

National Transportation Safety Board

Office of Research and Engineering

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VOYAGE DATA RECORDER - AUDIO

Group Chair's Factual Report

April 6, 2023

WARNING

The reader of this report is cautioned that the summary of a voyage data recorder audio recording is not a precise science but is the best product possible from a National Transportation Safety Board group investigative effort. The summary or parts thereof, if taken out of context, could be misleading. The summary should be viewed as an accident investigation tool to be used in conjunction with other evidence gathered during the investigation. Conclusions or interpretations should not be made using the summary as the sole source of information.

A. ACCIDENT

Location: Ingleside, TX
Date: August 7, 2022
Time: 16:25 Central Daylight Time (CDT)
Vessel: LNG Fukurokuju (IMO 9666986)

B. VOYAGE DATA RECORDER - AUDIO GROUP

A VDR audio group was convened on March 28, 2023. The group consisted of the following members:

Group Chairman Sean Payne
Branch Chief - Vehicle Recorder Lab
National Transportation Safety Board (NTSB)

Member Jon Furukawa
Investigator In Charge (IIC)
NTSB

Member Alice Park
Electrical Engineer
NTSB

C. FEDERAL CARRIAGE REQUIREMENTS

Chapter V of the International Convention for the Safety of Life at Sea (SOLAS), regulation 20, specifies voyage data recorder (VDR) carriage requirements. Cargo ships larger than 3,000 gross tons, and all passenger ships regardless of tonnage, must be equipped with a VDR. The VDR for a cargo ship larger than 3,000 gross tons, constructed before July 2002, may be an S-VDR. Either system requires a minimum of the most recent 12 hours to be stored. In the event of an incident or accident, investigation authorities must be able to download and replay the VDR data without delay. Software, instructions, and special parts necessary for data extraction and replay are required to be contained within the main unit of a VDR.¹

LNG Fukurokuju was built in June 2016, and therefore was required to be fitted with a VDR.

¹ Refer to IMO resolution MSC.214(81) for required download and playback equipment for investigation authorities.

For additional details related to VDR carriage requirements, refer to table 1 below.

Table 1. Comparison of VDR and S-VDR requirements.

Parameters to be Recorded	VDR	VDR	S-VDR ^c
	after June 2014 ^a	before July 2014 ^b	
Date and time	X	X	X
Ship's position	X	X	X
Speed	X	X	X
Heading	X	X	X
Bridge audio	X	X	X
VHF communications audio	X	X	X
Radar	X	X	X ^d
AIS	X		X ^d
ECDIS	if fitted		
Depth (echo sounder)	X	X	X ^d
Main alarms	X	X	X ^e
Rudder order and response	X	X	X ^e
Engine and thruster order and response	X	X	X ^e
Hull openings status	X	X	X ^e
Watertight and fire door status	X	X	X ^e
Accelerations and hull stresses	if fitted	X	X ^e
Wind speed and direction	if fitted	if fitted	X ^e
Rolling motion (inclinometer)	if fitted		
Configuration data	X		
Electronic logbook	if fitted		

^a Refer to IMO resolution MSC.333(90) for required VDR parameters for installations after June 2014.

^b Refer to IMO resolution A.861(20) for required VDR parameters for installations before July 2014.

^c Refer to IMO resolution MSC.163(78) for required S-VDR parameters.

^d S-VDR installations require radar, unless no commercial off the shelf (COTS) interface is available. If COTS interface for radar is not available, AIS data must be recorded.

^e Certain parameters are only required for S-VDR installations if an IEC 61162 digital interface is available.

SOLAS Chapter V, regulation 18, requires an annual performance test (APT) for VDRs by an approved testing or servicing facility to verify the accuracy, duration, and recoverability of recorded data. Included in an APT is an inspection of devices fitted to aid locating the recorder. An APT was not requested for this investigation.

LNG Fukurokuju was built in 2016 and was equipped with a Furuno VR-7000 VDR.

D. DETAILS OF THE INVESTIGATION

The NTSB Vehicle Recorder Division received an electronic file containing the VDR data from the LNG Fukurokuju. This data came from Furuno VR-7000.

1.0 Furuno VR-7000 Recorder Description

The Furuno VR-7000 is a full VDR system capable of recording navigation, propulsion, alarms, weather and radar data. Additionally, bridge audio and communications audio channels are recorded by the system.

1.1 Recorder Condition

The recorder was in good condition and the data were extracted normally from the recorder. The NTSB did not perform the data extraction on the LNG Fukurokuju.

1.2 Recording Description

A six hour download of the ship's VDR was provided to the NTSB. Timing of the VDR data is synchronized to GPS time and is recorded as coordinated universal time (UTC).² Data from the time surrounding the event was recorded by the VDR. The time of the selected six hour download ranged from 20:31:50 UTC on August 7, 2022 to 3:31:50 UTC on August 8, 2023.

The parameters evaluated for this report appeared to be in accordance with VDR carriage requirements, however, the device's configuration file was not fully explored and not all parameters were validated.

