



REPÚBLICA DE ANGOLA  
MINISTÉRIO DOS TRANSPORTES  
INSTITUTO NACIONAL DE PREVENÇÃO E INVESTIGAÇÃO DE ACIDENTES DE TRANSPORTES  
INIPAT

# MARINE ACCIDENT & INCIDENT INVESTIGATION MANUAL



MAIIM/INIPAT/25



## **PREFACE**

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15 April 2025

This Manual is a technical guide produced for the conduct of marine accident and incidents investigations by the National Institute for Transport Accidents Investigation and Prevention (INIPAT). The Manual has been produced to provide the information, policies and procedures necessary to carry out tasks in support of Angola's Marine Safety Investigators working at INIPAT and in the Angolan maritime industry.

All INIPAT personnel assigned to perform tasks that are addressed in this Manual shall observe the relevant policies and procedures in the execution of their tasks. Other relevant working documents related to these tasks and responsibilities shall also be considered.

The Marine Safety investigators of Angola in charge of INIPAT shall comply with this Manual bearing in mind that for investigation procedural references and technical information within the investigation process, they shall follow the criteria defined in IMO Casualty Investigation Code (CI Code), based on the international maritime conventions, including United Nations Conventions on the Law of the Sea (UNCLOS), International Convention for the Safety of Life at Sea (SOLAS) and International Convention for the Prevention of Pollution from Ships (MARPOL).

This manual, being a dynamic document, is subject to regular reviews for its updating and conformity with the Angolan marine legislation and the evolution of the operational safety practices of the international maritime community, in accordance with what is established in INIPAT's regulations on the matter, therefore, all addressees/users of this manual are invited to submit relevant and necessary contributions for its updating and consequent adequacy.

Approved by:

A handwritten signature in blue ink, appearing to read 'Luís António Solo', written over a horizontal line.

Luís António Solo  
Director-Genral of the INIPAT



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## RECORD OF REVISIONS

MANUAL # M01/INIPAT/25 ISSUED IN Luanda, April 15, 2025

- Insert and remove pages as indicated on the revision cover letter.
- Follow the guidance in Chapter 1 for the insertion and recording of manual and bulletin revisions.
- Review the revision summary cover page for specific page replacement.
- For missing pages, contact the Technical Publications Librarian.

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## COMMENT REPORT

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## **Chapter 1**

### **Manual Administration**

The purpose of this Chapter is to provide guidance for the—

- z Availability of this manual
- z Compliance with this manual
- z Revision of this manual
- z Understanding of the manual formatting
- z Application of standard symbols or methods

The definitions for acronyms and critical words and phrases used in this manual are provided in Appendix 1-A to this chapter.

#### **1.1 INIPAT ACCIDENT & INCIDENT INVESTIGATION MANUAL**

- A. This manual is both a source reference and primary user manual regarding the INIPAT investigation policies and procedures related to accidents and incidents that occur both within and outside the territory of Angola.

A primary user manual is defined as a manual that contains the compiled general policies and procedures for the conduct of a user's assigned duties for a specific task or job category.

- B. The guidance in this manual has precedence over any other policies and procedures found elsewhere in Angola technical guidance relating to accident and incident investigation. These policies shall be followed by INIPAT personnel in the performance of their job duties and responsibilities.

#### **1.2 AVAILABILITY OF THIS MANUAL**

- A. The latest version of this INIPAT Aircraft Accident & Incident Investigation Manual will be available to all technical personnel involved in hard copy and Intranet links.
- B. A printed copy will also be maintained in the Technical Library.

#### **1.3 COMPLIANCE WITH THIS MANUAL**

- A. Each assigned user must comply with policies and procedures provided in this manual.
- B. Should the user identify any policy or procedure that might not be consistent with INIPAT requirements, that information should immediately be communicated to their assigned supervisor.

Following the policies and procedures of this manual will ensure compliance with the INIPAT requirements.

#### **1.4 MAINTENANCE AND OWNERSHIP OF MANUAL**

- A. The INIPAT Marine Accident & Incident Investigation Manual must be maintained in current status by the assigned user in accordance with the policies and procedures specified in this chapter.



- B. This manual is considered the property of INIPAT and must be relinquished to the appropriate INIPAT Manager in the event of the user's retirement, termination, transfer or contract termination.
- C. The content of this manual is managed and updated by the INIPAT Director General and, as adapted, is the express property of the Angola Government.

## **1.5 POSTING REVISIONS TO THIS MANUAL**

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### **1.5.1 INSERTION OF REVISIONS**

- A. Revisions will be forwarded to all persons and organizations on the distribution list for this manual.
- B. Regardless of personal schedules, the user of this manual is required to confirm, to the Technical Librarian, receipt of manual updating materials, review and insertion of those materials on or before the revision's effective date.

A revision may be inserted and recorded as soon as it is received even if it is issued more than two weeks prior to the effective date.

### **1.5.2 INSERTION OF LIST OF EFFECTIVE PAGES [LEP]**

- A. An LEP will be issued for the original and all revisions to this manual.
- B. The LEP is the controlling reference for the page currency of the manual.
- C. Use the LEP to verify that all pages of the manual are current.
- D. Only the most current LEP should be retained in the manual.

### **1.5.3 IDENTIFYING REVISIONS**

#### **1.5.3.1 Summary Page**

- A. Each revision contains a summary page that reflects important information concerning the revision.
- B. An 'action' page number and summary column contain pertinent information to follow when inserting revision pages.

#### **1.5.3.2 Change Bars**

- A. Black vertical change bars in the outside margin are used to highlight the location of new or revised text on a newly published page. Deletion of text will be noted in the revision summary.
- B. Change bars are used to highlight a change in the revision information at the bottom of the page. Change bars will also be used to highlight this information when a change elsewhere has shifted the page text, but no text revision was made on the page.
- C. Change bars will not be used on the LEP, index or table of contents pages normally generated automatically by the publishing software.
- D. With the next revision of a page, previous change bars are deleted.

### **1.5.4 RECORDING REVISION INSERTION**

To indicate review and insertion of a revision, the user must record the revision's effective date and their initials after the appropriate revision number on the Record of Revisions page located in the front of the manual.



### 1.5.5 DISPOSAL OF PAGES

- A. The manual holder must destroy and discard out-of-date pages and the new revision summary pages/revisions checklist.
- B. Verify that all out-of-date pages are irretrievably destroyed by shredding, cutting, tearing or some other form of destruction, such that the information cannot be successfully pieced together.

The manual holder must not discard pages in hotel, port or other public area trash receptacles.

### 1.5.6 PROPOSING REVISIONS

- A. The success of the accident and incident policy and procedure implementation depends on employees and other users bringing professional insights. INIPAT welcomes and encourages such communication to ensure that operation is at peak performance.
- B. Any user of this manual may propose changes to this manual.
- C. Further questions about this manual should be directed to INIPAT Director General.

## 1.6 EDITING CONVENTIONS

The following apply to the use of certain specific terminology within the text of all INIPAT manuals–

- z **Gender** - In this manual, the male or female gender may be used in a generic sense to designate both sexes.
- z **Will, Shall and Must** - The words “will,” “shall,” and “must” are used in an imperative sense to state the requirement to accomplish the act prescribed. Compliance is mandatory.
- z **May** - The word “may” is used in a permissive sense to state authority or permission to do an act. Compliance is not mandatory.
- z **Includes** - The word “includes” means “includes, but is not limited to...”
- z **Refer to** - Where further discussion or reference is suggested, the notation “*Refer to...*” directs the reader to material located in another paragraph, chapter or manual. In these cases, the referenced location should be specific as to manual, chapter and paragraph.
- z **AMSR or AMSRs** - Where used in this manual, this acronym will be an abbreviation for Angola Marine Safety Regulation(s).

## 1.7 USE OF NOTES, CAUTIONS AND WARNINGS

These additions to the text are used to highlight or emphasize important points when necessary. They call attention of the user about safety and precautionary or additional information to make the job safe, easier and efficient.

### 1.7.1 NOTES

- A. Notes provide amplified information, instruction, or emphasis.
- B. Notes call attention to methods that enable a user to perform a job easier or wiser.
- C. If a Note applies to consecutive procedural steps, it is placed under the topic heading for those steps.

This is an example of a note. A note is identified and displayed in this type of box and is generally located parallel the discussion that it amplifies.





1.7.2 IMPERATIVE EMPHASIS NOTE

- A. Imperative Emphasis Notes are used to emphasize the necessity to comply with the text provided.
- B. This display is used when the text is important, but does not meet the criteria for a caution or warning.

|                                                                                   |                                                                       |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------|
|  | An "IMPERATIVE NOTE" is identified and displayed in this type of box. |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------|

1.7.3 CAUTIONS

- A. Cautions are instructions about hazards that, if ignored, could result in damage to an aircraft component or system.
- B. Cautions specify methods and procedures that must be followed to avoid damage to equipment.
- C. If the caution applies to consecutive subtasks/steps, it is placed before the first subtask/step. D. If the caution applies to several, non-consecutive subtasks/steps, it is placed before the applicable subtask/step.

|                                                                                   |                                                              |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------|
|  | A "CAUTION" is identified and displayed in this type of box. |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------|

1.7.4 WARNINGS

Warnings are instructions about hazards that, if ignored, could result in injury, loss of aircraft control or loss of life.

|                                                                                     |                                                                                        |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
|  | This is an example of a "WARNING." It is identified and displayed in this type of box. |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|

1.8 INTENTIONALLY BLANK

- A. "This page intentionally left blank" will be printed on any page that contains no text or graphics. This will usually be the even page at the end of a chapter.
- B. "The remainder of the page intentionally left blank" will be printed on any page that has more than ten lines of blank space at the bottom of the page.
- C. The only exception to paragraph B is when "End of (Chapter/Section/Appendix)" is printed immediately following the text.

*End of Chapter - Appendix Follow*



## APPENDIX 1-A

### Definitions & Acronyms for this Manual

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#### 1. Definitions

Critical words or phrases used in this manual are defined as follows—

- 1) **Marine casualty** - an event, or a sequence of events, that has resulted in any of the following which has occurred directly in connection with the operations of a ship:
  - (i) the death of, or serious injury to, a person; For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified as a fatal injury by OMI
  - (ii) the loss of a person from a ship;
  - (iii) the loss, presumed loss or abandonment of a ship;
  - (iv) material damage to a ship;
  - (v) the stranding or disabling of a ship, or the involvement of a ship in a collision;
  - (vi) material damage to marine infrastructure external to a ship, that could seriously endanger the safety of the ship, another ship or an individual; or
  - (vii) severe damage to the environment, or the potential for severe damage to the environment, brought about by the damage of a ship or ships.

However, a marine casualty does not include a deliberate act or omission, with the intention to cause harm to the safety of a ship, an individual or the environment.

- 2) **Marine incident** - an event, or sequence of events, other than a marine casualty, which has occurred directly in connection with the operations of a ship that endangered, or, if not corrected, would endanger the safety of the ship, its occupants or any other person or the environment.

However, a marine incident does not include a deliberate act or omission, with the intention to cause harm to the safety of a ship, an individual or the environment.

- 3) **Marine safety investigation** - an investigation or inquiry (however referred to by a State), into a marine casualty or marine incident, conducted with the objective of preventing marine casualties and marine incidents in the future. The investigation includes the collection of, and analysis of, evidence, the identification of causal factors and the making of safety recommendations as necessary.
- 4) **Marine safety investigation report** - a report that contains:
  - (i) a summary outlining the basic facts of the marine casualty or marine incident and stating whether any deaths, injuries or pollution occurred as a result;
  - (ii) the identity of the flag State, owners, operators, the company as identified in the safety management certificate, and the classification society (subject to any national laws concerning privacy);
  - (iii) where relevant the details of the dimensions and engines of any ship involved, together with a description of the crew, work routine and other matters, such as time served on the ship;
  - (iv) a narrative detailing the circumstances of the marine casualty or marine incident;
  - (v) analysis and comment on the causal factors including any mechanical, human and organizational factors;
  - (vi) a discussion of the marine safety investigation's findings, including the identification of safety issues, and the marine safety investigation's conclusions; and
  - (vii) where appropriate, recommendations with a view to preventing future marine casualties and marine incidents.



- 5) **Marine safety investigation Authority** - an Authority in a State, responsible for conducting investigations in accordance with the CI Code;
- 6) **Marine safety investigating State(s)** - the flag State or, where relevant, the State or States that take the responsibility for the conduct of the marine safety investigation as mutually agreed in accordance with the CI Code;
- 7) **Marine safety record** - the following types of records collected for a marine safety investigation:
  - (i) all statements taken for the purpose of a marine safety investigation;
  - (ii) all communications between persons pertaining to the operation of the ship;
  - (iii) all medical or private information regarding persons involved in the marine casualty or marine incident;
  - (iv) all records of the analysis of information or evidential material acquired in the course of a marine safety investigation;
  - (v) information from the voyage data recorder.
- 8) **Material damage** in relation to a marine casualty means damage that:
  - (i) significantly affects the structural integrity, performance or operational characteristics of marine infrastructure or a ship; and
  - (ii) requires major repair or replacement of a major component or components; or
  - (iii) destruction of the marine infrastructure or ship.
- 9) **Seafarer means** - any person who is employed or engaged or works in any capacity on board a ship.
- 10) **Serious injury** - an injury which is sustained by a person, resulting in incapacitation where the person is unable to function normally for more than 72 hours, commencing within seven days from the date when the injury was suffered.
- 11) **Severe damage to the environment** - damage to the environment which, as evaluated by the State(s) affected, or the flag State, as appropriate, produces a major deleterious effect upon the environment.
- 12) **Substantially interested State** - a State:
  - (i) which is the flag State of a ship involved in a marine casualty or marine incident; or
  - (ii) which is the coastal State involved in a marine casualty or marine incident; or
  - (iii) whose environment was severely or significantly damaged by a marine casualty (including the environment of its waters and territories recognized under international law); or
  - (iv) where the consequences of a marine casualty or marine incident caused, or threatened, serious harm to that State or to artificial islands, installations, or structures over which it is entitled to exercise jurisdiction; or
  - (v) where, as a result of a marine casualty, nationals of that State lost their lives or received serious injuries; or
  - (vi) that has important information at its disposal that the marine safety investigating State(s) consider useful to the investigation; or
  - (vii) that for some other reason establishes an interest that is considered significant by the marine safety investigating State(s).
- 13) **Territorial sea** - territorial sea as defined by Section 2 of Part II of the United Nations Convention on the Law of the Sea.



- 14) **Very serious marine casualty** - a marine casualty involving the total loss of the ship or a death or severe damage to the environment.
- 15) **Investigation.** A process conducted for the purpose of accident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations.
- 16) **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.
- Nothing in this definition is intended to preclude the functions of an investigator-in-charge being assigned to a commission or other body.
- 17) **Maximum tonnage** - maximum certificated operation mass of ship.
- 18) **Shipowner/Operator** - A person, organization or enterprise engaged in or offering to engage in an ship operation.
- 19) **Preliminary Report.** The communication used for the prompt dissemination of data obtained during the early stages of the investigation.
- 20) **State ship** – A ship used only on behalf of a State entity (except for commercial purposes) or exclusively leased by a State for at least 90 continuous days.
- 21) **Safety recommendation.** A proposal of the accident investigation authority of the State conducting the investigation, based on information derived from the investigation, made with the intention of preventing accidents or incidents.
- 22) **State of Design.** The State having jurisdiction over the organization responsible for the type design.
- 23) **State of Manufacture.** The State having jurisdiction over the organization responsible for the final assembly of the aircraft.
- 24) **State of Occurrence.** The State in the territory of which an accident or incident occurs.
- 25) **State of the Operator.** The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.
- 26) **Voyage Data Recorder** - Any type of recorder installed on the ship/vessel with the aim of complementing the investigation of accidents/incidents.
- 27) **Ship** - Any floating construction that extends over water surfaces, which can be used to transport people or cargo, whether moved by its own means or not.



## 2. Acrónimos

The following acronyms are used in this manual

- 1) **ADREP** – Accident Data Report
- 2) **AMN** – Maritime National Authority
- 3) **AIM** – Accident Investigation Manager
- 4) **APIM** – Accident Principal Investigation Manager
- 5) **CA** - Certificate of Airworthiness
- 6) **COLREG** – International Regulations for Preventing Collisions at Sea
- 7) **DIAMP** – Marine and Port Accident Investigation Department
- 8) **DPETI** – Accident Prevention, Study and information Technology Department
- 9) **ECCAIRS** – Sistema de Reporte de Accidentes e Incidentes do Centro de Coordenação Europeu
- 10) **EPI** – Individual Protective Equipment
- 11) **GISIS** – Global Integrated Shipping Information System
- 12) **IALA** – International Association of Marine Aids to Navigation and Lighthouse Authorities
- 13) **IE** – Investigator in Charge
- 14) **IHO** – International Hydrographic Organization
- 15) **III Code** – IMO Instrument Implementation Code
- 16) **IMDG** – International Maritime Dangerous Goods Code
- 17) **IMO** - International Maritime Organization
- 18) **INAMET** – National Institute of Meteorology
- 19) **INIPAT** – Transportation Accident Prevention and Investigation National Institute
- 20) **INSTRUTIVOS** – Transportation Safety Instructives of Angola
- 21) **LPE** – List of Effective pages
- 22) **MAIA** – Marine Accident Investigation Authority
- 23) **MAIIF** – Maritime Accident and Incident Investigation Forum
- 24) **MARPOL** – International Convention for the prevention of pollution from ships
- 25) **MINTRANS** – Ministry of Transport
- 26) **MTC** - Marine Traffic Control
- 27) **MTS** – Marine Traffic Services (Serviços de Tráfego Marítimo)
- 28) **NMTCA** – National Maritime Traffic Control Authority **OPS** – Operations
- 29) **KPI** - Key Performance Indicator
- 30) **RIAMs** – Angolan Marine Accident Investigation Regulations
- 31) **SAR** - Search and Rescue
- 32) **SOLAS** – International Convention for the Safety of Life at Sea
- 33) **STCW** – International Convention on Standards for the Training, Certification and watchkeeping for seafarers
- 34) **VDR** – Voyage Data Recorder
- 35) **VTS** – Vessel Traffic Service

The Attachment 8-C, of the Chapter 8, contains a complete glossary of useful abbreviations for of the accident reports





## Chapter 2

# Marine Accident & Incident Investigation Policies & Overview

This chapter provides an overview of the implementation of the INIPAT program to ensure thorough investigations of marine accidents and incidents and related safety analysis in order to prevent recurrences.



The sole objective of such investigations is the prevention of accidents and incidents, and not to apportion blame or liability.

## 2.1 SUMMARY OF REQUIREMENTS

### 2.1.1 IMO STANDARDS

- A. As a signatory to the Convention on International Maritime Organization, Angola has a responsibility to comply with IMO Standards relative to the investigation of marine accidents and incidents.
- B. CI Code of the International Maritime Organization contains the IMO Standards relative to the investigation of marine accidents and incidents. There are also requirements in other Conventions or Resolutions that point to CI Code as the focal point.
- C. INIPAT has been tasked with the responsibility for ensuring that Angola fulfills its investigation responsibilities relative to marine accidents and incidents.

### 2.1.2 ANGOLAN REQUIREMENTS

- A. Angola has promulgated Angola Technical Norms of Marine Accident Investigation (RIAM) to ensure that the regulation for marine accident and incident investigation parallel the Standards of the IMO CI Code.
- B. Part 1 of the RIAMs establishes the requirements for INIPAT's mandatory and voluntary occurrence reporting systems.
- C. Several other parts of the RIAM establish additional incident reporting requirements.

Refer to RIAM Part 1, Subpart I, for specific regulatory requirements for occurrence reporting.

## 2.2 ORGANIZATION & QUALIFICATION FOR ACCIDENT INVESTIGATION

### 2.2.1 STRUCTURE & ORGANIZATION

- A. The Angola government responsibility for the conduct of marine accident and incident investigations is assigned to the Minister of Transport.
- B. Under the Ministry of Transport, the INIPAT Director General is assigned the responsibility for the conduct of marine accident and incident investigations.
- C. To that end, a member of the INIPAT staff has been assigned the responsibilities of an Accident Investigation Manager (AIM), which include ensuring that marine accident and incident investigations and related prevention activities are administered effectively and in a standardized manner.



- D. Other INIPAT departments have been assigned to support the AIM by providing qualified investigative and analytical support to ensure that accident and incident investigations and related analyses are completed in a professional and timely manner.

### **2.2.2 INVESTIGATOR QUALIFICATIONS**

- A. A key element in the effectiveness of marine accident and incident investigation programs is the qualifications of the investigators that conduct these investigations.
- B. INIPAT has well-documented qualifications that must be met by investigators that participate in marine accident and incident investigations.



Unqualified investigators are not permitted to participate in such investigation activities.

### **2.2.3 INVESTIGATOR TRAINING**

- A. In addition to having investigators who meet INIPAT's initial qualification requirements, the AIM will ensure that they progress, over time, through a 4-phase training program.
- B. Completion of these training requirements will assure the achievement of specified training outcomes established by INIPAT.

## **2.3 INVESTIGATIVE EQUIPMENT REQUIREMENTS**

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The AIM will ensure the ready availability of all the equipment necessary, in the form of investigation field kits, for use by INIPAT investigative personnel in the conduct of investigations.

## **2.4 NOTIFICATION**

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- A. The INIPAT has taken measures to ensure its prompt receipt of, on a 24-hour a day basis, notifications of accidents and serious incidents when they occur in Angola or elsewhere (when Angola is the State of the Operator or the Flag State).
- B. Upon its receipt of such reports, as required by Instructive I001M/INIPAT/25 of the RIAM, the INIPAT will make all the notifications specified in the IMO CI Code in a prompt manner.
- C. When receiving a notification from a State of Occurrence, usually when Angola is the State of the Operator or the Flag State, the INIPAT will promptly respond to the State of Occurrence in the prescribed manner concerning matters such as—
- 1) Appointment of an accredited representative,
  - 2) The provision of information regarding the ship and crew, and
  - 3) Dangerous goods on board the ship.

## **2.5 CONDUCT OF INVESTIGATIONS**

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- A. The INIPAT will conduct its investigations of marine accidents and incidents in accordance with the provisions of IMO CI Code.
- B. Angola, through INIPAT, will fulfill its obligations, particularly with regard to the required separation of investigative activities and any judicial proceedings, and respect the participatory rights of other IMO Contracting States and identified industry parties.



- C. With support from the AIM, the Investigator-in-Charge (IE) has complete control over the conduct of investigations through the preparation and adoption of the final report by INIPAT.

The IE will be supported, when necessary, by other INIPAT investigative personnel who will serve as chairmen of any investigative groups that may be formed under his direction.

## **2.6 PARTICIPATION IN INVESTIGATIONS CONDUCTED BY OTHER STATES**

- A. Angola, through INIPAT, will participate, usually through the appointment of an accredited representative and any needed advisers, in investigations conducted by other States in situations in which Angola—
- 1) Is the State of the Operator, or
  - 2) The State of Registry, or
  - 3) As a State whose citizens suffered fatalities or serious injuries.
- B. The INIPAT will fully cooperate in such investigations by facilitating access to voyage data recorder records, the recorders themselves, and providing information about any Angolan organization that may have had an affect on the operation of the ship.

## **2.7 REPORTING**

In its preparation of the final report of an investigation, INIPAT will—

- 1) Follow the format prescribed in CI Code, coordinate the draft with the appropriate States, and
- 2) Disseminate the final version to IMO (for larger ship) and the States with which the draft was coordinated.

## **2.8 SAFETY RECOMMENDATIONS**

- A. At any stage in the conduct of its investigations, the INIPAT will, when necessary, make safety recommendations addressed to the investigation authorities of other States and to IMO, particularly in situations when immediate or near-term action is needed to prevent the likelihood of recurrences.
- B. INIPAT will also exercise due diligence in responding to safety recommendations directed to Angola by indicating preventive or remedial actions planned or taken or explaining why no action will be taken.

## **2.9 IMO ACCIDENT/INCIDENT REPORTING**

As an IMO Contracting State, Angola, through INIPAT, will meet its obligation to prepare and send Preliminary Reports, Accident Data Reports, and Incident Data Reports to IMO in the aftermath of marine accidents and serious incidents.

## **2.10 INCIDENT REPORTING SYSTEMS AND OCCURRENCE DATABASE**

- A. Several parts of the RIAM establish mandatory incident reporting requirements as well as sanctioning the voluntary reporting of incidents by affording appropriate protections to reporters, thus creating the foundation for INIPAT's mandatory and voluntary incident reporting systems.





- B. INIPAT's creation and use of an Occurrence Reporting System (ORS) database, in connection with the IMO-compatible European Coordination Centre for Accident and Incident Reporting Systems, is used to capture and store data from accident and incident reports as well as providing the means for continuous safety analysis by INIPAT.

## **2.11 INVESTIGATOR SAFETY MEASURES**

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INIPAT will make every effort to identify and mitigate or eliminate hazards at accident sites. Through the AIM, INIPAT will have personal protective equipment (PPE) readily available for use by INIPAT investigative personnel when they are present at such sites.

*End of Chapter*



## Chapter 3

# Investigator Qualifications, & Training Requirements

The purpose of this Chapter is to describe the structure, organization, investigator qualifications, and investigator training requirements that will enable INIPAT to meet Angola's obligations with respect to part VII of the Maritime International Convention and its Resolution MSC-255 (IMO CI Code).

### 3.1 STRUCTURE & ORGANIZATION

#### 3.1.1 APPLICABLE LEGISLATION

- A. In conformity with IMO CI Code, Angola must institute an inquiry into the circumstances of an accident when it occurs in Angola.
- B. This obligation is acknowledged in Angolan Law n.º 34/22, from September 13 - Lei da Marinha Mercante, Portos e Actividades Conexas and of the Presidential Decree nr. 29/22, from January 27, that establish INIPAT as the Angolan transportation Accident Investigation Authority.

#### 3.1.2 OBJECTIVE & IMPARTIAL

- A. In discharging this responsibility, the INIPAT must be strictly objective and totally impartial and must also be perceived to be so, i.e. completely free from political or other interference or pressure.
- B. Angola meets this requirement by utilizing the practice of appointing a completely empowered Investigator-in Charge (IE) for each accident to be investigated.
- C. This IE reports directly to the Accident Investigation Manager (AIM) so that the findings and safety recommendations of the investigation are not unnecessarily diluted.

#### 3.1.3 TEAM OF INVESTIGATORS

- A. The IE will lead the team of investigators, including appropriate technical experts drawn from within the INIPAT.
- B. The IE and these technical experts will be appointed by the AIM but the Director General will ensure that they all remain available for the duration of the investigation, thus relieving them of their normal job responsibilities to the degree necessary.
- C. INIPAT assures the independence of these individuals, as well as those investigators drawn from outside INIPAT, by prohibiting any possibility of retribution when they return to their normal duties.

### 3.2 INVESTIGATOR QUALIFICATIONS

#### 3.2.1 APIM QUALIFICATIONS

- A. Marine accident investigation is a specialized task requiring the use of qualified investigators.

The importance of having appropriately qualified investigators cannot be overemphasized.



- B. While the INIPAT has an APIM largely dedicated solely to accident and incident investigation, INIPAT has identified other appropriately qualified personnel who are also to be trained in accident investigation techniques prior to being assigned to accident investigation duties.

### **3.2.2 GENERAL INVESTIGATOR QUALIFICATIONS**

- A. Potential accident investigators must have considerable practical experience in marine as a foundation on which to build their investigation skills.
- B. This experience can be acquired from civil or military qualification such as a pilot, mechanical engineer, cabin attendant or marine traffic controller.
- C. Personnel qualified in flight operations, airworthiness, marine traffic management, or marine related management are also suitable for accident investigator training.
- D. Since accident investigations will often involve specialized areas, it is important that those selected for training as investigators understand the marine infrastructure and are able to relate to as many different areas of marine as possible.

## **3.3 ACCIDENT INVESTIGATOR QUALIFICATIONS**

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Since the outcome of an accident investigation is largely dependent upon investigators' marine knowledge, skills and abilities, the basic types of marine accident investigators that may be employed or utilized by INIPAT are to possess the following minimum qualifications—

### **3.3.0.1 Flight Operations**

- A. A minimum of fifty thousand (50.000) nautical miles of maritime navigation as a captain/master, to include twenty five thousand (25.000) nautical miles in multi-engines ships/vessel
- B. Seafarer License with an Instrument Navigation Rating
- C. Captain/Master license
- D. Demonstrated knowledge of—
  - 1) Maritime operations;
  - 2) Dispatch of ships/vessels, port requirements;
  - 3) Commercial ship/vessel maintenance practices and procedures;
  - 4) Maritime accident investigation practices, techniques and procedures;
- E. Ability to write comprehensive, detailed technical reports
- F. *Major duties:*
  - 1) Investigates marine carrier and general marine accidents and selected incidents especially those involving new or large ships;
  - 2) May be assigned to investigate or participate in accident investigations in foreign countries;
  - 3) Also, may be assigned to special investigations involving significant safety issues;
  - 4) Investigative work involves on-scene organization and supervision of group members representing various organizations to objectively document operational factors including:
    - (i). Qualification, training, experience and performance of maritime crew;
    - (ii). ship performance;



- (iii). marine carrier operations;
  - (iv) port operations;
  - (v). airborne and ground navigation systems;
  - (v). operational procedures and marine traffic control.
- 5) Record and analysis the witness, sea crew statements and meteorological or environmental conditions that may have contributed to the accident or incident;
  - 6) participates in formal public hearings on particular accidents;
  - 7) writes factual and analysis reports that document investigative findings and conclusions;
  - 8) develops safety recommendations to prevent accidents and promote safety.
  - 9) Capacity to argument the INIPAT position and views in the meetings and conferences with other civil and government agencies.

### **3.3.0.2 Engineering (Ship Power-Plants, Structures, and Systems)**

- A. Experience/qualification as a ship maintenance/engineering technician within the last 6 years in a military or civil marine organization, Higher education from an accredited university or college in marine engineering;
- B. Demonstrated knowledge of:
  - 1) Ship power plants, their associated systems, and aircraft turbine engine certification, manufacturing and/or maintenance standards and practices (power plant specialty)
  - 2) Design of ship structures, structural mechanics, properties of various materials used in aircraft construction, manufacturing and/or maintenance standards and practices (structures specialty)
  - 3) Engineering aspects of electrical, hydraulic, mechanical, pneumatic, or electronic systems on large ship and large ship certification, manufacturing and/or maintenance standards and practices (systems specialty)
  - 4) Marine accident investigation practices, techniques and procedures
- C. Ability to write comprehensive, detailed technical reports
- D. *Major duties:*
  - 1) **Power-plants**
    - (i) Applies as a Marine Engineer (ship Power plants) Investigator with primary responsibility for providing engineering expertise on ship power-plant design, manufacturing, certification, and maintenance in the investigation of marine carrier and general marine accidents and incidents.
    - (ii) Applies forensic engineering techniques in directing the on-scene and subsequent testing phases of power-plant aspects of ship accident investigations; also investigates and documents records and practices relating to maintenance, certification, and manufacturing of power-plants and their related systems in coordination with other investigative groups.
    - (iii) Prepares technical reports of investigation findings to assist the INIPAT in determining causal factors in marine accidents; prepares and directs studies to address safety issues; and prepares accident prevention recommendations to regulatory authorities, manufacturers, and operators to correct safety deficiencies.



- (iii) Advises INIPAT management in his area of technical expertise. Assists in preparation for and participates in public hearings and depositions as a technical panelist or witness.

## **2) Structures**

- (i) Serves as a Marine Engineer (ship Structures) Investigator with primary responsibility for providing engineering expertise on ship structural design, manufacturing, certification, and maintenance in the investigation of air carrier and general aviation accidents and incidents.
- (ii) Applies forensic engineering techniques in directing the on-scene and subsequent testing phases of ship structures aspects of marine accident investigations; also investigates and documents records and practices relating to maintenance, certification, and manufacturing of ship structures in coordination with other investigative groups.
- (iii) Prepares technical reports of investigation findings to assist the INIPAT in determining causal factors in marine accidents; prepares and directs studies to address safety issues; and prepares accident prevention recommendations to regulatory authorities, manufacturers, and operators to correct safety deficiencies.
- (iv) Advises INIPAT management in his area of technical expertise. Assists in preparation for and participates in public hearings and depositions as a technical panelist or witness.

## **3) Systems**

- (i) Serves as a Marine Engineer (Ship Systems) Investigator with primary responsibility for providing engineering expertise on ship systems design, manufacturing, certification, and maintenance in the investigation of marine carrier and general marine accidents and incidents.
- (ii) Applies forensic engineering techniques in directing the on-scene and subsequent testing phases of ship systems aspects of marine accident investigations; also investigates and documents records and practices relating to maintenance, certification, and manufacturing of ship systems in coordination with other investigative groups.
- (iii) Prepares technical reports of investigation findings to assist the INIPAT in determining causal factors in marine accidents; prepares and directs studies to address safety issues; and prepares accident prevention recommendations to be presented to regulatory authorities, manufacturers, and operators to INIPAT management in his area of technical expertise. Assists in preparation for and participates in public hearings and depositions as a technical panelist or witness.

### **3.3.0.3 Marine Traffic Control/Marine Navigation Services**

- A. Work experience/skill as a marine traffic controller within the past 6 years, i.e. in a military or civilian marine traffic facility that involved the separation and control of air traffic or the provision of pre-voyage, in-voyage, or port advisory service to ship operators
- B. Demonstrated knowledge of:
  - 1) Marine traffic control regulations, practices, and procedures
  - 2) Marine accident investigation practices, techniques and procedures
- C. Ability to write comprehensive, detailed technical reports
- D. *Major duties:*
  - 1) Supervises and directs technical groups formed to investigate and analyze the marine traffic control aspects of marine incidents and accidents.
  - 2) Focuses on the history of the voyage; recorded MTC communications and associated transcripts; controller interviews, training and experience; related surface weather observations; recorded radar computer data; MTC procedures; MTC facility operations; MTC equipment maintenance records; etc.





- 3) Prepares detailed written factual reports of the facts, conditions, and circumstances pertaining to the marine traffic control aspects of the accident and prepares comprehensive analysis reports describing the findings and conclusions.
- 4) Participates in formal public hearings or deposition proceedings on appropriate accidents. Initiates special research projects, studies, and investigations concerning the marine traffic control aspects of marine accidents and ascertains what will best tend to reduce or eliminate the possibility of or recurrence of accidents.
- 5) Develops safety recommendations to prevent accidents and promote safety.

