



COLLISION AND CABIN FIRE

Los Angeles, CA

February 1, 1991



**FIRE
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Summary Investigation Report

Aircraft Collision and Cabin Fire Los Angeles International Airport February 1, 1991

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On the evening of February 1, 1991 a USAir, Boeing 737-300 collided with a Skywest, Fairchild Metroliner at the Los Angeles International Airport (LAX). The B-737 that was involved was configured to carry 128 people including both passengers and crew; however, only 89 people were aboard at the time of the accident. Twenty-two people on the B-737 died, and all 12 people aboard the Fairchild Metroliner were killed by the collision and subsequent fire.

The NFPA dispatched a staff member to participate in the National Transportation Safety Board's (NTSB) investigation of the accident. The NFPA's focus was on the aircraft rescue and fire fighting (ARFF) for the purpose of providing lessons learned from this accident to the NFPA Aircraft Rescue and Fire Fighting Committee, the Aviation Membership Section of the NFPA, and the fire community.

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The incident occurred at approximately 6:08 pm which was about 3/4 hour after sunset. Skies were clear and visibility was good at the airport, and the runway lights were on. The LAX control tower cleared Skywest Flight 5569, the Metroliner, onto Runway 24L from one of the taxiways and instructed it to hold in takeoff position. Approximately one minute later, the control tower also cleared USAir Flight 1493, the B-737, to land on that runway.

During an interview after the incident, the first officer from the B-737 stated that he first saw the Metroliner after his aircraft landed on the runway. He reported seeing the tail beacon of the smaller plane directly in front of him and his aircraft's landing lights reflecting off of the Metroliner's propellers. The B-737 collided with the Metroliner almost immediately thereafter. The Metroliner was caught by the B-737's left main landing gear and was dragged along by the larger aircraft. Together, the two aircraft skidded about 1540 ft before striking a former fire station. This unoccupied building was approximately 200 yd away from the runway.

Seeing a flash of fire, but not knowing the cause, a control tower operator called the airport fire department using the alert telephone and reported the incident. Four crash trucks immediately responded, carrying a total of 12,000 gal of water, 1460 gal of 6 percent Aqueous Film Forming Foam (AFFF) concentrate, and 600 lb of Halon 1301. As soon as the airport fire fighters were out of the station, they could see smoke from the crash scene, which was about 1/4 mile away. At 6:09 pm, the senior officer radioed the Los Angeles Fire Department Operations Control and Dispatch Section (OCDS) and confirmed that there was a major aircraft accident.¹

1 The LAX fire department is part of the Los Angeles City Fire Department. As a result, the LAX fire fighters were in contact with OCD and with LAFD structural fire fighters. In addition, LAFD structural fire stations adjacent to the airport are connected to the control tower's alert telephone system and are included as part of the initial response during major aircraft incidents.

Fire fighters reportedly arrived on the scene in less than a minute and found 40-50 people, all of whom self-evacuated from the B-737, standing outside the aircraft. The B-737 was in a nose down attitude because the nose landing gear had collapsed and the main landing gear remained extended. Flames from a pool fire engulfed the wing root area and extended back to the tail section. The incident commander also noted that flames were visible inside the forward cabin and immediately realized that this fire posed the greatest threat to anyone still inside the B-737.

Because the left side of the aircraft was against the building, ARFF crews set up on the right side and nose of the B-737. The fire fighters used both their roof and bumper turrets to attack the pool fire. Reportedly, they knocked down the majority of the exterior fire in approximately one minute. However, they were unable to easily extinguish all the flames under the B-737. While the exterior fire attack was in progress, fire fighters saw 6-7 survivors escape through the B-737's right overwing exit amid heavy black smoke that was also coming out that opening.

Fire fighters also began rescue and interior fire fighting operations upon arrival at the scene. One fire fighter went to the aid of the B-737's first officer and assisted him to escape out the aircraft's sliding window. Another fire fighter brought a 1 3/4-in handline to the B-737's right front door.

Apparently, an emergency oxygen system was damaged during the collision. Oxygen from storage bottles below the aircraft's forward cabin intensified the fire in this area of the aircraft, and the fire quickly burned a large hole through the roof in the B-737's forward cabin. Despite the ventilation provided by this opening, the fire fighter who brought the handline to the right front door could only advance a few rows toward the rear due to the intense fire and the limited flow from the single handline. About 10 min into the attack, fire fighters discharged 600 lb of Halon 1301 into the forward cabin. The halon had little or no effect on the cabin fire.

Several minutes into the incident, a fire fighter was extinguishing small fires under the B-737 when he found a propeller and aircraft engine. He brought this finding to the attention of his supervisor, and the control tower was contacted regarding the potential for a second aircraft. At approximately 6:14 pm, 6 min into the incident, the tower indicated that a Metroliner might be involved.

The fire continued to spread through the cabin, and at approximately 6:25 pm, the aft section, which included eight rows of seats, broke away and fell to the ground. Fire fighters who were on the right wing repositioned their handline in the resulting opening, and other fire fighters advanced a second handline into this same opening.

Fire fighters reported that all fires were extinguished approximately 20 min after they arrived on the scene. An estimated 20,000 gal of water, more than 1000 gal of AFFF concentrate, and 600 lb of Halon 1301 were used during suppression and overhaul operations.

While the fire suppression operations were in progress, Los Angeles Fire Department medical personnel established a primary triage area at the crash site and a secondary triage area for re-evaluation of survivors in a terminal building. The resources made available to the medical operations included fire rescue/ambulances, ten private ambulances, two task forces for personnel, and three air ambulances.² In addition, hospitals were contacted according to the local disaster plan, and several hospitals indicated that they would treat patients as necessary. Not all of the resources were necessary because only twenty-four of the survivors needed to be transported and treated at area hospitals.

