

For Immediate Release
07-012

January 26, 2007

**BC FERRIES ISSUES FINDINGS INTO INCIDENT INVOLVING GABRIOLA FERRY
Report rules out mechanical failure**

VICTORIA – BC Ferries today released the findings of its internal investigation into the January 9, 2007 incident where the MV Quinsam unexpectedly pulled away from the dock at the Nanaimo Harbour terminal resulting in a vehicle rolling off the ramp.

The Divisional Inquiry findings conclude no mechanical, electrical, or system faults were identified affecting the function of the vessel propulsion system immediately upon the occurrence of the incident or during subsequent inspections and testing.

The Divisional Inquiry panel, which included representatives from both management and the BC Ferry and Marine Workers' Union, therefore concluded that human factors likely contributed to the occurrence of the incident and the report details two possible scenarios.

The report also makes 16 recommendations on operational safety improvements that will be acted upon immediately.

To view the full report, visit www.bcferries.com

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Media Contact:
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Divisional Inquiry

M.V. Quinsam

**Unexpected Departure from
Nanaimo Harbour Terminal**



**Date of Incident:
January 9, 2007**

Divisional Inquiry No.: 815-07-01
Release Date: January 26, 2007

Particulars of Terminal:

Nanaimo Harbour

<i>MAILING ADDRESS</i>	c/o Long Harbour Terminal 1000 Long Harbour Rd. Salt Spring Island, BC V8K 2L8
<i>TELEPHONE</i>	(250) 753-9344
<i>FAX</i>	(250) 753-9803
<i>SITUATED</i>	In downtown Nanaimo, across from Port Place Mall on Front Street.
<i>CAR HOLDING CAPACITY</i>	80 vehicles
<i>PARKING</i>	Public parking for 16 vehicles; staff parking for 5 vehicles
<i>FACILITIES</i>	Two shelters. Washrooms.
<i>WASHROOMS</i>	Yes
<i>ROUTE</i>	Gabriola Island - Nanaimo
<i>BERTHS</i>	One
<i>LOAD LIMIT</i>	Weight G.V.W. 39,500 kg. Max. no. of loaded axles 5
<i>RESTRICTED CLEARANCES</i>	Width 3.2m (10'6"). Length 18.3 m (60') because of curved trestle.
<i>GENERAL INFORMATION</i>	Long low loads limited to tides over 4'.

Particulars of Vessel:

M.V. QUINSAM

<i>OFFICIAL NUMBER</i>	801691
<i>BUILT</i>	North Vancouver 1982 by Vancouver Shipyards Ltd.
<i>DESIGN AGENT AND DESIGN SERIES NO.</i>	Marine Design Associates-#4000
<i>OVERALL LENGTH</i>	86.85m (284'11")
<i>BREADTH (EXTREME)</i>	21.25m (69'8")
<i>CLEARANCE</i>	4.7m (15'3")
<i>DRAFT</i>	1.8m (5'11")
<i>MAIN ENGINE</i>	Four MTU 2000 Series V12
<i>HORSEPOWER</i>	2600 HP (1940 kw)
<i>SERVICE SPEED</i>	13 knots
<i>TONNAGE</i>	1458 gross 1392.02 registered
<i>CAPACITIES</i>	70 - Automobiles 400 - Passengers and 7 crew
<i>SIMILAR SHIPS</i>	M.V. Quinitza
<i>SPECIAL NOTES</i>	Transferred to BC Ferries October 1, 1985, from the Ministry of Transportation and Highways.