#### **3.3.0.4 Human Performance**

- A. For a position as a Human Factors Engineer, a full four-year degree from an accredited university or college in human factors engineering or knowledge and understanding equivalent to this education such as valid registration as a professional engineer, or
- B. For a position as a Marine Psychologist, a full four-year degree from an accredited university or college with a major or equivalent in psychology
- C. For a position as a Human Factors Investigator, a full four-year degree in one of the above or another relevant discipline. Graduate education up to and including the Ph.D. or equivalent doctoral degree is preferred.
- D. Specialized work experience in or directly related to the responsibilities of the human performance position that has equipped the applicant with the particular knowledge, skills, and abilities to successfully perform the duties of the position.
- E. Demonstrated knowledge of:
  - 1) Practices in the marine industry such as marine companies, marine traffic control, and marine frame and electronics manufacturers
  - 2) Current issues in marine human factors
- F. Ability to write comprehensive, detailed technical reports
- G. *Major duties:*
  - 1) Serves as Human Performance Investigator with primary responsibility and expertise in and human engineering factors concerning marine accident causation.
  - 2) Investigative responsibilities include such areas as operating practices and procedures; training; duty/ rest cycles; fatigue; workload; control/display systems; crew coordination; situational awareness; and decision-making.
  - 3) Incumbent organizes and coordinates the activities of participating government and industry personnel in marine accident investigations; determines requirements for special tests and studies, and evaluates their findings.
  - 4) Incumbent is responsible for developing and preparing documentation that accurately reflects pertinent findings in the human performance/human factors areas and for collaborating in the preparation of formal marine accident reports.
  - 5) Other duties include participating in public hearings, initiating and developing safety recommendations and conducting studies of behavioral involvement in accident causation.

#### **3.3.0.5 Meteorology**

- A. A full four-year degree from an accredited university or college in a major field of study in meteorology, atmospheric science, or other natural major science that included:
  - 1) At least 24 semester hours of credit in meteorology/atmospheric science including a minimum of:
    - (i) 6 semester hours of atmospheric dynamics and thermodynamics;



- (ii) 6 semester hours of analysis and prediction of weather systems (synoptic/mesoscale);
  - (iii) 6 semester hours of physical meteorology; and
  - (iv) 6 semester hours of remote sensing of the atmosphere and/or instrumentation.
- 2) 6 semester hours of physics, with at least one course that included laboratory sessions.
  - 3) 3 semester hours of ordinary differential equations.
  - 4) At least 9 semester hours of course work appropriate for a physical science major in any combination of three or more of the following:
    - (i) physical hydrology,
    - (ii) statistics,
    - (iii) chemistry,
    - (iv) physical oceanography,
    - (v) physical climatology,
    - (vi) radiative transfer,
    - (vii) advanced thermodynamics,
    - (viii) advanced electricity and magnetism,
    - (ix) light and optics,
    - (x) computer science.
- These basic requirements can also be met by a combination of education and experience including the course work shown above plus appropriate experience or additional education.
- B. Specialized work experience in or directly related to the responsibilities of the meteorologist position that has equipped the applicant with the particular knowledge, skills, and abilities to successfully perform the duties of the position.
  - C. Demonstrated knowledge of:
    - 1) Marine weather forecasting, including collecting, interpreting, and disseminating weather information
    - 2) Marine weather hazards
    - 3) Ship dispatching, airport requirements and air traffic control practices and procedures
  - D. Ability to write comprehensive, detailed technical reports
  - E. *Major duties:*
    - 1) Serves as a Meteorologist with primary emphasis on the investigation and analysis of weather-related aspects of marine incidents and accidents.
    - 2) Collects, analyzes, evaluates, and interprets meteorological data used to predict weather.
    - 3) Identifies safety issues associated with meteorology and its influence on the marine system.
    - 4) Also serves as the meteorology group chairman for major marine accidents.
    - 5) Supervises and directs technical groups formed to investigate the meteorological aspects of marine accidents.
    - 6) Prepares detailed written factual reports of the facts, conditions, and circumstances pertaining to the meteorological aspects of the accident and prepares comprehensive analysis reports describing the findings and conclusions.
    - 7) Participates in formal public hearings or deposition proceedings on appropriate accidents.
    - 8) Initiates special research projects, studies, and investigations concerning the meteorological aspects of marine hazards and ascertains what will best tend to reduce or eliminate the possibility of or recurrence of accidents.
    - 9) Develops safety recommendations to prevent transportation accidents and promote safety.





### **3.3.0.6 Survival Factors**

- A. For a position as a Survival Factors Engineer or Investigator, a full, four year degree from an accredited university or college in engineering or knowledge and understanding equivalent to this education such as valid registration as a professional engineer
- B. Specialized work experience in or directly related to the responsibilities of these survival factors positions that has equipped the applicant with the particular knowledge, skills, and abilities to successfully perform the duties of the position.
- C. Demonstrated knowledge of:
  - 1) Ship occupant survivability issues
  - 2) Ship crashworthiness factors
  - 3) Marine industry crashworthiness and survival standards
- D. Ability to write comprehensive, detailed technical reports
- E. *Major duties:*
  - 1) Serves as Survival Factors Engineer/Investigator with primary responsibility and expertise in pathology, forensic science, injury mechanisms and causation, and engineering factors concerning the crashworthiness of ship and the survivability of persons involved in marine accidents.
  - 2) Investigative responsibilities include examining and reporting on such areas as safety procedures, equipment design, emergency responsiveness, fire fighting and rescue techniques, medical care technology, crewmember emergency procedures training, and port operations.
  - 3) Organizes and coordinates the activities of participating government, medical, and industry personnel in marine accident investigations; determines requirements for special tests and studies, and evaluates their findings.
  - 4) May also be responsible for supervising the reconstruction of occupied space inside of accident ship.
  - 5) Responsible for developing and preparing documentation that accurately reflects pertinent findings in the survival factors areas and for collaborating in the preparation of formal marine accident reports.
  - 6) Other duties include participating in public hearings, initiating and developing safety recommendations, and conducting special studies in the areas of crashworthiness, marine evacuation, and occupant survival and protection.

### **3.3.1 PERSONAL ATTRIBUTES**

In addition to the foregoing qualifications, accident investigators utilized by INIPAT will possess certain personal attributes such as integrity and impartiality in the recording of facts, logic and 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 a marine accident.

## **3.4 INVESTIGATOR TRAINING REQUIREMENTS: AN OVERVIEW**

### **3.4.1 GENERAL**

- A. Marine accident investigators require different levels of experience, knowledge and training according to the particular role to which they are assigned.
- B. Marine accident investigators are therefore to receive training commensurate with their responsibilities as an accident investigator, group chairman, investigator-in-charge (IE), accredited representative, adviser or expert/specialist.



- C. The training guidelines and course syllabi are hence to be aligned in such a way that investigators receive training that enables them to perform effectively and efficiently in any role assigned to them by the INIPAT.

### **3.4.2 FORMAL & OJT TRAINING**

- A. INIPAT- arranged training for its marine accident investigation personnel involves several phases. These phases include:
  - 1) Initial training,
  - 2) On-the-job training (OJT),
  - 3) A basic accident investigation course, and
  - 4) An advanced accident investigation course supplemented by specialized follow-on courses.
- B. While on-the-job training is an ongoing process that continues for many years, there should be sufficient time intervals between each formal course to allow investigators to integrate the information and techniques learned.

### **3.4.3 FORMAL ACCIDENT TRAINING**

- A. Formal courses, basic or advanced, are designed to complement on-the-job training by exposing trainee-investigators to a cadre of experts who can pass on the details of their specialties to their students.
- B. The experts are usually recruited from those with experiences in a particular area of accident investigation. They include:
  - 1) Experienced investigators,
  - 2) Marine medicine physicians,
  - 3) Psychologists,
  - 4) Marine engineers, and
  - 5) Manufacturers' representatives.
- C. Such structured courses in marine accident investigation are available from universities, manufacturers, military establishments, other accident investigation authorities, and other educational institutions.
- D. INIPAT relies on the *IMO* STCW Convention and of the IMO web site related to ([www.imo.int/td](http://www.imo.int/td)) to identify institutions that offer appropriate marine accident investigation training courses.

### **3.4.4 CONTINUOUS TRAINING**

- A. On an annual basis, the DIAM will develop and secure funding for an annual training plan intended to provide training for presently available and new investigators expected to be in place during the course of the coming year.
- B. This plan is to take account of the investigator training requirements that are specified in paragraph 3.5 of this chapter.
- C. The DIAM will also maintain written records of the training that each INIPAT investigator successfully completes.

To enhance the utility of these plans, these plans should reflect 3-year projections that are updated on an annual basis.



## **3.5 THE FOUR TRAINING PHASES**

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### **3.5.1 PHASE 1: INITIAL TRAINING**

The aim of the initial training or indoctrination is to familiarize new investigators with Angolan laws and regulations and the related INIPAT procedures and requirements. The following subjects are addressed in this initial training:

**1) Administrative arrangements**

- Applicable Angolan law and marine accident investigation regulations;
- International agreements (including CI Code — *Marine Accident and Incident Investigation*);
- Memoranda of understanding with other organizations;
- Liaison arrangements with local and other national authorities;
- Structure of the INIPAT;
- INIPAT Accident and Incident Investigation Manual and procedures;
- Definitions and accident classification;
- Equipment and tools;
- Transport arrangements;
- Ethics and conduct; and
- Expenditure control.

**2) Initial response procedures**

- On-call procedures;
- Notification of other national authorities and organizations;
- Securing of records, recordings and samples;
- Accident site jurisdiction and security;
- Investigator safety including psychological stress;
- Recovery of human remains;
- Requests for autopsies; and
- Family assistance.

**3) Investigation procedures**

- 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 media.

### **3.5.2 PHASE 2: ON-THE-JOB TRAINING (OJT)**

- A. Following the initial training, INIPAT provides for on-the-job training for a new investigator.
- B. During this second phase, the new investigator practices the procedures and tasks covered in the initial training, and gains familiarity with investigation techniques.
- C. This training will also familiarize him with the investigation tasks at the accident site, the collection and analysis of factual information, and the development of the final report.
- D. The conduct of this OJT often involves more than one experienced investigator and is not limited to investigations within Angola, i.e. INIPAT may provide the opportunity to participate, as a trainee or observer, in an investigation being conducted by another accident investigation authority.



### **3.5.3 PHASE 3: BASIC ACCIDENT INVESTIGATION TRAINING COURSE**

Within the first year after completing the initial familiarization training (Phase 1), accident investigators are to attend a basic accident investigation course. The following subjects are to be addressed in this basic training—

- 1) The responsibilities of the States involved, as defined in CI Code — *Marine Accident and Incident Investigation*;
- 2) Accident site considerations, such as security, hazards, safety precautions, wreckage diagramming, collection of evidence and control of access;
- 3) The investigators' personal equipment and protective clothing;
- 4) The examination and recording of the wreckage and witness marks;
- 5) The range of apparatus available for recording evidence;
- 6) Witness interview techniques;
- 7) The full range of in-flight recorders and ground-based recorders;
- 8) The determination of the time and origin of any ship fires;
- 9) Crashworthiness and survival aspects;
- 10) The properties and the modes of failure of materials used in the ship structure;
- 11) The design of ship systems and likely modes of failure;
- 12) Dynamics and ship performance;
- 13) The examination of power plants;
- 14) Human performance;
- 15) Marine medicine and pathology; and
- 16) The methodology of report writing.

### **3.5.4 PHASE 4: ADVANCED ACCIDENT INVESTIGATION TRAINING COURSES**

#### **3.5.5 ADVANCED ACCIDENT INVESTIGATION COURSES**

As trained investigators gain experience, INIPAT will ensure that they are enrolled in an advanced accident investigation courses where they can update their knowledge of the basic techniques and increase their knowledge in special areas relevant to accident investigations.

#### **3.5.6 ADDITIONAL TRAINING**

- A. Since investigators may have to investigate accidents involving a variety of ship types, it may be impractical to train an investigator on each of the ship types that may be encountered. Nevertheless, investigators should have a basic knowledge of most of the major marine transport ship types operated in Angola.
- B. INIPAT will ensure that some of its investigators attend ship type courses, assigned on an equitable basis, on the most common ship types operated in Angola. Preferably, such ship type courses should include specialized technology transport category ship such as ship equipped with glass cockpits, new generation systems, and ship which contain composite materials in their structures.
  - 1) Investigators with a technical or engineering background are to attend the ship type courses for technical/maintenance personnel.
  - 2) Similarly, investigators with a seafarer background are to attend the ship type courses for captains/masters, which could include introductory navigation training in a navigation simulator.



C. Other additional training is to be obtained by:

- 1) Sending INIPAT investigators to conferences and seminars conducted by marine accident investigation organizations, such as the Marine Accident Investigators International Forum (MAIIF),
- 2) By investigators reading related material such as the IMO Marine Accident Digest circulars and marine accident investigation reports issued by other marine accident investigation authorities; and
- 3) On-site observations at major investigations in other States that are arranged by INIPAT
- 4) Training on marine accident site hazards in accordance with IMO Circulars and other documents, including occupational health risk management in marine accident investigation, hazards, risk management at marine accident sites, operational safety plan/accident site assessment, personal protective equipment and operational health and safety training.

### **3.6 TRAINING OUTCOMES**

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The ultimate outcomes of the four phase training program for INIPAT marine accident investigators are as follows:

- 1) an understanding of the depth of investigation that is necessary in order for the investigation to conform with the law, regulations and other requirements of Angola for which INIPAT is conducting the investigation;
- 2) a knowledge of marine accident investigation techniques;
- 3) the ability to obtain and manage the relevant technical assistance and resources required to support an investigation;
- 4) the ability to collect, document and preserve evidence;
- 5) the ability to identify and analyze pertinent evidence in order to determine the causes and, if appropriate, make safety recommendations; and
- 6) the ability to write a final report that meets INIPAT's requirements as the marine accident investigation authority conducting the investigation on behalf of Angola.

*End of Chapter*



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## Chapter 4

# Investigative Equipment Requirements

The purpose of this Chapter is to prescribe the investigative equipment needed by members of INIPAT accident investigation teams.

### 4.1 INTRODUCTION

#### 4.1.1 POLICY

- A. It is the responsibility of the INIPAT Accident Investigation Manager (AIM) to acquire and store this equipment for investigator use when needed.
- B. The availability and proper use of this equipment will help to ensure Angola's compliance with its obligations with respect to its conduct of accident investigations in accordance with the provisions of CI Code (Marine Accident and Incident Investigation) of the Convention on International Maritime Organization (IMO).

Refer to Chapter 12 (section 12.3) of this manual for guidance concerning the availability and use of personal protective equipment (PPE).

#### 4.1.2 EQUIPMENT & PERSONNEL READINESS

- A. The AIM will have investigation field kits for team members packed and ready so that they can proceed without delay to the accident site.
- B. The AIM will also ensure that potential team members have valid passports and current immunization records.
- C. Proper planning and preparedness are essential in facilitating the prompt arrival of investigators at an accident site and have considerable bearing on the effectiveness and efficiency of the investigation.

### 4.2 EQUIPMENT REQUIREMENTS: INVESTIGATION FIELD KITS

#### 4.2.1 INVESTIGATION FIELD KITS

- A. Investigation field kits will contain sufficient equipment to enable examination of the wreckage, the plotting of impact points and wreckage patterns, parts identification and the recording of observations.
- B. The AIM will maintain investigation field kits with the equipment from the list that are asterisked.

#### 4.2.2 SPECIFIC EQUIPMENT REQUIREMENTS

Investigators will bring to the accident site those items that they expect to use, subject to the direction of the Investigator-in-Charge (IIC).

In actual practice, there is usually no need for each investigator to bring all of the items in the following lists.



#### **4.2.2.1 General**

- 1) Identification papers, investigator's official tag, armband or high-visibility jacket
- 2) Relevant documentation (regulations, accident and incident investigation manual, checklists, report forms, etc.)
- 3) Appropriate ship manuals and parts catalogues
- 4) Emergency funds

#### **4.2.2.2 Survey Equipment**

- 1) Large-scale maps of the accident area, including topographical
- 2) Magnetic compass
- 3) Global Positioning System receiver
- 4) Laser surveying equipment
- 5) Clinometer
- 6) Navigational computer, protractor and dividers
- 7) Measuring tape, at least 20 m long, and a 30-cm-long ruler
- 8) Reel of cord, 50 to 300 m long
- 9) Calculator

#### **4.2.2.3 Marking Equipment**

- 1) Labels, tie-on tags and adhesive tags
- 2) Flag markers and stakes
- 3) Writing material, graph paper, waterproof notebooks and clipboards
- 4) Pens, pencils, grease pencils, indelible marking crayons and permanent markers

#### **4.2.2.4 Tools & Sampling Materials**

- 1) Tool kit
- 2) Waterproof flashlight with spare batteries and bulbs Small magnet
- 3) Multi-purpose knife
- 4) Inspection mirror
- 5) Magnifying glass (10 x)
- 6) Assorted antistatic containers (for electronic components with non-volatile memory) and sterile bottles (for ship fuel, oil and fluid samples, as well as or pathological fluid and tissue samples)
- 7) Syphons
- 8) Plastic bags (assorted) and plastic sheets
- 9) Masking tape

#### **4.2.2.5 Miscellaneous Items**

- 1) Model ship and color photographs of undamaged ship.
- 2) Photographic equipment for color prints/slides (film, zoom lens, macro lens, wide-angle lens and electronic flash unit), including spare batteries and film



- 3) Video camera
- 4) Small camera tripod
- 5) Binoculars with integrated compass and distance measuring
- 6) Small tape recorder, spare cassettes and batteries
- 7) Portable means of on-site communication, e.g. cellular telephone or walkie-talkie, spare batteries
- 8) Computer, facsimile machine, stapler, and paper clips

*End of Chapter*



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## **Chapter 5**

### **Notification**

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The purpose of this Chapter is to provide the procedures that must be followed when the Marine Accident Investigation Manager (DIAM), on behalf of the Angolan INIPAT, provides or receives notifications of accidents or serious incidents.

#### **5.1 GENERAL POLICIES**

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- A. Compliance with the notification requirements of this chapter will satisfy Angola's obligations with respect to Resolution MSC-255 (Marine Accident and Incident Investigation) of the IMO.
- B. Immediate notification of accidents and incidents to the INIPAT is essential because the proper conduct of an investigation requires the prompt arrival of investigators at the accident site.
- C. Any delay in their arrival may well result in the deterioration or disappearance of essential evidence due to theft, displacement or improper handling of the wreckage, adverse weather, corrosion of the wreckage, obliteration of ground scars or contamination of witness accounts through discussions among themselves.

#### **5.2 NOTIFICATIONS WITHIN ANGOLA (DOMESTIC OCCURRENCES)**

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- A. The Angolan Marine Accident and Incident Investigation Regulations establish immediate notification requirements for both Angolan and foreign air operators when an accident or specified serious incidents occur.
- B. This Regulations also specify the following specific information required to be included in such notifications, if available:
  - 1) Type, nationality, and registration marks of the ship;
  - 2) Name of owner, and operator of the ship;
  - 3) Name of the captain/master in command;
  - 4) Date and time of the accident;
  - 5) Last point of departure and point of intended arrival of the ship;
  - 6) Position of the ship with reference to some easily defined geographical point;
  - 7) Number of persons aboard, number killed, and number seriously injured;
  - 8) Nature of the accident, the weather and the extent of damage to the ship, so far as is known; and
  - 9) A description of any explosives, radioactive materials, or other dangerous articles carried.
- C. Such reports may be made to the nearest marine traffic services unit, flight information unit or directly to the INIPAT accident and incident reporting and notification unit in Luanda.



- z Regardless of which channel is utilized, such notifications must be sent to the INIPAT in the most expeditious manner possible.
- D. The INIPAT DPETI or his designee will be available on a 24-hour basis in order to acknowledge receipt of the notification of an accident or serious incident and take appropriate measures to initiate investigations.
- E. The DPETI will provide prior notification of INIPAT contact information to all marine traffic services facilities, port authorities, police departments, and operators licensed by INIPAT within Angola.

The DPETI should also stress the need for immediacy, providing the rationale in paragraph 5.1.2 of this chapter.

## **5.3 ACCIDENTS INVOLVING FOREIGN-REGISTERED SHIP**

### **5.3.1 PROCEDURES FOR SENDING NOTIFICATIONS**

#### **5.3.1.1 Recipients of Notifications**

- A. In representing the State of Occurrence, the INIPAT DPETI or his designee will be available on a 24-hour basis in order to forward the required notification of an accident or serious incident with a minimum of delay and by the most suitable and quickest means available to:

In this situation, Angola is the State of Occurrence.

- 1) The Flag State;
- 2) The State of the Operator;
- 3) The State of Design;
- 4) The State of Manufacture;
- 5) States whose citizens suffered fatalities and serious injuries;
- 6) States which may be requested to provide information to the INIPAT
- 7) The IMO, when the ship involved is of a maximum gross tonnage of over 500 tons.

#### **5.3.2 METHODS OF NOTIFICATION & PROTOCOL**

- A. Telephone, facsimile, e-mail or the Maritime Fixed Telecommunication Network (MFTN) will in most cases constitute "the most suitable and quickest means available".
- B. The 5-letter designator in association with a 4-letter IMO location indicator forms the 8-letter Recipient Indicator for messages sent by AFTN to authorities responsible for investigating maritime accidents or incidents
- C. For messages sent over the public telecommunication service the addressee indicator cannot be used and a postal or telegraphic address must be substituted.
- D. The 8-letter recipient indicators and corresponding postal and telegraphic addresses, when notified to the IMO, are published in the Designators for Ship/Vessel Operations Agencies, Maritime Authorities





### **5.3.3 LIST OF MARINE ACCIDENT INVESTIGATION AUTHORITIES**

- A. A list of addresses of marine accident and incident investigation authorities can be found in the IMO website. The DPETI will ensure that IMO is always kept advised of the currency of the information that pertains to Angola.
- B. However, when the INIPAT is not made aware of a serious incident, the Flag State or the State of the Operator, as appropriate, is expected to forward a notification of such an incident to the State of Design, the State of Manufacture, and to the INIPAT.

### **5.3.4 FORMAT & CONTENT USE FOR NOTIFICATIONS**

- A. The INIPAT notification shall be in plain language and prepared in one of the working languages of IMO, taking into account the language of the recipient(s), whenever it is possible to do so without causing undue delay.
- B. However, as soon as it is possible to do so, the DPETI or his designee will collect and dispatch the details omitted from the initial notification as well as other known relevant information.
  - 1) For accidents, the identifying abbreviation ACCID, for serious incidents INCID;
  - 2) Manufacturer, model, nationality and registration marks, and serial number of the aircraft;
  - 3) Name of owner, operator and hirer, if any, of the ship;
  - 4) Name of the captain-in-command, and nationality of crew and passengers;
  - 5) Date and time (local time or UTC) of the accident or serious incident;
  - 6) Last point of departure and point of intended arrival of the ship;
  - 7) Position of the ship with reference to some easily defined geographical point and latitude and longitude;
  - 8) Number of seafarers and passengers; aboard, killed and seriously injured; others, killed and seriously injured;
  - 9) Description of the accident or serious incident and the extent of damage to the ship so far as is known;
  - 10) An indication to what extent the investigation will be conducted or is proposed to be delegated by the State of Occurrence;
  - 11) Physical characteristics of the accident or serious incident area, as well as an indication of access difficulties or special requirements to reach the site;
  - 12) Identification of the INIPAT as the originating authority and means to contact the investigator-in-charge (IIC) and the DPETI at any time; and
  - 13) Presence and description of dangerous goods on board the ship/boat.

It shall contain as much of the following information as is readily available, but its dispatch will not be delayed due to the lack of complete information.



## **5.4 ACCIDENTS & SERIOUS INCIDENTS INVOLVING ANGOLAN-REGISTERED SIHIP/BOAT**

### **5.4.1 PROCEDURES FOR SENDING NOTIFICATIONS**

When the DPETI, representing Angola as either the State of Occurrence, Registry, or Operator institutes an investigation of an accident or serious incident, he will follow the notification procedures outlined above in 5.3.1.

In this situation, Angola is the State of Registry and/or the State of the Operator and/or the State of Occurrence.

## **5.5 PROCEDURES FOR REACTING TO NOTIFICATIONS FROM OTHER STATES**

### **5.5.1 TWENTY-FOUR HOUR NOTIFICATION CAPABILITY**

- A. The DPETI or his designated designee, representing Angola as the State of Registry and/or the State of the Operator, will be available on a 24-hour basis in order to acknowledge receipt of the notification of an accident or serious incident.
- B. Upon receipt of the notification, the DPETI will, as soon as possible, provide the State instituting the investigation with any relevant information available to INIPAT regarding the ship/boat and seafarer crew involved in the accident or serious incident.

In this situation, Angola is the State of Registry and/or the State of the Operator

### **5.5.2 ACCREDITED REPRESENTATIVE APPOINTMENT**

- A. The DPETI will also inform the State instituting the investigation whether the INIPAT intends to appoint an accredited representative.
- B. If such an accredited representative is appointed, the DPETI will inform the State:
  - 1) The name of the representative;
  - 2) His contact details, and
  - 3) Expected date of arrival.

Refer to Chapter 7 for additional guidance concerning participation in investigations conducted by other States.

The ETA only if the accredited representative will travel to the State instituting the investigation.

### **5.5.3 DANGEROUS GOODS NOTIFICATION**

Upon receipt of the notification, the DPETI representing Angola as the State of the Operator, will also, with a minimum of delay and by the most suitable and quickest means available, provide the State of Occurrence with details of dangerous goods on board the ship/boat.

- z Standards of the IMO Resolution MSC-255 establish the right of the Flag State or State of Registry and the State of the ship-owner/Operator to appoint an accredited representative to participate in the investigation.
- z Such standards further requires the Flag State or State of Registry and the State of the ship-owner/Operator to appoint an accredited representative when specifically requested to do so by the State conducting the investigation of an accident to a gross tonnage ship/boat equal or over 500 tons.

*End of Chapter*



## Chapter 6

# Conduct of Investigations

- A. The purpose of this Chapter is to provide the procedures to be followed by the Marine Accident Investigation Manager (DIAM), the Investigator-in-Charge (IIC) and other INIPAT investigative personnel in their conduct of accident investigations on behalf of Angola.
- B. Adherence to these procedures should ensure Angola's compliance with its obligations with respect to the IMO Resolution MSC-255 (CI Code).

### 6.1 BASIC PRINCIPLES

- A. In accordance IMO Resolution MSC-255, the investigation committee has complete independence and unrestricted authority in the conduct of investigations.
- B. Such investigations will include:
  - 1) The gathering, recording and analysis of all available information on that accident or incident;
  - 2) If appropriate, the issuance of safety recommendations;
  - 3) If possible, the determination of the causes; and
  - 4) The completion of the final report.
- C. The conduct of INIPAT investigations will involve, when possible, visits to the scene of the accident, examinations of the wreckage, and securing of statements from witnesses.
- D. The INIPAT will not make the following records available for purposes other than accident or incident investigation, unless Angolan judicial authorities, for the purpose of administration of justice in Angola, determines that their disclosure outweighs the adverse domestic and international impact such action may have on that or any future investigations:
  - 1) All statements taken from persons by the INIPAT investigators in the course of their investigation;
  - 2) All communications between persons having been involved in the operation of the ship/boat;
  - 3) Medical or private information regarding persons involved in the accident or incident;
  - 4) Voyage Data Recorder recordings and transcripts from such recordings;
  - 5) Recordings and transcriptions of recordings from marine traffic control units; and
  - 6) Opinions expressed in the analysis of information, including flight recorder information.
- E. These records will be included in the final report or its appendices only when pertinent to the analysis of the accident or incident. Parts of the records not relevant to the analysis will not be disclosed.
- F. If, after an INIPAT-conducted investigation has been closed, new and significant evidence becomes available, the INIPAT will re-open it. However, when another State actually instituted an investigation conducted by INIPAT, Angola, through INIPAT, will first obtain the consent of the State which instituted the investigation.



- G. While INIPAT will normally institute an investigation into the circumstances of an accident and be responsible for the conduct of the investigation, it may also, as warranted by the circumstances, delegate the whole or any part of the conduct of any investigation to another State by mutual arrangement and consent. In such circumstances, Angola, through INIPAT, will use every means to facilitate the investigation.
- H. Angola, through INIPAT, will take all reasonable measures to protect the evidence and to maintain safe custody of the aircraft and its contents for such a period as may be necessary for the purposes of an investigation. Protection of evidence will include the preservation, by photographic or other means of any evidence which might be removed, effaced, lost or destroyed. Safe custody will include protection against further damage, access by unauthorized persons, pilfering and deterioration.
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|                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Protection of flight recorder evidence requires that the recovery and handling of the recorder and its recordings be assigned only to qualified personnel. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|
- I. If INIPAT receives a specific request from the Flag State, the State of the ship-owner/Operator, the State of Design or the State of Manufacture that the ship/boat, its contents, and any other evidence remain undisturbed pending inspection by its accredited representative, the INIPAT, representing the State of Occurrence, will take all necessary steps to comply with such a request, provided that:
- 1) it is reasonably practicable and compatible with the proper conduct of the investigation;
  - 2) it is not necessary to move the ship/boat to the extent necessary to extricate persons, animals, mail and valuables, to prevent destruction by fire or other causes, or to eliminate any danger or obstruction to marine navigation, to other transport or to the public; and
  - 3) it does not result in undue delay in returning the ship to service where this is practicable.
- J. Angola, through INIPAT, will institute an investigation into the circumstances of a serious incident. Angola may also, as warranted by the circumstances, delegate the whole or any part of the conduct of any investigation to another State by mutual arrangement and consent. In such circumstances, Angola, through INIPAT, will use every means to facilitate the investigation.
- K. The incidents listed below are typical examples of incidents that are likely to be serious incidents. The list is not exhaustive and only serves as guidance for the definition of serious incident.
- z Near collisions requiring an avoidance maneuver to avoid a collision or an unsafe situation or when an avoidance action would have been appropriate.
  - z Departure from a closed or engaged area of port with marginal separation from obstacle(s).
  - z Arrival or attempted arrival at a closed or engaged area of port.
  - z Gross failures to achieve predicted performance during departing or initial marine trip.
  - z Fires and smoke in the passenger compartment, in cargo compartments or engine fires, even though such fires were extinguished by the use of extinguishing agents
  - z Events requiring the emergency use of oxygen by the seafarer crew
  - z Ship/boat structural failures or engine disintegrations not classified as an accident.
  - z Multiple malfunctions of one or more ship systems seriously affecting the operation of the ship.
  - z Seafarer crew incapacitation in marine trip.
  - z Fuel quantity requiring the declaration of an emergency by the seafarer.
  - z Departure or arrival incidents. Incidents such as lack of speed, overtaking or running on the side of the predicted trajectory;





- z System failures, weather phenomena, operations outside the approved trip envelope or other occurrences which could have caused difficulties controlling the ship/boat.
- z Failures of more than one system in a redundancy system mandatory for trip guidance and navigation.
- L. Any judicial or administrative proceedings to apportion blame or liability are separate from any INIPAT investigation. However, Angola, through INIPAT, recognizes the need for coordination between the investigator-in-charge (IIC) and Angolan judicial authorities. Particular attention will be given to evidence which requires prompt recording and analysis for the investigation to be successful, such as the examination and identification of victims and read-outs of voyage data recorder recordings.

Possible conflicts between INIPAT and Angolan judicial authorities regarding the custody of voyage data recorders and their recordings may be resolved by an official of the judicial authority carrying the recordings to the place of read-out, thus maintaining custody.
- M. With regard to accidents or serious incidents of Angolan-registered ship that occur in non-Contracting IMO States that do not intend to conduct an investigation, Angola, through INIPAT, will institute and conduct an investigation in cooperation with the State of Occurrence, if possible. In similar circumstances but for Angolan-operated ship/boat that are registered in another State, Angola, through INIPAT, will institute and conduct an investigation if the State of Registry does not intend to do so.
- N. With regard to accidents or serious incidents of Angolan-registered ship that occur in undetermined locations but likely outside the territory of any State,
- O. Angola, through INIPAT, will institute and conduct any necessary investigation, while reserving the option to delegate the whole or any part of the investigation to another State by mutual arrangement and consent.
- P. With regard to accidents or serious incidents of Angolan-operated ship registered in non-Contracting States that do not intend to conduct an investigation, Angola, through INIPAT, will institute and conduct an investigation. However, Angola may delegate the whole or any part of the investigation to another State by mutual arrangement and consent.
- Q. When an accident occurs in international waters nearest to Angola, Angola will provide such assistance as it is able and will, likewise, respond to any requests from the State of Registry.

## **6.2 PARTICIPATION IN INVESTIGATIONS: RIGHTS AND OBLIGATIONS**

### **6.2.1 INVESTIGATIONS CONDUCTED BY ANGOLA.**

- A. In accordance with the provisions of the IMO Resolution MSC-255 (CI Code), Angola recognizes the following participatory rights to other IMO Contracting States.
  - 1) The State of Registry, the State of the Operator, the State of Design and the State of Manufacture are all entitled to appoint an accredited representative to participate in the investigation. This right will also be extended to the State that designed or manufactured the powerplant or major components of the aircraft that request participation in the investigation of an accident.
  - 2) The right to appoint an accredited representative is also extended to States that:
    - (a) on request provides information, facilities or experts to the INIPAT.

This does not preclude Angola from extending participation beyond the entitlements enumerated.



