



Ships and Fishing Vessels

At about 0110 on 21 June 2000 a fisherman from Iluka, New South Wales, was killed when his 14 m trawler was run down and sunk by a 181 m long, 42 717 tonne deadweight bulk carrier.

The collision highlights:

1. the risks faced by fishermen from large ships;
2. the limitations of radar; and
3. the mutual obligation of all people at sea to observe the International Regulation for Preventing Collisions at Sea, 1972 (Colregs).

The Risks

Since June 1995, the Australian Transport Safety Bureau has investigated fourteen collisions between trading ships and Australian fishing vessels. In all these cases, the fact that a collision occurred indicates that the lookout aboard the trading ship, both visual and by radar for whatever reason, was ineffective. In a few cases it is probable that the lookout was non-existent. Regardless of any failure on the part of the trading ship to keep a proper lookout:

- Only three involved fishing vessels engaged in fishing.
- Seven involved fishing vessels not engaged in fishing, but en route between fishing grounds.
- Four involved fishing vessels anchored in open water.
 - On three of the four vessels at anchor no lookout was maintained and the crewmembers went to bed despite being anchored in open waters in recognised shipping lanes,
- In twelve incidents, the fishing vessel failed to maintain a proper lookout
 - In four of the incidents, a contributory factor was that the person keeping

watch on the fishing vessel had no training, did not understand the obligations placed on a fishing vessel by the Colregs and did not understand how to use the radar.

- The number of crew typically employed on fishing boats was two or three, which for a sustained 24-hour operation is insufficient to fish and maintain a proper lookout required by the Colregs.

Until 21 June, Australian fishing vessels had been lucky as no fatalities had occurred.

Figures from the UK show that since 1991, at least 19 fishermen are known to have died as a direct result of collisions. In 1998, five fishermen were killed in four collisions involving merchant vessels and British registered fishing vessels.

The Limitations of Radar

RADAR operates by transmitting electromagnetic signals in the form of pulses from an antenna. Radar reflective objects, which lie in the path of this transmission reflect the signal, which is received by the same antenna in the form of a return signal (echo).

Radar technology has developed to the extent where radars are reliable aids to both navigation and collision avoidance. They do, however, have limitations. Radars are not 'all seeing eyes'.

It is important for fishermen to understand what these limitations are.

The weakest detectable echo, which a radar can display, is one which is just stronger than the radar receiver noise level.

The display of this echo is dependent on the following four factors.

1. The correct setting up of the radar display.
2. The siting of the vessel's radar antenna.
3. The target.
4. The weather conditions at the time of using the radar.

All these factors are very important, but the target and weather conditions are crucial to fishermen.

The target

The echo response received from a target depends upon the following four factors:

- (a) size,
- (b) shape,
- (c) composition and
- (d) aspect

(a) size

Targets presenting a large surface area to the radar signal will be detected easily and at long range. Small targets of limited surface area, which are not very high, may not be detected, if at all, until much closer to the source radar.

(b) shape

A smooth shaped object (hull of a fishing vessel) gives a poor radar detection response as compared to a rough shaped object (rocky coastal out crop).

(c) composition

Metal objects give a better radar response than wood.

Fibreglass objects are transparent to radar signals and will not be displayed on a radar screen.

Small vessels, particularly of wooden or other non-metallic construction, can have a large number of separate reflectors (metal masts, booms, engine and other metallic reflectors). None of these are large enough to provide a constant echo. The close proximity of masts rigging, engine etc., acting as reflectors, can also make the vessel a 'multiple' reflector target. This characteristic can result in either an enhanced echo or the return echoes cancelling each other out. A very small change in relative distance from the radar antenna can make the difference between being seen – 'in phase' – and not being seen – 'out of phase'.

Similarly, the phase of the radar signal and echo can be affected by skipping or bouncing off the sea surface resulting in signals that may subtract from each other as described above.

(d) aspect

A target beam on to the radar transmission is more likely to give a radar return than a target lying at an angle of 45° to the transmission.

Weather conditions at the time of using the radar

Waves themselves form targets, which when reflected and picked up by the radar, form 'sea clutter'. 'Sea clutter' varies widely with the sea state. Return echoes from rain showers (rain clutter) can have the same effect. Small vessels are more likely to be consistently lost in clutter than are large vessels.

Rain, fog, high humidity and an air temperature lower than the sea temperature will also reduce the radar detection range.

The Regulations

The Colregs apply to all vessels at sea.

The requirement to keep a proper look-out is a mutual obligation for all vessels at sea.

Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and risk of collision.

In short every vessel must keep a lookout, whether fishing or not.

Although power-driven vessels and sailing vessels must keep out of the way of vessels 'engaged in fishing', fishing vessels must, so far as possible keep out of the way of a vessel not under command or a vessel restricted in her ability to manoeuvre.

A vessel carrying certificates as a fishing vessel is only a 'restricted' vessel when actually engaged in fishing. It is not restricted when its nets are on the surface or when it is on passage to or from fishing grounds.

Vessels are only considered to be engaged in fishing when fishing with nets, lines, or trawls or other fishing apparatus which restrict manoeuvrability, but does not include a vessel fishing with trolling lines or other fishing apparatus which does not restrict manoeuvrability.

Please remember

If you cannot see a long way visually then the radar cannot generally detect targets at a long range either.

To improve the radar detection of small vessels you should fit as a minimum:

- a metal corner radar reflector mounted 'in the catch water position'; or
- an octahedral cluster of corner reflectors;

as high as possible above the water line.

Proper understanding and observation of the Colregs and a listening watch on channel 16 VHF can protect your life and your boat.

Safety at sea is like safety on the road. You should assume everybody else is a potential danger – an idiot – and act accordingly.

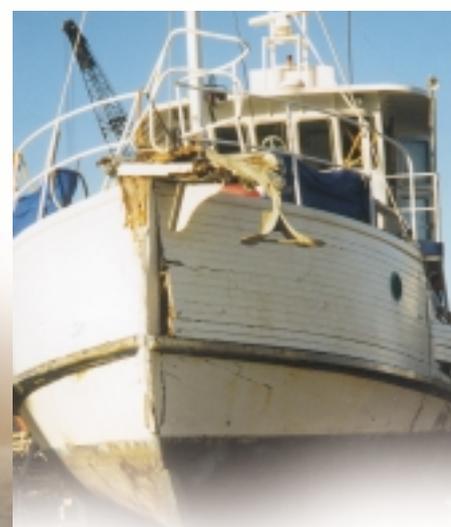
End note

The vulnerability of fishing vessels has been highlighted in a number of Incidents at Sea reports. The problems created by working lights were highlighted in Report 35 (September 1991) and Report 49 (December 1992). Since June 1995, the issue of fishing boats maintaining a lookout or the limitations in radar in detecting small vessels has been highlighted in the following reports:

- 81 (June 1995)
- 94 (July 1996)
- 98 (September 1996)
- 103 (November 1996)
- 104 (November 1996)
- 106 (December 1996)
- 116 (April 1997)
- 125 (September 1997)
- 131 (April 1998)
- 144 (February 1999)

Acknowledgements

ATSB is grateful to Mr Ian Smith, Manager Ship Simulator at the Australian Maritime College and Mr John Pothen, Teacher (Ship Simulator) at the Sydney Institute of Technology for advice on radar.



www.attrib.gov.au

1800 621 372