TRAINING MANUAL

(FOR OFFICERS AND INVESTIGATORS)

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TERMINOLOGY

The definition of the terminology is hereby given to ensure that the readers understand the intended meaning of the terms in the context of this circular.

Accident investigation authority. The State organization responsible for conducting aircraft accident investigations.

Accident investigator. A person engaged in the investigation of aircraft accidents, incidents and other aviation safety hazards.

Accredited representative. A person designated by a State, on the basis of his or her qualifications, for the purpose of participating in an investigation conducted by another State.

Adviser. A person appointed by a State, on the basis of his or her qualifications, for the purpose of assisting its accredited representative in an investigation.

Expert/Specialist. A person invited to participate in an investigation, on the basis of his or her specialized knowledge, skills or experience.

Investigation. A process conducted for the purpose of accident prevention. It includes the gathering and analysis of information, the drawing of conclusions, the determination of causes and the making of safety recommendations.

Investigator-in-charge. A person charged, on the basis of his or her qualifications, with the responsibility for the organization, conduct and control of an investigation.

Observer. A person permitted to be present in an investigation for the purpose of observing the investigation process.

INTRODUCTION

Aircraft accident investigation is a specialized task which should be undertaken by qualified investigators only. Aircraft Accident and Incident Investigation Bureau (AAIIB) Mongolia has been established in year 1980. Earlier Air Safety Directorate of MCAA Group was carrying out the functions and duties of investigation and prevention of accidents. Initially AAIIB is being manned by qualified and experienced investigators from Airline and CAA.

Aircraft accident and incident investigators have been trained and developed through participation in various training programmes delivered by officially recognized training organizations by the International Civil Aviation Organization (ICAO). In recent years, initial, on-the-job, additional and specialized training has also been conducted in-house under the supervision of qualified Instructor-Investigators with relevant experience.

In addition to the aforementioned training programmes advanced and specialized training as well as dedicated recurrent and, where necessary, additional or refresher training are conducted through recognized training organizations by the ICAO.

CHAPTER 1

QUALIFICATION AND EXPERIENCE

1.1 General

Since the outcome of an accident investigation is largely dependent upon the aviation knowledge, skills and experience of the assigned aircraft accident investigators, they should have:

- an understanding of the depth of investigation that is necessary in order for the investigation to conform with the legislation, regulations and other requirements.
- a knowledge of aircraft accident investigation techniques;
- an understanding of aircraft operations and the relevant technical areas of aviation;
- the ability to obtain and manage the relevant technical assistance and resources required to support the investigation;
- the ability to collect, document and preserve evidence;
- the ability to identify and analyze pertinent evidence in order to determine the causes and, if appropriate, make safety recommendations; and
- the ability to write a final report that meets the requirements of the accident investigation.

1.2 Recruitment requirement

The recruitment experience requirements for senior levels in the AAIIB are civil aircraft accident investigation as per the obligation of ICAO Annex 13. However at entry level officers with experience & qualification in various fields of aviation will be recruited with a knack for qualitative and investigative analysis. Qualification in the legal and statistical analysis field will be desirable qualification. In addition a panel of experts will be kept with above type of experience. When assigned to an accident investigation, such personnel will be relieved of their regular duties as and when required for the investigation.

1.3 Experience requirement

As of now and in future, the appropriately qualified personnel available with the AAIIB will require training in the accident investigation techniques in order to participate in or to conduct an aircraft accident investigation. These personnel will have considerable practical experience in aviation as a foundation on which to build their investigation skills such as a pilot, aeronautical engineer or aircraft maintenance engineer. Personnel qualified in flight operations, airworthiness, air traffic management, or aviation related management will also be provided accident investigator training, since accident investigations will often involve specialized areas. It will be ensured at all times that those selected for training as investigators understand the aviation infrastructure and are able to relate to the many different areas of aviation.

1.4 Qualification requirement

An accident involving a general aviation or small commuter aircraft, depending on the conditions may be investigated by a Committee of Inquiry comprising of two persons or at times small reports prepared by a single investigator. Most likely, the investigators will be drawn from a panel of experts maintained with the AAIIB. The experts should have at least attended the introductory Aircraft Accident Investigation course covering the procedures as per ICAO Annex 13. In these investigations, it is desirable for operations investigator to have some technical experience and for an engineering investigator to have some operational experience. In addition, the investigators should have a comprehensive understanding of the interrelationship of each of the supporting services that are necessary to operate an aircraft in the aviation environment.

1.5 Personal requirement

In addition to technical skills and experience, an accident investigator requires certain personal attributes. These attributes include integrity and impartiality in the recording of facts; ability to analyze facts in a logical manner; perseverance in pursuing inquiries, often under difficult or trying conditions; and tact in dealing with a wide range of people who have been involved in the traumatic experience of an aircraft accident.

1.6 Instructor

The head of the AAIIB and chief investigator shall be authorized to conduct and teach courses in initial, basic and on-the-job training, selected from among qualified investigators working as investigators in the Aircraft Accident and Incident Investigation Bureau.

Candidate requirements:

- Has a higher education, is an aircraft engineer, pilot, air traffic controller and has completed a specialized course
- The airline industry has been under his leadership for more than 15 years
- 5-10 years of experience in aircraft accident and incident investigation, with multiple time of experience in investigation
- Experience in reforming and implementing the Mongolian Civil Aviation Law, extensive knowledge of International Civil Aviation Organization (ICAO) documents, Article 26 of the Convention, and Annex 13
- Ability to convey knowledge systematically and clearly
- Ability to organize case-based training, simulations, and discussions
- Able to assess and provide feedback to students
- Intermediate or above English language skills (able to use international materials and conduct training)
- Ability to prepare reports.

The person authorized to teach shall conduct classes and training in accordance with the programs set forth in the "Aircraft Accident and Incident Investigation Policy and Procedures" and "Training Manual " The Bureau shall be responsible for the registration of training.

CHAPTER 2

TRAINING GUIDELINES

2.1 GENERAL

2.1.1 Aircraft accident investigators require different levels of experience, knowledge and training according to the particular role to which they are assigned. AAIIB officers will be imparted training commensurate with their responsibilities as an accident investigator, group leader, investigator-in charge, and accredited representative or expert. The panel of experts will be imparted training to act as advisers, experts or specialist. The training guidelines and course will be planned in such a way that the investigators receive appropriate levels of training and will enable them to perform efficiently in any of the roles assigned to them.

2.1.2 Training a person for aircraft accident investigation involves several phases. These phases include initial training, on-the-job training, a basic accident investigation course and an advanced accident investigation course supplemented by specialized courses. While on-the-job training is an ongoing process that continues for many years, there will be sufficient time intervals between each formal course to allow the investigator to consolidate the information and the techniques learned.

2.1.3 Formal courses are designed to complement on-the-job training by exposing the AAIIB officers to a cadre of expert investigators. The experts conducting the training will be from those with experiences in a particular area of accident investigation i.e. aviation medicine physicians, psychologists, aeronautical engineers and manufacturers' representatives. Structured courses in aircraft accident investigation will also be conducted by AAIIB as and when required.

2.2 PHASE 1. INITIAL TRAINING

Every officer on joining AAIIB will be imparted initial training. In case very few officers join the training may be imparted in parts. The aim of the initial training is to familiarize new investigators with the legislation and with the procedures and requirements of the AAIIB. The following subjects are included in the initial training or indoctrination:

a) Administrative arrangements

- Chicago Convention on 7 December 1944. Article 26, Annex13 Aircraft accident incident Investigation;
- Civil aviation Law of Mongolia on 07 July 2023. Regulation of AAIIB on 13 October 2025 Order A/272

- Memoranda of understanding with other organizations;
- Liaison arrangements with local authorities;
- Structure of the AAIIB;
- Aircraft accident investigation procedures manual;
- Definitions and accident classification;
- Equipment and tools;
- Transport arrangements;
- Ethics and conduct; and
- Expenditure control. b) Initial response procedures
- Procedures for calling after occurrence;
- Notification of other Mongolian authorities and organizations;
- Securing of records, recordings and samples;
- Photography
- Handling of Flight Recorders
- Accident site jurisdiction and security;
- Investigator
- Recovery of human remains;
- Requests for autopsies; and
- Family assistance. c) Investigation procedures
- On site investigation;
- Preservation of evidences;
- Authority and responsibility;
- Size and scope of the investigation;
- Investigation management;
- Use of specialists;
- Parties to the investigation, accredited representatives, advisers and observers; and
- Release of information to the news media.

d) Reports
- Preliminary report;
- Final report including aspect of reopening;
- Submission of reports and ADREP;
- Follow up on recommendations;

2.3 PHASE 2. ON-THE-JOB TRAINING

Following the initial training, the AAIIB will provide on-the-job training for new investigators. During this second phase, the new investigators will practice the procedures and tasks covered in the initial training, and gain familiarity with investigation techniques. This training will also familiarize him/her with the investigation tasks at the accident site, the collection of factual information, the analysis of the factual information and the development of the final report. The conduct of on-the-job training should involve more than one experienced investigator and should not be limited to investigations within Mongolia, since international experience is necessary for all investigators.

