



Accident Report

The Gem

Grounding and Foundering at
Taieri Island, Otago on

20 July 2005

Class A





The Gem

REPORT NO.: 05 3797

VESSEL NAME: THE GEM

Ship Type:	<i>The Gem</i>
Certified Operating Limit:	Coastal
Port of Registry:	Port Chalmers
Flag:	New Zealand
MSA/Maritime No.:	127882
Built:	2000
Construction Material:	Fibreglass hull, aluminium wheelhouse
Length Overall (m):	11.2
Maximum Breadth:	4.2
Gross Tonnage:	7
Registered Owner:	John Scott
SSM Company:	Survey Nelson
Accident Investigator:	Zoe Brangwin



SUMMARY

The coastal fishing vessel *The Gem* grounded on Taieri Island at approximately 0700 hours, Wednesday 20 July 2005.

The vessel was on its way from Port Chalmers to Nugget Point when the Skipper fell asleep approximately three nautical miles from Taieri Island. The vessel hit the rocks on the eastern side of the Island. The Skipper tried to manoeuvre the vessel off the rocks but was forced further up onto the rocks by the swell. After half an hour the vessel started to sustain severe damage to the hull. *The Gem* subsequently broke up and sank. All three men got ashore safely with no injuries.



NARRATIVE

Vessel Details

The Gem was a fishing vessel of fibreglass and aluminium construction built in Dunedin in August 2000. The vessel was purpose built for cray fishing. She had a length overall of 11.2 metres, a breadth of 4.2 metres, a draft of 1.3 metres and a gross tonnage of about 7. The vessel was powered by a single Scania 350 kW diesel engine, with a maximum top speed of 18 knots.

Merton Fishing Trust owned *The Gem*. The trustees were the Skipper and his accountant. The vessel was purchased in 2001.

The vessel had a valid Safe Ship Management (SSM) Certificate with Survey Nelson. The vessel was fit to carry three crewmembers and ply coastal limits within 12 nautical miles of the coast. A Survey Nelson approved surveyor inspected *The Gem* on 15 May 2004. The vessel was found to have nil deficiencies.

The vessel had five watertight compartments, namely a bow compartment, accommodation/wheelhouse, engine room, ice hold and steering gear compartment.

There was 1200 litres of diesel and 200 litres of water onboard at the time of the accident.

Skipper Details

The Skipper/Owner aged 31 years holds a Commercial Launch Master Certificate (CLM) obtained in 1993.

He has over 13 years experience as a commercial fisherman. He has owned and worked his own fishing vessels since 1996.



Crew Details

Crewman "A" aged 26 years, holds an Inshore Launch Masters (ILM) Certificate obtained in January 2004. He had worked as watchkeeper and deckhand on a number of offshore and coastal vessels similar to *The Gem*. He has approximately 7-8 years experience in the fishing industry. He joined *The Gem* in June for the crayfish season. He had worked the previous crayfish season onboard *The Gem* and then returned to his hometown of Nelson for the off-season.

Crewman 'B' aged 24 years, holds no maritime qualifications. He had been working onboard *The Gem* for nine months. He has worked as a deckhand on a regular basis over the previous two years.

Both crewmembers had been trained by the Skipper and were competent to carry out their duties.

Navigation and Safety Equipment

The vessel was equipped with the following navigation and safety equipment:

- JRC radar
- JRC GPS and chart plotter
- Furuno echo sounder
- Simrad autopilot
- Magnetic compass
- VHF radio
- Cell phone
- Lifejackets
- 4 person life raft

The radar and GPS chart plotter were operational at the time of the accident.

At the time of the accident the Skipper was navigating by chart plotter and radar. He was monitoring his position in relation to the land and was making adjustments to his course in order to cut in close to the land and avoid the tide. The helm was in autopilot.

The Skipper stated that he normally set waypoints on the GPS. He had not set waypoints on the morning of the accident as he was following the coastline and making adjustments to his course as he went.

The Skipper had not set any guard zones on the radar. He had used them in the past but found the function to be unreliable.

