

## About the Effect of Stress Factors on Flight Safety Attitude<sup>14</sup>

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### Abstract

Stress has been a concept that is very difficult to define throughout history. The concept was first used in positive sciences and was later used in social sciences and psychology. It can be evaluated as the individual's efforts beyond physical and psychological limits due to incompatible conditions arising from the physical and social environment and the situation of adapting to the environment. The aviation industry is a means of transportation that is developing rapidly day by day. When the causes of accidents experienced by aircraft are examined, it is seen that they are largely caused by human factors. In this study, stress, stress factors, job stress and studies to determine which situations are sources of stress in pilots were investigated. When job stress in pilots is examined; the factors that create stress in pilots were investigated and the studies carried out for this purpose were researched. As a result of the review, they were grouped as psychological and environmental stress factors.

### Introduction

The origin of the word stress is Latin and it is also a term used in the English language. “Stress” is based on the words “Estrictia” in Latin and “Estrece” in old French. In the Websters dictionary, the word has various meanings as a noun and a verb. Stress was defined as adversity and affliction in the 17th century. In the 18th and 19th centuries, it was used in meanings such as power, pressure, force, towards objects, people, organs or spiritual structures. Accordingly, stress has begun to be used as a resistance to distortion and deformation of the object and person. The word also expresses

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the state of “preserving its integrity” and “making an effort to return to its original state”. (BALTAŞ & BALTAŞ, 2018, p. 374)

“Stress” first appeared in physics and was later adopted by psychologists and life scientists. As in physics, it is found in terms of pressures, tensions or forces. The term stress used in psychology basically means that people, like other physical objects and bodies, resist external forces acting on them. (BAMBA, 2016, p. 190)

The individual begins to get physically and psychologically tired when it becomes difficult to adapt to the physical conditions caused by the external environment and the psychological conditions individual is in. The effort exerted by an individual beyond physical and psychological limits due to incompatible conditions arising from the physical and social environment is called stress. (CÜCELOĞLU, 2006, p. 321) Stress is the physiological and psychological responses to profound or sudden changes causing a blur or disruption in the course of one’s life. (PAYNE, HANH, & LUCAS, 2012, p. 24) Ivancevich and Matteson define stress as the individual’s interaction with the environment. (LUTHANS, LUTHANS, & LUTHANS, 2021, p. 248). Also, Edward Gross (1970) defined stress as the failure of routine methods to manage threats. (GROSS, 1970, p. 55)

Gümüştekin and Özdemir (2004) defined stress as the force that causes behavioral and physical changes in the individual, due to physical or psychological effects originating from the individual’s environment or her/himself, and affects the organism, first psychologically and then physically. (GÜMÜŞTEKİN & ÖZTEMİZ, 2004, p. 64)

Hinkle (1977) defines the word stress; It is used to express the condition in a living creature resulting from the organism’s interaction with harmful stimuli or conditions. In other words, it is a dynamic situation within the organism; It is not a stimulus, assault, load, symbol, burden or any element of the environment; whether internal, external, social or otherwise. (LAZARUS & FOLKMAN, 1984, p. 3)

Yücel Ertekin defined stress as the price a living thing pays to adapt to its environment. According to Becker, stress is the price that the organism must pay to adapt to internal and external factors. Although stress is caused by psychological factors, it is possible to observe the physical consequences of this phenomenon over a period of time. In Yates’ research, stress is the unclear reaction of the person’s body to pressures and demands. (ERTEKİN, 1993, p. 6)

According to Robbins (1997), stress is a dynamic response of the individual to stimuli as a result of his individual wishes and desires, in the face of an opportunity that may be positive for him or herself, or in the face of a pressure that will make him feel in danger. (TÜRKSEVEN & EĞE, 2021, p. 17)

Hans Selye considered stress as the the body's non-specific response to any given demand. (SELYE, 1976, p. 137) He sees the stress reaction as a three-stage process within the body that enables it to survive and adapt to change. The first stage of any stress reaction is alarm. During this period, the autonomic nervous system is active. It pumps plenty of adrenaline into the blood. Under the influence of these secretions, the body becomes alert and prepares to deal with emergency situations. (CÜCELOĞLU, 2006, p. 321)

If the environment or stimulus that causes stress continues, the second period, the resistance period, begins. During this period, the body makes a kind of adaptation to the stressful environment and withdraws biochemical substances from the blood. It gives the impression that the organism is under normal conditions, but in fact the organism is tired and losing its resistance.

