Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

MARINE INVESTIGATION REPORT

M03L0148

GROUNDING

BULK CARRIER *YONG KANG*

OFF SAINT-JEAN, ÎLE D'ORLÉANS, QUEBEC

06 DECEMBER 2003

Canada

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Bulk Carrier *Yong Kang*
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Report Number M03L0148

Summary

The bulk carrier *Yong Kang,* en route from Esperance, Australia, anchored off Saint-Jean, Île d'Orléans, in the St. Lawrence River on 02 December 2003, while awaiting a berth to unload in the port of Québec.

At approximately 0715, eastern standard time, on December 6, driven by the ebb tide current and strong northeast winds, the *Yong Kang* started to drag its anchor and drift slowly toward the south bank of the river, where it grounded at approximately 0815.

The *Yong Kang* was refloated by the rising tide at around 1230, but it had sustained some damage to its hull in way of the forepeak; ballast tanks 1, 2, and 3; and the propeller. No pollution or injury was reported.

Ce rapport est également disponible en français.

Other Factual Information

Particulars of the Vessel

Name	***Yong Kang***
Official Number	HK-0708
Port of Registry	Hong Kong
Flag	Hong Kong, China
Type	Bulk carrier
Gross Tonnage	40 437
Deadweight[1]	74 500 tonnes
Length	225 m
Draught	Fwd: 13.51 m Aft: 13.52 m
Built	2001, Shanghai, China
Propulsion	One diesel engine developing 10 224 kW and driving one fixed-pitch propeller
Cargo	Nickel and bauxite
Crew	23
Owner	Wisemar Shipping Ltd., Hong Kong, China
Management	COSCO Shipping Company Ltd.

Description of Vessel

The bulk carrier *Yong Kang* was launched in March 2001. It has a deadweight of 74 500 tonnes and an overall length of 225 m. It has one main deck and has seven cargo holds with a total capacity of 91 717 m^3. The propulsion machinery, steering apparatus, wheelhouse, lifeboats, and accommodation are located aft. The vessel is fitted with a single centre-line rudder. The *Yong Kang* is designed to carry heavy cargo; holds 2, 4, and 6 can be left empty and hold 4 can be filled with liquid ballast.

[1] Units of measurement in this report conform to the International Maritime Organization standard or, where there is no such standard, are expressed in the International System of units.

History of the Voyage

On 24 October 2003, the *Yong Kang* left Australia with 66 330 tonnes of bulk cargo: 49 432 tonnes of alumina for the port of Contrecoeur, Quebec and 16 898 tonnes of nickel concentrate for the port of Québec. While steaming up the St. Lawrence River toward the pilotage station at Les Escoumins, Quebec, the ship's agent informed the master of the *Yong Kang* that berth 53 in the port of Québec was occupied and that the vessel should anchor off Saint-Jean, Île d'Orléans, Quebec, for about 24 hours. The master was advised of the approximate position where the vessel was to drop anchor (see Figure 1) and that the pilot would disembark.

