

Divisional Inquiry

Spirit of British Columbia

Unintended Deviation from Track

**Date of Incident:
December 14, 2004**

Divisional Inquiry No.: 815-04-05

Particulars of Vessel or Terminal

M.V. SPIRIT OF BRITISH COLUMBIA

<i>OFFICIAL NUMBER</i>	815277
<i>BUILT</i>	Commissioned March 5, 1993 - Integrated Ferry Constructors Ltd. (IFC) - Prime contractor Block A - Integrated Module Fabricators (IMF)-Yarrows built the stern section of the hull and were responsible for final outfitting and sea trials. Block B - Allied Shipbuilders constructed the bow section of the hull. Block C-G - Pacific Rim Shipyards (PRS) constructed the superstructure and load-out to the ship's hull.
<i>DESIGN AGENT AND DESIGN SERIES NO.</i>	Preliminary design - Knud E. Hansen Detailed design - Polar Design & Associates
<i>OVERALL LENGTH</i>	167.5m (549'6")
<i>BREADTH (EXTREME)</i>	26.6m (87'3")
<i>CLEARANCE</i>	4.6m (15'1") - main car deck below platform deck 2.2m (7'5") - upper car deck
<i>DRAFT</i>	5.0m (16'5")
<i>MAIN ENGINE</i>	Four MAN 6L 40/54
<i>HORSEPOWER</i>	21,394 BHP (15,953 kw)
<i>SERVICE SPEED</i>	19.5 knots
<i>TONNAGE</i>	18,747.44 gross; 12,739.44 tons registered
<i>CAPACITIES</i>	470 - Automobiles; Interior Seating - 1,730 2100 - Passengers and crew; Exterior Seating - 380
<i>SIMILAR SHIPS</i>	Spirit of Vancouver Island

SHIP'S SERVICES

3 Banks of Elevators (forward, midships, aft) Cafeteria, Buffet, Snack Bar, 4 Lounges, Baby Changing Room adjoining Ladies' and Men's Washrooms, fully accessible for the disabled with "flush" decks throughout the vessel, First Aid Room, Newsstand, Gift Shop, Telephones, Tourist Information, 2 Video Arcades, 34 Study/work Cubicles and Children's Play Area, Passenger cabins for rent, Conference/Training Room.

SPECIAL NOTES

This is a 'Green' vessel due to hull design, propulsion and monitoring systems; high efficiency lighting can be turned off at night without restart problems; waste heat from engines is used to heat the vessel; and a new waste management system will reduce volume and facilitate recycling.

Synopsis

The Spirit of British Columbia was on its first AM sailing ex Tsawwassen (scheduled departure 0700 Hrs), bound for Swartz Bay. The Spirit of British Columbia had completed the transit of Active Pass and had just rounded Enterprise Reef to port when at approximately 0800 Hrs the vessel made an unintended and large deviation from its normal track. The deviation resulted in the Spirit of British Columbia passing within approximately 2.0 cables (400 yards) of Prevost Island.

Summary of Events

The Spirit of British Columbia was in its normal berth, Berth 5 Tsawwassen Terminal, prior to the commencement of the first AM sailing of the day. The morning start up checks had been completed and no machinery or equipment defects were noted. To keep the vessel lying against the North West wing wall for loading operations 15 degrees of starboard helm had been applied on the synchronized rudder control at the centre control console. This was the usual practice once the vessel was pushing into the berth. For maneuvering on departure the Master took control at the port bridge wing control console.

The vessel departed the berth and proceeded on its first crossing to Swartz Bay. On changing back from the port wing control console to the centre control console the Master did not check and confirm that the centre control console synchronized rudder control was reset to amidships. On assuming charge of the conduct of the vessel from the Master the 2nd Officer did not check and confirm that the synchronized rudder control was set to amidships.

The passage proceeded normally and Active Pass was transited without incident. The Chief Officer relieved the 2nd Officer of the watch just prior to the alter course position off Enterprise Reef. He did not check and confirm that the synchronized rudder control was set to amidships.

The Chief Officer gave the appropriate helm orders to round Enterprise Reef to port and then steadied the vessel on a gyro course of 155 to clear Portlock Point, on Prevost Island, to starboard. Once the vessel was steadied on course the helm was put to amidships and the Chief Officer then switched to auto pilot by depressing the 'IN COMMAND' button. At this time the vessel was briefly in auto pilot as the steering mode selector was actually set at 'AUTO' but then the Chief Officer, believing the steering mode selector switch to be in 'SYNCHRO,' rotated the switch anticlockwise from 'AUTO' to 'SYNCHRO.' The 'AUTO' setting is at the extreme clockwise movement of the three way selector so any anticlockwise rotation of the selector would be incorrect when selecting 'AUTO.' The Chief Officer had sufficient experience with the system that he should have been aware of this and should in any event have confirmed visually the position of the selector.