The third period is the period of exhaustion. During this period, the body loses its resistance to the pressure of stress. Some symptoms during the alarm period occur again. Diseases occur and even deaths may occur. (CÜCELOĞLU, 2006, p. 321)

According to the Luthans (2021), defined stress is as an adaptive response to an external situation that results in physical, psychological, and/or behavioral deviations for organizational participants. Stress is usually thought of in negative terms. It is thought to be caused by something bad (for example, a student failing an exam, a loved one is seriously ill, or the boss gives a formal reprimand for poor performance). This is a form of distress. But there is also a positive, pleasant side of stress caused by good things (for example, an attractive, respected acquaintance asks for a date, an employee is offered a job promotion at another location). This is a form of eustress. (LUTHANS, LUTHANS, & LUTHANS, 2021, pp. 247-248)

Stress is all the factors that can disrupt the balance of the organism. These factors, called stressors in scientific language, may be physical (trauma, heat, cold, etc.), psychological (emotional tensions, internal and external conflicts, spouse problems, etc.), or social (environmental factors, cultural change, etc.). (BALTAŞ & BALTAŞ, 2018, p. 373)

Stress does not always harm the individual. It has been observed that a certain level of stress is beneficial. It provides energy to the individual and increases his attention and performance. Stress that can be controlled and managed helps increase the individual's potential. An example is that a certain level of stress before the exam increases success. (KURŞUN, 2014, p. 6)

### **Stress Factors**

Stress sources that cause stress, create pressure and strain on individuals. According to Kreitner and Kinicki (1989), stressors were examined in four groups.

-Stressors at the individual level; It is directly linked to the individual's duties and responsibilities.

-Group and organizational level stressors; It includes factors such as group cohesion, intergroup conflict, organizational climate and organizational design.

-Finally, external stressors; It occurs through external factors such as family and quality of life. (GÜMÜŞTEKİN & ÖZTEMİZ, 2004, p. 64)

According to Albrecht (1988), factors that create stress in working life are in the individual's environment, and stress is in the individual himself. It is possible to categorize the factors that cause stress into three groups: physical, social and emotional.

Physical stress sources; These are sources that originate from the individual's environment and cause physical stress and make the person anxious about the consequences.

Social sources of stress; It is about the relationships between individuals in working life. Here, it is not a physical element that causes stress, but another person.

Emotional stress sources are the way employees perceive their relationships with their environment and cause feelings of frustration, anxiety, anger or similar stress in the individual. (GÜNEY, 2007, p. 598)

Sabuncuoğlu and Tüz; named the factors that cause stress as stressors. He examined stressors by grouping them as individual factors, physical environmental conditions and organizational factors. (ATMACA, 2020, p. 9)

Erol EREN categorized the factors that create stress into three main groups.

- The stress sources related to the individual himself,
- The stress sources created by the individual's work environment
- The stress sources created by the general environment in which the individual lives. (TOMRUK, 2014, p. 6)

### **Individual Stress Factors**

McMichael (1978) described and assumed that “stress is in the eye of the beholder,” meaning that the same characteristics can be perceived quite differently by different individuals. (HOUSE, 1980, p. 127) In general, unexpected changes and uncertainties in human life cause different levels of stress in individuals. (FİDAN, 2016, p. 21)

### **Biological Causes**

A certain increase in an individual's stress level positively affects his performance and health. However, the increase in stress level reaches its peak after a certain point. After this point, the positive effects turn into negative situations, harming the health and performance of the individual and negatively affecting the quality of life. Regardless of the cause of stress, the human brain detects the situation and immediately activates the organism. The brain applies the fight or flight sanction in the face of the danger it perceives. Fulfillment of this sanction may vary for each individual. Systemic diseases, structural and functional disorders of endocrine organs, and genetic diseases, if any, affect the individual's level of physical stress. (KURŞUN, 2014, p. 11)

