

Disaster Management Planning during Aero India'98 : Aero-Medical Aspects

Wg Cdr Sunil Kumar*

ABSTRACT

Aero India'98 was held at Bangalore from 08 to 12 Dec 98. Thirty countries took part in the Show. Of the forty two aircrafts put up at the Air Show, twenty six displayed their flying prowess. The visiting population ranged from thirty five to ninety thousand daily. Nearly two thousand event related personnel were also involved. Infra structure planning commenced nearly six months prior to the Air Show to meet the multifaceted requirements. This involved interaction with agencies like the State Government, local corporate hospitals and various military and paramilitary organisations. The aim of the Disaster Management Plan was that every one who survived the initial injury would survive. In survivable accidents immediate rescue and timely medical aid are the prime determinants of a good outcome. Predisaster planning and preparedness optimises utilisation of available resources without confusion or waste of time. Locally available resources must be augmented to cater for sudden increase in numbers and demands of the casualties. Major hospitals as well as super speciality hospitals were included into the treatment chain. Paramedical staff participated in the crash rescue drill for all the twenty six aircrafts taking part in the flying display. Procedures were formulated and practiced for prompt response to any emergency. The whole Disaster Management Plan as formulated by the Indian Air Force was adopted by the State government as per the available information. The complete Aero Medical/Disaster arrangements were controlled by the medical set up of Air Force Station Yelahanka.

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Aero India '98, the prestigious International Air Show was held at Air Force Station Yelahanka, Bangalore from 08 to 12 Dec 98. Thirty countries took part in the Air Show. Of the forty two aircrafts put up for display at the Air Show, twenty six proved their flying prowess. The visiting population ranged from thirty five to ninety thousand daily. Nearly two thousand event related personnel were also involved. Infra structure planning commenced nearly six months prior to the Air Show to meet the multifaceted

requirements. This involved interaction with agencies like the State Government, local corporate hospitals and various military and paramilitary organisations. The complete aero-medical/disaster arrangements were controlled from the medical set up of Air Force Station Yelahanka.

* *Classified Specialist (Av Med) & SMO, Air Force Station Yelahanka, Bangalore.*

The need for Disaster Management Plan

During forecast planning, it was estimated that around forty to fifty thousand persons would be present, at any given time during the nine hour evening period of the air show, daily. With such a large crowd being present at the venue of the Air Show any untoward incident like air crash, bomb explosion, hangar collapse, stampede etc would lead to disaster. To minimise the impact in case of disaster, it was mandatory on the part of the organisers to formulate a disaster management plan and be prepared for its successful execution rather than to improvise and get overwhelmed post disaster.

Principles of Disaster Management

A disaster is a catastrophic event that occurs in a very short time and overwhelms the health care facility in terms of man power and resources. It is unexpected, unforeseen, sudden, violent and destructive. The injury potentials can be extensive to fatal. The two main principles of disaster management are :

- i) Rescue Efforts : Urgent effective rescue is the primary step towards reducing the death toll.
- ii) Medical Aid : Successful and rapid delivery of high quality medical aid on the spot and evacuating victims to designated hospitals for preservation of life and limb is the next step towards reducing mortality.

Pre disaster planning and preparedness would optimise utilisation of available resources without confusion or waste of time [1].

Action Plan : Air Force station Yelahanka

A. Medical Disaster Management Plan

The base has an effective pre-accident plan to cater to aircraft accidents. The medical set up has primary care facility and can handle all day to day medical problems of the station. An eight bedded Station Sick Quarters (SSQ) is functioning at the station to cater for the medical needs of a population of approximately five thousand, situated about thirty kilometers from Bangalore city. With a population of approximately forty to fifty thousand expected at the Aero India '98 at any given time, planning was done to cater for roughly one percent i.e. four hundred to five hundred persons to be involved during disaster [2]. Of these nearly thirty percent i.e. hundred and twenty to hundred and fifty would require hospitalisation [2]. Hence, arrangement had to be made to cater for hundred and fifty in-patient casualties. It was necessary to formulate a plan where by all the casualties would be given definitive treatment within the Golden Hour.

A three tier system for delivery of medical care was planned. A hangar was designated and kept ready for triage. Initial life saving and resuscitatory measures would be given on the spot. Preliminary definitive treatment was planned to be given at the SSQ. Tertiary care would be instituted at major hospitals at Bangalore.