- (b) provides an operational base for field investigations, or is involved in search and rescue or wreckage recovery operations, or is involved as a State of a code-share or alliance partner of the operator.
- 3) This right of participation is also extended to advisers or experts that are proposed by—
  - (a) the ship-owner/operator, and appointed by the Flag State or the State of the Operator to assist its accredited representative
  - (b) the organizations responsible for the type design and the final assembly of the ship, and appointed by the State of Design and the State of Manufacture to assist their accredited representatives
  - (c) a State which has a special interest in an accident by virtue of fatalities or serious injuries to its citizens. This expert will be entitled to:
    - (i). visit the scene of the accident;
    - (ii). have access to the relevant factual information;
    - (iii). participate in the identification of the victims;
    - (iv). assist in questioning surviving passengers who are citizens of the expert's State; and
    - (v). receive a copy of the Final Report.
- B. Nothing in the above provisions is intended to preclude a State participating in an investigation from calling upon the best technical experts from any source and appointing such experts as advisers to its accredited representative. To plan for the contingency in which INIPAT may not have its own appropriately qualified investigators to address some aspects of an investigation, the Director General will ensure that INIPAT has arrangements in place (such as Memoranda of Understanding) to use experts seconded by the State's Marine Authorities or other organizations in the States or from other sources such as other ship accident investigation authorities.as investigators.
- C. When any of these above mentioned States do not appoint an accredited representative, the INIPAT will invite the operator and the organizations responsible for the type design and the final assembly of the ship/boat to participate, subject to its investigation procedures.
- D. Advisers assisting accredited representatives will be permitted, under the accredited representatives' supervision, to participate in the investigation to the extent necessary to enable the accredited representatives to make their participation effective.
- E. The specific nature and scope of the above participatory rights include all aspects of the investigation, under the control of the investigator-in-charge (IIC), in particular to:
  - 1) visit the scene of the accident;
  - 2) examine the wreckage;
  - 3) obtain witness information and suggest areas of questioning;
  - 4) have full access to all relevant evidence as soon as possible;
  - 5) receive copies of all pertinent documents;
  - 6) participate in read-outs of recorded media;
  - 7) participate in off-scene investigative activities such as component examinations, technical briefings, tests and simulations;
  - 8) participate in investigation progress meetings including deliberations related to analysis, findings, causes and safety recommendations; and
  - 9) make submissions in respect of the various elements of the investigation.

Pertinent documents include documents such as reports on examinations of components or studies performed within the framework of the investigation.



- F. However, participation of States other than the State of Registry, the State of the Operator, the State of Design and the State of Manufacture may be limited to those matters which entitled such States to participation under paragraph above.

### **6.2.2 INVESTIGATIONS CONDUCTED BY OTHER IMO CONTRACTING STATES**

In accordance with the provisions of IMO Resolution MSC-255 (CI Code), Angola recognizes and will meet the following obligations.

- 1) When the State conducting an investigation of an accident to a ship/boat of a gross tonnage equal or over 500 tons specifically requests participation by Angola in its possible role as the State of Registry or State of the Operator, Angola will appoint an accredited representative.
- 2) Angola's accredited representatives and their advisers will provide the State conducting the investigation with all relevant information available to them and will not divulge information on the progress and findings of the investigation without the express consent of the State conducting the investigation.



Notwithstanding this policy, Angola's accredited representatives are not prohibited from reporting back to INIPAT in order to facilitate appropriate safety actions.

## **6.3 PRE-ACCIDENT PLANNING**

- A. To achieve its purpose, an investigation must be properly planned and managed. The main parts of an investigation must be planned so that the members of an investigation team are aware of their various tasks and have the appropriate qualifications to perform them. The plan must also recognize that these tasks will be coordinated by the investigator-in-charge (IIC).
- B. When a large ship is involved, a sizeable team of investigators, set up in specialized groups, is necessary to properly cover all aspects of the investigation. In some investigations, the areas on which the investigation should focus will become evident at an early stage, and the main investigation effort can then be effectively channeled into these relatively specialized areas. Nevertheless, it is still essential that investigators progress systematically through all aspects of the accident. Whether or not the causes are apparent, the investigation should determine any underlying systemic factors that may have contributed to the accident as well as any non-causal deficiencies that could contribute to future accidents.
- C. In the case of accidents involving small ship, the investigation effort is proportionately smaller. The functions are still the same, but the work is undertaken by one or two investigators or, alternatively, by an investigator and a specialist qualified in a particular aspect that requires expert examination. Again, it is stressed that even when small ship are involved, pre-accident planning is essential.

### **6.3.1 MANAGING INVESTIGATIONS**

#### **6.3.1.1 Role and Authority of the Investigator-in-Charge (IIC)**

- A. In conducting its investigations, the INIPAT Director General will designate the IIC of the investigation who will initiate the investigation immediately.
- B. The IIC has unhampered access to the wreckage and all relevant material, including voyage data recorders and MTS records, as well as unrestricted control over it to ensure that a detailed examination can be made without delay by authorized personnel participating in the investigation.

The importance of the critical role played by the IIC in leading an investigation cannot be over-emphasized.





- C. In this role, the IIC is accountable to the DIAM to organize, conduct and manage the investigation.
- z His objective is to gather and analyze factual information related to the occurrence and identify those safety deficiencies that may have contributed to the severity of the occurrence.
- z He is required to report on the findings, causes and contributing factors related to the occurrence, and submit recommendations designed to reduce or eliminate any related safety deficiencies.

Refer to Appendix 6-A of this chapter for a complete checklist for use of the IIC throughout the entire course of the investigation process.

#### **6.3.1.2 Role of Investigative Groups**

- A. An accident investigation involving a large or complex ship requires a large team of investigators in order to conduct the investigation in the most effective and expeditious way.
- B. The effective utilization of the available investigators in a major investigation can be achieved by dividing the investigation activities into functional areas, each of which can be assigned to a group within the overall investigation team.
- C. Each investigative group will have as many members as are necessary to examine the particular circumstances of the accident. Normally the group chairman (the investigator responsible for a group) will be an INIPAT employee who, in an investigation, is accountable to the IIC for the performance of the group's tasks.
- D. Members of the investigative groups and supporting experts may be from INIPAT or seconded from other marine agencies in other States.
- E. Since the outcome of an accident investigation is largely dependent on the skill and experience of the investigators assigned to it, at least one experienced investigator should be assigned to each investigative group to ensure an adequate level of experience.
- F. Members of an investigative group should normally have access to all information uncovered in the course of the investigation and are usually required to participate in the investigation until the group report is completed.
- G. The investigative groups that might be formed under the overall direction of the IIC during a major investigation include:
- 1) marine operations
  - 2) maintenance and ship records
  - 3) site survey
  - 4) survivability/cabin safety
  - 5) human factors/performance
  - 6) structures
  - 7) systems
  - 8) power-plants
  - 9) voyage data recorders
  - 10) meteorology, and
  - 11) marine traffic services/airports.

Not all investigations will require this complete range of investigative groups.



- H. The circumstances and complexity of the accident will determine the number and types of groups required. In most investigations, a coordinator provided by the ship operator is appointed for liaison duties. The IIC should, in most cases, be the person responsible for communications with the accredited representatives from other States participating in the investigation in accordance with MSC-255 (CI Code)
- I. As noted above, some accidents do not require the full range of investigative groups. For example, under most circumstances, a collision in the moor zone would require that marine traffic services and marine operations specialists participate in the investigation, with possibly a human factors specialist assisting in examining human performance factors. If an accident occurred during potentially restricted visual conditions, icing conditions, or convective activity, the participation of a meteorological specialist would be required. If evidence in an accident indicates a probable ship malfunction, the participation of structures, systems, power-plants, and maintenance records specialists would be required.

### **6.3.1.3 Role and Composition of Launch or GO Teams**

- A. The launch or GO team is a group of INIPAT investigators designated by the Director General who are on- call for immediate assignment to investigations of accidents and serious incidents. This team consists of an IIC along with specialists and any necessary laboratory support personnel. This team must be able to depart to the scene of an accident with minimum delay at any time of day. This means that team members must be available for departure from the airport or another designated departure point within two hours of being notified.
- B. As noted above, a full GO team could consist of specialists covering up to 11 of the designated specialty areas. The actual composition of any GO team will be determined, on a case-by-case basis, by the DIAM and the IIC. Additional groups may be formed to interview witnesses, examine the response of ship rescue and firefighting personnel, or other duties, as required, to support the investigation. INIPAT investigators will serve as chairmen of investigative groups while INIPAT investigators who are in a training status will be assigned as members of investigative groups, but under the supervision of another INIPAT employee, usually a group chairman or the IIC.
- C. The DIAM will maintain a periodically updated GO team roster of the names, telephone and pager numbers of all INIPAT personnel assigned current standby duty for investigations of accidents. A new list is prepared once each week or whenever necessary, such as after the launch of a prior group of GO team members.
- D. The obligations of the GO team members, including the IIC, on a current standby list are as follows:
  - 1) Arrange personal affairs such that they are able to depart for the scene of an accident with a minimum of delay. Regardless of when they are notified about an accident, GO team members are to arrive at the port, airport or other designated point of departure within two hours of being notified.
  - 2) For launches that occur during normal duty hours, GO team members who live too far to travel home and return to the port, airport or other designated point of departure within this timeframe should bring clothing and other launch essentials to the office.
  - 3) Always ensure that the information listed on the GO team sheet concerning their phone/pager numbers is correct and that their cell phones are in their possession.
  - 4) Always ensure that they can be reached when on call. This includes testing the pager for proper operation, forwarding alternate phone numbers to the DIAM, IIC, and their supervisors in advance of expected travel, and maintaining contact with the DIAM.
  - 5) Ensure that valid passports, business cards, and notebooks to record all notes on an accident from initial notification to issuance of the final report are in their possession
  - 6) Ensure that they have had appropriate inoculations that have not expired



- E. With regard to transportation of the GO team to the accident site, the INIPAT will have made prior arrangements for standby use of an INIPAT aircraft, ship and/or motor vehicles on a priority basis. As a contingency measure, the INIPAT will make prior arrangements for the expeditious issuance of tickets on commercial flights for the team members.



Effective and reliable means of transportation are essential to the success of the investigation.

6.3.2 LIAISON WITH OTHER AUTHORITIES

- A. Although it is recognized that the circumstances surrounding each accident are different, the importance of proper planning and establishing good liaison with other authorities, particularly the police, port and airport managers, and rescue and fire fighting services, cannot be overemphasized. To achieve this, the INIPAT will establish formal Memoranda of Understanding, when necessary, with the various government agencies involved in disaster response, particularly the police department, Angolan military authorities, and the coroner's office.
- B. As noted above, the INIPAT will liaise with other authorities, particularly those at or in the vicinity of ports, to prepare for the eventuality of a ship/boat accident. It is important that the INIPAT is aware of the emergency plans put in place by these local authorities. Cooperation with the police in this manner can help to ensure that, for example, relevant topics are addressed in police training syllabi and in official police handbooks to ensure that members of the police force are informed, in advance, of what is expected of them in the event of a ship/boat accident. This effort will also include related tasks such as: (1) victim identification (usually with the support of a coroner and possibly other medical personnel such as pathologists and forensic dentists), and (2) notification of next of kin, a sensitive task that must be planned and undertaken with great care in order to avoid anomalies, such as multiple or erroneous notifications.
- C. INIPAT may have to rely on assistance from other Angolan civil and military organizations to provide facilities, equipment and additional manpower, i.e. helicopters, heavy lifting and moving gear, metal detectors, Geiger counters, communication equipment, and divers. It is important that heavy salvage equipment, such as cranes, bulldozers, or lifting helicopters, are readily available. When an extensive wreckage plot is required, it may also be necessary to obtain the services of professional surveyors through liaison with appropriate government agencies. In some cases, a full-scale expedition may have to be mounted, requiring additional transportation, food, lodging, etc. The INIPAT will be prepared to address such contingencies.
- D. In regard to situations when the wreckage is in water (refer to section 6.5.4 below), locating and recovering ship/boat wreckage in the water requires a well-coordinated plan. Depending on the circumstances of the accident, locating the wreckage might require that the INIPAT obtain witness statements, weather data, radar tracking data and trajectory analyses to aid in locating the wreckage.
- E. To assist in quickly and effectively locating and recovering ship/boat wreckage in the water, the INIPAT should have prior arrangements in place with naval authorities, private marine salvage services, or other States to provide assistance in the search and recovery of ship/boat in the water.

Prior arrangements or understandings can make a major contribution to the success of an investigation.



The IIC needs to pay careful attention so that measures are taken to protect and preserve aircraft components critical to the success of the investigation.

Any such standing agreements should contain contact information for use on a 24-hour basis. This agreement should also specify that INIPAT will, prior to the actual recovery of the wreckage, brief salvage personnel on the recommended locations for attaching cables, straps, hooks, etc., to ensure that the structure is properly raised with minimal damage. Such an agreement should also require





consultation with specialists from the operator and the equipment/engine manufacturer. INIPAT will also require that, once the wreckage is raised to the surface, salvage personnel immediately treat it with the appropriate solvents so as to prevent rapid corrosion of parts.

- F. For marine accidents in which a voyage data recorder is installed, the recorders will probably have an ultrasonic underwater locator beacon (ULB) installed. The ULB automatically activates when



The IIC needs to keep this important time constraint in mind when supervising the recovery of the flight recorders.

submerged and operates on a frequency of 37.5 kHz. The ULB battery is designed to last about 30 days so a search for the ULB signal must be initiated immediately.

### **6.3.3 ROLE OF THE MEDIA AND ASSISTANCE TO SURVIVORS AND FAMILIES**

- A. Since most major accidents generate a high degree of interest from both the public and the media, the DPETI will strive to establish a good rapport with the media, so that the media become an asset to the investigation.

Cooperation of the media can help to ensure a successful investigation.

It may be necessary, for example, to enlist the cooperation of the local media to withhold precise details of the location of a marine accident until adequate crowd-control measures can be implemented. It may also be necessary to enlist aid from the public, via the media, in obtaining further information about the local area, the names of possible witnesses or when seeking the public's assistance in recovering missing pieces of the wreckage.

- B. INIPAT has established policy regarding the release of information to the media about accidents and progress of investigations. To promote dissemination of factual information and to minimize speculation and rumors about accidents, the DPETI or his designee, e.g. the IIC, serves as the single point-of-contact for providing the media, on a regular basis, with all those facts that can be released without prejudice to the investigation. Such media contact, in consultation with the accredited representatives, should provide non-prejudicial facts and circumstances to the media. Nevertheless, INIPAT will ensure that the needs of the media do not interfere with the proper conduct of the investigation.
- C. Other organizations involved or affected by the accident (such as marine companies, port authorities, emergency services and ship/boat manufacturers) may also be required to release information to the media. The DPETI, in coordination with the IIC, will make every attempt to coordinate, to the extent possible, among the organizations and agencies involved.
- D. The DPETI and the IIC will make every effort to ensure that the accredited representatives and their advisers participating in an investigation will not give the media or the public access to any documents obtained during the investigation without their express consent. The release of such information by a participating State, without the consent of INIPAT, would undermine the mutual confidence and cooperation among the States involved and must therefore be avoided.
- E. Since the IIC must remain focused on the investigation, the provision of family assistance should be separate from the investigation. Nevertheless, the INIPAT has a responsibility to provide relevant and timely information to the families and the accident survivors, information of immediate concern such as the release of human remains and personal effects held as part of the investigation, information on the progress of the investigation in determining the causes of the accident, and any safety recommendations being contemplated to prevent similar accidents. To fulfill this responsibility, the DPETI will shield the IIC from the customary large number of direct inquiries by appointing an INIPAT liaison person to serve as the focal point for the families.



## 6.4 ACTIONS UPON RECEIPT OF NOTIFICATION OF AN ACCIDENT

### 6.4.1 INTRODUCTION

- A. This section addresses procedures to be followed from the time a notification is received until the time the INIPAT GO team arrives at the site of the accident.
- B. This stage consists of identifying and notifying the appropriate parties for the investigation and the other States that may be involved, requesting the proper local authorities to secure the wreckage site, and arranging for transportation of the GO team, its investigative equipment, and any necessary personal protective equipment (PPE) to the accident site.
- C. Additionally, this is the time to start collecting and preserving documents and recordings relevant to the accident.

### 6.4.2 PRE-LAUNCH ACTIONS

Following receipt of notification, the Director General or his designee, in coordination with the designated IIC, will immediately take the following actions:

- 1) Based on the current GO team roster, make a decision on the actual team composition based on the probable scope of the investigation and the magnitude of the tasks involved, giving due consideration to the number of injuries/fatalities, the type of ship, previous accidents of this type, location of the accident, extent of the ship and other damage, weather, public interest, and workload of the INIPAT personnel who would be assigned
- 2) Determine and notify organizations that can provide the necessary technical assistance for the investigation and extend party status to them. Such parties normally include the operator, manufacturers of the ship, power-plants and systems, and labor organizations involved due to the accident circumstances. When possible, advise them of contact information for the IIC, the location of the command post, and the date, time and location of the organizational meeting.
- 3) Provide the notifications specified in Chapter 5 of this manual, including contact information for the Director General and the IIC, as well as the location of the command post and the date, time and location of the organizational meeting, when possible.
- 4) Notify the IIC and other GO team members of the details of the occurrence (e.g. date/time of the occurrence, casualties, ship information, weather conditions at the site, and site terrain information), any known safety hazards at the site, and the point of departure for the team's launch to the accident site.



**Any information on safety hazards is helpful at this point in making initial determinations on mitigation measures, including the usefulness of PPE.**

- 5) If it has been determined that the wreckage is in water, initiate the measures prescribed in section 6.5.4 of this manual, subject to follow-on consultation with the IIC when he arrives on-site, to obtain the best technical expertise to locate and possibly recover and preserve the wreckage
- 6) Establish initial contact with the local police authority at the site, exchange contact information for the IIC and this local police authority, make arrangements for an on-site safety risk assessment and security of the wreckage by the local police authority, secure directions to the precise location of the accident site, and coordinate plans for the IIC and an airworthiness investigator to proceed directly to the site upon arrival, while the remainder of the GO team proceeds directly to the hotel/command post.



- 7) Secure the following records, recordings, and samples:
  - (a) marine traffic services communication recordings and documents associated with the trip
  - (b) ship operator's documentation associated with the trip, the seafarer crew, and the trip operation
  - (c) special weather report from the meteorological authority
  - (d) fuel samples from stocks or refueling points
- 8) In coordination with the IIC, make logistical arrangements for:
  - (a) transportation of team members, their investigative equipment (field kits) and personal protective equipment (PPE) to the accident site
  - (b) provision of rental cars (as needed) and hotel rooms for the GO team
  - (c) command post meeting room with an adequate number of telephone lines
  - (d) press briefing room
  - (e) equipment and supplies for the command post, e.g. photocopy machine, personal computers (if necessary), printers and printer paper, fax machine, and telephone message board
  - (f) documentation such as this manual, meeting attendance record (Appendix 6-D), MSC-255 (CI Code), etc...
  - (g) temporary clerical/secretarial support

## **6.5 INITIAL ACTIONS AT THE ACCIDENT SITE**

### **6.5.1 INTRODUCTION**

This section addresses initial actions to be taken at the site by non-INIPAT organizations as well as procedures to be followed by the IIC and GO team members from the time they arrive on-site until the time the organizational meeting is conducted at the INIPAT command post.

### **6.5.2 ROLES OF POLICE AND FIRE DEPARTMENTS**

- A. Through prior liaison between INIPAT and other authorities, as prescribed above in section 6.3.3, Angola will take all reasonable measures to protect the evidence and to maintain safe custody of the ship/boat and its contents for such a period as determined by the DIAM and the IIC



Protection of flight recorder evidence requires that the recovery and handling of the recorder and its recordings be assigned only to qualified ANIPAA-designated personnel.

to be necessary for the purposes of an investigation. Protection of evidence includes the preservation, by photographic or other means of any evidence which might be removed, effaced, lost or destroyed. Safe custody includes protection against further damage, access by unauthorized persons, pilfering and deterioration.

- B. Local police and fire departments will probably be the first officials to arrive at a ship/boat accident site, and it is therefore important that they ensure that vital evidence is not lost through interference with the wreckage. The police and fire departments should be aware of what is

The cooperation of police, firefighting, and rescue personnel is essential to the preservation and protection of evidence.





expected of them in the event of a marine accident, and plans and arrangements for the following essential tasks should be in place so that they can be accomplished without delay:

- 1) notifying rescue personnel and the DIAM or his designee
  - 2) securing the wreckage from fire hazards and further damage;
  - 3) checking for the presence of dangerous goods, such as radioactive consignments or poisons being carried as freight, and taking appropriate action;
  - 4) posting signs indicating a potentially dangerous area (left until experts have thoroughly evaluated the danger involved)
  - 5) placing guards to ensure that the wreckage is not tampered with or disturbed\
  - 6) taking steps, in conjunction with the IIC, to preserve, through photography or other appropriate means, any evidence of a transitory nature, such as ice or soot deposits; and
  - 7) obtaining the names and addresses of all witnesses whose testimony may aid in the investigation of the accident.
  - 8) leaving the bodies of persons killed in an accident involving a large ship *in situ* for examination and recording by both the disaster victim identification team and the INIPAT investigation team
  - 9) similarly, personal belongings should remain untouched as their location may assist in the identification of the victims
- C. In the event that bodies have been removed from the ship/boat wreckage before the arrival of INIPAT investigators, it is important to establish whether or not a record, as set out below, has been maintained. If not, the IIC should ensure that rescue personnel are interviewed to establish such a record. Apart from these arrangements, the wreckage is to be left undisturbed until the arrival of the INIPAT investigation team. In general, disturbance of the wreckage should be limited to that necessary to rescue survivors, extinguish fires and protect the public.
- D. With regard to the location of pieces of wreckage, the police can be of considerable assistance in also liaising with the local population, particularly with regard to locating outlying pieces of wreckage. While persons living in the nearby vicinity should be encouraged to report the discovery of pieces of ship/boat wreckage, the importance of leaving these pieces undisturbed should also be impressed upon them. Collecting outlying pieces of wreckage and arranging them into neat piles alongside the main wreckage are sometimes done with good, but misguided, intentions. With no record of where such pieces were found, their value to the investigation is diminished. Similarly, the removal of pieces of wreckage by souvenir hunters must be prevented.
- E. With regard to rescue operations for survivors, the primary concern of the first persons to arrive at the site of a marine accident is the rescue and aiding of survivors and the protection of property. Persons who are involved with the extrication of victims from ship/boat wreckage should, at the earliest opportunity, record their observations regarding the location in the ship where the survivors were found and what portions of the wreckage had to be moved during the rescue. If circumstances permit, the bodies of persons killed in the accident should be left as found until their location and condition are recorded, photographs are taken and a chart is made indicating their location in the wreckage. If bodies are located outside the wreckage, their location should be marked by a stake with an identifying number. A corresponding label should be attached to each body stating where it was found. The careful recording of these data is essential to the identification of bodies and also provides information which may assist in the accident investigation.



- F. Upon completion of the initial rescue operation, rescue personnel are to exercise as much care as possible to ensure that their movements do not destroy evidence that may be of value to the investigation. For example, once the survivors have been rescued and the fire risk has been eliminated as far as practicable, movement of ambulances and fire vehicles should not be permitted along the wreckage trail.

### **6.5.3 ACTIONS TO BE TAKEN BY INIPAT**

- A. Upon arrival at the port, airport or other point of arrival, the IIC and the investigator(s) charged with safety risk assessment, site survey, and photography duties should proceed directly to the accident site while the other members of the GO team proceed to the hotel and assist in establishing the command post and its facilities so that it will be ready for the conduct of the organizational meeting in the near future. The IIC's immediate task is to meet with the local police commander on site and assure that the measures prescribed in section 6.5.2 above have been taken.

- B. Most importantly, the IIC will determine if there has been any disturbance of the wreckage during the rescue operations and record any such disturbance.



The IIC should accord priority to the important task of documenting any disturbances to the wreckage.

- C. The IIC will provide clear and specific instructions to the local police commander on the need for INIPAT-authorized personnel to have proper identification to access the accident site. The IIC will facilitate such access control by advising the local police commander of the badges or other form of security pass that INIPAT will issue to all authorized persons, e.g. armbands or jackets that show proper affiliation.

- D. Following this consultation with the local police commander, the IIC will then ensure that the following actions are completed:

- 1) Observation and inventory of the wreckage (missing parts)
- 2) Security of the voyage data recorders, if possible
- 3) Safety risk assessment (identification of hazards) conducted in cooperation with the local police commander



**The IIC and the investigator assigned safety duties should make careful notes for use in briefing at the organizational meeting.**

- 4) Site survey, diagram, and photography, possibly including aerial photography
- 5) Collection of perishable evidence (anything that is likely to be moved or destroyed before it can be investigated), e.g. paperwork, ice shapes, fuel, oil, and hydraulic fluid samples, etc.



Completion of this task could also be critical to a successful investigation.

- E. The remaining areas of attention for the IIC at the site include:

- 1) *Evidence of unlawful interference.* If, at this and later stages of the investigation it becomes known, or it is suspected, that an act of unlawful interference is involved, the IIC, through the DIAM, will immediately initiate action to ensure that the maritime or nautical security authorities of Angola and other concerned States are so informed.



- 2) *Voyage data recorders.* In accordance with INIPAT policy, effective use will be made of voyage data recorders in the investigation of accidents and incidents and, hence, the IIC, in conjunction with the DIAM, will arrange for their read-out without delay, using available facilities in other States after considering the follow factors:
- (a) the capabilities of the read-out facility;
  - (b) the timeliness of the read-out; and
  - (c) the location of the read-out facility.
- 3) *Autopsy examinations.* If fatalities are involved, the IIC will arrange for complete and expeditious autopsy examinations of fatally injured flight crew and, subject to the particular circumstances, of fatally injured passengers and cabin attendants, by a pathologist, preferably experienced in accident investigation.
- 4) *Medical examinations.* When appropriate, the IIC will arrange for expeditious medical examination of the crew, passengers and involved marine personnel, by a physician, preferably experienced in accident investigation. Such examinations may also determine whether the level of physical and psychological fitness of seafarer crew and other personnel directly involved in the occurrence is sufficient for them to contribute to the investigation.

In making this decision, the APIM should refer to guidance contained in Attachment D to ICAO Annex 13.

#### **6.5.4 SPECIAL MEASURES WHEN WRECKAGE IS IN WATER**

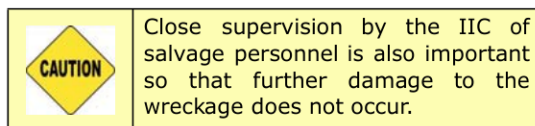
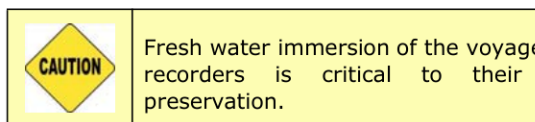
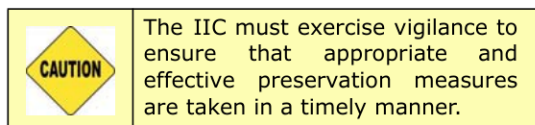
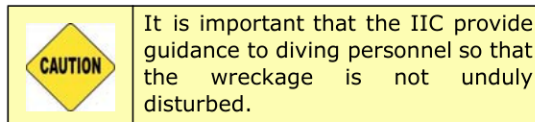
- A. Special measures must be taken when the accident has occurred in water such as in an ocean, bay, lake, or river. The first issue to be addressed in such situations is determining the actual location of the wreckage. As soon as it has been determined that the wreckage is in water, efforts must be made to obtain the best technical expertise available. Naval authorities, marine salvage services and accident investigation authorities of other States known to have experience in this field are to be consulted. Advice may also be obtained from fishermen and oceanographers whose knowledge of local conditions, such as configuration of lakes, sea-beds and local currents, is often extensive. The first step is to ascertain the most probable point of impact based on floating wreckage, witness reports, search and rescue reports and radar recordings. Buoys should be positioned at the estimated point of impact.
- B. If the water is shallow (less than 5 feet), search methods using divers can be effective. If the wreckage is located in deeper water, or conditions make it difficult to use divers, use of the following equipment should be considered:
- 1) underwater equipment used to locate the underwater locating devices on the voyage data recorders;
  - 2) underwater videos and cameras;
  - 3) side-scan sonar equipment; and
  - 4) manned or unmanned submersibles.
- C. The circumstances and location of an accident will determine whether salvage of the wreckage is practicable. In most cases, wreckage should be recovered if it is considered that the evidence it might provide would justify the expense and effort of a salvage operation. If the wreckage is likely to contain evidence significant to marine safety as determined by the IIC and DIAM, INIPAT will make every effort to ensure that action is promptly taken to recover the wreckage. There have been several instances where ship wreckage has been successfully recovered from deep water. Major parts of the wreckage of large ships were





recovered from a depth of approximately 4,500 meters in the Mediterranean and Indian Sea. But such recoveries necessitated expensive salvage operations lasting several months, but the results exceeded expectations, and the evidence obtained from the wreckage did establish the causes of the accidents.

- D. Once the wreckage has been located and a decision has been made to recover it, the IIC will ensure that a chart plotting the wreckage distribution is prepared. In shallow waters, this can be achieved by divers. In deep waters, underwater video cameras from remotely controlled submersibles may be used. The state of the various pieces of wreckage, their connection by cables or pipes, the cutting of these connections for the salvage operations, etc., should be recorded before lifting the various pieces of wreckage from the bottom. Usually the divers will not be experienced in marine accident investigation and, therefore, the IIC is to provide them with specific instructions.
- E. The IIC must also be concerned with the preservation of the wreckage. The rates at which various metals react with salt water vary considerably. Magnesium components react quite violently and, unless recovered within the first few days, may be completely dissolved. Aluminium and most other metals are less affected by immersion in salt water. For example, a ship recovered from a depth of 3,500 meters showed little corrosion after having been submerged for twelve years. However, corrosion will rapidly accelerate once the component is removed from the water, unless the IIC takes action to prevent it.
- F. Once the wreckage has been recovered, its components are to be thoroughly rinsed with fresh water. It may be convenient to hose the wreckage as it is raised out of the sea prior to it being lowered onto the salvage vessel. Freshwater rinsing does not stop all corrosive action. When large aircraft are involved, it may not be practicable to take further anti-corrosion action on large structural parts. However, all components that require metallurgical examination will require further preservation. The application of a water-displacing fluid will provide additional corrosion protection; fracture surfaces should then be given a coat of corrosion preventives such as oil or inhibited lanolin. When organic deposits, such as soot deposits or stains, require analysis, organic protective substances should not be used. Freshwater rinsing should be employed followed by air drying. When the component is completely dry, it should be sealed in a plastic bag with an inert desiccant such as silica gel.
- G. It is important that voyage recorders not be dried but instead kept immersed in fresh water until the INIPAT-assigned voyage recorder specialist assumes responsibility for them.
- H. Special precautionary measures are to be taken when recovering the wreckage. In particular, consideration should be given to deflating tires and pressure containers as early as possible. Corrosion of magnesium wheel assemblies can progress rapidly to the extent that the wheel assemblies become safety hazards. Other pressure containers should be discharged as soon as their contents have been evaluated. The operation of recovery equipment and the supervision of salvage personnel should be left to the salvage contractor. If necessary, the IIC should provide advice on how to attach cables, hooks, etc., to the wreckage to ensure that it is not unnecessarily damaged during the recovery. When salvage barges, which are equipped with large machinery, hoists, cables, nets, rigging





equipment, etc., are used, the IIC and other INIPAT personnel should exercise caution and, in particular, remain clear of equipment and sling loads.



**INIPAT personnel need to exercise caution at salvage sites for their own personal safety.**

## **6.6 SUBSEQUENT ACTIONS AT THE ACCIDENT SITE**

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### **6.6.1 INTRODUCTION**

This section addresses the organization of the INIPAT-led investigative team and their expected tasks to be completed at the accident site and at the command post until the time that all on-site investigative activities are completed, the wreckage is released, and the team disperses.

### **6.6.2 ORGANIZATIONAL MEETING**

- A. The manner in which the IIC conducts the organizational meeting establishes the tone of the investigation so it is important that he clearly establishes his overall authority and responsibility to resolve any differences or issues that arise on scene. Therefore, the importance of being organized, articulate, assertive, composed, and understanding cannot be overstated.
- B. As the formal opening of the investigation into a marine accident, the organizational meeting serves several purposes as follows:
  - 1) share preliminary information on the accident
  - 2) introduce the participants of the investigation to each other and identify those eligible to participate;
  - 3) organize participants into investigative groups;
  - 4) establish rules of conduct for the investigation; and
  - 5) reiterate safety and health considerations for all participants.
- C. All on-site activities should be shut down pending the organizational meeting. If search and recovery operations are still in progress, the IIC should designate an INIPAT representative, likely the site coordinator, to remain at the site during the organizational meeting. The organizational meeting should be held as soon as practicable after the IIC makes his initial visit to the accident site, but not until after the key parties have arrived.
- D. Prior to the actual commencement of the meeting, the IIC will consult with the representatives of those organizations granted party status by INIPAT i.e. the parties. Each such party must designate a party coordinator who is the main spokesperson and point-of-contact for the IIC. He should have sufficient authority to be able to make decisions without a great deal of consultation with his supervisors. He should be available to the IIC at all times during the investigation and is responsible for recommending appropriately qualified participants for the investigative groups as well as their performance and conduct. Both the party coordinators and their participants are to complete and sign the Statement of Party Representatives to INIPAT Investigation in Appendix 6-B.
- E. Prior to the commencement of the meeting, the IIC will also ascertain if there are any persons seeking observer status for the investigation, e.g. usually persons who are seeking to familiarize themselves with INIPAT's investigation process. Observers should not have any self-interest in the investigation and the IIC will permit access to only those portions of the investigation he deems appropriate. Observer status must be coordinated and approved in advance. Although observers will sometimes work with one of the investigative groups, they will be under the overall



authority of the IIC and will be given factual information on a "need-to-know" basis". After validating the purpose of their participation, he will grant his permission using the letter contained in Appendix 6-C of this manual that, after being signed by the recipient, he will provide to all the group chairmen during the course of the organizational meeting. Before they depart the investigation, the IIC will ensure that all observers debrief him and provide him with copies of any reports they prepare.

- F. At the outset of this meeting, the IIC will present an outline of the issues to be covered in the meeting, including stating the 5 purposes of the meeting prescribed in paragraph B above. The IIC will identify himself and ask reporters, attorneys, and others not technically qualified or needed for the investigation to leave the room. The IIC should then distribute the meeting attendance record (Appendix 6-D) for each person to sign and make sure that business cards (or equivalent information) have been collected from all participants. These cards will be photocopied and distributed to investigation participants so they can maintain contact with each other after the on-scene phase has been completed.
- G. Next, INIPAT and other personnel in the room will identify themselves, their organizations, and their positions within their particular organizations, including accredited representatives from other States and their advisers. After introductions, the IIC will present the known facts of the accident as follows:
  - 1) type, model, nationality and registration number of the ship
  - 2) name of owner, operator and customer, if any, of the ship
  - 3) name of the captain/master in-command
  - 4) date and time of occurrence
  - 5) last point of departure and point of intended arrival
  - 6) position of the occurrence, including specific directions on how to reach the site (site diagram, if available)
  - 7) description of hazardous cargo (if any)
  - 8) number of seafarer crew and passengers (if known, number killed or seriously injured)
  - 9) nature of the occurrence and the extent of damage to the ship so far as it is known (photographs, if available)
  - 10) disposition of voyage data recorders (if known)
  - 11) physical characteristics of the occurrence site (photographs, if available)
- H. After this preliminary information about the accident has been given, the IIC will brief the participants on the site security arrangements (including access controls and INIPAT's identification requirements), the identification of the local police commander, and the results of the safety assessment, identifying the presently known hazards and focusing on any need for any specific personal protective equipment (PPE), including its proper use and disposal. On the latter matter, INIPAT will only provide PPE to INIPAT personnel while all other participants will be responsible for their own protection and access the accident site at their own risk.