As soon as the Chief Officer rotated the steering mode selector he averted his attention to fill out the deck log after briefly confirming that the set course and the actual course on

the auto pilot panel were the same. The Chief Officer mistakenly believed that this was confirmation that the auto pilot was engaged. Immediately after selecting 'IN COMMAND' the Chief Officer dismissed the helmsman from the wheel and the helmsman immediately turned to collect and sign for his pay slip. This resulted in no member of the bridge team paying attention, at this critical juncture, to confirm that the auto pilot was engaged and functioning correctly and also that the vessel was maintaining the desired heading.

The Spirit of British Columbia was veering off course with a rudder angle of starboard 15 degrees for an estimated 30 - 40 seconds before the Chief Officer and the deckhand became aware, almost simultaneously, that something was awry. As the vessel is fitted with high lift rudders the rate of turn was estimated to be between 40 to 60 degrees/minute. The Chief Officer ordered the deckhand back to the helm and then ordered 'hard a port.' The helmsman questioned the helm order and at the same time the Chief Officer countered his initial helm order with 'hard a starboard'. The engine controls were left at 10 ahead on both shafts. This resulted in an increased rate of turn to starboard.

Although the Master was on the bridge he was sitting at the computer, facing aft, and was unaware of the unfolding crisis. There was no sensation of excessive heel and it was only when glancing over his shoulder that he became aware of the circumstances the vessel was in. The Master moved directly to the centre control stand and assessed the situation, initially being disoriented by the unexpected view of trees close to hand through the bridge front windows. The vessel was estimated to have swung through approximately 125 degrees to a heading of about 280 degrees before the Master was aware that the vessel was off course/track. Hawkins Island was bearing fine to starboard. Once the Master was orientated with the vessel's position, and also realizing that the vessel was swinging clear of danger, the Master reduced the engine controls to 4 ahead on both shafts.

The turn to starboard was continued until the vessel was clear of all danger and was in a position to resume passage to Swartz Bay. Engine controls were increased to 10 ahead both shafts and a new course selected to bring the vessel to the alteration point off Portlock Point.

The Queen of Nanaimo had observed the Spirit of British Columbia complete the round turn to starboard and had contacted the vessel, via company FM, to confirm that all was in order.

Senior Master of the Spirit of British Columbia joined the vessel when it returned to Tsawwassen terminal and completed a round voyage to compile relevant information and assess the bridge team on the incident.

Findings

- The Master did not check and confirm that the synchronized steering control on the wheelhouse centre control console was set to amidships once controls were transferred to the centre console after departing the berth.
- Neither the 2nd Officer nor the Chief Officer checked and confirmed the synchronized steering control was set to amidships when they assumed the watch and conning responsibilities of the vessel.
- Before engaging the auto pilot on departure, and again after rounding Enterprise Reef, none of the bridge team checked and confirmed that the centre control console synchronized steering control was set to amidships before changing the steering mode.
- The Chief Officer had served in that capacity on the Spirit of British Columbia for five years.
- The Chief Officer did not check and confirm that the auto pilot was engaged and functioning correctly.
- The Chief Officer did not demonstrate knowledge of how to confirm that the auto pilot was engaged.
- The Chief Officer unknowingly selected synchronized steering instead of auto, on the mode selector switch. He did not check and confirm visually the switch position selected. On making this unintended steering mode selection the synchronized steering control immediately applied 15 degrees of starboard rudder.
- On incorrectly selecting synchronized steering mode the Chief Officer immediately diverted his attention to make a log entry and was unaware that the vessel was veering off course. The Chief Officer did not make use of any of the visual or instrumentation cues such as: two sets of rudder indicators, rate of turn indicator, auto pilot function lights, radar or ECDIS, that would have confirmed that the steering controls were not at the intended settings and that the vessel was rapidly veering off course.
- The helmsman turned away from the steering console immediately upon being advised that the vessel was on auto pilot and went to collect and sign for his pay slip. He did not pause to confirm that the vessel was steady on course and did not assume his primary responsibility of keeping a lookout.
- When the vessel was in hand steering, immediately prior to the event, the bridge team was incomplete, as only the Officer of the Watch and the helmsman were actively engaged in the bridge team. There was no lookout, as required by Regulation 79 of the Canada Shipping Act. The Master was present in the wheelhouse but was working on the computer, facing aft, and therefore was not taking an active role in the

bridge team. For a vessel of 3,000 gross tons or more the regulations require that, when in hand steering, the navigational watch consists of an officer of the watch and two additional persons, one acting as a lookout and the other as helmsman.

