

**NATIONAL TRANSPORTATION SAFETY BOARD
Office of Research and Engineering
Vehicle Recorder Division
Washington, D.C. 20594**



SPECIALIST'S FACTUAL REPORT OF INVESTIGATION

CEN21LA259

**By
Michael Portman**

WARNING

The reader of this report is cautioned that the summary of a cockpit voice recorder audio recording is not a precise science but is the best product possible from a Safety Board 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.

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division

April 28, 2022

Cockpit Voice Recorder

Specialist's Factual Report
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1. EVENT SUMMARY

Location: Aspen, Colorado
Date: June 4, 2021
Aircraft: Cessna 560XL
Registration: N615RG
Operator: Aircraft Leasing & Sales Inc.
NTSB Number: CEN21LA259

A solid-state cockpit voice recorder (CVR) was sent to the National Transportation Safety Board (NTSB) Vehicle Recorder Division for evaluation.

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Division received the following CVR:

Recorder Manufacturer/Model: **Fairchild A-200S**
Recorder Serial Number: **01748**

3.1 CVR Carriage Requirements

Per federal regulation, turbine multiengine aircraft with more than six passenger seats and requiring two pilots manufactured prior to April 7, 2010, and operated under 14 CFR 91, must be equipped with a CVR that records a minimum of the last 30 minutes of aircraft operation; this is accomplished by recording over the oldest audio data. The accident aircraft was manufactured in 1998. When the CVR is deactivated or removed from the airplane, it retains only the most recent 2 hours of CVR operation.

3.2 Recorder Description

This model CVR, the Fairchild A-200S, is a solid state CVR that records 120 minutes of digital audio. Specifically, it contains a 2-channel recording of the last 120 minutes of operation and separately contains 4-channel recording of the last 30

minutes of operation. The 120-minute portion of the recording is comprised of one channel that combines three audio panels sources and a second channel that contains the cockpit area microphone (CAM) source. The 30-minute portion of the recording contains 4 channels of audio information: one channel for each flight crew, one channel for a cockpit observer, and one channel for the CAM.

3.3 Recorder Damage

Upon arrival at the laboratory, it was evident that the CVR had not sustained any heat or structural damage and the audio information was extracted from the recorder normally, without difficulty.

3.4 Audio Recording Description

Each channel's audio quality is indicated in Table 1.¹ Channel number one did not contain any audio information (nor was it required by federal regulations).

Table 1. Audio Quality.

Channel Number	Content/Source	Quality	Duration (hh:mm:ss)
1	Observer	N/A	N/A
2	Captain	Excellent	00:30:41
3	First Officer	Excellent	00:30:41
4	CAM	Good	00:30:41
5	Combined 1,2,3	Excellent	02:02:53
6	CAM	Good	02:02:53

3.5 Timing and Correlation

Timing on the transcript was established by correlating the local time of the accident to corresponding CVR events. This was accomplished through the use of security camera video on airport property which captured the landing, rollout, and excursion sequence. The video filename contains the time the video started recording, which was 0953:43 local time. The point of touchdown occurred approximately 1 second into the recording, giving an approximate touchdown time of 0953:44. The CVR events were offset to reflect the local mountain daylight time (MDT) of the incident. The timing provided by the security camera system could not be independently validated and thus the times presented in this report are approximate.

3.6 Description of Audio Events

In agreement with the Investigator-In-Charge, a CVR group did not convene. A summary of events from the CVR follows. In general, the crew followed appropriate crew resource management techniques, did not engage in significant non-pertinent discussion during periods of sterile cockpit procedures, and appeared to complete checklists appropriately.

¹ See attached CVR Quality Rating Scale.

TIME MDT (HH:MM:SS)	OBSERVATION
07:51:43	The recording began. The aircraft was on the ground during various boarding and pre-flight activities.
08:26:26	During the taxi-out, the pilots discussed the brake pedals feeling "wonky," with one of the pilots noting that the brakes didn't seem quite even when they did a hard brake earlier.
08:28:24	The aircraft took off and climbed to cruise, uneventfully. No abnormal noises during takeoff or gear-up were noted.
09:15:59	The flight began its descent into Aspen. Throughout the descent, various discussions took place regarding the weather, topography, and navigation, all unremarkable.
09:17:17	The crew discussed strategies for descending and slowing per air traffic control (ATC) instructions, acknowledging that there was ATC pressure.
09:33:38	The crew obtained Aspen ATIS information Mike as follows: issued 14:53Z, winds calm, visibility 10 statute miles, sky clear, temperature 17 degrees Celsius, dewpoint 3 degrees Celsius, altimeter 30.28 inches of Mercury, visual approach in use to runway 15, departing runway 33.
09:48:05	The crew contacted Aspen tower with the field in sight, were told to stay on or west of final, with winds from 30 degrees at 3 knots. An increase in ambient noise was noted at this time, consistent with gear deployment.
09:48:48	The crew completed a checklist including confirming that gear were down.
09:49:09	The crew selected full flaps.
09:51:22	The flight was cleared to land.
09:52:52	The crew confirmed before landing checks complete, including gear down, lights on, and damp off.
09:53:08	An Enhanced Ground Proximity Warning System (EGPWS) 500 ft callout was heard.
09:53:16	An EGPWS Terrain callout was heard.
09:53:44	Sounds consistent with touchdown were noted, and immediately thereafter a reed/horn-like tone, approximately 1,300Hz sounded, which remained on throughout the remainder of the recording.
09:53:53	The pilot monitoring calmly verbalized concern and advised the pilot flying to hold the aircraft straight.
09:53:55	ATC began to give turnoff instructions, then advised the aircraft that sparks were visible on the right side of the aircraft.

09:54:05	The aircraft came to a stop, and the crew commented that the gear had failed, likely collapsing on landing, and noted that they confirmed there were three green gear indications.
09:54:17	ATC informed the crew that the emergency response vehicles were responding.
09:54:36	The recording ended.

Attachment I

CVR Quality Rating Scale

The levels of recording quality are characterized by the following traits of the cockpit voice 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 cockpit/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 simultaneous cockpit/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 cockpit noise that obscures portions of the voice signals or by a minor electrical or mechanical failure of the CVR 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 cockpit noise level with a low voice signal (poor signal-to-noise ratio) or by a mechanical or electrical failure of the CVR 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 CVR system.