

Investigation of the capsizing
and sinking of the
fishing vessel

***Solway Harvester* BA794**

11 miles east of the Isle of Man
on 11 January 2000
with the loss of seven lives

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Extract from
The Merchant Shipping
(Accident Reporting and Investigation)
Regulations 1999

The fundamental purpose of investigating an accident under these Regulations is to determine its circumstances and the causes with the aim of improving the safety of life at sea and the avoidance of accidents in the future. It is not the purpose to apportion liability, nor, except so far as is necessary to achieve the fundamental purpose, to apportion blame.

Note

This summary report is not written with liability in mind and is not intended to be used in court for the purpose of litigation. It endeavours to identify the relevant safety issues pertaining to this specific accident, and to make recommendations aimed at preventing similar accidents in the future.

NARRATIVE

Solway Harvester sailed from Kirkcudbright at about 0130 on 10 January 2000 and headed south into the Irish Sea. Seven people were on board.

About 0930 on Tuesday 11 January, the skipper had already filled 150 to 155 bags of scallops. The wind at the time was light, force 2, but the forecast was bad.

Solway Harvester hauled her gear at 1530. The conditions were deteriorating. With the wind now SW force 7 to 8 and the forecast continuing poor, the skipper headed for shelter at Ramsey Bay, Isle of Man, about 27 miles to the north-west.

During *Solway Harvester's* passage towards Ramsey Bay, the skipper made several telephone calls, one to inform the company purchasing the catch that he would have about 200 bags to land.

The last communication from *Solway Harvester* was to another skipper who was at home. The weather conditions were poor and Manx radio was forecasting winds up to 50 knots. The call was transmitted at 1729.

Nothing more was heard from her until 1747 when a polar orbiting satellite detected signals from an emergency position indicating radio beacon.

A major search and rescue operation was launched, which continued through the night. Two unopened liferafts were recovered, both of which were identified as being from *Solway Harvester*. With no hope remaining of finding survivors, the search and rescue operation was terminated at dusk on 12 January.

On 15 January, a seabed search located the wreck of *Solway Harvester*, lying on her starboard side in 35 metres of water. The bodies of all seven crew members were subsequently found in the wreck and recovered. The wreck was raised for further examination.

RECONSTRUCTION OF EVENTS

Examination of the wreck by the MAIB demonstrated that the *Solway Harvester* capsized. However, in theory, a vessel like *Solway Harvester* should have been able to cope comfortably with the seas that night. What the MAIB has had to determine is what sequence of events could have caused the capsize of an inherently stable vessel. The following reconstruction is necessarily speculative to a degree, but has been proved feasible by exhaustive tests and trials and is, in the professional opinion of the MAIB, the only explanation that fits all the facts. Details of analysis to reach these conclusions will be published in the full report in due course.

Solway Harvester recovered her last catch at 1530. If the crew had processed it immediately, the fish room would then have been unoccupied from 1615, approximately 1½ hours before she capsized. If the catch had not been processed immediately, but stored in the tipping bins, the fish room would have been unoccupied since 1515. It appears that during this period, the fish room flooded through water draining off the main deck through the ice scuttles, which were kept open to facilitate the passage of chutes from picking trays on the deck. The bilge alarm was known to be defective, so gave no warning of the flooding.

Solway Harvester's skipper finished the last of a series of calls on the vessel's mobile telephone and VHF radio at 1729. He was in the wheelhouse monitoring the vessel's passage to Ramsey Bay some 12 miles away. At least four of the crew were in their bunks in the aft cabin, and one, or possibly both, of the others were up and about elsewhere.

A few minutes later the skipper must have become aware that something was not right. Perhaps it was the vessel's subdued motion, or he noticed a list had developed, or he had been alerted to a problem by one of the crew. Whatever the prompt, he became suspicious that there was excessive water in the fish room. The mate was not on board on this trip, and the skipper had nobody else on board with sufficient experience to sort out the flooding. He, therefore, decided to leave the wheelhouse himself.