### **Personality Structure (The Role of Dispositions)**

Through the years there has not been universal agreement on the exact meaning of personality. Much of the controversy can be attributed to the fact that people in general and those in the behavioral sciences define “personality” from different perspectives. (LUTHANS, LUTHANS, & LUTHANS, 2021, p. 102) The most important individual source of stress that causes stress is the personality type of the individual. People generally react differently to the same causes of stress. It can be said that there are as many stress reactions as there are people. (YATES, 1989, p. 39) Freidman and Rosenman revealed that personality types have an impact on the stress experienced by an individual. It has been revealed that these personality structures are affected by stress in different ways. (FİDAN, 2016, p. 21)

Human personality is grouped into three groups, type A, type B, and type C and it can be determined which personality traits are more prone to

stress and its negative effects. (GÜMÜŞTEKİN & ÖZTEMİZ, 2005, p. 277) Friedman and Rosenman (1971) have been described Type A behavior as a hard-working, aggressive, time urgent behavior and have also been shown to be a risk factor for heart disease. (HOUSE, 1980, p. 17)

People with type A behavior are people who have intense impulses, are aggressive, passionate, competitive, feel the pressure of many tasks that need to be done, and are racing against time. (BALTAŞ & BALTAŞ, 2018, p. 374) There are three main characteristics that determine people with type A behavior.

- Striving for success in competition,
- Exaggerated lack of time,
- Aggression and hostility.

All these features integrate and reveal themselves as a bundle of behavior and emotion. Opposite to this type of behavior is type B behavior. The three main features of this form of behavior are:

- Relaxed,
- Calm and
- Does not feel time pressure.

No person in the world has all the characteristics of Type A behavior. What distinguishes both types of behavior are the number and severity of type A behavior style features.

Another important point that should be noted here is to distinguish between behavior patterns, not people. In short, there is no type A or type B person. There are people who exhibit type A or type B behavior. (BALTAŞ & BALTAŞ, 2018, p. 162)

Table 1.1 briefly summarizes the Type A and Type B profiles. Obviously Type A employees (managers, salespersons, staff specialists, secretaries etc.) experience considerable stress. (LUTHANS, LUTHANS, & LUTHANS, 2021, p. 254)

*Table 1.1 Profiles of Type A and Type B Personality (LUTHANS, LUTHANS, & LUTHANS, 2021, p. 255)*

Table 1.1 Profiles of Type A and Type B Personalit	
Type A Profile	Type B Profile
<ul style="list-style-type: none"> <li>• Is always moving</li> <li>• Walks rapidly</li> <li>• Eats rapidly</li> <li>• Talks rapidly</li> <li>• Is impatient</li> <li>• Does two things at once</li> <li>• Can't cope with leisure time</li> <li>• Is obsessed with numbers</li> <li>• Measures success by quantity</li> <li>• Is aggressive</li> <li>• Is competitive</li> <li>• Constantly feels under time pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Is not concerned about time</li> <li>• Is patient</li> <li>• Doesn't brag</li> <li>• Plays for fun, not to win</li> <li>• Relaxes without guilt</li> <li>• Has no pressing deadlines</li> <li>• Is mild-mannered</li> <li>• Is never in hurry</li> </ul>

Temoshok and Heller (1981) conceptualized type C behavior pattern along the trait variables of those who express their emotions versus those who suppress their emotions. It is reported that Type C individuals are;

- Helpful,
- Non-assertive,
- Suppress negative emotions and especially anger,
- Docile towards authority. (PAŞA, 2007)

### **Individual Stress Factors Resulting From Demographic Factors**

Individuals experience changes in physical activity and mental structure as a result of aging. These changes manifest as inattention in perception and a slowdown in thinking speed and are reflected in learning ability and movements. Individuals are more affected by stressors at different ages depending on their varying physical and mental states. (KURŞUN, 2014, p. 15)

Gender-based stress factor manifests itself when women work in male-dominated environments. For example; Conflict of family and workplace responsibilities, which are common among female employees, gender discrimination in the workplace and, accordingly, physical and psychological violence as well as sexual harassment incidents are observed.