**Meeting participants need to pay careful attention to the safety assessment briefing.**

- I. The IIC will then brief on the important matter of public release of information about the investigation. He will emphasize that he as the IIC is the only person authorized to release



The IIC should place particular stress on his role as the sole spokesperson to the media.





information on the progress of the investigation to the media or the public. He will then provide the specifics of the Instructives I001M/INIPAT/25 (Communication and Notification of Marine Accidents, and Incidents) and I002M/INIPAT/25 (Investigation of the Marine Accidents and Incidents). In this regard any employee of the government of Angola or any other persons concerned with the conduct of an investigation into an occurrence, wherever it occurred, will not make any of the following records available to any person for purposes other than such an investigation, unless the appropriate authority for the administration of justice in Angola or another State of Occurrence determines that the benefits resulting from disclosure of the records out-weighs the adverse domestic and international impact the disclosure may have on that or any future investigation. These records include:

- 1) Statements taken from persons by INIPAT or the investigation authorities of other States of Occurrence in the course of their investigations
  - 2) Communications between persons involved in the operation of the ship/boat.
  - 3) Medical or private information regarding persons involved in the occurrence.
  - 4) Cabin voice recordings or transcripts from such recordings.
  - 5) Voyage data recordings or output from such recordings.
  - 6) Marine traffic control recordings or transcripts from such recordings.
- J. With respect to the particular sensitivity of cabin voice recordings and their transcripts, all investigative personnel assigned to the voyage data recorder investigative group are to read and sign the cabin voice recorder nondisclosure agreement contained in Appendix 6-E.
- K. Before explaining roles and procedures, the IIC will next address the assignment of INIPAT and other investigators to the necessary investigative groups. The IIC determines who will be participants in the investigation and gives due consideration to the rights of participation specified in section 6.2.1 (Investigations conducted by Angola) of this manual when making these designations. Only technically qualified individuals with the necessary expertise, including international participants, will be permitted to participate in the investigation. Specialists typically include representatives of the operator, manufacturers of the ship, power-plant, and accessories, labor associations, and other experts who can contribute knowledge and expertise. The INIPAT-designated group chairmen and the IIC will assess the qualifications of proposed group members when assigning them to the groups. The final decision regarding the assignment of specialists will be made by the IIC in coordination with the respective group chairmen.
- L. The IIC will then next address the roles and work methods used to conduct the investigation, outline the major tasks that will be expected to be accomplished during the subsequent days on-site, and explain that a progress meeting will be held at the end of each day at which, based on the field notes they will make and keep, the group chairmen will report their results of the day's activities. He will also indicate that all participants are expected to be available for the duration of the investigation and that substituting personnel, subject to his approval, is not allowed except in extreme situations. Group members will then be asked to report to their respective group chairmen after the organizational meeting for further instructions.
- M. The IIC should then adjourn the organizational meeting by stating the times of both the next meetings of group chairmen (usually at the beginning of each day) and of the entire group (usually at the end of each day). Throughout the course of the on-site investigation, the IIC will also maintain frequent contact with the DIAM and DPETI to provide periodic status reports on the progress of the investigation.



The IIC should emphasize his pre-eminent role, along with that of the group chairmen, in managing and controlling all investigative activities.



### 6.6.3 INITIAL INVESTIGATIVE GROUP MEETING

- A. Immediately following the organizational meeting, each group chairman is to meet with his group members. Since some group members may be unfamiliar with INIPAT investigation procedures, several things should be discussed with the group, including the scope of the group's investigation, assignment of duties, and INIPAT's reliance on field notes. The chairman will emphasize that the team members' primary responsibility is to their working group and respective group chairmen, not to their respective organizations. They must arrange their personal schedules to conform to the schedule determined by the respective group chairman and commit to staying with the group until released by the IIC and their respective group chairman. Before the meeting concludes, chairmen and members of groups whose work may necessitate visits away from the accident site, e.g. to operator or air traffic control facilities, will need to establish departure times and contact procedures.
- B. Each group chairman will brief group members on his requirement to compile field notes that document the on-site activities of his group. Field notes represent the summation of factual material gathered and information obtained by each investigative group participating in the investigation. Each group will have one official set of field notes. The field notes will contain relevant information related to the investigation topic assigned to their group, any of the 11 areas specified in section 6.3.2 B above. The group chairman will use these field notes each day to brief the IIC at the daily meetings and they will ultimately serve as the basis for the group chairman's report prescribed in Chapter 8 of this manual (section 8.2).
- C. The group chairman will indicate that, at the end of each day of the on-site investigation, they will discuss their efforts and findings to update the field notes, usually just prior to the overall daily progress meeting conducted by the IIC. At the end of the on-site phase of the investigation, every member of each working group must sign the group's field notes. These signatures indicate and clearly convey that each member of the group has read all of the field notes and either agrees with the information included in the notes or has indicated, in writing, specific areas of disagreement and the reasons for that disagreement. If group members do not attach written statements of disagreement to the field notes, it will be assumed that they agree with the content and completeness of the information contained in the field notes. For the sake of consistency in the field notes, the IIC will draft a summary of the accident for each group chairman to use in his field notes.
- D. At the conclusion of the on-site investigation, the group chairman will present the group's field notes to the IIC for review and signature. After the IIC's approval, the group chairman will provide copies of the field notes for his group members. The group chairman and, therefore, the group members will not be released until the field notes have been approved and so distributed. However, the group chairman will also indicate his intent to reconvene the group in whole or in part, in order to conduct follow-on work such as witness/crew interviews, maintenance records reviews, flight testing/simulations, or the testing/teardown of power-plants, instruments, and system components. In such instances, the group chairmen will continue to document progress and findings using the same field note methodology.

It is important that all group chairmen have the means to stay in constant contact with the IIC, regardless of where their investigative activities take them.

It is important to capture factual data in this manner since the field notes will serve as the basis for both the group chairman's factual report and the final report.

### 6.6.4 CONDUCT OF PRESS BRIEFINGS

Using the press briefing room arranged by the DPETI, the IIC will normally conduct the first press briefing after the organizational meeting (although it could also occur at a different time as well).

Persons attending the briefing are to sign the meeting attendance record (Appendix 6-D). Press briefings are normally conducted then and after the daily progress meetings when information concerning the facts of the investigation is fresh. In these briefings, the IIC should limit the briefing to a presentation of

Refer to section 6.3.4 above for more guidance on media relations.



known facts and not speculate on the cause of the accident. If material gathered to date is highly technical, the IIC should have the appropriate group chairmen attend the briefing in order to assist the IIC when necessary.

#### **6.6.5 DAILY ACTIVITIES OF THE IIC**

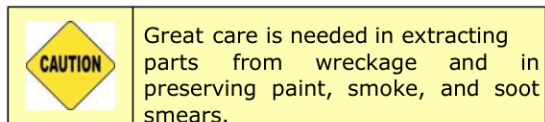
- A. As part of his responsibility for oversight of the investigation, the IIC will serve as a liaison between the DPETI at INIPAT headquarters and the investigative team and between the command post and the accident site, usually via the site coordinator, a role normally performed by the chairman of the structures group or another experienced airworthiness investigator whose other duties normally require him to be at the site. Liaison with INIPAT headquarters is primarily carried out through at least daily briefings. Additional daily responsibilities include an early morning meeting with the group chairmen to review the day's planned activities followed by a brief meeting with the party coordinators to review and resolve issues that have arisen, visits to the site twice daily, if possible, to learn first-hand of the progress of the investigation and specific problems encountered, observe working conditions for the team, and ensure that progress is being made. Throughout the course of the day, the IIC should also prepare notes for the daily progress meetings to occur at the end of the day.
- B. Near the end of the workday, the IIC presides over the usually daily progress meetings to disseminate information obtained during the day's activities and to discuss plans for subsequent investigative activities. The meetings also result in factual information that the IIC can make available to the media at press briefings when they are held and at any meetings with survivors and family members.
- C. The IIC will begin the meeting by distributing the meeting attendance record in Appendix 6-D and then asking those who are new to the investigation to stand and identify themselves, their organizations, and their roles in the organizations. For the first few meetings, all attendees must identify themselves at the start of the meeting. Any new persons who are acceptable to the IIC and the group chairmen will be assigned to investigative groups. This must be coordinated before the start of the progress meeting. Each group chairman will then present the prominent facts obtained that day and the investigative activities planned for the next day and also request needed support or establish coordination meetings with other groups. The group chairman should be prepared to respond to any questions about his area of responsibility. Questions or discussions on group chairmen's presentations should be limited to factual material only. Analytical questions to the group chairmen on the implications of their findings will not be allowed. The progress meetings should not be used for a discussion of accident causation. Each group chairman's report should take 5-10 minutes and cover the current day's activities, the next day's activities, significant problems that arose, help needed from other investigative groups, and suspected material failures or other parts that require laboratory examination (refer to section 6.6.6 below).
- D. The IIC should then present a brief outline of activities performed by the voyage recorder group with respect to the voyage data recorder (VDR) and cabin voice recorder (CVR), as well as other groups whose tasks have been performed away from the accident site. However, if possible, the members of such groups should participate in the meeting by telephone or teleconferencing.
- E. At the conclusion of the meeting, the IIC should announce the time of the next morning's meeting of group chairmen and the next evening's progress meeting, as well as reminding participants not to discuss the investigation in public areas or in places in which their conversations can be overheard. Participants should also be reminded to remove their personal belongings and notes from the command post overnight or at other times when the room is unattended.





## **6.6.6 MATERIALS LABORATORY EXAMINATIONS**

- A. During the course of the on-site investigation, the IIC may determine that specialist examination or testing of specific components is required. Before proceeding to arrange for such examinations, he will seek the assistance of the DIAM to determine if: (1) the judicial authorities of Angola will permit the removal of any part from the wreckage, and (2) for components requiring destructive testing, if prior written authorization from both the owner of the ship/boat and the insurance company is necessary.
- B. If it is necessary to send a part, or parts, of a damaged aircraft to another State for technical examination or testing, the DIAM will coordinate arrangements with the accident investigation authority of the State concerned to ensure that the movement of such part, or parts (including their eventual return), is effected without delay, in accordance with IMO procedures for security and facilitation.
- C. Specialist examinations may range from a scanning electron microscope examination of a failed part to chemical analysis, systems testing or trip testing. Laboratory examination and testing generally entail the use of specialized equipment not available in the field and often beyond the capability of an ship/boat maintenance facility. Consideration should be given to using the component manufacturer's facilities where specialized equipment and trained personnel are readily available.
- D. Laboratory testing should not be limited to standard tests. In addition to testing for compliance with appropriate specifications, it is sometimes necessary to determine the actual properties of the specimen (such as metal, material, fuel and oil). Occasionally it is necessary to devise special tests that will fully exploit the component's capabilities. A wide range of specialized testing equipment will permit simulation of a variety of malfunctions, the only limitation being the ingenuity of the investigators.
- E. When the INIPAT sends failed parts or components for laboratory testing, the IIC should provide as much information as possible relative to the circumstances contributing to the failure of such parts or components, including their own suspicions. The information provided is intended only as a guideline to the specialist who should, nevertheless, explore all relevant aspects. It is not sufficient for an investigator to forward parts for specialist examination with the innocuous instructions "for testing". The IIC should provide a detailed history of the part or component, covering such items as:
  - 1) the date it was installed on the ship/boat;
  - 2) the total number of service hours;
  - 3) the total number of hours since last overhaul or inspection difficulties reported; and
  - 4) any other pertinent data that might shed light on how and why the part or component failed.
- F. In order to preserve evidence, it is essential that failed parts and components requiring specialist examination be extracted from the wreckage with care. Systems, whether mechanical, electrical, hydraulic or pneumatic, should be removed in sections as large as practicable. Relevant sections should preferably be dismantled rather than cut. Paint smears, which are often extremely important in collision accidents and in-trip failures, require protection. This also applies to smoke or soot smears.
- G. The DIAM will consider the nature of the specialist examination and the type of components and systems to be tested when determining the facility to be chosen. The DIAM must be confident that the facility chosen is capable of providing the required examination and testing. The DIAM





should have prior arrangements in place with the facility as far in advance as practicable so that the facility's management can plan the tests and assign personnel and equipment.

- H. When choosing a system and components for specialist examination and testing, it is desirable to include as many components of the system as practicable, e.g. wiring harnesses, relays, control valves and regulators. Tests conducted on a single component will reveal information about the operation of that particular unit only, whereas the problem may actually have been in one of the related components. The most valid test results will be obtained by using as many of the original system components as possible.

- I. Each component should be tagged with its name, part number, serial number and the accident identifier. The IIC should maintain a listing, descriptive notes and photographs of all components that are to be tested. The components themselves should be kept in protective storage until ready for shipping. Components should be packed to minimize damage during transport. Particular care should be taken to ensure that fracture surfaces are protected by appropriate packing material so that they are not damaged by mating surfaces coming into contact with each other or with other parts.



Precautions should be observed in packing components for shipment to avoid undue damage.

- J. Whenever possible, power-plants should be shipped in their special stands and containers. Other heavy components, such as trip control power-units, stabilizer screw jack assemblies and actuators, should be packed in protective wrapping and placed in separate wooden containers. Blocks or bracing should be installed inside the containers to prevent any movement of the component during transport. Smaller and lighter components may be shipped in the same manner with more than one to a box but in a manner that will prevent them from coming into contact with one another. Very light units may be packaged in heavy corrugated pasteboard cartons with sufficient packing material to prevent damage from mishandling during transport. The IIC should label all boxes and cartons appropriately and should make an inventory list for each container.

- K. The IIC will request that testing facility personnel and his assigned investigator prepare and keep notes concerning special examinations and testing while the facility personnel should record the results on the standard forms used by the facility for such work. Prior to conducting the examinations and tests, the investigator involved should be briefed on the type and extent of the tests to be carried out and should review the test procedures to ensure their adequacy.



An investigator assigned by the IIC should be present to witness and document testing procedures and results, along with testing facility personnel.

- L. Any discrepancies found during testing should be photographed and documented with an explanation as to their bearing on the operation of the system or component. It should be kept in mind that the tolerances called for in the test procedures may only apply to new or overhauled components and that components which have been in service for some time may have acceptable limits outside these tolerances. If the nature of the discrepancy so warrants, a component should be disassembled following completion of the tests to ascertain the cause of failure. Photographs should be taken of the parts prior to and during disassembly, and the findings documented.

## **6.6.7 FINAL PROGRESS MEETING**

- A. After several days, the investigative groups will likely begin to present less information and some groups will have completed their activities and be released, when appropriate, by the IIC. When the IIC determines that little new information remains to be obtained from the remaining





investigative groups in the on-site phase of the investigation, he will end the progress meetings and schedule a final progress meeting to complete the on-site activities.

- B. During the final progress meeting, the IIC should update the participants on the status of the investigation, advise them of any proposed follow-on investigative activities, and approve and distribute group chairmen's final on-site field notes to the other group chairmen and members. He will remind everyone of the need for their participation in later phases of the investigation, likely to occur at INIPAT headquarters and announce a date for the initial work planning meeting to include all the chairmen of the investigative groups.

The continuing participation of investigative personnel, particularly the group chairmen, is indispensable to the successful completion of the investigation.

### **6.6.8 DISPOSITION OF THE WRECKAGE**

- A. When the IIC and the group chairmen have determined that parts or all of the wreckage is no longer needed for investigative purposes, the IIC (or a group chairman so designated), in consultation with the DIAM, will be responsible for approving the release of the wreckage, usually to any person or persons duly designated by the State of Registry or the State of the Operator, as applicable, who will acknowledge its receipt in writing, a copy to be retained by the IIC.
- B. For this purpose, the DIAM representing Angola as the State of Occurrence, will facilitate access to the aircraft, its contents or any parts thereof, provided that, if the aircraft, its contents, or any parts thereof lie in an area within which the INIPAT finds it impracticable to grant such access, it will itself effect removal to a point where access can be given.
- C. It is also noted that there should be no pressure to release all of the on-scene wreckage. Often it is better to arrange for wreckage removal and storage and to retain control of the wreckage in case there is a need to examine it later.
- D. The documentation prescribed above will also include a detailed list of any parts or components of the wreckage that will be retained by the INIPAT for further examination. After INIPAT has completed any subsequent examination of retained parts, INIPAT will return the parts to the owner or person responsible for receiving the parts, and receive written acknowledgment of receipt of the parts returned by INIPAT. In the event that portions of the wreckage are returned at different times or to different individuals, it will be necessary to receive similar written acknowledgements each time.

## **6.7 ACTIONS UPON RETURN FROM THE ACCIDENT SITE**

### **6.7.1 INTRODUCTION**

This section addresses the meetings and coordination that largely take place at INIPAT headquarters following the return of the team through the preparation and issuance of the final report.

### **6.7.2 IMMEDIATE ACTIONS TO BE TAKEN**

- A. As one of his first actions upon his return to INIPAT headquarters, the IIC will debrief the DIAM, the Director General, the board members and the DPETI. The primary purpose of this briefing is to provide a synopsis of the facts as they are presently known and the process to be used in the development and release of the final report. Specific mention should be made to these senior managers of the need to permit any of their subordinates who were chairpersons and members of the investigative groups ample time to support this process through to its conclusion.



- B. The DPETI, in coordination, with the IIC, will prepare and submit the preliminary ADREP report to IMO and the designated States (if the ship is over 300 tons). Guidance on the preparation and submission of this report is contained in Chapter 10 (section 10.2) of this manual.
- C. The IIC will next schedule the first in a series of work planning meetings for group chairmen to discuss a tentative schedule of activities. The IIC will prepare and send a memo to each group chairman and his supervisor at least several days before the meeting announcing the meeting, its location, date, and time. After providing a summary outlining the major issues of the investigation, it should prescribe the purposes of the meeting, i.e. discuss progress made to date, identify tasks still to be completed, agree on tentative due dates for the group chairman factual and analysis reports, and address the need for a public hearing to solicit additional information relevant to the occurrence.
- D. The IIC will prepare and disseminate to all group chairmen and the DPETI:
  - 1) a listing of all INIPAT investigative group chairmen, group members, and party coordinators that provides mailing addresses, e-mail addresses, and telephone/fax numbers (to facilitate communication in this phase of the investigation)
  - 2) a common accident summary opening paragraph for future factual and analysis reports to be drafted by the group chairmen

### **6.7.3 WORK PLANNING MEETINGS**

- A. The purpose of the work planning meetings is to discuss activities that will follow the on-scene phase of the investigation, e.g. consideration of new evidence resulting from the completion of materials laboratory examinations and follow-up interviews, etc. A key purpose of these meetings is to reach a consensus on reasonable and firm dates for the completion and submission of the factual and analysis reports by the group chairmen to the IIC, reports that will form the basis of the final report to be drafted by the IIC.
- B. Early on, the IIC will also convey his expectations to the group chairmen for specific further investigative activities that they should pursue so that there is mutual agreement on key accident-related issues, the activities that remain to be completed, the recommendation on whether or not to convene a public hearing, if it is believed or not that such an event will yield information of value in determining probable cause and necessary safety recommendations.
- C. Following each meeting, the IIC will prepare a memo summarizing items of agreement achieved during the meeting, a revised issue outline, and any unresolved issues. All deadlines for report submissions and anticipated milestones should also be documented in this memo, one that is disseminated to each group chairman, his supervisor, and the DPETI.

The use of such communications will ensure that all key INIPAT personnel have a continuing, mutual understanding of the status of the investigation.

### **6.7.4 ON-GOING COORDINATION ROLE OF THE IIC**

- A. In addition to these meetings, the IIC will maintain continuing contact with the group chairmen to maintain awareness of the progress of their follow-up activities. On the other end, the group chairmen will notify the IIC if they cannot meet reporting and other deadlines and provide new dates for completion of their tasks, as well as the reasons for any delay. The IIC will integrate the activities of related investigative groups if it is determined that they are proceeding in similar directions. For example, if maintenance training becomes an issue, the systems, maintenance records, and structures groups might examine maintenance practices together. Likewise, the human performance and the flight operations groups may work together in carrying out interviews and records examinations. If two group chairmen are working together, the IIC will

When needed, the IIC can play an important brokering and coordination role among the group chairmen.



ensure that each of them will cover a specific area to avoid overlap among the groups. Identical areas of investigation should not appear in the reports of two separate groups.

- B. In the foregoing manner, the IIC will ensure that he is informed of all group activities and group findings. The IIC is responsible for ensuring that the appropriate group chairmen cover all relevant issues. The IIC is also responsible for keeping abreast of potential discrepancies, loopholes, and conflicts about the findings of the various group chairmen and either resolve these issues or bring them immediately to the attention of the DPETI.

#### **6.7.5 DETERMINATION OF NEED FOR A PUBLIC HEARING**

- A. While the group chairmen are completing their tasks, the IIC must also focus on developing a recommendation he must make to the DPETI within 30 days of returning from the accident site. Prior to making such a recommendation that could have the effect of opening the accident file to the public, the IIC is to give all parties to the investigation the opportunity to record in writing whether or not they want a public hearing to be conducted on the accident and provide them a deadline for sending their views to him via fax, e-mail, or regular mail.
- B. The IIC will consider the views of the parties and then prepare and send a decision memo to the DPETI recommending whether or not to convene a public hearing. The memo will present a logical discussion supporting the recommendation based on the expected likelihood of gathering previously unknown facts, previous accidents and subsequent follow-on actions, INIPAT action on these past issues, the level of public interest as well as local and national media attention, and interest in higher levels of the government of Angola. A summary of the major issues and the key findings of the investigation, as determined to date, are also to be included. The memo should also include the views of the parties regarding the need for a public hearing.

#### **6.7.6 GROUP CHAIRMAN FACTUAL AND ANALYSIS REPORTS**

- A. With regard to the factual reports, upon completion of a group's factual documentation, the group chairman will prepare a factual report based on the field notes and subsequent investigation activities, using the outline contained in Chapter 8 of this manual (Appendix 8-A). A draft of the factual report should be made available to the group members for comments that can be incorporated into the group chairman's factual report. Incorporation of group member comments is at the discretion of the group chairman. Concurrence of the group members is desired but not required. If a group member is dissatisfied that his comments were not included in the factual report, he should contact the IIC to discuss the issue. If the group member remains concerned, he may send his concerns in writing to the DPETI detailing his position. The group chairman will ensure the objectivity and accuracy of information in the factual report, with input from the IIC. After the IIC receives and tentatively approves these reports, he will send copies to the party coordinators for information purposes and eventual discussion at the Technical Review meeting (refer to section 6.7.7 below) and use the information contained therein when he prepares the final report of the investigation.
- B. In their drafting of the factual reports, group chairmen should exercise caution in their handling of a company's confidential or proprietary information. Each page containing proprietary information is to be stamped or have some other indication that the page contains such proprietary information, indicating that INIPAT staff is obligated not to release such marked material. Unless the needs of the investigation require including the information in any public issuance of information, group chairmen must honor the relevant party's request to withhold disclosure of the information. If it is determined that the material must be made public, the DPETI must consult with legal counsel as to which public notice procedures can be implemented in such situations.

Proprietary information must be treated with great sensitivity.





- C. With regard to the analysis reports, the group chairman will prepare an analysis report based on the information contained in his factual report, using the outline contained in Chapter 8 of this manual (Appendix 8-B). Group chairmen should begin writing their analysis reports as soon as appropriate and should not wait until the entire factual portion of the investigation is complete. The analysis report should review and evaluate all facts documented by the group regarding their relevance to the accident and should state the principal findings and their relevance to a probable cause of the accident. Analysis reports and any drafts are INIPAT internal products and should be marked "For Official Use Only." They are not to be released to the group members, party coordinators, or the public for any reason. After they have obtained approval from their respective supervisors, group chairmen will submit their analysis reports to the IIC for use in the production of INIPAT's final report.
- D. If there is to be no public hearing, the DPETI, in coordination with the IIC, will prepare and send a memo to the Director General, the Deputy Director General, and other senior INIPAT managers advising them that he is about to arrange for the public availability of the factual reports and, if available, the transcript of the CVR recording. He will also alert the parties, using expeditious means such as e-mail, of this imminent release as well. At this time, the IIC will then assemble and send packages of the factual reports and the CVR transcript to each of the parties, along with an invitation to the Technical Review meeting addressed below in section 6.7.7, providing a date, time, and location for this meeting, providing enough time for the parties to review the written materials beforehand. It is also important that this communication establish the limits of the party review process, noting that the discussions will focus on fact-finding only, that no analysis will be addressed during the course of this Technical Review, and that written party submissions for the analysis phase will be solicited at the conclusion of the Technical Review.



Draft and final analysis reports must be handled with great discretion and only shared within INIPAT on a "need-to-know" basis.

If a public hearing is to be held as the vehicle to release this information and also gather more facts about an accident, it will be planned and conducted in accordance with general INAVIC policies concerning the use of public hearings.

### **6.7.7 TECHNICAL REVIEW FOR THE FACTUAL PHASE OF THE INVESTIGATION**

- A. The Technical Review is normally the final step in the factual phase of the investigation and provides the parties with the opportunity to perform a final review of all factual material obtained during the investigation. It allows the parties to raise any investigative problem areas so the issues can be resolved or at least addressed in the report preparation process. In addition, the Technical Review provides a formal review of the accuracy of information contained in the group chairmen's factual reports.
- B. Group chairmen and their supervisors will be present at the Technical Review. The IIC should begin the Technical Review by calling upon each group chairman, as necessary, to discuss the work of his group during the investigation. Next, each party coordinator will be asked whether he has questions concerning the material presented in the particular factual report. Finally, party coordinators will be given the opportunity to suggest additional avenues of investigation or to submit additional factual information for inclusion into the factual reports to ensure that the information is considered in the drafting and approval of the final report.
- C. At the conclusion of the meeting, the IIC will encourage the party coordinators to submit their analyses, conclusions, and/or recommendations that they believe are justified by the facts of the investigation. After the meeting, the IIC will send a letter to the parties and group chairmen listing agreed-upon changes to the factual reports as well as establishing a deadline for submission of analysis inputs for INIPAT consideration in the drafting of the final report, usually 30 days after the conclusion of the Technical Review.



### **6.7.8 PARTY SUBMISSIONS FOR THE ANALYSIS PHASE OF THE INVESTIGATION**

- A. While the Technical Review provides parties with the opportunity to offer comments on the factual material, as noted above, parties are strongly encouraged to provide INIPAT with their proposed conclusions, recommendations, and probable cause under the provisions of the Instructive I002M/INIPAT/2025 of the Angola Marine Safety Regulations. When sending this material to the IIC, parties should also be encouraged to send copies of their submissions to all the other parties as well.
- B. When received, the IIC should distribute submissions to the DPETI, group chairmen and their supervisors. The party submissions will be considered during development of the final report.

### **6.7.9 REPORT PLANNING MEETING**

A report planning meeting will be convened to occur after the deadline for party submissions and completion and submission of the analysis reports by the group chairmen in order to discuss the report outline and to resolve any outstanding issues

This meeting is a key event when tentative agreement is reached on the substantive issues to be addressed in the final report.

identified during the work planning meetings. The IIC will send a memo announcing the date, time, and location of the meeting and distribute it (along with a list of major areas of discussion) to the DPETI, group chairmen, their supervisors and any person (report writer/editor) charged with the drafting, so that everyone is aware of all proposed recommendations, including any resulting from the party submissions, being considered for the final report. At the conclusion of the meeting, all participants should agree on the major issues to be discussed in the report, recommendation topics, the thrust of the probable cause, and remaining deadlines. The IIC will send a follow-on memo or e-mail message to all meeting participants after the meeting that summarizes the major points that were agreed to for inclusion in the report.

### **6.7.10 PREPARATION OF THE FINAL REPORT**

The format of the final report will follow the outline reflected in Chapter 8 (Reporting) of this manual (based on IMO CI Code requirements). Most sections of this reporting format vary little from one accident to another although certain sections will contain more or less material depending on the circumstances of the investigation. The section entitled "Additional Information" and the analysis sections will be drafted to reflect the major investigative activities of the groups critical to the issues of the particular investigation. The last section, which is not always used in every report, is reserved to highlight new or effective investigative techniques that may have been applied during an investigation. If this section is used, it should briefly indicate the reason for using the techniques and the benefits derived while presenting the results in the previous sections.

### **6.7.11 DRAFTING THE REPORT**

- A. If he is using the services of a professional report writer/editor, the IIC will provide him with the group chairmen's factual and analysis reports as soon as they become available so that the report writer can begin drafting the final report. The IIC should meet with the report writer to discuss the best method of portraying these group reports. All factual material in the draft final report must be supported by material that has already been released to the public, and all calculations should be checked for accuracy. Calculations that come directly from the group chairmen's factual and analysis reports should be verified by the group chairmen, their supervisors, or the IIC before these reports are given to the report writer. Where possible, the report writer should re-confirm calculations and question the group chairmen or IIC if something does not seem correct.
- B. The report writer should check all figures, tables, and photographs for quality of reproduction and, when necessary, ask the appropriate group chairman or IIC to obtain diagrams, schematics, or photographs that more clearly illustrate a particular concept. Group chairmen should determine whether any figures, tables, or photographs used in their factual or analysis





reports require permission for use and obtain permission where necessary. The report writer will ensure that permission from appropriate entity has been obtained if its charts are to be used in the draft final report. If any proprietary information is to be used, the IIC and report writer must coordinate such use with legal counsel. This action is to be taken as early as possible in the event the owner of the information objects to its use in the final report.

#### **6.7.12 PROCESSING DRAFT REPORT MATERIAL**

- A. When completed by the writer/editor, the IIC will circulate and solicit comments on the initial complete report draft from the DPETI, group chairmen, and their supervisors. Reviewers will be asked to correct any known discrepancies and to suggest textual improvements, which may range from minor changes to substantive revisions. The report writer will evaluate each suggestion and, when necessary, discuss potential conflicts with the group chairmen or IIC.
- B. After the final report has been revised to address issues identified during this review, DPETI, in coordination with the IIC, will prepare a memo conveying the final report and announcing the date, time, and location of a final review and approval meeting to include the Director General, the Board Members, the DIAM and the DPETI, as well as inviting the participation of the group chairmen and their supervisors. This memo should also identify any dissenting opinions from or between group chairmen and senior staff, keeping in mind that consensus is a goal but not a requirement.
- C. At the outset of this decision-making meeting, the IIC will make the presentation summarizing the principal issues of the investigation and the final report and then identifying unresolved areas of disagreement among INIPAT participants or the parties involved in the investigation, if any. He will report the names of the organizations to which INIPAT would be directing any safety recommendations and then entertain questions from any meeting participant. At the conclusion of this meeting, the final report will either be adopted, adopted but with specified revisions, or not adopted by a vote of the following participants: the Director General, the Board Members, the DIAM, and the DPETI.
- D. Following approval of the final report, its public release will be delayed to allow time for its coordination with other States and organizations as prescribed in Chapter 8 of this manual (refer to section 8.3.3). At the end of the prescribed period of sixty (60) days, the IIC, in conjunction with the DPETI and with the participation of the group chairmen, if needed, will either amend the final report to reflect the substance of the comments received or, if requested by the commenting State, append the comments to the final report. The DPETI has the discretion to seek approval of any such amendments in the manner prescribed above in paragraph C before making arrangements for the public release of the final report, including its dissemination in the manner prescribed in Chapter 8 of this manual (refer to section 8.4).
- E. The DPETI, in coordination with the IIC, will prepare and submit the accident data ADREP report to IMO (if the ship is over 300 tons). Guidance on the preparation and submission of this report is contained in Chapter 10 (section 10.3) of this manual.

This review is the last opportunity for reviewers to make comments before the final INIPAT decision-making meeting to adopt the final report.

#### **6.7.13 PETITIONS FOR RECONSIDERATION BY INIPAT**

- A. After an accident report has been adopted and released to the public, a party or any other person with a direct interest in the accident investigation can formally petition the INIPAT to reconsider all or part of the analysis, conclusions, or probable cause. When such petitions for reconsideration are received, the DPETI will promptly acknowledge their receipt in writing and then assign the petition to the IIC and the appropriate group chairman to evaluate the issue(s) raised, perhaps also involving INIPAT staff members who were not initially involved in the investigation.



- B. To respond to such a petition, the IIC will first determine whether the petition has met the requirements for consideration by the INIPAT, i.e. whether the petitioner has presented new and significant factual evidence or has demonstrated that the INIPAT's analysis was faulty. If the petition meets these requirements, the IIC will draft a formal response to the petition, one that will be signed by the DPETI and sent to the petitioner. The IIPAT's response should be designed to bring closure to the issues raised in the petition and consist of:
- 1) a brief summation of the accident involved followed by the relevant initial INIPAT conclusions
  - 2) the probable cause, and
  - 3) the areas in which the petitioner has focused the petition
  - 4) point-by-point discussion of the:
    - (a) merits of the petitioner's argument, and
    - (b) quality of the new evidence presented
  - 5) proposed INIPAT response to the petition
- C. The INIPAT's response will end with a statement indicating whether and to what degree the petition will be granted, i.e., granted in its entirety or in part or denied in its entirety. In line with the principle documented in paragraph 6.1.2 C of this manual, the INIPAT can and will, when warranted, re-open an investigation if new and significant evidence becomes available or the INIPAT's analysis was demonstrated to be faulty.

