AVIATION MEDICINE VOLUME 27 NUMBER 2 1983

"Pilot Error" Accident-A Case Report : Need for Inflight Physiological Monitoring

RR KAPUR

'Pilot - error' accidents are on the increase in Indian Air Force. This is an alarming trend. Many a time we come across pilots who are accident-prone. Such pilots usually have past history of 'pilot - error' incidents and/or accidents. Many of them keep flying because policy regarding their disposal is not well defined Invariably their routine medical examinations do not show any mental, physical or behavioural abnormality. A case report is discussed. Inflight physiological monitoring of EEG for such cases is recommended to detect their limitations under actual flying stresses.

MOST aircraft accidents are the result of material or human failure, i. e., something has been over stressed. Every aircraft accident should be looked upon as an experiment where at great expense of lives and material the tolerance levels have been exceeded. Such accidents offer an opportunity to make a detailed study of the results so that future preventive actions can be formulated to avoid recurrence of the same breakdown.

In the analysis of every accident, the first question arises, how did it all start ? In the train of events human and material factors may be hard to separate. A structural/mechanical break down may cause overload of the human pilot which may finally result in an accident.

'Pilot error' accidents are mostly due to physical and mental over stressing of the pilots. There are in some instances a mismatch between the man and the machine. To substantiate these statements it becomes necessary to investigate the alertness, the state of consciousness during flight in two groups of pilots :

(a) those with a past history of 'pilot error'

(b) those with no such past history,

Fortunately for us, the latter group constitutes about 90% of our pilots. The problem arises regarding the disposal and utilisation of the remaining 10% of pilots with previous history of 'pilot error' accidents.

Such cases usually keep flying because disposal of these cases poses administrative difficulties. There seems to be a tendency for neglecting such odd cases because policy regarding their utilisation is not very clearly defined. There is a definite need and scope to investigate such cases.

A case report of 'pilot error' accident is discussed to justify the above point of view.

Case Report

A 23 years old fighter pilot, with 507 hours of total flying and 245 hours on type, was flying as No. 2 in a three aircraft formation for a low level strike mission. During downwind while turning downwards he gave a call that he had no contact with the runway. Later with assistance he established contact with the runway and continued turn on to finals from downwind but was noticed to be closer to the runway than normal. This was considered unsafe height by the SFS and he was about to give a call to go round when the pilot himself initiated the go round action. At this stage the No. 1 had asked if there was any problem but the pilot replied in the negative. The No. 1 however, gave him the position of the runway in relation to No. 2. The No. 3 (who happened to be the Squadron Commander) gave a call to No. 2 that he was high on the dumbell. The No. 2 replied that his altimeter, was not reading properly. The No. 3 instructed him to disregard his altimeter at this stage. The No. 2 was seen to turn at a lower height with under carriage down. During the turn he did not climb to the normal height but stayed lower at about 300 meters. He continued to turn till he was converging towards the runway to the extent which made the SFS give a call to 'straighten out' Subsequently the No. 2 turned away from the runway on a diverging course. At this stage No. 1 gave a call to No. 3 to shepard No. 2 because he seemed to have some problem. On enquiry by No. 3, whether he had any problem, the No. 2 replied in the negative again and said he would land. At this stage the No. 3 who was on finals, instructed the No. 2 that the runway was behind him and to gain a little height. The No. 2 commenced his finals turn from a divergent course with gradual loss of height. By the time he was half way through the turn, he had descended to about 100 — 150 meters. The SFS gave him a call to maintain height. The aircraft, however, continued its turn with increased rate of descent. The SFS gave him a call to go round. There was no response to any of these R/T calls from No. 2. The rate of descent had now increased considerably and the aircraft was seen disappearing behind the trees. The aircraft crashed at about 3.5 kms from the landing dumbell and the pilot was killed.

The Court of Inquiry investigating the accident attributed it to 'error of judgement' on the part of the pilot. During the finals turn the pilot had allowed the aircraft speed to drop below the minimum required to maintain safe approach path, resulting in an uncontrollable rate of descent, till the aircraft hit the ground. He had also flown the aircraft at a low height at this stage which was not sufficient for recovery of the aircraft to safe flying conditions. The factors which contributed and/or aggravated the situation were as follows :

(a) Inadequate experience of the pilot in handling the aircraft in a configuration of four drop tanks and two rocket pods at low speed with under carriage down.

(b) Inadequate familiarity with the airfield and its surrounding area which contributed towards his difficulty in spotting the runway. The divergent course on downwind and subsequent descent to low height also aggravated the situation.

(c) The major portion of the pilot's attention was diverted outside the cockpit to spot the runway at a crucial time during the finals turn resulting in his not monitoring the air speed indicator (ASI).

(d) The pilot's altimeter was not reading properly and this could have disturbed him adversely affecting the reactions and concentration.

(e) The pilot had failed to extend flaps during the final turn.

