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Psychosocial burden among offshore drilling platform employees

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ABSTRACT

Conditions of work on offshore drilling platforms are particularly hard due to extreme environmental situations created both by nature and technological processes. Oil drilling workers employed on the open sea are potentially exposed to permanently high stress. Apart from the obvious objective factors affecting drilling platform employees, a great role in the general work-related stress level is played by the working conditions and work-related psychosocial factors, defined according to Karask's concept as demands, control, and social support. A total of 184 drill platform workers were examined using objective and subjective research methods.

The level of subjective stress among drilling platform workers is lower than the level of objective stress and the stress resulting from prognoses related with specificity of work in extremely hard conditions (audit). The examinations of drilling platform workers reveal a positive role of stress in psychological adaptation, being a special case of the "work ethos" and attachment to the firm. In such investigations of work-related stress on drilling platforms, which are very specific workplaces, a multi-aspect character, sociological and economic aspects, organizational culture conditions in the firm, and a tendency to conceal ailments and the stress experienced should be taken into account. It is important to apply measures referring to at least three different types of evidence (objective demands, subjective stress, health problems reported). Otherwise, the result reflecting work-related stress may not be objective and far from the truth.

Key words: psychosocial stress, physical work burden, work on drilling platforms

INTRODUCTION

Work on drilling platforms is performed in especially hard conditions due to the extreme environmental forces of nature and technological processes. These may result in permanent negative health consequences. The safety and health of the employees is endangered despite the provision of appropriate technical, organizational, and medical prophylactic measures. Offshore drilling workers are potentially exposed to gas and oil eruption or fire, and are under permanent stress resulting in diverse somatic and neurotic disturbances and occasionally, in extreme cases, the necessity of resignation from work. In the present paper we will analyze psychosocial factors which, along with objective factors, may be stress sources for drilling platform workers.

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STRESSORS IN DRILLING PLATFORM WORK

PHYSICAL, CHEMICAL, AND BIOLOGICAL WORK OVERLOAD FACTORS

When considering the work environment as a source of stress on Polish drilling platforms one should take into account the objective and subjective factors accompanying the employees. The essential ones are physical, chemical, and biological overload:

1. **Noise** — from ventilation, machine assemblies, technological processes (drilling, exploitation turbines, etc.).
2. **Vibrations** — vibrations of the whole platform, local vibrations affecting upper limbs (hand tools).
3. **Temperature and air humidity** — temperature variations, low air humidity, perceptible air flow velocity causing the spreading of various biological contaminants.
4. **Air pollution** — aerosols: mixtures of engine oils and dust.
5. **Chemical** — chemical agents used in technological processes, e.g. coagulants.

WORKING CONDITIONS AS STRESSORS IN DRILLING PLATFORM WORK

1. **Life loss risk** (gas eruption, drowning).
2. **Commuting to/from work**
   Marine drilling platforms operate at a distance of 60–100 km from the coastline. In good atmospheric conditions the transport is provided by helicopters. During a bad weather, tug boats have to be used (the journey takes up to eight hours). To get onto the platform, to a height equivalent to an eleven-storey building, a suspended basket is used, frequently in bad weather conditions. Such circumstances cause long waits and uncertainty as to the means of transportation, time of departure, and arrival, often necessitating many changes of plans.
3. **Time of stay on the platform**
   The shift work system is: two weeks on the platform/two weeks leisure.
4. **Shift work**
   Drilling and exploitation employees work in a continuous work system from midday until midnight, and the sea service from 7 pm until 7 am.
5. **Constant stand-by work**
   Workers are sometimes required to stay on for the next shift in emergency situations: on the day of crew exchange the shift can last as long as 18 hours.
6. **Social conditions**
   Compared to other platforms, social conditions are not satisfactory: small cabins and the consequent necessity to stay with the same people for two weeks, no opportunity for recreation or sport.

Aside from objective elements such as temperature, lighting, noise, dust levels, irradiation, equipment, and other work-related harmful factors, there are numerous agents that cause health consequences via the mechanism of stress. These are the so-called psychosocial factors [1–4] arising in specific social and organizational working conditions, and their possible harmful character is determined by psychological evaluation for an individual, i.e. if it poses a threat, limitation, deprives the person of important values, or is a challenge for the person's abilities, aspirations, etc. [3]. The attribution of negative significance to the situation releases the next organic transformations leading to health disorders. Psychosocial harmful factors may be defined as "aspects of work management and organization, with their social and environmental context that may induce psychical, social, or physical damages" [1].