Individuals may feel stressed because of some health problems experienced by the individual. As a result of this situation, individuals may experience performance impairments. (AKALIN, 2019, p. 9) As a result of some studies shows that, it has been understood that as the education level of a person increases, he can cope with some stressors more easily. (BÜYÜKFIRAT, 2009)

### **Environmental Stress Factors**

Different environments impose different adaptations. For example, people living in a hot and humid climate obviously put more effort into preventing food from spoiling than people living in colder climates. Throughout history, humanity responds to the demands imposed by the environment. When there are discussions about this, some views have emerged on how human characteristics, actions and changes are shaped by the demands and constraints imposed by the physical environment. According to this idea, a system that does not help people adapt to their natural lives is inevitable. For example, Mechanic (1974) said, People's ability to start with the environment depends on the efficiency of his culture and the effectiveness of the solutions. The characteristics developed to cope with the environment depend on the competence of the assembly involved. (LAZARUS & FOLKMAN, 1984, p. 227)

Under the influence of environmental factors, employees experience tension and stress. The results of the evaluations show that work stress is not limited to the events experienced in the business. It is clear that the social and technological changes that employees face in their daily lives, general problems of the city they live in, economic conditions, political developments and natural disasters are sources of stress. (EKİNCİ & EKİNCİ, 2003, p. 111)

Problems arising from employees' daily lives often affect their business lives and shape the reflection of their work-oriented skills and characteristics on success. For this reason, stress sources related to life outside the organization affect organizational stress sources, in some cases relatively reduce the effect of organizational stress on employees, and often increase organizational stress exponentially in businesses. (EKİNCİ & EKİNCİ, 2003, p. 111)

Physical stress stimuli related to the work environment; Negative physical conditions such as crowding and noise, occupations with high risk of physical danger, extreme heat or cold and air pollution are factors that cause stress in the work environment. (COŞGUN, 2006, p. 7)



Physical environmental factors can be evaluated under four headings: noise, lighting, heating and ventilation.

### **Noise**

Noise is one of the most important physical stressors affecting employees in the work environment. (PAŞA, 2007) Noise has three effects on humans.

-The first of these, it can cause hearing loss in individuals.

-Secondly, noise acts as a masking factor that prevents employees from perceiving their own and others' voices.

-Third, excessive noise creates stress, having negative effects on productivity and sense of well-being. (PEHLİVAN, 2000)

### **Lighting**

One of the first problems that arise in the working environment is the lighting problem that will enable the work to be done in the best conditions. It is thought that 80% of the information required to do a job is gained by seeing. While darkness is a great enemy for people, light is an important security element and one of the physical conditions necessary for people to work. An insufficient amount of light narrows the visual field and does not allow objects to be seen and perceived clearly. (PAŞA, 2007, s. 56)

### **Heating and Ventilation**

Fatigue can be a hard thing to define. The dictionary (Merriam- Webster Ninth New Collegiate Dictionary 1985) defines fatigue as “weariness or exhaustion from labor, exertion, or stress.” (MARTINUSSEN & HUNTER, 2018, p. 57) Working in an extremely hot environment causes general fatigue and reduces overall performance. Working in an extremely cold environment especially affects manual work and reduces the motor movement ability of the hands. (PEHLİVAN, 2000)

Since a suitable working environment will positively affect job satisfaction by keeping the morale level of the employee high, heating, lighting, ventilation, etc. Physical conditions must be well adjusted and in line with the wishes and desires of the employees. Most of the time, it is observed that employees' negative behavior towards their jobs, their anxiety and disappointment, and their psychological problems arise when they complain about these conditions in their work environment. (TÜRK, 2007, p. 78)

## Organizational Stress Factors

Employees inevitably encounter stress while performing their duties according to their roles in business life. In business life, this stress is called “job stress” or “organizational stress”. Hellriegel, John and Richard (1992) identify organizational stress sources, workload, work conditions, role conflict and role ambiguity, career development, interpersonal relations in the organization, and conflict between work and other roles. (TÜRKSEVEN & EĞE, 2021, p. 17)

Organizational stress: It can be defined as the physical, mental and psychological reaction of employees when performance above their abilities is expected from them at work. (SEZER, et al., 2024, p. 2772)

Luthans examined organizational stress sources under four headings and classified them as

- Administrative policies and strategies
- Organizational structure and design
- Organizational processes and
- Working conditions (LUTHANS, LUTHANS, & LUTHANS, 2021, p. 253)



*FIGURE 1.1 Macrolevel Organizational Stressors (LUTHANS, LUTHANS, & LUTHANS, 2021, p. 253)*

### **Administrative policies and strategies**

Some of the factors related to administrative policies and strategies created stress in organizational life are: “Downsizing, Competitive pressure, Merit pay plan, Bureaucratic plan, and advanced technology”.

