

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



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OPERATIONAL FACTORS/HUMAN PERFORMANCE

Group Chairs' Factual Report

November 18, 2024

TABLE OF CONTENTS

A. INCIDENT	4
B. OPERATIONAL FACTORS/HUMAN PERFORMANCE GROUP	4
C. SUMMARY	5
D. DETAILS OF THE INVESTIGATION	5
1.0 OPERATIONAL FACTORS GROUP ACTIVITIES.....	5
2.0 HISTORY OF FLIGHT	6
3.0 PILOT INFORMATION	13
3.1 Captain	13
3.1.1 Captain's Certification Records.....	13
3.1.2 Captain's Training and Proficiency Checks	14
3.1.3 Captain's Flight Times.....	15
3.1.4 Captain's 72-Hour History.....	15
3.1.5 Perceptions of the Captain's Proficiency	16
3.2 First Officer	16
3.2.1 First Officer's Certification Records.....	16
3.2.2 First Officer's Training and Proficiency Checks	17
3.2.3 First Officer's Flight Times	17
3.2.4 First Officer's 72-Hour History	18
3.2.5 Perceptions of the First Officer's Proficiency	18
4.0 AIRPLANE INFORMATION	19
4.1 Dispatch Record.....	22
4.2 Weight and Balance	22
5.0 AIRPLANE TOW TRACTOR INFORMATION	22
6.0 AIRPORT INFORMATION	25
6.1 Terminal Main Ramp Gates	27
6.2 Airport NOTAM.....	27
7.0 METEOROLOGICAL INFORMATION	28
8.0 HAWAIIAN AIRLINES	28
8.1 Safety Management System	29
9.0 RELEVANT FLIGHT OPERATION PROCEDURES – HAWAIIAN AIRLINES	31

9.1	Manual Engine Start Procedure	31
9.1.1	Manual Engine Start Procedure - Expanded Checklist.....	31
9.1.3.1	Start Checklist.....	34
9.1.4	Pushback and Engine Start Callouts	37
9.1.5	After Starting Checklist	38
9.1.6	Pushback Guidance.....	40
9.1.7	Pilot's Eye Orientation - Static Aircraft	43
9.1.8	Taxiing Guidance.....	43
9.2	Relevant Ground Operation Procedures - Hawaiian Airlines	45
9.2.1	Ground Service Equipment Safety Checklist	45
9.2.1.1	Daily Inspection	46
9.2.2	Aircraft Movement Safety	47
9.2.3	Circle Checks	48
9.2.4	Departure Procedures and Responsibilities	49
9.2.5	Pushback with Interphone	52
10.0	FAA OVERSIGHT.....	55
11.0	OGG ADMINISTRATIVE RULES	56
12.0	FAA GUIDANCE.....	56
12.1	Advisory Circular 150/5120-5D	56
E.	ATTACHMENTS.....	57

A. INCIDENT

Location: Kahului, HI
Date: 11/30/2023
Time: 0614 Hawaiian Standard Time (HST)¹
1614 Universal Time Coordinate
Airplane: Boeing 717-200; N494HA, HAL 105

B. OPERATIONAL FACTORS/HUMAN PERFORMANCE GROUP

Group Chair	Shawn Etcher - Operational Factors National Transportation Safety Board Washington, D.C.
Group Chair	William Bramble - Human Performance National Transportation Safety Board Washington, D.C.
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¹ All time will be local HST unless otherwise noted. UTC (Zulu) was 10 hours ahead of HST.

C. SUMMARY

On November 30, 2023, about 0614 Hawaii standard time (HST), a Boeing 717-200, N494HA, sustained minor damage when it collided with a tow tractor² while taxiing for departure at Kahului Airport (OGG), Maui, Hawaii. The 119 passengers and crew onboard were uninjured. One ramp agent sustained minor injuries. The flight was operating as a Title 14 *Code of Federal Regulations* Part 121 scheduled domestic passenger flight from OGG to Daniel K. Inouye International Airport (HNL), Honolulu, Hawaii.

The flight crew reported that during push back from the gate, they received clearance from the tug driver to start the engines. The No. 1 (left) engine auto start was inoperative, so the crew had to perform a manual start. The No. 1 engine was started, pushback was completed, and the brakes were set. The ground crew was instructed to disconnect the towbar. While the FO was reviewing load data and an air route traffic control clearance, the captain started the No. 2 (right) engine. The captain, using the airplane interphone, cleared the ground crew to disconnect, which allowed the ground crew to disconnect the tow tractor operator's headset and the nose landing gear steering bypass pin. The flight crew obtained a taxi clearance from ATC and commenced the taxi. The airplane's left main landing gear impacted the towbar and the left wing impacted the tow tractor cab. The cab collapsed, injuring, and trapping the driver. Airport fire and rescue extricated the driver who was transported to a local hospital for treatment. Post accident examination of the airplane revealed minor damage to the left wing.

D. DETAILS OF THE INVESTIGATION

1.0 Operational Factors Group Activities

December 1, 2023 - The operational factors investigator was assigned to the investigation to gather crew statements and obtain Hawaiian Airlines guidance materials and other documentation.

December 8, 2023 - After receiving flight crew statements, the investigator in charge requested the formation of an operational factors and human performance combined group. An NTSB human performance investigator was subsequently assigned, and FAA, Hawaiian Airlines, ALPA, and Boeing members were subsequently added to the group.

December 20, 2023 - The group convened via Zoom to interview the first officer (FO) and then the captain of the incident flight. These interviews were recorded and sent off to be transcribed that same day.

² For this report "tug," "tractor," "tow-tractor," and "tow" are synonymous and could be interchanged.

December 21, 2023 – The group chairs requested interviews with involved ramp personnel, the airline’s chief pilot, the ramp supervisor, and personnel responsible for training ramp personnel. The chairs requested the opportunity to conduct a visibility study from the cockpit of a B-717. The chairs also requested interviews with the FAA Principal Operations Inspector (POI) and Front-Line Manager (FLM) responsible for overseeing the Hawaiian Airlines certificate.

February 20, 2024 – The group reconvened at OGG, interviewed three involved ramp personnel, and conducted a night observation activity on the OGG ramp (See Attachment 13 - Night Ground Handling Observation at Kahului Airport).

February 22, 2024 – The group met at Hawaiian Airlines headquarters at HNL, received a briefing from Hawaiian Airlines managers about ramp agent training, interviewed ramp training program personnel, and interviewed the standards chief pilot/119 chief pilot.

February 23, 2024 – The group visited the FAA HNL Flight Standards District Office (FSDO) and interviewed the POI and FLM for Hawaiian Airlines.

2.0 History of Flight

Flight 105 was scheduled for an 0600-departure. The captain estimated they left the hotel about an hour before departure and arrived at the airport about 0525. The FO performed his preflight flow in the cockpit and then went outside and performed an exterior preflight inspection while the captain performed preflight flows in the cockpit.

After the crew arrived at the airplane, the captain found that the airplane had two MELs³: a wing landing light was inoperative and the No. 1 engine auto start was inoperative. The wing landing light had been secured by maintenance and the MEL required no flight crew action. The No. 1 engine MEL item required the flight crew to perform a manual start on the No. 1 engine. The captain reviewed the manual start procedure in the Quick Reference Handbook (QRH) and Flight Crew Operating Manual (FCOM). (See Section 9.1.2 for more information about the MEL items).

The captain began entering information in the flight management system (FMS) to assist the FO. The FO joined the captain in the cockpit, reviewed information the captain had entered in the FMS, and completed his preflight flow.

The captain discussed the two MEL items with the FO and the two pilots reviewed the manual start procedure in the QRH and FCOM. During a post-incident

³ Minimum equipment list

interview, the captain told investigators the manual start required setting a timer when the engine was started and running the engine at 19 percent N1 for 30 seconds while monitoring the exhaust gas temperature.

The flight crew discussed weather as the passengers boarded. The captain recalled that the weather was "dicey" that morning, with airports at low ceilings and visibility, rain, and large line of thunderstorms moving through the area.

Cargo loading and subsequent load close out paperwork, delayed flight 105's departure. The captain noted that a tow tractor was not yet connected to the airplane by the scheduled departure time, so he radioed the ramp to ask for one.⁴

The FO obtained flight 105's clearance to HNL and ATC advised that there might be a runway change. The captain and first officer reviewed available departures at OGG.

A ramp agent connected a tow tractor to the airplane using a towbar. Another ramp agent served as the tow tractor operator. The tow tractor operator connected a headset to the receptacle located behind an access panel on the lower right side of the airplane's nose so they could communicate with the flight crew.

The tow tractor operator requested clearance from the captain to disconnect external power and air conditioning from the airplane, and the captain approved. Those items were disconnected. The tow tractor operator informed the captain that a "circle check" (a visual inspection of the airplane exterior and surrounding area) was complete. The FO could initially hear these communications, but he muted the volume of that channel on his headset before pushback began so he could more easily listen to ATC.

According to the FO, ATC informed the flight crew that the flight's departure runway had changed. A controller provided a new departure clearance. The FO recalled writing down the new clearance before pushback. (The captain recalled differently, stating that they received the clearance sometime after pushback.)

According to the captain, "*about 8 minutes⁵*" after disconnecting the ground power, the ground crew was ready to pushback. The FO obtained pushback clearance from the air traffic control tower. The FO recalled that he informed the tower controller that they would be performing a manual engine start. The captain recalled that he informed the tow tractor operator that they would be performing a manual start and

⁴ Source: Operational Factors/Human Performance - Attachment 1 - "Flight Crew Interview Transcripts" pg. 19, line 13-14.

⁵ Source: Operational Factors/Human Performance - Attachment 1 - "Flight Crew Interview Transcripts" pg. 20, line 21.

explained that starting the engines might take longer than usual. The tow tractor operator did not recall discussing the starting of the engines with the captain.

The captain told the tow tractor operator he had released the brakes, and the ground crew was cleared to push back the airplane. According to the tow tractor operator, she honked the tractor's horn to alert other ramp personnel to the movement and, about 0608:33 (according to airport surveillance video), the tow tractor began pushing the airplane away from the gate.

It was dark outside. The captain told investigators it was raining and the wipers were on. The FO told investigators that he normally saw a rotating yellow light on top of the tow tractor, but when investigators asked if it was working that morning, neither the FO nor the captain could recall seeing a rotating light, LED bar, or other form of hazard lighting on the tow tractor. Airport surveillance video also showed no yellow or amber hazard lighting in operation on the tow tractor. However, it showed that the tugs headlights were on.

Airport surveillance video indicated that two wing walkers were in position (one on either side of the airplane) when the tow tractor operator began pushing back HAL105. Each was initially holding a pair of lighted wands. About 25 seconds into the pushback (which lasted a total of 1 minute 15 seconds), the wing walker on the airplane's left-hand side began walking toward a ground service vehicle near the gate, placed his wands in the driver's seat area, and then walked back toward the airplane. About 35 seconds into the pushback, the agent on the airplane's right-hand side approached the driver's area of a different ground service vehicle. His wands also disappeared (the image was not clear enough to verify whether he placed them in the vehicle). He then walked back towards the gate, out of view.

During an interview with the captain was asked if the ground crew cleared them to start engines during pushback which he stated *"Yes...So that's after they started pushing⁶."* Both pilots stated that the captain performed the manual start on the No. 1 engine during the pushback. The FO stated that he read the procedure for *"the manual start and helping him watch the gauges to make sure we don't go out of parameter."⁷* to start the no. 1 engine. The captain recalled that he was heads down in the cockpit throughout the start procedure. The captain recalled that they had the cockpit dome and thunderstorm light (which illuminated cockpit panels) turned on to aid them in performing the start procedure. Both flight crew members recalled receiving the load closeout via ACARS⁸ during pushback.

⁶ Source: Operational Factors/Human Performance - Attachment 1 - "Flight Crew Interview Transcripts" pg. 50, lines 10-16.

⁷ Source: Operational Factors/Human Performance - Attachment 1 - "Flight Crew Interview Transcript." Pg. 118, lines 16-19.

⁸ Aircraft Communication Addressing and Reporting System

Pushback was completed about 0609:48 (according to airport surveillance video) and the tow tractor operator turned the tractors headlights off. The tow tractor operator recalled telling the captain to set the brakes. The captain did so, confirmed that the brakes were set, and gave the ground crew *"permission to disconnect towbar."*⁹ The escort disconnected the towbar from the tow tractor.

Airport surveillance video showed the white rear-facing lights of the tow tractor illuminate, and the tow tractor backed up. These lights then extinguished, and the tow tractor moved forward to the left side of the airplane's nose. The tow tractor stopped there at 0610:21, and the escort pulled the towbar around to the rear of the tow tractor and secured it to the back of the vehicle. The tow tractor's headlights came back on after the tug came to a stop. They illuminated pavement behind the cockpit, along the left side of the airplane's fuselage.

According to the captain, the load closeout came as they were starting the No. 2 engine. The captain recalled finishing the last few steps of the QRH start procedure for the No. 1 engine after the towbar was disconnected. He then began a manual start on the No. 2 engine. The captain recalled that the No. 2 engine start took a bit longer than the No. 1 engine.

The FO recalled that the captain performed a manual start on the No. 1 engine and an auto start on the No. 2 engine. He recalled that the captain began the No. 2 engine after setting the parking brake. The FO told investigators that when the No. 2 engine *"started normalizing, I put my head back down and printed out the numbers and inserted the numbers into the MCDU"*¹⁰, until it was a normal start."¹¹

The captain recalled that after he successfully started the No. 2 engine, he told the ground crew *"disconnect headset and show us the pin on the lefthand side; have a good morning"*. The tow tractor operator recalled the captain saying, *"...you are clear. Everything's -- engines are clear to start. You guys have a good day."* The operator recalled replying, *"all right, cap. Clear to disconnect headset and you guys have a good day as well."*¹²

The captain told investigators he saw one of the ramp agents display the pin and its ribbon overhead with two hands. He recalled giving the ramp agent a salute in return but was unsure if the ramp agent saw him do it.