During on-the-job training (OJT) newly appointed inspectors should be involved in at least two on-site inspection activities as observers.

2.4 PHASE 3. BASIC ACCIDENT INVESTIGATION TRAINING

After completing the initial familiarization training of phases 1 and 2, the aircraft accident investigator will attend a basic accident investigation course as soon as is practicable, preferably within the first year of training. Basic training should include "hands-on" aircraft wreckage examination in an accident laboratory and should include a curriculum that includes the following topics to ensure familiarity with the effective investigation methods of analysis and investigation:

- knowledge about operations of ICAO, with emphasis on Annex 13 and the Manual of Aircraft Accident and Incident Investigation, Doc 9756;
- the responsibilities of the States involved, as defined in Annex 13; accident/incident notification and response procedures;
- investigation management;
- the investigators' personal equipment and protective clothing;
- accident site safety;
- protection of evidence;
- initial actions at the accident site, such as security, hazards, safety precautions, wreckage diagramming, collection of evidence and control of access;
- the examination and recording of the wreckage, witness marks, and other evidence;
- information gathering techniques and tools;
- communication and recording media;
- air traffic control system;
- witness interview techniques;
- the full range of in-flight recorders and ground-based recorders;
- examination of maintenance documents;
- fire and explosions;
- crashworthiness and survival aspects;
- aircraft structures design and modes of failure;
- aircraft systems design and modes of failure;
- aircraft power plants design and modes of failure;
- aerodynamics and aircraft performance;
- rotary wing aircraft;
- human factors investigation;
- aviation medicine and pathology;
- organizational information (corporate culture);
- determination of flight crew suitability for flight;
- report writing methodologies;
- news media and public relations; and
- families of victims on the accident.

ICAO does not endorse specific courses or educational institutions that offer aircraft accident investigation training. However, the Aviation Training Directory and the ICAO web site (www.icao.int/td) list institutions that offer aircraft accident investigation courses.

2.5 PHASE 4. ADVANCED ACCIDENT INVESTIGATION TRAINIG AND ADDITIONAL TRAINING

2.5.1 ***Advanced accident investigation courses.*** Once an officer gains experience as a trained investigator, he/she will be sent for an advanced accident investigation course where he/she can update his/her knowledge of the basic techniques and increase his/her knowledge in special areas relevant to accident investigations.

2.5.2 ***Additional training.*** Additionally they will be called upon to investigate accidents involving a variety of aircraft types, thereby getting an opportunity to have a basic knowledge of most of the major air transport aircraft types that are operated in Mongolia. In this regard the officers will be asked to undergo aircraft technical training courses at manufacturers and operators facilities. Preferably, such aircraft type courses which include specialized technology transport category aircraft (i.e. aircraft equipped with a glass cockpit, fly-by-wire systems and aircraft which contain composite materials in their structure). Investigators with a technical or engineering background will attend the aircraft type courses for technical maintenance personnel. Similarly, investigators with a

Pilot background will attend the aircraft type courses for pilots, which could include introductory flight training in a flight simulator.

2.5.3 In accordance with Annex 13, the State of Design and the State of Manufacture participate as accredited representatives in investigations involving the type of aircraft that are designed or manufactured in their State. Although the accredited representatives are usually accompanied by expert advisers from the design organization and the manufacturer, it will be ensured that the investigators, who are appointed as accredited representatives have a basic knowledge of the aircraft designed or manufactured in Mongolia.

2.5.4 Efforts will also be made to impart other additional training to officers by sending them to attend conferences and seminars conducted by aircraft accident investigation organizations, such as the International Society of Air Safety Investigators (ISASI), IAF. The officers will be deputed to major investigations as observers.

2.6 INDIVIDUAL DEVELOPMENT PLAN

The aircraft accident investigators require different levels of experience, knowledge and training according to their particular background and role to which they may be assigned, the AAIIB has developed an Individual Development Plan (IDP) for each investigator. The IDP contains the basic requirements of knowledge, skills, and experience that each investigator either must possess when hired, or must gain through a structured training program. The IDP also provides a tool to manage and plan each investigators training.

CHAPTER 3

COURSE GUIDELINES

3.1 BASIC ACCIDENT INVESTIGATION COURSES

3.1.1 Recommended topics

Basic aircraft accident investigation courses will cover the following topics:

- the responsibilities of the States involved, as defined in Annex 13 Aircraft Accident and Incident Investigation;
- the accident site considerations, such as security, 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 marks;
- the range of apparatus available for recording evidence;
- witness interview techniques;
- the full range of in-flight recorders and ground-based recorders;
- the determination of the time and origin of any aircraft fires;
- crashworthiness and survival aspects;
- the properties and the modes of failure of materials used in the aircraft structure;
- the design of aircraft systems and likely modes of failure;
- aerodynamics and aircraft performance;
- the examination of power plants;
- human performance;
- aviation medicine and pathology; and
- the methodology of report writing.

3.1.2 Detailed breakdown of the topics that will be covered

3.1.2.1 ***General Introduction.*** The first phase of a course will introduce to the history of aircraft accident investigation, the development of the international agreements on the conduct of investigations, and the Standards and Recommended Practices (SARPs) adopted by ICAO and its Contracting States in the field of aircraft accident investigation. The applicable international agreements and SARPs are contained in Annex 13 — Aircraft Accident and Incident Investigation to the Convention on International Civil Aviation. Relevant guidance material from the Manual of Aircraft Accident Investigation (Doc
6920) and Manual of Aircraft Accident and Incident Investigation (Doc 9756) will be used for training. A review of these documents and their salient points will be done so that the investigator knows where to find the information on the relevant topics. General guidance will also be given on the investigation of accidents involving unlawful interference and inaccessible or missing aircraft.

3.1.2.2 ***Accident notification procedures.*** The trainees will be introduced to the accident notification systems and the appropriate responses to be expected from each State and organization that are notified. This introduction will cover the ways on how the notification of the occurrence of an accident initiates the process of an

investigation. It will also cover the support to be provided to the accident investigation authority in the State of Occurrence by the State of Registry, the State of the Operator, the State of Design, the State of Manufacture, and any other States that are involved by virtue of the number of their nationals involved in the accident or are involved by providing a permanent base for the investigation due to their proximity to an accident site. They will be made aware of the requirements of Annex 13 in relation to this phase of an investigation. Preparation for overseas travel in the form of passports and visas and airport airside passes will be reviewed, as will be the benefits of access provided by the international agreements inherent in Annex 9 Facilitation.

3.1.2.3 ***Investigation management.*** The introduction will cover the role of the investigator, the skills he will need to acquire, and the accident investigation process. He will be made aware of the value of assessing the availability of resources (such as funding, personnel, equipment and buildings) as well as the planning for the investigation of a major accident before hand. He will be given guidelines for determining the appropriate size and scope of an investigation, the differences between the management of large and small investigations, and the type of circumstances in which assistance from specialists will contribute to the success of the investigation. An appreciation of the realities of the limits imposed by the resources available and the optimum use of those resources will be discussed. The value of memoranda of understanding with departments and organizations that might be involved in an investigation will also be addressed.

3.1.2.4 ***Investigators' equipment.*** The equipment to be used during investigations will be determined not only by availability and cost but also by the means available to transport it to the site. Information on the use of contemporary aids such as global positioning systems (GPS) and data links back to base, as well as on the use of basic items such as compasses and inclinometers will be made available. Instruction on the proper method of taking samples of aircraft fluids and the appropriate containers will also be included.

3.1.2.5 ***Accident site safety.*** The safety of personnel at an aircraft accident site is of paramount importance and must be understood by participants of an investigation. An investigator is a valuable resource and it is important that he is protected and well equipped to do his work in the field with as little risk as is practicable and with the optimum efficiency. Aircraft accidents frequently occur in adverse weather conditions in areas of inhospitable terrain such as mountainsides, swamps and deserts, or in adverse climatologically conditions involving ice or fierce heat. The need to take appropriate measures to protect those on the site against exposure to the elements, to any hazardous cargo or dangerous materials released from the aircraft, and against injury or infection must be understood.