### **Organizational structure and design**

The factors related to organizational structure and design created threat resulting stress are: “Centralization and formalization, Line staff conflicts, Specialization, Role ambiguity and conflict, No opportunity for promotion, Restrictive & untrusting culture”.

### **Organizational processes**

The factors creating stress related to organizational processes are: “Tight control, only downward communication, little performance feedback, Centralized decision making, Lack of participation in decisions, and Punitive appraisal systems”.

### **Working conditions**

As revealed from the literature the factors related to working conditions creating stress are: “Crowded work area, noise, heat, or cold, polluted air, strong odor, unsafe & dangerous conditions, poor lighting, physical or mental strain, Toxic chemicals or radiations”. (LUTHANS, LUTHANS, & LUTHANS, 2021, p. 253)

### **Job Stress**

National Institute for Occupational Safety and Health (NIOSH) which is connected to U.S. Department of Health and Human Services, defined job stress as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. (NIOSH, 1999, p. 6) Job Stress results from two things. Firstly, pressures of the work exceed the worker’s ability. Secondly worker’s knowledge and abilities are not sufficiently utilised. (LEKA, GRIFFITHS, & COX, 2003, p. 4)

Sources of stress in a work environment for individuals can cause effects; such as boredom, apathy, high accident rate, complaints, absenteeism, constant fatigue, insomnia, change in appetite, increase in tobacco, alcohol and drug use, mistakes and indecisiveness. (GÜMÜŞTEKİN & ÖZTEMİZ, 2004, p. 65)

United Nations' International Labor Organization has been defined occupational stress as a global epidemic. Stress often is related directly to the work situation, such as dealing with dangerous heavy equipment or working in an uncomfortable environment. In contrast, office workers are more likely to experience stress related to inter-personal relationships on the job. "People pressures" such as unclear supervision, tension among team members and fear or aversion of conflict can cause stress. (MAXON, 1999, p. 1) NIOSH agreed that stressful working conditions have a primary role in causing job stress. This stressful working conditions which is also known as job stressors include:

- The tasks design, such as heavy work load, long working hours, shift works, etc.

- Management style for example lack of workers' participation in decision making, poor communication, or lack of family-friendly policies

- Interpersonal relationships such as poor social environment

- Work roles such as conflicting or uncertain job expectations

- Career concerns such as job insecurity and lack of opportunity for growth, advancement, or promotion

- Environmental conditions, such as unpleasant or dangerous physical conditions such as crowding, noise, air pollution, or ergonomic problems. (NIOSH, 1999, p. 9)

Gross (1970) defined three main types of job stress,

- Firstly, connected with the propagation of a career,

- Secondly, involving performance or task-induced stress, and

- Thirdly, connected with organizational structures that affect interpersonal relations. (LAZARUS & FOLKMAN, 1984, p. 239)

The stresses reflected in business life and their consequences directly or indirectly concern everyone in the world. Business life has an importance that extends to every aspect of life. The job determines people's social status, the satisfaction he/she gets from life, the opportunities he/she provides for his family and the pleasure he gets from life. Work conditions that cause problems known as stress create pressure and strain on employees. If this strain lasts for a long time, it can lead to serious health consequences. (BALTAŞ & BALTAŞ, 2018, pp. 70-71)

