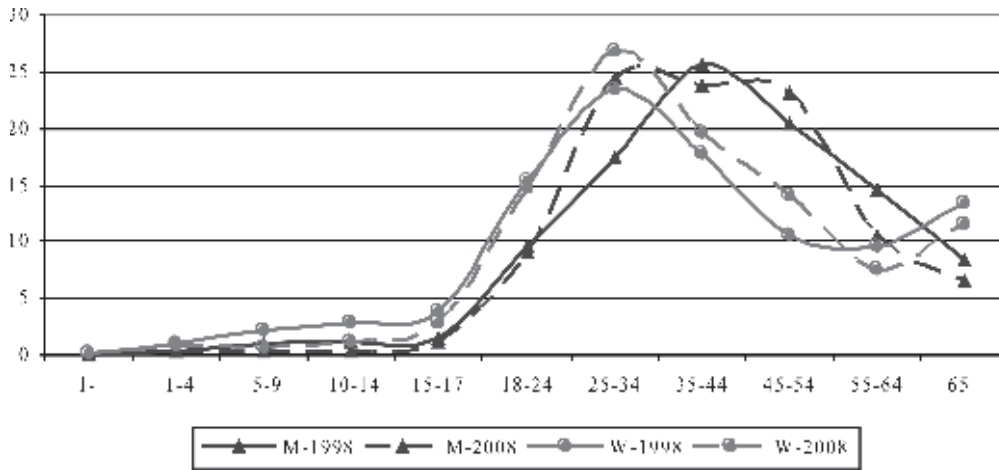


Fig.1. Distribution of patients with active tb by age and sex in Ukraine (in 1998 and 2009, %)

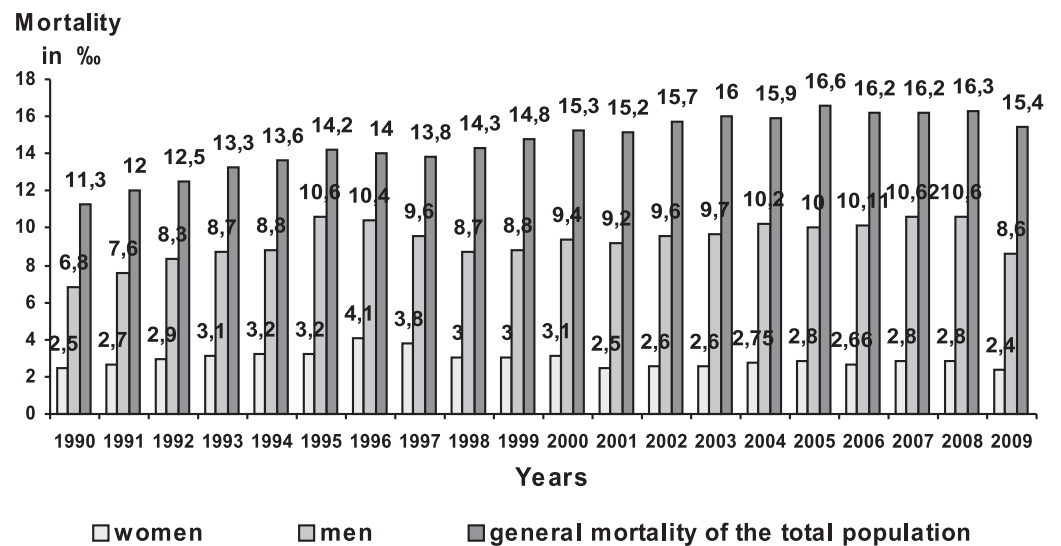


Fig. 2. Mortality of the population in able-to-work age in Ukraine (1990-2009, %)