*End of Chapter - Appendices Follow*



## APPENDIX 6-A

### Checklist for the Investigator-in-Charge (IIC)

#### INTRODUCTION:

This investigatory tool is designed to lead an investigator-in-charge through most of the steps documented in the foregoing chapter and required for a major marine accident investigation. It should also help to assure continuity and standardization among different IICs over time. While it is largely intended for use in investigating accidents that involve major, large hull loss/numerous casualty types of accidents, items that do not apply to other types of accidents can simply be ignored. It should also be acknowledged that the DIAM and DPETI will support the IIC with the accomplishment of many of these tasks.

| YES | NO | NA | 1    | ACTIONS UPON RECEIPT OF NOTIFICATION OF AN ACCIDENT                                  |
|-----|----|----|------|--------------------------------------------------------------------------------------|
|     |    |    | 1.1  | Actual composition of GO team (6.4.2 a)                                              |
|     |    |    | 1.2  | Transportation of the GO team, investigative field kits, and PPE to the site (6.4.2) |
|     |    |    | 1.3  | Identification/notification of organizations with party status (6.4.2 b)             |
|     |    |    | 1.4  | Other States/organizations with participation rights (6.4.2 c)                       |
|     |    |    | 1.5  | Details of occurrence/site environment for GO team members (6.4.2 d)                 |
|     |    |    | 1.6  | Measures if wreckage in water (6.4.2 e)                                              |
|     |    |    | 1.7  | Contact with local police authority (6.4.2 f)                                        |
|     |    |    | 1.8  | Securing records, recordings, and samples (6.4.2 g)                                  |
|     |    |    | 1.9  | Logistical arrangements at/near accident site (6.4.2 h)                              |
| YES | NO | NA | 2    | INITIAL ACTIONS AT THE ACCIDENT SITE                                                 |
|     |    |    | 2.1  | Site survey and photography (6.5.3 A)                                                |
|     |    |    | 2.2  | Safety risk assessment (6.5.3.A)                                                     |
|     |    |    | 2.3  | Assessment and documentation of disturbances to wreckage (6.5.3 A)                   |
|     |    |    | 2.4  | Establishment of command post and space for press briefing (6.5.3 A)                 |
|     |    |    | 2.5  | Coordination with local police commander--access control measures (6.5.3 B)          |
|     |    |    | 2.6  | Survey of wreckage---missing parts (6.5.3 C)                                         |
|     |    |    | 2.7  | Security of voyage data recorders (6.5.3 C)                                          |
|     |    |    | 2.8  | Collection of perishable evidence (6.5.3 C)                                          |
|     |    |    | 2.9  | Unlawful interference determination (6.5.3 D)                                        |
|     |    |    | 2.10 | Voyage recorder read-out arrangements (6.5.3 D)                                      |
|     |    |    | 2.11 | Autopsy examinations (6.5.3 D)                                                       |
|     |    |    | 2.12 | Medical examinations (6.5.3 D)                                                       |
|     |    |    | 2.13 | Salvage operations arrangements (6.5.4)                                              |
| YES | NO | NA | 3    | SUBSEQUENT ACTIONS AT THE ACCIDENT SITE                                              |



|            |           |           |             |                                                                                                                                                                  |
|------------|-----------|-----------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            |           |           | <b>3.1</b>  | Conduct of organizational meeting (6.6.2)                                                                                                                        |
|            |           |           | <b>3.2</b>  | Determination of party representatives and documentation on form in Appendix 6-B (6.6.2 D)                                                                       |
|            |           |           | <b>3.3</b>  | Determination of observers and documentation using letter in Appendix 6-C (6.6.2 E)                                                                              |
|            |           |           | <b>3.4</b>  | Completion of CVR Nondisclosure Agreement (Appendix 6-E) by members of the flight recorder investigative group (6.6.2 I)                                         |
|            |           |           | <b>3.5</b>  | Assignment of investigators to investigative groups (6.6.2 J)                                                                                                    |
|            |           |           | <b>3.6</b>  | Initial and subsequent press briefings (6.6.4)                                                                                                                   |
|            |           |           | <b>3.7</b>  | Completion of daily duties (6.6.5):                                                                                                                              |
|            |           |           | <b>3.7a</b> | Briefing for INIPAT headquarters                                                                                                                                 |
|            |           |           | <b>3.7b</b> | Group chairmen meeting (early morning)                                                                                                                           |
|            |           |           | <b>3.7c</b> | Party coordinators meeting (morning)                                                                                                                             |
|            |           |           | <b>3.7d</b> | Visits to the accident site (2 daily)                                                                                                                            |
|            |           |           | <b>3.7e</b> | Daily progress meeting (early evening)                                                                                                                           |
|            |           |           | <b>3.8</b>  | Arrangements for materials laboratory examinations (6.6.6)                                                                                                       |
|            |           |           | <b>3.9</b>  | Final progress meeting (6.6.7)                                                                                                                                   |
|            |           |           | <b>3.10</b> | Disposition of the wreckage, including its full or partial release (6.6.8)                                                                                       |
| <b>YES</b> | <b>NO</b> | <b>NA</b> | <b>4</b>    | <b>ACTIONS UPON RETURN FROM THE ACCIDENT SITE</b>                                                                                                                |
|            |           |           | <b>4.1</b>  | De-briefing for senior INIPAT managers (6.7.2 A)                                                                                                                 |
|            |           |           | <b>4.2</b>  | Preliminary ADREP report to IMO and designated States (6.7.2 B)                                                                                                  |
|            |           |           | <b>4.3</b>  | Conduct of first work planning meeting (6.7.2 C)                                                                                                                 |
|            |           |           | <b>4.4</b>  | Prepare and disseminate contact list and accident summary statement (6.7.2 D)                                                                                    |
|            |           |           | <b>4.5</b>  | Follow-on work planning meetings and follow-up memos summarizing Agreements (e.g. deadlines for submission of factual and analysis reports) and progress (6.7.3) |
|            |           |           | <b>4.6</b>  | Views of the parties on the need for a public hearing (6.7.5 A)                                                                                                  |
|            |           |           | <b>4.7</b>  | Decision memo (concerning public hearing) to the DPETI (6.7.5 B)                                                                                                 |
|            |           |           | <b>4.8</b>  | Approval of factual reports and transmission to party coordinators for later discussion at the Technical Review (6.7.6 A)                                        |
|            |           |           | <b>4.9</b>  | Alerting of senior INIPAT managers of imminent public release of factual reports and transcript of the CVR recording, if available                               |
|            |           |           | <b>4.10</b> | Conduct of Technical Review and follow-on letter to the parties and group chairmen (6.7.7)                                                                       |
|            |           |           | <b>4.11</b> | Dissemination of party views for consideration in analysis reports (6.7.8)                                                                                       |
|            |           |           | <b>4.12</b> | Conduct of report planning meeting and follow-on memo (6.7.9)                                                                                                    |
|            |           |           | <b>4.13</b> | Supervision of the report drafting effort (6.7.11)                                                                                                               |



|  |  |  |             |                                                                                                                                   |
|--|--|--|-------------|-----------------------------------------------------------------------------------------------------------------------------------|
|  |  |  | <b>4.14</b> | Internal coordination of the complete draft and the conduct of the decision-making meeting by senior INIPAT managers (6.7.12 A-C) |
|  |  |  | <b>4.15</b> | Coordination of the final report with other States and organizations (6.7.12 D)                                                   |
|  |  |  | <b>4.16</b> | Processing of any petitions for reconsideration (6.7.13)                                                                          |

*End of Appendix 6-A*





## **APPENDIX 6-B**

### **Statement of the Used Experts Seconded by the State's NMA or Other Organizations as Investigators**

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Ship/boat identification: \_\_\_\_\_

Ship/boat registration: \_\_\_\_\_

Make and model: \_\_\_\_\_

Location of occurrence: \_\_\_\_\_

Date of occurrence: \_\_\_\_\_

The undersigned hereby, holder of the ID/Passport n.º \_\_\_\_\_, acknowledge that he is participating in the above-referenced marine accident investigation process (including any component tests and teardowns or simulator testing) as investigator seconded by the State's NMA or other organizations for the purpose of providing technical assistance to the Instituto Nacional de Investigação e Prevenção de Acidentes de Transportes (INIPAT).

The undersigned further acknowledge that he has read the attached copy of INIPAT Instructive n.º. I002M/INIPAT/25 (Maritime Accident and Incident Investigation) and has familiarized himself with section 02.027 in particular, which governs participation in INIPAT investigations and agrees to abide by the provisions of this instructive.

It is understood that the expert to an investigation may not be a person who also represents claimants or insurers. The placement of a signature hereon constitutes a representation that participation in this investigation is not on behalf of either claimants or insurers and that, while any information obtained may ultimately be used in litigation, participation is not for the purposes of preparing for litigation and during the all investigation period, the expert will be relieved from his regular duties.

By placing his signature hereon the investigator seconded by NMA or other organizations agrees that he will neither assert nor permit to be asserted on their behalf, any privilege in litigation, with respect to information or documents obtained during the course of and as a result of participation in the INIPAT investigation as described above.

It is understood, however, that this form is not intended to prevent the undersigned from participating in litigation arising out of the accident referred to above or to require disclosure of the undersigned's communications with counsel.

Signed \_\_\_\_\_

Date \_\_\_\_/\_\_\_\_/\_\_\_\_

Organization of origin \_\_\_\_\_

Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**APPENDIX 6-B1**

**Statement of Party Representatives to INIPAT Investigation**

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**STATEMENT OF PARTY REPRESENTATIVES  
TO INIPAT INVESTIGATION**

Ship/boat identification: \_\_\_\_\_

Ship/boat registration: \_\_\_\_\_

Make and model: \_\_\_\_\_

Location of occurrence: \_\_\_\_\_

Date of occurrence: \_\_\_\_\_

The undersigned hereby acknowledge that they are participating in the above-referenced marine accident field investigation (including any component tests and teardowns or simulator testing) on behalf of the party indicated adjacent to their name, for the purpose of providing technical assistance to the Instituto Nacional de Investigação e Prevenção de Acidentes de Transportes (INIPAT).

The undersigned further acknowledge that they have read the attached copy of Instructive nº I002M/INIPAT/25(Maritime Accident and Incident Investigation) of the Angola Marine Accident Investigation Regulations and have familiarized themselves with section 02.027 in particular, which governs participation in INIPAT investigations and agree to abide by the provisions of this regulation.

It is understood that a party representative to an investigation may not be a person who also represents claimants or insurers. The placement of a signature hereon constitutes a representation that participation in this investigation is not on behalf of either claimants or insurers and that, while any information obtained may ultimately be used in litigation, participation is not for the purposes of preparing for litigation.

By placing their signatures hereon all participants agree that they will neither assert nor permit to be asserted on their behalf, any privilege in litigation, with respect to information or documents obtained during the course of and as a result of participation in the INIPAT investigation as described above.

It is understood, however, that this form is not intended to prevent the undersigned from participating in litigation arising out of the accident referred to above or to require disclosure of the undersigned's communications with counsel.

Signed \_\_\_\_\_

Date \_\_\_\_/\_\_\_\_/\_\_\_\_

Organization of origin \_\_\_\_\_

Address \_\_\_\_\_  
\_\_\_\_\_



*End of Appendix 6-B*



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## **APPENDIX 6-C Observer Status**

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Date.....

### **GRANTING OF OBSERVER STATUS**

Ship/boat identification: \_\_\_\_\_

Ship/boat registration: \_\_\_\_\_

Make and model: \_\_\_\_\_

Location of occurrence: \_\_\_\_\_

Date of occurrence: \_\_\_\_\_

The Instituto Nacional de Investigação e Prevenção de Acidentes de Transportes (INIPAT) is empowered to investigate marine casualties in Angola, taking into account the international obligations of Angola. The objective of an INIPAT investigation is to advance aviation safety by identifying safety deficiencies and making recommendations designed to prevent such occurrences from happening in the future.

When the INIPAT conducts a formal investigation into an accident or serious incident, it may grant observer status to anyone who has a legitimate need to familiarize themselves with INIPAT's investigation process. Observers should not have any self-interest in the investigation.

By this letter, you are granted the status of an observer for this investigation, under the supervision of the INIPAT Investigator-in-Charge (IIC), and will be permitted access to only those portions of the investigation he deems appropriate.

Your participation as an observer is subject to the following conditions:

- 1) You will limit your activities at the occurrence site to those outlined by the IIC.
- 2) You will ensure that your activities do not restrict or otherwise interfere with IIPAT investigators in the performance of their duties.
- 3) You will ensure that the information you gain as a result of your observer status is not disclosed to any unauthorized person.

Failure to comply with any of the above responsibilities could result in the immediate revocation of your observer status. You should also understand that the privileges of an observer will be exercised at your own risk. Please sign and date below and return this letter to the Investigator-in-Charge (IIC), thus indicating your understanding and acceptance of the above-mentioned conditions and responsibilities.

Sincerely,

Investigator-in-Charge  
Instituto Nacional de Investigação e prevenção de Acidentes de Transportes (INIPAT)



I understand and accept the conditions outlined above with respect to my attendance as an observer at the subject investigation.

I also understand that the privileges of an observer will be exercised at my own risk, and I hereby agree to indemnify and hold harmless the Instituto Nacional de Investigação e Prevenção de Acidentes de Transportes (INIPAT) for any damage or injuries I may suffer as a result of my attending the investigation as an observer.

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

Representing: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*End of Appendix 6-C*





## APPENDIX 6-D

### Meeting Attendance Record

Occurrence: \_\_\_\_\_

Date \_\_\_\_\_

Time started/completed \_\_\_\_\_ / \_\_\_\_\_

Location \_\_\_\_\_

| FULL NAME | ORGANIZATION | GROUP | TELEPHONE | SIGNATURE |
|-----------|--------------|-------|-----------|-----------|
|           |              |       |           |           |
|           |              |       |           |           |
|           |              |       |           |           |
|           |              |       |           |           |
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|           |              |       |           |           |
|           |              |       |           |           |

*End of Appendix 6-D*



## APPENDIX 6-E

### CVR Nondisclosure Agreement

#### CABIN VOICE RECORDER (CVR) NONDISCLOSURE AGREEMENT

Ship/boat identification: \_\_\_\_\_

Ship/boat registration: \_\_\_\_\_

Make and model: \_\_\_\_\_

Location of occurrence: \_\_\_\_\_

Date of occurrence: \_\_\_\_\_

Each of the undersigned acknowledges that he has read Instructive nº I002M/INIPAT/25 (Maritime Accident and Incident Investigation) of the Angola Marine Accident and Incident Investigation Regulations and has familiarized himself with section 02.037 in particular, which are attached to this document, and agrees to comply with those rules.

Each undersigned further agrees not to disclose or cause to be disclosed any information from the cabin voice recorder (CVR) recording or any transcript thereof except as expressly authorized by the INIPAT. Approval from the INIPAT Investigator-In-Charge must be obtained before disclosure of any information. Disclosure of information to his respective organization shall include only that information which is directly related to safety and at no time shall non-pertinent remarks, comments, or conversations be disclosed to any person, party, or organization.

By placing his/her signature hereon, the undersigned acknowledges that the unauthorized release of CVR information shall be grounds for immediate dismissal from the investigation, and may result in further legal sanction.

I have read and understand the above conditions:

| FULL PRINTES NAME | PARTY | N.º ID/PASSAPORT | SIGNATURE | DATE |
|-------------------|-------|------------------|-----------|------|
|                   |       |                  |           |      |
|                   |       |                  |           |      |
|                   |       |                  |           |      |
|                   |       |                  |           |      |
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|                   |       |                  |           |      |
|                   |       |                  |           |      |

*End of Appendix 6-E*



## Chapter 7

# Participation in Investigations Conducted by Other States

The purpose of this Chapter is to provide the procedures that must be followed to guide Angola's participation in marine accident and serious incident investigations conducted by other States.

## 7.1 POLICY & BACKGROUND

### 7.1.1 ANGOLA PARTICIPATION

Angola will assign one or more technically qualified representatives to participate in marine accidents and serious incidents that occur in other States involving—

- 1) Angola-registered ship/boat; and
- 2) Angola MOC holders; and

The procedure to address these participation matters is contained in Chapter 5 of this manual..

### 7.1.2 IMO OBLIGATIONS

- A. This policy will ensure that Angola is in compliance with their obligations with respect to IMO CI Code (Marine Accident and Incident Investigation).
- B. While this participation would usually relate to Angola's role as the Flag State or State of the Operator, it could also relate to other situations as well, e.g. when citizens of Angola suffer fatalities or serious injuries related to an accident of a foreign aircraft that occurs outside the territory of Angola.

### 7.1.3 APPLICABLE MSC-255 (CI Code) STANDARDS

- A. IMO MSC-255 (CI Code) establishes the right of the Flag State and the State of the Operator to appoint an accredited representative to participate in the investigation.
- B. CI Code further requires the Flag State and the State of the Operator to appoint an accredited representative when specifically requested to do so by the State conducting the investigation of an accident to a ship/vessel over 300 tons.

The procedure to address these participation matters is contained in Chapter 5 of this manual.

## 7.2 ANGOLA'S RESPONSIBILITIES

### 7.2.1 Voyage Data RECORDERS

- A. Subpart C (Section 02.013) of Instructive nº I002M/INIPAT/25 (Maritime Accident and Incident Investigation) of the Angola Marine Accident and Incident Investigation Regulations establishes wreckage and records preservation requirements for both Angola and foreign air operators when an accident or specified serious incidents occur.
  - z These requirements include "all recording mediums of trip, maintenance, and voice recorders" to be preserved until INIPAT takes them into its custody.



- B. When an Angolan ship/boat involved in an accident or a serious incident arrives in a State other than the State of Occurrence, the INIPAT DPETI and DIAM will, on request from the State conducting the investigation, arrange to furnish the latter State with the voyage recorder records and, if necessary, the associated voyage recorders.

If necessary, the DPETI will also request the cooperation of any other State in the retrieval of such voyage recorder records that may be made available for the investigation.

### **7.2.2 ORGANIZATIONAL INFORMATION**

- A. The INIPAT DPETI will, on request from the State conducting the investigation, gather and provide pertinent information on any Angolan organization whose activities may have directly or indirectly influenced the operation of the ship/boat.
- B. The INIPAT DIAM, acting on behalf of Angola, will appoint one or more advisers, proposed by the operator and others designated by the Director-General, to assist Angola's accredited representative.

### **7.2.3 OTHER INFORMATION**

- A. The INIPAT DPETI, on behalf of Angola, will, on request from the State conducting the investigation of an accident or an incident, gather and provide that State with all the relevant information available to it.
- B. In the event that Angolan facilities or services had been (or would normally have been) used by an ship/boat prior to an accident or an incident, the IIPAT DPETI will gather and provide information pertinent to the investigation to the State conducting the investigation.

## **7.3 ANGOLA'S PARTICIPATION: ANGOLA CITIZENS INVOLVED**

- A. Angola has a special interest in an accident by virtue of fatalities or serious injuries to its citizens. Hence, the INIPAT DPETI will make a request to the State conducting the investigation to appoint an expert to participate in its investigation.
- B. IMO CI Code Standards, establishes the right of States in such circumstances to participate in the investigation. In this regard, the INIPAT-appointed expert is entitled to;
- 1) visit the scene of the accident;
  - 2) have access to the relevant factual information;
  - 3) participate in the identification of the victims;
  - 4) assist in questioning surviving passengers who are citizens of Angola; and
  - 5) receive a copy of the Final Report on behalf of INIPAT

*End of Chapter*



## Chapter 8

# Reporting

The purpose of this Chapter is to provide the procedures that must be followed when the Accident Prevention Manager (DPETI), on behalf of the Angolan INIPAT, prepares the final reports of INIPAT-conducted accident investigations and coordinates these reports with accident investigation authorities from other IMO Contracting States.

### 8.1 INTRODUCTION

Lastly, these procedures also address the release of the final report, following the completion of the coordination process. Adherence to these procedures will ensure Angola's compliance with its obligations with respect to IMO CI Code (Marine Accident and Incident Investigation).

#### 8.1.1 FINAL REPORT

- A. The Final Report of a marine accident investigation is the foundation for initiating safety actions necessary to prevent accidents from similar causes. Therefore, the Final Report of an accident must establish in detail what happened, how it happened and why it happened. The findings and the causes in the Final Report should lead to safety recommendations so that appropriate preventive measures can be taken.
- B. In sum, the essential features of a Final Report are:
- 1) a record of all the relevant facts (including any conflicting evidence);
  - 2) an analysis of the relevant facts;
  - 3) conclusions in the form of findings and causes that point clearly to the safety issues that need to be addressed; and
  - 4) safety recommendations
- C. While the INIPAT DPETI is ultimately responsible for the Final Report, it will normally be written by the investigator-in-charge (IIC).
- D. The report should cover in detail all relevant aspects of the investigation.
- E. When the investigation of an accident (usually a major one) requires the use of specialized groups, group chairmen will submit written reports to the IIC together with all supporting documentation and data covering the facts and findings established.
- F. The Final Report will be drafted based, to a large extent, on the reports of these groups.
- G. The IIC is responsible for ensuring that the Final Report is written in a consistent and uniform style.

The Final Report is a critical tool in the effort to prevent recurrences.





## **8.2 BASIS FOR THE FINAL REPORT: THE GROUP REPORTS**

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### **8.2.1 GROUP CHAIRMAN PERFORMANCE**

A major marine accident will normally involve the use of specialized groups of technical experts, as outlined in Chapter 6 of this manual.

The chairman of each group, with assistance from his group members and under the direction of the IIC, is responsible for scrutinizing the evidence gathered in relation to the tasks assigned to the group.

He must then lead the effort to draft the group's factual and analysis reports, which presents all the facts relevant to the activities of the group as well as an analysis of the facts which the group has established, including the findings of the group's investigation and its proposals for safety recommendations.

### **8.2.2 FEATURES OF THE REPORTS**

The essential features of these two reports follow below.

The two reports are to be drafted according to the outlines contained in Appendices 8-A and 8-B.

#### **8.2.2.1 Introduction**

- z A description of the accident and the names, titles and affiliations of the group members.
- z Matters of organization, such as the forming of sub-groups to handle specific tasks within the terms of reference of the group. For example, in the case of the marine operations group, sub-groups such as a witness group and a performance group are sometimes formed.
- z Brief details of the time and location of investigation activities

#### **8.2.2.2 Investigation**

- z The facts, conditions and circumstances established by the group describing the areas investigated.
- z All the relevant facts, whether or not considered significant to the findings of the group.

#### **8.2.2.3 Analysis**

- z Discussion of the significance of the facts stated in the previous section of the group report
- z The group's analysis of those facts as they pertain to the tasks assigned to the group, presented in a logical way that leads to and supports the findings.

#### **8.2.2.4 Conclusions**

- z The substantiated findings of the group's investigation.
- z An indication of the findings of the group which considered to be factors in the accident

#### **8.2.2.5 Safety Recommendations**

- z Any safety issues identified
- z Safety actions already taken
- z Proposals for safety recommendations.



## **8.3 PREPARATION AND COORDINATION OF THE DRAFT FINAL REPORT**

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### **8.3.1 INTRODUCTION**

- A. The Final Report should be structured logically and written in clear and concise language. A standardized format of the Final Report assists in the production of a complete and reliable record of the investigation of the accident.
- B. In a major investigation, the IIC receives the group chairmen reports and then uses them to draft the Final Report. The Final Report should be a comprehensive report of the whole investigation. The factual information collected during the investigation should form the basis for the analysis section of the report, which leads to and supports the establishment of the findings, causes and safety recommendations.

The organization of the Final Report is intended to present a logical sequencing of information ultimately leading to probable causes and safety recommendations.

### **8.3.2 FORMAT AND CONTENT OF THE FINAL REPORT**

The standardized format to be used for the Final Report that follows below provides a well-structured record of the investigation. The Final Report contains five parts: Introduction (Title and Synopsis), Factual Information, Analysis, Conclusions (Findings and Causes) and Safety Recommendations. Along with providing the format to be used, detailed guidance on completing each section of the Final Report is also provided below.

#### **8.3.2.1 Introduction (Title and Synopsis)**

- A. The title of the Final Report shall contain the following information: name of the ship operator; manufacturer, model, nationality and registration marks of the ship/boat; and place and date of the accident.
- B. The introduction should contain brief information on the notification of the accident to national and foreign authorities, the identification of the accident investigation authority conducting the investigation (i.e. INIPAT), the accredited representation from other States, brief information on the organization of the investigation, and the date of release.
- C. The introduction should contain a synopsis which briefly describes the accident. It should provide an overview of the accident flight, a statement of why the accident happened and a brief summary of the injuries and damage. The synopsis could be described as an executive summary of the Final Report and should usually not exceed one page in length.
- D. The title page, or the inside cover, may contain a statement on the accident prevention objective of the investigation and the Final Report. It may also be stated that it is not the purpose of the investigation and the Final Report to apportion blame or liability. For example, the following text may be considered: "In accordance with IMO CI Code (MSC-255), it is not the purpose of aircraft accident investigation to apportion blame or liability. The sole objective of the investigation and the Final Report is the prevention of accidents and incidents."
- E. The introduction may also contain a statement regarding the responsibility for implementing the safety recommendations. For example, the following text may be considered: "Unless otherwise indicated, recommendations in this report are addressed to the regulatory authorities of the State having responsibility for the matters with which the recommendation is concerned. It is for those authorities to decide what action is taken."



- F. The introduction should contain a reference to the time of day used in the report, and the differential between local time and Co-ordinated Universal Time (UTC).
- G. A table of contents, a list of abbreviations used in the report and a list of appendices are to be used to enhance the readability of the report.

### **8.3.2.2 Factual Information**

- A. This part of the Final Report is descriptive in character and should be a comprehensive record of the facts and circumstances established in the investigation. When the investigation was conducted by groups, the report should integrate the relevant information from the group reports. Supporting documents, such as photographs, diagrams, relevant parts of voyage data recorder readouts and technical reports, should be included or appended to the report. However, only those documents, or portions thereof, which are required to support the facts, analysis and conclusions, should be appended to the Final Report.
- B. The collection of Human Factors information is an integral part of the investigation. Thus, the Human Factors information should be integrated into the appropriate areas of the factual part of the report, rather than being placed under a separate heading. Human Factors information should be presented in a language that is consistent with the presentation of the other factual information.
- C. The factual information part of the Final Report should contain a description of all events and circumstances directly related to the occurrence. The sequence should begin as far back in time as is necessary to include the significant events which preceded the accident. This part also contains all factual information, i.e. information resulting from direct verification, which is essential for the development of the analysis, conclusions and safety recommendations. The significance of the facts should not be explained in the factual information part. Such discussions should be presented in the analysis part.

### **8.3.2.3 History of the Trip (Voyage)**

- A. The history of the trip describes the significant events which preceded the accident, in chronological order when this is practicable. The objective is to enable the reader to understand how the accident happened but to avoid any analysis of why the accident occurred. The information is usually obtained from sources such as voyage data records, flight data recorders, cabin voice recorders, marine traffic services records and recordings, and witness accounts. The information should be correlated to local time or UTC if the flight involved more than one time zone. The information presented in this section of the report should be based on established facts. Usually the trip number, the type of operator and operation, the crew briefing and trip planning, the departure point and time of departure, and the point of intended arrival will be given, followed by a description of the events leading to the accident, including navigational details and relevant radio communications. It is important to give a description of the trip and the pertinent event as they occurred, including a reconstruction of the significant portion of the trip path, if appropriate. Evidence which facilitated the reconstruction of the sequence of events, such as witness accounts, cabin voice recorder and marine traffic services transcripts, should be mentioned.
- B. With regard to the location of the occurrence, include:
  - 1) the latitude and longitude, as well as a geographical reference to a well-known location;
  - 2) the elevation of the accident site;
  - 3) time of the occurrence in local time (and UTC if the trip crossed time zones); and
  - 4) whether it was day, dawn, dusk or night,



#### **8.3.2.4 Injuries to Persons**

A. The following table will be completed with numerical entries—

| Injuries | Crew | Passengers | Total in Ship/Boat | Others         |
|----------|------|------------|--------------------|----------------|
| Fatal    |      |            |                    |                |
| Serious  |      |            |                    |                |
| Minor    |      |            |                    | Not applicable |
| None     |      |            |                    | Not applicable |
| TOTAL    |      |            |                    |                |

B. Fatal injuries include all deaths determined to be a direct result of injuries sustained in the accident. For statistical purposes, IMO and INIPAT classify a fatal injury as an injury which results in death within thirty days of the accident. The heading "Others" in the table refers to persons outside the aircraft who were injured in the accident. When the accident involves a collision between two ships/boats, a separate table should be used for each aircraft.

C. Also, the nationalities of the passengers and the crew should be listed by stating the number of fatalities and serious injuries for each nationality.

#### **8.3.2.5 Damage to Ship/Boat**

This section should contain a brief statement of the damage sustained by the ship/boat in the accident (destroyed, substantially damaged, slightly damaged, or no damage). A detailed description of damage to relevant ship components and systems is to be included in the Wreckage and Impact information below.

#### **8.3.2.6 Other Damage**

Make a brief statement of damage sustained by objects other than the ship/boat, such as buildings, vehicles, navigation facilities, port structures and installations, and any significant damage to the environment.

#### **8.3.2.7 Personnel Information**

A. A. Provide a brief description of the qualifications, experience, and history of each voyage crew member, including age, gender, type and validity of licenses and qualifications; sailing experience (total miles), types of vessels operated and miles on each type; sailing hours in the last 24 hours, 7 days, and 90 days before the accident; results of recent training and mandatory and periodic checks; experience on the route and port involved in the accident; relevant information on service time and rest periods in the 48 hours prior to the accident; significant medical history and medical checks. Additionally, indicate the position held by each crew member and identify who was in command of the vessel. Use subheadings, as appropriate, to organize the information in this section.

B. When relevant to the accident, give a brief statement of:

- 1) the duties and responsibilities of the cabin crew, as well as their qualifications, experience, and training. For example, these details would be relevant if the accident involved an evacuation of the vessel.
- 2) the validity of licenses and ratings, the qualifications and experience of marine traffic services personnel, including age, gender, position manned, total experience (in years), and details of experience specific to the position manned. Details of training and pertinent checks should be included, as well as duty times and rest periods in the 48 hours prior to the occurrence.





- 3) maintenance personnel and other personnel involved to include qualifications, experience, time on duty, shift work rosters, workload and the time of the day.

#### 8.3.2.8 Ship/Boat Information

- A. When relevant to the accident, provide a brief statement regarding the seaworthiness and maintenance of the vessel, including the following information:
  - 1) **General information:** vessel manufacturer and model, serial number and year of manufacture; nationality and registration marks, validity of the Registration Certificate; name of the owner and the shipowner/operator; and validity of the Certificate of Seaworthiness;
  - 2) **Vessel/Ship History:** total hours of navigation since manufacture, since overhaul, and since the last periodic inspection. Include relevant information on maintenance records and documentation, compliance (or non-compliance) with seaworthiness directives, manufacturer's service bulletins, and the vessel/ship's modification status;
  - 3) **Engines and propellers:** manufacturer and model, position on the vessel and serial number; engine overhaul period in case of engine failure; total hours, hours since overhaul and hours since last inspection, for each engine. If relevant, provide the same information for the propellers;
  - 4) **Fuel:** Type of fuel used and type of fuel authorized. Also, state the amount of fuel on board and how it was determined, its specific gravity and its distribution in the fuel tanks;
  - 5) **Accessories:** In respect of any component which failed, give details of the manufacturer, type, model, part and serial number, certificated time and cycle limits, and operating time since manufacture and since overhaul;
  - 6) **Defects:** List any technical defects in the aircraft, engine, or accessories that were discovered during the investigation or recorded in the appropriate logbook and that have not been corrected. Indicate whether the defects were recurring and whether the sea voyage was permitted under the vessel/ship's technical requirements.
  - 7) **Vessel cargo:** the maximum certified tonnage for the safe operation of the vessel must be indicated at the beginning, during the sea voyage, including at the time of the incident. In addition, indicate the certified limits for the vessel's center of gravity and the position of the center of gravity at the beginning and during the voyage, including at the time of the incident. Include a description of the shipowner/operator's cargo control system, cargo distribution and safety, and how the vessel's tonnage and center of gravity details were established.
- B. Describe any ship/boat part or system which had a bearing on the accident. Similarly, describe operational procedures, performance limitations and other ship related circumstances which played a role in the accident. The objective is to enable the reader to fully understand how the accident happened.
- C. Collision warning systems: the availability, operability and use of maritime anti-collision equipment should be indicated. The relevant systems should be discussed in detail for near collisions, collisions during sea voyages, approach and docking accidents.





### **8.3.2.9 Meteorological Information**

- A. Provide a brief statement on the relevant meteorological conditions, including the forecast and actual weather, together with an appreciation of the weather in retrospect. When relevant to the occurrence, the following information should be included:
- 1) Describe when, where, and how the crew obtained the data on weather conditions;;
  - 2) Weather forecast: Route and port forecasts available to the seafarer crew and details of any weather briefing obtained by the crew prior to departure or received en route;
  - 3) Real-time information on the route of the trip, including weather observations, SIGMETs, crew reports, and witness accounts;
  - 4) Actual weather on the route of the trip, including weather observations, SIGMETs, crew reports and witness accounts;
  - 5) A general view of the weather situation (synoptic weather);
  - 6) Weather radar recordings, satellite photos, low-level wind shear alert system (LLWSAS) data, and other recorded meteorological information; and
  - 7) Natural light conditions at the time of the accident, such as day (sunlight or overcast), twilight (dawn or dusk; when relevant, the time of sunrise or sunset at the applicable altitude should be included), night (dark or moonlight) and when relevant, the position of the sun in relation to the direction of the sea voyage should be included.
- B. The amount of meteorological information to be included in this section depends on the significance of the meteorological factors in the occurrence. A detailed description of the forecast and weather observations is appropriate for a weather-related occurrence whereas a brief summary of the weather is appropriate when the weather was not a factor.

### **8.3.2.10 Aids to Navigation**

- A. Include any relevant information regarding maritime navigation and docking aids, such as global navigation satellite system (GNSS), non-directional radio beacon (NDB), very high frequency omnidirectional radio range (VOR), distance measuring equipment (DME), and visual aids on water and land, as well as their serviceability at the time of the accident.
- B. When relevant, include pertinent information about equipment on board the vessel, such as the autopilot, voyage management system (FMS), global positioning system (GPS), and inertial navigation system (INS), including their operability. Relevant maps, charts, approach signs, and radar records should also be discussed and included in the report, or attached to it.

### **8.3.2.11 Communications**

Describe the communication facilities available to the seafarer crew and their effectiveness. Describe the communications with the marine traffic services and other communications relevant to the trip, including reference to communication logs and transcripts of recordings. When essential to the analysis and understanding of the occurrence, pertinent extracts from the transcripts of marine traffic services communications recordings should be included in this section or attached to the report.

