Report on the Investigation

on the Capsize of the

UK Registered Fishing Vessel

CATRINA NN194

South of Newhaven

on 13 October 1998

Extract from

The Merchant Shipping

(Accident Reporting and Investigation)

Regulations 1994

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.

CONTENTS

GLOSSARY OF ABBREVIATIONS

GM	Metacentric height
GZ	Righting lever measured between centre of gravity and the line of action of buoyancy force on hull
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
SFIA	Sea Fish Industry Authority
UTC	Universal Co-ordinated Time

Chart of area of interest, Newhaven to Eastbourne

SYNOPSIS

The accident was reported to the Marine Accident Investigation Branch (MAIB) during the afternoon of 13 October 1998. The investigation began the following day and an inspector interviewed the skipper and owner. An acute lack of resources stopped all progress on the investigation for many months, and it was re-started in late April 1999.

Catrina, a dual purpose stern trawler/twin beam scallop dredger of 11.96 metre registered length, broached and capsized at about 1305 on 13 October 1998 about 8 cables south of Newhaven breakwater light. The crew of two were thrown into the water and rescued by the fishing vessel *Boy Antony*; none was injured. The vessel was returning from a fishing trip with a small catch of red mullet. The wind was south-south-westerly force 5 and a steep 2m sea was on *Catrina*'s port quarter.

It has been concluded that *Catrina*'s stability was probably substantially less than that recommended by the Maritime and Coastguard Agency (MCA) for small fishing vessels, and that this was a factor in the accident. The broach was probably a consequence of *Catrina*'s speed and the vessel being steered by autopilot.

Three recommendations have been made to the owner covering stability, additional freeing ports and the obstruction of freeing ports.

Photograph of *Catrina* in port

VESSEL AND INCIDENT PARTICULARS

Vessel

Name	:	*Catrina*
Registered owners	:	Bickerstaff Fishing Co., West Quay Road, Newhaven
Port of Registry	:	Newhaven
Type	:	Fishing vessel (twin beam scallop dredger/stern trawler)
Crew	:	2
Fishing number	:	NN194
Registered length	:	11.96m
Overall length	:	13.92m
Breadth moulded	:	4.84m
Depth amidships moulded	:	2.12m
Construction	:	Steel, multi-chine
Built	:	1991 at Newbury Engineering Ltd, Newhaven
Position of accident	:	50° 45.71'N 000°03.89'E
Time and date	:	1305 on 13 October 1999
Casualties	:	None

1.0 FACTUAL INFORMATION

All times are Universal Co-ordinated Time (UTC) +1.

1.1 NARRATIVE

Catrina left Newhaven at about 0500 on 13 October 1998 with a crew of two (skipper and deckhand), to fish off Eastbourne. She arrived at the fishing grounds at about 0630 and shot her stern trawl. Her scallop bars were stowed securely, on either side of the deck.

Initially, the weather was favourable, but it steadily deteriorated during the morning and a gale was forecast. By midday, winds had increased to south-westerly force 5, forcing *Catrina* to stop fishing and head back to Newhaven with her catch of six boxes of red mullet. The hatch to the fish hold was securely closed. Her freeing ports were open and both derricks were topped.

The vessel approached Newhaven from the south at a speed of about 7.5 knots with the seas on her port quarter (**Figure 1**). A moderate swell was running and *Catrina* was rolling heavily. She was being steered by autopilot and holding her course well. Conditions were well within her known capabilities and she was experiencing little difficulty.