PSYCHOSOCIAL FACTORS AS WORK-RELATED STRESSORS

Psychosocial threats may affect both psychical and physical health, directly or indirectly, via the action of stress. Work-related situations are perceived stressful by workers when the demands do not comply with their knowledge and abilities or their needs. In particular, this applies to situations when the work level control is low and social support at work is weak. In the report of the European Agency for Safety and Health at Work, ten categories of work, work environment, and organization were selected that might pose a threat. In addition, the features of work were selected referring to the *"context of work"* and those referring to the *"essence"* of work [1]. Under certain conditions, each of the ten features of work were stressful and harmful:

Context of work:

- Organizational culture and function (poor communication, low levels of support, lack of definition of organizational objectives).
- Role in organization (role ambiguity and role conflict, responsibility for people).
- Career development (career stagnation and uncertainty, poor pay, job insecurity).
- Decision latitude/control (low participation in decision making, lack of over work).

— Interpersonal relationships at work (social or physical isolation, poor relationships with superiors, interpersonal conflict, lack of social support).
— Home-work interface (conflicting demands at work and home, low support at home).

Content of work:

— Work environment and work equipment (reliability, availability, suitability, equipment, and facilities).
— Task design (lack of variety or short work cycles, fragmented or meaningless work, underuse of skills, high uncertainty).
— Workload/workplace (work overload, lack of control, high levels of time pressure).
— Work schedule (shift working, inflexible work schedule, unpredictable hours).

WORK-RELATED STRESS MODELS

There are several concepts of work-related stress and many classifications of stressors in literature [3–7].

The best known is Karask's model [8, 9], which assumes two stressor groups: demands level at work, various kinds of pressure, and the ability to make decisions and control the work performed. According to this model, the most important factor is the work process control level. The lack of balance between demands and control at work may lead to health consequences. With growing demands at work and a declining sense of control over the situation, tension occurs. In general, increased autonomy causes better health functioning. High autonomy, fewer limitations, a sense of control over the work process, and social support enable the stress level to be reduced [8, 9]. Johnson J.V. has added a third parameter to Karask's model, yielding a "demands-control-support" model [10]. The parameter called "social support" refers to all social support interactions, both from associates and superiors. It seems that social support plays a key role in managing work-related stress. It actsas a buffer against the possible unfavourable effects of excessive psychological demands [11]. Winnubst and Schabracq found that high demands, low control, and low social support (high social isolation level) are related with increased risk of cardiovascular diseases [12].

As reported by J. de Jonge, when low demands are accompanied by high control, regarded as a possibility of free decision making of workplace organization and choice of tasks, and high social support, then the demands are not a source of stress (Figure 1). They rather motivate and stimulate the workers. According to investigation results, work-related stress is least probable when the worker is given difficult and demanding tasks, at the same time being sure of autonomy in decision making and having substantial and emotional support [13]. As pointed out by Karasek and Theorell, the interaction between high demands, low control, and low social support is particularly dangerous in view of the stress felt (Figure 1).

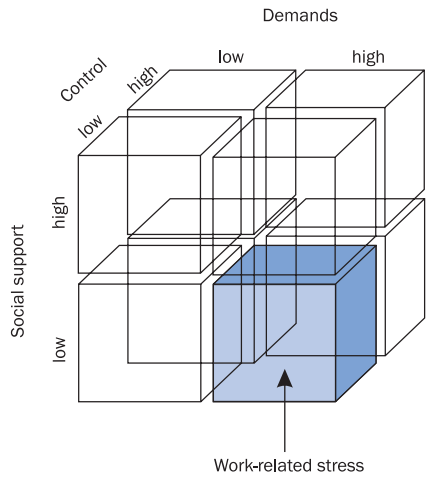

Figure 1. Model of work-related stress. Source: Karasek and Theorell, 1980 [14]

It should be noted that in the latest concepts of theory and practice of management, attention is paid to the sources of stress in situations threatening the sense of personal dignity of the worker (an organization member). The notion of "dignity", although difficult to be exactly defined, and the situation of a threat to that dignity, resulting in a loss of values important for the individual, is very harmful and stressful [15].