⁹ Source: Operational Factors/Human Performance - Attachment 1 - "Flight Crew Interview Transcripts" pg. 21 line 14.

¹⁰ Multi-function Control Display Unit.

¹¹ Source: Operational Factors/Human Performance - Attachment 1 - "Flight Crew Interview Transcripts" pg. 119, lines 7-9.

¹² Source: Operational Factors/Human Performance - Attachment 2 - "Maui Ground Personnel Interview Transcripts" pg. 34 line 1-2.

The captain estimated that the tow tractor was seven or eight feet from the side of the airplane, and the ramp agent was standing on the opposite side of the tow tractor, about 10 or 15 feet from the airplane. He recalled that it was difficult to see outside because of the rain and darkness, particularly with the cockpit dome light turned on. The captain could not recall whether the ramp agent “was male or female¹³” or whether the pin’s red ribbon was illuminated by the headlights of the tow tractor. The FO told investigators that from his vantage point he could not see the ramp agents or the tow tractor because they were obscured by aircraft structure.

The captain said that in practice, the escort would normally display the pin, the flight crew would salute, and the escort would salute in return. Asked whether he normally flashed the taxi light as well during this exchange (an action specified in the FCOM¹⁴), the captain said, “*That’s something that we usually do, and I didn’t do that on that time.*”¹⁵ He added, “I think I was just so saturated in helping out the FO inside, you know, with the numbers and clearance.” The FO said he was heads-down looking at the FMS and did not see whether the captain gave a hand signal to the ramp agents.

After receiving the captain’s clearance to disconnect the headset, the tow tractor operator recalled giving the escort a thumbs-up, indicating that he could disconnect the headset cable. The tow tractor operator next recalled seeing the escort remove the steering bypass pin, disconnect the headset cable, close the cable’s access panel door, walk to the passenger side of the tractor, and place the headset cable on the passenger seat. The tow tractor operator estimated that the escort then stood near the passenger side of the tow tractor and displayed the pin for about the next two minutes. Airport surveillance video showed the escort close the intercom access panel at 0612:42, approach the passenger’s side door of the tractor, and arrive there at 0612:45. The escort remained standing near the passenger side of the tractor for the next 1 minute 38 seconds.¹⁶ No lighted wands were visible in the video recording.

The escort told investigators that captains normally saluted him after he displayed the steering bypass pin, but he “*did not see [the captain]*”¹⁷ of HAL105 salute him on this occasion. He could see the captain moving around in the cockpit and it appeared as if the captain was performing checks and attending to the instruments in front of him.

¹³ Source: Operational Factors/Human Performance – Attachment 1 – “Flight Crew Interview Transcripts” pg. 44, lines 7-8.

¹⁴ Flight Crew Operations Manual. See Section 9.0 of this report for more detailed information.

¹⁵ Source: Operational Factors/Human Performance – Attachment 1 – “Flight Crew Interview Transcripts” pg. 51, line 7.

¹⁶ The tow tractor operator told investigators that it normally took less than 30 to 45 seconds to receive an acknowledgement. Source: Operational Factors/Human Performance – Attachment 2 – “Maui Ground Personnel Interview Transcripts” pg. 34, line 16.

¹⁷ Source: Operational Factors/Human Performance – Attachment 2 “Maui Crew Interview Transcripts” pg. 105, line 1.

The escort informed the tow tractor operator that he had not received a salute from the captain. The tow tractor operator recalled that she *"honked my horn...can't hear anything. I notice he didn't hear anything. So I held it down. ...Still nothing. So then I realized that I needed to get his attention."*¹⁸ She told investigators that she put the tractor in neutral, set the parking brake, stood on a step on the side of the tractor, and waved her hand at the cockpit, but the captain did not notice. She removed a work glove and tossed it above her head three or four times, but the captain still did not respond. These actions were not visible on the airport surveillance video. However, another taxiing airplane passed between airport surveillance cameras and the tow tractor for about 14 seconds (0613:38-0613:52) during the period when the tow tractor operator and the escort were waiting for a salute, obscuring the cameras' view.

After the captain completed his after-start flow, he remembered calling for the After Start checklist. The FO had finished verifying the weights from the load manifest, and he performed the After Start checklist with the captain, which the captain estimated took five to ten seconds to perform. The After Start checklist contained an item "ground salute." Investigators asked the FO whether the captain saluted the ramp agent when the FO read this item, or whether the captain had already done so. The FO said he did not know whether the captain provided the salute, but he recalled that the captain provided the correct verbal response when the FO read the checklist item.

The FO requested and received a taxi clearance from the tower and the captain turned off the cockpit dome light in preparation for taxi. Surveillance video indicates that the cockpit darkened at 0614:21. The tow tractor operator recalled seeing the cockpit darken and realizing that the airplane was about to taxi. The escort also noticed the cockpit darken and walked over to the driver's side of the tow tractor. The operator sat down in the cab, looked at the escort, and said that they needed to exit the area. The escort began to move away from the area on foot.

Investigators asked the captain if he looked out the left side of the cockpit and said, *"clear left"* in accordance with a required procedure in the Flight Operations Manual (FOM) before taxi.¹⁹ He stated, *"I do usually do that. On that day, I think I did say that, the left side clear, and then did the right side clear visually. And then -- yeah, I mean, like I said, it was kind of dark out there. I don't recall seeing anything on the left side."*²⁰

At 0614:28 (per the surveillance video), the airplane's taxi light illuminated, and one second later the airplane began to move forward. About 0614:30, the escort could be seen running away from the airplane toward the gate. The tow tractor operator

¹⁸ Source: Operational Factors/Human Performance – Attachment 2 "Maui Crew Interview Transcripts" pg. 35, lines 3-7.

¹⁹ See Section 9.0 of this report for further information.

²⁰ Source: Operational Factors/Human Performance – Attachment 1 – "Flight Crew Interview Transcripts," pg. 52, line 16-18.

recalled that she released the parking brake, put the tractor in forward gear, and tried to drive away from the airplane. About 0614:36 on surveillance video, the tow tractor began to move forward, toward the approaching left wing of the airplane. About 0614:38 the airplane's left wing impacted the tow tractor's frame, roof, and the frame of its front window, and the airplane's left main landing gear tires impacted the towbar.

The captain recalled that the airplane *"started bouncing and we weren't moving."*²¹ The FO recalled a *"tug that happened which didn't feel normal."*²² The captain set the parking brake and asked the FO to inform the tower that they would not be taxiing and they *"might have an issue."*²³ The captain tried unsuccessfully to contact the ramp by radio. About 0616:16 (according to surveillance video) a ramp agent came to the captain's cockpit side window and informed him that the airplane had struck the tow tractor.

A timeline of events derived from airport surveillance video is provided below.

Table 1: Timeline of Events

Video Time Stamp	Event Description
0608:33	Pushback begins
0609:48	Pushback stops
0609:53	Escort appears to remove towbar from front of tow tractor
0609:58-6:10:21	Tow tractor moves forward, parks on left side of HAL105's nose
0610:33-53	Escort attaches towbar to rear of tow tractor
0610:53-6:12:43	Escort disappears from view between the tow tractor and HAL105
0612:25-29	A light inside tow tractor cab temporarily illuminates
0612:42	Escort closes HAL105's intercom access panel
0612:42-45	Escort walks in front of tow tractor headlights from left to right
0612:45-6:12:53	Escort stands next to passenger side door of tow tractor
0612:53-13:16	Escort stands near front right corner of tow tractor
0613:16-6:14:23	Escort moves slightly ahead of the tow tractor
0613:38-0613:52	Another taxiing airplane temporarily blocks view of HAL105 and tow tractor
0614:21	HAL105's cockpit dome light is extinguished
0614:23	Escort moves toward driver's side door of the tow tractor
0614:28	HAL105 taxi light turns on
0614:29	HAL105 begins to move forward
0614:30	Escort begins to walk away from the area

²¹ Source: Operational Factors/Human Performance – Attachment 1 – "Flight Crew Interview Transcripts" pg. 23 , line 5-8.

²² Source: Operational Factors/Human Performance – Attachment 1 – "Flight Crew Interview Transcript" pg. 97, lines 5-6.

²³ Source: Operational Factors/Human Performance – Attachment 1 – "Flight Crew Interview Transcript," pg. 23, line 11.

0614:36	Tow tractor begins to drive forward
0614:38	HAL105 impacts tow tractor

3.0 Pilot Information

The flight crew consisted of a captain and FO. According to the flight crew interview transcripts, the captain was going to be the pilot flying (PF) and the FO was going to be the pilot monitoring (PM). The crew was composed of two pilots and three flight attendants.

3.1 Captain

The captain, age 29, held an Airline Transport Pilot (ATP) certificate with a rating for multiengine land, commercial pilot privileges for airplane single-engine land, and type ratings on the B-757²⁴, B-767, DC-9²⁵. He held an FAA first-class medical certificate dated March 8, 2023 with limitations of *"Must use corrective lens(es) to meet vision standards at all required distances."*

3.1.1 Captain's Certification Records

FAA Records of the captain indicated the following certificate history:

Notice of Disapproval - Private Pilot - Single-Engine Land - Airplane was issued on September 4, 2018. Unsatisfactory item: *"Flight planning unsat. All other areas not graded."* Number of failures: 1.

Notice of Disapproval - Private Pilot - Single-Engine Land - Airplane was issued on September 14, 2018. Unsatisfactory item: *"Steep turns - unsat. All other areas not graded."* Number of failures: 2.

Private Pilot - Airplane Single-Engine Land; Limitation: English Proficient certificate was issued on September 21, 2018.

Notice of Disapproval - Private Pilot - Single-Engine Land- Instrument - Airplane was issued on December 19, 2018. Unsatisfactory item: *"Flight planning - unsat, flight portion not graded."* Number of failures: 1.

Private Pilot - Airplane Single-Engine Land; Instrument Airplane; Limitation: English Proficient certificate was issued on January 18, 2019.

²⁴ The Boeing Company, 757-200 Series, 757-200PF Series, 757-200CB Series, 757-300 Series, 767-200 Series, 767-300 Series, 767-300F Series, 767-400ER Series, 767-2C Series. Source: FAA Order 8900.1, Figure 5-88, dated March 29, 2024.

²⁵ The Boeing Company, DC9-11, DC-9-12, DC-9-13, DC-9-14, DC-9-15, DC-9-15F, DC-9-21, DC-9-31, DC-9-31, DC-9-32F, DC-9-33F, DC-9-34, DC-9-34F, DC-9-41, DC-9-51, DC-9-81, DC-9-82, DC-9-83, DC-9-87, MD-88, MD-90-30, 717-200. Source: FAA Order 8900.1, Figure 5-88, dated March 29, 2024.

Commercial Pilot - Airplane Single-Engine Land; Airplane Multiengine Land; Instrument Airplane; Limitation: English Proficient certificate was issued September 21, 2020.

Flight Instructor - Airplane Single-Engine certificate issued October 12, 2019.

Flight Instructor - Airplane Single-Engine; Instrument - Airplane certificate was issued May 15, 2020.

Flight Instructor - Airplane Single-Engine; Airplane Multiengine; Instrument - Airplane certificate was issued December 11, 2020.

Airline Transport Pilot - Airplane Multiengine Land; B-757, B-767; Commercial Privileges Airplane Single-Engine Land; ATP CIRC APCH - VMC Only; B-757, B-767 Circ Apch- VMC Only; The B-757, B-767 is subject to Pilot-in-Command Limitation(s) certificate was issued June 8, 2021.

Ground Instructor - Instrument certificate was issued January 6, 2022.

Airline Transport Pilot - Airplane Multiengine Land; B-757, B-767, DC-9; Commercial Privileges Airplane Single-Engine Land; Limitations: English Proficient; ATP CIRC APCH - VMC Only; B-757, B-767, DC-9 Circ Apch- VMC Only certificate was issued August 9, 2022.

3.1.2 Captain's Training and Proficiency Checks

The following training record information, for the captain, was provided by the captain during his interview and Hawaiian Airlines:

Date of Hire with Hawaiian Airlines	June 1, 2022
Initial Qualification -B717	September 3, 2022
Most Recent Ground Training - Captain Upgrade	August 15, 2023
Most Recent Procedures Validation	August 18, 2023
Most Recent Line Check	September 14, 2023
Most Recent Initial Operating Experience ²⁶	September 14, 2023
Most Recent FAA Observation	September 14, 2023
Most Recent Flight Training	August 25, 2023
Most Recent Line Operating Experience (LOE)	August 25, 2023

²⁶ Initial Operating Experience (IOE) was completed on September 14, 2023 and followed on the same day with a line check. IOE was accomplished with 14:43 minutes of flight experience and 12 landings.

3.1.3 Captain's Flight Times

The captain's approximate flight times were based on interview transcripts and Hawaiian Airlines' records:

Total Flight Experience	3,300
Total Flight Experience B-717	1,200

3.1.4 Captain's 72-Hour History

The captain estimated that he needed 7 to 8 hours of sleep per night to feel rested when he was off duty for an extended time and not working. He provided the following information about his recent sleep and activities.

On November 27, the captain estimated that he woke about 0430. He reported for duty at 0525, operated five flights (3 hours 32 minutes total flight time), and went off duty at HNL about 1200. He estimated that he went to sleep between 2100 and 2130.

On November 28, the captain woke about 0530. He engaged in routine activities at home. He was on reserve duty from 0500 to 1700. He did not operate any flights that day but he was assigned a trip that would start the following day. He recalled going to sleep between 2100 and 2130.

On November 29, the captain woke between 0415-0430. He reported for work about 0500, operated five flights with the FO (3 hours 56 minutes total flight time), and went off duty about 1230 at OGG. He recalled going to sleep at a hotel in Kahului between 2030 and 2100.

