

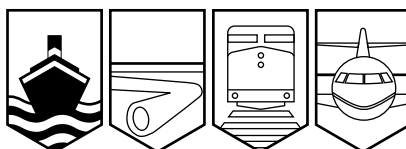
Transportation Safety Board  
of Canada



Bureau de la sécurité des transports  
du Canada

## **MARINE INVESTIGATION REPORT**

**M99W0087**



### **BOTTOM CONTACT**

**BULK CARRIER “ALAM SELAMAT”  
FRASER RIVER, BRITISH COLUMBIA  
16 JUNE 1999**

**Canada**

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

## Marine Investigation Report

### Bottom Contact

**Bulk Carrier “ALAM SELAMAT”  
Fraser River, British Columbia  
16 June 1999**

**Report Number M99W0087**

### *Summary*

The “ALAM SELAMAT” was en route to sea from Fraser-Surrey Dock, British Columbia, under the conduct of a Canadian pilot when she made contact with an uncharted shoal in the channel near buoy S-6 on the Fraser River. The vessel sheered towards Steveston Jetty but her movement was stopped by the bridge team using propulsion, steering, and anchor. The pilot notified Marine Communications and Traffic Services of the bottom contact, and the master and crew carried out damage assessment. Neither injury nor pollution was reported as a result of this occurrence. Approximately three hours later, the “ALAM SELAMAT” weighed anchor and sailed. The vessel’s classification society was not notified prior to the vessel leaving Canadian waters.

*Ce rapport est également disponible en français.*

## *Other factual Information*

<b>"ALAM SELAMAT"</b>	
Official Number	326145
Port of Registry	Port Kelang, Malaysia
Flag	Malaysia
Type	Bulk carrier
Gross Tons <sup>1</sup>	21 941
Length	180.8 m
Draught	Forward: 7.25 m Aft: 7.25 m
Built	1992, Tokyo, Japan
Propulsion	One Diesel, 7000 brake horsepower
Cargo	19 300 tonnes (t), general cargo
Crew	23
Passengers	Nil
Owner(s)	Pacific Ship Managers Petaling Jaya, Malaysia

### *Description of the Vessel*

The "ALAM SELAMAT" is a geared bulk carrier with five cargo holds and four cranes. The wheel-house, machinery, and accommodation are all housed in one superstructure located at the after end of the vessel. The distances from the superstructure to the vessel's bow and stern are approximately 150 m and 30 m, respectively.

The wheel-house has an open layout, with the steering console in the middle and the chart table behind the steering console. Two radars are mounted to the left of the steering console, and a pulpit with engine controls to the right.

The clock, the vessel's speed, rudder angle, and revolutions per minute (rpm) indicators are mounted on the forward bulkhead in front of the steering console. Additional rudder indicators are located on both bridge wings. A gyro repeater with azimuth mirror is located on each bridge wing and a third is mounted on the forward bulkhead inside the wheel-house.

The propulsion machinery of the "ALAM SELAMAT" consists of one reversible main engine driving one right-handed, fixed-pitch propeller. It may be controlled either from the engine

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<sup>1</sup> Units of measurement in this report conform to International Maritime Organization (IMO) standards or, where there is no such standard, are expressed in the International System (SI) of units.

control room or directly from the wheel-house. At the time of the occurrence, the wheel-house control mode was in use.

### *History of the Voyage*

On 16 June 1999, at 1315 Pacific daylight time (PDT)<sup>2</sup> a Fraser River pilot, accompanied by a British Columbia (B.C.) coast pilot, boarded the “ALAM SELAMAT”, which was moored starboard side to Fraser-Surrey Dock No. 7 in Surrey, B.C. The vessel had completed loading her cargo and was preparing to sail.

At 1318 stand-by engine was rung and, with two tugs assisting, the “ALAM SELAMAT” departed Fraser-Surrey Dock at 1330. After turning 180 degrees to port, the vessel was lined up with the Annieville Channel’s main axis, the tugs were released and the engine rpm gradually increased up to the full manoeuvring speed.

Five persons were in the wheel-house: the river pilot, the master, the officer of the watch (OOW), the helmsman and the coast pilot. While the vessel proceeded down the Fraser River, the river pilot had the con while the master monitored the performance of both the personnel and the vessel. The coast pilot did not take part in the navigation. According to the record maintained by Marine Communications and Traffic Services (MCTS) Victoria, the vessel passed the two check-in points, 12b and 12a, at 1401 and 1424, respectively.