RESEARCH AIMS

An evaluation of the impact of psychosocial factors on work-related stress amongst Polish drilling platform workers.

MATERIALS AND METHODS

The study group comprised **184** drilling platform workers, men only, average age 42, mean work experience 12 years (Table 1).

The following investigation methods were employed:

1. Data on objective burden
   a) Data on objective psychosocial burden
      Experts' opinion on objective work evaluation based on Work Evaluation Questionnaire by B. Dudek. This method is used to measure the global load of workplaces with psychosocial factors and to determine work factors and features that are the greatest sources of work-related stress. Potential factors are assessed

Table 1. Demographic characteristics of the study group

		Size N	% of N in the column
Age	Up to 30	27	14.6%
	31–40	61	33.0%
	41–50	49	26.5%
	51–60	40	21.6%
	Above 60	8	4.3%
Seniority	Up to 5 yrs	45	24.5%
	6–10 yrs	28	15.2%
	11–15 yrs	57	31.0%
	16–25 yrs	31	16.8%
	25 yrs or more	23	12.5%
Education	Elementary vocational	31	16.85%
	Secondary	78	42.39%
	Higher	75	40.76%
Marital status	Married (1 union)	143	77.72%
	Divorced/married again	8	4.35%
	Divorced	4	2.17%
	Widower	1	0.54%
	Single	2	1.09%
	Common-law marriage	3	1.63%
	Bachelor	23	12.50%

by experts (2–3 experts) who know the workplace but do not work in it. The following objective work conditions are evaluated: Unpleasant working conditions, complexity of work, threats conflicts, work-related uncertainty, physical difficulties, haste, responsibilities, physical effort, and competition [3].

2. Data on subjective work-related stress
   a) Psychosocial working conditions (Widerszal-Bazyl, Cieślak) to investigate individual impressions of employees about work-related stress. We focused on the following scales of the questionnaire:
      — Demands — 25 questions concerning the kind of demands that are connected with the job.
      — Control — 20 questions concerning the amount of control the worker has on what is going on at the workplace.
      — Social support — 16 questions concerning the kind of social support and help the worker can count on [6].
   b) Subjective opinions on work influence on different aspects of life (marked on a scale 1–10)
      — Burden with physical factors.
      — Burden with psychical factors.
      — My conviction of effective managing stressful situations.
      — Opinion on stress felt at home.
      — Level of general life satisfaction.
      — Level of general work satisfaction.
      — Impact of work on family life.
      — How strongly attached to your firm do you feel?

RESULTS

OBJECTIVE WORKING CONDITIONS — EXPERTS' DATA

Objective work demands were assessed by 3–4 experts proficient at the specificity of the post examined (scale: min. = 1 sten, max = 10 sten). As regards demands, the result is 8.08 sten for the drilling platform (EP), 7.56 sten for exploitation platform

(EM), and the average is 7.82 sten, which reflects a high demand level (Figure 2).

Detailed analysis of objective demands in the work environment shows that on the drilling platform the burden with unpleasant conditions of work, its complexity, hazards, conflicts, and responsibility is higher compared to other workplaces. This does not regard the uncertainty due to the organization of work, haste, physical effort, and competition. Data are shown in Table 2.

SUBJECTIVE STRESS

The following results were obtained on work-related psychosocial burden (Table 3).

All obtained values oscillate around average results.

In the next stage, the relationship between individual burden factors was analyzed: Demands (D), Control (C), Social Support (SS), and subjective opinions on the work on platforms, its impact on family life, sense of own effectiveness, and life satisfaction (Table 4).