Particulars of Propulsion System:

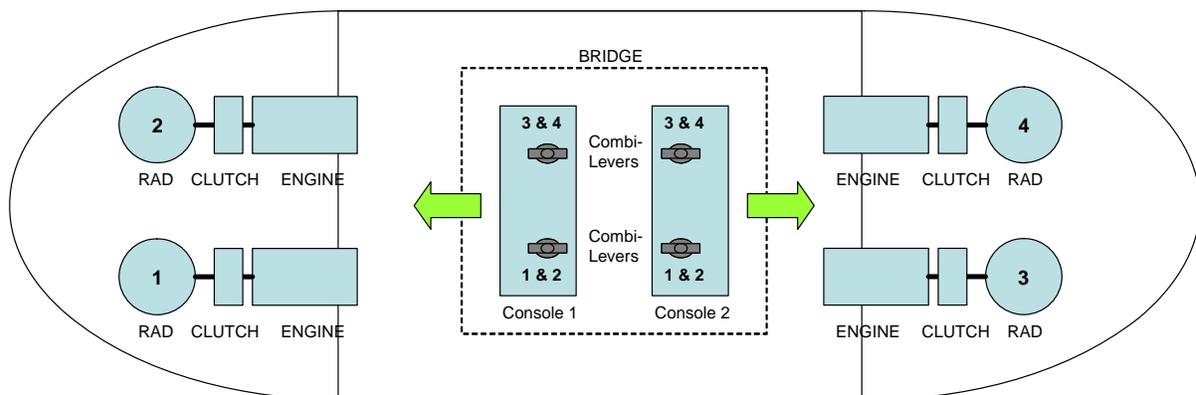
Right Angle Drives (RAD) Units

The vessel is propelled and steered by four azimuth turning type, right-angled drive (RAD) units, one at each corner of the hull. Each RAD has its own engine room compartment and is independently powered by a diesel engine, via a clutch. The RADs can be controlled from two locations in the wheelhouse or locally in each of the four engine rooms.

Each RAD unit has an independent electronic control system dedicated to that RAD alone. There are no electronic interconnections between control systems. The four control systems were new in 2002.

Steering the vessel is effected by rotating the RADs and pointing the propellers in the desired direction. The rotation of a RAD leg is done via gearing and by a hydraulic motor powered by an engine-driven hydraulic pump. The direction of rotation of a RAD unit is controlled by an electro-hydraulic 'proportional' valve, which receives its signals from a control head in the wheelhouse or which can be operated locally by manual action.

Each wheelhouse control console provides a forward looking view with the direction of the vessel and by means of a 'transfer' switch, becomes the active or 'live' control station. There are two 'combi-lever' type control heads at each console. Each combi-lever contains three functions: clutch state (in/out), steering angle (azimuth) and engine RPM. The left side combi-lever simultaneously controls both "forward" end RADs and the right side combi-lever simultaneously controls both "stern" end RADs.



Divisional Inquiry

M.V. Quinsam Unexpected Departure from Terminal January 9, 2007

Synopsis

On Tuesday, January 9, 2007, at approximately 1857 hours, the M.V. Quinsam unexpectedly departed Nanaimo Harbour terminal while loading vehicles and passengers. A GMC pickup truck rolled off the apron, which had collapsed to approximately a 45° angle. The lone male occupant exited the vehicle prior to the vehicle rolling off the apron and entering the water, and climbed the apron to safety.

There were no injuries and no persons entered the water. There was minor damage to the terminal apron hoist unit and cable and to one tie up cable system. There was no damage to the vessel.

Summary of Events

Environmental Conditions

Tides (Pt. Atkinson)	1644 hours	8.2'	Low water slack
	2129 hours	10.5'	High water slack

Weather

Wind 25-30 knots gusting from northwest
Combination of rain and hail/snow developing into snow with ground accumulations
Visibility approximately ½ nautical mile

- At 1828 hours, the M.V. Quinsam departed Gabriola Island (Descanso Bay) for Nanaimo Harbour with nine (9) underheight vehicles and thirteen (13) passengers. The vessel had a crew of seven (7) onboard. The vessel was crewed in accordance with applicable regulations and no equipment deficiencies were noted.
- The mate had control of the vessel with acting #2 quartermaster assisting in the wheelhouse. (The dayman deckhand was acting as #2 quartermaster as #2 quartermaster was on his meal break)
- At 1843 hours, at Gallows Point (on Protection Island) the mate altered course to 274° Gyro and reduced engine revolutions to 1200 rpm to commence the approach to Nanaimo Harbour terminal. All four Right Angle Drive (RAD) units were fully tested and operational.
- At approximately 2.5 cables (500 yards) from Nanaimo Harbour terminal, the mate reduced speed to slow ahead position on the four RAD units and maneuvered the vessel towards the terminal.
- At approximately one cable (200 yards) from Nanaimo Harbour terminal, the mate rotated the two aft RAD units approximately 150° to reduce speed and turn the vessel (units #1 and #2). Acting # 2 quartermaster visually confirmed the rotation.