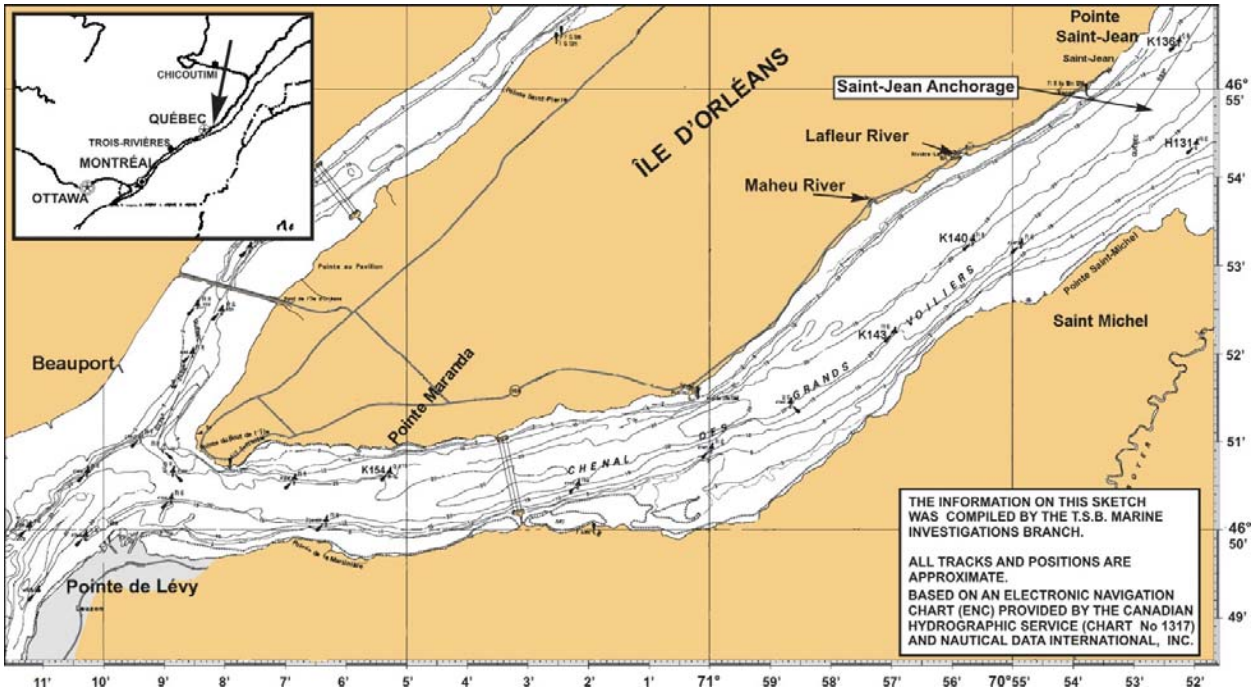

Figure 1. Saint-Jean anchorage

At 1143[2] on 02 December 2003, the vessel dropped anchor off Saint-Jean, Quebec; seven shackles of chain were let out in position 46˚54.9′ N latitude and 070˚52.1′ W longitude (see Figure 2, A). The weather forecast for the next few days was relatively good, and as per the agent's arrangement, the captain of the *Yong Kang* released the pilot. Before disembarking, the pilot gave the master a copy of the tide tables for the area off Lauzon, Quebec, for the period from December 1 to 7 inclusive.

The main engine, windlass and other equipment was kept on emergency standby and bridge watch was established. The position of the vessel was monitored by means of a radar connected to the GPS receiver. This allowed a reference position, the position of the anchor and a safety area around the anchor position to be programmed. An audible alarm would sound if the vessel moved outside the safety area, which was established at 0.25 nautical mile (nm) around the anchor position. The echo from the Saint-Jean wharf was used as the reference target.

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[2] All times are eastern standard time (Coordinated Universal Time minus five hours).

At 2205 on December 3, the pilot of an inbound vessel reported to Marine Communications and Traffic Services (MCTS) in Québec that the *Yong Kang* was a hazard to shipping due to its proximity to the upstream end of the Traverse du Nord channel. He also indicated that the vessel had probably dragged its anchor. Concerned about the safety of the navigation, safety of the vessel and given that there was no pilot on board, he suggested that the vessel be moved.