There are medical risks and hazards from the aircraft wreckage itself and they must be explained to the investigators. Another subject that will be covered is how to deal with psychological stress of investigators and other personnel with exposure at an accident site. Disease is an ever-present risk and inoculations against such risks as hepatitis, malaria and tetanus are essential. The use of protective equipment against airborne and blood borne pathogens will be demonstrated. Utilities such as gas mains, electricity transmission lines and main transport routes require special consideration.

Finally, a plan for aid and rescue in the event of an accident involving personnel at the site is required by many occupational health and safety organizations and is also dictated by common sense.

3.1.2.6 ***Protection of evidence.*** To establish a suitable environment for a competent examination of the area and the accident debris, measures should be taken to protect the wreckage from fires, meteorological hazards and souvenring. The need to give priority to recording transient evidence, securing light objects that may be lost in the wind, and recording ground scars and other site markings that may become obliterated will be addressed. The conduct of interviews with the rescue personnel will also be discussed in order to facilitate the determination of the movement of items of wreckage, which they may have caused inadvertently.

3.1.2.7 ***Initial action at the accident site.*** The trainee will be given a thorough understanding of the numerous considerations that should be taken into account at the accident site. With some exceptions such as accidents involving missing aircraft or resulting in wreckage that is inaccessible, the accident site is the primary area of investigation. The methods of apportioning time effectively, prioritizing the types of information to be gathered, plotting the position of surface marks, and identifying and plotting the position of items of wreckage, as well as the preparation for the removal of any exhibits to a secure site are important considerations that the investigator should become familiar with from the outset.

3.1.2.8 ***Information gathering techniques.*** The trainee will be introduced to the methods of gathering and reviewing relevant documentation and procedures; the interview techniques used for different types of witnesses; the transcription of air traffic services and other recordings; and the review of aerodrome facilities, emergency services responses and meteorological data.

3.1.2.9 ***Communication and recording media.*** The various media available for communicating to and from an accident site and for recording the evidence at the accident site and throughout the investigation are essential elements of an investigation course. Digital video cameras and digital cameras, standard film photography, laptops and hand-held computers with connections via telephones to sources of information of immediate use at the accident site, and tape recorders are all useful for recording the available information as accurately and rapidly as is practicable. As each type of equipment is evolving rapidly, it will be an essential subject in the training of an investigator.

3.1.2.10 ***Witness interviews.*** The range of witnesses varies with physical condition, nature of involvement, and differences in ethnic backgrounds. They will also vary in their value based on their understanding of the required information and their proximity to the scene. They may be a visual witness who saw an event or an aural witness who heard a sound or relevant conversation. The preparation for interviews, information to be gleaned from body language, the relative positioning of the interviewer and interviewee, preparation of the questions to be asked, the use of open questions, the art of listening and general conduct of the interview, the use of recorders such as video cameras and tape recorders, the value of written statements and signed transcripts will

be considered. The precautions to be taken when interviewing the injured or persons in ill health, the young, the aged and hostile witnesses as well as the use of experts in the field of inquiry will be discussed.

3.1.2.11 ***Recorders.*** In addition to the flight recorders, there are many other forms of recorders used in the aviation industry, from the security cameras on the aerodrome perimeter fence to the maintenance recorders in the aircraft, each with potential use to an investigator. The value of each form of recorder, the methods of interpreting and downloading the information, and the sources of readout will be in the course syllabus. Equally, the value of manufacturer's expertise in recovering information from damaged recorders (such as global positioning receivers, solid-state flight recorders and inertial navigation unit components) will be explored. Another aspect of importance is the means of locating the flight recorders and recovering them from locations that are difficult to reach. Recorders at air traffic services facilities, particularly those that record radar returns, will be the subject of study and guidance regarding their potential use to an investigation.

3.1.2.12 ***Examination of relevant maintenance documents.*** The maintenance history of the aircraft is established primarily from the records held by the operator. However, the investigator must learn to establish whether the maintenance, inspection procedure and servicing that are recorded as having been completed have in fact been carried out, and he must also learn to determine the adequacy of the specified maintenance procedures.

3.1.2.13 ***Fires and explosions.*** The evidence available to distinguish an in-flight fire or explosion from post-accident fires forms a valuable lesson that will be passed on to the trainees. The means of determining the ignition source and the fuel supply of a fire are important. It is necessary to teach about the effectiveness of fire fighting measures available on board the aircraft and the means for preventing post accident fires during an investigation.

3.1.2.14 ***Survival aspects.*** The chances of occupants surviving an accident can be assessed and the means to do so will be given. They will know the formulae for impact force calculations and the various forms of attenuating impact forces. A discussion on the limits of human tolerance to heat and impact forces is worthwhile, as are the effects of toxic by-products of the accident environment. The efficiency of the rescue and fire fighting services, standard pre-flight passenger briefing spiels, restraint systems, seat anchorages and aids to egress from the aircraft are items that will be studied under this heading. It is also very important to review the factors that affect the occupants' chances of surviving the accident. The means of determining the after effects of a fire on the occupants and the fire's impediment to passenger evacuation will be discussed, as must the availability of such items as smoke hoods and smoke goggles. An understanding of the methods used to protect the aircraft occupants from the impact forces and post-impact effects (such as thermal stress and water immersion) is very important for the accident investigator. He must be able to assess the effectiveness of the methods and make recommendations which will provide better protection for the occupants in the future.

3.1.2.15 ***Structures.*** As the basis for the examination of the wreckage, the study of structures is an area of prime interest to the investigator. The study of structures will comprise metallurgy, fiber reinforced plastics and timber structures, stress analysis and the strength of these materials. It will also include the various modes of failure and the characteristics of such failures in the materials used in aircraft structures.
The methods of failure analysis, reconstruction of areas of interest in the airframe, and the evidence of the various modes of failure are important considerations. The various types of flight controls and landing gear structures will also be studied under this heading. This section of the syllabus will cover the advanced equipment used in the study of failure mechanisms, the preparation of samples for examination by such equipment, and the methods for comparative testing of similar materials. The study of structures also provides a platform for introducing the means of wreckage trajectory analysis. Every effort will be made to provide examples of the various failure modes in materials used in aircraft construction.

3.1.2.16 ***Systems.*** Aircraft systems vary from mechanical controls that are still found in general aviation aircraft to the fly-by-wire systems already extant in wide-bodied transport aircraft. There are a wide variety of systems that the investigator should become familiar with in general terms. However, the focus will be on the resources available to assist the investigator in the event of an accident involving a complex system and on common causes of system failure that might be experienced. A lead to system health can often be found in past maintenance records or on-board recorders. In general terms, fuel, hydraulic, pneumatic, electrical, pressurization, flight control, instruments, navigation, autopilot and instrument systems will be discussed. Other topics that will be considered include software failures in airborne computers and the adequacy of the protection against catastrophic events ensuing from such failures.

3.1.2.17 ***Aerodynamics.*** The common areas of aerodynamics that frequently assume importance in an investigation are those related to performance and in-flight structural failure caused by overload or flutter. A review of basic aerodynamics and the means of detecting failure from aerodynamic factors will be included in the investigator's basic training. The topics of engine failure recognition speed, V1 and V2, climb gradient, over-speed, engine-out performance, icing and stability also deserve special attention.

3.1.2.18 ***Power plants.*** The detailed analysis of power plants is normally the subject of a separate course and is usually carried out in conjunction with the engine manufacturer's representatives. Nevertheless, the explanation of the basic principles of reciprocating and turbine engines has a place in basic and advanced investigation courses. The same is true with regards to the analysis of damage to propellers and helicopter rotors, and a general overview of methods of evaluating damage to determine if further investigation of the particular propeller or engine is warranted. For example, propellers and turbines can give a worthwhile indication of an absence of engine power at the time of impact. This is another subject in which examples of failures and accident damage form an essential part of the course.

3.1.2.19 ***Rotary wing aircraft.*** A general introduction to the principles of flight for helicopters and their control systems is relevant. However the subject of investigating helicopter and other rotary wing aircraft accidents will be a separate specialty course.

3.1.2.20 ***Organizational information.*** Organizational and management information is a section of the final report format and it concerns the organizations and the management involved in influencing the operation of the aircraft. The organizations include, for example, the operator; the air traffic services, airway, aerodrome and weather service agencies; and the regulatory authority. Conducting a review of the organizational structure and functions as well as the management policies and practices of the agencies, authorities and aircraft operator involved is a subject that will be covered. For example, an investigator should have the competence to review an aircraft operator's management functions, policies and practices in their entirety. There are many aspects of the supervisory process which may have a direct bearing on the accident, such as acceptance of inadequate flight crew qualifications; deficient guidance material; maintenance shortcuts; improper crew roistering; failure to provide proper training in aircraft type; shortcomings in crew resource management; and unreasonable pressure to complete schedules on time. The methods of investigating management and organizational aspects of an organization to determine the presence of any risk factors or other shortcomings is a requirement of a well-rounded accident investigation course. An examination of the means of supervision is very important and will include a review of orders, regulations, manuals and independent audits as well as the performance of supervisors, instructors and company management.