On November 30, the captain woke about 0445. He recalled sleeping well and feeling good that morning. He recalled arriving at OGG before his scheduled report time but could not recall what time that was. The first officer recalled that the captain seemed friendly, calm and alert. November 30 was the captain's last day of work before taking a vacation.

²⁷ Crew Resource Management training was part of the captain's initial new hire training, there was no logged training of CRM in the training report provided by Hawaiian.

3.1.5 Perceptions of the Captain's Proficiency

The FO stated that the captain was “a good captain” and a “proficient pilot.” With respect to CRM, he believed the captain was “more on the shy side,” but still “very assertive [about] his decision making.” He added that the captain would listen to input from him as an FO and “combine what we both have to say and come up with the best plan of action.”

3.2 First Officer

The FO, age 35, held an Airline Transport Pilot (ATP) certificate with a rating for multiengine land, commercial pilot privileges for airplane single-engine land, and type ratings on the CL-65²⁸, DC-9. He held an FAA first-class medical certificate dated November 3, 2022 with limitations of “None.”

3.2.1 First Officer's Certification Records

FAA records on the FO indicated the following certificate history:

Private Pilot - Airplane Single-Engine Land; Limitation: English Proficient certificate was issued on January 29, 2019.

Notice of Disapproval - Private Pilot - Instrument - Airplane was issued on June 26, 2019. Unsatisfactory items: “Non-precision approach - VI A S3, S5, S8, S10 S11 - Applicant failed to tune proper heading into OBS and descended below MDA. Descent Rate +1300 feet. Missed approach - Applicant used wrong VOR.” Number of failures: 1.

Private Pilot - Airplane Single-Engine Land; Instrument Airplane; Limitations: English Proficient certificate was issued on July 6, 2019.

Commercial Pilot - Instrument Airplane; Airplane Single-Engine Land; Limitations: English Proficient certificate was issued November 23, 2020.

Commercial Pilot - Airplane Single-Engine Land; Airplane Multiengine Land; Instrument Airplane; Limitations: English Proficient certificate was issued February 10, 2022.

Airline Transport Pilot - Airplane Multiengine Land; CL-65; Commercial Pilot Privileges; Airplane Single-Engine Land; Limitations: English Proficient; The CL-65 is subject to

²⁸ Bombardier Inc., CL-600-2B19, CL-600-2C10, CL-600-2D24, CL-600-2D15. Source: FAA order 8900.1, Figure 5-88, dated March 29, 2024.

Pilot-in-Command Limitation(s); ATP Circ. APCH - VMC Only; CL-65 Circ. APCH - VMC Only certificate was issued October 6, 2022.

Airline Transport Pilot - Airplane Multiengine Land; CL-65, DC-9; Commercial Pilot Privileges; Airplane Single-Engine Land; Limitations: English Proficient; The CL-65 is subject to Pilot-in-Command Limitation(s); ATP Circ. APCH - VMC Only; CL-65, DC-9 Circ. APCH - VMC Only certificate was issued July 6, 2023.

3.2.2 First Officer's Training and Proficiency Checks

The following training record information, for the FO, was provided by Hawaiian Airlines:

Date of Hire with Hawaiian Airlines	April 18, 2023
Initial Qualification -B717 ²⁹	August 2, 2023
Most Recent Ground Training	May 8, 2023
Most Recent Procedures Validation ³⁰	June 20, 2023
Most Recent Initial Operating Experience ³¹	August 2, 2023
Most Recent Flight Training	June 27, 2023
Most Recent Line Operating Experience (LOE)	July 6, 2023
Most Recent Crew Resources Management (CRM) ³²	May 9, 2023

3.2.3 First Officer's Flight Times

The FO's approximate flight times were based on interview transcripts and Hawaiian Airlines' records:

Total Flight Experience ³³	2,000
Total Flight Experience B-717	233
Flight Experience Preceding 24 Hours	3:56
Flight Experience Preceding 7 Days	18:49
Flight Experience Preceding 30 Days	66:52
Flight Experience Preceding 90 days	179:23

²⁹ The qualification was based on the successful completion of his line check following the completion of his initial operating experience (IOE)

³⁰ Training records indicate that on June 12, 2023 the FO had conducted an initial procedures validation however it was listed as "U" for unsatisfactory.

³¹ Initial Operating Experience (IOE) was completed on August 2, 2023 and followed on the same day with a line check. IOE was accomplished with 27:03 minutes of flight experience and 21 landings.

³² Crew Resource Management training was part of the initial new hire training.

³³ Source: Operational Factors/Human Performance - Attachment 1 -"Flight Crew Transcripts"; pg. 91 lines 17-25. FAA Form 8710-1 dated October 1, 2022 the pilot reported 1,538.9 total hours of flight experience and 1,416.4 hours as pilot-in-command.

3.2.4 First Officer's 72-Hour History

The FO said he normally slept 6.5 to 7.5 hours per night when he was off duty for an extended period. He provided the following information about his recent sleep and activities.

On November 27 he woke at a layover hotel in Lihue, Hawaii about 0630. He reported for duty at Lihue Airport (LIH) at 0859. He operated seven flights and went off duty at 1900. He had a 20 to 25-minute drive home. He could not recall what time he went to sleep.

On November 28 he estimated that he woke between 0600-0615. He was off duty. He was at home and could not recall his activities. He went to sleep between 2000-2030.

On November 29 he woke between 0345-0400. He drove from his residence to HNL and reported for duty at 0530. It was the first day of a two-day trip with the captain. They operated five flights and ended their workday at OGG. The FO went to a layover hotel. He estimated that he went to sleep between 2100-2130.

On November 30 he woke at 0430. He felt like he had slept well. He recalled meeting the captain in the hotel lobby at 0515. The captain recalled that the FO appeared alert and relaxed.

3.2.5 Perceptions of the First Officer's Proficiency

The captain stated that he had been the FO's flight instructor when the FO was undergoing general aviation flight training in Honolulu, and he knew him well. He thought the FO's proficiency as a pilot was *"pretty good."* He had a feeling of camaraderie with the FO and was comfortable flying with him. He stated that during preparation for departure on the accident flight, *"it was a bit saturated... with MELs, air traffic control's clearance and whatnot. But... [the FO] was doing a really good job with that."*

4.0 Airplane Information



Figure 1: Incident Airplane (Source: JetPhotos.com)

The aircraft was a B717-200, Serial No. 55182 and was manufactured in 2004. It was powered by two Rolls-Royce, BR700-715C1-30, turbo fan engines, each capable of producing 21,430 lbs. of thrust. The aircraft was owned by BCC Equipment Leasing Corporation and operated by Hawaiian Airlines, Inc.



Figure 2. Tow tractor connected to the airplane. (Not the accident flight)

During pushback, the airplane was connected to the tug by a metal towbar. A coiled headset communications cable stretched from the tow tractor to an access panel

on the nose of the airplane where the cable was plugged into the flight crew's interphone system.



Figure 3. Nose gear steering bypass pin.



Figure 4. A ramp agent displaying the pin and ribbon with a lighted wand. (Not the accident agent)

The airplane's nose gear steering bypass pin was a small metal part with an attached red ribbon approximately two feet in length.

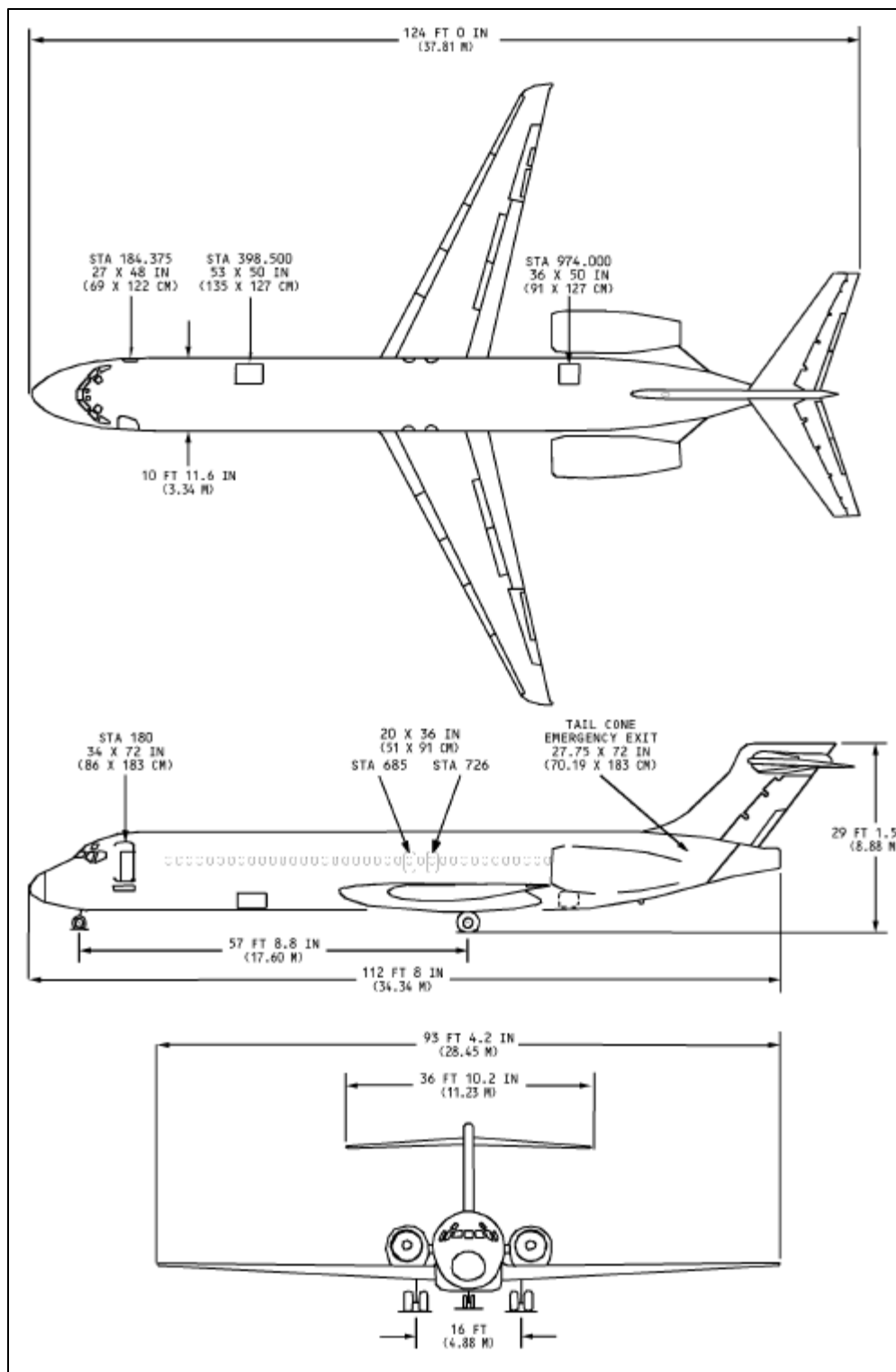


Figure 5: B717 Aircraft Dimensions

4.1 Dispatch Record

According to the dispatch release the flight was scheduled to be 23 minutes in duration and the airplane had two MEL³⁴ items associated with it. The MEL items³⁵ were M33-41-01E *"wing landing light extend/retract system light retracted"* issued November 29, 2023, at 2231 HST and M80-11-03, *"auto starter control system"* issued November 29, 2023, at 0751 HST.

4.2 Weight and Balance

The following weight and balance information was taken from the dispatch release and the final load sheet time stamped at 0610. Limitations are indicated in **bold** type. All weights below are in pounds (lbs.).

Zero Fuel Weight	95,147
Maximum Zero Fuel Weight	100,500
Ramp Fuel	10,600
Ramp Weight	105,747
Taxi Fuel	200
Takeoff Fuel	10,400
Maximum Taxi Weight	115,000
Takeoff Weight	105,547
Maximum Takeoff Weight	114,000
Planned Enroute Fuel Burn	2,149
Planned Landing Weight	103,398
Maximum Landing Weight	110,000

5.0 Airplane Tow Tractor Information

The airplane tow tractor was a TMX-350 manufactured by TLD. According to the manufacturers website³⁶ towing tractor was designed to perform push and pull operations for up to 300 tons. The TMX-350 gross weight was between 53,000 lbs. and 61,600 lbs. depending on the model. The manufacturer had a standard specifications; however, most tow tractors were built per a specification provided by the purchaser (see figure 7 for the TMX-350 catalog data sheet for the standard dimensions). It featured a Cummins QSB4.5 4-cylinder turbo diesel engine, with a powershift transmission with torque converter. The maximum speed when empty was 15 mph forward and 3 mph in reverse. The event model had only front wheel hydraulically-powered steering. The 24-volt DC electrical system powered 10 items of which front head lights, rear LED lights, stop LED lights, flashing beacon and hazard lights were among those items.

³⁴ Minimum equipment list.

³⁵ MEL item's date and time of issuance was based on Zulu time which was HST+10 hours.

³⁶ Source: [TLD TMX-350 Aircraft Towing Tractor - AERO Specialties](#)



Figure 6: Tow Tractor. Note that the exemplar vehicle in this photo does not have a front hitch with a 2.7 diameter tow pin nor does it have a rotating amber beacon mounted on the roof of the cab, both of which the event tow tractor had. (Source: Aero Specialties Website)

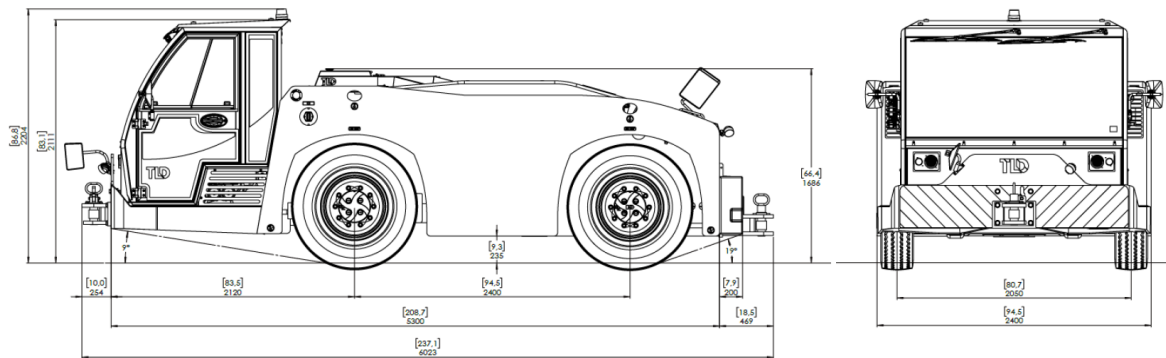


Figure 7: Approximate dimensions of a TMX-350 Tow-Tractor (Source: TLD datasheet)

A rotating wand allowed the operator to turn the tow tractors headlights on and off, and a button on the tip of the wand activated the vehicle's horn (figure 8).