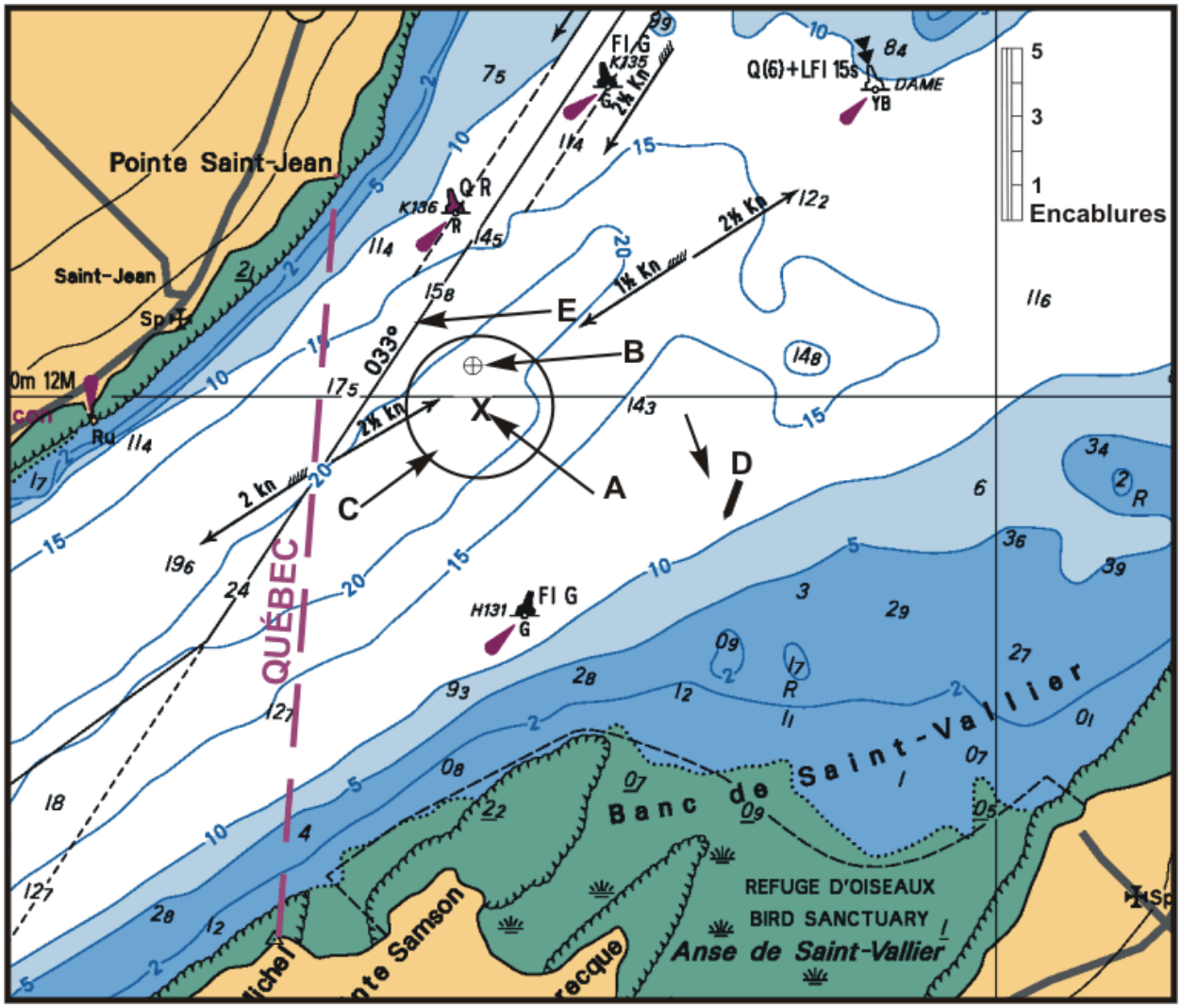

Figure 2. Saint-Jean anchorage

A. Initial position of the *Yong Kang* anchor
B. Position of the *Yong Kang* as reported by pilot in transit at about 2205 on 03 December 2003
C. Swinging room around the anchor
D. Position of the *Yong Kang* grounding on 06 December 2003
E. Saint-Michel range

Believing that the Saint-Jean anchorage was part of the port of Québec, the MCTS relayed the information to the harbour master's office. The harbour master's representative asked the pilot of the westbound vessel to report to him directly by telephone, then asked the MCTS to confirm the position of the *Yong Kang*. Neither the MCTS nor the harbour master's office could confirm

the position of the vessel in the Saint-Jean anchorage by means of instruments. There followed a series of telephone calls between the harbour master's representative, the vessel's agent, and the pilot. The agent could not understand why the pilot was complaining about a vessel anchored at that position by another pilot. He also mentioned that the operation could be quite costly. At approximately 2245, assuming that the vessel would be docked within the next 24 hours and with no adverse short-term weather forecast, a decision was made not to move the vessel. The decision was made without obtaining information on the reason for the delay with the vessel occupying the berth.

December 4 and 5 passed without incident. No report or verification of the *Yong Kang*'s position was made by the MCTS, the harbour master's office, or the pilots. A number of vessels had transited this area. The master of the *Yong Kang* enquired regularly on the availability of berth 53. Effective evaluation of the prolonged stay at anchorage was not carried out.

At approximately 0715 on 06 December 2003, the radar alarm sounded on the bridge: the vessel was outside the programmed safety area. The master was advised of the situation and, when he arrived on the bridge, realized immediately that the vessel was dragging its anchor. The first officer was dispatched to the forecastle, and the third officer was instructed to report to the bridge. The main engine was started up, and the MCTS was advised of the situation. The master then notified the harbour master's representative, who was in communication with the docking pilot on the telephone. The representative informed the docking pilot that the vessel's agent wanted him on board the *Yong Kang* at 1000. On learning that the vessel was dragging its anchor, the representative informed the docking pilot that the master wanted him on board the vessel as soon as possible. The docking pilot replied that he would be on board at 1000 and that the master should carry out the manoeuvres necessary to keep the vessel within the anchorage. The MCTS was advised of the intentions of the docking pilot.

Communication between the *Yong Kang*, the harbour master's office, and the MCTS was difficult: messages were not always received. On several occasions, the master requested the services of a pilot because the vessel was dragging its anchor. He was informed that the pilot would be aboard at 1000 and that he should do whatever was necessary to keep the vessel safe in the meantime. At 0810, the master requested a tug, and reiterated that he needed a pilot and that he was finding the vessel difficult to manoeuvre. A pilot on a transiting vessel in the area called the MCTS and confirmed that the *Yong Kang* was in a precarious situation. The MCTS decided to dispatch a tug on the basis of this information. The *Océan Charlie* was dispatched at 0817, but it did not leave until 0845, with the docking pilot aboard.