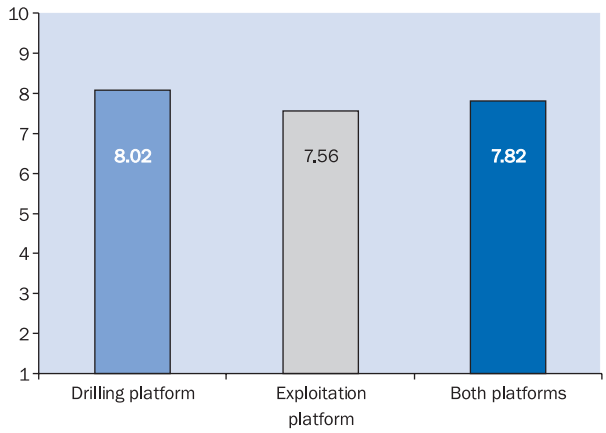

Figure 2. Objective working conditions — expert data

Table 2. Objective work evaluation (experts' opinion: 3–4 experts per 1 workplace)

Unpleasant working conditions	11.8*
Complexity of work	19.2
Threats	19.4
Conflicts	8.6
Work-related uncertainty	9.7
Physical difficulties	11.3
Haste	4.6
Responsibilities	6.8
Physical effort	3.5
Competition	1.2

*Elevated results of stress burden in comparison with other occupational groups

Table 3. Psychosocial working conditions

Scales	Value (1–10)
Demands	5.2
Intellectual demands	4.8
Psychophysical demands and responsibility for safety	5.6
Demands resulting from contrariness of roles and overburden	5.6
Control	6.2
Behavioural control	5.8
Cognitive control	6.6
Social support	6.6
Support from superiors	6.4
Support from associates	6.7

The higher the general and intellectual demands at work, the stronger the attachment to the firm, but also the greater the stress at home. High psychophysical and responsibility demands result in tighter attachment to the firm and greater work satisfaction.

High demands due to the conflict of roles result in greater psychical burden and stress at home, and simultaneously with a weaker sense of one's own effectiveness and reduced work satisfaction (Table 5).

A high sense of cognitive control at work is related with a smaller burden of physical and psychical factors, and better work and life satisfaction, but also with greater stress at home and greater impact of work on family life (no influence on what is happening at home during 2-week stay on the platform).

On the other hand, high behavioural control is related with high life satisfaction and stronger influence on family life, being inversely related to physical burdens (Table 6).

Support from superiors and associates is related with the belief of one's management effectiveness, better impact of work on family life, general life and work satisfaction, and attachment to the firm. Strong support from superiors is especially connected with life and work satisfaction, whereas support from associates is connected with life satisfaction.

The burden with psychosocial working conditions was analyzed and simulated subjectively on the background of expected burden values.

Table 4. Demands at work and explaining variables (*indicate significance level < 0.05*)

DEMANDS		Demands scale	Intellectual demands	Psychophysical and responsibility demands	Demands due to contrariness and overburden
Burden with psychical factors	Pearson's correlation	0.144	0.108	0.087	0.238
	Significance (two-sided)	0.062	0.163	0.259	**0.002**
	N	169	169	169	169
My conviction of effectively managing stressful situations	Pearson's correlation	–0.034	–0.044	0.139	–0.161
	Significance (two-sided)	0.655	0.570	0.070	**0.036**
	N	170	170	170	170
Opinion on stress felt at home	Pearson's correlation	0.156	0.161	0.036	0.201
	Significance (two-sided)	**0.043**	**0.036**	0.641	**0.009**
	N	170	170	170	170
How strongly attached to your firm do you feel?	Pearson's correlation	0.149	0.151	0.259	–0.117
	Significance (two-sided)	0.052	**0.049**	**0.001**	0.128
	N	170	170	170	170
Level of general work satisfaction	Pearson's correlation	0.072	0.079	0.186	–0.218
	Significance (two-sided)	0.352	0.310	**0.015**	**0.004**
	N	169	169	169	169

Table 5. Control at work and explaining variables (*indicate significance level < 0.05*)

CONTROL		Control scale	Behavioural scale	Cognitive scale
Burden with physical factors	Pearson's correlation	–0.159	–0.151	–0.187
	Significance (two-sided)	**0.038**	**0.049**	**0.015**
	N	170	170	170
Burden with psychical factors	Pearson's correlation	–0.162	–0.059	–0.239
	Significance (two-sided)	**0.036**	0.450	**0.002**
	N	169	169	169
My conviction of effectively managing stressful situations	Pearson's correlation	0.179	0.105	0.245
	Significance (two-sided)	**0.019**	0.172	**0.001**
	N	170	170	170
Opinion on stress felt at home	Pearson's correlation	–0.206	–0.094	–0.224
	Significance (two-sided)	**0.007**	0.224	**0.003**
	N	170	170	170
Level of general life satisfaction	Pearson's correlation	0.252	0.234	0.210
	Significance (two-sided)	**0.001**	**0.002**	**0.006**
	N	170	170	170
Level of general work satisfaction	Pearson's correlation	0.252	0.140	0.236
	Significance (two-sided)	**0.001**	0.069	**0.002**
	N	169	169	169
Impact of work on family life	Pearson's correlation	0.205	0.172	0.182
	Significance (two-sided)	**0.008**	**0.026**	**0.018**
	N	169	169	169

