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STRESSING FACTORS IN AVIATION

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Abstract: *Due to the price and consequences of stress generated by work situations, during the last decades, most of the researches have mainly oriented towards it. Occupational stress was initially studied at the level of managers (stress of the executives), the study was subsequently enlarged to those professions with more intense demands and with a high risk degree: pilots, workers in the oil industry and nuclear centers, nurses, policemen, military etc., and it is accepted nowadays that occupational stress is present in all the activity fields and in all professions. Some professional categories are more powerfully affected, as compared to others. This category, more affected, also includes surgeons and the remaining staff employed in the medical care system, the staff in the field of social work, education, pilots, air traffic controllers, terminal operators, policemen etc.*

Key words: *stress, traumatic, burn-out, specific, coping, stressors, strategies*

1. INTRODUCTION

The word "stress" has been used so often lately, that it started to lose its meaning of "danger", "tremor". Most of the diseases of the third millennium include stress that is awful fatigue, irritation, unbearable pressure we are object of due to the crazy speed of our restless life, due to acerb competition, running for the money, loneliness, lack of communication, depression. The term of stress, come from medieval English - distress - (trouble, difficulty, and unpleasant situation), means unspecific response of our body to any demand. Although the term itself does not mean only nervous pressure, consequence of the action of harmful factors (stress can be a pleasant thing, without negative consequences), only indicating the adoptive demand of the body, in the daily language stress is related to overload, that fact that it

represents a permanent comrade of life being neglected. The adaptation possibilities of the human being are more and more demanding due to modern life, with all it assumes. Under such conditions, stress became an issue we permanently deal with, both extra-professionally and professionally. Systemic stress, understood like a syndrome, characterized by an inter-waved multitude of specific and nonspecific responses of the body to the action of stressors, including both the lesion, and the wear of the body and the suffering felt, it always has a psychic structure. This is the so-called secondary psychic stress. But there is also a primary psychic stress, where the stressors injure the scope of the psychic, leading to absurd subjective experiences, discomfort, and anxiety. The negative or indifferent stimuli are perceived as having harmful significance and therefore, disproportionate, non-adaptive conduct

changes occur. Psychic stress is induced most often by language. But the structures altered by psychic stress are both material (the central nervous system, and mental (psychic processes as such).

The Air Forces, by the nature and specificity of their duties, generate occupational stress. The military environment – more than any other – is strongly individualized in the society by a series of characteristic elements which may represent occupational stress sources. We regard here the social liability of the military profession and the structure of the military organization (hierarchical, linear, multi-level, rigid, which involves a hierarchical authority, an exclusive vertical subordination). Such organizing requires conformism and, even, a relative unification, the military environment being relatively closed, therefore limiting the connections with the outside, and if seen as liberty restrictive it can become frustrating for the individual. The values promoted by the military organization are sometimes differentiated by those of the civil environment – for example, the military requests altruism, while the civil environment is marked by the increase of individualism; the military environment claims abidance, subordination, adaptation as premises of success, the civil encourages autonomy, self-improvement, tolerance as premises of success in life and profession etc. Under such conditions, if the pilot does not understand such differences, does not accept them or considers them incompliant with civil life, he / she feels constrained, frustrated, stressed. Other pressure sources for the pilot may also be deprivations, restrictions, dangers, and doubt, physical and psychic intense demands. Some statistics look like aircraft pilots, decision of which deals with human lives, suffer from hypertension as consequence of the stress, in a proportion forth times higher than the other professional categories. These specificity elements of the military environment do not automatically launch occupational stress. The mode the individual intercepts, interprets and evaluates on the one hand, the stressors, and on the other hand, his/her capacity proportions to handle them, determines the appearance of

stress or eustress, that beneficial stress which may mobilize personal resources and leads to occupational satisfaction and success.