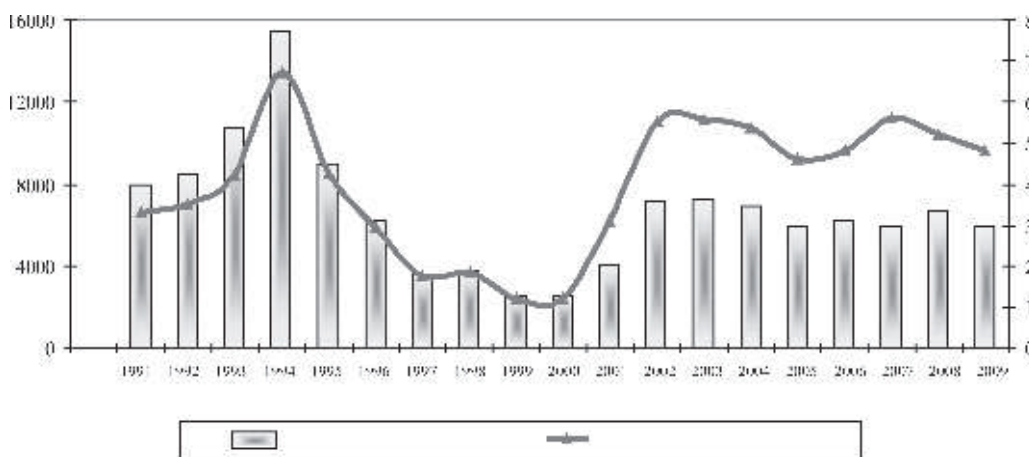


Fig. 3. Absolute number of patients and morbidity rates on occupational pathology in Ukraine per 10 000 employees (1991-2009)

Fig. 4. Morbidity rates of new cases of occupational diseases in the population of European countries (per 100 000 working population)

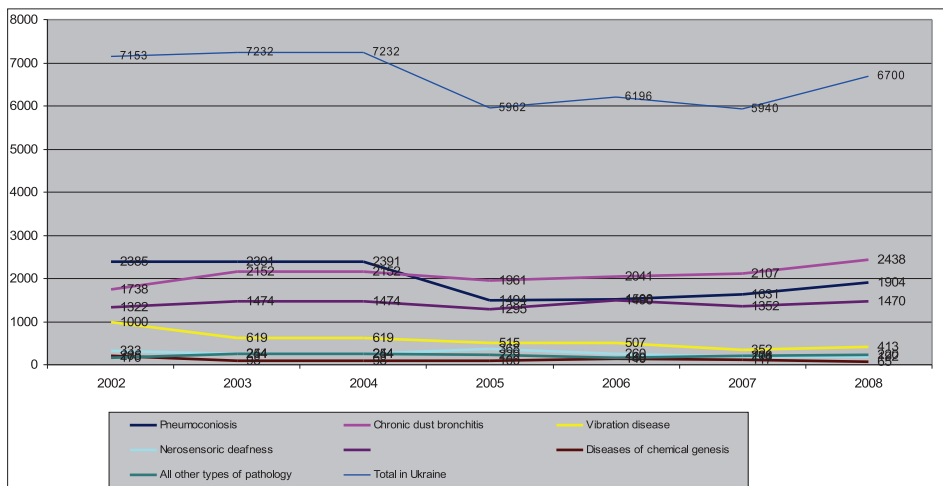
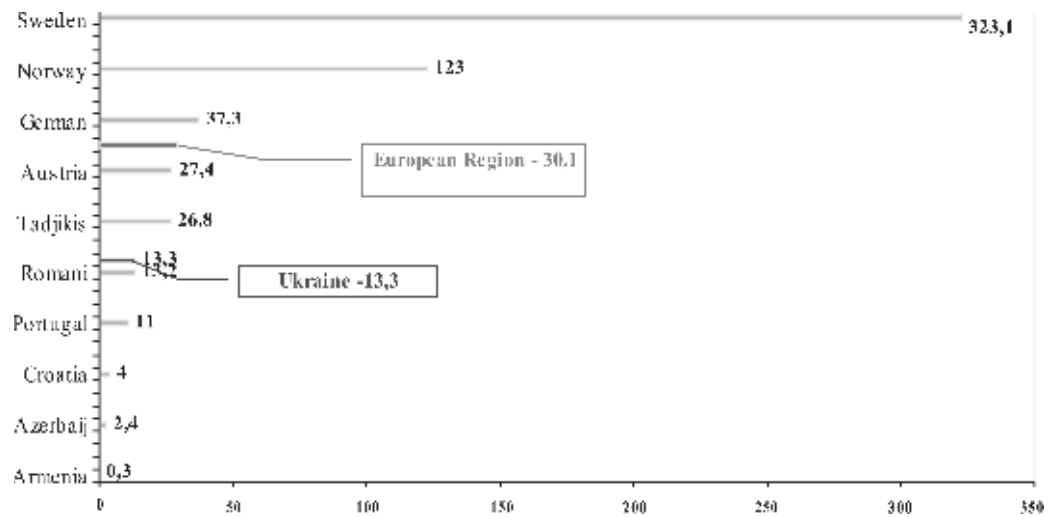