Table 6. Social support and explaining variables (*indicate significance level < 0.05*)

SUPPORT		Social support scale	Support from superiors	Support from associates
My conviction of effectively managing stressful situations	Pearson's correlation Significance (two-sided) N	0.224 **0.003** 170	0.212 **0.005** 170	0.205 **0.007** 170
How strongly attached to your firm do you feel?	Pearson's correlation Significance (two-sided) N	0.248 **0.001** 170	0.242 **0.002** 170	0.261 **0.001** 170
Level of general life satisfaction	Pearson's correlation Significance (two-sided) N	0.327* **0.000** 170	0.293* **0.000** 170	0.334* **0.000** 170
Level of general work satisfaction	Pearson's correlation Significance (two-sided) N	0.312 **0.000** 169	0.323* **0,000** 169	0.261 **0.001** 169
Impact of work on family life	Pearson's correlation Significance (two-sided) N	0.190 **0.014** 169	0.228 **0.003** 169	0.164 **0.033** 169

* *Pearson's correlations close to 0.3 or higher*

It was expected, based on audits performed on the platforms, that the demands would be high, the control level quite low (due to the specificity of work), and social support would be above average. However, the results obtained revealed the declared medium burden with demands, higher control, and definitely stronger social support (Figure 3).

Based on experts' opinions, objective demands turned out stronger than subjective demands.

Subsequently, regression analysis was carried out with psychical burden as the **explained variable** and the following **explaining variables**:

— Opinion on the state of health.
— Belief about the effectiveness of management in stressful situations.
— Opinion on stress felt at home.
— How strongly attached to your firm do you feel?
— General life satisfaction level.
— General work satisfaction level.
— Impact on family life.
— Burden with physical factors (Figure 4).

From the nine explaining variables analyzed, four allow the prediction of the psychical burden in 41%: physical factors, life satisfaction, stress felt at home, and the influence on family life. The greatest role in general psychical burden is played by physical factors which are three-fold stronger compared to life satisfaction and stress felt at home. The influence of work on family life is worth noting. The stronger such an influence, the lower the psychical burden level (Figure 5).