3.1.2.21 ***Human performance.*** No accident investigation can be complete without a thorough consideration of Human Factors issues involved. The demands of the environment and the aircraft on the human often approach the physiological and psychological limits of the flight crew, maintenance and servicing crews, air traffic services personnel and other personnel required to support aircraft operations. The study of human limitations, communications, fatigue, decision-making processes, flight crew health and the information available from post-mortem examinations are vital components of this section of an investigation course. An examination of the handling of the aircraft will encompass the areas of operations and training.

a. The area of operations includes the man-machine relationship and the actions or lack of actions in the events leading to the accident. The investigation in this area covers specifically how the flight crew members reacted, analyzed and attempted to cope with the complexities of the flight.

b. The area of training will cover the extent and adequacy of the training relevant to the accident flight. The Manual of Civil Aviation Medicine (Doc 8984), the Human Factors Training Manual (Doc 9683), the Human Factors Guidelines for Air Traffic Management (ATM) Systems (Doc 9758) and the Human Factors Guidelines for Safety Audits Manual (Doc 9806) are references which will be used in this section of the training.

3.1.2.22 ***Determination of the flight crew's suitability for the flight.*** The flight crew members are required to meet certain licensing, training and experience requirements before conducting any flight. In addition, they must be fit for their duty and the complement of the crew must be appropriate. Familiarity with the flight crew documentation and requirements is essential. Fitness of the flight crew for the flight can be considered as part of several Human Factor considerations and will be explained in detail.

3.1.2.23 ***Methods of analyzing the factual information gathered.*** There are several structured procedures for analyzing the evidence and facts determined during the investigation. Knowledge of these procedures will enable the investigator to establish whether further investigation is required in order to complete the investigation or to test any hypotheses that the investigation team is considering.

3.1.2.24 ***Report writing.*** Report writing is an integral responsibility of an accident investigator.

ICAO has developed a format for writing reports that leads logically from the history of the flight to the safety recommendations. There is a minimum of duplication and a full consideration of aspects of the flight that are relevant to the improvement of safety. Knowledge of this format and process gives the investigator a sound basis for drafting the final report, including the formulation of appropriate safety recommendations.

3.1.2.25 ***The news media and public relations*** .Almost any aircraft accident is of interest to the news media and will to some extent involve the investigator-in charge in public relations activities. There are two aspects to this subject: the information made available to the public and more specialized approach to the survivors and the families of those involved in an accident. The importance of keeping others informed on the progress of an investigation, while not speculating as to causes and protecting the privacy of those who assist with sensitive information must be explained to investigators. The Guidance on Assistance to Aircraft Accident Victims and their Families (Cir 285) is a sound basis for addressing this subject and will be used during training.

3.2 ADVANCED ACCIDENT INVESTIGATION COURSE

3.2.1 Most topics covered in the basic course will also apply to advanced courses, but the instructors will vary their treatment of these topics to suit the purpose of the course and the experience level of the officers for that batch.

3.2.2 In general, an advanced course is desirable for preparing an investigator for the responsibilities of group leader or investigator-in-charge of a major investigation. Such a course will aim to give the investigator an understanding of and some competence in the organization of a major accident investigation.

3.2.3 In addition to the review of the organization of a major investigation, topics that will be discussed include:

- the provision of family assistance to those involved in an accident;
- relations with the media;
- an introduction to methods for cataloguing a large number of fragments of wreckage;
- management of a large accident site for security, safety and protection of the personnel;
- preparation of briefings and answers to formal questions for members of government;
- the methods of undertaking investigations that involve both civil and military

aircraft; and

- liaison with the law enforcement authorities in accidents involving unlawful interference.

3.2.4 Other specific subjects which should be included in advanced courses include:

- techniques used to investigate accident damaged systems that involve specialized technologies such as glass cockpit, fly-by-wire systems, GPS, and enhanced ground proximity warning systems (EGPWS);
- reconstruction of evidence recorded in damaged solid state recorders;
- the use of virtual video presentations in large structural reconstructions of wreckage; and
- the use of computer simulations and programs for flight simulators to recreate aspects of the aircraft's flight path which are of interest to the investigation.

3.3 SPECIALTY COURSES

3.3.1 AAIIB will contact the manufacturers of systems for specialty courses, since most manufacturers have their own accident investigators and support personnel that are familiar with the systems and the investigation techniques required to extract the information stored in the systems. Similarly for other specialty courses arrangements will be made with other State authorities. Specialty courses will be introduced to an officer at any stage after a basic course. The courses would augment the skills and knowledge acquired by the investigator in order to meet the needs of a particular area of accident investigation that is relevant to his assigned duties.

3.3.2 For topics such as helicopter accident investigation, gas turbine engine accident investigation, accident survival aspects, fires and explosions, Human Factor investigation, family assistance and media relations, they are generally extensive enough to warrant a short course of their own with a specialized syllabus.

3.3.3 Description of the systems involving specialized technologies (such as glass cockpit, fly- by-wire systems, global positioning system (GPS), electronic flight instrument system (EFIS) and enhanced ground proximity warning system (EGPWS), memory chips are usually provided during aircraft type courses. However, aircraft type courses do not include the investigation aspects or the investigation techniques of such complex systems. Extensive information can be obtained from memory chips and other solid state electronic circuits used in new technology systems. Increasingly, the investigation techniques for solid state electronic circuits are covered in accident investigation courses.

3.3.4 This training may be introduced at any stage following an initial accident investigation course. Specialty courses enhance the competencies acquired by the investigator to meet the needs of a particular investigation area, method, technique or technology that is relevant to the functions assigned. Chapter 3 of Doc 10206 provides some investigation areas and topics that could be addressed through specialty training.

CHAPTER 4

RECCURENT TRAINING AND TRAINING RECORDS

4.1 RECURRENT TRAINING

4.1.1 All officers of AAIIB will be provided a recurrent training once in 3 (three) years period.

4.1.2 The curriculum for a recurrent training may be from 3 to 5 days and will aim to updates new investigation skills the knowledge of participants with latest techniques, amendments in procedure manual, technologies, regulations etc.

4.1.3 The recurrent training will be conducted in house by senior officers to whom specific topics will be assigned by Director and General Investigator AAIIB.

4.1.4 Recurrent training of empaneled experts will be carried out every 3 (three) years. In addition to the training of AAIIB officers, case histories of important/complex investigations will be discussed and analyzed.

4.1.5 For the sake of logistic convenience recurrent training of AAIIB officers and empaneled experts will be combined. In addition, periodically training can be conducted in specific stages by selecting courses that are necessary to improve the skills of analysts.

4.2 TRAINING RECORDS

Administration Officer will maintain training dossiers of all AAIIB officers and empaneled experts. All officers and experts should also keep updated records of their training. It will be the responsibility of officers/experts to provide copies of certificates of training by them to Administration Officer for maintenance of records.

CHAPTER 5

GENERAL PROVISIONS FOR COMPETENCY-BASED TRAINING

5.1 INTRODUCTION

5.1.1 The full application of a competency-based training (CBT) and assessment methodology may not be suitable for aircraft accident investigator functions. Instead, high-level guidance on an adapted CBT model may be more appropriate and useful for States' accident investigation authorities, which, based on their size and resources, could then determine how to apply the model.

5.1.2 Competency is defined as a dimension of human performance that is used to reliably predict successful performance on the job. A competency is manifested and observed through behaviours that mobilize the relevant knowledge, skills and attitudes (of an investigator) to carry out activities or tasks under specified conditions.

5.1.3 CBT is a training system that is characterized by a performance orientation, emphasis on standards of performance, and the development of training to the specified performance standards. It has proven to be an effective tool for ensuring that investigators are trained for task-oriented functions and that resources are used efficiently, and for the enhancement of competency in different areas of investigations.

5.1.4 Adapted CBT enables the accident investigation authority to demonstrate an investigator's range of knowledge, skills and attitudes based on the investigator's job description. After analysis, competencies to perform the asks should be identified to develop the proper training that will enable the investigator to carry out the work.

5.1.5 The development of CBT should be based on a systematic approach whereby competencies and associated standards are defined, training is based on the competencies identified, and appraisals can be developed to determine whether these competencies have been achieved.