- When the Chief Officer thought he had switched to auto pilot the bridge team was incomplete as the helmsman did not then take up his primary responsibility, as the additional person, of keeping a lookout.
- Both the Chief Officer and the helmsman became aware that the vessel was not following the intended course and track at approximately the same time – estimated to be about 30 – 40 seconds after the incorrect selection of the steering mode.
- The Chief Officer made the correct decision to revert to hand steering by the helmsman as soon as he became aware of the situation.
- Despite the gravity of the situation the Chief Officer failed to advise the Master, who was close to hand, of the vessel's predicament.
- The Master adjusted the main engine control settings and later countermanded the Chief Officer's course instructions but did not confirm that he had assumed the con. The Chief Officer was unclear as to who had the con once the Master intervened.
- The Engine Room, which was no longer on standby after clearing Active Pass, was not advised of the circumstances – despite the fact that the bridge main engine controls were moved from ahead setting 10 to ahead setting 4 and them back up to 10.
- Despite the Master and the Chief Officer having completed Bridge Resource Management training within the last year there was a lack of effective Bridge Resource Management. There was no evidence that visual/aural checks and aural confirmations were made of the steering system status. A number of opportunities were lost to catch both the incorrect control settings and also to detect that the vessel was deviating from its intended heading/track.
- Changing the steering mode on any vessel is a procedure that can result in unintended and hazardous consequences if the procedure is not carried out correctly. Cross checks and confirmation of desired settings must be carried out by the bridge team to minimize risk. This is particularly relevant on vessels that have a multi mode/multi control steering system.

Recommendations

1. The Marine Superintendent, Mainland Services, South to issue a Marine Superintendent General Orders (MSGO) to the Spirit Class vessels directing that when the autopilot is to be engaged the steering mode selector switch be set to 'AUTO' prior to the 'IN COMMAND' button being activated. The practice of the mode selector switch first being set in the 'SYNCHRO' position when the 'IN COMMAND' button is activated and then switching mode to 'AUTO' is to cease immediately as this introduces a second unnecessary and potentially confusing step in the procedure.
2. The Executive Vice President of Operations to issue a temporary directive to all vessels that the autopilot, if fitted, is not to be used in the area between one mile north of Georgina Point and Portlock Point. The autopilot is only to be engaged when the vessel is well clear of all navigational hazards and the level of marine traffic is consistent with the use of the autopilot.
3. The Marine Superintendent, Mainland Services, South to issue a Marine Superintendent General Orders (MSGO) that watch hand over on Route 1 is not to be conducted in the area between one mile north of Georgina Point and Portlock Point.
4. The Executive Vice President, Operations to issue a Temporary Directive on navigational watch handover procedures to re-emphasize those contained in Fleet Regulation 7.1.28 Hand-over Command Procedures, Navigational Watch Hand-over. Specifically, the watch is only to be handed over in open waters and also when:
 - a) the vessel is not engaged in an alteration of course
 - b) the vessel is not about to engage in an alteration of course
 - c) the vessel is not taking, or is about to take, avoiding action with other marine traffic
 - d) the relieving officer has cross checked with the off going officer the status of the engine and steering machinery and controls.
5. The Executive Vice President, Operations to issue a Temporary Directive to all vessels instructing that:
 - a) All steering, thruster and main engine controls are returned to amidships, zero thrust or zero pitch/declutched, as appropriate, when either the machinery or the controls are not in use. On vessels with multiple control consoles this check must be carried out at each control console prior to testing the bridge equipment during the start up routine, at the end of the start up routine, and also when handing over the con or the watch.
 - b) On Right Angle Drive (RAD) vessels with bridge control consoles at the fore and aft ends of the wheelhouse the after controls must be rotated to point in the same direction as the forward controls as soon as practicable after the transfer of control from one control console to the other. Before commencing the start up procedure and also when shutting down at the end of the shift the after controls must be set to point into the berth but declutched.

- c) Before taking over the watch or assuming the con of the vessel the Master and/or Officers must satisfy themselves by cross checking with the other members of the bridge team that machinery and steering controls are correctly set.
 - d) Machinery and steering controls can only be left in other than the zero pitch, declutched or amidships position when control is about to be transferred from one control console to another. Checks must be made to ensure the control positions are matched before control transfer takes place. As soon as control is transferred the out of use controls are to be set at amidships, zero pitch or declutched, as appropriate.
6. The Executive Vice President, Operations to issue a Temporary Directive to all vessels instructing that the helmsman is to stay at the wheel when switching from hand steering to any other steering mode until it is confirmed that transfer of control has been successfully completed and that the vessel is steering as expected.
7. The Executive Vice President, Operations to issue a Temporary Directive to all vessels instructing that the second additional person is to be readily available to the bridge team when the vessel is in autopilot.

Report Signed By: Chair

Date: 24 December 2004

Initial Distribution

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