At 1440 the “ALAM SELAMAT” passed Steveston Bend and, gradually altering course to port, steadied on a course of 237° true (T), parallel to the Steveston Jetty. As reported by the bridge personnel and corroborated by the two fixes marked on the chart by the OOW at 1440 and 1445, she proceeded along the line delineated by the ranges astern of the vessel (two beacons located ashore and in line 057°-237°T).

At 1445, in a position approximately 200 m north of S-6 buoy, a strong vibration was felt by the persons in the wheel-house and the vessel started sheering to starboard, towards Steveston Jetty. The pilot ordered hard-to-port rudder, slow ahead engine, and for the port anchor to be deployed and held fast when it touched the bottom.

Both the rudder and engine manoeuvres were executed promptly but the anchor was let go after a few seconds’ delay and the chain was not held fast as ordered by the pilot. The crew attempted to stop the chain by applying the winch brake. However, the brake pads overheated and burned and the gypsy continued to rotate and allowed the anchor chain to run out. The whole chain, approximately 275 m, ran out until the bracket at its bitter end was torn off the bulkhead in the chain locker and became jammed in the spurling pipe. The vessel sheered, lost its momentum, swung to starboard and steadied with her bow pointing upstream, in the opposite direction to the outbound course. The anchor held fast and the “ALAM SELAMAT” was swinging gently with her engines stopped. Reportedly, apart from the initial vibration and subsequent sheering, there was no indication of another contact of the vessel’s hull with the ground.

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<sup>2</sup> All times are PDT (coordinated universal time minus seven hours) unless otherwise noted.

At 1510 the pilot reported the occurrence to MCTS as a grounding near buoy S-6 on the Fraser River and requested that tugs be sent to assist the vessel. Following the pilot's report, the MCTS notified the authorities and apprised them of the situation. The crew assessed the damage; all tanks and bilges were checked. No damage or pollution was observed and, reportedly, none of the crew was injured. The master gave the order to weigh the anchor; however, it was discovered that the bitter end bracket of the chain was jammed in the spurling pipe and consequently, the anchor chain could not enter the chain locker. Weighing of the anchor was abandoned and the crew began clearing the spurling pipe.

Shortly after the occurrence had been reported, two tugs arrived and stood by the anchored "ALAM SELAMAT". The Canadian Coast Guard (CCG) inquired about pollution and dispatched a hovercraft to stand by to monitor the waters around the vessel. A Transport Canada Marine Safety (TCMS) surveyor received notification of the occurrence and made inquiries concerning possible damage to the vessel.

It took the crew approximately three hours to dislodge the bracket and the anchor was weighed at 1754. Assisted by tugs, the "ALAM SELAMAT" turned short round and proceeded down river. The river pilot disembarked off Sand Heads at 1820 and the vessel continued towards Victoria pilot station with the coast pilot at the con. After the coast pilot disembarked at the Victoria pilot station at 2311, the "ALAM SELAMAT" proceeded to her destination, Vancouver, Washington, U.S.A.

The Canadian authorities were satisfied with the report relayed by MCTS that the vessel had not sustained damage as a result of the grounding. The TCMS surveyor on duty accepted the vessel's account that it had not sustained damage, and, reportedly, knowing that the river bottom is made of soft mud, considered that damage to the hull was unlikely. Consequently, he did not impose restrictions on the vessel.

The Classification Society's (Lloyd's Register of Shipping) regulations require that "any damage, defect or grounding, which could invalidate the conditions for which a class has been assigned, is to be reported to LR without delay". Prior to leaving Canadian waters, the Classification Society of the "ALAM SELAMAT" was not notified of the occurrence. TCMS was not obligated to notify the authorities in the United States that the vessel, which was about to enter U.S. waters, had been involved in an occurrence, and did not do so.

The vessel's next port of call, Vancouver, Washington, is approximately 86 miles upstream in the Columbia River. Prior to entering the Columbia River, the United States Coast Guard (USCG) imposed a movement restriction on the vessel, allowing her to navigate the river during daylight hours only. On 18 June 1999 at 1630, the "ALAM SELAMAT" berthed at Vancouver, Washington. Upon berthing, both the USCG and Lloyd's Register inspectors boarded her to conduct post-occurrence surveys.

### *Damage*

No damage resulting from the grounding on the Fraser River was found during the inspection in Vancouver, Washington; however, a strong current on the Columbia River precluded diving operations. The U.S. authorities requested that the underwater survey of the hull be conducted in Los Angeles, California—the vessel's next port of call—before the vessel sailed for Japan.