5.2 PRINCIPLES OF COMPETENCY-RELATED TRAINING

Below are the main principles of competency-related training:
a) Relevant competencies are clearly defined for a particular role within an aviation discipline, for example, investigation.
b) There is an explicit link between competencies, training and the required performance on the job.
c) Competencies are formulated in a way that ensures that investigators can be trained for, and observed and appraised in, a variety of investigation contexts.
d) Investigators successfully demonstrate competency by meeting the associated competency standard.
e) Each stakeholder in the process, including the investigator, instructor and training organization, has a common understanding of the competency standards.
f) Clear performance criteria are established for appraising competencies.

g) Evidence of competent performance is valid and reliable.
h) Performance appraisals are calibrated to achieve a high degree of inter-rater reliability.
i) Appraisal of competencies is based on multiple observations across multiple investigation contexts.
j) To be considered as competent, the investigator demonstrates an integrated performance of all the required competencies to a specified standard.

CHAPTER 6

COMPETENCY-BASED TRAINING FOR ACCIDENT INVESTIGATORS

6.1 ADAPTED COMPETENCY-BASED TRAINING MODEL

6.1.1 The adapted competency-based training (CBT) model for accident investigators is composed of 10 competencies:
Competency 1: Code of ethics and standards of professional conduct
Competency 2: Managing an accident/incident investigation
Competency 3: Leadership and teamwork
Competency 4: Coping, adapting and learning
Competency 5: Investigation risk management
Competency 6: Collecting data and controlling evidence
Competency 7: Interviewing witnesses, crew members and other persons
Competency 8: Analysing/critical thinking
Competency 9: Report writing
Competency 10: Communicating

6.1.2 The ICAO Competency Framework for Aircraft Accident Investigators and the associated competency descriptions and observable behaviours are provided in 5.2.

6.1.3 Each accident investigation authority should consider the application of the ICAO Competency Framework for Aircraft Accident Investigators based on:
a) the size and extent of its activities; and
b) its existing human and financial resources.

6.2 ICAO COMPETENCY FRAMEWORK FOR AIRCRAFT ACCIDENT INVESTIGATORS

COMPETENCY 1: CODE OF ETHICS AND STANDARDS OF PROFESSIONAL CONDUCT

Description: Demonstrates attributes and values in accordance with fundamental values of the accident investigation authority.

Observable behaviours
- Acts with integrity, competence and diligence and respects all people with whom the investigator may interact during an investigation.
- Places the integrity of the investigation and the safety of the public above all other considerations.

• Uses sensitivity when dealing with victims, human remains, survivors, interviewees and others.

• Verifies the accuracy of work, ensuring that it is based on all available evidence, confirming information before its release and using original sources whenever possible.

• Exercises independence, diligence and thoroughness in analysing investigation data, and has a reasonable and adequate basis from which to draw conclusions, supported by appropriate research and investigation.

• Protects confidential and private information and respects the privacy rights of people involved in the accident as well as people who provide information to the investigation.

• Treats others respectfully, fairly and objectively, regardless of differences.

• Identifies and mitigates conflict of interest situations.

• Recognizes the pressures of the investigation and its effects on others.

• Is accountable for his or her own actions.

COMPETENCY 2: MANAGING AN ACCIDENT/INCIDENT INVESTIGATION

Description: Develops an investigation plan to achieve the objectives of the investigation.

Observable behaviours

• Establishes defined investigation objectives and milestones in consideration of expected safety benefits, time, political and public pressures.

• Identifies States and stakeholders involved and determines the appropriate level of interaction with these.

• Ensures that applicable Annex 13 provisions are applied in a timely manner.

• Estimates the human and financial resources required, based on the investigation scope and objectives.

• Assesses risks and threats associated with the management of the investigation and devises appropriate mitigations.

• Plans all examinations, tests and research activities according to the investigation scope and ensures that they meet the objectives.

• Tracks the progress of the investigation against the plan and the expected outcome.

• Identifies needs to amend the investigation plan based on established evidence to date, changing circumstances or a revised scope.

COMPETENCY 3: LEADERSHIP AND TEAMWORK

Description: Participates effectively in the achievement of the investigation objectives and has a clear understanding of his or her role and assigned tasks. Motivates the investigation team and highlights the importance of achieving the investigation objectives by providing guidance, instruction and direction, as appropriate.

Observable behaviours

• Assigns the various investigation roles to the investigation team members considering the scope of the investigation and the investigators' areas of

competency

• Sets clear objectives with specific expectations.

• Defines and shares objectives with the investigation team members, clarifies time targets, and adapts and rephrases the objectives of team members according to evolving investigation challenges.

• Leads the investigation team and communicates with other involved entities.

• Monitors team performance and provides guidance when necessary.

• Coordinates and integrates team member inputs by maintaining open communications within the team.

• Communicates with the team openly to share expertise, knowledge and information, and effectively participates in the investigation progress meetings.

• Adapts communication to consider the personal level of emotion in traumatic situations.

• Promotes respect and sensitivity among the team members and between the team and stakeholders.

• Commits to the highest quality of work and to the timely publication (reflective of the complexity) of applicable interim statements and the investigation Final Report.

• Identifies the requirements and issues safety recommendations without delay.

• Uses a team consensus approach for planning and establishing findings.

COMPETENCY 4: COPING, ADAPTING AND LEARNING

Description: Applies sound judgment to issues that appear during the investigation and uses learning opportunities from new investigation standards, methodologies, techniques or technology.

Observable behaviours

• Sets and applies personal rules to cope with a high-pressure environment.

• Recognizes personal emotions in difficult situations and complex environments.

• Organizes ways to maintain and improve knowledge, investigation techniques, methodologies and standards.

• Adapts to changing circumstances, new evidence and amendments to the investigation plan as they become apparent through the investigation management system.

• Considers valid new ideas.

• Copes with ambiguity and uncertainty by organizing, in real time, the key elements of an action or of the project.

COMPETENCY 5: INVESTIGATION RISK MANAGEMENT

Description: Identifies the various investigation risks, including those from the predefined hazard register and any additional hazards that become apparent during the investigation, and then implements risk control and mitigation actions appropriately.

Observable. Behaviours

• Identifies States that are entitled to participate in the investigation according to Annex 13.

• Solves political disputes among concerned States and applies relevant Annex 13 provisions diplomatically.

• Ensures that the investigation is separate from any judicial or administrative proceedings to apportion blame or liability.

• Resolves possible conflicts with judicial authorities regarding the custody of flight recorders and the wreckage.

• Identifies accident site hazards rapidly and comprehensively.

• Determines and implements measures to eliminate and/or mitigate accident site risks.

• Assesses the effectiveness of those measures.

• Estimates investigation safety and operational risks.

COMPETENCY 6: COLLECTING DATA AND CONTROLLING EVIDENCE

Description: Obtains information relevant to the occurrence from organizations and persons having such information and from persons directly involved in the occurrence.

Observable Behaviours

• Applies site and wreckage documentation techniques.

• Determines the wreckage pieces, components and other onsite evidence that need to be subjected to further examination.

• Applies evidence recovery and preservation techniques.

• Interprets relevant data from the various flight recorders and other recording media (for example, flight data analysis programme, quick access recorder, data recovery, non-volatile memory, GPS, and helicopter health and usage monitor system).

• Interprets data recorded by phones, tablets, radar, air traffic control, electronic flight bags, primary flight displays, etc.

• Examines relevant data from the records of the flight crew, flight controllers and other involved personnel.

• Takes relevant notes from the records of the aircraft airframe, engines and propeller(s).

• Records data collected during the testing/examination of the aircraft/wreckage and any data collected during test and research.

• Takes notes from the review of the various aircraft manuals, organizations' operations manuals, standard operating procedures, etc.

• Collects data relevant to any system that may have contributed to the accident from the aircraft design organization/manufacturer and/or certification authority.

• Identifies, obtains and distributes information needed for the identification of continuing airworthiness concerns in a timely manner.

COMPETENCY 7: INTERVIEWING WITNESSES, CREW MEMBERS AND OTHER PERSONS

Description: Obtains information from persons who witnessed the occurrence, who may have information relevant to the occurrence and persons directly involved in the occurrence.

Observable Behaviours
- Identifies eyewitnesses and other witnesses to the occurrence.
- Adapts and responds empathically to those persons' behaviours.
- Prepares questions after referring to the records, recordings, manuals and procedures.
- Applies cognitive interviewing techniques that maintain interviewee interest o encourage the interviewee to give valid and credible answers.
- Documents the interviews for future reference.

COMPETENCY 8: ANALYSING/CRITICAL THINKING

Description: Applies analysis method(s) to draw conclusions from direct and circumstantial evidence.