Figure 8: Wand control for the vehicle's headlights with a horn button on the tip.

A dashboard rocker switch panel allowed the operator to turn on or off the front and rear tow pin spotlights, front and rear wipers, a rotating amber beacon, and hazard lights (figure 9). An icon on each switch was illuminated by a blue light. When a switch was turned on, a green LED light embedded in the switch became illuminated. When the switch was selected off, the green LED light was extinguished.



Figure 9: Switch panel on the dashboard of the tow tractor. In this photo, the front tow pin spotlight, rear tow pin spotlight, and rotating beacon are selected on.

The FAA classifies pushback tractors as aircraft support vehicles and requires those operated in airport movement areas to have a yellow flashing light mounted on the uppermost part of the vehicle structure.^{37, 38} The yellow flashing light must be “visible from any direction, day and night, including from the air. The tow tractor’s rotating amber beacon met this requirement.

U.S. Department of Transportation Regulations pertaining to the state of Hawaii specify that “Any vehicle proceeding onto the movement area [of an airport] between the hours of sunset and sunrise except those being escorted shall also operate an overhead flashing light which is visible for one mile.”³⁹ The yellow flashing light is required to increase the conspicuity of ground vehicles and to aid their detection by other airport personnel.

The tow tractor operator said they believed the light was operating during the pushback of HAL105. They said the light activated automatically whenever the tractor was “in motion” and deactivated when the tractor was “turned off.” Neither a ramp agent who served as a wing walker during the pushback nor the flight crew of HAL105 could recall whether the light was illuminated. Airport surveillance video indicated that it was not.

During a night observation at Kahului airport (OGG), investigators assessed the visibility of the tow tractor from the captain’s eye position inside the cockpit of a B717 when the tow tractor was parked in a location similar to that observed on the airport surveillance video.⁴⁰ With the amber beacon selected ON the tow tractor was conspicuous in the investigator’s peripheral vision. With the beacon selected OFF, the tow tractor was low-contrast and difficult to see without focused visual attention.

6.0 Airport Information

Kahului International Airport was located about 3 miles east of Kahului, HI, had a field elevation of 55.4 ft msl, and was located at latitude/longitude of

³⁷ According to 14 CFR Part 139.5 “Definitions”, the movement area encompasses “the runways, taxiways, and other areas of an airport that are used for taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and aircraft parking areas.”

³⁸ FAA Advisory Circular No. AC 150/5210-5D, April 1, 2010, p. 5. The Advisory Circular states: “The Federal Aviation Administration (FAA) recommends the guidelines and standards in this Advisory Circular for vehicles operating in the airport AOA. In general, use of this AC is not mandatory. However, use of this AC is mandatory for vehicles funded with federal grant monies through the Airport Improvement Program (AIP) and/or with revenue from the Passenger Facility Charges (PFC) Program. See Grant Assurance No. 34, “Policies, Standards, and Specifications,” and PFC Assurance No. 9, “Standard and Specifications.”

³⁹ *Amendment and Compilation Chapter 19-15.1 Hawaii Administrative Rules* dated February 19, 2004, §19-15.1-31 *Operational area; vehicle operations in movement areas.*

⁴⁰ See Attachment X to the Operations and Human Performance Factual, Night Ground Handling Observation at Kahului Airport.

N20°53.55'/W156°25.49'. The airport was owned by Hawaii State Airports Division and was serviced by an FAA Air Traffic Control Tower (ATCT) that was in operation from 0600-0000 and was operating at the time of the incident. The ATCT was located approximately 3,800 ft east-northeast of gate 17.

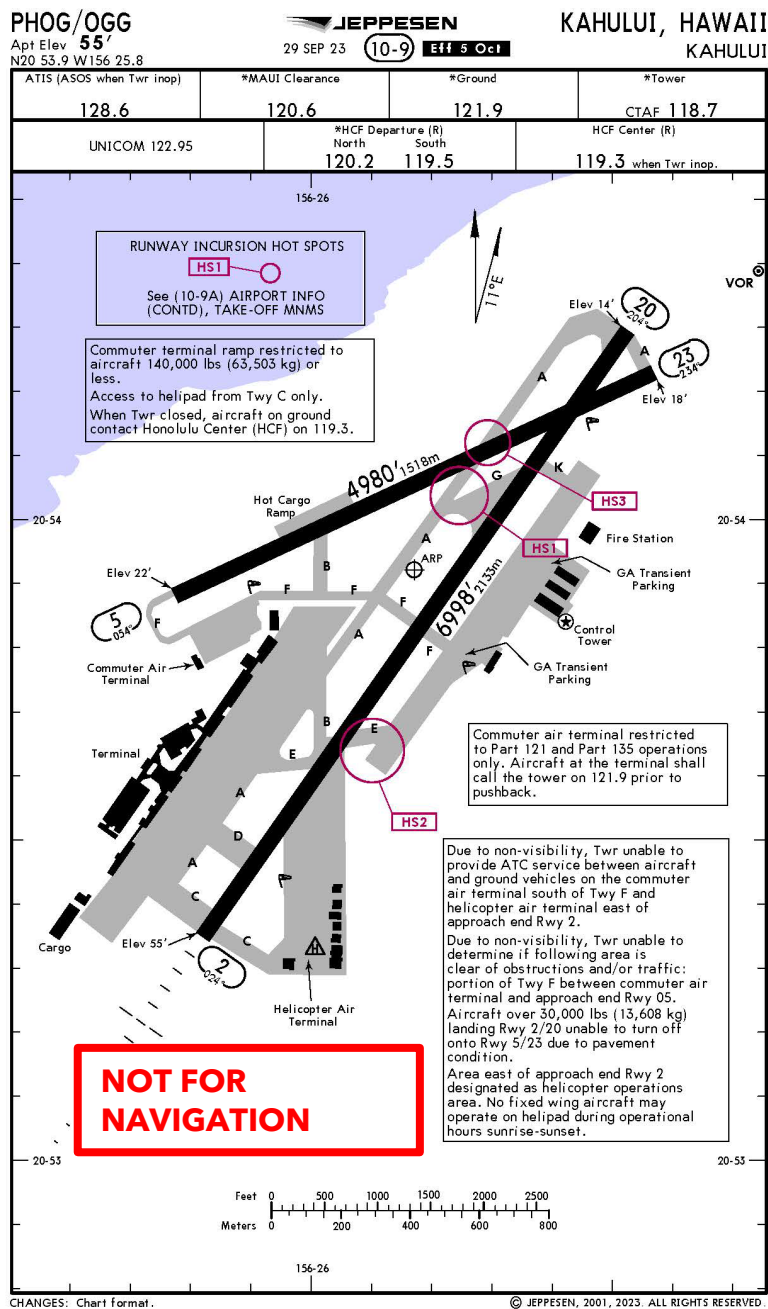


Figure 10: Kahului Airport Diagram (Source: Jeppesen)

6.1 Terminal Main Ramp Gates

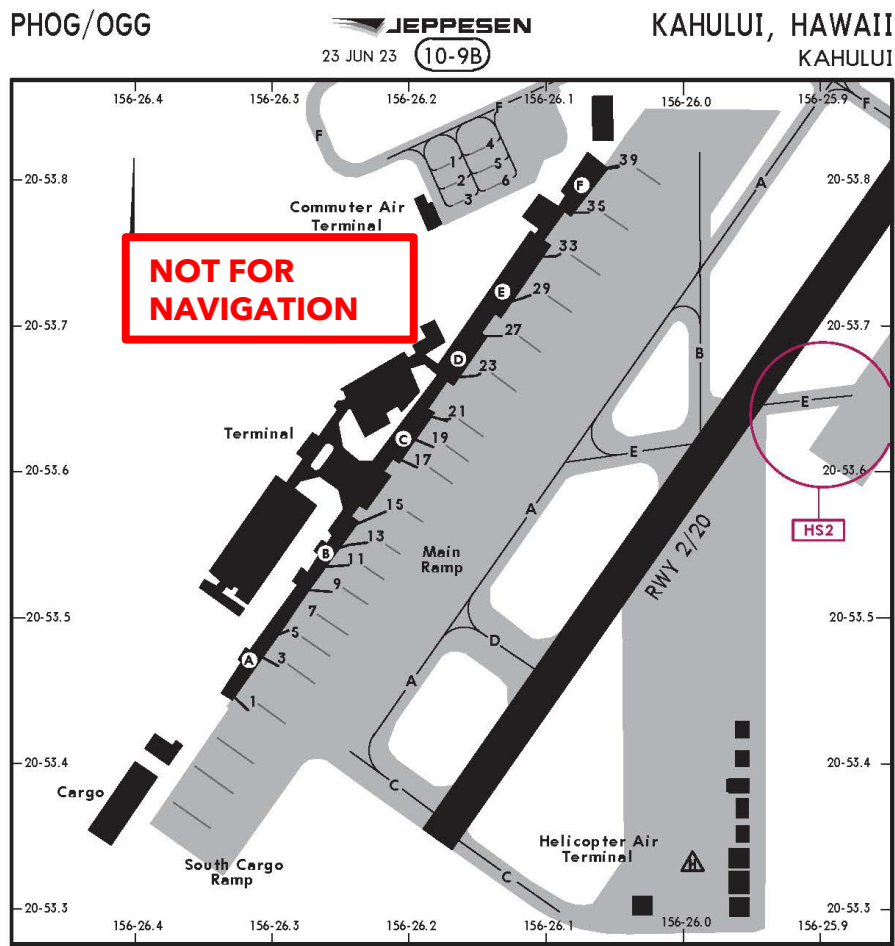


Figure 11: Terminal Ramp Gate Locations Diagram (Source: Jeppesen)

The event airplane was parked at and pushed from Gate 17. During the pushback, the tow tractor pushed the airplane so the tail was pointed towards the south southwest and parallel to runway 2/20. The pushback resulted in the captain's side of the airplane being closest to the terminal.

6.2 Airport NOTAM

The following were NOTAMs⁴¹ that were in effect at the time of the event:

OGG LTA-OGG-11 LTA 05/13/2022 1603 05/17/2022 1200 05/17/2024
1200 Areas of Non-Visibility
OGG LTA-HCF-81 LTA 11/17/2022 1517 11/29/2022 1200 11/29/2024
1200 Practice Instrument Approaches at Kahului Airport

⁴¹ Notice to Air Mission

OGG LTA-HCF-85 LTA 11/22/2022 1523 12/11/2022 1200 12/11/2024
1200 FAA Aircraft Wake Turbulence Re-Categorization (RECAT)
Consolidated Wake Turbulence Radar Separation Standards (CWT)
Implementation
OGG LTA-OGG-13 LTA 08/28/2023 2312 08/29/2023 1200 08/29/2025
1200 Helicopter Air Terminal VFR Arrival and Departure Routes, Kahului
Airport, Kahului, Maui, HI
OGG LTA-HCF-89 LTA 11/02/2023 2048 11/04/2023 1200 11/04/2025
1200 VFR Aircraft Operations within HNL Class B Airspace

There were no NOTAMs in effect that would affect the ramp area where the event occurred.

7.0 Meteorological Information

The most recent recorded weather, prior to the incident, was the PHOG METAR which recorded the following:

METAR PHOG 301754Z 01004KT 10SM FEW020 23/22 A2999 RMK AO2 RAE49
SLP160 P0000 60001 T02280222 10233 20217 51017=

METAR PHOG 301654Z 35005KT 10SM -RA SCT110 23/22 A2998 RMK AO2
RAB47 SLP158 P0001 T02330222=

Incident Event

METAR PHOG 301554Z AUTO 28005KT 7SM BKN110 23/22 A2996 RMK AO2
SLP150 T02330222 TSNO=

METAR PHOG 301454Z AUTO 28006KT 10SM FEW120 23/22 A2994 RMK AO2
SLP143 T02280217 53001 TSNO=

At the time of the incident official sunrise was at 0645:06 and dawn was 0621:31 and the sun was 7.73° below the horizon⁴².

8.0 Hawaiian Airlines

According to the Hawaiian Airlines website⁴³ the airline was incorporated on January 30, 1929 under the name Inter-Island Airways Ltd. with the first scheduled flight being operated on November 11, 1929. The airline began operating passenger flights aboard a DC-9-10 in 1966 and then added the DC-9-50 in 1975. Hawaiian began

⁴² Source: [SunCalc - sunrise, sunset, shadow length, solar eclipse, sun position, sun phase, sun height, sun calculator, sun movement, map, sunlight phases, elevation, Photovoltaic system, Photovoltaic](#)

⁴³ Source: [History | Hawaiian Airlines](#)

operating scheduled service to the South Pacific in 1984 and the Transpacific flights in 1985. In 2001 Hawaiian began replacing the DC-9 with B-717 airplanes.

According to the Hawaiian Airlines general fact sheet, as of February 2024 they had 7,380 employees with an average of 225 daily flights based on the approximate average for the first quarter of 2024, to five island destinations which comprised of about 150 flights per day, 15 north American destinations and 10 international destinations. The airline has a total of 61 airplanes with 19 of those airplanes being the Boeing 717.

