

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



SPECIALIST'S FACTUAL REPORT OF INVESTIGATION

DCA16FA013

**By
Bill Tuccio, Ph.D.**

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

June 14, 2016

Cockpit Voice Recorder

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1. EVENT SUMMARY

Location: Fort Lauderdale, Florida
Date: October 29, 2015
Aircraft: Boeing 767-200, Registration N251MY
Operator: Dynamic Air, Flight 405
NTSB Number: DCA16FA013

On October 29, 2015, about 1233 eastern daylight time (EDT), Dynamic International Airways flight 405, a Boeing 767-200ER, N251MY, caught fire while taxiing for departure at Fort Lauderdale-Hollywood International Airport (FLL), Fort Lauderdale, Florida. One passenger received serious injuries and the remaining 89 passengers and 11 crewmembers received minor injuries or were not injured. The airplane sustained substantial damage from the fire. The scheduled charter flight was operating under the provisions of 14 *Code of Federal Regulations* (CFR) Part 121 supplemental and was en route to Maiquetia - Simon Bolivar International Airport (CCS), Caracas, Venezuela. 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: **L-3/Fairchild FA2100-1020**
Recorder Serial Number: **000356988**

3.1 CVR Carriage Requirements

Per federal regulation, turbine engine powered aircraft operating under 14 CFR Part 121 must be equipped with a CVR that records a minimum of the last 2 hours of aircraft operation; this is accomplished by recording over the oldest audio data. 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 L-3/Fairchild FA2100-1020, records a minimum of 120 minutes of digital audio stored on solid state memory modules. Four channels are recorded: 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 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

Table 1: Audio Quality.			
Channel Number	Content/Source	Quality	Duration
1	Observer and/or Cabin	Poor	120 min
2	Captain or First Officer	Good	120 min
3	Captain or First Officer	Good	120 min
4	CAM	Good	120 min

3.5 Timing and Correlation

Timing on the transcript was established by correlating the CVR events to common events on the flight data recorder (FDR). Specifically, the three radio transmissions made by the aircraft and recorded at 7193.5, 7204.0, and 7214.7 CVR Elapsed Time (time from the start of the recording) were correlated to the radio transmit microphone key parameter from the FDR at 44964.4, 44975.4, and 44985.4 EDT (seconds after midnight). Each of the three radio transmissions acted as an anchor point for a linear interpolation between the remaining CVR events. Accordingly, 10 hours, 29 minutes, and 30.5 seconds was added to CVR Elapsed Time to convert to EDT.

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 this summary, the captain and first officer were not determined; as such, the pilots are referred to as "A" and "B."

The recording began when a mechanic was discussing deferred maintenance item (DMI) number "55," related to a flight attendant station.

At about 1115 EDT, the mechanic discussed maintenance write-ups with one of the pilots, including: the aforementioned flight attendant station, "EICAS" software load, anti-ice valve, and a fuel quantity gauge. Shortly thereafter, both pilots discussed who would fly the flight out of FLL.

¹ See attached CVR Quality Rating Scale.

At about 1121 EDT, the 1053 EDT ATIS information “Foxtrot” was received. The crew then started the auxiliary power unit (APU).

The crew then discussed various company policies, briefed a flight attendant on the flight, discussed the fuel load, and engaged in social conversation.

At about 1148 EDT, the crew noted fuel was being drawn from the center tank and conjectured the mechanics may have had a reason to use the center tank. Thereafter, the crew briefed the v-speeds for the takeoff and briefed the taxi and takeoff.

The crew then engaged in the transcribed dialogue in table 2. Abbreviations and editorial styles used in table 2 (and table 3 which follows) are described in the legend on the last page of this report.

Table 2. Crew dialogue before taxi.

EDT	Source	Text
1207:49	CREW-A	EICAS software, aft cargo detector, fuel quantity indicator [laughter].
1208:07	CREW-B	illegal as hell.
1208:09	CREW-A	yep.
1208:17	CREW-A	[Crewmember says he wanted to talk to the mechanic. Crewmember left the cockpit to ask mechanic if he has center fuel pump on for a reason.]
1210:09	CREW	[crewmember returned, crew performed preflight checklist, including cabin crew briefing]
1211:56	CREW-B	fuel quantity indicator.
1212:14	CREW-B	ah. what do ya think?
1212:17	CREW-A	you mean about?
1212:18	CREW-B	fuel quantity indicator. **.
1212:22	CREW-A	you know if we wanted to be # we could just say fix it.
1212:29	CREW-B	**.
1212:30	CREW-A	I mean this isn't any help either. because this just gives calculated...
1212:37	CREW-A	...ahh fuel.
1212:39	CREW-B	yeah.
1212:41	CREW-A	you know. so.
1212:43	CREW-A	that box that doesn't give me a--
1212:44	CREW-B	at least we have these.
1212:47	CREW-A	sometimes.
1212:48	CREW	[both crewmembers laugh]
1212:52	CREW-B	more than likely that's gonn'a come up.
1212:54	CREW-A	oh yeah. once we get rolling it'll. it'll [laughing]. somewhere along the way.
1212:58	CREW-B	or go away.
1212:59	CREW-A	[laughing] or go away permanently.
1213:02	CREW-A	somewhere on the route.
1213:03	CREW-A	anyhow.
1213:08	CREW-A	theoretically ahh. as we all know. it should be. sorry. sorry.

