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



GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

CEN19FA119

By Charles Cates

WARNING

The reader of this report is cautioned that the transcript of a cockpit voice recorder audio recording is not a precise science but is the best product possible from a Safety Board group investigative effort. The transcript or parts thereof, if taken out of context, could be misleading. The transcript 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 transcript as the sole source of information.

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

August 4, 2020

Cockpit Voice Recorder

Group Chairman's Factual Report By Charles Cates

1. EVENT SUMMARY

Location:	New Albany, Mississippi
Date:	April 13, 2019
Aircraft:	Rockwell Sabreliner, Registration N265DS
Operator:	Classic Aviation Inc
NTSB Number:	CEN19FA119

On April 13, 2019 about 1514 CDT, a Rockwell International NA-265-65 airplane, N265DS, impacted terrain near New Albany, Mississippi, following a reported electrical malfunction. The two commercial pilots and one passenger were fatally injured. The airplane was destroyed. The airplane was registered to Classic Aviation Inc. and operated as a 14 *Code of Federal Regulations* Part 91 personal flight. Instrument meteorological conditions were reported at the accident site and along the route of flight about the time of the accident, and the flight was operated on an instrument flight rules flight plan. The flight originated from University-Oxford Airport (UOX), Mississippi, at 1506 and was destined for Marion County-Rankin Fite Airport (HAB), Georgia.

A tape cockpit voice recorder (CVR) was sent to the National Transportation Safety Board (NTSB) Vehicle Recorder Division for evaluation. The CVR group meeting convened on June 25, 2019, and a partial transcript was prepared for the 30-minute tape recording (see attached).

2. GROUP

Chairman:	Charles Cates Mechanical Engineer National Transportation Safety Board
Member:	Dan Baker Investigator in Charge National Transportation Safety Board
Member:	Phil Gohde Aviation Safety Inspector Federal Aviation Administration

3. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Division received the following CVR:

Recorder Manufacturer/Model:**B&D Instruments**Recorder Serial Number:illegible/data plate destroyed

3.1 CVR Carriage Requirements

Per federal regulation, 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 1980. When the CVR is deactivated or removed from the airplane, it retains only the most recent 30 minutes of CVR operation.

3.2 Recorder Description

This model CVR by B&D Instruments records a minimum of 30 minutes of analog audio on a continuous loop tape in a four-channel format: one channel for each flight crew, one channel for a cockpit observer, and one channel for the cockpit area microphone (CAM).

3.3 Recorder Damage

Upon arrival at the laboratory, it was evident that the exterior of the CVR had sustained significant impact structural damage. The outer case was removed and it was found that the interior crash-protected case also sustained significant structural damage (see Figures 1 and 2). The tape reel was shattered, and the magnetic tape had bits of the metal reel embedded, along with mold growing on the tape. The magnetic tape was retrieved from within the crash-protected case and was meticulously cleaned and ultimately was successfully read out.

Figure 1. As-received condition of CVR showing significant impact structural damage.



Figure 2. Photo taken during disassembly of the recorder showing the shattered tape reel and magnetic tape with mold growth.



Figure 3. Photo of disassembled crash case and exposed magnetic tape showing extreme damage and deformation.



3.4 Audio Recording Description

The tape contained four channels of audio, however only one channel contained anything other than electrical noise. Channel 4 had the audio from left and right hot mics and left and right radios multiplexed in to one channel. Each channel's audio quality is indicated in Table 1.¹

Table 1: Audio Quality.					
Channel Content/Source Quality Duration Number					
1	N/A	Unusable	30 min		
2	N/A	Unusable	30 min		
3	N/A	Unusable	30 min		
4	HOT, RDO	Good	30 min		

3.5 Timing and Correlation

Timing on the transcript was established by correlating the air traffic control recording transmission time to the corresponding CVR event. Specifically, the CVR time of the final radio transmission from N265DS was linked to the corresponding ATC local time, and all CVR events were offset to reflect the local central daylight time of the accident.

¹ See attached CVR Quality Rating Scale.

3.6 Description of Audio Events

The recording began with the aircraft on approach to University Oxford Airport (UOX). The approach and landing were uneventful, and the transcript began at 1501:54, the time that the engines were started prior to the accident flight.

At 1505:16 the pilot contacted Oxford area traffic to advise they would be departing on runway 9 and at 1505:48 a sound similar to engines advancing in power was recorded.

At 1506:29 the pilot radioed Memphis center and reported that they were departing Oxford and climbing through thirteen hundred to three [thousand feet]. Memphis cleared them to one one thousand feet and warned that there was moderate to extreme precipitation in the vicinity.

Starting at 1508:01 intra-cockpit communication focused on identifying and troubleshooting an unknown electrical issue the airplane was having. The discussion and troubleshooting continued until the end of the recording.