Before leaving the wheelhouse, he pulled the throttle/gear lever back to the neutral position, and moved the throttle lever to maintain the engine speed at about 1400 rpm. This would normally ensure the bilge pump and generators continued to run to capacity. He also turned on the exterior floodlights to illuminate the vessel to warn other shipping. They would normally have been switched off while making way. He turned off the autopilot to stop unnecessary rudder movement. As the way came off, *Solway Harvester* would have come beam to sea, with the wind and waves on her port beam. She would have started to roll more heavily.

It cannot be determined exactly what he did next but two thoughts would have occurred to him: a need to alert the crew and to get the water pumped out as quickly as possible. He would have wondered why the bilge pump, set to pump the fish room slush well continuously, was not working as it should. A natural reaction would be to check through the system by looking at various possibilities, and eliminating them one by one. The easiest way to check if the ejector was clear would have

been to see that there was water flowing through it.

The skipper probably saw water being discharged over the side, but would not have been able to tell whether it included bilge water from the fish room. He might have suspected that the bilge suction was blocked in the fish room, but, since the strainer would have been underwater and inaccessible, he could not verify this or clear the blockage.

To increase the ejector's suction capacity further, someone appears to have closed the valves supplying water to the starboard shaker, starboard tipping bins, the port shaker and port forward tipping bin. These valves were normally open at sea, reducing the suction at the fish room slush well to nothing when the port Desmi pump alone supplied all the outlets. However, the valve to the aft port tipping bin was found open when inspected after the accident, suggesting that there had possibly not been enough time to complete the process.

At some point the skipper was in the engine room. Possibly he used the fore-deck hatch to get there. It was later found open. It is not known what he was trying to do in the engine room, but it is known that it involved taking local control of the engine speed by lifting the governor control lever on the main engine, and rotating it through 180°. This was the position in which it was found, and it was unlikely that anyone else on board would have known how to do it.

It is impossible to know exactly what happened in the final moments before *Solway Harvester* capsized, but clearly the skipper returned to the main deck. One of the fishermen was inside the fish room with a screwdriver and might well have been trying to clear the submerged bilge suction strainer. The doors to the starboard passageway and the workshop had been opened, possibly to get something from the workshop.

Solway Harvester would have rolled to a very large angle, probably 30° to 40°. This would have caused some of the catch, and the spare gear in the fish room, to slide to starboard. *Solway Harvester* would have slowly recovered to a list of about 20° to 25°, but been prevented from coming further upright by a number of factors: the movement of cargo and spare gear to starboard; the water trapped in the starboard passageway; and water retained on the main deck.

Water would have been continuing to flood into the starboard passageway and the aft workshop through the open weathertight doors.

The starboard ice scuttle would have been submerged, causing massive additional flooding to the fish room and eroding the vessel's stability still further.

The quantity of water retained on the main deck would have increased. Slowly to start with, but ever faster, *Solway Harvester* would have rolled to starboard until she lay on her side. The crew would not have been able to do anything about it. She would have continued to roll until almost completely upside down.

The flooding would have continued until all positive buoyancy had been destroyed. She sank at about 1745.

SAFETY RECOMMENDATIONS

During, and arising from, the investigation the MAIB issued Safety Bulletin 1/2000 on 23 February 2000 which included the following interim recommendations (1 to 4):

Owners and skippers of UK fishing vessels are recommended to:

1. ***Check that any liferaft carried is in date for servicing and correctly attached.***
2. ***Check that anyone sailing in their vessels who was born after 1 March 1954, has completed the mandatory safety training. If it is found that they have not, such training should be arranged as a matter of urgency.***

The Maritime and Coastguard Agency is recommended to:

3. ***Take immediate action in its promotion of safe practice and its enforcement of safety requirements on the four areas of concern raised by the loss of Solway Harvester:***
 - ***the watertight integrity of main decks***
 - ***the service history of liferafts***
 - ***the correct installation of liferafts***
 - ***crew's completion of the mandatory basic safety training courses.***
4. ***Examine all vessels of similar design to Solway Harvester to ensure the watertight integrity of the main deck.***

Comment: The MCA has accepted these recommendations.

