Aviation Investigation Final Report

Location:	Sitka, Alaska	**Incident Number:**	ANC09IA015
Date & Time:	December 20, 2008, 07:47 Local	**Registration:**	N771AS
Aircraft:	Boeing 737-4Q8	**Aircraft Damage:**	None
Defining Event:	Cabin safety event	**Injuries:**	88 Minor
Flight Conducted Under:	Part 121: Air carrier - Scheduled		

Analysis

After departure the cabin crew reported to the captain that they were becoming nauseated. The captain noted that the departure was the first flight of the day and that the airplane had been sitting on the ramp overnight connected to an external heating unit. He said that prior to flight the first officer and cabin crew went to prepare the airplane while he remained in the operations center with paperwork. He said the first officer requested the ground crew shutdown the external heater because of exhaust fumes in the airplane's cabin. The first officer started the airplane's auxiliary power unit to provide power and heat to the airplane. The captain said that about 15 minutes later he did not detect any unusual smells or odors, and wiped his hand across seats and surfaces to detect contamination. Finding none, he felt it was safe to continue boarding. He reported that the boarding process was normal, and none of the crew or passengers reported any unusual smells or odors. When the cabin crew reported feeling nauseated, the captain determined that they were 20 minutes from their destination and decided to continue the flight rather than turn back. The captain reported that he and the first officer were symptom free, and that the first officer remained on oxygen for the remainder of the flight as a precaution. Upon arrival the flight crew all tested positive for elevated levels of carbon monoxide. The cabin of the airplane was examined and no traces of carbon monoxide were found. Tests of the ground heating unit found no anomalies, and the heat output hose was tested for CO with negative results. According to the director of safety for the operator, the contamination probably occurred when the morning ground crew started the push-back unit in the proximity of the heater's fresh air intake. As a result, the heating unit has been repositioned away from other operating equipment, and a 20-foot exhaust hose attached. Carbon monoxide detectors are now placed in the operator's aircraft during extended external heater usage.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The placement of operating equipment in close proximity to an external heating unit's intake by ground personnel, resulting in the contamination of the airplane's cabin with carbon monoxide.

Findings

Aircraft	(general) - Incorrect service/maintenance
Personnel issues	Use of equip/system - Ground crew

Factual Information

History of Flight

Prior to flight	Cabin safety event
Enroute-climb to cruise	Cabin safety event (Defining event)

On December 20, 2008, about 0747 Alaska standard time, the cabin crew of Alaska Airlines Flight 73, N771AS, a Boeing 737, reported to the captain that they became nauseated after departing from Sitka, Alaska. The flight was being operated by Alaska Airlines, Seattle, Washington, as an instrument flight rules (IFR) passenger flight under Title 14, CFR Part 121, when the event occurred. The flight departed Sitka for Juneau, Alaska about 0710, and an instrument flight plan was filed and activated.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on December 21, the acting director of flight safety for the operator said he requested a written report from the Captain, and that he was en route to Sitka to investigate the event. The IIC discussed with the acting director testing the external heater for leaks, and the placement of other equipment near the heaters air intake. He said he would report back to the IIC after assessing the situation.

In a written statement submitted to the NTSB on December 22, the captain reported that on the morning of the event the crew met early, as the departure from Sitka was the first flight of the day. The airplane had been sitting on the ramp overnight and was connected to an external heating unit. The captain said the first officer and cabin crew went to prepare the airplane while he remained in the operations center to complete the required paperwork for the day's flights. He said he overheard the first officer request the ground crew shutdown the external heater because of exhaust fumes in the airplane's cabin and the jetway. The captain wrote that the first officer remained on the flightdeck long enough to start the airplane's auxiliary power unit (APU) to provide power and heat to the airplane. The first officer and cabin crew returned to the operations center. The captain said about 15 minutes later he went to the airplane to evaluate the condition of the airplane. He said he tried to be cognizant of unusual smells/odors, and wiped his hand across seats and surfaces to detect contamination. Finding none, he felt it was safe to continue boarding for the flight. He reported that the boarding process was normal, and none the crew or passengers reported any unusual smells/odors.

After departure the captain reported that the cabin crew reported feeling nauseated. The captain said he consulted with the cabin crew and first officer, and determined that since they were 20 minutes from their destination (Juneau) he would continue the flight rather than turn back to Sitka. The captain reported that he and the first officer were symptom free, and that the first officer remained on oxygen for the remainder of the flight as a precaution.

Upon arrival at Juneau the flight crew and one passenger, an off-duty airline employee, were taken to the local hospital to be tested for carbon monoxide (CO). The captain said he was told that the normal levels for carbon monoxide in the blood are 0.0-0.08 percent. He reported that the crew's levels were from 1.8 percent to 4.7 percent. According to the Center for Disease Control (CDC), elevated levels of carbon monoxide in the blood of 2.0 percent for non-smokers and 9.0 percent for smokers, can support a diagnosis of carbon monoxide poisoning.

About an hour after landing the cabin of the airplane was examined by the fire department, and no traces of carbon monoxide were found.

On February 27, 2009, the acting director submitted his findings to the IIC. Tests of the heating unit found no anomalies, and the heat output hose was tested for the presences of CO, with negative results. He said he believed the contamination occurred when the morning ground crew started the push-back unit in the proximity of the heater's fresh air intake.
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According to the acting director, as a result of this event, the heating unit is now repositioned to the opposite side of the aircraft away form other equipment, and a 20-foot exhaust hose is attached. No other operating equipment is allowed in the vicinity of the heater. Carbon monoxide detectors are now placed in the operator's aircraft during extended external heater usage.

Pilot Information

Certificate:	Airline transport	**Age:**	48,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:	Class 1	**Last FAA Medical Exam:**	
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 12100 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Boeing	**Registration:**	N771AS
Model/Series:	737-4Q8	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	25104
Landing Gear Type:	Retractable - Tricycle	**Seats:**	149
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Turbo fan
Airframe Total Time:		**Engine Manufacturer:**	CFM INTL.
ELT:		**Engine Model/Series:**	CFM56 SERIES
Registered Owner:	MSA I	**Rated Power:**	2200 Horsepower
Operator:	Alaska Airlines	**Operating Certificate(s) Held:**	Flag carrier (121)
Operator Does Business As:	Alaska Airlines	**Operator Designator Code:**	ASAA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	
Precipitation and Obscuration:			
Departure Point:	Sitka, AK (PASI)	**Type of Flight Plan Filed:**	IFR
Destination:	Juneau, AK (PAJN)	**Type of Clearance:**	IFR
Departure Time:	08:30 Local	**Type of Airspace:**	

Airport Information

Airport:	Sitka PASI	**Runway Surface Type:**	
Airport Elevation:	21 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	5 Minor	**Aircraft Damage:**	None
Passenger Injuries:	83 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	88 Minor	**Latitude, Longitude:**	57.047222,-135.361663

Administrative Information

Investigator In Charge (IIC):	Lewis, Lawrence
Additional Participating Persons:	Tom Crawley; Alaska Airlines; Seattle, WA
Original Publish Date:	March 23, 2010
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=73130

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