If the symptoms of stress are relatively simple to recognize, its causes are difficult to guess. In the thousand studies dedicated to it, its origin is localized both in highly banal facts – lack of material safety or excess of positive ions -, and in complex facts, usually spiritual: deaths, divorces, separations etc. Stress often results from conflicts occurred between two or several individuals, having a different manifestation: the desire of communication opposes to the desire of solitude, the desire of independence, dependence, desire of competition, of cooperation, desire to do what you like, to abide by social obligations. Naturally, if we are to know which of such conflicts we face, we shall know better how to remedy the stress they lead to.

The psychological and emotional stress factors may appear due to several causes. Such cause may relate to the job (flight difficulties at the beginning of the career or a stressed relation to chiefs and mates) or to the family (marital or financial issues). The result of psychological stress shall impose overload of the pilot and the appearance of weak professional results. The factors concurring to such type of stress are: focusing on one single problem and distraction from the flight; weak analysis capacity; easy loss of orientation; distraction from initial duties; resigned attitude in front of the problems; tiresome, early breakdown.

Most militaries accept stress as normal in their specific activity, but the problems appear when its effects exceed the individual's strength of coping. Military psychiatrists and psychologists describe, depending on the intensity, the following types of stress:

a) Basic stress – is determined especially by the interpersonal relations set within activities and based on personal attributes: age, education, physical condition, previous experience, skills, convictions, attitudes, self-esteem etc. Such type of stress is not too serious and can benefit from effective management if treated before reaching a level beyond control. For such purpose, it is necessary to identify the stress sources, to



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know personal limits and a good time management.

b) Cumulative stress – consists of discomfort, lasts for more and is more serious than basic stress. Discomfort may lead to breakdown, intense tiresome, “burn-out” depression and other manifestations such person is incapable to face.

c) Traumatic stress – is the result of stressing situation, appears suddenly and violently and the individual can no longer continue his/her activity. This type of stress may be immediately signaled, few hours/days or even months/years from the impact to a stressing event and is characterized as acute stress. This is the most harmful as it erodes the capacity of the person to adapt and may lead to serious health issues.

Any demand for the individual may be a possible stressing factor seeing the overload of the individual, the incapacity of adaptive response to the agents in the surrounding environment, if the situation is not correctly managed. Therefore, the body is worn out and high suffering degree is generated. In case of pilots, even combining minimum demands may lead to fatigue (a radio call from the soil while the pilot makes a difficult maneuver to reach lateral wind in turbulence conditions, low or night visibility, faulty operation of equipment on board). A lower demand may awake our interest, determining the settlement of the situation and the growth of attention to the alert level. Over-demand may lead us to an inferior action area, in the area of “panic”, which has as effect a weak performance in our actions. The target is, certainly, a demand level which we shall successfully face and which shall be as low as possible, below the over-demand, but not as low as not to react at all.

2. STRESS IN AVIATION

We identified in aviation types of stress specific to the developed activity:

Physical Stress. Unexpected fear, as for example perception of physical danger, determines the brain to get quickly ready for action. Suprarenal glands release the adrenaline hormone which physically stimulates the body to face the threat– fight or run. The pulse grows rapidly, certain blood veins contract in order to guide blood to the body areas which need it. Performances may intensity and, in the limits of experience and training, the response to such stimuli may be quick and precise. The decision to “fight or run” depends on several factors, including the personality and aptitude for the activity to be deployed and for the level of perception of dangers.

Non-physical stress. Some stress situation does not necessarily come from perceived physical threat but from some intellectual, psychological or emotional causes. They may be the pressures imposed by time, decisions difficult to make (to continue the flight in worse and worse weather conditions or to change direction and to land at a reserve airport), and lack of trust, strange interpersonal relationship or emotional overstimulation. Some psychological or emotional demands, as for example a loss, may imbalance for long term or chronicise, while intellectual pressure shall prepare you for a quick mental activity. The stimuli may increase or decrease performances. The way the pilot faces a situation depends on his/her active awareness status. A part of the stimuli increase the status of active awareness (feeling of fear), others inhibit it (fatigue). A low level of awareness is related to profound sleep, tiresome, sleep deprivation, lack of motivation, a low body temperature. A high level of awareness is related to fear, panic, ad lack of trust. Both a

very low level of awareness and a very high level of awareness lead to weak performances. There is, between these two extremes, an optimum area where the active awareness status determines optimum performances for the fulfilment of duties. The measure of performance depends on the response speed to a given situation, on the intensity and accuracy of the response, on the optimum coordination of the response, on the quick modification of the response if the situation changes.