At 1508:24 Memphis center reported radar contact five miles to the east of Oxford airport and requested the altitude status. The pilot responded that they were leaving nine for one one [thousand feet]. Memphis center again reported moderate to heavy precipitation along the route and asked the pilot to let the controller know if they need a deviation. The controller requested that the pilot recycle their mode C [transponder].

Following the discussion with Memphis center the pilot and first officer continued to discuss the electrical issue, but they never identified the failed systems that they were troubleshooting.

At 15:10:04 Memphis center told them that their transponder was not working properly and they were not on their route. The pilot responded that he could see they were off and were descending to one one thousand. At 1010:26, following the discussion with Memphis center, the first officer told the pilot that he didn't have any comm and couldn't hear the controller. The pilot directed him to look for a circuit breaker.

The recording ended shortly thereafter at 1510:42 with the aircraft still in flight.

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.

Transcript of a B&D Instruments cockpit voice recorder installed on a Rockwell Sabreliner (N265DS), which impacted terrain in New Albany, Mississippi on April 13, 2019.

НОТ	Boom microphone
RDO	Radio communication
MEM	Memphis Center controller
-1	Voice identified as the captain
-2	Voice identified as the first officer
-?	Voice unidentified
*	Unintelligible word
#	Expletive
@	Non-pertinent word
()	Questionable insertion
[]	Editorial insertion

LEGEND

Note 1: Times are expressed in central daylight time.

Note 2: Generally, only radio transmissions to and from the incident aircraft were transcribed.

Note 3: Words shown with excess vowels, letters, or drawn out syllables are a phonetic representation of the words as spoken.

Note 4: A non-pertinent word, where noted, refers to a word not directly related to the operation, control or condition of the aircraft.

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
1439:07.0 START OF START OF	RECORDING TRANSCRIPT		
15:01:54.9	[start of transcription]		
15:01:57.0 HOT	[sound similar to engine start with igniters operating]		
15:02:12.2 HOT-1	you bring them all the way up? i said to ten.		
15:02:15.0 HOT-2	yeah i must have.		
15:02:23.4 HOT	[sound similar to engine start with igniters operating]		
15:02:40.1 HOT	[sound similar to hydraulic pump motor operating, continues intermittently through recording]		
15:02:40.4 HOT-2	* * ten thousand? nineteen.		
15:02:44.7 HOT-1	fourteen five and three. seventeen five.		
15:02:48.8 HOT-1	seventeen eight maybe.		
15:02:51.0 HOT-2	ok. * * * * *		
15:02:59.3 HOT-2	one hundred nine on the airspeed.		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication	
15:03:08.0 HOT-1	checkin the brakes.			
15:03:10.0 HOT-2	run em down.			
15:03:10.8 HOT-1	adjustin my speed.			
15:03:18.7 HOT-1	got spoiler comin in?			
15:03:20.3 HOT-2	i do.			
15:03:20.5 HOT-1	got the altitude set?			
15:03:22.2 HOT-2	i do not. three thousand.			
15:03:25.0 HOT-1	that's correct.			
15:03:37.5 HOT-1	i believe our rain ex is about worn off our windshield	1.		
15:03:40.4 HOT-2	yeah.			
15:03:43.4 HOT-1	might ought to turn the avionics on.			
15:03:49.2 HOT	[sound of two clicks]			