Pilot's flying experience and back ground

The pilot had some flying experience in the National Cadet Corps before joining the Air Force. During his flying training, he was initially a bit slow on uptake and was repeatedly warned for poor progress in flying. But later on with hard work and perseverance he improved considerably. He was considered just an 'average pilot'. In flying. although his overall performance was poor, his individual flying ability was assessed by his squadron commander as 'within normal limits'

Past history of accidents/incidents :

(a) Approximately two years before the fatal accident, he had bounced after touch down resulting in collapse of the nose wheel. The aircraft was a write off and the pilot was directly blamed for the accident.

(b) About 10 months later, he did a heavy landing and bounced. Aircraft was slightly damaged. He was again blamed.

(c) Seven months later, after landing, he switched off the aircraft engine on the runway only. He attributed it to his flying overall sleeves getting stuck in the throttle lever inadvertently.

All these three incidents/accidents were attributed to his errors (Pilot error) and he was blamed for each of these. The first accident was attributed to his experience and he was warned. He was off flying for about two months. For the second incident also he was blamed and the Station Commander removed him from flying for three months. During this time he was given the job of Food Member in the Officers' Mess, which was more or less a full time job for him keeping him away from the Squadron environment. It was only after the third incident (i. e., when he switched off the aircraft on the runway), that he was referred to medical authorities, to find out if anything was wrong with him physically and / or mentally. The Station Commander was of the opinion, that something was wrong with this Pilot's vision and that was why, he was committing mistakes at landing phases only.

The case was referred to an Aviation Medicine Specialist for his opinion. After his initial investigations, which included a detailed interview of the pilot, review of his past and present flying records discussions with his supervisory staff and a clinical examination; the case was referred by him to Air Force Central Medical Establishment (AFCME) for medical evaluation. A special request was made to the Neuropsychiatrist at AFCME to investigate the case in detail to find out if there was any fear of flying or change of motivation towards flying. A detailed executive report from his Squadron Commander was also forwarded along with his medical documents.

The case was fully investigated at AFCME. The Psychiatrist there took special interest in the case and carried out detailed investigations, which included, beside others, electroencephalography (EEG) at rest and under photic simulation, various intelligence tests, tests for coordination and narcoanalysis. No physical or mental disability or behavioural abnormality was detected and no change in his medical category was recommended.

The Aviation Medicine Specialist in his report to the Station Commander recommended that in view of his favourable administrative report from the Squadron Commander and favourable medical report from AFCME, the Pilot be permitted to continue his flying. His poor performance during landing phases was probably due to he being kept away from flying environment repeatedly due to various reasons. It was recommended, that the supervisory staff should exercise adequate care and give special attention to his flying progress.

After a lapse of about 1½-2 months, the pilot once again started flying. He showed good progress in his flying ability for next 8 months or so and his supervisory staff seemed quite happy with him. And, then, this fatal accident happened.

Discussion

The case is a straight forward 'Pilot error' accident and probabty majority of us will say that he was an 'accident - prone pilot'. Then the question arises what have we done to him ? He gave enough evidence of his poor flying ability and performance and the administrative authorities still remained uncertain about his final disposal. Every time only temporary grounding was done and that made the situation worse since he started lagging behind in his flying as compared to his course mates. Finally the case was referred to medical authorities to find out some medical cause, probably, to finally ground him.

From the Aviation Medicine Specialist's point of view, the questions which are significant are :

(i) Whether the present methods of medical evaluation in such cases are adequate?

(ii) What is the role of an aviation medicine specialist as a squadron doctor in such cases ?

In such problematic cases besides the routine medical tests, one must also include inflight biomedical monitoring. Today it is possible to monitor pilots during operational missions without interfering with the mission or the pilots' performance or comfort. The use of inflight EEG recording is strongly recommended in such cases. The United States and Norwegian Air Forces use airborne EEG recording to weed out the 'Pilot error' pilots with low stress tolerance.

The Squadron Medical Officer with his Aviation Medicine background must keep his eyes and ears open to spot out such vulnerable 'pilot error-prone pilots. He must recommend to supervisory or administrative authorities for on board physiological monitoring of such pilots. This approach may help in flight safety since we all know that some of the pilot's physiological capabilities and serious limitations are, unfortunately often too late, first evident during the accident investigation. Physiological monitoring of EEG during operational flights should therefore, be vigorously pursued to substantiate and expand our knowledge in our steady on going stride to improve effectiveness and reduce aircraft accident.

References

1. Sem- J acobsen C W : Electroencephalographic study of pilot stress in flight. J Aerospace Med. 30:797, 1959.

2. Sem - Jacobsen C W : Physiological aspects of aircraft accident investigation. Aerospace Med. 42(2) : 199, 1971.

3. Sem-Jacobsen C W and Sem - Jacobsen E : Selection and evaluation of pilots for high performance aircraft and spacecraft by inflight EEG study of srress toleranco. J Aerospace Med. 34:601, 1963.