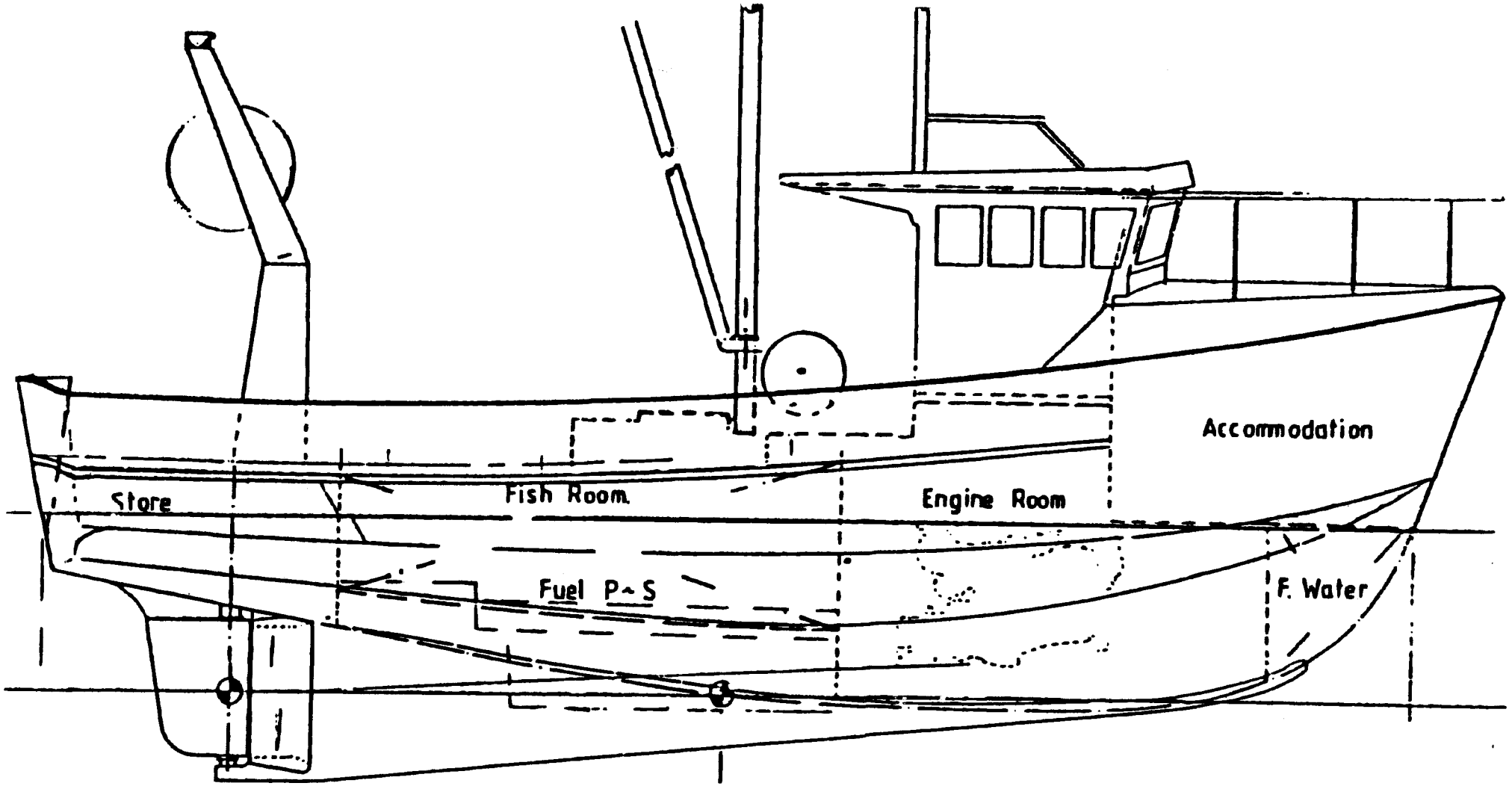
At about 1305, and less than a mile south of Newhaven breakwater light, *Catrina* broached, turning to port and rolling heavily to starboard. When she was in a trough, the skipper saw the crest of a large breaking wave bearing down on them. It hit *Catrina* directly on the beam and rolled her on to her side. Water flooded through the open wheelhouse door and the starboard engine room ventilator.

The deckhand was trapped inside the wheelhouse. He was rescued by the skipper who pulled him clear of the capsized vessel. *Catrina* rolled upside down and sank in 11 metre of water in position 50° 45.71'N 000° 03.89'E, leaking some 5000 litre of diesel fuel which was quickly dispersed by the rough seas.

Both the skipper and deckhand were rescued by another fishing vessel, *Boy Antony*, whose crew had been alerted to the accident by the duty officer in the West Pier signal station, who saw *Catrina* capsize. They were landed at Newhaven and taken to hospital by ambulance. The skipper required treatment for seawater ingestion.

1.2 THE VESSEL

Catrina was one of four identical sister vessels in service with the same company. She was manufactured to a design developed by the shipyard for the owner, and had proved very successful in service. The transverse stability of the design was not assessed, but the skipper had every confidence in the vessel which he had found very seaworthy during his 6½ years as skipper. On many occasions he had sailed in far worse conditions than generally prevailed on 13 October and did not expect problems on that day, particularly with a lightly loaded vessel.



Layout of *Catrina*

FIGURE 2

On 4 September 1998 *Catrina* sank while alongside in Newhaven. The cause of the sinking was a leaking stern gland which was repaired by fitting a new stern tube to the vessel. To do this a large portion of the skeg had to be cut away and the ballast inside the skeg removed. Both were restored before the vessel was put back into service.

The sinking on 4 September also broke the liferaft's securing straps. These had not been repaired when *Catrina* sailed on 13 October, and, on her first trip after the sinking, the liferaft was stowed inside the wheelhouse.

Catrina was equipped to operate as both a stern trawler and twin beam trawler and invariably carried both sets of gear when in service. The stern trawl was stowed on a net drum mounted on the towing gantry.

She was fitted with a forward wheelhouse (**Figure 2**). Access to the wheelhouse was through a wooden door in the starboard side of the aft bulkhead (**Figure 3**). Forward of the wheelhouse was the accommodation, which was connected to the wheelhouse by an opening in the bulkhead on the starboard side (**Figure 4**).