Observable Behaviours
- Evaluates the validity and credibility of the collected data and evidence.
- Selects and uses appropriate analysis methods, models and techniques To identify and communicate relationships between the established facts, analyses and findings.
- Develops a sequence of events from data collected from various sources.
- Applies an integrated process to analyse human factors data to identify relationships of performance of crew, maintenance, air traffic control and other persons involved in the flight.
- Identifies any systemic organizational deficiencies, including in the effectiveness of the applicable safety management system (SMS), State safety programme and State regulatory authority's oversight.
- Analyses and establishes any connections between regulatory, oversight and organizational systemic deficiencies that may have contributed to the occurrence.
- Develops effective safety recommendations.
- Identifies safety recommendations of global concern.
- Identifies the need to publish safety recommendations, as appropriate.

COMPETENCY 9: REPORT WRITING

Description: Presents the investigation outcomes in a manner that enables the reader to understand the safety lessons.

Observable Behaviours
- Develops the investigation reports to meet relevant Standards of Annex 13.
- Writes unemotively and without implying blame.
- Presents the main events in a chronological sequence.
- Presents an analysis showing the linkages between the different parts of the factual report to substantiate the analyses, findings and safety recommendations.
- Presents the safety recommendations in a clear format.

COMPETENCY 10: COMMUNICATING

Description: Communicates effectively to ensure optimum implementation of investigation tasks, presentation of the investigation outcomes and acceptance of safety recommendations.

Observable Behaviours
- Describes investigation observations during the investigation progress meetings in clear investigation language and using technical and operational terminology.
- Interacts with investigation stakeholders to coordinate the site investigation and off-field data collection.
- Handles post-accident communications and media interaction.
- Considers the requirements of the family assistance plan while ensuring the proper protection of accident investigation information as well as pertinent investigation records.
- Coordinates effectively with the judicial authority's investigators.
- Presents clear and precise descriptions of investigation outcomes to States' representatives.
- Articulates safety recommendations to the organizations concerned in a way that makes such recommendations understood and accepted as being necessary for action.
- Adapts content, style, tone and media of communication to suit the target audience, considering cultural aspects and the promotion of dialogue.

CHAPTER 7

SYLLABUS

7.1 BASIC ACCIDENT INVESTIGATION COURSE

Module-I- One Week

Introduction

- History of aircraft accident investigation
- Development of the international agreements on the conduct of investigations and the standards and recommended practices adopted by ICAO contracting States in the field of aircraft accident investigation.
- A review of ICAO Annex13 Aircraft Accident and Incident Investigation to the convention on International civil Aviation; ICAO Manual of Aircraft Accident Investigation (Doc 6920) and Manual of
- Aircraft Accident an Incident Investigation (Doc 9756) General guidance on the investigation of accidents in which unlawful interference, has occurred and those which involve both civil and military aircraft or facilities.

Accident Notification Procedures

- Accident notification systems and the appropriate responses expected from each State and organization that is notified.
- Way in which the notification of the occurrence of an accident initiates the process of an investigation.Provision of support for the accident investigation authority in the State of Occurrence from the State of Registry, the State of the Operator, the State of Design, the State of Manufacture and any other States that are involved by virtue of the number of their nationals involved in the

accident, or by virtue of their proximity to an accident site and providing a permanent base for the investigation.

- Requirements of Annex 13 in relation to this phase of an investigation.

Investigation Management.

- Investigator's role, the skills he will need to acquire and the accident investigation process.
- Value of assessing the availability of resources, such as funding, personnel, equipment and buildings, as well as planning for a major accident beforehand.
- An appreciation of the realities of the limits imposed by the resources available and making the optimum use of those resources.
- Guidelines for determining the appropriate size and scope of an investigation,
- The differences between the management of large and small investigations
- Type of circumstances in which assistance from specialists will be beneficial to the success of the investigation.
- The value of memoranda of understanding with departments and organizations that might be involved in an investigation
- Progress meetings.

Investigators' Equipment.

- The equipment to be used during investigations and factors determining the use of particular equipment.
- Use of aids such as global positioning systems, satellite telephones, data links back to base and the basic items such as compasses and inclinometers.
- Means of recording in extreme wet or cold conditions
- Instruction on the proper method of taking samples of aircraft fluids and the appropriate containers

Accident Site Safety.

- Safety of personnel at an aircraft accident
- The need to take appropriate measures for protection on the site against exposure to the elements, any hazardous cargo or dangerous materials released from the aircraft, injury or infection
- Medical risks and hazards from the aircraft wreckage and needs of inoculations against such risks as hepatitis, malaria and tetanus
- Demonstration of Protective equipment against airborne and blood borne pathogens
- Utilities such as gas mains, electricity transmission lines and main transport routes.
- A plan for aid and rescue in the event of an accident involving personnel at the site

MODULE-2 - One Week

Protection of Evidence.

- Measures to protect the wreckage from fires, meteorological hazards and souveniring. Recording of transient evidence,
- Secure of light objects and recording ground scars and other site markings that may become obliterated
- Determining from the rescue personnel the nature of damage and movement which they may have caused

Initial Action at the Accident Site.

- eonsiderations to be taken into account at the accident site.
- Methods of apportioning time effectively, prioritizing the information to be gathered, plotting of the position of surface marks, identifying and plotting the position of items of wreckage
- The preparation for removal of any exhibits to a secure site.

Information Gathering Techniques.

- Methods of gathering and reviewing relevant documentation and procedures,
- Interview techniques used for different types of witnesses
- The transcription of air traffic services and other recordings, the review of aerodrome facilities, emergency services responses
- Meteorological data.

Communication and Recording Media.

- The various media available for communicating to and from an accident site and recording the evidence at the accident site.
- Recording the information available as accurately and rapidly as practicable u sing digital video cameras and cameras, standard film photography.
- Use of laptop and hand held computers with connections via satellite telephones to sources of information of immediate use at the site.

Witness interviews.

- Preparation for interviews, information to be gleaned from body language, the relative positioning of the interviewer and interviewee.
- Preparation of the questions to be asked; use of open questions.
- Art of listening and general conduct of the interview
- Use of recorders such as video cameras and tape recorders
- Value of written statements and signed transcripts
- The precautions to be taken when interviewing the injured or persons in ill health, the young, the aged, hostile witnesses and Use of experts in the field of inquiry

Recorders

- Different form of recorders which may be useful to the investigation viz. flight recorders, security cameras on the aerodrome perimeter fence, maintenance recorders in the aircraft etc.
- The value of each form of recorder, the methods of interpretation and downloading the information, and the sources of readout.
- Value of manufacturer's expertise in recovering information from damaged recorders such as global positioning receivers, solid-state flight recorders and inertial navigation unit components
- Means of locating the flight recorders and recovering them from locations that are difficult to reach.
- Air traffic control recorders, particularly those that record radar returns

MODULE-3-One Week

Examination of Relevant Maintenance Documents

- Determining the maintenance history of the aircraft.
- Importance of establishing whether the maintenance, inspection procedures and servicing that is recorded as having been completed has in fact been carried out
- Determining the adequacy of the maintenance procedures specified
- Examination of evidence available to distinguish an in-flight fire or explosion from post-accident fires.
- Means to determining the ignition source and the fuel supply of a fire.
- Examination of effectiveness of fire fighting measures available on board the aircraft.
- Means of preventing post-accident fires during an investigation.

Survivability

- Assessment of the occupants' chances of surviving an accident and the means of doing so.
- Formulae for impact force calculations and the various forms of attenuating impact forces
- The limits of human tolerance to heat and impact forces
- Effects of toxic by products of the accident environment.
- The efficiency of the rescue and fire fighting services, standard pre- flight passenger briefing spiels, restraint systems, seat anchorages and aids to egress from the aircraft
- The review of the factors that affect the occupants' chance of surviving the accident
- The means of determining the after effects of a fire on the occupants and the fire's impediment to passenger evacuation and availability of such items as smoke hoods and smoke goggles.
- Methods used for protecting the aircraft occupants from the impact forces and post-impact effects such as thermal stress and water immersion

Aircraft Structures.

- Metallurgy,
- An introduction to fiber reinforced plastics and timber structures; Stress analysis and the strength of these materials; various modes of failure and the symptoms of such failures for these materials.
- Methods of failure analysis
- Reconstruction of areas of interest in the airframe, and the evidence of
- The various types of flight controls and landing gear structures.
- Advanced equipment for the study of failure mechanisms; Preparation of samples for examination by such equipment and the methods for comparative testing of similar materials.
- Means of wreckage trajectory analysis.
- Examples of the various failure modes in materials used in aircraft construction during

Systems:

- Aircraft systems including Fly-by wire system, Hydraulic, Pneumatic, Electrical, Pressurization, Flight control, Instruments, Navigation, Autopilot and Instrument systems
- Resources available to assist the investigator in the event of an accident involving a complex system and on common causes of system failure that might be experienced.
- Examination of past maintenance records and on-board recorders.
- Software failures in airborne computers and the Adequacy of the protection against catastrophic events ensuing from such failures

MODULE-4- One Week

Aerodynamics

- Performance
- In-flight structural failure caused by overload, flutter, divergence, aileron reversal and other aero elastic phenomenon
- A review of basic aerodynamics and the means of detecting failure from aerodynamic factors
- Over-speed, engine-out performance, icing and stability.

