Application of Flight Physiology/Human Factors Principles to Safe Flight

Human factors are concerned with the working and living situations of the people, their interactions with the machines, with the procedures, and with their environment around them and with that of the other people. The factors are flexible, adaptable and the most significant portion of the aviation system and it is still the most vulnerable part to influences that can greatly influence the aviation system performance (Carnegie, 2008). Human factors play a key role in determining the safety of flights. An error in the human decision will translate into an accident and thus the flight safety will be compromised.

One such human factor is the aeronautical decision making (ADM). It is a systematic approach concerned with the mental processes that is utilized by the airplane pilots to determine the course of action that is best in response to a particular set of circumstances. Accidents that are related to the human factors motivated the airline industry to develop the crew resource management (CRM) training for the flight crews. The training aims at making sure all the available resources are utilized effectively; the resources include hardware, information, and human resources. The pilot develops the ADM skills through the understanding of the decision making process (Federal Aviation Administration, 2007).

Controversies/Ramifications in ADM

Despite the efforts to make sure procedures and design systems support safe and correct flight operations, human judgment errors still occur and they are a major contribution to accidents. There are three issues that arise concerning ADM; the nature of the decision errors in aviation (naturalistic decision making), factors that contribute to the decision errors, and the type of technologies that they may alleviate these errors.

The person making the decision usually acts in response to what he knows about the situation and the origin of error is in the decision made by the decision maker. A problem arises

in determining the decision errors due to the fact that there is no clear scale for measuring correctness and there is a loose connection between the decision process and the event outcome. A poor decision may arise due to the redundancy in the aviation system. There are cases where the pilot may underestimate the risk and lead to accidents. A good example is the investigation done on the causes of the mild air collision accidents (MAC); the investigation was unique because the accidents mostly involved experienced pilots. Schuch was able to conclude that the experienced pilots made repeated flights that lacked an accident or an incident. Thus, they became accustomed with the area and stopped scanning the sky (Martin and Orasanu, 1998).

The flight safety can be improved through a number of ways. The human errors still account for these accidents and automation of the aviation systems can become very useful. Automation will assist the pilot in making the right decisions about a certain situation. The probability of the pilot making the bad choice will be greatly reduced. The training of the aviators should be thorough and they should be more of a practical approach rather than the theoretical part of it.

Perhaps one of the major flight disasters caused by the failure of the flight crew in history is the Tenerife Disaster that involved the Canary Islands bound flights 4805 from Amsterdam and 1736 from Los Angeles and New York. Following the closure of the Las Palmas airport after an explosion, both flights were diverted to the nearby Los Rodeos located in Tenerife where landings happened at 1.38 pm (4805) and 2.30 pm (1736). The emergency airport was a small taxi space that could have allowed only one plane departure at a time. Communication hitches brought a confusion that led to translation of facts that the pilot in the first plane (flight 4805) had taken off, “we are now at takeoff,” (Weick, 2000). The second plane was directed to the runway without confirmation of the ambiguous statement from the first pilot. Since the actual location of the first plane was uncertain, the second plane followed resulting in a hazardous

collision. All 234 passengers as well as 14 crew members onboard 4805 perished at the collision while 319 passengers as well as 16 crew members of 1736 perished.

Lack of proper communication as later investigated by the Spanish Ministry of Transport and Communication was the main mishap that resulted in the loss of over 50 lives. Human error of this nature could have been averted were there clear guidelines for the pilots' communication with the control tower. As observed by several theorists with regard to the actual conditions that could affect pilots thereby occasioning misunderstanding of basic communication, a thorough stress analysis of the environmental factors in an area should be used. Besides, very simplified and standardized communication lines should be applied at all times of handling flights (Holroyd and Lazarus, 1982). With respect to uncertainty in actual interpretation of the communicating parties at the control tower and in the plane, ambiguity should be eliminated to facilitate a smooth and effective control.

Language barriers in that context are a paramount element that determines the level of communication success between the communicating parties. I suggest that the slightest language barrier including accent should be considered, bearing in mind that there was some level of probability for English and Spanish infusion in the parties languages conversance. Standard phrases such as "line up and wait" were adopted by the International Civil Aviation Organization (ICAO) and many other flight authorities across the continents, having seen the magnitude of risks involved in faulty communication. The Federal Aviation Administration (FAA) on the other hand had been using the phrase "position and hold" for the same meaning of application until in 2010. Such intricacies illustrate the loopholes in harmonization of language to eliminate the barriers. Understanding the stressor factors that particular regions of the world have to the extent that they could hamper smooth flight operation needs to be put in place.

In the above illustration of a major mishap, there is need for human factors to be

reconciled with basic safety standards and controls. In the event of a major emergency such as the one experienced at the Tenerife episode, clearly laid procedures of unraveling the various human factors affecting accuracy and efficiency should be put in place. With the advent of information, communication and technology, continued research should assist in eliminating the simple yet hazardous human failures.

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