

Aircrew Survival Experiences in IAF : A Retrospective Study

Wg Cdr RR Kapur*, Wg Cdr AK Dhingra**,
Sqdn Ldr US Mohalanobish+, Sqdn Ldr GBS Kang++

Once an aircraft accident has occurred, survival becomes the major issue for all its crew members. The Search and Rescue (SAR) teams aim at providing expeditious rescue for the crew in the minimum possible time. This paper, is an analysis of the data pertaining to SAR and Survival experiences of IAF for the period June 1974 to April 1990 encompassing issues related to SAR and use of survival equipment provisioned.

Key words : Non fatal aircraft accidents, rescue time, survival equipment

The occurrence of an aircraft accident invariably brings forth the issues of Search and Rescue (SAR) and Survival for all occupants of the aircraft. In this context, the term Survival refers to the capability to outlive or to continue to live inspite of adverse circumstances¹. In real terms the act of survival encompasses more than just continuing to live. The aircrew, in addition, must also make every effort to improve his situation and increase the probability of an eventual rescue. Needless to say, there are no typical "Survival Situations". Each one is different and reflects the highly specific interaction between the survivor and his environment.

The final outcome in any "survival situation" will depend upon the crew himself as well as the "survival equipment" available to him and its proper/ adequate use. The survival equipment include communication and signalling devices, floatation gear, first aid items, clothing and shelter, food and water, miscellaneous tools and occasionally weapons. Survival equipment, has not been significantly advanced since 1950s except for a limited development during the Vietnam war¹. In a non-combat environment, there are minimal demands for improvements in the survival equipment. Combat survival often includes escape and evasion and is inherently more complex than the peace time survival situation.

"Survival equipment" is available to the aircrew as a Survival Pack which can either be an "aircraft survival pack", as is the case for commercial airliners, transport aircraft or helicopters or a "Personal Survival Pack" (PSP) for combat aircraft. The PSP forms an integral part of the ejection escape systems and is available to the crew member on landing. In principle, the items placed in the PSPs are terrain specific because of the shortage of packing space within the packs. Two types of PSPs which cater for two entirely different survival situations are : (a) Land variant and (b) Sea variant.

Land survival situations may vary from desert conditions at one extreme to snow/ high altitude conditions at the other, with jungle or mixed land survival conditions somewhere in between these two extremes. Therefore, a land variant PSP ideally should be one of the types : (a) Desert Variant (b) Snow variant or (c) Jungle variant.

Because of variations in our terrain of operations and keeping logistic considerations in mind, in the IAF the option of a "Composite Land Variant" is preferred which caters for the need of various land survival situations with some degree of compromise made on the requirements of any specific hostile terrain environment. Secondly, most aircraft in IAF inventory are procured from abroad. The PSPs available with these aircraft contain imported items, some of which are not considered adequate or suitable for our " survival environment " requirements. The problem of replenishments of short life imported items necessitates repacking with indigenous substitutes.

So far, the selection of items for inclusion in Survival Packs have been based on anticipated

* Professor (Av Med) and Head, ** Asst. Professor (Av Med), + Associate Professor (Av Med), ++ Asst Professor (Av Med), Department of Human Engineering, Institute of Aerospace medicine, Vimanapura, Bangalore - 560 017

requirements rather than on the basis of an actual statistics. Guidelines to provisioning of items in Survival Packs can be obtained from past survival experiences and the past records of our SAR achievements. In this paper an attempt has been made to collect and analyse the relevant available SAR data of IAF. A comparison is also made with similar data available in the literature. Suitable recommendations have been made to improve our SAR system and to make PSPs more realistic and effective.

Material and Methods

All medical reports on major aircraft accidents pertaining to nonfatal aircraft accidents available at Institute of Aerospace Medicine, IAF, Bangalore were studied. Type of aircraft involved, injury of crew members, rescue time, mode of rescue and use of survival items as reported in these reports were analysed.

Findings and Discussions

A total of 118 files (Medical Report on a Major Aircraft Accident IAFF (MS) - 1956) were analysed for the period June 1974 to April 1990. The data is far from complete since the collection of IAFF(MS)-1956 was started as a policy only in 1981. Twenty nine of these 118 records pertain to the period 1974 to 1981.

Out of the total of 118 aircraft involved in these accidents, 112 (94.9%) were Combat/Fighters & Trainers and 6 (5.1%) were helicopters and transport aircraft.

In all the accidents, except one, the crew had to face land survival situation. The only case of sea survival was in the western sector (Arabian Sea). Six of the accidents were at night, the rest were during day.

Out of 118 aircraft accidents involving 139 crew members, 89 crew members (64%) were injured. The injuries varied from minor bruises, sprains, fracture of long bones, spinal fractures and even head injury. Not a single crew sustained any injury due to survival situation per se.

The details of time taken to rescue the crew after the accident are shown in Table I.