Beginning at 0715, the crew of the *Yong Kang* tried to manoeuvre the vessel but it continued to be driven by the wind and current toward the shore; during this period the anchor was weighed. At 0820, the *Yong Kang* reported to the MCTS that it had run aground in position 46˚54.79′ N latitude and 070˚51.1′ W longitude on a heading of 202˚ True. The vessel was then six cables north of the bird sanctuary at Anse-Saint-Valier on the south shore.

Refloating Operation

Soundings were taken around the *Yong Kang*. The crew determined that the vessel was aground from the bow to the number 2 hold. To lighten the forward part of the vessel, 400 tonnes of ballast was pumped from the forepeak.

After learning that the *Yong Kang* had run aground, and unsure of the full extent of his duties in this situation, the docking pilot called the Laurentian Pilotage Authority (LPA) for guidance. He was informed to do whatever was necessary to refloat the vessel.

When the pilot boarded the *Yong Kang* at 1000, he found the anchor in the hawse pipe and the main engine running astern. He assessed the situation and discussed the necessary manoeuvre with the master. They would wait until the next high tide, which was expected around noon. Over the course of the morning, the weather grew worse. The pilot feared that, once afloat, the vessel's stern would be driven quickly upstream by the tide and the northeast wind. Under advice from the pilot, the stern of the vessel was to be made fast to the *Océan Charlie*, which was still at the site.

The sea was rough. Waves were breaking over the *Océan Charlie,* and ice was forming on its bow. The crew of the *Yong Kang* had a great deal of difficulty running a mooring line to the tug: they were not using a heaving line. The idea of towing the vessel was then dropped, and the *Océan Charlie* was instructed to push on the starboard side of the vessel. In the meantime, a second tug, the *Océan Delta,* was requested. It left at 1115, but mechanical trouble forced it to turn back at 1148.

At about 1230, or two hours after the tide had begun to rise, the *Yong Kang* was refloated and re-anchored. The pilot remained on board until the vessel docked at 2138 in the port of Québec.

Damage

The *Yong Kang* sustained damage to its bottom plating in way of the forepeak and ballast tanks 1, 2, and 3. The plating was stove in, and several stiffeners had buckled. There was a fracture in one of the plates in ballast tank 1. Three blades of the propeller were deformed and two were fractured. Also, the port bilge keel in way of ballast tank 3 had buckled over a length of about 1 m.

Saint-Jean Anchorage

The "Saint-Jean anchorage" is not included in the Sailing Directions. It is found southeast of Pointe Saint-Jean, Île d'Orléans, where it provides a mud-bottom anchorage 10 to 24 m deep. Located at the upstream intersection of the Chenal du Sud and the Traverse du Nord, it is marked on the north by buoy K135 and on the south by buoy K131. Its western edge approximates the eastern end of the port of Québec. To the northeast is the south cardinal buoy DAME, which shows the start of the Île Madame Reef. The northwest edge of the anchorage is in proximity to the Saint-Michel range, which runs 033˚- 213˚ (see Figure 2).

The seabed is generally described as appropriate for anchorage. *The Atlas of Tidal Currents* notes that currents in this area can reach 2.5 knots. The medium and high tide ranges are 4.5 and 6.6 m, respectively.

The anchorage offers vessels little protection from northeast to east winds or southwest winds. The area, suitable for vessels with a draught of over 15 m, is approximately 2 nm long and 0.5 nm wide, running along a northeast-southwest axis. Vessels drawing 12.5 m and up drop anchor at the Saint-Jean anchorage regularly because those off the Maheu and Lafleur rivers are not deep enough. Pilots usually use the Saint-Jean anchorage to await favourable tides to transit the Traverse du Nord.

Availability of Berths in the Port of Québec

The Beauport sector of the port of Québec includes berths 50 to 53, which are reserved for handling liquid and solid bulk cargo. The water depths available at berths 50, 51, 52, and 53 are 11.2 m, 12.1 m, 12.2 m, and 14.5 m, respectively (see Figure 3)[3]. A depth of 15.2 m is also available at berth 52 at a distance of about 90 m from the end of berth 53. To unload cargo, there are four serviceable gantry cranes available at berths 52 and 53.