### **8.3.2.12 Port Information**

- A. When the occurrence took place during departure or moor, include information concerning the port and its facilities. This section should be divided into departure port information and destination port information, if both ports were pertinent to the occurrence.
- B. When relevant, include the following information—



- 1) Port name, location indicator, reference point (latitude/longitude) and elevation;
  - 2) Identification, markings, tidal length and slope, length of safety areas at arrival and departure points in the port and obstructions;
  - 3) Conditions of the berthing area, such as water conditions, debris deposits, presence of mud, snow, ice, coefficient, etc.;
  - 4) Lighting, such as port lighting, handling area, berthing area and waiting bay lighting, visual aids – such as the Visual Approach Slope Indicator System (VASIS);
  - 5) Inspection programs for berthing areas in the port and inspections carried out;
  - 6) Marine and aerial wildlife risk mitigation programs.
- C. If the vessel was departing from or arriving in an area other than a port, relevant information about the departure or docking area must be provided.

### **8.3.2.13 Voyage Data Recorders**

- A. Fornecer os dados para cada gravador de dados de vigem, tais como: fabricante, modelo e número de parâmetros registados, meio de gravação e duração da gravação. Os gravadores devem incluir gravadores dos parâmetros de viagem, gravadores de voz da cabina, gravadores de vídeo, cartão de memória não volátil em sistemas de embarcações, e outros gravadores a bordo ou em terra.
- B. Describe the condition of the recorder on recovery, in particular their exposure to fire and impact forces. If the voyage recorder(s) could not be recovered, the reasons should be explained. If data was not recorded or could not be extracted, describe the reasons for the malfunction or loss of data. Include techniques used to extract data and any problems encountered. If the recorders operated properly, a short statement to this effect should be made and the pertinent data presented.
- C. In this section, provide information recorded by the voyage recorders. Because of the length of a voyage data recording read-out report, include here or in an appendix to the Final Report only those parts of the readout reports which are pertinent to the analysis and findings.
- D. Transcripts from the cabin voice recordings should be included in the Final Report or its appendices only when essential to the analysis and understanding of the occurrence. Parts of the recordings not essential to the analysis shall not be disclosed. Chapter 6 of this manual contains provisions pertinent to transcribed voice recordings and should be taken into account when it is considered necessary to include such transcripts in the Final Report or its appendices.
- E. If the ship/boat was not required to be equipped with voyage recorders, a statement along the following lines may be used: "The ship/boat was not equipped with a voyage data recorder or a cabin voice recorder. Neither recorder was required by the Angola Marine Safety Regulations."

### **8.3.2.14 Wreckage and Impact Information**

- A. Provide a general description of the site of the accident and the distribution pattern of the wreckage, including the final portion of the trip/voyage path, the impact path, the impact sequence and the location of impact impressions on the water/ground, trees, buildings and other objects. The impact heading, ship/boat attitude (pitch, roll and yaw) and ship/bot configuration at impact should be given. When relevant, the water/terrain surrounding the site of the accident should be described. Relevant wreckage distribution diagrams, charts and photographs should be included in this section or appended to the report. The location and the state of the major parts of the wreckage should be presented. In case of a break up during the trip of the ship/boat, a detailed description of the wreckage distribution should be provided.



- B. In major accident investigations, it might be necessary to present the examination of the wreckage and the technical investigations under appropriate sub-headings in this section, such as structures, power plants, instruments, ship/boat controls and systems. The descriptions under each sub-heading should embrace the significant facts determined by the group which was responsible for the detailed investigation. Under appropriate sub-headings also include the relevant results of special technical investigations, examinations and laboratory tests, and the significance of the results obtained (see also Tests and Research below). When relevant, the technical laboratory and test reports should be appended to the Final Report.
- C. It is important to include all pertinent material failures and component malfunctions, and to indicate whether they occurred prior to or at impact. It is essential that failed or malfunctioning components which are deemed to be significant to the accident be described. A detailed description of all wreckage components is not necessary; describe only components considered to be relevant or which required examination and analysis. The inclusion of drawings of components and photographs of specific failures will enhance the Final Report. Such drawings and photographs could be presented together with the appropriate text or as an appendix.

#### **8.3.2.15 Medical and Pathological Information**

- A. Describe the results of the medical and pathological investigations of the voyage crew. Medical information related to the voyage crew's maritime identity cards should be included in the Personal Information required above. When relevant to the accident, the medical investigation may also concern cabin crew members, passengers, and ground personnel.
- B. The results of the pathological and toxicological examinations concerning injuries, detection of disease and factors which impaired human performance, such as carbon monoxide, oxygen deficiency, alcohol and other drugs, should be stated. If alcohol and drugs are detected, their effects on human performance as determined by medical experts should be presented in this section.
- C. Describe the pathological evidence of significance to the survival investigation such as the relationship of injuries and pathological evidence to the deceleration forces, ship/boat attitude at impact, seat design and attachments, seat belts (see also Survival aspects below), break-up of the ship/boat structure, smoke inhalation, decompression and any evidence of preparation for an emergency situation, such as forced landing, ditching and unlawful interference.
- D. Given the provisions in Chapter 6 of this manual with regard to medical and private records, particular care should be taken that such information is disclosed in the Final Report only when pertinent to the analysis and conclusions of the accident.
- E. If medical examinations indicate that the flight crew members' performance was not impaired, a phrase such as the following may be used: "There was no evidence that physiological factors or incapacitation affected the flight crew members' performance."

#### **8.3.2.16 Fire**

- A. If a fire or an explosion occurred, give a brief description of whether the fire started during the trip or after accident impact. If there was no fire, a sentence along the following lines may be used: "There was no evidence of fire during the trip or after the impact." For fires during the trip, describe the effectiveness of the ship/boat fire warning systems and the ship/boat fire extinguishing systems. The determination of the origin of a fire, source of ignition, fuel source, duration, severity and effects on the ship/boat structure and the occupants usually requires an analysis of the facts and indications, and should therefore be dealt with in the analysis part of the Final Report. This section should describe the factual information which was established in the investigation related to the fire and which should then be discussed and analyzed in the analysis part.
- B. For fires on the water/ground, describe the propagation and the extent of the fire damage. The response time of the rescue fire service, access to the accident site by the rescue fire service





vehicles, the type of fire fighting equipment used, the type of extinguishing agent and the amount that was used and its effectiveness should also be described.

- C. The effect of the fire on the evacuation and survivability of the occupants should be described in Survival Aspects below.

#### **8.3.2.17 Survival Aspects**

- A. Give a brief description of the search and rescue activities. When applicable, include information regarding the serviceability and effectiveness of the emergency locator transmitters.
- B. The location of crew members and passengers in relation to injuries sustained should be stated. The failure of structures, such as seats, seat belts and overhead bins should be described. Also, the use and effectiveness of safety equipment should be reported. Aspects pertinent to the crashworthiness of the ship/boat should be addressed, as well as occupant survivability in relation to impact forces and fire.
- C. If an evacuation was conducted, a description of the following information is usually included—
  - 1) first notification of an accident to the emergency services and the response time;
  - 2) emergency lighting in the ship/boat (installation, activation, functioning and failures);
  - 3) communications;
  - 4) passenger behavior and carry-on baggage;
  - 5) emergency exits (types of exits and their use);
  - 6) evacuation slides (types of slides, activation and their use);
  - 7) injuries sustained in the evacuation; and
  - 8) post-evacuation events.

#### **8.3.2.18 Tests and Research**

- A. Describe the results of any tests and research undertaken in connection with the investigation. Marine tests, simulator tests and computer modeling of ship/boat performance are examples of the type of information that should be included in this section. Relevant details of research that is used to support the analysis should also be included.
- B. The results of examinations of ship/boat and engine parts may alternatively be included in item: WRECKAGE AND IMPACT INFORMATION or include it in the attachment to the Final Report.

#### **8.3.2.19 Organizational and Management Information**

- A. When relevant to the accident, provide pertinent information on any organization and its management whose activities may have directly or indirectly influenced the operation of the ship/boat. The organizations to be addressed in this section could include—
  - 1) Owners/Operators;
  - 2) maintenance organizations;
  - 3) marine traffic services;
  - 4) port administration;
  - 5) meteorological services;
  - 6) ship/boat manufacturer;
  - 7) certification and licensing authority; and
  - 8) regulatory authority.



- B. When deficiencies in the organizational structure and functions had a bearing on the accident, the information could include, but need not be limited to, the following factors:
  - 1) safety culture;
  - 2) resources and financial viability;
  - 3) management policies and practices;
  - 4) internal and external communications; and
  - 5) certification, safety oversight and regulatory framework.
- C. When relevant, provide pertinent information concerning the operator, such as type and date of issuance of the marine operator certificate, types of operations authorized, types and number of ship/boat authorized for use, and authorized areas of operation and routes. Also, include information concerning any deficiencies found in the operator's company operations manual and other operator documentation, when the deficiencies had a bearing on the accident.

#### **8.3.2.20 Additional Information**

Provide relevant information and facts, not already included in previous sections above that are essential to the development of the analysis and conclusions parts of the Final Report.

#### **8.3.2.21 Useful or Effective Investigation Techniques**

When useful or effective investigation techniques have been used during the investigation, briefly describe the main features of these techniques and their pertinence to future investigations. However, the data and the results obtained as they relate to the accident should be included under the appropriate sections above. The full report on the use of these techniques may be included as an appendix to the Final Report.

### **8.3.3 ANALYSIS**

- A. In the analysis part of the Final Report, the significance of the relevant facts and circumstances which were presented in the factual information part should be discussed and analyzed in order to determine which events contributed to the accident. It may be necessary to repeat the description of some of the evidence already presented in the factual information part, however, the analysis should not be a restatement of the facts. Also, no new facts should be introduced in the analysis part. The purpose of the analysis is to provide a logical link between the factual information and the conclusions that provide the answer to why the accident occurred.
- B. The analysis part should contain an evaluation of the evidence presented in the factual information part and should discuss the circumstances and events that existed or may have existed. The reasoning must be logical and may lead to the formulation of hypotheses which are then discussed and tested against the evidence. Any hypothesis which is not supported by the evidence should be eliminated; it is then important to clearly state the reasons why a particular hypothesis was rejected. When a hypothesis is not based on fact but is an expression of opinion, this should be clearly indicated. The justification for sustaining the validity of a hypothesis should also be stated and reference should be made to the supporting evidence. Contradictory evidence must be dealt with openly and effectively. Cause-related conditions and events should be identified and discussed. The discussion in the analysis should support the findings and the immediate and systemic causes of the accident.
- C. Also, discuss and analyze any issue that came to light during the investigation which was identified as a safety deficiency, although such an issue may not have contributed to the accident.
- D. Because the Final Report is often drafted as the investigation progresses and several investigators (all the groups in a major investigation) will contribute to the analysis part of the report, the development of an outline and sub-headings for the analysis part will ensure that the





investigators know their drafting assignments. Such an outline will also indicate to the investigators how the subheadings will come together in forming the analysis part of the Final Report.

#### **8.3.4 Conclusions**

This part should list the findings and the causes established in the investigation. The conclusions are drawn from the analysis. However, it is essential to maintain the same degree of certainty in a conclusion as was established in the analysis. For example, if the discussion in the analysis indicates that an event or circumstance was likely, then the finding should contain the same qualifier, i.e. likely.

##### **8.3.4.1 Findings**

- A. The findings are statements of all significant conditions, events or circumstances in the accident sequence. The findings are significant steps in the accident sequence, but they are not always causal or indicate deficiencies. Some findings point out the conditions that pre-existed the accident sequence, but they are usually essential to the understanding of the occurrence. The findings should be listed in a logical sequence, usually in a chronological order.
- B. All findings must be supported by and directly related to the factual information and the analysis. No new factual information should be introduced in the findings.
- C. It is customary to report on certain conditions in every investigation, such as the validity of licenses, the training and experience of the seafarer crew members, the airworthiness and maintenance of the ship/boat, the loading of the ship/boat, and whether there was a pre-impact failure. The following findings are typical of what is usually included:
  - 1) The seafarer crew members were licensed and qualified for the trip/voyage in accordance with existing regulations;
  - 2) The maintenance records indicated that the ship/boat was equipped and maintained in accordance with existing regulations and approved procedures;
  - 3) The mass and centre of gravity of the ship/boat were within the prescribed limits; and
  - 4) There was no evidence of airframe failure or system malfunction prior to the accident.
- D. Significant events and facts that were investigated in detail but eliminated in the analysis should also be mentioned in the conclusions. For example, conclusions such as "travel crew fatigue was not a factor in the accident" and "there was no failure of the elevator control system" should be considered when a comprehensive investigation has been made into these aspects. Areas of ambiguity should be identified and stated, for example, "the investigation was unable to establish whether the master/master or the chief mate/bosun was the crewman at the controls of the vessel at the time of the accident."
- E. The causes of the accident may be presented separately from the findings under their own heading. Alternatively, in the list of findings, those which were causes of the accident may be annotated as being a "causal factor" or a "contributory factor".

##### **8.3.4.2 Causes**

- A. Causes are those events which alone, or in combination with others, resulted in injuries or damage. A cause is an act, omission, condition or circumstance which if eliminated or avoided would have prevented the occurrence or would have mitigated the resulting injuries or damage.
- B. The determination of causes should be based on a thorough, impartial and objective analysis of all the available evidence. Any condition, act or circumstance that was a causal factor in the accident should be clearly identified. Seen together, the causes should present a picture of all the reasons why the accident occurred. The list of causes should include both the immediate causes and the deeper or systemic causes. No new information should be introduced in the



causes. The causes should be presented in a logical order, usually chronological order, bearing in mind that it is essential that all the causes be presented. The causes should be formulated with preventive action in mind and linked to appropriate safety recommendations.

- C. The causes of the accident may be presented sequentially as they occurred without attempting to prioritize the causes. Alternatively, the causes may be prioritized by using terms such as primary causes and contributing causes.
- D. When certain of a cause, a definite statement should be used; if reasonably sure of a cause, a qualifying word such as "probable" or "likely" should be used. The causes statement is usually a reiteration of statements made at or near the end of the analysis and in the findings. For example, if the analysis and the findings state that a cause- related event or circumstance was "probable", then the causes statement should contain the same qualifier, i.e. probable.
- E. When there is insufficient evidence to establish why an accident occurred, there should be no hesitation in stating that the causes remain undetermined. In many instances, the most likely scenario could be stated provided that a qualifier, such as "likely" or "probable" is included. However, a list of possible causes should not be given.
- F. The causes should be formulated in a way which, as much as practicable, minimizes the implication of blame or liability. Nevertheless, the accident investigation authority should not refrain from reporting a cause merely because blame or liability might be inferred from the statement of that cause.

### **8.3.5 SAFETY RECOMMENDATIONS**

- A. The sole objective of the investigation of an accident is the prevention of accidents and incidents. Therefore, the determination of appropriate safety recommendations is of utmost importance. The safety recommendations are actions which should prevent other accidents from similar causes or reduce the consequences of such accidents. In order to ensure that appropriate action is taken, each safety recommendation will include a specific addressee. This is usually the appropriate authority of the State which has responsibility for the matters with which the safety recommendation is concerned.
- B. At any stage in its conduct of an accident investigation, INIPAT will recommend to the appropriate authorities, including those in other States, any preventive action that is considered necessary to be taken promptly to enhance aviation safety. The interim safety recommendations made during the investigation may be presented in the safety recommendations part of the Final Report. Also, the preventive actions taken in response to the interim recommendations should be presented, as well as any other preventive actions taken by the appropriate authorities and the industry, such as changed operating procedures by the ship/boat operator and the issuance of service bulletins by the manufacturer. Publishing the preventive actions taken in the Final Report has significant accident prevention value for those involved in similar operations.
- C. A safety recommendation should describe the safety problem and provide justification for safety actions. Attention should be focused on the problem rather than the suggested solution. Consideration should be given to whether a safety recommendation should prescribe a specific solution to a problem or whether the recommendation should be flexible enough to allow the addressee latitude in determining how the objective of the recommendation can be achieved. A safety recommendation should identify what actions to take, but leave scope for the authorities responsible for the matters in question to determine how to accomplish the objective of the recommendation. This is particularly important if all the salient facts are not available and

A list of addresses of ship/boat accident and incident investigation authorities can be found in the CITSO n.º 1 of INIPAT. This list may also be accessed on-line at the web-site of the OMI at: <https://www.imo.org>



additional examination, research and testing appears necessary. In addition, the accident investigation authority may lack the detailed information and experience required to evaluate the financial, operational and policy impacts on the addressee of specific and detailed recommendations.

- D. During marine accident investigations, safety issues are often identified which did not contribute to the accident but which, nevertheless, are safety deficiencies. These safety deficiencies should also be addressed in the Final Report.
- E. In summary, the safety recommendations should include a convincing presentation of the safety problem with the attendant safety risks deriving from it, as well as a recommended course of action for the responsible authority to take in order to eliminate the unsafe condition. The safety recommendations should identify what action is required, but should leave considerable scope for the implementing authority to determine how the problem will be resolved.

### **8.3.6 APPENDICES**

The appendices should include, as appropriate, any pertinent information considered necessary to understand the report, such as a glossary, supporting technical reports, accident site diagrams, photographs and flight recorder data. Graphics and diagrams should have a professional appearance and should show only the information required for understanding the report. The appendices should be numbered and listed in the table of contents. The following is a list of appendices that should be considered for inclusion in a Final Report:

- 1) communications transcripts;
- 2) voyage data recorder readouts;
- 3) voyage/trip plan and loadsheet;
- 4) technical investigation reports;
- 5) pertinent pages from manuals and handbooks;
- 6) pertinent maintenance records;
- 7) maps and diagrams; and
- 8) photographs.

### **8.3.7 COORDINATION WITH OTHER STATES**

- A. The INIPAT, acting on behalf of Angola that conducted the investigation, will send a copy of the draft Final Report with the intended safety recommendations included in to the State that instituted the investigation (if not instituted by Angola) and to all States that participated in the investigation, inviting their significant and substantiated comments on the report.
- B. The IIPAT will also send copies of the draft Final Report to the operator and the organizations responsible for type design and final assembly of the ship/boat, through the State of the Operator, the State of Design and the State of Manufacture, respectively, in order to enable the operator and such organizations to submit comments on the draft Final Report.
- C. When sending the draft Final Report to recipient States, the INIPAT should consider using the most appropriate means available, such as facsimile, e-mail, courier service or express mail. When the draft Final Report is sent by e-mail, secure protection should be used when available.
- D. If the INIPAT receives comments within 60 days of the date of the transmittal letter, he shall either amend the draft Final Report to include the substance of the comments received or, if desired by the State that provided the comments, append the comments to the Final Report.





Usually, comments to be appended to the Final Report are restricted to non-editorial specific technical aspects of the Final Report upon which no agreement could be reached.

- E. When the INIPAT is in receipt of a draft Final Report prepared by another States, the INIPAT shall not circulate, release or give access to such a draft report or any part thereof, any group reports or any other investigation documentation obtained during an investigation of an accident, without the express consent of the State which conducted the investigation, unless such reports or documents have already been published or released by that latter State.

It is important to respect the confidentiality rights of other States when reviewing draft Final Reports prepared by their investigation authorities.

## **8.4 RELEASE OF THE FINAL REPORT**

- A. If the INIPAT receives no comments within 60 days, it shall issue the Final Report, unless an extension of that period has been agreed to by the States concerned. The INIPAT will release the Final Report in the shortest possible time and, if possible, within 12 months of the date of the occurrence. If the report cannot be released within 12 months, the INIPAT will release an interim report or use some other means detailing the progress of the investigation and any safety issues identified.
- B. In addition to the release and distribution of the Final Report within Angola, the INIPAT will send the Final Report with a minimum of delay to—
- 1) the State which instituted the investigation;
  - 2) the Flag State;
  - 3) the State of the Operator;
  - 4) the State of Design and the State of Manufacture;
  - 5) any State having suffered fatalities or serious injuries to its citizens;
  - 6) any State which provided relevant information, significant facilities or experts, and
  - 7) the International Maritime Organization (OMI) when the accident or incident involved a ship/vessel of a maximum gross tonnage of over 500 tons, prepared, when possible, in one of the working languages of OMI

The address to which a copy of the Final Report will be sent to IMO is as follows:  
International Maritime Organization  
Attention:  
4 Albert Embankment, London, SE1 7SR, United Kingdom (UK)  
For transmission by e-mail: [info@imo.org](mailto:info@imo.org)

- C. Marine accident prevention is dependent, in part, on information made available from accident investigations. The causes of accidents, especially those in which large ship are involved, are of interest to all States and in particular to those States operating similar ship types. Therefore, prompt dissemination to all States of the findings of ship/boat accident investigations can be a major contribution to aviation safety. To facilitate the exchange of accident information, the INIPAT, on behalf of Angola, will disseminate their Final Reports to other States as expeditiously as possible. In a like manner, the INIPAT will also exchange information concerning any interim safety recommendations made before the completion of the Final Report.

*End of Chapter*



## APPENDIX 8-A

### Group Chairman's Factual Report Outline

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Instituto Nacional de Investigação e Prevenção de Acidentes de Transportes (INIPAT)  
Accident Prevention and Investigation Managers, Luanda, Angola

[Date]

[Name of group] GROUP CHAIRMAN'S FACTUAL REPORT

A. ACCIDENT

Operator:  
Location:  
Date:  
Time:  
Ship/boat:

B. [Name of group] GROUP

Chairman: [name]  
Member: [name, organization, city, state]  
Member: [name, organization, city, state]

C. SUMMARY

[This section shall contain a short summary of the accident, as provided by the IIC]

D. DETAILS OF THE INVESTIGATION

A summary of the specific group's activities as they relate to the investigation, including factual documentation from the on-scene phase of investigation, as well as any follow-up efforts, testing, etc. Observe the following points:

- 1) Prepare text in past tense to indicate the facts as they were at the time of the event.
- 2) Do not include personal information such as social security numbers, addresses or phone numbers as factual reports will eventually be available to the public.
- 3) Do not include any analytical information.
- 4) If new information was learned after the factual report was approved, prepare an "Addendum." To correct mistakes, prepare an "Errata."

E. DETAILS OF THE INVESTIGATION

Include factual documentation from on-scene phase of investigation, as well as any follow-up efforts, testing, etc.

[name, title, and signature of group chairman]

*End of Appendix 8-A*





## APPENDIX 8-B

### Group Chairman's Analysis Report Outline

Instituto Nacional de Investigação e Prevenção de Acidentes de Transportes (INIPAT)  
Accident Prevention and Investigation Managers, Luanda, Angola

[Date]

[Name of group] GROUP CHAIRMAN'S ANALYSIS REPORT

A. ACCIDENT

Operator:  
Location:  
Date:  
Time:  
Ship/boat:

B. DETAILS OF THE ANALYSIS

[Provide complete opinion as to what each fact means and what bearing and weight such fact or evidence has to the occurrence. Only analyze information that was documented in the factual report, i.e. do not introduce new information]

C. FINDINGS

- 1) [State the principal findings briefly and concisely]
- 2)
- 3)

D. PROBABLE CAUSE(S)

[Provide complete opinion on the relevancy of the findings to a probable cause of the accident or as contributing factors in the accident]

E. RECOMMENDATIONS

[Provide any proposed recommendations addressing safety deficiencies discovered during the group's investigation. Supporting data for the recommendation should be included in both the factual and analysis reports]

[name, title, and signature of group chairman]

*End of Appendix 8-B*



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## **APPENDIX 8-C**

### **Glossary of Abbreviations for Accident Reports**

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This appendix presents a selection of acronyms and abbreviations that are likely to be encountered when writing the Final Report of an accident. Knowledge of these terms will facilitate the identification and formulation of the technical aspects that were present in the accident.

- 1) AC - Alternating current; or Advisory circular
- 2) SCARS - Ship communications addressing and reporting system
- 3) ACAS - Airborne collision avoidance system
- 4) MACC - Maritime Area Control Center
- 5) SD - Seaworthiness Directive
- 6) ADF - Automatic direction-finder
- 7) ADI - Attitude direction indicator
- 8) MDIZ - Marine defense identification zone
- 9) ADS - Automatic dependent surveillance
- 10) ATCS - Automatic Trip control system
- 11) PNIS - Port Navigation information service
- 12) AFTN - Aeronautical fixed telecommunication network
- 13) AGL - Above ground level
- 14) MAIA - Marine Accident Investigation Authority
- 15) MIC - Maritime information circular
- 16) MIP - Maritime Information Publication
- 16) MAREP - Marine report
- 17) AMSL - Above mean sea level
- 18) MNO – Marine navigation order
- 19) MOC - Marine Operator Certificate
- 20) SOM - Ship Operating Manual
- 21) DCS – Dockage control service
- 22) DCO – Dockage control
- 23) APU - Auxiliary power-unit



- 24) MRTCC – Marine route traffic control center
- 25) MSI – Marine speed indicator
- 26) PSR Port surveillance radar
- 27) MTC – Marine traffic control
- 28) MTCC – Marine traffic control center
- 29) MTFM - Marine traffic flow management
- 30) ATIS - Automatic terminal information service
- 31) SL - Seafarer License
- 32) MTS Maine traffic services
- 33) AVASIS Abbreviated visual approach slope indicator system
- 34) C° - Degrees Celsius (Centigrade)
- 35) CMDC - Central marine data computer
- 36) CAM - Cabin area microphone
- 37) CAS - Calibrated airspeed
- 38) CAT - Clear air turbulence; or Category
- 39) CAVOK - Visibility, cloud and present weather better than prescribed values and conditions  
(cloud and visibility OK)
- 41) CG - Center-of-gravity
- 42) cm - Centimeter(s)
- 43) C S - Certificate of seaworthiness
- 44) CRM - Crew resource management
- 45) CRT - Cathode-ray tube
- 46) CTA - Control area
- 47) CVR - Cabin voice recorder
- 48) DD - Decision distance
- 49) DL - Decision level
- 50) DC - Direct current
- 51) DVDR - Digital voyage data recorder
- 52) PD – Point of decision
- 53) PA – Port of arriving



- 54) DME - Distance measuring equipment
- 55) E - East;
- 56) EL - Eastern longitude
- 57) ES - Equivalent speed
- 58) ECSM - Electronic centralized ship monitor
- 59) EICAS - Engine indication and crew alerting system
- 60) EFIS - Electronic navigation instrument system
- 61) EGPWS - Enhanced ground proximity warning system
- 62) EGT - Exhaust gas temperature
- 63) ELT - Emergency locator transmitter
- 64) EMI - Electromagnetic interference
- 65) EPR - Engine pressure ratio
- 66) ETA - Estimated time of arrival; or Estimating arrival
- 67) ETD - Estimated time of departure; or Estimating departure
- 68) FMR - Federal Marine Regulations
- 69) SCOM - Seafarer crew operating manual
- 70) VD - Voyage director
- 71) VDAU - Voyage data acquisition unit
- 72) VDM – Voyage deck management
- 73) VDR - Voyage data recorder
- 74) MIR – Marine information region
- 75) MIS - Marine information service
- 76) VMC - Voyage management computer
- 77) VMS – Voyage management system
- 78) FOD Foreign object damage
- 79) MSS – Marine service station
- 80) ft - Foot/feet
- 81) NM/min - Nautical miles per minute



- 82) g - Normal acceleration
- 83) GNSS - Global navigation satellite system
- 84) GPS - Global positioning system
- 85) h - Hours
- 86) HF - High frequency (3,000 to 30,000 kHz)
- 87) Hg - Mercury
- 88) hPa - Hectopascal
- 89) HSI - Horizontal situation indicator
- 90) HUD - Head-up display
- 91) Hz - Hertz (cycle per second)
- 92) IS - Indicated speed
- 93) IMR - Instrument marine rules
- 94) IIC - Investigator-in-charge
- 95) IDS - Instrument Dockage system
- 96) IMC - Instrument meteorological conditions
- 97) INS - Inertial navigation system
- 98) IRS - Inertial reference system
- 99) ISA - International standard atmosphere
- 100) kg - Kilogram(s)
- 101) kHz - Kilohertz
- 102) km - Kilometer(s)
- 103) km/h - Kilometers per hour
- 104) kN - Kilonewton
- 105) kt - Knot(s)
- 106) L - Liter(s)
- 107) DDA - Dockage distance available
- 108) LED - Light emitting diode
- 109) LF - Low frequency (30 to 300 kHz)
- 110) LLWS Low-level wind shear
- 111) LORMN - Long range marine navigation system





- 112) m - Meter(s)
- 113) MEL - Minimum equipment list
- 114) MET - Meteorological;
- 115) MS - Meteorological services
- 116) MHz - Megahertz
- 117) min - Minute(s)
- 118) mm - Millemeter(s)
- 119) MMEL - Master minimum equipment list
- 120) MOC - Minimum obstacle clearance (required)
- 121) MOPS - Minimum operational performance standards
- 122) MSL - Mean sea level
- 123) mu - Coefficient of sliding friction
- 124) N -North; or Northern latitude; or Newton
- 125) N<sub>1</sub> - Engine fan speed (high pressure turbine speed)
- 126) N<sub>2</sub> - Engine compressor speed
- 127) NDB - Non-directional radio beacon
- 128) NDT - Non-destructive testing
- 129) NOTSM - Notice to seamen
- 130) NM - Nautical mile(s)
- 131) OAT - Outside air temperature
- 132) NM - Nautical mile(s)
- 133) OAT - Outside air temperature
- 134) OCL - Obstacle clearance limit
- 135) OCS - Obstacle clearance surface
- 136) OPS - Operations
- 137) PA - Public address system
- 138) PMNS - Procedures for Marine Navigation Services
- 139) PCU - Power control unit
- 140) SeafIC - Seafarer-in command



- 141) SREP - Seafarer report
- 142) P/N - Part number
- 143) QQA - Quality assurance
- 144) QAR - Quick access recorder
- 145) RA - Resolution advisory
- 146) RCC - Rescue coordination center
- 147) RF - Radio frequency
- 148) RFFS - Rescue and fire fighting service
- 149) RMI - Radiomagnetic indicator
- 150) ANAV - Area of navigation
- 151) RPM - Rotation per minute
- 152) RTF – Radiotelephony
- 153) s - Second(s)
- 154) S - South; or Southern latitude
- 155) SAR - Search and rescue
- 156) SAS - Stability augmentation system
- 157) SB - Service bulletin
- 158) SCAS - Stability and control augmentation system
- 159) SDR - Service difficulty report
- 160) SEM - Scanning electron microscope
- 161) SI - International system of units
- 162) SID - Standard instrument departure
- 163) SIGMET - Significant meteorological information (information concerning specified en-route weather phenomena which may affect the safety of ship/boat operations)
- 164) SMC - Surface movement control
- 165) SMR - Surface movement radar
- 166) S/N - Serial number
- 167) MPECI - Marine selected special weather report
- 168) SRA - Surveillance radar approach
- 169) SSR - Secondary surveillance radar
- 170) STAR - Standard instrument arrival
- 171) SVR - Slant visual range
- 172) t - Ton
- 173) TPF - Terminal Port forecast
- 174) TAR - Terminal area surveillance radar



- 175) TS - True speed
- 176) TAWS - Terrain awareness and warning system
- 177) TCAS - Traffic alert and collision avoidance system
- 178) DDP - Departure decision point
- 179) TMA - Terminal control area
- 180) TRCON - Terminal radar control
- 181) PTWR – Port control tower
- 182) PCS - Port control service
- 183) UAC - Upper area control center
- 184) UHF - Ultra-high frequency (300 to 3,000 MHz)
- 185) ULB - Underwater locator beacon
- 186) UTC - Coordinated Universal Time
- 187) VMR - Visual Marine rules
- 188) VHF - Very high frequency (30 to 300 MHz)
- 189) VMC - Visual meteorological conditions
- 190) VOR - VHF omnidirectional radio range
- 191) V - SPEEDS—
  - (a)  $V_1$  - Decision speed
  - (b)  $V_2$  - Departure safety speed
  - (c)  $V_{MCA}$  - Minimum control speed in the water
  - (d)  $V_{MCL}$  - Minimum control speed during dockage with all engines operating
  - (e)  $V_{MO}/M_{MO}$  - Maximum permissible operating speed
  - (f)  $V_{NE}$  - Never exceed speed
  - (g)  $V_R$  - Rotation speed
  - (h)  $V_{REFA}$  - Reference arrival speed, all engines operating
  - (i)  $V_S$  - Minimum calibrated speed during the voyage
- 192) W – West
- 193) WL - Western longitude

*End of Appendix 8-C*



## APPENDIX 8-D

### Accident-Related Descriptive Technical Terms

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This appendix presents a selection of technical terms that are likely to be encountered when writing the Final Report of an accident. Knowledge of these terms will facilitate the identification and formulation of the technical aspects that were present in the accident.

- 1) **Arcing.** Visible effects (burn spots, fused metal) of an electrical discharge between two electrical connections. Also: flash over.
- 2) **Battered.** Damaged by repeated blows or impacts.
- 3) **Bent.** Deviated from original line or plane usually caused by lateral force. Also: creased, folded, kinked.
- 4) **Binding.** Restricting movement, such as tightened or sticking condition, may result from high or low temperature or a foreign object jammed in mechanism. Also: sticking, tight.
- 5) **Bowed.** Curved or gradually deviated from original line or plane often caused by lateral force or heat.
- 6) **Brinelling.** Circular surface indenting of bearing races, usually caused by repeated shock loading of the bearing. False brinelling is wear caused by bearing rollers sliding back and forth across a stationary race, while true brinelling is plastic displacement of material.
- 7) **Broken.** Separated by force into two or more pieces. Also: fractured.
- 8) **Bulged.** Swollen outward locally. Usually caused by excessive local heating or differential pressure. Also: ballooned, swelling.
- 9) **Burned.** Oxidized destructively. Usually caused by higher temperature than the parent material can withstand.
- 10) **Burrs.** A rough edge or a sharp projection on the edge or surface of the parent material.
- 11) **Carboned.** Covered by an accumulation of carbon deposits. Also: carbon-covered, carbon-tracked, and coked.
- 12) **Chaffed.** Worn by frictional damage. Usually caused by two parts rubbing together with limited motion.
- 13) **Checked.** Cracked on the surface. Usually caused by heat.
- 14) **Chipped.** Broken away at the edge, corner or surface of the parent material. Usually caused by heavy impact; not flaking.
- 15) **Collapsed.** Inwardly deformed original contour of a part. Usually due to high pressure differentials.
- 16) **Corroded.** Gradually destroyed by chemical action. Often evidenced by oxide build-up on the surface of the parent material. Also: rusted, oxidized.
- 17) **Crack.** Visible partial separation of material.
- 18) **Crossed.** Damaged parent material of parts due to improper assembly (as in the case of crossed threads) or parts rendered inoperative (as in the case of crossed wires).
- 19) **Curl.** A condition where the tip(s) of compressor or turbine blades have been curled over due to rubbing against engine casings.