The echo sounder was switched off. The Skipper stated that he did not use the echo sounder during transit.

The vessel was not equipped with a watch keeping alarm.



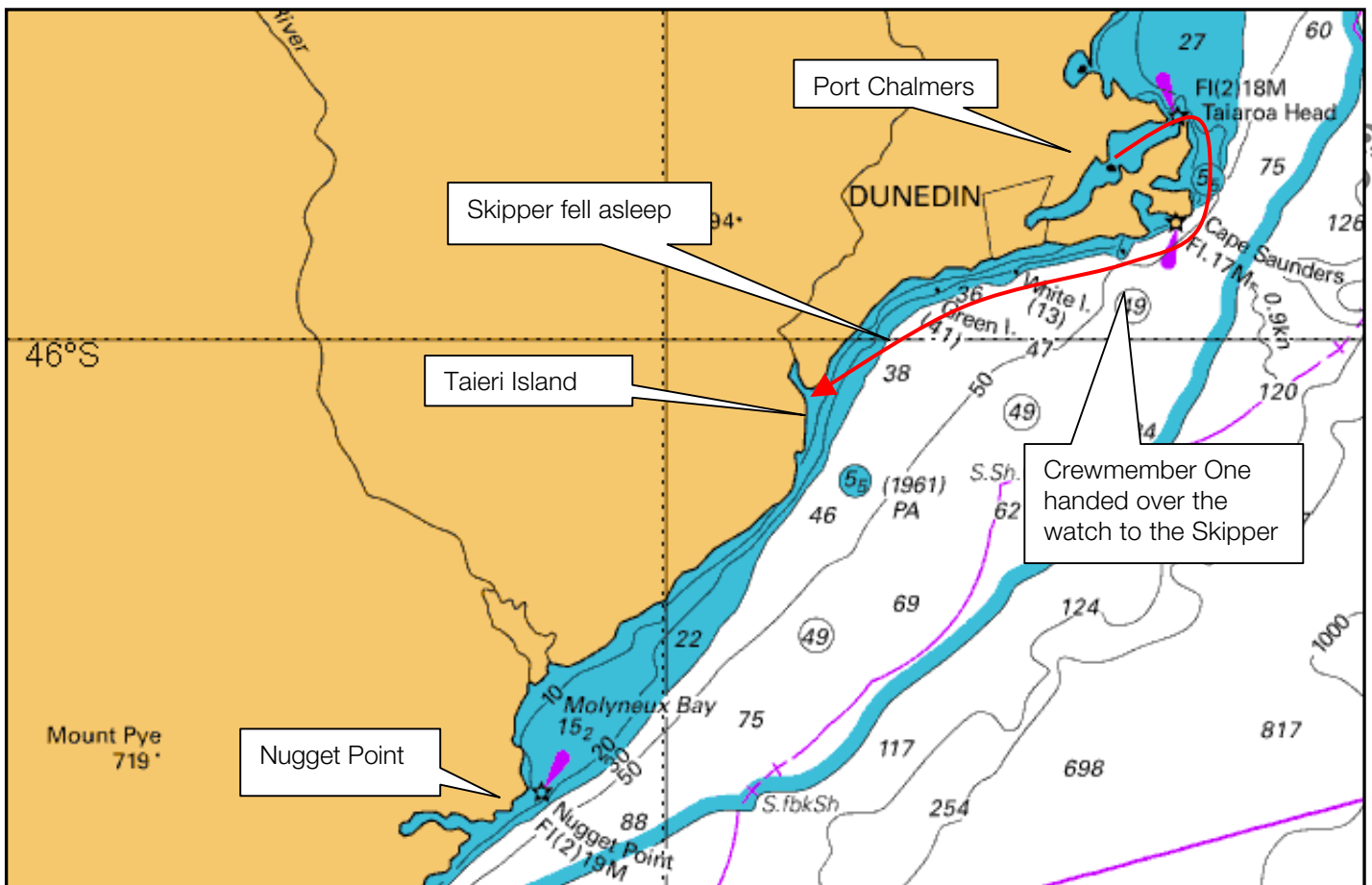
THE ACCIDENT

At approximately 1800 hours, Tuesday 19 July 2005, the Skipper of *The Gem* called his two crewmembers and told them that they would be away in the morning and that he would meet them at the vessel at 0330 hours. The Skipper went to bed at about 2100 hours, and fell asleep around 2145 hours. At 0230 hours, the Skipper was woken by his alarm clock. He had about 4.5 hours sleep. He drank a cup of coffee and then drove the half hour from his house to Port Chalmers.