Summary of Events (Cont'd)

- At approximately the same time, the ship's phone rang and the acting #2 quartermaster answered it. The call was for the Master. At that moment the Master arrived in the wheelhouse and took the phone call. Acting #2 quartermaster excused himself from his duties as he was relieved by the Master, and proceeded to the car deck.
- At 1848 hours, the vessel docked with #2 end inshore without incident. From the #2 end car deck position, the #1 quartermaster sounded one long and three short on the vessel's docking buzzer to indicate that the vessel is in the dock.
- The mate sounded one long and three short on the docking buzzer and called #1 quartermaster on the ship's phone system and said that the vessel was pushing in with four legs and all clear to discharge.
- #1 quartermaster and acting #2 quartermaster put on both securing chains. Acting #2 quartermaster signaled to the terminal supervisor (ashore) to lower the apron. The apron was lowered and the foot passengers were directed ashore. The terminal supervisor then escorted the foot passengers up the trestle to the parking lot area.
- The terminal supervisor remained in the parking lot area leaving the ramp controls unattended as is the normal routine.
- #1 quartermaster discharged the underheight vehicles. The Master and mate remained in the wheelhouse during the discharge and loading process. During the nine minutes in dock, the mate prepared the log book for the next voyage, adjusted the inshore and off shore windshield wipers, and tuned the radar at the offshore end of the wheelhouse (#1 end). The Master remained positioned near the inshore radar (#2 end) and to the left of the console.
- Once the discharged vehicles were clear of the trestle, #1 quartermaster pushed the traffic control indicator on the ramp to show a green light and the terminal supervisor sent the foot passengers to the vessel.
- When the foot passengers were almost aboard the vessel, the terminal supervisor commenced loading the 31 vehicles in the parking lot.
- #1 quartermaster loaded the vehicles while the acting #2 quartermaster parked vehicles at appropriate distances apart.
- As the second to last vehicle was crossing the apron, the mate sounded one short on the docking buzzer indicating that it was scheduled sailing time.
- Acting #2 quartermaster, hearing the buzzer moved toward the apron and removed the port securing chain. Acting #2 quartermaster noticed the last vehicle, a white GMC pickup truck, driving down towards the apron.
- The acting #2 quartermaster then noticed the vessel pulling away from the apron fingers slowly at approximately 1857 hours. The vessel appeared to be accelerating away from the dock. Acting #2 quartermaster saw the starboard securing chain becoming taut and said to #1 quartermaster to watch it.

Summary of Events (Cont'd)