- 20) **Dented.** Damage by impact of a foreign object resulting in a surface indentation with rounded bottom. Parent material is displaced, but seldom separated. Also: peened.
- 21) **Deposits.** A build-up of material on a part either from foreign material or from another part not in direct contact. Also: metalizing.
- 22) **Disintegrated.** Separated or decomposed into fragments. Excessive degree of fracturing (breaking) as with disintegrated bearings. Complete loss of original form. Also: shattered.
- 23) **Distortion.** Extensive deformation of the original contour of a part usually due to impact of a foreign object, structural stress, excessive localized heating or any combination of these. Also: buckled, depressed, twisted, warped.
- 24) **Eccentricity.** Part(s) wherein the intended common center is displaced. Also: non-concentric.
- 25) **Electrical circuits — grounded.** Circuits in which the current has a path to ground.
- 26) **Electrical circuits — open.** Incomplete electrical circuit due to separation at or between electrical connections.
- 27) **Electrical circuits — shorted.** Circuits in which the current has an undesired path between leads or circuits that are normally at different electrical potentials.
- 28) **Eroded.** Component from which material has been carried away by flow of fluids or gases; may be accelerated by heat or grit.
- 29) **Fatigue.** The progressive failure of a part under repeated loading.
- 30) **Flattened out.** Permanent loss of curvature beyond tolerance limits. Usually caused by compression.
- 31) **Frayed.** Worn into shreds by rubbing action. *Fretting.* Removal of material by rubbing.
- 32) **Fusing.** Joining together of two materials. Usually caused by heat, friction or electrical current flow.
- 33) **Galling.** Chafing or severe fretting caused by relative movement of two surfaces under high contact pressure.
- 34) **Glazing.** Undesirable development of a hard, glossy surface due to rubbing action, heat or varnish.
- 35) **Gouging.** Scooping out of material usually caused by a foreign object. Also: furrowed.
- 36) **Groove(s).** Smooth, rounded furrow or furrows of wear, usually wider than scoring, with rounded corners and a smooth groove bottom.
- 37) **Hot-spot.** Result of subjection to excessive temperature usually evidenced by change in color and appearance of part. Also: heat discolored, overheated.
- 38) **Melted.** Deformed from the original configuration due to heat, friction or pressure.
- 39) **Mis-match.** Improper association of two or more parts.
- 40) **Mis-positioned.** Improperly installed part which may damage the installed part or two associated parts. Also: mis-aligned, reversed.
- 41) **Nick.** A sharp surface indentation caused by impact of a foreign object. Parent material is displaced, seldom separated.
- 42) **Out-of-round.** Part with inconsistent diameter.





- 43) **Out-of-square.** Part with deformation of right angle relationship between part surfaces.
- 44) **Peeling.** A breaking away of surface finishes such as coatings and plating. Peeling would be flaking of large pieces. A blistered condition usually precedes or accompanies peeling. Also: blistered, flaked.
- 45) **Pick-up.** A transfer of metal from one surface to another. Usually the result of rubbing two surfaces together without sufficient lubrication.
- 46) **Pit.** A small irregular shaped cavity in the surface of the parent material usually caused by corrosion, chipping or electrical discharge.
- 47) **Plugged.** Totally or partially blocked pipe, hoses, tubing, channeling or internal passages. Also: clogged, obstructed, restricted.
- 48) **Porous.** State of material caused by internal voids. Usually applied to cast material or welds.
- 49) **Rolling-over.** Lipping or rounding of a metal edge. Also: lipped, turned.
- 50) **Rubbed.** Moved with pressure or friction against another part.
- 51) **Rupturing.** Excessive breaking apart of material usually caused by high stresses, differential pressure, locally applied force or any combination of these. Also: blown, burst, split.
- 52) **Score(s).** A deep scratch or scratches made by sharp edges of foreign matter.
- 53) **Scratches.** Light narrow, shallow mark or marks caused by movement of a sharp object or particle across a surface. Material is displaced, not removed.
- 54) **Seized.** Parts bound together. May be due to expansion or contraction due to high or low temperature, foreign object jammed in mechanism or lack of lubricant. Also: frozen, jammed, stuck.
- 55) **Sheared.** Body divided by cutting action. Also: cut
- 56) **Spatted.** Sharply roughened area characterized by progressive chipping-away of surface material. Not to be confused with flaking.
- 57) **Stretching.** Enlargement of a part. May result from exposure to operating conditions or excessive force. Also: growth.
- 58) **Stripping.** A condition usually associated with fastener threads or electrical insulation. Involves removal of material by force.
- 59) **Torn.** Separated by pulling apart.
- 60) **Worn.** Consumption of material of a part as a result of use.

*End of Appendix 8-D*



## APPENDIX 8-E

### Accident Report Human Factors Terms

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This appendix presents a selection of human factors terms that are likely to be encountered when writing the Final Report of an accident. Knowledge of these terms will facilitate the identification and formulation of the Human Factors aspects that were present in the accident.

- 1) **Acute fatigue.** The result of excessive physical and/or mental activity during a short period. A temporary condition that may be reversed by adequate rest.
- 2) **Channelized attention.** A mental state which exists when a person's full attention is focused on one stimulus to the exclusion of all others. This becomes a problem when the person fails to perform a task or process information of a higher priority and thus fails to notice or has no time to respond to cues requiring immediate attention.
- 3) **Chronic fatigue.** The result of long exposure to successive periods of acute fatigue, over many days or weeks, without adequate rest periods for recovery.
- 4) **Cockpit authority gradient.** The relative skills and experience in a particular environment that are factors in determining the extent of the pilot's authority.
- 5) **Cognitive saturation.** The information to be processed exceeds an individual's span of attention.
- 6) **Complacency.** A state of reduced conscious attention caused by a sense of security and self-confidence. Behavior characteristics of complacency include overconfidence and boredom, both of which can significantly degrade performance.
- 7) **Confirmation bias.** An expectation of an event may diminish an individual's ability to recognize evidence that events are not developing as anticipated.
- 8) **Distraction.** The interruption and redirection of attention by environmental cues or mental processes.
- 9) **Fascination.** An attention anomaly in which a person observes environmental cues, but fails to respond to them.
- 10) **Fatigue.** The progressive decrease in performance due to prolonged or extreme mental or physical activity, sleep deprivation, disrupted diurnal cycles, or life event stress.
- 11) **Habit pattern interference.** Behavior in which the subject reverts to previously learned response patterns which are inappropriate to the task at hand.
- 12) **Illusion.** An erroneous perception of reality due to limitations of sensory receptors and/or the manner in which the information is presented or interpreted.
- 13) **Inattention.** Inattention is usually due to a sense of security, self-confidence or perceived absence of threat. Boredom is a form of inattention due to an uninteresting and undemanding environment. Complacency is another form due to - an attitude of overconfidence, laxity or lack of motivation.
- 14) **Pressure.** A type of stress resulting from the demands of management, peers, self-induced goals, time, environmental factors or man-machine relationship.
- 15) **Situational awareness.** The ability to keep track of the prioritized significant events and conditions in the environment of the subject.
- 16) **Spatial disorientation.** Unrecognized, incorrect orientation in space.
- 17) **Stress.** Mental or physical demand requiring some action or adjustment.



- 18) **Vigilance.** Maintenance of the appropriate level of conscious attention for the assigned task. Lapses in attention may occur after a person has been at a monitoring task for a period of time.

*End of Appendix 8-E*



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## Chapter 9

### Safety Recommendations

- A. The purpose of this chapter is to provide the procedures that must be followed when the Accident Prevention and Investigation Managers (DPETI and DIAM), on behalf of the Angolan INIPAT, develops and makes safety recommendations addressed to the investigative authorities in other States and to IMO.
- B. This chapter also prescribes the procedures to be followed when the Angola INIPAT receives safety recommendations from investigative authorities in other States.

#### 9.1 POLICIES RE: SAFETY RECOMMENDATIONS

- A. Since the sole objective of investigations is prevention of recurrences, determination of safety recommendations and addressing them to the appropriate authority is of paramount importance.

Safety recommendations are critical to achieving the goal of preventing the recurrence of accidents and serious incidents.
- B. Such recommendations should describe the safety problem and provide justification for safety actions.
- C. Care should be taken to avoid prescribing specific solutions, deferring instead to the recipient authority to determine how the objective of the recommendation can best be achieved.
- D. In sum, a safety recommendation should identify possible actions to be taken, but leave scope for the responsible authority to identify the best remedy, particularly since the all of the salient facts may not be available to the investigating authority and further research and testing is needed.

An example, as applied in a recommendation addressed to IMO, is provided below in paragraph 9.4.

#### 9.2 INIPAT ISSUANCE OF SAFETY RECOMMENDATIONS

- A. At any stage of INIPAT's investigation of an accident or incident, the DPETI, on behalf of Angola, may make interim recommendations to the appropriate authorities, including those in other States, for preventive action that INIPAT considers necessary to be taken promptly to enhance aviation safety.
- B. The DPETI, on behalf of Angola, in the course of INIPAT investigations of accidents or incidents, will address, when appropriate, any safety recommendations arising out of these investigations to the accident investigation authorities of other State(s) concerned and, when IMO documents are involved, to IMO.
- C. When Final Reports contain safety recommendations addressed to IMO (because IMO documents are involved), the DPETI will send such reports to IMO accompanied by a letter outlining the specific action proposed.





### **9.3 INIPAT RESPONSE TO SAFETY RECOMMENDATIONS**

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- A. When the INIPAT receives safety recommendations, the DPETI will
  - 1) Coordinate the recommendations with the appropriate INIPAT senior managers and
  - 2) Then inform the proposing State of the preventive action taken or under consideration by INIPAT, or
  - 3) The reasons why no action will be taken by INIPAT, and
  - 4) Finally, record all responses to the issued safety recommendations.
- B. Compliance with these requirements satisfies Angola's obligations with respect to CI Code (Marine Accident Investigation) of the International Maritime Organization (IMO).

### **9.4 FORMULATION OF SAFETY RECOMMENDATIONS**

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- A. A. The text of a sample inadequate recommendation could read as follows: "IMO should establish a working group to clarify the international Standards and Recommended Practices (SARPs) in a Resolution MSC-255(84) related to cooperation between the marine investigation authorities and regulators".
- B. In this example, the recipient (IMO) is not being afforded sufficient latitude to determine how best to achieve the objective of this recommendation, since the wording prescribes the use of a working group to address the identified problem (as opposed to other alternatives). Limiting the scope of the recommendation to the Resolution MSC-255(84) may also not make sense, since related supporting IMO guidance material may merit re-examination as well.
- C. A better formulation of this safety recommendation would read as follows—
  - z "The (accident investigation authority) recommends that IMO re-examine its international requirements in Resolution MSC-255(84) and its supporting guidance material regarding the cooperation between the marine accident investigation authorities and the regulators."

*End of Chapter*



## Chapter 10

### IMO Accident/Incident Reporting

The purpose of this Chapter is to provide the procedures that must be followed to ensure Angola's participation in IMO's Accident/Incident Reporting system with regard to the preparation and submission of preliminary reports and accident/incident data reports to IMO.

#### 10.1 ACCIDENT REPORTING POLICIES

##### 10.1.1 OBLIGATIONS TOWARDS THE IMO

- A. This obligation applies to the INIPAT when Angola is the State conducting the investigation of accidents and of serious incidents to ship/vessel over 500 tons. Compliance with these requirements satisfies Angola's obligations with respect to Resolution RSC-255(84) (Marine Accident and Incident Investigation) of the International Maritime Organization (IMO).
- B. In Instruction I002/INIPAT/2025 (INIPAT Communication and notification of Maritime Accidents and Incidents) there are details on guidelines from the IMO ADREP System. This document, including communication forms, can be purchased electronically on the INIPAT website: [www.inipat.gov.ao](http://www.inipat.gov.ao)

##### 10.1.2 IDENTIFICATION OF SAFETY ISSUES

- A. Thorough investigations and reports enable IMO to identify safety issues, both at the marine operator level and at the State level.
- B. However, it is sometime difficult to distinguish between isolated manifestations of a problem and systemic unsafe conditions.
- C. Such safety issues must be validated and this is done, at least in part, by comparing the accident and incident experience in question with the broader experience of the marine companies, the State, and other States.
- D. This type of comparative analysis requires reliable and complete data. Through its ADREP system, IMO provides States with the data that will assist them in validating safety issues.
- E. Based on this validation process with its attendant assessment of risk, INIPAT and other accident investigation authorities can develop and offer meaningful recommendations for correcting unsafe conditions in the maritime system.

Participation by Angola and other States facilitates IMO's task of undertaking meaningful safety analyses on a global basis.

#### 10.2 PRELIMINARY REPORT

##### 10.2.1 ACCIDENTS TO SHIP/Vessel TONNAGE OVER 2300 TONS

###### 10.2.1.1 Complete Preliminary Report

- A. The Preliminary Report should contain basic factual and circumstantial information on an accident that is usually available within the first 2-to-4 weeks of the investigation.



- B. Within this timeframe, therefore, the INIPAT Accident Prevention Manager (DPETI) will complete the required reporting form (Form P) for the Preliminary Report (in one of the working languages of IMO) and send it to:
- 1) The Flag State or the State of Occurrence, as appropriate;
  - 2) The State of the Operator;
  - 3) The State of Design;
  - 4) The State of Manufacture;
  - 5) Any State that provided relevant information, significant facilities or experts; and
  - 6) The International Maritime Organization.

#### **10.2.1.2 Preliminary Report Submission Timing**

- A. The DPETI will send the Preliminary Report by facsimile, e-mail, or airmail within 30 days of the date of the accident unless the Accident/Incident Data Report has been sent by that time.
- B. When matters directly affecting safety are involved, it will be sent as soon as the information is available and by the most suitable and quickest means available.

#### **10.2.1.3 Methods of Submission**

- A. If possible, the DPETI will send the report to IMO through its preferred method of submission
- z In electronic format to the IMO [info@imo.org](mailto:info@imo.org).
- B. If electronic transmission is not possible, the report can be sent to IMO as follows:
- International Maritime Organization  
4 Albert Embankment, London, United Kingdom (UK)  
Tel.: +44 (0)20 7735 7611  
[www.imo.org](http://www.imo.org)

### **10.2.2 ACCIDENTS TO SHIP/BOAT OF 300 TONS OR LESS**

#### **10.2.2.1 Forwarding Preliminary Report**

- A. When such a ship/boat is involved in an accident and when seaworthiness or matters considered to be of interest to other States are involved, the INIPAT will forward the Preliminary Report to:
- 1) the Flag State or the State of Occurrence, as appropriate;
  - 2) the State of the Operator;
  - 3) the State of Design;
  - 4) the State of Manufacture; and
  - 5) any State that provided relevant information, significant facilities or experts.
- B. The DPETI will send the Preliminary Report by facsimile, e-mail, or airmail within 30 days of the date of the accident unless the Accident/Incident Data Report has been sent by that time.
- C. When matters directly affecting safety are involved, it will be sent as soon as the information is available and by the most suitable and quickest means available.



### **10.3 ACCIDENT DATA REPORT (ACCIDENTS TO SHIP/BOAT OVER 500 TONS)**

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- A. Following completion of the investigation and release of the final report, the DPETI will complete the required reporting form (Form D) for the Accident Data Report and send it, as soon as practicable after the investigation, to IMO in the manner described above in 10.2.1 B.

If the completion of the investigation indicates that some of the data in the Preliminary Report is inaccurate or incomplete, this information should also be reflected in the Accident Data Report.

- B. The DPETI will also, upon request, provide other States with pertinent information additional to that made available in its Accident/Incident Data Report.

### **10.4 INCIDENT DATA REPORT (INCIDENTS TO SHIP/BOAT OVER 500 TONS)**

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- A. If Angola conducts an investigation into an incident to such a ship/boat, the DPETI will complete the required reporting form (Form D) for the Incident Data Report and send it, as soon as practicable after the investigation, to IMO in the manner described above in Paragraph 10.2.
- B. Serious incidents are of main interest to IMO for accident prevention studies. Serious incidents are defined in Chapter 1 of this manual as "incidents involving circumstances indicating that an accident nearly occurred".

Typical examples of such serious incidents are found in Chapter 6 (6.1.2 F) of this manual.

*End of Chapter*



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## Chapter 11

# Incident Reporting Systems and Occurrence Database

The purpose of this Chapter is to provide the procedures related to the INIPAT's mandatory and voluntary incident reporting systems as well as its related accident and incident database.

### 11.1 TYPES OF INCIDENT REPORTING SYSTEMS

- A. Establishment and use of these systems and associated databases ensures that the INIPAT meets Angola's obligations with respect to Resolution MSC-255(84) (Marine Accident and Incident Investigation) of the International Maritime Organization.
- B. In general, an incident involves an unsafe, or potentially unsafe, occurrence or condition that does not involve serious personal injury or significant property damage.
- C. When an incident occurs, persons involved may or may not be required to submit a report. In the context of the mandatory INIPAT incident reporting system, persons are required to do so while under the aegis of the INIPAT voluntary incident reporting system, persons are encouraged, but not required, to make such reports.

Given the fact that the number of incidents generally greatly exceeds the number of accidents, incident reporting systems are indispensable tools in accident prevention.

#### 11.1.1 MANDATORY INCIDENT REPORTING SYSTEMS

- A. The IMO Resolution MSC-255(84) standards require States to establish a mandatory incident reporting system to facilitate the collection of information on actual or potential safety deficiencies. In a mandatory system, people are required to report certain types of incidents.
- B. This necessitates detailed regulations outlining who will report and what will be reported. Along these lines, INIPAT's mandatory reporting requirements in the Angola Marine Safety Regulations are summarized below.
- C. The number of variables in ship/boat operations is so great that it is difficult to provide a comprehensive list of items or conditions that are to be reported. For example, loss of a single hydraulic system on a ship/boat with only one such system is critical. On a type with three or four systems, it may not be.
- D. A relatively minor problem in one set of circumstances can, in different circumstances, result in a hazardous situation.

Since mandatory systems generally deal with hardware matters, they tend to collect more information on technical failures than on the human factor or error aspects.

#### 11.1.2 VOLUNTARY INCIDENT REPORTING SYSTEMS

- A. The IMO Resolution MSC-255(84) Recommended Practices recommend that States introduce voluntary incident reporting systems to supplement the information obtained from mandatory reporting systems, usually aimed specifically at acquiring more information on the human factor aspects of occurrences.



- B. In such systems, the reporter, without any legal or administrative requirement to do so, submits a voluntary incident report. In a voluntary reporting system, regulatory agencies may offer an incentive to report.

For example, enforcement action may be waived for unintentional violations that are reported.

- C. The reported information should not be used against the reporters, i.e. such systems must be non-punitive to encourage the reporting of such information. Along these lines, the protections afforded by INIPAT are found in sections 02.055 and 02.057 of Instructive nº I002M/INIPAT/25 (Marine Accidents and Incidents Investigation) of the Angola Marine Accident and Incident Investigation Regulations.

## 11.2 REPORTING REQUIREMENTS FOR INIPAT INCIDENT REPORTING SYSTEM

- A. Requirements for mandatory incident reporting are reflected under provisions of Angolan Marine Safety Regulations. These requirements are summarized as follows—

| Reporting Requirement                                                                                          | Regulatory Reference                                             | Method of Reporting                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mandatory and voluntary occurrences                                                                            | I001M/INIPAT/25<br>(Parte B e Anexo 1)                           | The prescribed persons and organizations to prepare and submit Occurrence Reports (Form 02)                                                                                                                                                                                                                                                                                       |
| Failures, malfunctions, and defects associated with ships/boats over 500 tons                                  | I001M/INIPAT/25<br>(Parte B e Anexo 1)                           | Owners and operators report within 3 days of determination of occurrence. INIPAT to disseminate report to States of Design and Registry, as appropriate (Form 02)                                                                                                                                                                                                                 |
| Unworthy conditions                                                                                            | I001M/INIPAT/25<br>(Parte B e Anexo 1)                           | Approved maintenance organizations report within 3 working days any identified condition that could present a serious hazard to the SHIP (Form 02)                                                                                                                                                                                                                                |
| Seafarer taking of actions in emergency situations that violate the regulations and procedures of other States | I001M/INIPAT/25 (Parte B e Anexo 1)<br>I002/INIPAT (Parte B)     | Seafarers report any such action within 10 calendar days to the authority of the State where the actions occurred (if required by that State) and to ANIPAA (Form 02)                                                                                                                                                                                                             |
| Facility and marine navigation inadequacies                                                                    | I001M/INIPAT/25<br>(Parte B e Anexo 1)                           | Crew members report, without delay, any facility or navigational aid inadequacy or irregularity in the course of operations to the person responsible for the facility or navigational aid (Form 02)                                                                                                                                                                              |
| <b>Incidents:</b><br>☐ Marine traffic occurrences<br><br>☐ Bird hazards<br><br><br>☐ Dangerous goods           | I001M/INIPAT/25 (Parte B e Anexo 1)<br>I002M/INIPAT/25 (Parte B) | <b>Seafarer-in command:</b><br>☐ Submit a marine traffic incident report without delay (Form 02)<br><br>☐ Notify the appropriate ground station without delay (whenever a hazard is observed) and submit a written bird strike report after landing (Form 02)<br><br>☐ Inform the appropriate MTC facility when an in-voyage emergency involving dangerous goods occurs (Form 02) |



|                                         |                                                         |                                                                                                                                                                                                                                                                                              |
|-----------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Accident notification                   | I001M/INIPAT/25 (Parte B);<br>I002M/INIPAT/25 (Parte A) | Seafarer-in-command notify by quickest means available the nearest appropriate authority of any accident to his ship/boat that results in fatalities or serious injuries or substantial damage to the ship/boat or property. Seafarer-in-command also to submit a report to INIPAT (Form 02) |
| Dangerous goods accidents and incidents | I001M/INIPAT/25 (Parte B);<br>I002M/INIPAT/25 (Parte A) | Operator to report, within 72 hours of the occurrence, to INIPAT, unless exceptional circumstances prevent this (Form 02)                                                                                                                                                                    |
| Accident and incident notification      | I001M/INIPAT/25 (Parte B);<br>I002M/INIPAT/25 (Parte A) | Operator of civil, public (if not military) or foreign ship/boat to notify INIPAT immediately when accident or specified serious incidents occur                                                                                                                                             |
| Accident reporting                      | I001M/INIPAT/25 (Parte B);<br>I002M/INIPAT/25 (Parte A) | Operator of civil, public (if not military) or foreign ship/boat to file a report within 10 days or after 7 days if an overdue aircraft is still missing.                                                                                                                                    |

- B. In accordance with section 02.057 of Instructive nº I002M/INIPAT/25 (Marine Accidents and Incidents Investigation) of the Angola Marine Accident and Incident Investigation Regulations, incidents that may be reported under the voluntary incident reporting system are all those that are not prescribed by INIPAT as incidents that must be reported to INIPAT.
- C. In accordance with the provisions of section 02.057 of Instructive nº I002M/INIPAT/25 (Marine Accidents and Incidents Investigation) of the Angolan Marine Safety Regulations, reporters under the voluntary reporting system are afforded protection from punitive measures.

## **11.3 SUBMISSION OF OCCURRENCE REPORTS**

### **11.3.1 GENERAL**

- A. The INIPAT places primary responsibility for reporting with individuals. However, the interests of marine safety are best served by full participation, in the investigation and follow-up, by the organization involved.
- B. Wherever possible, the INIPAT encourages the use of company reporting systems, with a responsible person(s) within the organization being nominated to receive all reports and to establish which reports from individuals within the organization meet the desired criteria for an occurrence report to the INIPAT.
- C. Correlation of operational and technical aspects and the provision of any relevant supplementary information, e.g. the reporter's assessment and immediate action to control the problem, is an important part of such activity
- D. With such systems the reporting level within the organization can be, and often is, set at a lower level than the INIPAT requirement in order to provide a wider monitoring of the organization's activities.

Company incident reporting systems are a valuable complement to INIPAT's incident reporting systems.

### **11.3.2 ORGANIZATION VS INDIVIDUAL REPORTING**

- A. Individuals may submit an occurrence report directly to the INIPAT should they so wish, but in the interest of marine safety they are strongly advised also to notify their employers, preferably



by a copy of the report, unless confidentiality is considered essential. When appropriate, the employer, in turn, should then advise the aircraft or equipment manufacturer(s).

- B. However, when the employee making such a report is a person having a duty to report to the INIPAT, the company must tell him if his report has been passed on to the INIPAT or not. If not, and the employee is convinced that it should, he must have the right to insist that the report be passed to the INIPAT or to report it directly to the INIPAT himself.
  - z Procedures to ensure that this right of the individual reporter is maintained must be incorporated into the organization's reporting procedures and be clearly stated in the relevant instructions to staff.
- C. In the case of occurrences arising from, or relating to, defects in the ship/boat, its equipment or any item of ground equipment, it is important that the appropriate manufacturer(s) be advised of the occurrence as soon as possible.

### **11.3.3 DUPLICATE REPORT TO EQUIPMENT MANUFACTURER**

- A. The INIPAT therefore expects that any organization which raises an occurrence report (or which has been made aware of a report raised by an individual employee) will pass a copy of the report to the appropriate ship/boat or equipment manufacturer(s) as soon as possible, unless it is known that the originator has already done so.
- B. A manufacturer or maintenance, overhaul or repair organization of ship/boat, components or equipment is not expected to report to the INIPAT, as a matter of routine, those occurrences involving products which have been reported to it by an operator/individual, if the operator/individual has already reported the occurrence to the INIPAT.

The primary duty for reporting in such cases will rest with the operator/individual.
- C. Manufacturers should report any such occurrence which they think is reportable, if they know that the operator concerned has not done so.
- D. Where a repair organization, overhauler, etc. is in doubt as to the applicability of the reporting requirements, e.g. it discovers a defect in a piece of equipment which cannot be associated with a particular ship/boat, or even a type of ship/boat, it should, nevertheless, make a report in order to ensure that it has complied with its reporting obligations.
  - z The INIPAT would, in any case, desire that the organization or individual report voluntarily such defects on equipment fitted to ship/boat types not subject to mandatory reporting.

### **11.3.4 LIST ALL ADDRESSEES**

In the case of incidents affecting ground installations or services, e.g. port and/or marine traffic control, those responsible for those services should also be informed. The original report should list all addressees to whom it has been sent.

### **11.3.5 FASTEST POSSIBLE MEANS**

- A. Occurrence reports are to be submitted to INIPAT within the deadlines prescribed in the Angolan Marine Safety Regulations, unless exceptional circumstances prevent this. Nevertheless, when the circumstances of an occurrence are judged to be particularly hazardous, the INIPAT expects to be advised of the essential details by the fastest possible means (e.g. email/telephone/fax/telex).
- B. This should be followed up by a complete Occurrence Report to the INIPAT with appropriate copies.
  - z The INIPAT is dependent upon the judgment of those responsible for submitting reports to establish which occurrences are in this category.





### **11.3.6 REPORTS WITH LESSER DEGREE OF HAZARD**

- A. Conversely, for occurrences involving a lesser degree of hazard, reporters must exercise their judgment in deciding whether, in order that all those concerned may be alerted in the minimum time, to submit a report immediately on the limited information available or if there is the likelihood of any additional and useful information becoming available within 96 hours, to delay the dispatch of the report.

### **11.3.7 INCOMPLETE INITIAL REPORTS**

- A. Should the initial report be incomplete in respect of any item of information required by any part of the Angolan Marine Safety Regulations, a further report containing this information must be made as soon as possible of the information becoming available.
- B. Prompt advice to the INIPAT on the results of investigations and the actions taken to control the situation will minimize or may render unnecessary direct INIPAT involvement in the investigative activity.
- C. The INIPAT seeks the co-operation of all reporting organizations in this respect. In the case of technical failures or difficulties, the availability of photographs and/or preservation of damaged parts will greatly facilitate the subsequent investigation.

The availability of photographs and damaged parts, in the case of technical failures, is very useful for company and INIPAT investigations.

## **11.4 PROCESSING OF OCCURRENCE REPORTS**

### **11.4.1 GENERAL POLICIES**

- A. The Accident Prevention and Investigation Managers (DPETI and DIAM) has access to technical staff and data processing facilities for the storage of the data derived from occurrence reports (both mandatory and voluntary), INIPAT safety recommendations, etc.
- B. The DPETI is responsible for the management and coordination of the INIPAT Occurrence Reporting System (ORS) and thus serves as the focal point for—
  - 1) Receipt,
  - 2) Initial evaluation,
  - 3) Dissemination,
  - 4) Analysis, and
  - 5) Storage of occurrence report data.

### **11.4.2 DPETI PROCESSING**

- A. The tasks to be completed by the DPETI are as follows:
  - 1) Receipt of the occurrence reports (refer to Appendix 11-1 for form) and the entry of data from these reports into the ORS data base;
  - 2) Evaluation to identify those occurrences considered to require INIPAT involvement in follow-up and to formally assign these in writing (along with a copy of the Occurrence Report received, unless it is a confidential report) to the appropriate INIPAT manager, e.g. Marine Standards Inspectorate, Marine Navigation Services, etc. for action.
  - 3) Such reports are classified as Open. All reports not requiring INIPAT follow-up are recorded as Closed and entered as such into the ORS;





- 4) Analysis, investigation, and follow-up actions to be taken by the assigned INIPAT manager and subsequent response of specific closure action provided to the DPETI for entry into the ORS;
- B. Until this response is received, the DPETI will monitor and progress to satisfactory closure the INIPAT follow-up on Open occurrences, entering appropriate details into the ORS (but not including the names or addresses of individual persons);

#### **11.4.3 REPORTS NOT REQUIRING INIPAT FOLLOW-UP**

- A. With regard to occurrence reports that do not require INIPAT follow-up, a considerable number of occurrences reported to the INIPAT, while meeting the criteria for a reportable occurrence, have been adequately dealt with by the reporting organization. Thus, there is often no need for further investigation by the INIPAT, although details of the occurrence and corrective actions taken do provide valuable information for analysis and dissemination purposes.
- B. Reports judged to be in this category are Closed on receipt by the DPETI, the principal justification for closure being that it is evident from the report that existing requirements, procedures, documentation, etc., coupled with the reporter's action, have adequately controlled the identified hazard.
  - z When necessary, the DPETI will contact the reporter and/or seek advice from other appropriate INIPAT managers in making this decision.

#### **11.4.4 CONFIDENTIAL REPORTS**

- A. With regard to confidential reports submitted under the voluntary reporting system, such reports will be directed to and reviewed personally by the DPETI who will initiate a de-identified record of this Occurrence Report in the ORS.
- B. The DPETI will then contact the reporter (by telephone if possible) to acknowledge receipt, discuss the implications or obtain further information as appropriate, and then mutually agree on a course of action.
- C. The data from this Occurrence Report is entered into the ORS (marked CONFIDENTIAL) as noted above, the original report form destroyed, and the information processed as prescribed. INIPAT will also restrict access to this portion of the ORS (confidential reports) to the DPETI.

### **11.5 OCCURRENCE REPORTING SYSTEM (ORS) DATABASE**

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#### **11.5.1 DATABASE PROCESSING**

- A. In accordance with OMI Resolution MSC-255(84), INIPAT has established an Occurrence Reporting System (ORS) as Angola's accident and incident database in order to facilitate INIPAT's effective analysis of information obtained, including that from its incident reporting systems.
- B. Since the number of significant occurrences in Angola is likely not sufficient to give an early indication of potentially serious hazards or to identify meaningful trends, the ORS uses standardized formats to facilitate data exchange with other aircraft accident investigation authorities so that a broader and more meaningful range of data is available for INIPAT's analysis purposes.

#### **11.5.2 ECCAIRS**

- A. To this end, Angola, through INIPAT, has partnered, along with many other marine accident investigation authorities within and outside of Europe, with the European Coordination Centre for Accident and Incident Reporting Systems (ECCAIRS), an organization whose mission is to "assist national and European transport authorities and accident investigation bodies in



collecting, sharing, and analyzing their safety information in order to improve public transport safety.”

z ECCAIRS has become the de facto standard for reporting and exchanging safety data, further evidenced by the fact that the International Maritime Organization (IMO) adopted the ECCAIRS when it implemented its updated ADREP system in 2004.

- B. This partnership enables INIPAT to access the ECCAIRS database using common classification taxonomies that are compatible with the IMO ADREP system, as well as to utilize ECCAIRS standard and flexible accident and incident data collection tools, its vehicles for data exchange, analysis tools, and options for presentation in a variety of formats.
- C. INIPAT has executed an end-user license agreement with ECCAIRS (through the Joint Research Centre of the European Commission) that enable INIPAT to utilize the ECCAIRS software that is based on IMO ADREP 2000 taxonomy as its prime enabling tool for the implementation of accident prevention measures.
- D. This arrangement with ECCAIRS therefore constitutes the foundation for INIPAT’s Occurrence Reporting System (ORS) with its ultimate focus on analysis and accident prevention.

## **11.6 CONTINUOUS ANALYSIS AND REPORTING**

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### **11.6.1 SPECIAL REPORTS**

- A. In accordance with IMO Resolution MSC-255(84), the DPETI will analyze the information generated by INIPAT’s incident reporting system and included in its ORS data base to determine any preventive actions required.
- B. In performing this role, the DPETI will continuously monitor all incoming occurrence reports to identify significant or potential hazards that, in combination with ORS data from previously submitted occurrence reports, may warrant special alerts he would provide to other INIPAT managers, e.g. Marine Standards Inspectorate, Marine Navigation Services, etc.
- C. He will also regularly monitors stored ORS data to identify hazards or potential hazards or other safety-related trends and carry out searches and analyses in response to requests from elsewhere within the INIPAT or the aviation industry, drawing attention, when possible, to any lessons learned.

### **11.6.2 INTERNAL INIPAT ALERTS**

The INIPAT’s continuous safety analysis efforts should also have an external focus. In this regard, in addition to providing internal INPAT alerts to INIPAT senior managers based upon analysis of information in the ORS database, the DPETI will also forward such safety information to other States as soon as possible when he considers such matters to be of interest to other States.

### **11.6.3 TRANSMISSION OF ANOTHER MAIA**

- A. Along the same lines, such analyses, like accident and incident investigations, could result in the need for safety recommendations, recommendations that, when relevant to a particular State for consideration and possible action, are to be transmitted by the DPETI to the appropriate accident investigation authority of that State.
- B. With regard to external requests for information from the ORS, the DPETI will require that such requests for data normally be in writing (unless urgency dictates otherwise). He will also require that requestors state precisely which data are required, both in terms of parameters to be searched and the information required in the resulting report. If the DPETI has any doubts on these points, he shall discuss the requirements directly with the requestor.