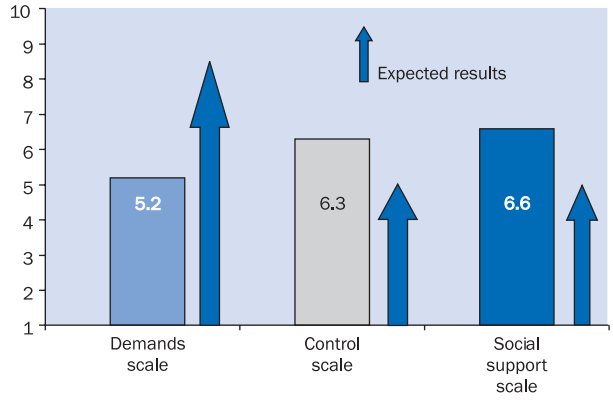

Figure 3. Psychosocial working conditions

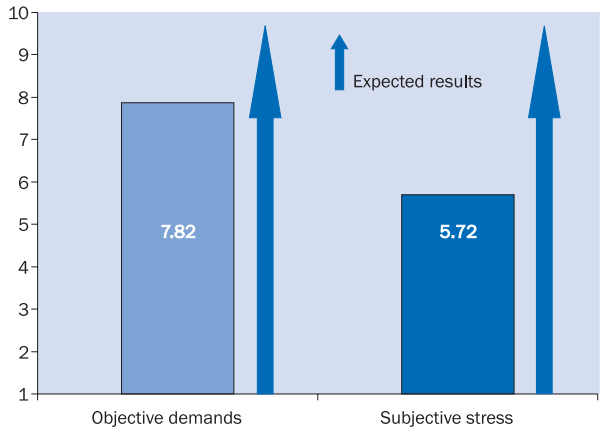

Figure 4. Objective demands *v.* subjective stress

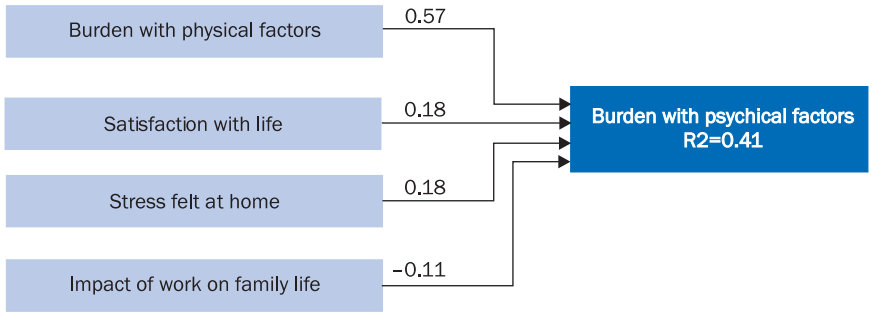

Figure 5. Psychical burden — regression analysis

CONCLUSIONS — PERSPECTIVES FOR FURTHER RESEARCH

The results obtained demonstrate that the objective stress on the platform is high, and subjective stress is medium. It was expected that platform workers should have been burdened with psychosocial factors much more that it might have been indicated by the results obtained. Social support, both from superiors and associates, was shown to be especially important. In addition, the interaction between home and work proved to be very significant.

The extended "demand-control-support" model has been criticized as it does not consider individual differences in susceptibility to stress and managing it. The relation between the dimensions of the model and health measures depends on individual traits of the worker. In further research, the importance of personal traits as stress moderators, of sources, ability to cope with stress, and the need for risk will be established. It is possible that in the whole population of drilling platform workers there are so-called "hidden psychological costs" resulting from the specificity of work on Polish drilling platforms. It may be that these workers are afraid to admit to experiencing stress or to reveal their state of health (concealment of the disease) as they care for the job and do not want to lose it. In addition, in this occupational group an important role is played by the attachment to the firm, the "work ethos", the role of a "strong man", the difficult situation on the labour market, and fear of work loss. There is a temptation to use so-called sensitive, discreet information (on life quality, family investigation on behaviour, addictions, etc.), but in this case ethical aspects of acquiring information from the family and associates are important.

The research has indicated a multi-aspect character of the effect of psychosocial factors on work-related stress. As well as measuring the stress levels, the sociological, economic, political, and cultural organization of the firm should be taken into account. The research results presented confirmed the thesis of T. Cox, which states that work-related stress should be examined based on the triangulation principle [1, 17]. Data from four types of measurements should be taken into account (objective demands, subjective stress, health problems reported, objective information on the state of health), which may provide, in some measure, an objective image of work-related stress. In the present article we have focused on the first two measures (objective demands and subjective stress).

Drilling platform workers, in their profession combining the duties of miners and seamen, are not under heavy work-related psychosocial burdens [18, 19]. Examinations of drilling platform workers can also be an example of the positive role of stress in the psychological adaptation of the people employed. It is important to continue the studies on personal factors being the moderators of stress management. Arne J. Ulven, an expert in the topic of the offshore petroleum industry, said: "The offshore industry is a huge business but a small family", which allows us to suppose that social abilities play a special role in the psychological adaptation to work on drilling platforms [20]. Numerous reports on stress show that there is an essential relationship between personal factors, as moderators of stress managing, and the reaction to and management of stress [20–24]. This area of research will be presented in susequent papers.

REFERENCES

1. Cox T, Griffiths A, Rial-Gonzalez E. European Agency for Safety and Health at Work. Psychosocial factors and mental stress at work. Luxembourg: The Publications Office of the European Union, 2000.
2. Kaplan HB. Psychosocial Stress from the Perspectives of Self Theory. In: Kaplan HB. Psychosocial Stress. Perspectives on Structure, Theory, Life-Course and Methods. California: Academic Press 1996b; 175–247.

