

TECHNIQUES AND MANAGEMENT OF
AIRCRAFT ACCIDENT & INCIDENT INVESTIGATION
AT INDIAN AVIATION ACADEMY, NEW DELHI
(27.08.2018 to 31.08.2018)

Five days training (27.08.2018 to 31.08.2018) on the 'Techniques and Management of Aircraft Accident Investigation' was conducted at Indian Aviation Academy New Delhi. This training was 3rd in series conducted by AAIB, the earlier two being in the year 2012 and 2015. The topics of the training were covered by the subject matter experts inhouse and from the industry including Coast Guard (SAR) and DRDO Psychologist (Human Factors). It was attended by more than 50 officials including the officers from AAIB, industry and experts. The training was focused on both the phases i.e. phase 1 and phase 3 of the training for investigators. The OJT (Phase 2) for the officers and experts is an ongoing process. The training comprised of

- Aircraft Accident Investigation - Phase 1 (Initial Training)
 - ✚ Management of accident and incident investigations
 - ✚ Various aspects of aircraft accident investigation
 - ✓ **Administrative Procedures**
 - ✓ **Initial Response Procedures**
 - ✓ **Investigation Procedures**
- Aircraft Accident Investigation - Phase 3 (Some aspects of Basic Accident Investigation)
 - ✚ the accident site considerations, such as hazards, safety precautions, wreckage diagramming, collection of evidence and control of access;
 - ✚ the investigators' personal equipment and protective clothing;
 - ✚ the examination and recording of the wreckage and witness
 - ✚ witness interview techniques;
 - ✚ flight recorders;
 - ✚ Crew Suitability and human performance;
 - ✚ the methodology of report writing; and
 - ✚ Organizational information.

Lot of exercises and examples were discussed during the training. These exercises were based on the real investigations undertaken by AAIB, India and emphasis was laid on the methodologies of investigation and root cause analysis. Aspects of Just Culture while analysing the factual information were brought out during interactive sessions.

0930 - 1100		1115 - 1300	1345 - 1515	1530 - 1730
27.08.2018	0900 - 0930	ADMINISTRATIVE PROCEDURES	FLIGHT CREW SUITABILITY	EXERCISE ON INCIDENT INVESTIGATION
	0930 - 1000 Hi Tea			
28.02.2018	1000 - 1115 INTRODUCTION & AIM OF TRAINING	INVESTIGATION PROCEDURES (WRECKAGE EXAMINATION & ORGANISATION)	FLIGHT DATA MONITORING	EXERCISE – FAIR TOOL JUST CULTURE
	INITIAL RESPONSE PROCEDURES INCLUDING SAFETY AT INVESTIGATION SITE			
29.08.2018	MEDICAL HAZARDS AT AIRCRAFT ACCIDENT SITE	HANDLING THE MEDIA AFTER AN INVESTIGATION (AAIB & AIRLINES PERSPECTIVE)	ANALYSIS OF EVIDENCES AVAILABLE AT AERODROMES	ANALYSIS OF EVIDENCES - METHODOLOGY
30.08.2018	INVESTIGATION - MAINTENANCE ASPECTS	REPORT WRITING	HUMAN FACTORS & AVIATION PSYCHOLOGY	EXERCISE – ANALYSIS AND REPORT WRITING
31.08.2018	SEA SEARCH OPERATIONS	SSP/SMS – FOR INVESTIGATORS	ROOT CAUSE ANALYSIS OF COMMON CAUSAL FACTORS	REGIONAL COOPERATION CLOSURE

TEA BREAK

LUNCH BREAK

TEA BREAK



Capt. Pankaj Chopra is pilot by profession. He had flown 14 different types of aircraft (both fighter and transport) and is now Director with one of the NSOPs. He had served in IAF for about 25 years. He had been Chief of Flight Safety and then Head of Safety and Ops Quality with scheduled airlines.

He had been Qualified Flying Instructor, Aircrew examiner, Instructor on Theory, Systems, and Documentation on Airbus 320. He is Accident Investigation Specialist with IFSA, a lead Auditor (IATA) Aviation Safety and Quality and Safety Management Systems. He has undergone Crisis Management and Crisis Communication Facilitator training from Kenyon International Ltd.

He took the subject of "Handling the media after an accident".

