MARINE OCCURRENCE REPORT

MAIN MACHINERY FAILURE

"STAR HOSANGER"
BULK CARRIER
VANCOUVER HARBOUR, BRITISH COLUMBIA
06 MAY 1997

REPORT NUMBER M97W0078

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.

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Summary

The "STAR HOSANGER" experienced difficulty in starting the main engine during berthing operations in Vancouver Harbour. Control of manoeuvring is by means of a Diesel Manoeuvring System 900 (DMS 900) computer system activated by the wheelhouse telegraph. The operation of the DMS 900 was not fully understood by the officers of the vessel. They mistakenly intervened and overrode the automatic restart sequence preventing the DMS 900 from functioning properly. When the starting air pressure fell below normal levels, the vessel's anchors were dropped to stop her. After the air pressure was regained the main engine was started and the vessel manoeuvred alongside without any problems.

Other Factual Information

	"STAR HOSANGER"
Port of Registry	Bergen
Flag	Norwegian
IMO/Lloyds Number	9081801
Type	Bulk Carrier
Gross Tonnage	34364
Length	199.9m
Built	Okpo, Korea
Propulsion	Single Screw Diesel Engine
Number of Crew	26
Registered Owner	Masterbulk Pte. Ltd.

On the morning of 6 May 1997 the Bulk/Container Vessel "STAR HOSANGER" departed Squamish, Howe Sound, BC, with a Pacific Coast Pilot on board, and proceeded to Vancouver, BC. After an uneventful passage the vessel entered Vancouver Harbour passing under First Narrows Bridge into the inner harbour.

At approximately 0800 PDST (1500Z on Data Logger Record) the vessel commenced manoeuvring alongside the berth. Engine speeds were reduced from "Full Ahead" to "Half Ahead" at 08:10:25, again down to "Slow Ahead" at 08:12:36 and finally to "Stop" at 08:16:32. Following an order for "Dead Slow Astern" at 08:20:0, the telegraph was put on "Dead Slow Astern" but the main engine did not start. Instead the "Repeated Start" lamp on the bridge panel lit up, see drawing number 900.370.48 5 item 11, Appendix "B".

At the time the movement was demanded the engine was stopped, RPM zero on data log, and the ship had between 5½ and 6 knots of ahead way according to the speed log.

Since it appeared to the Master that the system required a repetition of the start sequence, the telegraph was put to "Stop" at 08:20:13 and then to "Slow Astern" at 08:20:36. Again the engine did not start but the "Repeated Start" lamp lit up.

Start attempts were repeated four times before the Start Air Pressure fell to 17bar; below 15bar the engine start can only be done from the engine room control. Orders were given to drop the anchors and, because of the vessel's proximity to the Second Narrows Railway Bridge, the bridge operator was notified of the difficulties that the vessel was experiencing.

The last "Stop" command on the telegraph was logged at 08:24:52. The Start Air Pressure built up quickly and the telegraph was put to "Slow Astern" at 08:27:15 at which time the engine started. The engine continued to operate through various movements until the vessel was moored at Lynnterm in North Vancouver.

Manoeuvring of the main engine is by way of the telegraph and a Diesel Manoeuvring System 900 (DMS 900) computer system. The information regarding the DMS 900 control system and the "Repeated Start" condition is in manuals in English which had been translated from a Scandinavian language.

The information in the manuals was apparently not fully understood by the ship's staff for whom English is a Second Language (ESL). The automatic control system was not used correctly.

The Pacific Coast Pilot on board the vessel at the time of this occurrence was not fully briefed on the DMS feature and was also unaware of the automated repeated start system.

There are four sister ships in this Company. The Master has sailed with the same Company since 1990. He had joined the vessel one month previously and had served four months on the vessel's sister ship "STAR HERANGER". During this time he had not experienced any problems in manoeuvring either vessel.

Main Engine Manoeuvring Control System

The main engine of this vessel is controlled by an Alpha Computer which in turn controls a Diesel Manoeuvring System 900 (DMS 900) that translates the bridge telegraph demands into operational sequences.

The last two paragraphs on page 3.4 of the Operating Instruction Manual for the DMS 900, give instructions regarding the "Repeated Start" and "Start Blocked" conditions for this unit.

> "If the start attempt failed, a repeat start will automatically follow. After three failed start attempts a start-blocking occur, and the navigator has to *move the telegraph handle to stop before a new start can be performed*."

And the second paragraph:

> "If the engine is ordered to move in the opposite direction whilst moving, starting air will not be supplied until the engine speed has decreased below the reversing level. This may take several minutes depending on the ship's speed, propeller size, loading condition and other ship parameters."