The fish hold was amidships between watertight bulkheads, and forward of this was the engine room. Access to the engine room was through a non-watertight hatch in the wheelhouse sole (**Figure 5**). Ventilators to the engine room were fitted on both sides just inboard of the bulwarks and against the aft face of the foc'sle bulkhead (**Figure 6**). The ventilators were 150mm x 200mm in section and stood 840mm above the weather deck.

No compartments were fitted with bilge alarms.

The working deck was bounded by bulwarks fitted with three freeing ports on each side and two across the transom. The total area of the freeing ports on each side was about 0.35 m^2, some 30% greater than the area specified in the Sea Fish Industry Authority (SFIA) *Rules for the construction of steel fishing vessels of less than 24.4 metres registered length*. The freeing ports could be closed by vertical plates (**Figure 7**).

Catrina was fitted with a 194 kW Cummins diesel engine driving a single fixed pitch propeller in a non-steerable nozzle. Immediately aft of the propeller was a single, centre-line rudder which was connected to the hydraulic steering gear and autopilot. Bilge keels, 360mm wide by 2800mm long, were fitted on both sides.

1.3 THE CREW

Both the skipper and crew had completed a basic sea survival course. The skipper was 31, he had been at sea for 16 years and skipper of *Catrina* for the last 6½ years, since the vessel was new. The deckhand was 18 years old.

FIGURE 3

Wheelhouse Door

FIGURE 4

Access to Forward Accommodation from Wheelhouse

FIGURE 5

Engine Room Hatch in Wheelhouse

FIGURE 6

Engine Room Ventilator on Port Side

FIGURE 7

Freeing ports

1.4 ENVIRONMENTAL CONDITIONS

High water on 13 October 1998 was at 1804. It was a neap tide, which at 1305 was ebbing at about 0.4 knots towards the east-south-east.

The wind was south-south-west force 5 and a moderate sea was running.

Boy Antony experienced a short, steep confused sea with breaking waves about 2m high when she went to the aid of the crew of *Catrina*. Similar conditions were reported by the RNLI lifeboat.

1.5 SALVAGE OF THE VESSEL

The vessel's insurers arranged for the salvage of the vessel. When she was recovered, all her freeing ports were found open and once she was pumped dry she floated without water ingress.

1.6 SUBSEQUENT ACTIONS BY THE OWNER

Following the accident, *Catrina's* owner engaged the services of a naval architect to examine her stability. He conducted an inclining test on her sister vessel *Carina* and, using this data, produced an estimate of the condition of *Catrina* when she capsized (**Annexe 1**). It was found that *Catrina* failed to meet the criteria recommended by MCA (**Annexe 2**) except for the minimum metacentric height (GM) and the area under the GZ curve to 30° (**Figure 8**).

Figure 8

***Catrina* - stability assessment, beamer**

Stability parameter	Minimum Recommended	Actual Measured	Assessment
Initial metacentric height, GM	0.42	0.869	pass
Angle of maximum righting lever	25	20	fail
Maximum GZ between 30° and 90°	0.24	0.177	fail
Area under GZ curve to 30°	0.066	0.082	pass
Area under GZ curve to 40°	0.108	0.105	fail
Area under GZ curve between 30° and 40°	0.036	0.024	fail

To further reduce his vessels' centres of gravity and increase their stability, the owner has instructed his skippers not to sail with both sets of fishing gear on board. That is, if a vessel is scallop fishing, the stern trawl gear should be removed from the vessel, and vice versa. He has also instructed his skippers to lower both derricks to the horizontal when the vessels are at sea.

1.7 OTHER INFORMATION

During the investigation, the MAIB received information that it was possibly the wash from the high speed catamaran ferry *Elite*, en route from Dieppe to Newhaven, which had exacerbated the sea conditions and indirectly caused the capsize of *Catrina*. Investigation showed that *Elite* arrived off Newhaven over half an hour after *Catrina* had capsized and so had no part in the accident.

2.0 ANALYSIS

2.1 SEA CONDITIONS

It is well known among local fisherman that sea conditions over the last mile of their approach to Newhaven are likely to be worse than the conditions encountered further seaward. There are no unusual seabed features south of Newhaven's west pier to account for this, and it is probably an effect of the shallower water closer to shore.

Experienced observers estimated that the wave height at the time of the accident was about 2 metre, which indicated (from wave statistics) that the highest waves were less than 3.7 metre. The steepness of the breaking waves was 1:7, giving wave lengths of 14 metre for a 2 metre high wave and 25.9 metre for one 3.7 metre high. Therefore, steep waves of similar length to *Catrina* could have been encountered, which is an important factor when considering broaching.

2.2 BROACHING

A broach occurs when a vessel, initially with the sea behind her, swings sharply to one side despite corrective rudder being applied. The tight turn will cause the vessel to heel to an angle which depends on her stability and rate of turn. A broach makes her vulnerable to capsize because she is not only beam on to the seas but also heeled, possibly heavily.

