Appendix 6

Quick Check Lists for Field Investigators for Various Types of Accidents

The questions contained in the next few pages were developed by the New Zealand MSA. They are not all inclusive but as these questions are asked and answered, they will ultimately lead to others. It is suggested that laminated copies be made available to the investigators.

Groundings

1 Name, address, telephone number, date of birth, qualifications and experience.

2 What was the passage plan? (Ask about courses, times, weather, way points, intentions, distances on each leg, dangers on passages & why, critical points on passage)

3 What were the night orders? What were you told?

4 What were the standing orders? from both master to others and from company to ship.

5 Ask to see the chart and log book used? Was a Nautical Almanac used or tide tables? Take copies of charts and logbooks.

6 What was the position fixing method and how often was the position fixed?

7 What was the last fix plotted before the vessel grounded?

8 What were the courses and speeds over ground that were steered?

9 What were times of course alterations?

10 Were you steering by hand or by auto pilot?

11 What was the Gyro/compass error and the allowance/correction? See compass error book.

12 Do you have a compass correction certificate? What was the deviation on the course steered?

13 What was the weather like, leeway?

14 What was the tidal stream?

15 What was the visibility like? (fog?, moon?, how they determined it) Where there any decklights impairing visibility?

16 How was the radar performing? Was there clutter? Do they know how to use it? What was the radar range in use?

17 Was the echo sounder in use and used in comparison with the chart? Was there an alarm set? Does it work on the plane? Is it affected by speed?

18 What were your rest/work periods for the previous week?

19 Had you consumed any alcohol?

20 What were the orders (regarding courses, speeds, way points) that were left at the change over of watch? Before taking over the watch did you verify the vessel's position? By what means?

21 What time did the vessel ground? What speed do you estimate the vessel grounded at? How many people were on the bridge at the time of grounding? What was everybody else doing?

22 What was the position of the grounding? Did you check the vessel damage, water ingress, propeller damage? Was any pollution caused?

23 What was the vessel' draft?

24 Has the vessel a course recorder?

25 What setting were the engines at when the vessel grounded?

26 Was the gear tested prior to arrival/departure?

27 What was the height of tide?

28 Did any alarms sound before contact?

29 Can I see your accident register?

Stability

1 Full names, addresses (and nationalities if not NZ) of witnesses with contact telephone numbers.

2 Age and date of birth.

3 All sea going qualifications (including country of issue if not NZ). Ascertain, as fully as possible, *precisely* what instructions (written, verbal and practical) each witness has received, when and from whom on stability. *(As an example, the holder of a CLM certificate should know what is meant by 'good stability" and "poor stability" and recognise the warning signs of the latter.)* In addition, he should be able to describe the effect on stability of:

- Raising & lowering weights
- Freely suspended weights
- Free fluid surface
- Low freeboard
- Obstructed freeing ports
- Rolling period. Rolling faster or slower than normal.

For details of the stability knowledge that holders of a Coastal Master Certificate, Mate and Skipper of a Deep Sea Fishing Boat should have - the syllabuses are available from Seafarer Licensing.

4 How long at sea, date of joining the vessel and previous seafaring background of witnesses. How long on this vessel. What training have you received on stability and free surface effect?

5 Particulars of the vessel should include:

- Name & port of registry
- Type & category of vessel
- Official number
- Present ship location
- Owners and/or agents addresses & contact phone numbers
- Registered & overall length
- Maximum breadth
- When & where the vessel was built
- Gross & net tonnage
- Draughts of vessel
- Summer deadweight & draughts on summer deadweight
- Freeboard on summer deadweight
- TPC at load draught