The following additional recommendations from the investigation should be implemented, to ensure that lives are not lost in the future in similar tragic circumstances:

Owners of fishing vessels are recommended to:

5. ***Engage a suitably qualified marine safety expert to undertake a comprehensive review of safety management throughout the company. The aim should be to produce an effective safety management system for its vessels and crews.***

Rationale:

- The safety management system in *Solway Harvester* was shown to be inadequate in the condition of the liferafts and their securing arrangements, the absence of distress flares, a missing ice scuttle cover, a failed main bilge pump, and a missing protective cover over the starboard side of the fish room slush well.

6. ***Ensure that any crew member employed on any of its vessels has attended the three mandatory short safety courses in first-aid, survival and fire-fighting.***

Rationale:

- Four of the seven crew members had not attended the mandatory basic safety courses for fishermen, although this was not a factor in their deaths.

7. ***Inspect vessels in its fleet to ensure the protective covers over the fish room slush wells are in working order. The company should also ensure that its skippers and mates fully understand the importance and function of these items.***

Rationale:

- The cover to the fish room slush well was broken. Without the protection provided by the lid, there was nothing to prevent any large item dropping into the well near the open end of the bilge suction pipe. It could then be drawn to the pipe to block it completely.

8. ***Revise the arrangement on any vessel in its fleet, so that either the bilge suction strainers in the fish room are easily accessible or vessels are equipped with portable diesel-driven salvage pumps.***

Rationale:

- The bilge suction strainer in the fish room was not readily accessible when the fish room was loaded with catch, and flooded more than 200mm above the bilge well. There was no portable salvage pump on board.

9. ***Review the operations of its vessels with regard to the stowage of spare gear and fishing gear to ensure that these items can be properly secured against movement, and issue the appropriate instructions to its skippers in this regard.***

Rationale:

- Spare gear weighing 2.8 tonnes was lying unsecured on the floor of the fish room. The movement of this gear was one of the contributing factors to the capsizing.

- 10. *Review its stores policy, in the light of its risk assessments, to ensure spares for critical safety equipment such as bilge alarm sensors, are readily available.***

Rationale:

- On 22 December an electrician inspected the inoperative bilge alarm. If a new alarm sensor had been readily available, it would have been fitted, and might have averted the loss.

- 11. *Equip with bilge alarms the fish rooms and large volume shaft tunnels on all vessels.***

Rationale:

- The loss of *Solway Harvester* again demonstrates the importance of bilge alarms in all large spaces.

The Maritime and Coastguard Agency is further recommended to:

- 12. *Issue guidance to industry emphasising the need to stow catches in the fish hold securely to prevent them shifting at sea.***

Rationale:

- The stow of scallop bags was arranged with unsupported gaps to give access to the bilge suction strainer. Movement of the catch was one of the contributing factors to the capsizing.

- 13. *Review, and revise as necessary, the guidance to industry and surveyors regarding the accessibility of bilge suction strainers in fish rooms.***

Rationale:

- The bilge suction strainer in the fish room was not readily accessible when the fish room was loaded with catch, or was flooded more than 200mm above the bilge well. This contributed to the poor stow of the catch and the inability to respond effectively to the flooding.

14. Issue guidance to industry and fishermen's training colleges about watertight integrity, capsizing avoidance and the role of watertight bulkheads on fishing vessels.

Rationale:

- Although the syllabus for the Deck Officer Class 2 (Fishing) qualification covers free surface effects, it does not cover watertight bulkheads and sub-division. It is probable that *Solway Harvester's* skipper believed that in restricting any flooding to one compartment, the vessel's watertight bulkheads provided security against capsizing or foundering. They did not.

15. Issue guidance to the industry and surveyors regarding the acceptance of seawater pumps in combination with bilge ejectors.

Rationale:

- The capacity of the operable bilge pumps during the vessel's final trip met the requirements of the Fishing Vessels (Safety Provisions) Rules 1975. However, the discharge rate from the fish room slush well was negligible when the port Desmi pump was supplying simultaneously other outlets on both sides of the main deck, in addition to the bilge ejector.

