



# Marine Investigation Guide Leaflet

## **\*INTRODUCTION**

In order to be able to carry out an investigation after an incident or maritime casualty, it is necessary to follow an approved method so that the result will be in conformance with the requirements of International maritime & shipping legislations (ISM, ISO 9001-2008, etc), implying effectiveness & continual improvement.

The IMO resolution A 849(20) outlines the requirements as approved procedures which should be adhered to.

The following leaflet is a guide to be used by investigators; the aforementioned resolution has been used as a base for the compiling of the set of questionnaires herein.

## **\*COLLECTING INFORMATION**

### ***A) The following are the information generally required in all cases:***

#### ***A-1) Particulars of the ship:***

1. Name, IMO number, nationality, port of registry, call sign
2. Name and address of owners and operators, if applicable, also, if an overseas ship, of agents
3. Type of ship
4. Name and address of charterer, and type of charter
5. Deadweight, net and gross tonnages, and principal dimensions
6. Means of propulsion; particulars of engines
7. When, where and by whom built
8. Any relevant structural peculiarities
9. Amount of fuel carried, and position of fuel tanks
10. Radio (type, make)
11. Radar (number, type, make)
12. Gyro compass (make, model)
13. Automatic pilot (make, model)
14. Electronic positioning equipment (make, model) (GPS, Decca, etc.)
15. Life saving equipment (dates of survey/expiry)

#### ***A-2) Documents to be produced:***

(Note: Any documents that may have relevance to the investigation should be produced. Where possible original documents should be retained, otherwise authenticated and dated photocopies should be taken in accordance with 9.1.2 of the IMO Code.

1. Ship's register



2. Current statutory certificates
3. ISM Code certification
4. Classification society or survey authority certificates
5. Official log book
6. Crew list
7. Crew qualifications
8. Deck log book
9. Port log, log abstract and cargo log book
10. Engine movement book
11. Engine-room log book
12. Data logger print-out
13. Course recorder chart
14. Echo sounder chart
15. Oil record book
16. Soundings book
17. Night order book
18. Master's/Chief Engineer's Standing Orders
19. Company Standing Orders/Operations Manual
20. Company Safety Manual
21. Compass error book or records
22. Radar log book
23. Planned maintenance schedules
24. Repair requisition records
25. Articles of Agreement
26. Bar records - daily purchases - voyage receipts, etc.
27. Records of drug and alcohol tests
28. Passenger list
29. Radio log
30. Ship Reporting records
31. Voyage Plan
32. Charts and record of chart corrections
33. Equipment/machinery manufacturer's operational/maintenance manuals
34. Any other documentation relevant to the inquiry

*A-3) Particulars of voyage:*

1. Port at which voyage commenced and port at which it was to have ended, with dates
2. Details of cargo
3. Last port and date of departure
4. Draughts (forward, aft and midships) and any list
5. Port bound for at time of occurrence
6. Any incident during the voyage that may have a material bearing on the incident, or unusual occurrence, whether or not it appears to be relevant to the incident



7. Plan view of ship's layout including cargo spaces, slop tanks, bunker/fuel lube oil tanks (diagrams from IOPP Certificate)
8. Details of cargo, bunkers, fresh water and ballast and consumption

*A-4) Particulars of personnel involved in incident:*

1. Full name / Age
2. Details of injury
3. Description of accident
4. Person supervising activity
5. First aid or other action on board Capacity on board
6. Certificate of Competency/License: grade; date of issue; issuing country/authority; other Certificates of Competency held
7. Time spent on vessel concerned
8. Experience on similar vessels / Experience on other types of vessels
9. Experience in current capacity / Experience in other ranks
10. Number of hours spent on duty on that day and the previous days
11. Number of hours sleep in the 96 hours prior to the incident
12. Any other factors, on board or personal, that may have affected sleep
13. Whether smoker, and if so, quantity
14. Normal alcohol habit
15. Alcohol consumption immediately prior to incident or in the previous 24 hours
16. Whether under prescribed medication
17. Any ingested non-prescribed drugs
18. Records of drug and alcohol tests

*A-5) Particulars of sea state, weather and tide:*

1. Direction and force of wind
2. Direction and state of sea and swell
3. Atmospheric conditions and visibility
4. State and height of tide
5. Direction and strength of tidal and other currents, bearing in mind local conditions

*A-6) Particulars of the incident:*

1. Type of incident
2. Date, time and place of incident
3. Details of incident and of the events leading up to it and following it
4. Details of the performance of relevant equipment with special regard to any malfunction
5. Persons on bridge
6. Persons in engine-room
7. Whereabouts of the master and chief engineer
8. Mode of steering (auto or manual)