Any vessel in steep following waves of about the same length as herself and slowly overtaking her, will be vulnerable to broaching. These were the conditions as *Catrina* approached Newhaven. The most effective way the broach could have been avoided would have been to reduce speed so that the waves passed quickly with no opportunity for *Catrina* to "surf-ride". In these circumstances it would have been prudent also for the skipper to have switched off the autopilot and steered her himself, because the autopilot would not have applied enough corrective rudder angle to prevent the broach.

Catrina and her sister vessels had shown themselves to be seaworthy through their many years of service. However, as with most fishing vessels of less than 12 metre registered length, the designs have some undesirable features, as far as broaching is concerned. These are a consequence of keeping the registered length below 12 metre (*Catrina's* registered length was 11.96 metre), and include a low length to beam ratio, and positioning the rudder well forward of the transom.

Catrina had a length to beam ratio of 2.5 which is at the lower end of the range but not unusual for a vessel of under 12 metre registered length, where ratios as low as 2.3 are not unknown. Traditional fishing vessel designs, which were not influenced by length restrictions, had length to beam ratios of about 3 to 3.5. There is a perceived commercial advantage in keeping the registered length of small fishing vessels to just less than 12 metre to avoid a number of the safety regulations which apply to longer vessels. At the same time, beam is maintained to ensure sufficient internal volume in the fish hold and to improve stability. These considerations have led to designs with low length to beam ratios.

To achieve the best steering, a rudder should be positioned as far aft of the vessel's longitudinal centre of gravity as possible. However, because the registered length of fishing vessels is measured from the rudder stock, the further forward the rudder stock is placed, the smaller the registered length of the vessel. Conversely, a larger vessel can be designed for a given registered length. On *Catrina* the rudder was a metre further forward than necessary, reducing the distance between the rudder and the longitudinal centre of gravity of the vessel by 20% of the maximum possible separation.

2.3 INTACT STABILITY

The analysis which follows is based on the assumption that the stability characteristics of *Catrina*, which were not measured, were the same as the stability characteristics of her identical sister vessel *Carina*, on which an inclining experiment was carried out by the owner's naval architect. Discussions with the builder and naval architect and examination of the stability data has led the inspector to conclude this was a reasonable assumption.

The stability of *Catrina* did not meet the recommended minimum standard for beam trawlers (**Figure 8**). However, since the accident occurred while the vessel was on passage, it is probably more meaningful to compare her stability with that recommended for non-beam trawlers (**Figure 9**). This is because the extra margin of stability for beam trawlers was included for their more onerous fishing operations. *Catrina* still failed the criteria but, with the exception of the angle of maximum righting lever, only marginally. For this reason the capsize of *Catrina* was most unusual.