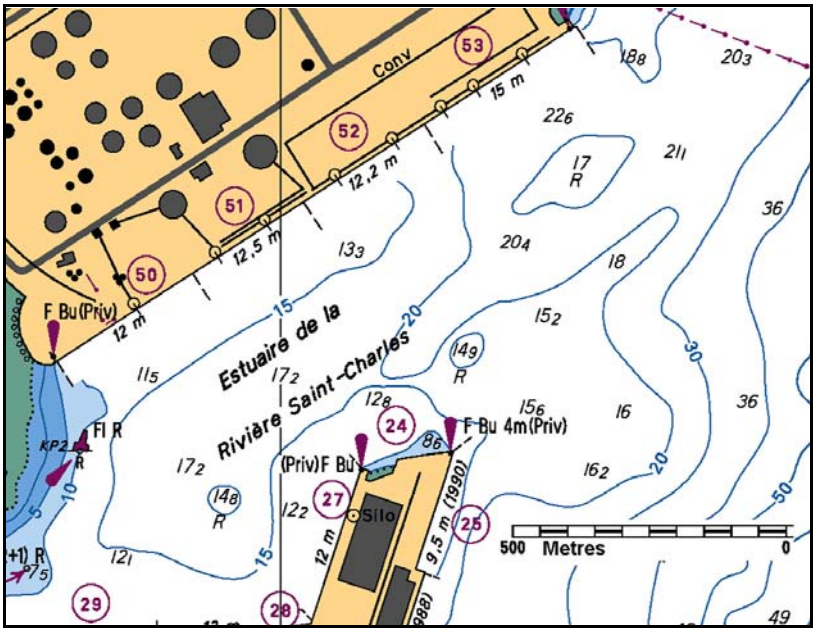

Figure 3. Port of Québec, Beauport sector

The harbour master oversees the assignment of berths at the port of Québec. Berths 52 and 53 are managed by a private stevedoring company that determines the order of ships docking there. Although a vessel may at times be granted priority docking privileges, berths are usually available on a "first-come, first-served" basis.

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[3] The variation in the depths of water marked on the chart and depths available at berths may be attributable to the silting.

When the *Yong Kang* arrived on 02 December 2003, berths 52 and 53 were occupied by the *Puffin* and the *Legiony Polskie*, respectively. The plan had been for the *Yong Kang* to dock between berths 52 and 53, because of its deep draught and the limited cargo space on the dock. At 0327 on December 3, however, the *Canadian Navigator* replaced the *Puffin*. In addition, equipment failures and a shortage of personnel had delayed trans-shipping operations on the *Canadian Navigator* and the *Legiony Polskie*. As a result, the *Yong Kang* was not given access to the dock until the two vessels had left on December 6.

Vessel Certification

After the occurrence, the classification society, acting under the Chinese authority of the Hong Kong special administrative region, issued a Load-line Certificate and a Conditional Safety Construction Certificate. These certificates required corrective action before 19 February 2004 and limited the vessel movements to a single voyage from Québec to a port in China via the Suez Canal. All other certificates required for this type of vessel were valid and appropriate.

Personnel Certification

The master and officers held valid certificates in accordance with the requirements of the *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers*. Their certificates were appropriate for the type of voyage the vessel was on and its operation.

Weather

At 0700 on 06 December 2003, the Environment Canada observation station at Saint-François, Île d'Orléans, logged winds from the northeast-by-east at 41 km/h. The winds shifted to northeast-by-north at about 1000, while their speed rose to 57 km/h around noon, then to about 75 km/h at the end of the day. The air temperature fell steadily throughout the day. At the time of the occurrence, it was recorded at −6° C.

Currents and Tides

From 02 to 06 December 2003, the range resulted in mean tide levels. At 0715 on 06 December 2003, the ebb tide was moving northeast at a rate of approximately 2.5 knots, while at 1230, when the vessel was refloated, the incoming tide was flowing southwest at about 2 knots. The pilot had given the bridge personnel a document listing the times for the tides, together with some handwritten notes on the changes in current direction caused by the tides.

Government Infrastructure

The primary objective of Canadian public ports administrations is to ensure the economic efficiency of the port while protecting the environment. With that in mind, some port administrations have adopted criteria for anchorage assignment. The LPA ensures the safe operation of pilotage services and the maintenance of pilot qualifications, and oversees the delivery of pilotage services. In 1988, while reorganizing its services, it agreed to combine some of them with those of the Québec port administration. Under the agreement, the LPA would provide the following services to the harbour master's office:

- assignment of pilots;
- assignment of berths and movement of vessels; and
- administration of all applicable services or services that must be provided by the port.

Even though the Saint-Jean anchorage is not part of the port of Québec area, the harbour master's office was notified of the vessel's precarious situation at about 2205 on December 3.