8.1 Safety Management System

A Hawaiian Airlines senior manager of airport operations safety stated that the Hawaiian Airlines corporate safety team was led by the company's chief executive officer (CEO). The CEO oversaw the chief operating officer (COO). The COO oversaw the managing director of corporate safety. The managing director of corporate safety oversaw the director of safety management systems (SMS). The director of SMS oversaw SMS managers in each of the following operational departments: airport, cargo, flight, in-flight, tech ops, and dispatch. Each of these SMS managers reported to a supervisor in their operational department but also provided safety-related information to the director of SMS. The senior manager of airport operations safety said the airline's SMS was designed to support safety policy, safety risk management, safety assurance, and safety promotion.

The senior manager of airport operations safety described how SMS was used to manage risk in airport operations. He said that if the airline implemented a new system, revised an existing system, developed new operational procedures, or identified ineffective risk controls, safety personnel worked to identify related risks. Risks identified were classified by severity and given a color coding. Risks classified as green (minor severity) were managed by the manager of SMS for airport operations. Risks classified as yellow (moderate severity) were managed by the vice president of airport operations. Risks classified as orange or red (serious risks) were managed by an integrated safety review board chaired by the COO and facilitated by the director of SMS. The company's Ground Service Manual (GSM) contained policies and procedures for ground personnel to follow. Changes to policies or procedures might be proposed, and these would be analyzed through a safety risk analysis (SRA) process. The SRA process led to the development of a safety risk management (SRM) plan. SMS managers and subject matter experts from relevant operational departments were involved in the development of such plans. After an SRM plan was implemented, a safety assurance phase began. This involved monitoring the effectiveness of the plan for 90-days.

Safety assurance tools used as part of the airport operations SMS included observations of monthly ground observations performed by airport operations

management. These inspections were performed using a checklist. Airport operations had a confidential hazard reporting system known as Ground Safety Improvement Program (GSIP). Flight operations had a similar reporting system known as Pilot Safety Action Program (PSAP) and technical operations had a system called Maintenance Safety Action Program (MSAP). These reports were analyzed by Hawaiian Airlines event review committees (ERCs). Hawaiian Airlines intended to combine these reporting systems into a single system known as Hawaiian Airlines Safety Action Program (HSAP), but that had not yet taken place. Managers also filed mandatory safety reports for events involving accidents, damage, or injuries through a reporting system called Intellex.

Accidents involving ground service personnel were typically investigated by corporate airport operations safety, assisted by personnel from the affected station. A Hawaiian Airlines investigation of the flight 105 accident was performed by two investigators from airport operations safety in cooperation with two airport operations managers from the Maui base (the base director and one operational manager). This investigation identified a lack of compliance with some operational procedures, and a lack of clarity in company manuals. According to the senior manager for airport operations safety, the GSM specified that after the headset cable was disconnected ground service personnel were supposed to relocate the tow tractor one wingspan from the fuselage and 45 degrees forward of the cockpit before they displayed the nosewheel steering pin. Hawaiian Airlines found that ground crews had been displaying the pin next to the cockpit and saluting the flight crew without first relocating the tug. Hawaiian Airlines determined that this practice, which the senior manager of airport operations described as evidence of “procedural drift” could be addressed through clearer guidance and training. They subsequently issued an alert, began meeting with ground personnel at each base to discuss the existing procedure, and reviewed ground service training materials to see how they could be improved.

The airport operations safety team had also coordinated with the airline’s flight operations department to ensure that there was no discrepancy between the GSM and the flight operations manual (FOM) regarding how pilots and ground service personnel were to coordinate during pushback. The FOM (but not the GSM) stated that the flight crew was supposed to flash the taxi light before ground service personnel provided a salute and departed with the tug. In practice, this was not consistently happening. During the NTSB’s investigation, the Hawaiian Airlines airport operations and flight operations departments were in the process of examining the FOM to determine if its language could be clarified. Specifically, they were considering whether the instructions should be modified to indicate when the crew should flash the taxi light during the final interaction with ground personnel (such as when low visibility conditions existed).

9.0 Relevant Flight Operation Procedures - Hawaiian Airlines

9.1 Manual Engine Start Procedure

The Hawaiian Airlines - Quick Reference Checklist, Revision 35, dated July 15, 2023 provided the following checklist in regard to "Manual Engine Start Procedure:"

NOTE: For the expanded version of this procedure, see FCOM page SP.80.10.

CAUTION: Auto Abort protection is not available during a manual start. During the start, it is the responsibility of the crew to monitor engine parameters for start exceedances. In the event of start exceedance, start must be manually aborted.

START CHECKLISTCOMPLETE
IGNITION switch..... ON
ENG START switchPULL
Engine must be motored for 30 seconds at 19% N2 or greater.
TGTVERIFY LESS THAN 150°C
FUEL Switch..... ON
TGT Rises
Discontinue start if necessary to prevent exceeding the 700°C TGT limit.
N2 APROXIMATELY 39%
Observe the ENG START switch retracts and switch light extinguishes.
Ground Idle RPM
Verify N1 and N2 indications stabilize at ground idle RPM. TGT and ENG OIL quantity/pressure indicate in normal range.
IGNITION SwitchAUTO

9.1.1 Manual Engine Start Procedure - Expanded Checklist

The Hawaiian Airlines, 717 Flight Crew Operating Manual, "Supplemental Procedures - Eng/APU," revision 49, dated August 1, 2023 provided the following expanded checklist (**emphasis** in original) for a "manual engine start procedure:"

CAUTION: Auto Abort protection is not available during a manual start. During the start, it is the responsibility of the crew to monitor engine parameters for start exceedances. In the event of start exceedance, start must be aborted.

Failure to observe the following may result in an engine fire:

- **If tailwind component is 10 knots or greater, delay moving FUEL switch to ON position until there is an indication of increasing N1 rotation.**
- **If winds are greater than 30 knots, the airplane must be positioned into the wind (± 10 degrees).**

- **If the airplane cannot be positioned into the wind and the tailwind component is greater than 25 knots or if indications of increasing N1 cannot be attained, coordinate with ground crew and deploy thrust reversers to idle reverse. (Ground crew must activate override circuitry to allow reverser deployment prior to engine start). When at ground idle RPM, stow thrust reversers.**

START Checklist COMPLETE
 IGNITION Switch ON
 ENGINE START Switch. PULL

Pull ENG START switch and observe switch light illuminates.

Engine must be motored for 30 seconds at 19% N2 or greater.

NOTE: If ENG START switch will not remain latched, pull and hold ENG START switch and observe N₂ rotation.

TGT VERIFY LESS THAN 150°C
 FUEL Switch ON

Move the FUEL switch to ON and call "FUEL ON." Confirm the FUEL switch is firmly latched in the ON position by jiggling the switch and pushing down. Observe oil pressure rising. Observe normal fuel flow indication when the FUEL OFF message is extinguished.

NOTE: With the incorporation of SB 717-30A0009, the following alerts will be displayed with a MASTER CAUTION light when either fuel switch is selected to ON and the Air Data Heat (ADH) switch is OFF:

- PITOT AUX FAIL
- PITOT CAPT FAIL
- AOA HEAT R FAIL
- AOA HEAT L FAIL

The following alerts will also be displayed on the Systems Display (SD) after pushing the STATUS cue switch on the System Control Panel (SCP):

- STATIC R HEAT
- STATIC L HEAT

The RUDDER PITOT FAIL will be displayed only after pushing the MISC cue switch on the SCP.

TGT Rises

Call "TGT" when temperature indication increases.

Discontinue start if necessary to prevent exceeding the 700° TGT limit.
CAUTION: If TGT does not rise within 10 seconds after initial indication of fuel flow, discontinue start.

N2 APPROXIMATELY 39%

Observe the ENG START switch retracts and switch light extinguishes.
 NOTE: If ENG START switch is manually being held open, release.

Ground Idle Rpm

Verify N₁ and N₂ indications stabilize at ground idle rpm. TGT and ENG OIL quantity/pressure indicate in normal range.

IGNITION Switch AUTO

9.1.2 MEL 33-41-01E

According to the Hawaiian Airlines B717 Minimum Equipment List dated April 30, 2022 MEL 33-41-01E was as follows:

NUMBER INSTALLED				NUMBER REQUIRED FOR DISPATCH		
REPAIR CATEGORY				CREW PLACARDING		
ITEM NO.	NAME/DESCRIPTION					REMARKS OR EXCEPTIONS
33-41-01E	Wing Landing Light Extend/Retract System	C	2	0	N	(M) May be inoperative provided: a) Associated Landing Light is not used, and b) Associated Landing Light is secured RETRACTED.

Figure 12: B717 MEL 33-41-01E - Wing Landing Light Extend/Retract System

9.1.3 MEL 80-11-03

According to the Hawaiian Airlines B717 Minimum Equipment List dated April 30, 2022 MEL 80-11-03 was as follows:

NUMBER INSTALLED				NUMBER REQUIRED FOR DISPATCH	
REPAIR CATEGORY				CREW PLACARDING	
ITEM NO.	NAME/DESCRIPTION				REMARKS OR EXCEPTIONS
80-11-03	Auto Starter Control System	C	2	0	Y (O) Automatic Start System may be inoperative provided manual start procedures are used.

PLACARD

Maintenance Logtbook cover with HAL 46-1333b.

OPERATIONS PROCEDURES (O)

- If circuit breaker for affected Ignitor is not pulled, Auto Engine Start will not be available. Start engine per Manual Starting procedure from FCOM, SP.80.4
 - START Checklist.....ACCOMPLISH
 - IGNITION SwitchON
This initiates a manual ground start sequence and provides continuous power to the ignitors.

CAUTION: THE AUTOMATIC ABORT CAPABILITY OF THE ENGINE IS INHIBITED WITH THE IGNITION SWITCH IN ON. IN THE EVENT OF A STARTING ANOMALY OR EXCEEDANCE, THE START MUST BE MANUALLY ABORTED.

 - ENGINE START SwitchON
Pull ENG START switch and observe switch light illuminates.
Observe oil pressure rising.
After N1 indication, (at approximately 26% N2)
NOTE: If N1 indication can not be obtained, use max motoring N2. Carefully observe N1 indication at light off. If tailwind conditions exist, verify counter clockwise rotation of N1 from the ESS.
 - FUEL SwitchON
Move FUEL switch to ON and call "N1, FUEL ON." Confirm the FUEL switch is firmly latched in the ON position by jiggling the switch and pushing down. Observe normal fuel flow indication when the FUEL OFF message is extinguished.
 - TGT Rises
If necessary, discontinue start to prevent exceeding TGT limits.
 - At approximately 39% N2
Observe ENG START Switch pops in, switch light extinguishes and START L/R VLV OPEN (ENG) does not illuminate.
 - Ground Idle RPM
Verify N1 and N2 indications stabilize at ground idle RPM. TGT and ENG OIL quantity and pressure indicate in normal range.
 - IGNITION SwitchAUTO
NOTE: If there is a residual TGT in excess of 150°C, the engine should be dry cranked to reduce the TGT to 150°C or less. Care should be taken not to exceed starter duty limits.

Figure 13: B717 MEL 80-11-03 Auto Starter Control System

9.1.3.1 Start Checklist

The Hawaiian Airlines 717 Flight Crew Operating Manual, Section 40, "Start Procedure" provided the following guidance to be accomplished prior to pushback:

NOTE: Ensure EXT power switch is selected to OFF before advising ground crew to disconnect external electrical power. This allows for a NBPT onto APU electrical power. The ground crew should not pull external power until the EXT PWR NOT IN USE light is illuminated on the Ground Power Panel.

HYDRAULIC AUX/TRANS Pumps

- *Move hydraulic AUX/TRANS pump switches to ON. Check for normal hydraulic pressure and quantity.*

PACK/ISOL Switches

- *Move PACK switches to OFF.*

NOTE: To maintain cabin cooling, select PACK switches to off at the Captain's discretion just prior to engine start.

- *Verify ISOL switch is OPEN.*

NOTE: If left engine is started first ISOL switch may be moved to AUTO position and L PACK switch moved to ON once left engine is stabilized.

BCN Light Switch

- *Push BCN light switch to ON.*

NOTE: Illumination of beacon lights will be an indication to ground crews in close proximity that engines are about to be started or are operating or airplane is moving.

ALL DOOR Alerts

- *Check no door alerts are displayed on STATUS page and cockpit door and windows are closed.*

NOTE: All doors must be shut prior to engine starting.

- *Verify pilot seats are securely locked in their fore/aft position prior to airplane being moved.*

- *Prior to closing the Flight Deck door, the FFA will state "CABIN SECURE." This will confirm that all doors are armed, all passengers are seated, overhead bins closed and carry-on luggage/equipment are stowed.*

PARKING BRAKE

- *To set parking brake, push and hold brake pedals. Pull on PARK BRAKE knob and release brake pedals. Observe "PARK BRAKE ON" alert is displayed. It is essential to verbalize the movement of the parking brake so that all pilots on the flight deck are aware of its status.*

NOTE: Detailed pushback procedures can be found in the "Procedures and Techniques, Ground operations, PT.10.1 Pushback/Towing." section.

