

## Aeromedical Indoctrination of Aircrew

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**I**N modern high speed and high performance flying the environmental and functional stress on the aircrew is of considerable magnitude. There is also the increasing complexity of the personal protective equipment used in high performance aircraft. These have made a thorough physiological training of the aircrew an imperative necessity in a modern operational Air Force.

The reduction of barometric pressure and the consequent lowering of oxygen tension is the main environmental problem in high altitude flying. Another factor of importance is the thermal stress in aircrew in a tropical country like ours. High speed manoeuvres and escape from aircraft in emergencies also put considerable stress on aircrew. In modern aircraft, protection to aircrew in flight is ensured by pressurising the aircraft, conditioning the cabin for temperature and humidity, supplying oxygen on demand and by providing assisted escape mechanism for emergency escape.

There is a necessity for the aircrew to familiarise with the intricate protective equipment, know their limitations and learn corrective actions to be taken in the event of mal-function or failure. The use of protective equipment does not imply that in all cases the stress factor is completely eliminated; thus it becomes essential to give subjective experience to aircrew by simulation of the different types of stresses encountered in flying.

Aeromedical training of all categories of aircrew are conducted at the Institute of Aviation Medicine, No. 1 Aero-Medical Training Centre and also by the Medical Officers at Flying stations.

Indoctrination of aircrew is also carried out at Flying units on the latest developments in the aeromedical fields with particular reference to operational

effectiveness and Flight Safety by Specialists from IAM and No. 1 AMFC. Senior Executive Officers are given Aeromedical Indoctrination at IAM. Emphasis is placed during this training on the value of co-ordinated approach to the problem of operational efficiency and Flight safety measures.

Repetition of this training is considered essential to ensure that it becomes almost a second nature in combating routine and emergency flying situations in correct manner. The total aircrew Physiological Training Programme has been so tailored that it meets the challenging situation of ever increasing complicated flying task of the present day. In aeromedical indoctrination, simulators have got an important role. The simulator training covers :—

- Problems of hypoxia and reduced blood oxygenation
- Requirement of oxygen breathing under positive pressure and function of protective clothing following cabin pressure failure at high altitude.
- Aircraft oxygen systems and personal oxygen equipment.
- Decompression sickness
- Otitis and sinus barotrauma.
- Physiological effects of Rapid Decompression.
- Effects of accelerations
- Effects of exposure to high Thermal stress.
- Visual, auditory and sensory problems in flying and the importance of trusting aircraft instruments for orientation in Flight.

In the training programme, Physiological assessment of the aircrew subjects are carried out by recording physiological parameters, like Heart rate, Blood pressure, ECG, EEG, respiratory rates and depths, blood oxygen saturation etc. on as required basis

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During high altitude indoctrination recording of blood pressure, ECG and Respiration is done as a routine. This helps in weeding out susceptible aircrew.

An aircrew "preservation programme" is discussed in all indoctrination. Maintenance of physical and psychological functions of an aircrew at optimum levels of efficiency is an important consideration. The need for adequate diet and nutrition and the requirement of Pre-flight and in-flight feeding is emphasised. Usefulness of daily physical exercise to ensure a balanced physical and mental health and the need for avoidance of undue stress and strains in life are also brought out.

Effects of high levels of alcohol in blood and tissues on a flier's performance and the need to observe caution and self discipline in consumption of alcohol and tobacco are impressed upon the aircrew. The danger of consumption of drugs like cannabis preparations, Tranquilisers, Barbiturates, LSD, etc. particularly by young aircrew and their short and long term effects are explained.

Training on Ejection test Rig, Disorientation simulator, Reaction time feed back recorder and Hot cockpit would provide valuable experience to aircrew under conditions of simulated stress.

## Conclusions

(a) The physiological training ensures greater safety in flying by infusing confidence and conditioning the aircrew. It is all the more important as we have now switched on mostly to supersonic flying.

(b) Our experiences in imparting physiological training to about 4000 aircrew during past 2 decades at IAM and No. 1 Aero-Medical Training Centre have convinced us that aircrew gain valuable knowledge and benefit through personal experiences of emergencies in simulators under controlled conditions. This contributes to instinctively adopting corrective procedures by the aircrew in an emergency in the air and on the ground.

(c) Intensification of physiological training programmes will further contribute to preservation of aircrew in good physical and mental state, increase his operational efficiency and reduce Flight Safety Hazards.

(d) Location of aeromedical training centres equipped with decompression chamber, training aids and topical instructional films under each Flying Command is an urgent necessity.

A refresher course once every three years should be introduced to ensure continuous aircrew operational effectiveness. The programme of physiological training of aircrew should have high priority in an operational Air Force like ours.