One operation centre and two divisions of the Marine Programs Directorate of the Canadian Coast Guard, Department of Fisheries and Oceans Canada (DFO), were involved in this incident:

- The Regional Operations Centre, which coordinates search and rescue (SAR) operations, manages ice operations, and coordinates ship and helicopter operations, was advised of the occurrence at 0909 on December 6. The centre asked the CCGS *Martha L. Black,* which was in the area, to halt its activities and stand by to respond. The vessel was released at 1030.

- The Environmental Response Division, whose mandate is to protect the environment after marine accidents, was advised of the occurrence on December 6 at 1042. There was no pollution and the situation was monitored.

- The MCTS Division, which provides marine communication and traffic services to the marine community, and ensures the safety of life at sea and the protection of the environment, forwarded requests from the *Yong Kang* to the divisions and organizations concerned.

The Marine Safety Directorate of Transport Canada (TC), which is tasked with ensuring that vessels involved in marine accidents are still seaworthy, was contacted at 0909 on December 6. It confirmed that the vessel was not causing any pollution and monitored the events as they unfolded. Once the vessel was docked, a surveyor ensured that it had been temporarily repaired satisfactorily before giving it clearance to sail.

Towing and Pilot Boarding Services

Towing and pilot boarding services are provided by the same private company in the port of Québec. Boarding services are provided by a pilot boat in summer and a tugboat in winter. One tug is always on duty within the harbour, but a second tug within or outside the harbour requires one hour's notice.

Analysis

Choice of Anchorage

The main criteria for choosing a vessel's anchorage, whether as a shelter or a place to await the order to proceed, include the number and proximity of other vessels; the weather conditions and forecast; and the currents and tidal ranges. Certain physical aspects of the site are also taken into account, including water depth, obstacles around the perimeter, the anchor holding ground, proximity to shipping lanes, and room to manoeuvre.

The choice should also consider factors related to the hydrodynamic behaviour of the vessel, such as ratio of draught to water depth and shape of the bow. In shallow water, the hydrodynamic behaviour of a vessel at anchor is similar to that of a vessel underway: the ship acts like an obstacle, forcing the moving water to go around it, thus creating areas of high and low pressure around the hull. The resultant forces and the mass of the ship itself have a direct effect on the strength of the anchor's hold on the sea bed.

Table 1 shows the forces acting on an oil tanker with a deadweight of 50 802 tonnes in a tidal current of 5 knots and a 50-knot wind.[4] Note that the lower the keel clearance, the greater the forces acting on the ship.

Table 1. Forces acting on a vessel at anchor

Ratio = $\frac{\text{Water depth}}{\text{Draught}}$	Forces acting on bow in tonnes, caused by		Total forces acting on bow in tonnes
	Wind	Current	
3	20.05	18.79	38.84
2	20.05	30.56	50.61
1.4	20.05	47.54	67.59
1.2	20.25	56.58	76.63

[4] Master R.W. Rowe, FNI, *The Shiphandler's Guide*, by The Nautical Institute

A parallel can be drawn between the example in Table 1 and this occurrence: between December 1 and 6, the water depth in the Saint-Jean anchorage varied between 20.5 and 25.1 m. The draught of the *Yong Kang* was 13.5 m, so the ratio of water depth to draught ranged from 1.5 to 1.9. Even though there are no data describing the shape of the *Yong Kang* hull to compare to those of the oil tanker in Table 1, it has been established that winds and currents applied considerable force on the *Yong Kang* in the Saint-Jean anchorage.

The Saint-Jean anchorage is considered a good one, but it is marginally suitable for large vessels with a deep draught. The shallow water means they have low keel clearance and currents around their hulls create forces greater than those in deep water. In addition, these vessels have little room to manoeuvre and the shallow water further restricts their ability to move. For this reason, the St.-Jean anchorage is used primarily as a short-term anchorage.

With seven shackles of anchor chain, the *Yong Kang* had a maximum swinging room of roughly four cable lengths in diameter, which is less than the programmed safe area on the radar. It is important to note, however, that because of the position of the anchor and the length of chain in the water, the *Yong Kang* could come within one cable length of the Saint-Michel range, so that the stern of the vessel was in line with the green buoys of the Traverse du Nord. On the south side, the stern of the vessel could come within one cable length of the 15 m isobath. Given the vessel's large size, deep draught, low keel clearance, the strength of the currents, the increasing winds, and the limited room to manoeuvre, the *Yong Kang* was not anchored in a suitable or safe anchorage.

Manoeuvre to Avoid Grounding

When the alarm sounded at approximately 0715 on 06 December 2003, the vessel was dragging its anchor. The master immediately used the main engine and tried to gain control of the situation, but this was a complex manoeuvre due to the length of time required to weigh seven shackles of chain. In one hour, the currents and the winds, which had picked up, had caused the ship to drift about 7.8 cables to the southeast.