3. Dudek B, Waszkowska M, Hanke W. Ochrona zdrowia pracowników przed skutkami stresu zawodowego (Workers health protection against occupational stress consequences). Instytut Medycyny Pracy im. prof. dr med. Jerzego Nofera 1999.
4. Campell Quick J, Tetrick LE (ed.). Occupational Health Psychology. American Psychological Association, Washington 2003.
5. Cooper CL, Marshall J. Źródła stresu w pracy kierowniczej i umysłowej (Stressors in manager and mental work). In: Cooper CL and Payne R (eds). Occupational stress. PWN Warszawa 1987; 23–163.
6. Kahn RL, Byosiere Ph. Stress in organisation. In: Dunette M, Hough L (ed.). Handbook of industrial and organisational psychology. Consulting Psychologists Press, Paolo Alto, California 1992; vol. 3: 571–650.
7. Borucki Z. Współczesna koncepcja stresu psychologicznego (Current concept of psychological stress). Zeszyty Naukowe — Psychologia 1991; 10.
8. Karasek RA. Job characteristics in relation to the prevalence of myocardial infarction in the U.S. HES and HANES. Public Health 1988; 79: 910–918.
9. Karasek RA. Healthy work. Stress, productivity and the reconstruction of working life. Basic Books 1990.
10. Johnson JV. Control Collectivity and Psychosocial Work Environment. In: Sauter SL, Hurrell JJ, Cooper CL (ed.). Job Control and Worker Health. Chichester, Wiley 1989.
11. Theorell T. Fighting for and losing or gaining control in life. Acta Physiologica Scandinavica 1997; 161 (Suppl. 640): 107–111.
12. Winnubst JAM and Schabracq MJ. Social Suport, Stress and Organization "Towards Optima Matching. In: Schabracq MJ, Winnubst JAM and Cooper CL (eds). Handbook of Work and Heath Psychology. John Wiley & Sons, Chichester 1996.
13. de Jonge J et al. The Demand-Control Model: Specific Demands, Specific Control, and Well-Defined Groups International Journal of Stress Management Publisher Springer Netherlands 2000; 7 (4): 269–287.
14. Karasek R and Theorell T. Healthy work: Stress, Productivity and the Reconstruction of Working Life, Basic Books, New York 1990.
15. Stoner JAF. Kierowanie (Management). PWN, Warszawa 2001.
16. Widerszal-Bazyl M. Stres w pracy a zdrowie (Work-related stress and health). CIOP-PIB, Warszawa 2003.
17. Leszczyńska I, Jeżewska M. Work-Related Stress At Sea. Possibilities of Research and Measures of Stress. Int Marit Health 2008; 59 (1–4): 93–102.
18. Leka S. Psychosocial Hazards and Seafarer Health: Priorities for Research and Practise, Int Marit Health 2004; 55 (1–4): 137–153.
19. Leszczyńska I, Jeżewska M. Stres w pracy zawodowej (Occupational stress). In: Psychologia w medycynie (Psychology in medicine). Borys B. (ed.). Wydawnictwo GUMed 2006.
20. Ulven Arne J. Medical and Psychological Challenges in the Offshore Petroleum Industry. Int Marit Health 2009; 60 (1–2): 40–42.
21. Heszen-Niejodek I. Stres i radzenie sobie — główne kontrowersje (Stress and its coping — main controversies). In: Heszen–Niejodek I and Ratajczak Z (ed.). Człowiek w sytuacji stresu. Problemy teoretyczne i metodologiczne. Wydawnictwo Uniwersytetu Śląskiego, Katowice 2001.
22. Hobfoll S. Stress, Culture and Community. Plenum Press, New York and London 1998.
23. Plopa M. Stres w izolacji morskiej. Psychospołeczne uwarunkowania. (Stress in isolation at sea. Psychosocial conditions). Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 1996c.
24. Ratajczak Z. Stres — radzenie sobie — koszty psychologiczne (Stress — coping with — psychological costs). In: Heszen-Niejodek I and Ratajczak Z (ed.). Człowiek w sytuacji stresu. Problemy teoretyczne metodologiczne (A man under stress. Theoretical and methodological problems). Wydawnictwo Uniwersytetu Śląskiego, Katowice 2000.