

MARINE INVESTIGATION REPORT  
M97W0044

EXPLOSION AND FIRE ON BOARD  
THE OPEN HERRING-SKIFF "SHA 122"  
COMOX SMALL CRAFT HARBOUR, BRITISH COLUMBIA  
23 MARCH 1997

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

### Explosion and Fire On Board

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### *Summary*

The small fishing vessel "SHA 122" was moored, second from the dock, in a row of four vessels at the floating dock on the east side of the jetty at Comox Small Craft Harbour. On the afternoon of 23 March 1997, the operator returned, after an absence of 48 hours, intending to sail from Comox to Prince Rupert, British Columbia. He boarded the vessel, opened the gasoline tank valves and went forward to start the engines. At 1730 he started the port engine and immediately there was an explosion followed by a large gasoline-fuelled fire. The force of the explosion ejected the operator from the "SHA 122" and he landed on the deck of another vessel. Crews from other vessels at the dock began moving vessels and freeing the burning "SHA 122" from the dock. The operator was treated overnight in a hospital and released. "SHA 122" was extensively damaged, was cut in two during salvage operations, and was a constructive total loss.

*Ce rapport est aussi disponible en français.*

## *Other Factual Information*

"SHA 122"	
Port of registry	Vancouver, British Columbia (B.C.)
Flag	Canada
Official number	13K108419
Type	Open Herring-Skiff (powered)
Gross tons	7
Length	12.19 m
Built	Richmond, B.C.
Propulsion	Twin screw, 2 gasoline engines
Number of crew	1
Registered owners	Dennis Nakatsuru, Richmond, B.C. and Ted Akune, Vancouver, B.C.

### *Description of the Vessel*

"SHA 122" is an aluminum, gasoline engine-powered open herring-skiff, commonly known as a "Superpunt". The vessel has a helm and control position at the forward end and an engine compartment at the aft end with a net winch mounted over the engine compartment.

Amidships the vessel has an inner bottom, forming a void space in which are mounted the gasoline fuel tanks. Fuel from the tanks is piped within the void and to the engine compartment through the forward bulkhead of the engine compartment. The port engine was an old carburettor-type fuel-supply engine and the starboard engine was a new, fuel-injected engine.

"SHA 122"

### *Description of the Accident*

The “SHA 122” was moored at the floating dock on the east side of the jetty, at Comox Government Dock. The vessel was the second from the dock, in a row of four vessels.

The other vessels were the “COWBOY I”, closest to the dock, the “QUICK CHANGE”, outboard of the “SHA 122” and the “ABRACADABRA I”, the outermost vessel from the dock.

This row was the second row from the piled wooden wharf running from the shore to the Department of National Defence (DND) fuel wharf (Appendix “A”). In the first row and directly ahead of the “SHA 122” was another fishing vessel, the “TRIPLE 8”. The wooden wharf, running out to the DND wharf, carries two exposed six-inch fuel lines for supplying the airbase with aviation jet fuels “A” and “B”.

On the afternoon of 23 March 1997,<sup>1</sup> the operator returned, after an absence of 48 hours during which the vessel was unattended, intending to sail from Comox to Prince Rupert. At approximately 1725, he boarded the vessel and opened the gasoline tank valves and went forward to start the engines. The operator had run the vessel this way since his appointment two months earlier and noticed nothing unusual before he started the port engine.

The vessel did not comply with the provisions of the Small Vessel Regulations, as they apply to the forced ventilation of the engine compartment or the void space where the fuel tanks were located. Consequently, any build up of gasoline vapours could not be vented before starting the engines. The owner was unaware of the regulatory requirement for a mechanical ventilation system for spaces below deck where a gasoline-fuelled engine is located and any spaces where gasoline vapours may collect. He relied on the fact that the vessel had

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<sup>1</sup> All times are PDT (Coordinated Universal Time (UTC) minus seven hours) unless otherwise stated.

been operating this way prior to his purchase of the vessel. To promote such awareness, the Office of Boating Safety of the Canadian Coast Guard (CCG) conducts regular courtesy examinations of fishing vessels less than 15 gross ton, such as the SHA 122, thus inciting such fishers to participate in these examinations. Also the forward bulkhead of the engine compartment was not water- or gas-tight and a gasoline leak, in either space, would affect both spaces.

When the operator started the port engine, there was an explosion followed by a large gasoline-fuelled fire. The inner bottom was torn free of the hull at the forward end and as it peeled backwards the sides of the hull were pulled inwards, until the welds between the sides and the inner bottom fractured.

The force of the explosion ejected the operator from the vessel and he landed on the deck of another vessel.

Shrapnel and equipment from the "SHA 122" were sprayed over a wide area, causing minor damage to other vessels. In particular the "TRIPLE 8" suffered damage to the windshield, and the radar scanner of the "COWBOY I" was damaged. Both the "ABRACADBRA I" and the "QUICK CHANGE" suffered fire damage when the fire spread to their decks.

The inner bottom of the "SHA 122" was peeled back, by the explosion, as far as the forward bulkhead of the engine compartment and ended up being vertical instead of horizontal. During the fire the inner bottom and the engine compartment forward bulkhead were completely consumed by the fire. Part of the engine compartment top and the net winch drum, both aluminum-constructed, were consumed.