Media has the power to change the public perception of an aviation accident, incident or any event concerned with aviation. The spread of information about such events nowadays is almost instant and widespread. This information can either make or mar the reputation of operator if not dealt with in a timely and correct manner. Suitable and immediate action therefore should be taken by the investigation authority and operator concerned for providing factual information. Facts about the progress made in this regard during initial days may also be released on day to day basis, if possible.

Operators have to ensure that suitably trained staff is designated to handle the media in the event of an accident. Media handling is a critical part of the Crisis Handling Procedure. It has to be proactive, sincere, upfront, honest and timely. Media should be treated with care and consideration. Media handling should neither be adversarial nor complacent as they have their own priorities, constraints and positive/negative attributes. It is best to know them, understand them and use them to the advantage to prevent unnecessary damage post an accident.



Colonel (Dr) K Nageshwar Rao is an alumnus of the Armed Forces Medical College Pune. He did MBBS and post-graduation in Aerospace Medicine from IAM, Bangalore. In the field of Aerospace Medicine, he has established himself as a scholar of repute within the Defence services and outside by his innovative thinking. He has been on the faculty of IAM Bangalore and has been the Head of Department of the High Altitude Physiology Department. He has numerous scientific papers published in National Journals to his credit and has presented scientific papers at various national and international conferences. He is also the recipient of the best scientific paper award twice at the National conference of the Indian society of aerospace medicine and Chief of the Army Staff Commendation in the field of Aerospace Medicine. He covered the subject of "medical hazards" at the crash site.

Hazards at accident site such as Environment — location (both geographic and topographic), fatigue (effects of travel and transportation), insects/wildlife, climate, security and political situation; Physical — fire, stored energy, explosives, structures; Materials — exposure to and contact with materials and substances at the site; and Psychological — stress and traumatic pressures imposed by exposure to the aircraft accident, and interaction with those associated with the air carrier and related aviation activities.

Biological hazards — pathogens associated with human remains or cargo consignments and state of local hygiene were covered in detail viz. Food & Water; Human Contact; Blood Borne Pathogens; Virus Persistence Infectivity; General Protection Measures; Personal Protection and Post Exposure Management.



Col. Pradeep Srivastava (Retd.) served the Indian Army for about 22 years. He has flown different types of helicopters and is Instructor and Examiner on Helicopters. He is a DGCA, India- Industry Expert, Helicopter and on pool of experts with AAIB, India for Accident Investigation. He had been chairman and member of different Committees of Inquiries constituted by MoCA for carrying out investigation of helicopter. He has flown Helicopter in all terrains- Jungles, Plains, Mountains, desserts and High Altitudes, Rescue operations etc. He had participated in Indian Anti Insurgency Army Operations and participated in United Nations Mission.

He is a safety enthusiast and has passion for the analysis of occurrences.

It is quite rare for an accident to be explained by one single cause. Almost every mishap is the consequence of a chain of events and accident reports usually discriminate between the main cause and a number of contributing factors.

Covered the root cause analysis of some of the accidents/ serious incidents in the recent years, particularly small aircraft and helicopters. The methodology being used for the analysis of these accidents/ incidents (5 whys) vis-à-vis the well established techniques used for finding the root cause were discussed.



Capt. Dhruv has total flying experience of more than 15000 hrs covering Fokker-27, B737 & Airbus A319/320/320. He currently flies as a "Designated Examiner" on A320. He has been associated with pilot training, CRM training, audits, emergency response , accident & incident investigation. He is passionate about the investigation and has been a speaker and member at many of the International Conferences organised by ICAO and Airbus. He is on the pool of experts of AAIB.

He gave the insights on the "Flight Crew Suitability" particularly emphasizing the dimension of accident prevention.

One should be assessed for suitability at the time he intends to be flight crew and should be sufficiently mature educationally, physically and mentally to acquire and demonstrate the relevant theoretical knowledge and practical skill. There should be rugged systems in place across all the airlines to check and assess the suitability of flight crew. Followed by this should be the systems of correcting any deficiencies or weaknesses which may creep into due various reasons including human factors. Interactive discussions were held through various examples of accidents and the investigation thereof,



Mr. Anirudh Choudhary is the Associate Director of the Flight Safety of an Airline. An Engineer with an ME in Aeronautical Engineering from Kiev International University of Civil Aviation, Ukraine, he has more than 16 years of experience in airlines on Flight Data Analysis & Monitoring, incident investigation and Safety Audit. He was the prime-mover in setting up of Safety Department of an airline.

He spoke on FDRs and their handling after an accident.