9. Extracts from all relevant ship and, if applicable, shore documents including details of entries in official, bridge, scrap/rough and engine-room log books, data log printout, computer printouts, course and engine speed recorder, radar log, etc.
10. Details of communications made between vessel and radio stations, SAR centres and control centres, etc., with transcript of tape recordings where available
11. Details of any injuries/fatalities
12. Voyage data recorder information (if fitted) for analysis

*A-7) Assistance after the incident:*

1. If assistance was summoned, what form and by what means
2. If assistance was offered or given, by whom and of what nature, and whether it was effective and competent
3. If assistance was offered and refused, the reason for refusal

*A-8) Authentication of documents:*

The master should be asked to authenticate all documents and to sign all copies taken of documents as being true copies, also to authenticate relevant dates and times

*A-9) Engine-room orders:*

In all cases where a collision or a stranding is the subject of an investigation, and the movements of the engine are involved, the master or officer on watch and other persons in a position to speak with knowledge are to be asked whether the orders to the engine-room were promptly carried out. If there is any doubt on the matter, the investigator shall refer to it in his report.

*A-10) External sources of information:*

Investigators should consider independent corroborating information from external sources such as radar or voice recordings from vessel traffic systems, shore radar and radio surveillance systems, marine rescue co-ordination centres, coroners and medical records.

***B) The following are additional information required in specific cases:***

*B-1) Fire/Explosion:*

1. How was the ship alerted to the fire?
2. How was the individual alerted to the fire?
3. Where did it start?
4. How did it start (if known)?
5. What was the immediate action taken?
6. Condition of fire-fighting equipment, supported by dates of survey/examination
7. Extinguishers available:
8. Type available in the vicinity;
9. Types available on the ship;
10. Types used



11. Hoses available/used
12. Pumps available/used
13. Was water immediately available?
14. Were air vents closed off to the space?
15. What was the nature of the material on fire and surrounding the fire?
16. Fire retardant specification of bulkheads surrounding the fire
17. Restrictions caused by (a) smoke, (b) heat, (c) fumes
18. Freedom of access
19. Access availability for fire fighting equipment
20. Preparedness of crew - Frequency, duration, content and locations of fire musters and drills
21. Response by land-based fire-fighting brigades

*B-2) Collision:*

(Investigators should bear in mind the IMO Damage cards and intact stability reporting format.)

*General:*

1. Local or other special rules for navigation
2. Obstructions, if any, to manoeuvring, e.g. by a third vessel, shallow or narrow waters, beacon, buoy, etc.
3. Circumstances affecting visibility and audibility, e.g. state of the sun, dazzle of shore lights, strength of wind, ship-board noise and whether any door or window could obstruct look-out and/or audibility
4. Geographical plot
5. Possibilities of interaction
6. Name, IMO number, nationality and other details of other vessel

*For each ship:*

1. Time, position, course and speed (and method by which established), when presence of other ship first became known
2. Details of all subsequent alterations of course and speed up to collision by own ship
3. Bearing, distance and heading of other ship, if sighted visually, time of sighting, and subsequent alterations
4. Bearing and distance of other ship, if observed by radar, timing of observations and subsequent alterations of bearing
5. If other ship was plotted and by what method (auto-plot, reflection plotter, etc.), and copy of plot, if available
6. Check performance of equipment
7. Course recorder
8. Lights/day signals carried and operated in ship, and those seen in other ship
9. Sound signals, including fog signals, made by ship and when, and those heard from other ship and when
10. If a listening watch was kept on VHF radio channel 16, or other frequency, and any messages sent, received or overheard



11. Number of radars carried on ship, number operational at time of casualty, together with ranges used on each radar
12. Whether steering by hand or automatic
13. Check that steering was operating correctly
14. Details of look-out
15. The parts of each ship which first came into contact and the angle between ships at that time
16. Nature and extent of damage
17. Compliance with statutory requirement to give name and nationality to other ship and to stand by after collision

*B-3) Grounding:*

1. Details of voyage plan, or evidence of voyage planning
2. Last accurate position and how obtained
3. Subsequent opportunities for fixing position or position lines, by celestial or terrestrial observations, GPS, radio, radar or otherwise, or by lines of soundings and, if not taken, why not
4. Chart datum comparison to WGS datum
5. Subsequent weather and tidal or other currents experienced
6. Effect on compass of any magnetic cargo, electrical disturbance or local attraction
7. Radar/s in use, respective ranges used, and evidence of radar performance monitoring and logging
8. Charts, sailing directions and relevant notices to mariners held, if corrected to date, and if any warnings they contain had been observed
9. Depth sounding taken, when and by what means
10. Tank soundings taken, when and by what means
11. Draught of ship before grounding and how determined
12. Position of grounding and how determined
13. Cause and nature of any engine or steering failure before the grounding
14. Readiness of anchors, their use and effectiveness
15. Nature and extent of damage
16. Action taken, and movements of ship, after grounding

(Note: information as in cases of foundering may also be required)

*B-4) Foundering:*

(Investigators should bear in mind the IMO damage cards and intact stability reporting format.)