High temperature stress (hyperthermia).

In a high temperature environment, more than 35 degrees C, the body fights to keep its temperature to 37° C preventing hyperthermia. The breathing rate, blood pressure or pulse grows in such situation. In moist atmosphere, skin transpiration does not evaporate and the tendency is for the human body to overheat. In order to reduce such type of stress, it is enough to control the temperature of the work environment and the most important, to drink liquids, especially water, before any thirst sensation installs, this being already an indication of dehydration.

Low temperature stress (hypothermia).

In a cold environment, the body automatically sends more blood to the central areas than to the extremities. This is an attempt to keep internal temperature of approx. 37°C by reducing heat losses through the skin. The heat loss is made by: a) radiation in the open areas of the skin, especially around the head, scalp which has lots of surface blood veins; b) conduction, when wind passes onto the skin and takes over some of the heat exhaled by it (also known as cold wind factor); c) evaporation of sweat from the skin. In low temperatures, the fingers from hands and legs may be cold, the muscles may be stiff and weak, and the status of the body shall be tiresome and drowsiness, followed by tremble, this is the attempt of the body to generate more heat by muscles activity.

Stress generated by vibration. The vibrations transmitted to the body from the plane by the chair, the safety belt and the floor may determine a discomfort, which shall distract the pilot from the main duties and may lead to tiresome. A vibrating board panel makes it harder to read the apparatuses. Due to

strong vibrations the globe of the eye starts vibrating making it almost impossible to read boar apparatuses, maps or to survey the airspace. Even if the vibrations of the aircraft are impossible to reduce, the construction of the chairs may diminish body vibrations, in case they are well assembled and equipped with buffers.

Stress generated by turbulence.

Turbulence leads to irregular movements of the aircraft, varying from small trepidations, to very large movements which may damage the aircraft. Turbulences create discomfort both for the pilots, and for the passengers who are also object to unexpected G forces, which may lead to motion sickness. All this makes it harder to control the aircraft.

Stress generated by noise. Excessive noise in the cockpit, especially high frequency and loud, determines the appearance of stress and tiresome. Industrial limit for noise is 85dB and exceeding such limit recommends hearing protection. The noise in the cockpit is 75 – 80dB, and this is the background noise only. However, the noise of the communication radio station adds to it (more than 90dB), noise which leads to stress and irritation and hence to tiresome. Over the level of 80dB, hearing protection is used. Faulty receipt of messages is also stress; therefore, having high quality headphones shall reduce such risk.

Stress generated by discomfort. By the nature of their trade, pilots are forced to stay in small cockpits for long periods of time. The stress caused by being in a noisy aircraft, with high vibrations, and by the usual flight demands, as for example, turbulence, navigation, radio communications etc., may lead to accumulation of tiresome. The most indicated mean to fight against this type of stress is for the pilot to be fit, well rested before the flight, and properly positioned in his/ her chair.

Stress produced by sickness. Sickness may very easily lead to overload and predisposition to tiresome. The body shall use a part of its energy in order to fight against sickness and, therefore, a small amount of energy shall remain for the other duties. Human performances shall be lower than usual. If accompanied by headaches, infections



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of the upper respiratory tract, light wounds, stomach aches or coughing access, it is not advisable for the pilot to start the flight. Airsickness/ motion sickness may even induce disinterest to what happens. This phenomenon does not only limit to beginners and to passengers, but, seldom, it may also happen to experimented pilot. A pilot may be as well object of useless stress unless regularly or well fed, in this case, the result being low hypoglycemia.

The stress generated by eye fatigue. Eye fatigue may occur due to faulty sight and weak lighting. Faulty sight may be corrected by glasses or contact lenses. The solution for weak lighting is turning on the lights so that the needed comfort is created. During night, if the lights in the cockpits are too strong, eye fatigue may occur, in case the pilot looks out for searching for other aircrafts, or in order to notice weather evolution.

