

Case Report

Somato/ocologyral illusion in helicopter flying Lt Col KK Tripathi 1 Gp Capt JK Gupta + Air Cmde Ranjit Kumar

ABSTRACT

A Chetak helicopter, piloted by a 28 years old trainee aviator met with an accident in a rocky terrain. The aviator, having commenced a left descending turn with 8-10 degrees of bank, experienced pronounced yaw to right both pilot and co-pilot perceived it as a case of engine failure. The visual sense was so overwhelming that they failed to notice the jet pipe temperature and the presence of engine noise. Subsequent actions were taken by the co-pilot, a trained aviator with a total of 1483 flying hours. Helicopter crash landed with severe vertical impact. The pilot was unable to monitor or interpret instruments. The accident occurred due to misperception of the abnormal attitude of aircraft as an emergency due to single, yet visually predominant symptom (viz yaw to right). This misappropriation can be ascribed to an inadequate correspondence while simulating such an emergency during flying training. The paper discusses such issues as 'transfer surfaces' and 'realism' during flying training and simulation.

IJASM 2001; 45(1) : 16 to 18

KEY WORDS: Somato/ocologyral illusion, Helicopter crash, flying training, Realistic simulation

Many a times, simulation of emergencies during flying training is not very realistic. This results into a degree of correspondence, between simulation and the situation simulated, less than one-to-one. In such situations, successful learning takes place indirectly i.e. through cues and selecting appropriate responses, a process called discrimination and use of previously learned skills in situations which are different from the situations wherein the skill was learned, a process called generalization. Nevertheless, the skill acquired through training in such low realism simulations, which are instinctually incompatible is vulnerable to certain subtle breakdowns especially in a novice. This paper discusses a helicopter accident of Army Aviation. The accident was a direct consequence of a false perception of the abnormal attitude of aircraft as an emergency. This misperception can be ascribed

1Classified Specialist (Av Med), 666 Recce & ObsnSqn, C/056APO
+ Senior Adviser (Av Med) & Chief Instructor, 1AM (IAF), Bangalore - 560 017
Director Medical Services (A), Air HQ (RK Puram) New Delhi -110 066

In the accident cited above, the following important points were observed:

- (a) Following a left descending turn, the pilot perceived a sense of yaw to right. It is possible that the left descending turn was tighter than admitted by the pilot and accelerative force in the manoeuvre could have been well/marginally beyond the threshold of human perception. This perception of yaw to right could have been due to oculo/somatogyral illusion.
- (b) Pilot's inability to monitor the instruments could be an accompaniment of oculo/somatogyral illusion.
- (c) The accident occurred due to misperception of the abnormal attitude of the aircraft by the pilot and co-pilot, due to a single, yet visually predominant, symptom of yaw to the right, as an emergency i.e., engine failure. This was because, during flying training, such an emergency is simulated by lowering the *collective* control column. This results in a loss of height and yaw to right. However, two other cardinal signs of the emergency viz fall in JPT and loss of engine noise can not be simulated because the engine is actually running. Loss of height and movement of yaw to right, alone are to be learnt as an indication of engine failure with a presumed fall in JPT and cessation of engine noise. Obviously, the correspondence between simulation and the situation simulated is less than *one-to-one* and the learning is through *discrimination* and *generalization* which are liable to degenerate in a stressful situation, especially in a novice crew.

Conclusion:

The accident reiterates the significance of realism in simulation during flying training. Such realism may be achievable in an advanced, motion based simulator. Statistics of occurrence of flying accidents due to inadequate realism in simulation during flying training is not available to the authors. However, *"no power landing"* are known to have been executed by the fixed wing pilots in Indian Air Force even when there was no engine malfunction. These instances share a common analogy with the sequence of events in the case presented above (i.e. an erroneous yet dominant cue was misinterpreted as an emergency even in the absence of corroborative evidences). The accident also underlines the need for a *"human factor"* analysis of such simulations, during flying training, to evaluate its conformity to human instinct, degree of correspondence between the simulation and the

situation simulated and their consequent efficacy in imparting flying skill.

References

1. Thorndike EL: In Human learning. New York: Century. 1931.
 2. Osgood CE (1949). The similarity paradox in human learning: A resolution. Psychological Review 1949; 56: 132-143
- Caro PW. Flight Training and Simulation. In : Human Workload in Aviation. In : EL Weiner, DC Nagel eds. Human Factors in Aviation. San Diego, Academic Press 1988: 229-261.