## Job Stress in Pilots

Flying a high-technology aircraft is not only an issue of skilled psychomotor performance but also of real-time decision-making involving situation awareness, choice amongst alternatives and assessment of risk within a limited-time frame (Wen, 2011, p. 159) Gümüştekin and Özdemir (2004) while describing occupational stress that may occur in pilots mentioned that, in addition to general stress sources, there are some stress factors arising from the characteristics of the profession. They defined these stress factors as aviation-related stress factors. Gümüştekin and Özdemir evaluated aviation-related stress factors under two headings and defined them as psychosocial and environmental stresses. (GÜMÜŞTEKİN & ÖZTEMİZ, 2004, p. 62)

## Psychosocial Stress Factors in Pilots

Based on the definition that psychosocial factors are factors in the social environment that affect human performance, the factors in the social environment that affect the performance of pilots are called psychosocial factors. (HELMREICH, 1987, p. 18) Psychosocial stress factors that create stress in pilots. These stress factors can be defined such as:

- Work stress,
- Illness,
- Family connections,
- Aircraft accidents and accident rate, and finally
- Work and rest schedules. (GÜMÜŞTEKİN & ÖZTEMİZ, 2004, p. 63)

## Work Stress

Pilots who cannot trust their own abilities to perform responsible tasks or have difficulty establishing relationships with the flight crew and avoid teamwork are exposed to stress. Pilots must perform a wide variety of tasks in addition to taking the aircraft from one point to another. As a result, pilots must learn to make decisions and develop judgment regarding mission performance in addition to making decisions about flying the aircraft. (Wen, 2011, p. 159)

## Illness

The FAA defines fatigue as “... a condition characterized by increased discomfort with lessened capacity for work, reduced efficiency of accomplishment, loss of power or capacity to respond to stimulation,

and is usually accompanied by a feeling of weariness and tiredness” (MARTINUSSEN & HUNTER, 2018, p. 57) Although pilots are subject to strict health checks, gradual deterioration in their health over time (increase in cholesterol, eye defects, hearing loss, etc.) causes stress. In addition to these health problems, stress-related fatigue is a common cause of many diseases. (GÜMÜŞTEKİN & ÖZTEMİZ, 2004, p. 63) A particularly insidious fatigue risk takes the form of short sleep attacks, also known as micro-sleeps. According to a 2001 study of in-flight brain activity, pilot micro-sleeps occurred most frequently during the middle-to-late segments of cruise flight. The micro-events were also found to occur during the period from top-of-descent to landing (CARON, 2020, p. 14)

### **Family Connections**

For flight crews, family is a source of motivation. At the same time, being away from their families due to intense flight tempo and duties can become a source of stress for pilots. This situation negatively affects the performance of pilots. Shift work is problematic and has significant consequences for one’s private life. There are issues with meeting family commitments and participating in social activities. Having a day off on a weekday is not the same as having a day off on the weekend. Family commitments may also make it more difficult to sleep during the day to recuperate after a night shift or having been awake for a long period of time. Mood volatility after night shifts undeniably places additional demands on the individual and the family (MARTINUSSEN & HUNTER, 2018, p. 230)

### **Aircraft Accidents and Accident Rate in Aviation**

High accident rates create additional stresses on flight crews. Especially, if technical reasons are at a high rate in aircraft accidents, pilots may feel distrustful of the aircraft. This feeling of insecurity will also cause stress for pilots.

### **Work and Rest Schedules**

Working according to a time schedule that the human body is not accustomed to causes stress in pilots. Especially after long night flights, the pilot’s rest may not be provided during periods when it is daylight and social life continues. This causes measurable decreases in reaction time and learning and decision-making ability.

## Environmental Stresses

Environmental influences may together with an individual vulnerability cause mental health problems. (MARTINUSSEN & HUNTER, 2018, p. 219) Some environmental factors that create stress in pilots. These stress factors can be defined such as:

- Altitude or flight level
- Speed
- Heat
- Aircraft design
- Characteristics of aircraft
- Bad weather, instrument flight conditions and night flying