The Skipper and crew met at the vessel at 0330 hours. They spent half an hour preparing the vessel for sea. The Skipper and crew were departing at this time in order to reach the fishing grounds around daylight (this is a common practise among fisherman). The vessel *Lady Bridget* left Port Chalmers approximately 20–30 minutes after *The Gem*.

At 0400 hours, they sailed from Port Chalmers (See Figure 1 - Chart 1). The Skipper took *The Gem* out of the harbour. Once they were clear of the entrance to the harbour at Tairaroa Head, the Skipper handed the watch to Crewman A. The Skipper instructed him to wake him once they were south of Toe Rock. The Skipper then went below to try and sleep for an hour. He stated that he thought he may have got about 15 minutes sleep.

At about 0530 hours, Crewman A woke the Skipper. The Skipper came up to the helm, assessed the situation and then took over the watch.



At this time it was still dark. Visibility was good. There was 10 knots of WSW wind and a short NE swell of 1-1/2 metres. The Skipper described the conditions as comfortable. He stated that he felt relaxed and that it was nice to have “decent weather conditions”. He stated that he felt good.

The Skipper remembered seeing Taieri Island three miles ahead on the radar (See Figure 1 - Chart 1). The radar was on the six-mile range scale. The next thing he woke up as he heard and felt the vessel ground. He looked at the GPS to check their position and saw that they had grounded on Taieri Island (See Photograph 1).

Just after the vessel grounded the Skipper and crew heard the weather forecast over the VHF radio. The local weather forecast is broadcast at 0700 hours.



Photograph 1 - Taieri Island. The vessel grounded at the far side of the island

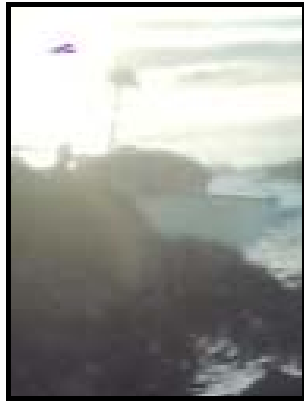
The two crewmembers woke at the time of the grounding. They both donned their lifejackets and started checking the vessel for damage. Initially there was no hull damage.

The Skipper switched the floodlights on. He then tried to put the vessel astern but they were hard aground. He then called a friend at Taieri and told him what had happened and also asked him about the tides. It was low water. He then called the Skipper of *Lady Bridget* (as they were about 20-30 minutes astern of them). *Lady Bridget* responded that they would be there as soon as possible and they would try to tow them off the rocks.

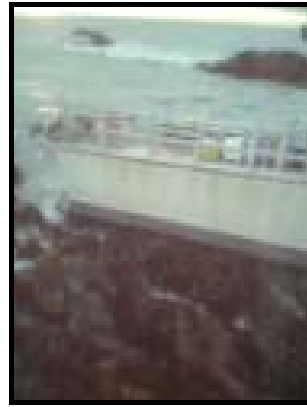
During this time the vessel was taking a pounding from the swell which was lifting it further up onto the rocks (See Photographs 2, 3 & 4). About 30 minutes after the grounding, cracks started appearing in the hull. The crew tried to stem the flow but they could not stop the flooding.

Lady Bridget arrived but it was not possible to tow *The Gem* off the rocks. The Skipper of *The Gem* contacted a person ashore who in turn contacted the local surf club. They sent a crew with an inflatable rescue boat (IRB) to take the crew of *The Gem* ashore.