- Both the #1 quartermaster and acting #2 quartermaster yelled and waved their arms for the GMC pickup truck driver to stop.
- The driver stopped the pickup truck on the apron and remained in the vehicle.
- #1 quartermaster radioed the wheelhouse that the vessel was pulling out of the dock.
- Both #1 quartermaster and acting #2 quartermaster yelled at the driver to get out of the vehicle.
- Acting #2 quartermaster watched as the vessel pulled away from the terminal and heard a thump as the apron came free of the vessel's deck and the starboard chain parted.
- The apron dropped to about a 30-45° angle to the horizontal with the pickup truck and one male passenger inside.
- The Master hearing the radio transmission from acting #2 quartermaster, immediately took the inshore wheelhouse controls and declutched all four RAD units.
- The vessel stopped about 30 feet from the apron and rested against the floating leads.
- The driver of the pickup opened the door and grabbed the apron railing, climbing up the apron to the ramp.
- The terminal supervisor asked the driver if anyone else was in the vehicle and the driver said no.
- The pickup truck then slowly slid forward off the apron into the water. The pickup remained afloat momentarily and then sank coming to rest on the bottom on all four wheels.
- The Senior Chief Engineer came to the car deck and assisted #1 quartermaster and acting #2 quartermaster with moving passengers away from the #2 end.
- The Marine Superintendent and Senior Master were notified.
- Both #1 quartermaster and acting #2 quartermaster proceeded to the wheelhouse to assist.
- The mate radioed Marine Communications and Traffic Services (MCTS) and called the terminal by cellular phone.
- The Master moved the vessel away from the dock and confirmed that all four RAD units were operating correctly.
- The Master maneuvered the vessel clear of the terminal (approximately ½ mile) and conducted a thorough control check with the senior chief engineer. All controls appeared to operate correctly. The Master did note that one RAD unit rotated in the opposite direction of the rotation of the combinator, however, it did respond to the requested azimuth setting.

Summary of Events (Cont'd)

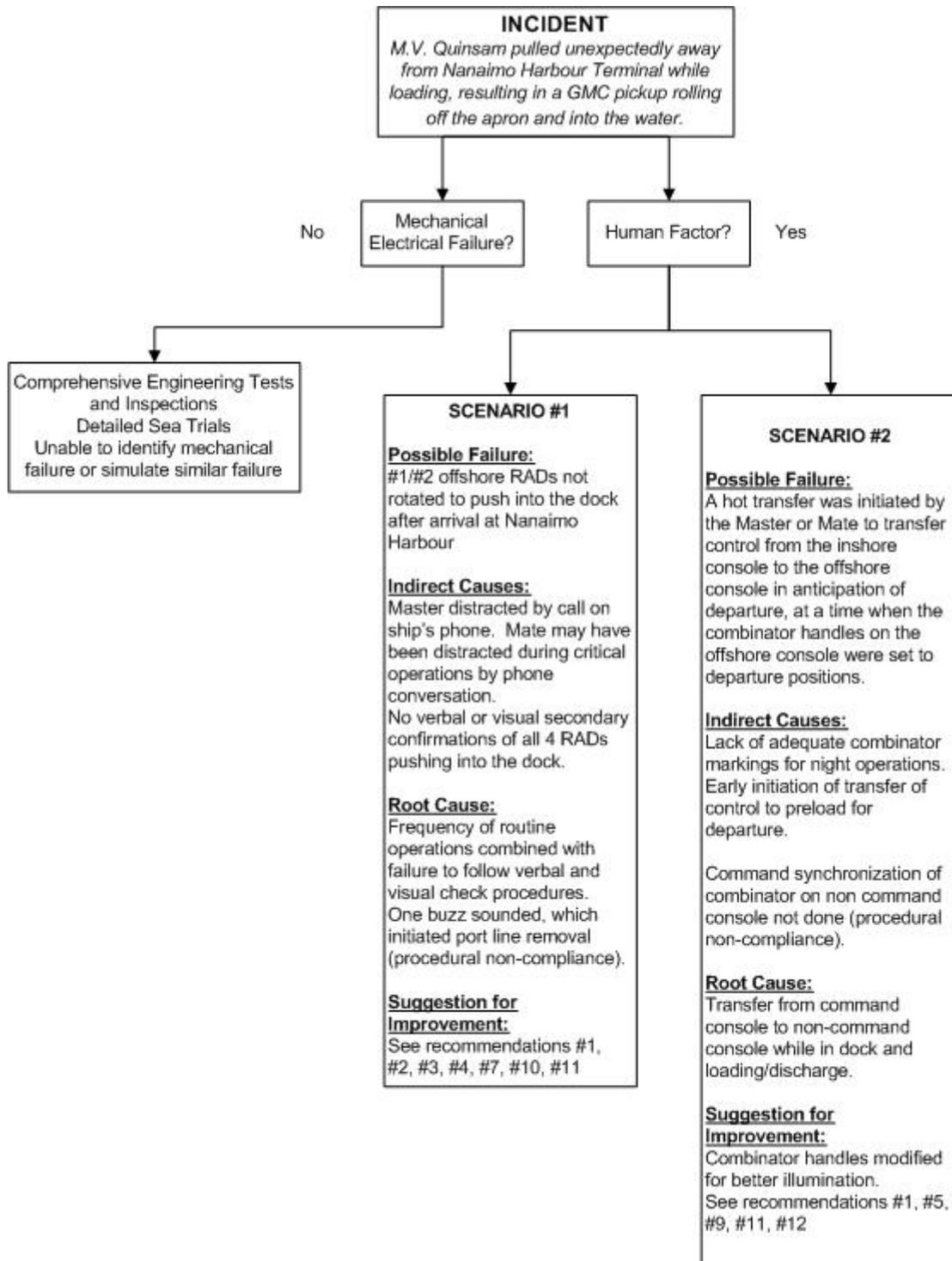
- The Master and Marine Superintendent agreed that the vessel should take the 30 vehicles and 57 passengers to Gabriola Island and tie up and cancelled the remaining sailings that evening.
- At approximately 1921 hours, the vessel departed the vicinity of Nanaimo Harbour terminal where it was holding and proceeded to Gabriola Island.
- The vessel arrived at Descanso Bay, Gabriola Island at 1943 hours and discharged all passengers and vehicles and secured to the dock.
- At 2009 hours, the vessel switched to engine room control.
- On January 10th, a BCF Engineering incident investigation team and the control manufacturer (Mechtronics Technology Inc.) conducted detailed inspections of the control and propulsion systems and simulated testing trials were conducted. No mechanical or electrical faults were detected. Additionally, during sea trials, no control or propulsion faults or failures were observed. Transport Canada witnessed the inspections and sea trials. The vessel was declared fit for service by Transport Canada and resumed scheduled sailings on Thursday, January 11th.
- On January 10th, 2007, BCFS Terminal Maintenance inspected and tested the Nanaimo Harbour main ramp and apron and associated components.
 - The apron hoist unit and hoist cable were replaced.
 - The port side tie up cable system cable and chain were replaced.
 - All other components were found in good condition and safe and operable.
 - The Nanaimo Harbour main ramp and apron were certified for full operation.