Most of the fire was in the aftermost one-third of the vessel in the engine compartment, or just ahead of the engine compartment forward bulkhead. The trim of the vessel by the stern would pool any leaking gasoline in the aft ends of the void space if from the fuel tanks, or in the engine compartment if from the engine.

Crew members from other vessels at the dock began moving them away from the burning vessel and freeing it from the berth. The crew members from a Department of Fisheries and Oceans patrol vessel were on-scene immediately after the explosion and removed the operator from the fishing vessel to the dock. They returned with a portable pump to fight the fire. Comox Fire Department were on-scene in four minutes and had their boat in the water at 1738.

The foremost concern was to keep the fiercely burning "SHA 122" away from the wooden wharf fitted with the jet fuel lines, as the south-easterly wind tried to push the vessel downwind onto the wharf. There is no boom or restraining chain to keep vessels away from the wharf, although there are two free-standing piles that could be used for holding a floating boom or chains.

High Water at Comox was predicted to be 4.23m at 1723 on 23 March, immediately before the explosion. The high tide brought the fishing vessel up to a level where it could have struck the fuel lines, mounted externally to the walkway, which were very exposed.

Comox Docks have some firefighting equipment in the form of dry powder chemical extinguishers mounted on

the piles at regular intervals and fire hydrants on the jetty and the floating docks.

The original floating docks, west of the jetty, have fire hydrants supplied by a flexible hose connection to the jetty. This system is not charged until required and there are no hoses on the docks as the hydrants are intended for the Fire Department use only.

On the east side of the jetty, the floating docks have hydrants, also supplied by flexible hose, which are always charged with water. When this water line was installed, the pressure was reduced to domestic levels for vessels to hook-up their water systems while at the dock. This reduced pressure means that the ability of the Fire Department to fight fires on the east side is impaired.

The operator was saved from being burned by a piece of canvas that wrapped around him before he was ejected from the vessel. He was treated overnight in a hospital and released with only a minor strain injury to his ankle and a shrapnel wound in his knee. The knee wound continues to cause him pain and he has not fished since the occurrence.

Before the 48-hour respite in Comox, the vessel had been engaged in fishing in the Georgia Strait. The weather on the last two days' fishing had been poor, with rough seas that had buffeted the vessel about.

The "SHA 122" was extensively damaged during the fire and was beached on the outer breakwater, to prevent it from sinking. It was cut in two during salvage operations and was a constructive total loss.

## *Analysis*

The inner bottom of the vessel forms a void that houses the gasoline fuel tanks and supply-piping to the engines in the engine compartment. The void has no forced ventilation so the operator cannot purge any gasoline fumes from the void before starting the engines. Similarly the engine compartment also has no ventilation fan to remove gases before starting the engines. The operator had run the vessel previously and was used to starting the engines without pre start-up ventilation. Consequently, he followed the same method on the day of the occurrence with catastrophic results.

The operator did not check the engines before attempting to start them. This activity would have required him to open the engine compartment to reach the engines and may have led to the discovery of fuel in the bilge.

In the two days before the layover in Comox, the vessel had been fishing in rough seas in the Georgia Strait. It is likely that the fuel lines from the tanks in the void space to the engines were shaken enough either to slacken back a union fitting or crack the lines. A further possibility is that the fuel tanks themselves were shaken enough to crack a weld. Either of these two scenarios would have resulted in a build-up of gasoline in the void, the engine compartment or in both spaces.

High Water was only seven minutes before the occurrence and the wind was south-easterly. When the "SHA 122" was cleared from the dock, the wind was pushing it downwind onto the wooden wharf fitted with the

six-inch jet fuel lines. The lack of a floating boom or chain to prevent vessels from approaching the wooden wharf places the six-inch diameter aviation jet "A" and "B" fuel lines at risk. A floating boom could be easily laid against the two free-standing piles located to the east of the wooden wharf.

The fire generated enough heat for the aluminum of the inner bottom and the engine compartment bulkhead to burn.

### *Findings*

1. The "SHA 122" had no forced ventilation to purge the void space and/or engine compartment before the engines were started.
2. The operator did not inspect the engines or engine compartment before attempting to start the engines.
3. The "SHA 122" had been fishing in rough seas before berthing at Comox and the heavy movements may have caused a fuel leak in either the void space or engine compartment.
4. The source of fuel ignition is most likely the starter motor of the port engine.
5. The operator was protected from fire by the canvas that wrapped around him, and by being blown out of the vessel and away from the fire.
6. The piled wooden wharf, running from the shore to the DND fuel wharf, has no protection from vessels either drifting or driven down onto it from the south-east. The exposed jet fuel lines on the east side of the wharf are in danger of being fractured or gashed by vessels at high tides.

### *Causes and Contributing Factors*

The fire was most likely caused by gasoline fuel in the void space or engine compartment that was ignited when the port engine starter was engaged. The lack of forced ventilation in the void space and the engine compartment prevented the operator from properly purging any gasoline vapours from the spaces before starting the engines.

### *Safety Action Taken*

The harbour master of the Comox Small Craft Harbour requested that a floating boom be installed to prevent any vessel from contacting the wooden wharf. This request was acted upon by Small Craft Harbours and a

floating boom now protects the jet fuel lines on the Department of National Defence wharf.

*This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail, Charles Simpson and W.A. Tadros, authorized the release of this report on 20 October 1998.*



*Appendix A - Sketch of the Accident Area*