On the bridge, the third officer and the helmsman were assisting the master. The third officer recorded the engine orders in the log-book and plotted the position on the chart. The master's attention was divided between the control of the vessel and anchor manoeuvres. Furthermore, his workload was compounded because he had to communicate with the MCTS, the harbour master's office, and the ship's agent in a language that was foreign to him. A master's primary task at such a critical time is to ensure the con of the vessel. However, the master of the *Yong Kang* had to divide his attention between controlling his ship and communicating his case for assistance over the radio. This discussion may have prevented him from focussing his full attention on the con of his vessel.

Under the prevailing circumstances and conditions, the bridge personnel were unable to prevent the vessel from grounding before the pilot arrived. The tidal currents and winds drove the vessel onto the south shore of the St. Lawrence River.

Criteria for Assigning Anchorage

No one in authority attempted to prevent the *Yong Kang* from dropping anchor in the Saint-Jean anchorage. Seafarers tend to consider it as part of the port of Québec, even though it is not. With the exception of a few port authorities, no Canadian government agency controls the use of anchorages. At the time of the occurrence, the port of Québec had no official criteria for assigning anchorages.

Except when action is needed to protect the environment, MCTS marine regulators do not have a mandate to direct marine traffic. As a result, they cannot assign a ship to a specific anchorage or prevent it from using one.

The information on anchorages in the *Sailing Directions* deals with their physical characteristics. It provides no analysis to identify risks or restrict access. It is up to the master to use the information in the *Sailing Directions* to decide whether or not an anchorage is suitable. The master of a foreign vessel who may have limited local knowledge can, however, be guided by the pilot or the ship' agent.

Other than the prevailing weather forecast and the initial expected wait time, the parties did not take the aggregate circumstances and conditions into account. In addition, they could not refer to any anchorage assignment criteria based on risk analysis. As a result, they made decisions based on incomplete information, which placed the *Yong Kang* at risk. Some ports in the St. Lawrence have established criteria for assigning anchorages to vessels. For example in the port of Montreal a person is designated to assign anchorages. Some risk-based criteria established include, among others, traffic, vessel draught, type and dimensions, duration of stay, notices from harbour master. However, similar risk-based approach is not taken to identify and establish criteria for other anchorages within the river.

Assignment of Pilot to Anchorage

Despite the fact that the *Yong Kang* was expected to be at anchor for only a short while, it was decided that the pilotage services were no longer required. However, the ship remained at anchor for five days. The master, who did not know the area, relied on the pilot and ship's agent and did not oppose the decision to release the pilot.

The safety implications of a master's decision are based on the accuracy and completeness of information supplied by the ship's agent and the pilot. The ship's agent can advise the master in such circumstances, but the decision to keep a pilot on board in an anchorage is the master's responsibility. In other words, the master alone must assess the safety of a situation, while taking the economic pressures of his work into account.

In compulsory pilotage areas, a vessel underway like the *Yong Kang* is required to have a licensed pilot or a person who holds a pilotage certificate on board. When the vessel is docked or in an anchorage, the services of a pilot are not mandatory. In anchorage areas that are exposed to the effects of winds and tides, caution must be exercised and additional safeguards

instituted to mitigate the risks of a vessel dragging anchor and thus adversely affecting the safety of a navigable channel, the safety of the vessel and creating a threat to the environment. Retaining pilotage services is one way of mitigating these risks.

Pilots with the knowledge and experience to keep a vessel safe and protect the environment can reduce the workload of bridge personnel as well as the navigational risks. They can also establish communications more easily between the vessel and the MCTS, tugboats, the port authorities, and other vessels. According to the LPA, an assessment of the requirement to provide pilotage services on board a vessel at anchor on the St. Lawrence River has never been done.

Response Plan and Emergency Resources

Despite the urgent calls for assistance by the master of the *Yong Kang*, no government or private agency took action under a pre-established response plan. Because no pollution was reported, Transport Canada (TC) and the Environmental Response Division only monitored the situation. The MCTS answered the call from the *Yong Kang* and relayed the information to the appropriate authorities at TC and DFO under the procedures in place for this type of occurrence. The Regional Operations Centre positioned the CCGS *Martha L. Black*, in case of an environmental emergency or marine rescue, but released it about two hours before the *Yong Kang* was refloated. Even though the master had informed the authorities of a developing emergency situation at about 0715, the *Océan Charlie*, with the docking pilot on board, did not leave until 0845. The *Océan Delta*, sent to provide additional assistance, turned back because of mechanical trouble. No other tug or SAR unit was dispatched to replace it.