- Number & location of all watertight doors, watertight/non watertight bulkheads, hopper tanks and cofferdams
- Number, location capacity and dimensions of all double bottom tanks (void, water ballast, fresh water & fuel oil)
- Number, location (including height above the keel), dimensions and capacity of all wing tanks, day tanks & service tanks (void, water ballast, fresh water, lube oil, machinery oil and fuel oil)
- Number, location & capacity of all water ballast and bilge pumps
- Number, location & height above bottom of tank/hull plating of all bilge/ballast suctions including whether fitted with high bilge alarm.
- Volume in cubic metres of cargo holds/fish holds/freezer spaces
- Dimensions of cargo holds/fish holds/freezer spaces
- Number & position of all air pipes to ballast fuel oil tanks and manner of blanking off
- Number & position of all ventilators (including accommodation, engine room, fish & cargo holds) and manner of blanking off
- Details of all other closing appliances at weather deck level, including their manner of securement, e.g., fish holds and cargo holds
- Number, location & dimensions of all freeing ports
- Details of all substantial fixed weights above main deck level to include height above the keel and weight and date when fitted, e.g., on fishing vessels, such things as 'A' frames and booms, truck decks and net rollers (including warp wires and nets)
- How were the tank soundings determined:- by manual soundings and/or automatic system?
- What was the purpose of the voyage?
- Navigational information eg. auto pilot/hand steering

6 Obtain copies of the following documents from the vessel:

- Stability booklet
- Stability cross curves
- Hydrostatic curves
- Bonjean curves
- TPC and displacement curves
- GZ Curves
- Load line certificate
- Tonnage certificate
- General arrangement plan
- Capacity plan
- Pumping arrangement plan
- Shell expansion plan
- Cargo stowage plan

7 Ascertain the distribution/weight and height above the keel of all moveable weights on the vessel at the time of accident/incident, i.e., cargo, stores, fuel, oil/lubricants, fresh water and ballast water. In respect of ballast, fuel oil and fresh water tanks, ascertain which of these were empty, full or partly full. Ascertain the GM of the vessel, if this is possible.

8 Ascertain which, if any, weights were moved or were in the process of being moved, when or shortly before the accident/incident happened, including when this was done, from where and to which point the weight was being moved, the amount of weight being moved, the reason why and the type of weight being moved, e.g., ballasting/deballasting tanks, moving cargo, landing fish on deck.

9 Ascertain details of the weather, to include height of sea/swell and duration between wave/swell crests. Clarify the extent to which, if at all, any seas were being shipped on board and if so where and in what quantity the extent to which this was remaining on the deck and the times at which this occurred in relation to the accident/incident. Did you kow hatches were shut? How did you know?

10 Ascertain the extent to which the vessel was rolling, i.e., in degrees and whether the vessel was rolling quickly or slowly. Do you understand the significance of this?

11 Ascertain whether the vessel was listed at all before the accident/incident and if so, when and to what extent.

12 Ascertain how cargo both on and below deck was secured, e.g., by lashing, shoring/pound boards.

13 Ascertain to what extent, if at all, the vessel was hogged or sagged.

14 Ascertain precisely what steps the crew took to prevent the accident/incident occurring, e.g., by lowering weights, ensuring weights were properly secured, pressing up slack tanks to reduce free surface effect, minimising rolling of vessel/water being shipped on deck (e.g., by reducing speed/turning into the weather, vessel hove to, etc.) securing watertight doors and all openings at weather deck level.

15 What was the disposition of the cargo/fish at the time?

16 Do you understand what is meant by free surface effect (FSE)? How was FSE established? How was it applied in your calculations and what practical effect did it have?

17 Have you had a similar disposition of weights on other voyages or was this unusual?

18 Have there been any modifications to the hull or equipment recently? What are they?

19 What was the draught when you left? What displacement does this draught correspond to?

20 What valves were left open?

21 Do you know if they function adequately as non return valves? When were they last cleaned?

22 How often do you check the level in the fish hold?

23 How frequently did you have to operate the bilge pump?

24 Describe the fuel transfer procedure. Was it adhered to?

25 What is there to prevent the seawater inlet valve for the deck service line back flooding?

26 How much weight (fish) can be landed on deck before the vessel's stability will be compromised? How do you know this? How do you decide how much of the load to pick at once?

27 Who calculates the maximum bending moments allowed? How does he/she do it? Who sets the standard? Were the standards exceeded on this occasion?

Personnel Injury

1 Name, address, phone number, date of birth, qualifications.

2 What is your position on board (skipper, deckhand etc.)?

3 How many years of experience do you have in the industry?

4 How long have been on board vessel?

5 Is the vessel surveyed? What SSM Company?

6 How many crew are employed on board?

7 What were the events of the accident? *(Take time to ask for clarification on tasks and procedures, events leading up to the accident, and establish times! Also find out what happened afterwards regarding the emergency procedures.)* How efficient were the emergency procedures?