On 23 June 1999, an underwater survey was conducted while the "ALAM SELAMAT" was laying alongside in Los Angeles. It was determined that the vessel's starboard bilge keel was slightly bent, indicating an earlier contact of the hull with another object. The surveyors, however, could not positively establish if the detected damage was the result of the subject grounding on the Fraser River. No other damage was found during the inspection.

### *Certification*

All vessel's certificates on the "ALAM SELAMAT" at the time of the grounding were valid and endorsed by appropriate authorities.

The pilot holds a Master Home Trade under 350 tons certificate of competency and a Pilot's Licence, both issued in Canada. He had attended all the required upgrading courses: ARPA, SEN, MED, BRM, and shiphandling. His total sea time was approximately 45 years, on various Canadian home-trade vessels. He has worked as a Fraser River pilot since 1980.

The master of the "ALAM SELAMAT" held an appropriate and valid certificate of competency. He has accumulated approximately 28 years of total sea time with various companies. His service as master totals approximately 16 years. He had commanded the "ALAM SELAMAT" for three months prior to the occurrence.

The officers and crew on board the "ALAM SELAMAT" all held appropriate and valid certificates of competency. The competency of the crew was not a factor in the occurrence.

### *Weather and Environmental Information*

The weather was reported as clear with light, southerly winds and good visibility; it was not a factor in the occurrence. The tide was approximately 45 minutes after its low water level.<sup>3</sup> According to the Canadian Hydrographic Service (CHS), the predicted surface current in the vicinity of the S-6 buoy at about the time of the grounding was ebbing at approximately six knots.

CHS Chart No. 3490, in use on board the "ALAM SELAMAT", indicates the least depth in the middle of the channel in vicinity of the S-6 buoy as being 8.5 m above chart datum (lowest normal tide at the low stage of the river). Reportedly, CHS reviews the sounding sheets provided by Public Works and Government Services Canada (PWGSC), produces Notices to Mariners, if required, and releases a new edition of the charts (3490 and 3491) every second year.

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<sup>3</sup> Predicted low water at Sand Heads was at 1400.

The Fraser River displaces and carries sediment and thereby builds mounds and troughs on the bottom. Consequently, the depths are subject to continuous change and the users of this waterway, including river pilots, in their everyday routine do not rely on the chart but refer to data based on periodic depth surveys.

The frequency of the surveys depends on the stage of the river flow, which is monitored and assessed by the discharge rate at Hope, B.C. The higher the discharge rate, the greater the probability of changes in depth. Users of the waterway understand that during the freshet period (from May until August), the river bottom may change in as short a period as 48 hours, and that ridges and troughs may appear, disappear, or move on the bottom of the Fraser River—changing its profile substantially.

The data sheet, showing the depths along Steveston Jetty referred to by the pilot on 16 June 1999, was based on the survey conducted on 27 May 1999. The least depth shown in the subject area is 8.3 m above chart datum. Reportedly, the subsequent depth survey of this part of the river was scheduled for 20 June 1999. However, after the grounding of the “ALAM SELAMAT” the date of the survey was expedited and conducted on 18 June 1999. The data sheet based on this survey shows a least depth of 6.0 m in the middle of the channel, north of the S-6 buoy.

Depth surveys of the Fraser River are conducted by PWGSC when requested by the CCG. The boats—owned, equipped and operated by PWGSC—conduct surveys and collect data in both electronic-digital and analog formats. The turn-around period for the surveying of a given section of the river depends on several factors, of which the location and the observed river discharge are paramount. Some sections of the Fraser River are known to be critical and, prior to 1998, the turn-around period for these areas was approximately two weeks; the intervals lengthened after the CCG and the PWGSC were affected by budget cuts.

While the analog sounding charts recorded on the surveying boats are readable and available simultaneously with the sounding, they are neither corrected for tide nor approved by the PWGSC specialist and, as such, are not distributed directly to the end users.

Data from the boats are delivered to a processing centre located on Annacis Island. After processing and plotting the soundings, the PWGSC surveyors send the sounding plans to the PWGSC downtown Vancouver office for approval. Upon approval, an electronic copy is sent to CCG and posted on the Internet. Furthermore, PWGSC, on behalf of CCG, distributes copies of the sounding plans to interested parties, including the Pacific Pilotage Authority.

There is a time lag between data collection and its distribution to end users. It ranges from three to six days, depending on factors, such as tasks, holidays, and manpower, affecting all of the involved organizations. The results of the expedited survey conducted on 18 June 1999 were faxed to several recipients on 21 June 1999. Reportedly, the pilot obtained a copy on 24 June 1999.