The key to success in an emergency response is to take action in a timely and orderly fashion. The parties involved must know the primary risks and dangers as well as the economic and environmental input. Only then is it possible to establish a response plan, make preventive administrative decisions, and determine the resources needed to support the actions in the plan.

In its report on the *Alcor*,[5] the Board recommended that

> The Department of Transport, the Department of Fisheries and Oceans, and Canadian pilotage authorities, in consultation with marine interests, develop, implement, and exercise contingency plans to ensure that risks associated with navigation-related emergencies are adequately addressed (M03-03, issued January 2004).

This occurrence demonstrates that no effective measures have been initiated to mitigate risks, pending development of such a final formalized plan. Although several government agencies were involved in the response, they did not coordinate their actions. Without a response plan, they were unable to assess the relevance and effectiveness of the actions taken. A predefined risk matrix controlled by proper authorities provides a framework against which navigation risk can be assessed in Canadian waters. Except for search and rescue and oil spill operations, other

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[5] M99L0126, Grounding and Constructive Total Loss, The Bulk Carrier *Alcor*, Traverse du Nord, St. Lawrence River, 09 November 1999.

marine emergencies can occur without an appropriate response. While risks associated with uncoordinated SAR or environmental emergency response are not tolerated, the risks associated with developing navigation-related emergencies are tolerated.

Findings as to Causes and Contributing Factors

1. Considering the large size and deep draught of the vessel, the low keel clearance, the strength of the currents and winds and its limited room for manoeuvre, the *Yong Kang* was not anchored safely in an appropriate anchorage.

2. The vessel could not be prevented from grounding in the strong wind and tidal conditions, and timely local assistance from a pilot and a tug was not available.

Findings as to Risk

1. A risk-based approach is not used to identify anchorages that pose unique risks, permitting vessels to be assigned anchorages that may not be suitable.

2. While risks associated with uncoordinated search and rescue (SAR) or environmental emergency response are not tolerated, the risks associated with developing navigation-related emergencies are tolerated.

Other Findings

1. Neither the Marine Communications and Traffic Services (MCTS) in Québec nor the port of Québec has the equipment to remotely confirm the position of vessels within the waters under its jurisdiction.

2. When it was reported that the *Yong Kang* had dragged its anchor on 03 December 2003, the vessel had not reached the limit of its programmed safety area on the ship's radar.

Safety Action

Action Taken

At a meeting on 10 May 2004, representatives of the Laurentian Pilotage Authority (LPA), the Corporation des pilotes du Bas Saint-Laurent, the Québec port authority, the Marine Safety Directorate of Transport Canada, and the Department of Fisheries and Oceans, Marine Communications and Traffic Services (MCTS) acknowledged that a vessel can drag its anchor in certain tide and wind conditions. The following propositions have been agreed and added to the Operations Manual of the MCTS centre in Québec, Quebec:

- MCTS will ask that all anchored vessels give their position by latitude and longitude when they are in an area that is not covered by the control centre radar or when the Automated Identification System (AIS) is not available or functional.

- Upon receiving information that a ship is dragging its anchor, the control centre will call the vessel to check the situation and will compare the ship's position with the position given when the ship was anchored.

- If a ship's position is outside the original swinging room and the ship is dragging its anchor, the control centre will call the LPA dispatch centre and, if necessary, the port authority concerned. The control centre and the LPA will decide if a pilot should be dispatched to the vessel for repositioning or if any other action is required, e.g. sending a tug.

Since July 2004, all pilot dispatch offices under the supervision of the LPA have been centralized in Montreal under the same address as the LPA head office. The proximity of the dispatch office gives the LPA the capability to have a good and quick picture of the maritime situation on the St. Lawrence river and to rapidly detect any problems. In 2006, LPA will acquire the INNAV system, and will be able to have vessel positions displayed on a chart giving them the capability to get a real time picture of the traffic on the river.

Safety Concern

The Board acknowledges the actions taken by the Department of Fisheries and Oceans which jointly collaborated with representatives of the LPA, the Corporation des pilotes du Bas Saint-Laurent, the Québec port authority and Transport Canada. However, the Board is concerned that navigational risks, as evidenced in this occurrence and in the grounding and constructive total loss of the bulk carrier *Alcor*, may still persist until a comprehensive assessment of such risks is undertaken and corresponding emergency response measures are put in place. Such measures may involve assessing the adequacy of safe anchorage areas as well as assessing the need for vessels at anchorages to have pilots aboard. The Board will therefore continue to monitor these types of occurrences with a view to determining the need for any further safety action.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 18 April 2006.

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