The Skipper decided it was time for the crew to leave the vessel. The IRB could not get close to the vessel due to the swell and tide. The Skipper got into his wetsuit, and then inflated the life raft. The two crewmembers got in the life raft and the Skipper swam them across the water from the rocks to the island. Once on the island the three men were picked up by the IRB and taken to across the estuary to Taieri.



Photograph 2



Photograph 3

Both taken from Crewman B's mobile phone after the accident.

The Skipper reported the accident to Maritime New Zealand as soon as he got ashore. The Dunedin Maritime Safety Inspector attended the scene at about 1200 hours. By the time he arrived *The Gem* had broken up.



Photograph 4 - The rocks that *The Gem* grounded on. Part of the vessel can still be seen.



COMMENT & ANALYSIS

Human Factors

The Skipper's work sleep pattern for the 72 hours prior to the accident were as follows:

DAY	WORK/ACTIVITY	SLEEP (approx)
Tuesday 19 th	Worked at the boatshed	4.5 hours
Monday 18 th	Worked at the boatshed	8 hours
Sunday 17 th	Paperwork at home	8 hours
Saturday 16 th	At sea. 0700 hours start, back in port at 2130 hours	8-9 hours

The Skipper had three good nights sleep prior to Tuesday night. His sleep quality was good.

The Skipper had a good dinner the night before the accident. He drank a glass or two of cordial drink with dinner and had not consumed any alcohol.

He stated that he may have had a Spirulina (herbal health drink) in the hour before the accident. Despite this, he may still have been dehydrated at the time he fell asleep.

The Skipper stated that he felt fine on the morning of the accident. He did not remember feeling sleepy prior to falling asleep.

The Skipper was not on any medication at the time of or prior to the accident. He stated that he had mild cold/flu symptoms, which he had had for a few days.

The Skipper had woken at 0230 and started work at 0330 hours. He had a short rest between 0440 and 0530 hours, during this time he stated that he thought he had about 15 minutes of sleep.

Naps provide a defence for a while against going to sleep on watch. The decision to have a nap before taking the watch was a sensible and positive act. This was part of the Skipper's normal routine upon leaving port.

In a study compiled by the Canadian Transport Safety Board they state that although individual rhythms may vary, everybody's cycle has two distinct peaks and dips. The big dip is at night, with the time of our lowest alertness in the hours just before dawn between 0300 and 0500 hours.

The Gem grounding occurred at 0700 hours. During the dips it can be particularly difficult to maintain alertness. Whenever alertness is affected by fatigue, human performance can be significantly impaired. Alertness cycles closely follow the body temperature cycle, with peak alertness occurring when the body temperature is highest, near midday and low alertness occurring when the body temperature is lowest, between 0300 and 0500 hours.

Our circadian clock makes us sleepy or alert on a regular basis whether we are working or not.

Signs and symptoms of fatigue vary. Sometimes people nod off slowly and other times they can fall asleep with little or no warning.

Environmental Conditions

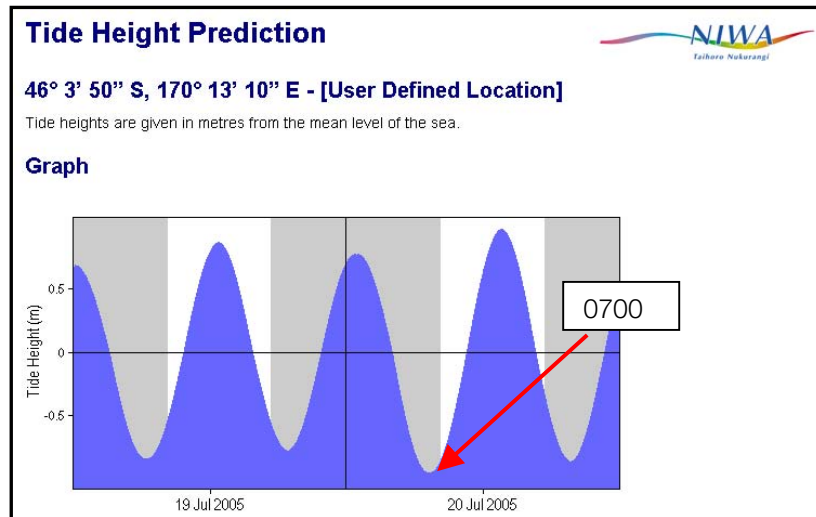
The Skipper described the weather as follows: Visibility - good. 10 knots of WSW wind and a short NE swell of 1-1/2 metres. The Skipper stated the conditions were comfortable.