16. Review its policy for the inspection of fishing vessels over 15 metres length overall, to assess their effectiveness in maintaining safety standards between the full surveys for the renewal of UKFVCs; intermediate survey requirements should be implemented.

Rationale:

- It is essential to maintain safety standards between these full surveys.

17. Enhance safety audits on fishing vessel employers to ensure that compliance with the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997 is achieved throughout the industry.

Rationale:

- Some of the equipment and procedural problems may have been highlighted by an audit of these Regulations.

- 18. Review its policy on the survey of remedial work and, if necessary, revise its guidance to surveyors to ensure that critical items are resurveyed.**

Rationale:

- The bulkheads enclosing the starboard passageway were not watertight because there were large gaps around pipes passing through them. The MCA had accepted the installation without inspecting it.

- 19. Review, and revise as necessary, the guidance on the criteria for assessing the acceptability of 'new' buoyancy, before approving revised stability books.**

Rationale:

- Utilising the buoyancy of the starboard passageway was a low cost solution to the stability problem, but the practical ergonomics of the layout were overlooked to achieve, on paper, compliance with the regulations. In this case, the area was an operational thoroughfare, that in an emergency was left open, with the result that it did not provide the reserve buoyancy required.

- 20. Revise the standard letter accompanying approved UKFVCs to show that changes could not only invalidate the certificate, but also seriously endanger the safety of the vessel and her crew.**

Rationale:

- *Solway Harvester* had been modified on several occasions without first consulting the MCA and/or Sea Fish Industry's Authority.

- 21. Review its policy for dealing with cases where surveyors discover that substantial changes have been made to a fishing vessel, which could endanger the vessel, and have not been notified to the MCA.**

Rationale:

- *Solway Harvester* had been modified on several occasions without first consulting the MCA. When some of the changes were revealed during a later survey, no action was taken.

22. Issue guidance to industry and surveyors regarding the restrictions in the approved use of flush deck scuttles on fishing vessels.

Rationale:

- The operation of the vessel, relying as it did on the continuously open ice scuttles when fishing, was fundamentally unsafe. However, current fishing vessel safety regulations placed no restriction on the use of the ice scuttles at sea.

23. Amend the fishing vessel safety regulations to ensure that the use of flush deck scuttles is more tightly controlled, and to phase out their use at sea as quickly as possible.

Rationale:

- The operation of the vessel, relying as it did on the continuously open ice scuttles when fishing, was fundamentally unsafe.
- The fishing vessel safety regulations placed no restriction on the use of the ice scuttles at sea.
- Had the flush deck ice scuttle openings been replaced with conventional hatches having coamings and weathertight closures, this accident would not have occurred.

24. Review and clarify the guidance on the application of the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997 in respect to risk assessment on the safety of the vessel.

Rationale:

- The Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997 requires employers to ensure the safety of the vessel as a work place, but this is apparently contradicted by MGN 20 (M+F) which excludes the need for a risk assessment on hazards which imperil the ship.

25. Consider a research project to investigate whether the trend in modern fishing vessel design towards lower length to breadth ratios is exposing them to an increased risk of capsize in the event of fish room flooding.

Rationale:

- The large size of the fish room meant that relatively low levels of flooding could lead to the vessel capsizing. The Fishing Vessel (Safety Provisions) Regulations 1975 do not require the consequence of flooding to any internal space to be examined.

26. Issue guidance to the industry and surveyors on remote access to seawater inlet valves in shaft tunnels.

Rationale:

- The seawater inlet valves in the shaft tunnel would have been inaccessible in the event of flooding to that space, and could not be operated remotely from inside the engine room. On *Solway Harvester's* sister ship, *Tobrach-N*, they could be.

The Sea Fish Industry's Authority and Fishermen's Federations/Associations are jointly recommended to:

27. Make it easier for fishing vessel owners to meet their obligations on safety training by examining ways of ensuring it is made readily available to all fishing communities throughout the UK.

Rationale:

- Four of the seven crew members had not attended the mandatory basic safety courses for fishermen, but this was not a factor in their deaths.
- The risk of an accident will be greatly reduced if everyone on board has received basic training in safety matters.

**Marine Accident Investigation Branch
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