Findings

1. At approximately 1000 hours on the day of the incident, Transport Canada inspected the vessel with the Senior Master, Senior Chief Engineer, and Engineering Superintendent for annual safety recertification. The inspection was completed at approximately 1500 hours. All four RADs were fully tested and operational. No deficiencies were noted.
2. No mechanical or electrical faults were identified by the Senior Chief Engineer affecting the function of the vessel propulsion system immediately after the occurrence of the incident. No mechanical, electrical, or system faults were identified during subsequent inspections and testing, that could have caused the vessel to pull away from the berth in the manner described by Master and mate.
3. The possibility of both RAD units #1 and #2 rotating in the manner perceived by the Master and mate is found to be highly improbable. All 4 RAD systems are independent and the possibility of an un-commanded rotation of both RADs #1 and #2 rotating simultaneously and to the exact same position is highly improbable.

Findings (Cont'd)

4. Human Factors likely contributed to the occurrence of the incident. Two possible scenarios are described as follows:



Findings (Cont'd)

5. Before loading was completed, the starboard securing chain remained attached and the port securing chain had been let go.
6. No emergency warning signal was sounded by buzzer or whistle or general alarm in accordance with the Vessel Specific Manual 7.1.9. The Master and mate were not aware vessel was departing until alerted by #1 quartermaster.
7. Shift rotation
 - Both Master and mate follow a six days on, 3 days off shift pattern.

The Master's shift pattern in the previous 14 days prior to the incident was:

- 1 vacation day
- 3 days off shift
- 3 vacation days
- 3 AM shift (0515 – 1430 hours)
- 3 days off shift
- 1 PM shift (1445 – 2330 hours)

The incident occurred on the Master's 2nd PM shift.