At the time of the accident it was dark. Sunrise was at 0810.



The tides at Taieri Island on Wednesday 20 July were as follows:

20 Jul 2005	00:56	0.78
20 Jul 2005	07:09	-0.94
20 Jul 2005	13:32	0.99
20 Jul 2005	19:46	-0.86



Tidal graph courtesy of the NIWA website



Maritime Rules

Maritime Rule Part 31C.14 Fitness for Duty:

- (1) *The owner and the master of a fishing vessel must establish and implement procedures in respect of the vessel's crew, taking into account the requirement in 31C.15(1)(Fatigue), to ensure that all crew are fit for duty when keeping a watch.*
- (2) *The crew of a fishing vessel must ensure, taking into account the requirement in rule 31C.15(2), that they are fit for duty at all times when keeping a watch.*

Maritime Rule Part 31C.15 Fatigue:

- (1) *When the owners and the Master of a fishing vessel establish and implement procedures for ensuring a seafarer's fitness for duty, they must take into account that:-*
 - (a) *the level of alertness of a person keeping a navigational watch or engine room watch may be affected by fatigue.*
 - (b) *whenever alertness is affected by fatigue performance can be impaired.*
- (2) *A seafarer on a fishing vessel, when considering his or her fitness for duty, must take into account:-*
 - *the signs, symptoms, and affects of fatigue*
 - *that fatigue will affect his or her level of alertness*
 - *that the performance of any person whose alertness is affect by fatigue can be impaired.*

Maritime Rule Part 31C.16 Watchkeeping Standards:

- (1) *The owner and the master of a fishing vessel must establish and implement watchkeeping procedures addressing - (a) for navigational watchkeeping, -*
 - (i) *the composition of the watch;*
 - (ii) *the fitness for duty of watchkeepers;*
 - (iii) *navigation planning and duties;*
 - (iv) *the use of navigational equipment;*
 - (v) *look-out duties;*

The Skipper was aware of fatigue as a hazard. He took into account fatigue when allocating watches. He also kept watches to 1-1/2 hours. As the vessel is a crayboat the normal work hours are from daylight to dark. When the vessel is at the fishing grounds the crew work all day and then have at least 8 hours sleep at night at anchor or on a mooring.

There was no documented procedures addressing the above rules.

Maritime Rule 22.5 Lookout

“Every vessel must 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 the risk of collision.”

By falling asleep the Skipper failed to keep a proper look out in accordance with **Maritime Rule Part 22 5- Lookout**.

Health and Safety in Employment Act



Section 7. Identification of hazards

- (1) *Every employer shall ensure that there are in place effective methods for--*
 - (a) *Systematically identifying existing hazards to employees at work; and*
 - (b) *Systematically identifying (if possible before, and otherwise as, they arise) new hazards to employees at work; and*
 - (c) *Regularly assessing each hazard identified, and determining whether or not it is a significant hazard.*

Fatigue is a recognised hazard that needs to be identified and managed.

Early morning departures are a feature of the trip pattern for many vessels including **The Gem**. This is a risk that should be addressed in the vessels hazard register.

The Gem had a hazard register; the Dunedin Maritime New Zealand Inspector on the previous inspection had viewed this. The hazard register was lost with the vessel therefore the Investigator was not able to observe what hazards had been documented as identified.

The Skipper had identified fatigue as a hazard but this was not documented.

Fatigue within the Fishing Industry

Analysis of 20 New Zealand Fishing vessel groundings and collisions involving fatigue found that about half occurred on the way out of port.

