

Aviation Psychology: Study of the Human Mind Takes Flight

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Abstract: Aviation Psychology is an emerging field under the domain of psychology. Although history shows its need after World War II it only focused in the recruitment of military aviators. Later reports suggested that about 70% of the airline mishaps occurred not because of any technical failure but due to human error. Thus the need to study the behaviour of aviation employees namely pilots, flight attendants, air traffic controllers, ground employees, maintenance personnel etc. and increase performance and safety among them was realised and aviation psychology gained its momentum. Aviation psychology is multidisciplinary in nature. Industrial psychology, Clinical psychology, Cognitive ergonomics, Engineering, Neuropsychology contribute to the study of aviation psychology. This paper presents an introduction to this emerging field and describes its history, scope and current status.

Keywords: aviation psychology, pilots, flight attendants, air traffic controllers, history, scope.

INTRODUCTION

Year after year, history has witnessed great amount of accidents in the aviation industry. Due to lack of research, it has been hard to account for the number of accidents that took place. From the year 1959 till 2015, close to 1900 flight accidents have been recorded.

The causes for these accidents initially pointed to technical as well as environmental factors. However, it was soon recognized that human error also played a major role in aviation accidents [1]. In the light of these accidents, the field of aviation psychology came up with the aim to ensure a safer and smoother functioning of the industry. The field focuses on the human behaviour and actions involved in aviation with respect to promoting and identifying those behaviours that reduce errors. The field focuses on the overall health of the personnel involved in the smooth functioning of the aviation industry. The field has its major focus on all members involved in the functioning of the aviation industry such as pilots, crew members and air traffic controllers, ground staff, cargo staff, flight technicians etc. Apart from aiming for reduced human error in flights, the field also focuses on the training and recruitment of pilots and crew members, their general safety, mental and physical health, accident and incident investigation, cockpit design, improving working conditions in the flight, and smooth running of the industry [2]. If the aviation personnel are found to be unwell and unequipped to fly, the field also offers clinical and psychological interventions to remedy the same. The major focus of the field is to improve team work, decision making, communication and interpersonal relationship among the crew members, pilots and the air traffic controller [3]. It also studies the

other physical factors such as the flight environment, resources, software involved etc. for the smooth functioning of flights.

Multiple gates of opportunities have been opened for the field in the recent past. Started with the military setting, the field has spread its roots even in the commercial airlines. The field also influences the aerospace medicine, laboratories and companies as well. Certain governmental agencies also consult the field to serve the people. There have been ample amounts of research done on the field and for the betterment of it. However, it still doesn't seem enough, making research and academia another field that aviation psychology taps on.

The field is in the developing phase in India. It has just made baby steps towards full blown growth of the field. Certain associations that encourage the field are European Association for Aviation Psychology (EAAP), Australian Aviation psychology (AAP), Federal Aviation Industry (FAA) etc. India promotes the field through Indian Society of Aerospace Medicine, started in the year 1942. A pictorial description been provided in Figure 1. The timeline traces the development of the field through various air crashes that occurred during the years and led to major changes in procedure and practices of the industry.

Due to the unfortunate crashes mentioned in figure 1, several psychological factors that could affect the safety in the skies came in to the fore. The issue of faulty communication between the ATC and the pilots was believed to be responsible for the mid-air collision between the TWA flight 2 and United Airlines Flight 718 in 1956 [4]. However, the issue of external communications from the air to the ground cannot be considered as the only psychological factor affecting air crashes. The internal communications and procedures followed inside the air craft also have a major role to play. The Tenerife airport disaster was the one of many incidents which highlighted this. Due to miscommunication within the cockpit, the crew of KLM flight 4805 falsely assumed that they had been given clearance to take off from the ATC and as a result collided with Pan Am Flight 1736 on the runway. This incident brought to light the need of crew resource management and standardised cockpit procedures [5]. Thirdly, and most importantly the psychological factors including the cognitive abilities, the state of mind of the pilot and the maintenance of the aircraft by the ground crew also came into picture. These factors contribute to a cascading chain of events which finally result in disaster. If any of these factors can be rectified, a disaster can be prevented [6]. Investigations of multiple

air disasters have shown that a pilot error coupled with improper maintenance are a fatal combination. For example, the lack of situational awareness on the part of the pilot-not knowing that his flaps were at the wrong angle which led to a higher rate of burning of fuel-combined with a maintenance error with the landing gear lead to the crash of United Airlines Flight 173 [7]. A similar scenario was observed in the Keg worth air disaster where a fracture to the engine fan blade caused an engine to fail but a grave error on the part of the pilots to mistakenly shut down the good engine caused the plane to crash [8]. The pilot error to not follow the ATC instructions led to the mid-air collision between the Kazakhstan Airlines Flight 1907 and Saudi Arabian Airlines Flight 763 [9]. How cognitive factors can contribute to air crashed was highlighted in the crash of Crossair Flight 498 wherein the pilot got spatially disoriented due to the ingestion of a sedative [10]. Such incidents through the course of history show that flying an aircraft is more than just physics and technology. It involves the serious application of human skill, knowledge and abilities which can only function optimally if the aviators are in the right psychological condition. Therefore, in this context the field of aviation psychology gains great relevance in making the skies safer.



Fig-1: Timeline of Significant Air crashes in History

Apart from improving the safety of air travel, aviation psychology is also highly relevant in the research of human factors that affect a flying situation. Such research has identified several models which help us conceptualize reasons for air accidents in a systematic and standardized manner and at the same time help us in developing protocol and procedures to prevent similar occurrences in the future. The field has also been recognised as highly relevant by organisations such as NASA, ISRO, Institute of Aerospace Medicine, EAAP, FAA, etc. which are encouraging more research in the field.

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