The Fraser River Port Authority maintains the Fraser River as a navigable waterway round-the-clock for all vessels with draught not exceeding 10.67 m on a 3.96 m tide. The operations and schedules of all the users of the Fraser-Surrey docks are, *inter alia*, based on this concept. The river is monitored and, whenever necessary, dredged to help ensure safe passage. It is then

neither customary nor necessary to delay sailing to wait for higher tide if the vessel's draught is less than the limiting draught.

## *Analysis*

The pilot and master of the "ALAM SELAMAT" decided to unberth the vessel and transit the Fraser River at low tide. The vessel's deepest draught was 7.25 m, i.e. 3.36 m less than the maximum draught allowed by the port authority. They had no reason to believe that there was less water than needed for safe passage, although a higher tide would have increased the under-keel clearance. Neither the chart nor the latest available survey results indicated any depth reduction in the main channel.

There was no indication that the draught of the "ALAM SELAMAT" increased after leaving Fraser-Surrey docks, nor that she deviated from her track; the vessel was proceeding along the line defined by the ranges when she ran aground. As was ascertained after the occurrence, there was a shallow spot with a depth of 6.0 m (above chart datum) in the position where the vessel reportedly made contact with the bottom.

The detected shallow patch confirms that the depths on the Fraser River are subject to change, a known phenomenon caused by sediment displaced and carried by the river. To maintain safe passage for vessels, the authorities implement regular depth surveys and dredging of the river. The depth survey results are circulated among all interested parties and also serve as the basis for planning and coordinating dredging operations.

These preventive measures should ensure a safe passage for vessels as declared by port authority. During the annual freshet period, depth changes occur so rapidly that dredging is not an effective option. The only practical method to maintain the navigability of the river is thus limited to the frequent monitoring of depths and the distribution of survey results to all users.

From the navigator's point of view, the monitoring of depths and the conning of the vessel accordingly is sufficient to prevent grounding. On 16 June 1999 the master and the pilot on the "ALAM SELAMAT" relied on the latest available survey data. Although the survey sheet was dated 27 May 1999, approximately 20 days prior to the date of the occurrence, they considered it, in good faith, to be up-to-date. The presumption was that if there had been any change in depth in the main channel since the date of the latest survey, the changes would have been promulgated by the authorities.

However, there were factors beyond the knowledge of the master or the pilot that made the available source of information obsolete. The frequency of the surveys in the Fraser River was inadequate in an area subjected to frequent changes in depth. The results of a survey, made available after a time lag of three or more days, are of little relevance during the freshet period when the depth of the river may change substantially within 48 hours.

The "ALAM SELAMAT" sailed and left the site of the occurrence approximately three hours after she had touched the bottom, an occurrence which was reported as a *grounding*. The



quality of the bottom in the area of the occurrence was known to be soft mud and, after a damage assessment was carried out by the crew, the vessel reported that no damage was discovered. Neither TCMS nor the Classification Society, however, conducted a survey to assess the seaworthiness of the vessel before she left Canadian waters.

## *Findings*

1. At the stage of the tide, the draught of the “ALAM SELAMAT” was approximately 3.3 m less than the maximum draught to transit the Fraser River.
2. The “ALAM SELAMAT” made contact with the bottom of the river and sheered towards a breakwater when proceeding along its main navigable channel.
3. The master and the pilot ordered the anchor to be dropped and succeeded in stopping the vessel before she struck the breakwater.
4. Immediately after the incident the crew surveyed the vessel and the pilot reported the occurrence as a grounding to Marine Communications and Traffic Services and this information was relayed to the authorities including Transport Canada Marine Safety.
5. Three hours later the “ALAM SELAMAT” reported no damage, weighed the anchor, and sailed for sea.
6. When navigating the Fraser River, pilots refer to the special Depth Survey charts distributed periodically by the Canadian Coast Guard.
7. None of the available sources of information showed a decreased depth in the main channel of the Fraser River.
8. The depths in the Fraser River are subject to frequent change, especially during the annual freshet period.
9. The authorities monitor depths in the Fraser River by conducting periodical surveys and distributing the results to all interested parties.
10. Presently, the interval between two consecutive surveys of the same critical section of the Fraser River is too long for an early warning.
11. The existing system for processing survey data incurs a time lag of three days or more before the results of the survey reach end users.