8 Was the seafarer told to clean/use the machinery/equipment or undertake the task on this particular occasion? If so, by whom? What initial training was the crew member given before undertaking this task?

9 What are the main tasks of the victim on board? When did he/she last undertake safety training? Was the crew member fit to undertake duties?

10 Had the person cleaned/used/maintained the machinery, or undertaken the task before? How often? Did he/she take precautions or follow procedures in the past? Was the crew member taking any short cuts or not using the equipment correctly? If so, why?

11 What instructions were given regarding the operation of machinery, or the performance of the task? (Ask both the person in charge and the victim.)

12 Were regular checks made that any person, using the machinery/equipment, or undertaking the task, was taking precautions as instructed?

13 Who was operating the controls? Was any other seafarer assisting in the task? Did the equipment have emergency stops. When were they last tested? Were the controls within easy reach of the operator?

14 If equipment or machinery was involved, who was the manufacturer? How old was the model? Have replacement designs been subsequently introduced to the industry which have eliminated the hazard? Have any modifications been made to the equipment? Had controls been modified or over ridden? When was the equipment last examined? Were there any guards in place? Were these sufficient?

Had guards been asked for yet not supplied? Are all running nips guarded?

15 Have other injuries or close calls occurred under the same circumstances? *(i.e., associated with the same equipment/ machinery/procedures / task?)* Have any other crew had problems or suffered injury as a result?

16 If so, had the injury or near miss been recorded in the accident register? Were they discussed at safety meetings?

17 Are these mishaps reviewed, investigated and monitored?

18 How often is the accident register reviewed?

19 Is it necessary to do the task in the way it was done on this particular occasion? Could it be done in another way? Safer?

20 Had this particular task/equipment/machinery/procedure/ substance been identified as a hazard to the crew?

21 Are there any notices on board the vessel to warn seafarers about the hazard?

22 Have any notices been erected since the accident?

23 What has been done to prevent a similar accident from occurring?

24 Has comprehensive hazard identification been carried out on the vessel?

25 What method was used? (Items analysis, task analysis, process analysis) Was a checklist used?

26 Were significant hazards identified and then controlled. Was priority given firstly to elimination and then by isolation or minimisation?

27 Have the hazards been managed? Give examples.

28 What training have the seafarers received with regards to all hazards on board the ship?

29 Are there any procedures that have to be followed on board?

30 Are these documented?

31 Are you aware of any similar accidents occurring on any other (similar) vessels in the industry?

32 What personal protective equipment is available to the crew?

33 Has training been given to the use of the personal protective equipment?

34 Is there an induction programme for new crew members who work on board?

35 How is information about safety on board vessels communicated to the crew? (e.g. notices, manuals, meetings, etc.)

To the employer:

36 Are you aware of the responsibilities under the [specify the national legislation]? (To identify, assess and control significant hazards, Ensure every seafarer is given information about emergency procedures and all identified hazards, provide appropriate training and supervision and involve seafarers in the development of health and safety procedures.)

To the seafarer:

37 Are you aware of your responsibility as a seafarer under the [specify the national legislation] that all practicable steps must to taken to ensure your own safety and the safety of others. And that you must not knowingly expose yourself or others to harm?

Collision

1 Name, address, telephone number, date of birth.

2 All sea - going qualifications (including country of issue if not NZ) and when obtained. This to include any ancillary certificates such as radar simulator, navigation control, electronic navigational systems and bridge resource management. Rank on board the vessel at the time of the collision and date of first attaining that rank.

3 How long have you been at sea, what date did you join the vessel, and what is your previous seafaring background (in brief).

4 What are the particulars of vessel *(include)*:

- Name and port of registry
- Type & Category of vessel (including whether laden or ballast)
- Official number
- Present ship location
- Owners and/or agents addresses & contact phone numbers
- Registered length & overall length
- Maximum breadth
- Distances from bridge to bow and bow to stern
- Height of bridge above the waterline
- When & where the vessel was built
- Gross tonnage
- Deadweight
- Draughts of vessel at the time of collision
- Make & type of main engine with details of propulsion power
- Maximum sea speed of vessel & direction of revolution of propeller (e.g., right or left turning, fixed or CPP)
- Turning circle and stopping information of vessel, if available (usually displayed on bridge)
- Manoeuvring data, if available (usually displayed on bridge), including corresponding revolutions & speeds at full, half, slow and dead slow ahead and astern, plus emergency full astern.