Due to their importance in investigating accidents, FDR and CVR are carefully engineered and constructed to withstand the force of a high speed impact and the heat of an intense fire. Following an accident, the recovery of the FDR is usually a high priority for the investigating body, as analysis of the recorded parameters often detect, identify or corroborate causes or contributing factors.

Modern day FDRs receive inputs via specific data frames from the Flight Data Acquisition Units (FDAU). They record significant flight parameters, including the control and actuator positions, engine information and time of day. FDRs are accompanied by an underwater locator beacon that emits an ultrasonic "ping" to aid in detection when submerged. These beacons operate for up to 30 days and are able to operate while immersed to a depth of up to 6,000 meters (20,000 ft).

The real challenge is to obtain data from the damaged units. Trainees were taken through (PPT) one of the FDR unit retrieved from under water (sea) where data was successfully downloaded highlighting the precautions and challenges in the process.



Capt. Gaurav an Instructor on B777 has 12,000 flying Hours to his credit. His management experience spans over a period of 8 years, having held positions in Flight Operations Projects , Strategic Planning and Flight Safety. He has made several contributions in improving safety awareness, investigations and introductions to safety processes and systems. He has undergone several courses to enhance his understanding on safety, the most recent one being at the Cranfield University.

He provided a brief review of the Annex 13 investigation and discussed the need for a formal Analysis method with the industry best practices. This was followed with the challenges and proposed methods in interactive sessions with case studies.



Mr. N. Venkat Vice Chairman of the Regional Operations Safety Committee, ACI-Asia Pacific is currently holding the responsibility of 'Head Safety & Environment Compliance' at one of the airports and is also the Safety Investigation Coordinator. He comes with more than three decades of aviation industry experience with specific expertise on Safety Management System, aerodrome certification, airport operations, airside planning and safeguarding, aircraft bird-strike conflict management, Course development and training delivery. He has undergone Aerodrome Certification Course-ICAO, Safety management system-ICAO and Trainair plus Training Development Course from ICAO. He also holds Global Safety Network professional Diploma and Accident & Incident investigation procedures from ACI.

He shared his views on role of aerodrome operator in case of an accident.

The process of investigation is like creating a work of art and indeed an investigator need to be more creative and must have the ability to see things which are actually not there. Imagination and visualization are key ingredients of the investigation process. Also the basic intention of all aircraft accident investigations is to prevent it from happening again. Hence it is essential to zero in on the 'Root-cause(s)' which need to be addressed to prevent future occurrences. However, accurate identification of the Root-cause largely depends on meticulous collation of evidences and their correct interpretation. Various sources of information/evidence available in an airport scenario keeping the big picture in mind were discussed.



Mrs. KUHU GANGULY Scientist 'F' with Dte. of Aerospace Safety, Air HQs. was a Merit Scholar in her graduation and post graduation in Psychology. She is a Certified Accident Investigator & Aviation Psychologist from Cranfield University and her primary role is in Psychological Analysis of accidents from human factors perspective. She regularly gives presentations in Air Force, Army & Naval Flight Safety Conferences and has numerous international and national published papers to her credit. She was expert with Air India & Alliance Air for selection of pilots for Airbus A-320 and was Board Member of SSB & AFSB. She gave insights into social and psychological aspects of human element in aviation scenario.

Aviation is one of the most difficult and challenging careers. Although Statistics indicate a decline in accident rate in Aircraft accidents, Human Error (HE) accidents continue to remain at a steady 70%-75%. Human Factors is a field that involves psychological, social, physical and biological characteristics of the man in aviation scenario. The information thus obtained is used for design, operation and optimizing human performance, health and safety. The human element is the most flexible, adaptable and valuable part of the aviation system, but is also the most vulnerable to influence which can adversely affect performance.

Psychological perspective as the root cause of human error accidents and development of appropriate training modules significantly enhances aerospace safety.



Mr. Raj Ramanand has 34 plus years of industrial experience including Manufacturing, IT and Business Consulting. He is working with Flight Safety team of an airline and has brought in simulation and modelling techniques for Predictive Data Analysis. He is a certified Lead Auditor of Quality Systems based on ISO 9001 as well as IT Security Auditor based on ISO 27000. As a Business Consultant he has worked with more than 60 organizations worldwide, providing, advisory, auditing and training services. He trains in the areas of IT, Six Sigma, Project Management, Safety Management, Risk Management, Culture and Change Management.

He conducted an exercise on Just Culture.