Table-I : Rescue Time

Rescue time	No of aircraft	Percentage
> 30 min	76	64.40
30 - 60 min	23	19.49
60 - 120 min	13	11.02
120 - 180 min	4	3.39
180 - 240 min	1	0.85
240 min	Nil	Nil
Not known	1	0.85
Total	118	100%

The mode of rescue of the involved crew members is shown in Table II.

Table-II : Mode of Rescue

Sl No	Mode of Rescue	No of Cases
1	Local population only	2
2	Local population initially and /or by Service Road Transport/Ambulance	45
3	Local population initially and then by Service Helicopters	70
Total		118

The details of the cases retrieved by Service Helicopters are given below in Table III.

Table-III : Rescue by Helicopters

Sl No.	Period	Total No of Accidents	No of cases Rescued by Helicopters	Percentage
1	1974-1981	29	13	44.8
2	1982-1990	89	57	64.0
Total		118	70	59.32%

Tables II and III clearly bring out that number of cases retrieved by helicopters exceeds the number rescued by road transport. Helicopter rescue facilities were more utilised in the period 1982-90 as compared to the period 1974-81. This is because more number of helicopters are now available for Search and Rescue missions.

In addition to the data already stated, review of all the available IAFF (MS)-1956 of 118 cases brought out the following interesting points :

- All the aircraft involved in these accidents carried Survival Packs
- In most of the documents perused, no specific mention has been made to the specific use of survival items provisioned in the Survival Packs. In only one case it has been clearly

brought out that the signalling equipment had been used by the survivor, the torch was found unserviceable and the water sterilising tablets were date expired.

- Non use of survival items have been clearly indicated in 29 of the 118 documents perused. The adequacy of existing contents is not commented upon in any of the documents.

A Canadian study of the entire survival scenario in military flying during the period 1965 to 1974 observed that approximately 35% of the survivors did not report using any survival equipment. Among the 124 aircrew using equipment, the use of signalling equipment predominated. The frequency of signalling equipment used were, flares (27%), survival radio (22%), signal panels (8%) and mirror/ Heliograph (6%). First aid kits, matches and an axe were used on 5% of the occasions; 4% used insect repellent. Other available items, mosquito-veil, sun-hat, mitts, gloves, socks, knives, rations and parachute as shelter were used by two or less survivors. The sleeping bag was used only once by one individual who survived for 14.5 hours. Thus, a total of 17 items from Survival Kits were used, leaving approximately 80% of available survival kit items unused².

The data presented in the above study imply that the requirement for survival equipment and the need for training on use of survival equipment seem to be limited to basic first aid, communication and signalling equipment.

During the above mentioned Canadian study, inquiries conducted at the Institute of Aviation Medicine (IAM) at Farnborough, England revealed that the Royal Air Force (RAF) had no clear cut philosophy for survival and attempted to provide survival equipment to cover all geographic areas and mission roles which resulted in equipment packing problems.²

The United States Military Air Services have a triservice (Air Force, Army and Navy) agreement that specifies the areas of responsibility for research, development and eventual procurement of survival equipment. Although concentrating on survival packages for

specific missions, their concept involves a sophisticated core of survival system. The United States concept assumes short-term survival and early rescue, concentrating on the majority of accident situations.²

No published data or studies regarding Soviet Air Force survival strategy are available. However, a close scrutiny of their survival equipment, which are available in various Soviet aircraft in IAF inventory, reveals that their concept also revolves around short-term survival and early rescue. Their major thrust is also on signalling and communication equipment.

From the discussions so far it is clear that survival time is a critical factor for deciding or choosing the survival equipment for PSPs. The probability of finding survivors and their chances for survival diminish each minute that elapses after the accident. It is, therefore, important that all Search and Rescue (SAR) activities occur promptly. The life expectancy of injured survivors decreases by upto 80% after the first 24 hours, where as the survival of uninjured survivor diminishes rapidly after the first 3 days².

In the IAF, there is no clear cut policy for SAR and Survival. There is a tendency to provide a large number of survival equipment to cover all geographic areas and mission roles, resulting in equipment packing problems in the PSPs. The problem is becoming more complex in view of the wide and varied area of our air operations.

Recommendations

It is recommended that detailed data collection regarding the use of survival equipment and their adequacy, must be instituted. Similarly, adequate data should be recorded regarding the search and rescue activities. Also periodic studies of the data collected should be taken up to review our SAR and Survival policy.

REFERENCES

1 Spurgeon N Rolant SH : Medical aspects of survival and rescue. In : Aerospace Medicine, Editor : Randel HW, 2nd Edition. Maryland, Williams and Wilkins 1971, P 418.

2 DeHart RL, Beers KN: "Aircraft Accidents, Survival and Rescue", In: Fundamentals of Aerospace Medicine, Editor : DeHart RL, Philadelphia, Lea and Febiger, 1985, P 883.