DIRECTION OF TRAVEL	NO. OF ACCIDENTS
Out of Port	8
Into port	9
Other	3

The risk of falling asleep while on watch is one that owners and Skippers should be actively seeking defences against.

In this situation where the Skipper has fallen asleep on the way to the fishing grounds there are defences that could be put in place.

- The Skipper could ensure that all crewmembers get six hours sleep before sailing, (the forthcoming Maritime New Zealand fatigue management guidelines recommend six hours at one stretch as the minimum for transport workers); and or,
- The instillation of a watch keeping alarm;
- Echo sounder shallow water alarm;
- Radar guard zone;
- GPS waypoints arrival alarm (to go off on arrival at the course alteration waypoint);
- Steering by hand.



Current work in Progress at Maritime New Zealand for the Fishing Industry

FishSAFE, a group consisting of representatives from the Maritime New Zealand, Seafood Industry Training Organisation, Accident Compensation Corporation and the fishing industry has been tasked with the aim of bringing into effect, the recommendations of the Fishing Industry Safety and Health Advisory Group, FISHgroup into the safety performance of the New Zealand commercial fishing industry. This includes the development of a Safe Code of Working Practice for Commercial Fishers and the development and dissemination of practical fatigue management guidelines as an important first step in managing fatigue issues within the fishing industry.

The objectives are to raise awareness of the importance of fatigue management amongst workers in the maritime industry; to develop practical methods of managing fatigue and to provide training in fatigue management techniques to both employers and employees within the maritime industry.

Work currently underway by Maritime New Zealand includes the development of guidance material for the industry as an aid in developing appropriate fatigue management arrangements; and the revision of maritime qualifications syllabuses to cover the human factor.

CONCLUSIONS

N.B. These are not listed in order of importance

- The Skipper fell asleep while on watch. **The Gem** subsequently grounded. Although the Skipper kept short watches and napped in-between, these defences alone were not enough to stop him from falling asleep.
- The Skipper was suffering from a mild cold and was most probably dehydrated. Both factors would have had an effect on his state of alertness.
- Monotony of the task. Lack of stimulation and motivation.
- The time of day, before sunrise.
- By falling asleep the Skipper failed to keep a proper look out.
- The Skipper had put the vessel onto autopilot therefore he was not at the helm of the vessel. Had he been at the helm he would have had to concentrate on steering, which would have helped to keep him awake.
- The Skipper did not set any alarms on the radar or echo sounder.
- The Skipper had not set anyway waypoints on the GPS.
- The vessel was not fitted with a watch keeping alarm.
- Complacency – The Skipper did not think it could happen to him or his crew. The crew did not think they were high risk due to their normal work and watch keeping patterns onboard.
- Early morning departures are a feature of the trip pattern for many vessels. This is a risk that should be addressed in the vessel's hazard register.



SAFETY RECOMMENDATIONS

Maritime New Zealand suspended the Skipper's CLM for a period of 14 days while the accident was under investigation. At the end of the 14-day period the certificate was reinstated.

1. It is recommended that the Skipper purchases a watch keeping alarm and to fit to his next vessel. In addition the Skipper should document and implement a policy on the use of the watchkeeping alarm
2. It is recommended that the Skipper uses the Echo sounder when entering and leaving port and during transit. It is also recommended that he set a depth alarm and use a waypoint arrival alarm and cross track error alarm.
3. It is recommended that the Skipper talk about his experience with relation to this accident at the next Southland Maritime New Zealand seminar.
4. It is recommended that this accident is included in the Maritime New Zealand Safety Digest.
5. It is recommended that this report be forwarded to FISHSAFE for their information.
6. It is recommended that this report be forwarded to all SSM companies to bring the issue of fatigue related accidents on the way out of Port to the attention of all those who operate fishing vessels in New Zealand.
7. It is recommended that SSM companies put into place procedures to ensure that the company and their surveyors work with vessel owners to make sure that each vessel has adequate defences in place to minimise accidents caused by fatigue.