## 11.7 DISSEMINATION

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The DPETI will regularly prepare and disseminate within INIPAT and externally to interested persons upon request the following two reports on a monthly basis:

### 11.7.1 OCCURRENCE LIST

- A. This is an ORS-generated listing of new occurrences that have been reported and recorded during the previous month.
- B. Each occurrence contains the essential details (e.g. ship/boat type or service/facility involved, trip/voyage phase, etc.) together with a brief narrative describing the occurrence.
- C. Each occurrence displays the Reporter (unless it is a confidential report), so that the list also provides an acknowledgement that reports of occurrences have actually been received by INIPAT.
  - z The list will also indicate the status of INIPAT action on each occurrence, i.e. open or closed.
  - z Previously entered occurrences for which significant new information has become available during the period may also appear in this list.

### 11.7.2 INIPAT FOLLOW-UP ACTIONS

These reports will contain details of the INIPAT responses to:

- 1) Occurrence Reports closed by INIPAT, and
- 2) Safety recommendations emanating from investigations conducted by INIPAT and other IMO Contracting States.

*End of Chapter - Appendix Follows*



## Chapter 12

### Investigator Safety Measures

The purpose of this chapter is to describe the common potential hazards that must be addressed by the Accident Prevention and Investigation Managers (DPETI & DIAM) and the Investigation-in-Charge (IIC),



This chapter is of particular value to those investigators assigned to be safety coordinators at accident sites.

#### 12.1 SAFETY POLICIES

- A. All accident investigation shall be aware of the hazards that are usually encountered at accident sites, as well as the precautions and procedures to mitigate or eliminate their effects.
- B. It is the DIAM that must ensure that the necessary items are included in personal protective equipment (PPE) kits for use by INIPAT investigators.
  - z It is the responsibility of the DIAM to acquire and store these kits for ready access when needed.
- C. These measures will help to ensure Angola's compliance with its obligations with respect to its conduct of accident investigations in accordance with the provisions of Resolution MSC-255 (Marine Accident and Incident Investigation) of the International Maritime Organization).

Refer to Chapter 4 (section 4.2) of this manual for guidance concerning the availability and use of investigation field kits.

#### 12.2 HAZARDS

##### 12.2.1 DEFINITION

- A. A hazard is something that has the potential to cause adverse consequences and the degree of adverse consequences caused by specific exposures is important when determining the risk posed.
- B. A wide range of hazards may exist at ship/boat accident sites, some of which may not be directly associated with the aircraft wreckage. Hazards may be posed by pathogens (from human or animal remains), cargo, and the nature of the accident location, ground installations, and other factors.

##### 12.2.2 CATEGORIZATION OF CATEGORIES

- A. Given the wide range of potential hazards at an accident site, it is helpful to categorize typical hazards, in order to better manage the accident site and reduce or eliminate the possibility of adverse consequences.
- B. When considering hazards, it is important to consider the manner in which they may be presented.



### 12.2.2.1 Short Duration Hazards

Some hazards produced by acute events may result in a risk of short duration; these may be physically evident as, for example, fire, explosives, electrical discharges, lack of oxygen and chemicals.

### 12.2.2.2 Delayed Symptoms Hazards

- A. Other hazards may not be immediately observable but, through either single or multiple exposures, pose significant health risks over time. It is not unusual for hazards posing more immediate threats to be prioritized ahead of hazards threatening delayed symptoms, yet the hazards threatening delayed symptoms may eventually present a much greater degree of risk.

## 12.2.3 AWARENESS & SAFETY PRACTICES

- A. Investigators must be aware of these potential hazards at an accident site and what precautions to take.
- B. The investigator-in-charge (IIC) or a designated site safety coordinator will brief the investigation team on all known and potential hazards and establish necessary safety practices.
- C. The IIC will enlist the support of the local police and fire departments and dangerous goods specialists, when necessary, to evaluate existing and potential hazards and brief the investigation team.



The role of investigators is to investigate the accident, not to fight fires or remove hazardous materials.

## 12.3 TYPES OF HAZARDS AND PROTECTIVE MEASURES



**Familiarity with the following wide range of hazards and use of the associated protective measures will enhance investigator safety.**

### 12.3.1 ENVIRONMENTAL HAZARDS

- A. Such hazards are associated with extreme climates, mountainous terrain, deserts, jungles, swamps, poisonous plants, dangerous animals and insects. In environments such as these, investigators should—
- 1) Work in pairs,
  - 2) Carry a first aid-kit and
  - 3) Have a means of communication.
- B. Special precautions are also necessary at urban accident sites where investigators may encounter:
- z Downed power lines,
  - z Leaking natural gas, propane, heating oil or other flammable liquids or gases, and
  - z Buildings that have become structurally unsound from fire or impact damage.



Consider that an evaluation of the hazards by experts is likely required before accessing the area or buildings.





### **12.3.2 FORECAST & UNFORCAST WEATHER**

- A. With regard to extreme climates, investigators may be faced with extremes of heat and cold depending on the terrain and the time of year. Investigators expecting to spend a few hours at a remote site could find themselves spending the night if their transportation is unable to return for them. Before departure, the current and forecast weather conditions should be checked.
- B. In cold weather, the following precautions should be taken:
  - 1) Wear sufficient protection to prevent frostbite and hypothermia.
  - 2) Wear layered clothing that will absorb perspiration.
  - 3) Be aware of white-out conditions — disorientation can occur in uniformly bright and white surroundings.
  - 4) Wear sunglasses and sun block.
  - 5) Drink liquids to prevent dehydration
- C. In hot weather, the following precautions should be taken:
  - 1) Bring sufficient liquids for personal drinking needs.
  - 2) In situations involving high temperatures and humidity, combined with heavy exertion, drink at least half a liter of water or juice per hour.
  - 3) Be aware of symptoms of heat stress and heat stroke.
  - 4) Wear a wide-brimmed hat and loose-fitting clothing.
  - 5) Wear sun block.

### **12.3.3 HIGH ALTITUDE**

- A. The main concern in mountainous terrain at high elevations is altitude sickness which is characterized by—
  - z dizziness,
  - z headaches,
  - z loss of appetite,
  - z difficulty sleeping,
  - z aches and pains,
  - z a pale complexion and
  - z loss of energy.
- B. Activities should be paced to conserve energy. If altitude sickness is suspected, the person should sit or lie down. In severe cases, the person should descend immediately to a lower altitude.
- C. The following precautions are recommended for working in mountainous terrain:
  - 1) Limit physical exertion above 8,000 feet above sea level.
  - 2) Keep hands free on steep climbs.
  - 3) Rest frequently.
  - 4) Have oxygen available at high altitudes,
  - 5) Drink water or juice often to avoid dehydration.
  - 6) Wear sun block, sunglasses and a hat.



- 7) Seek advice from the local guides who should, ideally, be accompanying the investigation team.

#### **12.3.4 OTHER AREAS**

If the accident site is located in a desert, jungle or swamp environment, the following safety precautions should be taken.—.

##### **12.3.4.1 Deserts**

- 1) Wear a wide-brimmed hat, loose-fitting clothing, sunglasses, sun block, and goggles.
- 2) Bring plenty of drinking water.
- 3) Limit activities during the heat of the day and set up open-sided sun shelters.
- 4) Employ local drivers; navigating on sand dunes and unmarked roads can be hazardous even in a four-wheel drive vehicle.
- 5) Ensure that appropriate clothing and shelter suitable for temperature decreases at night are available.

##### **12.3.4.2 Jungles**

- 1) Secure trouser legs and the tops of boots with rubber bands, strings or duct tape to protect against - leeches, insects and crawlers.
- 2) Bring plenty of drinking water.
- 3) Compensate for the heat and humidity by reducing activities.
- 4) Maintain communications with others in the party.

##### **12.3.4.3 Swamps**

- 1) If swamp boats are used as a means of transportation, wear a life jacket and ear plugs.
- 2) If walking in water, wear chest waders and use a tall walking stick to find level footing and to determine water depth.
- 3) Prevent swamp water from coming into contact with open cuts and sores, since swamp water may be contaminated.
- 4) Avoid travel or work at night.
- 5) Wear clothing that covers the skin and a wide-brimmed hat with a mosquito net.
- 6) Protect against insects and leeches, as well as snakes, alligators and crocodiles.

#### **12.4 DANGEROUS ANIMALS & INSECTS**

- A. The potential danger from poisonous plants, dangerous animals and insects varies with location, weather, elevation, time of year, etc., and the advice of local experts should be obtained.
- B. Although most wild animals will avoid contact with humans, there are some species that are dangerous, and investigators should take precautions on the basis of advice from local experts.
- C. In many areas, mosquitoes transmit malaria and yellow fever.



Poisonous snakes are prevalent in many areas and snakebite serums should be included in the investigator's first-aid kit.



- z Any protective product that contains "DEET" in a 25 to 30 per cent solution should be an effective mosquito repellent. Concentrations of "DEET" higher than 30 per cent may, however, irritate the skin.



Anyone working in areas where malaria and yellow fever are prevalent should take antimalarial drugs and be inoculated against yellow fever.

- z It should be noted that mosquito repellents of this type contain a solvent that may melt plastics found on cameras, watches, small tools, etc.

D. Ticks, which inhabit fields and forests, may carry bacterial diseases, such as Lyme disease, a bacterial infection caused by the bite of an infected tick. The following precautions should be taken when working in areas that may be infested with ticks—

- 1) Wear long pants and long sleeves. Secure pant legs with duct tape or rubber bands.
- 2) Spray a permethrin-type tick repellent on clothing.
- 3) Use a repellent containing the compound DEET on exposed skin areas, except for the face.
- 4) Check the entire body for ticks daily.
- 5) Immediately remove ticks from the skin.

## **12.5 PHYSICAL HAZARDS**

Such hazards are associated with fire, stored energy, explosives, and structures. The details of these hazards and their associated precautionary aspects are as follows—

### **12.5.1 FLAMABLE LIQUIDS & GASES**

A. With regard to fire and flammable substances, fuel is likely to be one of the most common hazards encountered at a crash site. While being a harmful substance on its own, it is its flammability aspect that most warrants precautions.

There are, however, other health hazards presented by inhalation of fumes and prolonged skin contact that should also be considered.

- B. Where available, the advice of an experienced fire officer at the site should be sought in guarding against fire hazard and in securing fuel tanks and containers of other flammable liquids such as hydraulic fluids.
- C. Fire may also be the result of aircraft batteries short-circuiting; caused by impact damage.
- D. Prolonged exposure to fire-fighting agents can also cause skin and respiratory injuries. These agents should be washed off skin and clothing as soon as possible.

### **12.5.2 AVIABILITY OF FIRE FIGHTING EQUIPMENT**

A. Given the foregoing, fire-fighting equipment should be readily available while a high fire risk remains, and there should be no smoking permitted within the guarded area.

- z Ship/boat batteries should be disconnected as soon as possible and if ship/boat fuel tanks are still intact, they should be emptied.
- z Care should be exercised to control possible sources of ignition, such as static electricity.

B. The quantity of fuel removed from each tank should be measured and recorded. If there has been a large spillage of fuel, the investigators



The operation of radio or electrical equipment or the use of salvage equipment should be avoided until the fire risk has been assessed and eliminated.



must control any activity that could increase the possibility of ignition, such as the moving of parts of the wreckage.

### **12.5.3 STORED ENERGY**

- A. The stored energy components in many aircraft structures and systems have the potential to cause injury to personnel.
- z Electrical accumulators or capacitors and emergency power supplies can be hazardous due to their electrical potential and chemical content.
  - z Hydraulic accumulators, oleo struts, wheels and fire extinguishing bottles are examples of components that have potential stored energy.
- B. Some pressurized gases are carried onboard Ship/boat in containers of various designs. The rapid discharge of these can pose a risk of physical injury and asphyxiation if released in enclosed spaces.



z Some fire extinguishing agents can also be toxic.

z Pressurized oxygen can increase the risk of fire or explosion when released.

### **12.5.4 EJECTION DEVICES**

- A. Current and former military aircraft are now commonly flying with civil registration. Civil ship/boat accident investigators and emergency responders may, therefore, come into close proximity with potential cockpit escape equipment and ejector seats and, as a result, be subject to associated hazards.
- B. Other safety equipment is being introduced into civil ship/boat, e.g. rocket-deployed emergency parachute systems and airbag restraint systems across a range of ship/boat. Often these systems are not clearly marked and may not be marked at all.
- C. With regard to pyrotechnics and explosives, most commercial and many private aircraft carry Custom-built explosive charges to initiate devices, such as:
- z Escape slides,
  - z Parachutes,
  - z Fire extinguishers,
  - z Cable cutters,
  - z Flotation gear,
  - z Deployable emergency locator transmitters
- D. While the activation of these charges may pose only a small direct risk to personnel, the unexpected initiation of the systems that they operate may present a more significant risk.



The armed and unfired rocket of a rocket-deployed recovery parachute system may pose a potential hazard to investigators and rescue personnel.

### **12.5.5 PYROTECHNICS & EXPLOSIVES**

- A. Pyrotechnics are carried by a variety of aircraft and often get scattered among the ship/boat wreckage. They sometimes sustain impact damage and, as a result, pose an increased risk of initiation.
- B. Weapons may also be carried by passengers or crew as cabin or stored baggage and should be carefully treated.
- C. In the early stages of the crash investigation, perhaps at the reporting phase, the IIC should

These hazards also support the need for adequate police resources to restrict the public and media from access to the accident site for their own protection.





seek information about any pyrotechnics or explosives known or thought to be on board the ship/boat.

### **12.5.6 DAMAGED & UNSTABLE STRUCTURES**

- A. Generally, the hazards posed by damaged and unstable ship/boat structures will be obvious and most will be readily identified.
  - z For example, wreckage may move or give way under foot and persons on site may be surprised and consequently exposed to unexpected hazards.
- B. Modern materials, including composite structures, may appear undamaged externally but have lost structural integrity due to impact and/or heat damage.
- C. They can also retain significant energy under the stress of impact, which, when released, may suddenly pose a significant hazard.
  - z In a relatively short period of time, for example, saltwater, by corrosion, may pose a risk to materials such as magnesium, reducing its structural strength.

## **12.6 BIOLOGICAL HAZARDS**

- A. Such hazards are related to pathogens associated with human remains, cargo consignments, and the state of local hygienic conditions at the accident site.
- B. With regard to human remains, accident investigators are at risk of exposure to many biological hazards that may exist in the cockpit, cabin, and cargo wreckage as well as on the ground where bodies and survivors have lain.

### **12.6.1 PREVENTING EXPOSURE**

- A. Since it is not possible to readily identify contaminated blood and other bodily fluids, it is prudent to take precautions whenever working around and in wreckage, when handling wreckage and when performing off-site examinations and tests on wreckage parts.
- B. Precautions must be taken to prevent viruses from entering mucous membranes (such as the eyes, nose and mouth) or non-intact skin such as open cuts or rashes.
- C. The accident site may be contaminated with liquid, semi-liquid and dried blood and other bodily fluids, fragmented bones, human or animal tissue and internal organs.



In the dried state, there is a risk that particles of these substances may become airborne and come into contact with the unprotected eyes, nose and mouth.

### **12.6.2 PRE-ACCIDENT QUALIFICATION NECESSARY**

As part of the investigation-planning process, appropriate precautionary measures should be taken against biological hazards. Investigators and others who work on-site, or who carry out off-site examinations and tests of wreckage, are to receive biological hazard precaution training (as specified in Chapter 3) and also inoculated against the Hepatitis B virus.

### **12.6.3 SURVEY & CONTAINMENT**

- A. Procedures to be followed at the accident site should include an initial survey for biological hazards in the form of visible blood or other bodily fluids. When there are serious injuries or fatalities, there will often be bodily fluids remaining after the dead and injured are removed.
- B. Areas contaminated by spilled blood or bodily fluids should be identified and roped off and have only one single point of entry and exit. Only persons using personal protective equipment should





be allowed access to the contaminated areas. Any components that are removed from the accident site for examination and testing should be labeled as bio-hazardous to ensure that they are treated with the same care as exercised at the accident site.

#### **12.6.4 PROTECTION PROCEDURES**

- A. Investigators should always assume that human tissue and bodily fluids are contaminated, and as a minimum precaution, should don a face mask and wear latex gloves under their work gloves when examining wreckage known to contain blood or other fluids.
- B. The most common contaminated items include all cabin interior materials, e.g. seat belts/shoulder harnesses, seat cushions, other upholstery and trim materials, and instrument panels.
- C. While wearing personal protective equipment in the biological hazard area, investigators should not:
  - 1) Eat,
  - 2) Drink or smoke;
  - 3) Apply cosmetics, lip balm or sun block;
  - 4) Touch their or others' face, eyes, nose or mouth; or
  - 5) Handle contact lenses.

#### **12.6.5 DISPOSAL OF BIOLOGICAL HAZARD WASTE**

- A. Biological hazard waste such as clothing and contaminated personal protective equipment should be disposed of appropriately according to local State requirements.
- B. Investigators should carefully pull off the outer work gloves first, then peel off the latex gloves and drop both pairs into a biological hazard disposal bag.
- C. Contaminated personal protective equipment should never be reused.
- D. Exposed skin should be wiped immediately with moist towels, and then washed with soap and water or a solution of one part chlorine bleach to ten parts of water.
- E. A new bottle of bleach solution should be mixed every day. Contaminated eyes should be flushed with fresh water.
- F. Special attention should be given to thorough hand washing after removing latex gloves and before:
  - z Eating,
  - z Drinking,
  - z Smoking, or
  - z handling contact lenses.
- G. Where an investigator or response person suffers an exposure incident involving biological hazards, appropriate and timely medical assessment should be undertaken and any measures indicated by that assessment be taken to ensure the health and well-being of the investigator involved.

#### **12.6.6 HAZARDS WITH WEATHER PERSONAL PROTECTION EQUIPMENT**

- A. Investigators should be aware that wearing personal protective equipment in hot and humid climates may result in heat stroke unless precautions are taken to minimize heat stress.
  - z Before donning personal protective equipment, a liter or more of water should be consumed.



- B. Depending upon the heat and the humidity, and on the amount of physical exertion required, it may be necessary to limit the amount of time that investigators wear personal protective equipment.
- C. Once they have left the biological hazard area, removed and disposed of their personal protective equipment and disinfected their hands, investigators should rest in the shade and consume at least a liter of water.
  - z It may be necessary to have medical personnel assess the condition of investigators who have experienced heat stress.

#### **12.6.7 MINIMIZE NUMBER OF INVESTIGATORS EXPOSURE**

- A. Since it is important to minimize the number of investigators, tools and equipment that could come into direct contact with contaminated materials, only a selected, minimal number of investigators should be assigned to handle wreckage and disassemble components.
- B. Other investigators could be assigned to take notes, draw diagrams, take photographs or use the appropriate manuals and engineering drawings.

#### **12.6.8 CLEAN-UP OF CONTAMINATED INVESTIGATION EQUIPMENT**

- A. Contaminated investigation equipment, such as tools, flashlights and tape measures, should be cleaned with soap and water, disinfected and allowed to dry.
- B. Personnel, when leaving the area, should place in biological hazard disposal bags any equipment that cannot be readily disinfected.
- C. On-site garments should be removed at a decontamination area and clean garments worn in transit to prevent biological hazards from being spread to clean areas away from the accident site.
- D. The disposal bags and their contents are usually incinerated at appropriate facilities, such as hospitals.

#### **12.6.9 PERSONAL HYGIENE**

- A. With regard to local hygienic conditions at the accident site, low levels of hygiene can pose health risks. Even relatively minor complaints can become serious when personnel do not have ready access to medical treatment.



Guidance on essential hygiene should be sought from experts prior to undertaking foreign travel.

- B. Care should be taken when eating and drinking in remote locations or where hygiene levels are of concern.

### **12.7 MATERIALS HAZARDS**

Such hazards are associated with exposure to and contact with various types of hazardous materials and substances at the site that can pose hazards to investigators. The following paragraphs discuss the details of these hazards and their associated precautionary aspects—

#### **12.7.1 AIRCRAFT MATERIALS**

- A. Damaged ship/boat materials can pose health hazards to investigators as well as search and rescue personnel. This requires the identification of hazardous materials found at work in order to make an assessment of the associated risks to health, and to put in force suitable measures to control these risks.



- B. The risk of exposure is highly dependent upon the particular accident profile but manufacturers and operators can assist in compiling lists of materials that may become hazardous when damaged.
- C. These hazardous materials are categorized as follows: metals and oxides, composite materials, chemicals, and other substances (including radioactive materials).

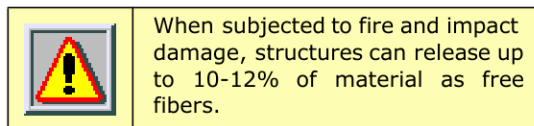
### 12.7.2 METALS & OXIDES

- A. Many of the metals used in ship/boat structures (primarily aluminum alloyed with small amounts of other metals including magnesium, zinc and copper) and their respective oxides are hazardous to health when ingested into the body.


  - ⌞ All dusts and particles are considered hazardous when encountered in sufficient concentrations.
  - ⌞ It requires only relatively small quantities of some metals to pose risks to health..
- B. These metals and oxides are accordingly classified as high risk. These substances may adversely react with chemicals, such as fire fighting agents, so any indication of chemical reaction should be treated with the greatest care and reported to the IIC.
  - ⌞ Advanced materials are under development or are already in use in new metal alloys. The properties of many of these materials, when damaged, are not well understood at present.
- C. The products of combustion of many materials are hazardous when inhaled, ingested or absorbed and exposure to them is hazardous.
  - ⌞ In practice, it is almost impossible to separately identify and quantify safe limits of exposure to these substances during emergency response and accident investigation activities.
  - ⌞ Accidents in industrial areas may introduce entirely new chemicals that may adversely react with each other and adversely affect rescue and investigators.

### 12.7.3 COMPOSITE & FIBERGLASS MATERIALS

- A. The use of fiber-based composites on aircraft is extensive, with ship/boat structures commonly consisting of more than 15% by weight of these materials.
  - ⌞ There is a range of fibrous materials used in the construction of composite materials, including carbon, glass, kevlar and boron, with these and others often combined to form a hybrid fiber.
  - ⌞ The resin matrix binding the fiber generally accounts for around 40% of the manufactured composite material.
- B. These different fibers, not surprisingly, behave differently when subjected to the forces and effects of ship/boat accidents.
  - ⌞ For example, when subjected to fire or impact alone, composite structures are likely to release around 1% of their base material as free fibers.
- C. Fiberglass is found in soundproofing blankets, cockpit and cabin panels, cargo bin liners and other aircraft furnishings.



#### 12.7.3.1 Some Degree of Potential Hazards

- A. Damaged composite structures do pose a degree of potential hazards. Carbon fiber exhibits minimal fibrogenic activity and therefore little evidence of lung toxicity in tests.



- z The studies show that carbon fiber is different from asbestos and mineral fiber, and less toxic than silica.
- z However, exposure to the dusts of burnt composites may pose more of a problem than exposure to free fibers.
- B. There are other short term health effects resulting from exposure to fibers and debris from impacted and combusted composites.
  - z Most notably, the fibers are highly irritating, particularly to the eyes, and also to the nose, throat and lungs.
  - z Partially burnt debris will cause contact hazards, such as dermatitis. Substances which are taken into the lungs with fiber and dust may also cause sensitization (allergies).

#### **12.7.3.2 Limit Exposure & Reduce Disturbance**

- A. As with other hazards, appropriate procedures to limit exposure and reduce disturbance will prevent dusts and fibers from becoming airborne and minimize their hazardous nature when they do.
- B. Entering the accident site from an up-wind direction is recommended so that hazardous exposure is reduced as much as possible, and if encountered, provides a known exit direction with a reduced risk of further exposure. Other measures include:
  - 1) Wearing goggles, face masks, and disposable coveralls,
  - 2) Handling splinters from fractured fiberglass panels and composites with gloves, and
  - 3) If fire-damaged, spraying composite and fiberglass materials with water or preferably with a 50-50% solution of acrylic floor wax and water before handling.

#### **12.7.3.3 Chemicals**

- A. Ship/boat contain many chemical compounds, some of which may cause hazards in their natural state, and others which can create hazards when exposed to heat or other substances. For example:
  - 1) Viton ® is a synthetic rubber-like material containing fluorine used for 'O' rings and gaskets in engines and hydraulic systems. If exposed to high temperatures and moisture, the material may degrade and produce a corrosive substance.
  - 2) Batteries contain chemicals such as lithium that reacts vigorously with water; thionyl chloride which decomposes in air to form hydrochloric acid and sulphur dioxide.
  - 3) Hydraulic fluids may pose hazards in their normal state, perhaps being classed as irritants. Some also become acidic when exposed to temperatures above a certain threshold.
  - 4) Used mineral oils from engines are widely known to be carcinogenic.
- B. Other substances (including radioactive materials). Partially combusted fuels and lubricants are known to produce a range of hazardous substances. For example:
  - 1) Asbestos is not frequently used in aircraft construction but has been used in heat shielding materials on and around engines and in various gaskets.
  - 2) Radioactive substances are often used in small volumes in some aircraft components and are frequently carried as cargo in commercial operations, particularly substances for medical use.





- Generally, specific radio activities of these are low, and half lives are short.
- However, higher activity material is regularly carried onboard aircraft.

Restrictions on packaging these are, however, very strict, ensuring that in the majority of cases, packaged contents will remain effectively inert in the event of an accident.

#### 12.7.4 RADIOACTIVE MATERIALS

Several radioactive materials have been used in the construction of ship/boat. These are mainly materials with a low specific radioactivity, and therefore pose a low risk in their normal state.

When reduced to dust after fire, these radioactive materials are likely to pose a hazard to health if ingested or inhaled.

##### 12.7.4.1 Depleted Uranium

- A. Depleted uranium has been used in ballast weights for control surfaces in a range of civil and military ship/boat. It was fitted in several hundred early versions of large ships/boats. This material has also been used to manufacture tip weights for helicopter main rotor blades.
- B. Radiologically depleted uranium is not classified as a significant risk in its undamaged form. Where particulate is produced, however, e.g. by machining or fire damage, depleted uranium may be ingested, inhaled, or absorbed.



Once in the body, depleted uranium poses a significant chemical hazard.

##### 12.7.4.2 Thorium

- A. Thorium has been used extensively in components for aircraft engines, both piston and turbine, and is often alloyed with magnesium, although at relatively low concentrations. It has also been used in other components such as gearbox casings on many ships/boats.
- B. While its use has been reduced significantly in recent years, there are significant stocks of thoriated components available and are, presumably, still to be used.

##### 12.7.4.3 Tritium Gas

Beta lights with tritium gas are used extensively on ship/boat to indicate emergency exits on some civil ship/boat, and also in instrument lights for some military ship/boat. Typical beta lights each contain a total of about 20 curies of tritium gas.

- z Exposure to the contents of a single broken beta light could result in a dose of up to 1/10th of the current acceptable annual limit.

##### 12.7.4.4 Nuclides

- A. Other nuclides such as Americium are used in some forward-looking infra-red (FLIR) systems.
- B. Krypton is used within oil level indication systems and Strontium 90 can be found within ice detection systems and in helicopter rotor crack indicating systems.

## 12.8 CARGO HAZARDS

- A. There are immense difficulties associated with identifying and assessing risks posed by cargo. A huge variety and volume of freight is carried by sea, most of which is identified in some way, although a significant volume carries only a general description and is normally categorized as:
  - 1) Dangerous Sea Cargo (DSC, also referred to as Dangerous Goods),
  - 2) General cargo, and
  - 3) Private cargo/mail.





### **12.8.1 EARLY SITE ASSESSMENT**

- A. When carrying out early site assessment work, it is essential to obtain the full information about the complete load of cargo as soon as possible. Dangerous Goods manifests may usually be obtained quickly, but general cargo manifests should also be obtained and reviewed at a very early stage.
- B. A wide range of information is contained in manifests/cargo documents, including:
  - 1) Descriptions of packaging,
  - 2) General description of cargo, and
  - 3) Contact details of consignors/consignees, etc.

### **12.8.2 DANGEROUS GOODS**

- A. DSC is usually well-identified and documented, and information may be gathered (using DSC manifests) at a very early stage to help determine the degree of hazard.
- B. While general cargo, by definition, is considered non-dangerous (in transport classification terms), in general health and safety terms, it is quite capable of posing significant hazards.
- C. It should be noted that DSC and general cargo may include the chemicals and substances described above.
  - z Neither mail nor private goods, often carried in large volume by air, carries any indication of contents on its packaging.

### **12.8.3 RADIOACTIVE MATERIALS**

- A. With increasing frequency, radioactive materials are being carried as ship/boat freight
- B. If such materials are carried, steps are immediately to be taken to have them removed by qualified personnel before any harm is caused to persons working in close proximity to the wreckage.
- C. Limitations on the quantity of radioactive material, authorized to be carried on-board a ship/boat, the strength of its packaging and shielding will minimize the possibility of container damage in a ship/boat accident.
  - z As long as the packaging and shielding remain intact, there is likely to be little danger from radiation.
- D. However, a post-impact fire could damage the packaging and shielding, and the ensuing heat may cause the radioactive material to change into gaseous form, in which case radiation may spread.



No examination of the wreckage should be initiated until the level of radiation has been measured and the site declared safe.

  - z In such cases, all participants in the rescue and fire-fighting operations should be checked, decontaminated and placed under medical observation, as necessary.

### **12.8.4 Marine SPRAYS**

- A. Accidents involving marine spraying have the potential to expose investigators to hazardous materials in the form of pesticides and insecticides.
- B. At the accident site, personal protective equipment must be used, and face masks equipped with appropriate filters should be worn.



## **12.9 PSYCHOLOGICAL HAZARDS**

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- A. Such hazards are associated with the stress and traumatic pressures imposed by exposure to the marine accident scene as well as the necessary interactions with those associated with the marine operator and the voyage/trip involved.
- B. In particular, major accidents with a large number of fatalities may induce psychological stress, not only in investigators, but also in persons involved in the search for and identification of bodies.

### **12.9.1 STRESSFUL SITUATION**

- A. Accident investigations frequently require personnel to work in close proximity to disaster and trauma. This work involves dealing not just with the fatally or seriously injured, but with survivors, relatives and colleagues of the victims.
- B. The intensity, scale, and often long duration of the task can present significant potential for adverse psychological impact on investigation teams, sleep disturbance, intrusive thoughts and flashbacks.
- C. While there may be little available evidence to confirm such symptoms, suggesting that the psychological impact poses less of a risk to investigators than once thought, this more satisfactory outcome may be due to the success of existing safety personnel management practices. These include effective selection processes, the establishment of professionalism at both an individual and team level (including good work practices) and effective peer support.

### **12.9.2 DEVELOPING AREA OF RESEARCH**

- A. Psychological impact is still a developing area of research for medical teams, and at this time there are varying opinions as to the degree of hazard that it poses. Nevertheless, it is undeniable that some risk is always present and it is recommended that the prospect of some proactive and responsive counseling be incorporated in risk assessments as a precautionary measure to guard against any trauma resulting from the nature of the work.
- B. Peer support is particularly valuable because colleagues are likely to quickly recognize personality changes in team members and are in a position to suggest timely counseling. When necessary, therefore, the services of counselors will be employed as a matter of course. They may provide immediate assistance to any or all personnel responding to the accident.
- C. In such situations counselors customarily play a passive role, making themselves available to individual who either seek assistance or are referred for assistance.

## **12.10 PERSONAL PROTECTIVE EQUIPMENT (PPE)**

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### **12.10.1 OVERVIEW**

- A. Problems may arise in identifying the most suitable personal protective equipment (PPE) for accident investigators due to conflicting task requirements and varying weather conditions. When setting control measures at the site, PPE should only be introduced after other controls have been considered.
- B. These could include the:
  - 1) Isolation,
  - 2) Removal or covering of hazards,



- 3) Suppression of dust and fibers, and
  - 4) Restriction of entry to hazardous areas.
- C. Wearing of PPE may also pose its own health and safety hazards due, for example, to heat stress, restriction of visibility, and hampered respiration. Since types and specifications of approved PPE vary internationally, the IIC should confirm with their specialist advisors the equipment most appropriate to the tasks to be undertaken.
- D. Investigators and site-essential experts are also to be properly trained in the use of this required PPE, and be closely monitored to ensure their safety during the use and disposal of this PPE.

### **12.10.2 PERSONAL PROTECTIVE EQUIPMENT KITS FOR INVESTIGATORS**

The APIM, in conjunction with the IIC, will have prepared PPE kits containing sufficient equipment appropriate to the required duration of work at a particular site. Each kit will include—

- 1) Half face respirator c/w spare set of broad range chemical/dust cartridges (The set should be effective for organic vapor, acid gas and P100). If space permits, a full face piece respirator c/w spare set of cartridges should be included.
- 2) Several disposable dust/mist HEPA/P3 masks — Two or more disposable coveralls
- 3) Several pairs of disposable nitrile gloves
- 4) Several pairs of disposable heavy duty gloves, ones that provide hands, wrists, and forearms with puncture and abrasion protection
- 5) One pair of kevlar-cut resistant gloves with lined palm & fingers
- 6) Protective footwear with sole and toe protection, as well as protective shoe covers made from polyvinyl chloride (PVC) or butyl rubber
- 7) Hard hat
- 8) Disposable but durable and liquid-resistant protective suits.
- 9) Eye protection in the form of safety goggles, ones fitted with one-way check valves or vents to prevent fogging
- 10) Hearing protection: either ear muffs or ear plugs
- 11) Hand and equipment wipes
- 12) High visibility vest
- 13) Chemical or duct tape
- 14) Other equipment such as—
  - (a) Cleaning/disinfectant chemicals and supplies
  - (b) Bio-disposal bags
  - (c) Drinking water
  - (d) First aid kit
  - (e) Foul weather clothing
  - (f) Insect protective solutions and medication is recommended

Two chemical types are commonly used to disinfect personal protective equipment. Rubbing alcohol of 70 per cent strength is effective and is available in towelettes, as well as in large hand towels. The most effective disinfectant solution is a mixture of common household bleach and water, with 1 part bleach to 10 parts of water. Never mix alcohol and bleach.



- (g) Extra batteries and power supply adaptors for electronic equipment
- 15) Additional equipment for marine environments

This equipment may be specified and supplied by vessel operators.

- (a) Life vest
- (b) Suitable footwear for deck operations
- (c) Hard hat or, if permitted, peaked water proof hat
- (d) Pair of neoprene gloves
- (e) Sun protective screen
- (f) Motion sickness medication, if necessary

*End of Chapter*

