

Current Status of Fatal Aircraft Accident Investigation

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Introduction

THE line dividing a non-fatal aircraft accident from a fatal accident is indeed very thin; with very slight changes in the circumstances prevailing in an accident, a non-fatal accident could easily end up fatally. Although the methods employed for investigation of both types of accidents basically remain the same, fatal accident investigation differs in a very significant manner. Due to the availability of survivors in non-fatal accidents the evidence available is more definitive and therefore determination of the cause of the accident is relatively easier. On the other hand, in the case of a fatal accident, there being no survivors, the only way to come to any conclusion would be by process of deductive reasoning from facts gathered by thorough and detailed examination of all available evidence connected with the air-crash. Thus, it is obvious, that in a fatal accident the important requirement is to recover as many facts as possible and not to allow any evidence to be missed. This is the reason why, now-a days, a number of specialists get associated with the inquiry of this type of aircraft accidents. Since the main thrust of such investigations, these days, is being directed towards the examination of human remains, a meticulous autopsy examination by a trained Specialist in Aviation Pathology becomes the key-stone. One may even go to the extent to state that the present status of fatal aircraft accident investigations all over the world may be attributed to the realisation that examination of human remains contributes considerably to the successful culmination of such investigations.

The concept

To fully appreciate the changing concept in respect of investigation of fatal aircrashes it is necessary

to have a glimpse in the past and review the developments that have occurred in this direction during the past two decades. Following reasons mainly account for the changing concept:—

- (i) On the basis of logical hypothesis.
- (ii) On the basis of actual experience gained.
- (iii) On the basis of statistical trends observed.

Extract from a letter written by Wg Cdr Bruce Harvey, an RAF Physician, to Brig Gen Elbert De Coursey, the then Director of Armed Forces Institute of Pathology, is reproduced below and is self-explanatory:

“As you know, when a fatal accident occurs, engineers immediately descend upon the wreckage and take numerous samples back to their laboratories for investigation. The human remains, however, are usually collected together and put into a box and buried with due ceremony. May not the examination of such remains by skilled pathologist provide evidence which may account for the accident?”

The experience gained from the investigation of two Comet aircraft accidents is well known and does not require any elaboration. Examination of human remains by Pathologist in these accidents provided invaluable findings leading to research which finally enabled the aeromedical investigators to establish the cause of death being explosive decompression.

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A study carried out in United States Air Force revealed that the number of aircraft accidents remaining unexplained are roughly three times more frequent in the case of fatal accidents when compared with non-fatal accidents¹. It is also generally known that in spite of very critical engineering evaluation of aircraft wreckage the cause of considerable number of aircraft accidents remains unexplained. Therefore, it was felt that an appraisal of autopsy findings from the "dead body" should be able to give evidential support comparable to that based on the findings in the "dead machine."

Fortunately, from the point of view of accident investigations this concept was translated into practice and special facilities were created in UK, U.S.A. and Canada so that examination of human remains by skilled Pathologists, now designated as Aviation Pathologists, became a regular practice. However, it was soon realised that examination of human remains in isolation, though vital, is inadequate and for such investigation to be meaningful, it is imperative to correlate the autopsy findings with medical history of the aircrew, environmental factors, structural damage to the aircraft and use or abuse of safety equipment so that a complete picture of the accident could be reconstructed and the contributory factors to the causation of accident could be logically derived¹.

Many crashes occur at unpredictable and not easily accessible places. In such situations the concept of "bringing the body to the autopsy" has necessarily to be changed to "taking the autopsy to the body". The current view is that it may be better to take the investigating Pathologist and his technical assistant for on-the-spot autopsy, even if the conditions for such examination are not very favourable, rather than lose the evidence completely.

Investigative Systems

Based on the lessons so far learnt, many countries have organised suitable investigative systems. By and large they have ensured that the requirements indicated in the foregoing text have been satisfied. Study of these systems, especially those currently existing in UK and USA, reveal the following common salient features:

- (i) All fatal aircrashes, civil or military, are invariably investigated².

- (ii) The investigation is carried out by a team of specialists forming specialist groups. The aeromedical investigation is carried out by a group consisting of Aviation Medicine Specialist, helped by a Medical Officer if locally available. Autopsy is invariably carried out by an experienced Pathologist viz, either a Consultant Pathologist or an Aviation Pathologist who also is a member of this group. Even if it is done by a Coroner's Pathologist, an Aviation Pathologist is always present during the autopsy.

- (iii) There is very close liaison between the local Medical Officer, Medical member and the Pathologist.

- (iv) Clear instructions and authority for the move of each member of aeromedical investigation team exists. The status of each member of the team vis-a-vis the total investigations are clearly defined.

- (v) A comprehensive Aviation Pathology report is invariably submitted by the Aviation Pathologist to the inquiring agency for consideration as evidence.

It will be useful at this stage to visualise the model plan of aeromedical investigation of a fatal aircraft accident in the Air Force.

Role of Medical Officer

Fatal accident investigation commences as soon as the Unit MO reaches the crash site. He should prepare a sketch of the crash site giving relative positions of different parts of wreckage, body/bodies, flying clothing, safety equipment, ejection seat, parachute, harness etc. In addition he should ensure photography of specific items which may be informative and of medical interest. On arrival of the investigating Pathologist and Medical member of the Court of Inquiry at the scene of accident, the MO should pass all the information available with him to these specialists.

Role of Pathologist

Aviation Pathologist should direct his investigation with the following main objectives:

- (i) Reconstruction of accident sequence with special attention to the possibility of survival.

(ii) Appraisal of the use and abuse of safety equipment.

(iii) Discovery of the cause of accident, which may be medical or non-medical.

A proper Aviation Pathology investigation of the accident should include the following steps :—

(i) Pathologist should thoroughly familiarise himself with the type of aircraft, internal structures, seating arrangements, ejection mechanism etc., and if possible to examine an intact aircraft of the type involved in the accident.

(ii) Pathologist should get properly acquainted with all available information about the circumstances of the crash and all relevant information regarding the aircrew including their health.

(iii) The third step consists of careful observation and recording of the crash site findings. This is a sphere in which the help of local MO to the Pathologist will be invaluable.

(iv) Carrying out a meticulous autopsy examination, including Histological and Toxicological studies.

(v) Correlation of the autopsy findings with all other relevant details of the accident to reconstruct a complete picture of the accident is essential to complete an aviation pathology report for submission to the investigating agency as evidence.

Role of Medical Member of Court of Inquiry

The Medical Member of the Court of Inquiry being a specialist in Aviation Medicine assumes the responsibility of Advisor to the Court on all aeromedical matters associated with the accident. He is required to look into the question of Psychological and medical factors which may account

for the accident. He is supposed to analyse the injuries sustained by the crash victims, the manner of their production and recommend practical remedial measures. In discharge of these responsibilities he should be helped by the Unit MO and the investigating Pathologist. The medical member on his part should render all help to the Pathologist by providing him factual information about the details of the crash as known to him. Basically it is the medical member who interprets and explains all the aeromedical evidence for the consideration of the Court.

On completion of the inquiry it is the responsibility of the medical member of the court to submit a medical report on the prescribed form which is designed to give in detail the information on various aspects of the accident. This is essential for proper recording and storage of information for retrieval and analysis at a later date.

Conclusions

Investigation of fatal aircraft accident involves a group system of which Aviation Pathologist forms an important component. A meticulous examination of human remains, by a trained Pathologist is an essential part of the investigation and its value has been realised all over the world based upon logical hypothesis, actual experience gained, and on statistical basis.

References

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