Airport operations/police responded to the scene approximately 1-2 min into the incident and began establishing early perimeter control. Within 10-15 min airport operations/police responded to the scene with their mobile

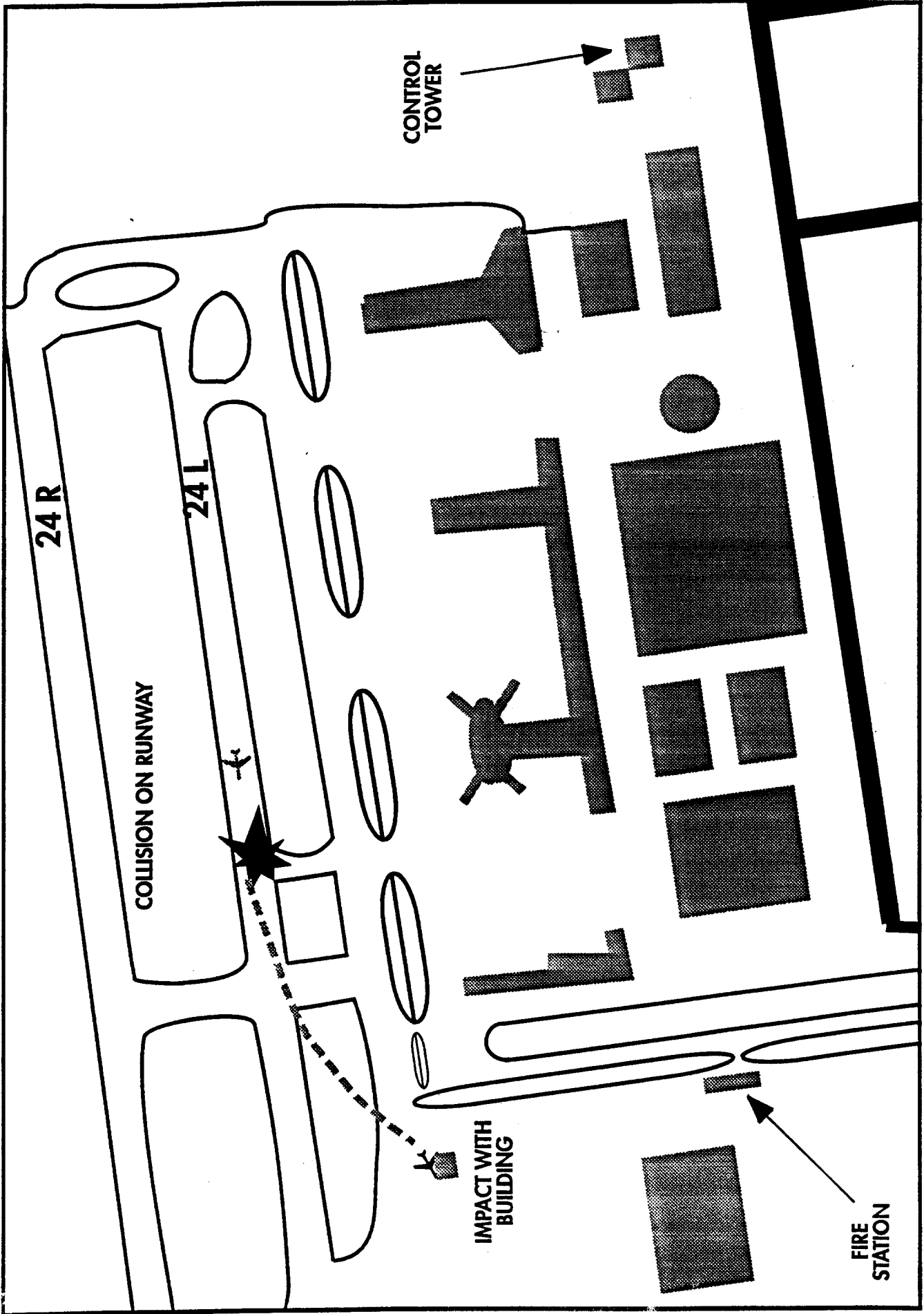
2 A "task force" consists of two engines, one ladder truck, and 10 fire fighters.

command post (large motor home) and co-located with the fire department's incident command post. Also within this time, a large airport bus (people mover) arrived on the scene to accommodate the survivors. These facilities allowed emergency personnel to gather the survivors together and to keep them in a "controlled environment" enhancing their safety.

The LAX incident showed that time was a critical element affecting the survival of people during this aircraft cabin fire. Fire entered the B-737 passenger cabin early in the incident and ignited the interior finish materials. Several exits on the B-737 were not usable, yet 40-50 survivors were able to escape in about one minute. In addition, twenty of the twenty-two victims on the B-737 were able to move from their seats toward exits before being overwhelmed by the rapidly growing fire and the combustion products that quickly filled the cabin.

The LAX fire fighters who responded to this incident were trained, were using state-of-the-art suppression equipment and agents, and recognized that the cabin fire was an immediate threat to anyone still in the B-737. However, time was required for the ARFF crews to respond and to begin suppression and rescue operations. Only 6 to 10 people were able to escape from the B-737 during the fire suppression and rescue operations. The rest of the people in the aircraft either escaped before the arrival of ARFF crews or were victims.

Since 1965 the NFPA Fire Investigations Division has documented eleven aircraft cabin fires, and several have resulted in the deaths of many passengers. The past incidents, as well as this most recent incident at LAX, show that interior cabin fires are an immediate threat to occupants and are difficult fires to suppress unless suppression is initiated during the incipient stage.



Collision and Impact Points, Los Angeles International Airport, February 1, 1991