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
15:03:59.4 HOT	[sound of three clicks]		
15:04:06.9 HOT	[sound of two clicks]		
15:04:10.5 HOT-2	you got one oh nine (on/in) airspeed right?		
15:04:12.8 HOT-1	i do.		
15:04:16.6 HOT	[sound of click]		
15:04:33.1 HOT-1	alright put direct K H A B.		
15:04:44.9 HOT-1	enter.		
15:04:45.9 HOT-1	*		
15:04:48.4 HOT-1	now, procedure.		
15:04:52.9 HOT-1	select approach, enter.		
15:04:56.2 HOT-1	now what'd you skip?		
15:04:57.7 HOT-2	i just hit procedure en approach, enter, but.		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
15:05:00.7 HOT-1	alright, well.		
15:05:02.9 HOT-2	go back to flight plan then?		
15:05:04.3 HOT-1	yeah well it may just not have found itself yet so just wait. put direct Hamilton.		
		15:05:16.0 RDO-1	and Oxford area traffic sabre two six five delta sierra departin runway nine to the east traffic advised.
15:05:22.7 HOT-2	ten degrees flaps. flaps appear set. * three thousand. fly heading.		
15:05:30.1 HOT-1	uh headin. altitude select.		
15:05:36.5 HOT-2	* comin *		
15:05:37.7 HOT-1	turn the ignitions on. got the heats on?		
15:05:40.6 HOT-2	yup. heats are on.		
15:05:41.3 HOT-1	lights are out. airplane's supposed to be.		
15:05:43.2 HOT-2	clear panel.		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
15:05:45.1 HOT-1	almost.		
15:05:46.4 HOT-1	clear as you clear as its gonna get let's put it that way.		
15:05:46.5 HOT-2	*		
15:05:48.4 HOT	[sound similar to engines advancing in power]		
15:05:49.4 HOT-1	yeah.		
15:05:51.1 HOT-1	now's when it goes showin out. (guard that).		
15:05:56.0 HOT-1	that way i can break a finger if i didn't pull it back.		
15:05:57.9 HOT-2	airspeed's alive. there's eighty. and quick. so.		
15:06:01.6 HOT-2	nosewheel steering off.		
15:06:05.0 HOT-1	what were our trims supposed to be set to? feels like its wantin to fly off the runway by itself. gear up.		
15:06:10.7 HOT-2	six point one.		
15:06:11.6 HOT-1	gear up.		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
15:06:12.8 HOT	[sound similar to hydraulic pump operation]		
15:06:16.7 HOT-1	flaps up.		
15:06:18.4 HOT	[sound similar to hydraulic pump operation]		
15:06:26.8 HOT-1	[sound of cough]		
		15:06:29.2 RDO-1	memphis two six five delta sierra with you off ah Oxford climbing through thirteen hundred for three.
		15:06:35.4 MEM	november two six five delta sierra * roger got moderate to extreme precipitation in the vicinity of oxford use caution climb and maintain one one thousand the Oxford altimeter is two niner eight two.
		15:06:42.6 RDO-1	two niner eight two up to one one.
15:06:45.4 HOT-1	one one thousand please.		
15:06:50.7 HOT-2	your autopilots are all (off).		
15:06:52.5 HOT-1	[sound of cough] yeah, well, hang on.		
15:06:59.5 HOT-2	* turn it on to * select *		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
15:07:03.4 HOT-1	turn it on.		
15:07:18.6 HOT-1	[sound of cough]		
15:08:01.7 HOT-2	what'd you do? * it and break the filament?		
15:08:05.1 HOT-1	naw, its shifts, movin around sometimes get its a ground i think on it.		
15:08:09.1 HOT	[sound of pop, similar to electrical power source change]		
15:08:12.8 HOT-1	its workin so it don't matter.		
		15:08:24.6 MEM	november two six five delta sierra gotcha radar contact five miles to the east of the Oxford airport Oxford altimeter two niner eight two say your altitude leaving.
		15:08:31.1 RDO-1	we're outta nine for one one.
		15:08:33.8 MEM	november five delta sierra roger scattered moderate to heavy precipitation along your route of flight so let me know if you need a deviation.
15.08.35.9			

15:08:35.9 **HOT-2** * (want it on)?

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
15:08:37.5 HOT-1	yeah.		
15:08:38.6 HOT-2	how come that's completely gone?		
15:08:40.6 HOT-1	i don't know.		
		15:08:41.8 RDO-1	will do delta sierra.
		15:08:43.5 MEM	and five delta sierra, um, can you try recycling your mode c as well?
15:08:44.9 HOT-2	what am i not (gettin here)?		
		15:08:48.6 RDO-1	alright, will do.
15:08:55.8 HOT-1	uh, see about turnin that back on.		
15:09:01.0 HOT-2	what do you want me to do, check a breaker or what?		
15:09:02.8 HOT-1	uh see, uh see if you got a breaker off or anything.		
15:09:12.7 HOT-2	look like equipment ground blower.		
15:09:16.0 HOT-1	what?		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
15:09:16.9 HOT-2	a ground blower breaker * is * gone. primary secondary.		
15:09:21.4 HOT-1	alright.		
15:09:40.2 HOT-2	avionics master * *. heading.		
15:09:49.4 HOT-1	we got somethin off on the autopilot. right there.		
15:09:49.4 HOT-2	*		
15:09:53.1 HOT-?	yeah.		
15:09:53.7 HOT-?	yup.		
15:09:54.9 HOT-1	let me fly the airplane.		
15:09:56.3 HOT-2	please do.		
15:09:58.7 HOT-1	eleven thousand. str- recycle the, we got somethin that's cut the power off to that.		
		15:10:04.3 MEM	november five delta sierra, uh, are you on course for Hamilton or? i don't know what the deal is, you and another

Hamilton or? I don't know what the deal is, you and another aircraft, i guess, uh, your transponders aren't working properly you're not on your route.

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
		15:10:14.1 RDO-1	ok i see we're off we're headed to CESRO we'd like to do the r-nav runway one eight approach and we're havin a little - if i could and we're descendin to one one thousand at this time.
		15:10:24.4 MEM	november five delta sierra roger cleared direct CESRO.
15:10:26.7 HOT-2	i don't have any comm i don't hear him.		
15:10:29.1 HOT-1	well look for a circuit breaker.		
15:10:42.6	[recording faded and ended]		
1510:50.1 END OF TR END OF RE	ANSCRIPT CORDING		