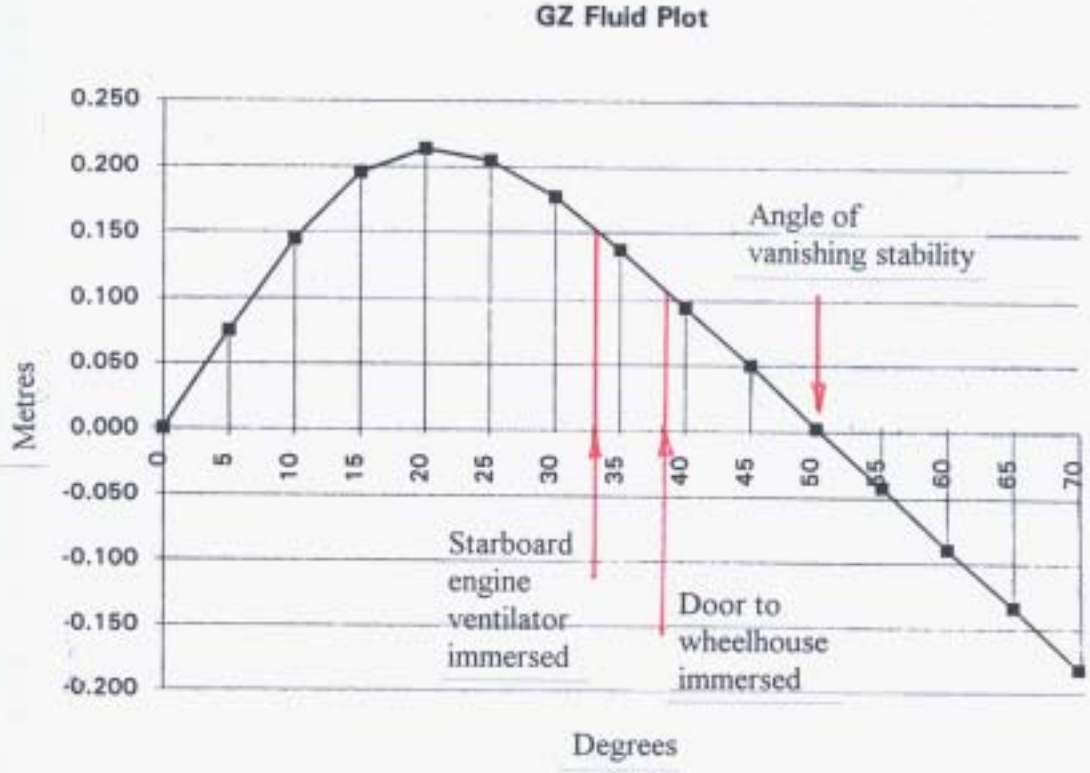
Figure 9

Catrina - stability assessment, non beamer

Stability parameter	Minimum Recommended	Actual Measured	Assessment
Initial metacentric height, GM	0.35	0.869	pass
Angle of maximum righting lever	25	20	fail
Maximum GZ between 30° and 90°	0.2	0.177	fail
Area under GZ curve to 30°	0.055	0.082	pass
Area under GZ curve to 40°	0.09	0.105	pass
Area under GZ curve between 30° and 40°	0.03	0.024	fail

The MAIB knows of no other fishing vessel of less than 12m registered length, and whose stability so nearly met the recommended standard, being overwhelmed solely by adverse sea conditions. This fact has led the inspector to question the validity of the earlier assumption that the stability of *Catrina* could be estimated reasonably accurately from that of *Carina* and to conclude that it was possibly substantially less.

FIGURE 10



***Catrina*'s Stability Curve Showing Downflooding Points**

FIGURE 11

Catrina **in Port, Showing Obstructions to Freeing Ports**

The MAIB's research into the underlying causes of accidents has shown that in the majority of cases an accident has followed soon after a substantial change, such as a new skipper taking command or the vessel starting to fish on unfamiliar grounds. Often, an accident occurs on the first trip after a substantial refit or repair, which in some way has altered the stability of the vessel. *Catrina* capsized on her first trip after substantial repairs which, in the MAIB's experience, could indicate that her stability had somehow been reduced by the work carried out on her.

It has been concluded that *Catrina*'s stability was possibly substantially less than *Carina*'s; which would have increased her heel during the broach and reduced her ability to survive the impact of breaking waves. To reduce the likelihood of a similar accident, the MAIB recommends that the owner ensures that her stability meets, in full, the MCA's recommended stability standard (**Annexe 2**) before the vessel is returned to service.

2.4 DOWNFLOODING

It is particularly important on small vessels that no openings are immersed before the angle of vanishing stability is reached. On *Catrina* two substantial openings were immersed, well before she had heeled to the 50° angle of vanishing stability. This caused rapid and extensive flooding of the interior of the vessel and possibly prevented her survival. At about 38° the door to the wheelhouse was immersed, flooding both the wheelhouse and forward cabin. At about 33° the starboard ventilator to the engine room was submerged, flooding that space (**Figure 10**).

Openings essential to the working of the vessel should be placed on the centre-line, wherever possible, to ensure that maximum advantage is taken of the available range of stability. For the same reason the locations and heights of ventilators should also be carefully considered.

2.5 EFFECT OF WATER ON DECK

Substantial quantities of loose water trapped on the weather deck can drastically reduce a vessel's stability. It is not known whether this was an important factor in the accident, but *Catrina*'s low freeboard and full beam would ensure that she shipped water on deck at relatively low angles of heel. About 10° of heel would immerse the deck edge and about 20° would immerse the bulwark rail.

She was well provided with freeing ports, the total area of which was well in excess of SFIA requirements. However, an inspection of the vessel showed that the freeing ports were concentrated amidships and there was a large area of the deck forward where water could be trapped inside the bulwarks. This could be improved by fitting an additional freeing port just aft of the foc'sle bulkhead.

The MAIB was also concerned that gear on deck, such as pound boards and stowed scallop bars, could have obstructed the freeing ports and prevented the deck from draining rapidly. Photographs of *Catrina* in harbour showed that pound boards were obstructing

the flow of water through the freeing ports in the transom, and fishing boxes were stowed in front of some of the freeing ports on the starboard side (**Figure 11**).

It is essential that freeing ports are unobstructed when the vessel is at sea. The owner is recommended to draw this important matter to the attention of his skippers.

2.6 STANDARDS OF STABILITY AND FREEBOARD

The minimum standards of stability and freeboard, which are mandatory on fishing vessels greater than 12m registered length, have proved a very effective safety measure. The standards are not mandatory on fishing vessels below 12m registered length, and in some cases may not be appropriate. However, smaller fishing vessels are at greater risk of being overwhelmed by wave conditions, which is demonstrated by the number of vessels less than 12m which have been lost in rough seas in recent years. These include: *Copia* (1993), *Katy* (1994), *Karen Marie II* (1994), *May Girl* (1995), *Gorah Lass* (1997) and *Blue Hooker* (1998). A total of 14 lives have been lost in these accidents alone.

