

April 12, 1937.

Secretary Roper today made public the report of the Accident Board of the Bureau of Air Commerce in connection with the fatal air line accident at San Francisco, California, on February 9, 1937. The report is as follows:

REPORT OF THE ACCIDENT BOARD

Statement of probable cause concerning an accident which occurred to an aircraft of United Air Lines Transport Corporation at San Francisco, California, on February 9, 1937

To the Secretary of Commerce:

On February 9, 1937, at approximately 8:50 p. m. at a point in the Bay about 2 miles off shore from the San Francisco Airport, an airplane of United States registry while being flown as a part of scheduled interstate operation, carrying mail, passengers and express, met with an accident which resulted in death to all on board and the complete destruction of the aircraft.

The pilot, A. R. Thompson, held a Federal transport pilot's license and a scheduled air transport rating. His latest physical examination, taken on January 1, 1937, showed him to be in good physical condition and his license and rating were renewed on that date. The co-pilot, Joe DeCesaro, held a Federal transport pilot's license and a scheduled air transport rating. His latest physical examination, taken on November 30, 1936, showed him to be in good physical condition. The stewardess was Ruth Kimmel. The passengers were Mark Fontana, R. Margaron, J. A. Grennan and Gertrude Grennan, of San Francisco, J. F. Gilmore, H. D. Friedlander and M. Large of Los Angeles, and R. Meyer of New York.

The aircraft, a Douglas, model DC-3A, was inspected and approved for license by the Department of Commerce on December 3, 1936, and bore Federal license No. NC-16073. It was owned by the United Air Lines Transport Corporation and at the time of the accident was being operated on the Oakland Division of this Corporation as Trip No. 23, scheduled from Los Angeles to Oakland, California, with one stop, at San Francisco. This operation was conducted under a regular Federal letter of Authority.

The flight was cleared from the Union Air Terminal, near Los Angeles, on schedule at 7:00 p. m. and was due to arrive at the San Francisco Airport at 9:00 p. m. Good flying weather existed throughout the flight and nothing unusual was reported enroute. At 8:44 p. m., when the flight had approached to within approximately 10 miles of San Francisco, the crew radioed to the control tower operator at the airport giving their position and requesting surface winds and directions for landing. The control tower replied that the wind was practically calm and requested the pilot to land south to north, which in effect meant to use the North-South runway. The crew acknowledged these directions.

At 8:47 p. m., when approximately 3 miles from the airport, the crew again contacted the control tower stating that they would use the East-West runway. The control tower operator immediately acknowledged this message giving his approval. This was the last radio contact with the flight. However, the airplane was in sight of several witnesses on the airport from that time on.

The airplane was observed to fly over the airport at an altitude estimated by several witnesses to be between 400 and 500 feet. When just over the airport, the airplane started a wide turn to the right and out over the Bay, which, if completed, would have described a complete circle over the water and placed it in position for a direct approach to the East-West runway on the airport. The accident occurred before this turn was completed and witnesses vary in their impressions as to whether the turn to the point of accident was continuous or made up of two distinct turns.

While in the turn and flying at an altitude of approximately 400 feet, the airplane was observed to assume a descending angle, estimated to be between 35 and 40 degrees, which continued up to the time of striking the water. The total time for this descent was estimated to be four seconds. One witness believed that the airplane was banked at quite an angle during this descent and the subsequent damage appears to bear this out.

The evidence indicates that the right wing of the airplane contacted the water first and was torn off almost simultaneously with the right propeller, engine and a portion of the right nacelle structure. The propeller was found about 75 feet to the rear of the engine and the wing parts, which were scattered about the vicinity in a radius of approximately 800 feet. The main body of the airplane was found approximately one mile away from this point in the direction of a four mile per hour tide which was running at the time. Most of the wreckage was recovered through dragging operations which lasted over a period of three weeks.

A detailed investigation of this wreckage showed no evidence of failure of the air of the airplane structure, engines or propellers. The separation of the right propeller from the engine and the engine from the wing was proven beyond a reasonable doubt to be the result of the impact with the water. The condition of both propellers and both engines indicates that they were rotating and operating normally at the time of contact with the water, either under their own inertia while slowing down, or, in any event, at low power. The master switch was found to be in the "off" position. This could have moved as a result of the accident or during the salvage operations but it appears more likely that the switch was pulled to the "off" position by the pilot just prior to striking the water.

The control system was carefully investigated and no failures or broken cables or damaged parts were found which were not readily traceable to impact at the time of the accident, with one exception. Both control wheels were found to be dished away from their hubs in the direction of the pilots. From the manner in which the upper part of the pilot's cockpit was pushed in, this might conceivably have resulted from impact. It more strongly suggests, however, that the combined efforts of the two pilots had been used in an effort to pull back on the elevator control to overcome some malfunctioning of the elevator control system. A most careful inspection of the entire control system, however, failed to disclose any jamming or malfunctioning of the system itself and no foreign objects, not easily accounted for as a result of impact, were found interfering with these controls.

The two radio microphones were recovered within the pilot's cockpit but were not found in any position to suggest their having interfered with the control of the airplane in any way. Further investigation, however, showed marks

on the co-pilot's microphone, the seat rail support, the canvas boot around the control column and on the control column itself, which suggested that this microphone had been squeezed between the column and the seat support. Also, a small piece of bakelite from a microphone casing was found wedged between the metals adjacent to the seat rail support. Placing the microphone in the position indicated by these marks prevented the control column from being brought back to full neutral position, which meant that under this condition the nose of the airplane could not be raised to a level flight position. Other marks on the control column indicate that after finding the elevator control jammed and applying pressure in an effort to overcome this, the pilot momentarily released this pressure with the result that the microphone assumed a new position, blocking the control beyond a neutral position. Tests made with other airplanes and microphones of like models proved that the control system could be so jammed and that the combined pull of both pilots could not relieve the jam.

The piece by piece recovery of the wreckage of the airplane over an extended period of time gave rise to many theories as to the cause of the accident. A careful study of the completely assembled evidence, however, disproved most of these theories. It is not known why the pilot, after acknowledging instructions from the control tower to land on the North-South runway, elected, when nearly to the airport, to land on the East-West runway. There is nothing, however, to indicate that the flight was in any trouble at this time. The abnormally rapid descent of approximately 400 feet in four seconds precludes any possibility of the pilot having dragged a wing in the water through misjudging his elevation. A study of the wreckage indicated beyond a reasonable doubt that there was no structural failure of the aircraft, power plant or controls. The steepness of the descent and the manner in which the airplane first struck the water is an indication of sudden loss of elevator control. It also suggests a quickly executed emergency maneuver on the part of the pilot in using his remaining controls to place the airplane in a striking position most favorable to his passengers. The microphone, lodged between the elevator control column and the seat rail support, would create just such an emergency. The relatively low altitude at which the airplane was flying prevented any maneuvering and permitted no time for an examination to determine and remove the cause of the trouble.

It is the opinion of the Accident Board that the probable cause of this accident was accidental jamming of the elevator controls as the result of a microphone being inadvertently dropped and lodging in such a position that the crew was unable to prevent rapid descent of the airplane.