

## Centrifuge training for ab-initio pilots (Stage II A) of Indian Air Force : Training schedule at IAM, IAF

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A two day centrifuge training course for ab-initio fighter pilots of Indian Air Force undergoing stage II A flying training has been started from No. 160 Pilots Course. A total of three Pilots Courses consisting of total 129 pilots have gone through the training at the Institute of Aerospace Medicine, Bangalore. The paper discusses the general conduct of the course, training in proper learning and performance of anti-G straining manoeuvre (AGSM). Pilots are also given the feel of Anti-G suit and training in the proper wearing of the suit. The paper deals with the experience in dealing with young and relatively inexperienced pilots and utility of such introduction at the early stage of fighter flying carrier.

**Keywords :** Aircrew training, anti-G straining manoeuvre, anti-G suit.

The more we know about +Gz-induced loss of consciousness (GLOC), the more effort and preventive measures are required to be taken to reduce its incidence in actual fight. One of the well known practical measure to prevent the occurrence/reduce the incidence is to impart human centrifuge training to the pilots. Regular training at high +Gz enhances aircrew performance, while prolonged lay off from exposure in high +Gz profiles (G-lay off) can result in reduced Gz endurance. The centrifuge Gz training is primarily directed towards teaching aircrew how to perform effective anti-G straining manoeuvre (AGSM) [1]. Additional benefits derived from such exposure are learning one's +Gz tolerance, experiencing Gz under controlled conditions and even perhaps losing consciousness. There is some evidence to suggest that exposure to G-LOC on the centrifuge is beneficial relative to better recognition, when it occurs in an aircraft [2, 3]. One additional benefit of imparting centrifuge training to ab-initio pilots, who are going to be future operators of high

performance aircraft, is that they are likely to realise the great physical demand of high sustained +Gz (HSG) during the training through experience, demonstration and also through theoretical classes. A insight into this demand of HSG will make them realise the importance of regular physical training especially designed for this need which can be followed through out their effective flying career.

A regular course for two weeks known as Advanced Fighter Aircrew Indoctrination Course is conducted by the Institute of Aerospace Medicine Bangalore (IAM, IAF) for the aircrew of Indian Air Force and Indian Navy [4]. The course mainly deals with Centrifuge training besides other related topics of operational relevance to aircrew. The course had its beginning in March, 1991. Aircrew are subjected upto +9 Gz runs. 252 aircrew

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have undergone this course.

All the experience gathered so far points that centrifuge training is highly cost effective method to overcome the problem of High Sustained Gravitational (HSG) force encountered in modern fighter aircraft. Indian Air force has rightly decided that completion of centrifuge training is essential for aircrew selected for air superiority fighters.

The experience of conducting centrifuge training in aircrew of varied experience and with its encouraging result, it was decided to conduct a two days capsule course for ab-initio pilots selected for fighter stream and undergoing stage II A course and the same has been started from 160 PC in Jun 1998. Details of the course is discussed below.

### Theoretical Training

Theoretical training covers a briefing about high G-physiology. The immediate and delayed effects of increased +Gz on the body including hydrostatic effect on the blood circulation is discussed. Gz time tolerance curve is utilised to explain the peripheral light loss (PLL), central light loss (CLL), tunnel vision, greyout, blackout, and G-LOC. Importance of onset rate on the cardiovascular physiology is stressed upon. Significance of G-LOC with associated features of confusion and disorientation is stressed upon and recorded episodes of such events is fully utilised. The institute has records of large number of G-LOC episode.

The importance of all physiological and mechanical protective methods are briefed. A special attention is given to the execution of AGSM. Importance of muscle tensing and cyclic increase of intrathoracic pressure for about 4 sec

is covered in detail. Individual attention is given to each trainee in correct performance of LI maneuver. A video demonstration of poor and a correctly performed AGSM is resorted for proper learning of the method. Factors effecting Gz tolerance are discussed.

The functioning of the centrifuge and various safety devices, switches and indicator are shown to the pilots. A combined and individual briefing is given prior to each run. The overall results of the training is discussed and post training questionnaire is completed by each individual trainee.

### Training Profiles

The aim of centrifuge training is to teach aircrew how to perform an effective AGSM under actual Gz condition with relatively high onset rate. Hence the profiles have been designed to give sufficient number of exposure where the technique of AGSM is practised. The limit of exposure should commensurate with need of the pilot. Stage II A course was initially designed to give each pilot an exposure of max. of 6 Gz for a period of 30 sec. An exposure of 4 Gz, 5 Gz and 6 Gz was given for 30 sec each after finding out their relaxed rapid onset rate tolerance. Based on the experienced gained and the trainee's view an simulated air combat maneuver (SACM) run consisting of 4.5 Gz and 6.5 Gz / 7 Gz has been added. The number of run gives enough exposure in terms of duration and magnitude to learn effective AGSM and to realise the importance of the physical need of HSG.

A debrief after each run and subsequently from the video records of each trainee is given by the instructor. Only two trainees were not able to complete the +6 Gz run for 30 sec. Details of the result have been discussed by Aggarwal.

### Conclusion

The experience of imparting centrifuge training to ab-initio pilots of fighter stream has been rewarding and high level of satisfaction has been shown by the trainees. The importance of physical demand of HSG has been realised by most of the trainees. This realisation in early phase of their career will help them in following a regular physical conditioning programme which is a requirement for fighter pilots operating high performance aircraft.

### References

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