Power plants.

- Basic principles of reciprocating and turbine engines
- The analysis of damage to propellers and helicopter rotors
- General overview of methods of evaluating damage to determine if further investigation of the particular propeller or engine is warranted.
- Examination of propellers and turbine for indication of an absence of engine power at the time of impact.
- Examples of failures and accident damage

Rotary wing aircraft.

- A general introduction to the principles of flight for helicopters and their control systems

MODULE 5 -One Week

Management.

- Methods of conducting a review of the management and supervisory aspects of an aircraft operation require such as management's acceptance of inadequate flight crew qualifications, deficient guidance material, maintenance shortcuts, improper crew rostering, failure to provide proper training in aircraft type, crew resource management and unreasonable pressure to complete schedules on time.
- An examination of the means of supervision including a review of orders, regulations, manuals and independent audits, as well as the performance of supervisors, instructors and company management.

Human Factors.

- Study of human limitations, communications, fatigue, decision- making processes, flight crew health and the information available from post-mortem examinations
- Examination of the handling of the aircraft such as operations and training; Man-machine relationship and the actions or lack of actions in the events leading to the accident; Study of flight crew members reaction, analysis and attempt to cope with the complexities of the flight; the extent and adequacy of the training relevant to the accident flight.
- A brief review of The ICAO Manual of civil Aviation Medicine (Doc 8984) and the ICAO Human Factors Training Manual (Doc 9683)

Determination of the flight crew's suitability for the flight.

- Familiarity with the flight crew documentation and requirements.

Methods of analyzing the information gathered.

- Procedures for analyzing the evidence and facts determined during the investigation.

Report Writing.

- Format for writing reports
- Formulation of appropriate safety recommendations.

News Media and Public Relations.

- DGCA policy guidelines
- The ICAO circular on Guidance on Assistance to Aircraft Accident Victims and their Families (circ 285)

MODULE 6- One Week

- case studies including midair collisions, In-flight fires, in-flight breakups and weather related accidents.
- Test on Analysis and conclusion of an accident.
- Visit to school of aviation Medicines.
- Visit to National Aeronautical Laboratories.
- Presentation by the Participant.

recreate aspects of aircraft's flight path, which are of interest to the investigation.

7.2 RECURRENT TRAINING

1. PURPOSE

This manual establishes the recurrent training system for investigators of the Aircraft Accident and Incident Investigation Bureau (AAIIB) of Mongolia and incorporates a standard curriculum for competency maintenance in accordance with ICAO Annex 13, ICAO Doc 9756, ICAO Doc 9962, ICAO Doc 10206, and applicable national aviation legislation.

2. APPLICABILITY

This manual applies to Basic Investigators, Advanced Investigators, Investigator-in-Charge (IIC) personnel, technical specialists assigned to investigations, and other personnel designated by the Bureau for recurrent training.

3. TRAINING POLICY

- Recurrent training shall be conducted at least once every three (3) years.
- Additional refresher instruction may be provided when ICAO SARPs are amended, new aircraft technologies are introduced, or investigation findings identify competency gaps.
- Training delivery may include classroom instruction, case studies, practical exercises, scenario-based learning, and supervised discussion.

4. STANDARD CURRICULUM

The following curriculum converts the recurrent training programme into a module-based standard curriculum with defined learning outcomes, delivery methods, practical work, and assessment requirements.

4.1 Curriculum Summary

Module	Title	Duration	Delivery
1	ICAO Framework and Legal System	4 hours	Lecture / Discussion
2	Investigation Management (Doc 9756)	4 hours	Lecture / Practical
3	Policies and Procedures (Doc 9962)	3 hours	Lecture / Workshop
4	Aircraft Systems and Technical Analysis	4 hours	Classroom / Case Review
5	Flight Data and Human Factors	3 hours	Workshop/ Discussion
6	Accident Site Management	2 hours	Practical Exercise
7	Advanced Investigation Topics	2 hours	Lecture / Discussion
8	Safety Recommendations and Reporting	2 hours	Workshop

Module 1 — ICAO Framework and Legal System

Duration: 4 hours

Learning Outcomes	**• Apply ICAO Annex 13 requirements.** **• Identify State responsibilities in aircraft accident and incident investigation.** **• Interpret the legal framework governing investigation authority and independence.**
Content	• ICAO Annex 13 latest amendments • SARPs updates • State of Occurrence, Registry and Operator responsibilities • National aviation law of Mongolia
Training Method	Lecture and facilitated discussion
Assessment	Short written test

Module 2 — Investigation Management (Doc 9756)

Duration: 4 hours

Learning Outcomes	**• Plan and organize investigation activities.** **• Manage investigation phases from notification to reporting.** **• Coordinate an investigation team and allocate responsibilities.**
Content	• Notification procedures • Initial response and mobilisation • Investigation planning • Team organisation and coordination
Training Method	Lecture, scenario planning and group exercise
Assessment	Group practical exercise evaluation

Module 3 — Policies and Procedures (Doc 9962)

Duration: 3 hours

Learning Outcomes	**• Apply standard operating procedures.** **• Ensure consistency in documentation and evidence handling.**
Content	• Investigation procedures • Documentation standards • Chain of custody

	• Administrative controls
Training Method	Lecture and workshop
Assessment	Instructor observation and document review

Module 4 — Aircraft Systems and Technical Analysis

Duration: 4 hours

Learning Outcomes	**• Understand major aircraft systems. • Recognize technical failure indicators relevant to investigations.**
Content	• Airframe systems • Engines • Avionics • Technical failure case review
Training Method	Classroom instruction and case review
Assessment	Case review discussion

Module 5 — Flight Data and Human Factors

Duration: 3 hours

Learning Outcomes	**• Interpret recorded flight data. • Analyse human factors affecting occurrence sequence and crew performance.**
Content	• FDR/CVR analysis fundamentals • HFACS framework • Fatigue, CRM and organisational factors
Training Method	Workshop and guided discussion
Assessment	Scenario-based analysis

Module 6 — Accident Site Management

Duration: 2 hours

Learning Outcomes	**• Manage accident site safety and evidence preservation. • Document the site systematically.**
Content	• Site safety • Evidence protection

	• Documentation methods • Scene mapping
Training Method	Practical exercise
Assessment	Practical performance review

Module 7 — Advanced Investigation Topics

Duration: 2 hours

Learning Outcomes	• Recognize special investigation considerations. • Address complex operating environments.
Content	• Unlawful interference • Remote area investigations • Missing aircraft
Training Method	Lecture and discussion
Assessment	Facilitated Q&A

Module 8 — Safety Recommendations and Reporting

Duration: 2 hours

Learning Outcomes	• Develop effective safety recommendations. • Draft investigation reports using factual and analytical structure.
Content	• Risk-based recommendations • Final report structure • Findings and safety actions
Training Method	Workshop
Assessment	Draft recommendation and report review

4.2 Final Case Study and Evaluation

A final case study and evaluation session shall conclude the course. Participants shall analyse a representative occurrence scenario, present findings, and receive instructor feedback.

5. ASSESSMENT CRITERIA

Assessment Component	**Weight**
Participation and engagement	20%

Case study performance	30%
Written test	30%
Instructor evaluation	20%

Minimum pass score: 70 per cent. Participants shall complete all modules and required exercises.

6. TRAINING OUTPUTS

- Accident analysis summary
- Draft safety recommendation
- Investigation planning exercise output

7. INSTRUCTOR REQUIREMENTS

Instruction should be delivered by Senior Investigators, IIC-qualified personnel, or other approved instructors with suitable experience in aircraft accident and incident investigation and knowledge of ICAO Annex 13 and related manuals.