5 Particulars of bridge and navigational aids to include:

- Number and type of compasses and repeaters - check if gyro repeaters are correctly aligned with master compass with details of gyro error and magnetic deviation - see deviation card on vessel. Check chart for details of variation

- Number & types of radar (e.g., relative motion and/or true motion together with type of display being used at the time of collision, such as "north up" or "ship's head up" and whether stabilised or unstabilised, range scales available on the radars, whether fitted with VRM and the type of bearing cursor), whether there are any blind sectors on the radars, and if so, their extent and location.
- Whether the vessel is fitted with an ARPA
- Type of log fitted, e.g., doppler (check for accuracy)
- Number & type of echo sounders (e.g., digital or graph paper)
- Type of position fixing equipment (other than radar) e.g., GPS/DGPS, whether corrected to agree with NZ geodetic data
- Type of steering gear apparatus - manual, automatic hydraulic, electric
- Type of communication equipment such as VHFs (fixed and hand held) including number of channels, SSB and whether H/F or M/F, portable aldis lamp and/or fixed light signalling equipment, whistle and whether it's manual/automatic or both
- Course recorder trace, if fitted
- Details of the navigational chart(s) in use at the time and whether corrected and up to date
- The position of all of the above equipment within the wheelhouse / chartroom. This should be noted on a sketch plan with photographs and any defects noted. The plan should also note the number and position of windows/doors within the wheelhouse, whether these were open/closed at the time of the collision and details of any blind sectors caused by the existence of cranes or other structures on the fore deck.

6 Where the vessel was proceeding from and to at the time of the collision, with type of cargo carried

7 The names and ranks of the master, pilot (if any) and crew who were on the bridge, on deck and in the engine room at the time of the collision. Ascertain where master ,pilot and each crew member was at the time of the collision and what they were doing in the 2-3 minutes immediately preceding the collision.

8 The originals of <u>all</u> deck and engine log books, main engine print out sheets/bell books, course recorder trace, echo sounding traces, radio traffic messages, weather reports/facsimile sheets, gyro/compass error books, crew list, officers' certificates (if not NZ), working charts, master/pilot/crew reports/sketches of the collision, masters/company standing orders/instructions and masters night orders <u>*must*</u> be obtained and considered before any interview and then used as a cross reference when interviewing each witness.

9 Details of the weather conditions, range of visibility and tidal data at the time of the collision and the extent to which, if at all, these were causative of or contributed towards the collision.

10 Get information on the extent of damage to both vessels, details of any crew injury and risk of pollution from cargo/bunkers.

11 How did you ascertain if a risk of collision existed?

12 Did you find that a collision risk existed?

13 Whose responsibility was it to give way?

14 Whose responsibility was it to stand on?

15 How did you exercise that responsibility? *(Give times of course and/or speed alterations and their effects)*

16 The time, relative bearing, distance course, speed, closest point of approach (CPA) and time of CPA (to your vessel) of the other vessel when it's echo was first observed by radar (if applicable) – when obtaining the time, get the source of this i.e. Ship's clock or watch and its accuracy

17 The course, speed and position of your vessel at the time the other vessel was first observed by radar.

18 The time, relative bearing, distance, course, speed and the configuration of the navigational light(s) exhibited by the other vessel when she was first observed visually .

19 The course, speed and position of your vessel at the time the other vessel was first observed visually

20 Whether any plots were made of the other vessel - if so, ascertain from which source these plots were made i.e. Radar or by hand and by whom they were made. They should be checked for accuracy.

21 Details of the navigational aids that were in operation, whether or not these had any defects and the crew who were on duty on the bridge and in the engine room of your vessel at the time the other vessel was first observed by radar/visually.

22 Details of the changes in the course, speed, relative bearing, distance, CPA and time to CPA and the configuration of the navigational lights of the other vessel *and the times at which these occurred* between the time she was first observed by radar and/or visually and the time of the collision.

23 Details of the changes in the course and speed of your vessel (this should include the helm orders/action and telegraph orders/action that occurred), the reasons for these changes and the times at which they occurred from the time the other vessel

was first observed by radar/visually and the time of the collision.