9.1.4 Pushback and Engine Start Callouts

The Hawaiian Airlines Flight Operations Manual, Chapter 11 "Engine Start-Takeoff" provided the following guidance on callouts between the flight deck crew and ramp crew:

Removal of Ground Power and/or Air Conditioning		
Event	Flight Deck	Ramp Crew
Prior to scheduled departure.(10 to 15 minutes prior to pushback)		"Ground to Flight Deck."
	"Flight Deck, Go Ahead"	
Flight Crew confirms aircraft status and clears the ramp crew to disconnect external power/ air. Upon confirming the brakes are set, the ramp crew will remove the chocks when ready.		"Confirm brakes are set?, Are You Ready to Disconnect External Power and/or Air?"
	"Brakes set, Standby" (not ready) or "Brakes set, Cleared to Disconnect External Power and/or Air"	
		"Cleared to Disconnect External Power and/or Air"

Circle Check Complete		
Event	Flight Deck	Ramp Crew
		"Ground to Flight Deck."
	"Flight Deck, Go Ahead"	
Tug is connected and the ramp crew confirms the chocks are removed and personnel / equipment is clear of aircraft (circle check).		"Circle Check Complete; Pitot Covers Removed. ⁽¹⁾ Ready for Push."
	"Standby for Push Clearance"	
After pushback clearance is received from ATC/ Ramp control, the parking brake is released.	"Cleared to Release Brakes?"	
		"Release Brakes"
	"Brakes Released, Cleared to Push" (pushback instructions)"	
		"Brakes Released, Cleared to Push "(reads back pushback instructions).
Engine Start Clearance, at the discretion of the ramp crew.		"Clear to Start Engines."
	"Cleared to Start Engines."	
⁽¹⁾ A321 / A330 only for the "Pitot Covers Removed"		

Figure 14: Engine Start Callouts (Source: Hawaiian Airlines FOM)

Pushback Completed		
Event	Flight Deck	Ramp Crew
Ramp Crew completes pushback		"Push Complete, Set Brakes."
	"Brakes Set" "Cleared to Disconnect Towbar"	
		"Brakes Set, Cleared to Disconnect towbar"
Once engines have been started and parameters are stabilized, the headset can be removed.	"Cleared to Disconnect Headset"	
		"Cleared to Disconnect headset"
The Ramp Crew will standby on the airport terminal side of the aircraft.		Upon confirming the area is clear, the ramp crew will: 1) Display the Pin. 2) Issue a Salute.
The Flight Crew will verify with each other that the Tug/Towbar are disconnected, the Pin is displayed & and Salute is received. The Pilot on the respective side of the aircraft that the ramp crew is on should return the salute to the ramp crew. Full control now transfers to the flight crew. The flight crew performs the After Start Checklist after returning the salute and flashing the nose light once.	Return Salute & Flash taxi light once	
NOTES 1. If an abnormal occurs during pushback, the flight crew and ramp crew will communicate in plain language with each other. I.e., "We have an abnormal indication, stay connected and standby." 2. Once off headset, the Flight Deck can flash the taxi light three times to gain the attention of the ramp crew to re-establish communication. CAUTION: When utilizing external lights during nighttime operations, flight crews must remain highly vigilant anytime personnel are in the vicinity of the aircraft due to the risk of eyesight injury. 3. The flight crew member operating the parking brake must always verbalize its movement so that all flight crew are aware of its status.		

Figure 15: Callouts following pushback (Source: Hawaiian Airlines FOM).

9.1.5 After Starting Checklist

The Hawaiian Airlines 717 Flight Crew Operating Manual, "Normal Procedures - Start Procedure," provided the following expanded checklist for the "After Start Procedure:"

Electrical Control Panel

Move EXT power switch to OFF.

AIR Control Panel

Move PACK switches to AUTO.

Move ISOL switch to AUTO.

NOTE: If left engine is started first ISOL switch may be moved to AUTO position and L PACK switch moved to AUTO once left engine is stabilized.

ICE PROTECTION Control Panel

Move WINDSHIELD ANTI-ICE switch to ON.

Verify AIR DATA HEAT Switch is in the ON position (OFF light extinguished), and the "AIR DATA HEAT OFF" Level 1 alert is not displayed.

NOTE: Some aircraft have an updated model of windshield heat controller. This model does a self-test on power up causing a momentary WSHLD HEAT FAIL alert. This indication is normal.

Arm PROF

Arm FMS Profile by pressing the PROF switch on the FCP.

Transponder

Rotate mode selector to the XPNDR position.

Door Alerts

Verify no door alerts are annunciated.

Cockpit Door

Closed and locked.

Departure Salute

Departure salute will be given by ground crew from the terminal side of the aircraft. This will confirm the pushback is complete, the aircraft is clear of equipment and the aircraft is able to move under its own power.

FLAP/SLAT Handle

Move FLAP/SLAT handle to preselected takeoff flap detent.

NOTE: The Captain may, as a part of the After Start Flow, turn off the APU Air switch or the APU Air and Master switches. In this case the F/O will verify the switches are in the desired position on the Taxi Check.

Load Closeout and FMS Weight Data

Print the Load Closeout when received via ACARS. Verify correct tail and flight number. One crew member shall read the ZFW, FOB, TOW, ZFW CG, TOW CG, and soul count from the printed load closeout while the other crew member verifies the correct data on the MCDU. The FO shall set the takeoff STAB TRIM setting, enter the reduced climb power setting as appropriate for the TOW.

When possible, review the load closeout prior to taxi. If the load closeout has not been received by the completion of the after start checklist, taxi to the departure runway is allowed. However, the FOM requires this review to be completed prior to take off.

9.1.6 Pushback Guidance

The Hawaiian Airlines, 717 Flight Crew Operating Manual, Chapter PT "Procedures & Techniques" Section 10, dated March 15, 2023 provided, in part, the following guidance for flight crews on pushback procedures:

General

The following safety and operating precautions apply to all airplane towing procedures and should be strictly adhered to. These precautions include the following:

- *Prior to any movement, ensure cabin is properly prepared, all cargo doors and main gear doors are closed and wheel chocks are removed.*
- *Ensure IRU alignment has been completed.*
- *Establish positive contact with towing personnel and ramp control.*
- *Verify hydraulic pressure is normal (No "BRAKE PRESS LO" alert annunciated) If brake pressure is below 2000, or "BRAKE PRESS LO" alert illuminates, turn AUX and TRANS pump switches to ON.*
- *Verify anti-collision lights are on.*
- *Release or set parking brakes only when so directed by towing personnel.*
- *In congested areas, request wing walkers to ensure clearance between airplane, adjacent airplanes, equipment, and buildings.*
- *Ensure towing speed is not excessive.*
- *Be alert for any situation which may require cockpit crew intervention with towing operation.*
- *Ensure last few feet of towing are in a straight line to align gear and relieve tire and tow bar twisting stresses.*
- *Ensure all towing personnel are well clear of airplane, pins removed, and a departure salute has been received prior to taxi.*

...

CIRCLE CHECK COMPLETE		
EVENT	FLIGHT DECK	RAMP CREW
Tug is connected and the ramp crew confirms the chocks are removed and personnel / equipment is clear of aircraft (circle check).		"Ground to Flight Deck."
	"Flight Deck, Go Ahead"	
		"Circle Check Complete; Ready for Push."
	"Standby for Push Clearance"	
After pushback clearance is received from ATC/Ramp control, the parking brake is released.	"Cleared to Release Brakes?"	
		"Release Brakes"
	"Brakes Released, Cleared to Push (pushback instructions)"	
		"Brakes Released, Cleared to Push (reads back pushback instructions)."
Engine Start Clearance, at the discretion of the ramp crew.		"Clear to Start Engines."
	"Cleared to Start Engines."	

PUSHBACK COMPLETED		
EVENT	FLIGHT DECK	RAMP CREW
Ramp Crew completes pushback		"Push Complete, Set Brakes."
	"Brakes Set" "Cleared to Disconnect Towbar"	
		"Brakes Set, Cleared to Disconnect towbar"
Once engines have been started and parameters are stabilized, the headset can be removed.	"Cleared to Disconnect Headset"	
		"Cleared to Disconnect headset"
The Ramp Crew will standby on the airport terminal side of the aircraft.		Upon confirming the area is clear, the ramp crew will: 1) Display the Pin. 2) Issue a Salute.
The Flight Crew will verify with each other that the Tug/Towbar are disconnected, the Pin is displayed & and Salute is received. The Pilot on the respective side of the aircraft that the ramp crew is on should return the salute to the ramp crew. Full control now transfers to the flight crew. The flight crew performs the After Start Checklist after returning the salute and flashing the nose light once.	Return Salute & Flash taxi light once	

PUSHBACK COMPLETED		
EVENT	FLIGHT DECK	RAMP CREW
NOTES: <i>If an abnormal occurs during pushback, the flight crew and ramp crew will communicate in plain language with each other. i.e., "We have an abnormal indication, stay connected and standby."</i> <i>Once off headset, the Flight Deck can flash the taxi light three times to gain the attention of the ramp crew to re-establish communication.</i> <i>It is essential to verbalize the movement of the parking brake so that all pilots on the flight deck are aware of its status.</i>		

9.1.7 Pilot's Eye Orientation - Static Aircraft

The Hawaiian Airlines, 717 Flight Crew Operating Manual, Chapter SP "Supplemental Procedures" provided a diagram of a pilot's visibility when seated in a cockpit seat. The diagram detailed that if a pilot was looking forward through the windscreen and over the nose it was about a 16.9° angle and when looking at the side window was about a 30° angle when a pilot would be able to view the ground, assuming a 1° pitch down static position. Those angles correlated to the pilot being able to view the ground starting approximately 40 ft in front of the airplane and 23 ft looking out the Clearview⁴⁴. Boeing's 717 Aircraft Maintenance Manual Figure 201/06-00-990-801 indicated that the Clearview height was about 10 ft 6 inches above the ground plus/minus 3 inches depending on vertical excursions due to loading, varying strut and tire inflation, and pavement unevenness.

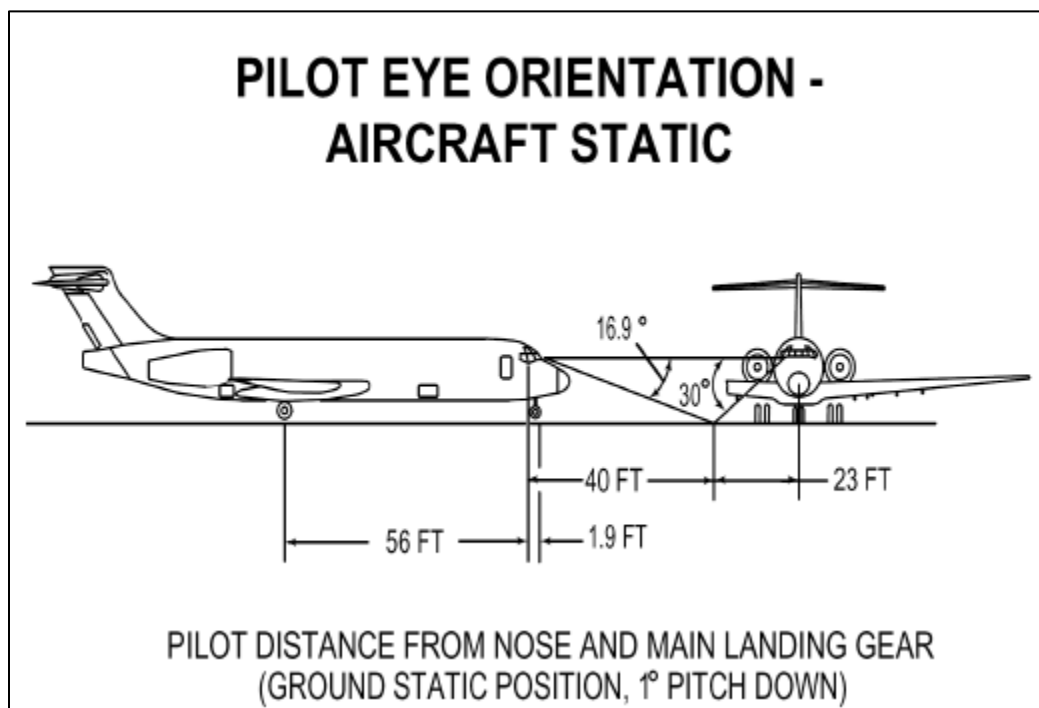


Figure 16: Pilot Eye Orientation Diagram (Source: Hawaiian Airlines 717 FCOM)

9.1.8 Taxiing Guidance

The Hawaiian Airlines FOM, Section 11.6 "Taxiing" provided the following guidance to flight crewmembers on taxiing:

1. *A taxi clearance shall be obtained from ATC before brake release, or before entering the movement area, as applicable. The Captain shall make sure that one or both of the flight crew write down the clearance. The crew shall brief the taxi*

⁴⁴ Clearview was the term McDonnell Douglas used when referring to the moveable side window on either the captain's or first officer's side of the cockpit.

instructions. This can be as simple as a repeat of instructions by the Captain to the First Officer verifying the ATC taxi instructions. Unless operating at a non-towered airport, no aircraft may be taxied on a runway unless an appropriate clearance has been received from ATC.

A. When assigned a takeoff runway, ATC will first specify the runway, issue taxi instructions, and state any hold short instructions. Instructions to cross a runway can only be issued one runway at a time. You must have crossed the previous runway before another runway crossing instruction can be issued.

B. When issuing taxi instructions to any point other than an assigned takeoff runway, ATC will specify the point to taxi to, issue taxi instructions, and state any hold short instructions or runway crossing clearances if the taxi route will cross a runway.

2. To preclude any misunderstandings, only standard phraseology shall be used in ATC communications. Non-essential tasks shall not be performed while obtaining the taxi clearance. Writing down taxi instructions, especially complex instructions can reduce the vulnerability to forgetting or misunderstanding a part of a taxi clearance. All taxi or runway hold short clearances shall be read back verbatim to ATC.

A. If a flight crewmember is uncertain about any ATC instruction or clearance, it shall be immediately verified. Any misunderstanding or disagreement regarding a taxi clearance shall be clarified with ATC before taxiing the aircraft.

3. Prior to the start of taxi, the Captain shall visually check the left side of the aircraft and announce "Clear Left." The First Officer shall visually check the right side of the aircraft and announce "Clear Right."

4. During taxi operations, the airport taxi diagram shall be out and plainly visible to all assigned flight crew. The aircraft's progress shall be followed on the airport taxi diagram to ensure that the taxi clearance is being adhered to. Obtain directions or progressive taxi instructions when taxi route is in doubt or stop aircraft on the taxiway and request ATC clarification if there is confusion regarding aircraft position or ATC taxi clearance. If on a runway, taxi off the active runway if possible and then initiate communications with ATC to regain orientation.