The system was also designed to record a screenshot of the ship's ECDIS and radar system every 15 seconds. The VDR playback software allowed the ECDIS screenshots to be replayed, however, the system's image export feature did not work. Instead, the video of the ECDIS and Radar playback was reviewed within the VDR's replay software.

1.3 Audio Recording Description

Each channel's audio quality is indicated in table 2. Table 2 lists the five audio tracks from the microphones on and around the bridge that were recorded; each channel's audio quality is indicated in the table. All recordings were made in mono.³

Table 2. Audio Quality and Channel Description.

Source Microphone	Channel Number	Quality ⁵	Duration ⁶
Unknown Bridge Mounted Unit ⁴	1	Fair	6:00:00.00
Unknown Bridge Mounted Unit	2	Fair	6:00:00.00
Unknown Bridge Mounted Unit	3	Fair	6:00:00.00
Unknown Bridge Mounted Unit	4	Fair	6:00:00.00
Unknown Bridge Mounted Unit	5	Fair	6:00:00.00
Unknown Bridge Mounted Unit	6	Fair	6:00:00.00

² UTC is sometimes referred to as Greenwich mean time (GMT).

³ Monaural audio - a single channel of audio perceived from a single position or speaker.

⁴ Location of each bridge mounted microphone were not ascertained for the this investigation.

Source Microphone	Channel Number	Quality ⁵	Duration ⁶
VHF1	7	Excellent	6:00:00.00
VHF2	8	Excellent	6:00:00.00

⁵ Audio Quality Rating Scale provided in attachment 1 below.

⁶ Format given is HH:MM:SS.000, where HH is equal to the number of elapsed hours, MM is equal to the number of elapsed minutes and SS.000 is equal to the number of seconds to 3 decimal places.

E. AUDIO AND DATA SUMMARY

Voices in English appear in English. Voices in Korean are noted as "in Korean" and were translated by an audio group member who is a native Korean speaker.

The audio summary began at 1619:20 CDT.

All times are given in CDT.

At 1618:20 the pilot stated, "captain, we're going to slow down right here * * *⁵." At 1618:39, a secondary radio transmission was detected with the phrase, "(make it fast)".

At 1619:28, the pilot ordered "257" and the helmsman responded "257." The helmsmen then reported "(heading) 257 mister pilot", the pilot acknowledged, "thank you."

At 1620:55, the pilot was audible on the LNG Fukurokuju VHF radio stating, "all units, unit 9 inbound between 25 and 26, light L-N-G tanker, be turning inbound La Quinta Channel in the next 15 minutes, check traffic out of Port Ingleside, unit 9 out."

At 1621:19, the pilot stated on the VHF radio, "all units, unit 9 inbound between 25 and 26, power slide, L-N-G tanker, bound for Cheniere, check traffic out of Port Ingleside, unit 9 out."

At 1621:43, there was a brief unintelligible conversation on a secondary radio. The pilot then asked, "could you put a weight on that heaving line to the tug?" There were then some secondary radio conversations in Korean that were unintelligible. Another voice in English was detected on the secondary radio stating, "heaving line."

At 1623:06, the pilot ordered "256" and the helmsman responded, "256" and then, "256 mister pilot."

⁵ An asterik * indicates an unintelligible word. Three asterisk *** indicates an unintelligible sentence or phrase. Parenthesis () indicate a questionable insertion.

At 1623:30, the USCG reported on VHF, "sécurité sécurité sécurité, all stations, all stations, all stations, this is the United States Coast Guard Sector Corpus Christi Texas, for safety marine information broadcast regarding obstructions in Lydia Ann Channel, switch to channel 52A frequency 157.1 MHz, out."

At 1623:47, a Korean voice on the secondary radio stated, "(something not done yet)?" A voice on the secondary radio then exclaimed in Korean, "(something is not working)." During this time, the pilot ordered "255" and then "half ahead" and the helmsman confirmed. The Korean voice came back on the secondary radio and stated, "(something is wrong, the line is not working)" and then the phrase "(power I found it)." The other Korean voice stated, "is it working okay?" The other voice responded on the secondary radio with a phrase in Korean, "something rolling." The voice then restated on the secondary radio in Korean, "rolling up" again. The pilot was audible asking, "what's going on?" A voice on the secondary radio then stated, "we got a line back there pretty low." There was then a partially unintelligible secondary radio transmission in English stating, " * * * freewheeling comeback," and some more unintelligible exchanges, both in English and Korean occurred. "standby, standby" was then audible on the secondary radio in English. Immediately following this exchange, at approximately 1624:45, the pilot commanded "slow ahead" and the helmsman acknowledged.

At 1624:50, the pilot asked, "captain, what's going on up there?"

A secondary radio conversation then took place in Korean. One Korean voice asked, "(something not there? is it okay)?" another voice stated, "(yeah its okay)." A secondary radio transmission in English was detected, the phrase "we are stuck aground freewheeling." The pilot was then audible stating, "do whatever you gotta do to take care of yourself."