Smaller vessels, simply because of their size, are less able to deal with poor sea conditions than larger vessels, and it is very important that small fishing vessels, which frequently have to operate to the limit of their capabilities, are designed to the highest stability standard compatible with their size and operational limitations

3.0 CONCLUSIONS

3.1 FINDINGS

The capsize

1. *Catrina* broached in steep quartering seas 8 cables south of the west pier off Newhaven, which heeled her heavily to starboard and brought her beam on to the waves. [1.1]

2. While in this vulnerable position, she was hit by a breaking wave which rolled her on to her side. She inverted and sank. [1.1]

3. The sea conditions, which were about 2 metre significant wave height, should have been well within the capability of the vessel. [1.2, 2.1]

Broaching

4. The broach might have been avoided by reducing speed, switching off the autopilot and steering manually. [2.2]

5. *Catrina*, like many fishing vessels designed to have registered lengths just less than 12 metre, had features which could make her susceptible to broaching. [2.2]

Stability

6. *Catrina*'s stability was possibly substantially less than that recommended by the MCA, which could have been an important contributory factor in the accident. [2.3]

7. The positions of engine room ventilators and the wheelhouse door allowed extensive flooding of the vessel at relatively low angles of heel. [2.4]

8. The owner's decision to instruct his vessels to carry either scallop gear or stern trawl gear but not both, is prudent and should have a positive effect on his vessels' stability and safety. [1.6]

Freeing ports

9. The total area of freeing ports fitted was well in excess of SFIA requirements. [2.5]

10. Some freeing ports were possibly obstructed by pound boards or stowed gear on deck. [2.5]

11. The freeing ports were concentrated amidships leaving a large area of the deck forward where water could be trapped inside the bulwarks. [2.5]

3.2 CAUSES

Immediate cause

The capsize was caused by the impact of a breaking wave when *Catrina* was heeled heavily to starboard following a broach.

Contributory factors

1. *Catrina*'s speed was close to that of the following waves, which led to the broach.

2. Because she was steering in autopilot, the helm response was insufficient to correct the initial swing which developed into the broach.

3. Low stability possibly led to a large heel angle in the broach and left the vessel vulnerable to capsize.

4. The locations of the engine room ventilators and the wheelhouse door caused flooding of the interior of the vessel at a relatively low angle of heel.

5. There was nothing to prevent the spread of flooding from the wheelhouse to the forward accommodation and the engine room.

4.0 RECOMMENDATIONS

The owner of *Catrina*, Mr I Bickerstaff, is recommended to :

1. Ensure that the stability of *Catrina* meets, in full, the standard recommended by the MCA for small beam trawlers (**Annexe 2**) before she is returned to service.

2. Fit an additional freeing port on both sides of the vessel immediately aft of the foc'sle bulkhead.

3. Inspect his vessels from time to time to check that their freeing ports are kept clear of stowed gear and pound boards.

ANNEXE 1

Estimated stability condition of C*atrina* based on her sister vessel C*arina*

STABILITY CONDITION.

ARRIVAL IN PORT

BEAM TRAWLER

SCALLOP GEAR

WITH NET ON DRUM

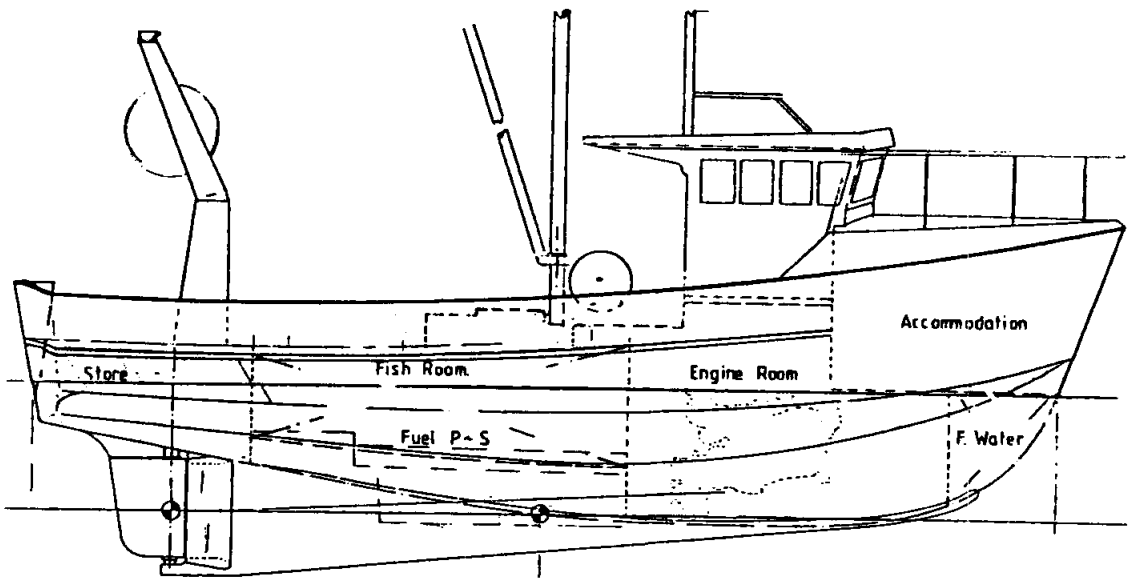
50% FUEL

CARINA 12 M REG

NN 257

LCG FROM CL RUDDER STOCK

VCG FROM HYD BASE = 1.685 BELOW DWL.