5. When instructed by ATC to "Hold short of Runway ##," the Captain shall stop so no part of the aircraft extends beyond the painted holding position marking.

6. Anytime the aircraft is cleared to hold short of or cross an active runway, the Captain and First Officer will verbally confirm the ATC clearance with each other.

7. Prior to crossing or positioning an aircraft for takeoff, each end of that runway shall be visually cleared by both the Captain and First Officer. Each shall announce that the runway is clear by stating: "Clear (left or right)" as applicable.

 HAWAIIAN AIRLINES.		VEHICLE/GSE OPERATOR'S SAFETY CHECK					
		VEHICLE TYPE		VEHICLE ID		MONTH / YEAR	
ALL VEHICLES MUST BE INSPECTED PRIOR TO USE REPORT ALL VEHICLE ACCIDENTS IMMEDIATELY TO MANAGER ON DUTY		DAY	EMPLOYEE # / INITIALS	DAY	EMPLOYEE # / INITIALS	DAY	EMPLOYEE # / INITIALS
		1		11		21	
		2		12		22	
ITEMS TO BE CHECKED BEFORE USE (if installed / applicable)		3		13		23	
		4		14		24	
		5		15		25	
1. PERFORM GENERAL CONDITION WALKAROUND		6		16		26	
2. FUEL QUANTITY (AT LEAST % FULL)		7		17		27	
3. BRAKE PEDAL		8		18		28	
4. PARKING BRAKE		9		19		29	
5. ACCELERATOR PEDAL		10		20		30	
6. CLUTCH PEDAL (if applicable)							
7. LIGHTS							
8. Horn (if applicable)							
9. WINDSHIELD (WIPERS / WASHER FLUID / CRACKS) (if applicable)							
10. STEERING							
11. TIRES / WHEELS (DAMAGE / INFLATION / LUG NUTS)							
12. DAMAGE / MISSING ITEMS (INTERIOR/EXTERIOR)							
13. FLUID LEAKS							
14. CHOCKS (if applicable)							
15. Seatbelt Restraints (if applicable)							
16. Bumpers (applies to Belt Loaders and Container Loaders)							
17. Retractable Flap(s) (applies to Container Loaders)							
Note: GSE must be removed from service for any other condition that may cause injury or damage.							
AFTER USE							
1. REMOVE ALL TRASH / DEBRIS		OPERATOR'S EMP # & INITIALS SIGNIFIES ACCOMPLISHMENT OF SAFETY CHECKS		1234	JD	31	
2. PERFORM GENERAL CONDITION WALKAROUND				854321	JD		

Figure 18: Hawaiian Airlines form HA O504 Vehicle/GSE Operator's Safety Check Form - Page 2

The form was maintained in the respective station for 30-days following the end of the month. After 30-days the forms were disposed of. The event form had been disposed of prior to a request for the form.

9.2.1.1 Daily Inspection

The Hawaiian Airlines Ground Service Manual (GSM), Chapter2 "General Procedures" provided, in part, the following information in regard to daily inspection of ground service equipment:

1. ► To help ensure that GSE is in safe and workable condition, daily vehicle inspections must be performed as outlined in the following sections.
 - A. Hawaii Stations:
 - 1) Hawaii stations are required to complete Operator's Vehicle GSE Safety Check (Form O504) daily.
 - 2) ► At the beginning of each shift, the first person to use a vehicle is required to inspect it utilizing the Operator's Vehicle GSE Safety Check (Form O504). The form must be completed prior to vehicle use. If no form is with the vehicle, one must be obtained from station management.

NOTE

When initiating a new form, the GSE operator ensures that the "Vehicle Type," "Vehicle ID", and "Month/ Year" sections are completed.

- 3) Any discrepancies found for items three (3) to seventeen (17) requires that the GSE be tagged out by the GSE operator according to Removing GSE from Service procedures found, refer to 2.6.2.3 Removing GSE from Service of this section.*
- 4) Each form covers one month of daily inspections and is kept with the equipment in the provided weatherproof pouch. If deemed necessary, HNL may opt to retain GSE inspections checklists in the Ramp/Fleet Manager's office for agent completion.*
- 5) The Operations Manager, or designee, ensures the checklists are being completed properly. The Operations Manager or designee reviews the form and reports any unresolved or new issues with the equipment and advise GSE mechanics as necessary.*

9.2.2 Aircraft Movement Safety

The Hawaiian Airlines Ground Service Manual (GSM), Chapter 2 "General Procedures" provided, in part, the following guidance on aircraft movement safety:

- 1. The following items apply to all aircraft movement.*
 - A. Individuals executing the movement of aircrafts must first be trained and qualified.*
 - B. Prior to movement, pushback crew must make an inspection of surface conditions (i.e., ice, snow) to determine if it is safe to move the aircraft.*
 - C. If it is deemed unsafe to move the aircraft, station personnel will notify Flight, Dispatch and SOCC and will suspend operations if necessary.*
 - D. Pushback crew must make a visual inspection of the aircraft to ensure all doors and panels are closed and locked.*
 - E. All equipment not necessary to move the aircraft must be positioned outside the Circle of Safety, or in a specifically designated and painted area within the circle.*

NOTE

GSE must be parked in designated areas facing away from the aircraft.

NOTE

Stations that plan to paint designated areas need to ensure they go through the SMS process to have them added.

- F. A visual inspection of the area must be made to ensure it is clear of FOD.*
- G. A verification must be made that power cables, jet bridges, etc. are detached from the aircraft.*
- H. Wing walkers are required for all aircraft movement.*

NOTE

Wing walkers must use deliberate hand signals when guiding an aircraft.

- I. When performing wing-walking duties, personnel must use high-visibility wands, paddles or gloves during the day and lighted wands during the night.*

9.2.3 Circle Checks

The Hawaiian Airline's GSM, Chapter 4 "Line Service Procedures" provided the following guidance in regard to ground personnel conducting a circle check:

- 1. The Circle Check is the final series of checks given an aircraft, connections to the aircraft, and its immediate vicinity prior to departure. No aircraft is dispatched or towed from any area, for any type of flight, until these checks are complete. Furthermore, if an aircraft returns to the ramp and is subsequently dispatched, the Circle Check must be repeated. Completion of the Circle Check must be communicated to the cockpit prior to commencing pushback.*

A. Responsibility

- 1) The Control Service agent is responsible for the final Circle Check and communicating completion to the Escort. The aircraft is not moved until this function has been completed.*

B. Requirements

- 1) The following steps are required for all Circle Checks:*
 - a) Check all cabin, cargo and service doors to make certain they are closed, locked and free of damage. Any damage must be documented and reported to Maintenance immediately. Where visible, check door handles to verify they are in the locked position.*

NOTE

If additional bags are added after initial circle check is completed, another inspection of cargo doors is required.

- b) Inspect the aircraft tires for any obvious F.O.D. damage.*
- c) Visually confirm that the ramp area is sufficiently free of ice, snow, etc.*
- d) Confirm all external panels are closed and secured.*
- e) Ensure any ground equipment not required for engine start has been removed.*

- f) *Verify landing gear lock pins have been removed (If not, call Maintenance for guidance)*
- g) *Ensure ground power has been disconnected and removed, unless required for engine start.*
- h) *Confirm the towbar has been properly secured at both the aircraft and tow tractor connection points.*
- i) *Verify that all ramp personnel and passengers are clear of, and a safe distance from, the departing aircraft.*

9.2.4 Departure Procedures and Responsibilities

The Hawaiian Airline's GSM, Chapter 4 "Line Service Procedures" provided, in part, the following guidance in regard to departure procedures and ground personnel responsibilities:

1. *The following procedures must be adhered to during dispatching of all "Live Flights", or flights carrying passengers. Procedures for aircraft "Towing", or repositioning, refer to 4.2.11 Aircraft Towing of this chapter.*
2. *The aircraft beacon is turned on by the flight crew just prior to pushback or whenever an engine is about to be started. The beacon signifies to ground personnel and other aircraft that the aircraft is about to be moved or an engine is running. The beacon is not used by the flight crew to signal to the ground crew that the flight crew is ready.*

...

2. *Control Service Agent*
 - A. *The Control Service agent is in charge of and is responsible for the pushback, which includes operating the tow tractor and communicating with the flight crew.*
 - B. *The Control Service agent will use the headset as the primary source of communicating with the flight crew.*
 - 1) *If there is no operable headset available, refer to procedures for Pushback Without Interphone.*
 - 2) *An adequate supply of headsets is readily available for implementation into operations to maximize efficiency.*
 - C. *The Control Service agent is required to:*
 - 1) *Be familiar with the headset and proper cord attachment. (Or wireless headset operation, where applicable)*
 - 2) *Verify the headset is available and in working order. (For wireless headsets, ensure all necessary components are in working order)*
 - 3) *Verify that there are a minimum of two (2) wing walkers in position.*
 - a) *One of the wing walkers will be assigned as the Escort, and must be trained on handling of tow bar and steering bypass pin, as well as post-pushback hand signals (engine start, etc.).*

- b) *Wing walkers must use high-visibility wands, paddles or gloves for all signaling during daylight hours. Illuminated wands must be used at night or in low visibility.*
 - 4) *Receive permission from the flight crew any time the aircraft is to access the movement area (taxiway).*
 - 5) *Communicate clearly and concisely.*
 - 6) *Repeat the message back to the flight crew to verify it was received and understood. Responding to a message from the flight crew with "copy that" or "roger that" is unacceptable.*
- D. *The qualified Control Service agent is also responsible for the following duties:*
 - 1) *Verify the towbar is operable and suitable for the specific aircraft type.*
 - 2) *Verify the tractor is serviceable and suitable for the specific aircraft type.*
 - 3) *Perform a walk around inspection (Circle Check) to verify that all doors and panels are closed and no damage to the aircraft exists. This includes a check of the aircraft tires for obvious F.O.D. damage and the opening of the fueling panel to ensure the fuel cap is on and the fuel panel latches are secured when the panel is closed. (See complete list of checks, refer to 4.2.8 General Arrival and Departure Requirements of this chapter.)*
 - 4) *Advise the flight crew, "Circle Check complete." and "Push Crew standing by for brakes to be set."*
 - 5) *Communicate with and assist flight crew at least 5 minutes prior to ETD, and remain in direct contact until all pushback functions have been completed.*
- 3. *Escort*
 - A. *The assigned Escort will be responsible to:*
 - 1) *Install the steering bypass pin in accordance with maintenance procedures.*
 - 2) *Connect the towbar and assist with connecting the tractor to the aircraft.*
 - 3) *Serve as a wing walker.*
 - 4) *Remove the tow bar.*
 - 5) *Remove steering bypass pin: verify lever is set. Show pin to Captain after tractor and personnel are clear of the Circle of Safety and in a Safe Area and prior to Salute to release Aircraft to Flight Crew.*
 - 6) *Notify the flight crew that the steering bypass pin has been removed by displaying the pin flag; and that all procedures have been completed and the aircraft is released by way of salute.*
- 4. *Wing Walkers*
 - A. *A minimum of two (2) wing walkers is required for every departing aircraft. At least one of the wing walkers must be designated as the Escort and be trained on handling the towbar, steering bypass pin, post-pushback procedures and wing walkers must use deliberate hand signals when guiding an aircraft.*
 - 1) *During pushback without interphone, the assigned Escort may be either a wing walker or the additional communications facilitator.*

- B. The wing walkers will position themselves at the entrance to the departure gate area: at the roadway where applicable, or at the end of the demarcation lines nearest to the taxiway if there is no marked roadway immediately behind the gate.
 - 1) The above is a minimum requirement. Stations may use additional wing walking personnel at different positions, as needed.
 - 2) Wing walkers must always remain in clear view of the Control Service agent.
- 5. The wing walker on the aircraft-right side will face towards aircraft-left, and will scan the area to ensure no obstructions, traffic, and/or safety hazards exist.
 - A. If any obstructions, traffic and/or safety hazards exist, the wing walker will signal the Control Service agent by crossing wands, paddles or arms ("Brake Set" signal).
- 6. The wing walker on the aircraft-left side will face towards aircraft-right, and scan the area to ensure no obstructions, traffic and/or safety hazards exist.
 - A. If any obstructions, traffic and/or safety hazards exist, the wing walker will signal the Control Service agent by crossing wands, paddles or arms ("Brake Set" signal).
- 7. When the area is deemed clear, the wing walkers will use hand signals to communicate this to the Control Service agent by extending the arm closest to the aircraft upwards, and extending the opposite arm in the direction that the AC will be moving.
- 8. If at any time during aircraft movement a safety hazard arises, the wing walker will signal the Control Service agent by:
 - A. Crossing wands, paddles or arms, or
 - B. Performing the "emergency stop" signal (waving wands, paddles or arms into a crossed position) as appropriate for the situation.
 - C. The "emergency stop" signal is only used in an emergency situation, in which immediate stop of the aircraft is required. Misuse of this signal could result in injury in the aircraft (standing Flight Attendants) or damage to equipment due to a sudden stop.
- 9. The wing walker function will be completed when the aircraft and pushback tractor have fully cleared the marked roadway, or to the end of the gate demarcation lines nearest to the taxiway if there is no marked roadway immediately behind the gate.
- 10. The Escort assigned to wing walking duties will assume Escort duties immediately after their wing walking tasks are complete.
- 11. Transition from Wing Walking to Escort
 - A. For the purpose of escorting or wing walking, the Escort transitions the final pushback position on foot.
 - B. Upon completion of wing walking duties, and while transitioning between the wing walking position and the final pushback position, the Escort must remain positioned in a safe area. The below illustration shows the recommended area for the Escort to remain during push back in green.

9.2.5 Pushback with Interphone

The Hawaiian Airline's GSM, Chapter 4 "Line Service Procedures" provided, in part, the following guidance in regard to pushback procedures when using the interphone which was the primary method:

...