EDT	Source	Text
1213:21	CREW-A	it depends how hard they squeeze us. that's how hard we squeeze them right?
1213:25	CREW-B	well we've never had the left one fail.
1213:27	CREW-A	yeah.
1213:28	CREW-B	so if we have to go on one engine. we've got the left one. we'll go into. oh where should we go? we'll go into like ah Santa Domingo.
1213:39	CREW-A	lots of places. to go along the way. right.
1213:44	CREW-A	yeah. Santa Domingo's a good place.
1213:46	CREW-B	Bahamas.
1213:48	CREW-A	Bahamas.
1213:49	CREW-B	Curacao.
1213:50	CREW-A	Curacao. yeah. lots of places.

After this dialogue, the crew received and processed the load and release paperwork and coordinated the pushback off the gate. During the pushback, the crew started the engines and then verified the aircraft was disconnected from the pushback equipment.

Table 3 provides a transcript after the push back until the end of the recording.

Table 3. Transcript after pushback until end of recording.

EDT	Source	Text
1228:02	CREW-B	see this?
1228:05	CREW-A	oh #.
1228:15	CREW-A	it's the generator right?
1228:17	CREW-B	yeah.
1228:19	CREW-A	that just the field?
1228:22	CREW-B	looks like the whole generator huh?
1228:24	CREW-A	can we do a reset?
1228:26	CREW-B	that's a good idea.
1228:28	HOT	[sound of clunks]
1228:29	CREW-A	yeah. it's just the field.
1228:32	CREW-B	good man.
1228:40	CREW	[briefly discuss a flagged display]
1228:58	CREW	[before taxi checklist, including APU off]
1229:24	RDO-A	[ready to taxi]
1229:34	RAMP	[contact ground]
1229:45	RDO-A	[calls for taxi from Tango Four]
1229:58	GND	[taxi to 28R, Tango 4, Bravo]
1230:59	CREW	[before takeoff checklist]
1231:06	PA-A	ladies and gentlemen number two for takeoff. flight attendants please be seated.
1231:16	CREW	[before takeoff checklist, with takeoff fuel 44,000 even, flaps set. finish with line items to go.]

EDT	Source	Text
1232:08	GND	[over to Tower Dynamic 405H]
1232:27	RDO-A	[calls Tower short of 28R]
1232:37	AC-SabreWings	hey tower. Sabre Wings ah one nineteen.
1232:43	TWR	Sabre Wings one nineteen go ahead sir.
1232:44	AC-SabreWings	hey ah Dynamic ah out of the left engine. it looks like its leaking a lot of ah I don't if its fuel or what. its fluid leaking out of the left engine.
1232:52	TWR	okay Dynamic four zero five heavy did you copy?
1232:55	RDO-A	ah yes sir. we copy. ah we'll probably need to go back to the ah ramp.
1233:00	TWR	okay. hold short of there tango one. contact ramp on one one eight point one seven. let him know that you need to go back to the gate.
1233:05	CAM	[sound of two thumps]
1233:06	RDO-A	okay hold short tango one and we'll ah contact ramp.
12:33:10.0	UNKNOWN RADIO	engine's on fire. engine's on fire.
1233:11	CAM	[sound of single chime]
1233:11	CREW-?	engine's on fire.
1233:12	TWR	engine's on fire. we're calling the fire rescue right now.
1233:13	CAM	[sound of four, 1,200Hz tones over 0.7 seconds]
1233:15	CAM	[sound of two clicks]
1233:16	RDO-B	okay ah this is Dynamic four oh five. declaring an emergency. call the fire trucks.
1233:17	PA-FLIGHT ATTENDANT	[spanish] abajense. abajense. [translated: "get off. get off."] ***. [speaking loudly]
1233:18	CAM	[sound of alternating high/low, warbling tone]
1233:19	CAM	[sound of bell for 0.8 seconds]
1233:21	TWR	roger. nine thousand two.
1233:22	CAM	[sound of four, 1,200Hz tones over 0.7 seconds]
1233:24	CAM	[sound of chime]
1233:25	CREW-?	**.
1233:28	PA-B	flight attendants. evacuate right side of the airplane. evacuate right side of the aircraft. evacuate right side of the aircraft. evacuate right side of the aircraft.
1233:30	CAM-A	evacuate.
1233:32	(RDO)-A	evacuate.
1233:35	RDO-A	and Dynamic. is evacuating.
1233:35	CAM	[sound of rumbling]
1233:38	HOT	[sound of bell for 0.8 seconds]
1233:40	CREW-A	shuttin' her down.
1233:44	CAM	[end of recording]

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.

Summary of a L-3/Fairchild FA2100-1020 solid-state cockpit voice recorder, serial number 000356988, installed on an Dynamic Air Boeing 767-200 (N251MY), which experienced an engine fire at Fort Lauderdale-Hollywood International Airport (FLL) in Fort Lauderdale, FL.

LEGEND

CAM	Cockpit area microphone voice or sound source
HOT	Flight crew audio panel voice or sound source
CREW	Voice of a crewmember
RDO	Radio transmissions from N251MY
RAMP	Radio transmission from the FLL ramp controller
GND	Radio transmission from the FLL ground controller
TWR	Radio transmission from the FLL airport tower controller
AC-SabreWings	Radio transmission from SabreWings Flight 119
PA	Passenger cabin public address system
-A	Voice identified as crewmember "A"
-B	Voice identified as crewmember "B"
FLIGHT ATTENDANT	Voice identified as the flight attendant
-?	Voice unidentified
*	Unintelligible word
#	Expletive
()	Questionable insertion
[]	Editorial insertion and/or paraphrased dialogue

Note 1: Times are expressed in eastern daylight time (EDT).

Note 2: Generally, only radio transmissions to and from the accident 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.