Planning for upgradation of medical services started at D minus six months. Some of the resources available with us were:

(i) Medical Officers	-	03
(ii) Medical Assistants	-	28
(iii) Ambulances	-	03
(iv) Beds	-	08

In addition facilities like laboratory, radiography, electro cardiography, physiotherapy and Station Health Organisation (Medium) was

available. Emergency medical equipment like defibrillator, nebuliser, suction apparatus, oxygen delivery system etc were also available.

then worked out as:

The augmentation of available resources keeping in mind the anticipated casualties was

- (i) Medical Officers - 06
- (ii) Medical Assistants - 12
- (iii) Ambulances - 03

Table-1 : Resources and Facilities

Sl. No.	Resources	Available	Augmentation
01.	Medical Officers	03	06
02.	Medical Assistants	28	12
03.	Ambulances	03	06
04.	Ambulance Coach	Nil	01
05.	Beds	08	150
06.	Blood (Units)	Nil	300
07.	Laboratory	Yes	Nil
08.	Radiography	Yes	Nil
09.	Electro Cardiography	Yes	Nil
10.	Physiotherapy	Yes	Nil
11.	SHO (Medium)	Yes	Nil
12.	Operation Theatre with Complements	Nil	Yes
13.	I V fluids	100	300
14.	Drugs	Available	Yes
15.	Dressing Material	Available	Yes
16.	Suction apparatus	02	01
17.	Nebuliser	01	Nil
18.	Defibrillator	01	Nil
19.	Portable Oxygen set	02	Nil
20.	Anesthesia machine	Nil	Yes
21.	Portable OT Table	Nil	Yes
22.	Stretchers	20	12

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(v) Ambulance Coach - 01 (vi) Beds - 150 (vii) Blood - 300 units (viii) I V fluids - 300 units (ix) Operation theater and its complement (x) Drugs and dressing materials.	Indent for medical stores was planned and placed. Medical equipment not available were procured. The requirement for additional beds, blood, ambulance etc was worked out and arrangements made with the State government (Table-2). One hundred and fifty beds were reserved and kept readily available in various major and super speciality hospitals. Also three hundred units of blood of various groups were kept aside and a donor panel drawn up. Specialist were asked to stand by in their hospitals during flying hours
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All these are depicted in Table-1.

Table-2: Hospitals and Available Resources

Sl. No	Hospitals	Type of cases	Beds	Blood (unit)	Ambulance	Distance/Time
01.	Wheel and axle	General	10	-	-	7.5 kms/10 min
02.	Manipal	Cardiac/Head injury	10	20	On call	4.5 kms/8 min from HAL airport 32 kms/45 min
03.	Nimhans	Head injury	10	30	-	30 kms/45 min
04.	Sanjay Gandhi	Trauma/Burns	15	30	Ambulance	25 kms/60 min
05.	Bowring & Lady Curzan Hosp	General	10	-	Ambulance	25 kms/40 min
06.	Mallya Hosp	All cases	10+	20	Ambulance	25 kms/40 min
07.	Hosmat	Trauma	05	-	Ambulance	25 kms/40 min
08.	Victoria	Burns	05	20	-	24 kms/40 min
09.	St. John's	Burns	10	20	-	38 kms/55 min
10.	Baptist	General	10	20	-	12 kms/20 min
11.	Red Cross Society	-	-	130	(1000 units)	available on request
12.	Jayadeva Institute of Cardiology	Cardiac	05	-	Ambulance	24 kms/40 min
13.	HAL Hospital	-	-	-	Ambulance	01 kms/5 min from airport
14.	CHAFB	All cases	50+	30+	Ambulance	28 kms/45 min 06 kms/10 min from airport

Note: - Helicopter will take 12 min from Air Force Station Yelahanka to Bangalore Airport.

-Direct Hotline services provided to (i) CHAFB, (ii) Mallya Hospital, (iii) Manipal Hospital.

and a list of hospitals and their specialists panel along with their telephone numbers were kept at the Medical Control Centre. Some of the hospitals also provided ambulances with a medical officer and a trained nurse in each.