Safety culture is the bedrock of safety performance and has at its heart a Just Culture reporting environment. A safety culture encompasses an organisation's commonly held perceptions and beliefs regarding safety and has the potential to significantly influence people's behaviour. Founded upon a Just Culture, safety culture allows individuals to freely and openly share safety-related information in an atmosphere of trust, born from a sense of justice.

FAiR® 2 System developed by © Baines Simmons Limited was used (by taking practical examples) to classify the behaviors, i.e. Errors, Mistakes, Violations (intentional)



Sh. Arun Kashyap is an aviator by profession with 20 years aviation experience. After completing basic course in aircraft maintenance in Avionics stream, he got the endorsements on Boeing 737, Boeing 777, Airbus 330, Airbus 340 and ATR 72-500. He has got Masters in Air Transport management from City University UK. He has worked in different airlines at various positions in engineering and Maintenance division. In addition to domestic airlines, he has worked with Fly Dubai, Oman Air etc. He had held management positions in different airlines and is now Executive Vice President and Head of Engineering and maintenance. He was also a part of start-up team at Fly Dubai in 2009 and core team involved in turnaround of airline in 2014.

He talked on Maintenance aspects (wreckage examination) of investigation.

The aircraft structure investigation concentrates on the airframe, including primary and secondary structure, lift and control surfaces. When investigating an accident caused by structural failure of the airframe or system, study the wreckage and evaluate the components and fractured surfaces. Knowledge of the history of the flight, prevailing weather conditions, aircraft behaviour, and the probable type of air loads sustained during flight manoeuvres also assist in determining failure areas.

Reconstruction is employed for specific components such as a wing, tail surface or control system, although in some instances it is necessary to reconstruct almost all major components. Reconstruction is performed in two stages: Identify the various pieces and arrange them in their relative positions & examine in detail the damage to each piece, and establish the relationship of this damage to the damage on adjacent or associated pieces.



Commandant Amol Deshpande joined the Indian Coast Guard in 1996 when the service was seeing massive growth in form of assets and infrastructure. He has more than 4000 hours of operational flying. The Officer has also represented his country while on Deputation to the Republic of Mauritius.

During the course of his career, the Officer has had the privilege to serve onboard all the class of ships and has commanded Fast Patrol Vessel based at New Mangalore. The Officer is also trained in the Maritime Search and Rescue (M-SAR), GMDSS and Aircraft Accident Investigation.

He will give us practical insight into Maritime Search & Rescue.

The SAR Convention (1985) was designed to provide the framework for necessary arrangements for provision and co-ordination of search and rescue services. The aim was to develop a global SAR plan, to ensure that, no matter where an accident occurs, the rescue of persons in distress at sea will be coordinated according to international standards and, if necessary, by co-operation between neighbouring states. Therefore the world's oceans are divided into search and rescue regions established by agreement among Parties concerned.

In Indian pretext the co-ordination and planning is with Indian Coast Guard. The success of plan depends almost entirely on the number of parties to the Convention and how well parties assure necessary arrangements for the provision of adequate search and rescue services for persons in distress at sea within their search and rescue regions. The details of plan / procedure and facilities available were good information to know and use.



R S Passi, Director Air Safety holding degrees in engineering and law is in the field of aircraft accident investigation from last 33 years and has carried out investigation of around 50 serious incidents/ accidents. He has acted as Accredited Representative from India in number of cases. In addition to the domestic trainings at AI training school, IAF, COSCAP, EU he has undergone trainings at Seattle USA (Boeing 777) & Kazan helicopters, Russia (Mi 172), ICAO USOAP Auditors training (Bangkok), Aviation Safety Inspectors training (Oklahoma, USA) and ICAO train the trainers course on SMS.

He has presented papers on AAIB (India) at ICAO DGCA conferences and ICAO safety symposiums. He studied the functioning of major investigating authorities of the world (visited ATSB Australia), while AAIB India was being established. He delivers lectures on Safety Management System, ICAO Annex 13 & Accident Investigation Techniques (e.g. IAF & Afghan DGCA officers) & on Cabin Safety for DGCA Cabin Safety Inspectors as per ICAO syllabus.

He covered the topics of investigation & Management viz. administrative procedures, initial response procedures, investigation procedures, report writing, wreckage examination. In addition, he also complemented the topics of DFDR monitoring, Wreckage site hazards, investigation methodologies and harmonised the issues raised during interactive sessions.

Acted as overall coordinator/ moderator for all the topics during training.