## Altitude or Flight Level

Physiologically, the most important concern of a pilot is hypoxia. At the surface of the Earth, the atmosphere contains about 78% nitrogen and 21% oxygen. These ratios remain fairly constant up to about 100 km. However, the pressure decreases steadily with an increase in altitude. As the partial pressure of oxygen decreases, your body has increasing difficulty in absorbing sufficient oxygen to maintain body functions. (MARTINUSSEN & HUNTER, 2018, p. 51) Stress caused by altitude can be seen at altitudes where atmospheric changes are greatest. Lack of oxygen in extremely high-altitude flights and uneven terrain (especially mountainous regions) in low flights are sources of stress. (GÜMÜŞTEKİN & ÖZTEMİZ, 2004, p. 63) As the altitude increases, the amount of oxygen in the air decreases, abnormally long and deep breathing, ear/sinus congestion while experiencing sudden and deep altitude loss, and loss of consciousness due to G force may occur. (GÜLER, 2014, p. 8)

## Speed

The flight speed is greater than the speeds we encounter in our normal lives. This speed creates stress on pilots as it requires always being ready, sudden reaction and maximum reflexes. (GÜMÜŞTEKİN & ÖZTEMİZ, 2004, p. 63)

## Heat

Both hot and cold ambient temperatures impact performance on a wide range of cognitive tasks. (MARTINUSSEN & HUNTER, 2018,

p. 64) Another factor that causes stress in pilots is excessively hot or cold weather conditions. This situation causes stress on the pilot in the cockpit. To reduce heat-related stress, flight crew members need to adapt to the heat, use appropriate clothing and equipment, and maintain fluid balance. (GÜMÜŞTEKİN & ÖZTEMİZ, 2004, p. 63)

### **Aircraft Design**

Aircraft design, which is one of the environmental stress factors, causes stress in pilots. When factors such as lighting, cockpit design, placement of instruments, accessibility of switches, comfort and ergonomics of seats, heating and ventilation systems, cleanliness of the cockpit, visibility and sound level are inappropriate or disturbing, pilots encounter certain stresses and their attention to the flight may be distracted. The location of the switches and controls, the ability to recognize the switches and controls by sight or touch, and whether the design is outside or in from the eye-reference point are important aircraft designs. (GÜLER, 2014, p. 9)

### **Characteristics of Aircraft**

Flight characteristics of aircraft are stressful factors. Airplanes are structurally stationary vehicles, but their landings and takeoffs must be made to airports at high speed. On the other hand, helicopters require more pilot attention as prepared runways are not required. Technical competence is a cornerstone of effective pilot performance. It has obvious links among ability, training, and technical performance. (HELMREICH, 1987, p. 16)

### **Bad Weather, Instrument Flight Conditions and Night Flying**

Helicopter pilots generally fly according to visual flight conditions. In these flight conditions, especially helicopter pilots need to be more careful, constantly monitor and observe the flight instruments. Lack of ground visibility, the occurrence of icing conditions, and the occurrence of errors and malfunctions in navigation devices are stressful factors. (GÜMÜŞTEKİN & ÖZTEMİZ, 2004, p. 63) Mood volatility after night shifts undeniably places additional demands on the individual and the family. (MARTINUSSEN & HUNTER, 2018, p. 230)

### **Conclusion**

In conclusion, the intricate relationship between stress factors and flight security is undeniable, as both elements significantly impact the safety and well-being of passengers and crew alike. Stressors can manifest in various forms, ranging from external threats such as terrorism or natural disasters



to internal pressures like operational demands and interpersonal conflicts within aviation personnel.

Research suggests that heightened stress levels among aviation professionals can impair decision-making, compromise situational awareness, and increase the likelihood of errors that could jeopardize flight safety. Moreover, stress can contribute to fatigue, which further diminishes cognitive functioning and operational performance.

While stringent security measures are essential for mitigating external threats, addressing internal stressors within the aviation industry is equally crucial. Implementing comprehensive training programs, fostering a supportive organizational culture, and promoting open communication channels can help alleviate stress among aviation professionals, thereby enhancing their ability to effectively manage security challenges.

Furthermore, the integration of innovative technologies, such as artificial intelligence and automation, holds promise for reducing the cognitive burden on flight crews and enhancing overall operational efficiency, consequently enhancing flight security.

Ultimately, a holistic approach that addresses both external threats and internal stressors is imperative for ensuring robust flight security. By prioritizing the well-being of aviation professionals and implementing proactive measures to manage stress factors, the aviation industry can uphold its commitment to passenger safety and operational excellence in an ever-evolving security landscape.

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