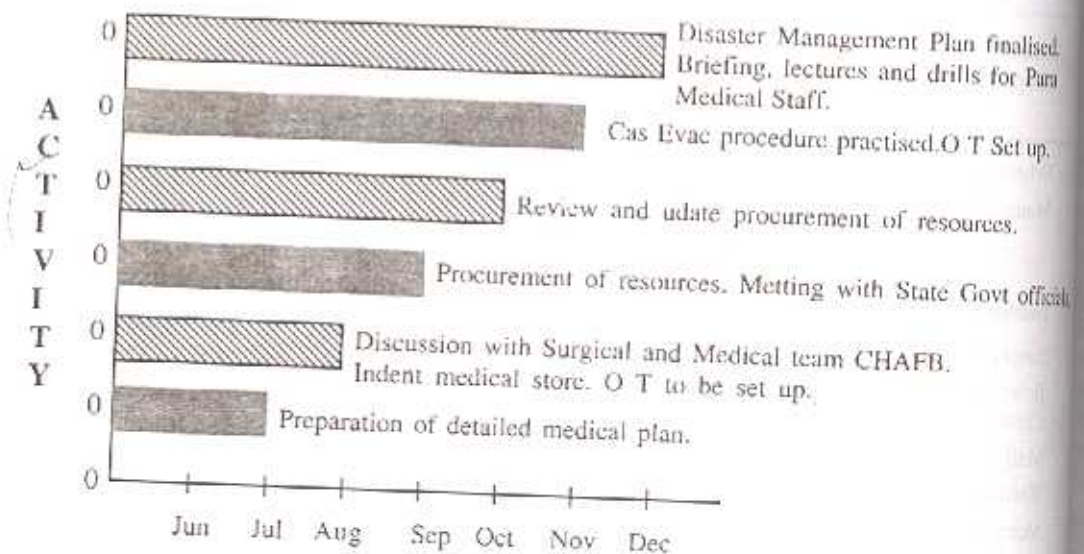
To monitor the progress of various activities a Programme Evaluation Review Technique (PERT) chart was drawn up (Fig 1) and compliance

checked periodically. A contingency plan was drawn up.

Aircraft Disaster Management Plan

The already existing station aircraft disaster management plan was augmented for the purpose of Aero India '98. This involved:

Fig 1 : PERT chart of activities during air show



Note : Contingency Plan

1. For items not available through medical stores contingency fund to procure the same from market was planned.
 2. It was planned to have a mobile OT in case the OT at SSQ was not established in air.
- (i) Crash and Rescue as per Pre-accident plan, the reaction to any disaster during Air Show
- (ii) Triage and Evacuation.
- (iii) Emergency Medical Services.

(i) The Pre-Accident Plan (PAP)

The PAP of Air Force Station Yelahanka was upgraded as part of the Disaster Management

The medical Disaster Management Plan for Aero India '98, was merged with the Station Aircraft Disaster Management Plan to synergise

at Aero India '98. The crash and rescue teams were fully trained in rescue/evacuation procedure of all the twenty six types of aircrafts that took part in flying display (Table-3). All the medical assistants participated in the crash rescue drill and

learnt how to operate the Quick Release Box (QRB), open the harnesses remove the helmet and oxygen mask in case of fighters. To minimise casualties in case of a crash. Hygiene and sanitation in the camp was stepped up and waste

Table - 3 : Aircrafts for flying display

Sl. No.	Name of Aircraft	Type of Aircraft	Country
01	AN-38	Transport	Russia
02	MIG-AT	Fighter trainer	Russia
03	Mirage 2000	Fighter	France
04	KA-50	Helicopter	Romania
05	Mig-21	Fighter	Romania
06	Su-30	Fighter	Russia
07	Su-33	Fighter	Russia
08	Falcon-2000	Transport	France
09	Hawk-200	Fighter trainer	UK
10	HS-125	Transport	UK
11	Lear Jet	Transport	South Africa
12	IL-114T	Transport	Uzbekistan
13	ATR-42500	Transport	France
14	P-68	Transport	India
15	Hansa	Transport	India
16	Sea King	Helicopter	India
17	HPT-32	Trainer	India
18	Pushpak	Trainer	India
19	Domier	Transport	India
20	Jaguar	Fighter	India
21	Chetak	Helicopter	India
22	Mig-27	Fighter	India
23	AVRO	Transport	India
24	ALH	Helicopter	India
25	Lancer	Helicopter	India
26	Kiran	Fighter trainer	India

bins with covers were positioned at strategic points. Insecticidal spraying of the whole camp was done. All these measures helped reduce bird menace.

All the aircrafts took off and landed from Air Force Station Yelahanka. Around one hundred and ten take-offs and landings took place every day during the period of the Air Show.

The PAP laid down procedures to establish responsibilities for ensuring the quickest and most systematic rescue operation possible [3]. Procedures were formulated and practiced for a prompt response to an aircraft accident on or off base. This involved trained man power planning and fool proof communication for rescue and evacuation [4]. It was ensured that all rescue services were on high alert when ever flying was in progress. Interpreters were available with pagers at the base operation centre to help the rescue services in case foreign nationals were involved. All the aircrew and ground crew who were briefed about the available arrangements, expressed their satisfaction.