ITEM	WT (t)	VCG (m)	(M)	LCG (m)	(M)	FSM)tm)
LIGHT SHIP	39.03	1.99	77.59	4.460	174.07	
CREW WHSE	0.24	3.40	0.82	7.500	1.80	
SCALLOP GEAR ON DECK	0.90	2.35	2.12	5.70	5.13	
NET ON DRUM	0.60	5.21	3.13	-0.10	-0.06	
MISC FISHING GEAR	0.30	2.60	0.78	4.50	1.35	
ICE	1.50	1.10	1.65	3.60	5.40	
CATCH 6 BOXES	0.24	0.80	0.19	3.50	0.84	
FRESH WATER	0.97	1.12	1.09	10.40	10.09	0.000
FUEL P&S ENG RM	0.28	1.38	0.39	6.30	1.76	0.000
FUEL MAIN	2.60	1.15	2.99	3.85	10.01	0.080
	0.00	0.00	0.00	0.00	0.00	0.000
	0.00	0.00	0.00	0.00	0.00	
	0.00	0.00	0.00	0.00	0.00	
TOTAL	46.66	1.944	90.73	4.51	210.40	0.080

DRAUGHT	1.585 M		
LCG	4.509 M	TRIM LEVER	-0.009 M
LCB	4.518 M	TRIM MOMENT	-0.414 M
LCF	4.025 M		
MCT	0.513 TM CM	TRIM	-0.008 M
KM	2.815 M	WATERLINE LTH	12.900 M
VCG	1.944 M	DRAUGHT FWD	1.582 M
GM SOLID	0.871 M	DRAUGHT AFT	1.588 M
CG' CORR.	0.002 M		
GM FLUID	0.869 M	KG =	1.946 METRES

CARINA NN 257
SCAPPOP GEAR
50 % FUEL 100 % ICE
NET ON DRUM

CROSS CURVES KN to GZ

CONDITION **BEAM TRAWLER**

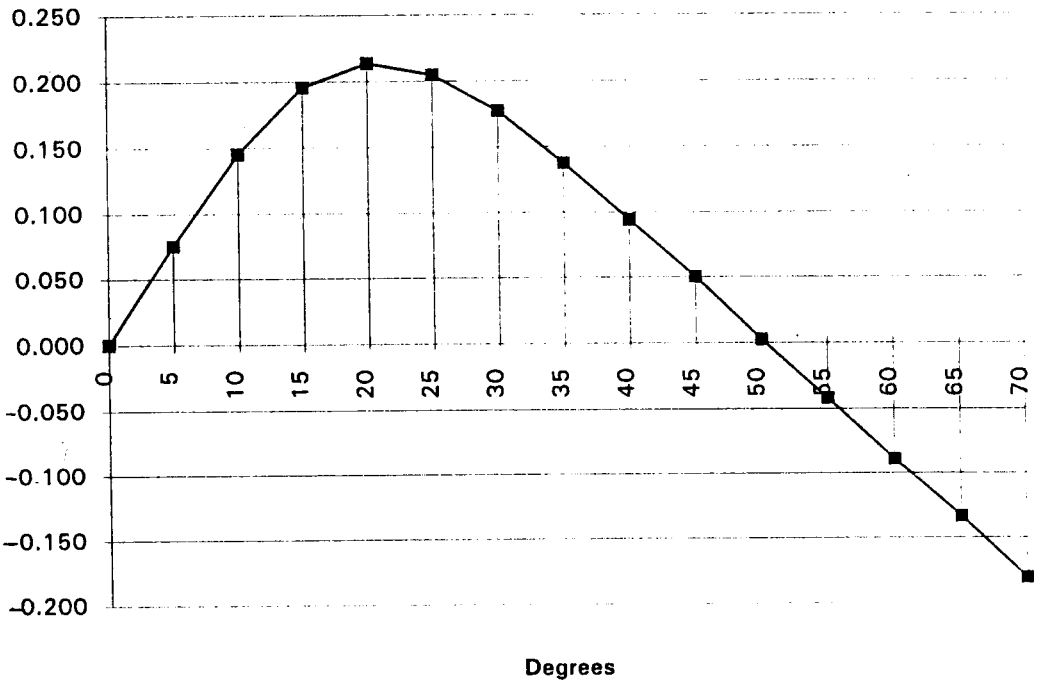
ARRIVAL	IN PORT	

DISPLACEMENT	46.66	TONNES	
WATERLINE	1.585	METRES	
KN		CROSS CUR RVE	ORD
KMT	2.815		
KG	1.944	CENTRE OF F GRAV.	ABOVE B
KG FLUID	1.946		
GM	0.871		
FREE S CORR	0.002		
GM FLUID	0.869		
0 DEGREES		ANGLE OF INCLINATION	
BASE	1.68	METRES BELOW DWL	L 7