## *Causes and Contributing Factors*

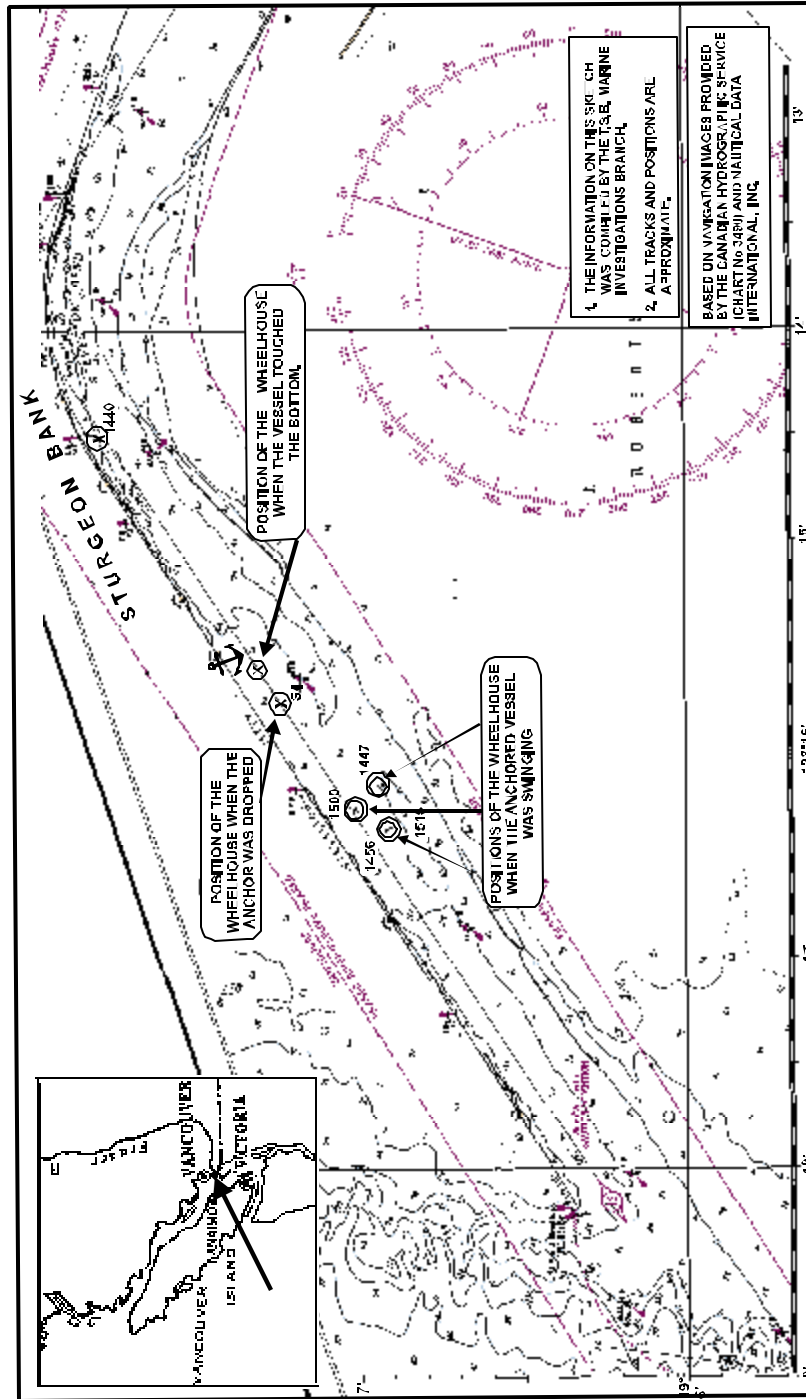
The "ALAM SELAMAT" made contact with the bottom of the main channel off Steveston Jetty because the bridge team was not aware of a shallow spot in the navigable channel of the Fraser River. The current system of monitoring navigable channels and producing depth information cannot ensure that end users have up-to-date survey information during freshet.

### *Safety Action Taken*

The Canadian Coast Guard advised that a formal Working Committee, with representatives from the Fraser River Pilots Association, Fraser River Port Authority and Coast Guard has been established and will be meeting quarterly to review channel conditions and status of the channel monitoring and maintenance dredging program. A possibility of modelling the sedimentation process to determine various rates of in-fill associated with forecasted river flow/discharge will be explored.

*This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 24 May 2000.*

# Appendix A - Sketch of the Occurrence Area



\* As per fixes plotted by the vessel's navigation personnel.

## *Appendix B - Photographs*



The “ALAM SELAMAT” anchored off Steveston jetty (in the background) after the grounding. Two tugs are assisting the vessel.



The “PROFILER” is one of the specially equipped boats used by PWGSC to conduct depth surveys on the Fraser River.