(ii) Casualty Evacuation (Cas Evac)

After rescue and triage in one of the hangers designated for holding casualties they would be evacuated to major hospitals by road or air depending upon the severity of their injuries [5].

A MI-8 helicopter was in a state of readiness throughout the duration of air display with one Medical Officer, two Medical Assistants, Scale 'E', Portable Oxygen and battery operated Suction apparatus [6]. A MI-8 can carry twelve lying or twenty sitting cases. As the ambulance version hook-on stretchers were not available only six light weight foldable stretchers were carried. The Medical Officer would decide on the number of lying and sitting cases to be carried in consultation

with the captain of the helicopter. The Officer in charge of casualty evacuation was in constant contact with Duty Air Traffic Officer (DATCO) and Senior Medical Officer (SMO).

A special landing site was ear marked and a casualty evacuation helicopter at Bangalore 534 (Fig 1). The flying time was 12 minutes (Fig 1). In majorities the casualty would be transported to and on to hospitals by ambulance. Fully equipped ambulances with a team of one doctor and one nurse in each, were kept ready at base for the evacuation of casualties by road. An ambulance was also kept ready and stand by to handle casualties. The route to the various hospitals was marked out and timed (Appendix-A). Personnel were posted on duty to ensure smooth passage of ambulance [7].

All these measures ensured that the casualties reached the designated hospital within the Golden Hour to ensure that every one who survived initial injury would live [1,8]. A Medical Centre (MCC) was set up with direct links to major hospitals to co-ordinate casualty evacuation.

(iii) Emergency Medical Services

Emergency Medical Services were upgraded to meet any eventuality. The Forward Aid Posts (FAP) and three Medical Aid Posts (MAP) was established so that the medical aid on the spot in the exhibition area without any delay. The SSQ was upgraded to the setting up of an operation theatre with a team, Medical Specialist with Cardiac Care, Expanded Ward, Burns Ward and Post Operative Ward. These facilities were hardly half a kilometre away from the exhibition area and easily accessed by readily available ambulances.

Utilization of Medical Services during the airshow

Disaster Management Plan was luckily, not required to be activated during aeroindia '98. However the medical services handled illness of general nature. A total of 794 persons reported illness, 260 (32.7%) of these reported to various FAPs and MAPs at the exhibition site and the remaining 534 (67.3%) reported to the SSQ (Table-4). The majority of the ailments were of the minor nature and only 25 cases (3.6%) required hospitalisation (Table-5). All patients were given treatment within 15 minutes of their falling sick and reporting.

Table-4 : Place of Sick Report

Place	No. of Cases	%
FAP/MAP	260	32.7
SSQ	534	67.3
Total	794	100

Table-5 : Pattern of Sick Report

Pattern	No	%
Minor	25	3.6
Major	669	96.4

Special Features of Disaster Management Plan : Aero India '98

- One hundred and fifty beds were reserved and kept readily available in various major hospital including corporate hospitals.
- Three hundred units of blood of various blood groups were kept in readiness. In addition one thousand unit would be available immediately on demand.
- The Primary Health Centres around the airfield were kept on alert during flying.

- A team of specialists and super specialists were on duty each day in their respective hospitals till flying was over for the day.
- Direct not lines were established with major hospitals.
- Improvement in hygiene and sanitation helped reduce bird menace.
- Each ambulance was fully equipped and was manned by a team of one doctor and one nurse.
- An ambulance coach was kept ready and stand-by for evacuating mass casualties.
- The police were apprised of the importance of the Golden Hour and hence were placed enroute designated hospitals to regulate and clear traffic to assist casualty evacuation.
- Interpreters were available for ready communication with the foreigners. The Defence Exhibition Officer handled all the activities pertaining to foreigners.
- The State Government endorsed the Disaster Management Plan formulated by the Indian Air Force.

Conclusion

Disaster Management Plan was an essential part of the planning for Aero India '98. The plan was exhaustive and well practiced so that any emergency situation could be handled. The plan ensured that high quality medical aid was provided on the spot and definitive treatment was instituted within the Golden Hour. Simple measures instituted early often contribute more in saving lives than advanced life support instituted too late. The total support of Head Quarters Training Command and other agencies led to the successful planning and execution of the air show Aero India '98 had thus set the standard for future Air Shows in India.

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