Stress occurred by intermittent lights. Intermittent light has the role to focus attention on other machines or aircrafts. The sight of intermittent lights shall make you more alert. If intermittent light does not adapt to sight, it becomes bothering and tedious. As well, when the plane is in the clouds, its own intermittent lights may become stressing.

Stress generated by focus. This type of stress may result from keeping high performance level for a long time (for example, piloting the aircraft during turbulences, IFR, or even horizontal flying VFR, log time in case of experimented pilot).

Stress occurred by the lack of sleep. The lack of refreshing sleep creates tiresome and the pilot must stay awake in order to face the flight demands. The pilot must fight to stay awake and this focusing effort leads to a high stress level, even strong tiresome. The solution is, of course, rest and refusal to perform the flight mission.

Stress from the place of work. Most of the pilots live the experience of fear related to the future flight, but this is not normal, as the awareness level is high, to the best understanding level which leads to good results. However, a stressed pilot, overloaded due to the problems during the flight, may be at an awareness level which leads to good performances, customary situation in case of student-pilots or beginners but also in case of the most experimented.

Psychological and emotional stress. It can be caused by personal problems. Therefore, domestic stress may be dangerous for the pilot. If the focusing power during maximum demands is affected by the problems at home (death in the family, divorce or financial problems), a responsible pilot shall stay at soil due to own initiative. This type of stress may lead to insomnia, chronic tiresome, emotional instability and dangerous flight operations.

Beyond the controversies and disputes existing in the problem of occupational stress, there are three essential concepts channeling researchers' preoccupations in the field: stressors, their effects on people and coping modalities to stress.

Stressors (stressing factors) represent any occupational-organizational condition which needs adaptive responses from the individual. There are various taxonomies which group stressors. The most often quoted stressors in the specialty literature are: ambiguity and role conflict, work overload, danger of accidents and rhythm of work, situational constraints imposed to the individual by the organization etc. Please find that stressors are not the same for all people, therefore, the same situation may be for some real stress source, while for others, just a challenge.

Effects represent those individual reactions to the action of a stressor, while the "tensions" created are aversive effects on the individual. The most frequent examples of effects are: –

psychological effects (depression, burnout, tiresome, fatigue, hostility, depersonalization, anxiety, frustration etc.); – physical health issues (various physical pains, ulcer, cardiovascular diseases, hormonal imbalances) – behavioral effects related to the organization and individual (absenteeism, work performance, staff fluctuation, occupational accidents, abuse of harmful, toxic substance, of tobacco, alcohol, drugs, marital issues, accidents, suicide etc.); The most serious consequence of uncorrected occupational stress is “burnout“ or the fatigue syndrome, nervous wear which appears as result of long term stress at the place of work and evolution of which is divided into three steps: ● physical fatigue – tiresome, frazzle, insomnia, lack of energy, weakness, chronic tiresome etc; ● mental fatigue – negative attitudes oriented either towards work, mates, partners, customers, collaborators, chiefs, job and even family; ● emotional fatigue – depression, helplessness, dispersion, disappearance of previous satisfactions etc.

3. CONCLUSIONS

Coping methods (management of occupational stress). Like in case of stressors, there is much taxonomy which groups various prophylaxis strategies and stress control both individually, and organizationally. Newmann & Beehr (1978) group the coping strategies of individual occupational stress into four categories: – psychological strategies (organizing own life, realistic evaluation of own person and own aspirations); – physical/physiological strategies (diet, physical exercise, sleep); – strategies to change own conduct / spare time management, using relaxing response, cultivating friendships for social support); – strategies to change the work environment (employment in a less demanding place of work or changing the occupation, changing the organization, in favour of another one, less demanding). There are lots of studies which show the effectiveness of individually oriented coping methods which lead to significant improvements, but unfortunately, short term,

in case of anxiety, depression, high blood pressure etc.

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