KG	0 DEGREES	KN @	Sin 0	KG * Sin 0	GZ = (kn-kg*Sin 0)
1.946	0	0.000		0.000	0.000
1.946	5	0.245	0.0872	0.170	0.075
1.946	10	0.483	0.1736	0.338	0.145
1.946	15	0.699	0.2588	0.504	0.195
1.946	20	0.879	0.3420	0.666	0.213
1.946	25	1.027	0.4226	0.822	0.205
1.946	30	1.150	0.5000	0.973	0.177
1.946	35	1.254	0.5736	1.116	0.138
1.946	40	1.345	0.6428	1.251	0.094
1.946	45	1.426	0.7071	1.376	0.050
1.946	50	1.493	0.7660	1.491	0.002
1.946	55	1.552	0.8192	1.594	-0.042
1.946	60	1.596	0.8660	1.685	-0.089
1.946	65	1.630	0.9063	1.764	-0.134
1.946	70	1.648	0.9397	1.829	-0.181

STABILITY	SUMMARY		MINIMUM BEAM TRAWL	ACTUAL
AREA UNDER GZ CURVE	UP TO 30 DEG	METRE RAD	0.066	0.082
AREA UNDER GZ CURVE	UP TO 40 DEG	METRE RAD	0.108	0.105
AREA UNDER GZ CURVE	BETWEEN30-40		0.036	0.024
MAXIMUM GZ		METRES		0.213
ANGLE OF HEEL AT WHICH	MAX GZ OCCURS	DEGREES	25	20
MAXIMUM GZ BETWEEN	30 - 90	DEGREES	0.24	0.213
GM SOLID				0.871
FREE SURFACE CORRECTION				0.002
GM FLUID			0.42	0.869

GZ Fluid Plot



ANNEXE 2

Stability of small fishing vessels engaged in commercial fishing - advice to designers, builders, owners and skippers

THE DEPARTMENT OF TRANSPORT

"Spring Place",
105 Commercial Road
Southampton
SO1 0ZD

Tel 0703 329100
GTN
DDI

Your Ref:

Our Ref: MS 07/08/0694

Date 21 June 1993

Dear Sir

STABILITY OF SMALL VESSELS ENGAGED IN COMMERCIAL FISHING - ADVICE TO DESIGNERS, BUILDERS, OWNERS AND SKIPPERS

We wish to draw the attention of designers, builders and operators of small fishing vessels to the effect that fishing operations such as hauling nets, relocating crab/lobster pots etc. can have on stability and, therefore, the safety of their vessels.

This is illustrated by the case of a 9.75 metre fishing vessel which, on only her third voyage, sank with loss of life. The sea was calm, there was no wind and the visibility was good. The vessel was beam trawling alone and hauling her nets, when she suddenly capsized. A subsequent inclining test confirmed that the vessel would capsize when lifting the heavy cod ends even with 3 tonnes of ballast on board. In fact less than one tonne was carried.

Fishing vessels of 12 metres or over must comply with the Fishing Vessels (Safety Provisions) Rules 1975. Rules 15 and 16 set out the freeboard and stability requirements that include values of dynamic stability, righting lever and metacentric height that are increased by 20% for beam trawlers. There are no such requirements for vessels under 12m and clearly something has to be done to improve their safety.

Officials are in discussion with the Fishing Industry Safety Group (FISG) with this in mind. That group has been advised that the Department has plans to develop a code for smaller fishing vessels with the cooperation of the fishermen. Until this is completed it is strongly recommended that, where doubts exist, vessels are inclined and the loading conditions checked with the following criteria to ensure adequate margins of stability:-

Criterion		Non-Beamers	Beamers
Initial GM	(m)	0.35	0.42
A_{30}	(m-radians)	0.055	0.066
A_{40}	(m-radians)	0.090	0.108
A_{30-40}	(m-radians)	0.030	0.036
$GZ_{(\theta \geq 30)}$	(m)	0.20	0.24
$\theta_{GZ\ max}$	(deg)	25.0	25.0

It is clearly essential that stability should be assessed by a person having the appropriate professional experience and knowledge - particularly when substantial alterations have been made to the structure, fishing gear or ballast - having regard to the intended type of fishing and service.

Yours faithfully

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Department of Transport