The mate's shift pattern in the previous 14 day prior to the incident was:

- 1 PM shift (1500 – 2330 hours)
- 3 days off shift
- 6 AM shifts (0530 – 1430 hours)
- 1 day off shift
- 1 AM shift (0530 – 1430 hours) (on Day Of Rest)
- 1 day off shift
- 1 PM shift (1500 – 2330 hours)

The incident occurred on the mate's 2nd PM shift

8. The PM shift Master and crew had completed four round trips prior to the incident.
9. A Right Angle Drive (RAD) log was maintained in the wheelhouse, to record abnormal operating conditions or failures observed by the Master or officers. This log was not integrated into the defect reporting system onboard the vessel.
10. The terminal supervisor and the Master did not know which deckhand had been designated as the designated deckhand, and when the designated deckhand was relieved at meal break for one trip, no handover or formal notification was undertaken.
11. Best operating practices were not observed, specifically verbal confirmations and secondary checks.
12. The Master and mate have not attended a Bridge Resource Management course. They are scheduled to attend a BRM course in March and April 2007, respectively.
13. Clearance procedures were not initiated prior to the vessel departing unexpectedly, as the departure was unplanned. Visual and verbal confirmations are normal practices on this vessel.

Findings (Cont'd)

14. In 2002 M.V. Quinsam had new control systems installed. These systems were fully inspected by the manufacturer (Mechtronics Technology Inc.) in April 2006 during the vessel's scheduled refit. All controls and propulsion systems were tested as fully operational and functioning properly.
15. When all control and propulsion units are operating normally, there are two methods to rotate RAD units. One combinator controls RAD units #1 and #2. The other combinator controls RAD units #3 and #4.
 - From the console in command, the combinator control must be physically rotated. This will rotate the selected RAD units (either RAD units #1 and #2 or RAD units #3 and #4) to the respective combinator position.
 - From the console not in command, a "Hot Transfer" can be initiated. A hot transfer is when the console in command has all four RAD units clutched in and operating at a selected rpm and the console not in command is selected by depressing two buttons simultaneously. Control of the four RAD units is then assumed at that station and the RAD units will rotate to the combinator's azimuth and rpm selected at that station.
16. BCFS Vessel Specific Manual Article 7.1.9 indicates "It is permissible for the Mate to designate an experienced deckhand to act as Loading Officer while the Mate is not present on the vehicle deck. There must be no misunderstanding among crew members as to who this designated person is."