Fig. 5. Distribution of injured, by main diagnoses and groups of occupational pathology in Ukraine over 2001-2009.

particular. In the structure of causes of mortality the leading places, traditionally, are taken by diseases of the blood circulation system, traumatism and tumors. The negative tendencies in this respect are characteristic for individuals of able-to-work age.

- The characteristic feature of the dynamic of rates of occupational morbidity in Ukraine is its wave-like character. This is associated with the decrease of the absolute number of employees in productions with harmful work conditions and with the increase of the number of patients with occupational pathology as well as with regulation documents adopted in 1993-1995 and 2001-2004, which provide for significant material compensations for health damages caused by work conditions.
- Morbidity rates of occupational pathology are the highest in workers of coal-mining, metallurgic, machine-building and construction industries.

- It is necessary to develop measures in order to raise the quality of medical care of employees, responsibility of employers and employees for general and occupational health. Also, there is a need to improve legislation mechanisms in the interrelations between enterprises, medical establishments, insurance funds and civil organizations.

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Effect of strained work on operators' reliability in 24-hour shift work

Wpływ stresującej pracy na niezawodność operatorów w 24-godzinny systemie zmianowym

Abstract:

Psychophysiological peculiarities of the effect of 24-hour shift work on psychophysiological indices of an operator's efficiency are considered. It is found that significant manifestations of the fatigue are developed in servicemen-operators as a result of daily shift-work. The informative psychophysiological characteristics, which can be used as reliable indicators of fatigue level, have been distinguished. A hypothesis has been proposed on the availability of several compensatory mechanisms in maintenance of the work capacity in operators in long-term shift work. An integral index of the reliability of operators' activity has been developed, allowing to assess the quality of work, using a wide range of intensities of the proposed signals as well as to receive data on the overall possibilities of an operator to process information at the given level of reliability.

Streszczenie:

Badano psychofizjologiczne cechy wpływu 24-godzinnego zmianowego trybu pracy na psychofizjologiczne wskaźniki wydajności operatorów. Stwierdzono wyraźne oznaki zmęczenia u operatorów, wynikające z codziennej pracy zmianowej. Określono charakterystykę psychofizjologiczną, która może być wykorzystana jako rzetelna metoda określania stopnia zmęczenia. Zaproponowano hipotezę dotyczącą dostępności kilku mechanizmów kompensacyjnych, które można zastosować dla utrzymania pełnej zdolności pracy pracowników zatrudnionych na wielogodzinnych zmianach. Opracowano integralny wskaźnik niezawodności pracy operatorów z wykorzystaniem szerokiego zakresu intensywności proponowanych sygnałów jak również w celu uzyskania danych ogólnych na temat zdolności operatora do przetwarzania informacji na określonym poziomie niezawodności.

Keywords: *working capacity, occupational health, integral assessment of work reliability, simple and compound psychomotor reactions, functional mobility of nervous processes*

Słowa kluczowe: *zdolność do pracy, zdrowie zawodowe, integralna ocena niezawodności pracy, proste i złożone reakcje psychomotoryczne, funkcjonalna mobilność procesów nerwowych*

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In the modern society ever more and more people work by 'non-standard' work schedule, including shift and night work, which are being risk factors for health, safety and