At 1626:06, a secondary radio conversation was audible in which the phrase, "we are aground, we're stuck" was detected. Later, at 16:26:37, a secondary radio transmission was audible and the phrase, "tug port side aground," was detected.

At 1626:15, the pilot stated, "yeah captain, the tug run aground. who's up on the bow? they didn't say anything about the tug running aground? go on cap'. we gotta tighten up a little here, we got to do a little better job. the crew up on the bow didn't say anything about the tug running aground on the side of the channel? who's on the bow?" At 1626:35 captain responded, "first officer." The pilot responded, "'kay, well, the first officer should see that the tugboat ran aground." The pilot then went on to state, "probably because when he dropped his line, he had to get out of the way."

Immediately following this exchange, there was a secondary conversation in Korean in which the first officer asked on the radio, "did he throw it wrong?" The

voice on the secondary radio came back in Korean, "the line came out normal so I tied but the tugboat movement was (not right/strange)."

At 1627:00, the pilot stated, "well good thing we got a bow thruster I guess." The pilot was later heard calling tug 1 and tug 3, but the conversation was largely unintelligible.

There was another secondary radio conversation in Korean at this time. One asked, "ah whatever happened is this the reason it happened?" The other voice responded in Korean, "yeah I tied it up, then all of the sudden lost the tension (tension came off) maybe that's the reason."

At 1628:14, the pilot ordered "256" and the helmsman confirmed.

At 1628:00, the pilot ordered "dead slow ahead," and then "257." The pilot later stated, "I couldn't figure out what was goin' on 'cause I was lookin' up there I was like how'd they run aground, I didn't realize they were like back there."

1629:20 the pilot stated, "he must of, when they dropped the line, he must have panicked (drove away) * * *." There were then radio exchanges between the pilot and the tugs. The tug aground stated, "we're pretty stuck right now." The pilot then stated, "he's in like 12 feet of water."

1631:07, the following VHF radio was detected, "CC Portland light tugboat Coast Guard?" A voice in English then stated, "great now I'm gonna get drug into this." The pilot was then audible stating, "did he say something about oil pads huh? hydraulic oil or something." At this time, in Korean, there were some secondary radio exchanges related to retrieving a line. One of the Korean voices stated, "he moved to the other side, the tugboat was kind of strange," and that he stated he was "glad nobody got hurt."

The VHF exchange from CC Portland that occurred around this time was approximately the following:

"CC Portland call sign WDK3262."

"CC Portland Coast Guard?"

"mayday, mayday, Portland calling Coast Guard."

"CC Portland calling Coast Guard."

"this is Coast Guard on channel 1-6 go ahead over."

"...we're aground in the Corpus Christi Ship Channel right around buoys 25/26, leaking a little oil right now. do you have somebody with boom system available?"

At 1633:20, the CC Portland was audible on the VHF providing answers to the USCG. The following was noted:

- "27°49.28' N, 097°10.22' W"
- 5 people onboard.
- Vessel has orange hull, cream & beige colored house.
- Hard aground, will take more than 30 minutes to get out.
- Leaking oil out of the starboard drive.
- Have an assist vessel around, but vessel is hard aground.
- Leaked approximately 40 to 55 gallons.
- Position is outside the channel on the green side of the channel.
- Have called the designate person ashore.
- No injuries.
- Vessel stopped leaking oil when engines were shut down; it was only leaking out of the drives when the engines were running.
- Was not pushing or pulling any barges; light tug; was on an LNG job, never got to line up.
- Provided phone number to Edison Chouest Offshore.

The pilot later ordered, "starboard 20," and the helmsman confirmed. No other audio was examined.

Submitted by:

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APPENDIX A. VDR QUALITY RATING SCALE

The levels of recording quality are characterized by the following traits of the voyage data recorder information:

Excellent Quality Virtually all of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate only one or two words that were not intelligible. Any loss in the transcript is usually attributed to simultaneous bridge conversations or radio transmissions that obscure each other.

Good Quality Most of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate several words or phrases that were not intelligible. Any loss in the transcript can be attributed to minor technical deficiencies or momentary dropouts in the recording system or to a large number of bridge conversations or radio transmissions that obscure each other.

Fair Quality The majority of the crew conversations were intelligible. The transcript that was developed may indicate passages where conversations were unintelligible or fragmented. This type of recording is usually caused by bridge noise that obscures portions of the voice signals or by a minor electrical or mechanical failure of the VDR system that distorts or obscures the audio information.

Poor Quality Extraordinary means had to be used to make some of the crew conversations intelligible. The transcript that was developed may indicate fragmented phrases and conversations and may indicate extensive passages where conversations were missing or unintelligible. This type of recording is usually caused by a combination of a high bridge noise level with a low voice signal (poor signal-to-noise ratio) or by a mechanical or electrical failure of the VDR system that severely distorts or obscures the audio information.

Unusable Crew conversations may be discerned, but neither ordinary nor extraordinary means made it possible to develop a meaningful transcript of the conversations. This type of recording is usually caused by an almost total mechanical or electrical failure of the VDR system or extremely high bridge noise.