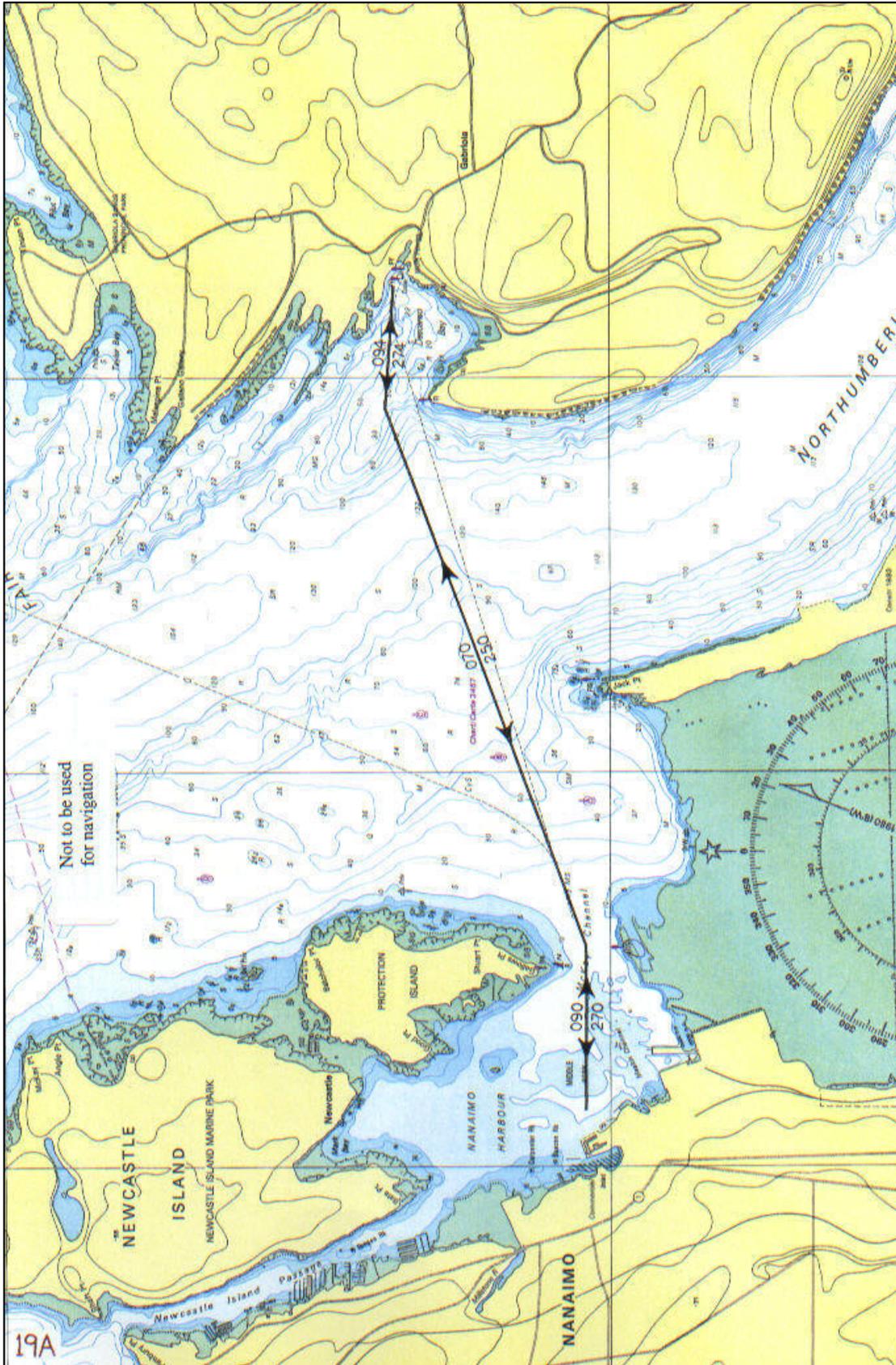
Recommendations

1. Non follow up alarms should be installed on all BCFS RAD equipped vessels to provide an audio visual alarm to give timely warning of a spontaneous deviation between the command signal from the joystick and the actual position of the RAD unit.
2. All BCFS terminal and all BCFS vessel securing arrangements should be reviewed to ensure that the terminal and vessel arrangement is suitable and adequate for holding the vessel in position during propulsion failure taking into consideration the reflex action of the wingwalls.
3. Review Voyage Data Recorder (VDR) installation program to ensure timely installations on all BCFS vessels.
4. All ship's departure practices should be reviewed to remove one short buzzer/sound from the wheelhouse signal that indicates that it is the scheduled sailing time and the deck crew should be ready to prepare for departure. Ship departure procedures should be reviewed to ensure they reflect best operating practices in a sequential order. M.V. Quinsam's departure checklist should be amended to reflect actual practice and arranged in sequential order.

Recommendations (cont'd)