1. Draught and freeboard on leaving last port and changes consequent upon consumption of stores and fuel
2. Freeboard appropriate to zone and date
3. Loading procedures, hull stresses



4. Particulars of any alterations to hull or equipment, since survey, and by whom such alterations sanctioned
5. Condition of ship, possible effects on seaworthiness
6. Stability data and when determined
7. Factors affecting stability, e.g. structural alterations, nature, weight, distribution and shift of any cargo and ballast, free surface in tanks or of loose water in ship
8. Subdivision by watertight bulkheads
9. Position of, and watertight integrity of, hatches, scuttles, ports and other openings
10. Number and capacity of pumps and their effectiveness; the position of suction Cause and nature of water first entering ship
11. Other circumstances leading up to foundering
12. Measures taken to prevent foundering
13. Position where ship foundered and how established
14. Life-saving appliances provided and used, and any difficulties experienced in their use

*B-5) Pollution resulting from an incident:*

(Investigators should bear in mind IMO reporting of incidental spillages of liquids, 50 tonnes or more, and reporting of information from investigation of incidents involving dangerous goods or marine pollutants in packaged form.)

1. Type of pollutant.
2. UN number/IMO hazard class (if applicable).
3. Type of packaging (if applicable).
4. Quantity on board.
5. Quantity lost.
6. Method of stowage and securing.
7. Where stowed and quantities in each compartment/container.
8. Tanks/spaces breached.
9. Tanks/spaces liable to be breached.
10. Action taken to prevent further loss.
11. Action taken to mitigate pollution.
12. Dispersant/neutraliser used, if any.
13. Restricting boom used, if any.

**\* ATTEMPTING ALL PARTS OF THE LEAFLET:**

All the parts of the questionnaire need to be attended & if any part is irrelevant or unrelated; it should be crossed out to show that it has been seen/attended.

**\*REPORTING**

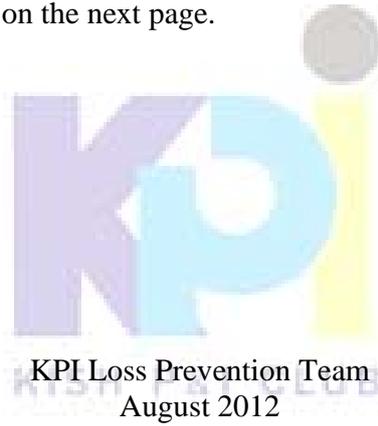
In order to achieve a uniformly accepted pattern for reporting the result of investigations; the Reports should include the following parts, wherever possible:



(The information required for compiling the report will be extracted from the check-list & answers to the questions therein)

1. A summary outlining the basic facts of the casualty and stating whether any deaths, injuries or pollution occurred as a result;
2. The identity of the flag State, owners, managers, company and classification society;
3. Details of the dimensions and engines of any ship involved, together with a description of the crew, work routine and other relevant matters, such as time served on the ship; [ For the purpose of this part; a copy of the ship's particular & a copy of the crew list can be used along with a short narrative to describe the work routine and other relevant matters ]
4. A narrative detailing the circumstances of the casualty;
5. Analysis and comment which should enable the report to reach logical conclusions, or findings, establishing all the factors that contributed to the casualty;
6. A section, or sections, analysing and commenting on the causal elements, including both mechanical and human factors, meeting the requirements of the IMO casualty data base;
7. Where appropriate, recommendations with a view to preventing similar casualties.

A sample format has been given on the next page.





INVESTIGATION REPORT

DATE OF REPORT:

REPORT ADDRESSED TO:

1-SUMMARY

2-DETAILS OF FLAG, OWNER, MANAGER & COMPANY

NAME OF THE SHIP:

VOYAGE NUMBER & DATE OF INCIDENT:

BRIEF DESCRIPTION OF THE INCIDENT:

3-DETAILS OF SHIP, ENGINE, CREW, WORK ROUTINE &  
OTHER RELEVANT MATTERS

4-NARRATIVE DETAILS OF CIRCUMSTANCES OF CASUALTY

5- ANALYSING & COMMENTING ON CONTRIBUTING  
FACTORS

6-ANALYSING & COMMENTING ON CAUSAL ELEMENTS

7-RECOMMENDATIONS FOR PREVENTION