Operation of the DMS 900

When the "repeated start," built into the DMS 900, is activated the system will perform three start attempts

before giving the alarm condition "Start Blocked." These three repeated start attempts do not require the intervention of the navigator, unless the engine `start blocking' engages.

Should the start blocking engage, the navigator has to put the telegraph on "Stop" to cancel the start blocking and then return the telegraph to the desired speed condition.

During the "repeated start" sequence the DMS 900 also increases the engine fuel pump index by 20%, giving more fuel to the engine for the repeated starts. There was no reference to this increased fuel index in the manuals available to the ship's staff. The manufacturer sets this at the vessels sea trials and neither the navigator nor the engineer can change the settings and this was the reason it was not mentioned in the manuals.

Analysis

The first paragraph in the appropriate section of the instruction manual reads;

"If the start attempt failed, a repeat start will automatically follow. After three failed start attempts a start-blocking occur, and the navigator has to *move the telegraph handle to stop before a new start can be performed.*"

Because of the way the paragraph is written, some interpretation of its meaning is required. For instance it does not categorically state that the DMS 900 will automatically perform three start attempts before the "start blocking" occurs. Instead it says `after three failed start attempts a start blocking occur' but it does not say what the start blocking function is or why it occurs. The ambiguity of the wording lead to the misunderstanding of the meaning of the paragraph by ship's staff - for whom English was a second language. The English text of the instructions was made even more difficult to understand because it had been translated from a Scandinavian language, probably by someone whose first language was not English.

Because the information regarding the 20% increase in fuel pump index during a "repeated start" was not contained in the instruction manuals, the ship's staff was unable to determine the full operation performed by the DMS 900. Because the ship's staff were unaware of the extent of this operation, they were not able to successfully trouble-shoot the starting arrangements or to immediately determine where the problem lay.

The second paragraph in the section reads:

"If the engine is ordered to move in the opposite direction whilst moving, starting air will not be supplied until the engine speed has decreased below the reversing level. This may take several minutes depending on the ships speed, propeller size, loading condition and other ship parameters."

This paragraph was apparently also not fully understood by the ship's staff because there was uncertainty about whether the vessel's forward speed had any bearing on the engine not starting at the time of the occurrence. Although the ship was still making 5½ to 6 knots ahead, the engine revolutions were zero. As this paragraph of the instructions clearly refers to "engine speed", the vessel's speed was not relevant in this occurrence.

The ship was properly rigged for entry into port with anchors ready for release. Dropping the anchors promptly prevented any damage to the ship, wharves or the nearby Second Narrows Railway Bridge.

Findings

1. The information regarding the "Repeated Start" condition was not fully understood and the automatic control system was not used correctly. Instead of allowing the DMS 900 control system to repeat start the engine, ship staff placed the telegraph on Stop, then to Slow Astern, effectively cancelling the repeated start function of the control.

2. The instruction manual is not concise when describing the repeated start and start blocking functions. Ambiguity in the wording led to the ship's staff, for whom English is a second language, to not fully understand the instructions.

3. The full extent of the repeated start operation performed by the DMS 900 was not included in the Instruction Manual. No reference is made to the increase in fuel pump index during an automatic repeated start.

4. The Pacific Coast Pilot on board the vessel, at the time of this occurrence, was not briefed on the "Repeated Start" feature of the DMS 900 control system and was unaware of the automated repeated start system.

5. No damage to the vessel or port infrastructure occurred as the vessel was controlled and brought to a stop by use of the anchors.

Causes and Contributing Factors

The original Instruction Manuals were written in a Scandinavian language. They were later translated into English. This had the effect of making the system more difficult to understand by the vessel's officers, for whom English is a second language. The vessel's officers were confused by the ambiguous wording of the instruction manuals for the DMS 900 computer control operation.

In addition, the full extent of the "repeated start" operation in increasing the main engine fuel index was intentionally omitted by the manufacturer from the instruction manuals. This omission prevented officers from fully understanding the operation of the system and added to their confusion. Consequently the bridge crew intervened in the automatic operation of the starting system.

The manual attempts to restart the engine were unsuccessful but the vessel was brought under control by the use of her anchors.

Safety Action

Action Taken

The manufacturer of the DMS 900 responded immediately to queries from the Transportation Safety Board and confirmed the operation of the system for the investigators. The manufacturer contacted the vessel's management company to inform them of the increased fuel indexing under "repeat start" conditions and to state that this information is part of the programming which cannot be altered by ship staff.

When contacted, the vessel management company took immediate steps to send updated information to all four sister ships operating DMS 900 systems. The Master of the "STAR HOSANGER" actually tested and proved the repeat start function on his vessel. All four vessels now have the information regarding this feature of the automatic start system on the Pilot Information Card so pilots boarding these vessels will be aware of the function.

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 07 July 1998.