5. Under normal operating conditions, standard procedures for fixed pitch RAD vessels should be developed (e.g. to utilize forward legs for reverse thrust when docking) and these procedures documented in the Vessel Specific Manual.
6. All RAD vessels' arrival leg rotation in dock (all legs pushing in) should be confirmed and recorded prior to giving clearance to discharge passengers and vehicles. Vessel Specific Manual Arrival Procedures should be amended to include this requirement.
7. In support of existing BCFS policy, all terminal aprons should be painted yellow and black indicating a *No Stopping Zone* to alert employees and customers.
8. All BCFS minor terminal ticket sales cutoff times should be established and enforced. Procedures for shore clearance in Fleet Regulations Manual should be reviewed to ensure adequacy and clarity.
9. Bridge Resource Management practices which require visual secondary checks and verbal confirmation of critical operations should be consistently practiced on all vessels. Vessel arrival and departure procedures should be amended to include this requirement.
10. The responsibility and visual means of identification of a designated deckhand should be reviewed to ensure adequacy.
11. While in dock and loading and discharging, evaluate all BCFS RAD vessels to determine if JOG steering should be engaged prior to clearance to discharge and remain until clearance to sail is given. If adopted, this procedure should be included in the Vessel Specific Manual.
12. All combinator control heads on RAD equipped vessels should be marked visually and with tactile strips to assist in night time operations.
13. A control transfer audio warning alarm which indicates transfer of control between consoles should be installed on all RAD vessels.
14. On M.V. Quinsam, the magnetic compass should be repositioned to enable an unobstructed view of the console indicators from the vicinity of the console. A review of all RAD equipped vessels should be conducted to ensure unobstructed view of all console gauges.
15. During critical operations (arrivals and departures) bridge members should not allow distractions to interfere with required critical procedures.
16. On all BCFS RAD equipped vessels as soon as practicable after departure, the non-command console combinator positions should be synchronized with the command console positions. The Vessel Specific Manual should be amended to include this requirement.

APPENDIX A – Gabriola / Nanaimo Routing Chart



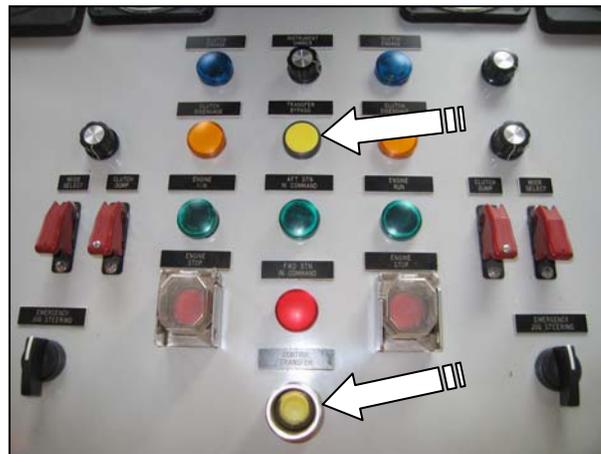
APPENDIX C – M.V. Quinsam Bridge Electronics



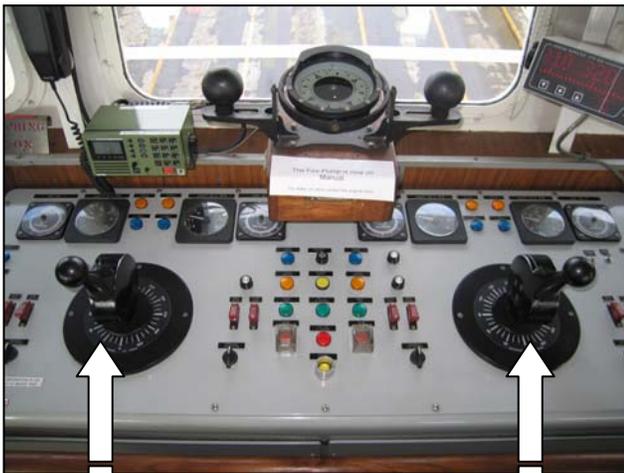
1 end console off shore in Nanaimo Harbour Terminal.



#2 end console inshore in Nanaimo Harbour Terminal.



Hot Transfer can be done by depressing the two yellow buttons simultaneously.



This combinator controls #1 and #2 RAD units at #1 console.

This combinator controls #3 and #4 RAD units at #1 console.



Close up of combinator and azimuth gauge indicating thrust of RAD units #3 and #4 and rpm settings.

APPENDIX D – Nanaimo Harbour Terminal



Nanaimo Harbour Terminal Ramp and Raised Apron



Nanaimo Harbour Terminal Tressel and Traffic Barrier