8. APPROVAL

Approved By	**Developed By**
Director and General Investigator Name: _____ Signature: _____ Date: _____	Chief Investigator Name: _____ Signature: _____ Date: _____

ATTACHMENTS FOR RECURRENT TRAINING PROGRAMME

Attachment A – TRAINING ATTENDANCE AND ASSESSMENT RECORD

No.	Participant Name	Attendance	Assessment Score (%)	Result	Instructor Signature

Assessment Criteria:

- Participation and engagement
- Case study evaluation
- Knowledge assessment (written or oral)

• Instructor evaluation

Attachment B – TRAINING EVALUATION FORM

Evaluation Criteria	Rating (1–5)	Comments
Course Content		
Instructor Effectiveness		
Training Materials		
Practical Exercises		
Relevance to Job		
Overall Satisfaction		

Rating Scale:
1 – Poor | 2 – Fair | 3 – Good | 4 – Very Good | 5 – Excellent
Participant Name: _____
Signature: _____
Date: _____

Attachment C – DETAILED ASSESSMENT RUBRIC (ICAO-ALIGNED)

Competency Area	Description	Rating (1–5)	Comments
Technical Knowledge	Understanding of ICAO Annex 13, Doc 9756, Doc 9962		
Investigation Skills	Application of investigation procedures		
Analysis	Ability to interpret evidence and determine causes		
Human Factors	Understanding of HFACS and human performance		
Safety Recommendations	Development of effective safety recommendations		
Reporting	Clarity and quality of reports		
Communication	Teamwork and coordination		
Professional Conduct	Ethics, objectivity, independence		

Rating Scale:
1 – Unsatisfactory
2 – Needs Improvement
3 – Acceptable
4 – Good
5 – Excellent
Overall Result: □ Pass □ Fail
Instructor Name: _____
Signature: _____
Date: _____

7.3 SPECIALTY TRAINING AND COURSES

Location: Aircraft Accident and Incident Investigation Bureau

Duration: 3-7 days

Purpose: Specialty training and courses may be conducted at any stage after initial training. specialty training is designed to enhance the skills of the examiner and to meet the specific requirements, methods, techniques or technologies relevant to the assigned function. It is intended to develop the investigators professional skills to an advanced level. Chapter 3 of the International Civil Aviation Organization (Doc10206) lists some of the areas and topics that can be covered through advanced training.

A. SPECIALTY TRAINING PROGRAM

№	TITLE	Duration	
		hour	day
1.	Objectives of specialized training in aircraft accident investigation	1	
2.	Improve knowledge related to basic accident investigation techniques and investigation procedures	2	
3.	Personal equipment and protective clothing for inspectors	1	
4.	Access to the accident site, control and attention to the accident site	1	
5.	Accident site safety, hazard prevention measures, waste site mapping, and waste disposal sites research and registration	2	1
6.	Registration of evidence	2	
7.	Collection, preservation and protection of evidence	2	
8.	Protection of flight recorder recordings	1	
9.	Protection of documents related to aircraft accident investigation	2	
10.	Passenger safety and survival issues during emergency landings	2	1

11.	Aircraft control panel indications, diagrams, and possible types of system failures	2	1
12.	Aerodynamic and flight-technical characteristics of the aircraft	2	
13.	Human performance	2	
14.	Methodology for preparing reports and developing recommendations in the field of ensuring flight safety	2	
Total		24	3

CONCLUSION:.....
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... year ... month ... day

B. SPECIALTY COURSE PROGRAM

№	TITLE	Duration	
		hour	day
1.	Introductory of specialty course for the Aircraft Accident Incident Investigation	1	1
2.	Information on the responsibilities of States whose interests are affected, as defined in Annex 13	2	
3.	Human factors	2	
4.	Helicopter and gas turbine engine aircraft accident investigation	4	
5.	Research methods and methodology	1	
6.	Determine the time and cause of any fire on board the aircraft	2	
7.	Characteristics of materials used in aircraft structures and types of damage	2	1
8.	Power plans	2	
9.	Special technology includes computerized graphic display flight decks, glass cockpit aircraft, fly-by-wire systems and aircraft incorporating composite materials in their structures, and systems such as GPS and electronic flight instrument system and EGPWS.	2	
10.	New technology that can extract large amounts of information from memory chips and other electronic circuits	2	
11.	Fire and explosion safety and accident survival	2	1
12.	Human factors analysis during an accident	1	
13.	Communication and Media relations	2	
14.	Provide assistance to families of victims of accidents	2	
15.	Aviation Medicine and Pathology	1	1
16.	Accident prevention measures based on aircraft accident violation classification, type, and database	2	
17.	Methodology for preparing reports and developing recommendations in the field of ensuring flight safety	2	
Total		32	4

CONCLUSION:.....
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7.4 ADDITIONAL TRAINING

AIRCRAFT POWER PLANT AND STRUCTURE TRAINING PROGRAM FOR INVESTIGATORS

Location: Aircraft Accident and Incident Investigation Bureau
Duration: 1 day

Purpose: To increase the investigator's work experience and develop the ability to analyze in factual situations.

№	TITLE	Duration	
		hour	day
1.	- About aircraft engines basic concepts and structure, - About systems such as fuel, oil, air - Engine operating parameters and data /Basic indicators such as RPM, EGT (Exhaust Gas Temperature), Oil pressure, etc.	8	1
2.	Symptoms/parameter changes during engine failure, warning lights, fire, noise changes, vibration, engine shutdown		
3.	Engine failure, types of damage, mechanical failure (fracture, wear, fatigue) combustion failure (flameout, detonation) compressor stall, turbine failure (blade failure) Foreign object entry into the engine, Bird strike, FOD (Foreign Object Damage)		
4.	About the fuselage structure and engines of the most common aircraft types used by private airlines and airlines		
5.	Engine Failure Cause Determination Methods -Fracturing, Fracture, Crack Analysis -Operation Errors, Human Factors -Maintenance Errors, Human Factors		
6.	Engine fire and explosion analysis at the accident site -Fuel, oil, hydraulic fluid leaks, traces of combustion -Heat impact analysis		
7.	Evidence Collection Methodology -Sequence of Engine Inspection at the Accident Site -Evidence protection		

	-Determining the Location and Distribution of Engine Parts -Photographic Documentation and Record Keeping		
Total		8	1

CONCLUSION:.....

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CHAPTER 8

ATTENDANCE RECORDS

Course No:		Duration:	
Course title:			
Subject:			
Teacher name:		Location:	

No	Date Trainee name	Hour/Day	Day 1	Day 2	Signature
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
Registered by / Signature /					

P-Present, L-Late, S-Sick, EA-Excused Absence, UA-Unexcused Absence

ATTENDANCE AND EXAMINATION REPORT

Aircraft type:		Start Date:	
Course No:		End Date:	
Course Name:		Duration:	

No	Student name	Days attended	Trainer Hours	Exam Score(s)
1				
2				
3				
4				
5				
6				

Reported by:		Date:	

ASSESSMENT BOOK

Course No:		Duration:	
Course title:			

No	Date Trainee name			Comment
1				
2				
3				
4				
5				
Registered by / Signature /				

COURSE FILE REGISTER

Course Title:					
Date Approved:					
Initial Course Package: (Number bundles per listing bellow)					Tick as req'd
1. Course Development Material (As applicable) 2. Course Approval Package (Check against MTOE001) 3. MTOE001 Training Course Approval Checklist					
Name:		Initials:		Date:	☐ ☐ ☐

Course File History				
Nos	Date	Item	Name	Initials
4				
5				
6				
7				
8				
9				
10				

KNOWLEDGE ASSESSMENT

Item:					
Candidates Name:				Staff No.	
Date:		Time:		Location:	
Performance Criteria:					
•					
•					
•					
•					
•					
Final Results: (Circle As Applicable)		Competent	J	Not Yet Competent	M
Assessor's Name:				Date:	
Assessor's Signature:				Date:	

MAINTENANCE TRAINEE SURVEY

Company

First Name Date of Birth

Family Name Town of Birth

Identification* Country of Birth

*Company ID, Identity Card, and Passport Number as applicable

License Information (If applicable)				
License	Number	Issue Date	Authority	Aircraft

Recent Experience on Aircraft more than 5.7 Tons			
Aircraft	From	To	Specialty

Level of English				
Reading	Fluent	Good	Poor	With Difficulty
Speaking	Fluent	Good	Poor	With Difficulty

Declaration by Company Authorized Person that above statements are true			
Name	Position	Signature	Date

TESTING PAPER

Course title:		Test No:	
Student name:		Date:	
Student signature:			

No	A	B	C	No	A	B	C
1				21			
2				22			
3				23			
4				24			
5				25			
6				26			
7				27			
8				28			
9				29			
10				30			
11				31			
12				32			
13				33			
14				34			
15				35			
16				36			
17				37			
18				38			
19				39			
20				40			

Grade:		Pass Status:	

Examiner's name	Signature

TRAINING FEEDBACK SUMMARY

Course:		Date Held:			
Summary of Feedback from Participants (Instructor to complete) • • • • • •					
Conclusions (Instructor to complete) •					
Name:		Signature:		Date:	
Recommendations (Training Co-ordinator to complete) •					
Name:		Signature:		Date:	
Implementation (Instructor to complete) •					
A signature below certifies: 1. All required amendments carried out (Refer TRM Course Revision process)					
Name:		Signature:		Date:	