2. Commencing Pushback

- A. *The Control Service agent assigned to aircraft pushback will re-establish positive communication with the flight crew via headset.*
- B. *The flight crew will request clearance to release brakes by stating "Cleared to release brakes?" The Control Service agent will respond "Release brakes" when ready for brakes to be released. Flightdeck will respond "Brakes released, cleared to push" and provide pushback instructions. Read back any pushback instructions and reply "Brakes released, cleared to push." After reading pushback instructions, state "Clear to start engines." The flightdeck will respond "Cleared to start engines."*
 - 1) *If Ramp conditions exist that, in the opinion of the Control Service agent, warrant the delaying of an engine start, the "clear to start at your discretion" command may be replaced with, "hold engine start until " (such time as it is deemed safe to start engines).*
 - 2) *At the Captain's discretion, he/she may advise the Control Service agent "ready to start engines" and may relay any special pushback instructions obtained from ground control.*
- C. *Prior to initiating pushback, verify the area is clear, and wing walkers are in position and ready for pushback.*
- D. *Pushback speed are no faster than walking speed. The Control Service agent must maintain constant, safe speed; until completion of pushback and the flight crew has set brakes after coming to a complete stop.*

3. Pushback Completed

- A. *The Control Service agent will state "Push complete; brakes set."*
- B. *The flight crew will set the parking brakes and acknowledge brakes set by replying "Brakes set; cleared to disconnect towbar."*
- C. *The Control Service agent will relay "brakes set" message to Escort via hand signal.*
- D. *The Escort may disconnect towbar after brakes set confirmed.*

NOTE

Although it is OK to disconnect the towbar any time after the "brakes set" message is confirmed, the Control Service agent must still maintain headset communication with the flightdeck until after both engines are started. Minimal movement of the tow tractor is used in the process of towbar disconnection/hookup to the tractor (i.e., no wide, looping circles near the aircraft).

- E. *If requested by the Captain, the Control Service agent and Escort MUST be available to participate in engine starts:*
 - 1) *The Control Service agent will relay "clear to start engine" signal to the Escort, and the Escort will acknowledge via hand signal to the Control Service agent. (Right arm extended to the side bent upward at the elbow, rotating wand at eye level. The left wand pointing at the engine to be started.)*
- F. *At all times, both the Escort and Control Service agent must be alert to potential hazards during engine start and be on the lookout for abnormal conditions (e.g., tailpipe fire). Any observed abnormal conditions must be communicated to the flight crew immediately.*
- G. *The Escort will disconnect the towbar (if not already disconnected).*

NOTE

Although it is OK to disconnect the towbar any time after the "brakes set" message is confirmed, the Control Service agent must maintain headset communication with the flightdeck until after both engines are started, and the crew has stated "clear to disconnect headset." Minimal movement of the tow tractor is used in the process of towbar disconnection/hookup to the tractor.

- H. *Once Flight crew confirms engines have been started, they will issue the "clear to disconnect headset" command. The Control Service Agent responds "Cleared to disconnect headset."*
- I. *Control Service agent will relay this to the Escort via the "affirmative" signal (thumb or wand up).*
- J. *The Escort will remove the following, in the order noted below:*
 - 1) *Nose gear steering bypass pin, ensuring that the bypass pin lever is in the proper position*
 - 2) *Interphone jack, ensuring that the communications panel door is closed and secured.*
- K. *The Control Service agent will move the tractor and towbar out of the path of, and facing away from the aircraft. (Refer to Figure 4-19. Direction may vary, based on pushback direction and/or traffic conditions.)*

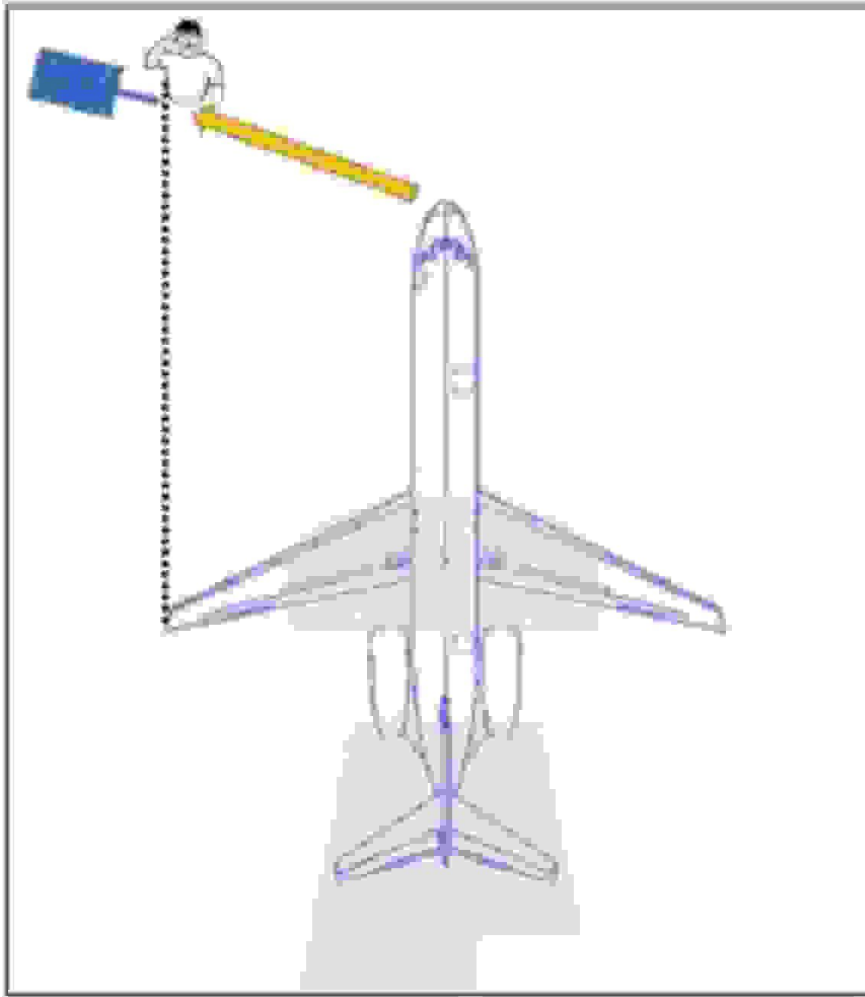


Figure 19: Control Service Agent Positioning of Tractor and Towbar (Source: Hawaiian Airlines GSM)

- L. *The Escort will move to the Signal Agent, confirm that personnel and equipment are in a Safe Area clear of Aircraft, and await the "Ready to Taxi" signal (nose gear lights flash once).*
- M. *When the "Ready to Taxi" signal (nose gear lights flash once) has been given, and the area is clear, the Escort will display the bypass pin flag and salute the flight crew, providing the "clear" signal.*
 - 1) *The Escort MUST verify that the area is clear, and that the nose wheel chock has been removed prior to issuing the "salute" to the crew.*
- ...
- O. *The Escort will board the passenger seat of the tractor for transportation back to the terminal area following the salute to the crew to ensure the safety of the Escort.*
 - 1) *The Escort will board the passenger seat of the tractor for transportation back to the terminal area following the salute to the crew to ensure the safety of the Escort.*

Chapter 4 of the GSM also contained the following table summarizing the order of communications between flight crew and ground personnel following pushback.

Event	Flightdeck	Ramp Crew
Ramp crew completes pushback.		"Push complete, set brakes."
	"Brakes set; cleared to disconnect towbar."	
		"Brakes set; cleared to disconnect towbar."
The ramp crew will standby on the airport terminal side of the aircraft.	"Cleared to disconnect headset."	
		"Cleared to disconnect headset."
		Upon confirming the area is clear, the ramp crew will: 1. Display the pin. 2. Issue a salute.
After pushback is complete, ramp agents are not required to remain at the aircraft for engine start unless requested by Flight Crew.		
The flight crew will verify with each other that the tug/ towbar are disconnected, the pin is displayed & and salute is received. The pilot on the respective side of the aircraft that the ramp crew is on should return the salute to the ramp crew. Full control now transfers to the flight crew. The flight crew performs the <u>after start</u> checklist after returning the salute and flashing the nose light once.	Return salute & flash taxi light once.	
NOTES • If an abnormal indication occurs during pushback, the flight crew and ramp crew will communicate in plain language with each other. i.e., "We have an abnormal indication, stay connected and standby." • Once off headset, the Flightdeck can flash the taxi light three times to gain the attention of the ramp crew to re-establish communication. • The flight crew member operating the parking brake must always verbalize its movement so that all flight crew are aware of its status.		

Figure 20. Communications between flight crew and ramp crew following pushback.

10.0 FAA Oversight

FAA oversight for Hawaiian Airlines, was provided by the Honolulu CMO⁴⁵. According to an interview with the FLM he had been assigned to the certificate since July 2023.

The FAA CMO team that managed the certificate consisted of an office manager, front line manager (FLM), principal operations inspector (POI), assistant principal operations inspector (APOI), principal maintenance inspector (PMI), assistant PMI (APMI), a principal avionics inspector (PAI), and an assistant PAI (APAI). Additionally there was an aircrew program manager (APM) assigned to each fleet type. For Hawaiian Airlines they had three APMs and each APM had an assistant APM (AAPM); however, the AAPM for the B-717 fleet had retired right in January 2024 and the APOI was in training to assume those duties.

According to an interview with the POI, he had been in that position since July 2023 and had an assistant to assist him with the POI duties in managing the Hawaiian Airlines certificate. He remote worked from California; however, he travelled to and

⁴⁵ Certificate management office

from the island about once every month. When he traveled, he would sit in the cockpit jumpseat and observe the flight crew as well as ground crew operations. He further stated that he sometimes would take the direct flight to HNL and other times he would take a flight from California to another island on Hawaiian and then a flight from that location to HNL. He stated he had observed ground and flight operations from the B-717.

11.0 OGG Administrative Rules

The Department of Transportation “Amendment and Compilation Chapter 19-15.1 Hawaii Administrative Rules” dated February 19, 2004, provided, in part, the following information:

§19-15.1-31 Operational area; vehicle operations in movement areas. (a) Any vehicle at a controlled airport which requires access to any portion of the operational area such as taxiways, runways, and safety areas which are beyond the yellow nonmovement area boundary marking painted on the ramp service area, shall be in two-way radio contact with the air traffic control tower or shall be escorted by a vehicle with this capability. In addition:

- (1) Any vehicle proceeding onto the movement area between the hours of sunrise and sunset except those being escorted shall be either painted a bright color, operate an overhead flashing light which is visible for one mile, or display a checkered flag not less than three feet square of international orange and white (the checks being at least one foot on each side);*
- and*
- (2) Any vehicle proceeding onto the movement area between the hours of sunset and sunrise except those being escorted shall also operate an overhead flashing light which is visible for one mile.*

12.0 FAA Guidance

12.1 Advisory Circular 150/5120-5D

Advisory Circular (AC) 150/5120-5D⁴⁶ “Painting, Marking, and Lighting of Vehicles used on an Airport,” defined an aircraft support vehicle as “vehicles that are routinely used in the AOA to support aircraft operations (e.g., aircraft pushback tractors, baggage/cargo tractors or trucks, air conditioning and aviation fuel trucks). These vehicles are typically owned by airlines, vendors, or contractors and are not eligible for Federal funding.” The guidance further provided, in part, the following guidance in regard to vehicle lighting:

VEHICLE LIGHTING.

⁴⁶ [AC 150/5210-5D, Painting, Marking, and Lighting of Vehicles Used on an Airport, 1 April 2010 \(faa.gov\)](https://www.faa.gov/air_traffic/operations/publications/ac/150/5120-5d)

a. *Airfield Service, Aircraft Support, and Airport Operations Vehicles.*

- (1) The standard for identification lighting is a yellow flashing light that is mounted on the uppermost part of the vehicle structure. A steady yellow light designates vehicles limited to non-movement areas.*
- (2) The light must be visible from any direction, day and night, including from the air.*
- (3) Color specifications for vehicle identification lights are per Appendix B.*
- (4) TLTVs. An LED light bar placed above the operator's cab may be used in place of the rotating yellow flashing light. In addition, a yellow flashing light (of any type) must be installed on the upper left-rear and right-rear corners of the TLTV, and must be activated when an aircraft is in tow. The size of the rear flashing lights must be large enough to meet the requirements of Section 5.c, but not so large as to interfere with the normal or towing operations of the TLTV.*

...

d. Light Colors.

- (1) Airport Emergency Vehicles.
 - (a) Ambulances. Per the most current version of Federal Specification KKK-A-1822.
 - (b) ARFF Vehicles. Red or a combination of red-and-white flashing lights per the chromaticity requirements in Appendix B.
- (2) Airport Security Vehicles. Signal blue or a combination of red and signal blue flashing light per the chromaticity requirements in Appendix B.
- (3) Airfield Service, Aircraft Support, Airport Operations, and Other Vehicles. Yellow flashing light per the chromaticity requirements in Appendix B.

E. ATTACHMENTS

Attachment 1 - Flight Crew Interview Transcripts
Attachment 2 - Maui Ground Personnel Interview Transcripts
Attachment 3 - FAA Personnel Interview Transcripts
Attachment 4 - Flight Crew Training Records [Excerpts]
Attachment 5 - Flight Release
Attachment 6 - Hawaiian Airlines Minimum Equipment List - B-717 [Excerpts]
Attachment 7 - Hawaiian Airlines Flight Crew Operations Manual [Excerpts]
Attachment 8 - Hawaiian Airlines Flight Operations Manual [Excerpts]
Attachment 9 - Hawaiian Airlines Ground Service Manual [Excerpts]
Attachment 10 - Hawaiian Airlines Operator Vehicle/GSE Operator's Safety Check
Attachment 11 - Accident Flight ACARS Load Closeout

Attachment 12 - Archived NOTAMs
Attachment 13 - Night Ground Handling Observation at Kahului Airport
Attachment 14 - Security Camera Video from Gate 11-13
Attachment 15 - Security Camera Video from HAL Gates 17-19

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