24 Full details of any aural/visual warning signals that were made by your/the other vessel, the times that these occurred and the relative bearing and distance of the other vessel when they were made. If any contact was made over the VHF/SSB get details of what was said, the time this occurred and what action, if any, was taken as a result.

25 The time the collision occurred and its position - this should include who obtained this information, the manner in which it was obtained e.g. GPS and its accuracy.

26 Ascertain the angle of blow between the two vessels at the time of impact, the parts of each vessel that initially and subsequently came into contact, the heading and speed of both vessels on collision and whether the two vessels were on a steady course or swinging when this occurred.

27 Get details if the master, pilot, crew were alert/sober - go through work/sleep pattern over last 72 hours to determine if master, pilot crew were fatigued - in this regard check the quality of sleep which may have been impaired by noise, personal concerns or interruptions.

28 Check whether the collision was witnessed by any other vessel. If so get as much information as you can on her identity so that follow up action can be taken.

29 Check with the engineers on duty for the time of collision and confirmation of engine manoeuvres.

30 Note that the crew can assist you/themselves by drawing sketch plans of the events leading up to the collision - ship models are also a useful aid.

Fire

1 How was the fire detected?

2 When was the fire detected?

3 Where was it thought to be?

4 What action was taken to extinguish the fire (alarms, stations, etc.)?

5 What fire fighting equipment was available (CO_2, portable, hoses, BA sets)?

6 Did the equipment work?

7 When was the equipment last inspected?

8 What did the fire fighting parties do?

9 Was it effective?

10 If not, why not?

11 Was the fire electrical, spontaneous combustion, conduction, convection, radiation?

12 How recent were the equipment overhauls?

13 Were they while in drydock or new installations?

14 How frequent are fire drills on the vessel?

15 Are there log book entries of fire drills?

16 Does the vessel have a fire fighting plan?

17 Were the fire service called?

18 Was the vessel stopped?

19 Was the course altered?

20 Where was the seat of the fire? What was the ignition source?

21 Are there any photographs or video evidence of the fire?

22 What was the combustible material involved in the fire?

23 Did the fire give off any gas/smoke, and if so, what colour was it?

24 How were any burns or smoke inhalation treated?

25 How many of the crew have fire fighting certificates?

26 Has there been a fire on board the vessel before?

27 Can I see your accident register?

28 With hindsight, how could you have dealt with it better?

29 Were there fuel remote trips? Ventilation flaps? Fan trips? Pump trips?

30 Were the fire dampers, fuel shut offs, fire doors used? Did they work? How often were they tested?

31 Was any use made of BA gear?

32 Who had been given training in the use of this equipment?

33 Were standard procedures followed

34 What training do the crew get? (courses, drills, videos)

Machinery Failure

1 Name, address, telephone number, date of birth, qualifications and experience.

2 Establish, what, where and when.

3 What was the mechanism of the failure, in as much detail as possible:

- What machinery and which part
- Any collateral damage
- Resulting circumstances
- Had there been any signs of impending failure?
- What was done about them?
- Try, if possible, to collect up and save damaged parts.
- Take lots of photos
- Get/make sketches or line diagrams

4 When did it happen?:

- Time of damage, as near as possible
- When and how it was noticed

5 Actions taken when the damage became apparent:

- Who did what, and why, when & how?

Once the circumstances of the actual accident/failure have been established, there are a number of questions you can ask, and actions you can take, that will be a significant help to the inquiry. Questions such as:

6 Had there been any concerns about this machine?

7 To whom were these expressed? Were they raised at safety meetings?

8 Is there a record?

9 Has this happened before? How many times? Have any trends been identified

10 Were procedures in place to prevent/mitigate this happening again?

11 Are these procedures documented?

12 Can you show that these procedures were followed?

13 What is the maintenance period for this machine?

14 When was the machine last overhauled?

15 Is there a record?

The following documents should be collected or photocopied (as appropriate):

- Machinery manuals
- Engineering drawings
- Piping diagrams
- Log books
- Any other official records that may be useful, such as maintenance records and planned maintenance schedules
- Letters/Reports that may refer
- Data log records

16 Are manuals in a language understood by all ship staff?

17 Are there warning signs on the machinery that failed?

18 Would warning signs have prevented the failure?

19 Did fatigue play a part?

20 What would you do to stop a recurrence?